

SMART ENERGY PLUG IN SWITCH

QUICK INSTALLATION GUIDE v1.0

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ELECTROMAGNETIC COMPATIBILITY

When operated according to manufacturer instructions, the product complies with Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU and R&TTE Directive 1995/5/EC standards. The connections conducting HF signals must not be damaged or altered in any way by the user.

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- Higher output power to enhance communication range (+5dBm output power compared to -2.5dBm 300 series)
- Auto report switch states when manually pushing ON/OFF button
- Auto report the wattage when variation is over 5%
- Voltage, current, power factor, instant power wattage and accumulated power consumption KWh report
- LED indication for power consumption
- Easy installation

SPECIFICATION

TECHNICAL SPECIFICATION

Protocol	Z-Wave Plus
Operating voltage	100 – 240VAC /50Hz~60H
Maximum load	13A (Resistive load)
Operating temperature	0 – 40° C
Humidity	85% RH max
Range	Minimum 40m indoor/100m outdoor
Measurement error	3W (under 40W)
Measurement error rate	5% (under 40W)
Weight	107 g
Dimensions	79 mm x 51 mm x 18 mm
Package weight	159 g
Package dimensions	89 mm x 82 mm x 127 mm
Regulations	Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, R&TTE Directive 1995/5/EC
Frequency	868.40 MHZ, 869.85 MHZ (EU)
Warranty	1 year

INSTALLATION AND OPERATION

- Plug this On/Off Switch into a wall outlet near the load to be controlled.
- Plug the load into the Switch. Make sure the load to be controlled cannot exceed 13A.
- Press the button or switch on the load to the ON position.
- To manually turn ON the Switch, press and release the On/Off button. The LED will turn ON, and the load plugged into the Switch will also turn ON.
- To manually turn OFF the Switch, simply press and release the On/Off button. The LED will turn OFF and the load plugged into the Switch will also turn OFF.

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TAKE CARE OF YOUR SAFETY

Display extreme caution when using ladders or steps, please follow manufacturer's instructions. Be careful when using hand and power tools and follow the manufacturer's guidelines when using them. Take care that the correct tools are used. Wear goggles or protective clothing where required.

DANGER RISK OF ELECTROCUTION

All work on the device should only be carried out by trained and skilled electricians. Observe the country-specific regulations.

DANGER
RISK OF FATAL INJURY FROM ELECTRIC CURRENT.
The device has no basic insulation and must therefore be installed in a way that protects against accidental contact.

DANGER
RISK OF FATAL INJURY FROM ELECTRIC CURRENT.
When installing a wall plate, the distance between the cover's fixing brackets or screws and the connections of the flush-mounted Micromodule Single Switch Max.Load 11A must be at least 4 mm once installed. If the distance is less than 4 mm, a deeper installation box must be used. The fixing brackets or screws of the cover must not press against the housing. Only insulated tools may be used for operation on the device, e.g. an insulated phase tester.

CAUTION

The connected devices and the flush-mounted receiver can become damaged if devices are operated that do not correspond to the technical specifications [see technical data].

INTRODUCTION

Smart Energy Plug In Switch is a security enabled wireless switch, based on Z-Wave Plus technology. Z-Wave Plus enabled devices displaying the Z-Wave Plus logo can also be used with it regardless of the manufacturer, and can also be used in other manufacturer's Z-Wave enabled networks. Remote On/Off control of the connected load is possible with other manufacturer's wireless Controller. Each switch is designed to act as a repeater. Repeaters will re-transmit the RF signal to ensure that the signal

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CHOOSING A SUTABLE LOCATION

- Do not locate the Switch facing direct sunlight, humid or dusty place.
- The suitable ambient temperature for the Switch is 0°C~40°C.
- Do not locate the Switch where exists combustible substances or any source of heat, e.g. fires, radiators, boiler etc..
- After putting it into use, the body of Switch will become a little bit hot of which phenomenon is normal.

LED INDICATION

To distinguish what mode the switch is in, view from the LED for identification. It represents the power consumption from light to heavy.

The color of LED could be:

- Blue - 59W and below
- Cyan - 60W - 119W
- Green - 120W - 399W
- Orange - 400W - 799W
- Pink - 800W - 1199W
- Red - 1200W and above

State Type	LED Indication
Normal	Under normal operation, toggle On/Off button between On and Off. When pressing On, LED lights up, whereas Off, LED is off.
No node ID	Under normal operation, when the Switch has not been allocated a node ID, the LED flashes on and off alternately at 2-second intervals. By pressing On/Off button, it will stop flashing temporarily.
Learning	When Switch is in learning mode, LED flashes on and off alternately and repeatedly at 0.5 second intervals.
Overload	When overload state occurs, the Switch is disabled of which LED flashes on and off alternately at 0.2 second intervals. Overload state can be cleared by unplugging and reconnecting the Switch to the wall outlet.

ADDING TO Z-WAVE NETWORK

In the front casing, there is an On/Off button with LED indicator

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is received by its intended destination by routing the signal around obstacles and radio dead spots. Because the Switch supports Security Command Class, it can learn with Secured controller. Its functionality and supported command classes is identical when included as a secure and non-secure device.

This Smart Energy Plug In Switch is able to detect instance wattage [3000W/230Vac] (13Ampere) and overload current [14.5A with resistive load] of connected lights or appliances. When detecting overload state, the Switch will be disabled and its On/Off button will be lockout of which LED will flash quickly. However, unplug and reconnect the switch will reset its overload condition to normal status.

OVERVIEW



PACKAGE CONTENT

1PC	Smart Energy Plug In Switch
1PC	Quick Installation Guide

FEATURES

- Z-Wave 500 series chip
- Zero-crossing switch
- Overload protection

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which is used to toggle switch on and off or carry out inclusion, exclusion, reset or association. When the power is applied for the first time, its LED flashes on and off alternately and repeatedly at 0.5 second intervals. It implies that it has not been assigned a node ID and start auto inclusion.

AUTO INCLUSION

The function of auto inclusion will be executed as long as the switch does not have Node ID and just plug the switch into a wall outlet.

Note: Auto inclusion timeout is 2 minute during which the node information of explorer frame will be emitted once several seconds. Unlike "inclusion" function as shown in the table below, the execution of auto inclusion is free from pressing the On/Off button on the Switch.

The table below lists an operation summary of basic Z-Wave functions. Please refer to the instructions for your Z-Wave Certified Primary Controller to access the Setup function, and to include/exclude/associate devices.

Function	Description	LED Indication
No node ID	The Z-Wave Controller does not allocate a node ID to the Switch.	2-second on, 2-second off
Inclusion	Put your Z-Wave controller into inclusion mode by following the instructions provided by the controller manufacturer.	
	Pressing On/Off button three times within 2 seconds will enter inclusion mode.	
Exclusion	Put your Z-Wave controller into exclusion mode by following the instructions provided by the controller manufacturer.	
	Pressing On/Off button three times within 2 seconds will enter exclusion mode.	
	Node ID has been excluded.	0.5s On, 0.5s Off [Enter auto inclusion]

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Reset	Pressing On/Off button three times within 2 seconds will enter inclusion mode.	Use this procedure only in the event that the primary controller is lost or otherwise inoperable.
	Within 1 second, press On/Off button again for 5 seconds.	
	IDs are excluded.	0.5s On, 0.5s Off [Enter auto inclusion]
Association	The Switch is an always listening Z-Wave device, so associations may be added or removed by a controller at any time.	
	OR If your controller requires from Switch to send a "node information frame" or "Node Information Frame (NIF)" for associations, then pressing the On/Off button three times within 2 seconds will cause the Switch to send its NIF.	
	There is only one group for the switch	

Note: Including a node ID allocated by Z-Wave Controller means inclusion. Excluding a node ID allocated by Z-Wave Controller means exclusion. Failed or success in including/excluding the node ID can be viewed from the Z-Wave Controller.

PROGRAMMING

1 | BASIC COMMAND CLASS / BINARY SWITCH

The Switch will respond to BASIC and BINARY commands that are part of the Z-Wavesystem.

1.1 | BASIC_GET / BINARY_SWITCH_GET

Upon receipt of the following commands from a Z-Wave Controller, the Switch will report its On/Off state to the node asked.

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BASIC GET COMMAND: [COMMAND CLASS BASIC, BASIC GET]
Basic Report Command: Report OFF: [Command Class Basic, Basic Report, Value = 0[0x00]] Report ON:[Command Class Basic, Basic Report, Value = 255[0xFF]]
Binary Switch Get Command: [Command Class Switch Binary, Switch Binary Get]
Binary Switch Report Command: Report OFF:[Command Class Switch Binary, Switch Binary Report, Value =0[0x00]] Report ON:[Command Class Switch Binary, Switch Binary Report, Value = 255[0xFF]]

1.2 | BASIC_SET / SWITCH_BINARY_SET

Upon receipt of the following commands from a Z-Wave Controller, the load attached to the Switch will turn on or off.

[Command Class Basic, Basic Set, Value = 1~99,255[0xFF]]: the load attached to the Switch turns on.
[Command Class Basic, Basic Set, Value = 0[0x00]]: the load attached to the Switch turns off.
[Command Class Switch Binary, Switch Binary Set, Value = 1~99, [255]0xFF]: the load attached to the Switch turns on.
[Command Class Switch Binary, Switch Binary Set, Value = 0[0x00]]: the load attached to the Switch turns off.

2 | Z-WAVE'S GROUPS (ASSOCIATION COMMAND CLASS VERSION 2)

The Switch can be set to send reports to associated Z-Wave devices. It supports one association group with one node support for Grouping 1. For group 1, the Switch will report its latest status to Z-Wave Controller.

Grouping 1 includes, SWITCH_BINARY_REPORT, METER_REPORT, ALARM_REPORT.

2.1 | AUTO REPORT TO GROUPING 1 (MAXIMUM NODE 1)

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2.1.1 | ON/OFF EVENT REPORT

When "on" or "off" state has been changed, it will send Binary Switch Report to the node of Grouping 1.

Binary Switch Report

ON:[Command Class Switch Binary, Switch Binary Report, Value =255[0xFF]] OFF:[Command Class Switch Binary, Switch Binary Report, Value=0[0x00]]
--

2.1.2 | INSTANT POWER CONSUMPTION VARY OVER 5% REPORT

When the power consumption of load vary over 5%, it will send Meter report to the nodes of Grouping 1.

Meter Report Command: [Command Class Meter, Meter Report, Rate Type = 0x01, Meter Type = 0x01, Precision = 1, Scale = 0x02, Size = 4, Meter Value[W]]
--

2.1.3 | OVERLOAD ALARM REPORT

When Switch detects the current is more than 14.5A, it will send Alarm Report to Group 1 node.

The content of Alarm Report:

Alarm report command: [Command_Class_Alarm, Alarm_Report, Alarm Type = 0x08, Alarm Level = 0xFF]
--

2.2 | RESPONSE TO METER GET COMMAND

The Switch will report its [1] instant Power Consumption (Watt) or [2] accumulated power consumption(KWH) or [3] AC load Voltage (V) or [4] AC load current [1] [5] load power factor (PF) to Z-Wave Controller after receive the Meter Get Command from Z-Wave Controller.

2.2.1 | INSTANT POWER CONSUMPTION (WATT) OF SWITCH

When receiving Meter Get Command, it will report Meter Report Command to the node.

Meter Get Command: [Command Class Meter, Meter Get, Scale =0x02[W]]
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Meter Report Command: [Command Class Meter, Meter Report, Rate Type = 0x01, Meter Type = 0x01, Precision = 1, Scale = 0x02, Size = 4, Meter Value[W]]

Example:
Meter Value 1 = 0x00 [W]
Meter Value 2 = 0x00 [W]
Meter Value 3 = 0x03 [W]
Meter Value 4 = 0xEA [W]
Meter[W] = Meter Value 3 *256 + Meter Value 4 = 100.2W

2.2.2 | **ACCUMULATED POWER CONSUMPTION (KW/H)**
When receiving Meter Get Command, it will report Meter Report Command to the node.

Meter Get Command:
[Command Class Meter, Meter Get, Scale = 0x00 KW/h]]

Meter Report Command: [Command Class Meter, Meter Report, Rate Type = 0x01, Meter Type = 0x01, Precision = 2, Scale = 0x00, Size = 4, Meter Value [KWh]]

Example:
Scale = 0x00 [KWh]
Precision = 2
Size = 4 Bytes [KW/h]
Meter Value 1 = 0x00[KWh]
Meter Value 2 = 0x01[KWh]
Meter Value 3 = 0x38[KWh]
Meter Value 4 = 0xA3[KWh]
Accumulated power consumption [KW/h] = [Meter Value 2*65536] + [Meter Value 3*256] + [Meter Value 4] = 800.35 [KW/h]

2.2.3 | **CLEARING ACCUMULATED POWER CONSUMPTION**

Whenever re-start counting the accumulated power consumption is needed, you can use Meter Reset Command to clear it.

Meter Reset Command: [Command Class Meter, Meter Reset]

2.2.4 | **AC LOAD VOLTAGE (V)**
When receiving Meter Get Command, it will report Meter Report Command to the node.

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Configuration Parameter 4		
Function	Size (byte)	Value
Threshold of KWh for Load caution	2	1-10000
Unit	Default	Description
1KWh	10000	10000*1KWh = 1000 KWh

Configuration Parameter 5		
Function	Size (byte)	Value
Restore switch state mode	1	0-2
Unit	Default	Description
1		0 : Switch off 1 : Last switch state 2 : Switch on

Configuration Parameter 6		
Function	Size (byte)	Value
Mode of Switch Off function	1	0-1
Unit	Default	Description
1		0: Disable 1: Enable

Configuration Parameter 7		
Function	Size (byte)	Value
LED indication mode	1	1-3
Unit	Default	Description
1		1 : Show switch state 2 : Show night mode 3: One flash mode

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3.6 | **MANUAL ON/OFF MODE:**
When the mode of switch On/Off is set to 0, any command of switch off will be disabled and the On/Off function of include button will be disabled. The default setting is enable mode. When manual On/Off function is disabled, the RF command can only switch On but not Off. This is useful function for keeping the device in switch on state.

3.7 | **LED INDICATION MODE:**

3.7.1 | **SHOW SWITCH STATE:**
When the Switch is on, LED is on. When the Switch is off, LED is off. The default setting is Show Switch State.

3.7.2 | **SHOW NIGHT MODE:**
When the Switch is on, LED is off. When the Switch is off, LED is on.

3.7.3 | **ONE FLASH MODE:**
When the state of the Switch changes, LED will turn on for 1 second.

3.8 | **AUTO OFF TIMER:**
Whenever the Switch switches to on, the auto off timer begin to count down. After the timer decrease to zero, it will switch to off automatically. However if Auto off timer is set as 0, the auto off function will be disabled.

3.9 | **RF OFF COMMAND MODE:**
Whenever a switch off command, BASIC_SET, BINARY_SWITCH_SET, SWITCH_ALL_OFF, is received, it could be interpreted as 4 variety of commands. The default setting is Switch Off.

3.9.1 | **SWITCH OFF:**
It switches to OFF state. The default setting is Switch Off.

3.9.2 | **IGNORE:**
The switch off command will be ignored.

3.9.3 | **SWITCH TOGGLE:**
It switches to the inverse of current state.

3.9.4 | **SWITCH ON:**
It switches to ON state.

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Meter Get Command: [Command Class Meter, Meter Get, Scale =0x04[V]]

Meter Report Command: [Command Class Meter, Meter Report, Rate Type = 0x01, Meter Type = 0x01, Precision = 1, Scale = 0x04, Size = 2, Meter Value[V]]

Example:
Scale = 0x04 [V]
Precision = 1
Size = 2 [2 Bytes of V]
Meter Value 1 = 0x09[V]
Meter Value 2 = 0x01[V]
AC load Voltage = [Meter Value 1*256] +(Meter Value 2)= 230.5 [V]

2.2.5 | **AC LOAD CURRENT (I)**
When receiving Meter Get Command, it will report Meter Report Command to the node.

Meter Get Command:
[Command Class Meter, Meter Get, Scale =0x05[I]]

Meter Report Command:
[Command Class Meter, Meter Report, Rate Type = 0x01, Meter Type = 0x01, Precision = 2, Scale = 0x05, Size = 2, Meter Value[I]]

Example:
Scale = 0x05 [I]
Precision = 2
Size = 2 [2 Bytes of I]
Meter Value 1 = 0x01[I]
Meter Value 2 = 0x21[I]
AC load current = [Meter Value 1*256] +(Meter Value 2)= 2.89 [A]

2.2.6 | **LOAD POWER FACTOR (PF)**
When receiving Meter Get Command, it will report Meter Report Command to the node.

Meter Get Command:
[Command Class Meter, Meter Get, Scale =0x06[PF]]

Meter Report Command:
[Command Class Meter, Meter Report, Rate Type = 0x01, Meter Type = 0x01, Precision = 2, Scale = 0x06, Size = 1 Bytes, Meter Value[PF]]

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Configuration Parameter 8		
Function	Size (byte)	Value
Auto off timer	2	0-0x7FFF
Unit	Default	Description
1s	0	0 : Disable auto off function 1-0x7FFF : 1s ~ 32767s

Configuration Parameter 9		
Function	Size (byte)	Value
RF off command mode	1	0-3
Unit	Default	Description
0		0 : Switch off 1 : Ignore 2 : Switch toggle 3 : Switch on

Configuration Parameter 11		
Function	Size (byte)	Value
Manual Switch Report Mode	1	0-1
Unit	Default	Description
1		0 : Disable 1 : Enable

Configuration Parameter 12		
Function	Size (byte)	Value
Auto Report after Reset	1	0-1
Unit	Default	Description
1		0 : Enable 1 : Disable

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3.10 | **MANUAL SWITCH REPORT MODE**
The default setting is Enable the function. Whenever the Switch is manually switched on or off, it will send BINARY_SWITCH_REPORT to the node of group1.

3.11 | **AUTO REPORT AFTER RESET**
Whenever the Switch is repowered, it will check this parameter for if sending a BINARY_SWITCH_REPORT to the node of group1 or not. The default setting is Disable the function.

3.12 | **ADJUSTABLE OVERLOAD**
The overload current can be adjustable from 4.5A to 14.5A. The default value is 1450 for 14.5A. (1450 * 0.01A = 14.5A).

4 | **PROTECTION COMMAND CLASSES**
The Switch supports Protection Command Class version 2, it can protect the switch against unintentionally control by e.g. a child. And it can also protect the switch from being turned off by setting it in "No RF Control" state.
After being set to "Protection by sequence" state, any intentional pressing of On/Off button should be hold longer than 1 second, or the switch state will not change. However, the operation of learn function does not change, because learning will not be protected.

Z-WAVE COMMAND CLASSES
COMMAND_CLASS_ZWAVEPLUS_INFO
COMMAND_CLASS_VERSION
COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2
COMMAND_CLASS_SECURITY
COMMAND_CLASS_DEVICE_RESET_LOCALLY
COMMAND_CLASS_ASSOCIATION_V2
COMMAND_CLASS_ASSOCIATION_GRP_INFO
COMMAND_CLASS_POWERLEVEL
COMMAND_CLASS_SWITCH_BINARY
COMMAND_CLASS_BASIC
COMMAND_CLASS_SWITCH_ALL
COMMAND_CLASS_METER_V3
COMMAND_CLASS_CONFIGURATION
COMMAND_CLASS_ALARM
COMMAND_CLASS_PROTECTION
COMMAND_CLASS_FIRMWARE_UPDATE_MD_V2

OVER THE AIR FIRMWARE UPGRADE

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Example:
Scale = 0x06 [PF]
Precision = 2
Size = 1 [1 Byte of PF]
Meter Value 1 = 0x63[PF]
Load power factor [PF] = Meter Value 1 =0.99

Z-WAVE CONFIGURATION

Configuration Parameter 1		
Function	Size (byte)	Value
Watt Meter Report Period	2	0x00-0x7FFF
Unit	Default	Description
5s	720	0: Disable Watt Report 1~32767:5s~45h

Configuration Parameter 2		
Function	Size (byte)	Value
KWH Meter Report Period	2	0x00-0x7FFF
Unit	Default	Description
10min	6	0: Disable KWh Report 1~32767:10min~227 days

Configuration Parameter 3		
Function	Size (byte)	Value
Threshold of current for Load caution	2	10-1300
Unit	Default	Description
0.01A	1300	1300*0.01A = 13A

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Configuration Parameter 13		
Function	Size (byte)	Value
Adjustable overload	2	450-1450
Unit	Default	Description
0.01A	1450	1450*0.01A = 14.5A

3.1 | **WATT METER REPORT PERIOD:**
If the setting is configured for 1hour (set value =720), the Switch will report its instant power consumption every 1 hour to Group1 node. The maximum interval to report its instant power consumption is 45 hours (5s*32767/3600=45hr). When the setting is set at 0, the Switch will disable Watt auto report function. The default value is 720.

3.2 | **KWH METER REPORT PERIOD:**
If the setting is configured for 1hour (set value =6), the Switch will report its Accumulated Power Consumption (KW/h) every 1 hour to Group1 node. The maximum interval to report its Accumulated Power Consumption (KW/h) is 227.55 days (10min*32767/1440=227.55 days). When the setting is set at 0, the Switch will disable KWH auto report function. The default value is 6.

3.3 | **THRESHOLD OF CURRENT FOR LOAD CAUTION:**
This is a warning when the current of load over the preset threshold value, if the setting value is 1300, when the load current of Relay1 over this value, Switch will send current meter report to warn the Group1 node, the Range of the setting value is from 10 to 1300,and the default value is 1300.

3.4 | **THRESHOLD OF KWH FOR LOAD CAUTION**
This is a warning when the KWh of load over the preset threshold value, if the setting value is 10000, when the Accumulated Power Consumption of Relay1 over this value, the Switch will send KWH meter report to warn the Group1 node, minimum value is 1KWh and default value is 10000 kWh.

3.5 | **RESTORE SWITCH STATE MODE:**
Whenever the AC power return from lost, the Switch will restore the switch state which could be SWITCH OFF, LAST SWITCH STATE, SWITCH ON. The default setting is LAST SWITCH STATE.

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Smart Energy Plug In Switch is based on 500 series SoC and supports Firmware Update Command Class, it can receive the updated firmware image sent by controller via the Z-wave RF media. It is a helpful and convenient way to improve some function if needed.

TROUBLESHOOTING

Symptom	Cause of Failure	Recommendation
Micromodule is not working and LED off	1. The Switch is not plugged into the electrical outlet properly. 2. The Switch broke down.	1. Check power connections 2. Don't open up the Micromodule and send it for repair.
The Switch LED is illuminating, but cannot control the ON/OFF Switch of the load attached	1.Check if the load plugged into the Switch has its own ON/OFF switch. 2. The switch is protected.	1. Set the ON/OFF switch of the load attached to ON 2. Unprotect the switch or follow the instruction of protection.
The Switch LED is illuminating, but the Detector cannot control the Switch	1. Not carry out association 2. Same frequency interference	1. Carry out association 2. Wait for a while to re-try
LED keep flashing, but cannot control	Overload occurs	Remove the load attached or check max. load cannot exceed 13A

Having trouble installing your new product?
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www.zipato.com

You can also find answers in the Zipato Community at: community.zipato.com

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GENERAL TERMS
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