

Wireless Outdoor Temperature and Humidity Sensor

User Manual

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1. Introduction

R712 is a long-range wireless outdoor temperature and humidity device based on the LoRaWAN open protocol (Class A).

The R712 is mainly used to detect the temperature and humidity in outdoor air, and also carrying a waterproof housing. It collects data over LoRa network and sends it to devices to be shown, fully compatible with LoRaWAN protocol.

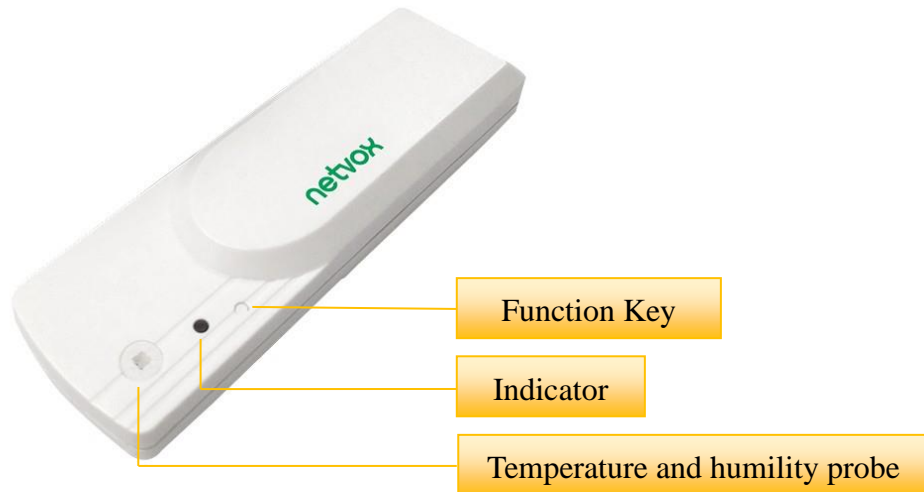
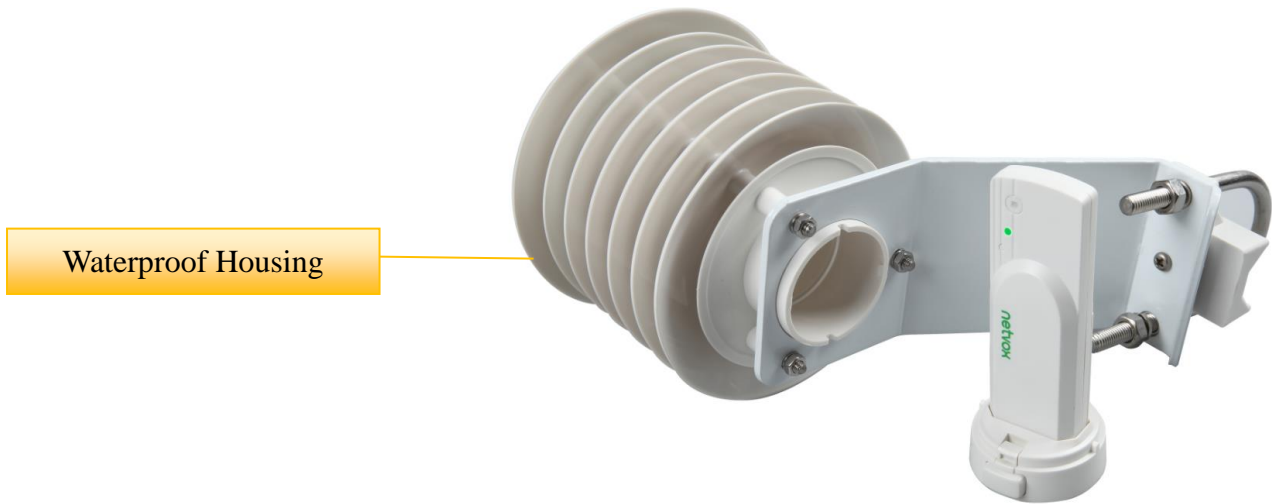
LoRa Wireless Technology:

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



3. Main Features

- Compatible with LoRaWAN
- 2 section 1.5V AA Alkaline battery
- Temperature and humidity detection
- IP rating IP43
- 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*2:
 - 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 2 section AA 1.5V batteries
Turn on	Press the function key till the green and red 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. Hold the function key and insert batteries, the device will be into 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>

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>
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Low Voltage Warning

Low Voltage	2.4V
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5. Data Report

The device will immediately send a version packet report along with an uplink packet including temperature, humidity and battery voltage.

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

Default setting:

MaxTime:Max Interval = 60 min=3600s

MinTime:Min Interval = 60 min =3600s

BatteryChange: 0x01 (0.1V)

TemperatureChange:0x0064 (1°C)

HumidityChange:0x0064 (1%)

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.

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 1~65535	Any number between 1~65535	Can not be 0.	Report per Min Interval	Report per Max Interval

Example of Report configuration

FPort: 0x07

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

CmdID– 1 bytes

DeviceType– 1 byte – Device Type of Device

NetvoxPayLoadData– var bytes (Max=9bytes)

Description	Device	CmdID	Device Type	NetvoxPayLoadData				
Config ReportReq	R712	0x01	0x01	MinTime (2bytes Unit:s)	MaxTime (2bytesUnit:s)	Battery Change (1byte Unit:0.1v)	Temperature Change (2byte Unit:0.01°C)	Humidity Change (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°C)	Humidity Change (2byte Unit:0.01%)

(1) Command Configuration:

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

Downlink: 0101003C003C0100640064 003C(H_{ex}) = 60(D_{ec}),0064(H_{ex}) = 100(D_{ec})

Response:

810100000000000000000000 (Configuration success)

810101000000000000000000 (Configuration failure)

(2) Read Configuration:

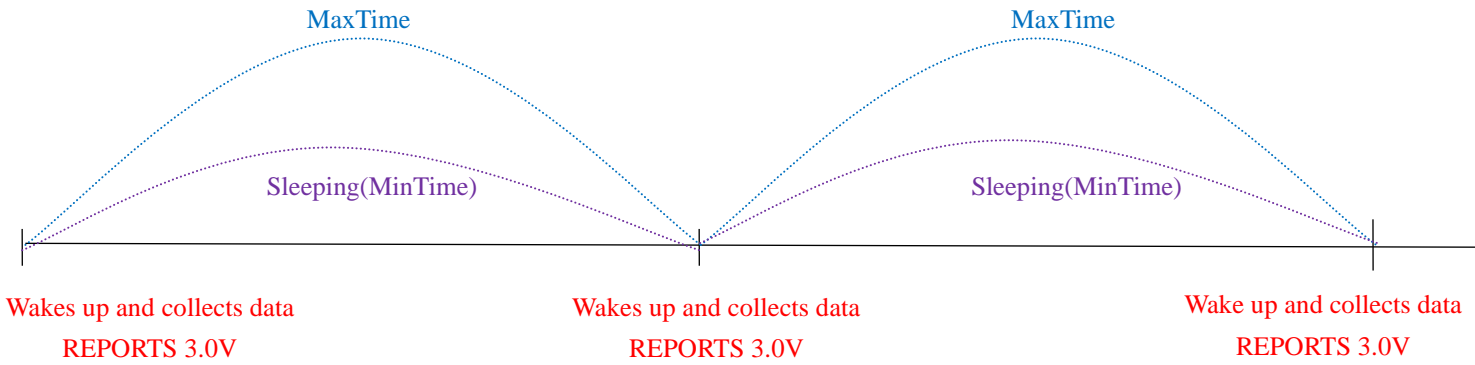
Downlink: 020100000000000000000000

Response:

8201003C003C0100640064 (Current configuration)

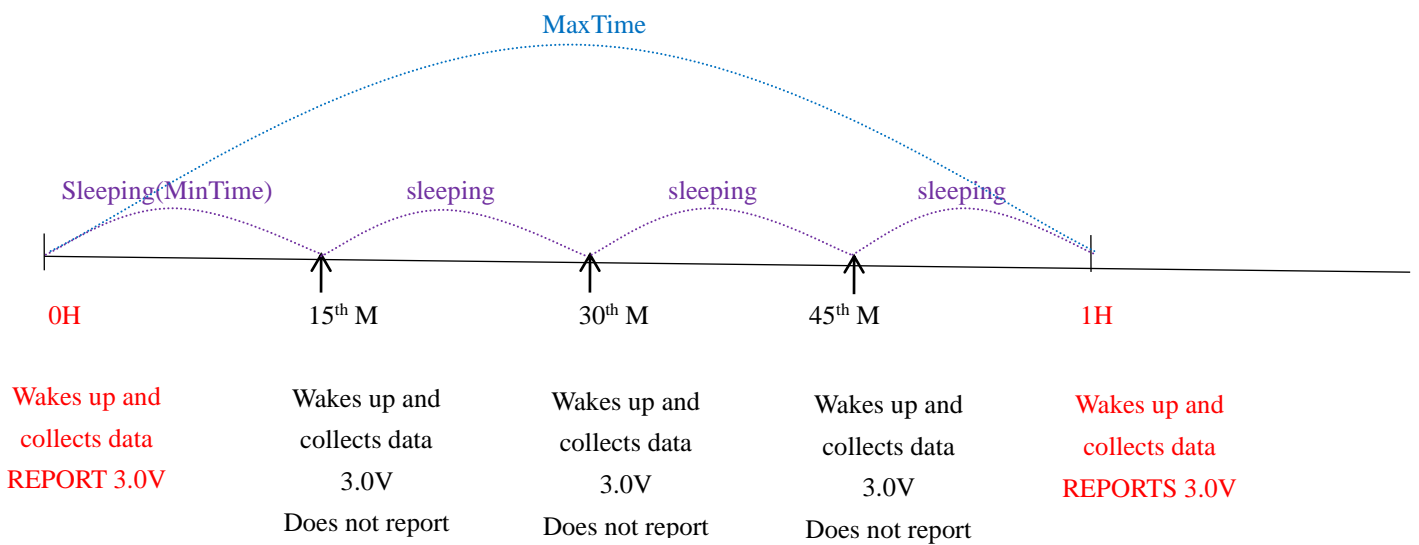
Example for MinTime/MaxTime logic:

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

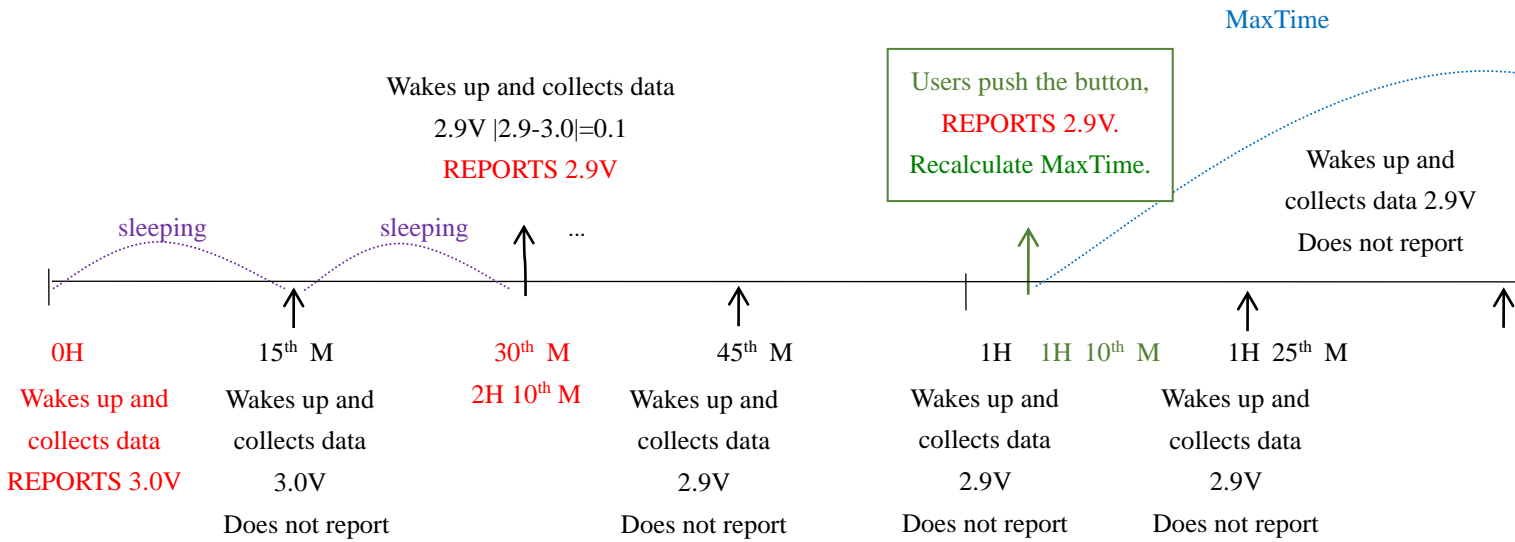


Note: MaxTime=MinTime. Data will only be report according to MaxTime (MinTime) duration regardless BatteryVoltageChange value.

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 and Precaution

1. Take out the temperature and humidity sensor and the base of it from the housing (as shown below).

Steps:

Press the buttons on both sides of the base (as shown in the below picture), then gently take out the sensor inside the housing.

Note:

Please keep the device from metal or other electrical equipment to avoid affecting the wireless transmission of the device.



2. Insert the battery into the sensor, then replace the sensor and base into the housing.

Note that the protruding part of the base should be aligned with the concave part of the housing (red frame below).



3. Unscrew the nut of the red circle below and lock the device to the tube as shown below.



4. When the temperature and humidity detected by R712 is compared with the last reported values, when the temperature change is exceeded 1°C (default) or the humidity change is exceeded 1% (default), it will report current values.

5. Installation height recommendation: 1-1.5 m

6. Installation ambient temperature: -20°C ~ 55°C

The outdoor temperature and humidity sensor (R712) is suitable for the following scenarios:

- Smart agriculture
- Environmental monitoring

When it is necessary to detect temperature or humidity outdoors

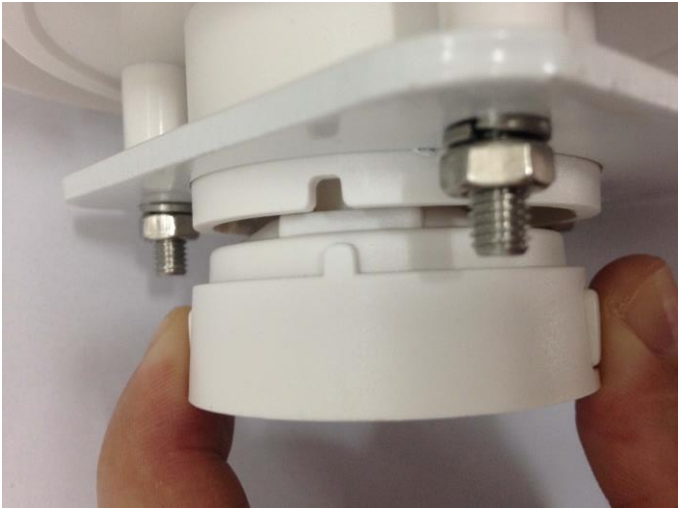


Battery installation steps

The device must use 2 sections of AA 1.5V Alkaline batteries

Step 1

Press the buttons on both sides of the base (as shown in the below picture), then gently take out the sensor inside the housing.



Step 2

On the back of the device, press and hold the battery cover, and then slide down to open the battery bay. Put the batteries into the battery bay of the device. Please note the positive and negative poles of the battery, please do not insert the battery reversely.



Step 3

After inserting the batteries, like the following picture, and put the lid back on.



7. 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.