Wireless Water Leak Detector / Temperature / Humidity Sensor

R718WAA
User Manual

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1. Introduction

R718WAA is an alarm device for water leakage detection of netvox ClassA type device based on LoRaWAN open protocol, which is compatible with LoRaWAN protocol. When the sensor of R718WAA detects water leakage, R718WAA will send alarm information and temperature and humidity to the gateway. When the sensor detects that there is no water leakage, it will send the information that the state returns to normal and the temperature and humidity to the gateway.

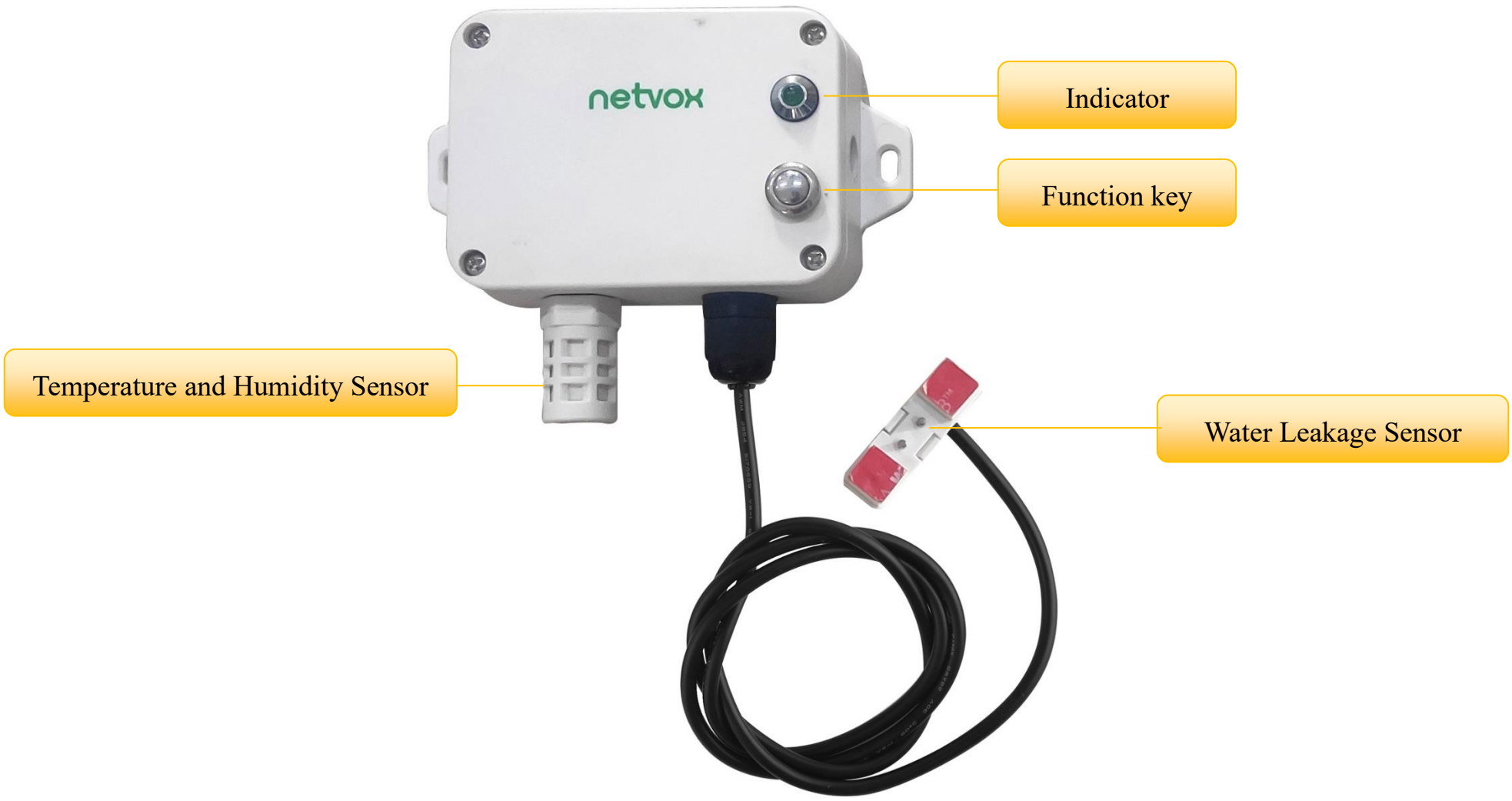
LoRa Wireless Technology:

LoRa is a wireless communication technology dedicated to long distance and low power consumption. Compared with other communication methods, LoRa spread spectrum modulation method greatly increases to expand the communication distance. Widely used in long-distance, low-data wireless communications. For example, automatic meter reading, building automation equipment, wireless security systems, industrial monitoring. Main features include small size, low power consumption, transmission distance, anti-interference ability and so on.

LoRaWAN:

LoRaWAN uses LoRa technology to define end-to-end standard specifications to ensure interoperability between devices and gateways from different manufacturers.

2. Appearance



3. Main Features

- Apply SX1276 wireless communication module
- 2 section of ER14505 battery in parallel (AA size 3.6V / section)
- Water leakage, air temperature and humidity detection
- IP rating: Main body-IP65, water leakage sensor-IP67
- The base is attached with a magnet that can be attached to a ferromagnetic material object
- Compatible with LoRaWAN™ Class A
- Frequency hopping spread spectrum
- Configuration parameters can be configured via a third-party software platform, data can be read and alerts can be set via SMS text and email (optional)
- Applicable to third-party platforms: Actility/ThingPark, TTN, MyDevices/Cayenne
- Improved power management for longer battery life

Battery Life:

- Please refer to web: http://www.netvox.com.tw/electric/electric_calc.html
- At this website, users can find battery life time for variety models at different configurations.

1. Actual range may vary depending on environment.
2. Battery life is determined by sensor reporting frequency and other variables.

4. Set up Instruction

On/Off

Power on	Insert batteries. (users may need a screwdriver to open)
Turn on	Press and hold the function key for 3 seconds till the green indicator flashes once.
Turn off (Restore to factory setting)	Press and hold the function key for 5 seconds till green indicator flashes for 20 times.
Power off	Remove Batteries.
Note	1. Remove and insert the battery; the device is at off state by default. 2. On/off interval is suggested to be about 10 seconds to avoid the interference of capacitor inductance and other energy storage components. 3. At 1st -5th second after power on, the device will be in engineering test mode.

Network Joining

Never joined the network	Turn on the device to search the network to join. The green indicator stays on for 5 seconds: success The green indicator remains off: fail
Had joined the network (not at factory setting)	Turn on the device to search the previous network to join. The green indicator stays on for 5 seconds: success The green indicator remains off: fail
Failed to join the network	When the network cannot be added, it is recommended to check the device registration information on the gateway or consult your platform server provider.

Function Key

Press and hold for 5 seconds	Restore to factory setting / Turn off The green indicator flashes for 20 times: success The green indicator remains off: fail
Press once	The device is in the network: green indicator flashes once and sends a report The device is not in the network: green indicator remains off

Sleeping Mode

The device is on and in the network	Sleeping period: Min Interval. When the reportchange exceeds setting value or the state changes: send a data report according to Min Interval.

Low Voltage Warning

Low Voltage	3.2V

*For the sake of power saving, it is recommended to remove the battery when the device is not in use.

5. Data Report

The device will immediately send a version packet report along with an uplink packet including water leak status, temperature, humidity and battery voltage. The device sends data in the default configuration before any configuration is done.

Default setting:

MaxTime: 3600s (if there is special customized shipment, the setting will change according to the customer's requirements)

MinTime: 3600s (by default, the current voltage value is detected every min interval)

Battery Change: 0x01 (Unit:0.1v, 0.1V)

Temperature Change: 0x64 (Unit:0.01°, 1°C)

Humidity Change: 0x64 (Unit:0.01%, 1%)

Water leak detection:

When R718WAA detects water leakage, it will immediately report a leak status as "1"

When R718WAA does not detect water leakage, it will immediately report a leak status as "0"

Note:

The device report interval will be programmed based on the default firmware which may vary.

The interval between two reports must be the minimum time.

Please refer Netvox LoRaWAN Application Command document and Netvox Lora Command Resolver

http://cmddoc.netvoxcloud.com/cmddoc to resolve uplink data

Data report configuration and sending period are as following:

Min Interval (Unit:second)	Max Interval (Unit:second)	Reportable Change	Current Change≥ Reportable Change	Current Change＜ Reportable Change
Any number between 1~65535	Any number between 1~65535	Can not be 0.	Report per Min Interval	Report per Max Interval

5.1 Example of ReportDataCmd

FPort：0x06

Bytes	1	1	1	Var(Fix=8 Bytes)
	Version	DeviceType	ReportType	NetvoxPayLoadData

Version– 1 byte –0x01——the Version of NetvoxLoRaWAN Application Command Version

DeviceType– 1 byte – Device Type of Device The devicetype is listed in Netvox LoRaWAN Application Devicetype.doc

ReportType – 1 byte –the presentation of the NetvoxPayLoadData，according the devicetype

NetvoxPayLoadData– Fixed bytes (Fixed =8bytes)

Version	**Device Type**	**Report Type**	**NetvoxPayLoadData**				
01	0xBE	0x00	SoftwareVersion (1Byte) Eg.0x0A—V1.0	HardwareVersion (1Byte)	DateCode (4Bytes) eg 0x20170503	Reserved (2Bytes) fixed 0x00	
		0x01	Battery (1Byte) unit:0.1V	Temperature (Signed2 Bytes) unit:0.01°C	Humidity (2Bytes) unit:0.01%	Status (1Byte) 0:off 1:on	Reserved (2Bytes) fixed 0x00

#Uplink 1: 01BE000A0B202005200000 // Version report

1st byte (01): Version

2nd byte(BE): DeviceType 0xBE — R718WAA

3rd byte (00): ReportType

4th byte(0A): Software Version, V1.0

5th byte (0B): Hardware Version, V1.1

6th ~9th byte (20200520): DateCode,2020.05.20

10th 11th byte (0000): Reserved

#Uplink 2: 01BE012406701A9E010000 // Status report

1st byte (01): Version

2nd byte(BE): DeviceType 0xBE — R718WAA

3rd byte (01): ReportType

4th byte(24): Battery — 3.6V, 24(Hex) = 36(Dec), 36x0.1v=3.6v

5th 6th byte (0670): Temperature — 16.48 °C , 0670(Hex)=1648(Dec), 1648x0.01°C = 16.48°C

7th 8th byte (1A9E): Humidity — 68.14%, 1A9E(Hex)=6814(Dec), 6814x0.01% = 68.14%

9th byte(01): Status — 1:on (leak)

10th 11th byte (0000): Reserved

5.2 Example of ConfigureCmd

FPort：0x07

Bytes	1	1	Var (Fix =9 Bytes)
	CmdID	DeviceType	NetvoxPayLoadData

CmdID– 1 byte

DeviceType– 1 byte – Device Type of Device

NetvoxPayLoadData– var bytes (Max=9bytes)

Description	**Device**	**Cmd ID**	**Device Type**	**NetvoxPayLoadData**				
Config ReportReq	R718WAA	0x01	0xBE	MinTime (2bytes Unit:s)	MaxTime (2bytes Unit:s)	BatteryChange (1byte Unit:0.1v)	Temperature Change (2byte Unit:0.01℃)	HumidityChange (2byte Unit:0.01%)
Config ReportRsp		0x81		Status (0x00_success)		Reserved (8Bytes,Fixed 0x00)		
ReadConfig ReportReq		0x02		Reserved (9Bytes,Fixed 0x00)				
ReadConfig ReportRsp		0x82		MinTime (2bytes Unit:s)	MaxTime (2bytes Unit:s)	Battery Change (1byte Unit:0.1v)	Temperature Change (2byte Unit:0.01℃)	HumidityChange (2byte Unit:0.01%)

(1) Configure R718WAA report parameters:

MinTime = 1min、MaxTime = 1min、BatteryChange = 0.1v、TemperatureChange= 1°C、HumidityChange=1%

Downlink： 01BE003C003C0100640064 3C(Hex) =60(Dec)

Device returns：

81BE00000000000000000 (Configuration success)

81BE01000000000000000 (Configuration failure)

(2) Read Configuration:

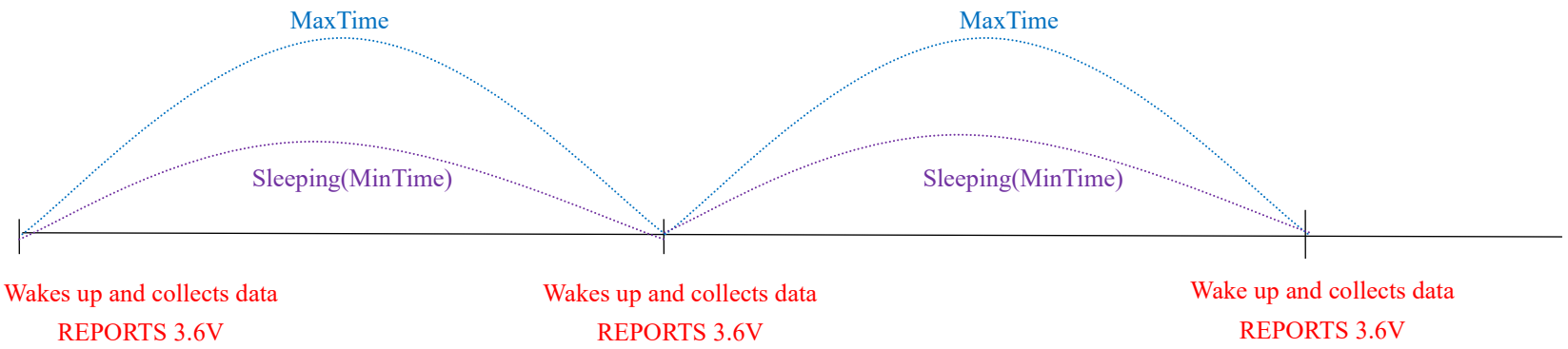
Downlink： 02BE000000000000000

Device returns：

82BE003C003C0100640064 (Current configuration)

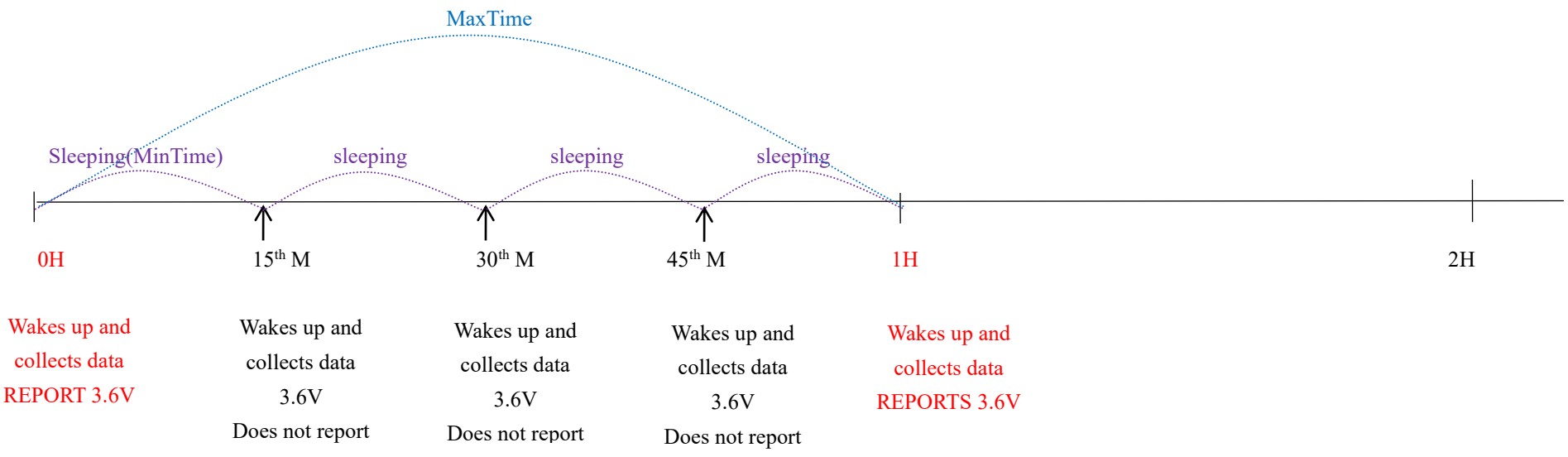
5.3 Example for MinTime/MaxTime logic

Example#1 based on MinTime = 1 Hour, MaxTime= 1 Hour, Reportable Change i.e. BatteryVoltageChange=0.1V



Note: MaxTime=MinTime. Data will only be report according to MaxTime (MinTime) duration regardless BatteryVoltageChange value.

Example#2 based on MinTime = 15 Minutes, MaxTime= 1 Hour, Reportable Change i.e. BatteryVoltageChange= 0.1V.



Example#3 based on MinTime = 15 Minutes, MaxTime= 1 Hour, Reportable Change i.e. BatteryVoltageChange= 0.1V.

Notes :

1) The device only wakes up and performs data sampling according to MinTime Interval. When it is sleeping, it does not collect data.
2) The data collected is compared with the last data reported. If the data variation is greater than the ReportableChange value, the device reports according to MinTime interval. If the data variation is not greater than the last data reported, the device reports according to MaxTime interval.
3) We do not recommend to set the MinTime Interval value too low. If the MinTime Interval is too low, the device wakes up frequently and the battery will be drained soon.
4) Whenever the device sends a report, no matter resulting from data variation, button pushed or MaxTime interval, another cycle of MinTime/MaxTime calculation is started.

6. Installation

When using it, the back of it can be adsorbed on the iron surface, or the two ends can be fixed to the wall with screws.

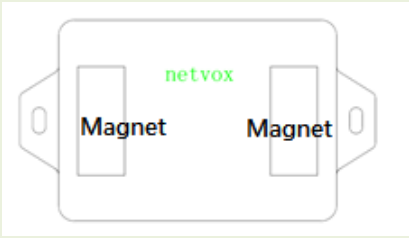
1.The Wireless Water Leak Detector/Temperature/Humidity Sensor (R718WAA) has a built-in magnet (as Figure 1 below).

It can be attached to the surface with iron material during installation.

To make the installation more secure, please use screws (purchased separately) to fix the device on the wall or other objects

Note:

Do not install the device in a metal shielded box or in an environment surrounded by other electrical equipment to avoid affecting the wireless transmission of the device.



2. Remove the 3M release paper (as the red part of the above figure) on the back of the sensor probe and attach it to the smooth ground that may accumulate leakage (as the right figure).

3. When the sensor probe detects the leak, the device will send an "alarm" message.

After remove the probe from the accumulated leakage and drain the remaining water from the sensor, the device will restore to the "normal" state and send the "normal" status message.

The R718WAA can be used in the following scenarios:

- Data centers and rooms.
- File storage center.
- Basement leakage detection
- Water pipe leakage detection
- The bottom of the cabin detection

This device is designed to detect water leakage and is not suitable for detecting hazardous chemical, solvent, oil, fuel, strong acid or other corrosive liquid.

Note: Please do not disassemble the device unless it is required to replace the batteries. Do not touch the waterproof gasket, LED indicator light, function keys when replacing the batteries. Please use suitable screwdriver to tighten the screws (if using an electric screwdriver, it is recommended to set the torque as 4kgf) to ensure the device is impermeable.

7. Information about Battery Passivation

Many of Netvox devices are powered by 3.6V ER14505 Li-SOCl2 (lithium-thionyl chloride) batteries that offer many advantages including low self-discharge rate and high energy density.

However, primary lithium batteries like Li-SOCl2 batteries will form a passivation layer as a reaction between the lithium anode and thionyl chloride if they are in storage for a long time or if the storage temperature is too high. This lithium chloride layer prevents rapid self-discharge caused by continuous reaction between lithium and thionyl chloride, but battery passivation may also lead to voltage delay when the batteries are put into operation, and our devices may not work correctly in this situation.

As a result, please make sure to source batteries from reliable vendors, and it is suggested that if the storage period is more than one month from the date of battery production, all the batteries should be activated.

If encountering the situation of battery passivation, users can activate the battery to eliminate the battery hysteresis.

ER14505 Battery Passivation:

7.1 To determine whether a battery requires activation

Connect a new ER14505 battery to a resistor in parallel, and check the voltage of the circuit.

If the voltage is below 3.3V, it means the battery requires activation.

7.2 How to activate the battery

a. Connect a battery to a resistor in parallel

b. Keep the connection for 5~8 minutes

c. The voltage of the circuit should be ≧3.3, indicating successful activation.

Brand	Load Resistance	Activation Time	Activation Current
NHTONE	165 Ω	5 minutes	20mA
RAMWAY	67 Ω	8 minutes	50mA
EVE	67 Ω	8 minutes	50mA
SAFT	67 Ω	8 minutes	50mA

Note:

If you buy batteries from other than the above four manufacturers, then the battery activation time, activation current, and required load resistance shall be mainly subject to the announcement of each manufacturer.

8. Important Maintenance Instruction

Kindly pay attention to the following in order to achieve the best maintenance of the product:

- Keep the device dry. Rain, moisture, or any liquid might contain minerals and thus corrode electronic circuits. If the device gets wet, please dry it completely.
- Do not use or store the device in dusty or dirty environment. It might damage its detachable parts and electronic components.
- Do not store the device under excessive heat condition. High temperature can shorten the life of electronic devices, destroy batteries, and deform or melt some plastic parts.
- Do not store the device in places that are too cold. Otherwise, when the temperature rises to normal temperature, moisture will form inside, which will destroy the board.
- Do not throw, knock or shake the device. Rough handling of equipment can destroy internal circuit boards and delicate structures.
- Do not clean the device with strong chemicals, detergents or strong detergents.
- Do not apply the device with paint. Smudges might block in the device and affect the operation.
- Do not throw the battery into the fire, or the battery will explode. Damaged batteries may also explode.

All of the above applies to your device, battery and accessories.

If any device is not working properly, please take it to the nearest authorized service facility for repair.