Shelly Dimmer, how to ... by Dimitar Dimitrov (english Version)

Document on the topic of requirements and problems with dimming in connection with the Shelly Dimmer2

Dimitar Dimitrov has created an informative document on Facebook on the subject of requirements and problems with dimming in connection with the Shelly Dimmer2.

Link to the original: https://www.facebook.com/notes/shelly-s…52291244987758/

The Bulbs

Halogen bulb

Each bulb is different in type, power and light intensity. Incandescent bulbs and halogen bulbs are best suited for dimming. They also emit light that is directly proportional to the power they use. What is special about them is that in the last 10% they increase the used power without leading to a noticeable change in brightness. The more powerful the bulb, the smaller the change in the last 10%. Therefore, you can save 10% of the price for electricity in the same light if you dim it to 90%.

Led bulb

Led bulbs are very different. They are divided into dimmable and non-dimmable, but this does not depend on the LEDs used in them but on the electronics that are inside of the bulb.

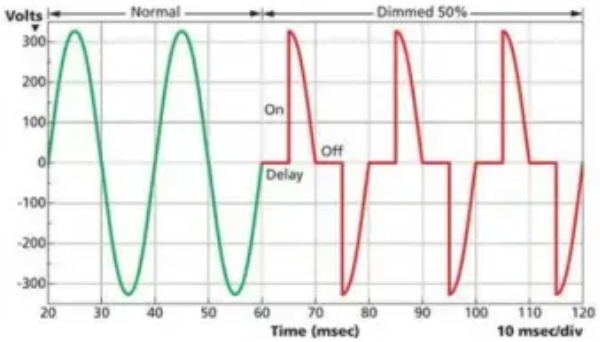
on the quality of the power supply that is in the socket. There is a concept called power factor. In one Incandescent bulb it is equal to 1. In low-quality dimmable bulbs it is 0.5 - 0.7 while in quality bulbs it is over 0.9. In reality, this shows what part of the power used is converted into light and what part of the power supply is converted into inductive or capacitive energy, which leads to heating of the cables.

Dimmable bulbs with LED driver. With them, things are much more complicated. The LED driver itself is an inductive load and dimming it is either impossible or difficult because it actually hides behind the actual power of the bulbs used. If you have a luminaire that is 5W with a transformer that is 100W, then a smart dimmer will find it very difficult or even impossible to determine the correct way of dimming. They work best with dimmers that are controlled with a rotated knob by hand. In order to be controlled with a smart dimmer, it is important that the LED driver is dimmable and also that its power does not exceed by 20% the power of the luminaire connected to it (for example if your light is 10W, LED driver is should be 12W).

Shelly Dimmer and calibration

When you connect the Shelly Dimmer to the luminaire, it does not know what it is and how the curve of brightness and power changes. To establish this, a calibration must be performed. During calibration, it increases the power first from 50% to 100% in small steps, then increases it from 0 to 50% to determine at what point what power the bulb uses. During the calibration, the dimmer tries to make the dimming as smooth as possible without light jumps if possible.

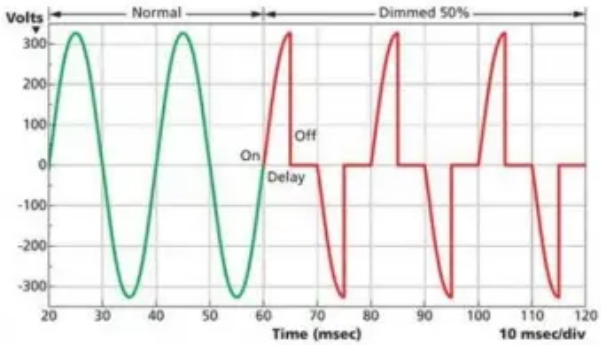
There are two types of dimming: leading edge and trailing edge. The national grid supplies AC (alternating current) Electricity to our homes, offices, restaurants, pubs and clubs. These two types of phase cutting dimmer get their names from the part of the AC wave that they cut off. **Leading edge** dimming cuts of the front edge of each waves' half cycle.



Leading edge dimming

Shelly Dimmer unlocks its outputs at a maximum voltage of 220 / 110V. This can help with some special bulbs that are specially made for this. But at the same time, ***incandescent light significantly increases the heat radiated by the dimmer****, because it creates powerful peaks with each unclogging and also has to clog them back very quickly in case the dimming is only 10% for example. This is the heaviest mode possible for electronics and is recommended for low power lights.* ***Although the Shelly Dimmer is designed to work with loads up to 230W, with this type of dimming the maximum recommended is up to 100W.***

Conversely **trailing edge dimming** cuts out the second half of each waves' half cycle.



Trailing edge dimming

There is a PDF printout here:

https://shelly-forum.com/index.php?atta…r-dimitrov-pdf/