



DCS2402-1S

LED lighting controller
Digital precision current source
for industrial image processing



Made in GERMANY © evotron 2019-04

Functional Overview

The lighting controller DCS2402-1S operates as a digital precision current source for the control of LED lightings with flash times of 1 μ s to continuous light. With the evotronLIGHT technology, the parameters of the LED lighting are monitored online, thus achieving high reliability and service life in industrial applications.

- LED current digitally adjustable from 1 mA to 2 A.
- Dimmer function for manual fine adjustment
- Flash times from 1 μ s to continuous light with high signal quality of the LED current pulses
- Flash frequency from 500 kHz up to 1 flash per day
- Online monitoring of the lighting parameters LED current, LED voltage and LED temperature
- Status report via LED display and digital STATUS-OUT signal
- 5V-TTL and 24V-PLC compatible I/O-Interface
- Digital TRIGGER-IN filter for high noise immunity
- Operating voltage range from 12V to 30V with integrated active reverse polarity protection
- Short circuit proof and ESD protected
- Especially suitable for precise machine vision measurement tasks with line- and matrix cameras

Connection plan

Pin assignment M8 male 4-pin

- Power supply
- Trigger-IN
- Status-OUT

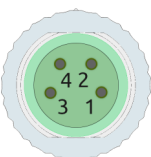


Pin	Cable	Signal
1	brown	+V _S
2	white	TRIGGER-IN
3	blue	GND
4	black	STATUS-OUT

Pin assignment M8 female 4-pin

- Pins LED-Lighting / LED Current
- Pins LED-Lighting / Sensor Data *

*Pins are used only for LED-Lights with evotronLIGHT-Technology



Pin	Cabel	Signal
1	brown	+I _{LED} (Anode)
2	white	SD *
3	blue	-I _{LED} (Katode)
4	black	SG *

Technical Data

	MIN	TYP	MAX
Supply voltage (DC) +V _S	12 V	24 V	30 V
Power consumption Standby I _{SSB} (I _{LED} =0 A)	16 mA	20 mA	22 mA
Output Power P _{OUT} (I _{LED} =2 A)			45 W
Power dissipation P _V			1.5 W

Output Parameter High Precision Mode (Switch SW1 Pos. 1, I_{LED} 50mA)

LED Output current I _{LED}	0 A	-	50 mA
Deviation Δ I _{LED} @ 50 mA			0.5 %
Pulse duration LED-Output current t _{LED-PULS}	1 μ s		Continues
Flash frequency LED f _{LED-PULS}	0 Hz (Continues)		500 kHz
LED Forward voltage V _{LED}	4.5 V		22.5 V
Delay Trigger-IN to LED Output current t _{LED-D}	345 ns	350 ns	35 μ s

Output Parameter Fast Mode (Switch SW1 Pos. 2...16, I_{LED} 100 mA... 2,0 A)

LED Output current I _{LED} (Dimmer D = 100%)	100 mA	-	2 A
Deviation Δ I _{LED}			2 %
Pulse duration LED Output current t _{LED-PULS}	1 μ s		Continues
Flash frequency LED f _{LED-PULSE}	0 Hz (Continues)		500 kHz
LED Forward voltage V _{LED}	4.5 V		22.5 V
Delay Trigger-IN to LED Output current t _{LED-D}	240 ns	250 ns	260 ns

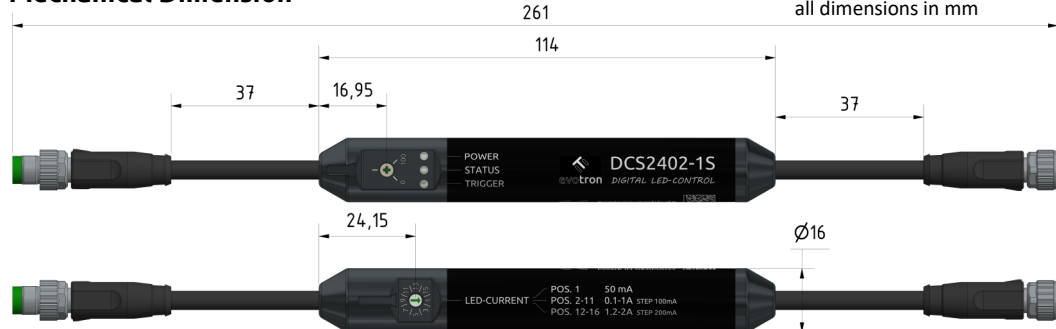
Digital IN - OUT Signals

Trigger-IN Low V _{TRIG_L}	-0.2 V	1.4 V	1.9 V
Trigger-IN High V _{TRIG_H}	2.5 V	2.6 V	30 V
Trigger-IN Input current I _{TRIG}	0.2 mA	3.5 mA	5.0 mA
Trigger Frequency f _{TRIG}	0 Hz (Continues)		500 kHz
Tigger OFF Time t _{TRIG-OFF}	1 μ s		Permanent OFF
Status-OUT Voltage V _{STAT-OUT} @ I _{STAT} = 350 mA	0.1 V	0.3 V	+V _S
Status-OUT current I _{STAT}	6 μ A		350 mA

Mechanical Parameters

Housing Material	Aluminium / PA11		
Weight		40 g	
Protection Rating		IP 50	
Ambient Temperature	-20 °C	+25 °C	+40 °C
Storage Temperature	-20 °C	+20 °C	+50 °C
Transport Temperature	-25 °C	+20 °C	+85 °C
Interfaces, Type of Connectors	Power & IO, M8 male, 4-pin / LED-Light, M8 female, 4-pin		

Mechanical Dimension



Technical Support

Questions about our products will answer you our technical support:

support@evotron-gmbh.de

+49 (0) 3681 / 4529951



evotron GmbH & Co. KG
Pfütschbergstraße 16
98527 Suhl /Germany

+49 (0) 3681-4529950
info@evotron-gmbh.de
www.evotron-gmbh.de

Intended Use

This lighting controller is only suitable for the control of LED lighting, which are intended for operation on a constant current source. The application fields are the industrial automation technology, laboratory measurement technology and industrial image processing. The permissible ambient conditions of the controller for the transport, installation and operation must be adhered to.

Safety Notes

Operate this LED Controller only in perfect, undamaged condition.

Before any installation, the device must be disconnected from the operating voltage.

Configure the application so that the LED Controller is always operated within its technical specification.

Improper installation can damage the LED Controller and the connected components.

Qualified Personal

The installation and commissioning of this device may only be made by qualified personnel. Professionals must be familiar with the relevant regulations and safety instructions for working with electrical equipment and have read and understood all safety and warning information in this document.

Disclaimer

The manufacturer assumes no liability for:


- improper use of the device.
- disregard of this manual.
- use of technically unqualified personnel.
- opening the device or an unauthorized intrusion into the device.
- operation of the device in a technically impermissible state.
- connection of unauthorized, unsuitable or incompatible components.


Installation

The controller was designed so that it can be looped directly into the connecting cable of the LED lighting. There is no additional installation effort required. An M8 cable with 0.5 mm² copper cross-section is recommended for the installation.

Connecting of the LED Lighting

The LED lighting is connected via the M8 socket pin-1 and pin-3 (see connection diagram). For flash operation with a flash duration of PULS < 100 µs, a cable length of <1m is recommended between controller and lighting.

 When connecting LED lightings of other manufacturers Pin-2 and Pin-4 of the M8 socket must remain free!

 Always switch off the operating voltage before changing the LED lighting!

Connecting the Power Supply

The 24V DC power supply is connected to the M8 connector at pin-1 and pin-3. If the Power Supply is connected properly, the blue POWER-LED is on.

The controller has an active polarity reversal protection. If the operating voltage is reversed, the POWER LED will be off.

Connecting of the control input TRIGGER-IN

The switching on and off of the LED lighting is controlled via the digital input TRIGGER-IN at pin 2 of the M8 connector.

With a switch-on delay of less than 250ns, the controller can precisely control light pulses from 1 µs in flash mode (Fig. 1). The maximum flash frequency is 500 kHz. A digital filter reliably suppresses interference pulses at the trigger input.

TRIGGER-IN is HIGH-active. As long a HIGH is applied to TRIGGER-IN, the LED lighting is active.

TRIGGER-IN can be controlled directly with a 5V TTL signal or a 24V PLC output (Fig. 2).

Monitoring-Output STATUS-OUT

The signal STATUS-OUT monitors the function of the controller and the connected LED lighting, it is available at Pin-4 of the M8 connector.

STATUS-OUT can be connected to a 24V PLC input or connected directly to a switching relay (I_{STAT} < 350 mA) (see Fig. 3).

STATUS-OUT is LOW active. As long as an error condition is detected, this output is LOW and the STATUS LED lights red.

In normal operation STATUS-OUT is in the high-impedance state. After clearing an error, the controller resets STATUS-OUT automatically.

Putting into operation

Before switching on the LED lighting, make sure that the set LED current does not exceed the maximum value specified in the data sheet of the lighting.

1. Set dimmer D to 100%.

Switch SW1	LED Current
1	50 mA
2	100 mA
3	200 mA
4	300 mA
5	400 mA
6	500 mA
7	600 mA
8	700 mA
9	800 mA
10	900 mA
11	1000 mA
12	1200 mA
13	1400 mA
14	1600 mA
15	1800 mA
16	2000 mA

2. Set switch SW1 to the desired LED current according to the table opposite.



3. TRIGGER-IN on HIGH switches on the LED lighting.

4. A fine adjustment of the brightness of the LED lighting can be made with the dimmer D.

5. The controller operates in high precision mode for small low current LED lights in In switch pos.1.

Switching on the supply voltage

After switching on, the controller starts with an initialization phase of 400 ms. In this phase, the auto-calibration of the LED current takes place, during which the LED lighting switches on shortly for 100 µs.

LED-Display Functions

The LED display has following functions:



LED	Color	Display Function if LED is ON
POWER	blue	Controller is ON, the Supply Voltage is OK
STATUS	red	Controller reports an error state
TRIGGER	green	TRIGGER-IN detects trigger pulses

Monitoring-Error States

The Error State is indicated by the STATUS LED and the activation of the STATUS-OUT signal.

* only for LED-Lightings with evotronLIGHT-Technology

Error State	Fault Elimination
Open LED Load	Check LED Lighting and Cable
Short Circuit	Check LED Lighting and Cable
Overtemperature Controller	Check operating conditions
Overtemperature inside the LED Lighting* (STATUS blinking at 2 Hz)	Check allowable maximum LED current

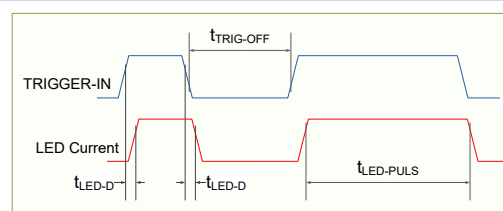


Fig. 1 Timing Diagram for TRIGGER-IN

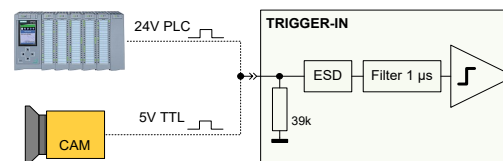


Fig. 2 Connection example for TRIGGER-IN

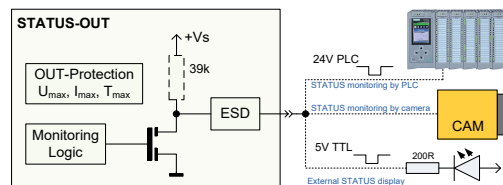


Fig. 3 Connection example for STATUS-OUT

Disposal

This product is RoHS compliant.

Instructions for the proper disposal of old devices can be obtained from the manufacturer, local sales partner or relevant national authority.

Alternatively, this product may be returned to the manufacturer for proper disposal.

Packaging and packaging aids are recyclable and should always be recycled.

The product itself must not be disposed of in the domestic waste.

