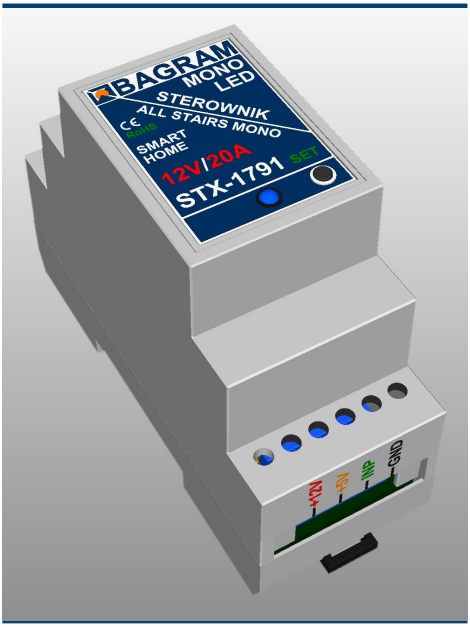
BAGRAM
Dickensa 26/2, 02-382 Warszawa, Poland
phone: +48 698 577 588
www.stairslight.com, office@stairslight.com

Stairs lighting controller

STX-1791



The **STX-1791** controller is used for static lighting control of stairs. Its operation consists in slowly switching on the lighting of entire stairs and after a set time, slowly dimming the lighting.

You can set five parameters of the controller yourself: brightness in the on state, brightness in the off state (so-called backlight), speed of lighting up (igniting) stairs, speed of blanking (dimming) and lighting time.

It is adapted to control LED MONO strips placed in steps or LED spots embedded in the wall above the steps. You can also control other lighting of stairs, eg 12V ceiling lamps.

The lighting can be started in the simplest version by pressing the button on the wall connected directly to the controller or by applying (additionally) a sensor (infrared, movement, pressure, etc.) detecting the moment of entry of the person on the stairs. If during the lighting of the stairs the button is pressed again or there is an impulse from the motion sensor, the lighting time will be extended.

Controller installation:

The controller is best placed in the electrical cabinet (switchboard) together with the power supply and possibly other controllers. The INJ and GND input terminals should be connected with buttons or motion detectors, with the help of which stairs lighting can be switched on and off. Note: Do not use a bistable switch such as in a normal light installation - use a button such as a bell or roller blind. The other two terminals on the front of the + 12V and + 5V controllers are used to power the motion detectors. Do not connect power supply to them!

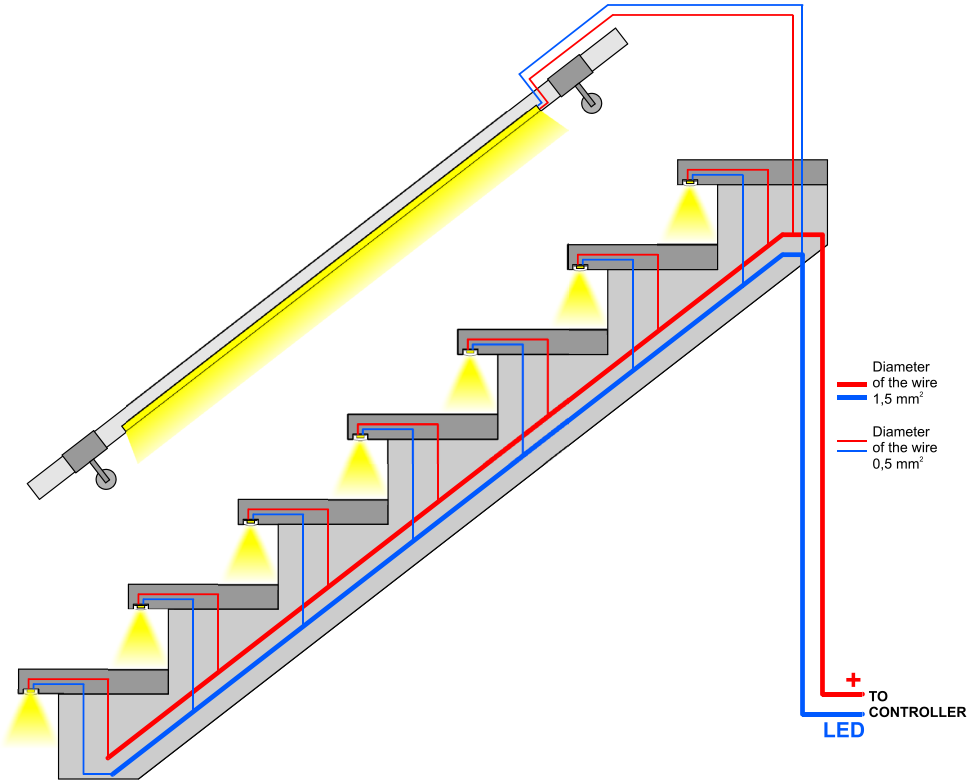
The LED strips placed on the steps are connected to the LED (-) terminal of the controller and to the plus voltage of 12V. The power supply voltage (+) to the controller's + 12V terminal, and the minus power to the GND terminal (three terminals on the back of the controller).

LED lighting

STX-1791 can control the backlight realized with LED strips or 12V lamps (but not 230V!). LED strips are generally mounted under the step, and lamps on the side of the step. It is only necessary to check if the lamps are dimmable like tapes. Connecting the illuminating elements show the next drawings.

LED strips

A popular way to highlight the stairs is to use LED strips. In the case of the STX-1791 controller, use single-color tapes (MONO). Color does not matter. The controller STX-1793 and STX-1796 are intended for the control of color tapes (RGB). The standard supply voltage of LED strips is 12V. The controller can also be connected to LED strips powered by 24V, but due to the electronics of the controller, this voltage should not be exceeded.



Electrical installation of stair steps - LED strips

TLED strips are usually placed under the steps. Points (+) should be connected together to one wire and the points (–) should be connected together to the other wire. Both wires with a cross-section of 1.5mm^2 are fed to the controller. You can also bring to the controller, separately one pair of wires from each LED strip (0.5mm^2). Both solutions are equivalent.

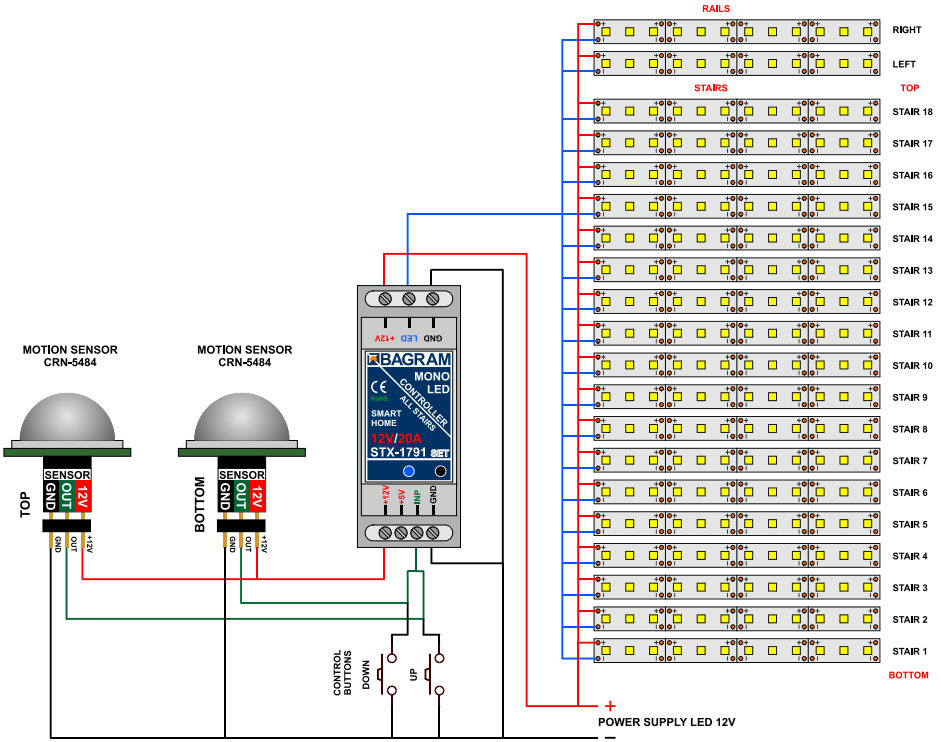


Diagram of connecting the controller to LED strips.

The diagram above shows the connection of the controller to stairs consisting of 18 steps and two handrails. All (+) LED strips are connected together and all (–) LED strips are connected together. Plus led strip is connected to the plus of the power supply, and minus LED strips to the driver output (LED). Controller buttons and sensors are connected to the controller input. You can also connect the same buttons or sensors themselves. The + 12V output is used to power the sensors. Several sensors and several buttons can be connected to the controller, depending on the needs and arrangement of the stairs.

Control

Controller input works on a short to ground. All you have to do is connect a mechanical button (not a switch) to start the driver after pressing it briefly. One contact of the button should be connected to the controller's input and the other to ground (minus 12V). All the drawings show this solution.

You can also run the controller using other components or devices, most often using motion sensors. Motion sensors found on the local market are in two versions: 230V mains voltage and 5 or 12V mains voltage. Do not connect these sensors directly to the controller input, because, especially in the case of 230V sensors, it will cause in the best case the wrong operation of the controller, and in the worst case, its total damage.

Before installing the sensors, their parameters must be set. The most important is the length of the pulse (the time the sensor is switched on), which should be set to the minimum and can not exceed 15 seconds (preferably about 1-5 seconds - check before purchasing). The second parameter that can be set in the sensor is its sensitivity or range. This parameter should be set experimentally so that the switch on takes place reliably and at the right moment.

Some sensors have different operating modes to choose from. The triggering mode should be turned off, because in this mode the sensor keeps the impulse during the whole time of the person's presence in its range and thus the pulse becomes too long for the controller's requirements.

Sensors operating in the 230V grid require the use of relays in order to separate the 230V circuit from the controller inputs. Low voltage sensors will almost certainly need a special adapter to match the sensor signal to the controller's requirements. The following diagrams and descriptions explain how to connect the most common types of sensors on the market. If it is necessary to use a different type of sensor, please contact us in order to agree on the method of connecting the sensor.

We urge you to use our sensors. They can be connected directly to the controller and have the appropriate time parameters.

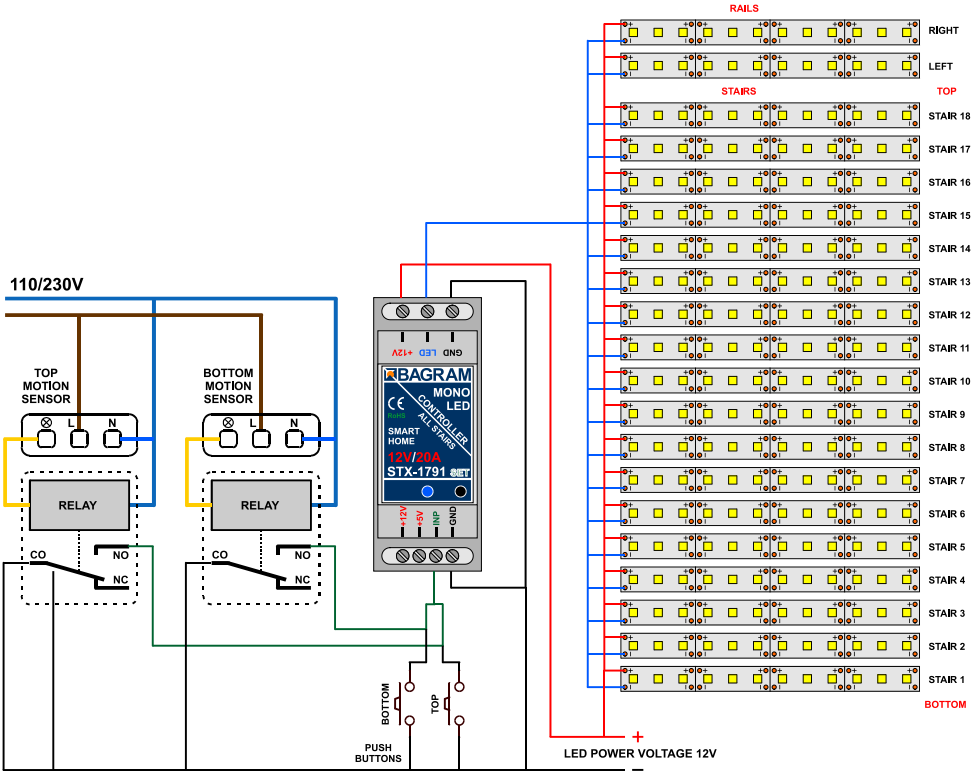
Motion sensors with a voltage of 230 V

A typical motion sensor (230V) is a standard size module and is connected to the installation box. It has regulatory elements (time, sensitivity, etc.) and usually three contacts for wires. Two are plugged into a 230V network, and the third wire is used to power the receiver (the lamp) and is marked with an appropriate symbol. Before installing the sensor, carefully read the instructions.

Motion sensor for 110-230V - CRN 5491

Some motion sensors have a built-in additional twilight sensor. Depending on the sensitivity settings it can be inactive in strong light. Thus, illumination of the stairs does not turn on during the day. However, this may cause problems - if it rains, the twilight sensor will lighten the stairs. By adjusting the sensitivity, you can try to prevent this. We can recommend our 230V sensor CRN-5491, modified to work with our controller:.

The next diagram is one of a typical motion sensor (230V) connected to the controller. Relays must be used! Relay coil voltage must be set at 230V, because this voltage is supplied from the motion sensor. Connect input 1 or 2 and (-) of 12V to the contacts of the relay NO (normally open) and CO (common),. We recommend the assembly to be done very carefully. If the connections are made erroneously, the controller will be damaged..

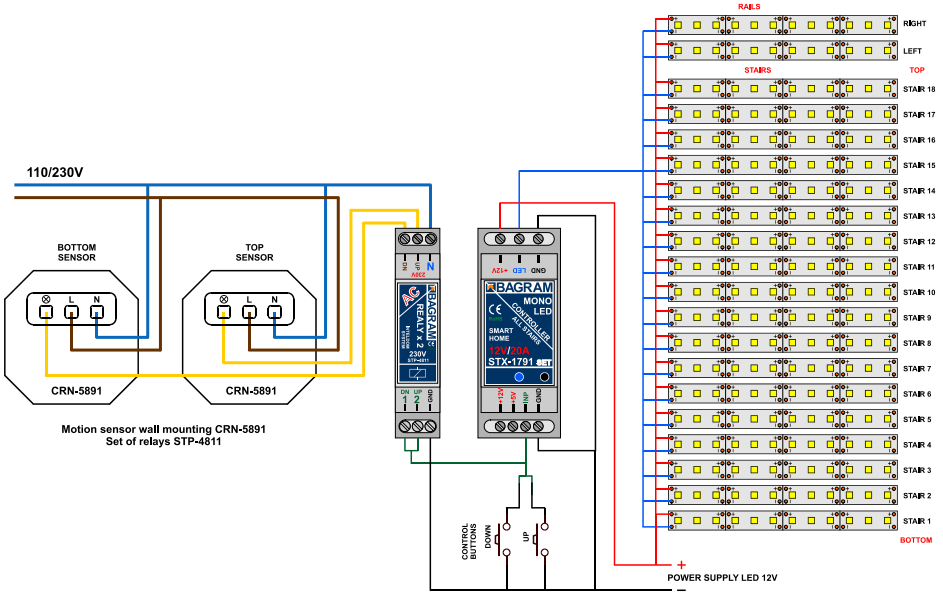


Installation diagram for connecting 230V motion detectors to the controller

Set of two relays **STP-4811**

The relays used to separate 230V circuit from the controller may be of any type. We recommend the relays to be mounted on T-35 bus, the same as the controller. Their use helps with the installation.

Photo to the left shows our product STP-4811 — a set of two relays in a single-rail case T-35. This set makes it possible to separate 230 V voltage coming simultaneously from two motion sensors.



Assembly diagram of motion sensors CRN-5891 connected to the controller by a set of relays STP-4811

NOTE: The knob „Time" in the sensors must be set to the minimum position!

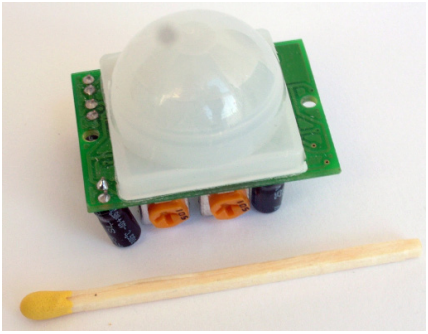
The motion sensor mounted on the wall

Installation of motion sensors in order to work properly is extremely difficult. The visualization presented here may be helpful.

We recommend the sensor to be tilted down, so it „sees" only a portion of the first step. The top of the Fresnel lens should be covered with an opaque material. If the motion sensor does not have a built-in light sensor, at least a small, steady source of light over the sensor should be added to light up the field observed by the sensor.

Motion sensors for 12V voltage

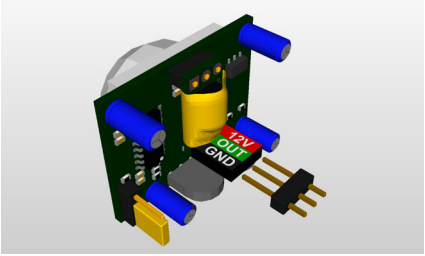
You can also use miniature motion sensors operating at a low voltage such as 12V. We offer a sensor with the symbol CRN-5481. Voltage of the sensor is identical to the LED supply voltage, which greatly simplifies installation of the entire system.



Miniature motion sensor

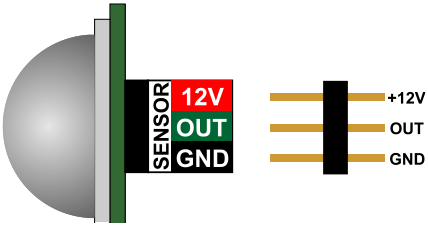
Sensor dimensions: plate: 32.5 x 23.5 mm, the diameter of the bowl: 23mm. The sensor has an adjustable impulse length and sensitivity.

The sensor can be connected directly to the controller input. It is important that the sensor, the adapter and the driver have been combined in the right way, according to the following pictures and diagrams.



The view of the sensor back side

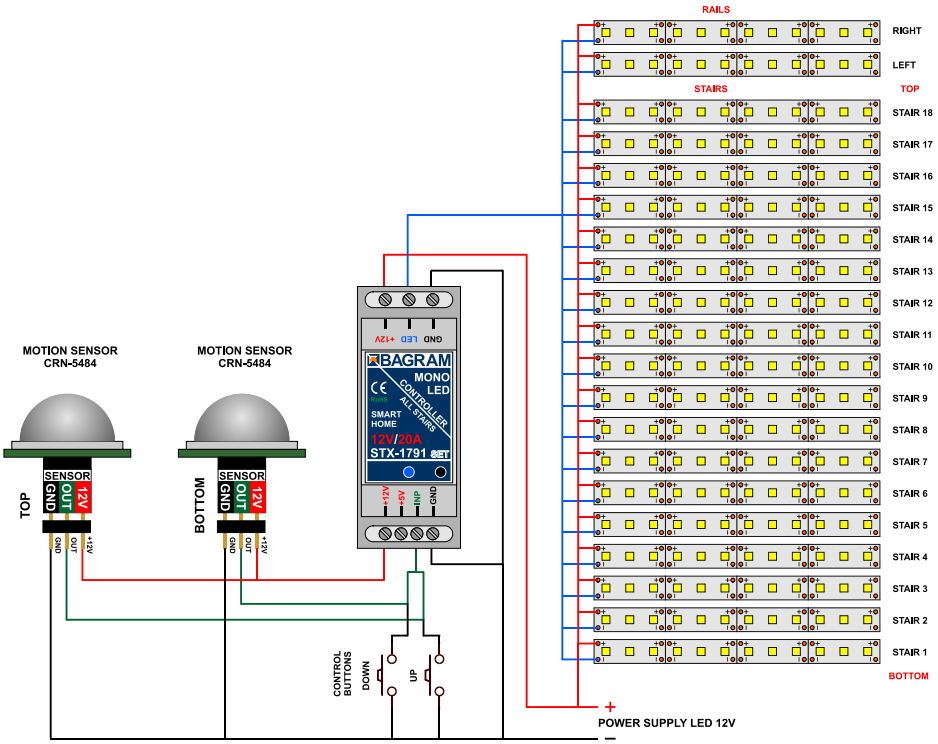
On the back of the sensor is a connector for connecting wires leading to the controller. To facilitate assembly, to each sensor is added the connector to soldering wires. You should keep the correct order of wires according to the description on the sensor connector.



Sensor socket and plug

It is recommended to use colored cables with the smallest possible diameter, eg. telephone cable bundles. Please note that any mistake in wiring, especially power can damage the sensor or controller.

The diagram below shows exactly how the whole set is built with the use of 12V motion sensors.



Installation diagram: 12V motion sensors connected to the controller

Before mounting the sensors, please set their time of action and sensitivity to a minimum. In the case of sensors with a jumper used to select the operating mode with or without triggering, choose the position “non-repeatable trigger.”

These two sets of adapters with sensors should be mounted in their appropriate place by the side of the first and the last step.

The controller can handle additional input located on the mezzanine. In such a case, an additional motion sensor (or an additional push button) should be placed so as to detect the entrance a person to the staircase mezzanine, but so it does not react to people walking up the stairs.

After detecting a person entering the stairs to the mezzanine, the controller will immediately start the lighting of the whole staircase and turn it off after approx. 20 seconds. The diagram on the neighboring side shows such a solution.

Setting the motion sensors

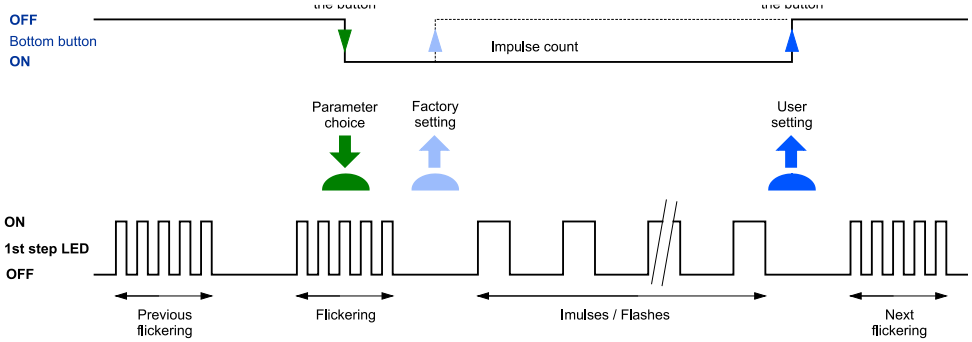
This is one of the most difficult operations — it requires patience and precision. First of all, adjust the sensitivity of the sensor in order to have it react effectively to a person entering the staircase. The second problem to solve is that the sensor should not react to a person coming down the stairs - that it does not re-activate the fading lighting of the stairs. The best way is to cover the sensor hemispheres respectively. Of course, the arrangement of the sensors is also very important — usually they are placed on the right side of the stairs looking in the direction of movement ('right-hand traffic'). Some sensors have an additional adjustable parameter - the so-called 'dead time'. It is the time measured after an impulse, during which the sensor does not respond to the next person entering the field of its operations. When the mentioned parameters are adjusted patiently, the sensors will function properly, providing a satisfactory lighting of the stairs.

Adjusting the controller

Setting the parameters should be performed only when strictly necessary, after reading the following description carefully.

In total, there are 5 parameters to change.

To start the parameter setting mode, press and hold the **SET** button until the green **LED** fades out. Release the button to go on to the controller parameter setting mode. A few seconds flickering of the **LED** (and first step) corresponds to each parameter. You can set or change 5 parameters, and therefore there will be five consecutive flickers of the **LED**. To select a specific parameter to be changed, you should count each flicker and then, after a suitable number of flickers, press the **SET** button. If you do not want to change a parameter, skip the flickering without pressing the button. If at the parameter setting mode the **SET** button is not pressed, none of the parameters will change.



Adjusting controller parameters diagram

The principle of setting the parameters is as follows: setting each parameter is indicated by a rapid flickering of the green **LED** (and first step). If during this flickering the **SET** button is pressed and held, then, depending on the parameter, you will see from one to several dozens of slow **LED** pulsees. Setting the parameter takes place after a release of the button after the desired number of pulsees or just after the end of the flickering. During the flickering, if the **SETUP** button is not pressed, after a short time of the **LED** fading out, flickering of the next parameter will appear and so on until the end of the setting mode. If the given flicker is omitted, the corresponding parameter will not be changed. This allows you to set only one parameter, without any of the others. Notice: if the **SET** button is pressed during the flickering and released immediately after it, but before the first pulse, the parameter will return to the factory setting.

After setting the selected parameter, the controller immediately returns to a stand-by state, waiting for a signal from pulse sensors or push buttons. There are no flickers for other parameters. To set another parameter, use of the **SET** button again.

Description of parameters

To go to the setting of fixed parameters, press and hold the SET button until the LED goes out. After a while, the LED will flash several times indicating the possibility of setting parameters.

Flickering 1: Setting the maximum brightness of the stairs. Pressing the button during the first flickering will allow you to set the maximum value (ON state). The button should be pressed and held until the lighting of the stairs changes cyclically its brightness. During this time the diode is slowly flashing. Releasing the button at the appropriate brightness sets it as a constant maximum brightness. If you want to immediately set the value to the maximum possible, you should release the button immediately after the first flickering. Factory set to the maximum.

Flickering 2: Setting the minimum brightness (OFF state). The lighting of the stairs does not have to fade to zero. For safety reasons, especially at night, it is recommended to set a certain minimum value for the stairs lighting. The controller allows setting such brightness (backlight). Press the button during the second flickering and keep it until the brightness of the light changes smoothly. Releasing the button at the right time set the required constant minimum brightness. If you want the light to turn off completely, let go of the button immediately after flickering. Factory set to minimum stair lighting.

Flickering 3: Set the brightening time for diodes. Press the button during this flickering and hold until there are slow pulses. The number of flashes is proportional to the time of lighting (4 flashes are 1 sec of brightening). It is enough to hold the button for the right number of flashes. Releasing the button just after the end of flickering, sets the time to zero, i.e. the LEDs will light up immediately without smooth lightening. Factory set to 1 sec.

Migotanie 4: Setting the dimming time of diodes. Press the button during this flickering and hold until there are slow pulses. The number of flashes is proportional to the dimming time (4 flashes are 1 second dimming). It is enough to hold the button for the right number of flashes. Releasing the button just after the end of flickering sets the time to zero, i.e., the LEDs will go off immediately, without smooth dimming. Factory set to 4 seconds.

Migotanie 5: Setting the timer time. Here you can set the time after which the stairs will be dimmed. Press the button during this flickering and hold until there are slow pulses. Each pulse means one second. Releasing the button, eg after 5 pulses, will cause the staircase lighting to turn off after 5 seconds. Factory set to 20 seconds.

After the last process, the controller goes directly to the waiting mode for the trigger pulse.