netvox R718MA Wireless Asset Sensor User Manual

Wireless Asset Sensor
R718MA
User Manual

Contents

Introduction

This device is a simple positioning function (which can detect the position status of the device), and periodically reports RSSI and SNR.
The information is processed by the gateway, and the location range of the device is detected according to the reported RSSI and SNR information. The device applies SX1276 wireless communication module. For reported RSSI, SNR information location status, the acceptance sensitivity is -136 dBm (LoRa, Spreading Factor = 12, Bit Rate = 293 bps).
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.

Appearance

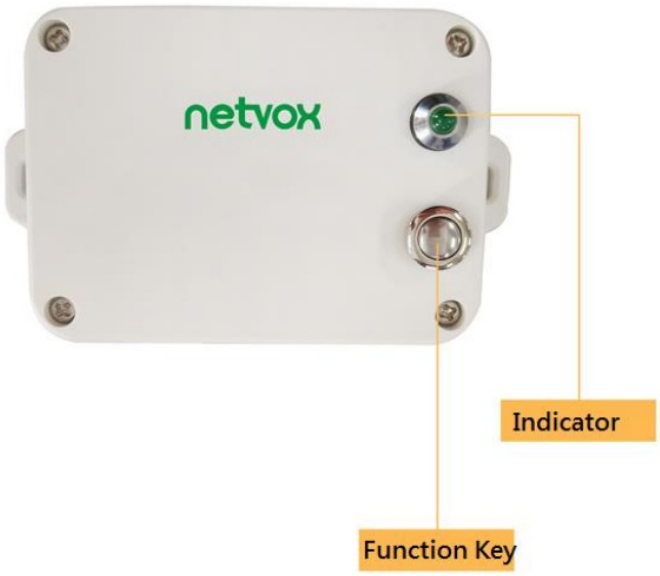


Fig.1 R718MA Appearance

Main Features

- Compatible with LoRaWAN protocol.
- Powered by 2 x ER14505 3.6V Lithium AA battery
- Easy set up and installation
- Simple location range detection

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. Once the battery is removed, the device is at off mode by default setting.
4. Turn off operation is same with “Restore to Factory Setting” operation.

4.2 Join Into LoRa 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 R718MA had been joined into a LoRa network, remove and insert the batteries; it will repeat step (1).

4.3 Function Key

1. Press and hold function key for 5 seconds to reset to factory setting. After restoring to factory setting successfully, the green indicator will flashes 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.

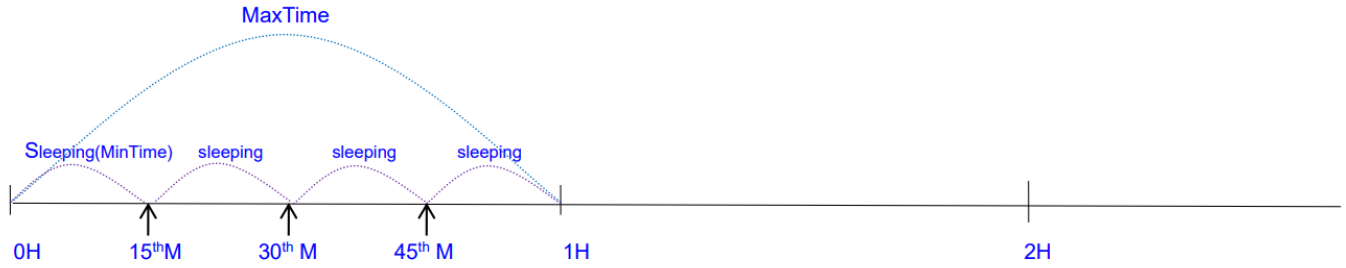
4.4 Data Report

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 report change:
Battery —- 0x01 (0.1V)
Note:
The device send data cycle depends on real burning configuration.
The interval between two reports must be the minimum interval.
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:

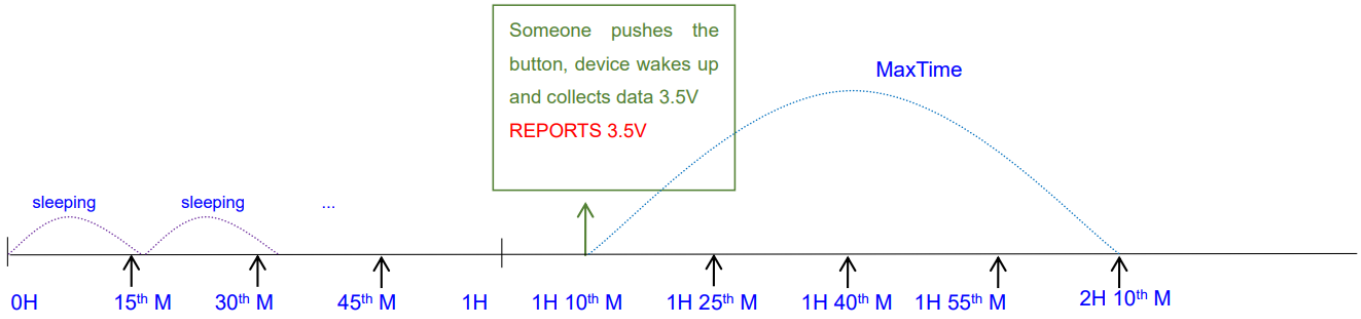
Min. Interval (Unit:second)	Max. Interval (Unit:second)	Reportable Change	Current Change? Reportable Change	Current Change < Reportable Change
Any number between 1-65535	Any number between 1-65535	Can not be 0.	Report per Min. Interval	Report per Max. Interval

Example#1
based on MinTime = 15 Minutes, MaxTime= 1 Hour, battery voltage Reportable Change = 0.1V



Wakes up	Wakes up and	Wakes up and	Wakes up and	Wakes up and collects data
and	collects data	collects data	collects data	REPORTS3.6
collects	3.6V	3.6	3.6	
data	|3.6-3.6|=0< 0.1	|3.6-3.6|=0<0.1	|3.6-3.6|=0<0.1	
REPORTS	Does not rep ort	Does not report	Does not report	

100mV
Example#2
based on MinTime = 15 Minutes, MaxTime= 1 Hour, battery voltage Reportable Change = 0.1V



Wake s up	Wakes up and	Wakes up and	Wakes u p and	Wakes up a nd	Wakes up a nd	Wakes u p and	Wakes up and	Wakes up a nd
and	collects data	collects d ata	collects data	collects data	collects dat a	collects d ata	collects da ta	collects data
collec ts	3.6	3.5	3.5	3.5	3.5	3.5	3.5	REPORTS
data	|3.6-3.6|= 0<0.1	|3.6-3.5|= 0.1=0.1	|3.5-3.5| =0<0.1	|3.5-3.5|=0< 0.1	|3.5-3.5|=0 <0.1	|3.5- 3.5|=0<0. 1	|3.5-3.5|=0 <0.1	3.5
REP ORT S 3.6	Does not r eport	REPORT S 3.5	Does not report	Does not rep ort	Does not re port	Does not report	Does not r eport	

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 Reportable Change 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 Maxime interval.
3. We do not recommend to set the Min Time Interval value too low. If the Min Time 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.

Restore to Factory Setting

R718MA 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. R718MA 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.

Sleeping Mode

R718MA 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 report change is larger than setting value, it will wake up and send a data report).
(B) When it is not in the network → R718MA 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.

Low Voltage Alarming

The operating voltage threshold is 3.2V. If the battery voltage is lower than 3.2V, R718MA will send a low-power warning to the LoRa network.

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

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 ≧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.

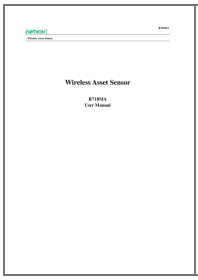
Important Maintenance Instruction

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.

Documents / Resources

	netvox R718MA Wireless Asset Sensor [pdf] User Manual R718MA Wireless Asset Sensor, R718MA, Wireless Asset Sensor, Asset Sensor

References

- Netvox LoRaWAN Application Command
- User Manual