



## How to Choose an LED Driver

Welcome to this guide to choosing an LED driver.

This guide includes the basic factors to consider when choosing an LED driver for your application. There is also information behind these factors to help you to make your decision. LED Spares stock a wide variety of LED drivers and power supplies from some of the most popular brands.

### Constant Current vs. Constant Voltage

All drivers are either constant current (CC) or constant voltage (CV), or both. This is one of the first factors you need to consider. This decision will be determined by the LED or module you will be powering, the information for which can be found on the LED's datasheet.

#### What is Constant Current?

Constant current (CC) LED drivers keep a constant electric current throughout an electronic circuit by having a variable voltage. CC drivers are often the most popular choice for LED applications. CC LED drivers can be used for individual bulbs or a chain of LEDs in series. A series means that the LEDs are all mounted together in line, for the current to flow through each one. The disadvantage is if the circuit is broken, none of your LEDs will work. However they generally offer better control and a more efficient system than constant voltage.

#### What is Constant Voltage?

Constant voltage (CV) LED drivers are power supplies. They have a set voltage that they supply to the electronic circuit. You would use CV LED drivers to run multiple LEDs in parallel, for example LED strips. CV power supplies can be used with LED strips that have a current limiting resistor, which most do. The voltage output must meet the voltage requirement of the entire LED string.

# What is Constant Current / Constant Voltage?

Some LED drivers may feature both options of CV and CC. As standard they run as CV but, when output current passes the rated current limit, they switch to a CC mode. This functionality is suitable for applications which require a flexible LED Driver.

## Applications for CV OR CC?

### CONSTANT CURRENT

LED Downlights

Office Lighting

Residential LED Lighting

Mood Lighting

Retail Lighting

Entertainment Lighting

LED Signs

### CONSTANT VOLTAGE

LEDs in parallel

LED Strips

LED Light Engines

Moving Signs

Stage Lighting

Architectural Lighting

Street Lighting

High Bay

Outdoor Lighting

# FACTORS TO CONSIDER

## Output Current (mA)

When using a Constant Current LED driver, observe the current requirements of your chosen LED(s). The CC driver should then reflect that value output. LEDs data sheets state what they require, with the value given in amps (A) or milliamps (mA).  $1 \text{ A} = 1000 \text{ mA}$

There are also variable and selectable output current drivers. They give either a range, for example 0 mA to 500 mA, or stepped values like 350 mA, 500 mA, 700 mA. Your LED must fall within the chosen value(s).

LEDs can be run at a lower current to help extend its life expectancy. Using a higher current could wear the LED out a lot quicker.

## Output Power (W)

This value is given in watts (W). Use an LED driver with at least the same value as your LED(s).

The driver must have a higher output power than your LEDs require for extra safety. If the output is equivalent to the LED power requirements, it is running at full power. Running at full power may cause the driver to have a shorter life span. Similarly the power requirement of the LEDs is given as an average. With tolerance added on top for multiple LEDs, you need a higher output power from the driver to cover this.

## Output Voltage (V)

This value is given in volts (V). For constant voltage drivers, it requires the same output as your LED's voltage requirements. For multiple LEDs, each LED voltage requirement is added together for a total value.

If you are using constant current, the output voltage must exceed the LED requirements.

# IP Rating

How water/dust resistant does your LED driver need to be? If your driver is going somewhere where it may come into contact with water/dust, you could use an IP65 rated driver. This means it is protected from dust and any water projected at it.

If you need something water-tight, you might need a driver with an IP67 or IP68 rating. The IP rating is given as a number. The first digit represents solid objects and the second is liquids. Here are the definitions:

IP Rating First Digit		
Number	Size of object	Protects against
0	—	No protection against contact or entrance by any object
1	>50 mm	Protection against any large surface area of the body but not deliberate tampering or force
2	>12.5 mm	Fingers or similar sized tools and objects
3	>2.5 mm	Thick wires, tools and similar-sized foreign bodies
4	>1 mm	Most wires, screws, etc.
5	Dust protected	Protected against dust – it has to enter in large amounts to interfere with operation. Complete protection against contact
6	Dust tight	Impossible for dust to enter; complete protection against any foreign body
X	Undetermined	Indicates that protection against solid objects is not defined

### IP Rating Second Digit

Number	Protects against	Tested for
0	Not protected	—
1	Dripping water	Dripping water – no damaging effect when tested against vertical falling water drops
2	Dripping water when tilted up to 15°	Vertically dripping water has no damaging effect when the light enclosure is tilted at an angle up to 15° from its usual position.
3	Spraying water	Water falling as a spray at any angle up to 60° has no damaging effect
4	Splashing water	Water splashing against light enclosure from any direction has no damaging effect
5	Water jets	Water projected by a nozzle (6.3mm) against light enclosure from any direction shall have no damaging effect
6	Powerful water jets	Water projected in powerful jets (12.5mm nozzle) against the light enclosure from any direction has no damaging effect
7	Immersion up to 1 m	Water won't infiltrate even when light enclosure is immersed in water up to 1m in depth
8	Immersion beyond 1 m	The equipment is suitable for continuous immersion in water under conditions specified by the manufacturer. Normally, this will mean that the equipment is hermetically sealed but in some cases, certain types of light enclosures can let some water in, but in a way that won't be detrimental to the function of the light.

## Termination Method

How will you connect your LED driver to your chosen application? Some LED drivers come with flying wires attached. Alternatively you could need to purchase wires separately. Screw or poke holes also exist for quick mounting of cables to the driver.