

# smartLEDs

## S19-P

### SMART STAIR LED LIGHTING CONTROLLER model PREMIUM

#### USER MANUAL v5.0.6

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In accordance with the provisions of the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE) it is forbidden to place with other waste any waste equipment marked with a crossed-out bin symbol.

The user, wanting to get rid of electronic equipment or services, is obliged to return it to a waste equipment collection point. Applicable restrictions have been introduced in order to restrict the amount of waste generated from waste electronic equipment.

This equipment does not contain any hazardous ingredients that may have a particularly negative impact on the environment and human health.

## 1 PURPOSE

S19-P is microprocessor controller for multi-spot 12V/24V LED lighting, intended for LED lighting of staircases (and other passageways), with a separate control of each lamp. The device turns on the consecutive LED lamps, and turns them off after a specified time. In the case of dimmable lamps, the turning on and off happens gradually and smoothly. The controller can also provide gentle backlight lighting as well as react to motion and dusk.

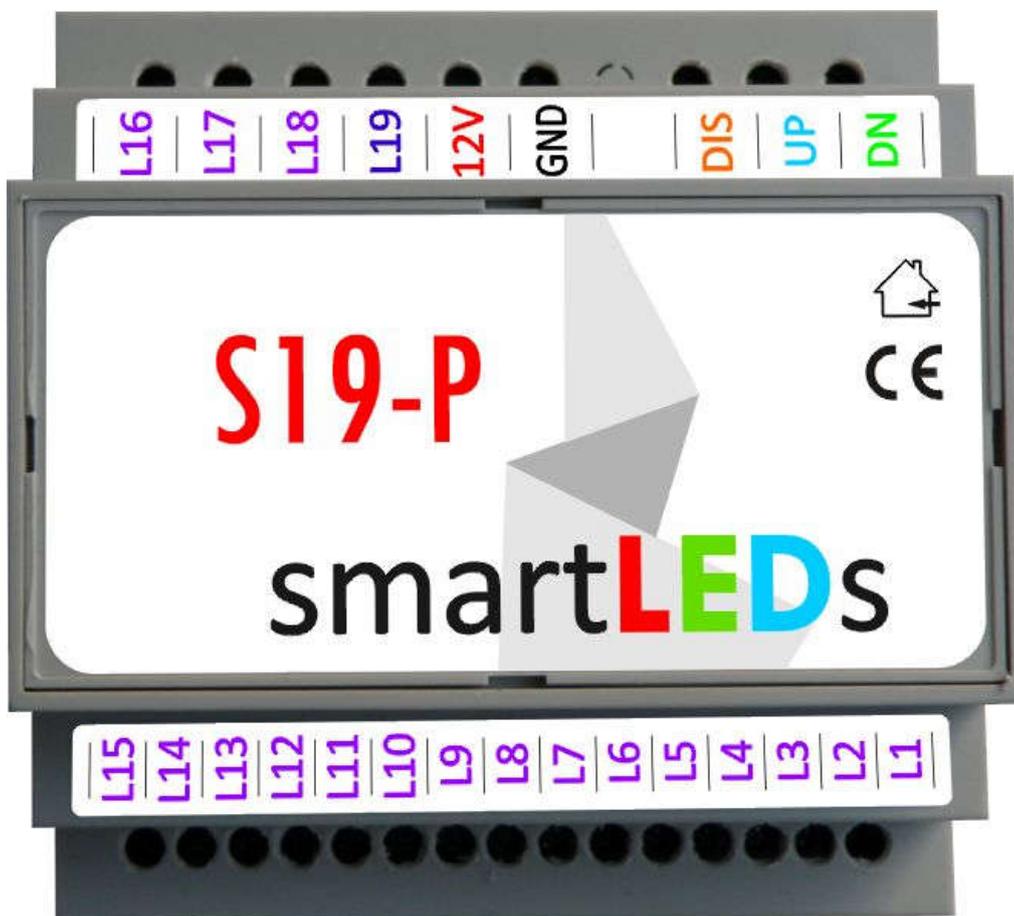
S19-P is equipped with:

- built-in configurator capable of setting 18 parameters, e.g. brightness; timing, speed, and smoothness of turning on/off; warning when the lights are about to turn off; and many more, which enables the users to set the device up according to their needs;
- integrated dusk switch (IDS) which disables the controller during daylight, with a light sensor that can be installed both indoors and outdoors.

## 2 DESCRIPTION

### 2.1 Terminals

The controller's terminals are depicted below.



### 2.1.1 Power supply

The controller requires external power supply with regulated DC output, safety extra-low voltage (SELV) in the range of 8–24 V DC; it should also have a minimum current load of 100 mA. The power is supplied to the GND terminal (ground, minus) and the 12V terminal (plus).

**CAUTION!** *Only use power supplies marked CE and with galvanic separation between the output voltage and the mains supply.*

### 2.1.2 Inputs

The controller has the following inputs:

- UP and DN ports which control upward and downward turning on of the lamps, and
- DIS port for disabling the controller, used for example for connecting the light sensor or an external switch.

The inputs should be fed with a potential-free signal of either connection (ZERO) or non-connection (ONE) to ground GND.

**CAUTION!** *The only external dusk sensors and clocks suitable for using with S19-P are those marked CE and with galvanic insulation of the output voltage and the mains supply.*

### 2.1.3 Outputs

S19-P has 19 outputs L1-L19 that control the LED lamps connected to them. Any LED lamps powered with SELV of up to 24 V DC can be used, provided that they are supplied from a DC SELV power supply (up to 24 V) with a galvanic insulation of the output voltage from the mains supply. The maximum current must not exceed 2 A per single output. The outputs should be connected to the negative terminal (cathode) of the LED lamps.

The outputs can be used either with dimmable LED lamps (smooth turning on/off, gentle backlight lighting), as well as non-dimmable (instantaneous turning on/off, no backlight lighting).

The last two outputs (L18 and L19) can be used as the Master lamp; this lamp is turned on first and turned off last.

## 2.2 Configurator

The parameters of S19-P may be set up with the integrated configurator (see Sec. 3).

### 2.3 Integrated dusk switch (IDS) with a light sensor

S19-P is equipped with an integrated dusk switch (IDS). The IDS disables the controller's operation during daylight, and is activated by connecting the light sensor to the DIS port and setting the threshold light level by configuring the **DIS input** parameter to a value between S1 and S10. The IDS responds only to long-term changes in light conditions, ignoring any short-term fluctuations. The light sensor may work both outdoors and indoors, which makes it more convenient than external dusk sensors that work properly only when exposed to natural sunlight (any artificial light sources can cause malfunction of external dusk sensors).

## 2.4 Controller's operation

The default state of the controller is the standby state when no inputs are active. In this state dimmable lamps may be either off or on with gentle backlight; non-dimmable lamps are off. The controller is awaiting a signal either at the DIS port (which will disable the controller and turn all the lights off) or from any of the UP /DN inputs (which will start the lighting sequence).

### 2.4.1 Turning lamps on

The 'turning-on' phase consists of turning on consecutive lamps:

- from the first to the last, if the signal came from the UP input;
- from the last to the first, if the signal came from the DN input;

If another signal appears at the other input while the lamps are being turned on, the sequence will also start from the other side.

If applicable, the Master lamp is turned on first, either before or at the same time as the first lamp in the sequence. The smoothness of the turning on of the lamps can be set within a broad scope by setting the **Smoothness** parameter: from sharp to very smooth turning on.

### 2.4.2 Lights on

When the lights are on, they remain on for a time predefined by the **On time** parameter. The time extends when a new signal appears at any of the inputs.

### 2.4.3 Warning

When the time determined by the **On time** parameter passes, either the lights turn off (if the **Number of warnings** parameter is set to 0) or the controller enters the warning phase (if **Number of warnings** is greater than 0). The warning phase informs the user that the lights are about to turn off. The phase consists of a number of 'warning–waiting' cycles consisting of the warning and awaiting the user's reaction. The warning can be either a short dimming of all lights (a 'blink'), alternate dimming of the even and odd lamps (a 'flicker') or a dimming of one or two lamps moving back and forth (pendulum effect).

### 2.4.4 Turning lamps off

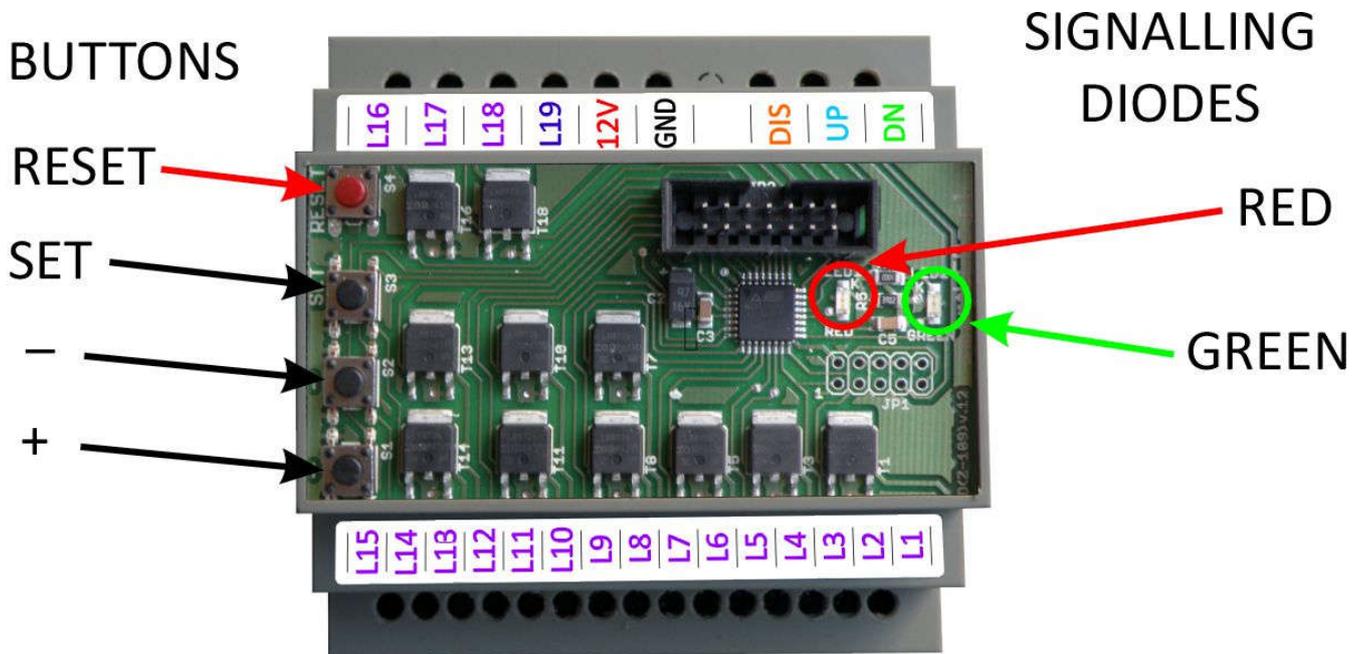
Turning off the lamps is defined as dimming the lights from the full brightness to the backlight level brightness.

The 'turning-off' phase is reversed with respect to the turning-on phase: the lamps are turned off either as they were turned on or in the reverse order (depending on the setting of the **Off direction** parameter). The Master lamp (if set) is turned off last. The smoothness of the turning off is the same as in the case of turning on, and set with the **Smoothness** parameter.

### 3 CONFIGURATION MANUAL

#### 3.1 Introduction

The controller is configured with the built-in Configurator shown below.



The Configurator consists of the RESET button, three configurational buttons (SET, '+', and '-'), and two signalling LEDs, RED and GREEN. The SET button increments the number of the parameter being set or exits the configuration procedure. The '+' and '-' buttons change the value of the parameter being set.

#### 3.2 Configuration

To begin the configuration, follow the steps 3.2.1–3.2.3 below.

##### 3.2.1 Get access to Configurator

Open the controller casing (by removing the front cover).

##### 3.2.2 Restart the controller

Restart the controller by pressing the RESET button shortly (both signalling diodes, RED and GREEN, will turn on for about 3 sec.).

##### 3.2.3 Put controller into configuration mode

Immediately after the RESET button is released (while the diodes are still on), put the controller into the configuration mode by pressing and holding the SET button until both signalling diodes start blinking quickly (please be patient; it may take about 4 seconds); then release the SET button.

#### 3.3 Setting configuration parameters

The configuration parameters are stored in the non-volatile memory (also after the device is switched off). The controller is shipped with the parameters preset to default values (see Table 1).

The parameters can be set in accordance with Table 1.

The configuration is done in a loop of 19 steps, setting one parameter per step in all the first 18 steps except the final one. The final step allows to either restart the configuration from step 1 or to finish the configuration. If the latter case, three options are given: (1) to save the new configuration, (2) to discard the new configuration, or (3) to restore the factory settings.

At each step the Configurator displays, through the signalling diodes, the step number and the present value of the parameter being set. The current value is communicated through a repeating series of flashes of the GREEN diode, in accordance with Table 1. At the same time, the step number is communicated by the number of flashes of the RED diode. To illustrate: a repeating single flash of the RED diode means the parameter being set is the **Number of Lamps** (parameter no. 1), while 16 consecutive flashes in a series of the GREEN diode mean the current setting is '16 lamps.' To change the value of the parameter, use the '-' and '+' buttons (selecting the preceding or the next value from Table 1, respectively). Having set the value of the parameter (or when we want to leave its value unchanged), we move to the next step by pushing the SET button briefly (under 2 seconds).

Reaching the final (19th) step in the loop is signalled by the RED diode giving off a steady light. There are then two possibilities:

- To return to the beginning of the configuration loop, i.e. the first step, in order to repeat all the steps and correct the settings, press the SET button briefly (under 2 seconds).
- Choose the desired value of the **Decision?** parameter with the '-' and '+' buttons, then press and hold the SET button until both diodes switch off (>4s). Selecting the value SAVE will result in saving the new configuration in the non-volatile memory of the controller. Selecting the value QUIT will result in discarding the new configuration and restoring the previous configuration. Selecting the value RESTORE will bring back the factory defaults.

**CAUTION!** *Pressing the SET button briefly (under 2 seconds) will always advance the configuration process to the next step.*

**CAUTION!** *Pressing and holding (for at least 4 seconds) the SET button (at every step except **Decision?**), pressing the RESET button, or cutting off the power supply will cause the configuration process to exit without saving the new parameters.*

**CAUTION!** *The built-in Configurator is capable of setting only the parameters shown in table 1.*

**CAUTION!** *Pressing '+' when the maximum value is displayed moves the selection to the first value; and pressing '-' when the first value is displayed moves the selection to the maximum value.*

**CAUTION!** *If no button is pressed for about 30 minutes, the controller will quit the configuration mode.*

**CAUTION!** *Exiting the configuration with saving the new settings is possible only in the last step of the sequence (**Decision?**), with the value set to SAVE.*

### 3.4 Parameters set by Configurator

**CAUTION!** *Changing the parameters indicated as '[advanced]' substantially affects the operation of the controller, and it is recommended to change these with caution.*

#### 3.4.1 Number of lamps

The number of all the LED lamps (including the Master lamp).

### 3.4.2 Master lamp

Allows to decide whether the last lamp is to be used as a master lamp; if the Master lamp is dimmable; and if the Master lamp should be turned on one step before or together with the start of the lighting sequence.

### 3.4.3 Number of warnings

The number of the 'warning-waiting' cycles; '0' means no warnings.

### 3.4.4 Warning type

The style the warning is displayed.

### 3.4.5 Step type

The pace of the turning on and off of the consecutive lamps in the sequence.

### 3.4.6 Off direction

The order of turning off the consecutive lamps (the same as the turning on or the opposite).

### 3.4.7 Smoothness

The smoothness of the dimming/brightening of the lamps. This parameter determines the visual effect of the dimming/brightening: low values of smoothness make the process energetic, while high values make it smooth and gentle. There are seven values to choose from. In the case of non-dimmable lamps the parameter must be set to 0; then there is no backlight lighting and the turning on and off proceeds in a one-by-one switching fashion.

### 3.4.8 Brightness

The brightness of the LED lamps.

**CAUTION!** While this parameter is being set, lamps L1 and L2 are lit with intensities corresponding to the values of the **Brightness** and **Backlight lighting** parameters, respectively.

### 3.4.9 Backlight lighting

The brightness of the backlight lighting of the LED lamps during stand-by, expressed as the percentage of the brightness set by the **Brightness** parameter.

**CAUTION!** While this parameter is being set, lamps L1 and L2 are lit with intensities corresponding to the values of the **Backlight lighting** and **Brightness** parameters, respectively.

### 3.4.10 Master brightness

The brightness of the Master lamp.

**CAUTION!** While setting this parameter, the last lamp (L19) is lit with a brightness corresponding to this parameter.

### 3.4.11 Master backlight

The stand-by backlight value of the Master lamp (expressed as a percentage of the Master brightness parameter).

**CAUTION!** While setting this parameter, the last lamp (L19) is lit with a brightness corresponding to this parameter.

### 3.4.12 Turning-on time

The time elapsed between the start of the first and the last lamp turning on.

### 3.4.13 On time

Determines how long the lamps remain on.

### 3.4.14 Warning time

The duration of a single warning.

### 3.4.15 Waiting time

Determines the 'waiting' time of the 'warning-waiting' cycle, when the controller awaits the user's reaction after a warning.

### 3.4.16 Turning-off time

The time elapsed between the start of the first and the last lamp turning off.

### 3.4.17 Active level [advanced]

The level (ZERO or ONE) defined as the active state at the controller inputs.

**CAUTION!** *An input left floating has the value ONE. Setting the active level to ONE while an input is left floating will result in a permanent active state.*

### 3.4.18 2. DIS input [advanced]

Determines what is done with the active state at the DIS input. The possible parameters are: BLOCK, UNBLOCK, TOGGLE, and S1, S2, ..., S10. Selecting one of the values S1–S10 activates the built-in dusk switch. The values from S1 (darkest) to S10 (brightest) determine the external light threshold of the dusk sensor above which the switch blocks the controller.

**CAUTION!** *Setting the parameter to one of S1, ..., S10 with the sensor disconnected will result in the controller not being blocked during daylight.*

**CAUTION!** *For the built-in dusk switch to work correctly, it is necessary to connect the enclosed sensor to the DIS terminal.*

**CAUTION!** *Setting the parameter to TOGGLE allows for controlling the DIS input manually with a pushbutton. With this setting, the controller by default starts in the active state when the power supply is turned on.*

**CAUTION!** *The default settings of the parameters **Active level** and **DIS input** are appropriate when the DIS port is left floating.*

### 3.4.19 Decision?

This is the final step in the configuration process. Pressing the SET button briefly (< 2 s) restarts the configuration process. Pressing it longer (> 4 s) exits the configurator. Choosing the SAVE option and pressing the SET button long exits the configurator with the new configuration saved. Selecting the QUIT option and then pressing the SET button long results in abandoning the configuration and restoring the prior settings. Similarly for the RESTORE option: the configuration process will be halted and the factory settings brought back.

**CAUTION!** *To confirm the selected option (SAVE, QUIT, or RESTORE), press the SET button and hold for at least 4 s until both signalling diodes turn off.*

Table 1. S19-P configuration using built-in Configurator (default values are **bolded and underlined**)

Parameter	Value	RED diode (# of flashes)	GREEN diode (# of flashes)	Remarks
Start of configuration		fast blinking until SET released	fast blinking until SET released	SET buton pressed for >4s
<b>Number of lamps</b>				
	3	1	3	3 lamps
	4	1	4	4 lamps
	...	1	...	
	18	1	18	18 lamps
	<b><u>19</u></b>	1	<b><u>19</u></b>	19 lamps
<b>Master lamp</b>				
	<b><u>NO</u></b>	2	<b><u>not flashing</u></b>	no Master lamp
	BRIGHTEN TOGETHER	2	1	Master dimmable, brightened together with the first lamp
	BRIGHTEN BEFORE	2	2	Master dimmable, brightened before the first lamp
	SWITCH TOGETHER	2	3	Master not dimmable, turned on together with the first lamp
	SWITCH BEFORE	2	4	Master not dimmable, turned on before the first lamp
<b>Number of warnings</b>				
	0	3	not flashing	no warnings
	<b><u>1</u></b>	3	<b><u>1</u></b>	1 warning
	2	3	2	2 warnings
	3	3	3	3 warnings
	4	3	4	4 warnings
	5	3	5	5 warnings
	6	3	6	6 warnings
	7	3	7	7 warnings
<b>Warning type</b>				
	BLINK	4	not flashing	dimming of all lamps
	PICO	4	1	very fast flicker
	<b><u>NANO</u></b>	4	<b><u>2</u></b>	fast flicker
	MICRO	4	3	medium flicker
	MILI	4	4	slow flicker
	BOB	4	5	dimming of one lamp moving back and forth
	SWING	4	6	dimming of two lamps moving back and forth
<b>Step type</b>				
	SLOW-DOWN	5	not flashing	pace of turning on/off of consecutive lamps slows down
	<b><u>CONSTANT</u></b>	5	<b><u>1</u></b>	pace of turning on/off of consecutive lamps is constant
	SPEED-UP	5	2	pace of turning on/off of consecutive lamps speeds up
<b>Off direction</b>				
	BACKWARD	6	not flashing	turning off in opposite direction as

				turning on
	<b>FORWARD</b>	6	<u>1</u>	turning off in the same direction as turning on
<b>Smoothness</b>				
	0	7	not flashing	not dimmable lamps
	1	7	1	sharp brightening/dimming
	2	7	2	
	3	7	3	
	4	7	4	smooth brightening/dimming
	<u>5</u>	7	<u>5</u>	
	6	7	6	
	7	7	7	very smooth brightening/dimming
<b>Brightness</b>				
	10%	8	3	10% max brightness
	20%	8	4	20% max brightness
	30%	8	5	30% max brightness
	40%	8	6	40% max brightness
	50%	8	7	50% max brightness
	60%	8	8	60% max brightness
	70%	8	9	70% max brightness
	80%	8	10	80% max brightness
	90%	8	11	90% max brightness
	<u>100%</u>	8	<u>12</u>	100% max brightness
<b>Backlight lighting</b>				
	0%	9	not flashing	no backlight lighting
	<u>2%</u>	9	<u>1</u>	2% brightness
	5%	9	2	5% brightness
	10%	9	3	10% brightness
	20%	9	4	20% brightness
	30%	9	5	30% brightness
	40%	9	6	40% brightness
	50%	9	7	50% brightness
	60%	9	8	60% brightness
	70%	9	9	70% brightness
	80%	9	10	80% brightness
	90%	9	11	90% brightness
<b>Master brightness</b>				
	10%	10	3	10% max brightness
	20%	10	4	20% max brightness
	30%	10	5	30% max brightness
	40%	10	6	40% max brightness
	50%	10	7	40% max brightness
	60%	10	8	60% max brightness
	70%	10	9	70% max brightness
	80%	10	10	80% max brightness
	90%	10	11	90% max brightness
	<u>100%</u>	10	<u>12</u>	100% max brightness
<b>Master backlight</b>				
	<u>0%</u>	11	<u>not flashing</u>	no backlight lighting
	2%	11	1	2% Master brightness
	5%	11	2	5% Master brightness

	10%	11	3	10% Master brightness
	20%	11	4	20% Master brightness
	30%	11	4	30% Master brightness
	40%	11	6	40% Master brightness
	50%	11	7	40% Master brightness
	60%	11	8	60% Master brightness
	70%	11	9	70% Master brightness
	80%	11	10	80% Master brightness
	90%	11	11	90% Master brightness
	100%	11	12	100% Master brightness
<b>Turning-on time</b>				
	0s	12	not flashing	simultaneous turning on
	0,4s	12	1	turning-on time: 0,4s
	1s	12	2	turning-on time: 1s
	2s	12	3	turning-on time: 2s
	3s	12	4	turning-on time: 3s
	4s	12	5	turning-on time: 4s
	6s	12	6	turning-on time: 6s
	<u>9s</u>	12	<u>7</u>	turning-on time: 9s
	12s	12	8	turning-on time: 12s
	18s	12	9	turning-on time: 18s
	24s	12	10	turning-on time: 24s
<b>On time</b>				
	0s	13	not flashing	no lights-on phase
	4s	13	1	on time: 4s
	10s	13	2	on time: 10s
	20s	13	3	on time: 20s
	<u>30s</u>	13	<u>4</u>	on time: 30s
	40s	13	5	on time: 40s
	60s	13	6	on time: 1min.
	90s	13	7	on time: 1,5min.
	120s	13	8	on time: 2min.
	180s	13	9	on time: 3min.
	240s	13	10	on time: 4min.
<b>Warning time</b>				
	0s	14	not flashing	no warning
	0,4s	14	1	warning time: 0,4s
	<u>1s</u>	14	<u>2</u>	warning time: 1s
	2s	14	3	warning time: 2s
	3s	14	4	warning time: 3s
	4s	14	5	warning time: 4s
	6s	14	6	warning time: 6s
	9s	14	7	warning time: 9s
	12s	14	8	warning time: 12s
	18s	14	9	warning time: 18s
	24s	14	10	warning time: 24s
<b>Waiting time</b>				
	0s	15	not flashing	no waiting
	0,4s	15	1	waiting time: 0,4s
	1s	15	2	waiting time: 1s
	2s	15	3	waiting time: 2s
	3s	15	4	waiting time: 3s

	<b>4s</b>	15	<b>5</b>	waiting time: 4s
	6s	15	6	waiting time: 6s
	9s	15	7	waiting time: 9s
	12s	15	8	waiting time: 12s
	18s	15	9	waiting time: 18s
	24s	15	10	waiting time: 24s
<b>Turning-off time</b>				
	0s	16	not flashing	simultaneous turning-off
	0,4s	16	1	turning-off time: 0,4s
	1s	16	2	turning-off time: 1s
	2s	16	3	turning-off time: 2s
	3s	16	4	turning-off time: 3s
	4s	16	5	turning-off time: 4s
	6s	16	6	turning-off time: 6s
	9s	16	7	turning-off time: 9s
	<b>12s</b>	16	<b>8</b>	turning-off time: 12s
	18s	16	9	turning-off time: 18s
	24s	16	10	turning-off time: 24s
<b>Active level</b>				
	<b>ZERO</b>	17	not flashing	connected to GND
	ONE	17	1	disconnected from GND
<b>DIS input</b>				
	<b>DISABLE</b>	18	not flashing	active level of DIS disables the controller
	ENABLE	18	1	active level of DIS enables the controller
	TOGGLE	18	2	active level toggles DIS input
	S1	18	3	threshold brightness S1
	S2	18	4	threshold brightness S2
	S3	18	5	threshold brightness S3
	S4	18	6	threshold brightness S4
	S5	18	7	threshold brightness S5
	S6	18	8	threshold brightness S6
	S7	18	9	threshold brightness S7
	S8	18	10	threshold brightness S8
	S9	18	11	threshold brightness S9
	S10	18	12	threshold brightness S10
<b>Decision?</b>		on	any	SET pressed <2s – continue configuration – move to step 1
	<b>SAVE</b>	on	<b>1</b>	SET pressed >4s (until GREEN diode stops blinking) – save new settings and finish configuration
	QUIT	on	2	SET pressed >4s (until GREEN diode stops blinking) – quit configuration without saving new settings
	RESTORE	on	3	SET pressed >4s (until GREEN diode stops blinking) – restore factory settings and finish configuration
normal function		free	free	„+“ „-“ and SET buttons released

## 4 Technical specifications

Power supply	8–24VDC / 100mA, SELV
Power supply current	10mA (average)
Power consumption	120mW
No. channels	19
Output voltage	24V DC (max)
Output load	2A each (max)
Load type	LED
Protection index	IP20
Safety class	III
Usage	continuous, indoors
Working temperature	from –10°C to +45°C
Housing dimensions	88 x 90 x 65mm (5 modules)
Installation	35mm DIN rail

## 5 Installation instructions

The S19-P controller is a versatile device with numerous possible applications. Figure 3 depicts an example of the most common installation.

**CAUTION!** *Installing the controller requires technical knowledge and experience and should be carried out by a qualified person. Connection of the power supply to the mains may only be done by a qualified electrician.*

**CAUTION!** *All installation proceedings should be carried out with the power supply disconnected. The voltage may only be turned on once it has been ensured all connections are correct.*

**CAUTION!** *A particular caution is advised when connecting the control inputs (UP, DN, DIS). These are potential-free inputs and no voltage should be applied to them as it may result in burning of the controller. Please ensure that any control device (e.g. motion sensors, including those powered with 12V) do not apply any voltage onto these inputs.*

**CAUTION!** *We advise particular caution also when connecting the controller's outputs. Before connecting the output circuits (LED lamps) please ensure there are no short circuits. A short circuit (or overload) at any of the outputs may result in burning of the controller.*

The installation should follow this order:

- 1 Connect all LED lamps / LED strips and the power supply to the controller. For now, do not connect anything to the controller inputs (UP, DN, DIS).
- 2 Check if all connections are correct and faultless: if carried out in accordance with the installation diagram, if there are no short nor open circuits, if the polarity is set correctly, etc.
- 3 Insulate the connections.
- 4 Turn the power on. All LED lamps/strips should light up fully and after about 3s dim to the backlight value (2% brightness).
- 5 Connect the OUT output of the lower DELTA sensor to the UP input. Remove the sensor cover. Detection of a person by the DELTA sensor is signalled by the lighting of the green LED on the front of the sensor and should cause smooth switching on of consecutive lamps from L1 to L19, and after about 30 seconds from the end of the detection by the sensor, the lights should smoothly dim (to the backlight level).

- 6 Repeat the operation from p. 5 for the DOWN sensor.
- 7 The next step is connecting the light probe, switch or timer to the DIS input. The probe, switch and timer have 2 output terminals: one should be connected to GND and the other one to the DIS input of the stair controller, in accordance with the assembly diagram. In case of light probe, in order to activate the internal dusk switch, it is necessary to change the *DIS input* parameter to one of the values from S1 (darkest) to S10 (brightest). Depending on the brightness detected the IDS should switch the controller to active (if it's dark) or blocked (if it's bright) state with certain delay.
- 8 In the last step, if necessary, configure other controller parameters, especially *Number of lamps*.

Remember to make any manipulations and changes in the installation with the power off. Even a short-term occurrence of voltage on the wrong outlet of the controller can permanently damage the controller, and such damage is not covered by the warranty. Turn the power on only when you are sure that everything is connected properly.

### **5.1 EXAMPLE DIAGRAM. Typical staircase installation of S19-P, with a common power supply for the controller, sensors and lamps; with an optional Master lamp; controlled by staircase sensors DELTA; with the built-in dusk sensor; and with the option to light the lamps permanently.**

Assumptions:

- 19 groups of LED staircase lamps
- optional Master lamp (L19 and L18, if not used as ordinary lamps) as the ceiling/wall light or handrail backlight (e.g. LED strip)
- common power supply of the controller, DELTA sensors and LED lamps (typically 12 VDC)
- automatic turning on the lights by DELTA sensors
- option: permanent steady lighting with additional switches
- blocking the controller during daylight with a built-in dusk switch.

