

WS033T Ultrasonic Depth Meter

User Manual

2.1 Parts List

QTY	Item	Image
1	Ultra-sonic Depth Meter (WS033T) (100mm)L*(105mm)W*(138mm)H LCD Dimensions 45mm*45mm Solar panel size 60mm*60mm	
2	Lag Screws for Mounting to horizontal plastic surface M4*30mm(L)	
1	Manual	

2.2 Recommend Tools

1. Screwdriver (for transmitter)
2. Hammer and nail for hanging display console.

2.3 Ultra-sonic Depth Meter Sensor Set Up



Note: Do not use rechargeable batteries due to the lower voltage. We recommend fresh alkaline batteries for outdoor temperature ranges between -20 °C and 60 °C and fresh lithium batteries for outdoor temperature ranges between -40 °C and 60 °C. For best results, do not mix battery types or brands.

1. Remove the battery door on the base of the sensor by the finger, as shown in Figure 2 .
2. Insert 4 x AA batteries into the battery box, observing the correct polarity.
3. Close the battery door. Make sure that the gasket (around the battery compartment) is properly seated in its trace prior to closing the door.
4. Check the LED and LCD. The sensor LED indicator (lens cover) will light for 3 seconds, and then flash once per 30 seconds thereafter. Each time it flashes, the sensor is transmitting data.

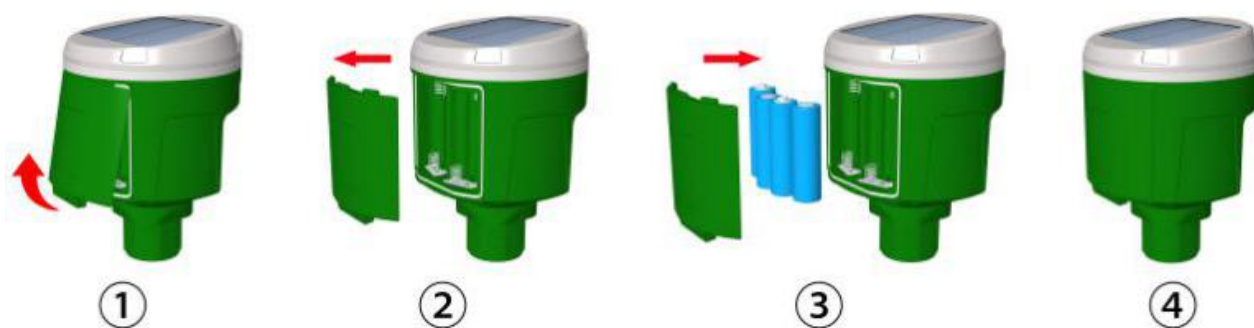


Figure 2



Figure 3

2.3.1 Display Transmitter Layout

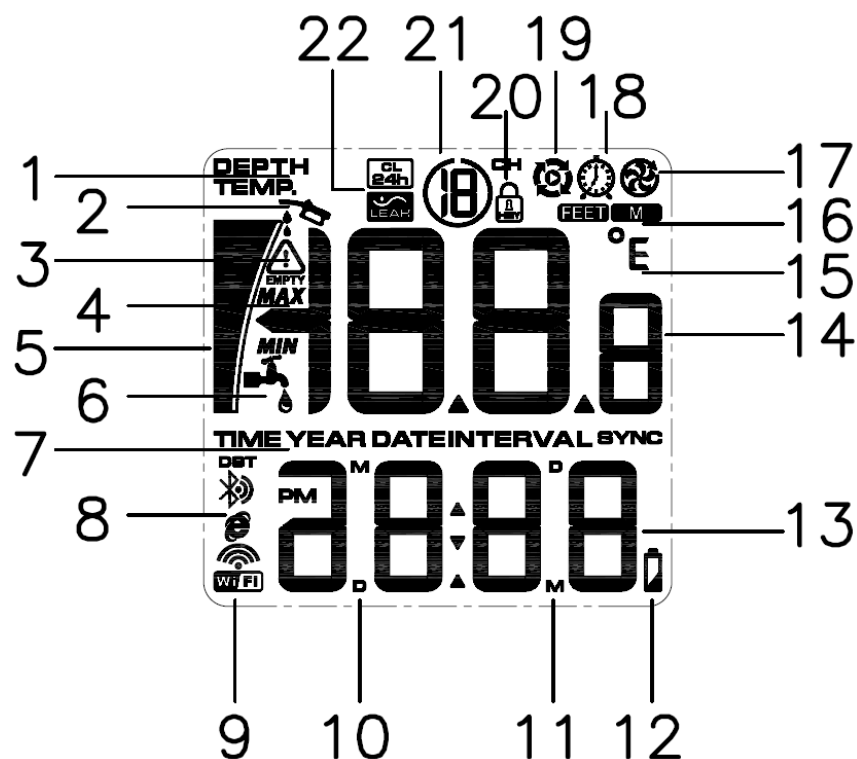


Figure 4

1. Depth or temperature icon of Tank 2. Import Pump icon (optional) 3. Empty alert icon 4. Min/Max icon for temp and depth display 5. Water level 10 element bar graph 6. Export Pump icon (optional) 7. Time, date and year indicator icon 8. Bluetooth network signal icon (optional) 9. WiFi network signal icon (optional) 10. Date display 11. Month display	12. Transmitter Low power indicator 13. Time, date or year (alternative) 14. Depth or temperature value display 15. Temperature units (°F or °C) 16. Depth units (Feet or Meter) 17. Auto mode indicator for pump (optional) 18. Timer mode indicator for pump (optional) 19. Manual mode indicator for pump (optional) 20. Lock KEY mode indicator 21. Channel 1-8 display 22. Min/Max reset for 24h and water leak icon
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2.3.2 Sensor Operation

Quick Display Mode



Note: The display transmitter has five keys for easy operation: **MAX/MIN/-** key, **Tank** key, **SET** key, **CHANNEL/+** and **TX** key.

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

- ◆ Once for time, date and year display,

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

- ◆ Once for depth and temperature value display,

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

- ◆ Once for Maximum and Minimum value display,

While in Normal Mode, press (do not hold) the **TX** key to test and transmit the temperature and liquid depth for one times.

When the sensor unit is powered up, the LCD display activates for 3 seconds.



Figure 5

Secondly, the unit displays the type number of transmitter for 2 seconds. (The type number is to identify the specific version of model in our product series. A0010F in below display is only a sample. Your unit does not necessarily displays this way.)



Figure 6

Then the unit displays the unique Device ID of transmitter for 2 seconds. (A808 in below display is only a sample. Your unit does not necessarily displays this way.)



Figure 7



NOTE: It is important that no transmitters with same channel number are nearby during pairing with receiver. When there are more than one transmitters with same channel number within receiving range, the receiver sticks to the one whose signals are synchronized first. The synchronized transmitter ID can be checked on receiver. Up to 8 transmitters with different channel numbers can be connected to one receiver.

Setting tank Depth and the Air Gap

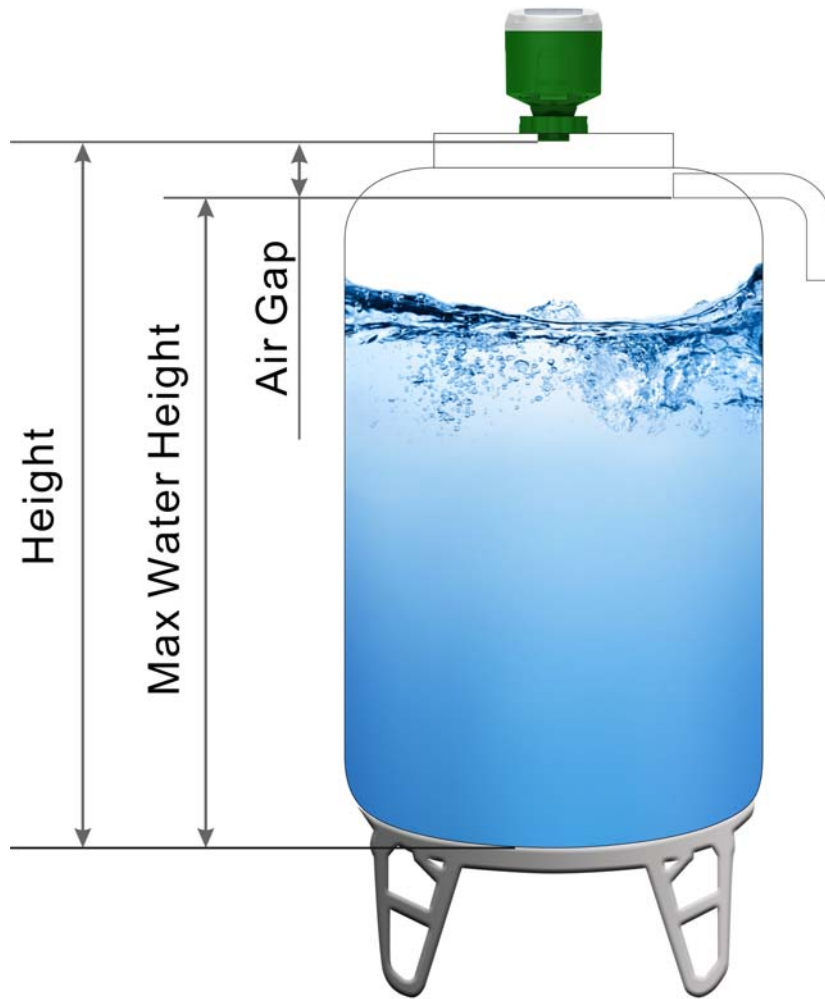


Figure 8

Then, the unit displays tank depth(**HEIGHT**) setting mode(Only for the first time of powering).



Figure 9

Display of "2.00"(default) and empty level flashes (Figure 8) . Press **MAX/MIN/-** key or **CHANNEL/+** key to increase or decrease depth. Press and hold **MAX/MIN/-** key or **CHANNEL/+** key to increase or decrease tank depth at greater step.

- **NOTE:** Tank depth is the distance between the bottom of the transmitter to the maximum fluid level of liquid. Tank depth range is 0.01M(min)~5M(max).

If tank depth is not set within 30 seconds or press the TX key the unit will switch to normal display mode automatically. (Don't set the tank depth and air gap under normal working condition).

Finally, the unit displays Air Gap setting mode.



Figure 9a

Display of "0.00"(default) and full level flashes (Figure 9a) . Press **MAX/MIN/-** key or **CHANNEL/+** key to increase or decrease air gap. Press and hold **MAX/MIN/-** key or **CHANNEL/+** key to increase or decrease air gap at greater step.

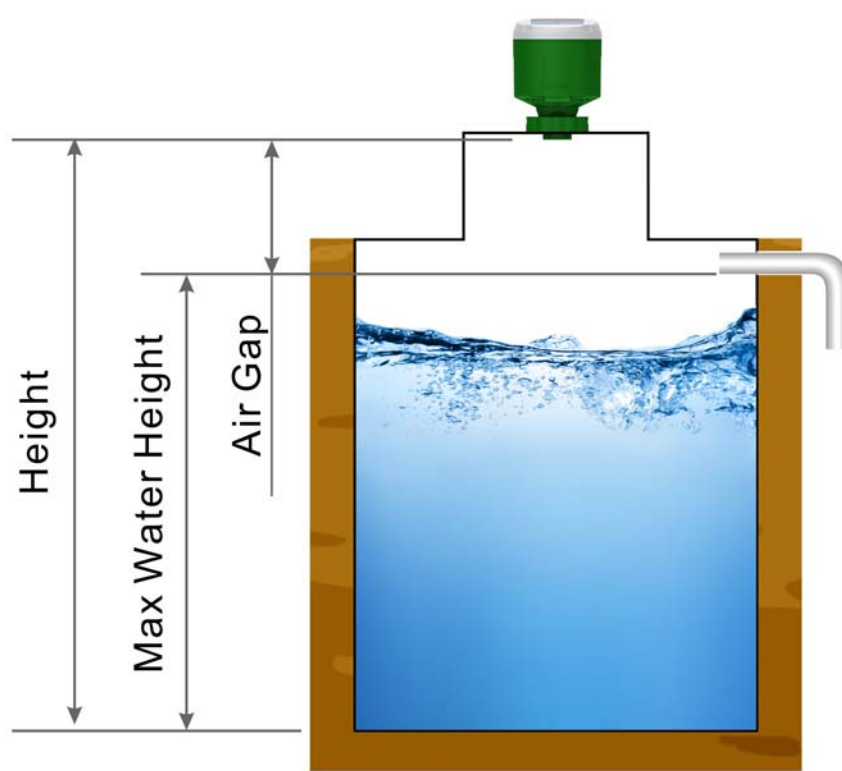


Figure 9b

- **Air Gap:** Distance between where tank unit is installed and the maximum fluid level.

If you miss this steps or want to correct it, you can set it later as follows.

In normal operation mode, press and hold **SET** and **TANK** keys for 5 seconds until tank depth and air gap value starts flashing. Press **MAX/MIN/-** key or **CHANNEL/+** key to increase or decrease depth. Press and hold **+ /MAX/MIN** key or **CHANNEL/+** key to increase or decrease tank depth at greater step.

Make sure not to immerse the sensor into liquid.

In normal display mode:

Press and hold **SET** key for 3 seconds to enter program menu.

- 12/24H: 12Hr or 24Hr will flash. Press +/**MAX/MIN** key or **CHANNEL/+** key to select 12H or 24H. Press SET key to move to hour setting.
- HOUR: Hour value will flash. Press **MAX/MIN/-** key or **CHANNEL/+** key to increase or decrease hour value. When hour value is set press SET key to set minute value.
- MINUTE: Minute value will flash. Press **MAX/MIN/-** key or **CHANNEL/+** key to increase or decrease minute value. When minute value is set press SET key to set date format.
- DATE FORMAT: Date format will flash. Press **MAX/MIN/-** key or **CHANNEL/+** key to select date format of Month-Day or Day-Month. When data format is set press SET key to set month (in month-day format) or date (in day-month format).
- MONTH: Month will flash. Press **MAX/MIN/-** key or **CHANNEL/+** key to increase or decrease month (date). After month is set press SET key to set date (month).
- DATE: Date will flash. Press **MAX/MIN/-** key or **CHANNEL/+** key to increase or decrease date (month). After date is set press SET key to set year.
- YEAR: Year will flash. Press **MAX/MIN/-** key or

CHANNEL/+ key to increase or decrease year. After year is set press SET key to set depth unit.

- Level unit will flash. Press **MAX/MIN/-** key or **CHANNEL/+** key to select water level unit of Feet or Meter. After press SET key to set temperature unit.

- Temperature unit will flash. Press **+ /MAX/MIN** key or **CHANNEL/+** key to select temperature unit of C or F. After temperature unit is set press SET key to set MIN/MAX record format.

- CL24h no/off icon will flash, Press **MAX/MIN/-** key or **CHANNEL/+** key to select DAILY CLEAR icon on/off (The Max/Min can be programmed to clear daily (at midnight) or manually), press SET key to exit

◆ Set Up Channel Number

In the Normal mode, press and hold the **CHANNEL/+** key for 3 seconds, the channel number will flash (the default is CH1).

Then press the **CHANNEL/+** key or **MAX/MIN/-** key to adjust the channel number from 1 to 8
After press SET key to exit.

If channel number is changed during working with display console, you need to re-synchronize to get the correct channel number and readings on the display console.

◆ CHECK AND RESET MIN/MAX VALUE

- In normal display mode press **MAX/MIN/-** key once to check the max value of level or sensor temperature.
- Press **MAX/MIN/-** key again to check the min value of level or sensor temperature (press the **Tank** key to switch).
- Press **MAX/MIN/-** key again to exit.

- In the MIN/MAX mode, when min/max icon and min/max values are displayed, press and hold the **MAX/MIN/-** key for 3 seconds (the CLR will display in time area), the min/max records will be reset to current value.

◆ Locking Keys

- In normal display mode, press and hold **TANK** and **TX** key at the same time for five seconds to lock keys

to prevent the operation mistakes (The LOC icon  will remain display). After the keys are locked, all key operations become invalid.

Press and hold **TANK** and **TX** key for 5 seconds again to unlock keys. (The **UNLOC** letter will display for 3 seconds)

2.3.3 Remote Sensor Installation

1. Drill a hole in the place that you have selected on the tank's top surface using a 35mm hole-saw. (Figure 10)

2. Remove cap from the hole and insert transmitter base, ensuring the weather seal is securely in place (Both side of Cap).
3. Tighten the transmitter base on to the tank with 2 stainless steel self-tapping, counter sunk screws supplied. Do not over tighten!
4. Screw the transmitter into the base. Ensure the transmitter is vertical on top of the tank and level. Ensure that the transmitter unit is screwed correctly into the base and that the threads have not crossed, to give a secure seal.

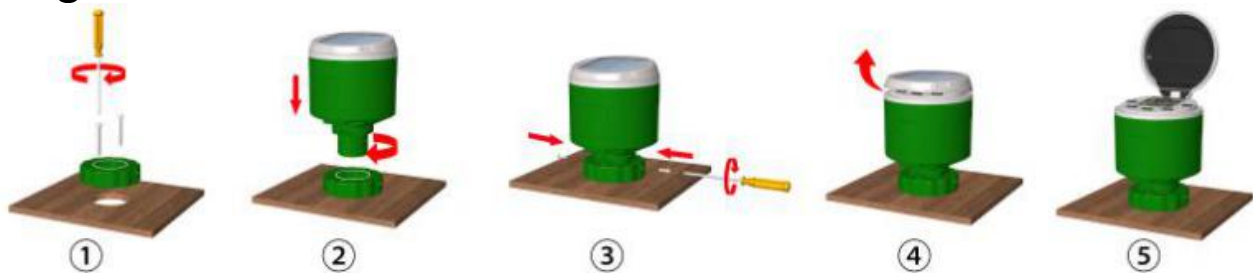
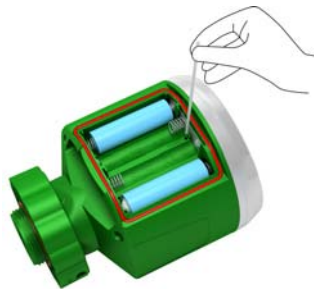


Figure 10

Height does not include the base/piers which tank sits on.



Press the RESET button in the battery case if the unit can not work.

 **Note:** Hold the **MIN/MAX/-** key and install the battery simultaneously, the RES will display and restore to factory default settings.

2.3.4 Set Up Sketch

The following picture illustrates transmitter installation:

- 1.Solar Panel
- 2.Battery
- 3.Screw
- 4.Bracket
- 5.Sonic sensor
- 6.Tank

NO	R(m)	H3(m)
1	0.1	≤ 1
2	0.2	≤ 3
3	0.3	≤ 5

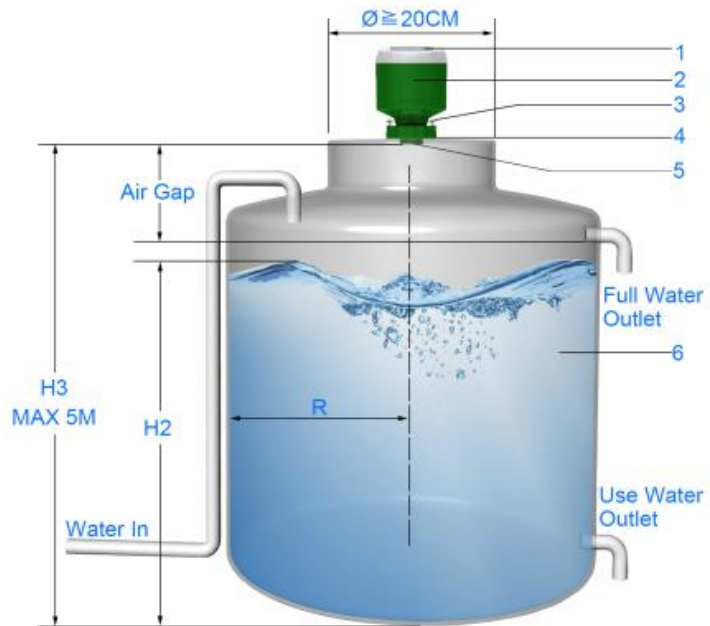


Figure 11

Please pay attention to the following issues in installation:

- 1) The distance between transmitter bottom and highest liquid surface must be 0.01m or more(Air Gap).
- 2) The maximum depth the unit can measure is 5m (16.4ft).
- 3) Observe the balance bubble on the sensor to ensure it is installed at a level horizontal position.

Examples of Wrong Installation

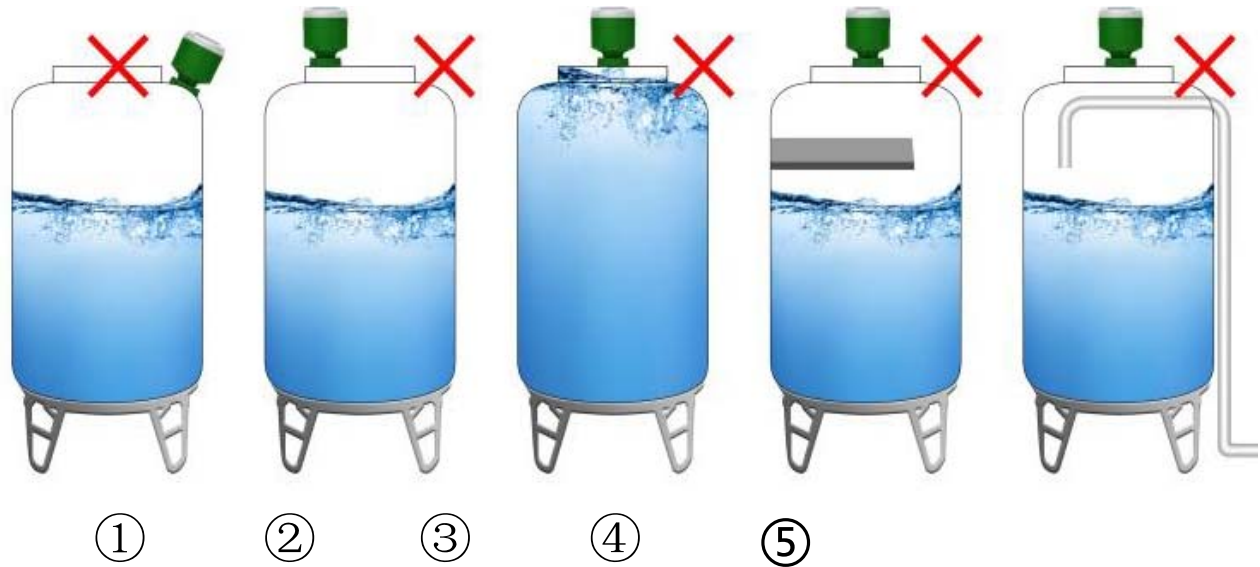


Figure 12

- 1) The sensor is not installed at a level horizontal position.
- 2) The sensor is too close to the TANK wall.
- 3) The transmitter bottom is immersed into liquid.
- 4) There are solid objects in the tank.
- 5) There are pipes of inlet or outlet in the tank.



2.3.5 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 868 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 f(100m) line of sight (no interference, barriers or walls) but typically you will get 100 f(30m) maximum under most real-world installations, which include passing through barriers or walls.

Figure 13

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
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Glass (untreated)	5-15%
Plastics	10-15%
Wood / Brick	10-40%
Concrete	40-80%
Metal	90-100%

7.Specifications

7.1 Wireless Specifications

- Line of sight wireless transmission (in open air): 150m(500 feet), 30m (100 feet)under most conditions.
- Update Rate: 30 seconds or 3mins (When the current measurement value changes by more than 0.03m compared to the previous one, it updates after 30 seconds, otherwise, it will be update after 3 minutes.)

7.2 Measurement Specifications

The following table provides specifications for the measured parameters.

Measurement	Range	Accuracy	Resolution
Indoor Temperature	0 to 60 °C (32 to 140°F)	± 1 °C (± 2°F)	0.1 °C(°F)
Outdoor Temperature	-40 to 60 °C (-40 to 140°F)	± 1 °C (± 2°F)	0.1 °C(°F)
DEPTH	0 – 5m(16.4feet)	+/- 0.03m(0.09feet)	0.01m(0.01feet)

7.3 Power Consumption

2) Depth transmitter:

- 4 x AA 1.5V batteries (Not included)
- Life: Minimum 24 months
- **Note:** Solar panel doesn't charge the battery and it is an auxiliary power supply

FCC Statement

Statement according to FCC part 15.19:

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Statement according to FCC part 15.21:

Modifications not expressly approved by this company could void the user's authority to operate the equipment.

Statement according to FCC part 15.105:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.



Warning: The user should be 20CM away from the product when it is used.