Wireless Multi-Sensor Device

R315 Series
User Manual

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1. Introduction

R315 series is a multi-sensor device of Netvox's Class A type device based on LoRaWAN open protocol. It can be connected with temperature and humidity, illuminance, door magnetism, internal vibration, external vibration, infrared detection, emergency button, tilt detection, water leakage detection, glass break, seat occupancy detection, dry contact in, DO out related functions (up to 8 types of sensors can be compatible at the same time), and 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.

2. Features

- Simple operation and setting
- Compatible with LoRaWAN Class A
- 2 sections of 3V CR2450 button battery power supply
- Frequency hopping spread spectrum technology.
- Available third-party platforms: Actility / ThingPark, TTN, MyDevices/Cayenne
- Low power consumption and long battery life

Note: Please refer to web: http://www.netvox.com.tw/electric/electric_calc.html. Users can find battery lifetime for various models at different configurations on this website.

1. The actual range may vary depending on the environment.

2. Battery life is determined by sensor reporting frequency and other variables.

3. Appearance

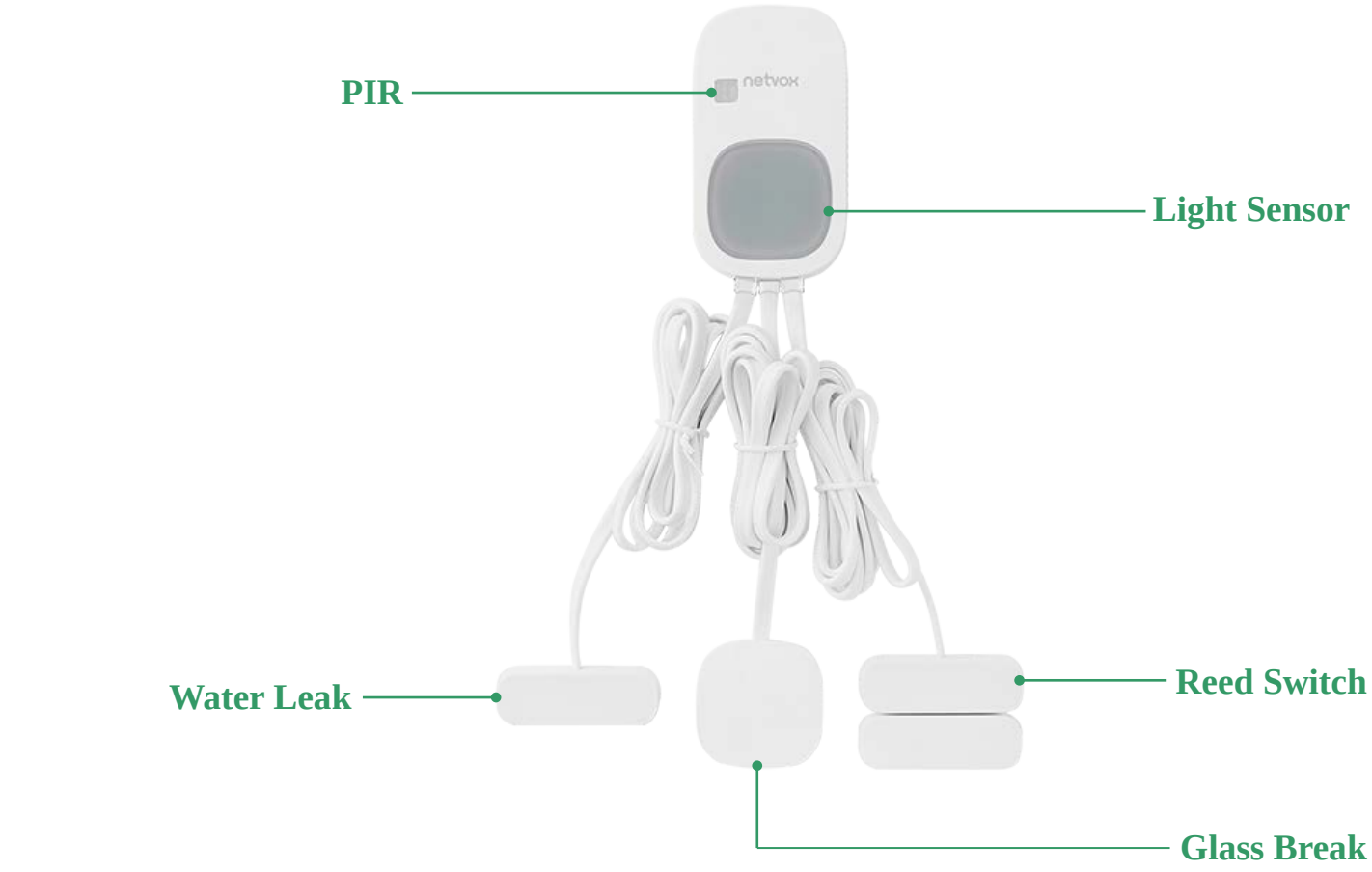
▸ R31523

External Sensors

- PIR
- Light
- Reed switch
- Glass break
- Water leak

Internal Sensors

- Temperature & Humidity
- Vibration
- Tilt



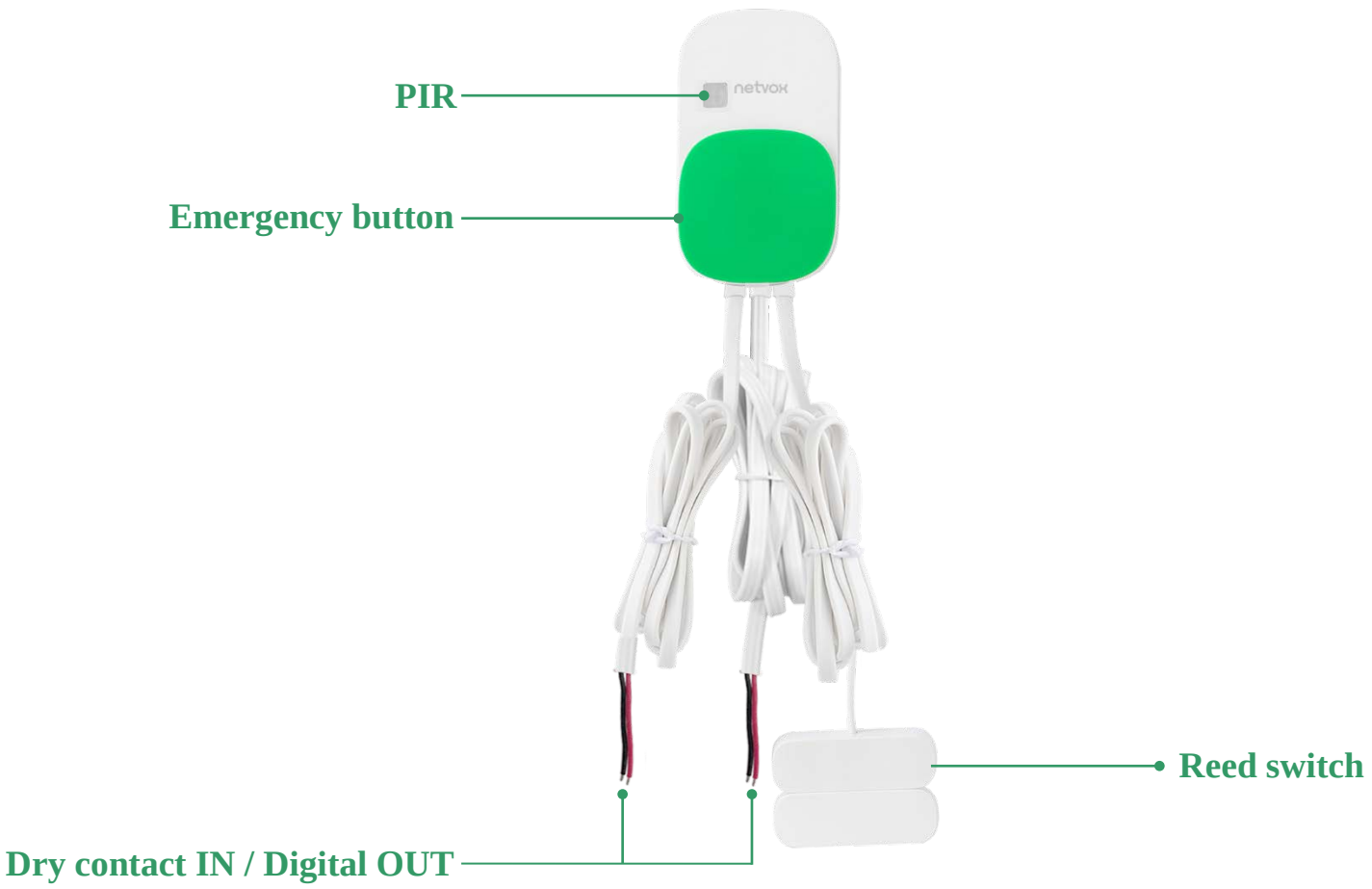
▸ R31538

External Sensors

- PIR
- Reed switch
- Emergency button
- Dry contact IN
- Digital OUT

Internal Sensors

- Temperature & Humidity
- Vibration
- Tilt



4. R315 8 in 1 Combination List

Model	Built-in Sensors						External Sensors						
	TH	Light	Vibration	PIR	Emergency Button	Tilt	Water Leak	Reed Switch	Dry contact IN	Digital OUT	Vibration	Glass break	Seat
R31511	V		V	V	V	V	V	V		V			
R31512	V		V	V	V	V	V	V				V	
R31513	V		V	V	V	V	V	V			V		
R31521	V	V	V	V		V	X2			V			
R31522	V	V	V	V		V	V	V		V			
R31523	V	V	V	V		V	V	V				V	
R31524	V	V	V	V		V	V	V			V		
R31527	V	V	V	V		V		X2				V	
R31531	V	V	V	V		V		V	V	V			
R31533	V		V	V	V	V	V		V	V			
R31535	V		V	V	V	V		V		V		V	
R31538	V		V	V	V	V		V	V	V			
R31545	V	V	V	V		V	V	V	V				
R31555	V		V	V	V	V		X2				V	
R31559	V		V	V	V	V	X2			V			
R31560	V	V	V	V		V		V		V			V
R31561	V	V	V	V		V		V		V		V	
R31570	V	V	V	V		V	V		V	V			
R31594	V		V	V	V	V	V	V	V				
R31597	V		V	V	V	V		V				X2	
R315101	V		V	V	V	V		V		V			V
R315102	V	V	V	V		V		V				X2	

5. R315 Sensor Function

5.1 Internal Sensors

Temperature & Humidity

- Detect ambient temperature and humidity

  Unit: 0.01℃ or 0.01%

Internal Vibration Sensor

- Detect the vibration state of the current device body.

  Vibration: report 1

  Still: report 0

- Adjust sensitivity:

  Range: 0 to 10; Default: 5

  (a) The lower the sensitivity value is, the more sensitive the sensor is.

  (b) Restore function could be set through configuration.

  (c) Configure sensitivity as 0xFF to turn off the sensor.

  Note: The vibration sensor should be fixed when it is in use.

Tilt Sensor

- Tilt detection

  Device tilt: report 1

  Device remain vertical: report 0

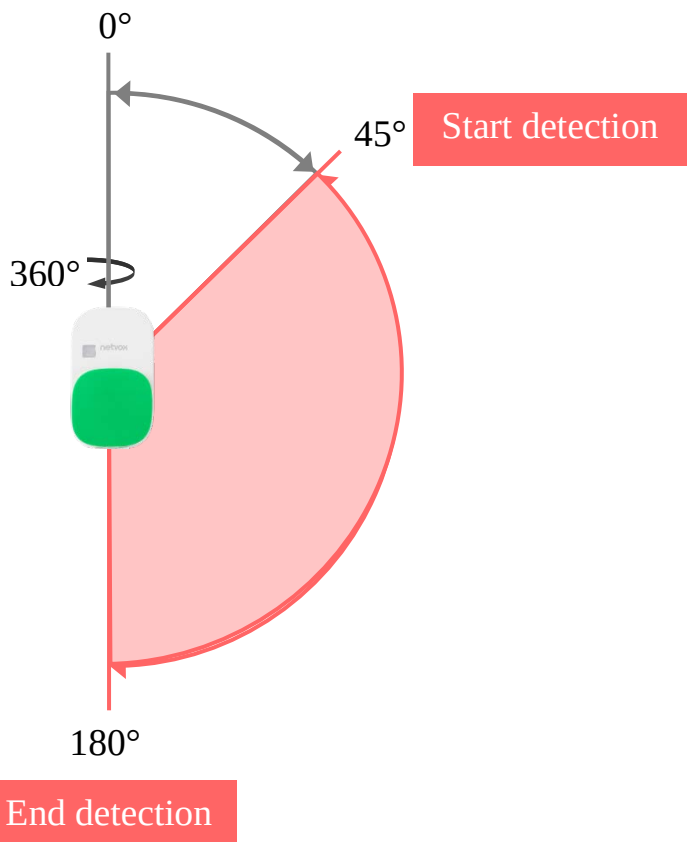
- Range: 45° to 180°

  (a) Set the tilt sensor vertically. (the square part on the lower side)

  (b) Tilt the sensor to any direction.

  (c) Report 1 as the sensor tilts over 45° to 180°.

  (d) Resend function could be configured.



PIR

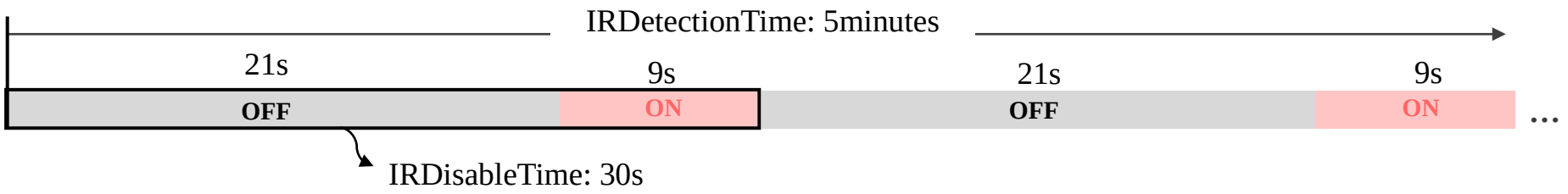
Default:

IRDetectionTime: 5 minutes

IRDisableTime: 30 seconds

Note:
IRDetectionTime: the total process of PIR detection; IRDisableTime: a short segment in IRDetectionTime

▶ When the PIR sensor is not triggered, …

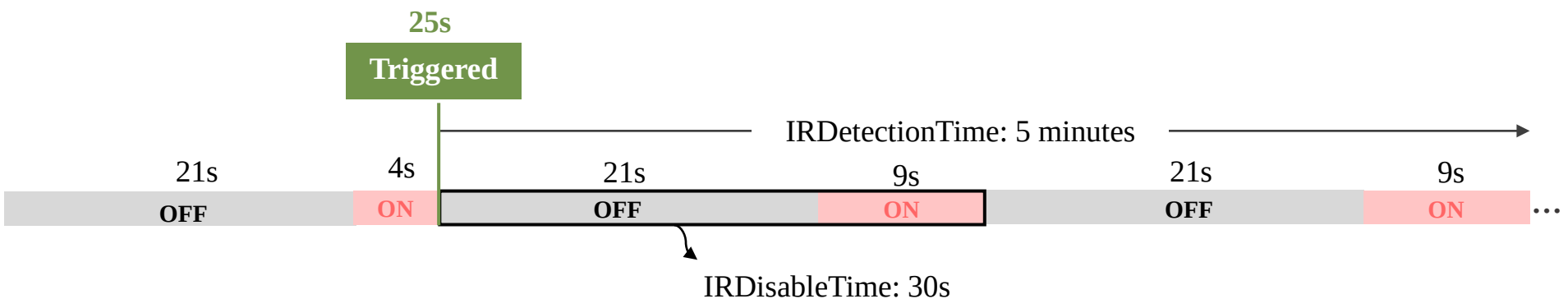


a. The PIR sensor stays off in 70% of the IRDisableTime and starts detecting at the last 30% of time.
Note: To save energy, the IRDisableTime is divided into 2 parts: the first 70% (21 seconds) and the rest 30% (9 seconds).

b. Once an IRDisableTime ends, the next one will continue until the whole process of IRDetectionTime ends.

c. If the PIR sensor is not triggered, it will report “un-occupied” along with other sensors’ data, such as temperature or illuminance right after the IRDetectionTime ends.

▶ When the PIR sensor is triggered, …

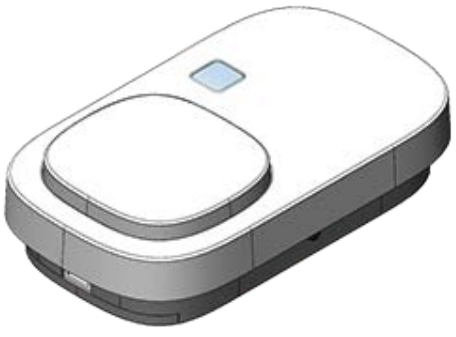


a. When the PIR sensor is triggered before an IRDetectionTime ends (at the 25th second), it will report data and restart a new IRDetectionTime.

b. If the PIR sensor is not triggered in the IRDetectionTime, it will report “un-occupied” along with other sensors’ data, such as temperature or illuminance right after the IRDetectionTime ends.

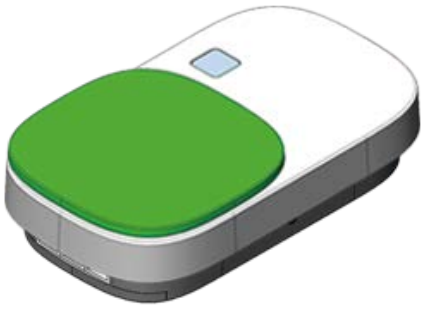
5.2 External Sensors

Light Sensor



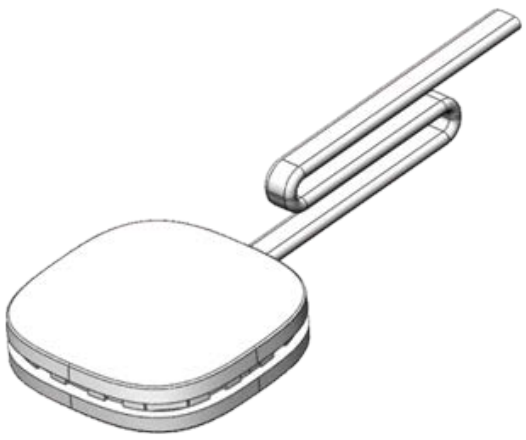
- Detect ambient illuminance
  Range: 0 – 3000Lux; unit: 1Lux

Emergency Button



- Press the emergency button to report the alarm status.
  No alarm: report 0
  Alarm: report 1
- Configurable press duration

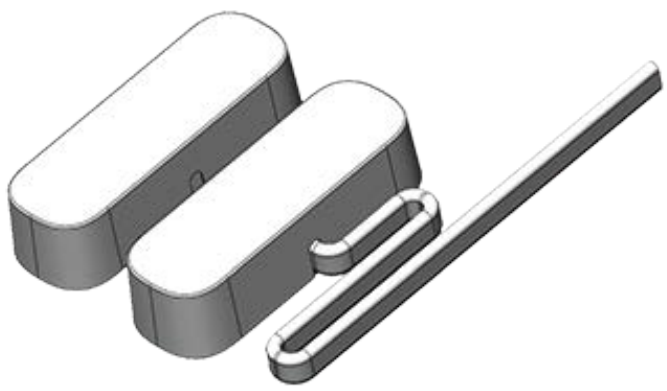
Glass Break Sensor



No broken glass detected: report 0

Broken glass detected: report 1

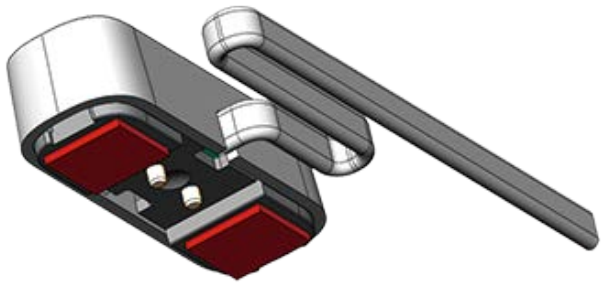
Reed Switch



- Detect the opening and closing state of the reed switch.
  Open: report 1
  Close: report 0
- Configurable resend function.

Note: The reed switch should be fixed when it is in use.

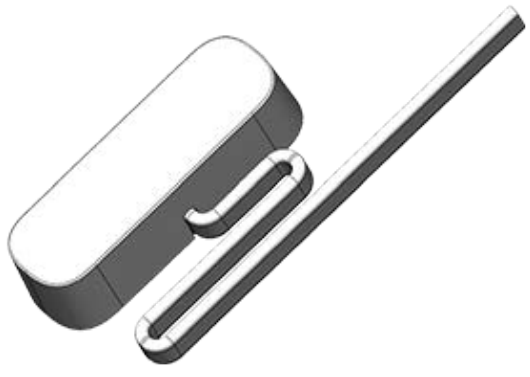
Water Leak Sensor



Water detected: report 1

No water detected: report 0

External Vibration Sensor



- Detect vibration of external sensor

  Vibration detected: report 1

  Still: report 0

- Adjust sensitivity:

  Range: 0 to 255; Default: 20

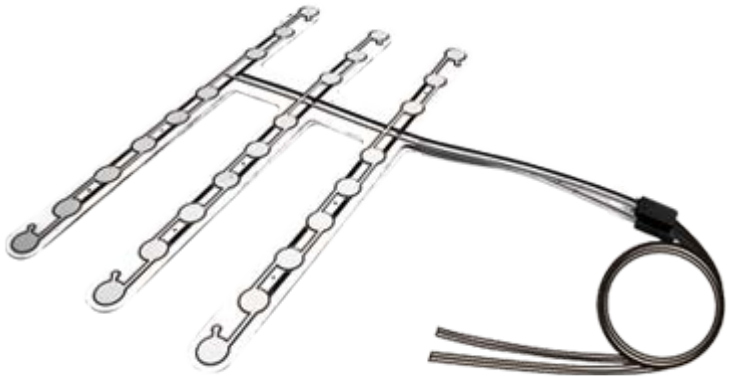
  (a) The lower the sensitivity value is, the more sensitive the sensor is.

  (b) Restore function could be set through configuration.

  (c) Configure sensitivity as 0xFF to turn off the sensor.

  Note: The vibration sensor should be fixed when it is in use.

Seat Occupancy Sensor



- Seat occupancy detection

  Seat being occupied: report 1

  Seat not being occupied: report 0

- Report follows IR disable time and IR detection time rules.

Dry contact IN & Digital OUT

- **Dry contact IN**

  Connected: report 1; Disconnected: report 0

  Dry contact can only receive signals from passive switch. Receiving voltage or current would damage the device.

- **Digital OUT**

  Connect to tilt sensor, pir, emergency button, reed switch, water leakage sensor, glass break sensor, and internal/external vibration sensor.

  Default:

  DryContactPointOutType = 0x00 (Normally Open)

  Note: DryContactPointOutType and TriggerTime could be configured through commands.

6. Set up Instruction

On/Off

Power on	Insert batteries.
Turn on	Short press the function key and the green indicator flashes once.
Turn off (Reset to factory setting)	Step1. Press the function key for more than 8 seconds, and the green indicator light will flash continuously. Step 2. Release the key after the indicator starts flashing, and the device will automatically shut down after the flash ends. Note: The indicator will flash once every 2 seconds.
Power off	Remove Batteries.
Note	1. Please put the battery into the battery holder according to the positive and negative electrodes of the battery and push back the back cover. 2. Two CR2450 button batteries are required to supply power at the same time. 3. The device memorizes the previous on/off state by default even user removes and inserts the batteries. 4. On/off interval should be 10 seconds long to avoid the interference of capacitor inductance and other energy storage components. 5. The device would enter engineer test mode when the user presses the function key and inserts the batteries at the same time.

Network Joining

Never joined 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	Please check the device verification information on the gateway with your platform server provider.

Function Key

Press the function key for more than 8 seconds	Back to factory setting / Turn off The green indicator flashes for 20 times: Success The green indicator remains off: Fail
Press once	1. Network Checking 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 2. Power on the device Turn on the device for the first time after it was set back to the factory setting

Press and hold the function key for 4s	Turn on/off the infrared detection function. The indicator flash once: Success

Sleeping Mode

The device is on and in the network	Sleeping period: Min Interval. When the reportchange exceeds setting value or the state changes, the device would send a data report according to Min Interval.
The device is on but not in the network	1. Please remove the batteries if the device is not in use. 2. Please check the device verification information on the gateway with your platform server provider.

Low Voltage Warning

Low Voltage	2.4V

7. Data Report

When the device is turned on, it will immediately send a version package.

Default Setting:

Max Interval: 0x0E10 (3600s)

Min Interval: 0x0E10 (3600s) Note: The device would check the voltage every min interval.

Battery Change: 0x01 (0.1V)

Temperature Change: 0x64 (1°C)

Humidity Change: 0x14 (10%)

Illuminance Change: 0x64 (100 lux)

InternalShockSensorSensitivity: 0x05 // Internal Vibration Sensor, Sensitivity Range:0x00–0x0A

ExternalShockSensorSensitivity: 0x14 // External Vibration Sensor, Sensitivity Range:0x00-0xFE

RestoreReportSet: 0x00 (DO NOT report when sensor restore) // Vibration Sensor

Disabletime: 0x001E (30s)

DectionTime: 0x012C (300s)

AlarmONTime: 0x0F (15s) // Buzzer

DryContactPointOutType: Normally Open

Note:

1. The interval between two reports must be the minimum time.

2. The reported data is decoded by the Netvox LoRaWAN Application Command document and http://www.netvox.com.cn:8888/cmddoc.

Data report configuration and sending period are as follows:

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	Cannot be 0	Report per Min Interval	Report per Max Interval

7.1 Example of ReportDataCmd

FPort：0x06

Bytes	1	1	1	Var (Fix=8 Bytes)
	Version	DeviceType	ReportType	NetvoxPayLoadData

Version– 1 byte –0x01—the Version of NetvoxLoRaWAN Application Command Version

DeviceType– 1 byte – Device Type of Device

ReportType – 1 byte –the presentation of the NetvoxPayLoadData, according the devicetype

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=0x98, binary=1001 1000, if bit 7= 1, it means low voltage.

   The actual voltage is 0001 1000 = 0x18 = 24, 24*0.1v =2.4v

2. **Version Packet:**

   When Report Type=0x00 is the version packet, such as 01D2000A03202308150000, the firmware version is 2023.08.15.

3. **Data Packet:**

   When Report Type=0x01 is data packet.

   (If the device data exceeds 11 bytes or there are shared data packets, the Report Type will have different values.)

4. **Signed Value:**

   When the temperature is negative, 2's complement should be calculated.

Version	Device Type	Report Type	NetvoxPayloadData			
0x01	0x D2	0x00	SoftwareVersion (1 byte) Eg.0x0A-V1.0	HardwareVersion (1 byte)	DateCode (4 bytes) e.g. 0x20170503	Reserved (2 bytes)
		0x01	Battery (1 byte, unit: 0.1v)	Temperature (2 bytes, unit: 0.01℃)	Humidity (2 bytes, unit: 0.01%)	Reserved (3 bytes)

		0x11	Battery (1 byte, unit:0.1V)	FunctionEnableBits (3 bytes) BIT0: THSensor BIT1: LightSensor BIT2: PIRSensor BIT3: EmergenceButton BIT4: TiltSensor BIT5: InternalContactSwitch BIT6: ExternalContactSwitch1 BIT7: ExternalContactSwitch2 BIT8: InternalShockSensor BIT9: ExternalShockSensor BIT10: ExternalDryContactPointIN BIT11: DryContactPointOut BIT12: ExternalWaterLeakSenor1 BIT13: ExternalWaterLeakSenor2 BIT14: ExternalSeatSensor BIT15: ExternalGlassSensor1 BIT16: ExternalGlassSensor2 BIT17-BIT23: Reserved When BIT is 1, the function is enabled	BinarySensorReport (2 bytes) Bit0: IRSensorState (0b01_ON, 0b00_OFF) Bit1: EmergenceButtonAlarmState (0b01_Alarm, 0b00_NoAlarm) Bit2: TiltSensorState (0b01_ON, 0b00_OFF) Bit3: InternalContactSwitchSensorState (0b01_ON, 0b00_OFF) Bit4: ExternalContactSwitch1SensorState (0b01_ON, 0b00_OFF) Bit5: ExternalContactSwitch2SensorState (0b01_ON, 0b00_OFF) Bit6: InternalShockSensorState (0b01_ON, 0b00_OFF) Bit7: ExternalShockSensorState (0b01_ON, 0b00_OFF) Bit8: ExternalDryContactPointINState (0b01_ON, 0b00_OFF) Bit9: ExternalWaterLeak1SenorState (0b01_ON, 0b00_OFF) Bit10: ExternalWaterLeak2SenorState (0b01_ON, 0b00_OFF) Bit11: ExternalSeatSenorState (0b01_ON, 0b00_OFF) Bit12: ExternalGlassSenor1State (0b01_ON, 0b00_OFF) Bit13: ExternalGlassSenor2State (0b01_ON, 0b00_OFF) BIT15: HeartBeat (0b01_Heartbeat, 0b00_NOTHeartbeat)	Reserved (2 byte, fixed 0x00)
		0x12	Battery (1 byte, unit:0.1V)	Temperature (Signed 2 bytes, unit: 0.01°C) (When THSensorBit is 0 in the FunctionEnable Bits, the filed is fixed 0xFFFF)	Humidity (2 bytes, unit: 0.01%) (When THSensorBit is 0 in the FunctionEnable Bits, the filed is fixed 0xFFFF)	illuminance (2 bytes, unit: 1 Lux) (When LightSensor is 0 in the FunctionEnable Bits, the filed is fixed 0xFFFF)	ThresholdAlarm (1 byte) Bit0_Low TemperatureAlarm Bit1_High TemperatureAlarm Bit2_ Low Humidity Alarm Bit3_ High Humidity Alarm Bit4_ Low illuminance Alarm Bit5_ High illuminance Alarm Bit6-7: Reserved (The Multi-Same ExternalSensor Don’t Support this field)

Note: R315 series would report 2 packets (DeviceType 0x11 and 0x12) when the light sensor and TH sensor are on. The interval of two packets would be 10 seconds.

Only one ppacket (DeviceType 0x11) would be reported as the light sensor and TH sensor are off.

Example of Uplink1: 01D2111C01815700550000

1st byte (01): Version

2nd byte (D2): DeviceType – R315

3rd byte (11): ReportType

4th byte (1C): Battery–2.8V, 1C (HEX) = 28 (DEC), 28* 0.1v = 2.8v

5th – 7th byte (018157): FunctionEnableBits, 0x018157 = 0001 1000 0001 0101 0111 (BIN) //Bit 0, 1, 2, 4, 6, 8, 15, 16 =1 (enable)

Bit0: Temperature and Humidity Sensor

Bit1: Light Sensor

Bit2: PIR Sensor

Bit4: Tilt Sensor

Bit6: External Contact Switch 1

Bit8: Internal Shock Sensor

Bit15: External Glass Sensor 2

Bit16: External Glass Sensor 2

8th – 9th byte (0055): BinarySensorReport, 0x0055 = 0000 0000 0101 0101 //Bit 0, 2, 4, 6 = 1 (enable)

Bit0: PIR Sensor

Bit1: EmergenceButtonAlarm

Bit2: TiltSensor

Bit4: ExternalContactSwitch1

Bit6: InternalShockSensor

10th –11th byte (0000): Reserved

Example of Uplink2: 01D2121C0B901AAA009900

1st byte (01): Version

2nd byte (D2): DeviceType – R315

3rd byte (12): ReportType

4th byte (1C): Battery – 2.8V, 1C (HEX) = 28 (DEC), 28* 0.1v = 2.8v

5th–6th (0B90): Temperature – 29.60°, 0B90 (HEX) = 2960 (DEC), 2960* 0.01°= 29.60°

7th–8th (1AAA): Humidity – 68.26%, 1AAA (HEX) = 6826 (DEC), 6826* 0.01% = 68.26%

9th–10th (0099): illuminance – 153Lux, 0099 (HEX) = 153 (DEC), 153* 1Lux = 153Lux

11th (00): ThresholdAlarm, 0x00 = 0000 0000 (BIN)

7.2 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 = 9 bytes)

Description	Cmd ID	Device Type	NetvoxPayLoadData					
ConfigReport Req	0x01	0xD2	MinTime (2 bytes, Unit: s)	MaxTime (2 bytes, Unit: s)	BatteryChange (1 byte, Unit: 0.1v)	TemperatureChange (2 bytes, Unit: 0.01°C)	HumidityChange (1 byte, Unit: 0.5 %)	Illuminancechange (1 byte, Unit: 1 Lux)
ConfigReport Rsp	0x81		Status (0x00_success)		Reserved (8 bytes, Fixed 0x00)			
ReadConfigReportReq	0x02		Reserved (9 bytes, Fixed 0x00)					
ReadConfigReportRsp	0x82		MinTime (2 bytes, Unit: s)	MaxTime (2 bytes, Unit: s)	BatteryChange (1 byte, Unit: 0.1v)	TemperatureChange (2 byte, Unit: 0.01°C)	HumidityChange (1 byte, Unit: 0.5 %)	Illuminancechange (1 byte, Unit: 1 Lux)
SetPIREnable Req	0x03		PIREnable (1 byte, 0x00_Disable, 0x01_Enable)		Reserved (8 bytes, Fixed 0x00)			
SetPIREnable Rsp	0x83		Status (0x00_success)		Reserved (8 bytes, Fixed 0x00)			
GetPIREnable Req	0x04		Reserved (9 bytes, Fixed 0x00)					
GetPIREnable Rsp	0x84		PIREnable (1 byte, 0x00_Disable, 0x01_Enable)		Reserved (8 bytes, Fixed 0x00)			
SetShockSensorSensitivityReq	0x05		InternalShock SensorSensitivity (1 byte, 0xFF represents disable ShockSensor)		ExternalShockSensor Sensitivity (1 byte, 0xFF represents disable ShockSensor)	Reserved (7 bytes, Fixed 0x00)		
SetShockSensorSensitivityRsp	0x85		Status (0x00_success)		Reserved (8 bytes, Fixed 0x00)			

GetShockSensorSensitivityReq	0x06		Reserved (9 bytes, Fixed 0x00)			
GetShockSensorSensitivityRsp	0x86		InternalShockSensor Sensitivity (1 byte, 0xFF represents disable ShockSensor)	ExternalShockSensor Sensitivity (1 byte, 0xFF represents disable ShockSensor)	Reserved (7 bytes, Fixed 0x00)	
SetIRDisableTImeReq	0x07		IRDisableTime (2 bytes, Unit: s)	IRDectionTime (2 bytes, Unit: s)	SensorType (1 byte, 0x00_PIRSensor, 0x01_SeatSensor)	Reserved (4 bytes, Fixed 0x00)
SetIRDisableTImeRsp	0x87		Status (0x00_success)	Reserved (8 bytes, Fixed 0x00)		
GetIRDisableTImeReq	0x08		SensorType (1 byte, 0x00_PIRSensor, 0x01_SeatSensor)	Reserved (8 bytes, Fixed 0x00)		
GetIRDisableTImeRsp	0x88		IRDisableTime (2 bytes, Unit: s)	IRDectionTime (2 bytes, Unit: s)	Reserved (5 bytes, Fixed 0x00)	
SetAlarmOnTimeReq	0x09		AlarmONTime (2 bytes, Unit: 1s)	Reserved (7 bytes, Fixed 0x00)		
SetAarmrOnTimeRsp	0x89		Status (0x00_success)	Reserved (8 bytes, Fixed 0x00)		
GetAlarmrOnTimeReq	0x0A		Reserved (9 bytes, Fixed 0x00)			
GetAlarmOnTimeRsp	0x8A		AlarmONTime (2 bytes, Unit: 1s)	Reserved (7 bytes, Fixed 0x00)		
SetDryContactPointOutTypeReq	0x0B		DryContactPointOutType (1 byte, 0x00_Normally Open 0x01_Normally Close)	Reserved (7 bytes, Fixed 0x00)		
SetDryContactPointOutTypeRsp	0x8B		Status (0x00_success)	Reserved (8 bytes, Fixed 0x00)		

GetDryContactPointOutTypeReq	0x0C		Reserved (9 bytes, Fixed 0x00)	
GetDryContactPointOutTypeRsp	0x8C		DryContactPointOutType (1 byte, 0x00_Normally Open 0x01_Normally Close)	Reserved (7 bytes, Fixed 0x00)
SetRestoreReportReq	0x0D		RestoreReportSet (1 byte) 0x00_DO NOT report when sensor restore 0x01_DO report when sensor restore	Reserved (8 bytes, Fixed 0x00)
SetRestoreReportRsp	0x8D		Status (0x00_success)	Reserved (8 bytes, Fixed 0x00)
GetRestoreReportReq	0x0E		Reserved (9 bytes, Fixed 0x00)	
GetRestoreReportRsp	0x8E		RestoreReportSet (1 byte) 0x00_DO NOT report when sensor restore 0x01_DO report when sensor restore	Reserved (8 bytes, Fixed 0x00)

Note: Restore Function (only for internal vibration sensor and external vibration sensor)

(a) RestoreReportSet = 0x00 – send data as the sensor detects vibration;

(b) RestoRereportSet = 0x01 – sends data as vibration is detected and when vibration stops

When the light sensor is on, the data will be sent 30 seconds after the vibration stops.

1. Configure device parameters

MinTime = 1min (0x3C), MaxTime = 1min (0x3C), BatteryChange = 0.1v (0x01), TemperatureChange=10℃ (0x3E8),

HumidityChange = 20% (0x28), Illuminancechange=100lux (0x64)

Downlink: 01D2003C003C0103E82864

Response: 81D2000000000000000000 (configuration success)

81D2010000000000000000 (configuration fail)

2. Read configuration

Downlink: 02D2000000000000000000

Response: 82D2003C003C0103E82864 (device current parameter)

7.3 Example of ResendtimeCmd

(for resending time of reed switch and tilt sensor)

FPort: 0x07

Description	Device	Cmd ID	Device Type	NetvoxPayLoadData	
SetLastMessageResendtimeReq	only used in contactswitch devicetype	0x1F	0xFF	Resendtime (1 byte, Unit: 1s, range: 3-254s), when 0 or 255 no resend, default is no resend	Reserved (8 bytes, Fixed 0x00)
SetLastMessageResendtimeRsp		0x9F		Status (0x00_success)	Reserved (8 bytes, Fixed 0x00)
GetLastMessageResendtimeReq		0x1E		Reserved (9 bytes, Fixed 0x00)	
GetLastMessageResendtimeRsp		0x9E		Resendtime (1 byte, Unit:1s, range: 3-254s), when 0 or 255 no resend, default is no resend	Reserved (8 bytes, Fixed 0x00)

1. Configure device parameters

Resendtime= 5s

Downlink: 1FFF050000000000000000

Response: 9FFF000000000000000000 (configuration success)

9FFF010000000000000000 (configuration fail)

2. Read configuration

Downlink: 1EFF000000000000000000

Response: 9EFF050000000000000000 (device current parameter)

7.4 Example of ConfigButtonPressTime (EmergenceButton)

FPort：0x0D

Description	CmdID	PayLoad (Fix byte, 1 byte)
SetButtonPressTimeReq	0x01	PressTime (1 bytes) 0x00_QuickPush_Less then 1 Second OtherValue present the presstime such as 0x01_1 Second push 0x02_2 Seconds push 0x03_3 Seconds push 0x04_4 Seconds push 0x05_5 Seconds push 0x06_6 Seconds push, and so on
SetButtonPressTimeRsp	0x81	Status (0x00_Success; 0x01_Failure)
GetButtonPressTimeReq	0x02	Reserved (1 byte, Fixed 0x00)
GetButtonPressTimeRsp	0x82	PressTime (1 byte) 0x00_QuickPush_Less then 1 Second OtherValue present the presstime such as 0x01_1 Second push 0x02_2 Seconds push 0x03_3 Seconds push 0x04_4 Seconds push 0x05_5 Seconds push 0x06_6 Seconds push, and so on

Default: presstime = 3s

1. Configure device parameters

Presstime= 5s

Downlink: 0105

Response: 8100 (configuration success)

8101 (configuration fail)

2. Read configuration

Downlink: 0200

Response: 8205 (device current parameter)

7.5 ConfigDryContactINTriggerTime (Bi-Direction)

FPort：0x0F

Description	CmdID	PayLoad (Fix byte, 2 byte)	
SetDryContactINTriggerTimeReq	0x01	MinTriggeTime (2 bytes) (Unit: 1ms, Default 50ms)	
SetDryContactINTriggerTimeRsp	0x81	Status (0x00_Success; 0x01_Failure)	Reserved (1 byte, Fixed 0x00)
GetDryContactINTriggerTimeReq	0x02	Reserved (2 byte, Fixed 0x00)	
GetDryContactINTriggerTimeRsp	0x82	MinTriggeTime (2 bytes) (Unit: 1ms, Default 50ms)	

Default: MinTriggerTime = 50ms

1. Configure device parameters

MinTriggeTime = 100ms

Downlink: 010064

Response: 810000 (configuration success)

810100 (configuration fail)

2. Read configuration

Downlink: 020000

Response: 820064 (device current parameter)

7.6 Set/GetSensorAlarmThresholdCmd

Fport:0x10

Cmd Descriptor	CmdID (1 byte)	Payload (10 bytes)			
SetSensorAlarmThresholdReq	0x01	Channel (1 byte, 0x00_Channel1, 0x01_Channel2, 0x02_Channel3, etc)	SensorType (1 byte, 0x00_Disable ALL SensorthresholdSet 0x01_Temperature, 0x02_Humidity, 0x05_illuminance,)	SensorHighThreshold (4 bytes, Unit: same as reportdata in fport6, 0Xffffffff_DISALBLErHighThreshold)	SensorLowThreshold (4 bytes, Unit:same as reportdata in fport6, 0Xffffffff_DISALBLErHighThreshold)
SetSensorAlarmThresholdRsp	0x81	Status (0x00_success)	Reserved (9 bytes, Fixed 0x00)		
GetSensorAlarmThresholdReq	0x02	Channel (1 byte, 0x00_Channel1, 0x01_Channel2, 0x02_Channel3, etc)	SensorType (1 byte, Same as the SetSensorAlarmThresholdReq's SensorType)	Reserved (8 bytes, Fixed 0x00)	
GetSensorAlarmThresholdRsp	z0x82	Channel (1 byte, 0x00_Channel1, 0x01_Channel2, 0x02_Channel3, etc)	SensorType (1 byte, Same as the SetSensorAlarmThresholdReq's SensorType)	SensorHighThreshold (4 bytes, Unit: same as reportdata in fport6, 0Xffffffff_DISALBLErHighThreshold)	SensorLowThreshold (4 bytes, Unit: same as reportdata in fport6, 0Xffffffff_DISALBLErHighThreshold)
SetThresholdAlarmCheckCntReq	0x03	ThresholdAlarmCheckCn (1 byte)	Reserved (9 bytes, Fixed 0x00)		
SetThresholdAlarmCheckCntRsp	0x83	Status (0x00_success)	Reserved (9 bytes, Fixed 0x00)		
GetThresholdAlarmCheckCntReq	0x04	Reserved (10 bytes, Fixed 0x00)			
GetThresholdAlarmCheckCntRsp	0x84	ThresholdAlarmCheckCn (1 byte)	Reserved (9 bytes, Fixed 0x00)		

Note:

(a) SensorHighThreshold and SensorLowThreshold = 0XFFFFFFFF by default as the thresholds are not set.

(b) Channel could only be set and started from 0x00_Channel1 when users adjust the sensor thresholds.

(c) SensorType = 0 when all thresholds are erased.

1. Configure device parameters

SensorHighThreshold = 40℃ (0FA0), SensorLowThreshold = 10℃ (03E8)

Downlink: 01000100000FA0000003E8

Response: 810000000000000000000 (configuration success)

2. Read configuration

Downlink: 020001000000000000000

Response: 82000100000FA0000003E8 (device current parameter)

3. Configure detection parameters

ThresholdAlarmCheckCn = 3

Downlink: 030300000000000000000

Response: 830000000000000000000

4. Read configuration

Downlink: 040000000000000000000

Response: 840300000000000000000

7.7 NetvoxLoRaWANRejoin

(Note: check if the device is still in the network. If the device is disconnected, it will automatically rejoin back to the network.)

Fport: 0x20

CmdDescriptor	CmdID(1Byte)	Payload(5Bytes)	
SetNetvoxLoRaWANRejoinReq	0x01	RejoinCheckPeriod (4 bytes, Unit: 1s 0XFFFFFFFF Disable NetvoxLoRaWANRejoinFunction)	RejoinThreshold (1 byte)
SetNetvoxLoRaWANRejoinRsp	0x81	Status (1 byte,0x00_success)	Reserved (4 bytes, Fixed 0x00)
GetNetvoxLoRaWANRejoinReq	0x02	Reserved (5 Bytes, Fixed 0x00)	
GetNetvoxLoRaWANRejoinRsp	0x82	RejoinCheckPeriod (4 bytes, Unit:1s)	RejoinThreshold (1 byte)

Note:

(a) Set RejoinCheckThreshold as 0xFFFFFFFF to stop the device from rejoining the network.

(b) The last configuration would be kept as users reset the device back to the factory setting.

(c) Default setting: RejoinCheckPeriod = 2 (hr) and RejoinThreshold = 3 (times)

1. Configure device parameters

RejoinCheckPeriod = 60min (0xE10), RejoinThreshold = 3 times (0x03)

Downlink: 0100000E1003

Response: 810000000000 (configuration success)

810100000000 (configuration fail)

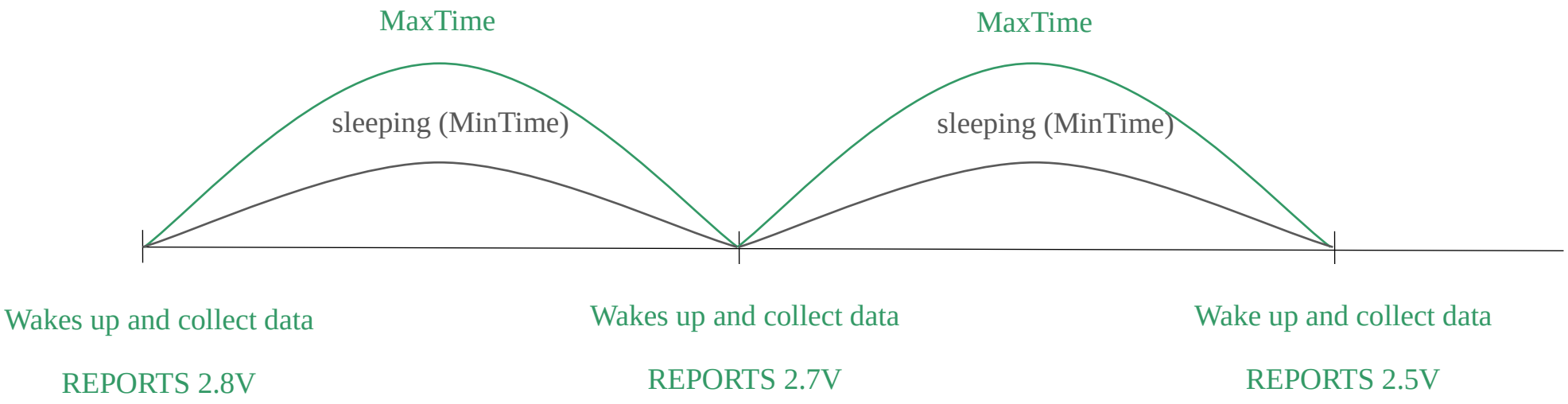
2. Read configuration

Downlink: 020000000000

Response: 8200000E1003

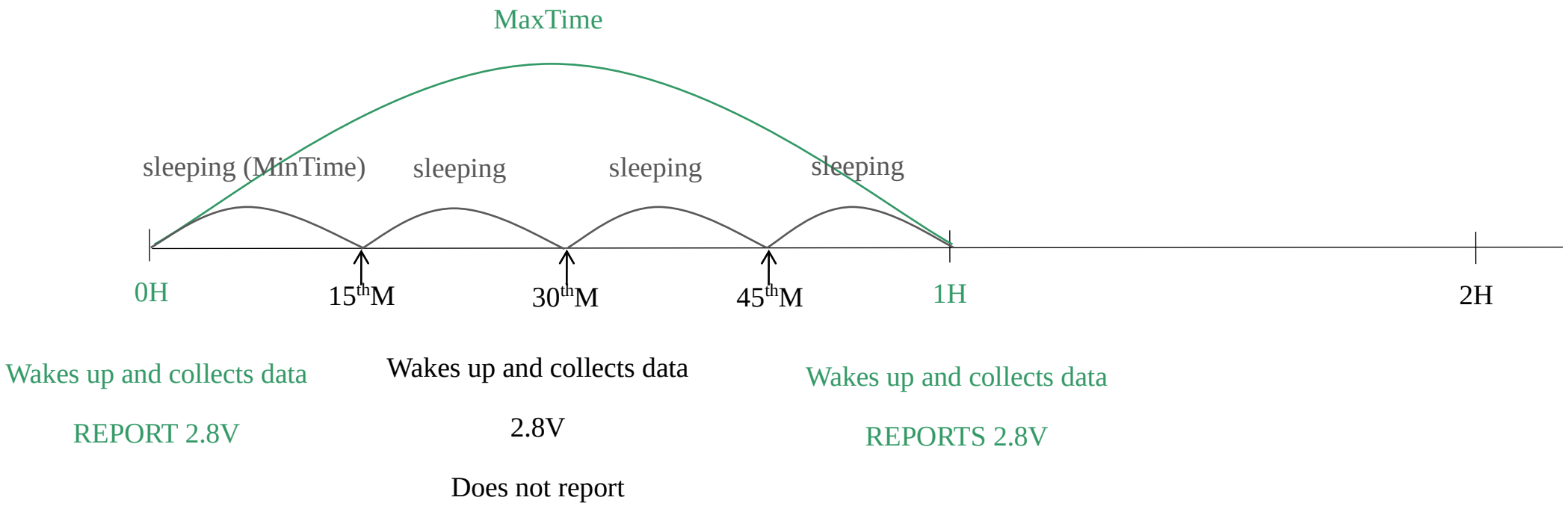
7.8 Example for MinTime/MaxTime logic

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

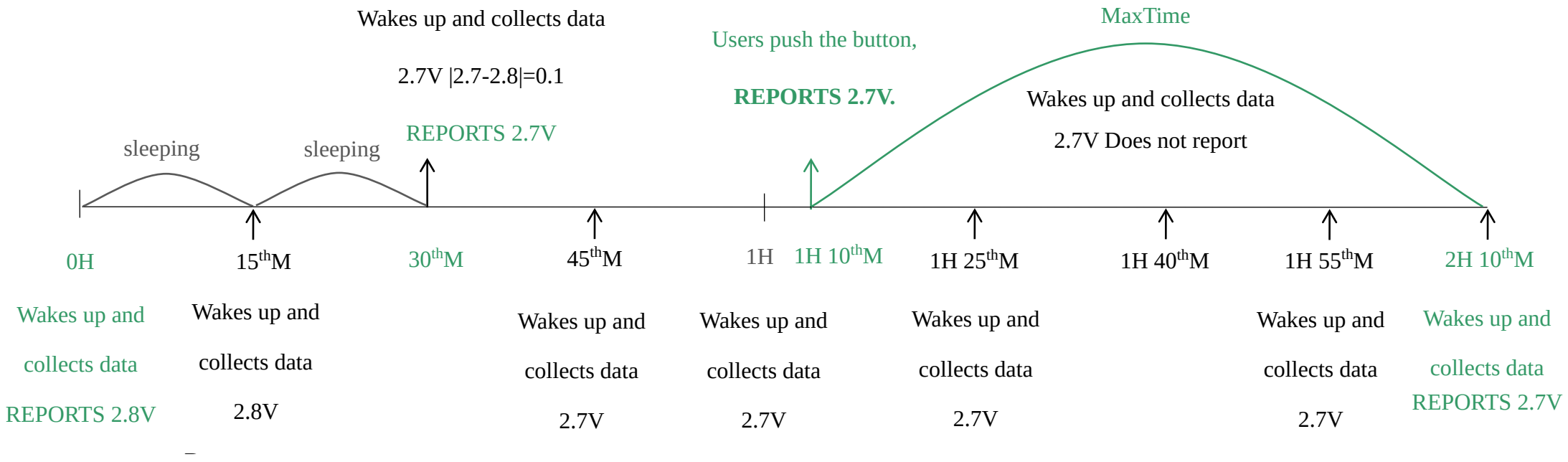


Note: MaxTime = MinTime. Data will only be reported according to MaxTime (MinTime) duration regardless BatteryVoltageChange value.

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.



Notes:

(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.

8. 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 a dusty or dirty environment. It might damage its detachable parts and electronic components.
- Do not store the device under excessively hot conditions. High temperatures 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 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.