Wireless Vibration Sensor, Rolling Ball Type

R313DA
User Manual

Table of Content

1. Introduction

R313DA is a wireless long-distance ball-type vibration device that is a Class A device based on the LoRaWAN^{TM} protocol of NETVOX. It 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 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.

LoRaWAN:

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

2. Appearance

Indicator

Function Key

3. Main Features

- Compatible with LoRaWAN

- 2 sections of 3V CR2450 button battery power supply

- Vibration status detection

- Simple operation and setting

- Protection level IP30

- 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

- Low power consumption and long battery life

  Note:

  Battery life is determined by the sensor reporting frequency and other variables, please refer to

  http://www.netvox.com.tw/electric/electric_calc.html

  On this website, users can find battery life time for varied models at different configurations.

4.Set up Instruction

On/Off

Power on	Insert batteries (user may need a screwdriver to open) Insert 2 x 3V CR2450 button batteries into the battery slot in the correct direction and close the back cover. Note: Require 2 button batteries to supply power at the same time.
Turn on	Press any function key till the green and red indicator flashes once.
Turn off (Restore to factory setting)	Press and hold two function keys for 5 seconds and the green indicator flashes 20 times.
Power off	Remove Batteries.
Note:	1. Remove and reinsert the battery: the device will remember the previous on/off status by default. 2. After insert batteries and press the button at the same time, the device will be in engineering testing mode. 3. 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 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	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 (when the device is on)	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 20 times: success The green indicator remains off: fail
Press once	The device is in the network: the 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 reportchange exceeds setting value or the state changes: send a data report according to Min Interval.

Low Voltage Warning

Low Voltage	2.4V

5. Data Report

When the device is turned on, it will immediately send a version package and an attribute report data.

The device sends data according to the default configuration before any other configuring.

Default setting:

Maximum time: 3600s

Minimum time: 3600s (Default: Every Min Interval will detect the state of the dry contact one time)

BatteryChange: 0x01 (0.1V)

(If there are special customized shipments, the settings will be changed according to customer's requirement.)

R313DA trigger:

When the device senses vibration and the ball is shaken, an alarm message will be reported.

The shaking alarm bit is "1".

The static and non-shaking alarm bit is "0".

Restore Function:

There are two ways for the ball to trigger an alarm.

One is not to report the recovery status after sending the alarm.   **(default)**

The other is to report the recovery status after the device stops vibrating for 5 seconds after sending the alarm.

The two ways can be executed before shipment or by LoRaWan command configuration

Note:

The interval between two reports must be the MinTime.

The reported data is decoded by the Netvox LoRaWAN Application Command document and

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

Example of ConfigureCmd

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)

Description	Device	Cmd ID	Device Type	NetvoxPayLoadData			
ConfigReport Req	R313 DA	0x01	0xA8	MinTime (2bytes Unit: s)	MaxTime (2bytes Unit: s)	BatteryChange (1byte Unit: 0.1v)	Reserved (4Bytes, Fixed 0x00)
ConfigReport Rsp		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)	Reserved (4Bytes, Fixed 0x00)

(1) Command Configuration:

MinTime = 1min、 MaxTime = 1min、 BatteryChange = 0.1v

Downlink： 01A8003C003C0100000000   // 003C(Hex) = 60(Dec)

Response：

81A8000000000000000000 (Configuration success)

81A8010000000000000000 (Configuration failure)

(2) Read Configuration:

Downlink： 02A8000000000000000000

Response： 824E003C003C0100000000 (Current configuration)

Restore function configuration

Description	Device	CmdID	Device Type	NetvoxPayLoadData	
SetRestore ReportReq		0x03		RestoreReportSet (1byte) 0x00_DO NOT report when sensor restore, 0x01_DO report when sensor restore)	Reserved (8Bytes, Fixed 0x00)
SetRestore ReportRsp	R313DA	0x83	0xA8	Status (0x00_success)	Reserved (8Bytes, Fixed 0x00)
GetRestore ReportReq		0x04		Reserved (9Bytes, Fixed 0x00)	
GetRestore ReportRsp		0x84		RestoreReportSet (1byte, 0x00_DO NOT report when sensor restore, 0x01_DO report when sensor restore)	Reserved (8Bytes, Fixed 0x00)

(3) Do report after sensor stops vibrating

    Downlink：03A8010000000000000000 (0x01_DO report when sensor restore)

    Response：

        83A8000000000000000000 (Configuration success)

        83A8010000000000000000 (Configuration failure)
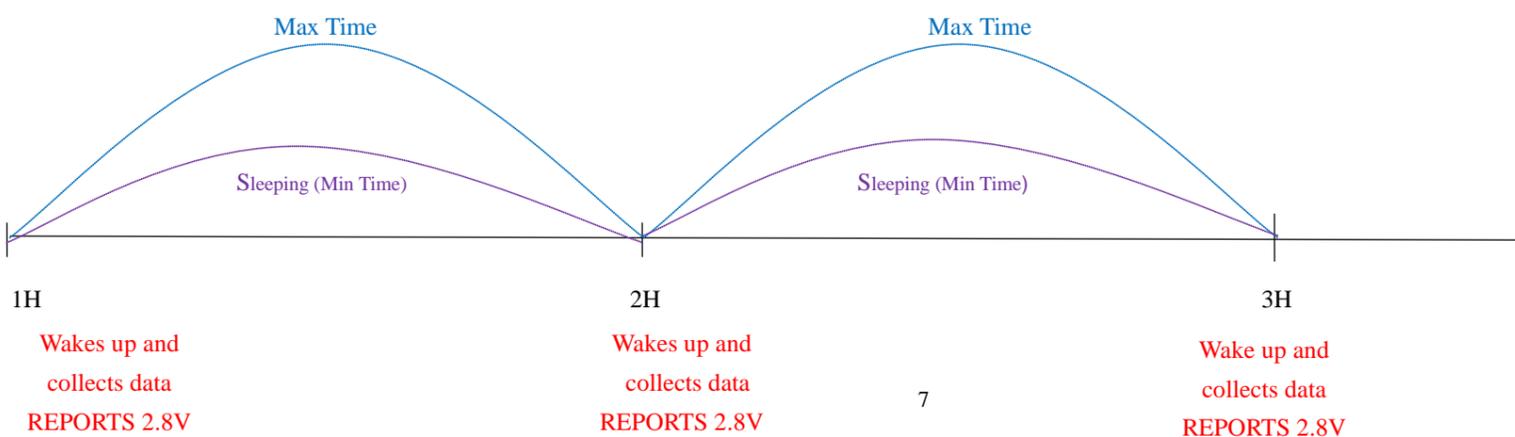
(2) Read restore function:

    Downlink：04A8000000000000000000

    Response：84A8010000000000000000 (Current configuration) (report when sensor restore)
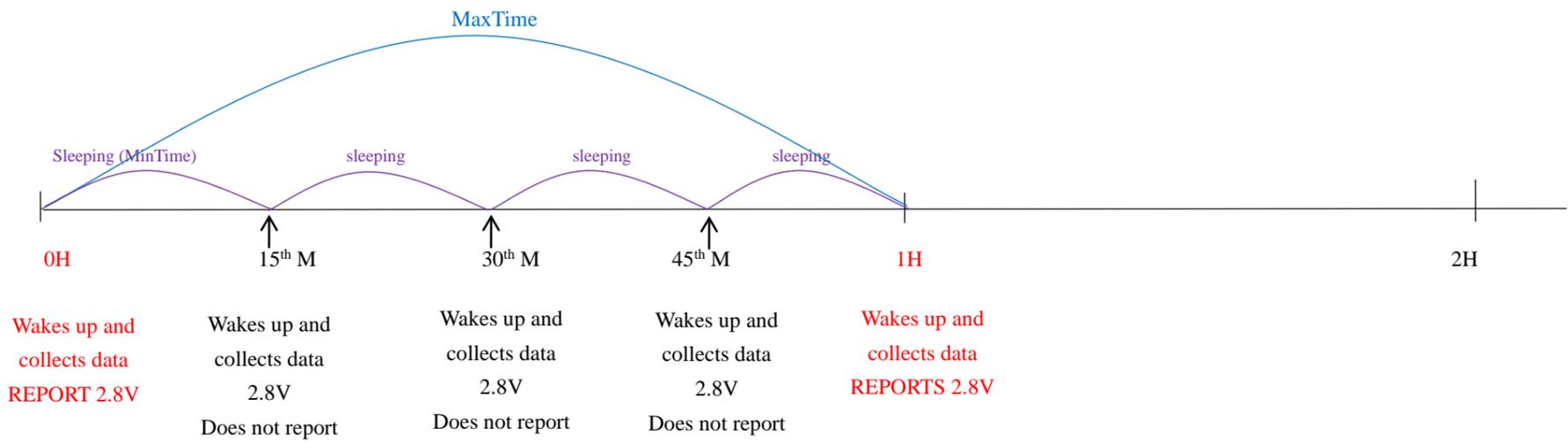
Example for MinTime/MaxTime logic:

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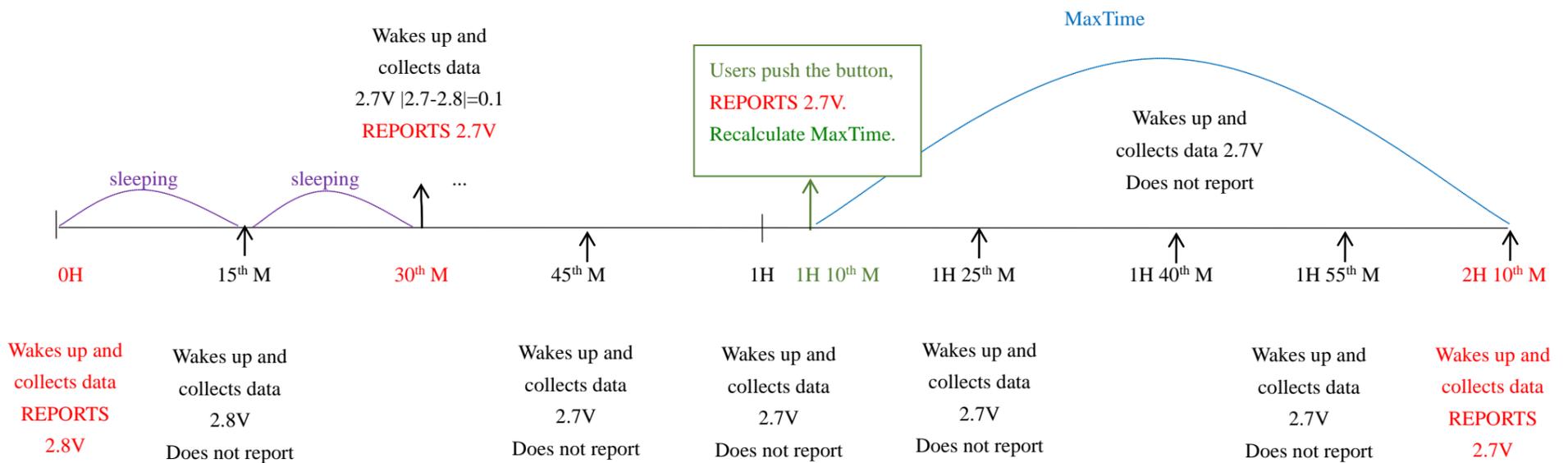
Note:

MaxTime=MinTime. Data will only be report according to MaxTime (MinTime) duration regardless BatteryVoltageChange value.

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

**Example#3** based on MinTime = 15 Minutes, MaxTime= 1 Hour, Reportable Change i.e. BatteryVoltageChange= 0.1V.

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 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.

6. Installation

(1) The device does not have a waterproof function. After the configuration of joining the network is completed, please place it

    indoors.

(2) The dust at the installation location should be wiped clean before paste the device.

(3) The battery installation method is as the figure below. (the battery with the "+" side facing up)
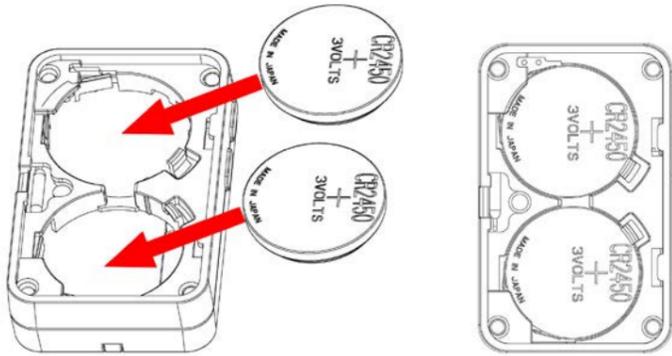
Note: The user may need a screwdriver to open the cover.

7. 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 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.