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netvox R718Y Wireless Differential Pressure and Temperature User Manual

Model R718Y
Wireless Differential Pressure and Temperature
User Manual

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Introduction

R718Y is the Class A device based on the LoRaWAN™ protocol of Netvox. The device detects the pressure

difference and the temperature. It 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, the LoRa spread spectrum modulation method greatly increases to expand the communication distance. Widely used in long-distance, low-data wireless communications. For Examples, automatic meter reading, building automation equipment, wireless security systems, and 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

Main Features

- Apply SX1276 wireless communication module
- 2 ER14505 batteries AA size (3.6V / section) in parallel
- Differential pressure sensor
- Protection class IP40
- The base is attached with a magnet that can be attached to a ferrous object
- 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

Battery Life:
- Please refer to the web: **http://www.netvox.com.tw/electric/electric_calc.html**
- On this website, users can find battery lifetime for various models at different configurations.

1. The actual range may vary depending on the environment.

2. Battery life is determined by sensor reporting frequency and other variables.

Set up Instruction

On/Off	
Power on	Insert batteries. (The users may need a 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 second, and the green indicator flashes 20 times.
Power off	Remove Batteries.
Note:	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. The first 5 seconds after power on, the device will be in engineering test mode.
Network Joining	
Never joined the network	Turn on the device to search the network. The green indicator stays on for 5 seconds: success The green indicator remains off: fail
Had joined the network	Turn on the device to search the previous network. The green indicator stays on for 5 seconds: success The green indicator remains off: fail
Function Key	
Press and hold for 5 seconds	Restore to factory setting / Turn off The green indicator flashes 20 times: success The green indicator remains off: fail
Press once	The device is in the network: green indicator flashes once and sends a report The device is not in the network: the green indicator remains off
Sleeping Mode	
The device is on and in the network	Sleeping period: Min Interval. When the report change exceeds the setting value or the state changes: send a data report according to Min Interval.

Low Voltage Warning

Low Voltage	3.2V

Data Report

When the device is powered on, it will immediately send a version package Report and the report data with the device battery voltage, the differential pressure, and the temperature.
The device sends data in the default configuration before any configuration is done.

Default setting:
MaxTime: Max Interval = 15 min = 900s
MinTime: Max Interval = 15 min = 900s
BatteryChange = 0x01 (Unit: 0.1v)
Different Pressure Change = 0x0A (1 Pa) (Unit: 0.1Pa)
Temperature Change = 0x0A (1°C) (Unit: 0.1°C)

Measurement Range:
Different pressure Measuring Range: -500 to 500 Pa
Temperature Measuring Range: -20°C to 50°C

Pressure Difference And Temperature Detection:
When the function key is pressed, the device immediately sends a report with the current-voltage value, differential pressure value and temperature value. Or when the configured time is up, it will also detect and send the report with Battery, Different Pressure, and Temperature.
Note: Please refer to Netvox LoRaWAN Application Command document and Netvox Lora Command Resolver **http://loraresolver.netvoxcloud.com:8888/page/index** to resolve uplink data.

5.1 Example of ReportDataCmd
FPort 0x06

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 device type is listed in Netvox LoRaWAN Application Devicetype doc
ReportType – 1 byte –the presentation of the NetvoxPayLoadData according to the device type
NetvoxPayLoadData– Fixed bytes (Fixed =8bytes)

Device	CmdID	Device Type	NetvoxPayLoadData			
R718Y	0xAC	0x01	Battery (1byte, Unit: 0.1v)	Different Pressure (Signed2Bytes, Unit: 0.1Pa)	Temperature (Signed2Bytes,Unit: 0.1°C)	Reserved (3Bytes, Fixed 0x00)

Uplink: 01AC0124001E0116000000
1″ byte (01): Version
2nd byte(AC): DeviceType OxAC — R718Y
3rd byte (01): ReportType
4thbr –, e (24): Battery, 24 Hex=36 Dec 36*0.1v=3.6v
5th 6th byte (001E): Different Pressure, 1E1-6 =30 Dec 30*0.1Pa=3 Pa
7th 8th byte (0116): Temperature, 116 Hex =278 Dec 278*0.1°C=27.8°C
9th —11th byte (000000): Reserved

5.2 Example of ConfigureCmd
FPort 0x07

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	CmdID	DeviceType	NetvoxPayLoadData					
Config ReportReq		0x01		MinTime (2bytes, Unit: s)	MaxTime (2bytes, Unit: s)	BatteryChange (1byte, Unit: 0.1v)	DifferentPressure Change (2bytes Unit:0.1Pa)	TemperatureChange (2byte Unit: 0.1°C)	
Config ReportRsp		0x81		Status (0x00_success)			Reserved (8Bytes, Fixed 0x00)		
ReadConfig ReportReq	R718Y	0x02	0xAC	Reserved (9Bytes,Fixed 0x00)					

ReadConfig ReportRsp	0x82	MinTime (2bytes, Unit: s)	MaxTime (2bytes, Unit: s)	BatteryChange (1byte, Unit: 0.1v)	DifferentPressure Change (2bytes, Unit: 0.1Pa)	TemperatureChange (2byte Unit: 0.1°C)

(1) Configure device parameters MinTime = 1min, MaxTime = 1min, BatteryChange = 0.1v, DifferentPressureChange=10Pa,
TemperatureChange = 10℃
Downlink: 01AC003C003C0100640064 003C(Hex) = 60(Dec)
Device returns:
81AC000000000000000000 (configuration successful)

81AC010000000000000000 (configuration failed)
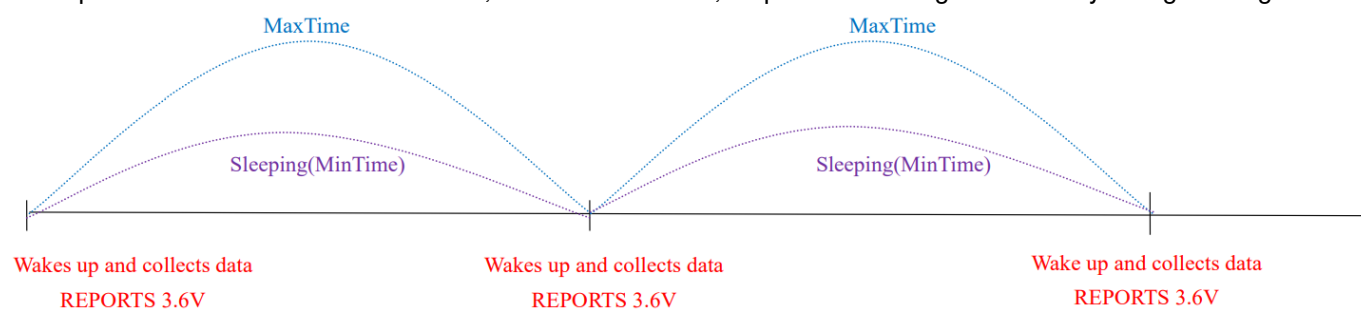(2) Read device parameters
Downlink: 02AC000000000000000000
Device returns:
82AC003C003C0100640064 (current device parameters)

5.3 Example for MinTime/MaxTime logic

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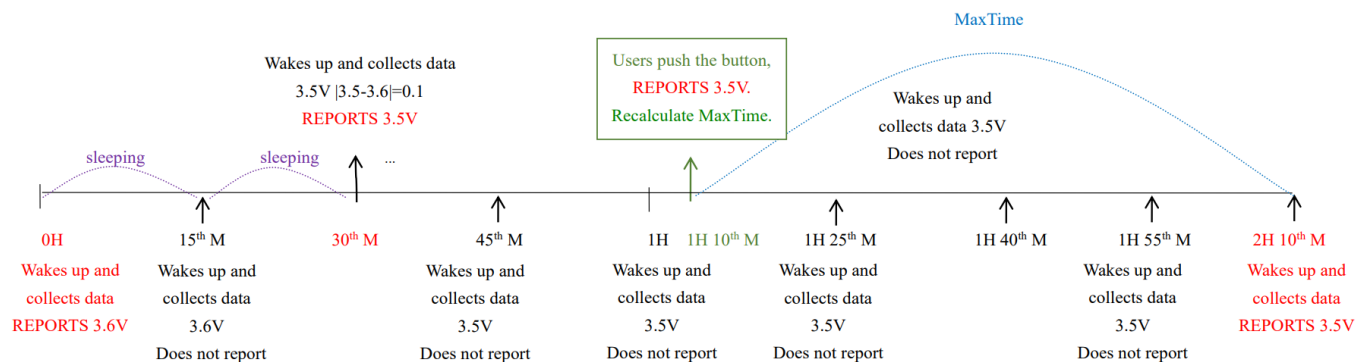

Note: MaxTime=MinTime. Data will only be report according to MaxTime (MinTime) duration regardless BatteryVoltageChange value.
Example#2 based on MinTime = 15 Minutes, MaxTime= 1 Hour, Reportable Change i.e. BatteryVoltageChange=

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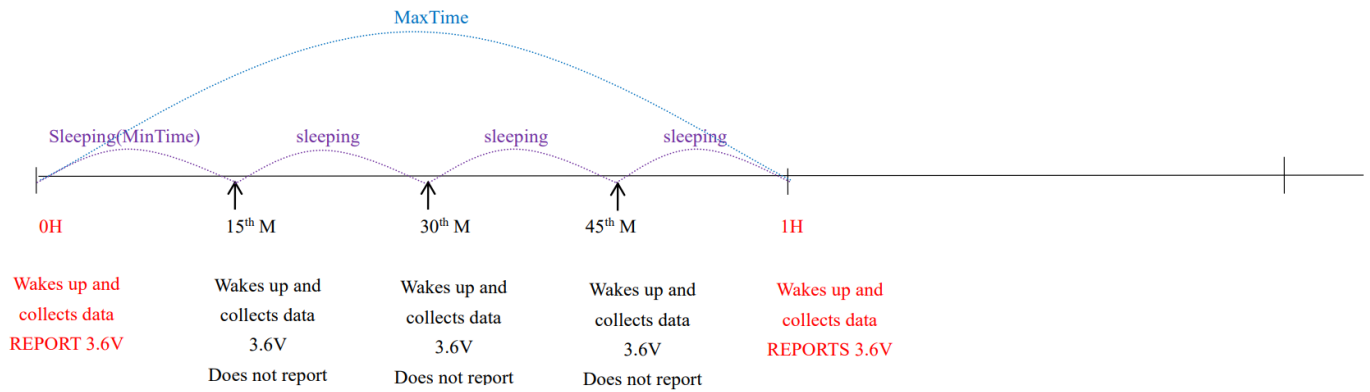
Example#3 based on MinTime = 15 Minutes, MaxTime= 1 Hour, Reportable Change i.e. BatteryVoltageChange= 0.1V.

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 the MinTime interval. If the data variation is not greater than the last data reported, the device reports according to the Maxime interval.

3. We do not recommend setting 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 push or Maxime interval, another cycle of MinTime/Maxime calculation is started.

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 a 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:
6.1 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.

6.2 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
NONE	165 Ω	5 minutes	20mA
RAMSAY	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.

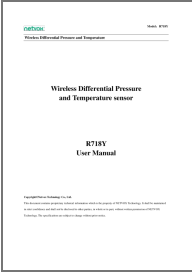## Important Maintenance Instruction

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 a dusty or dirty environment. It might damage its detachable parts and electronic components.
- Do not store the device under excessive heat conditions. 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.

Documents / Resources

References

- 🌐 **Netvox Command Resolver**
- 🌐 **ÉÔºò¡£¡£¡£**