netvox R718IB Wireless 0-10V ADC Sampling Interface User Manual

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R718IB
User Manual

Contents

Introduction

R718IB is an ADC sampling interface detection device for NetVu Class A type devices based on Lora WAN open protocol.

The device is suitable for detecting 0V to 10V, and R718IB is compatible with Lora WAN 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 extend 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.

Lora WAN:

Lora WAN uses Lora technology to define end-to-end standard specifications to ensure interoperability between devices and gateways from different manufacturers.

Appearance

Main Features

- Compatible with LoRaWAN
- Simple operation and setting
- 2 ER14505 lithium batteries in parallel power supply (3.6V / section)
- IP Rating: IP65
- 0 ~10V voltage detection
- Compatible with Lora WAN™ Class A
- The base is attached with a magnet that can be attached to a ferromagnetic material object
- Frequency hopping spread spectrum
- Applicable to third-party platforms: Activity/Thing Park, TTN, Devices/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 variety 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 till the green indicator flashes once.
Turn off (Restore to factory setting)	Press and hold the function key for 5 seconds till green indicator flashes 20 times.
Power off	Remove Batteries.
Note:	1. Remove and insert the battery; the device is at off state by default. Turn on the device to use again. 2. On/off interval is suggested to be about 10 seconds to avoid the interference of capacitor inductance and other energy storage components. 3. 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 to join. The green indicator stays on for 5 seconds: success The green indicator remains off: fail
Had joined the network (not at factory setting)	Turn on the device to search the previous network to join. The green indicator stays on for 5 seconds: success The green indicator remains off: fail
Fail to Join The Network	Suggest to 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 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: green indicator remains off

Sleeping Mode

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

Low Voltage Warning

Low Voltage	3.2V

Data Report

After power on, the device will immediately send a version packet report and an attribute packet report.
The device sends data according to the default configuration before any other configuring.
Default Setting:
Maximum Time: 0x0384 (900s)
Minimum Time: 0x0384 (900s)
Battery Change: 0x01 (0.1V)
ADC Raw Value Change: 0x0064 (100mV)
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 minimum time
3. Please refer NetVu Lora WAN Application Command document and NetVu Lora Command Resolver http://cmddoc.netvoxcloud.com/cmddoc to resolve uplink data.

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

5.1 Example of ReportDataCmd
FPort 0x06

Bytes	1	1	1	Var(Fix=8 Bytes)
	Version	Device Type	Report Type	NetVu Pay Load Data

Version– 1 byte –0x01——the Version of NetvoxLoRaWAN Application Command Version
Device Type– 1 byte – Device Type of Device
The device type is listed in NetVu Lora WAN Application Device type doc
Report Type – 1 byte –the presentation of the NetvoxPayLoadData according the device type
NetvoxPayLoadData– Fixed bytes (Fixed =8bytes)
Tips

1. **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
2. **Version Packet:**
   When Report Type=0x00 is the version packet, such as 012A000A0B202005200000, the firmware version is 2020.05.20
3. **Data Packet:**
   When Report Type=0x01 is data packet.

Device	Device Type	Report Type	NetvoxPayLoadData			
R718IB	0x2A	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)	AD Craw Value (2Bytes, unit:1mv)	Reserved (5Bytes, fixed 0x00)	

Uplink: 012A012409C40000000000
1st byte (01): Version
2nd byte (2A): Device Type 0x2A, R718IB
3rd byte (01): Report Type
4th byte (24): Battery 3.6v, 24 Hex=36 Dec 36*0.1v=3.6v
5th 6th byte (09C4): ADC Raw Value = 2500mV, 9C4=2500 Dec
7th ~ 11 byte (0000000000): Reserved

5.2 Example of Configure Cmd
FPort 0x07

Bytes	1	1	Var (Fix =9 Bytes)
	McDaid	Device Type	NetvoxPayLoadData

Cmd ID– 1 byte
Device Type– 1 byte – Device Type of Device
NetVu Pay Load Data– var bytes (Max=9bytes)

Description	Device	Cmd ID	Device Type	NetvoxPayLoadData

Config Report Req		0x01		Min Time (2bytes Unit:s)	Max Time (2bytes Unit:s)	BatteryChange(1byteUnit:0.1v)	AD Craw Value Change (2byteUnit:1mV)	Reserved (2Bytes,Fixed 0x00)
Config Report Rsp		0x81		Status (0x00_success)			Reserved (8Bytes,Fixed 0x00)	
Read Config Report Req		0x02		Reserved (9Bytes,Fixed 0x00)				
	R718IB		0x2A					

Read Config Report Rsp		0x82		Min Time (2bytes Unit:s)	Max Time (2bytes Unit:s)	BatteryChange(1byteUnit:0.1v)	AD Craw Value Change (2byteUnit:1mV	Reserved (2Bytes,Fixed 0x00)

1. Configure the device parameter MinTime = 1min, MaxTime = 1min, BatteryChange = 0.1V, ADCRawValue Change= 100mV

   Downlink: 012A003C003C0100640000

   Device Return:

   812A000000000000000000 (configuration success)

   812A010000000000000000 (configuration failure)

2. **Read the device parameter**

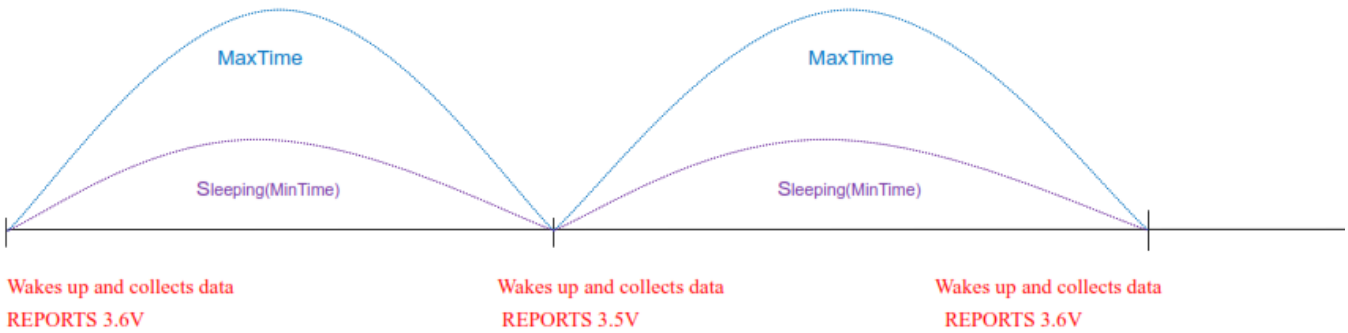
   Downlink: 022A000000000000000000

   Device Return:

   822A003C003C0100640000 (device current parameter)

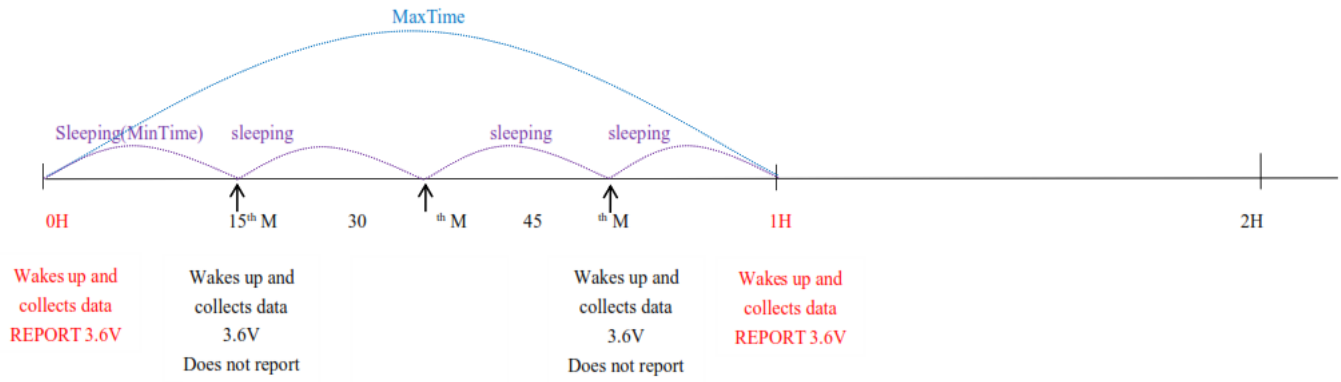
5.3 Example for Min Time/Max Time logic

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

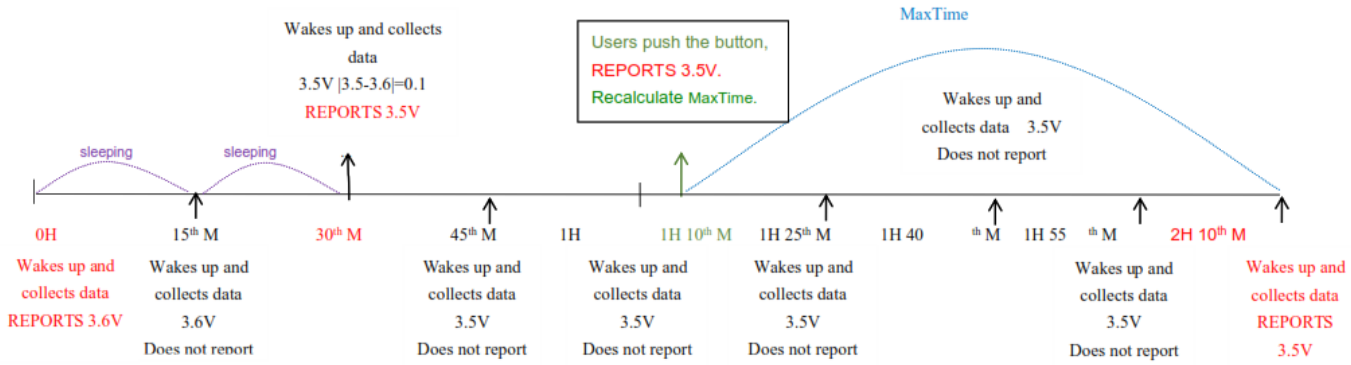


Note: Max Time=Min Time. Data will only be report according to Max Time (Min Time) duration regardless Battery Voltage Change value.

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 Min Time = 15 Minutes, Max Time= 1 Hour, Reportable Change i.e. Battery Voltage Change= 0.1V



Notes:

1. The device only wakes up and performs data sampling according to Min Time Interval. When it is on sleeping mode, 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 Max Time 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

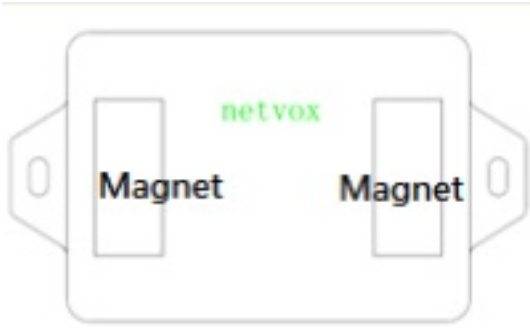
1. Wireless ADC Sampling Interface (R718IB) has the built-in magnet (as the figure below). When installed, it can be attached to the surface of an object with iron which is convenient and quick. To make the installation more secure, use screws (purchased) to

   secure the unit to a wall or other surface (as the figure below , the installation diagram of R718A is taken as an

example because the main body has the same appearance).

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.



2. Connect the sampling line of the ADC sampling interface sensor to the transmitter according to the wiring method shown in figure. There are two connection modes, 2-wire and 3-wire.
3. When the ADC sampling interface sensor detects the current voltage according to the configured time or by pressing the button, it sends the data immediately

Wireless Sampling Interface (R718IB)
It can also be applied to the following scenarios:

- Pressure transmitter
- Differential pressure transmitter
- Level transmitter

The transmitter with 0-10V output signal

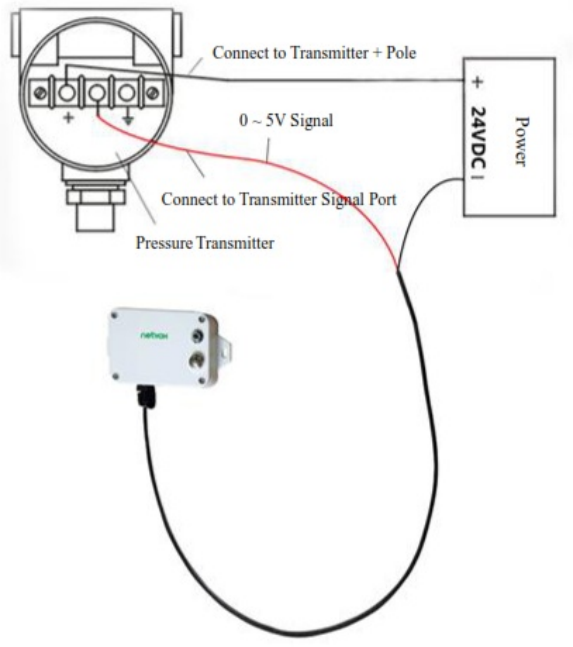


Figure1 2-wire System Example Diagram
(for wiring reference)

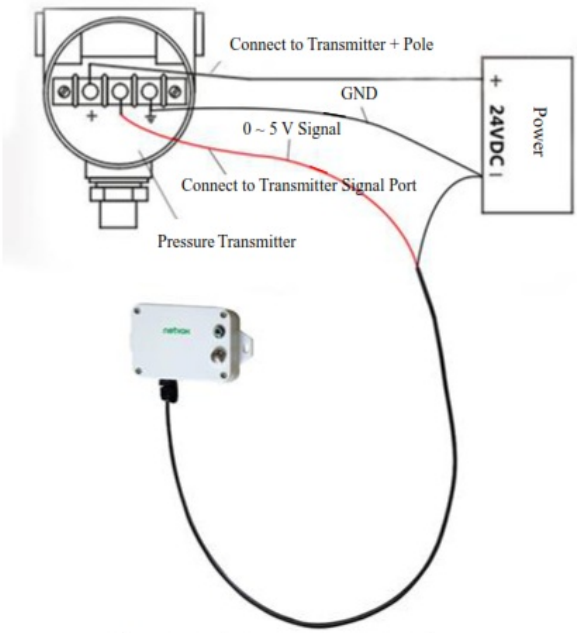


Figure2 3-wire System Example Diagram
(for wiring reference)

Information about Battery Passivation

Many of NetVu 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 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:

7.1 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.

7.2 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
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.

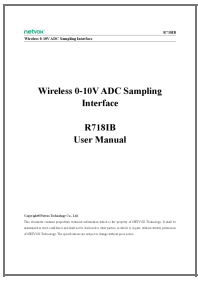
Important Maintenance Instruction

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

- Keep the device 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 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 excessive 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 repairing.

Documents / Resources

 Wireless 0-10V ADC Sampling Interface R718IB User Manual	netvox R718IB Wireless 0-10V ADC Sampling Interface [pdf] User Manual R718IB, R718IB Wireless 0-10V ADC Sampling Interface, R718IB ADC Sampling Interface, Wireless 0-10V ADC Sampling Interface, ADC Sampling Interface, Sampling Interface

References

- Netvox LoRaWAN Application Command
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