

# Introduction to Replacing LED Drivers



LED have been installed since the early 2000's and because of the long-life cycle of LED technology, the replacement market is still in its infancy. As LED fixtures fall out of their warranty period and components fail, the decision of whether to replace the failed fixture or component comes down to how confidently the installer can select the right driver for the intact module.

This paper will provide you with an understanding of LED Drivers and leave you with the knowledge needed to feel confident about your replacement selection.

- What is an LED driver and what does it do?
- Exploring LED driver types: Constant Current vs. Constant Voltage
- Can an LED driver be replaced and how interchangeable are they?
- How long will an LED driver last?
- Choosing the right replacement driver.

## WHAT IS AN LED DRIVER AND WHAT DOES IT DO?

### What is an LED Driver?



A LED driver is the power supply for an LED lighting system. The LED Driver “drives” the current for the LED Modules/Arrays. LED drivers have a similar function as fluorescent ballasts. They regulate output voltage or current for the LED modules.

They are enclosed in a case with wiring connections suitable for fixture assembly.

The LED driver is the power supply for an LED light engine (Module + Driver = Light Engine). An LED Light Engine goes inside of a luminaire or fixture.

The input of the driver is connected to the power line and the output is connected to the LED Modules. It is important here to note that the LED Drivers and the LED Modules must be compatible. A mismatch between the LED Driver and LED Modules could result in the modules not working, or even damage the LED Modules, shortening their life.

### What does a LED Driver do?

Fundamentally, the LED driver converts higher voltage, alternating current to low voltage, direct current. They also keep the voltage or current flowing through an LED circuit at its rated level.

## EXPLORING LED DRIVER TYPES: CONSTANT CURRENT V. CONSTANT VOLTAGE

### Driver Types:

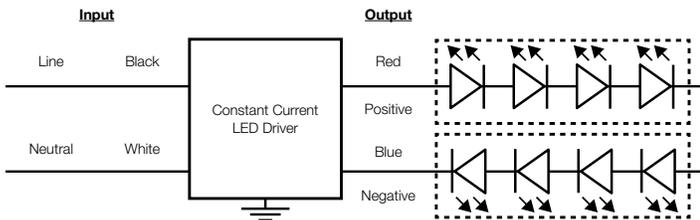
#### Constant Current vs. Constant Voltage

There are two basic types of LED drivers: Constant Current and Constant Voltage. LED Drivers must be correctly selected to the LED modules they are powering.

#### Constant Current Drivers

Constant Current LED Drivers are designed to provide constant current to an LED Module within a specific voltage range. The driver may power a single module or multiple LED modules within the fixture.

Most Constant Current LED Drivers can be programmed to operate over an output current range. Tuning or programming of the LED Driver is performed by the fixture manufacturer to adjust light levels of the luminaires. While not mandatory, if a driver has been programmed, it is often indicated on the product label or on a secondary label on the side of the driver. If you need assistance crossing a Driver in the field you can talk with our Technical Engineering Services team at [tes@unvlt.com](mailto:tes@unvlt.com) or call 1-800-225-5278.



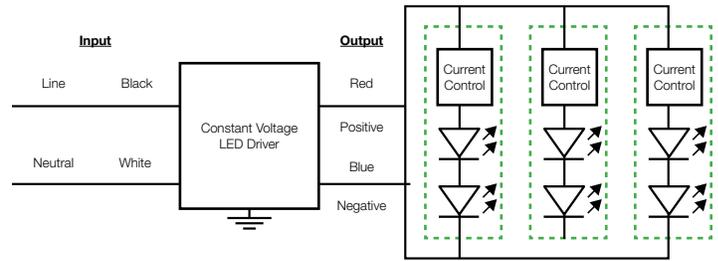
An example of a Constant Current LED Driver operating range is shown in the following graph.



#### Constant Voltage Drivers

Constant Voltage LED Drivers are typically used in signs. These LED Drivers provide a constant DC voltage output, typically 12V or 24V.

The LED modules, connected in parallel, are designed to run at a specified voltage and incorporates a current regulator to control the current through the LED. Constant Voltage LED Drivers are ideal for sign applications because of their flexibility to connect a wide range of modules in parallel.



For example, this EVERLINE Constant Voltage LED Driver has a fixed output voltage of 12V, over the output current range of up to 5A max.



Output Voltage	12±5%
Output Current	5.0 (A) max

## Driver Output Listings: Class 2 or Non-Class 2

### Class 2 Output

LED Drivers are listed to have either a Class 2 or non-Class 2 output.

In a Class 2 output, the current, voltage and power must operate within the following limits under normal operation and certain fault conditions:

- Maximum output DC voltage of 60 Volts (42.4 Volts for Canada and 30 Volts for wet locations).
- Maximum rated output current of 5 Amps
- Maximum output power of 100 W.

General indoor luminaires predominately use LED Drivers with a Class 2 output.

### Non-Class 2 Output

Non-Class 2 LED Drivers have an output higher than the allowed voltage, power or current levels specified for Class 2 Drivers, and require fixture manufacturers to meet additional safety requirements with the design of their LED luminaires.

## CAN AN LED DRIVER BE REPLACED AND HOW INTERCHANGEABLE ARE THEY?

An LED driver of the same type (Constant Current or Constant Voltage) may be replaced with a similar driver.

In general, our recommended approach to replacing an LED Drivers is to consult with your local Universal Lighting Technologies' LED Select distributor (find your local distributor on our website) or contact Universal's Technical Support Team to discuss your application and identify the optimal replacement driver.

Universal has additional cross-referencing resources which can assist you, including:

- Reference the LED Component Selector Guide
- Ask a [Touch to Tune LED Select Distributor](#)
- Email [tes@unvlt.com](mailto:tes@unvlt.com) or call 1-800-225-5278

## HOW LONG WILL AN LED DRIVER LAST?

Various factors may affect the life of an LED Driver, but the factor with the greatest impact is heat.

Similar to other power supplies (ballasts), the lifespan of the driver's internal components accelerate as heat goes up, causing the driver to fail and the LED luminaire to stop working. Many LED drivers have a Tc point indicated on their label. The temperature indicated at the Tc point is the maximum allowable temperature for proper operation of the LED driver.

Look at your LED Driver specification sheet. You'll find two key environmental parameters: Operating Temperature and Tc.

For example:

Operating Temperature	-40°C to 57°C
	(-40°F to 134°F)
Tc	80°C (176°F) max

Operating Temperature is the ambient temperature in the air around the driver inside of the luminaire, which is higher than the ambient temperature outside of the luminaire. Tc is the maximum allowable temperature for the LED driver, as measured at the Tc point.

There are additional factors than can shorten an LED Driver life including power quality and transient voltages.

## CHOOSING THE RIGHT REPLACEMENT DRIVER



An LED Driver can be replaced by another of the same type and specification to meet the LED luminaire requirements. Early generations of LED Drivers manufactured by the industry were odd shaped, round or oblong. By contrast, today the interchangeable shapes of LED Drivers offered by Universal Lighting Technologies gives customers longevity and application design flexibility. Universal offers a comprehensive portfolio of LED Driver options in multiple can (shape) variations. Universal makes it easy for you to choose the right replacement LED Driver for your facility.

When you are ready to choose a replacement LED Driver, it is always a good practice to take pictures of the existing driver label and any

additional labels applied to the sides of the driver.

To determine the right replacement for an existing driver, there are four pieces of information that you will need:

### 1. In what type of luminaire is the LED Driver being replaced?

While you may not need the exact dimensions of the driver, it's important to take note of the type of luminaire that the LED Driver was installed in. Taking a quick measurement within the luminaire will also give you the maximum size of the replacement driver to ensure that it will fit properly. For maximum flexibility, look for manufacturers that offer a variety of LED Driver Can sizes to fit different forms.

### 2. Is the LED Driver Constant Current or Constant Voltage?

Constant Current LED Drivers are found in everything from outdoor, general indoor, specialty, and architectural lighting. If there is a question, Constant Current lists voltage as a range (examples: 2-42V, 14-30V, 8-19V, etc.) and a specific output current or current range while Constant Voltage drivers list a specific voltage like 12V or 24V.

### 3. What are the LED Driver Output specifications?

If the voltage and current requirements of the modules are not listed in the luminaire, there are three specifications to look for - Current (mA), Max Power (W), and the Voltage Range (V).

- Current (mA): Equivalent to specified or up to 10% less than the mA rating. Any less than that and there may be a detectable difference to the light level in the fixture as compared to the other installed fixtures.
- Max Power (W): Equivalent to what is specified or higher. Max Power refers to the available amount of Watts, not necessarily what is used by the LED modules.
- Output Voltage (V): Refers to the output range of the LED Driver. This may be listed only as a max voltage.

### 4. Are there any control requirements?

Most of the Universal LED Drivers are equipped with 0-10V dimming. A dimming driver can always be used for applications where no dimming is required.

**Universal Lighting Technologies makes it easy for you to choose the right replacement driver for your facility.**

#### Learn about LED Drivers:

- Request [LED Driver Replacement Training](#) for your team at your facility
- Read more [LED Drivers Educational Articles](#)
- Sign up for LED Driver courses at the [Universal University](#)
- Learn more about the [Touch to Tune Driver Tuning App](#)

#### Find a Replacement LED Driver:

- [Find a local LED "Touch to Tune" Location Near You](#)
- [Watch the "Touch to Tune" Video](#)

#### Need help? Contact an expert:

- Contact the Universal Lighting Technologies Technical Support Team (TES) for assistance at [tes@unvlt.com](mailto:tes@unvlt.com) or 1-800-225-5278
- Find a local [ENERGY Select Partner](#) to help you with your plan retrofit project and select materials