netvox R718J Wireless Dry Contact Interface User Manual

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Introduction

R718J is a ClassA external dry contact device based on the 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 the 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.

Appearance

Features

- SX1276 wireless communication module
- 2 ER14505 lithium batteries (3.6V / section) parallel power supply
- Dry contact detection
- Magnetic base
- Protection class IP67
- Compatible with LoRaWANTM Class A
- Frequency hopping spread spectrum
- Applicable to third-party platforms: Actility/ThingPark, TTN, MyDevices/Cayenne
- Low power consumption and long battery life
- Battery Life:
  - Please refer to web: **http://www.netvox.com.tw/electric/electric_calc.html**
  - At this website, users can find battery life time for a variety of models at different configurations.

Set up Instruction

On/Off

Power on	Insert batteries. (Users may need a screwdriver to open)
Turn on	Press and hold the function key for 3 seconds until the green indicator flashes once.
Turn off (Restore to factory setting)	Press and hold the function key for 5 seconds until 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. Five 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
Fail to Join the Network	Please check the device verification information on the gateway or consult your platform server provider.

Function Key

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

Sleeping Mode

The device is on and in the netw ork	Sleeping period: Min Interval. When the report change exceeds the setting value or the state changes: sen d a data report according to Min Interval.

Low Voltage Warning

Low Voltage	3.2V

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.

Default Setting

- **Maximum Time:** 0x0E10 (3600s)
- **Minimum Time:** 0x0E10 (3600s) // Detect the current voltage value every 3600s by default setting
- **Battery Change**: 0x01 (0.1V)
- **Last Message Resend Time:** 0x00

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”.

Last Message Resend Time Function:

- Resend time = 0x00 or 0xFF, send the current dry contact state
- Resend time = 0x03 to 0xFE, send the current dry contact state, and re-send the dry contact state after 3-254s

  *The function of Resendtime is supported by the firmware version after 2020/05/13 version

Note
The device sends a data cycle depending on the 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://www.netvox.com.cn:8888/cmddoc** to resolve uplink data.

Data report configuration and sending period are as follows:

Min. Interval (Unit: second)	Max. Interval (Unit: second)	Reportable Change	Current Change≥ Reportable Change	Current Change Reportable Change
Any number betwee n 1~65535	Any number betwee n 1~65535	Can not be 0.	Report per Min. Interval	Report per Max. Interval

Example of Report Data Cmd

- **FPort** 0x06

Bytes	1	1	1	Var(Fix=8 Bytes)
	Version	Device Typ e	Report Type	Net vox Pay Load Data

- **Version–** 1 byte –0x01——the Version of Net vox LoRa WAN Application Command Version
- **DeviceType**– 1 byte – Device Type of Device
  The device type is listed in the Netvox LoRaWAN Application Device type doc
- **Report Type** – 1 byte –the presentation of the Netvox Pay Load Data according to the device type
- **Netvox Pay Load Data**– Fixed bytes (Fixed =8bytes)

Tips

Battery Voltage:
The voltage value is bit 0 ~ bit 6, bit 7=0 is normal voltage and bit 7=1 is low voltage. Battery=0xA0, binary=1010 0000, if bit 7= 1, it means low voltage. The actual voltage is 0010 0000 = 0x20 = 32, 32*0.1v =3.2v

Version Packet:
When Report Type=0x00 is the version packet, such as 0121000A0B202005200000, the firmware version is 2020.05.20

Data Packet:
When Report Type=0x01 is data packet.

Device	Device Type	Report Type	Netvox Pay Load Data			
R718J	0x21	0x00	Software Version(1Byte) Eg.0x0A—V1.0	Hardware Version (1Byte)	Date Code (4Bytes,eg0x20170503)	Reserved (2Bytes,fixed 0x00)
		0x01	Battery (1Byte,unit:0.1V)	Status (1Byte 0:off 1:on)	Reserved (6Bytes,fixed 0x00)	

Example 1 of Uplink: 012101240100000000000

1. **1st byte (01):** Version
2. **2nd byte (21):** Device Type 0x21 R718J
3. **3rd byte (01):** Report Type
4. **4th byte (24):** Battery 3.6v , 24(HEX)=36(DEC),36*0.1v=3.6v 5th byte (01): Status on
5. **6th ~ 11th byte (000000000000):** Reserved

Example 2 of Uplink: 0121019F00000000000000

1. **1st byte (01):** Version
2. **2nd byte (21):** Device Type 0x21 R718J
3. **3rd byte (01):** Report Type
4. **4th byte (9F):** Battery 3.1v , 1F (HEX)=31(DEC),31*0.1v=3.1v // The bit 7=0 represent normal battery voltage, bit 7=1 represent low battery 5th byte (00): Status off
5. **6th ~ 11th byte (000000000000):** Reserved

Example of Configure Cmd

- **FPort** 0x07

Bytes	1	1	Var (Fix =9 Bytes)
	CmdID	Device Type	Netvox Pay Load Data

- **CmdID–** 1 byte
- **Device Type–** 1 byte – Device Type of Device
- **Netvox Pay Load Data**– var bytes (Max=9bytes)

Description	Device	CmdID	Device Type	Netvox Pay Load Data			
Config Report Req	R718J	0x01	0x21	Min Time (2bytes Units:s)	Maxime (2bytes Units:s)	Battery Change (1byte Unit:0.1v)	Reserved (4Bytes,Fixed 0x00)
Config Report Rsp		0x81		Status (0x00_success)		Reserved (8Bytes,Fixed 0x00)	
Read Config Report Req		0x02		Reserved (9Bytes,Fixed 0x00)			
Read Config Report Rsp		0x82		Min Time (2bytes Units:s)	Maxime (2bytes Units:s)	Battery Change (1byte Unit:0.1v)	Reserved (4Bytes,Fixed 0x00)

Configure device parameters
Min Time = 1min, Max Time = 1min, Battery Change = 0.1v Downlink: 0121003C003C0100000000 003C(Hex) = 60(Dec)

Device returns

- 812100000000000000000 (configuration is successful)
- 812101000000000000000 (configuration failed)

Read device parameters
Downlink: 022100000000000000000

Device returns
8221003C003C0100000000 (current device parameters)

Set Last Message Resend time Req	ALL(0xFF) only used in contact switch device type	0x1F	0xFF	Resend time(1Byte) Unit:1s , Range:3-254s when 0 or 255 no resend, default is no resend	Reserved (8Bytes,Fixed 0x00)
Set Last Message Resend time Rsp		0x9F		Status (0x00_success)	Reserved (8Bytes,Fixed 0x00)
Get Last Message Resend time Req		0x1E		Reserved (9Bytes,Fixed 0x00)	
Get Last Message Resend time Rsp		0x9E		Resend time(1Byte) Unit:1s , Range:3-254s when 0 or 255 no resend, default is no resend	Reserved (8Bytes,Fixed 0x00)

Set resend time =5s

Downlink: 1FFF0500000000000000

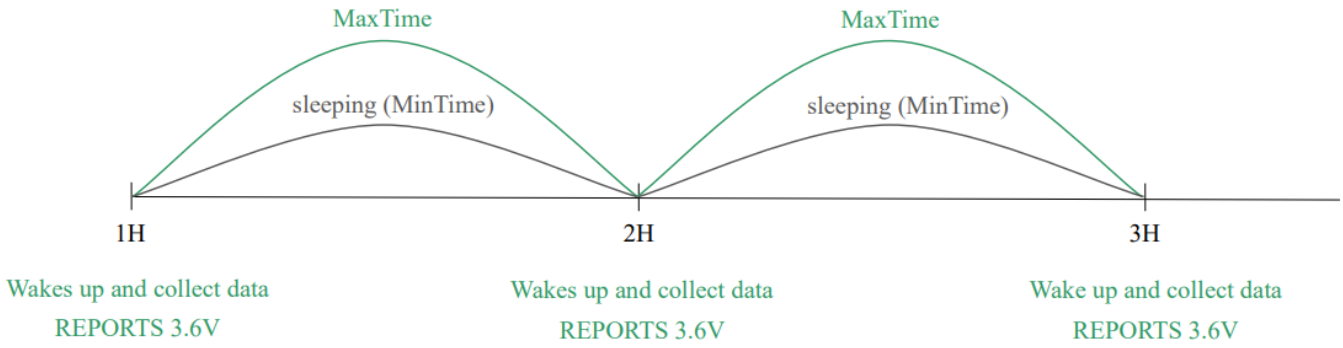
Response:

- FFF000000000000000000 Configuration success
- FFF010000000000000000 Configuration failure

- The function of Resend time is supported by the firmware version after 2020/05/13 version

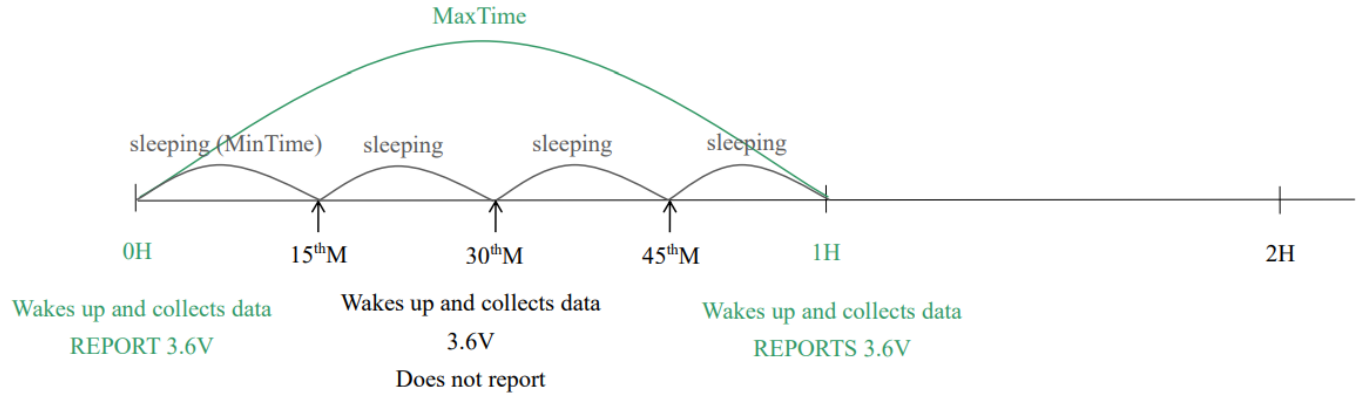
Example for Min Time/Max Time logic

Example#1 based on Min Time = 1 Hour, Max Time= 1 Hour, Reportable Change i.e. Battery Voltage Change=0.1V

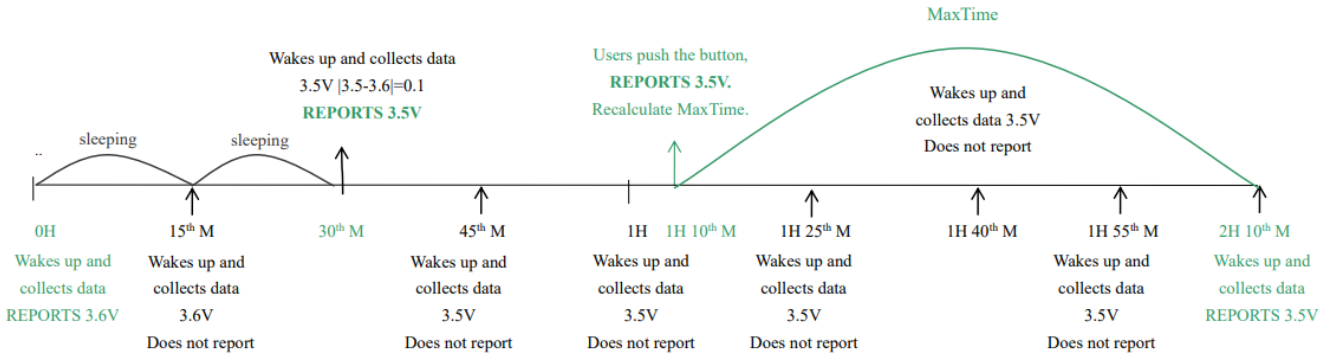


Note: Max Time=Min Time. Data will only be reported according to Max Time (Min Time) duration regardless of Battery Voltage Change value.

Example#2 based on Min Time = 15 Minutes, Max Time= 1 Hour, Reportable Change i.e. Battery Voltage Change= 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 Min Time 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 Min Time 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 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 Max Time interval, another cycle of Min Time/Max Time calculation is started.

Installation

1. The dry contact sensor (R718J) 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.
   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 changed, a piece of data will be reported regularly when the Max Time comes.

Note:

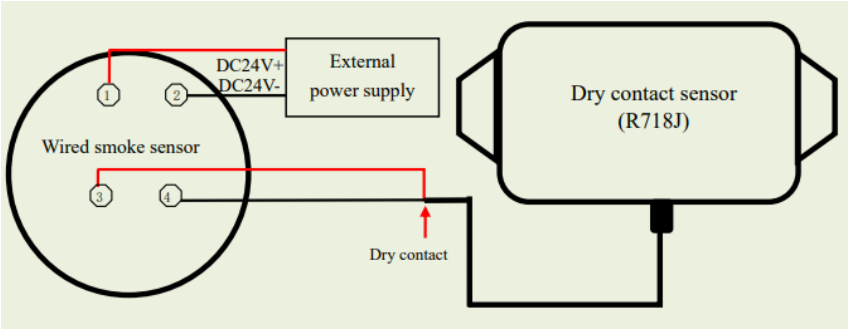
1. The input of dry contact can only receive signals from a passive switch. It does not receive analog signals, such as current or voltage.
2. When the dry contact is connected, the data status bit is “1”. When the dry contact is disconnected, the data status bit is “0”.

Dry contact sensor (R718J) can be used in the following scenarios:

- Various switches and buttons
- Dry contact output of the 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 (R718J) connecting to a wired smoke sensor.



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 reactions 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:

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.

How to activate the battery

- Connect a battery to a resistor in parallel
- Keep the connection for 5~8 minutes
- 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

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

- Do not put the device near or submerge in water. Minerals in rain, moisture, and other liquids could cause corrosion of
  electronic components. Please dry the device, if it gets wet.
- Do not use or store the device in dusty or dirty environments to prevent damage to parts and electronic components.
- Do not store the device in high temperatures. This may shorten the lifespan of electronic components, damage batteries, and
  deform plastic parts.
- Do not store the device in cold temperatures. Moisture may damage circuit boards as the temperatures rise.

- Do not throw or cause other unnecessary shocks to the device. This may damage internal circuits and delicate components.
- Do not clean the device with strong chemicals, detergents, or strong detergents.
- Do not apply the device with paint. This may block detachable parts and cause malfunction.
- Do not dispose of batteries in a fire to prevent the explosion. The instructions are applied to your device, battery, and accessories. If any device is not working properly, please bring it to the nearest authorized service provider for repair.

Documents / Resources

	netvox R718J Wireless Dry Contact Interface [pdf] User Manual R718J Wireless Dry Contact Interface, R718J, Wireless Dry Contact Interface, Dry Contact Interface, Contact Interface, Interface

References

- Netvox LoRaWAN Application Command
- ÉÔºò¡£¡£¡£
- User Manual