High Precision Digital Rain Gauge

with Indoor Temperature and Humidity

Model: WH5360B

Thanks for your purchasing of the WH5360B High Precision Digital Rain Gauge with indoor temperature and humidity. To ensure the best product performance, please read this manual and retain it for future reference.

Note: The stainless steel pole for the rain gauge is not included.

1 Table of Contents

2 Unpacking

Open your rain gauge 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	Rain gauge sensor
1	U-Bolts set for mounting on a pole (2pcs)
1	Threaded nuts for U-Bolts set (M5 size) (4pcs)
1	Metal mounting plate set to be used with U-Bolts
1	Stainless steel filter (for rain collector)
1	User manual (this manual)

Table 1: Package content

If any component is missing from the package, or broken, please contact our Customer Service department to resolve the issue.

3 Set up Guide

Note: We suggest you assemble all components of the rain gauge, including console in one location so you can easily test functionality. After testing, place the rain sensor 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 console.

Attention:

- Follow the suggested order for battery installation (outdoor sensor first, console last).
- Ensure batteries are installed with correct polarity (+/-).
- Only use new batteries for all battery-operated sensors.

3.1 Site Survey

Location of the outdoor sensor 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 rain sensor. Consider the following:

- 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.

Note: If the rain gauge sensor was mounted less than 3.3 feet or 1 meter above the ground, the electromagnetic waves would be absorbed by the earth when raining. Which may cause inaccurate rainfall data transmitting.

3.2 Rain Gauge Sensor Set Up and Installation

See Figure 1 to locate and understand all the parts of the rain gauge sensor once fully assembled.

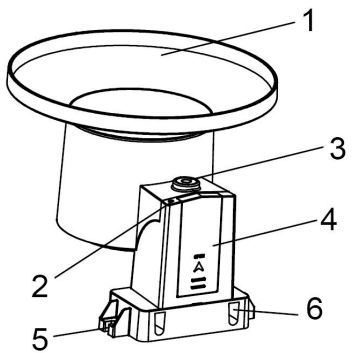


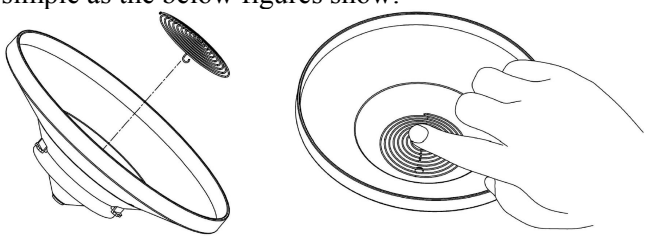
Figure 1: Sensor assembly components

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

Table 2: Sensor assembly detailed items

3.2.1 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 as simple as the below figures show:



Hook the filter hook on the edge of the rain collector to install the filter(as the figure 2 shows on the left).

Take out the filter hook from the edge to uninstall the filter(as the figure 2 shows on the right).

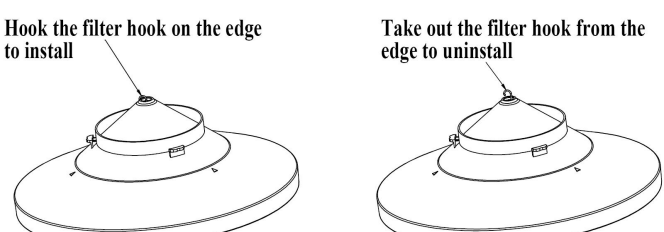


Figure 2: Rain gauge filter in/un-installation diagram

3.2.2 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 3. 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!

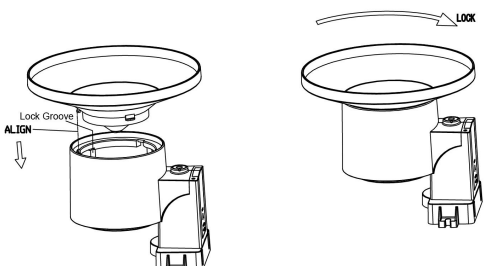


Figure 3: Rain collector top installation diagram

3.2.3 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.

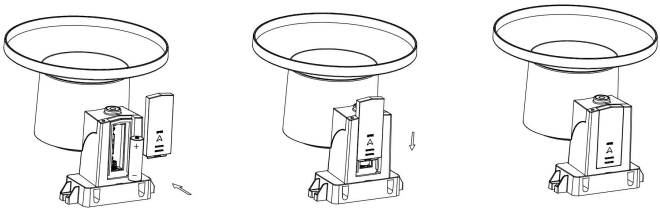


Figure 4: Rain gauge sensor battery installation diagram

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 batteries backwards. You can permanently damage the outdoor sensor.

Lithium batteries are recommended for the best performance. 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.

3.2.4 Mounting

3.2.4.1 Before you mount

Before proceeding with the outdoor mounting detailed in this section, you may want to skip to setup instructions in section 3.4 and onwards first, while you keep the assembled rain gauge sensor nearby (although preferably not closer than 5 ft. from the display console). This will make any troubleshooting and adjustments easier and avoids any distance or interference related issues from the setup.

After setup is complete and everything is working, return here for outdoor mounting. If issues show up after outdoor mounting they are almost certainly related to distance, obstacles etc.

3.2.4.2 Mounting with U-bolts

The mounting assembly includes two U-Bolts and a bracket that tightens around a 1-2" diameter pole(not included) using the four U-Bolt and nuts.

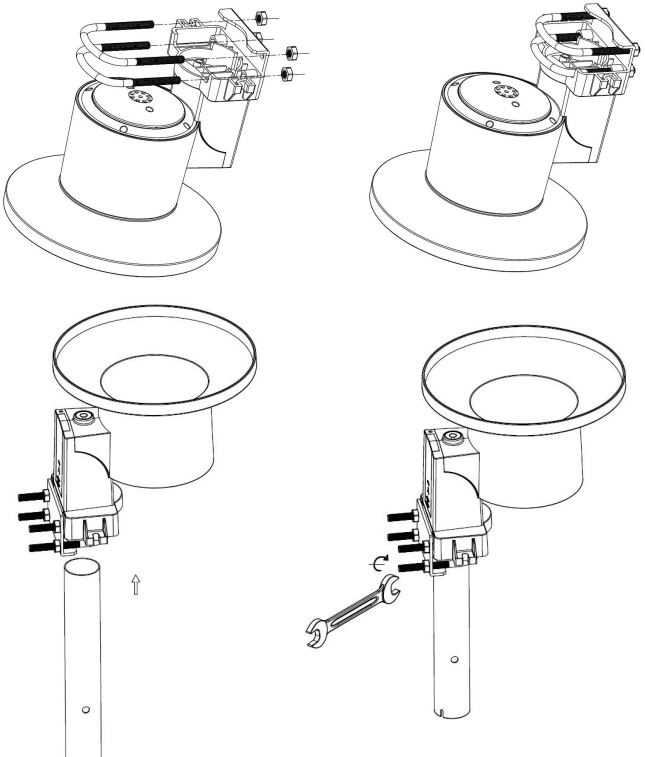


Figure 5: Rain gauge installation with U-bolts

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

3.2.4.3 Mounting with screws

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

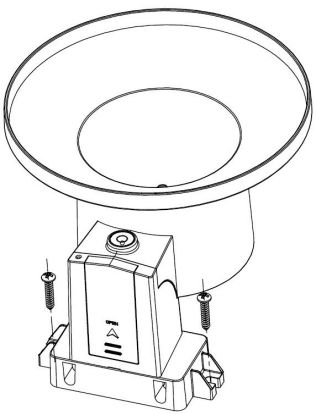


Figure 6: Rain gauge sensor mounting with screws installation diagram

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.

3.3 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 and the console:

- **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 console several feet away from computer monitors and TVs.
- **Radio Frequency Interference (RFI).** If you have other devices operating on the same frequency band as your indoor and/or outdoor sensors and experience intermittent communication between sensor and console, try turning off these other devices for troubleshooting purposes. You may need to relocate the transmitters or receivers to avoid the interference and establish reliable communication. The frequencies used by the sensors are one of (depending on your location): 433, 868, or 915 MHz (915 MHz for United States).
- **Line of Sight Rating.** This device is rated at 300 feet line of sight (under ideal circumstances; no interference, barriers or walls), but in most real-world scenarios, including a wall or two, you will be able to go about 100 feet.

- **Metal Barriers.** Radio frequency will not pass through metal barriers such as aluminum siding or metal wall framing. If you have such metal barriers and experience communication problems, you must change the placement of sensor package and or console.

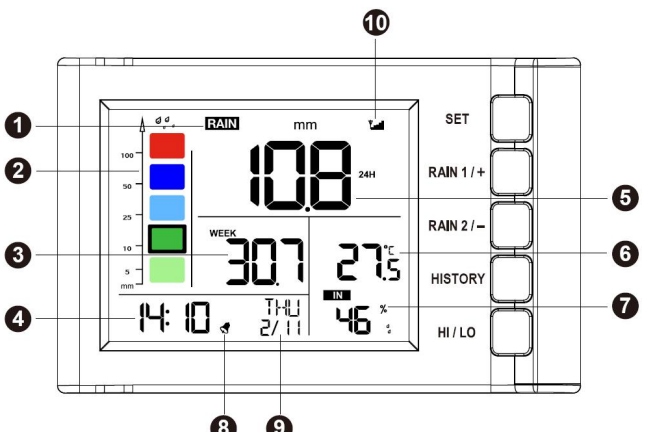
The following table shows different transmission media and expected signal strength reductions. Each "wall" or obstruction decreases the transmission range by the factor shown below.

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

Table 3: RF Signal Strength reduction

3.4 Console Display

See Figure 7 to help you identify elements of the console's display screen.



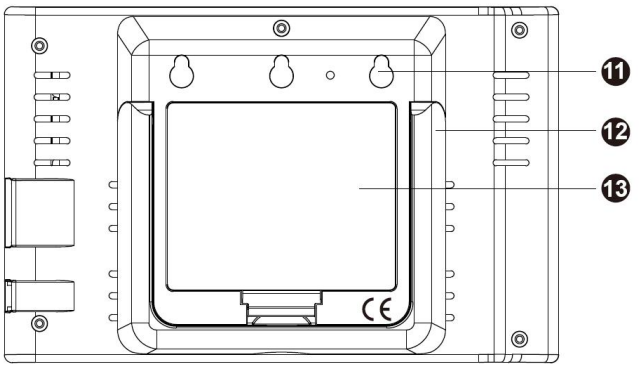


Figure 7: Display Console Screen Layout

1. Rainfall data display	8. Alarm icon
2. Rainfall grade graph	9. Date/Week
3. Rainfall of day/week/month/year display	10. Signal icon
4. Time	11. Wall-mounted hole
5. Rain rate/event/1h/24h display	12.Table stand
6. Indoor temperature	13. Battery door
7. Indoor humidity	

Table 4: Display console detailed items

3.4.1 Initial Display Console Set Up

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

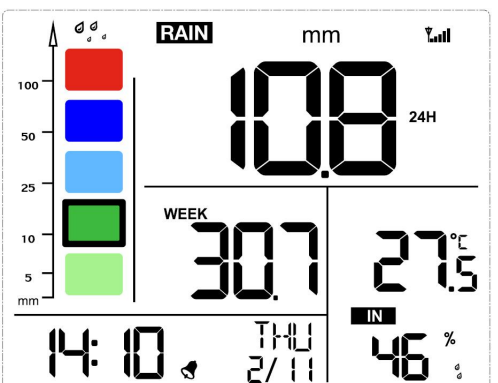


Figure 8: Console Normal Display

3.4.2 Key functions

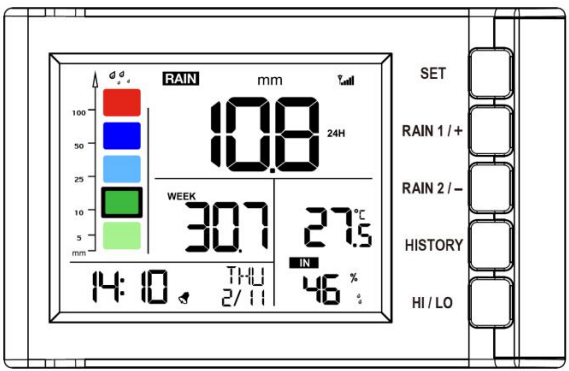


Figure 9: Buttons next to the display

There is a set of five keys on the right side of the display console. The following tables briefly explains the function of these keys.

Button	Description
SET	enter the setting mode
RAIN 1/+	display RATE, EVENT, 1H, 24H (normal mode) or + (programming mode)
RAIN 2/-	display DAY, WEEK, MONTH, YEAR, TOTAL(normal mode) or– (programming mode)
HISTORY	display history records / return to normal mode
HI/LO	display the MAX, MIN value (normal mode) / Set Alarm (hold the HI/LO button to enter setting alarm mode)

Table 5: Console buttons

3.4.3 Normal Mode

While in normal display, press the **RAIN 1**/+ button to alternate the display of:

- Display rain rate
- Display rain event
- Display rainfall total of 1h
- Display rainfall total of 24h

Note: Hold the button **RAIN 1**/+ over 5s will clear the current rainfall data displayed.

While in normal display, press the **RAIN 2**/+ button to alternate the display of:

- Display rainfall of day
- Display rainfall of week
- Display rainfall of month
- Display rainfall of year
- Display rainfall of total

Note: Hold the button **RAIN 2**/+ over 5s will clear the current rainfall data displayed.

3.4.4 Setting Mode

While in normal display, hold the button **SET** for 2 seconds to enter Setting Mode. The first setting will begin flashing. You can press the **SET** button again to skip any step, as defined below.

- Beep on/off
- 12/24 hour format
- Manual time setting (hours/minutes)
- Date format setting(D-M/ M-D)
- Date setting(year/month/day)
- Temperature unit setting(°C/°F)
- Rainfall unit setting(mm/in)
- Calibration mode

Note: In the setting mode, press **RAIN1/+** or **RAIN2/-** buttons to change or scrolls the value. Hold the button for 2 seconds can change rapidly.

The setting mode will return to normal display while idle for 15s or by pressing the button **HISTORY.**

3.4.5 Calibration Mode

While in Calibration mode, press **RAIN1/+** or **RAIN2/-** buttons can change the calibration coefficient (range: 0.1-5.0; default: 1.00). Hold the button for 2 seconds can change rapidly.

Before you calibrate the coefficient, please read the following first:

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 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 cm2, you get 353/250 = 1.412 cm = 14.1 mm.
3. Compare the rain readings from your console 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 his 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.

Simple way to check the accuracy

1. Take off the rain collector top.
2. Hit the spoon shaped part inside the bucket for 10 times (hit once every 2 second) and see whether it will register 1.0mm on the console after 5 minutes.

3.4.6 Rain History Mode

While in normal display, press the button **HISTORY** once to enter Day Rain History Mode, press **HISTORY** button twice will enter Month Rain history view mode;

Press the button **RAIN1/+** or **RAIN2/-** will scroll the display of history rainfall data records by days or month.

3.4.7 MIN/MAX Mode

While in normal display, press the button **HI/LO** to alternate the following max/min records with timestamp:

- Indoor temperature Max
- Indoor temperature Min
- Indoor humidity Max
- Indoor humidity Min

Note: Hold the button **RAIN2/-** over 5s will clear the current max/min records with timestamp displayed.

The setting mode will return to normal display while idle for15s.

3.4.8 Alarm Mode

While in normal display, hold the **HI/LO** button for 2 seconds to enter Alarm Setting Mode. You can press the **HI/LO** button again to skip any step, as defined below.

- Time alert ON/OFF;
- Time alert value setting(hour/minute);

- Rainfall Rate HI alert ON/OFF;
- Rainfall Rate HI alert value setting;
- Rainfall Event HI alert ON/OFF;
- Rainfall Event HI alert value setting;
- Indoor temperature HI alert ON/OFF;
- Indoor temperature HI alert value setting;
- Indoor temperature LO alert ON/OFF;
- Indoor temperature LO alert value setting;
- Indoor humidity HI alert ON/OFF;
- Indoor humidity HI alert value setting;
- Indoor humidity LO alert ON/OFF;
- Indoor humidity LO alert value setting;

Note: In the alarm setting mode, press **RAIN1/+** or **RAIN2/-** buttons to change or scrolls the value. Hold the button for 2 seconds can change rapidly.

When the alarm value is reached, the corresponding alarm icon will flash and the buzzer will ring for 2min. The ringing can be stopped by pressing any button.

The setting mode will return to normal display while idle for 15s or by pressing the button **HISTORY.**

3.4.9 Factory Reset/Clear Memory

While in normal display, hold the button **SET** and **HI/LO** at the same time and power up the display will reset the device to Factory Mode. All previously setting values will be reset to its default.

While in normal display, hold the button **RAIN1/+** and **RAIN2/-** for 5s, will register the transmitter signal for 3 minutes.

4. Features

a) Date

- Calendar (Month/date,2017-2099 Default Year 2017)
- 12/24 hr format selected
- Alarm clock

b) Indoor temperature and humidity

- Every 60 second the unit will measure indoor temperature and humidity.

- Indoor temperature and humidity MAX,MIN records with timestamp
- Temperature/humidity high/low alert

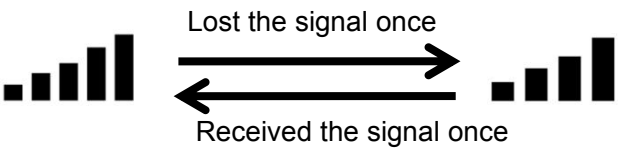
c) Rain

- Every 49 second the unit will receive wireless rain sensor.
- Rain1 record view: RATE,EVENT,1H,24H.
- Rain2 record view: DAY, WEEK, MONTH, YEAR, TOTAL
- Rain1 (Rate, Event, 1h, 24h rain data) against graph display
- Rain Rate/Event alert

d) Rainfall history (24 monthly rain history and the 730 days having rain rainfall records)

e) 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.

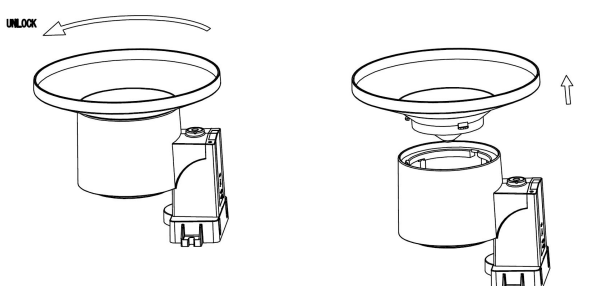


5. Maintenance

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.



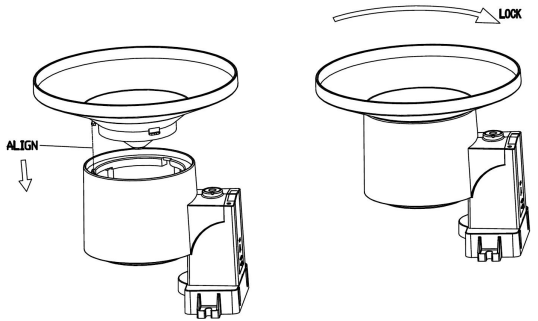


Figure 10: Rain gauge maintenance

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 rain collection top, to prevent snow build up.

6. Troubleshooting Guide

Problem	Solution
Wireless remote (outdoor unit) not reporting in to console. There are dashes (--) on the display console.	Check the remote-transmitter LED for flashing. The outside sensor has an LED under the plastic, just above the battery compartment. The LED will flash every 49 seconds. If the LED is not flashing every 49 seconds, replace the batteries in the outside sensor. If the batteries were recently replaced, check the polarity. If the sensor is flashing every 49 seconds, proceed to the next step. There may be a temporary loss of communication due to reception loss related to interference or other location factors, or the batteries may have been changed in the remote and the console has not been reset. The solution may be as simple as **powering down and up the console**.

Problem	Solution
	1. Make sure you have fresh batteries in the display console. 2. With the sensor array and console 10 feet away from each other, remove the batteries from the display console and wait 10 seconds. Put the batteries back in. 3. Do not touch any buttons for several minutes. 4. If the rainfall data is still showing dashes (--) after 3 minutes, the remote sensor is defective. If the sensor properly syncs up, proceed to the next step “How to prevent intermittent wireless communication” **How to prevent intermittent wireless communication issues:** 1. Install a fresh set of batteries in the remote sensor array and console. For cold weather environments, install lithium batteries. 2. The maximum line of sight communication range is 300" but most users will get 100" or less due to environmental conditions. Move the sensor and remote closer together.

Problem	Solution
	3. If the sensor assembly is too close (less than 5'), move the sensor assembly away from the display console. 4. Make sure the remote sensors are not transmitting through solid metal like aluminum siding (acts as an RF shield), or earth barrier (down a hill). 5. Move the display console around electrical noise generating devices, such as computers, TVs and other wireless transmitters or receivers. 6. Move the remote sensor to a higher location. Move the remote sensor to a closer location.
Temperature reads too high in the day time.	Make sure the console is placed in a shaded area on the north facing wall.
Display console contrast is weak	Replace console batteries with a fresh set of batteries.

7. Specifications

Outdoor data

Measuring interval: 49 sec

Transmission distance in open field: 100m(300 feet)

Frequency: 915/433/868MHz(North America: 915MHz)

Indoor data

Measuring interval: 60s

Rain fall measuring range: 0--6000mm; Accuracy: ±5%

Indoor temperature range: 0˚C--50˚C (32℉ to + 122℉)

Accuracy: ± 1°F/±0.5°C.

Indoor humidity measure range: 10% to 99%.

Accuracy: +/- 6% RH (@25°C. , 30%RH to 80%RH)

Accuracy: +/- 5% RH (@25°C. , 1%RH to29%RH；80%RH to 99%RH)

Power consumption

Base Station: 3xAA Alkaline batteries (not included)

Outdoor sensor: 1xAA lithium batteries (not included)

Battery life: Minimum 12 months for base station

Minimum 12 months for outdoor sensor

8. Warranty Information

We disclaim any responsibility for any technical error or printing error, or their consequences.

All trademarks and patents are recognized.

We provide a 1-year limited warranty on this product against manufacturing defects in materials and workmanship.

This limited warranty begins on the original date of purchase, is valid only on products purchased and only to the original purchaser of this product. To receive warranty service, the purchaser must contact us for problem determination and service procedures.

This warranty covers only actual defects within the product itself, and does not cover the cost of installation or removal from a fixed installation, normal set-up or adjustments, claims based on misrepresentation by the seller or performance variations resulting from installation-related circumstances.