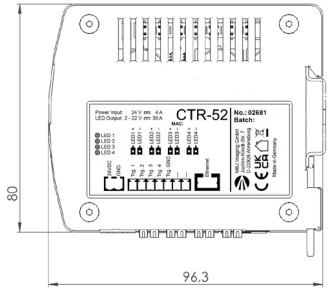
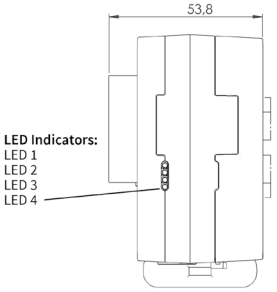
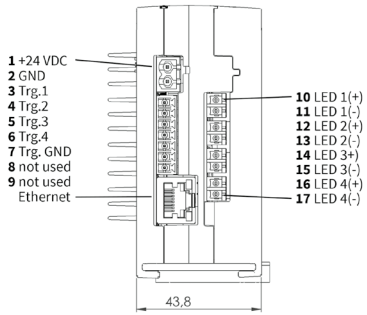
Mechanical Integration

The CTR-52 controller is supplied with top hat rail mounting and plug-contacts for the LED light, control signals and input power.

CTR-52







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

Safety Notes

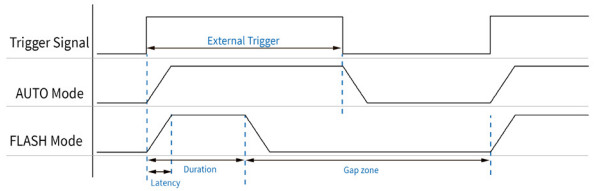
Before working with this unit read the warning and application instructions carefully and completely.

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 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-52

LED	Status	Meaning
LED 1	OFF ON	Channel 1 LED light not found Channel 1 LED light connected
LED 2	OFF ON	Channel 2 LED light not found Channel 2 LED light connected
LED 3	OFF ON	Channel 3 LED light not found Channel 3 LED light connected
LED 4	OFF ON	Channel 4 LED light not found Channel 4 LED light connected
LED 1-4	flashing	Error

Trigger Signals



Imaging starts with light

Operating Manual
Technical Data

Controller CTR-52

CTR-52
4-Channel LED driver
Current controlled operation for continuous LED light
Voltage controlled operation for short, precise and high-power LED flashes
Full control via Modbus TCP/IP
MS Windows based control software and multi OS Python scripts
Synchronize flash control via the camera's 'exposure time'
4 opto-coupled trigger I/O lines with flexible assignment to the LED channels
Passive cooling and overheat protection
Sequence mode with up to 16 steps and flexible light scenarios

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03735.05 Manual MBJ Controller CTR-52, September 2026

Electrical Connections

Pin	Pin Name	CTR-52 Function	Comment
1	24 VDC	24 VDC	Power supply input
2	GND	Ground	Power supply ground
3	Trg.1	Trigger 1 12-24 V[1]	Internally opto-coupled
4	Trg.2	Trigger 2 12-24 V	Internally opto-coupled
5	Trg.3	Trigger 3 12-24 V	Internally opto-coupled
6	Trg.4	Trigger 4 12-24 V	Internally opto-coupled
7	Trg. GND	Trigger ground	Common Tr. ground, isolated
8	--	not used	
9	--	not used	
	Pin Name	**Wire[2]**	**Output to light**
10	LED1+	white + brown	Channel 1
11	LED1-[3]	black + blue	Channel 1
12	LED2+	white + brown	Channel 2
13	LED2-[3]	black + blue	Channel 2
14	LED3+	white + brown	Channel 3
15	LED3-[3]	black + blue	Channel 3
16	LED4+	white + brown	Channel 4
17	LED4-[3]	black + blue	Channel 4
	Port	**Function**	**Comment**
	Eth	RJ45 network	Modbus over Ethernet

1) Signal high ≥ 10 V, signal low ≤ 2V
2) For MBJ connecting cable and MBJ LED light (-x) without integrated controller
3) Do **NOT** connect LED(-)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-52 Function
STEADY	Current controlled continuous light, LED always on
AUTO	Voltage controlled, LED output follows the trigger status
FLASH[1]	Manual set-up for flash, delay and duration via Modbus protocol
SEQUENCE	Up-to 16 different lighting scenarious in the FLASH mode
DISCHARGE	Unload flash capacitors
OFF	LED output is switched off

1) The CTR-52 factory setting of the operation mode is FLASH 150 mA, 300 µs. Other operating modes are selectable via the Modbus interface

Modubus Control

Hardware

The standard fieldbus provided with the CTR-52 is based on Modbus TCP. Modbus is a data communications protocol for use with programmable logic controllers (PLCs).

Modbus Setup Information

The CTR-52 is a Modbus device that allows you to access the light settings via Ethernet. The controller communicates using a master-slave technique in which only one device (the master) can initiate transactions (called queries). The other devices (slaves) respond by supplying the requested data to the master, or by taking the action requested in the query.
The CTR-52 is implemented as a Modbus slave. The CTR receives messages from the master, processes them and responds to them. The product does not send messages by itself.

Modbus Setup Information	
Modbus Type:	Slave (Server)
Modbus Format:	Modbus TCP
Output Data Mode:	Auto

Notes

- The default device IP address is 192.168.0.99. The address can be changed via a command line tool provided with the MBJ software package
- The RESET Button on the back of the device can be used to return to the factory default settings
- Please refer to the fieldbus communication protocol definition for details

Software

The CTR-52 can be programmed via different alternative methods:
- Direct Modbus access for which a detailed protocol definition is provided
- The easy to use MBJ software user interface based on MS Windows
- Use of sample python scripts for common application

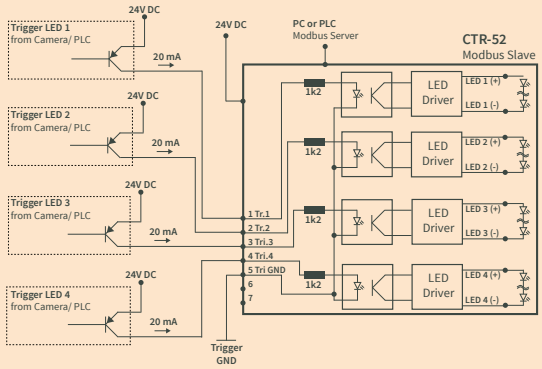
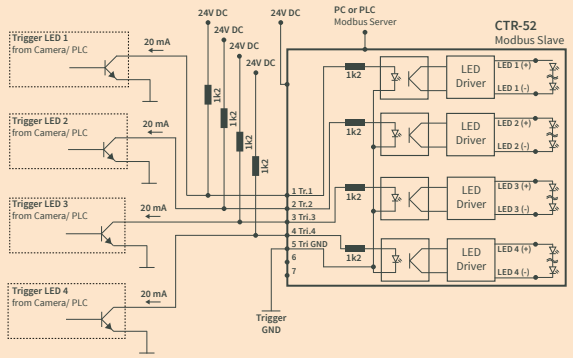
For further information and download of the CTR-52 software components visit: www.mbj-imaging.com/en/products/led-controller

Specification	CTR-52
Electrical parameter	
Operating Voltage	24 V DC / 4 A +10%/-5%, min. 2V above the forward voltage of the LED light source
LED steady current[1] (ON & AUTO mode)	min. 100 mA 1.5 A per Channel
LED flash current[2]	150 mA...25 A
Min flash duration	20 µs depending on LED working point and duty cycle
Max. flash duration	59 s
Max. trigger frequency	2 kHz
Max. flash latency[3]	3..5 µs
Flash duration & delay: smallest adjustable step	1 µs
Voltage range for LED modules	approx. 1.9 V...21.6 V
Mechanical parameter	
Dimension (H x W x D)	53 mm x 80 mm x 93 mm
Weight	250 g
Connectors	1x 2 Pin plug contact (RM5.08), 1x 7 Pin plug contact (RM3.81), 4x 2 Pin inv. plug contact (RM3.81) 1x RJ45 Ethernet
Certifications	CE, RoHS
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) Current < 100 mA is possible, but depending on the LED configuration light flicker may occure.
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 1 A. E.g.: 100 flashes/s * 100 µs * 30 A = 0.3 A
3) The higher the current and the shorter the cycle time, the greater the latency can be

Application Samples for CTR-52 Controller

Triggered light with PNP sourcing



Triggered light with sinking output (inverted strobe signal)