

User manual

LEDVD5CH20A-V1

Voltage driver for LED strips for compensated voltage drop in cables (without user interface circuit board)



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For each channel the PWM dimming value can be set separately. The dimming value is stored in an EEPROM and the stored values are directly used when turning on the voltage driver. This is very useful to square off in the voltage drop in LED strip installations, especially if the voltage drop between the various wires is different as a result of length of the LED strips, and the cables that go there. By offsetting it in the PWM value, the LED strips can still be adjusted to equal brightness.

To set the PWM value of each channel is a PC / laptop with a terminal program and a USB cable. Reference is made to the LED driver software manual in which the terminal commands are given for setting the PWM value.

LuxaLight can adjust the LED strip lighting on the location for you.

Recommended by calculation method:

In an LED strip installation first the voltage drop across the supply cables to the LED strips must be calculated. If the strips are working at maximum voltage, for example 24V, then find how much power absorbs the LED strip per meter back into the LED strip specification. To compensate this, the power supply voltage that feeds the voltage driver must be adjusted to a little higher value, for example to 28V (assuming that the voltage drop across the cables is less than 4V).

To calculate the voltage drop in the cables to the LED strips the length of the cables, the copper cross section and the current flow must be known for the cable. The voltage drop across the cable can then be calculated with the resistivity of copper.

For example: Adjust the power supply to an output voltage of 28V. You would supply the 24V LED strip with 24V. The calculated voltage drop in the LED strip power supply cable is 2V. With 100% PWM (output channel fully open corresponds to PWM value set to 255) would be 26V on the LED strip. To adjust the PWM value proportional smaller, the average voltage corresponds with 24V on the LED strip, the PWM value is set to 235.

Alternative method by measuring back the voltage:

Another method is to tune the voltage to 24V again is to measure the voltage with a multimeter on the LED strips connections themselves by adjusting the PWM only slightly lower (eg PWM value of 200) and then to increasing this PWM value until 24V over the LED strip is measured. However, the condition is here that you must be able to access the LED strips to measure the voltage.

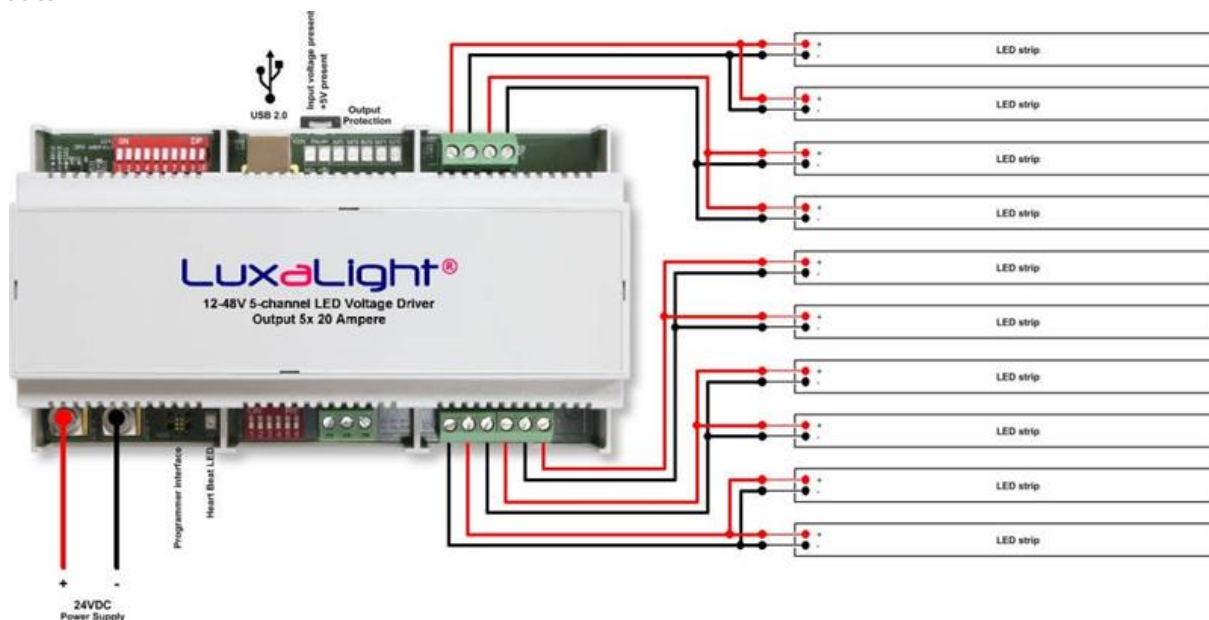
PAY ATTENTION: Measuring the voltage (or current) with PMW dimming is not as accurate as multimeters cannot handle PWM voltages on LED strips. So, the calculation method is better.

Voltage of the power supply:

It goes without saying that the power supply should be able to be adjusted sufficiently upwards to a higher voltage to be able to compensate for the maximum voltage drop that occurs at a LED strip cable.

Connecting and adjustments:

Schematics



The above diagram shows the use of this version of the controller.

The power supply:

On the left at the bottom side of the voltage driver there are two large terminals. This, the power supply wires are connected. The total requested flow from the diet can be with all five channels at full load up to 100 Amps. If the power wires between power supply and voltage driver no more than 1 to 1.5 meters, it is sufficient 2x 10mm², 16mm² is recommended for longer lengths.

The outputs:

The outputs of the voltage driver are located on the right side on the PCB and the order of the channel numbers is counter clockwise, starting on the bottom.

To the right on the circuit board at the bottom, a connecting block (X502) is located with 6 ports, starting from the left-hand connection: 1 Output 1 –

2 Output	1 +
3 Output	2 –
4 Output	2 +
5 Output	3 –
6 Output	3 +

To the right on the circuit board at the top, a connecting block (X503) is located with 4 ports, starting from the right-hand connection:

7 Output	4 –
8 Output	4 +
9 Output	5 –
10 Output	5 +

Channel setups:

Each of these five channels (voltage outputs) can be adjusted in luminous intensity level in 256 steps in which a value of 0 corresponds to complete dark and a value of 255 to full brightness. And so, the value of 127 corresponds to half the brightness at 50%.

Connect the voltage driver to the power supply, preferably with LED strips on the outputs, only to test your settings. Connect a PC or laptop with a terminal program (such as "Termite") with an USB cable to the USB connector (X301) of the voltage driver. Set the correct COM port (depending on the PC or laptop), 9600 baud, 8 data bits and stop bits 1 and set "Add CR" on it.

Download the USB driver for the Voltage driver from this website

<https://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx>

and install the version that fits to your operating system. The terminal program comes with a help menu if you type "help".

For setting the light intensity on the channels use the terminal command:

```
setDutyx yyy
```

where "x" is the channel;

1 for channel 1

2 for channel 2

3 for channel 3

4 for channel 4

5 for channel 5

and "yyy" the PWM value (duty cycle) between 000 and 255.

Make sure you type in the leading zero's for the PWM value. e.g. 063.

Example: We're going to Channel 1 set to 25% brightness with the command:

```
setDuty0 063
```

We see, if there is a LED strip is connected to channel 1 that it adjusts the light intensity directly.

To store the set brightness in the EEPROM use this terminal command:

```
writeDutyx
```

where "x" is the channel. The PWM value is not entered here, the value set is used with setDuty.

Example: We're going to save the set brightness of channel 1 in the EEPROM using the command:

```
writeDuty0
```

The terminal program reports that the write operation was successful. The voltage driver now also remembers without power set value of channel 1. When switching on the voltage PWM driver this stored value is used to set the corresponding voltage channel output. If no channel number is specified by write-duty command, then currently PWM values for all channels will be stored in the EEPROM.

To retrieve the stored EEPROM value is the terminal command:

getDutyx

where "x" is the channel.

Example: We're going to ask for the set brightness of channel 1 in the EEPROM using the command: getDuty0 The terminal program then comes back with the PWM value that was saved once before, and for that channel is used by the voltage driver during startup.

LED Indicators:

On the board are what LED indicators. The green LED's at the top indicate that the supply voltage on the print is present and hence the 5V for the controller electronics. The green flashing LED at the bottom indicates the "heart beat" of the controller as a sign that it is working properly. There are also some red LEDs OUT 1 t / m OUT5, which light up as soon as a voltage output is overloaded. Above a certain value is, moreover, the overloaded channel turned off by software.

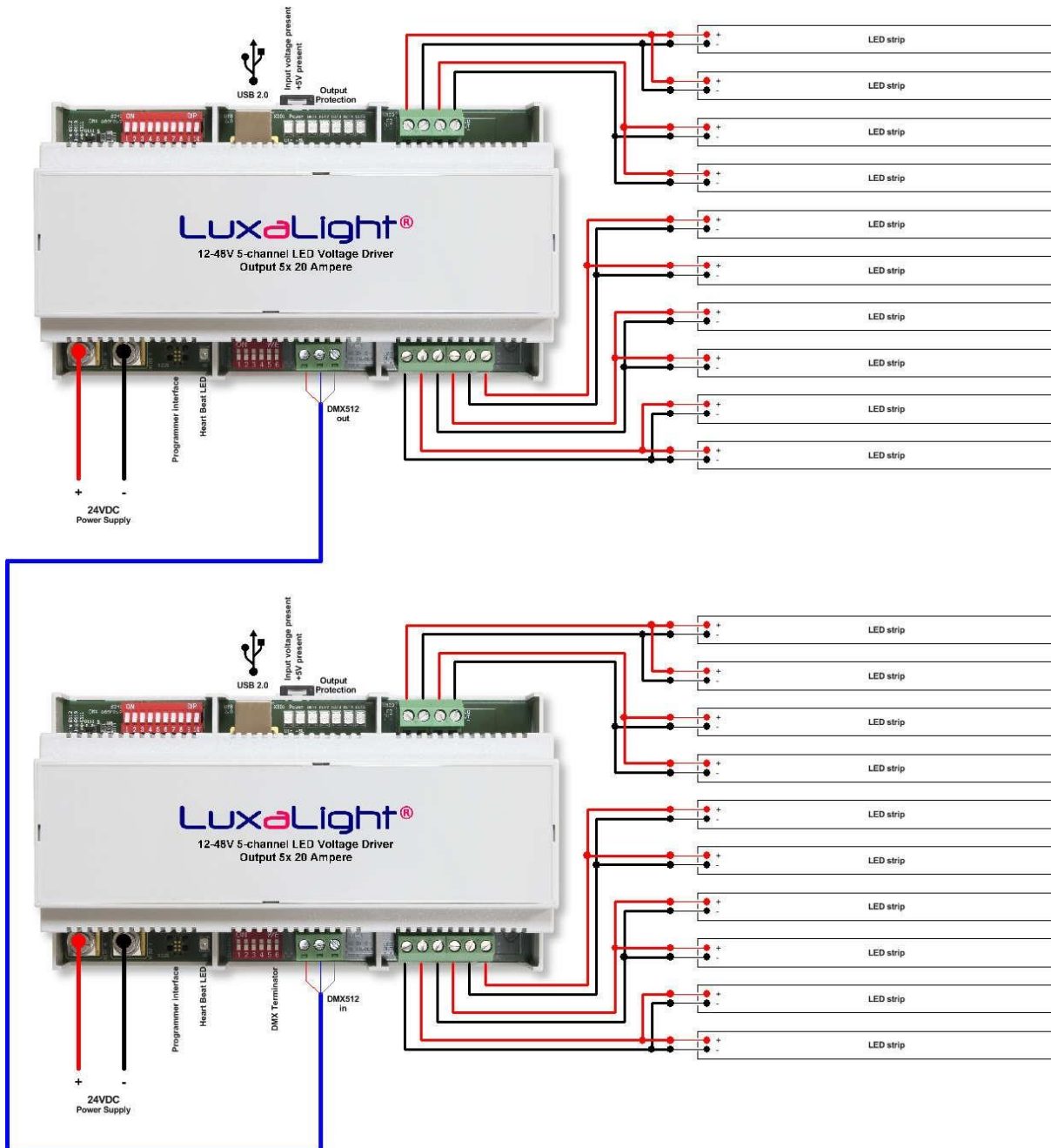
Custom made options:

The LuxaLight voltage driver provides the proprietary software options for customer-specific applications, such as connecting a light sensor. The hardware of the voltage driver offers this possibility, but an additional light sensor has to be made and should also be made an extensions in the software here. Customization options will be included in the offer.

Cascading the drivers:

The channels that ends with permanent DMX channels 1 t / m 5. In this way, by coupled Voltage drivers with each other are to multiple voltage drivers in which the same length LED strips with the same length of wiring set are also come as an output signal on the DMX connector with PWM with works the same PWM corrections.

See circuit diagram below:



Specifications:

Input voltage	12...48V
Maximal input current	100A (sum of the output currents)
Standby current	18mA (outputs fully dimmed)
Own power consumption	5W at 2400W load
Efficiency	Approx. 99.8%
Output current per channel	20 Ampere up to 24 Volt
Output power	12V – 5x 240 Watt = 1200 Watt (20A/channel)
	24V – 5x 480 Watt = 2400 Watt (20A/channel)
	36V – 5x 540 Watt = 2700 Watt (15A/channel)
	48V – 5x 576 Watt = 2880 Watt (12A/channel)
Overvoltage protection	Yes, up to 60 Volts
Short circuit protection	Yes
PWM frequency	250 Hz
No. of brightness steps per channel	256 (8-bit)
Color resolution	8-bit (16.7 million colors, true-color)
Outputs are EMC filtered	Yes
Temperature range	-20°C ... +40°C
Housing, b x h x d	DIN rail housing, 159mm x 90mm x 58mm
IP-class	IP20
Cooling	On circuit board, with coolfan on fan controller

Compliant:

Meets standards:

- CE mark is attached to the PCB
- RoHS directive 2002/95/EC
- EMC directive 2014/30/EC