PROFESSIONAL GSM/GPRS WEATHER STATION

Operation Manual

OVERVIEW

Introduction

Thank you for your purchasing this professional weather station. This device is working based on GSM/GPRS network. It can be configured to send data to a specified server by GPRS so that users can run remote monitoring of weather condition.

This manual will guide you step-by-step through setting up your device. Use this manual to become familiar with your professional weather station, and save it for future reference.

The device can measure the below weather data and transmit them to web:www.wunderground.com by GPRS network.

1. Wind direction   7.Gust

2. Wind speed   8.Temperature

3. Solar radiation rate   9.Relative Humidity

4. UV index   10. Rainfall

5. Absolute pressure   11. Dew point

6. Relative pressure

Package Content:

It includes a receiver built in GSM/GPRS module, an integrated outdoor sensor and a solar panel. Below please find the package content:

| QTY	Item
1	Receiver unit
1	Outdoor sensor(Thermo-hygrometer / Rain Gauge / Wind Speed Sensor /Transmitter)
1	Solar panel Unit
1	Wind Vane
1	USB cable
1	Stainless Steel Tube (D32*H200mm)
1	U style Stainless Steel Loop
1	Zip bag for 1pc Allen wrench
1	5 meter connection cable for solar panel to connect to Receiver
1	50meter 4 core Cable(with RS485 connection port)
1	TF card(2GB or 4GB)
1	User manual

Outdoor sensor:
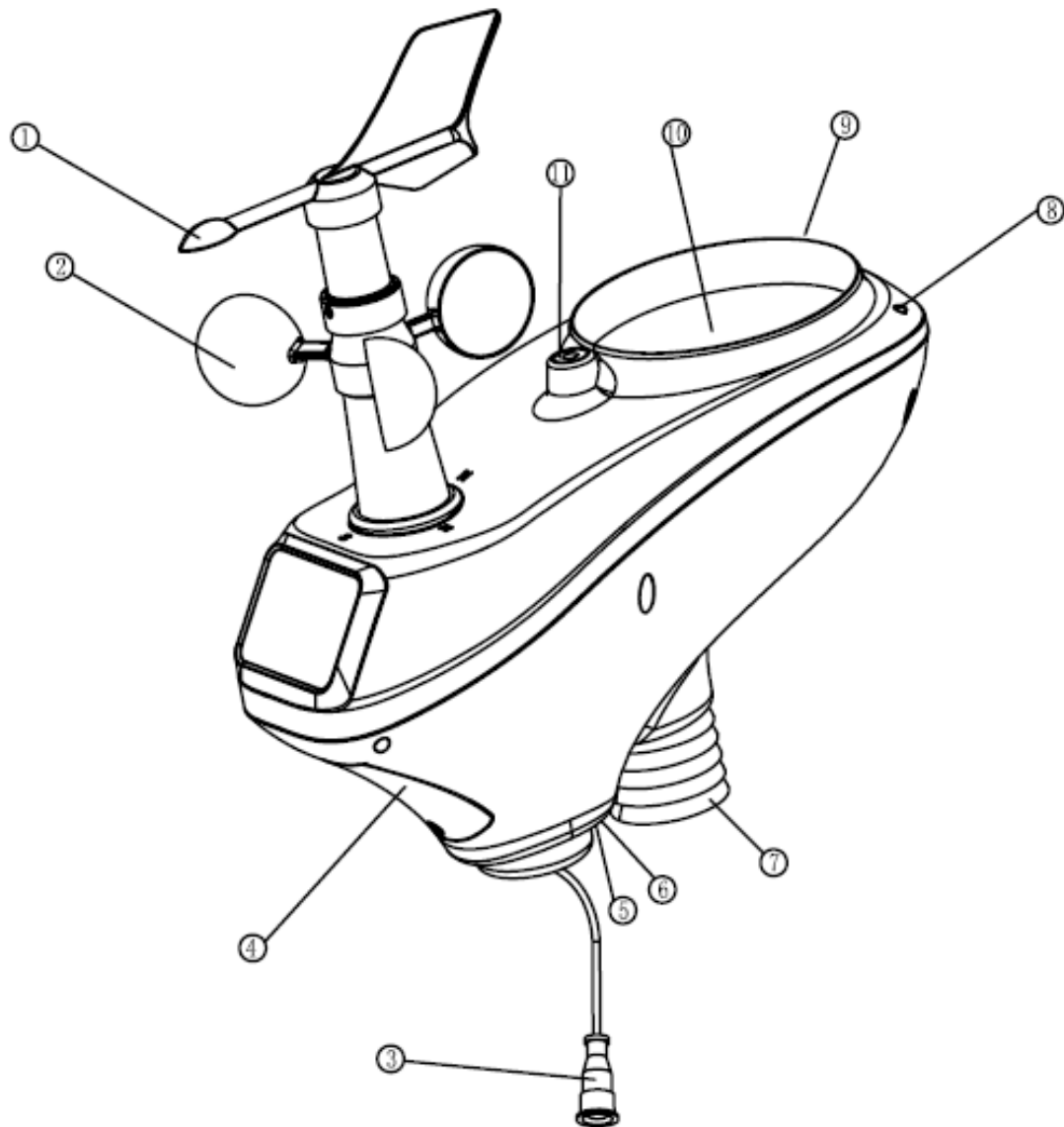
Figure 1

1. Wind Vane
1. Wind Vane
2. Wind Speed Sensor
3. RS485 connector
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

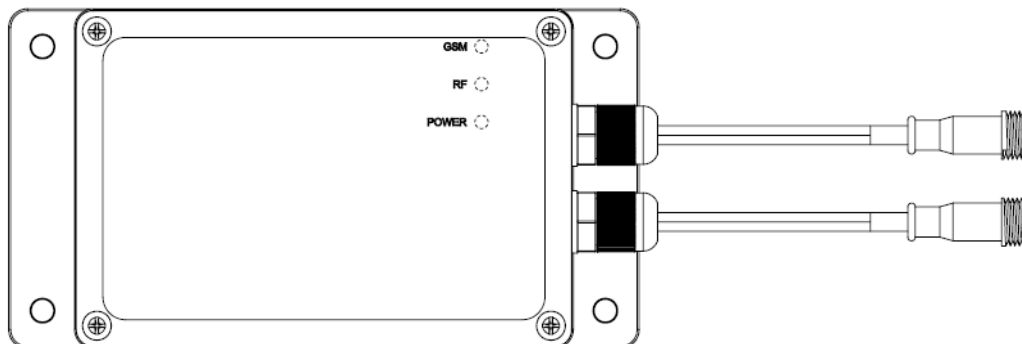## Receiver unit

Outside

Figure 2

There are 3 LED lights will be on after power on(Figure 2):

1. Power indicator: flashes every 3 seconds during working. It doesn't flash when no power coming through.

2. RF Data collecting indicator: flashes every 16 seconds when data from outdoor unit is received by the receiver terminal normally. If it flashes fast every 2 seconds, then you should check the connection or communication between the outdoor sensor and receiver unit.

3. GSM indicator: Flashes once after sending data successfully, whose time interval is configured by user. It will flash every 2 seconds if failed to deliver data for 3 times continuously.
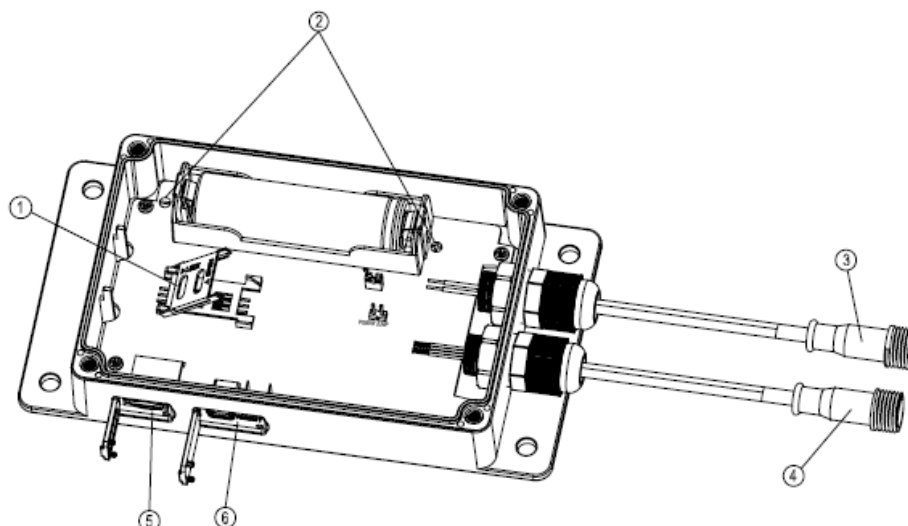
Inside

Figure 3

1. SIM card slot
2. +/- electrode symbol of battery

3. Connector for solar panel
4. Connector for Outdoor sensor
5. TF card slot
6. USB interface

Solar panel Unit

The solar panel base is to be connected to the power connector for receiver via a 2 core 5 meter extending cable.
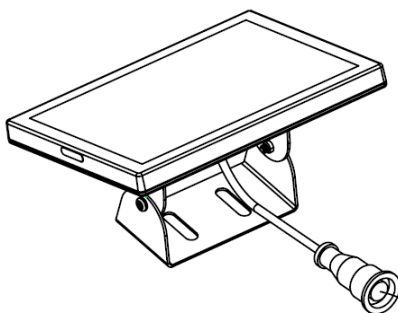

Figure 4

Installation

Before placing and installing all components of the weather station at their final destination, please set up the weather station with all parts being nearby for testing the correct function. Also please note configuring parameters on PC software is necessary before permanent installation. (Refer to USB Configure Tool Operation part).

Outdoor unit

1. Attach the wind vane

2. Push the wind vane into the shaft. as shown in figure 5.
   Tighten the set screw with the Allen Wrench (included) as shown in figure 6. Make sure the wind vane spin freely.
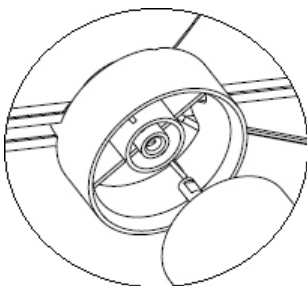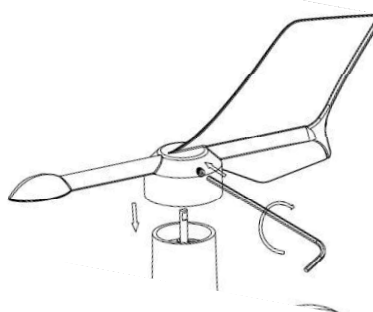

Figure 5

Figure 6

2. Install Mounting Pole
Insert the pole into the base, as shown in figure 7. Spin the lid onto the base as shown in figure 8.
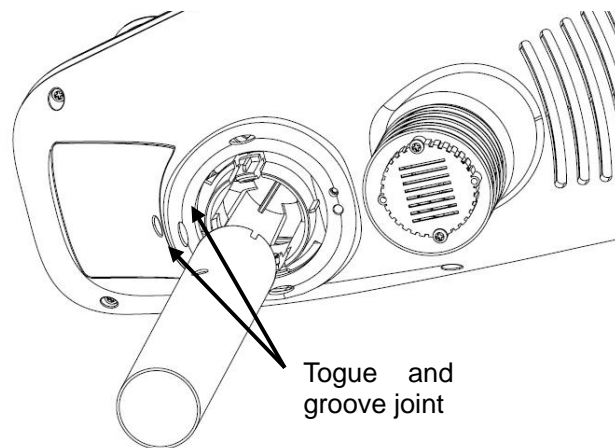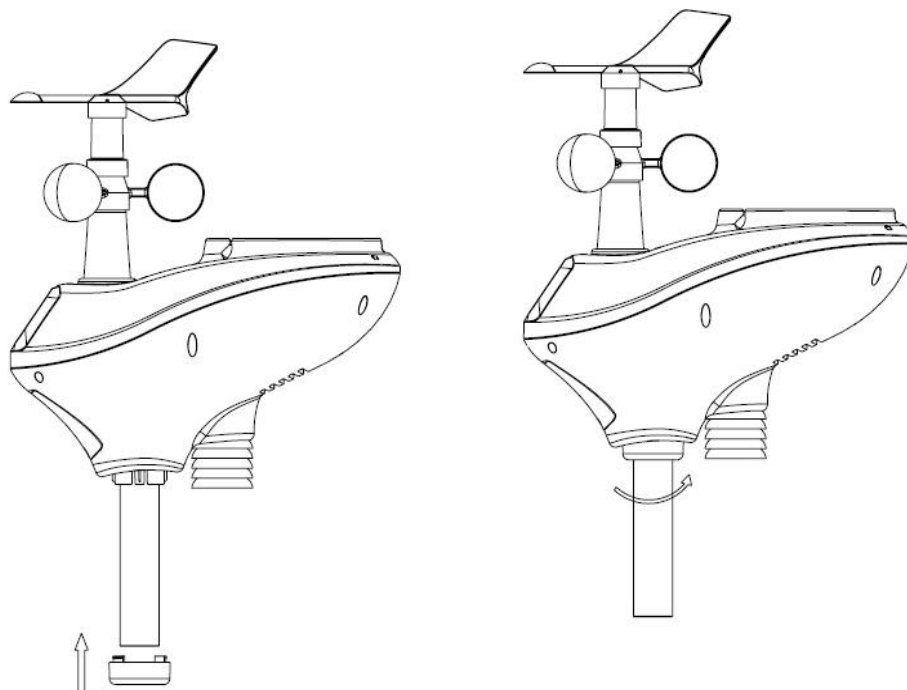
Togue and groove joint

Figure 7

Figure 8

3. Mount outdoor sensor

Fasten the mounting pole to your mounting pole or bracket (purchased separately) with the U-bolt, mounting pole brackets and nuts, as shown in Figure 9.

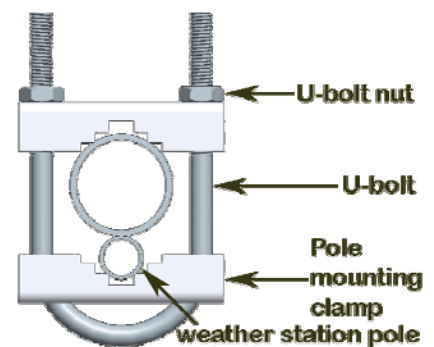Tighten the mounting pole to your mounting pole with the U-Bolt assembly, as shown in Figure 10.

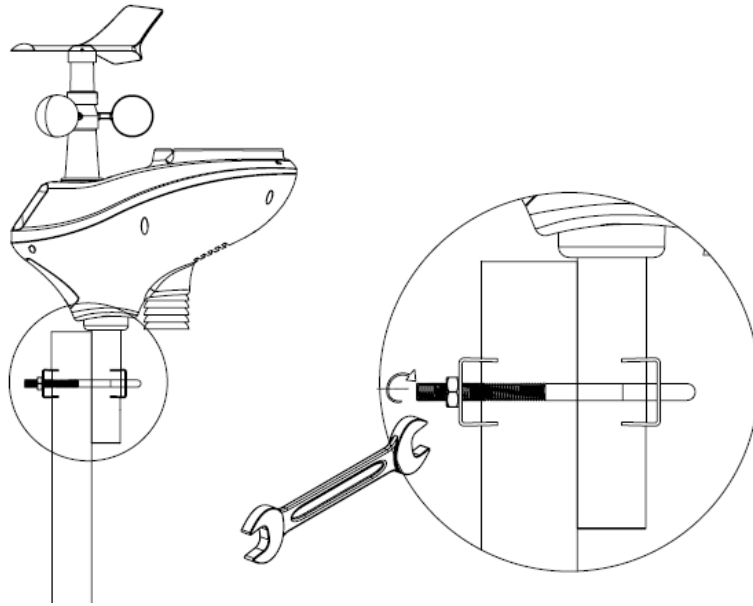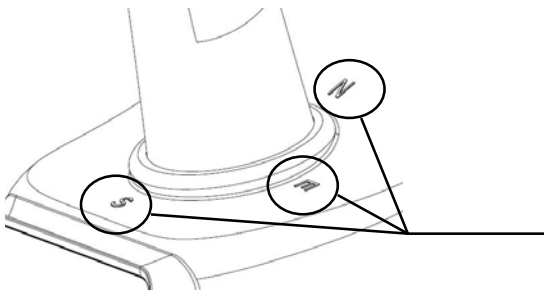U-bolt nut

U-bolt

Pole mounting clamp

weather station pole

Figure 9

Figure 10

Figure 11

there are four alphabet letter of "N","E","S"and "W" representing for the direction of North, East, South and West, as Figure 11. Wind direction sensor has to be adjusted so that the directions on the sensor are matching with your real location. Permanent wind direction error will be introduced when the wind direction sensor is not positioned correctly during installation.
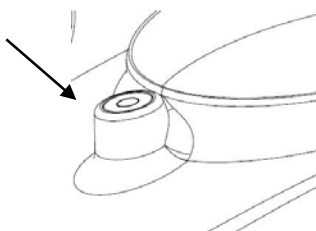

Figure 12

Level the sensors
Use the bubble level on the rain sensor as a guide to verify that sensors are level.

5. Reset Button and Transmitter LED

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

With an open ended paperclip, press and hold the RESET BUTTON for three seconds to completely discharge the voltage.
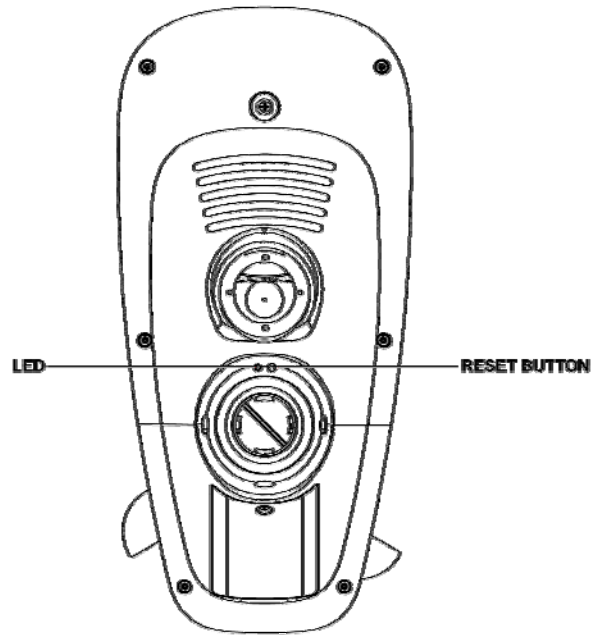
Figure 13

Initial Receiver Unit Set Up

1. Before power on the device, please open the case (Figure 14) and use a GSM SIM card to insert to the SIM card slot on the PCB board inside. (Figure 15)
2. At the same time insert a 2GB Micro SD card into the memory card slot. (Figure 15)
3. Install the supplied li-ion battery into the battery chamber. Do not install the batteries incorrect to the polarity markings. You can permanently damage the receiver. Until now the receiver is able to charge, work and supply power to outdoor unit (Figure 15)

4. Connect the receiver to PC via USB cable to charge the battery for more than 1 hour the first time you use it.(Or use a 5V adapter   which be able to connect to USB cable for charging)
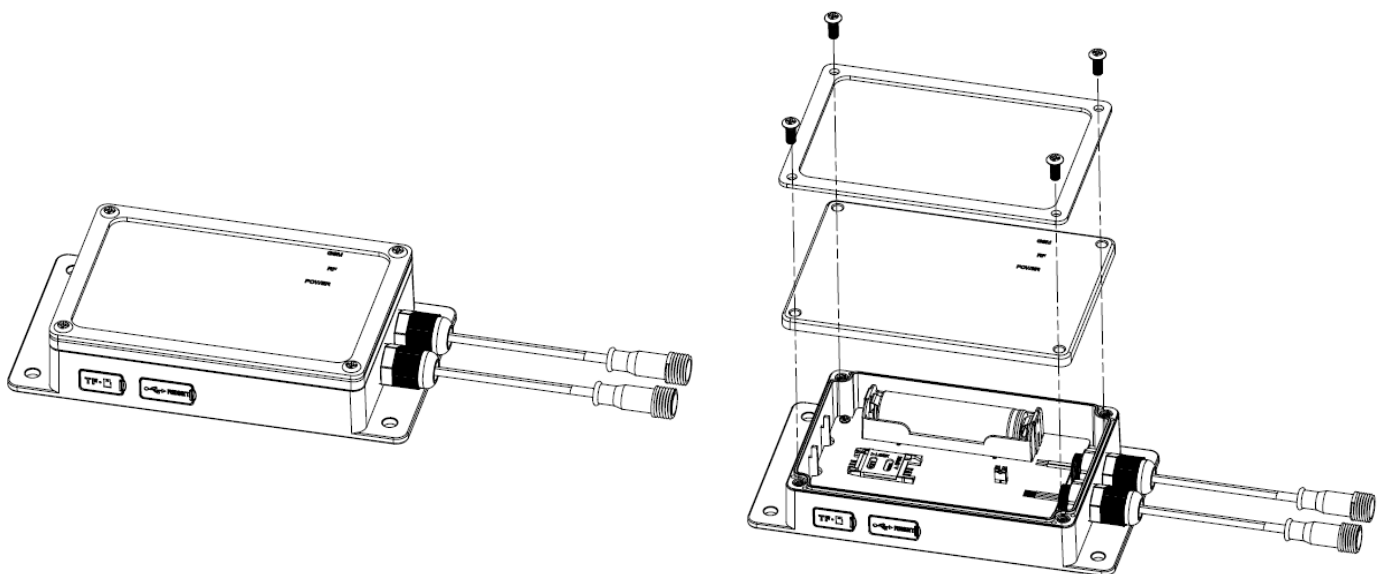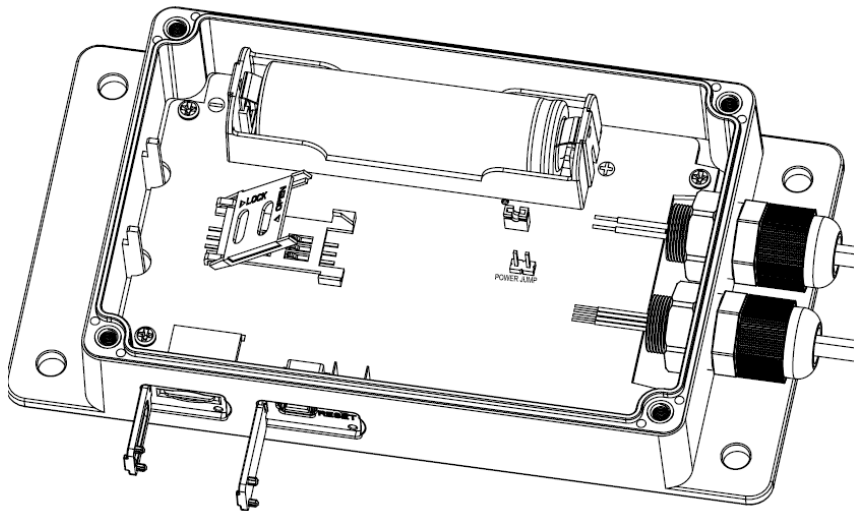

Figure 14

Figure 15

5. Please use the 5 meter 2 core extending cable to connect the solar panel and the "POWER" connector of receiver unit. While the 50 meter 4 core extending cable is to connect the outdoor sensor and the" outdoor sensor "connector.
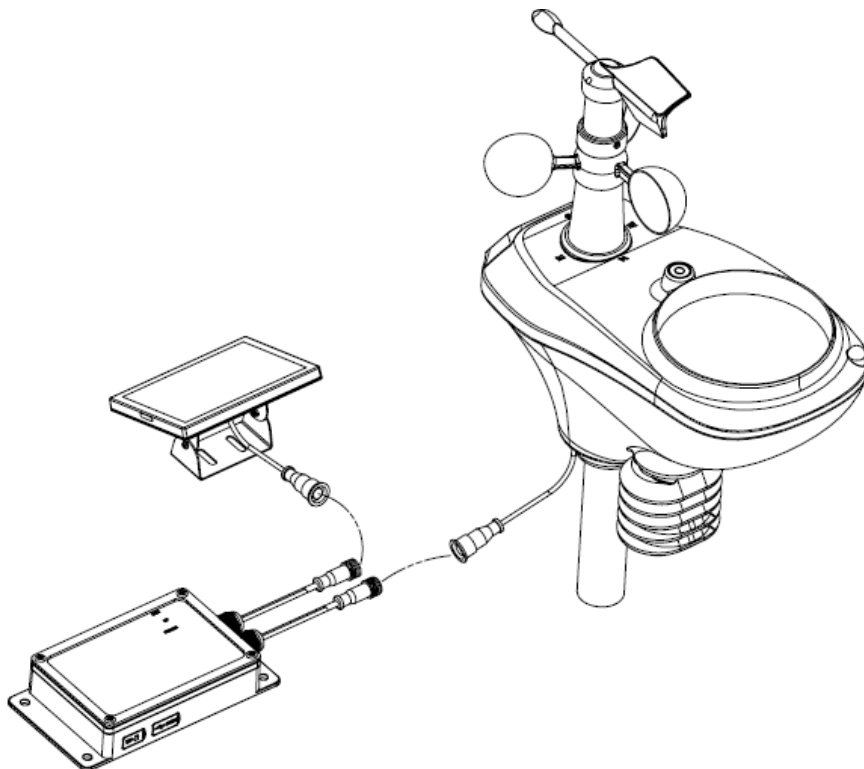
Figure 16

USB Configure Tool Operation

Before installation for working, parameters should be set via the PC software **WEATHER LOGGER GSM.**
Receiver unit doesn't have to be powered on during configuring, unless you need to check current weather data and MIN/MAX records.

1. Decompress the Weather Logger GSM file from CD, open the Weather Logger GSM Setup.exe to install the software.

2. Connect the receiver device to PC via an USB wire, and launch the software:

3. The parameters can be set and saved by clicking the "Save " keys separately:

3.1 DST start/end time set up

3.2 Time zone setting

3.3 Calibration setting:

If the data measured by device is found not in complete accord with official data, a reference coefficient can be configured to make it as accurate as possible.

3.4 Unit options:
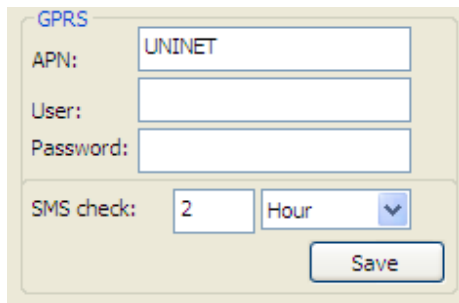
Note: Do not configure the units from time to time. Every time some unit is changed, a new log file would be generated in the micro SD card.

3.5 SIM card GPRS settings:

Before you set the below parameters, please inquire service provider for SIM card carrier service APN, APN USER, APN PASSWORD information.

SMS check is to set up the GSM module wakeup interval to check if there is SMS come in.

Note: If you change a SIM card belongs to a different carrier, APN information needs to be changed as well.
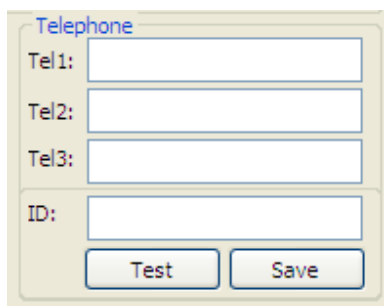
3.6 Authorized telephone No.s and Item ID setup:

You can set up at most 3 authorized numbers to send commands/receive alarm information.
And you need to define an ID No. for the device for identify. It can be consists of at most 14 digits or characters.
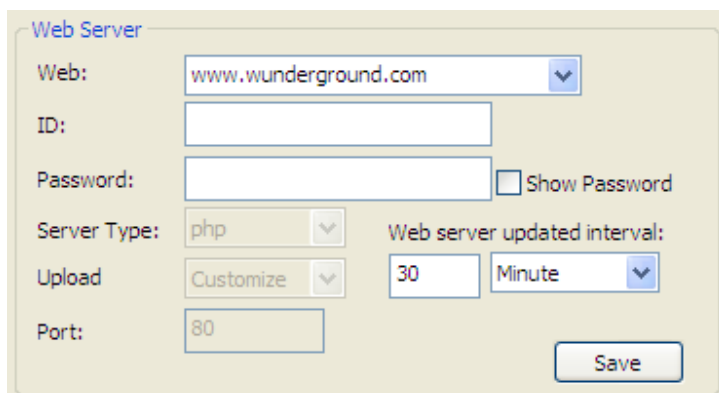
3.7 Server connection setting:

The default web we use is www.wunderground.com. If you use other webs which support same data exchange protocol as www.wundergound.com defined, choose "New web" and input the ID and password, Server type, upload type, port information. And the GPRS update interval can be configured here.

3.8 High/Low alarm thresholds setting for sending SMS to your phone:

High/Low alarm thresholds can be set up.

Alarms can be enabled or disabled all here as well.

The "Next alarm SMS Interval" means if alarm condition is still in effect, in order to prevent unwanted repeat alarm message sending out, the repeat time interval of sending out alarm message can be defined here.

3.9 Data Logger interval

Set up The interval of logging weather data in the TF card. The minimum interval is 5 minutes.

3.10 Max/Min Record button

Users can view max/min record of weather data by click this button .
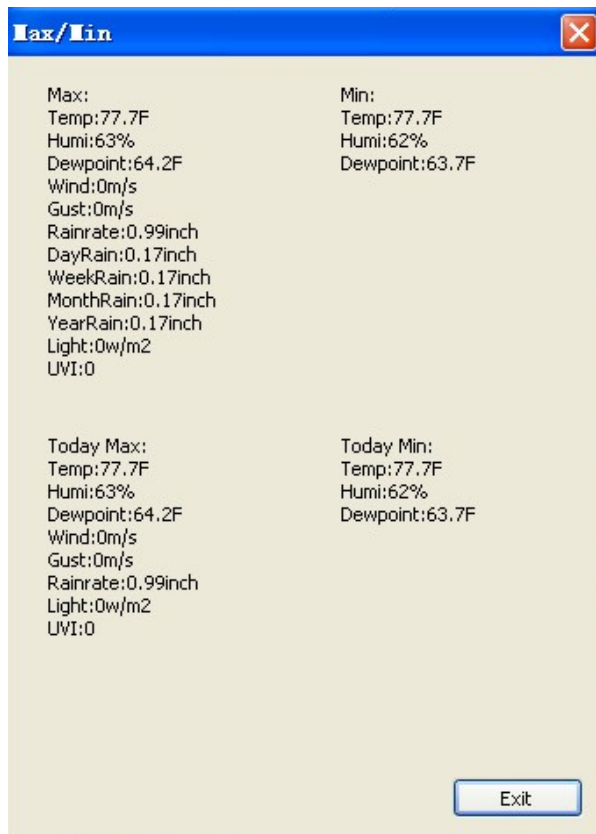
3.11   Function Buttons:

Reset: To clear the previous settings.
Read: To get the current values for the settings saved on machine.
(Note: Better wait for 15 seconds after the device is power on to do this.)
Save All: To Skip all the "Save" options for every zone and save all in one time.
Exit: Exit of the software.
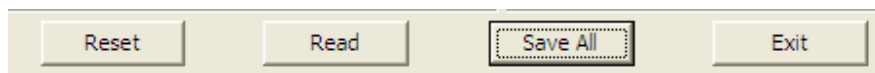
4. **The current weather data can be read if you connect the both receiver and transmitter (Transmitter is to be connected to the receiver and turned on)**

On the right side of main interface, all the real time weather data will be displayed as below:

SMS configuring and alarm indication

Configure by SMS

Users can switch on/off alarm indications, check current weather data by sending SMS to the receiver terminal via at most 3 authorized mobile numbers pre-determined on the PC software(Refer to USB configure tool Operation).

1. **Switch ON/OFF alarms:**

   ● **Switch on alarms:**

   The High/Low alarms defined on the USB configure tool will be activated only by sending below SMS command:

   Alarm On

   If alarms are switched on successfully, it Returns:

   Parameter is set successfully!

● **Switch off Alarms:**

To disable these alarms, please send below command:

Alarm Off

If alarms are switched off successfully, it Returns:

Parameter is set successfully!

Note: If the below commands returned with a failure notice as below:

Parameter setting failure!

Then you should check if the command is edited correctly or the input language is English. And send a correct command.

2. **Read Current & Max/Min weather Data**

Current real time weather data, Max/Min record and can be achieved by SMS.

● **Read current weather data:**

Please send below request command by SMS to receiver:

Weather
(Or **Current Weather)**

Then it should Return a SMS with full weather data:

```
12345678
Current:
Temp=14.1C
Humi=66%
ABS Pressure=30.13inHg
REL Pressure=29.98inHg
Wind=0.0km/h
Gust=0.0km/h
Wind Dir=59deg
Dew Point=7.9C
Rain Rate=0.0mm/h
Daily Rain=0.0mm
Weekly Rain=0.0mm
Monthly Rain=0.0mm
YearlyRain=0.0mm
Light=70.68w/2
UVI=0
Battery=4.12v
```

12345678: ID NO. of the device determined on PC software. Max length can be 14 digits, consists of numbers or characters.
Temp: Temperature.
Humi: Humidity
Wind: Wind speed
Wind Dir: Wind direction

● **Read Max/Min weather data record:**

Users can get History Max/Min and Today Max/Min values of weather data separately by sending commands.

Note:
History Max/Min: Max/Min weather data value since 0:00,Jan 1st of current year.
Today Max/Min: Max/Min weather data value since 0:00 of current day.

a) **Read History and Today max:**

Command: **Max**

History and Today max data will be returned:

12345678
History Max:
Temp=14.1C
Humi=66%
Dew Point=7.9C
Wind=0.0km/h
Gust=0.0km/h
Rain Rate=60.0mm/h
Daily Rain=12.0mm
Weekly Rain=18.2mm
Monthly Rain=30.7mm
YearlyRain=50.0mm
Light=70.68w/m2
UVI=0

Today Max:
Temp=14.1C
Humi=66%
Dew Point=7.9C
Wind=0.0km/h
Gust=0.0km/h
Rain Rate=60.0mm/h
Light=70.68w/m2
UVI=0

b) **Read History max value:**

Command: **History Max**

History max will be returned. (Refer to "History Max" command format part of above returned message)

c)   Read Today max value:

Command: **Today Max**

Today max values will be returned. (Refer to "Today Max" command format part of above returned message)

d) **Read History Min and Today Min values**

Command: **Min**

History and today Min weather data will be returned:

```
12345678
History Min:
Temp=7.1C
Humi=31%
Dew Point=1.9C

Today Min:
Temp=7.1C
Humi=31%
Dew Point=1.9C
```

e)   Read History min data

Command: **History Min**

History Min data will be returned. (Refer to "Today Min" command format part of above returned message)

f)   Read Today min data

Command: **Today Min**
Today Min data will be returned. (Refer to "Today Min " command format part of above returned message)

3. Read Receiver status

By below command, users can check the status of transmitter, network and memory card.

Command: **Status**

Return:
```
12345678
Status:
Transmitter=normal (error)
```

```
        Network=normal   (error)
        SD Card= normal   (full, not exist)
```

Transmitter=normal—Means the transmitter is measuring and sending weather data to receiver normally. If not, the reply will be **Transmitter=error**

Network=normal—Means the GSM network is normal. Otherwise it returns" **Network= error"**

SD Card= normal –Means micro SD card is saving weather data.
SD Card= full –Means memory is full
SD Card= not exist –Means micro SD card is not installed or recognized.

Real Time Weather data polling by SMS:

The real time weather data can be configured to send by SMS, if you set the time interval on the USB configure tool.

Sending by SMS in a certain time interval ranges from 1 minute to 24 hours. If you set it as "none", real time weather data will not be sent.

Please note each polling record would be send in 2 messages:

Format:

```
12345678
Current:
Temp:16.8C
Humi:44%
Wind:0km/h
Gust:0km/h
Wind dir:123deg
Dewpoint:-25.6C

Current:
Rainrate:0mm
Daily Rain:6.0mm
Weekly Rain=18.2mm
Monthly Rain=30.7mm
YearlyRain=50.0mm
Light=70.68w/m2
UVI=0
Bat:4.0V
```

Alarm indication

When the threshold of Alarms are exceeding, alarm will be triggered and SMS indication will be delivered by SMS to authorized cell phone No.s. The alarm sending interval is configurable, ranges from 5 to 240 minutes.

1. Alarm format:

● **High alarm indication:**

```
High alarm:
Temp:28.5C
Humi:44%
Wind:11.5km/h
Gust:12.2km/h
Wind dir:127deg
Dewpoint:15.1C
Rain Rate=2.0mm/h
Daily Rain:3.00mm
```

● **High & Low alarm indication.**

When there are high alarms and low alarms triggered at the same time. The alarm indication format is:

```
High alarm:
Wind:3.6km/h
Gust:7.9km/h
Wind dir:126deg
Rainrate:12.60mm
Daily Rain:5.10mm
Low alarm:
Temp:16.7C
Humi:4%
Dewpoint:-25.6C
```

● **Low Power alarm**

Users can read the battery voltage value on the PC software. The voltage value for full power status is 4.2V.When the power voltage is less then 3.6V, a low power alarm will be send to authorized cell phone No.s by SMS:

Warning message: Battery is lower than 3.6V, GSM module will be suspended.

At this moment, the GSM/GPRS module stops working. But the device will be still measuring and saving weather data. Please recharge the device via the USB cable. If the device continues to work without recharging, all the functions will stop once the voltage becomes less than 3.0V. And users need to press the "Reset" button to restart it after recharging.

2. Alarm continue and disarm condition:

Alarm indication will send at once to user by SMS the first time the threshold of Alarms are exceeding after power on or alarms are disarmed.

Continues to be alarm status or disarm the alarm must meet below conditions:

Within the 15 minutes after the newest alarm send, if the weather data was always beyond the threshold, then the alarm is to be continued to send to users.

Within the 2 hours after the newest alarm send, if there are counted up to 15 minutes that the weather data

was beyond the threshold, then once this 2 hours is passed, alarm indication will be send to user.

Until within 6 hours after the newest alarm send, and the time the weather data beyond the threshold are counted not more than 15 minutes, the alarm will be canceled.

Note: 15 minutes is a default detecting range. Users can adjust it according to their own needs.

Data Logging

The weather data transmitted from outdoor sensor unit will be logged in the TF card of receiver unit. Logging interval is from 16 seconds to 240 minutes, up to user's configuration.

The data is saved as CSV file on the TF card. It can be read on PC. Take out the TF card and use a card reader to open the CSV file on PC:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	No.	Time	Temperat	Eumidity(	AbsBaro(t	RelBaro(t	Wind(km/t	Cust(km/:	Dew Point	Wind Dir	Rain Rate	Daily Rai	Weekly Re	Monthly F	Yearly R:	Solar Rac	UV(uW/cm:	UVI()
2	1	2014/12/22 20:31	-9.7	20	1021.2	1012.4	0	0	-28.5	134	0	0	0	0	0	0	1	0
3	2	2014/12/23 9:31	-9.7	20	1021.2	1012.4	0	0	-28.5	135	0	0	0	0	0	0	1	0
4	3	2014/12/23 9:31	-9.7	20	1021.2	1012.4	0	0	-28.5	135	0	0	0	0	0	0	1	0
5	4	2014/12/23 9:31	-9.8	20	1021.2	1012.4	0	0	-28.6	135	0	0	0	0	0	0	1	0
6	5	2014/12/23 9:32	-9.8	20	1021.1	1012.3	0	0	-28.6	135	0	0	0	0	0	0	1	0
7	6	2014/12/23 9:32	-9.8	20	1021.1	1012.3	0	0	-28.6	135	0	0	0	0	0	0	1	0
8	7	2014/12/23 9:32	-9.8	20	1021.1	1012.3	0	0	-28.6	135	0	0	0	0	0	0	1	0
9	8	2014/12/23 9:33	-9.8	20	1021.1	1012.3	0	0	-28.6	135	0	0	0	0	0	0	1	0
10	9	2014/12/23 9:33	-9.8	20	1021.1	1012.3	0	0	-28.6	135	0	0	0	0	0	0	1	0
11	10	2014/12/23 9:33	-9.8	20	1021.1	1012.3	0	0	-28.6	135	0	0	0	0	0	0	1	0
12	11	2014/12/23 9:33	-9.8	20	1021.1	1012.3	0	0	-28.6	135	0	0	0	0	0	0	1	0
13	12	2014/12/23 9:34	-9.7	20	1021.1	1012.3	0	0	-28.5	135	0	0	0	0	0	0	1	0
14	13	2014/12/23 9:34	-9.6	20	1021.1	1012.3	0	0	-28.4	135	0	0	0	0	0	0	1	0
15	14	2014/12/23 9:34	-9.3	19	1021.1	1012.3	0	0	-28.7	135	0	0	0	0	0	0	1	0
16	15	2014/12/23 9:34	-9	19	1021.1	1012.3	0	0	-28.4	135	0	0	0	0	0	0	1	0
17	16	2014/12/23 9:35	-8.6	18	1021.1	1012.3	0	0	-28.7	135	0	0	0	0	0	0	1	0

Also,click "SDCard File" and "Read" key to save the weather data to PC directly,you can find the history in the folder which on the installation path of the software.

Weather Server

The receiver is configured to send real-time data to wunderground.com® Enter the Station ID and Password from wunderground.com®. The weather data will be displayed on the user interface.

Note: How to create a Wunderground.com account and station ID.

1. Join the Wunderground.com Community.   Visit:

    https://www.wunderground.com/members/signup.asp

and sign up with Wunderground.com.

2. **Join the Personal Weather Station (PWS) network**. Visit:

   http://www.wunderground.com/weatherstation/about.asp

   and **Get Started!** to add your weather station and you will receive a Station ID.

Enter the Station ID obtained and password you entered in the console's Weather Server page.

Note: If Wunderground.com is not updating, make sure the Station ID and Password are correct. The Station ID is all capital letters, and the password is case sensitive.   The most common issue is substituting an O for 0 in the Station ID.

Maintenance

1. Clean the rain gauge once every 3 months as follows. Reference Figure 11.

   Step 1: Make a note of the current rain totals by referencing the calibration screen (reference Section 3.4). You will need to re-enter these values after the calibration procedure it complete.

   Step 2: Pour water into the rain collector to moisturize the dirt inside rain bucket.

Step 3: Use an approximately 3 inch (80 mm) long cotton swab, and push the cotton tip through the rain collector hole until is reaches the self emptying mechanism, and press until the mechanism no longer rotates.

Step 4: Rotate the cotton swab back and forth, removing dirt from the tipping mechanism and rain collector hole.

Step 5: Remove the cotton swab and flush with water to remove any remaining dirt.

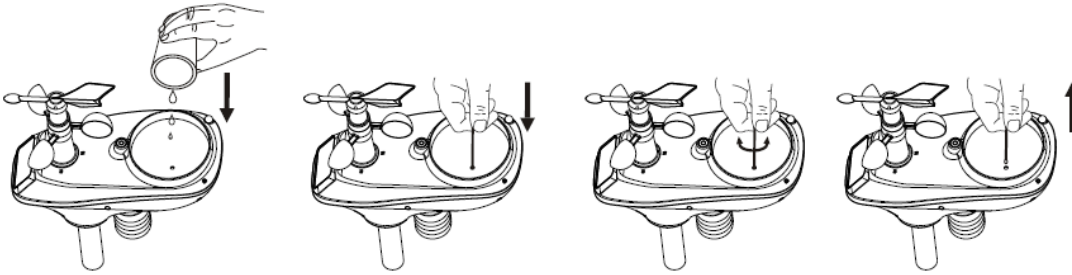**Step 6:** Re-enter the rain totals recorded in Step 1.

Figure 11

2. Clean the solar radiation sensor every 3 months with water and towel.
3. Replace rechargeable batteries every 2 to 3 years.

Troubleshooting Guide

Problem	Solution
Temperature sensor reads too high in the day time.	Make certain that the sensor array is not too close to heat generating sources or strictures, such as buildings, pavement, walls or air conditioning units. Use the calibration feature to offset installation issues related to radiant heat sources.
Rain gauge reports rain when it is not raining	An unstable mounting solution (sway in the mounting pole) may result in the tipping bucket incorrectly incrementing rainfall. Make sure you have a stable, level mounting solution.
Data not reporting to Wunderground.com	1. Confirm your password is correct. It is the password you registered on Wunderground.com. Your Wunderground.com password cannot begin with a non-alphanumeric character (a limitation of Wundeground.com, not the station). Example, $oewkrf is not a valid password, but oewkrf$ is valid. 2. Confirm your station ID is correct. The station ID is all caps, and the most common issue is substituting an O for a 0 (or visa versa). Example, KAZPHOEN11, not KAZPH0EN11 3. Make sure your time zone is set properly. If incorrect, you may be reporting old data, not real time data.

Problem	Solution

Specifications

Temperature range	:	-30˚C--65˚C (-22℉ to +149℉)
Accuracy	:	+ / - 1 °C
Resolution	:	0.1˚C
Measuring range rel. humidity	:	1%～99%
Accuracy	:	+/- 5%
Rain volume display	:	0 – 9999mm (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: 16 sec

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	:	Built in 18650 battery
Solar panel	:	Voc: 5.4V, Isc : 200Ma, Size:110*80mm

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