netvox Wireless Light Sensor R718PG User Manual

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Introduction

The R718PG is a Wireless Light Sensor for Netvox ClassA type devices based on the LoRaWAN open protocol and is compatible with the LoRaWAN protocol. It can detect illuminance anywhere, ex. sunlight, outdoor area.
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 inter operability between devices and gateways from different manufacturers.

Appearance

Main Features

- Compatible with LoRa WAN protocol.
- Powered by 2 x ER14505 3.6V Lithium AA battery
- Illuminance detection

- IP rating IP65 IP67 optional
- Compatible with LoRaWAN TM Class A
- Frequency hopping spread spectrum
- 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.

Battery Life:

- Please refer to web: http://www.netvox.com.tw/electric/electric_calc.html
- At this website, users can find battery lifetime for variety models at different configurations.
    1. Actual range may vary depending on environment.
    2. Battery life is determined by sensor reporting frequency and other variables.

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 for 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. At 1st -5th second 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
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 reportchange exceeds setting value or the state changes: send a data report according to Min Interval.

Data Report

The device will immediately send a version packet report along with an uplink packet including illuminance and battery voltage. The device sends data in the default configuration before any configuration is done.

Default setting:

- MaxTime: Max Interval = 1 5 min 900s
- MinTime: M in Interval = 1 5 min 900s
- BatteryChange: 0x01 (0 Illuminance)
- Change: 0x00 32 50 Lux Illuminance detection
- range: 0 157000 Lux

  Note:

  The device report interval will be programmed based on the default firmware which may vary. The interval between two reports must be the minimum time. Please refer Netvox LoRaWAN Application Command document and Netv ox Lora Command Res olver http://loraresolver.netvoxcloud.com:8888/page/index to resolve uplink data.

Data report configuration and send ing period are as following:

Min Interval (Unit:se cond)	Max Interval (Unit:s econd)	Reportable Change	Current Change≥ R eportable Change	Current Change Re portable Change
Any number betwee n 1~65535	Any number betwee n 1~65535	Can not be 0.	Report per Min Inter val	Report per Max Inte rval

Example of Report configuration:

Bytes	1	1	Var(Fix =9 Bytes)
	CmdID	DeviceType	NetvoxPayLoadData

CmdID– 1 byte
DeviceType– 1 byte – Device Type of Device
NetvoxPayLoadData var bytes (Max=9b ytes)

Description	Device	Cmd ID	Device Type	NetvoxPayLoadData			
Config ReportReq	R718PG	0x01	0x1E	MinTime (2bytes Unit:s)	MaxTime (2bytes Unit:s)	BatteryChange (1byte Unit:0.1v)	Illuminancechange (4bytes Unit 1 Lux)
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)	BatteryChange (1byte Unit:0.1v)	Illuminancechange (4bytes Unit 1 Lux)

1. Command C onfiguration:

   MinTime = 1min MaxTime = 1min BatteryChange = 0.1v I lluminance C hange = 100 Lux

   Downlink 011E003C003C0100 0000 64 003C (H ex) 60 (D ec) 64 (H ex) 100 (D ec)

   Response

   811E000000000000000000 Configuration success

   811E010000000 000000000 C onfiguration failure

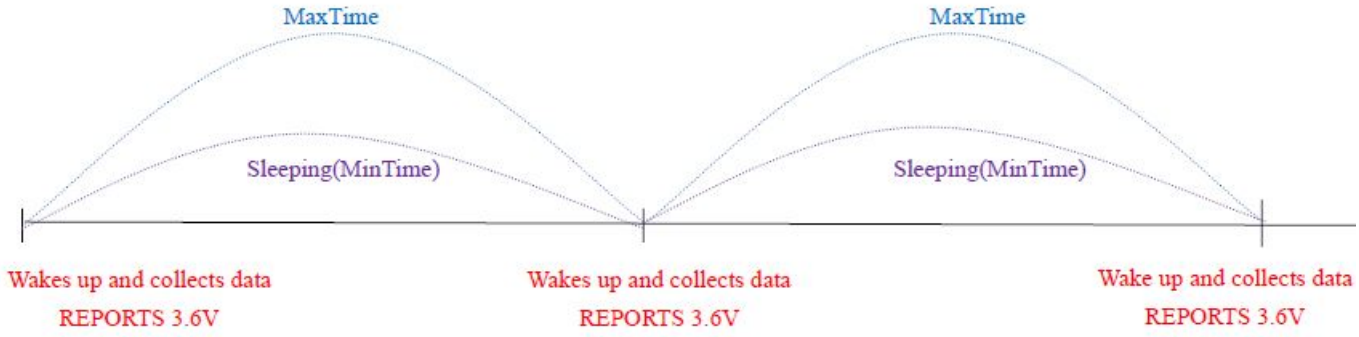
2. **Read Configuration:**

   Downlink 021E000000000000000000

   Response

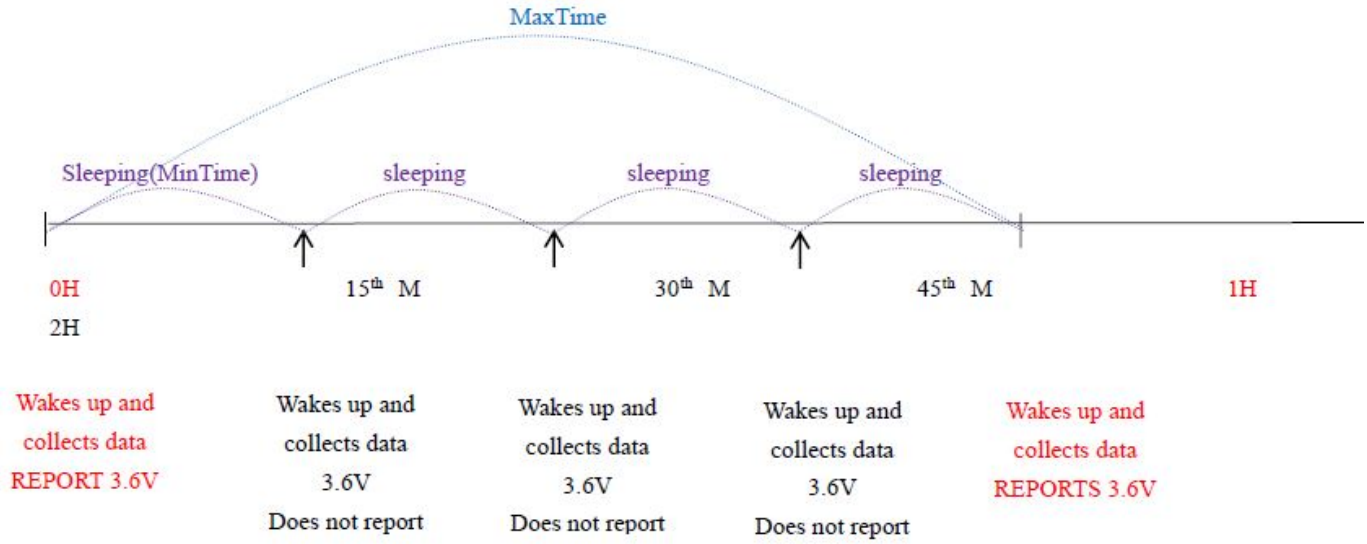
   821E003C003C0100 00 00 64 Current configuration

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 B aatteryVoltageChange value.

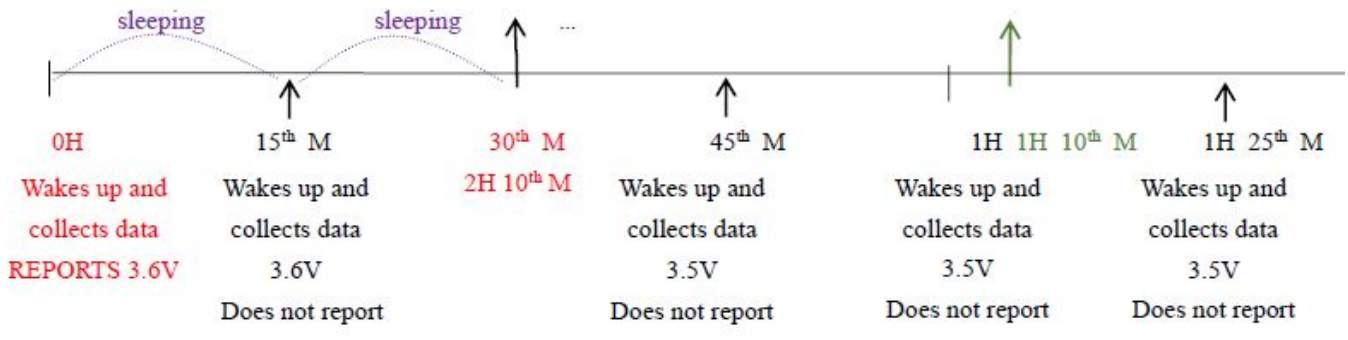
Example#2
based on MinTime = 15 Minutes, MaxTime= 1 Hour, Reportable Change i.e. BatteryVoltageChange= 0.1V.



Example#3
based on Min Time = 15 Minutes, MaxTime= 1 Hour, Repo rtabl e Change i.e. BatteryVoltageChange= 0.1V.

MaxTime

Wakes up and collects data 3.5 V | 3.5 3.6 |=0.1 REPORTS 3.5 V. Users push the button, REPORTS 3.5 V. Recalculate MaxTime.



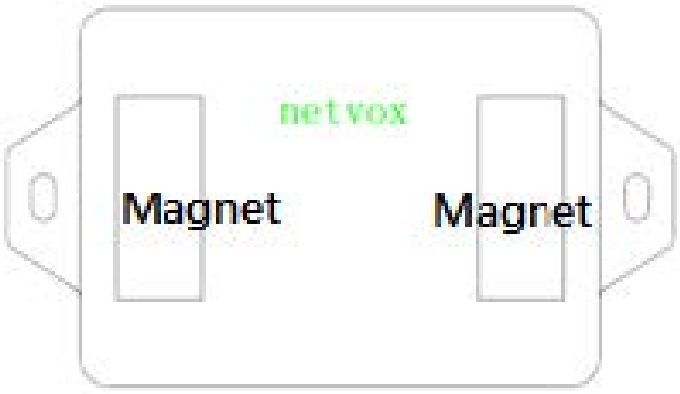
Note

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 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.

Installation

This product comes with waterproof function. 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.

1. Light Sensor R718PG has a built in magnet (see Figure 1 below),When installed, the back of it can be adsorbed onthe iron surface, or the two ends can be fixed to the wall with screws (should be purchased) to secure the unit to a wall or other surfa ce (see Figure 2 bel ow).
   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. Compare the illumi nation value detect ed by the illumination sensor wi th the set illumination value . The detected value exceeds the set value (default 50 L ux), the currently detected illumination value is sent. Light Sensor R718PG is suitable for the fo llowin g scenarios:
    - Family
    - School
    - Storage room
    - Hospital
    - Bar
    - Stairs
    - Agricultural greenhouse

      To detect the illumination value.

Note: Please do not disassemble the device unless it is required to replace the batteries. Do not touch the waterpro of gasket, LED indicator light, function k eys when replacing the batteries. Please use suitable screwdriver to tighten the screws (if using an elect ric screwdriver, it is recommended to set the torque as 4kgf) to ensure the device is impermeable.

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 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.

- 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.
- How to activate the battery

1. Connect a battery to a 68ohm resistor in parallel
2. Keep the connection for 6~8 minutes
3. 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 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 dusty or dirty environment. It might damage its detachable parts and electronic components.
- Do not store the device under excessive heat condition. 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

	netvox Wireless Light Sensor R718PG [pdf] User Manual netvox, Wireless, Light Sensor, R718PG