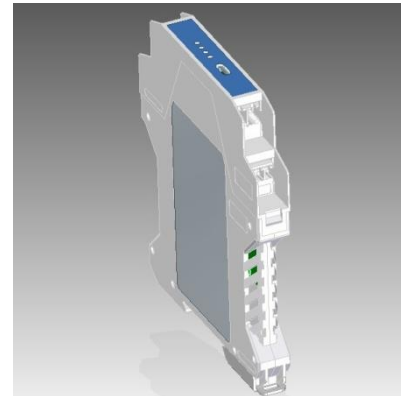


## Manual for camera system lighting controller CT-SL4D

### Use:

- Automated camera and lighting control for sequential image acquisition of four images with different lighting conditions.
- Smart Light series management
- Control of 4 stand alone lights (any light manufactured by Smart View)
- Integrated short circuit and overload protection.
- Dedicated camera trigger output with output voltage of +24V.
- Capability to invert Trigger signal.
- External system trigger input with a wide range of control signal voltage +4,5V až +24V.



### 1. Precautions

CT-SL4D is a device meant to be connected to the 24V DC. Please make sure that your power supply has stabilized supply voltage of 24V DC. The damage may occur if the power supply voltage exceeds 36V DC.

Maximum continuous current for the device is 4A from all four channels. Do not connect lighting that is exceeding these limitations. It is possible to use power supply of 24V DC at 4A or higher power output. When used with a power supply of more than 5A is used, we recommend to use suitable 4A fuse on the CT-SL1 power input.

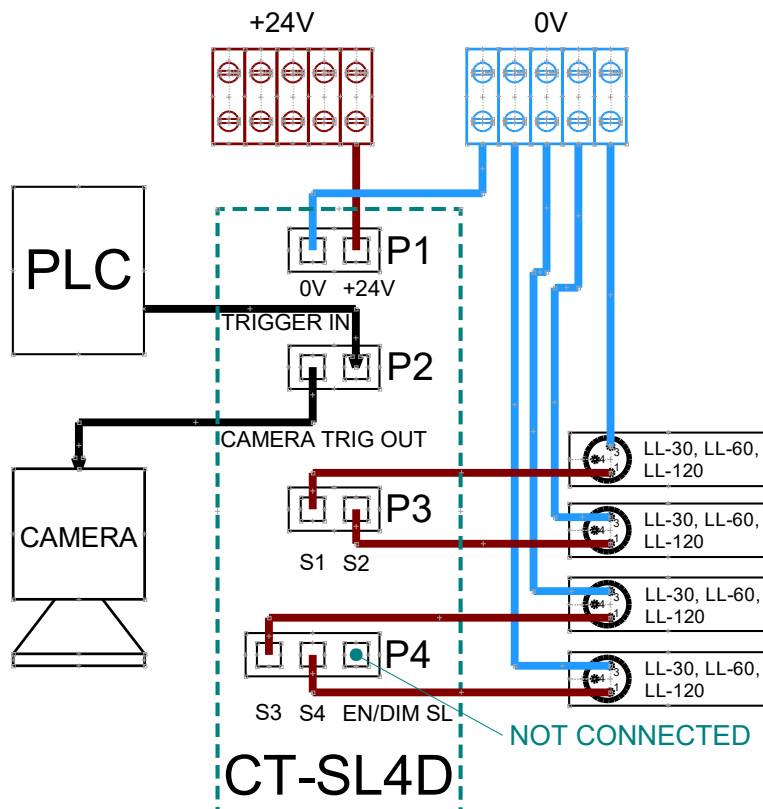
CT-SL4D uses the common potential of the grounding system with SELV protection. That means that (-) of the input voltage, trigger input, trigger output and metal housing are electrically interconnected and considered to be ground. This has to be considered when building an electrical connection between the controller and other system components. Make sure that all of the connected components allow connection to the (-) contact and are grounded to prevent the creation of different electrical potentials.

### 1. Wiring

This controller is meant to be used with all of the Smart View lights including SMART LIGHT line (type designation SL-xxx).

Typical wiring of the controller and lights is evident from the following three wiring variants.

Special wiring is needed when using smallest of the BarLight series with type designations of LL-30, LL-60 and LL-120. For these lights use wiring shown in the image nr. 1.



The LL-30, LL-60 a LL-120 do not have pin nr. 4 internally connected. The black wire on the M8 connector is therefore not used. The brown wire is directly connected to the S1-S4 outputs.

When using other SmartView lights except SMART LIGHT, please refer to the wiring in the image nr. 2.

For wiring the SMART LIGHT series please use the image nr. 3.

**Image 1 Wiring LL-30, LL-60, LL-120**

Connecting the lights with control signal for Enable/Dimmer (EN/DIM)

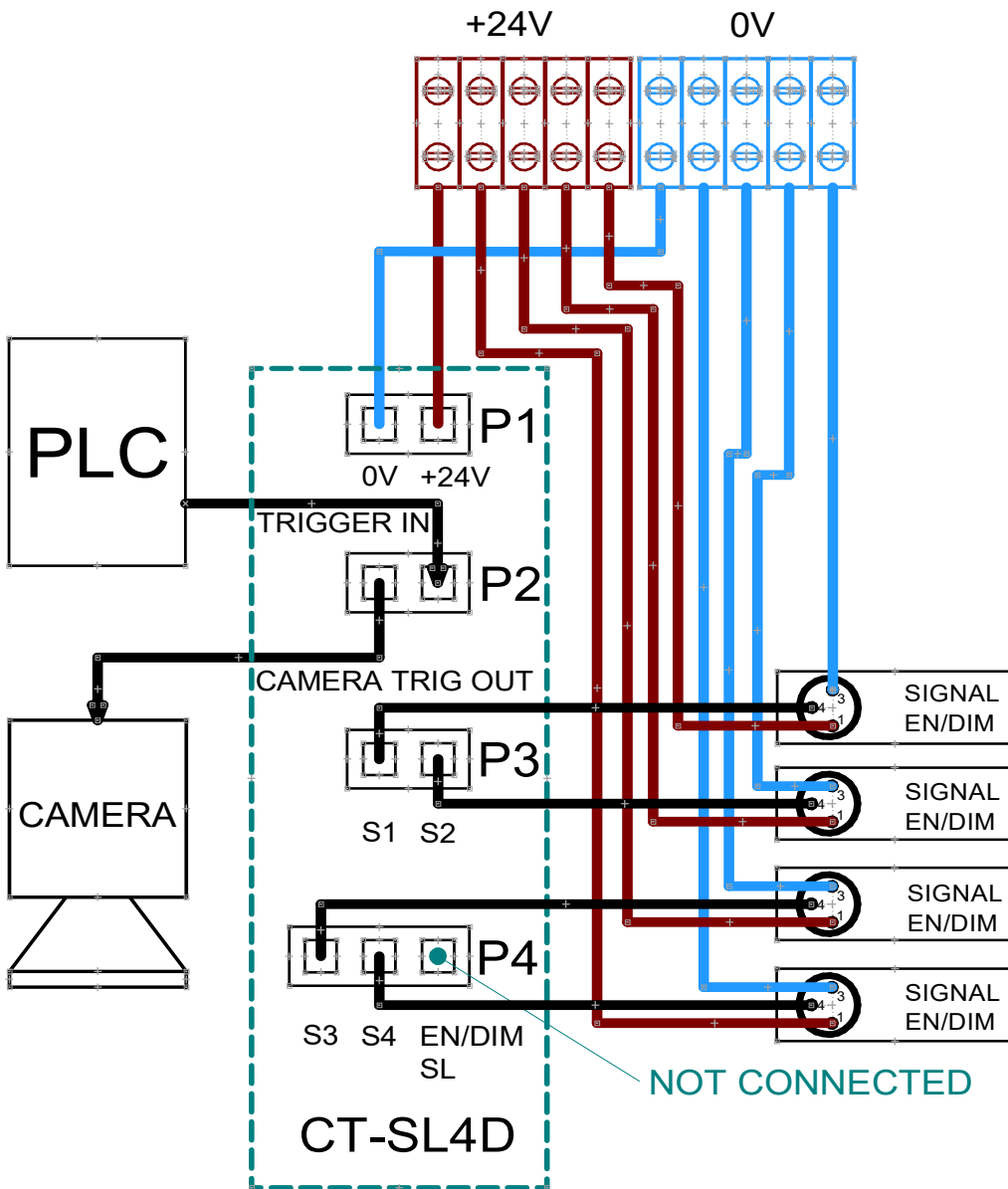


Image 2 Connecting four stand alone lights with, EN/DIM control signals

Control signals for enabling the light and dimming (ENABLE/DIMMER) are connected to the S1-S4 outputs of the controller.

The brown wire is connected to the +24V DC and blue wire is connected to the 0V.

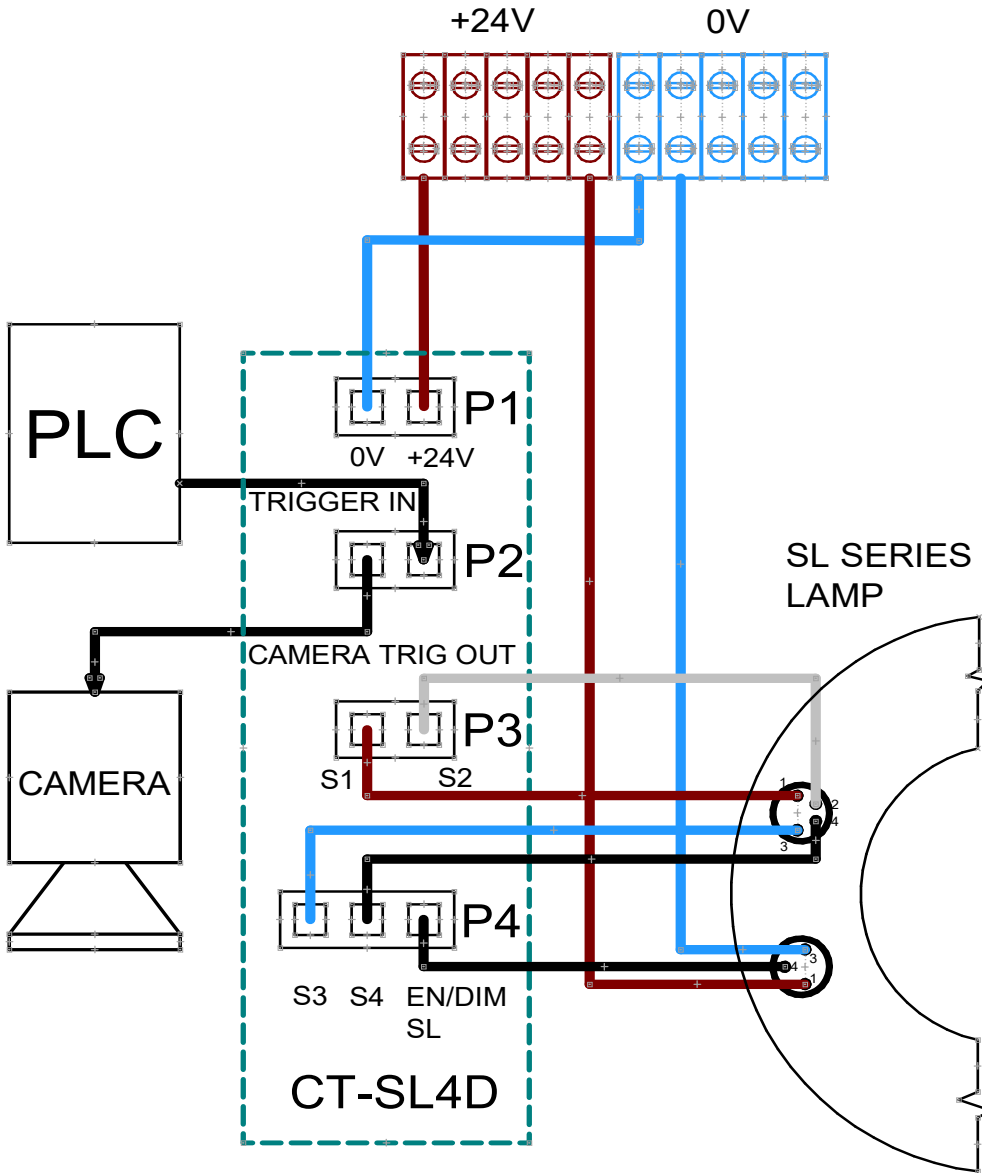


Image 3 Wiring the CTSL4 with SL series SMART LIGHT

## 2. Front panel

Status indicator LEDs and micro USB for PC communication are located on the front panel. The USB connection is not required for the controller to work. The serial USB port is meant to be used only for setting initial parameters to the controller with CTSL4.exe software or updating the firmware. The software can be found on the USB drive supplied with the controller.

ON	Green	Supply voltage is present
CT	Yellow	CAMERA TRIGGER OUT is active +24V
TIN	Yellow	TRIGGER IN signal is present
ER	Red	Electronic fuse indication. The electronic fuse protects the light and lights connected to the outputs from overload and short circuit. The fuse is indicated by a red LED. After removing the cause of the overload or shortcircuit reconnect the controller to the power supply. If cause of the problem got removed the controller will start in normal operating mode.
USB		USB Micro-B connector for PC communication

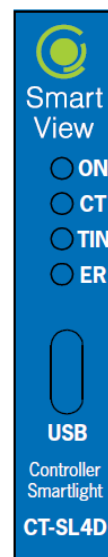


Image 4 Front panel with LEDs and USB Micro-B

### 3. Setting up the controller from CTSL4 software

You will find the program for setting up the controller on USB drive included in the packaging. The CTSL4 software does not require installation and can be launched directly from the USB drive. After closing the software the last used configuration is saved in the folder of the .exe file. This can be used when writing same settings into multiple controllers. The last configuration is an .ini file of same name as the .exe file.

Connecting the controller to your PC:

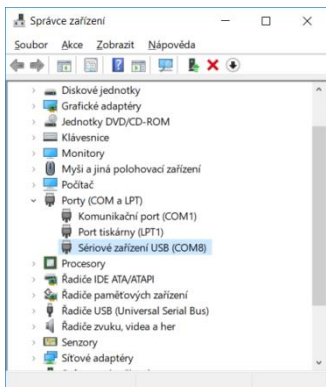
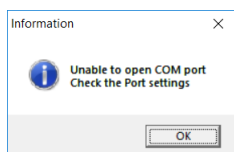


Image 5

1. Connect the controller and your PC with a USB cable.
2. After connecting the Windows should automatically detect the controller as a serial device on a new unused port.
3. To check whether the device was detected you can open device manager in your computer and check if new COM port was detected. Image 3 shows an example where the device was detected as COM8.

#### Launching the CTSL4.EXE

After the first startup, the program will not know which port to use for communications and prompt you with the message in image 4. You will need to change the port which the software is supposed to use for it to function. Any subsequent startups of the software will remember the last used port.



Press the **OK** to continue, this will open main window of the software.

Image 6

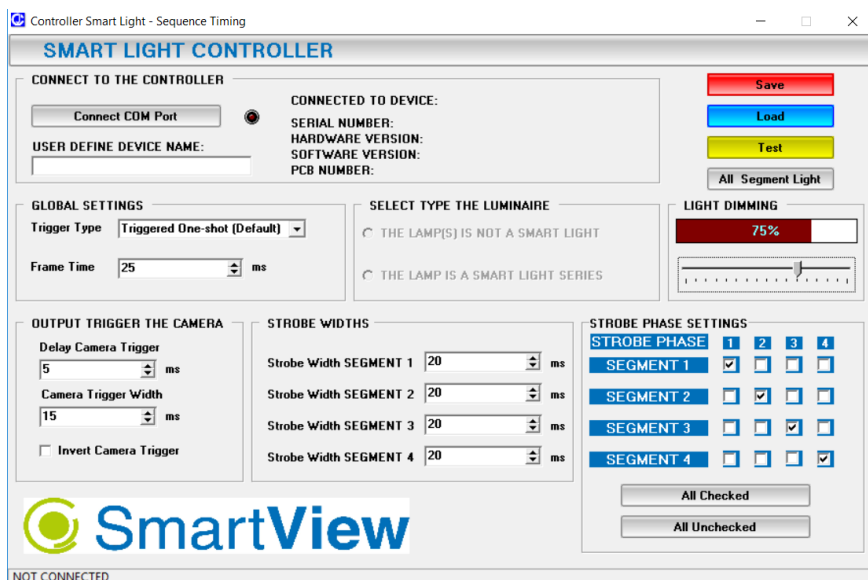
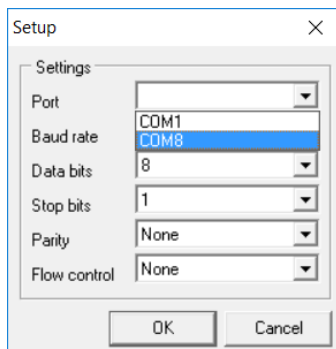


Image 7 - Main window before connecting the COM port

### Selecting the controllers COM port

In the main window click the **Connect COM Port** button to select required communication port.



Select **Port** from the dropdown menu of the **Setup** dialogue window of the controller. Leave the rest of the parameters unchanged.

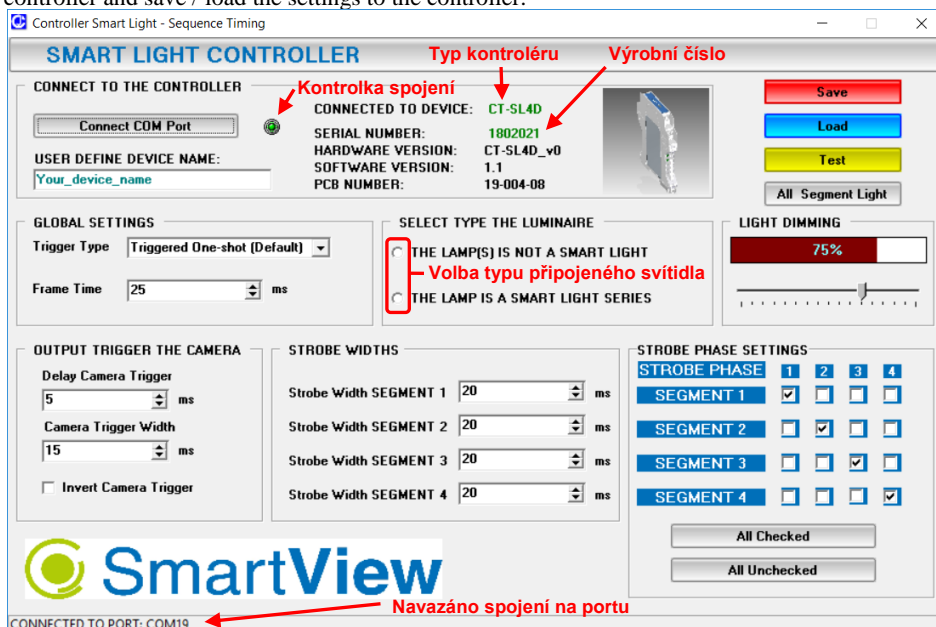
Baud rate: 9600  
Data bits : 8  
Stop bits : 1  
Parity : None  
Flow control: None

The **OK** button will activate the communication with the controller and the colour of the serial number in the main window should change to green and load all the information from the controller.

### Image 8 - COM port selection window

Main window after connecting to the controller

This is how the main window will look after establishing connection to the controller. Now, we will go over how to set up the controller and save / load the settings to the controller.



### Image 9 - Main window after establishing the connection

The main program window is divided into sections for better clarity.

### Section CONNECT TO THE CONTROLLER

This section contains button for serial port selection which was described in previous section and information about the controller uploaded from the device.

The section also contains **USER DEFINE DEVICE NAME** field which you can use to assign a name to the controller. The name length is limited to 30 characters. This name will be written to the controller along with the other parameters.

### Section GLOBAL SETTINGS

**Trigger Type** – Dropdown menu for selecting the trigger sequence

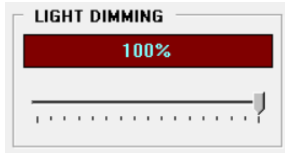
- **Triggeret One-shot** – Ony one sequence will be executed after rising edge signal on TRIGGER IN is detected. The signal has to return to the low state before the system can trigger again.
- **Triggered Continuous** – The sequence will be repeated continuously after rising edge signal on TRIGGER IN is detected and will stop only when signal returns to low state. The last sequence will be finished in such case.
- **Free-run** – The sequence is repeated continuously disregarding the TRIGGER IN signal.

**Frame Time** – Total time for a single frame. The value has to be same or larger than single segment time limit. If the frame time is longer than segment time then no segment is going to be enabled for that time difference in between the phases.

## Section SELECT TYPE THE LUMINARIE

The software is shared in between the two types of the controllers. This option is disabled after connecting the CT-SL1A controller. The CT-SL1A controller is only used with SmartView Smart Light and therefore does not need to be configured. This section is for configuring the CT-SL4D only. After connecting the CT-SL4D select the type of light that is connected to the controller. The light outputs behave differently in those modes and incorrect settings will cause them to behave incorrectly. Make sure to follow the recommended wiring in previous chapters.

## Section LIGHT DIMMING



This slider give you an option to set the light intensity in range from 20% to a 100% power. If the application permits it you can set the value to 70-75% and increase it over time if the LEDs start to wear out over time.

## Section OUTPUT TRIGGER THE CAMERA

**Delay Camera Trigger** – Requested delay for the camera triggering signal. If set to zero the camera trigger will occur at the same time as the light segment trigger. We recommend to set at least some minimal delay to make sure the inspection is illuminated for the acquisition duration.

**Camera Trigger Width** – This parameter sets how long will the CAMERA TRIGGER OUT signal be in high state.

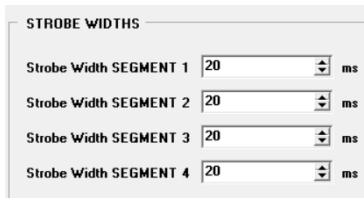
**Invert Camera Trigger** – Selecting this field will invert the CAMERA TRIGGER OUT signal. This option is meant to be used with NPN trigger logic.

Notice:

We strongly point out that the output signal voltage is +24V DC. Read the camera documentation thoroughly and check what are permitted voltages ranges on the camera input. If the signal logic is TTL, you will have to modify the signal appropriately by an external element.

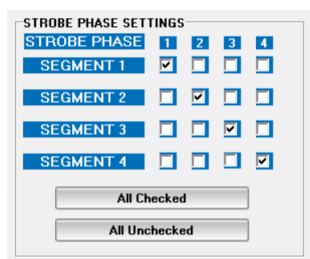
Improper wiring can permanently damage camera input circuits!

## Section STROBE WIDTHS



This section sets the flash time for individual segments. The times can be set in miliseconds depending on the needs of an application. The segment time cannot be longer than the set Time Frame. If that happens the software will notify you with a dialogue window to decide which of the times to prioritize and will change them accordingly.

## Section STROBE PHASE SETTING



STROBE PHASE	1	2	3	4
SEGMENT 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SEGMENT 2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SEGMENT 3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SEGMENT 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

All Checked  
All Unchecked

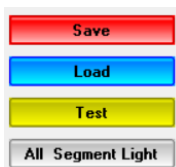
Strobe phase decides on which segments are going to be enabled in which phase by ticking the relevant fields. The Strobe phase 1 will be performed first after the TRIGGER IN signal is received.

Note:

The Smart Light divides its total current for light between all of the segments, therefore if only one is active all power will be going to that single segment causing it to have four times the light output compared to when all segments are active.

The above mentioned does not apply when four stand alone lights are connected to the CT-SL4D controller. The dimming sets all of the lights to same value. In this use case the light output is unaffected by the number of segments enabled at any given time.

## Buttons for transferring data between the PC and a controller



**Save** – Saves the data to the EEPROM of the controller. The saved data will be permanently stored. The data will remain even after disconnecting the power supply.

**Load** – Will load all the data saved in the controller to the PC software.

**Test** – This button will run the sequence with the parameters currently set in the software as if TRIGGER IN signal was used.

**All Segment Light** – Rozsvítí všechny segmenty najednou a vyšle jeden trigger do kamery. Časy podle nastavení, které je zapsáno v kontroléru (Delay Camera Trigger, Camera Trigger Width a Strobe Width

SEGMENT 1.

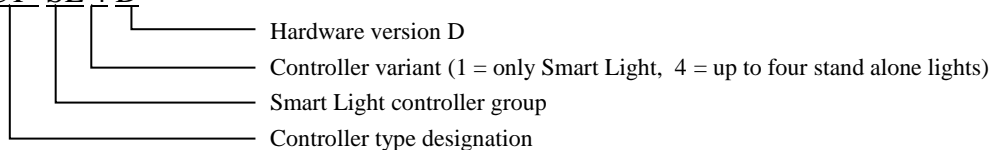
## 4. Technical specification

		CT-SL1A	CT-SL4D
Max. supply voltage	$U_{max}$	36 V DC	36 V DC
Nominal voltage	$U_{jm}$	24 V DC	24 V DC
Nominal current	$I_{jm}$	90 mA	90 mA
Max. current including the connected light	$I_{max}$	2 A	-
Max power	$P_{max}$	48 W	-
Trigger voltage TRIGGER IN	$U_{trig IN}$	+5,4-24 V	+5,4-24 V
Trigger current TRIGGER IN	$I_{trig IN}$	12 mA	6,5 mA
Trigger voltage CAMERA TRIGGER OUT	$U_{trig OUT}$	+24 V	+24 V
Trigger current CAMERA TRIGGER OUT	$I_{trig OUT}$	150 mA MAX	150 mA MAX
Output voltage SEGMENT 1 - 4	$U_{segment out}$	+24 V	+24 V
Output current SEGMENT 1 - 4	$I_{segment out}$	5 mA	750 mA/4x187 mA
Ambient temperature	$t_a$	-5 - +40 °C	-5 - +40 °C
Protection category		III.	III.
International Protection Marking	IP	30	50

Meets RoHS directive 2002/95/ES

## Order Code

CT- SL 4 D

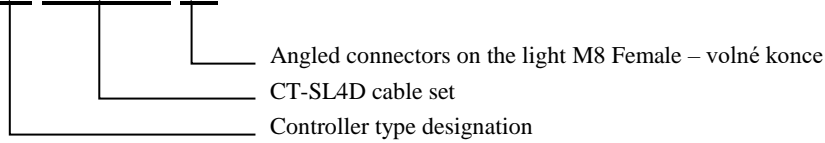


### Optional accessories

Ke kontroléru je možno objednat sadu kabelů potřebných pro kompletní zapojení svítidla. V nabídce máme dvě sady kabelů, zvolenou sadu je nutno objednat zvlášť, není součástí kontroléru. Varianty s úhlovým nebo přímým konektorem.

#### **CT-CABSET-L4**

#### **Cable set CT-SL4D 2x M8 Female angle, 5m**



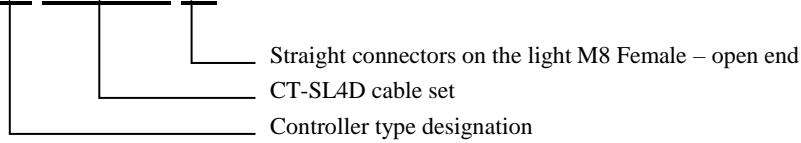
Packaging contains:

1x light power cable M8-3pin female angled – open end, length 5m.

1x segment control cable M8-4pin female angled – open end, length 5m.

#### **CT-CABSET-P4**

#### **Cable set CL-SL4D 2x M8 Female front, 5m**



Packaging contains:

1x light power cable M8-3pin female straight – open end, length 5m.

1x segment control cable M8-4pin female straight – open end, length 5m.