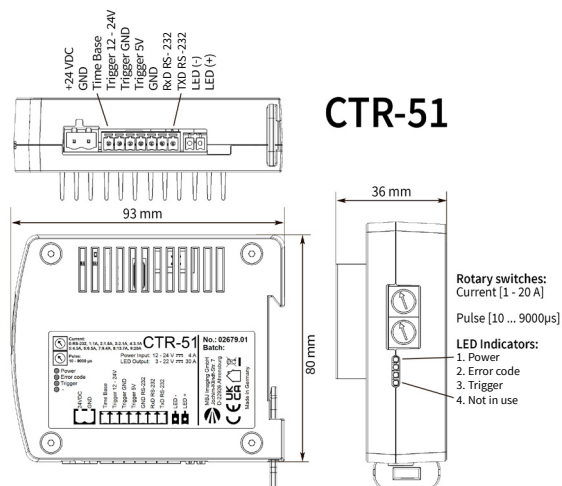
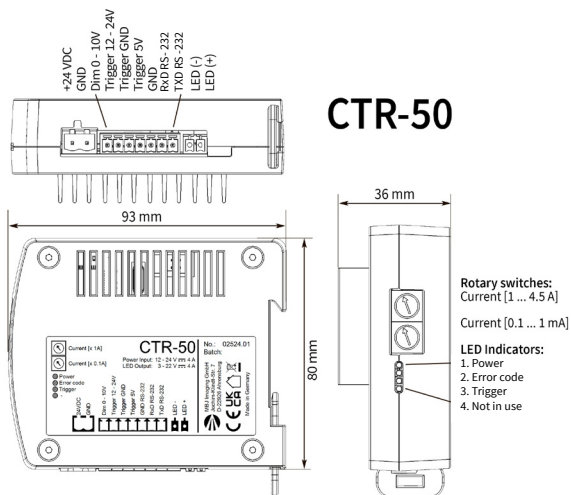


## Mechanical Integration

The CTR controllers are supplied with screwable plug-contacts for power supply, control signals, RS-232 interface and the LED light. The controller is made for top hat rail mounting, a clip locks the unit to the top hat rail.



## Safety Notes

Before working with this unit, read the warning and application instructions carefully and completely.



1. **The device is designed for indoor use only.**
2. **Health** – The device must be disconnected from the power source before the installation and/or maintenance can start. The device must not be used when a failure may cause a personal injury.
3. **Electricity** - The housing is electrically isolated from the ground of the power supply. Exceeding the permissible operating voltage or exceeding the maximum allowed switching current per channel can lead to the destruction of the device or to a significant shortening of the lifetime of the connected LED lighting module.
4. **Mechanical integration** – The controller is made for top hat rail mounting. A clip can be used to lock the unit to the top hat rail. For optimal heat flow a left/right distance of 10mm to next unit is recommended.

### Status LED's CTR-50/51

LED	Name	Status	Meaning
1	Power	OFF	Power input off
		ON	Power input on
2	Status <sup>1)</sup>	OFF	LED light switched off
		ON	LED light switched on
3	Trigger	s-s-l-l	No current, no LED connected
		s-l-l-l	Trigger received while still in IRQ <sup>2)</sup> (Flash + gap zone), trigger lost
		s-l-s-l	Max allowed temperature reached
		s-s-s-s	Check serial RS-232 status in logs
4	-	OFF	Trigger low state
		ON	Trigger high state
4	-	-	Not in use

1) s = short flash, l = long flash  
2) IRQ = interrupt request

# Controller CTR-50/51



### Models in Series

CTR-50	CTR-51
Current controlled 1-channel operation for steady LED light and simple LED flash light applications	Voltage controlled 1-channel operation for short, very precise and high-power LED flashes, precise flash pulses from 5 µs to 100 ms
Easy set-up of LED current via rotary switches	Easy set-up of LED flash duration and current via rotary switches
Straight flash control via the camera's 'exposure' or 'strobe' signal or manual flash set-up	
I/O for straight camera connection	
RS-232 access with any serial communication software	
Support for 3rd party LED lightings up to 22V	
Passive cooling and overheat protection (automatic switch off)	

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## Electrical Connections

Pin	CTR-50 Function	CTR-51 Function	Comment
1	24 VDC		Controller power input
2	GND		Device ground
3	Dimmer 0 V ... 10 V <sup>1)</sup> 0 V = 0 % of sel. current 10 V = 100 % of sel. current	Time base multiplier for rotary switch <sup>2)</sup> Ground: 10 – 90 µs Not connected: 100 – 900 µs 24V: 10.000 – 90.000 µs	On CTR-51 pin 3 has three status: connected to ground, left unconnected (open) or connected to 24 V.
4	Trigger 12-24V		
5	Trigger GND		Trigger ground, isolated
6 <sup>3)</sup>	Trigger 5V - TTL		Signal low ≤ 0.8V Signal high ≥ 2.0V
7	GND		Ground RS-232, int. connected to device GND
8	Rx D		Receive data RS-232
9	Tx D		Transmit data RS-232
Pin	Wire <sup>4)</sup>	Output to light	
10 <sup>5)</sup>	black + blue	LED (-)	
11	white + brown	LED (+)	

- 1) Dimmer switched off by factory default. Needs to be enabled via RS-232.
- 2) Longer flash times can be set via RS-232
- 3) Input voltages above 5.5 V will destroy the trigger input circuit!
- 4) for MBJ connecting cable and MBJ LED light (-) without integrated controller
- 5) Do **NOT** connect to the external ground of the power supply or the ground of the trigger signal! This might destroy connected lights or devices.

## Operating modes

Mode	CTR-50 Function	CTR-51 Function
STEADY	Continuous light, LED always on	-
AUTO <sup>1)</sup>	LED-output follows the trigger	LED-output follows the trigger
FLASH	Manual set-up for flash, delay and duration (via RS-232 only)	Flash-on-trigger with set flash duration via rotary switches or RS-232 <sup>2)</sup>
OFF	LED output switched off	

- 1) The CTR-50 factory setting of the operation mode is AUTO. Other operating modes are selectable via the RS-232 interface.
- 2) The CTR-51 factory setting of the operation mode is FLASH. Other operating modes are selectable via the RS-232 interface.

## Detection of the light source

After the CTR is powered on, it remains in detection mode until an LED illumination has been connected and detected. Afterwards the CTR starts operation.

## Application Samples for CTR controller

### Steady light

### Steady light with brightness control (CTR-50 only)

### 24 VDC triggered light Common emitter, sinking (NPN) Inverted strobe signal

### 5 V triggered light Common collector, sourcing (PNP)

## RS-232

The serial interface allows changing the operation mode and set-up of individual timings and currents. The control commands are described in a separate RS-232 manual which can be found at: [www.mbj-imaging.com/en/products/led-controller](http://www.mbj-imaging.com/en/products/led-controller).

## Rotary Switches

Use the rotary switches to set-up the allowed current for the connected LED. Please check the LED light manufacturer's manual to make sure not to exceed the maximum LED current.

## Upper rotary switch

Position	CTR-50	CTR-51
	LED current 1 A steps	Flash current
0	0 A (to 0.9 A) <sup>1)</sup>	Controlled via RS-232 (0 - 30 A) <sup>2)</sup>
1	1 A (to 1.9 A)	1.0 A
2	2 A (to 2.9 A)	1.5 A
3	3 A (to 3.9 A)	2.1 A
4	4 A (to 4.0 A)	3.1 A
5	-	4.5 A
6	-	6.5 A
7	-	9.4 A
8	-	13.7 A
9	-	20.0 A

- 1) CTR-50: If both rotary switches are set to 0 the factory default setting for the current is 50 mA
- 2) CTR-51: The factory default setting is 150 mA

## Lower rotary switch

Position	CTR-50	CTR-51		
	LED current 0.1 A steps <sup>1)</sup>	Flash duration <sup>2)</sup>		
		Pin 3 on GND	Pin 3 - open	Pin 3 on 24 V
0	add 0 mA	Controlled via RS-232 (0 - 30 A)		
1	add 100 mA	10 µs	100 µs	1 ms
...	...	...	...	...
9	add 900 mA	90 µs	900 µs	9 ms

- 1) CTR-50: If both rotary switches are set to 0 the factory default setting for the current is 50 mA
- 2) CTR-51: Shorter and longer flash times (5 µs - 100 ms) can be set via RS-232.

Specification	CTR-50	CTR-51
<b>Electrical parameter</b>		
Operating Voltage	min. 2 V above the forward voltage of the LED light source	
LED steady current <sup>1)</sup> (ON & AUTO mode)	50 mA ... 4000 mA	150 mA ... 1000 mA (AUTO mode only)
LED flash current <sup>2)</sup>	50 mA ... 4000 mA	150 mA ... 30 A
Min flash duration	2 ms depending on LED working point and duty cycle	5 µs depending on LED working point and duty cycle
Max. flash duration	59 s	60 ms
Max. flash latency <sup>3)</sup>	< 500 µs	< 1 µs
Max. flash frequency	< 500 Hz	25 kHz
Flash duration & delay: smallest adjustable step	10 µs	1 µs
Voltage range for LED modules	approx. 2 V to 22 V	
<b>Mechanical parameter</b>		
Dimension (H x W x D)	36 mm x 80 mm x 93 mm	
Weight	350 g	
Connectors	2 Pin plug contact (RM5.08), 7 Pin plug contact (RM3.81), 2 Pin inv. plug contact (RM3.81)	
Certifications	CE, RoHS, EN61000-6-2, EN61000-6-4	
Degree of protection	IP20	
Humidity	30% to 70%	
Operating temperature	Max. 45°C (duty cycle < 50 %)	
Accessories	Top rail mounting clip and plugs (scope of delivery). For cable, mounts and lighting modules please check <a href="http://www.mbj-imaging.com">www.mbj-imaging.com</a>	

- 1) LED current less than 100 mA may cause LED light flickering
- 2) The flash energy is provided by a capacitor and requires sufficient time for recharging. The flash energy (flash frequency \* flash duration \* current) is limited to 1A. E.g.: 100 flashes/s \* 100µs \* 30A = 0.3A
- 3) The higher the current and the shorter the cycle time, the greater the latency can be.

