

# PAN11-1/-2/-3 Smart Energy Plug-in Switch Z-Wave Series



## Features

- Adopt Z-Wave protocol to secure the success of wireless two way communication
- Higher RF output power (+2.5dBm output power as compared to -2.5dBm 300 series Z-wave module) to enhance the communication range
- With zero crossing technology to extend the number of switching
- Easy install
- Very low Electricity consumption ,
- Resistive load 3000W, 1500W for incandescent load or 320W for fluorescent load
- Overload protection
- Auto report the state when manually push the ON/OFF button
- Auto report the wattage when variation over 5%
- Voltage, Current, Power factor, Instant power Wattage and Accumulated power consumption KWh report
- Z-Wave V6.02
- Z-Wave Certificated  
PAN11-1 ZC08-13020005  
PAN11-2 ZC08-13020006  
PAN11-3 ZC08-13020007
- **LVD**:EN 61058  
**R&TTE** : EN 301489, EN 300200,

## Introduction

This smart energy plug-in switch is a transceiver which is a Z-Wave™ enabled device and is fully compatible with any Z-Wave™ enabled network. Z-Wave™ enabled devices displaying the Z-Wave™ logo can also be used with it regardless of the manufacturer, and ours 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 is received by its intended destination by routing the signal around obstacles and radio dead spots.

This smart energy plug-in switch is able to detect voltage, current, power factor, Instant power wattage (5~3150W) and overload wattage (3010~3300W) of connected light or appliances. When detecting overload state, the Module will be disabled and its On/Off button will be lockout of which LED will flash quickly for 30 seconds. However, unplug and re-connect the Module will reset its overload condition to normal status.

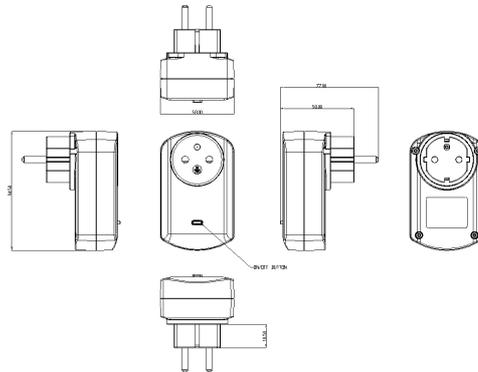
This plug-in switch can active sent out instant power wattage when variation over 5% or active sent out state change when manually push the ON/OFF button , this allows the controller to avoid polling the reading wattage value and state of the switch and can increase the efficiency of controller.

## Specification

Power	No load standby power Input voltage	0.48W (230V) 90 ~240VAC
RF	Frequency Regulation Distance	868.42 (EU) MHz FCC part15.249 / EN300 220-1/ min. 30m indoor min. 100m outdoor
Mechanical	weight Dimension (W x H x D)	118 g 57.7x94.5x76.6 mm (Germany type PAN11-1)
Environment	Operation Temperature Humidity	0 ~ 40° C 85%RH max
Load	Resistive load incandescent load fluorescent load load return error rate 5W~40W load return error rate 40W~3150W overload	3000W 1500W 320W ±3W ±5% 3300W



Dimension and Placement (unit:mm)



Germany type PAN11-1  
57.7x94.5x76.6 mm



France type PAN11-2  
57.7x94.5x76.6 mm



UK type PAN11-3  
57.7x94.5x61 mm



**Application:**  
Home Automation  
Energy Saving

**Philio Technology Corporation**  
[www.philio-tech.com](http://www.philio-tech.com)



## PHI\_PAN11 Z-Wave Schuko Plug-in Switch plus Power Meter

Firmware Version : 1.1

### Quick Start

**A** This device is a Z-Wave Actor. Triple click the button on the device confirms the inclusion, exclusion and association. After plugging in it will stay in auto inclusion mode for 4 minutes.

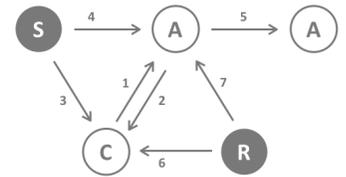
Please refer to the chapters below for detailed information about all aspects of the products usage.

### What is Z-Wave?

This device is equipped with wireless communication complying to the Z-Wave standard. Z-Wave is the international standard for wireless communication in smart homes and buildings. It is using the frequency of 868.42 MHz to realize a very stable and secure communication. Each message is reconfirmed (two-way communication) and every mains powered node can act as a repeater for other nodes (meshed network) in case the receiver is not in direct wireless range of the transmitter.

Z-Wave differentiates between Controllers and Slaves. Slaves are either sensors (S) transmitting metered or measured data or actuators (A) capable to execute an action. Controllers are either static mains powered controllers (C) also referred to as gateways or mobile battery operated remote controls (R). This results in a number of possible communication patterns within a Z-Wave network that are partly or completely supported by a specific device.

1. Controllers control actuators
2. Actuators report change of status back to controller
3. Sensors report change of status of measured values to controller
4. Sensors directly control actuators
5. Actuators control other actuators
6. Remote controls send signals to static controllers to trigger scenes or other actions
7. Remote controls control other actuators.



There are two different role a controller can have. There is always one single primary controller that is managing the network and including/excluding devices. The controller may have other functions - like control buttons - as well. All other controllers don't manage the network itself but can control other devices. They are called secondary controllers. The image also shows that its not possible to operate a sensor just from a remote control. Sensors only communicate with static controllers.

### Product description

The PAN11 is a Plug-in switch, which can be placed between a wall outlet for Schuko plug and electric devices with a resistive load up to 3000W, plugged in by cord. In addition, this intelligent plug-in switch is able to detect the voltage, the power factor, the current and measure the electric power taken by this load (in Wh) as well as meter the electrical energy consumed (in kWh). It will also detect a possible overload (3010 ~ 3300W) of the connected electrical device. When detecting an overload, the module is deactivated and the LED will flash for 30 seconds.

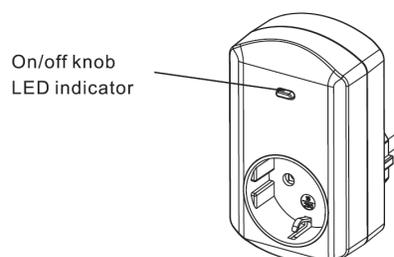
### Before Device is installed

Please read carefully the enclosed user manual before installation of the radio-actuator, in order to ensure an error-free functioning.

**ATTENTION:** only authorized technicians under consideration of the country-specific installation guidelines/norms may do works with 230 Volt mains power. Prior to the assembly of the product, the voltage network has to be switched off and ensured against re-switching.

The product is permitted only for proper use as specified in the user manual. Any kind of guarantee claim has to be forfeited if changes, modifications or painting are undertaken. The product must be checked for damages immediately after unpacking. In the case of damages, the product must not be operated in any case. If a danger-free operation of the equipment cannot be assured, the voltage supply has to be interrupted immediately and the equipment has to be protected from unintended operation.

### Installation Guidelines



In the front casing there is an On/Off button with LED indicator, which is used to toggle switch on and off or carry out inclusion, exclusion, reset or association. When first powered, the LED flashes on and off alternately at a 2-seconds interval. It implies that it is not included in a Z-Wave network and has not been assigned a node ID.

#### Auto Inclusion

The auto inclusion starts when the switch is not included into a Z-Wave network and plugged into a wall outlet. Auto inclusion timeout is 4 minutes during the node information frame will be emitted once every 5 seconds. Unlike the normal inclusion it is not necessary pressing the On/Off button on the switch. If auto inclusion exceeds the timeout you have to include the device manually.

Note: Do not locate the switch facing direct sunlight, humid or dusty places. The suitable ambient temperature for the switch is 0°C - 40°C. Do not locate the switch near to combustible substances or any source of heat. After putting it into use, the casing of the switch will become a little bit warm.

## Behavior within the Z-Wave network

**I** On factory default the device does not belong to any Z-Wave network. The device needs to join an existing wireless network to communicate with the devices of this network. This process is called Inclusion. Devices can also leave a network. This process is called Exclusion. Both processes are initiated by the primary controller of the Z-Wave network. This controller will be turned into exclusion respective inclusion mode. Please refer to your primary controllers manual on how to turn your controller into inclusion or exclusion mode. Only if the primary controller is in inclusion or exclusion mode, this device can join or leave the network. Leaving the network - i.e. being excluded - sets the device back to factory default.

If the device already belongs to a network, follow the exclusion process before including it in your network. Otherwise inclusion of this device will fail. If the controller being included was a primary controller, it has to be reset first.

Tripple Click the button on the device confirms inclusion and exclusion. After plugging in it will stay in auto inclusion mode for 4 minutes.

## Operating the device

#### Manual Operation

- Plug the device 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 3000 watts.
- Press the button or switch 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 again. The LED will turn off and the load plugged into the switch will also turn off.

#### Remote Operation

Remote On/Off control of the switch is possible with any manufacturer's Z-Wave controller. Further you can set associations to let your device controlled by other Z-Wave devices like sensors.

The switch is able to detect the current wattage (5 - 3150W) and overload wattage (3010 - 3300W) of connected lights or appliances. When detecting overload state, the switch will be disabled and its On/off button will be locked and the LED will flash quickly. However unplug and reconnect the switch to reset its overload condition to normal status.

## Node Information Frame

**NI** The Node Information Frame is the business card of a Z-Wave device. It contains information about the device type and the technical capabilities. The inclusion and exclusion of the device is confirmed by sending out a Node Information Frame. Beside this it may be needed for certain network operations to send out a Node Information Frame.

Tripple click the button on the device sends out a Node Information Frame.

## Associations

**A** Z-Wave devices control other Z-Wave devices. The relationship between one device controlling another device is called association. In order to control a different device, the controlling device needs to maintain a list of devices that will receive controlling commands. These lists are called association groups and they are always related to certain events (e.g. button pressed, sensor triggers, ...). In case the event happens all devices stored in the respective association group will receive a common wireless command.

Association Groups:

1	When the power consumption of load vary over 5%, the PAN11 will send a Meter Report. When "on" or "off" state has been changed, it will send Binary Switch Report. (max. nodes in group: 1)
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## Configuration Parameters

Z-Wave products are supposed to work out of the box after inclusion, however certain configuration can adapt the function better to user needs or unlock further enhanced features.

IMPORTANT: Controllers may only allow to configure signed values. In order to set values in the range 128 ... 255 the value sent in the application shall be the desired value minus 256. For example: to set a parameter to 200 it may be needed to set a value of 200 minus 256 = minus 56. In case of two byte value the same logic applies: Values greater than 32768 may needed to be given as negative values too.

#### Watt Meter Report Period (Parameter Number 1, Parameter Size 2)

If the setting is configured for 1hour (set value =720), the PAN11 will report its instant power consumption every 1 hour to Z-Wave Controller. Unit: 5 seconds

Value	Description
1 – 32767	720 * 5s = 3600s = 1 hour (Default 720)

#### KWH Meter Report Period (Parameter Number 2, Parameter Size 2)

If the setting is configured for 1hour (set value =6), the PAN11 will report its Accumulated Power Consumption (KW/h) every hour to Z-Wave Controller. Unit: 10min

Value	Description
1 – 32767	6 * 10min = 1hour (Default 6)

#### Threshold of Watt for Load caution (Parameter Number 3, Parameter Size 2)

This is a warning when the wattage of load over the preset threshold value, if the load wattage exceeds the setting value the PAN11 will send a warning alarm command to the controller.

Value	Description
10 – 3000	wattage threshold value (Default 3000)

#### Threshold of KWh for Load caution (Parameter Number 4, Parameter Size 2)

This is a warning when the KWh of load over the preset threshold value, if the Accumulated Power Consumption exceeds the setting value the PAN11 will send a warning alarm command to the controller.

Value	Description
1 – 10000	KWh threshold value (Default 10000)

## Command Classes

Supported Command Classes

- Basic (version 1)
- Binary Switch (version 1)
- Version (version 1)
- All Switch (version 1)
- Manufacturer Specific (version 2)
- Configuration (version 1)
- Meter (version 3)
- Association (version 1)

## Technical Data

IP Rating	IP20
Explorer Frame Support	Yes
SDK	6.02.00
Device Type	Slave with routing capabilities
Generic Device Class	Binary Switch
Specific Device Class	Binary Power Switch
Routing	Yes
FLIRS	No
Firmware Version	1.1

## Explanation of Z-Wave specific terms

- Controller – is a Z-Wave device with capabilities to manage the network. Controllers are typically Gateways, Remote Controls or battery operated wall controllers.
- Slave – is a Z-Wave device without capabilities to manage the network. Slaves can be sensors, actuators and even remote controls.
- Primary Controller – is the central organizer of the network. It must be a controller. There can be only one primary controller in a Z-Wave network.
- Inclusion – is the process of bringing new Z-Wave devices into a network.
- Exclusion – is the process of removing Z-Wave devices from the network.
- Association – is a control relationship between a controlling device and a controlled device.
- Wakeup Notification – is a special wireless message issued by a Z-Wave device to announces that is is able to communicate.
- Node Information Frame – is a special wireless message issued by a Z\_Wave device to announce its capabilities and functions.

## Disposal Guidelines

The product does not contain hazardous chemicals.

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available.

If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being.