In-wall Power Monitor Switch

User's Manual

Introduction

This In-wall Power Monitor Switch is a transceiver which is a Z-Wave enabled device and is fully compatible with any Z-Wave enabled network. Mini-sized design makes it easy to place the In-wall Power Monitor Switch into the wall box and fit in the house decoration.

There are many kinds of applications using the In-wall Power Monitor Switch to switch AC power On and Off. One of the main applications is the light control. The new smart relay calibration technology can reduce the inrush current caused by the load and let the switch work perfectly with many kinds of lights like the incandescent light, the fluorescent light and the LED light.

The In-wall Power Monitor Switch is able to detect Instant power wattage (AC 110~230V) and overloaded wattage (550W/1150W) of the connected light or appliances. When the overloaded state is detected, the In-wall Power Monitor Switch will be disabled, the On/Off button will be locked out, and the LED light will flash red and green quickly by turns. However, disconnect and re-connect the power of the In-wall Power Monitor Switch will reset its overloaded condition to the normal status.

In-wall Switch is also a security Z-Wave device and supports the Over The Air (OTA) feature for the product's firmware upgrade. If you want your In-wall Switch to be a security device that use secure/encrypted message to communicate in a Z-Wave network, then a security enabled Z-Wave controller is needed.

Package contents

- In-wall Power Monitor Switch x 1
- User manual x 1

Command class

In-Wall Power Switch Command Class Supported

COMMAND_CLASS_ZWAVEPLUS_INFO_V2,
COMMAND_CLASS_SWITCH_BINARY_V1,
COMMAND_CLASS_METER_V3,
COMMAND_CLASS_CONFIGURATION_V1,
COMMAND_CLASS_ASSOCIATION_V2,
COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION_V3,
COMMAND_CLASS_ASSOCIATION_GRP_INFO_V1,
COMMAND_CLASS_NOTIFICATION_V8,
COMMAND_CLASS_TRANSPORT_SERVICE_V2,
COMMAND_CLASS_VERSION_V3,
COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2,
COMMAND_CLASS_DEVICE_RESET_LOCALLY_V1,
COMMAND_CLASS_POWERLEVEL_V1,
COMMAND_CLASS_SECURITY_V1,
COMMAND_CLASS_SECURITY_2_V1,
COMMAND_CLASS_MULTI_CHANNEL_V4,
COMMAND_CLASS_SUPERVISION_V1,
COMMAND_CLASS_FIRMWARE_UPDATE_MD_V4

[security]

COMMAND_CLASS_SWITCH_BINARY_V1,
COMMAND_CLASS_METER_V3,
COMMAND_CLASS_CONFIGURATION_V1,
COMMAND_CLASS_ASSOCIATION_V2,
COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION_V3,
COMMAND_CLASS_ASSOCIATION_GRP_INFO_V1,
COMMAND_CLASS_NOTIFICATION_V8,
COMMAND_CLASS_VERSION_V3,
COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2,
COMMAND_CLASS_DEVICE_RESET_LOCALLY_V1,
COMMAND_CLASS_POWERLEVEL_V1,
COMMAND_CLASS_MULTI_CHANNEL_V4,
COMMAND_CLASS_SUPERVISION_V1,
COMMAND_CLASS_FIRMWARE_UPDATE_MD_V4

In-Wall Power Switch Device Information

Basic Device Class: ROUTING_SLAVE
Generic Device Class: SWITCH_BINARY
Specific Device Class: POWER_STRIP

Detailed description of each command class

【COMMAND_CLASS_ZWAVEPLUS_INFO】
The Z-Wave Plus Info Get Command is used to get additional information of the Z-Wave Plus device in question.

【COMMAND_CLASS_SWITCH_BINARY】
The Binary Switch Command Class is used to control the On/Off state of supporting nodes.

【COMMAND_CLASS_BASIC】
The Basic Command Class allows a controlling device to operate the primary functionality of another device without any further knowledge. The Basic Command Class ensures a basic interoperability if no other Command Class is shared by two devices.

【COMMAND_CLASS_METER】
The Meter Command Class is intended for Z-Wave enabled devices capable of reporting energy measurements in addition to any main functionality or features e.g. an appliance module reporting the current consumption of the connected load. This command class is not intended for residential utility sub-metering such as a water meter counting total consumption.

【COMMAND_CLASS_CONFIGURATION】
The Configuration Command Class allows product specific configuration parameters to be changed. One example could be the default dimming rate of a light dimmer.

This class is used for setting certain vendor specific configuration variables. See the following table for configuration variables:

ID	Name	Size	Range	Default value	Description
1	D1 automatically turn off	2	0~ 32767	0	0 : Disable (Default) 1~32767 : Time in second that the O2 will turn off automatically.
2	D2 automatically turn off	2	0~ 32767	0	0 : Disable (Default) 1~32767: Time in second that the O2 will turn off automatically.
3	Switch Type	1	0~2	0	0 : Toggle switches (Default) 1 : Toggle switches with memory 2 : Momentary switch
4	Reload power status	1	0~1	0	0 : device does not memorize its status at power cut. Load is disconnected (Default) 1 : device memorizes its status at the power cut. Load will be set to the status from before power cut.
5	Power reporting on power change	1	0~100	10	0 : Disabled 1~100 : 1 % ~ 100 %. (Default = 10%)
6	Watts auto-report period	2	0, 60~ 32767	300	0 : Disabled 60~32767Seconds. (Default = 300 Seconds)
7	KWH auto-report period	2	0, 60~ 32767	3600	0 : Disabled Set time interval of reporting KWH (60 ~32767) in seconds.
8	D1 automatically turn on	2	0~ 32767	0	0 : Disable (Default) 1~32767 : Time in second that the O2 will turn on automatically.
9	D2 automatically turn on	2	0~ 32767	0	0 : Disable (Default) 1~32767: Time in second that the O2 will turn on automatically.

【COMMAND_CLASS_ASSOCIATION】
The Association Command Class is used to manage associations to NodeID destinations. A NodeID destination may be a simple device or the Root Device of a Multi Channel device.

Group	Name	Description
1	"Lifeline"	Reports the device status and allows for assigning single device only (main controller by default).
2	”alarm EP 1”	It is assigned to switch connected to the S1 terminal (uses Notification command class)
3	”Switch 1”	It is assigned to switch connected to the S1 terminal (uses Basic command class)
4	”alarm EP 2”	It is assigned to switch connected to the S1 terminal (uses Notification command class)
5	”Switch 2”	It is assigned to switch connected to the S1 terminal (uses Basic command class)

The group allows to control 5 regular or multichannel devices per an association group.

MULTI_CHANNEL_ASSOCIATION

Endpoint	Group	Name
1	1	"Lifeline"
	2	”alarm EP 1”
	3	”Switch 1”
2	1	"Lifeline"
	2	”alarm EP 2”
	3	”Switch 2”

【COMMAND_CLASS_ASSOCIATION_GRP_INFO】
The Association Group Information (AGI) Command Class allows a node to advertise the capabilities of each association group supported by a given application resource. Controllers and installer tools SHOULD use AGI information to support controller-assisted button-to-button association and GUI-based drag-and-drop association in a plug-and-play fashion.

Centralized gateway-based deployments may create a single association from the lifeline association group to a central management application.

【COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION】
The Multi Channel Association Command Class is used to manage associations to Multi Channel End Point destinations as well as to NodeID destinations.

【COMMAND_CLASS_NOTIFICATION】
The Notification Command Class is used to advertise events or states, such as movement detection, door open/close or system failure. The Notification Command Class supersedes the Alarm Command Class.

Notification Type	Notification events
0x08 (Power Management)	0x00 (Previous event clear)
	0x06 (Over-current detected)

【COMMAND_CLASS_TRANSPORT_SERVICE】
The Transport Service Command Class supports the transfer of datagrams larger than the Z-Wave frame.

【COMMAND_CLASS_VERSION】
The Version Command Class, version 3 allows supporting nodes to advertise capabilities related to the Version Command Class and optionally provide a detailed list of information regarding implementation on the Z-Wave chip.

【COMMAND_CLASS_MANUFACTURER_SPECIFIC】
Manufacturer Specific Command Class, version 2 adds a set of commands to communicate unique identification, e.g. the serial number, of the product. Commands not mentioned here remains unchanged as specified for Manufacturer Specific Command Class, Version 2.

【COMMAND_CLASS_SECURITY】
The Security Command Class create the foundation for secure application communication between nodes in a Z-Wave network. The security layer provides confidentiality, authentication and replay attack robustness through AES-128.

【COMMAND_CLASS_SECURITY_2】
The Security 2 Command Class is a framework for allowing nodes to communicate securely in a Z-Wave network. The Security 2 Command Class provides backwards compatibility to nodes implementing the Security 0 Command Class. Security 2 Command Class also defines a new encapsulation format, new Security Classes and a new KEX Scheme 1, which together offers a number of advantages over the Security 0 Command Class. Security 2 Command Class is scalable and allows more KEX Schemes, Security Classes and encapsulation formats to be introduced in the future if necessary.

【COMMAND_CLASS_MULTI_CHANNEL】
The Multi Channel command class is used to address one or more end points in a Multi Channel device. An application implementing this command class MUST set the Optional Functionality bit in the NIF.

In-wall Power Monitor Switch implement 2 end points. A controlling devices MAY use Multi Channel encapsulation to communicate with Multi Channel End Points in other devices. If such a controlling device does not implement any End Points, the device SHOULD NOT advertise the Multi Channel Command Class in the Node Information Frame.

Command Class Supported Endpoint 1/2：

COMMAND_CLASS_ZWAVEPLUS_INFO_V2,
COMMAND_CLASS_SWITCH_BINARY,
COMMAND_CLASS_METER_V3,
COMMAND_CLASS_ASSOCIATION,
COMMAND_CLASS_ASSOCIATION_GRP_INFO,
COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION_V2,
COMMAND_CLASS_SUPERVISION,
COMMAND_CLASS_SECURITY,
COMMAND_CLASS_SECURITY_2

[security]

COMMAND_CLASS_SWITCH_BINARY,
COMMAND_CLASS_METER_V3,
COMMAND_CLASS_ASSOCIATION,
COMMAND_CLASS_ASSOCIATION_GRP_INFO,
COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION_V2,

In-wall Power Monitor Switch is Multi Channel ,it has two endpoints: D1 is Endpoit_1, D2 is Endpoint_2.

	Endpoint_1	Endpoint_2
Device Type	On/Off Power Switch	On/Off Power Switch
Installer Icon Type	POWER_SWITCH (0x0702)	POWER_SWITCH (0x0702)
User Icon Type	WALL_OUTLET (0x0700)	WALL_OUTLET (0x0700)
Control	COMMAND_CLASS: BASIC COMMAND: BASIC_REPORT Properties2:001 Value = 0x00(OFF), 0x01~0x63,(ON) 0xFF(ON),	COMMAND_CLASS: BASIC COMMAND: BASIC_REPORT Properties2:002 Value = 0x00(OFF), 0x01~0x63,(ON) 0xFF(ON),
	COMMAND_CLASS: SWITCH_BINARY COMMAND: SWITCH_BINARY_REPORT Properties2:001 Value = 0x00(OFF), 0x01~0x63,(ON) 0xFF(ON),	COMMAND_CLASS: SWITCH_BINARY COMMAND: SWITCH_BINARY_REPORT Properties2:002 Value = 0x00(OFF), 0x01~0x63,(ON) 0xFF(ON),

【COMMAND_CLASS_SUPERVISION】

The Supervision Command Class allows a sending node to request application-level delivery confirmation from a receiving node. The delivery confirmation includes relevant application-level status information in the confirmation message. The Supervision Command Class MAY be used for solitary commands such as Set and unsolicited Report commands.

The Supervision Command Class MUST NOT be used for session-like command flows such as Get←→Report command exchanges or firmware update.

【DEVICE RESET LOCALLY command class】

The Device Reset Locally Command Class is used to notify central controllers that a Z-Wave device is resetting its network specific parameters.

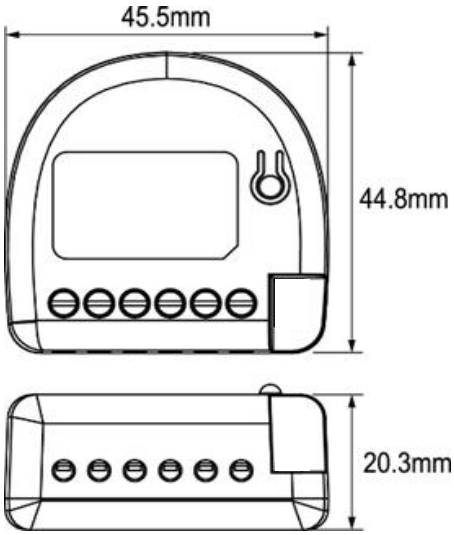
Device Installation

1. Put the In-wall Power Monitor Switch into a wall box and connect the AC power wire L/N to the In-wall Power Monitor Switch connector L/N.
2. Connect the wall switch to the In-wall Power Monitor Switch as illustrated in the above picture.
3. To manually turn ON the Switch:
   Press and release the ON/OFF button. The LED will light ON for 1 second, and the load plugged into the Switch will be turned ON.
4. To manually turn OFF the Switch:
   Press and release the ON/OFF button. The LED will light ON for 1 second, and the load plugged into the Switch will be turned OFF.

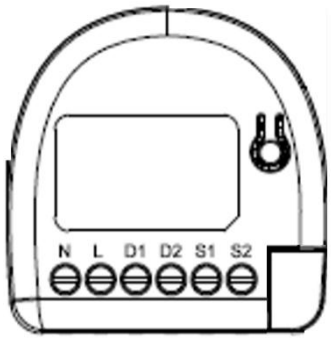
NOTE:

1. Please pull out the antenna and keep it straight to ensure the reception quality of the signals.
2. Do not use the wall switch with nightlight functions, or the In-wall Power Monitor Switch might not work properly.

Product Overview



Application Diagram



Main Diagram

The on-site environment: One load of lamp, and two wall switches. Two wall switches can control one identical lamp. This is the Tandem Switch. To achieve the purpose: Insert our In-wall Power Monitor Switch, and it will not affect the 2 current wall switches controlling the same lamp.

Glossary of terms

Include/Exclude Button - Inclusion/exclusion, press 3 times in 2 seconds

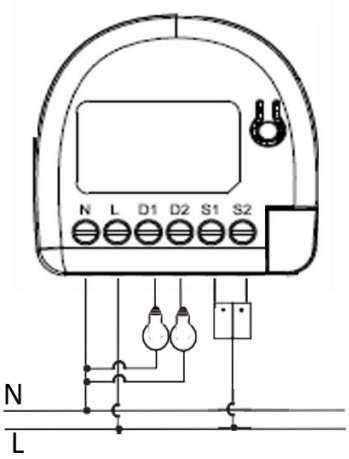
N - NEUTRAL wire	D2 - Device 2	N - NEUTRAL wire
L - LIVE wire	S1 - Switch 1	L - LIVE wire

NOTE:

1. The Resistive load of single S1 or S2 is 5A at max., while the total Resistive load of S1 plus S2 is 1150W at max., too.
2. In the range of 1150W, you can make any permutations. However, when S1 is set to 1150W (the maximum of load), S2 can only be 0W, and vice versa.

Basic Application Diagram

1. Connect S2 to one switch, you can control the device connected to D2.
2. Connect S1 to one switch, you can control the device connected to D1.



LED Indicator

STATUS	SIGNAL
No node ID (Before Inclusion)	1-second Red LED / 1-second Green LED
Power ON(No node ID)	Green Light on / 1-second Red LED
Power Off(No node ID)	1-second Red LED / 1-second Green LED
Add for Inclusion - Touch Three Time(<1Sec. Must release)	Green LED Flash and Z-Wave Inclusion
Remove for Exclusion - Touch Three Time(<1Sec. Must release)	Green LED Flash and Z-Wave Exclusion
Reset	Press the pairing button 3 times in 2 seconds and press and hold the pairing button for more than 5 seconds at the 3rd time. The module is excluded and restores to factory default setting. Then the module will be in auto-inclusion mode for 2 minutes. Please use this procedure only when the network primary controller is missing or otherwise inoperable.
Power ON(Z-Wave Connect)	Green LED on & Red LED turn off
Power Off(Z-Wave Connect)	Green LED & Red LED turn off
Over load Protect	Red LED every 0.5 second Flash

Notice: Including a node ID allocated by Z-WaveTM Controller means “Add” or “Inclusion”. Excluding a node ID allocated by Z-WaveTM Controller means “Remove” or “Exclusion”.

Support Z-Wave RF Package Communication

FUNCTION	DESCRIPTION
Allows Association to control the Controller	Combine other Slave devices to interlock simultaneously, able to connect up to 5 devices.
Support Set-time for specific controller	This function is to report the status to the controller on the set time. The fifth association is used to report to the controller after the node status is changed.
Support Z-Wave to read Device Detect status and report	YES

Specification

ITEM	DESCRIPTION
Power Mode	Self Power
Power Range	110 ~ 230 VAC ± 10% 50/60Hz
Power Consumption (Standby Mode)	Under 0.5W
Frequency	868.42MHz (EU) 908.40MHz (US)
Rated load current of AC output (resistive load)	2 x 5A
Output circuit power of AC output (resistive load)	2 x 1150 W (230 VAC) 2 x 550 W (110 VAC)
Power measurement accuracy	P = 0 ~ 200W, +/- 2W; P > 200W, +/- 3%
Overload Current Protection	5A
LED Indicator	Red/Green * 1
Button	Inclusion / Exclusion
Protocol	Z-Wave Plus
Data Rate	9.6kbps / 40kbps / 100kbps
Operation Range	100 feet (About 30M)
Application	Indoor use
Operation Temperature	-10℃ ~ + 40℃
User Interface (Cable)	16AWG * 6
Housing	PC+ABS
Dimensions (L*W*H)	45.5 x 44.8 x 20.3 mm

Regulatory Compliance

CE Caution

Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1,000 MHz frequency range with power levels ranging up to 500 mW; Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive.

FCC Caution

This device complies with Part 15 of the FCC rules standard. Operation is subject to the following two conditions:
(1)This device may not cause harmful interference, and
(2)This device must accept any interference received, including interference that may cause undesired operation.

WEEE Information

For EU (European Union) member users: According to the WEEE (Waste electrical and electronic equipment) Directive, do not dispose of this product as household waste or commercial waste. Waste electrical and electronic equipment should be appropriately collected and recycled as required by practices established for your country.
For information on recycling of this product, please contact your local authorities, your household waste disposal service or the shop where you purchased the product

Z-Wave Plus

This product can be included and operated in any Z-Wave network with other Z-Wave certified devices from other manufacturers and/or other applications. All non-battery operated nodes within the network will act as repeaters regardless of vendor to increase reliability of the network.
This device must be used in conjunction with a Security Enabled Z-Wave Controller in order to fully utilize all implemented functions.

Security S2

Security S2 is supported with the Authenticated and UnAuthenticated levels of security. The Authenticated level requires the user to enter the PIN code or QR code printed on the box of the in wall switch. The UnAuthenticated level does not require the PIN code. Both security levels will encrypt nearly all communication using AES-128 encryption to ensure reliable and secure

communication.

SmartStart

Silicon Labs technology makes installation easy and secure. Simply install In-wall Power Monitor Switch into a wall and it will automatically attempt to join the Z-Wave network. During the inclusion process, your home automation system will ask for a PIN code or to scan a QR code. The pin code is printed on the back of In-wall Power Monitor Switch along with the QR code. Simply enter the PIN code or scan the QR code with a compatible device. Each QR code is unique for every device. SmartStart uses the latest Security S2 encryption technology for all radio communication. It is completely backwards compatible with non-SmartStart systems if your home automation system doesn't support it yet.

About Pin code or QR code example:

Please save the QR code or PIN code carefully.

If both the DSK representation on the product and any DSK provided in the product packaging were to fade, rub off, or be lost, the device would not be able to be added to a Z-Wave network.