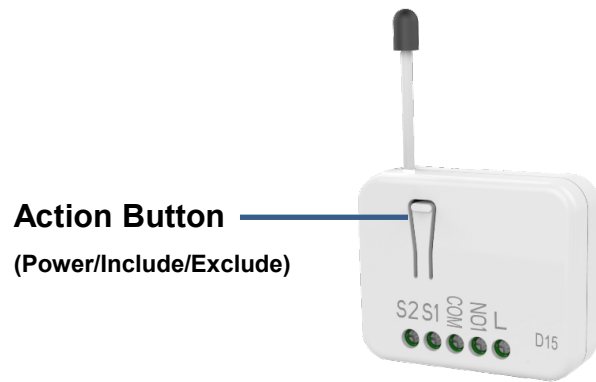


# PAD15 2 Wire Dimmer



PAD15 only needs to be connected to two wires, single wire (L) and load (NO1).

This device is a security enabled Z-Wave Plus™ product. The encrypted Z-Wave Plus™ messages support PAD15 to communicate with other Z-Wave Plus™ products.

PAD15 can be used with Z-Wave™ devices (with Z-Wave™ logo) from different manufacturers, it can also be included in the Z-Wave™ networks from different manufacturers.

All mains operated nodes (even from different manufacturers) in the network act as repeaters to increase the stability and reliability of the Z-Wave™ network.

The product is supported with Over-the-Air (OTA) feature for firmware upgrade.

## Specification

Operating Rated	100-240 Vac; 50Hz-60Hz; 0.9A
Output Load	Maximum 0.9A (100-240 Vac)
Fuse Information	Built-in High Breaking Capacity Current Fuse Protection. Rated: 2A; 250V Built-in Thermal Cut-off Fuses Protection. Rated Temperature: 125°C; Rated: 2A 250V
Maximum Watts	200W (Dimmable LED bulbs or Incandescent lamp) (230Vac)
Maximum Watts	100W (Dimmable LED bulbs or Incandescent lamp) (120Vac)
LED Minimum	Min. 20W for Dimmable LED bulb not flickering
Operating Temperature	0°C - 40°C
Humidity	Up to 85% max
Storage Temperature	-20°C - 60°C
Location	Indoor use only
Frequency Range	868.40MHz, 869.85MHz EU 908.4MHz, 916.0MHz US, 922.5MHz, 923.9MHz, 926.3MHz (JP) 920.9MHz, 921.7MHz, 923.1MHz (TW/KR/Thai/SG)
RF Maximum Power	+10dBm (Peak), -10dBm (Average)
Transmission Range	Up to 40m indoors or up to 100m outdoors (depending on building materials)
Communication Protocol	Z-wave™
OTA	Yes
FCC ID	RHHPAD15
Dimensions	47.5 x 39 x16 mm
Wire	0.75mm <sup>2</sup> ; 18AWG

✧ Specifications are subject to change and improvement without notice.

## Troubleshooting

Symptom	Cause of Failure	Recommendation
The dimmer does not work and LED off	<ol style="list-style-type: none"> <li>The dimmer does not connect to electrical wire properly.</li> <li>Dimmer is broken.</li> </ol>	<ol style="list-style-type: none"> <li>Check the power connections.</li> <li>Do not open the dimmer and send it back to distributor.</li> </ol>
The device can not join to Z-Wave™ network	The device may in a Z-Wave™ network.	Exclude the device then include again.
Flashing during dimming	Minimum load is less than 20W	Replace with larger load

## Installation Steps

1. Connect PAD15 to AC L line and the end of bulb load.
2. S1 and S2 can be connected externally to switches.
3. COM is for S1 and S2 connect port.

NOTE: If the load connected to the output starts flickering, we recommend you use a BYPASS. , BYPASS prevents flickering of the LED lights.

NOTE: The S1 & S2 are not allow to be used with luminous switches.

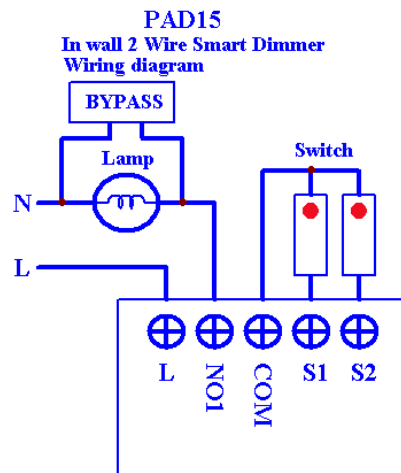


Fig 1. Assembling & Wiring

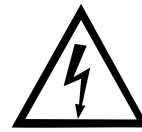
## IMPORTANT

Installation must be performed by skilled technicians who are informed about the standards and technical requirements of the appliance and its proper installation.

Check your local codes as they apply to your situation. If the house wiring is of aluminum, consult with an electrician about proper wiring methods.

Before proceeding with the installation, **TURN OFF THE POWER TO THE LIGHTING CIRCUIT AT THE CIRCUIT BREAKER OR FUSE BOX TO AVOID ELECTRICAL SHOCK.**

For Instruction to [http:// www.philio-tech.com](http://www.philio-tech.com)



**Danger of Electrocution**

All works on the device may be performed only by a qualified and licensed electrician. Observe national regulations. Any works introducing changes into the configuration must be always performed with disconnected voltage.

Choosing a Suitable Location

1. Do NOT place the module/device direct under sunlight, in a humid place or in any location where they may contact moisture, dirt, dust.
2. Do NOT place the module/device where exists combustible substance or any source of heat, fires, radiators, boiler etc.
3. When the module/device be used, the module/device might get warm. This is a normal condition.

## Adding to Z-Wave™ Network

There is a button with LED indicator in front of PAD15. It is used to dim on/off the light and carry out the inclusion, exclusion, reset or association of PAD15 from Z-wave controller.

When the first power on, the LED indicator flashes once per second for 30 seconds. With the SmartStart function, PAD15 will be automatically included by Z-wave controller.

PAD15 can be operated with any certified Z-Wave™ devices from different manufacturers in Z-Wave™ network. All non-battery operating devices act as repeaters to increase the stability and reliability of the Z-Wave™ network.

The table below provides an operation summary of basic Z-Wave™ functions. To add/remove/associate PAD15, please refer to the instruction of certified Z-Wave™ Primary Controller.

Function	Description	Annotation
Without Node ID	New PAD15 does not have Node ID until it is included by a Z-Wave™ Controller.	LED light flashes once per second for 30 seconds.
Add (Classic Inclusion)	<ol style="list-style-type: none"> <li>1. Set Z-Wave™ Controller to inclusion mode by following the instructions provided by the controller manufacturer.</li> <li>2. Press the button on PAD15 three times within 3 seconds to enter inclusion mode.</li> </ol>	

SmartStart	<ol style="list-style-type: none"> <li>1. To initiate the SmartStart process, please type in the first five digits of DSK string or scan the QR code. The QR Code can be found on PAD15 or in the box. Ex: DSK: 18112-24021-58001-62259-57092-27453-08187-47408</li> <li>2. PAD15 is supported with SmartStart, it can be added to Z-Wave™ network by scanning the Z-Wave™ QR code on the product.</li> <li>3. Without further actions, PAD15 will be automatically included in a certified Z-Wave™ Controller with SmartStart inclusion ability in 10 minutes after it turned on.</li> </ol>	
Remove (Exclusion)	<ol style="list-style-type: none"> <li>1. Set your Z-Wave™ controller to exclusion mode by following the instructions provided by the controller manufacturer.</li> <li>2. Press the button on PAD15 three times within 3 seconds to enter exclusion mode.</li> <li>3. Node ID will be excluded.</li> </ol>	LED light flashes once per second for 30 seconds.
Reset	<ol style="list-style-type: none"> <li>1. Press the button of PAD15 four times within 3 seconds and hold the last press until the LED light turns off.</li> </ol>	LED light turns on.
	<ol style="list-style-type: none"> <li>2. Once the LED light turns off, release the button within 2 seconds.</li> </ol>	LED light turns off.
	<ol style="list-style-type: none"> <li>3. Device has been reset.</li> </ol>	LED light flashes once per second for 30 seconds.
<p>✧ <b>Adding a node ID allocated by Z-Wave™ Controller means inclusion. Removing a node ID allocated by Z-Wave™ Controller means exclusion.</b></p> <p>✧ <b>The situation of including/excluding of the node ID can be checked from the Z-Wave™ Controller.</b></p> <p>✧ <b>Function Reset: The Reset procedure can only be used when PAD15 cannot be recognized by the Z-Wave™ Primary Controller.</b></p>		

## LED Light Indication

The LED light indicates the different modes of the PAD15

State Type	LED Indication
Without Node ID	Under normal operation, when the PAD15 has not been allocated a node ID, the LED light will flash on and off alternately at 1-second intervals. By pressing the On/Off button, LED light will stop flashing temporarily.
Learning	Flashes when learning is successful
Over-load	LED flashes once per 0.4 seconds.

## Manual Dimming Level Control

1. Long press the button, the light level will be increased and decreased, slowly and repeatedly.
2. Short press the button, the light will be on/off to the last light level.
3. User can set Z-Wave™ Configuration 1 according to different switch type as following form tells:
4. When the config 1 set at value 2, S1 is used only for increasing the light; S2 is used only for decreasing the light.

Input Switch Type	Config 1 Set Value	Long Press	Short Press
Button on PAD 15	-	Dimming	On / Off
S1	0, 1	Dimming	On / Off
	2	Dimming (Increased)	-
	3	Toggle	
S2	1	Dimming	On / Off
	2	Dimming (Decreased)	-
	3	Toggle	

## Over-Load

When Over-Load situation occurred, the protection mechanism and cut off power of loading will be occurred. LED light will quick flash once per 0.4 seconds.

The Z-Wave™ Notification “Over-load detected” will be sent by PAD15 and PAD15 will not receive any command from any controllers or gateways until the AC power be on again.

## Z-Wave™ Functions

Basic Command Class and Multilevel Switch Command Class are two parts of the Z-Wave™ system. PAD15 responds to both Basic Command Class and Multilevel Switch Command Class. However, if PAD15 is included as a secure node, it responds only to the security encapsulation command of Basic Command Class and Multilevel Switch Command Class.

The Basic Command Class is mapped according to the following table.

Basic Command	Mapped Command
Basic Set (Value)	Multilevel Switch Set (Value)
Basic Report (Current Value, Duration)	Multilevel Switch Report (Value, Duration)

## Z-Wave™ Association Groups

PAD15 can be set to send reports to associated Z-Wave™ devices. It supports two association groups with five nodes support for group 1 and group 2.

Group 1, the dimmer will report  
 MULTILEVEL\_SWITCH\_REPORT  
 SENSOR\_MULTILEVEL\_REPORT and  
 DEVICE\_RESET\_LOCALLY\_NOTIFICATION.

Group 2 is for light control, the BASIC\_SET command will be sent by PAD15 to this group.

1. Grouping 1 Lifeline (Maximum 5 nodes).
2. MULTILEVEL\_SWITCH\_REPORT  
When "on" or "off" state has been changed, It will send Multilevel Switch Report to the nodes of Grouping 1.
3. SENSOR\_MULTILEVEL\_REPORT  
When sensor is change exceeds threshold.
4. DEVICE\_RESET\_LOCALLY\_NOTIFICATION  
When PAD15 is reset manually, it will send DEVICE\_RESET\_LOCALLY\_NOTIFICATION to the nodes of group
5. Grouping 2 (Maximum 5 nodes)
6. BASIC\_SET  
When PAD15 is used for manual dimming, BASIC\_SET will be sent to the nodes of group 2.

## Z-Wave™ Configuration

No.	Name	Size (Byte)	Default	Value	Description (Info)
1	Switch Set	1	3	0~3	0: Only S1 is effective 1: Both S1 and S2 are effective. 2: S1 dimmer increased; S2 dimmer decreased. 3.Both S1 and S2 are effective,action is toggle
2	Power-on Recovery Status Set	1	0	0~2	To set dimmer level when AC power on. Setting value: 0: OFF-0% 1: ON-last level 2: ON-100%

3	RF Report Set	1	1	0~1	To set if device send Multilevel Switch report to gateway when dimming finished. Setting value: 1: report ON 0: report OFF
4	Maximum Level	1	99	Minimum level+ 1~99	To set the maximum value of dimming level. Dimming level will not over the setting value. Setting value: Cannot be lower than the Minimum level
5	Minimum Level	1	0	0~ (Maximum level -1)	To set the minimum value of dimming level. Setting value: Cannot be higher than the Maximum level
6	Basic Duration Set	1	2	0~127	Unit: second To set dimming finished duration time when physical switch used.  Ex: When setting is 2, it will take 2 seconds from switch on action to dimming finished.

**Notice 1:** Always Reset a Z-Wave™ device before trying to add it to a Z-Wave™ network.

**Notice 2:** PAD15 can be operated in any Z-Wave™ network which provided by other certified Z-Wave™ Controllers. All non-battery operating devices act as repeaters to increase the stability and reliability of the Z-Wave™ network.

## Over-the-Air (OTA) Firmware Update

The device is supported with Z-Wave™ firmware update via OTA.

1. Set the Z-Wave™ Controller into the firmware update mode.
2. Choose the hex file to update the firmware.
3. Wait 10~15 minutes for completing the OTA process.
4. Result of OTA will show in Z-Wave™ Controller log.

During the OTA process, please DO NOT remove the power, otherwise, the firmware will be broken, and the device will be nonfunctional.

## Z-Wave™ Supported Command Class

Command Class	Version	Required Security Class
Z-Wave Plus™ Info	2	None
Security	1	None
Security 2	1	None
Supervision	1	None
Transport Service	2	None
Association	2	Highest granted Security Class
Association Group Information	3	Highest granted Security Class
Device Reset Locally	1	Highest granted Security Class
Firmware Update Meta Data	5	Highest granted Security Class
Indicator	3	Highest granted Security Class

Manufacturer Specific	2	Highest granted Security Class
Multi-Channel Association	3	Highest granted Security Class
Powerlevel	1	Highest granted Security Class
Version	3	Highest granted Security Class
Configuration	4	Highest granted Security Class
Notification	8	Highest granted Security Class
SWITCH MULTILEVEL	4	Highest granted Security Class

### CAUTION

**Risk of explosion if battery is replaced by an incorrect type. Dispose of used battery according to the instructions.**

### Choosing a Suitable Location

1. The suitable ambient temperature for the module/device is 0°C~40°C.
2. Do NOT place the module/device direct under sunlight, in a humid place or in any location where they may contact moisture, dirt, dust.
3. Do NOT place the module/device where exists combustible substances or any source of heat, fires, radiators, boiler etc.

### Disposal



This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmentally safe recycling.

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### **FCC Interference Statement**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. 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.

FCC Caution: Any changes or modifications not expressly ap-

proved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.