

**Wireless Single-phase Current Detection Sensor
R718N1
User Manual**

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1. Introduction

R718N1 series equipment is a current detection device of Netvox Class A type equipment based on LoRaWAN open protocol. It measures single-phase current through external current transformer. It is divided into:

R718N1 Wireless 1-Phase Current Meter with 1 x 30A CT Solid core
R718N13 Wireless 1-Phase Current Meter with 1 x 30A CT Split core
R718N17 Wireless 1-Phase Current Meter with 1 x 75A CT Split core
R718N115 Wireless 1-Phase Current Meter with 1 x 150A CT Split core
R718N125 Wireless 1-Phase Current Meter with 1 x 250A CT Split core
R718N163 Wireless 1-Phase Current Meter with 1 x 630A CT Split core

They are compatible with 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



Fig.1 R718N1 Appearance

3. Main Features

- Compatible with LoRaWAN protocol
- 2 sections ER14505 3.6V Lithium AA battery
- Detect occupancy status
- Protection level IP65
- Compatible with LoRaWAN™ Class A
- Frequency hopping spread spectrum technology
- Configuration parameters can be configured through third-party software platforms, data can be read and alarms can be set via SMS text and email (optional)
- Available third-party platform: Actility / ThingPark, TTN, MyDevices/Cayenne
- Low power consumption and long battery life

Note*: Battery life is determined by the sensor reporting frequency and other variables, please refer to http://www.netvox.com.tw/electric/electric_calc.html

On this website, users can find battery life time for varied models at different configurations.

4.Set up Instruction

On/Off

Power on	Insert batteries. (users may need a flat blade 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:	<ol style="list-style-type: none"> 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	<p>Turn on the device to search the network to join.</p> <p>The green indicator stays on for 5 seconds: success</p> <p>The green indicator remains off: fail</p>
Had joined the network (not at factory setting)	<p>Turn on the device to search the previous network to join.</p> <p>The green indicator stays on for 5 seconds: success</p> <p>The green indicator remains off: fail</p>
Fail to join the network (when the device is on)	<p>First two mins: wake up every 15 seconds to send request.</p> <p>After two mins: enter sleeping mode and wake up every 15 minutes to send request.</p> <p>Note: Suggest to remove batteries if the device is not used to save power.</p> <p>Suggest to check the device verification information on the gateway or consult your platform server provider.</p>

Function Key

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

Sleeping Mode

The device is on and in the network	<p>Sleeping period: Min Interval.</p> <p>When the reportchange exceeds setting value or the state changes: send a data report according to Min Interval.</p>
The device is on but not in the network	<p>First two mins: wake up every 15 seconds to send request.</p> <p>After two mins: enter sleeping mode and wake up every 15 minutes to send request.</p> <p>Note: Suggest to remove batteries if the device is not used.</p> <p>Suggest to check device verification on gateway.</p>

Low Voltage Warning

Low Voltage	3.2V
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5. Data Report

When the device is turned on, it will immediately send a version package and a cluster report which includes current values (mA).

Data will be reported once every 30 minutes by default setting.

Maximum time: Max Interval

Minimum time: Min Interval (Check the current voltage once per Min Interval)

Default reportchange:

Current---0x0064 (100mA)

Note:

The data transmission period of the device is subject to the programming configuration. If the minimum time of report configuration is less than 30 seconds, all counted for 30 seconds. If the the maximum time of report configuration is less than minimum time, all counted for minimum time.

The device starts sampling 15 seconds before the minimum time is due, and lasts for 15 seconds. If the current changes frequently, the sampling result may be inaccurate. Press function key to trigger.

For the analysis of the data reported by the device,

refer to the Netvox LoraWAN Application Command document and <http://www.netvox.com.cn:8888/page/index>.

Data report configuration and sending period are as following:

Min. Interval (Unit:second)	Max. Interval (Unit:second)	Reportable Change	Current Change \geq Reportable Change	Current Change < Reportable Change
Any number between 30~65535	Any number between Min.~65535	Can not be 0.	Report per Min. Interval	Report per Max. Interval

Uplink report payload example:

1	1	1	Var(Fix=8 Bytes)			
Version	DeviceType	ReportType	NetvoxPayloadData			
0x01	0x49	0x01	Battery(1Byte, unit:0.1V)	Current(2Bytes,Unit: 1ma)	Multiplier(1Byte),the real current should convert with Current* Multiplier	Reserved(4Bytes, fixed 0x00)

Uplink example:

0149012403E80100000000

The battery voltage is 3.6V, the single-phase current is 1000mA, and the multiplier is 1.

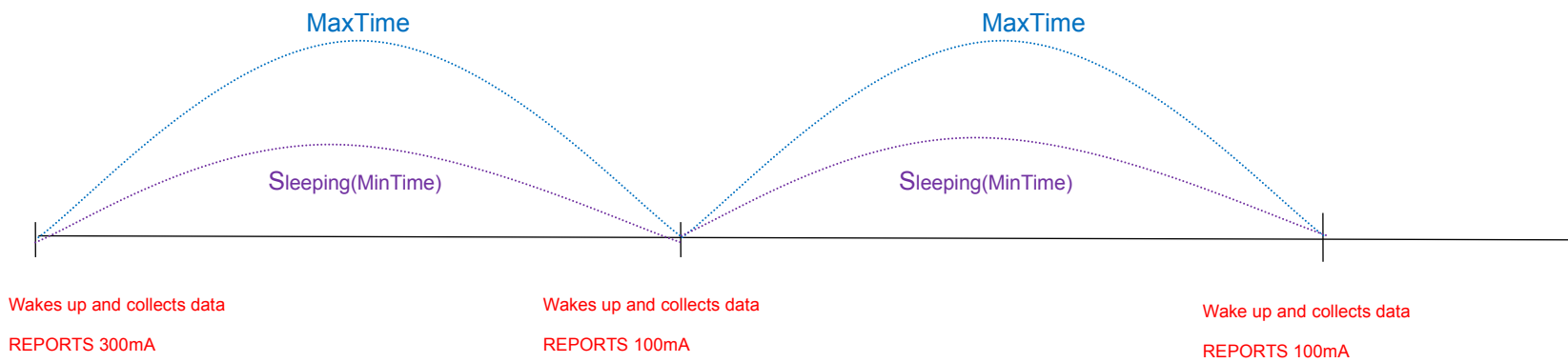
Report configuration:

Description	Device	CmdID	Device Type	NetvoxPayloadData			
ConfigReportReq	R718N1	0x01	0x49	MinTime(2bytes Unit:s)	MaxTime(2bytes Unit:s)	CurrentChange(2byte Unit: 1mA)	Reserved (3Bytes,Fixed 0x00)
ConfigReportRsp		0x81		Status(0x00_success)	Reserved (8Bytes,Fixed 0x00)		
ReadConfigReportReq		0x02		Reserved (9Bytes,Fixed 0x00)			
ReadConfigReportRsp		0x82		MinTime(2bytes Unit:s)	MaxTime(2bytes Unit:s)	CurrentChange(2byte Unit: 1mA)	Reserved (3Bytes,Fixed 0x00)

(1) Configure report parameters MinTime = 15min, MaxTime = 15min, CurrentChange = 100mA
 Downlink: 0149038403840064000000
 The device returns:
 8149000000000000000000 (Configuration succeeded)
 8149010000000000000000 (Configuration failed)

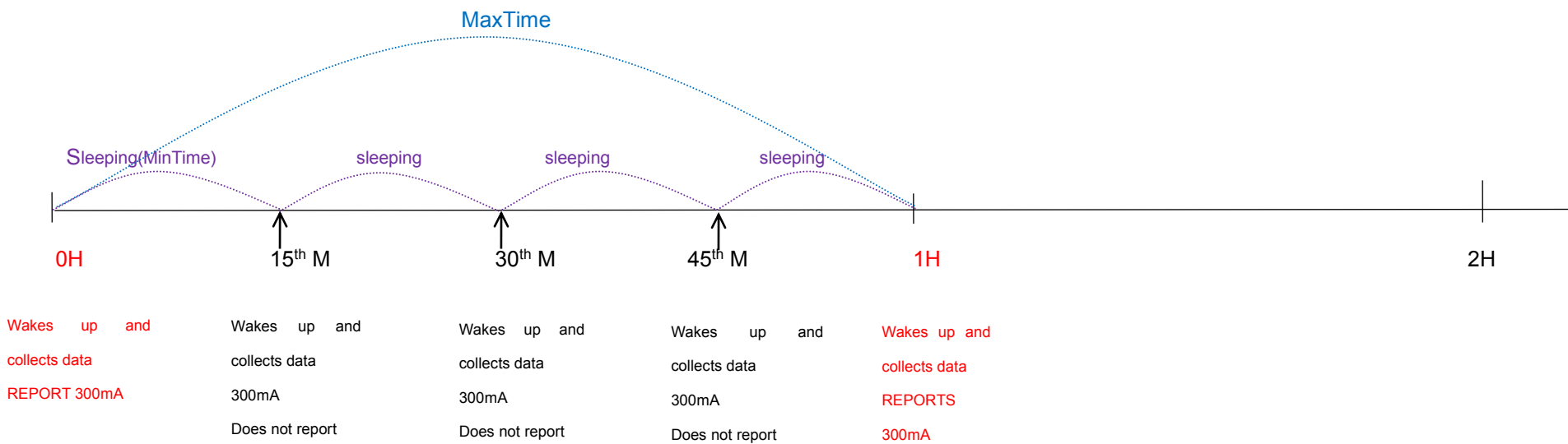
(2) Read device configuration parameters
 Downlink: 0249000000000000000000
 The device returns:
 8249038403840064000000 (current device configuration parameters)

Example#1 based on MinTime = 1 Hour, MaxTime= 1 Hour, Reportable Change i.e. CurrentChange=100mA

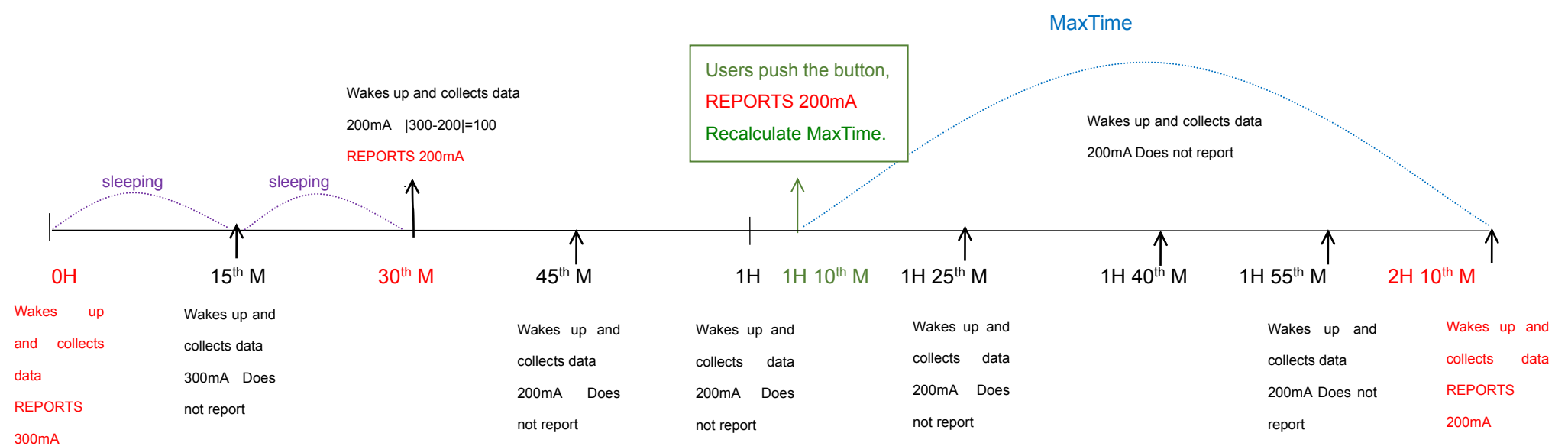


Note: MaxTime=MinTime. Data will only be report according to MaxTime (MinTime) duration regardless CurrentChange value.

Example#2 based on MinTime = 15 Minutes, MaxTime= 1 Hour, Reportable Change i.e. CurrentChange= 100mA.



Example#3 based on MinTime = 15 Minutes, MaxTime= 1 Hour, Reportable Change i.e. CurrentChange= 100mA



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. Measuring range and accuracy

R718N1 (solid CT) measurement range is 0.1A ~ 30A ($\pm 1\%$)

718R718N13 (split CT) Measurement range is 0.1A ~ 30A ($\pm 1\%$),

718R718N17 (split CT) Measurement range is 0.1A ~ 75A ($\pm 1\%$),

718R718N115 (split CT) Measurement range is 1A ~ 150A ($\pm 1\%$),

718R718N125 (split CT) Measurement range is 1A ~ 250A ($\pm 1\%$),

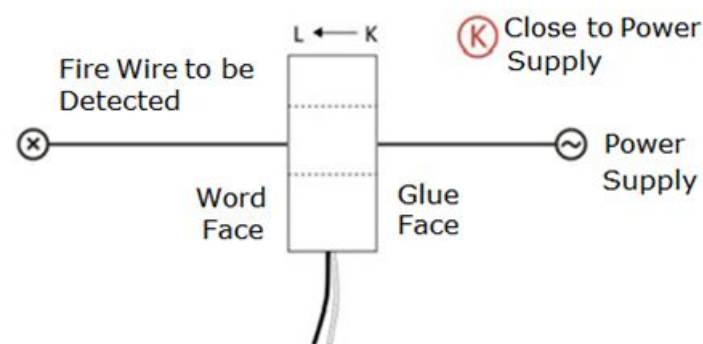
718R718N163 (split CT) The measurement range is 5A ~ 630A ($\pm 1\%$).

Note: The three large CT current models R718N115, R718N125, and R718N163 report 0A when the current is less than 1A, and the remaining R718N1 models report 0A when the current is less than 0.1A.

7. Installation

This product comes with waterproof function. 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. When installing the current transformer, separate the fire and neutral wires, and take out the fire wire separately and start the measurement according to the wiring below.

Split-core CT

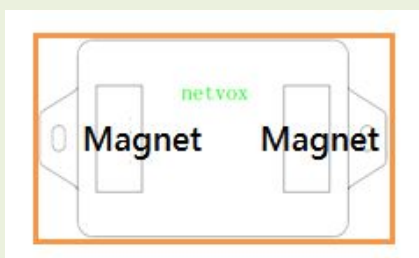


Note: To install the battery, use a screwdriver or similar tool to assist in opening the battery cover.

The single-phase current detector (R718N1) has a built-in magnet (see Figure 1 below). It can be attached to the surface of an object with iron during installation, which is convenient and quick.

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

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. Open the split current transformer, and then pass the wire through the current transformer according to the installation.

Note: "L←K" is marked on the bottom of the terminal.

3. Precautions:

- Before use, you must check whether the appearance is deformed, otherwise the test accuracy will be affected.
- The use environment should be kept away from strong magnetic fields, so as not to affect the test accuracy. It is strictly forbidden to use in humid and corrosive gas environments.
- Before installation, please confirm the current value of the load. If the current value of the load is higher than the measurement range, select a model with a higher measurement range.

4. The single-phase current detector (R718N1) takes 15 seconds to sample the current, that is, the device starts sampling 15 minutes before the arrival of Min Time. If the current value of the sample is relatively compared with the current value reported last time, it exceeds the set value (default value 100mA), when the Min Time is reached, the current value of the current sample is immediately reported. If the current change does not exceed the default value, the data will be reported regularly according to Max Time.

Short press the [Key] of the device to start sampling data and report the data about 15 seconds after pressing the key.

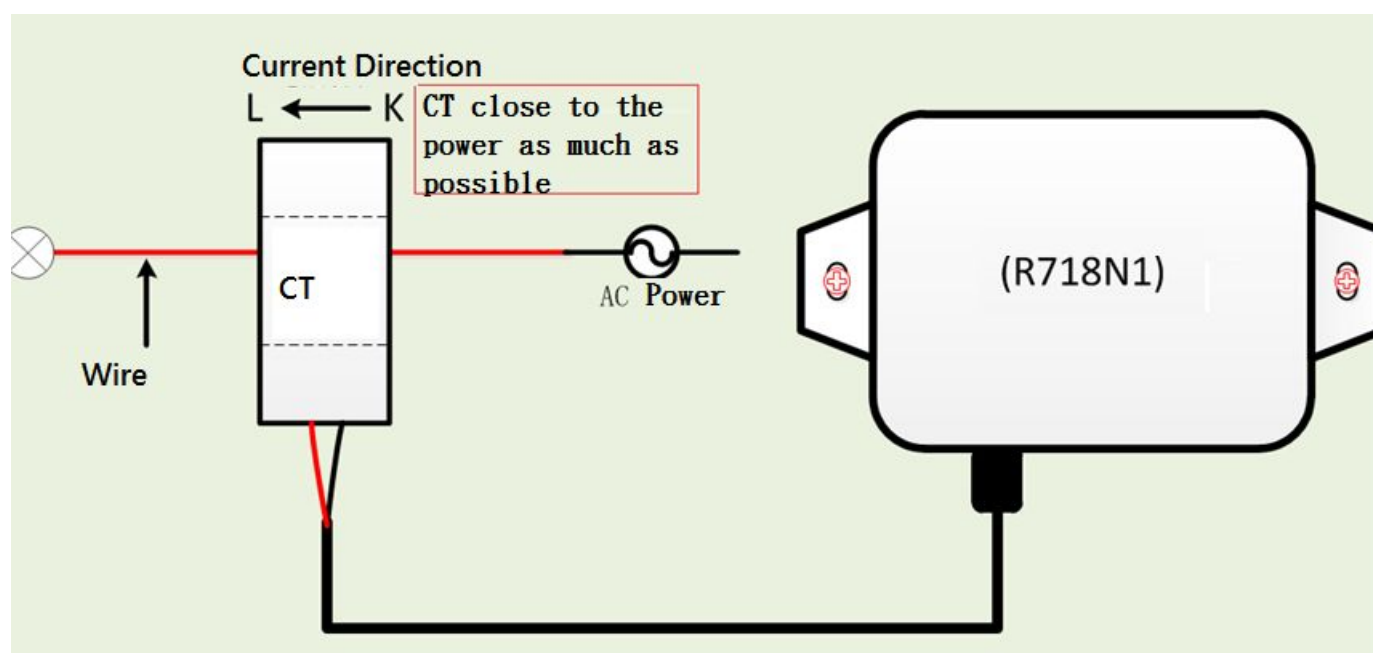
Note: Min Time cannot be set less than 30 seconds.

Max Time must be set greater than Min Time.

The single-phase current detector (R718N1) is suitable for the following scenarios:

- School
- Factory
- The mall
- Office building
- Smart building

Where the electrical data of the equipment needs to be detected.



8. Important Maintenance Instruction

Your device is a product of superior design and craftsmanship and should be used with care. The following suggestions will help you use the warranty service effectively.

- Keep the equipment dry. Rain, moisture, and various liquids or moisture may contain minerals that can corrode electronic circuits. In case the device is wet, please dry it completely.
- Do not use or store in dusty or dirty areas. This can damage its detachable parts and electronic components.
- Do not store in excessive heat. High temperatures can shorten the life of electronic devices, destroy batteries, and deform or melt some plastic parts.
- Do not store in a cold place. 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 wash with strong chemicals, detergents or strong detergents.
- Do not apply with paint. Smudges can block debris in detachable parts and affect normal operation.
- Do not throw the battery into a fire to prevent the battery from exploding. Damaged batteries may also explode.

All of the above suggestions apply equally to your device, battery and accessories. If any device is not working properly.

Please take it to the nearest authorized service facility for repair.