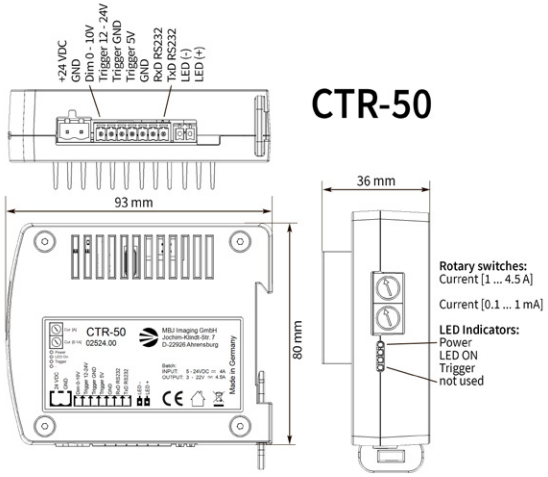
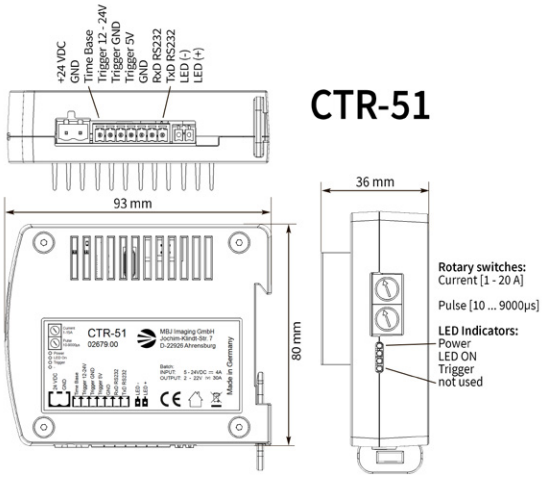
Mechanical Integration

The CTR controllers are supplied with plug-contacts for the LED light, control signals, RS232 interface and input power. The controller is made for top hat rail mounting, a clip locks the unit to the top hat rail.





More 2D and 3D drawings can be found online:
www.mbj-imaging.com

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	Status	Meaning
LED	Status	Meaning
1 Power	OFF ON	Controller power input - off Power input - on
2 Status[1)]	OFF ON	LED light switched off LED light switched on
	s-s-l-l	No current, no LED connected
	s-l-l-l	Trigger received while still in IRQ[2)] (Flash + gap zone), trigger lost
	s-l-s-l	max allowed temperature reached
	s-s-s-s	check serial RS232 status in logs
3 Trigger	OFF ON FLASH	Trigger low state Trigger high state 4x: system boot sequence
4 MBJ	OFF	Not in use

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

MBJ
imaging starts with light

Operating Manual
Technical Data

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 1µs to 100ms
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.	
Easy control via MS Windows 10® based software or directly through RS232	
Support for 3rd party LED lightings	
Passive cooling and over heat protection (automatic switch off)	

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Manual CTR50/51 Controller: Revision 05 - 18 Mai 2021. INDD file Rev09.

Electrical Connections

Pin	CTR-50 Function	CTR-51 Function	Comment
1	24V DC		Controller power input
2	GND		Device ground
Pin	**Function**	**Function**	**Comment**
3	Dimmer 0V … 10V[1] 0V= 0% of sel. current 10V=100% of sel. current	Time base multiplier for rotary switch[2] Ground: 10 – 90µs Not connected: 100 – 900µs 24V: 10.000 – 90.000µs	On CTR-51 pin 3 has three status: connected to ground, left unconnected (open) or connected to 24V.
4	Trigger 12-24V		
5	Trigger GND		Trigger ground, isolated
6[3]	Trigger 5V - TTL		Signal low < 0.8V Signal high > 2.0V
7	GND		Ground RS232, int. connected to device GND
8	RxD		Receive data RS232
9	TxD		Transmit data RS232
Pin	**Wire[4]**	**Wire[4]**	**Output to light**
10[5]	black + blue		LED (-)
11	white + brown		LED (+)

1) Dimmer switched off by factory default. Needs to be enabled via RS232. Without connection to pin 3, when dimmer is activated, intensity is like 0V = 0% of selected current
2) Longer flash times can be set via RS232
3) Input voltages above 5.5V will destroy the trigger input circuit!
4) for MBJ connecting cable and MBJ LED light (-x) 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 mode

Mode	CTR-50 Function	Mode	CTR-51 Function
STEADY	Continuous light, LED always on	-	no support for continuous light, use CTR-50
AUTO[1]	LED-output follows the trigger	AUTO	LED-output follows the trigger
FLASH	Manual set-up for flash, delay and duration (via RS232 only)	FLASH[2]	Flash-on-trigger with set flash duration (RS232)
OFF	LED outputs switched off	OFF	LED outputs switched off

1) The CTR-50 factory setting of the operation mode is AUTO. Other operating modes are selectable via the RS232 interface.
2) The CTR-51 factory setting of the operation mode is FLASH. Other operating modes are selectable via the RS232 interface.

Detection of the light source
After the CTR is supplied with voltage, it remains in Detect Mode until an illumination has been detected. Then the CTR changes to the selected mode.

RS232
The serial interface allows changing the operation mode and setup of individual timings and currents. The control commands are described in a separate RS232 manual.

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

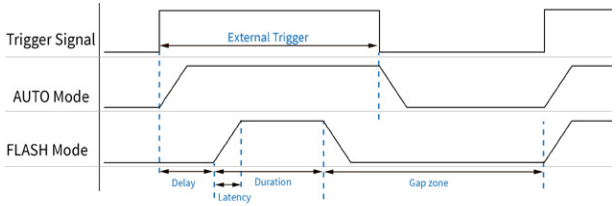
Position	CTR-50	CTR-51
	LED current 1A steps	Flash current [2]
0[1]	0A (to 0.9A)	Controlled via RS232 (0 - 30A)
1	1A (to 1.9A)	1.0A
2	2A (to 2.9A)	1.5A
3	3A (to 3.9A)	2.1A
4	4A (to 4.0A)	3.1A
5		4.5A
6		6.5A
7		9.4A
8		13.7A
9		20.0A

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

Lower rotary switch

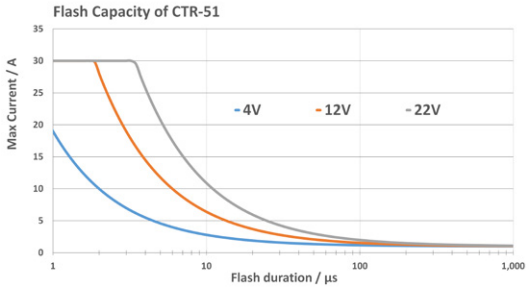
Position	CTR-50	CTR-51		
	LED current 0.1A steps[1]	Flash duration [2]		
		Pin 3 on GND	Pin 3 - open	Pin 3 on 24V
0	add 0mA	Controlled via RS232 (0 - 30A)		
1	add 100mA	10µs	100µs	1ms
...	...	...	...	...
9	add 900mA	90µs	900µs	9ms

1) CTR-50: If both rotary switches are set to '0', the current is 50mA, the factory setting for the current is 50mA
2) CTR-51: Shorter and longer flash times (1µs - 100ms) can be set via RS232.



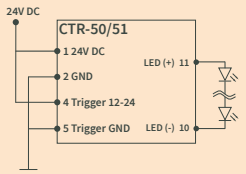
Specification	CTR-50	CTR-51
Electrical parameter		
Operating Voltage	24V DC/ 4.5A 5V - 26V, min. 2V above the forward voltage of the LED light source	
LED steady current[1] (ON & AUTO mode)	50mA ... 4000mA	150mA … 1000mA (AUTO mode only)
LED flash current[2]	50mA ... 4000mA	150mA … 30A
Min flash duration	2ms depending on LED working point and duty cycle	1µs depending on LED working point and duty cycle
Max. flash duration	59s	
Max. flash latency[3]	<500µs	<1µs
Flash duration & delay: smallest adjustable step	10µs	1µs
Voltage range for LED modules	approx. 2.5V to 22.0V	
Mechanical parameter		
Dimension (H x W x D)	36mm x 80mm x 93mm	
Weight	350g	
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 (made for control cabinet)	
Humidity	30% to 70%	
Operating temperature	10°C to 30°C	
Accessories	Top rail mounting clip and plugs (scope of delivery). For cable, mounts and lighting modules please check www.mbj-imaging.com	

1) LED current less than 100mA may cause LED light jitter
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.

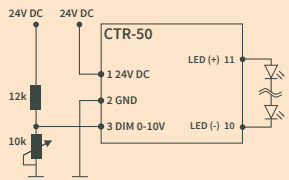


Application Samples for CTR controller

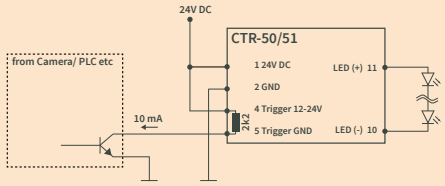
Steady light



Steady light with brightness control (CTR-50 only)



Triggered light with NPN sinking output (inverted strobe signal, open collector)



TTL triggered light with PNP sourcing (open emitter)