netvox R720G Series Wireless GPS Tracker with Tilt Angle User Manual

Wireless GPS Tracker with Tilt Angle
Model: R720G
R720G Series
User Manual

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Introduction

R720G is a ClassA positioning monitoring device based on LoRaWAN open protocol of netvox, which can monitor

the longitude and latitude, altitude and three-axis angle of the current device, and 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.

Appearance

Main Features

- 2 ER14505 lithium batteries (3.6V / section) in parallel
- Compatible with LoRaWAN™
- Simple setting and operation

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 and the green indicator flashes 20 times.
Power Off	Remove Batteries
Note	1. Remove and insert the battery: the device is in the turn-off state by default. 2. After 5 seconds of powering on, the device is in engineering testing mode. 3. Every time, after remove and reinsert the battery, the device is in a turn-off state and need to turn on again. 4. On/off interval is suggested to be about 10 seconds to avoid the interference of capacitor inductance and other energy storage components.
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	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 to check the device verification information on the gateway or consult your platform server provider.
Sleeping Mode	
The device turns on and joins 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
Low Voltage Threshold Alarm	
Low Voltage	3.2 V

Data Report

After the device is powered on and connected to the network successfully, a version package will be sent immediately, and two status packages will be sent 3 minutes after the device is connected to the network.

Default setting:

Report MaxTime Max Interval =7200s (2 hour)
Report MinTime Min Interval =300s
* The MinTime cannot be less than 3min.

Vibration detection:

When the device detects vibration, it sends data packets every mintime until the device detects that the current state is static, and then reports according to maxtime

Activity threshold

The active threshold can be changed by issuing a command.
The active threshold range is 0x01~0x3F (The default value is 0x02) Calculation method: ActiveThreshold /16 ex. ActiveThreshold=2, 2/16=0.125g=125mg

Note:

1. The first 3 minutes after the screening is the warm-up time of the GPS sensor. The positioning will be affected by weather, GPS signal and other factors. If the positioning is not found within 3 minutes, the longitude and latitude will be reported as 0xFFFFFFFF, and the altitude will be reported as 0xFFFF.
2. This device is used for outdoor positioning. Because there is no GPS signal indoors, it cannot be located indoors

The device reported data parsing please refer to Netvox LoRaWAN Application Command document and Netvox Lora Command Resolver **http://loraresolver.netvoxcloud.com:8888/page/index**

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	DeviceType	ReportType	NetvoxPayLoadData

Version– 1 bytes –0x01——the Version of NetvoxLoRaWAN Application Command Version
DeviceType– 1 byte – Device Type of Device
The devicetype is listed in Netvox LoRaWAN Application Devicetype doc
ReportType – 1 byte –the presentation of the NetvoxPayLoadData according the devicetype
NetvoxPayLoadData– Fixed bytes (Fixed =8bytes)

R720G	0xB5	0x01	Battery (1Byte, unit:0.1V)	Latitude (Signed 4Bytes,unit:0.000001°, 0xFFFFFFFF when can't fix)	AngleX (1Byte Signed Value,Unit:1°)	AngleY (1Byte, Signed Value ,Unit:1°)	AngleZ (1Byte, Signed Value ,Unit:1°)
		x02	Battery (1Byte, unit:0.1V)	Longitude (Signed 4Bytes, unit:0.000001°, 0xFFFFFFFF when can't fix)	HDop (1Byte,Unit:1)	altitudeGps (Signed 2Bytes, unit:1m, 0xFFFF when can't fix)	

Example of Uplink
#Packet1: 01B5012401761E920000A9
st 1 byte (01): Version
2nd byte (B5): DeviceType 0xB5 (R720G)
3rd byte (01): ReportType
4th byte (24): Battery 3.6v , 24 Hex=36 Dec 36*0.1v=3.6v
5th-8th byte (01761E92): Latitude 24.518290°
9th byte (00): AngleX 0°
10th byte (00): AngleY 0°
11th byte (A9): AngleZ -87°, A9(HEX)=-87 Dec,-87*1°=-87° // Negative numbers are represented by 2's complement

#Packet2: 01B50224070A517C010021

1st byte (01): Version
2nd byte (B5): DeviceType 0xB5 (R720G)
3rd byte (02): ReportType
4th byte (24): Battery 3.6v , 24 Hex=36 Dec 36*0.1v=3.6v
5th-8th byte (070A517C): Longitude 118.116732°
9th byte (01): HDop 1
10th-11th byte (0021): altitude Gps 33m, 21 Hex=33 Dec

5.2 Example of ConfigureCmd
FPort 0x07

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

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

Config ReportReq	R720G	0x01	0xB5	MinTime (2bytes Unit:s)	MaxTime (2bytes Unit:s)	Reserved (5Bytes,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)	Reserved (5Bytes,Fixed 0x00)

(1) Configure R720 G device parameter MinTime = 300s, MaxTime = 7200s
Downlink: 01B5012C1C200000000000
Device return
81B5000000000000000000 (configuration success)
81B5010000000000000000 (configuration failure)
(2) Read R720 G device parameter
Downlink: 02B5000000000000000000
Device return
82B5012C1C200000000000 (device current parameter)
5.3 Example of Threshold Configuration

Description	Device	CmdID	Device Type	NetvoxPayLoadData	
SetActiveThresholdReq	R720G	0x03	0xB5	ActiveThreshold (1Byte)	Reserved (8Bytes,Fixed 0x00)
SetActiveThresholdRsp		0x83		Status (0x00_success)	Reserved (8Bytes,Fixed 0x00)
GetActiveThreshold Req		0x04		Reserved (9Bytes,Fixed 0x00)	
GetActiveThreshold Rsp		0x84		ActiveThreshold (1Byte)	Reserved (8Bytes,Fixed 0x00)

(1) Assume that the active threshold is set at 2m/s2,
The value to be set is 16 * 2=32, and the last value obtained is an integer, configured as 32.
Configure R720 G device parameter ActiveThreshold= 0x20
Downlink: 03B5200000000000000000
Device return:
83B5000000000000000000 (configuration success)
83B5010000000000000000 (configuration failure)
(2) Read R720 G device parameter
Downlink: 04B5000000000000000000
Device return: 84B5200000000000000000 (device current parameter)

Installation

This product has waterproof function. When in use, the back can be adsorbed on the iron surface, or the two ends can be fixed on the wall with screws.
Note: To install the battery, please use a slotted screwdriver and other tools to open the battery cover

Precautions for assembly:
The user only needs to disassemble and assemble the battery when installing a new battery. Please do not disassemble and assemble the battery without authorization under other circumstances. Please do not touch the waterproof adhesive tape, waterproof fixed head, waterproof LED light and waterproof button during the battery assembly. After the battery is installed, an electric screwdriver with a torque of 4kgf must be used to assemble the casing screws (if there is no electric screwdriver, please use a cross screwdriver with an appropriate screw to assemble and lock to ensure that the upper cover and lower cover are tightly assembled), otherwise the airtightness after assembly will be affected; When disassembling and assembling the device, it is recommended to first understand the internal structure of the equipment to avoid damage to the device.

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 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 equired load resistance shall be mainly subject to the announcement of each manufacturer.

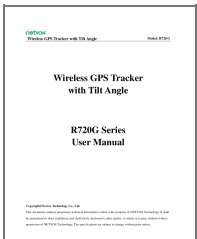
Important Maintenance Instruction

The device is a product with 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 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 GPS Tracker with Tilt Angle R720G Series User Manual	netvox R720G Series Wireless GPS Tracker with Tilt Angle [pdf] User Manual R720G Series Wireless GPS Tracker with Tilt Angle, R720G Series, Wireless GPS Tracker with Tilt Angle, Tracker with Tilt Angle, Tilt Angle

References

- Netvox Command Resolver