# Wireless Emergency Button

# R313MA
# User Manual

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# 1. Introduction

The R313MA is a long-range emergency button device for Netvox ClassA type devices based on the LoRaWAN open protocol and is compatible with the LoRaWAN protocol.

**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



| | |
|---|---|
| Indicator | Antenna |
| Emergency button | Function Key 1 |
| | Function Key 2 |
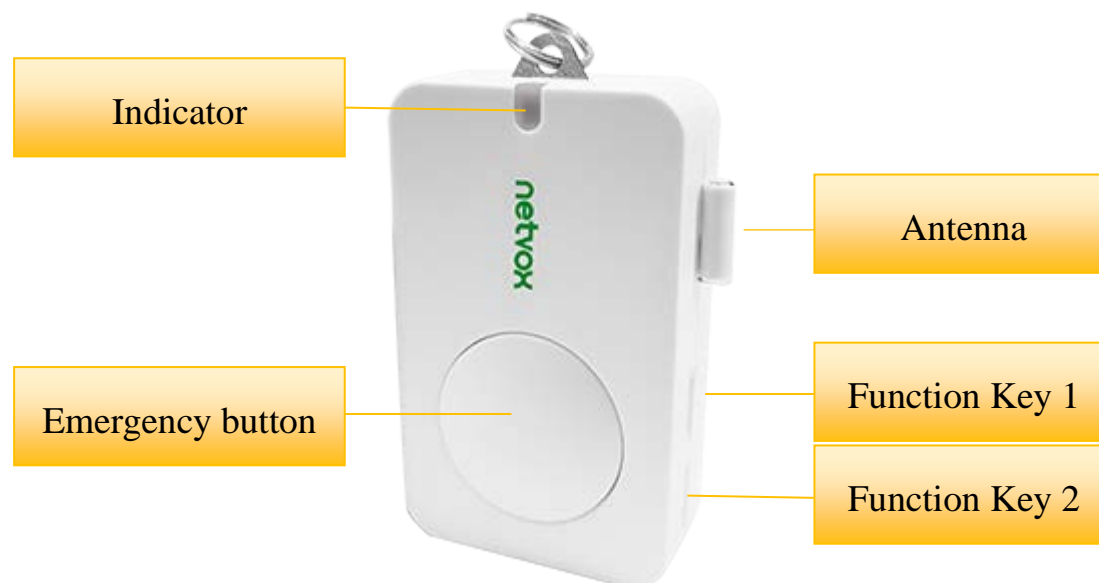
# 3. Main Features

- Compatible with LoRaWAN

- 2 sections of 3V CR2450 button battery power supply

- Detectable voltage value and emergency button status

- Simple operation and setting

- Easy to fix and carry with key ring

- Protection class IP30

- Compatible with LoRaWAN$^{TM}$ 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

- Low power consumption and long 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 varier models at different configurations.

# 4. Set up Instruction

**On/Off**

| | |
|---|---|
| Power on | Insert batteries. (Users may need a flat blade screwdriver to open); insert two sections of 3V CR2450 button batteries and close the battery cover.) |
| Turn on | Press any function key till green and red indicator flashes once. |
| Turn off (Restore to factory setting) | Press and hold both function keys for 5 seconds till green indicator flashes for 20 times. |
| Power off | Remove Batteries. |
| Note | 1. Remove and insert the battery; the device memorizes previous on/off state by default.<br>2. On/off interval is suggested to be about 10 seconds to avoid the interference of capacitor inductance and other energy storage components.<br>3. Press and hold any function key and insert batteries at the same time; it will enter engineer testing mode. |

**Network Joining**

| | |
|---|---|
| Never joined the network | Turn on the device to search the network to join.<br>The green indicator stays on for 5 seconds: success<br>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.<br>The green indicator stays on for 5 seconds: success<br>The green indicator remains off: fail |
| Fail to join the network (when the device is on) | Suggest to check device verification on gateway. |

**Emergency Button and Function Key**

| | |
|---|---|
| Press and hold both keys on the side for 5 seconds | Restore to factory setting / Turn off<br>The green indicator flashes for 20 times: success<br>The green indicator remains off: fail |
| Press any key on the side once | The device is in the network: green indicator flashes once and sends a report<br>The device is not in the network: green indicator remains off<br>*Distinguish function key 1 and function key 2 after firmware 2022.09.09 |
| Emergency Button | Default: press and hold the button for 3 seconds to send an alarm data<br>Remark: users can configure the button pressing time to send alarm by command |

**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 | 2.4V |
|---|---|

# 5. Data Report

The device will immediately send a version packet report along with an uplink packet including alarm status

The device sends data in the default configuration before any configuration is done.

**Default:**

Maximum time: 0x0E10 (3600s)

Minimum time: 0x0E10 (3600s)    (by default, the current voltage value is detected every Min Interval)

*If there is special custom shipping, the setting is changed according to customer requirements

Battery Change: 0x01 (0.1V)

**Emergency Button Trigger:**

Alarm status: 1

Normal state: 0

**Function Key Trigger:**                // Support the firmware after 2022.09.09

When the function key 1 is pressed, FunctionKeyTrigger reports 01

When the function key 1 is not pressed, FunctionKeyTrigger reports 00

When the function key 2 is pressed, FunctionKeyTrigger reports 02

When the function key 2 is not pressed, FunctionKeyTrigger reports 00

Note:

The actual data sending cycle of the device is subject to the programming configuration before shipment.

The interval between two reports must be the minimum time

Report configuration and sending cycle are as follows:

| 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

| 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)

| Device | Version | Device Type | Report Type | NetvoxPayLoadData | | | |
|---|---|---|---|---|---|---|---|
| R313MA | 0x01 | 0x4D | 0x01 | Battery (1Byte) unit:0.1V | Alarm (1Byte) 0:noalarm 1:alarm | FunctionKeyTrigger(1Byte) 0x01:tigger by fuctionkey1 0x02:tigger by fuctionkey2 0x00:others | Reserved (5Bytes,fixed 0x00) |

Ex1. Uplink: 014D011E00020000000000   // Battery=3v, alarm =0, trigger by fuctionkey2

Ex2. Uplink: 014D011C01000000000000   // Battery=2.8v, alarm =1

## 5.2 Example of ConfigureCmd

| 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 | R313MA | 0x01 | 0x4D | MinTime (2bytes Unit:s) | MaxTime (2bytes Unit:s) | BatteryChange (1byte Unit:0.1v) | Reserved (4Bytes,Fixed 0x00) |
| Config ReportRsp | | 0x81 | | Status (0x00_success) | | Reserved (8Bytes,Fixed 0x00) | |
| ReadConfig ReportReq | | 0x02 | | Reserved (9Bytes,Fixed 0x00) | | | |
| ReadConfigRep ortRsp | | 0x82 | | MinTime (2bytes Unit:s) | MaxTime (2bytes Unit:s) | BatteryChange (1byte Unit:0.1v) | Reserved (4Bytes,Fixed 0x00) |

（1）**Command Configuration:**

MinTime = 1min、MaxTime = 1min、BatteryChange = 0.1v

Downlink：014D003C003C0100000000　　003C(H$_{ex)}$ = 60(D$_{ec)}$

Response：

814D000000000000000000（Configuration success）

814D010000000000000000（Configuration failure）

（2）**Read Configuration:**

Downlink：024D000000000000000000

Response：

824D003C003C0100000000（Current configuration）

## 5.3 Example of Button Press Time

Default Press Time：0x03

| Description | CmdID | PayLoad (Fix byte,1byte) |
|---|---|---|
| SetButtonPressTimeReq | 0x01 | PressTime (1byte)<br><br>0x00_QuickPush_Less then 1 Second,<br><br>0x01_1 Second push,<br><br>0x02_2 Seconds push,<br><br>0x03_3 Seconds push,<br><br>0x04_4 Seconds push,<br><br>0x05_5 Seconds push,<br><br>Other value is reserved |
| SetButtonPressTimeRsp | 0x81 | Status<br><br>(0x00_Success<br><br>0x01_Failure) |
| GetButtonPressTimeReq | 0x02 | |
| GetButtonPressTimeRsp | 0x82 | PressTime (1byte)<br><br>0x00_QuickPush_Less then 1 Second,<br><br>0x01_1 Second push,<br><br>0x02_2 Seconds push,<br><br>0x03_3 Seconds push,<br><br>0x04_4 Seconds push,<br><br>0x05_5 Seconds push,<br><br>Other value is reserved |

(1) Command Configuration:

Downlink：0102　　　// Press time=2 s

Response：
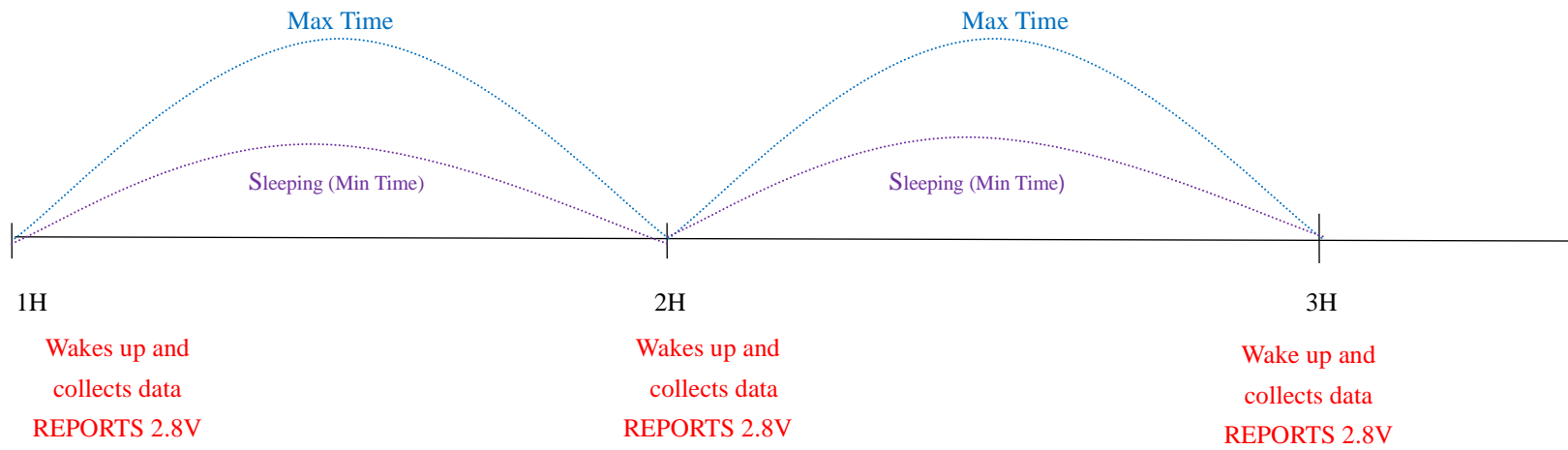
8100（Configuration success）

8101（Configuration failure）

(1) Read Configuration:

Downlink：02

Response：8202（Current configuration）
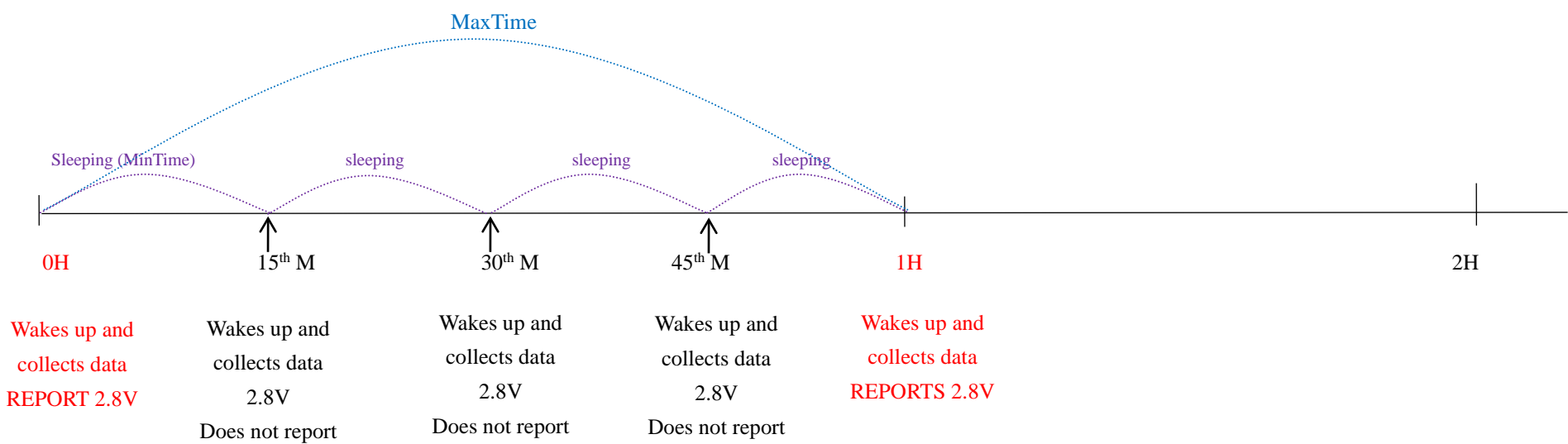
## 5.4 Example for MinTime/MaxTime logic

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

Max Time · · · · Max Time · · · ·

Sleeping (Min Time) · · · · Sleeping (Min Time) · · · ·

1H

Wakes up and
collects data
REPORTS 2.8V

2H

Wakes up and
collects data
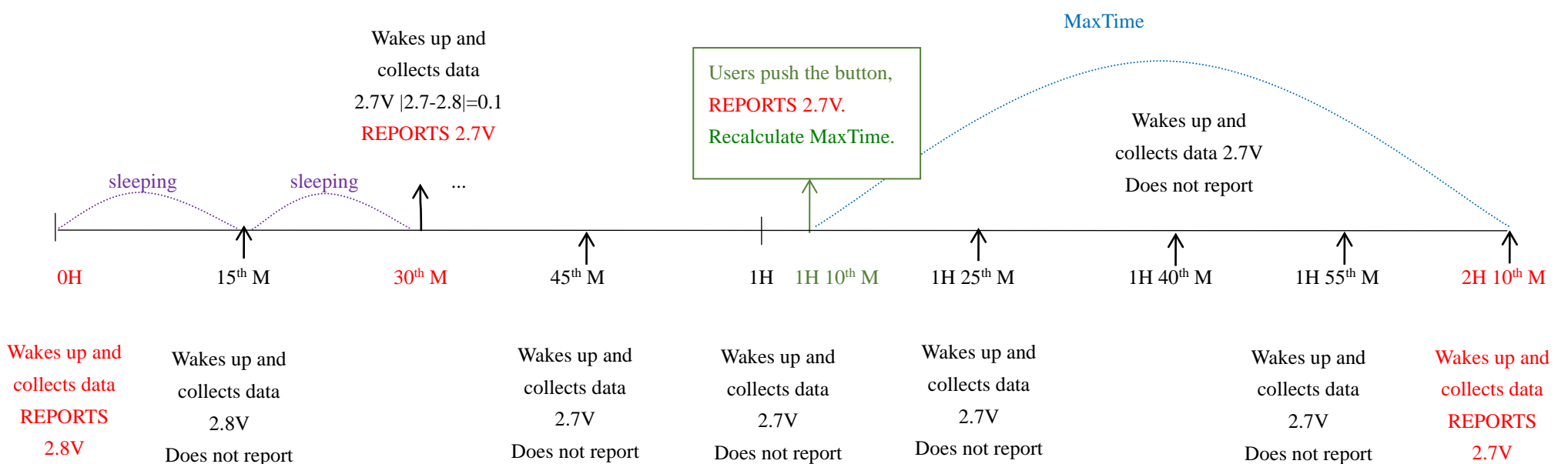REPORTS 2.8V

3H

Wake up and
collects data
REPORTS 2.8V

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.

MaxTime

Sleeping (MinTime)   sleeping   sleeping   sleeping

0H

Wakes up and
collects data
REPORT 2.8V

$15^{th}$ M

Wakes up and
collects data
2.8V
Does not report

$30^{th}$ M

Wakes up and
collects data
2.8V
Does not report

$45^{th}$ M

Wakes up and
collects data
2.8V
Does not report

1H

Wakes up and
collects data
REPORTS 2.8V

2H

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

Wakes up and
collects data
2.7V |2.7-2.8|=0.1
REPORTS 2.7V

Users push the button,
REPORTS 2.7V.
Recalculate MaxTime.

MaxTime

Wakes up and
collects data 2.7V
Does not report

sleeping   sleeping   ...

0H

Wakes up and
collects data
REPORTS
2.8V

$15^{th}$ M

Wakes up and
collects data
2.8V
Does not report

$30^{th}$ M

$45^{th}$ M

Wakes up and
collects data
2.7V
Does not report

1H    1H $10^{th}$ M

Wakes up and
collects data
2.7V
Does not report

1H $25^{th}$ M

Wakes up and
collects data
2.7V
Does not report

1H $40^{th}$ M

1H $55^{th}$ M

Wakes up and
collects data
2.7V
Does not report

2H $10^{th}$ M

Wakes up and
collects data
REPORTS
2.7V

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 change value 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.

# 7. Installation

(1) This product does not have a waterproof function. After the screening is completed, please place it indoors.

(2) The dust at the equipment installation position needs to be wiped clean and then pasted.

(3) The battery installation method is as shown below (the battery has a "+" side facing outward)
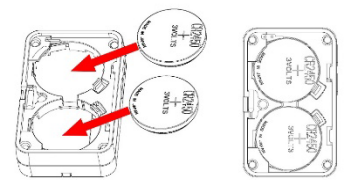


| | |
|---|---|
| 1.The key ring of the portable one-button emergency button (R313MA) can be snapped onto the backpack, the keychain around the waist, or hangs around the neck with a lanyard.<br><br>Note:<br>Do not install the device in a metal shielded box or other electrical equipment around it to avoid affecting the wireless transmission of the device.<br><br> | 2.Press and hole the emergency button for 3 seconds, the "alarm" message is generated.<br>When the device reports data periodically, it restores the "normal" status and sends "normal" status information.<br>Note:<br>  When alarming, the data alarm bit is "1";<br>  When it returns to normal, the data alarm bit is "0".<br><br>The emergency button (R313MA) can be applied to the following scenarios:<br>● Nursing home<br>● Family (bathroom)<br>● School<br>● Hospital<br>● Bank<br>● Wisdom site<br>● Wait for scenes where there is a possibility of an emergency. |

# 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.