Wireless Plug-and-Play Power Outlet with Consumption Monitoring

R809A
User Manual

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1. Introduction

R809A is a Wireless Plug-and-Play Power Outlet with Consumption Monitoring for Netvox Class C type devices based on the LoRaWAN open protocol and is compatible with the LoRaWAN protocol.

R809A can be remote and manual to control (turn on/off) the external connect the electrical equipment, it will report current, voltage, power and energy of the load.

R809A also supports to disconnect the load when over current then reports over current alarm.

Note:

The specifications of the plug and socket supported by R809A are B, F, G, I.

    R809AB: US type

    R809AF: EURO type

    R809AG: UK type

    R809AI: AU type

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

Network Indicator

Factory Restoring Key

Switch Indicator

Switch Button

The other socket type:

3. Main Characteristic

- Compatible with LoRaWAN standard
- 100-240VAC 50/60Hz power supply (According to socket type have different power supply)
- Simple operation and setting
- Compatible with LoRaWAN^{TM} 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	Plug the R809A and power on, the device two indicators will flash once.
Power off	Unplug the R809A and it will power off

Network Joining

Never joined the network	Turn on the device to search the network to join. The green indicator stays on: 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: success The green indicator remains off: fail
Fail to join the network	First two mins: every 15 seconds send a request to join the network. After two mins: every 15 minutes to send request. Note: Suggest to check the device verification information on the gateway or consult your platform server provider.

Function Key

Restore to factory setting	Press and hold the factory restoring key for 5 seconds to restore to factory setting: The green indicator will flash once at the fifth second, and release the button, the green indicator will quickly flash for 10 times, and it would restore to factory setting.
Erase the electrical energy	Press and hold the factory restoring key for 10 seconds to clear the historical data of electrical energy: The green indicator will flash once at the fifth second, and the second flash would be at the tenth second. Release the button at this moment, the green indicator will quickly flash for 5 times, and it would clear the historical electrical energy data.
Press the switch button	Control the relay switch on R809A for Toggle operation: When R809A is on, the switch indicator is green. When R809A is off, the switch indicator is red

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: Max Interval = 900s (15 min)

MinTime: Min Interval = 2 s

Current Change: 0x0064 (100mA)

Power Change: 0x14 (20W)

Note:

1. The device reports the ON/OFF status, energy, over current alarm first, and <u>after 10 seconds</u> 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. When the detected current exceeds the rated load current range for 2 seconds, the device will automatically disconnect the load.

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≥ 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

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	0x0E	0x00	SoftwareVersion(1Byte) Eg.0x0A—V1.0		HardwareVersion (1Byte)	DateCode (4Bytes,eg0x20170503)	Reserved (2Bytes,fixed 0x00)
		0x01	OnOff (1Byte) OFF_0x00,ON_0x01	Energy (4Byte) unit:1wh	OverCurrentAlarm (1Byte) 0:noalarm 1:alarm	※1DashCurrentAlarm (1Byte) 0:noalarm 1:alarm	※2PowerOffAlarm (1Byte) 0:noalarm 1:alarm
		0x02	Vol (2Bytes,Unit:1V)	Current (2Bytes,Unit:1mA)		※3Power (2Bytes,Unit:1W)	Reserved (2Bytes,fixed 0x00)

※1 Only CLAA version support *Dash Current Alarm*.

※2 Only R809A01 support *Power Off Alarm*.

※3 *Power* is Active Power.

First uplink reports 010E010000000006000000 and after 10 seconds, the second uplink reports 010E0200DB006400160000

    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

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	R809A	0x90	0x0E	Reserved (9Bytes,Fixed 0x00)				
On		0x91		Reserved (9Bytes,Fixed 0x00)				
Toggle		0x92		Reserved (9Bytes,Fixed 0x00)				
ClearEnergy		0x93		Reserved (9Bytes,Fixed 0x00)				
ReadCurrent Status		0x94		Reserved (9Bytes,Fixed 0x00)				
Config ReportReq		0x01		MinTime (2bytes Unit:s)	MaxTime (2bytes Unit:s)	CurrentChange (2byteUnit:1mA)	PowerChange (2byteUnit: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 (2byteUnit:1W)	Reserved (1Byte,Fixed 0x00)

(1) Turn off the R809A switch button.

　　Downlink: 900E000000000000000000

(2) Turn on the R809A switch button.

　　Downlink: 910E000000000000000000

(3) Toggle turn on/off switch button.

　　Downlink: 920E000000000000000000

(4) Clear the historical electrical energy data.

　　Downlink:930E000000000000000000

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

　　Downlink:010E0002012C0064001400

　　Response: 810E000000000000000000　　(successful)
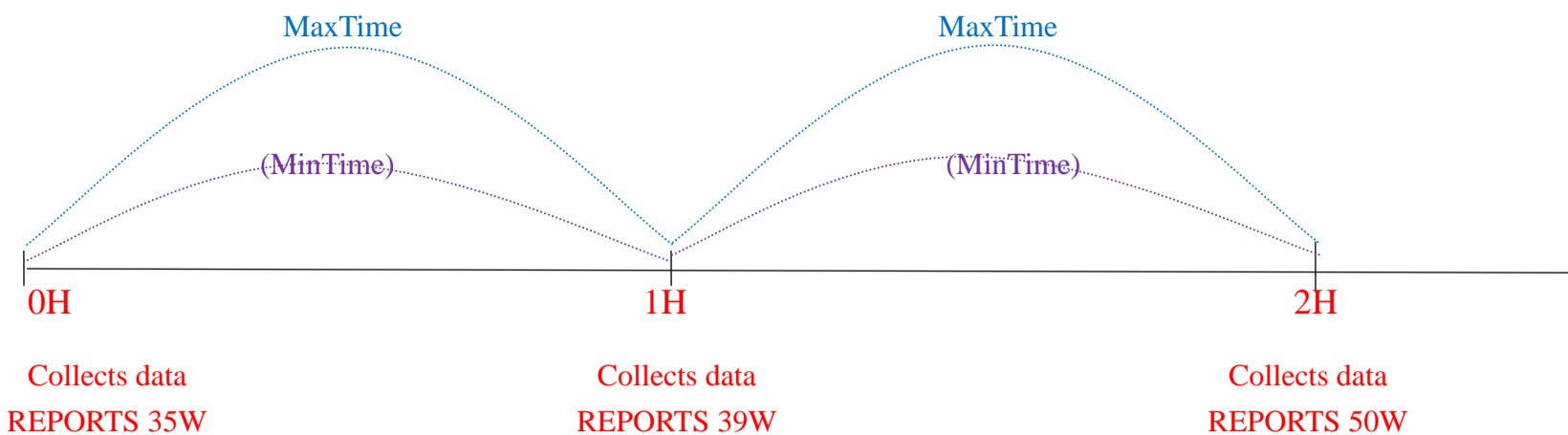
(6) Read the current report interval.

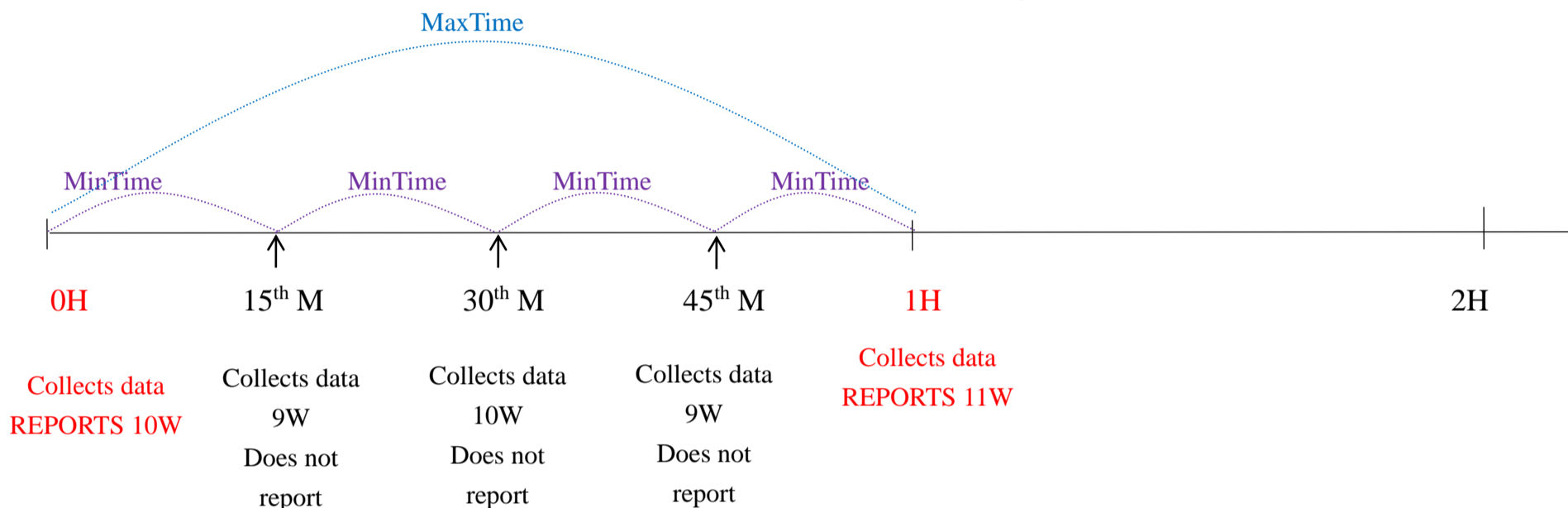　　Downlink: 020E000000000000000000

　　Response:820E0002012C0064001400

5.3 Example for MinTime/MaxTime logic

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

MaxTime   **MaxTime**

(MinTime)   (MinTime)

0H   1H   2H

Collects data   Collects data   Collects data
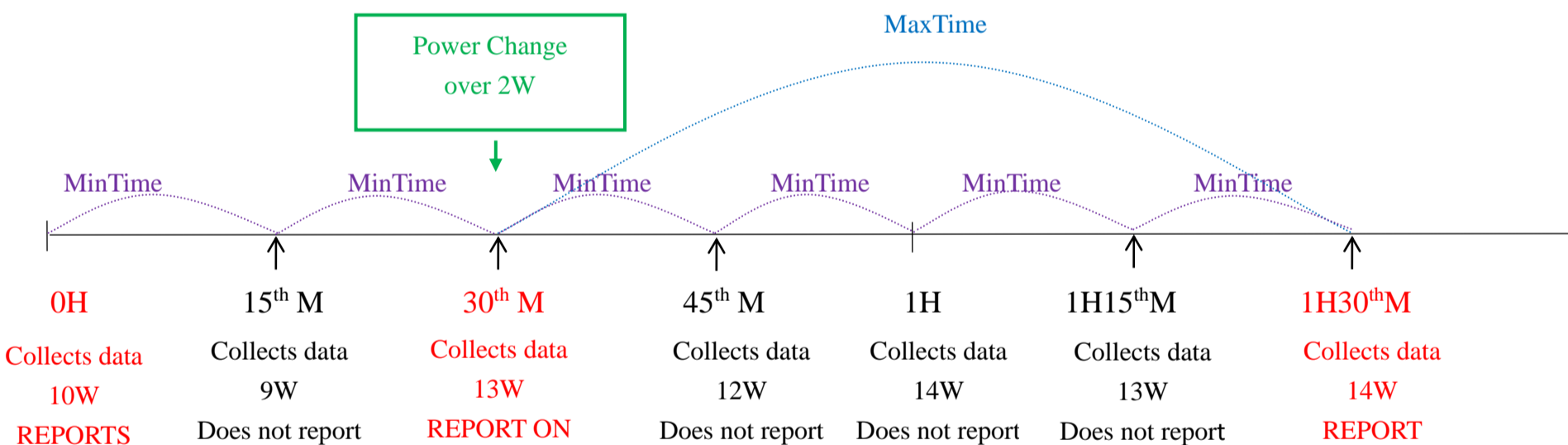REPORTS 35W   REPORTS 39W   REPORTS 50W

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

MaxTime

MinTime   MinTime   MinTime   MinTime

0H   15th M   30th M   45th M   1H   2H

Collects data	Collects data	Collects data	Collects data	Collects data
REPORTS 10W	9W	10W	9W	REPORTS 11W
	Does not report	Does not report	Does not report	

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

Power Change over 2W

MaxTime

MinTime   MinTime   MinTime   MinTime   MinTime   MinTime

0H   15th M   30th M   45th M   1H   1H15thM   1H30thM

0H	15th M	30th M	45th M	1H	1H15thM	1H30thM
Collects data	Collects data	Collects data	Collects data	Collects data	Collects data	Collects data
10W	9W	13W	12W	14W	13W	14W
REPORTS	Does not report	REPORT ON	Does not report	Does not report	Does not report	REPORT

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. Load Property

Rated Load（AC）	Max. Load	Max. Inductive Load（cosφ=0.4）	Max. Load with Electric Motors	Overload Protection with Auto Power Cutoff
EU Type：16A/250V UK Type：13A/250V AU Type：10A/250V US Type：15A/125V	< 400W	8A/250V	1.5HP/250V	YES

*When the detected current exceeds the rated load current range for 2 seconds, the device will automatically disconnect the load.

7. Installation

This product does not have a waterproof function.

The Wireless Power Outlet (R809A) is a removable, plug-and-play socket that plugs into a traditional socket or extension cord for use.

Note:

(1) The device is a high voltage equipment so be careful when installing or using it.

(2) Do not install the device in a metal shielded box or other electrical equipment around it to avoid affecting the wireless transmission of the device.

(3) Please stay away from magnetic fields, high temperature, humidity, etc.

(4) Do not wipe the device with a wet cloth or a volatile reagent. It is recommended to clean with a dry cloth.

(5) When installing the R809A, please operate it by professionals.

(6) Do not disassemble the housing by yourself.

(7) Do not install the R809A in a possible happened water leak place.

Applicable use cases for R809A Wireless Power Outlet include but are not limited to the following:

● Family

●School,

●Hospital

●Shopping mall

When electrical equipment needs turn on/off regularly, remote, and scene control.

Smart plug

Traditional Socket

When the R809A switch button turn on or turn off, the load is connected to the power supply, the uplink packet will report ON/OFF status, energy, over current alarm, and after 10 seconds reporting voltage, current and power.
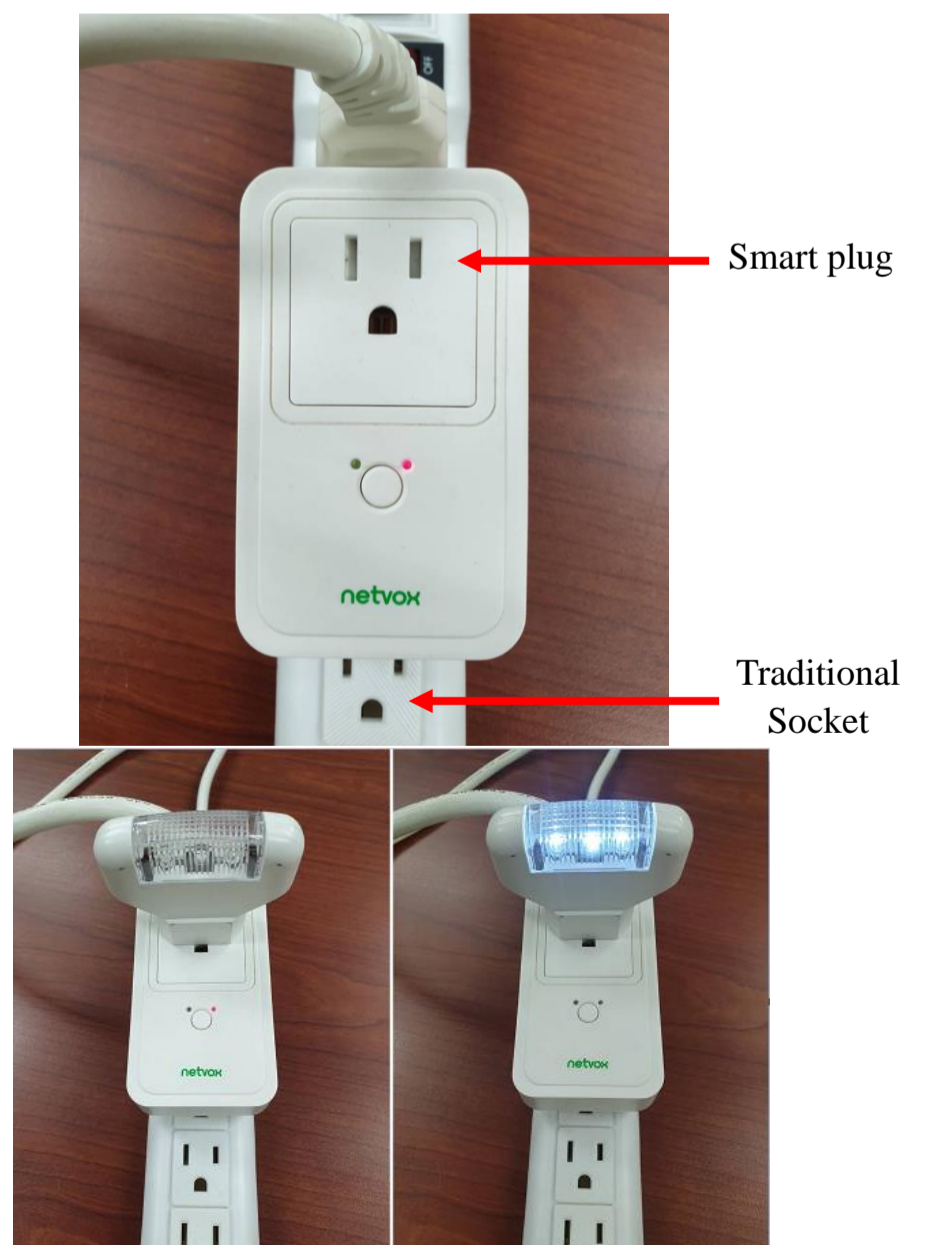
Note:

When disconnecting the load power, the current and power data will report "0"

Note:

    R809A saves the electric energy data every 10 second in memory IC AT24C02, it could loss the electric energy data

    in 10 seconds when power off.

8. 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.