

**Wireless Wall-Mounted Power Socket with Consumption Monitoring,
One Gang Wireless enabled, One Gang Straight-through, US type**

Wireless Wall-Mounted Power Socket with Consumption Monitoring (US type)

R816B User Manual

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1. Introduction

R816B is a long-distance wireless socket device for Netvox ClassC type devices based on the LoRaWAN open protocol, compatible with the LoRaWAN protocol. The AppServer can be used to control the opening and closing of the external load of the R816B, and the external load can also be controlled by the switch that comes with the R816B device itself. The current, voltage, power and energy values of the current load can be viewed through the AppServer. R816B supports automatic disconnection of load and over-current alarm.

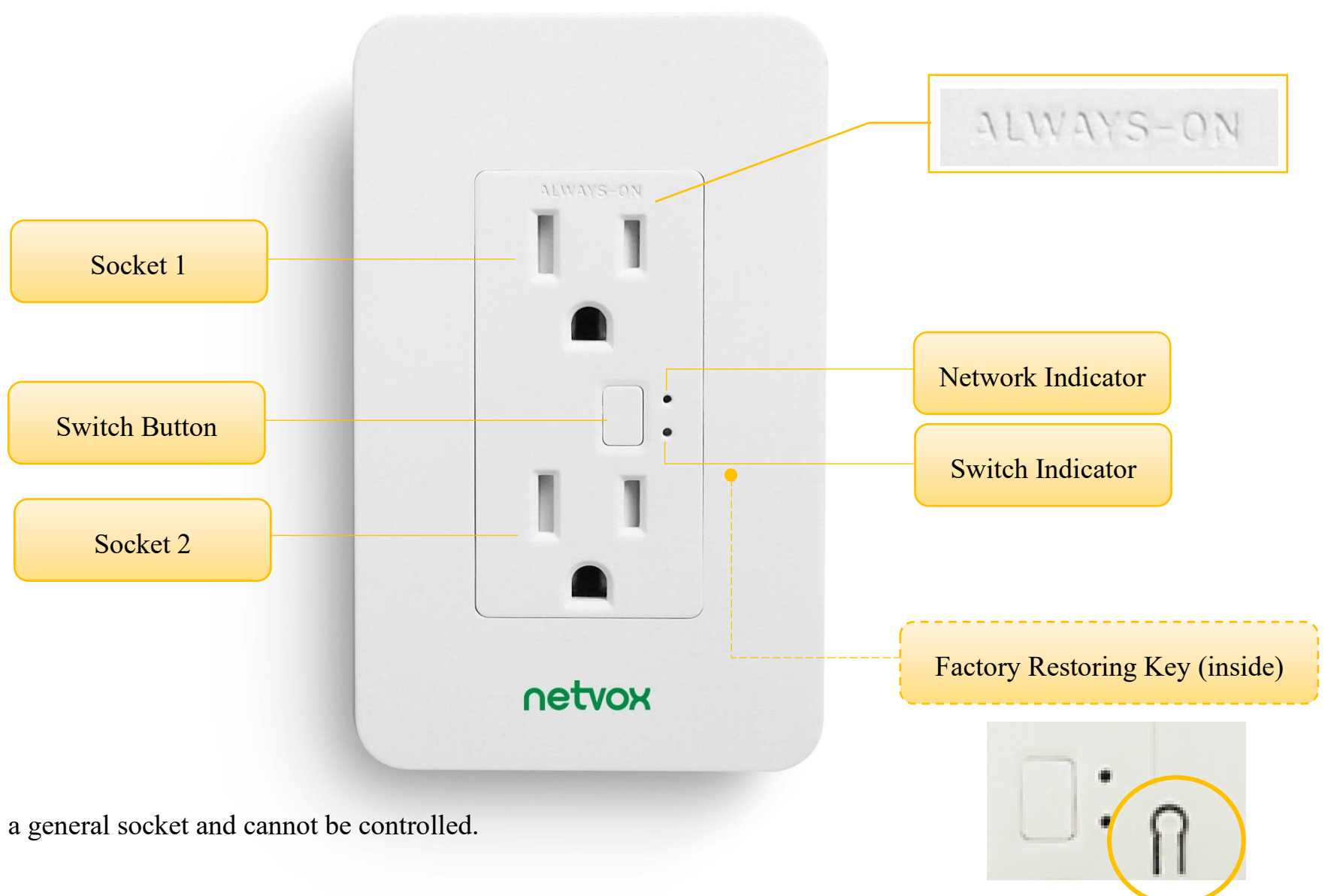
LoRa wireless technology:

LoRa is a wireless communication technology dedicated to long-distance low-power consumption. Its spread-spectrum modulation method greatly increases the communication distance compared with other communication methods, and can be widely used in long-distance low-rate IoT wireless communication fields in various occasions. Such as automatic meter reading, building automation equipment, wireless security systems, industrial monitoring and control. It has the characteristics of small size, low power consumption, long transmission distance and strong anti-interference ability.

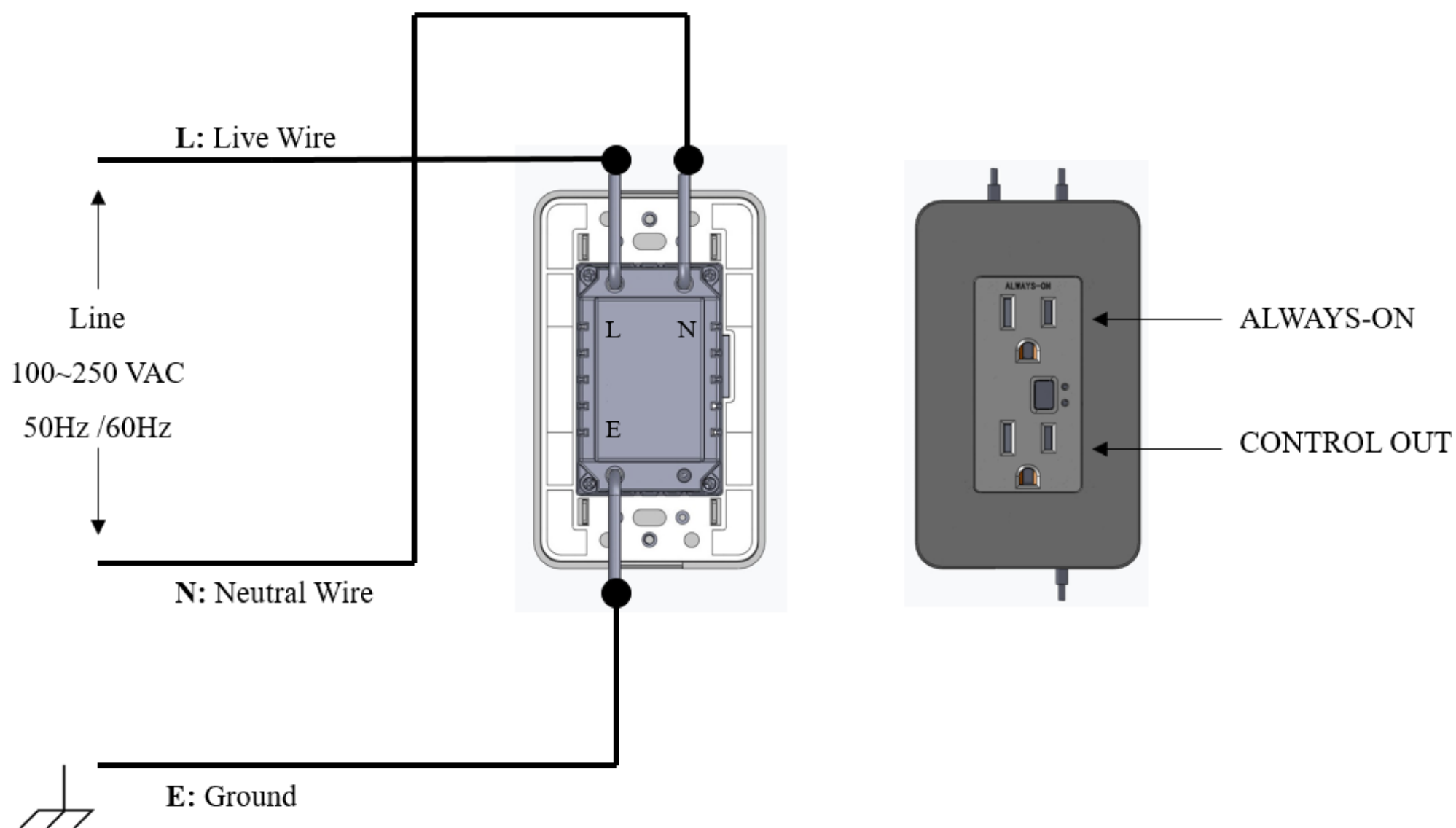
LoRaWAN:

LoRaWAN defines an end-to-end standard specification using LoRa technology to ensure interoperability between devices from different vendors.

2. Appearance



Note: Socket 1 is a general socket and cannot be controlled.



3. Main Characteristic

- Compatible with LoRaWAN standard
- 100-240VAC 50/60HZ power supply
- Simple operation and setting
- Compatible with LoRaWAN™ Class C
- Frequency hopping spread spectrum
- Applicable to third-party platforms: Actility/ThingPark, TTN, MyDevices/Cayenne
- Over current alarm
- Automatically disconnect the load due to over current

4. Operation

On/Off

Power on/Turn on	Socket the R816B into the power supply of the AC 100-240V, power on the device and all the indicators flash once.
Power off	When the R816B is removed from the power supply interface, the R816B will be powered off and stopped.

Network Joining

Never joined the network	<p>Turn on the device to search the network to join.</p> <p>The network indicator stays on: success</p> <p>The network indicator remains off: fail</p>
Had joined the network	<p>Turn on the device to search the previous network to join.</p> <p>The network indicator stays on: success</p> <p>The network indicator remains off: fail</p>
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 the factory restoring key for 5 seconds	<p>Restore to factory setting</p> <p>The network indicator flashes for 10 times: success</p> <p>The network indicator remains off: fail</p>
<p>Press and hold the factory restoring key for 10 seconds</p> <p>(The network indicator flashes once when the button is pressed for 5s, and flashes again when the button is pressed for 10s), and then release the key to clear the power information)</p>	<p>Clear electric energy cumulative value</p> <p>The network indicator flashes for 5 times</p> <p>If the network indicator does not flash, the clearing of the accumulated electric energy value fails</p>
Press the switch button	<p>Control the relay switch on R816B for Toggle operation</p> <p>When R816B is on, the switch indicator is on;</p> <p>When R816B is off, the switch indicator is off.</p>

5. Data Report

The device will immediately send a version packet report along with two uplink packets including ON/OFF status, energy, over current alarm, voltage, current and power.

The device sends data in the default configuration before any configuration is done.

Default setting:

MaxTime: 0x0384 (900s)

MinTime: 0x0002 (2s)

// MinTime is recommended to set by default 2 seconds. Need to control to reduce frequent Report recommendations by adjusting reportchange and Max Interval)

Current Change: 0x0064 (100mA)

Power Change: 0x0014 (20W)

Note:

1. The device reports the ON/OFF status, energy, over current alarm first, and after 10 seconds reports the voltage, current and power.
2. When happened the over-current alarm, it will disconnect the load and the network indicator will quickly flash about 25 times.
3. Press the switch button or receive the switch command: The device will be reported immediately.
4. Please refer Netvox LoRaWAN Application Command document and Netvox 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 \geq 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)

PayLoadData– var bytes (Max=9bytes)

Version	Device Type	Report Type	NetvoxPayLoadData				
0x01	0x73	0x01	OnOff (1Byte) OFF_0x00 ON_0x01	Energy (4Bytes) unit:1wh	OverCurrentAlarm (1Byte) 0:noalarm 1:alarm	* ¹ DashCurrentAlarm (1Byte) 0:noalarm 1:alarm	* ² PowerOffAlarm (1Byte) 0:noalarm 1:alarm
		0x02	Vol (2Bytes,Unit:1V)	Current (2Bytes,Unit:1mA)	Power (2Bytes,Unit:1W)	Reserved (2Bytes,fixed 0x00)	

*¹ R816B does not support *Dash Current Alarm*.

*² R816B does not support *Power Off Alarm*.

First uplink reports 0173010000000006000000 and after 10 seconds, the second uplink reports 01730200DB006400160000

The status of the switch is off.

The accumulated value of the energy is 6WH.

The over current does not alarm

The voltage is 219V 00DB(H_{ex})=219 (D_{ec})

The current is 100mA 0064(H_{ex})=100(D_{ec})

The power is 22W 0016(H_{ex})=22(D_{ec})

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)

Description	Device	Cmd ID	Device Type	NetvoxPayLoadData				
Off	R816B	0x90	0x73	Reserved (9Bytes,Fixed 0x00)				
On		0x91		Reserved (9Bytes,Fixed 0x00)				
Toggle		0x92		Reserved (9Bytes,Fixed 0x00)				
Clear Energy		0x93		Reserved (9Bytes,Fixed 0x00)				
Read CurrentStatus		0x94		Reserved (9Bytes,Fixed 0x00)				
Config ReportReq		0x01		MinTime (2bytes Unit:s)	MaxTime (2bytes Unit:s)	CurrentChange (2byte) Unit:1mA	PowerChange (2byte) Unit:1W	Reserved (1Byte) 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)	CurrentChange (2byte) Unit:1mA	PowerChange (2byte) Unit:1W	Reserved (1Byte) Fixed 0x00)

(1) Turn off the R816B switch button

Downlink: 90730000000000000000

(2) Turn on the R816B switch button

Downlink: 91730000000000000000

(3) Toggle turn on/off switch button

Downlink: 92730000000000000000

(4) Clear the historical electrical energy data

Downlink:93730000000000000000

(5) Setting Min Interval = 2 seconds, Max Interval = 300 seconds, Current Change = 100mA,Power Change = 20W

Downlink:01730002012C0064001400

Response: 81730000000000000000 (successful)

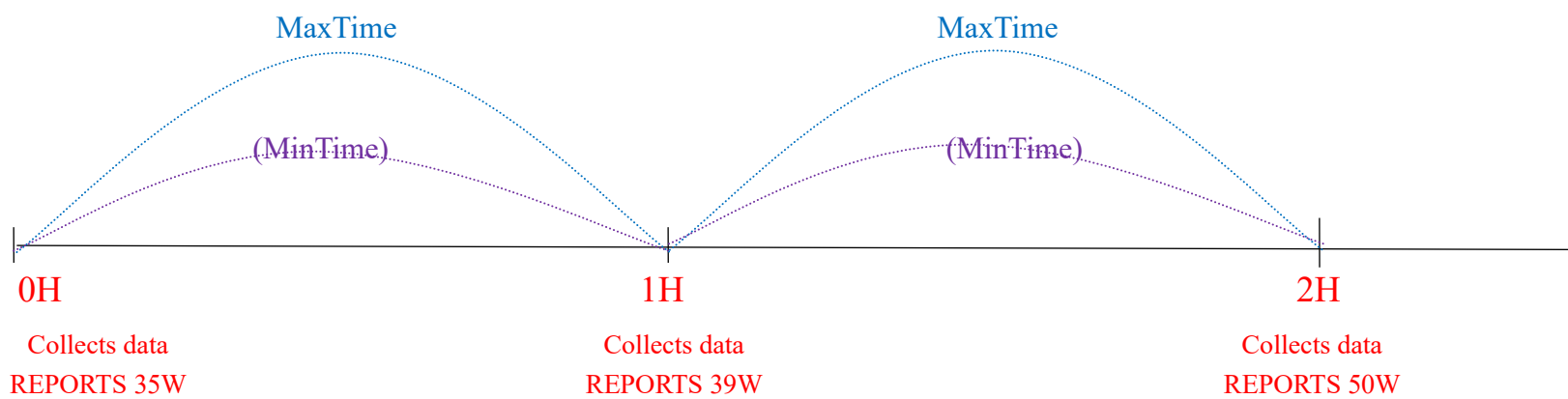
(6) Read the current report interval

Downlink: 02730000000000000000

Response:82730002012C0064001400

5.3 Example for MinTime/MaxTime logic

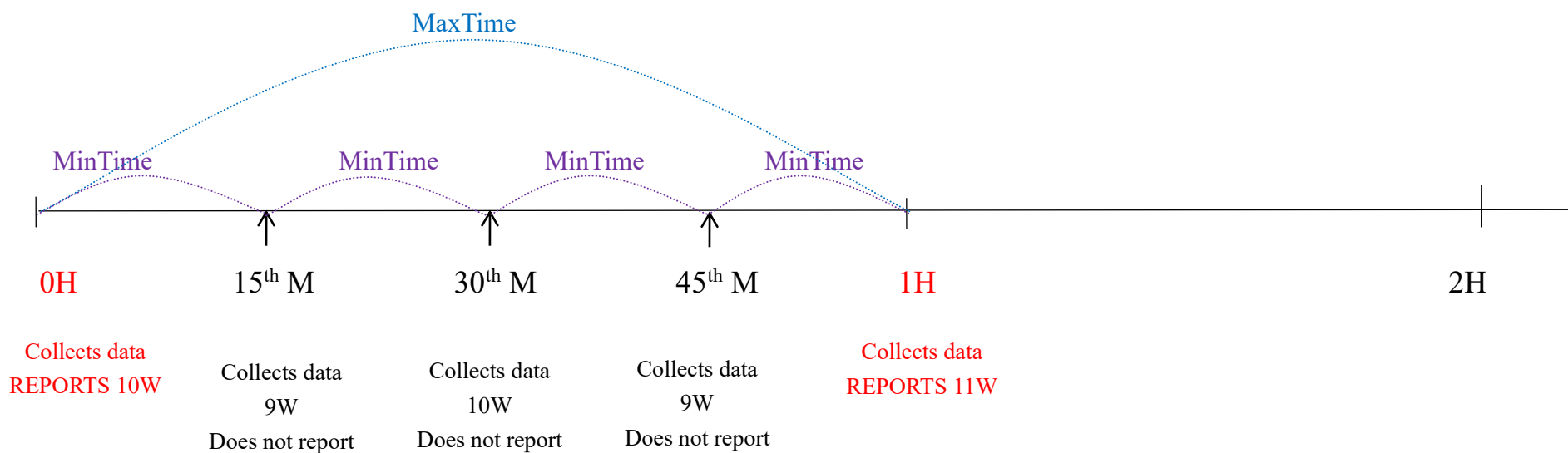
Example#1 based on MinTime = 1 Hour, MaxTime= 1 Hour, PowerChange=2W



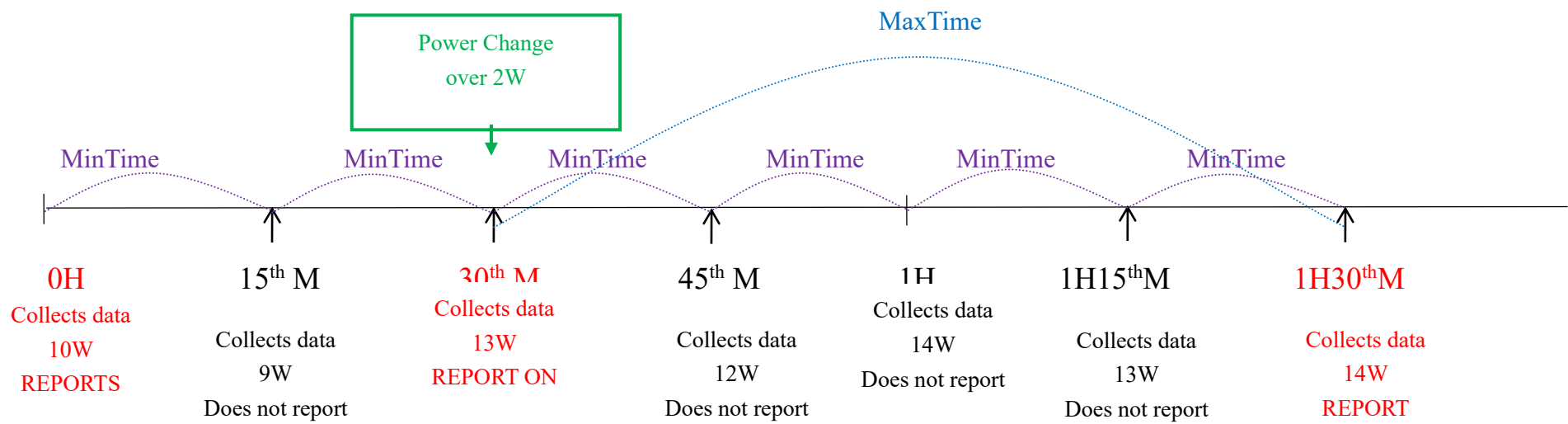
Note:

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

Example#2 based on MinTime = 15 Minutes, MaxTime= 1 Hour, PowerChange=2W



Example#3 based on MinTime = 15 Minutes, MaxTime= 1 Hour, PowerChange=2W



Remarks:

1. Compare the collected data with the last reported data. If the amount of data change is greater than ReportableChange, the device will report based on the MinTime interval. If the data change is not greater than the last reported data, the device will report based on the MaxTime interval.
2. For the energy consumption detection device, because the device is a constant power supply device, it is not recommended to set the MinTime interval value too high in order to obtain the status information in real time. It is recommended to use the default 2 seconds. If users need to control frequent report recommendations to adjust ReportableChange and MaxTime.
3. After the device sends a packet (regardless of whether the data has changed, such as pressing a button or the maximum time is due), another MinTime / MaxTime calculation cycle is initiated.

6. Product Installation

This product does not have a waterproof function. After the screening is completed, please place it indoors.

Note:

The energy data of R816B is saved once every 10 seconds if the memory chip is AT24C02, once every 10 seconds for AT2402.

After power off, the data within 10 seconds will be gone.

7. 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.