Stairs light controller 11-17k LCD Sharp

Our stair lights controller 11-17k LCD Sharp can light on/ off up to 17 steps/ points of light. Works with optical Sharp sensors. There is a LCD in the controller, so settings can be done easily. The controller is sold in a DIN housing.

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v 1.2016 multilanguage EN

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1. Technical data

Operating voltage	8-15V DC (typically 12V DC)
Current consumption (only the controller) Current consumption (controller with Sharp sensors)	20 mA 40mA
Power consumption (only the controller) Power consumption (controller with Sharp sensors)	0,25W 0,5W
Ampacity	1A per channel
Supported sensors	Optical Sharp and mini Sharp
Operating temperature	5-45 ˚C
Dimensions (in DIN rail case: D x SZ x W)	10,7cm x 8,8cm x 6,5cm

2. Controller description

The controller is designed for 12V LED strips or spots. In practice, the controller can be connected to the same diodes (with resistors), LED strips, LED modules, LED spots or LED bulbs. The distance from the light source to the controller can be up to several meters. The driver 11-17k LCD Sharp has a very high efficiency.

This version of the controller is intended to cooperate with the analog optical Sharp detectors with a range from 20 to 150cm (Sharp and Sharp mini - more information about the sensors on www.firmaled.pl). The controller is equipped with a sensors testing mode, which allows for *a* precise adjustment of the range of the sensors (see Section 5.17 Sharp sensors configuration – the threshold and the sensors testing mode).

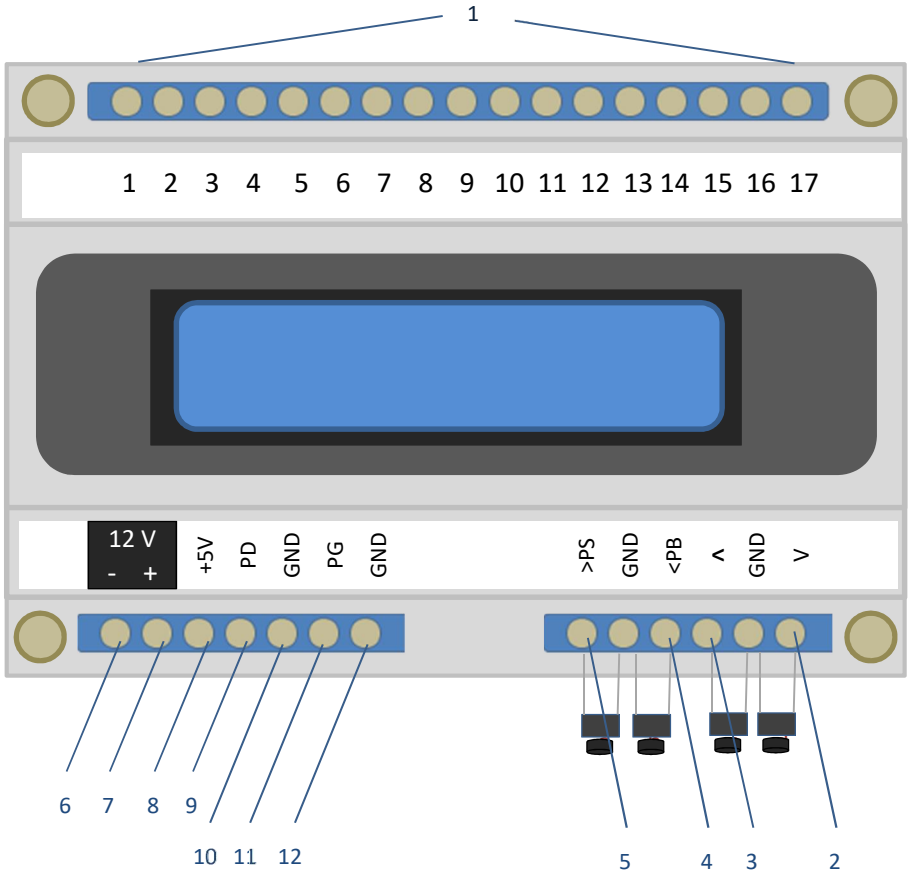
The controller has a large, clear LCD display 2x16. The display shows the subtitle in two lines, up to 16 characters each. The LCD provides information on the current operation of the controller (status messages), and the setup menu - the name of the menu item and the currently set value of the parameter.
The standard version of the 11-17k LCD Sharp controller has a display with a blue background and white characters. Upon customer request, following displays can be mounted:

- green background + dark grey subtitles (if available)
- black background + amber subtitles (if available)
- black background + white subtitles (if available).

2.1 Inputs, outputs and microbuttons

Inputs and outputs:
1 – channel outputs (from 1 to 17)
2 – '>' button input – to set the menu parameters (increase)
3 – '<' button input – to set the menu parameters (decrease)
4 – blocking input vPB. It is also used to enter, exit and walk through the menu (next item).
5 – constant lighting input ^PS. It is also used to exit and walk through the menu (previous item).
6 – minus (-) 12V
7 – plus (+) 12V
8 – +5V to power the sensors
9 – PD bottom Sharp sensor input. ONLY sharp/ mini Sharp sensor can be connected!
10 – GND
11 – PG top Sharp sensor input. ONLY sharp/ mini Sharp sensor can be connected!
12 – GND

Mikrobuttons:
a – microbutton '>' to set the menu parameters (increase)
b – microbutton '<' to set the menu parameters (decrease)
c – PB microbutton – to enter, exit and walk through the menu (next item).
d – PS microbutton – to test the constant lighting function, to exit and walk through the menu (previous item).



2.2 Principle of operation - a typical algorithm

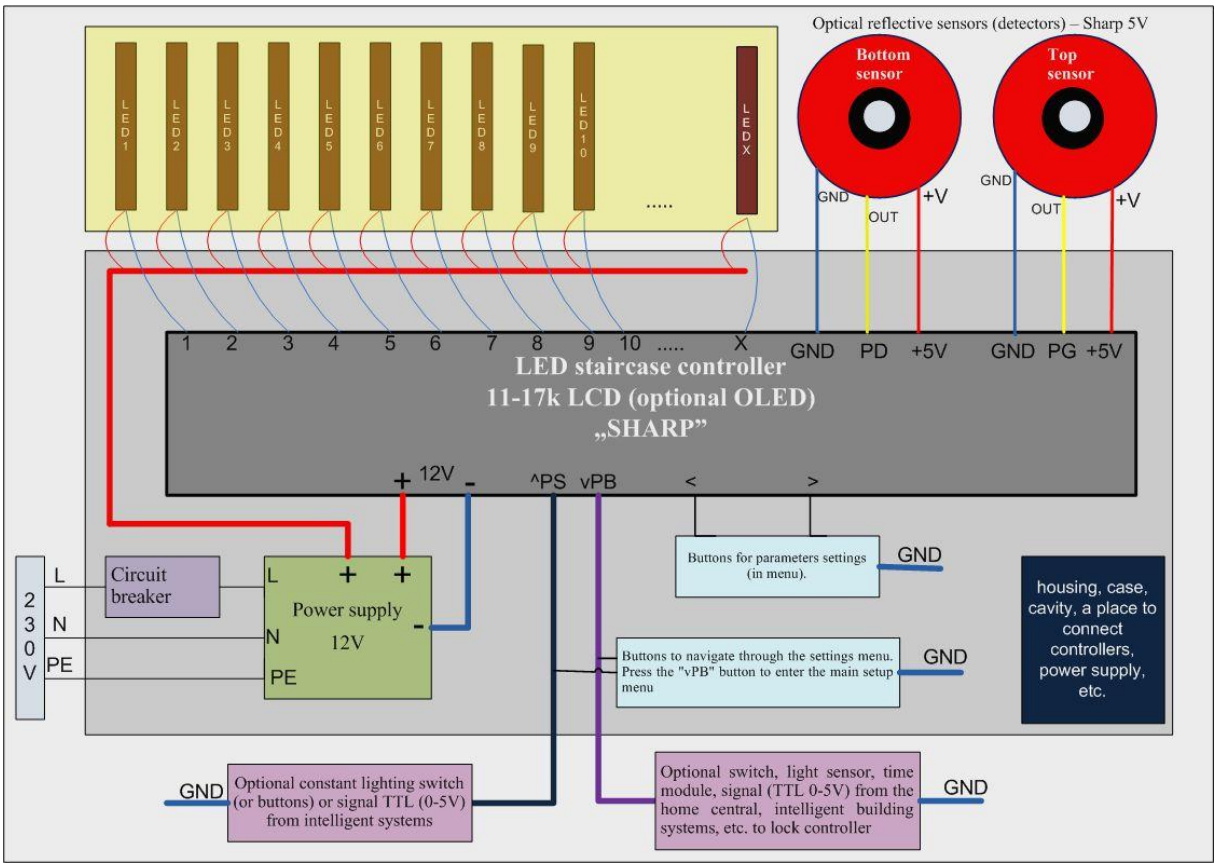
Controller's action is based on sequential switching of stair lighting - after receiving a signal from the optical Sharp detector. The person entering the stairs activates the detector. Signal from the detector goes to the driver. The controller steers channels and the lights are turning on in accordance with the selected algorithm. Leaving the stairs the person activates the second detector - this is the signal to start turning the stairs lights off.

The default algorithm is the algorithm No. 5 (see Section 5.10 Algorithm selection). The LED-spots/ LED-stripes go on sequentially, step by step, in the direction of moving person. Turning off - in the same direction as lighting on. Algorithm 5 also distinguishes the situation when two people come from opposite directions. Stair treads are then lit for each of them – one light effect goes from bottom to top, the other - from top to bottom. Effects meet the road. Turning off also takes place in both directions.

Using our 11-17k LCD Sharp controller with optical Sharp detectors you can fully automatize lighting of stairs, staircases, driveways, corridors etc. The system is intelligent - it detects a person entering the stairs and first turns the light on, then turns it off. This increases the safety of movement, especially after dark, and also allows you to save electricity (there is no problem of forgetting to turn the light off). The undeniable advantage is also a decorative visual effect, which will emphasize the uniqueness of each stair.

3. Controller wiring diagram

Connecting the light sources (LED Spots/ Strips), power supply, Sharp sensors, optional buttons/ switches for constant lighting or blockade function - as shown below.



4. Choosing the menu language

11-17k Sharp LCD controller is multilingual - controller's menu visible on the display may be in Polish, English or German. After connecting the power driver's screen looks like this:

or

or

The active menu language is shown in the second line. In about three seconds you can change the active language using the < and >. If for approx. 3 seconds you do not make any changes, active language is stored. Then on the display appears briefly information about version of the driver and the device will be ready for action.

5. Controller functions

The controller is equipped with a number of features and controls that allow the user to configure the final effect of highlighting stair treads. The final effect should be optimal for the conditions of the stairs and visually attractive.

The following features/ adjustments are discussed in the following sections. Parameter settings have to be done in settings menu (see Chapter 6. Settings menu).

- speed of turning the light on – 2 regulations: from bottom to top, from top to bottom
- speed of turning the light off – 2 regulations: from bottom to top, from top to bottom
- adjustment of irregularity (non-linearity, unevenness) – separate for turning on and off

- control of blur effect in smooth mode (separate for dimming on and off)
- number of connected stair treads (points of light) - from 11 to 17
- adjustable maximum lighting time
- second input (second detector) lock for launch
- constant lighting input ^PS with additional timer function (adjustable)
- adjustable constant light (PS input) brightness: from 0-100% electric power of LED
- 'stand-by' lighting: all steps or two extremes, adjustable brightness from 0 to 50% electric power
- maximum brightness of effect – adjustable in the range of 50-100% LED's electric power
- 10 algorithms (choosable lighting effects)
- 'leap' and 'smooth' mode
- locking input PB (signal from twilight sensor, time module, or 'smart home')
- adjustable locking input brightness (vPB)
- factory reset
- diagnostic mode
- Sharp sensors testing mode

5.1. Turning on/ off speed adjustment

There are 4 speed regulations available in the controller:

- speed of turning the light on from bottom to top
- speed of turning the light off from bottom to top
- speed of turning the light on from top to bottom
- speed of turning the light off from top to bottom

Lighting/ turning off speed control from bottom to top and from top to bottom within the range 0-255 (0 – fastest, 255 – slowest).

5.2. Calibrating the unevenness (nonlinearity)

There are two separate regulations of nonlinearity: for turning the light on and off. Adjusting the non-linearity is able in the following range: 0-255. The parameter is unit-less and has different reflection for 'smooth' and 'leap' mode. This parameter is not used in the 9th algorithm at random extinction.

The unevenness is adding a constant time delay for lighting on/ off next stairs. For small unevenness values turning on/ off is almost even in time for all steps. When this parameter is large, the illumination or dimming get slower towards the end. Looking otherwise it can be said, that with the increase of the unevenness value the effect is accelerated at the beginning.

The nonlinearity function is very useful if the detectors are mounted on the first/ last step, very close to the stairs and/ or operate with a delay. In this case, using the adjustment of non-linearity of the high parameter, you can make your stairs lights turning on quickly at the beginning and the slower, the closer to the end of stairs (so you can see the selected algorithm/ light effect).

5.3. Adjusting blur effect in 'smooth' mode

Adjusting the blur effect is only possible in the 'smooth' mode. It is to set the activation threshold, for which the next stair tread will start to glow/ dim. This threshold applies to the previous step. For example, the next step can lighten/ darken, like the previous one reaches 20% of capacity or - for different parameter values - the next step starts to lighten/ darken, when the former reaches 50% of electric power.

Blur effect is regulated separately for turning the stairs lights on/ off. Adjusting blur effect in 'smooth' mode is possible in the range of 0-255. For the small values, the blur is very large (the stair treads more "overlap" while illuminating/ dimming), for the large values - the blur is small.

5.4. Maximum lighting time calibration

Lighting time is the maximum amount of time all stair treads are lighting (after sensor triggers and the selected light effect reaches the end of the stairs). This time is reduced when the second detector will trigger (in algorithm optimal for detectors). Setting range: 0-60 seconds (not every value available).

This maximum time is necessary for both: detectors and buttons optimal algorithms. In the case of the algorithm optimal for buttons, where it is only required to press the activation button entering the stairs, setting maximum time decides when lighting is to be deactivated. In the case of the algorithm optimal for detectors: maximum lighting time is a kind of protection, if the second detector will not trigger (e.g. a person turns back or the detector does not detect motion) the staircase lights will be turned off after the set time.

5.5. 'Second' detector lock function (locking time)

The detector lock function is provided for detectors without timing calibration, which act quickly and react quickly. If the detector is mounted low and detects only close objects, there can be a situation, that it detects two legs instead of one person. The driver recognizes that for two people or a turning back person (walked down the stairs, left stairs, turned and walked up the stairs again). By setting detector lock parameter the controller PD/PG input is "frozen' for a specified time so that the driver recognizes the signal from the detector as one, not two (two legs).

Lock always refers to the detector, which trigger as the second when walking the stairs (when leaving the stairs).

Detector lock is adjusted in seconds, in the range of 0 to 9. Especially useful in the application of the reflective optical detectors (including Sharp - optimal setting 2-3s) and light barriers (photoelectric).

Short-lock is activated after a pass through the detector signal. Optimum blocking time of about 3 seconds allows to avoid a situation in which the detector with a fast response time will give a signal twice per person, as it detects passing each of the legs separately. The risk of a double detector activation is the greater, the lower the sensor is mounted.

5.6. Constant light function

Constant light input ^PS can operate in two modes: continuous mode and timer mode (timer function).

Continuous mode - activated by shorting the ^PS input to ground above 2s. In practice, a bistable switch can be mounted or you can apply time module.

Timer mode – (so-called 'timer'), activated by shorting the ^PS input to ground below 2s. For timer mode, you can determine (in the menu) the time lights will be activated to, after pressing the PS button (one or many buttons can be connected in parallel). The lighting is switched off automatically after a set time. Time is adjusted in a following range: 4 to 719 seconds, 13 to 999 minutes. Timer function can be deactivated at any time by pressing the PS button again.

TIP:
In the case of stairs with an additional room entrance from the landing, the 'timer mode' constant lighting function can be used to switch the lighting when getting out the room. A person coming from the room on the landing activates the timer and goes safely in any direction, because all stair are lighting by the time set in the menu. Switching time function can be performed by pressing the button, the signal (logical 0) or detector's relay.

5.7. Calibrating the constant lighting brightness

Adjusting the brightness of light/stair launched from the ^PS input (constant or timer mode) is possible in the range 0-100% of LEDs' electric power.

5.8. 'Stand-by' modes and stand-by brightness adjustment

The controller allows a low dim illumination ('stand-by') of all or first and last step, which provides more safety in the dark. 'Stand-by' brightness can be set in the range of 0 to 50%. The parameter can be set so low that the stairs will be only slightly illuminated in the dark. After the sensor triggers stairs will light up to the set maximum brightness value.

Stand-by light can work in two modes: all steps are illuminated (<all>) or only first and last steps are illuminated (<two extremes>).

TIPS:

a) if <two extremes> mode is selected, in a classic case the first and last step will be highlighted.
b) In the case of mounting the LED strips also on the arms, you can just use the rails as a backlight rest. In this case, the LED strip railings must be connected to the first and last of the channels used by the controller.
c) There is a third possibility – to use additional lighting: ambient, decorative, on the ceiling above the stairs.

In the case of b) and c) to determine the number of channels used by the controller, you have to add two more channels (LED strips in handrails or other lights) to the number of stairs. This two channels are connected in parallel.

5.9. Maximum brightness adjustment

Adjusting the maximum brightness is an useful feature especially when using very strong LED strips. Maximum brightness can be set between 50 to 100% electric power of LEDs. Frequently seen hack is to use power LED strips, since they have more densely packed LEDs and the light appears to be more linear. To the human eye linearity of light emitted by the LED strips 60 LEDs per meter type is much smaller as compared with the 120 LEDs per meter type. If the power LED strips are shining too much, the maximum brightness parameter in the menu can be set lower.

5.10. Algorithm (lighting effect)

There are 10 different algorithms (lighting effects) available in the controller. Algorithms are marked with numbers from 1 to 10. Selection is made in the menu item 'Algorithm/effect No.'

- **Algorithm 1** – consecutive (one after the other) turning on, consecutive turning off (in the same direction as lighting on). Do not press the button leaving the stairs – the lights go off after the time set in the menu. Optimal for buttons
- **Algorithm 2** – consecutive turning on, consecutive turning off; with a function of second button switch-off by pressing and holding for 2 sec. – optimal for buttons
- **Algorithm 3** – consecutive turning on, turning off all at once – optimal for buttons
- **Algorithm 4** – consecutive turning on, consecutive turning off – optimal for buttons and detectors
- **Algorithm 5** – consecutive turning on, consecutive turning off, additional functions: person from the opposite direction, turning back – optimal for buttons and detectors
- **Algorithm 6** – consecutive turning on, turning off all at once – optimal for buttons and detectors
- **Algorithm 7** – carriage, train effect
- **Algorithm 8** – waterfall, cascade effects (in smooth mode, smooth random darkening) – optimal for buttons and detectors

- **Algorithm 9** – consecutive turning on, random turning off – optimal for buttons and detectors
- **Algorithm 10** – turning on and off all at once. No speed control. Lighting time set in the menu. Optimal for buttons and detectors.

5.11. Modes of operation

There are two basic operation modes: ‘leap’ and ‘smooth’.

Leap mode - the spotlights, LED strips on the stairs switch immediately from 0% (or stand-by brightness) to 100% (or to max. effect brightness).

Smooth mode - the spotlights, LED strips on the stairs smoothly brighten (from 0% or stand-by brightness to 100% or to max. effect brightness) and dim (to 0% or stand-by brightness), reaching all intermediate values (1, 2, 3, 4%, and so on). This effect is especially good on looking with LED strips.

5.12. Choosable number of stairs

From 11 up to 17 stair treads / points of light can be connected to the controller. Exact number of used channels have to be set in the menu item "The number of stair treads". For example, if there are 15 steps – you have to choose 15 in the menu. Then the first step is a channel 1, and the last step is a channel 15. Other channels are not used.

5.13. Lock function

The controller has an PB input, which after a short circuit to ground blocks the action of the controller (no lighting effects and no ‘stand-by’). The lock can be manually switched on with a standard switch, signal (logical 0) or twilight detector’s relay, signal (logical 0) from the time module/ "smart home".

NOTE: The permanent lighting (PS) has a higher priority and will run even when the controller is locked.

5.14. Blockade brightness

The controller allows to program the brightness of the blockade:

- level of brightness 0% - steps will not be illuminated when the lock (PB) is activated,
- level of brightness > 0% - steps will shine with the set brightness, e.g. 3%, when the lock (PB) is valid.

5.15. Reset

Reset function – to return to the factory settings of all parameters.

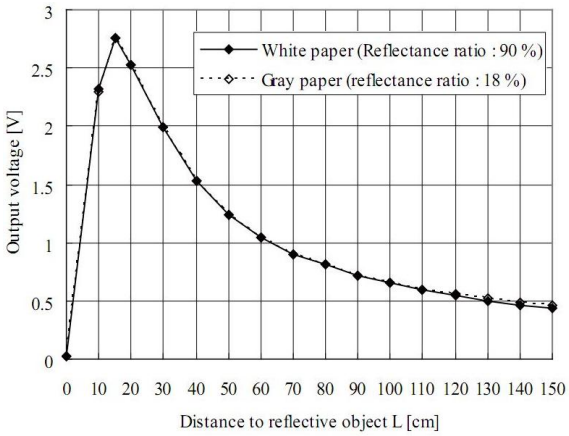
5.16. Diagnostic mode

Diagnostic mode is a function that counts the number of detector activation (top and bottom sensor separately), after power on the controller. The information is displayed on the main screen, in the top line, alternating with information about the current voltage from sensors. Diagnostics format: D: G X: Y means that the lower the detector was triggered X times, and the upper Y times.
It is recommended to perform a diagnostic test WITHOUT traffic on the stairs, to make sure that none of the environment elements do not affect the operation of detectors. If the test result is “D: 0 G: 0: it is an ideal situation (it means that the sensors are not inherently triggered when there is no traffic on the stairs).

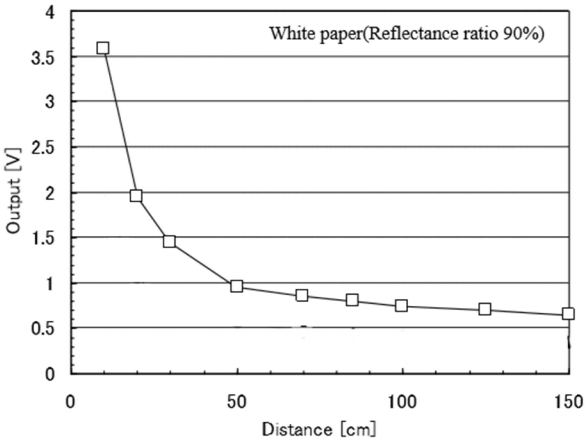
5.17. Sharp sensors configuration – the threshold and the sensors testing mode

Optical Sharp sensors working distance is 20-150cm. Depending on the distance from the detector to the reflecting object (here: people entering the stairs), the detector’s output voltage has a different value. This relationship is shown below.

Optical Sharp sensor



Optical mini Sharp sensor



Properly set threshold is a necessary condition for the correct detection of movement on the stairs, and thus switching the lighting. The driver activates the lighting when the voltage supplied from the detector exceeds the threshold voltage set in the menu.

In the settings menu (items: 'Det. downsta. threshold' and 'Det. upstai. threshold'), the entry threshold in Volts (for inputs PD and PG) has to be set. Changing the threshold affects the operating range of the detector in centimetres. This allows to adjust the operation of sensors and matching them to the conditions of concrete stairs. It is the best to set the threshold after the Sharp sensors have been installed (even temporarily) at the target site. The threshold is set separately for the top and bottom detector (downstairs und upstairs sensor), because the conditions at the bottom and top of the stairs are often different.

On the menu screen, in the top line, there is shown the current voltage supplied from the downstairs (bottom) sensor and upstairs (top) sensor respectively. This is called: 'sensors testing mode' and is designed to facilitate the correct setting of the both thresholds.

```
Det.downst. 1,1V
Threshold   0,7V
```

Top line: current voltage from the bottom (downstairs) sensor (exemplary: 1,1V)
Bottom line: the threshold set for the bottom (downstairs) sensor [V] (exemplary: 0,7V)
Sample values correspond to the situation of step 3b) of the Example below.

```
Det.upstai. 0,6V
Threshold   0,7V
```

Top line: current voltage from the top (upstairs) sensor (exemplary: 0,6V)
Bottom line: the threshold set for the top (upstairs) sensor [V] (exemplary: 0,7V)
Sample values correspond to the situation of step 3c) of the Example below.

Example:
Stair treads have a width of 90cm. Optical Sharp sensors have been used.

1. Set the detectors threshold at the level of the voltage supplied by the detector for a distance equal to the width of the stairs (according to the diagram: for the distance 90cm the voltage is 0.7V).
2. Attach the sensors in the target positions (can be temporarily).
3. Check the real range of detectors using the sensors testing mode:
    a) Go to the settings menu – item 'Det. downsta. threshold'.
    b) Walk upstairs (or ask someone to walk upstairs) and watch the value that appears in the top line of the display - current voltage from the bottom (downstairs) sensor. For the sensor to work, the current voltage must briefly (for a while) be greater than the threshold value (shown in the bottom line of the LCD).

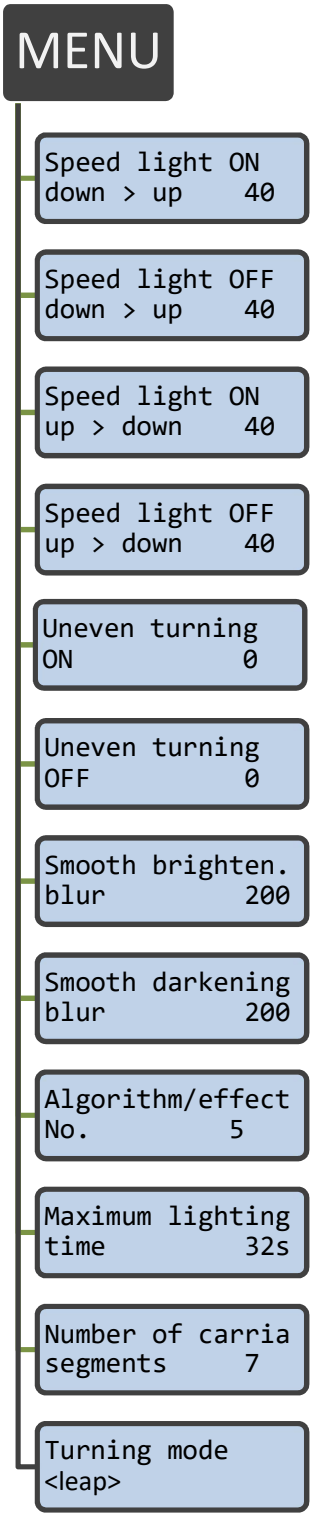
c) Go past the stairs to check that the Sharp sensor DOESN'T detect motion. The current voltage from the bottom (downstairs) sensor have to all the time be smaller than the pre-set threshold value (the value in the top line have to be smaller than the threshold value in the second LCD line).
d) Go to the settings menu – item 'Det. upstai. threshold' and repeat steps b) and c) for the top (upstairs) sensor.

4. If necessary, revise the entered value of the threshold (threshold increase will reduce the detector range, reducing the threshold - will increase the detector range).

Sharp optical detectors should be connected to the inputs PD and PG (see the wiring diagram in Section 3).

6. Settings menu

To access the basic settings configuration menu, press the vPB input button. Go to the next menu item by pressing vPB down or ^PS up. Setting the parameters is done using the "<" and ">" buttons. To exit the menu, press and hold vPB or ^PS, until the message "Exit menu, release the button" appears.



lighting speed control from bottom to top within the range 0-255 (0–fastest, 255–slowest)

turning off speed control from bottom to top within the range 0-255 (0–fastest, 255–slowest)

lighting speed control from top to bottom within the range 0-255 (0–fastest, 255–slowest)

turning off speed control from top to bottom within the range 0-255 (0–fastest, 255–slowest)

Regulation of nonlinearity (unevenness) of turning on lighting in the following range: 0-255 (0 – lack of non-linearity, 255 – the biggest non-linearity)

Regulation of nonlinearity (unevenness) of turning off lighting in the following range: 0-255 (0 – lack of non-linearity, 255 – the biggest non-linearity)

Control of blur effect for turning on in smooth mode in the following range:0-255 (0–the smallest blur, 255–the greatest blur)

Control of blur effect for turning off in smooth mode in the following range:0-255 (0–the smallest blur, 255–the greatest blur)

Setting algorithm/effect in the following range: 1-10

Adjustable lighting time from the moment the effect reaches the end (stairs light up), until the lights begin to fade. In algorithms optimized for detectors fading also begins from the triggering. Time range control 0-60s.

In carriage effect (Algorithm 7) on the menu instead of the ‘Maximum lighting time’ there is the "Number of carriage segments: 10" – the number of the “carriages”, the width of the “train” in the algorithm 7. Range: 1-16.

Selection of the operating mode. Available modes are <leap> and <smooth>. In smooth mode, the spotlights, LED strips on the stairs smoothly brighten and dim.

MENU cont

Standby-Light brightness 0,0%	Adjusts the resting brightness (on standby) in the following range: 0-50%.
Standby-Light <two extremes>	Resting highlight setting. Available options are <two extremes>, where on standby, first and last points/stairs are highlighted, and <all>, where all the points (stairs) are highlighted.
Max. brightn. of effect 100,0%	Adjusts the maximum brightness in an effect in the following range: 50-100%
Timer function button 124 s	Time of activation of constant lighting function in the timer function triggered from input by ^PS button. After launching from the ^PS input the lighting of all channels will activate with the set brightness for a set time in the following range: 4-719s and 13-999 minutes. You can always turn steady light off by pressing ^PS.
Brightness light ^PS input 100,0%	Adjusts the brightness of light/stair launched from the ^PS input (steady or timer mode) in the range 0-100%.
Brightness lock vPB input 0,0%	Adjusts the brightness of light points/stairs launched from the blocking vPB input in the following range: 0 - 100%.
Locking time detector 1 s	Second input (second detector) lock for launch. For fast detectors, so that the controller does not detect e.g. two legs instead of only one person, the lock time can be set so that one person rather than two legs is detected. The range of lock time 0-9s.
The numer of/17 stair treads	Setting the number of stairs connected in the range from 11 to 17.
Reset - default settings	Click “<” or “>” if you're sure you want to perform a factory reset.
Det.downst. 0,0V Threshold 1,0V	Bottom detector’s threshold in [Volt] from 0,1 to 4,00V. Sharp sensor outputs the voltage corresponding to the detection distance.
Det.upstai. 0,0V Threshold 1,0V	Upstairs detector’s threshold in [Volt] from 0,1 to 4,00V. Sharp sensor outputs the voltage corresponding to the detection distance.

NOTE: when using the timer module, make sure that the input vPB is not blocked by the time module (at the time of setting). If this occurs, you can either disconnect the time module, when you are making settings in the menu, or so modify time rages in the timer module, vPB is not blocked at the moment.

7. Status messages

Starting

Language/Sprache *English* <>	First information on the LCD after power on. In about 3 seconds there is a possibility to choose the language (by pressing „<" or „>"). Available are: English, German (Deutsch), Polish (polski).
Ver. 11-17k LCD *ECO* *Sharp*	Information about controller version.
D: X U: 0	Diagnostic mode, where X is the number of times the input PD was triggered, and Y - inputs PG, calculated from power on. It's very useful and helps to adjust the operating range, eliminate interferences (reflections, etc.).
Standby 9,5%	The value of the resting (standby) brightness for the two extremes or all channels with an exemplary 9.5% intensity. There are no time functions for the above message.
Ud=0,0V Uu=0,0V	Information about the current sensors' output voltage (Ud – from Sharp sensor applied downstairs, Uu – from Sharp sensor applied upstairs)

Controller's

ON D>U	Lighting up from bottom to top (**d**ownstairs>**u**pstairs).
OFF D>U	Turning off from bottom to top.
ON U>D	Lighting up from top to bottom (**u**pstairs>**d**ownstairs).
OFF U>D	Turning off from top to bottom.
All lights ON	Lighting of all levels as the effect reaches the end after igniting.
Lock input vPB	Blocking the action since the launch of the physical vPB input (light intensity set in the configuration menu). Lock from vPB input is for switch to ground above 2 seconds. Below this time is the entrance to the settings menu.
The 'Timer' from ^PS input	Time function triggered by an impulse from PS input (pulse less than 2 seconds). Time lighting with the set brightness. Timer function can be turned off at any time, by triggering ^PS input again with a pulse to ground. The intensity of the light is set in the configuration menu.
Constant light. from ^PS input	Constant lighting initiated by a switch to ground of ^PS input for minimum 2s. The outputs are driven to the set power as long as there is a ^PS input switch to ground.

Other messages

Reset - default wait…	Reset - OK Messages shown during and after the reset process.
Exit from menu Release button	Exit menu screen. Appears, if the user press and hold vPB or ^PS.

8. Priority of operation

- The highest priority of operation is triggering constant light from the ^PS input (constant lighting or timer function).
- Lock from the ^PB input
- The lowest priory are the effects from PD and PG inputs.

For example, if the lock function from the PB input is on and there is an input signal to PS, a constant light function will be launched, because it has a higher priority.

9. Installation guide

1. Setting up copper wires (typically 0.5 mm pairs) between the points of light (LED spots, LED strips), and the place where the stair controller will be placed (cabinet, box, bay, basement, attic, safe, utility room, etc.)
2. Setting up 3 -core wires (they can be thin, because they are signal, low-current wires) between the hole, the place of the bottom detector and the controller and between the hole, the place of the top detector and the controller.
3. Optional setting up wires with a minimum of 2 cores, 0.5mm to 1mm, to highlight handrails, railings, ceiling, top, side or decorative lighting.
4. Setting up the additional wires e.g. from switches, constant lighting buttons, lock, etc. For example, for the constant light function it is possible to connect a few buttons in different places at the same time.
5. Setting up wires for 230V network (3 wires L, N and PE) in the cabinet, bay, box, etc., to connect the 12V power supply.
6. Connecting the LED point, LED strip to the wires (preferably soldering or screwing with the use of terminals). Not recommended to use dip connectors.
7. Check that there are short - circuits on LED strips or point wires, for example, with a meter (ohmmeter) and/or by connecting each point of light to 12V and making sure that it emits light. If there is a short - circuit, you need to locate it and remove it. If the controller is connected to stripes with a short - circuit it may cause damage to the respective transistor of the controller channel.
8. Connecting the stair controller to 12V (if possible, check that the voltage on the power supply is not higher than 12V). In case of impulse module power supply, you can adjust the output voltage of the power supply. If a standby-light is on in the controller (eg. yellow, red diode), you can go to the next step.
9. Connect the stair treads lighting wires (optional on the railing, of the upper lighting, ceiling, etc.) to the staircase controller.
10. Check the operation of the controller using the attached micro - buttons. First, you can check the operation of the PS input. If the simulation of the staircase controller is carried out successfully, you can proceed to the next step. Micro - buttons can be left connected to the connectors.
11. Select algorithm, effect and initially adjust speed parameters etc.
12. Connect the analog optical Sharp (or mini Sharp) detectors to PD and PG inputs (and power) according to the descriptions of each detector. Check the operation on the detectors. Adjust the range of detectors by setting in the menu the appropriate threshold for each of the detectors (see: Sharp sensors configuration – the threshold and the sensors testing mode and Settings menu)

13. If the stairs are lit during the day with daylight and the stairs lighting should be disabled, it is possible to use "Controller time module" with the 11-17k LCD Sharp. Connect "time module" output W1 to PS and/or W2 to PB and power the module 9-15V - typically 12V).
    When testing the time module and the entire staircase LED lighting system, night - time must be set on the time module so that the detectors are not locked from the time lock function (or you should reset the lock hours for the month). If the lock time interval is set, and the real time clock timer module will be in this range, the time module does not give the starting signal to the staircase controller.
14. Tune to your needs, adjust the times, speed, select the effect, algorithm etc. for typical conditions prevailing on the stairs and expectations regarding the action. You can always easily return to the factory setting using RESET function (see Settings menu).

10. Disposal

Do not dispose of the controller in your normal domestic waste. This product is subject to the provisions of European Directive 2002/96/EC.

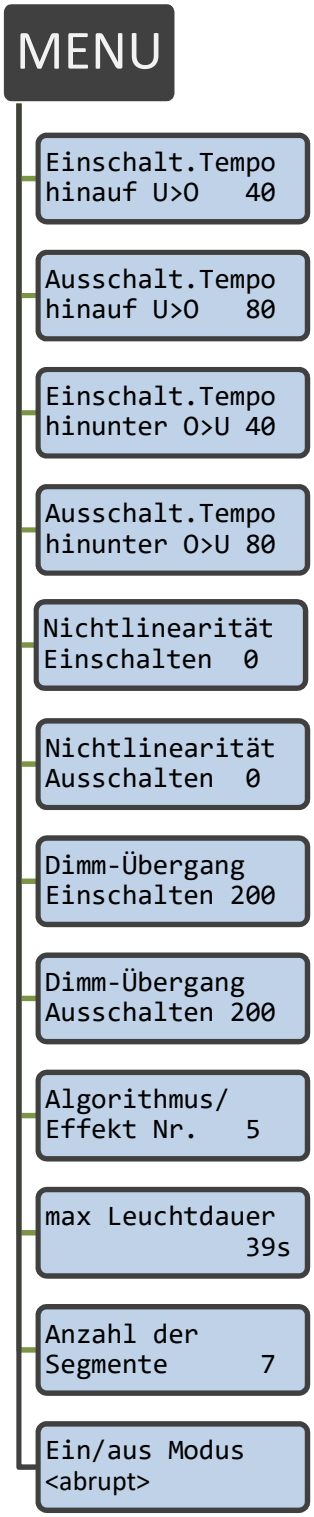
Disposal of the appliance

- Arrange for the product, or parts of it, to be disposed of by a professional company or by your communal waste facility.
- Observe the currently applicable regulations. In case of doubt, please contact your waste disposal centre.

Disposal of packaging

Dispose of all packaging materials in an environmentally friendly manner.

Appendix 1 – Settings menu – German (Deutsch)



lighting speed control from bottom to top within the range 0-255 (0–fastest, 255–slowest). U – unten, O - oben

turning off speed control from bottom to top within the range 0-255 (0–fastest, 255–slowest)

lighting speed control from top to bottom within the range 0-255 (0–fastest, 255–slowest)

turning off speed control from top to bottom within the range 0-255 (0–fastest, 255–slowest)

Regulation of nonlinearity (unevenness) of turning on lighting in the following range: 0-255 (0 – lack of non-linearity, 255 – the biggest non-linearity)

Regulation of nonlinearity (unevenness) of turning off lighting in the following range: 0-255 (0 – lack of non-linearity, 255 – the biggest non-linearity)

Control of blur effect for turning on in smooth mode in the following range:0-255 (0–the smallest blur, 255–the greatest blur)

Control of blur effect for turning off in smooth mode in the following range:0-255 (0–the smallest blur, 255–the greatest blur)

Setting algorithm/effect in the following range: 1-10

Adjustable lighting time from the moment the effect reaches the end (stairs light up), until the lights begin to fade. In algorithms optimized for detectors fading also begins from the triggering. Time range control 0-60s.

In carriage effect (Algorithm 7) on the menu instead of the ‘max Leuchtdauer’ there is the "Number of carriage segments: 10" – the number of the “carriages”, the width of the “train” in the algorithm 7. Range: 1-16.

Selection of the operating mode. Available modes are <abrupt> and <fließend>. In <fließend> mode, the spotlights, LED strips on the stairs smoothly brighten and dim.

MENU cont

Standby-Licht Stärke 0,0%	Adjusts the stand-by brightness (on standby) in the following range: 0-50%.
Standby-Licht <Rand/Antritt>	Resting highlight setting. Available options are <Rand/Antritt>, where on standby, first and last points/stairs are highlighted, and <alle>, where all the points (stairs) are highlighted.
max Lichtstärke Effekt 100,0%	Adjusts the maximum brightness in an effect in the following range: 50-100%
Dauerlicht Timer 124 s	Time of activation of constant lighting function in the timer function triggered from input by ^PS button. After launching from the ^PS input the lighting of all channels will activate with the set brightness for a set time in the following range: 4-719s and 13-999 minutes. You can always turn steady light off by pressing ^PS.
Lichtstärke von ^PS 100,0%	Adjusts the brightness of light/stair launched from the ^PS input (steady or timer mode) in the range 0-100%.
Lichtstärke vPB Block. 0,0%	Adjusts the brightness of light points/stairs launched from the blocking vPB input in the following range: 0 - 100%.
Blockade an Sensoren 1 s	Second input (second detector) lock for launch. For fast detectors, so that the controller does not detect e.g. two legs instead of only one person, the lock time can be set so that one person rather than two legs is detected. The range of lock time 0-9s.
Anzahl der /17 Leuchtelemente	Setting the number of stairs connected in the range from 11 to 17.
Reset settings	Click “<” or “>” if you're sure you want to perform a factory reset.
Det. unten 0,0V Schwellenw. 1,0V	Bottom detector’s threshold in [Volt] from 0,1 to 4,00V. Sharp sensor outputs the voltage corresponding to the detection distance.
Det. oben 0,0V Schwellenw. 1,0V	Upstairs detector’s threshold in [Volt] from 0,1 to 4,00V. Sharp sensor outputs the voltage corresponding to the detection distance.

Appendix 2 – Status messages – German (Deutsch)

Starting

Language/Sprache *Deutsch* <>	First information on the LCD after power on. In about 3 seconds there is a possibility to choose the language (by pressing „<" or „>"). Available are: English, German (Deutsch), Polish (polski).
Ver. 11-17k LCD *ECO* *Sharp*	Information about controller version.
U: X O: 0	Diagnostic mode, where X is the number of times the input PD was triggered, and Y - inputs PG, calculated from power on. It's very useful and helps to adjust the operating range, eliminate interferences (reflections, etc.).
Standby 9,5%	The value of the resting (standby) brightness for the two extremes or all channels with an exemplary 9.5% intensity. There are no time functions for the above message.
Uu=0,0V Uo=0,0V	Information about the current sensors' output voltage (Uu – from Sharp sensor applied downstairs (unten), Uo – from Sharp sensor applied upstairs (oben))

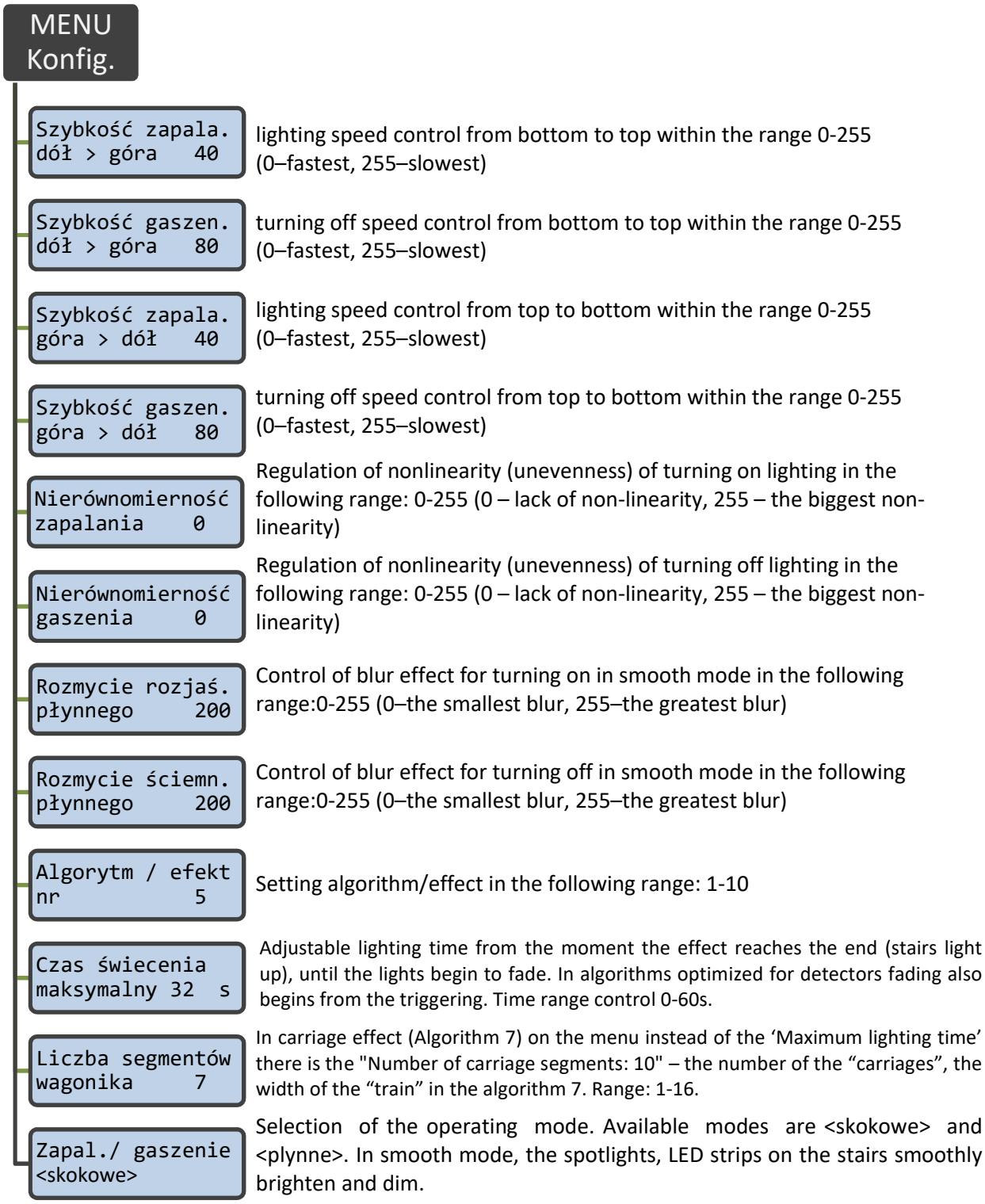
Controller's

Ein. U>O	Lighting up from bottom to top (**u**nten>**o**ben).
Aus. U>O	Turning off from bottom to top (**u**nten>**o**ben).
Ein.O>U	Lighting up from top to bottom (**o**ben>**u**nten).
Aus.O>U	Turning off from top to bottom (**o**ben>**u**nten).
Alle Ausgän. ein	Lighting of all levels as the effect reaches the end after igniting.
Blockade von vPB	Blocking the action since the launch of the physical vPB input (light intensity set in the configuration menu). Lock from vPB input is for switch to ground above 2 seconds. Below this time is the entrance to the settings menu.
Timer von ^PS	Time function triggered by an impulse from PS input (pulse less than 2 seconds). Time lighting with the set brightness. Timer function can be turned off at any time, by triggering ^PS input again with a pulse to ground. The intensity of the light is set in the configuration menu.
Dauerlicht von ^PS	Constant lighting initiated by a switch to ground of ^PS input for minimum 2s. The outputs are driven to the set power as long as there is a ^PS input switch to ground.

Other messages

Reset settings warten…	Reset - OK Messages shown during and after the reset process.
Menü verlassen Taste loslassen	Exit menu screen. Appears, if the user press and hold vPB or ^PS.

Appendix 3 – Settings menu – Polish (polski)



MENU
Konfig. cd.

Poziom jasności spoczynk. 9,5%	Adjusts the resting brightness (on standby) in the following range: 0-50%.
Jasność spoczyn. <dwa skrajne>	Resting highlight setting. Available options are <dwa skrajne>, where on standby, first and last points/stairs are highlighted, and <wszystkie>, where all the points (stairs) are highlighted.
Jasność max. efektu 100,0%	Adjusts the maximum brightness in an effect in the following range: 50-100%
Funkcja timer przycisk 124 s	Time of activation of constant lighting function in the timer function triggered from input by ^PS button. After launching from the ^PS input the lighting of all channels will activate with the set brightness for a set time in the following range: 4-719s and 13-999 minutes. You can always turn steady light off by pressing ^PS.
Jasność świecen. wej. ^PS 100,0%	Adjusts the brightness of light/stair launched from the ^PS input (steady or timer mode) in the range 0-100%.
Jasność blokady wej. vPB 3,9%	Adjusts the brightness of light points/stairs launched from the blocking vPB input in the following range: 0 - 100%.
Czas blokady czujki 1 s	Second input (second detector) lock for launch. For fast detectors, so that the controller does not detect e.g. two legs instead of only one person, the lock time can be set so that one person rather than two legs is detected. The range of lock time 0-9s.
Liczba stopni/17 schodowych	Setting the number of stairs connected in the range from 11 to 17.
Reset ustawień - do fabrycznych	Click “<” or “>” if you're sure you want to perform a factory reset.
Czuj. dolny 0,0V Próg PD 1,0V	Bottom detector’s threshold in [Volt] from 0,1 to 4,00V. Sharp sensor outputs the voltage corresponding to the detection distance.
Czuj. górny 0,0V Próg PG 1,0V	Upstairs detector’s threshold in [Volt] from 0,1 to 4,00V. Sharp sensor outputs the voltage corresponding to the detection distance.

Appendix 4 – Status messages – Polish (polski)

Starting

Language/Sprache *polski* <>	First information on the LCD after power on. In about 3 seconds there is a possibility to choose the language (by pressing „<" or „>"). Available are: English, German (Deutsch), Polish (polski).
Wer. 11-17k LCD *ECO* *Sharp*	Information about controller version.
D: X G: 0	Diagnostic mode, where X is the number of times the input PD was triggered, and Y - inputs PG, calculated from power on. It's very useful and helps to adjust the operating range, eliminate interferences (reflections, etc.).
Jas.spocz. 9,5%	The value of the resting (standby) brightness for the two extremes or all channels with an exemplary 9.5% intensity. There are no time functions for the above message.
Ud=0,0V Ug=0,0V	Information about the current sensors' output voltage (Ud – from Sharp sensor applied downstairs (dół), Ug – from Sharp sensor applied upstairs (góra))

Controller's

Zap. D>G	Lighting up from bottom to top.
Gas. D>G	Turning off from bottom to top.
Zap.G>D	Lighting up from top to bottom.
Gas.G>D	Turning off from top to bottom.
Max wyjścia zał.	Lighting of all levels as the effect reaches the end after igniting.
Blokada wej. vPB	Blocking the action since the launch of the physical vPB input (light intensity set in the configuration menu). Lock from vPB input is for switch to ground above 2 seconds. Below this time is the entrance to the settings menu.
Funkcja 'Timer' od wejścia ^PS	Time function triggered by an impulse from PS input (pulse less than 2 seconds). Time lighting with the set brightness. Timer function can be turned off at any time, by triggering ^PS input again with a pulse to ground. The intensity of the light is set in the configuration menu.
Stałe świecenie od wejścia ^PS	Constant lighting initiated by a switch to ground of ^PS input for minimum 2s. The outputs are driven to the set power as long as there is a ^PS input switch to ground.

Other messages

Reset ustawień - czekaj… / Zresetowano ustawienia	Messages shown during and after the reset process.
Wyjście z menu puść przycisk	Exit menu screen. Appears, if the user press and hold vPB or ^PS.