POP_123603
Z-Wave British Standard Plug Dimmer

Firmware Version : 1.0

Quick Start

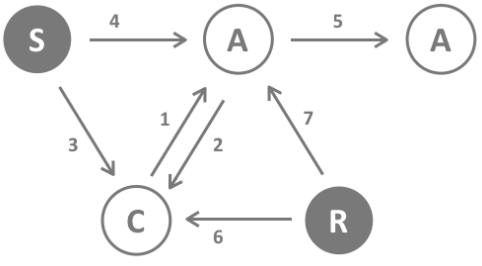
A This is a Z-Wave actuator. Inclusion and Exclusion are confirmed by a tripple click of the button.

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

This is a wall plug dimmer that can be placed between a British Standard wall outlet and electric devices, plugged in by cord. It can dim all incandescent lights, high voltage halogen lamps and transformers operated low voltage lamps without any restriction. Special optimization functions support the dimming of the majority of dimmable LED lights and Compact Fluorescent Lights (CFLs). The device is IP20 rated and can therefore only be used in dry environments. The device offers a Baby-Dim Function which dims down a lamp from a defined level into another defined level in a longer but also definable period (e.g. 20 minutes). An automatic Light-Off function and programmable dimming and switching behavior makes the device a very flexible tool for inhouse lighting.

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

The plug can be plugged into every British Standard wall outlet (Plug Type G). It is IP20 rated and can therefore only be used in dry environments. Do not locate the device facing direct sunlight, humid or dusty place. The suitable ambient temperature for the device is 0°C ~ 40°C. Plugs must not be stacked and operated.

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.

Inclusion and Exclusion are confirmed by a tripple click of the button.

Operating the device

The device is able to dim electric loads up to 300 W. The device can be dimmed wirelessly or using the local button.

Local Operation
The local button has the following functions:

If light is off a short press on the button will turn it either on 100 % or to the last dimming level before turning off
If light is on - regardless of dimming level - a short press on the button will turn the light off
Keep the button pressed starts to change dimming level slowly. The direction of dimming (up or down) depends on the direction of the last slow dimming.

The behavior of the button can be configured.
LED Usage
The device has one blue LED used to indicate status information. The behavior of the blue LED can be configured:

It may show the dimming state. This is the default option.
It may serve as night light. So it's on when the light is off.

It's deactivated.
It can be controlled wirelesly and used as an indicator for other advanced functions.

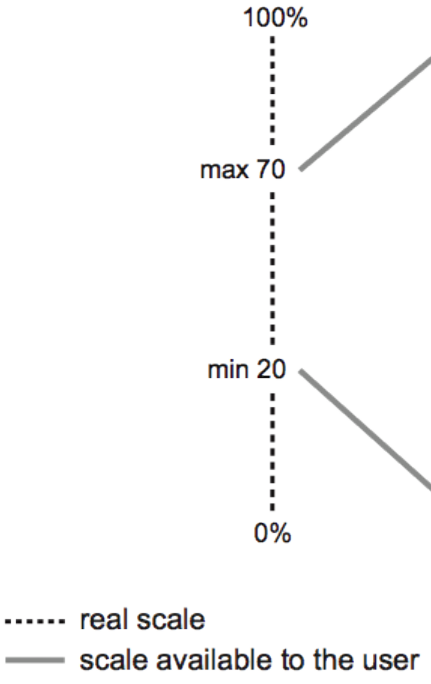
Automated Dimming Function
If activated the dimmer will turn off automatically after a defined time. This function is particularly useful if the dimmer is turned on using a motion detector of any other type of sensor. In this case it's possible to further define the reaction of the dimmer on certain signals sent from a sensor. This allowes a very flexible application of the dimmer in the house.

Baby Sleeping Function
The device can be used to help babies and little children to find sleep. (It's save to use the device in childrens rooms or closed to their beds due to the special shutter function that shield the high voltage from touching). When enabled a double click of the button will turn the light into a definable level and then it will gradually dim down over time. The time of dimming and the target dimming state - e.g. off - can be configured as well.

Dimming LEDs and CFLs
LEDs and Compact Flouroscent lights are complicated to dim for two reasons:

There are a so-called reactive load. At the moment of switching on they have virtually not resistance causing a very high inrush current that may destroy the dimmer device.
The light emission is based on an electronics that may not crease light according to the input power the dimmer is able to regulate.

There are special LEDs or CFLs that claim to be dimable however almost none of them can be dimmed in the full range of 0% to 100%. Some will flicker at very low dimming level or sometimes on 100% dimming. This flickering is not only annoying but also destroys the lighting device. This dimmer allows to set a lower (configuration parameter 17) and a higher (configuration parameter 18) border for dimming and surpress the dimming levels that are not supported by the device. On default the dimmer will dim between 0% and 100%. If you see problems at certain dimming levels, detect the dimming level at your controlling gateway (reading the dimming value) and change the configuration so that this dimming level will not reached anymore. The extreme case would be to only support 0% (off) and full diming level (on). This function is supported by all lights regardless of the technology. In this mode it is recommended to set the fast dimming speed to 0 (Instantly) using configuration parameter no. 5.



Advanced Options for LED and CFL tweakings
The configuration parameters No 51 - 54 allow to configure the dimming behavior on a very technical level. Do not touch these values unless you know what you do! A dimmer is controlled by the Zero Crossing signal and the TRIAC Fire pulse. The TRIAC fires every half sine wave max one time. A fire cycles starts with the Zero Crosssing and then lasts 156 pulse length increments. The value #51 defines the minimum time after zero crossing because the Triac can fire regardless of the dimming level. Parameter #54 defines whether the fire pulse has defines length (short) or is extended as long as allowed by the minimum start value in parameter #54 and the minimum trailing value defines by #53. This value defines the minimum time the pulse will not be active because of the next zero crossing signal.

Child Protection

The device can be turn into a child protection mode. In this mode all local operation is disabled.

The child protection mode MUST be turned on wirelessly. However in protected by sequence mode it is possible to unlock the device for local operation with a triple click. The unlock state will last for 5 seconds.

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	Send Reports on blind state change (max. nodes in group: 5)

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.

LED mode (Parameter Number 1, Parameter Size 1) Set LED indication mode

Value	Description
0	Disabled
1	Show switch state
2	Night mode (inverted switch state)
3	Operated by Indicator Command Class (Default)

Automatically switch off after (Parameter Number 2, Parameter Size 2) If not zero, automatically switch off after a user defined time

Value	Description
0	Disabled (Default)
1 — 65535	sec

What to do on RF off command (Parameter Number 3, Parameter Size 1) Defines how to interpret RF Off command. Can be used in conjunction with Auto Off function: Ignore - to switch on the light by motion detectors and switch it off after some amount of time: in case of multiple motion detectors each would try to switch the light off that would break logics; Switch on - to switch on the light on both On and Off paddle press on the remote and switch it off after some amount of time. Button off click will still work (if button operations are not disabled).

Value	Description
0	Switch off (Default)
1	Ignore
2	Switch on
3	Switch on if load is off else switch off

Ignore start level (Parameter Number 4, Parameter Size 1) Defines if the dimmer shall ignore start level in StartLevelChange command despite it is specified or not

Value	Description
0	No
1	Yes (Default)

Speed for fast dimming (Parameter Number 5, Parameter Size 1) Time to dim on button presses and Set command (if it has no duration specified). If not 0, dimming will be done smoothly to preserv bulb life.

Value	Description
0	Instantly
1 — 255	in 10ms units (Default 30)

Speed for slow dimming (Parameter Number 6, Parameter Size 1) Time to dim on button holds and StartLevelChange command (if it has no duration specified).

Value	Description
1 — 255	seconds (Default 3)

Behavior on 'Switch On' (Parameter Number 7, Parameter Size 1) Defines the dim level on command 'ON'. On default he dimmer restores last dim level. This parameter allows to configure to set maximum level on second On command (if already On) or to always switch on to maximum level

Value	Description
0	last dim level (Default)
1	maximum dim level when already turned on
2	Always maximum dim level

Baby Dimming time (Parameter Number 8, Parameter Size 1) Time to dim on double click Off button for Baby-Dim function. This function works only if the load is operated by single press and hold button action. If enabled, the device will wait for a click timeout to see if the second click would be pressed. This will introduce a small delay for single click commands

Value	Description
0	Disabled (Default)
1 — 99	in minutes

Target dimming level for Baby Dimming (Parameter Number 9, Parameter Size 1) Target level on which to stop while executing Baby Dimming. Can be 0 to completely switch off the light.

Value	Description
0 — 255	% (Default 0)

Typical click timeout (Parameter Number 10, Parameter Size 1) Typical time used to differenciate click, hold, double and triple clicks

Value	Description
1 — 100	in 10ms units (Default 50)

Limit minimal light level (Parameter Number 17, Parameter Size 1) Minimal level should be greater than maximal

Value	Description
1 — 95	Level limit (Default 1)

Limit maximal light level (Parameter Number 18, Parameter Size 1) Maximal level should be greater than minimal

Value	Description
0	Work as switch: use off and maximal level
10 — 99	Level limit (Default 99)

Dim Level on 'Switch On' (Parameter Number 19, Parameter Size 1) defines how the dimmer hall react on a simple ON Command.

Value	Description
0	Use previous light level (Default)
1 — 99	Define light level in %

Pause before pulse (Parameter Number 51, Parameter Size 1) NB: Do not touch these settings if you are not sure what they mean! For dimmable LEDs and CFL with bypass use value 10. For other bulbs use default value.

Value	Description
5 — 60	(Default 28)

Pause after pulse (Parameter Number 52, Parameter Size 1) NB: Do not touch these settings if you are not sure what they mean! For dimmable LEDs and CFL with bypass use value 40. For other bulbs use default value.

Value	Description
5 — 60	(Default 28)

Pulse width (Parameter Number 53, Parameter Size 1) NB: Do not touch these settings if you are not sure what they mean! For dimmable LEDs and CFL with bypass use value 20. For other bulbs use default value.

Value	Description
3 — 20	(Default 10)

Pulse type (Parameter Number 54, Parameter Size 1) NB: Do not touch these settings if you are not sure what they mean!

Value	Description
0	Long pulse (Default)
1	Short pulse

Command Classes

Supported Command Classes
Basic (version 1)
Multilevel Switch (version 2)
Version (version 1)
Indicator (version 1)
All Switch (version 1)
Configuration (version 1)
Manufacturer Specific (version 1)
Protection (version 1)
Node Naming and Location (version 1)
Association (version 2)

Technical Data

Power Supply	230V ~50-60 Hz
Attachable Loads	resistive and inductive up to 300 W, reactive up to 100 W
Fuse	Type: T 1.25 A H (Load 1.25 Ampere, high shutdown capacity), D: 5 mm, L: 20 mm
IP Rating	20
Frequency	868.42 MHz (SRD Band)
Wireless Range	up to 100 m outside, on average up to 20 m inside buildings
Explorer Frame Support	Yes
SDK	4.54.01
Device Type	Slave with routing capabilities
Generic Device Class	Multilevel Switch
Specific Device Class	Multilevel Power Switch
Routing	Yes
FLiRS	No
Firmware Version	1.0

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 annonces 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.