MOKO

M117B BLE Smart Plug

Product Specification

Version V1.1

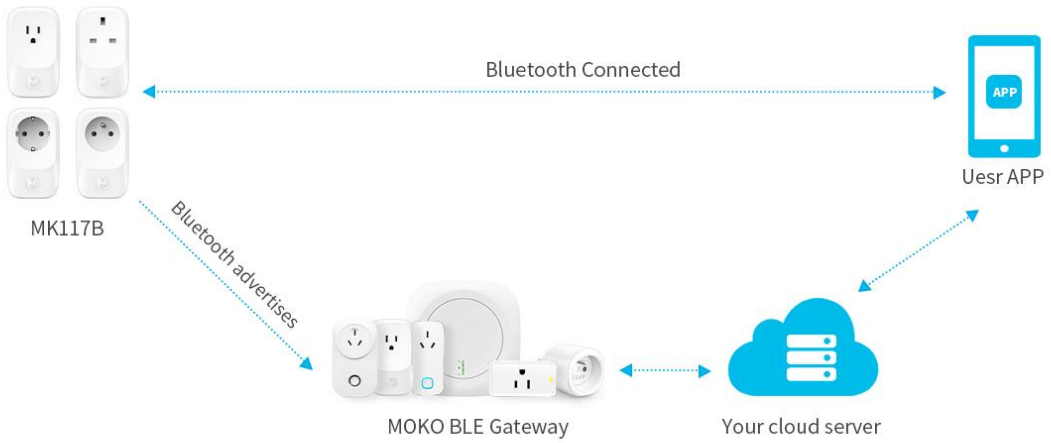
Contents

1. Introduction

1.1 Overview

MK117B is a BLE (Bluetooth Low Energy) smart plug with power and energy monitoring, the measuring accuracy is ±0.5%. The smart device is based on Nordic nRF52833 solution, which make it possible to realizes data connectivity and communication through Bluetooth, and turns your ordinary electrical devices into intelligent and controllable. It provides an effective way to help consumers fully understand their daily energy usage, convert real-time electricity consumption into accurate billing data and the ability to balance supply and demand.

The plug can connect with MOKO APP via Bluetooth, users can remotely control it and get its real-time power and energy data at any time. It also can work with MOKO BLE gateways, the gateway collects the power and energy data from the Bluetooth adverting data of the smart plug and ultimately send the data to your cloud server, so that users can effectively monitor the work status of your electrical devices and centralized manage your electricity bills.



1.2 Model List

MK117B supports multiple plug types, the model list and picture are as below:

Model	Description
MK117B- B	US type, max current is 15A
MK117B- G	UK type, max current is 13A
MK117B- F	EU type, max current is 16A
MK117B- E	FR type, max current is 16A

MK117B- B MK117B- G MK117B- F MK117B- E

2. Features

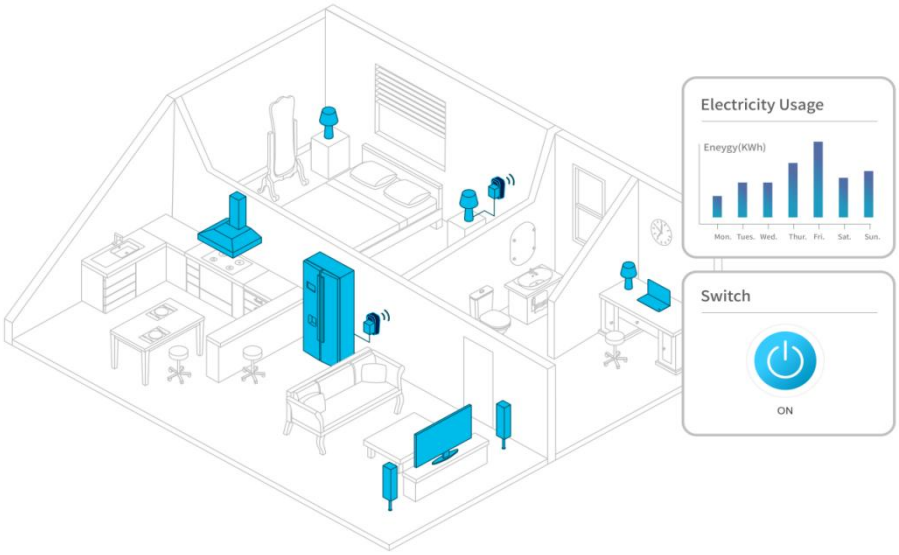
- Remote control via Bluetooth
- Real-time voltage, current and active power monitoring with an accuracy of ±0.5%
- Track the daily/monthly/historical total energy data, and locally record energy data
- Supports multiple protection, minimize the electricity risk
- Device status is more intuitively indicated by two LED indicators, the device network status and switch status are indicated separately
- Device parameters can be flexibly configured by user APP
- FCC&UL&CE&UKCA certified

3. Application

Scenario 1: Smart home appliance control

The plug provides a simple method to help users control and monitor their household appliances at any time, and fully understand their daily energy usage. It also can protect the electrical device from damage caused by the grid voltage fluctuation or abnormal working conditions, which can effectively save energy and reduce the electricity risk.

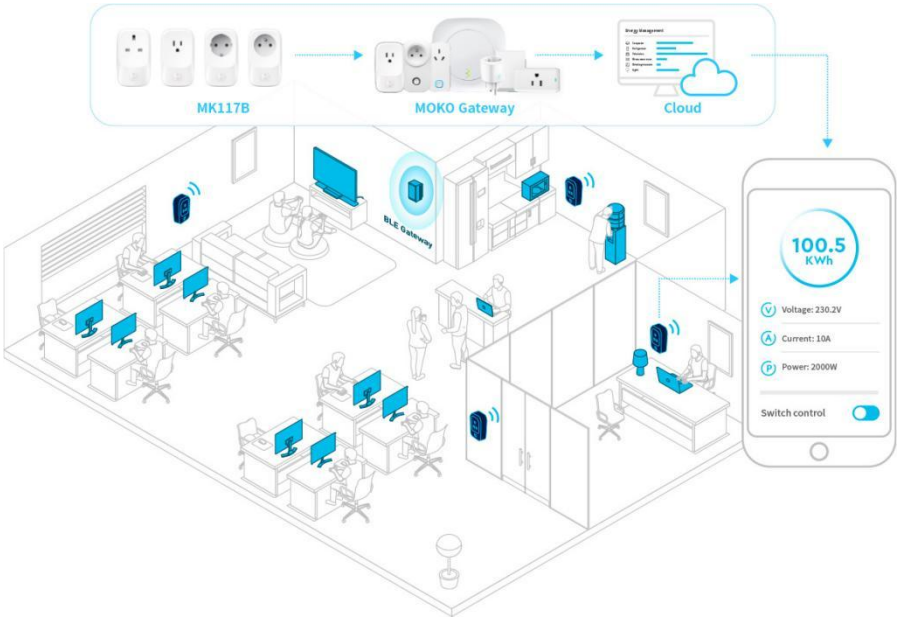
For example, when you are in the bedroom but the TV in the living room is still playing, you can turn off the TV with a quick tap of the APP.
When you need your water heater to work at a specified time, you can set a timer switch to let it run according to your schedule.
When the plug detects an abnormal voltage/current/power of the connected device, it will immediately turn off to protect the electrical appliances.



Scenario 2: Smart office energy solution

Deploy the plug in your offices to monitor and manage the computers, printers and other office electrical equipment. Users can set the plug automatically turn on the connected devices on working hours and turn them off on the working-off hours, which will efficiently save the office energy bill.

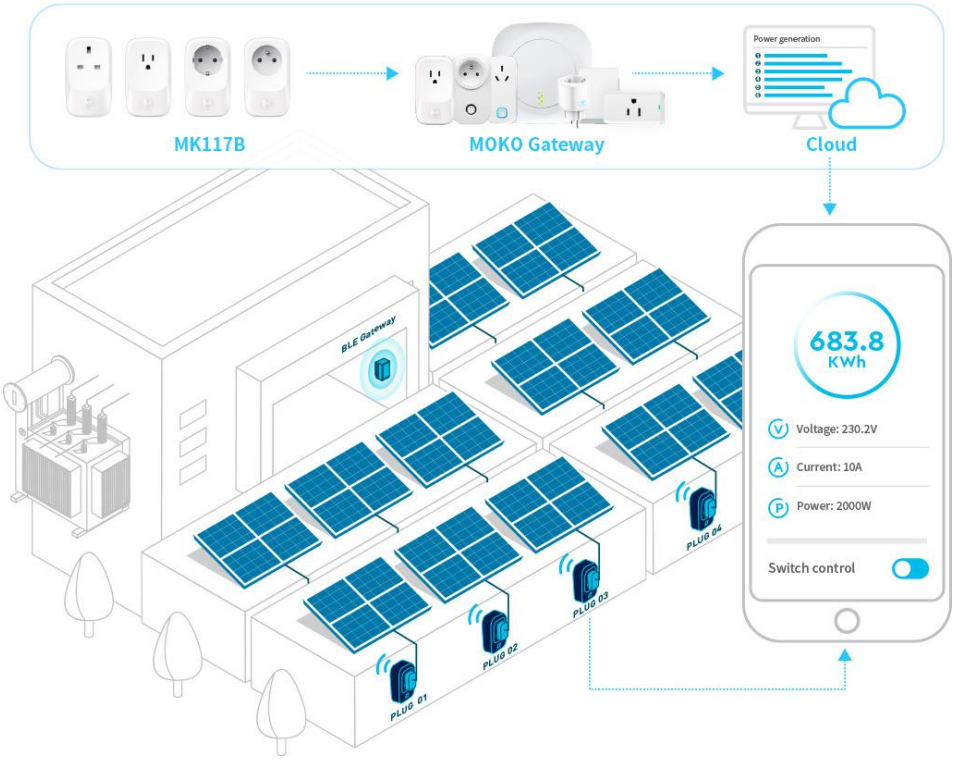
The plug also can work with a MOKO BLE gateway, the gateway collects the advertising data of all nearby plugs, and uploads the data to your cloud server. It can help you fully understand the daily power and energy consumption of your whole office and find out the equipment with abnormal power consumption quickly.



Scenario 3: Solar system metering

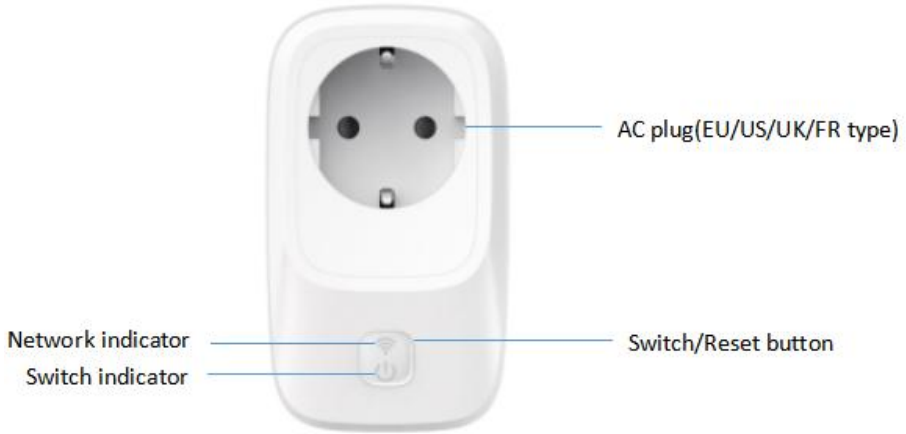
Deploy the plug in your solar system, the plug can measure the instant voltage, current and power value generated by the system, and report the real-time data to the APP.

The plug also can work with a MOKO BLE gateway, the gateway collects the advertising data of all nearby plugs, and uploads the data to the server in real time, users can calculate the daily/ monthly/year energy generated by the whole system and how much electricity revenue is created on the server.

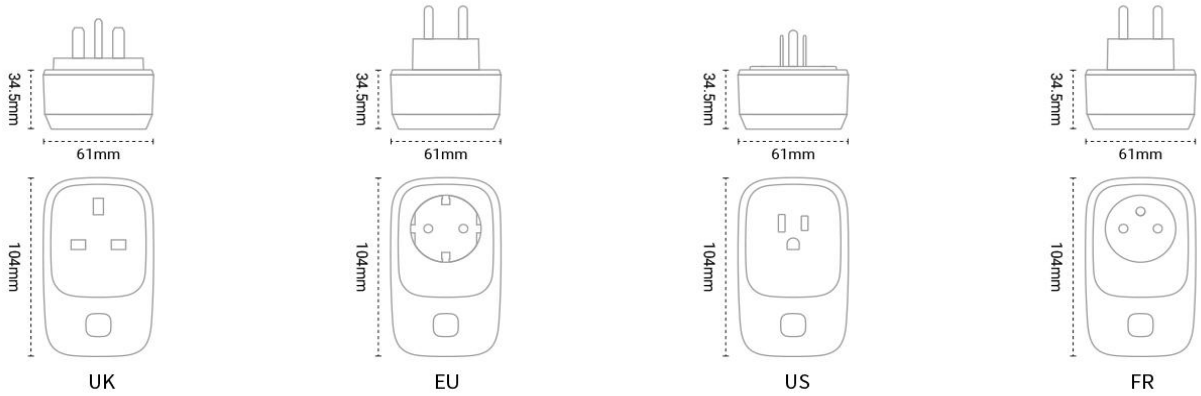


4. Product Appearance

4.1 Appearance



4.2 Dimensions



4.3 LED Patterns

Indicator	Action	LED Patterns
Top indicator (Network indicator)	BLE advertising (pairing mode)	Flash Blue
	BLE connected	Solid Blue
Bottom indicator (Switch indicator)	Switch ON	The color depends on the active power consumed by the load
	Switch OFF	LED OFF
	Restore to factory settings	Flash blue and yellow once
	Reset energy data	Triple flash white light
	Overload/overvoltage/overcurrent /undervoltage protection	Flash red once per second
	DFU process	Flash blue
	DFU succeed	Solid blue
	DFU failed	Solid red

5. Product Specification

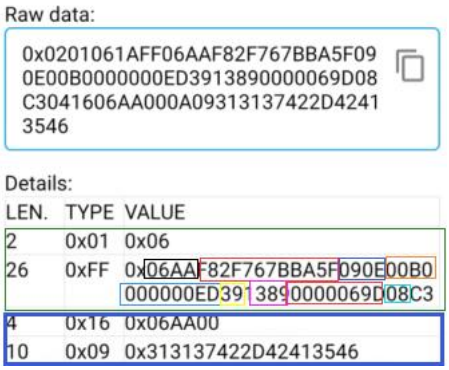
Electronic	
Plug type	US/UK/EU/FR
Power supply	100-240VAC, 50/60Hz
Output capacity	US type: 15A UK type: 13A EU/FR type: 16A
Button	Switch/reset button

LED indicator	2*RGB indicators
Physical	
Material	ABS + PC
Color	White
Dimension	104mm*61mm*34.5mm
Environment	
Operating temperature	0 ºC~ 40 ºC
Operating humidity	0%～95% (No condensation)
Storage temperature	-10 ºC~ 50 ºC
Bluetooth	
Protocol	BLE 5.0
Advertising distance	100 meters (in an open area)
Connection distance	90 meters (in an open area)

6. Main Functions

6.1 Bluetooth Advertising

The plug will enter pairing mode after it is powered up. In this mode, the device Bluetooth advertises data, and the top indicator flashes blue.
The data in the green box is advertising packet, and the data in the blue box is response packet.
Following is the advertising raw data:



Advertising packet：

Length	Type	Data
2	0X01	BLE Flags: 0X06 GeneralDiscoverable, BrEdrNotSupported
26	0XFF	Manufacturer data. Including device mac, electricity data and other information

4	0X16	Service data UUID: 0XAA06, product type: 0X00
10	0X09	Complete Local Name. Default: 117B-XXXX (The last 2 bytes of MAC address)

Description of the manufacturer data：

Byte	Description
1-2	Service data UUID: 0XAA06
3-8	MAC address
9-10	Voltage, unit: 0.1V
11-12	Current, unit: mA
13-16	Active power, unit: 0.1W
17	Power factor, unit: 1%
18-19	Frequency, unit: 0.01Hz
20-23	Historical total energy, unit: 0.01KWh
24	BLE TX power
25- Bit7	Switch status. 1: ON/ 0: OFF
25- Bit6	Load flag. 1: Load connected/ 0: No load connected
25- Bit5	Overload flag. 1: Yes/ 0: No
25- Bit4	Overcurrent flag. 1: Yes/ 0: No
25- Bit3	Overvoltage flag. 1: Yes/ 0: No
25- Bit2	Undervoltage flag. 1: Yes/ 0: No
25- Bit1	BLE Connection password flag. 1: BLE Connection requires password/ 0: BLE Connection doesn’t require password
25-Bit0	BLE Connectable flag. 1: Connectable/ 0: Unconnectable

6.2 ON/OFF Control

There are two methods to control the AC output of the plug:

- By the physical button, click the button once to switch the ON/OFF status.
- By the Bluetooth command. After the plug is successfully connected to the APP, users can send a Bluetooth command to remotely control the switch status with the APP.

6.3 Timer

After the plug is successfully connected to the APP, users can send a Bluetooth command to set a timer switch for the plug with the APP. When the timer is complete, the plug will automatically change the switch status.

6.4 Power Monitoring

The plug can measure the instant current, voltage, active power and other electricity information, the measuring accuracy is ±0.5%. After the plug is connected with APP, users can view the real-time electricity data on the app. The data includes:

- Current
- Voltage
- Active power
- Power factor
- Frequency

6.5 Energy Monitoring

The plug can track the current day/last 30 days/historical total energy data, and locally record the data, the measuring accuracy is also ±0.5%.
After the plug is successful connected to APP, users can visually view the energy data on the APP.

6.6 Power Consumption Indication

The bottom indicator codes the switch status and active power usage, the indicator color is determined by the active power consumption of the connected load, different color represents different power level. Users can intuitively and quickly capture the power change of the connected load.

6.7 Multiple Protection

The plug supports multiple protection. When it detects that the voltage /current /power of the connected load out of the safe range, the plug will automatically turn off, and the indicator will flash red to notify the user.

- Overvoltage/Overcurrent/Overload protection: When the plug detects that the measured value exceeds the set threshold for a period of time, it will automatically turn off.
- Undervoltage protection: When the plug detects that the measured voltage under the set threshold for a period of time, it will automatically turn off.

6.8 Load Status Detection

When the plug detects that the load starts/stops working, it will immediately send a notification to the APP. Users can receive the notification on the APP and know the working status of the load quickly.

6.9 DFU

The plug has the ability to upgrade firmware over the air.
If MOKO standard firmware updates, MOKO can provide customers with the latest firmware upgrade file, customers can upgrade their plug with MOKO APP.

6.10 Restore to Factory Settings

There are two methods to restore to factory settings:

- By the physical button, press and hold the button for 10 seconds, the plug will restore to factory settings.
- By Bluetooth command. After the plug is connected with the APP, users can send a Bluetooth command to make the plug restore to factory settings with the APP.

7. Development Document

MOKO provides the following documents for customers to test products and develop their own firmware/APP, and supports flash custom firmware during production.

File	Version	Description
MK117B Product Specification	V1.0	This document introduces the MK117B smart plug and guides users to understand the product.
MK117B User Manual	V1.0	This document instructs users to manage the smart plug and view power and energy data with MOKO APP.
MK117B Communication Protocol	V1.0	This document describes the communication commands supported on MK117B product.
MK117B Development Document	V1.0	This document contains the schematic diagram and test points related to firmware development and download. With this document, customers can develop their own firmware and download the firmware to the MOKO hardware.
APP SDK	/	iOS: https://github.com/MokoPlug/MokoPlug_IOS_Pro.git Android: https://github.com/MokoPlug/MokoPlug_Android_Pro.git The APP SDK includes the source code of the Mokoplug APP. Customers can quickly develop their own APP with it.
Power Metering SDK	/	https://github.com/RN8209C/RN8209C-SDK It contains the source code used for the power metering chip, customers can directly integrate it into their own firmware to reduce the development time.

8. Revision History

Revision	Description	Editor	Date
V1.0	Initial Version based on firmware V1.0.3	Weiguifen	2022.4.1
V1.1	Add IOS APP SDK	Weiguifen	2022.5.17

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