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netvox R718IJK Wireless Multi-Sensor Interface for 0-24V ADC User Manual

Model: R718IJK
Wireless Multi-Sensor Interface for 0-24V ADC, Dry Contact, and 4-20mA Sensors
Wireless Multi-Sensor Interface for 0-24V ADC, Dry Contact, and 4-20mA Sensors R718IJK
User Manual

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Introduction

R718IJK is a multi-interface detection device that is a Class A device based on the LoRaWAN open protocol and

is compatible with the LoRaWAN protocol. The device is suitable for detecting 4mA to 20mA current, 0V to 24V voltage, and dry contact detection. R718IJK is compatible with the LoRaWAN protocol.

LoRa Wireless Technology:
Lora is a wireless communication technology famous for its long-distance transmission and low power consumption. Compared with other communication methods, LoRa spread spectrum modulation technique greatly extends the communication distance. It can be widely used in any use case that requires long-distance and low-data wireless communications. For example, automatic meter reading, building automation equipment, wireless security systems, industrial monitoring. It has features like small size, low power consumption, long transmission distance, strong 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 Feature

- Adopt SX1276 wireless communication module
- 2 sections of ER14505 battery in parallel (AA SIZE 3.6V / section)
- 0V to 24V voltage detection
- 4mA to 20mA current detection
- Dry contact detection
- Protection level IP65/ IP67 (optional)
- Compatible with LoRaWANTM Class A

- Frequency-hopping spread spectrum
- Configuring parameters and reading data via third-party software platforms, and setting alarms via SMS text and email (optional)
- 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**
⁻ On this website, users can find battery lifetime for various models at different configurations.
1. 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 user 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 seconds till the green indicator flashes 20 times
Power off	Remove Batteries
Note	I. Remove and insert the battery, and the device is in a turn-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. In** the first 5 seconds after power-on, the device is in engineering test mode

Network Joining

Never join 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 (Not restored to the factory setting)	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	Suggest checking the device verification information on the gateway or consulting your platform service provider.

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, the device sends a data report according to Min Interval.

Low Voltage Warning

Low Voltage	3.2V

Data Report

The device will immediately send a version packet report and the data of the attribute report.
The device sends data according to the default configuration before any other configuring.
Default Setting:
MaxTime: Max Interval = 15 min = 900s
MinTime: Max Interval = 15 min = 900s (By default, the current voltage is detected every Min Interval.)
BatteryVoltageChange = 0x01 (0.1v)
ADC Raw Value Change = 0x64 (100 mV) // configuration need to greater than 0x50 (80 mV) Current Change —–0x02 (2 mA)
Note:
1. The cycle of the device sending the data report is according to the default.
2. The interval between two reports must be the MinTime.
3. If there are specially customized shipments, the setting will be changed according to the customer's requirements.)
Please refer Netvox LoRaWAN Application Command document and Netvox Lora Command Resolver
http://www.netvox.com.cn:8888/page/index 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 Chan
Any number between 1~65535	Any number between 1~65535	Can not be 0	Report per Min Interval

Example of ConfigureCmd

Description	Device	Cmd ID	Device Type	NetvoxPayLoadData			
Config ReportReq		0x01		Minime (2bytes Unit: s)	Maxime (2bytes Unit: s)	BatteryChange (1byte Unit:0.1v)	ADCRawValue Change Unit: 1mV)
Config ReportRsp		0x81		Status (0x00_success)			
Read Config ReportReq	R718IJK	0x02	0x5C				Reserved (9Bytes, Fixed 0)
Read Config ReportRsp		0x82		Minime (2bytes Unit: s)	Maxime (2bytes Unit: s)	BatteryChange (1byte Unit: 0.1v)	ADCRawValue Change Unit: 1mV)

(1) Configure R718IJK device parameter
(2) Read R718IJK device parameter
MinTime = 1min, MaxTime = 1min, BatteryChange = 0.1v, ADC Raw Value Change=100mV, Current Change =2mA
Downlink: 015C003C003C0100640200
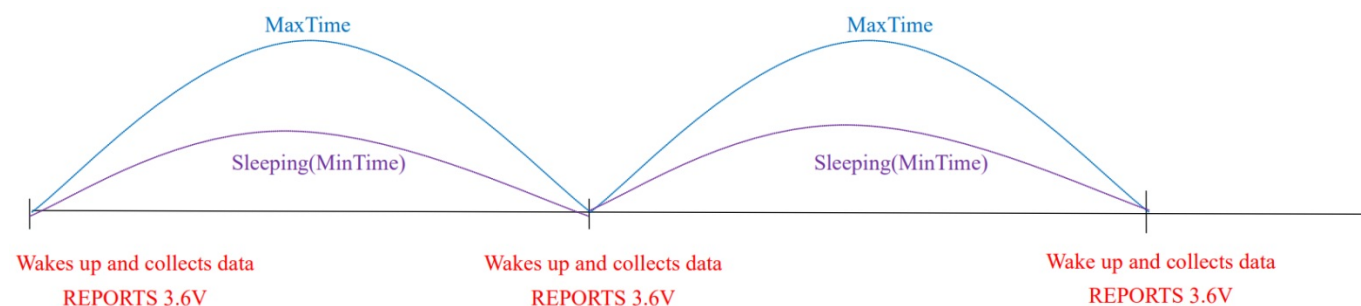Device Return:
815C000000000000000000 (configuration success)
815C010000000000000000 (configuration failure)

Downlink: 025C000000000000000000
Device Return: 825C003C003C0100640200 (device current parameter)
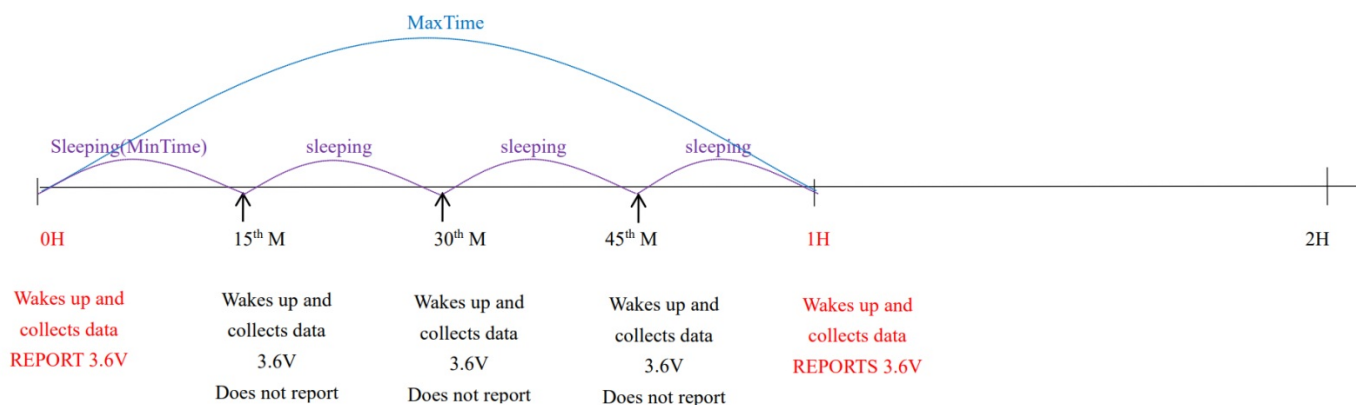**Example for MinTime/MaxTime logic:**
Example#1 based on MinTime = 1 Hour, MaxTime= 1 Hour, Reportable Change i.e. BatteryVoltageChange=0.1V
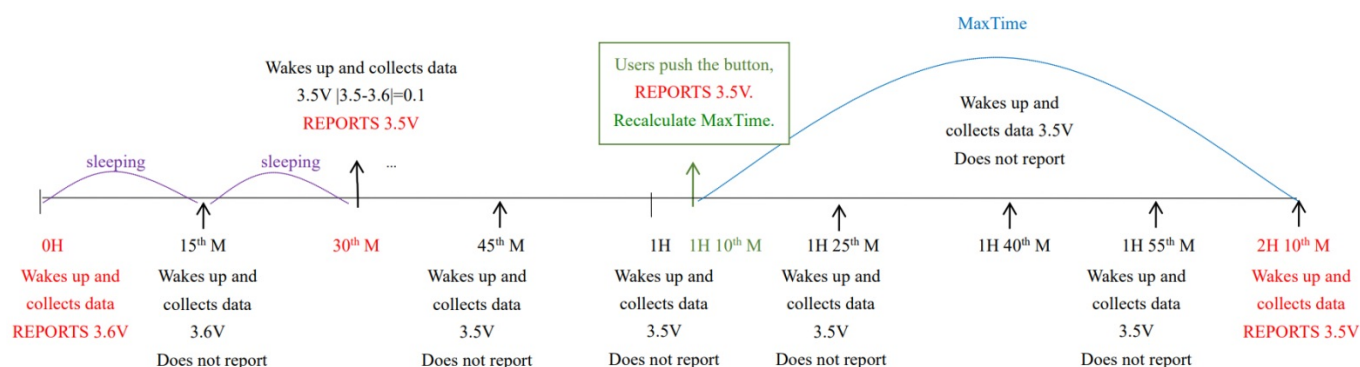

Note: MaxTime=MinTime. Data will only be reported according to Maxime (MinTime) duration regardless BatteryVoltageChange value.

Example#2 based on MinTime = 15 Minutes, MaxTime= 1 Hour, Reportable Change i.e. BatteryVoltageChange= 0.1V.

MaxTime

Sleeping(MinTime) sleeping sleeping sleeping

| 0H | 15th M | 30th M | 45th M | 1H | 2H |

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.

MaxTime

Wakes up and collects data
$3.5V |3.5-3.6|=0.1$
REPORTS 3.5V

Users push the button, REPORTS 3.5V. Recalculate MaxTime.

Wakes up and collects data 3.5V Does not report

sleeping sleeping ...

| 0H | 15th M | 30th M | 45th M | 1H | 1H 10th M | 1H 25th M | 1H 40th M | 1H 55th M | 2H 10th M |

Wakes up and collects data REPORTS 3.6V

Wakes up and collects data 3.6V Does not report

Wakes up and collects data 3.5V Does not report

Wakes up and collects data 3.5V Does not report

Wakes up and collects data 3.5V Does not report

Wakes up and collects data 3.5V Does not report

Wakes up and collects data REPORTS 3.5V

Note:
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 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 pushed, or Maxime interval, another cycle of MinTime/Maxime calculation is started.

Installation

1. R718IJK has a built-in magnet (as the figure below). When installed, it can be attached to the surface of an object with iron which is convenient and quick.
To make the installation more secure, use screws (purchased) to secure the unit to a wall or other surface (as the figure below).
Note:
Do not install the device in a metal shielded box or in an environment with other electrical equipment around it to avoid affecting the wireless transmission of the device.
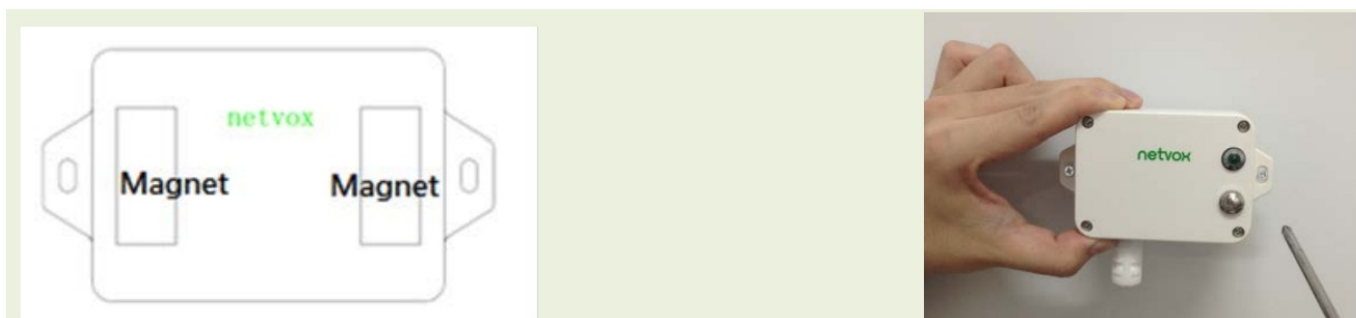
1. The ADC sampling line, dry contact sampling, and current sampling line of R718IJK are respectively connected according to the wiring method of Fig. 1, Fig. 2, Fig. 3, and Fig. 4.

2. R718IJK detects the battery voltage of the device, the voltage of the ADC sampling line, and the current of the current sampling line according to the MinTime, and compares the values with the last reported battery voltage value, ADC voltage value, and current value. When the default variation is exceeded (the default variation of battery voltage is 0.1V), the currently detected data is sent immediately. Otherwise, the device will report data regularly according to Maxime. Data can also be reported by pressing the button.

3. Dry contact sampling line will report data immediately after detecting the change of dry contact status.

Note:

- When the dry contact is connecting, the data status bit is "1". When the dry contact is disconnecting, the data status bit is "0".

- The wiring method of current detection is divided into the 2-wire wiring method and the 3-wire wiring method. Fig. 3 and Fig. 4 below.

  The **ADC detection** function of R718IJK is suitable for the following scenarios:

- Signal isolation and amplification in the industrial field
- Linear actuator for solenoid valve and proportional valve
- Linear controller with magnetic switch
- Electromagnetically driven coil or high-power load
- Ground wire interference suppression

  The signal isolation transmitter with output signal 0-24V.

  The d**ry contact** function of R718IJK can be used in the following scenarios:

- Various switches and buttons
- Dry contact output of the sensor
- The operating status of the equipment
- Door and window condition monitoring for home or business

  The occasion is necessary to judge the sensor state by dry contact signal.

  The current detection function of R718IJK is suitable for the following scenarios:

- Pressure transmitter
- Differential pressure transmitter
- Level transmitter
- Flowmeter

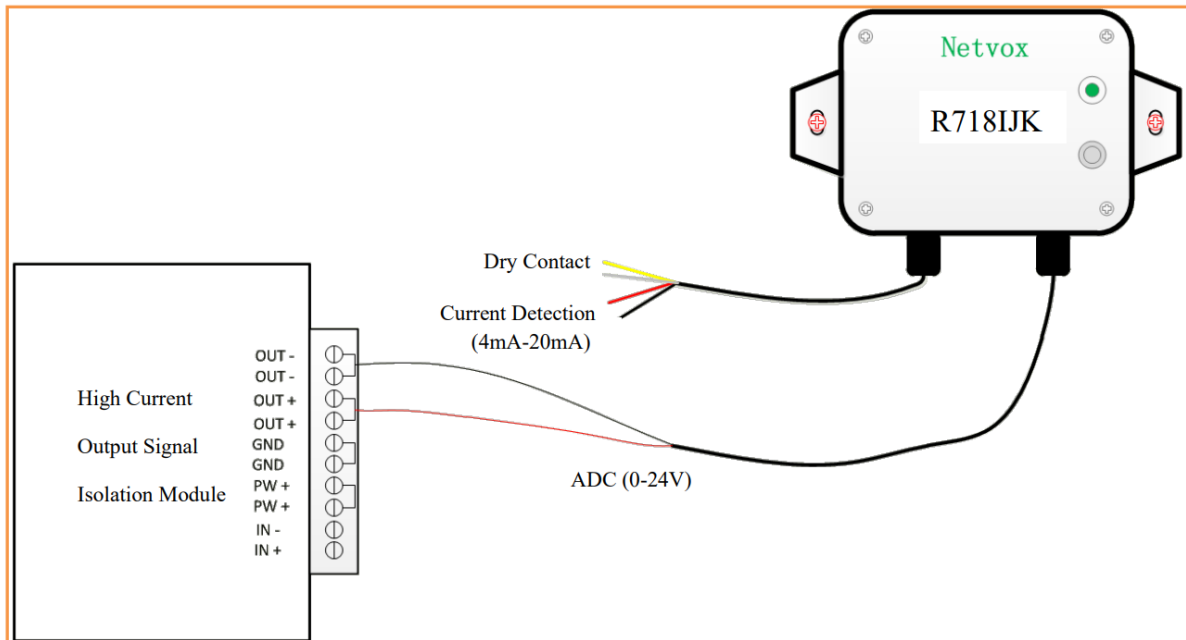 Such as transmitters with output signal 4-20mA.
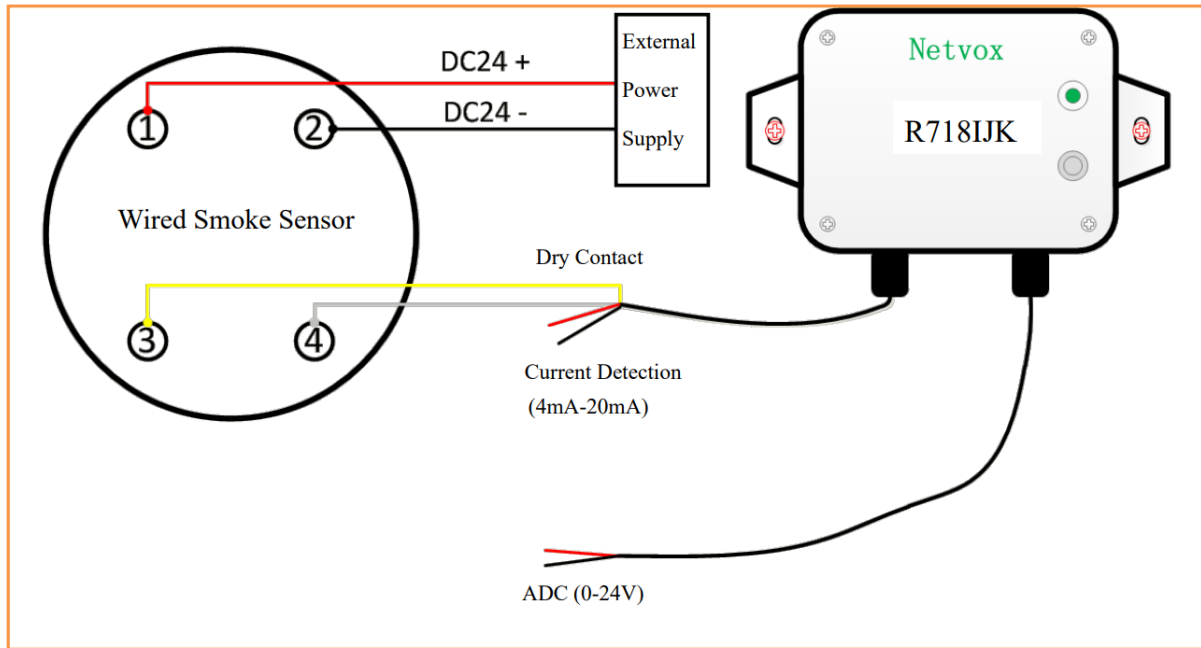
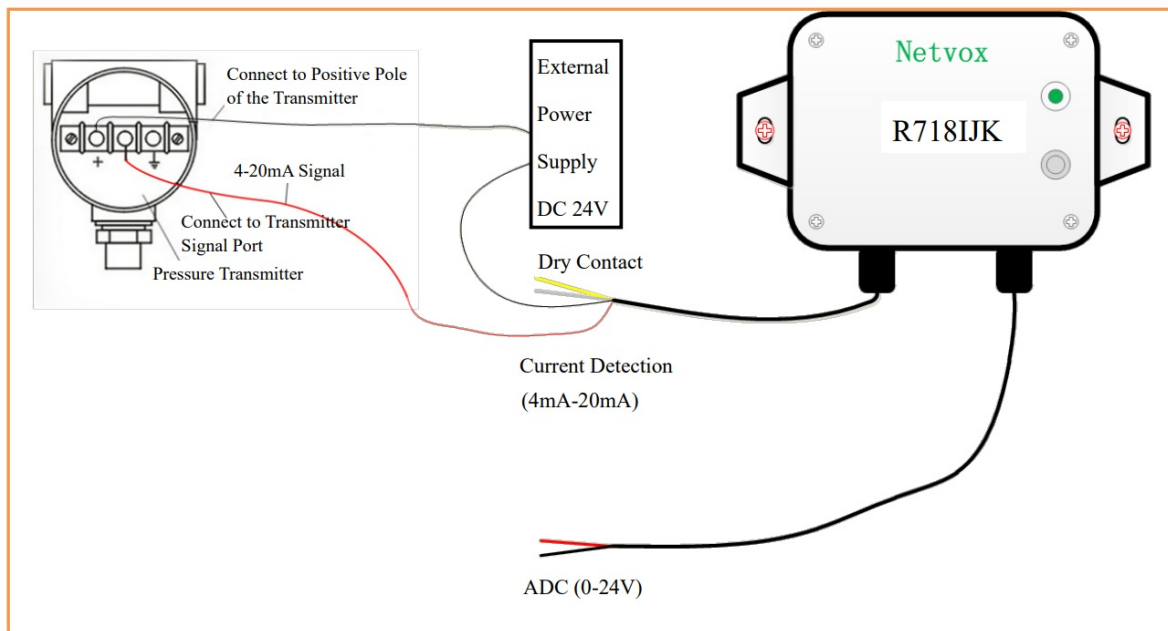**Fig. 1. ADC (0-24V) Detection Wiring Diagram**

Fig. 2. Dry Contact Wiring Diagram

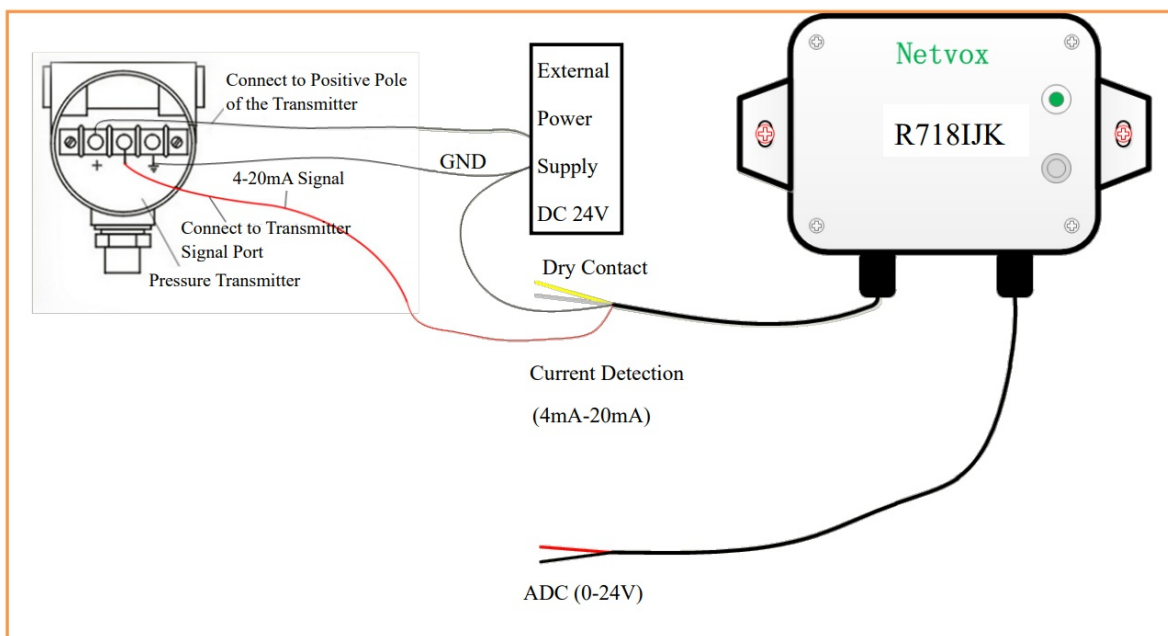**Fig. 3. Current Detection 2-Wire Wiring Diagram**

Fig. 4. Current Detection 3-Wire Wiring Diagram

Note:

Please do not disassemble the device unless it is required to replace the batteries.

Do not touch the waterproof gasket, LED indicator light, function keys when replacing the batteries. Please use a suitable screwdriver to tighten the screws (if using an electric screwdriver, it is recommended to set the torque as 4kgf) to ensure the device is impermeable.

Information about Battery Passivation

Many 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 the batteries should be produced

within the last three months.

If encountering the situation of battery passivation, users can activate the battery to eliminate the battery hysteresis.

7.1 To determine whether a battery requires activation

Connect a new ER14505 battery to a 68ohm resistor in parallel, and check the voltage of the circuit.

If the voltage is below 3.3V, it means the battery requires activation.

7.2 How to activate the battery

a. Connect a battery to a 68ohm resistor in parallel

b. Keep the connection for 6~8 minutes

c. The voltage of the circuit should be ≧3.3V

Important Maintenance Instruction

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

- Keep the equipment dry. Rain, moisture, and various liquids or water 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 way can damage its detachable parts and electronic components.

- Do not store in an excessive heat place. High temperatures can shorten the life of electronic devices, destroy batteries, and deform or melt some plastic parts.

- Do not store in an excessively 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. Treating equipment roughly can destroy internal circuit boards and delicate structures.

- Do not wash with strong chemicals, detergents, or strong detergents.

- Do not paint the device. Smudges can make debris block detachable parts up and affect normal operation.

- Do not throw the battery into the fire to prevent the battery from exploding. Damaged batteries may also explode.

  All the above suggestions apply equally to your device, batteries, and accessories.

  If any device is not operating properly.

  Please take it to the nearest authorized service facility for repair.

Documents / Resources

netvox Model: R718IJK Wireless Multi-Sensor Interface for 0-24V ADC, Dry Contact and 4-20mA Sensors Wireless Multi-Sensor Interface for 0-24V ADC, Dry Contact and 4-20mA Sensors R718IJK User Manual Copyright@Netvox Technology Co., Ltd. This document contains proprietary technical information which is the property of NETVOX Technology. It shall be maintained in strict confidence and shall not be disclosed to other parties, in whole or in part, without written permission of NETVOX Technology. The specifications are subject to change without prior notice.	**[netvox R718IJK Wireless Multi-Sensor Interface for 0-24V ADC](#)** [pdf] User Manual R718IJK, Wireless Multi-Sensor Interface for 0-24V ADC