netvox™

Wireless 2-Input Dry Contact Interface

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R718J2
User Manual

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1. Introduction

R718J2 is a ClassA external 2-way dry contact device based on LoRaWAN open protocol of Netvox. It can externally connect various switches, buttons, relays and reed switch output. It can detect the closing or disconnecting signal of dry contact and is compatible with LoRaWAN protocol.

LoRa wireless technology:

LoRa is a wireless communication technology dedicated to long-distance low-power consumption. Its spread-spectrum modulation method greatly increases the communication distance compared with other communication methods, and can be widely used in long-distance low-rate IoT wireless communication fields in various occasions. Such as automatic meter reading, building automation equipment, wireless security systems, industrial monitoring and control. It has the characteristics of small size, low power consumption, long transmission distance and strong anti-interference ability.

LoRaWAN:

LoRaWAN defines an end-to-end standard specification using LoRa technology to ensure interoperability between devices and gateways from different vendors.

2. Appearance
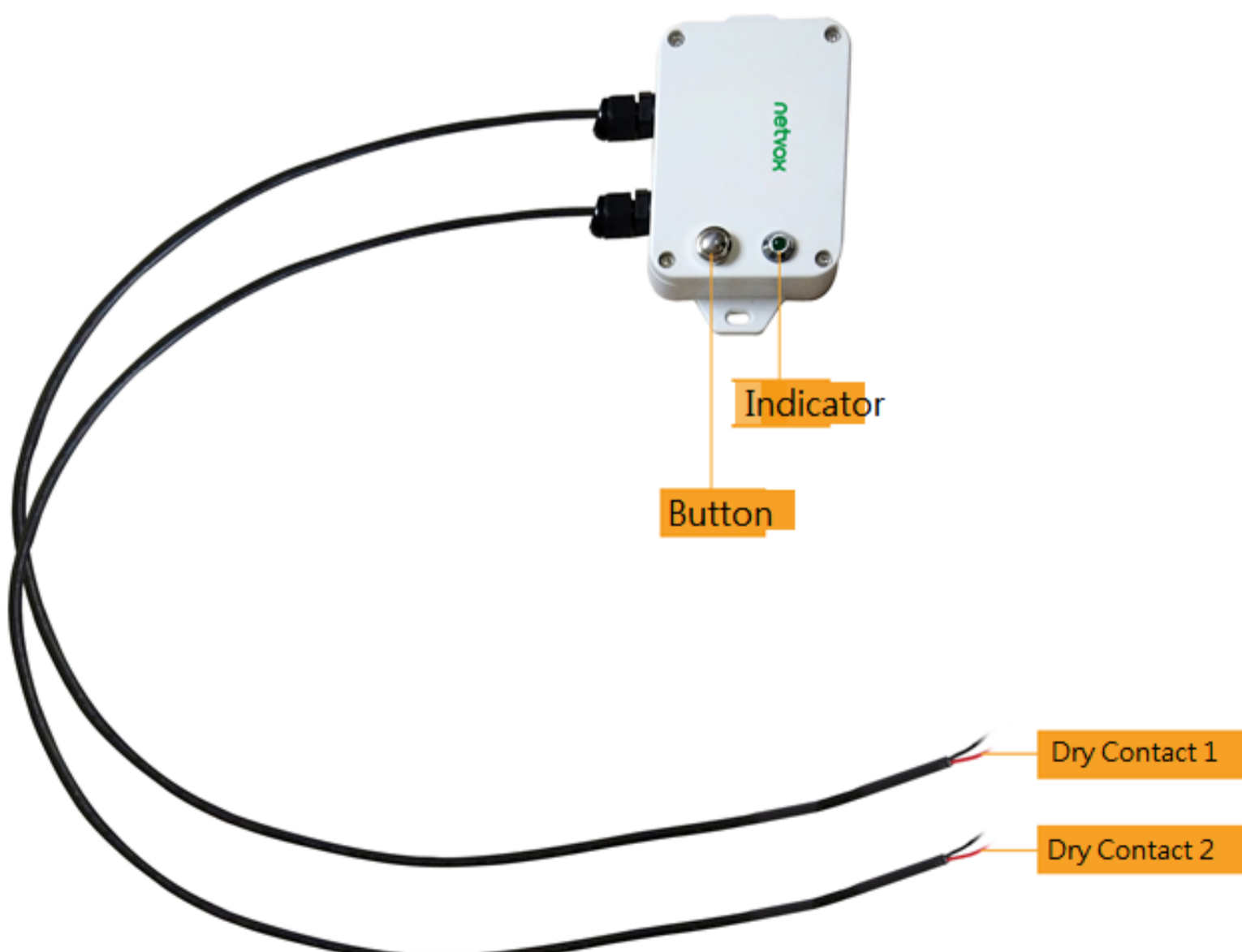
3. Main Feature

- Apply SX1276 wireless communication module

- 2 ER14505 lithium batteries (3.6V / section) parallel power supply

- Dry contact detection

- The base is attached with a magnet that can be attached to a ferromagnetic material object

- Protection class IP67

- 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

4.Set up Instruction

4.1 Power on and Turn on / off

(1) **Power on:** Insert batteries: open the battery cover; insert two sections of 3.6V ER14505 AA batteries and close the battery cover.

(2) **Turn on**: If the device had never joined in any network or at factory setting mode, after powering on, the device is at off mode by default setting. Press and hold function key for 3 seconds till the green indicator flashes once and release to turn on device.

(3) **Turn off:** Press and hold function key for 5 seconds till the green indicator flashes quickly and release. The green indicator will flash 20 times to show that the device is turned off.

Note:

1. The interval between shutting down twice or power off/on is suggested to be about 10 seconds to avoid the interference of capacitor inductance and other energy storage components.

2. Do not press function key and insert batteries in the same time, otherwise, it will enter engineer testing mode.

3. Turn off operation is same with "Restore to Factory Setting" operation.

4. Each time the battery is removed, it will be installed in the default "turn off" state, and users can turn on.

4.2 Join into the Network

To join the device into LoRa network to communicate with LoRa gateway.

The network operation is as following:

(1) If the device had never joined any network, turn on the device; it will search an available LoRa network to join. The green indicator will stay on for 5 seconds to show it joins into the network, otherwise, the green indicator will be off.

(2) If the device had been joined into a LoRa network, remove and insert the batteries; it will repeat step (1).

4.3 Function of Keys

(1) Press and hold function key for 5 seconds to reset to factory setting. After restoring to

    factory setting successfully, the green indicator will flash quickly 20 times.

(2) Press function key to turn on the device which is in the network and the green indicator will flash once and the device will send a data report.

4.4 Data Report

When the device is turned on, it will immediately send a version package.

Data will be reported once per hour by default setting.

Maximum time: 3600s

Minimum time: 3600s (Detect the current voltage value every 3600s by default setting)

Default reportchange:

       Battery ---- 0x01 (0.1V)

Dry contact detection trigger:

       When the dry contact is connected, the data status bit is "1".

       When the dry contact is disconnected, the data status bit is "0".

Note:

The device send data cycle depends on real burning configuration.

The interval between two reports must be the minimum interval.

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

Report Configuration

ConfigReportReq		0x01		MinTime (2bytes Unit: s)	MaxTime (2bytes Unit: s)	BatteryChange (1byte Unit:0.1v)	Reserved (4Bytes, Fixed 0x00)
ConfigReportRsp	R718J2	0x81	0x43	Status (0x00_success)	Reserved (8Bytes, Fixed 0x00)		
ReadConfigReportReq		0x02		Reserved (9Bytes, Fixed 0x00)			
ReadConfigReportRsp		0x82		MinTime (2bytes Unit: s)	MaxTime (2bytes Unit: s)	BatteryChange (1byte Unit:0.1v)	Reserved (4Bytes, Fixed 0x00)

(1) Configure R718PJ2 device parameter MinTime = 1min、MaxTime = 1min、BatteryChange = 0.1v

   Downlink: 0143003C003C0100000000

   Device Return:

      81430000000000000000000 (configuration success)

      81430100000000000000000 (configuration failure)

(2) Read R718J2 device parameter

   Downlink: 0243000000000000000000

   Device Return:

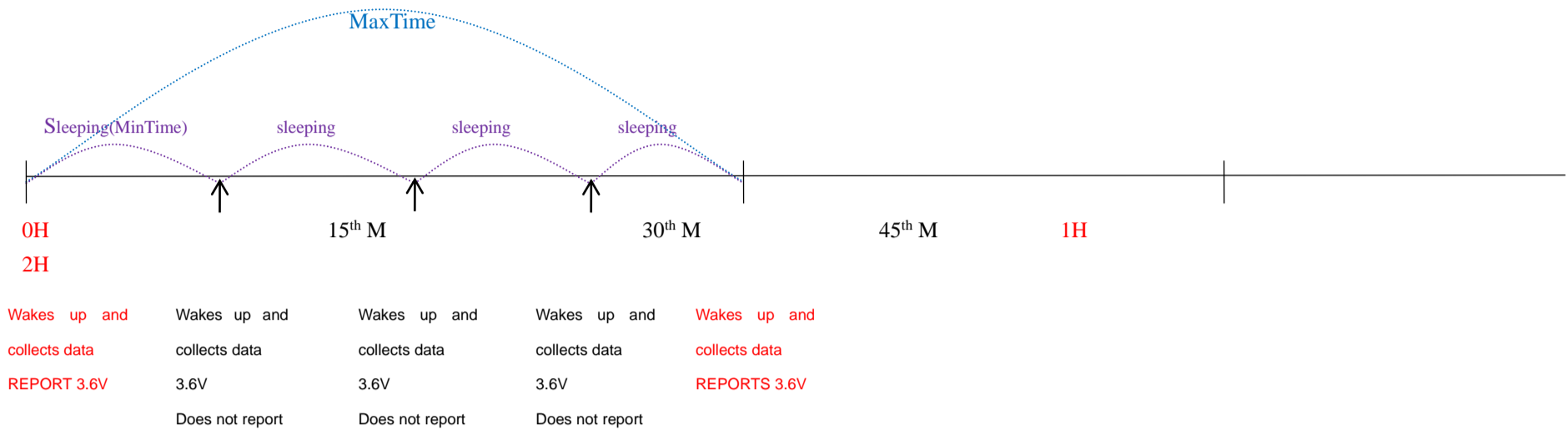   8243003C003C0100000000 (device current parameter)

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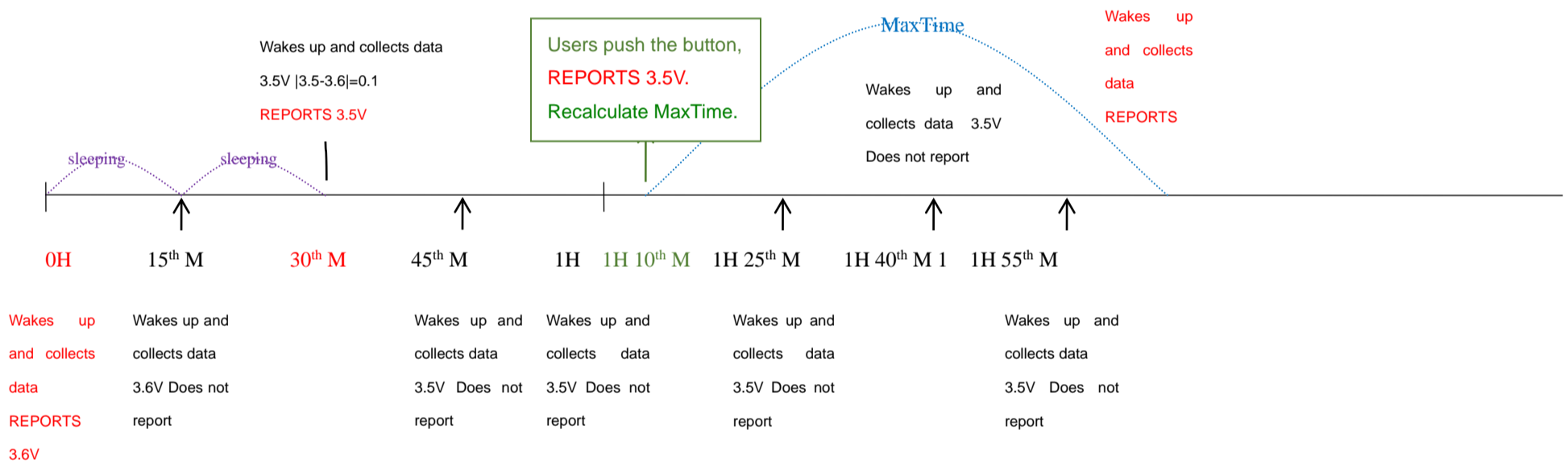

Note:

MaxTime=MinTime. Data will only be report according to MaxTime (MinTime) duration regardless BtteryVoltageChange 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   15th M   30th M   45th M   1H

2H

Wakes up and   Wakes up and   Wakes up and   Wakes up and   Wakes up and
collects data   collects data   collects data   collects data   collects data
REPORT 3.6V   3.6V   3.6V   3.6V   REPORTS 3.6V
                              Does not report   Does not report   Does not report

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

Wakes up and collects data

3.5V |3.5-3.6|=0.1

REPORTS 3.5V

Users push the button,
REPORTS 3.5V.
Recalculate MaxTime.

MaxTime

Wakes   up   and
collects data   3.5V
Does not report

Wakes   up
and collects
data
REPORTS

sleeping   sleeping

0H   15th M   30th M   45th M   1H   1H 10th M   1H 25th M   1H 40th M 1   1H 55th M

Wakes   up   Wakes up and   Wakes up and   Wakes up and   Wakes up and   Wakes up and
and collects   collects data   collects data   collects   data   collects   data   collects data
data   3.6V Does not   3.5V Does not   3.5V Does not   3.5V Does not   3.5V Does not
REPORTS   report   report   report   report   report
3.6V

5. Restore to Factory Setting

R718J2 saves data including network key information, configuration information, etc. To restore to factory setting, users need to execute below operations.

1. Press and hold function key for 5 seconds till the green indicator flashes and then release; LED flashes quickly 20 times.

2. R718J2 is at off mode by default setting after restoring to factory setting.

Note: The device operation of turning off is the same as the "Restore Factory Settings" operation.

6. Sleeping Mode

The device is designed to enter sleeping mode for power-saving in some situations:

(A) While the device is in the network → the sleeping period is Min Interval. (During this period, if the reportchange is larger than setting value, it will wake up and send a data report).

(B) When it is not in the network → R718J2 will enter sleeping mode and wake up every 15 seconds to search a network to join in the first two minutes. After two minutes, it will wake up every 15 minutes to request to join the network.

If it's at (B) status, to prevent this unwanted power consumption, we recommend that users remove the batteries to power off the device.

7. Low Voltage Alarming

The operating voltage threshold is 3.2V. If the battery voltage is lower than 3.2V, the device will send a low-power warning to the LoRa network.

8. Installation

1. The dry contact sensor (R718J2) has a built-in magnet (as Figure 1 below), which can be attached to the surface of an iron object during installation, which is convenient and quick.

In order to make the installation firmer, please use screws (purchased separately) to fix the device to the wall or other surface. (as Figure 2 below)

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.
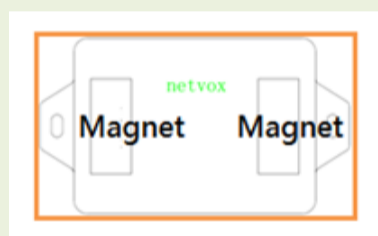
2. After the dry contact sensor detects the change of the dry contact state, it will report the data immediately.

3. If the battery voltage is detected that exceeds the change value during Min Time, the data will be reported immediately.

4. Whether the state of the dry contact is change, a piece of data will be reported regularly when the MaxTime comes.

Note:

When the dry contact is connected, the data status bit is "1". When the dry contact is disconnected, the data status bit is "0".

Dry contact sensor (R718J2) can be used in the following scenarios:

- Various switches and buttons
- Dry contact output of sensor
- The operating status of the equipment
- State monitoring of doors and windows in home or business

The occasion is necessary to judge the state of the sensor through the dry contact signal.
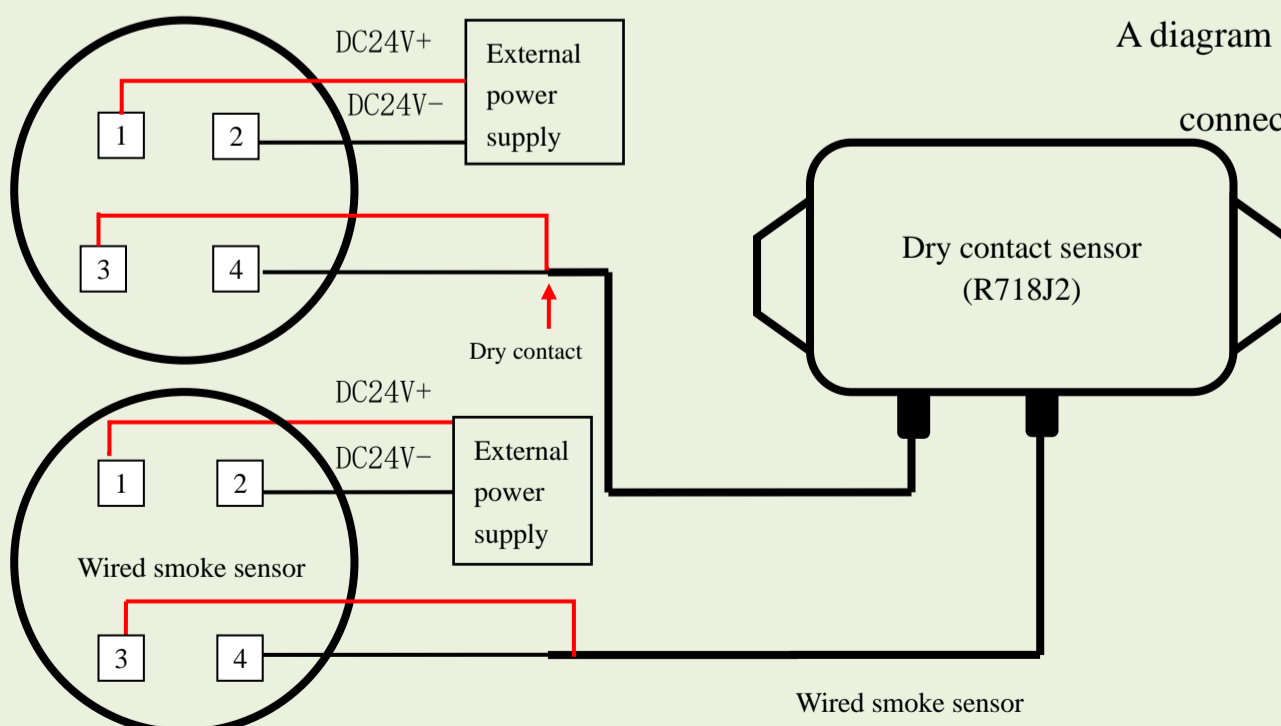
A diagram that the dry contact sensor (R718J2) connecting to two wired smoke sensors.

9. 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:

9.1 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.

9.2 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 $\geqq 3.3$, 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.

10. Important Maintenance Instruction

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

• Keep the equipment dry. Rain, moisture and various liquids or water 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 way can damage its detachable parts and electronic components.

• Do not store in excessive heat place. High temperatures can shorten the life of electronic devices, destroy batteries, and deform or melt some plastic parts.

• Do not store in excessive 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. Treating equipment roughly can destroy internal circuit boards and delicate structures.

• Do not wash with strong chemicals, detergents or strong detergents.

• Do not paint the device. Smudges can make debris block detachable parts up and affect normal operation.

• Do not throw the battery into the fire to prevent the battery from exploding. Damaged batteries may also explode.

All the above suggestions apply equally to your device, batteries and accessories.

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