Wireless Multi-Sensor Interface for 0-24V ADC, Dry Contact and 4-20mA Sensors

R718IJK

User Manual

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1. Introduction

R718IJK is a multi-sensor interface detection device for Netvox ClassA type devices based on LoRaWAN open protocol.

R718IJK multi-sensor interface including 0-24V ADC, Dry Contact and 4-20mA, and R718IJK is 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

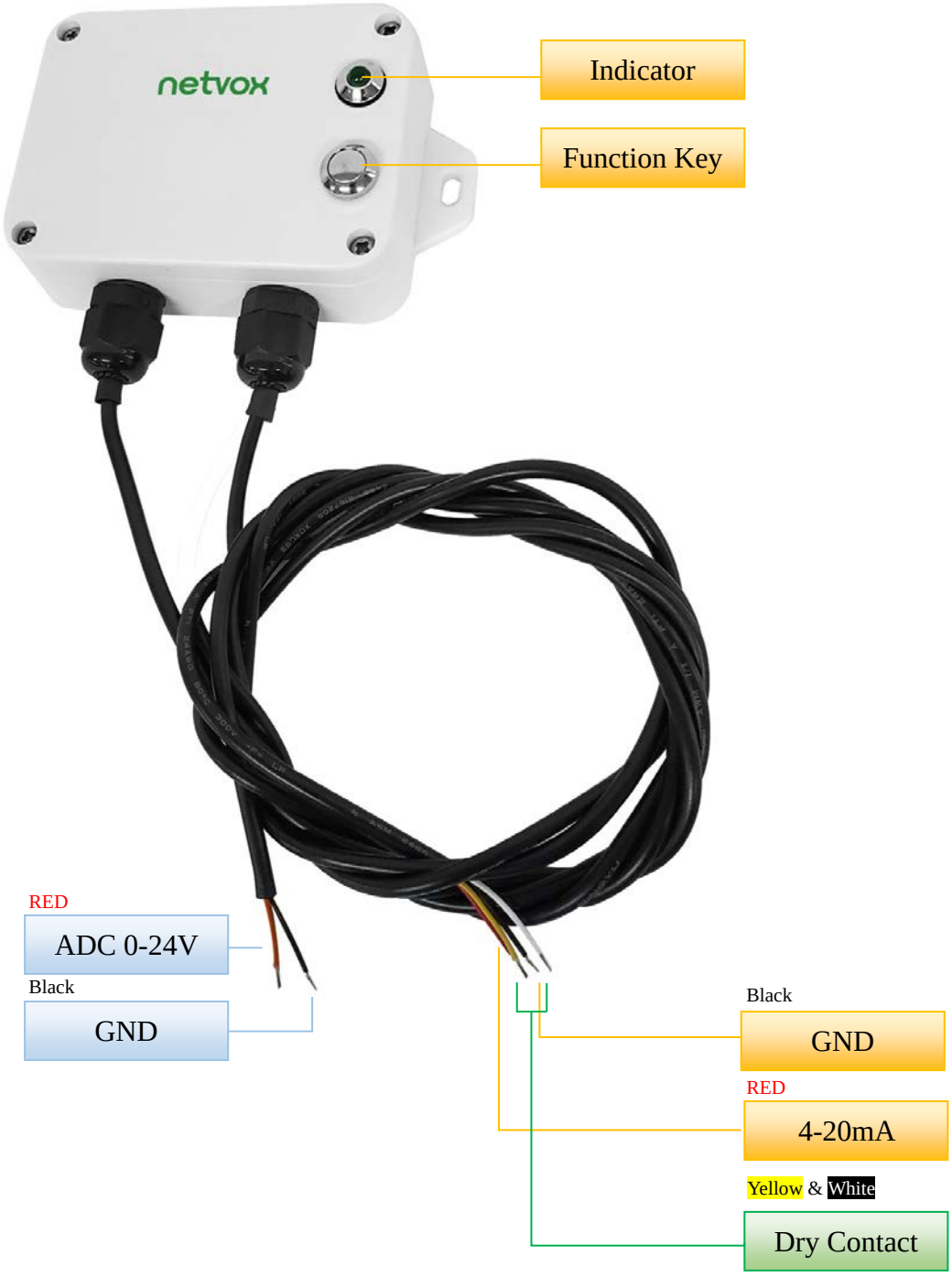


Fig.1 R718IJK Appearance

3. Main Features

- Apply SX1276 wireless communication module
- Powered by 2 x ER14505 3.6V battery in parallel
- Object to be detected connect 0-24V ADC port, then press the button, it sends an uplink packet reporting voltage.
- Object to be detected connect 4-20mA port, then press the button, it sends an uplink packet reporting current.
- Object to be detected connect dry contact port, then press the button, it sends an uplink packet reporting status.
- Compatible with LoRaWAN™ Class A
- Frequency hopping spread spectrum
- Protection class IP65
- 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

Note

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 varier 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

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.

4.2 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 R718IJK 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

The device will immediately send a version packet report along with an uplink packet including 0-24V ADC, Dry Contact and 4-20mA values.
The device sends data in the default configuration before any configuration is done.

Default value:

Maximum time: 900s (15min)
Minimum time: 900s (15min)
Reportchange:

BatteryChange ---- 0x01 (0.1V)
ADCRawValue Change ---- 0x64(100 mV) *Must more than 0x50 (80 mV)
CurrentChange ---- 0x02 (2 mA)

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

Config ReportReq	R718IJK	0x01	0x5C	MinTime (2bytes Unit:s)	MaxTime (2bytes Unit:s)	Battery Change (1byte Unit:0.1 v)	ADCRawValue Change(2byte Unit:1mV)	CurrentChange (1byte Unit:1mA)	Reserved (1Bytes,Fixed 0x00)
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:0.1 v)	ADCRawValue Change (2byte Unit: 1mV)	CurrentChange (1byte Unit:1mA)	Reserved (1Bytes,Fixed 0x00)

（1）**Command Configuration:**

MinTime = 1min,MaxTime = 1min,BatteryChange = 0.1v, ADCRawValue Change=100mV, CurrentChange=2mA

Downlink： 015C003C003C0100640200 003C($H_{ex)}$ = 60($D_{ec)}$

Response：

815C000000000000000000（Configuration success）

815C010000000000000000（Configuration failure）

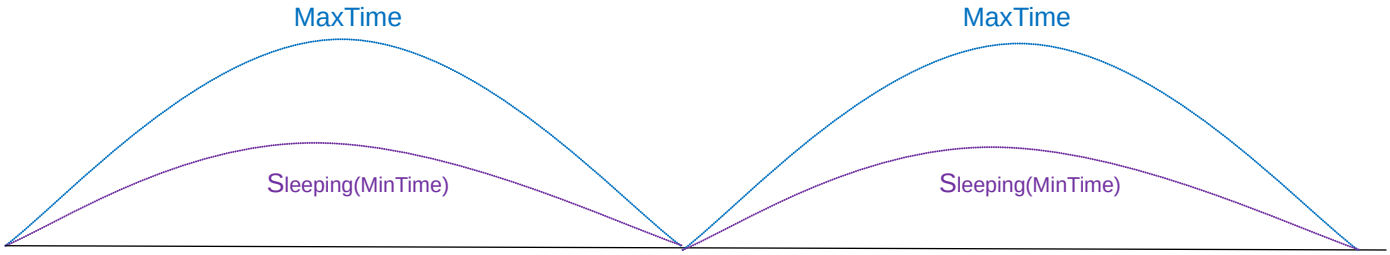
（2）**Read Configuration:**

Downlink： 025C000000000000000000

Response：

825C003C003C0100640200（Current configuration）

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



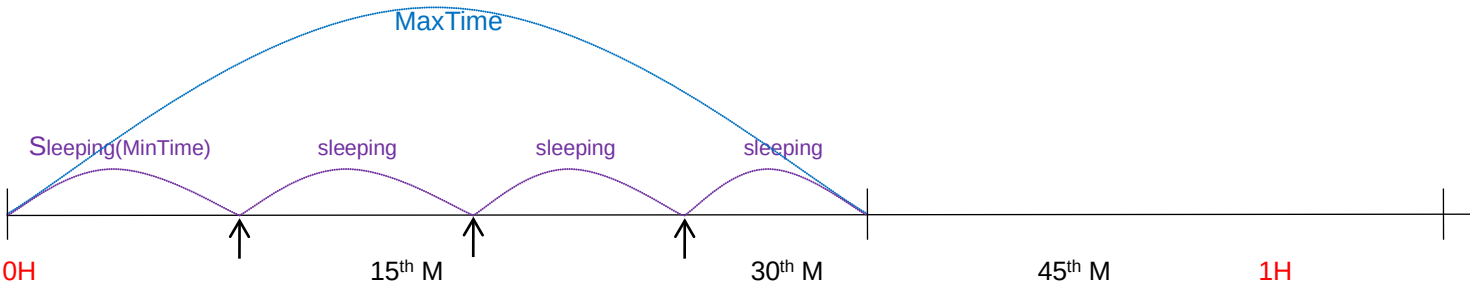
Wakes up and collects data
REPORTS 3.6V

Wakes up and collects data
REPORTS 3.5V

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.



Wakes up and collects data
REPORT 3.6V

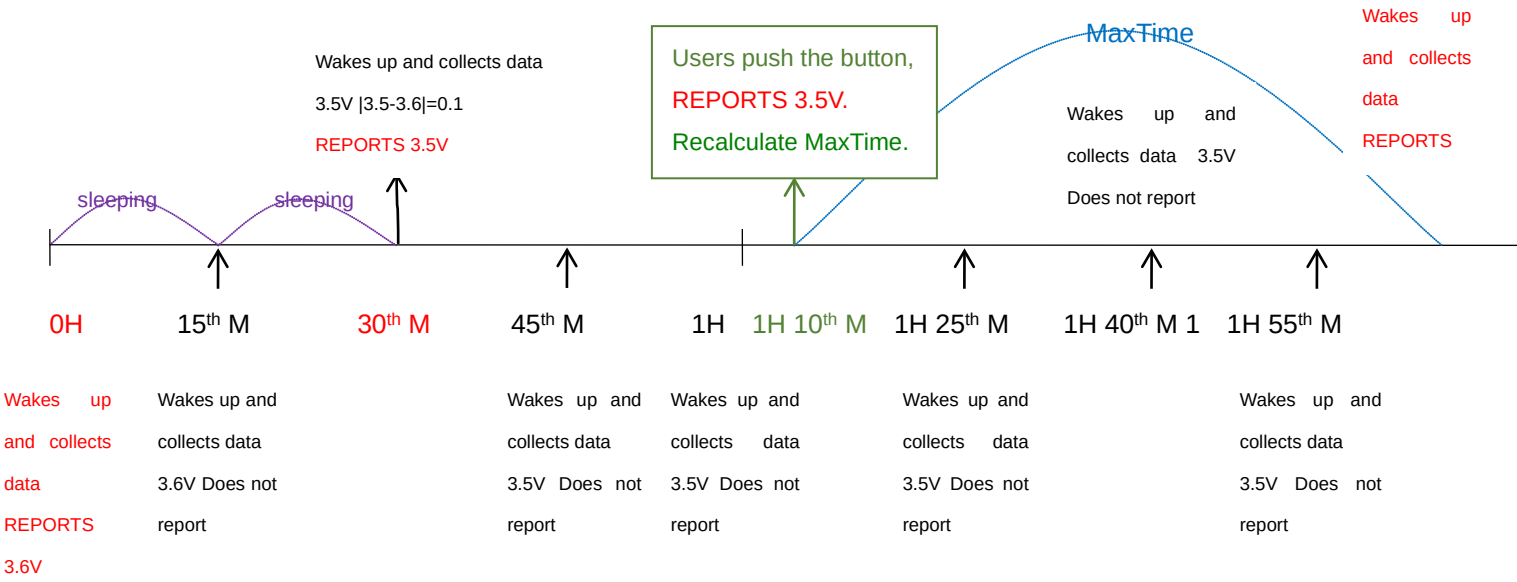
Wakes up and collects data
3.6V
Does not report

Wakes up and collects data
3.6V
Does not report

Wakes up and collects data
3.6V
Does not report

Wakes up and collects data
REPORTS 3.6V

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 change value 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.

5. Restore to Factory Setting

R718IJK 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. R718IJK 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

R718IJK 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 → R718IJK 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, R718IJK will send a low-power warning to the LoRa network.

8. Installation

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.

9. 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.