



Powering Solutions Made Simple



Transformer

A magnetic transformer in its basic form is a core and coil that converts AC voltages.

The number of turns around the core (turns ratio) determines performance.

An electronic transformer is a power supply that produces high frequency AC or DC voltage.

Many of Semper Fi Power Supply's transformers are backed by the industry's longest warranty—25 years.

Driver

Do not confuse constant voltage power supplies as LED drivers. An LED is driven by current. This is a major factor that determines LED light output quality.

LEDs are diodes, which only allow current to flow in one direction, requiring direct current (DC).

The forward voltage (Fv) is a by-product of the amperage applied and the LED's internal makeup (resistance).

Drivers are sized and selected by input voltage, output voltage (Fv) and current requirements to provide a regulated, but dimmable DC to the load.

The LV drivers can be used with low voltage AC or DC sources such as: transformers, batteries or renewable energy solutions like solar panels. Therefore they can be easily installed around the world.

The "D" drivers use patent pending technology to allow traditional wall box dimmers and control systems to dim LEDs.

Drivers include warranties up to 10-years, lasting as long as LEDs.

Properly driving LEDs will ensure a 50,000 hour minimum Half Light. Just how long is that? If left on 24/7/365, it will take almost six years before losing half of its original light output.

Dimmer Interface

A dimmer interface uses patent pending technology to allow traditional wall box dimmers and control systems to dim our drivers and power modules.

One dimmer interface per zone is required, but can dim dozens of drivers and power modules.

Total System Efficiencies

Resistors are commonly used to ballast low and medium power LEDs because they are simple and inexpensive. But, resistors are inefficient and do not guarantee performance. Expect 40 to 80 percent of the nominal wattage to be wasted as heat when resistors are used to ballast the current to the LEDs.

Semper Fi Power Supply and Gemini One Five Luminaires properly manages current and voltage to maximize color quality and light output in low voltage and LED lighting. No one manages power better, and our warranty proves it.

Power Module

Use the patent pending power module to provide a regulated, but adjustable and dimmable, DC voltage to the load.

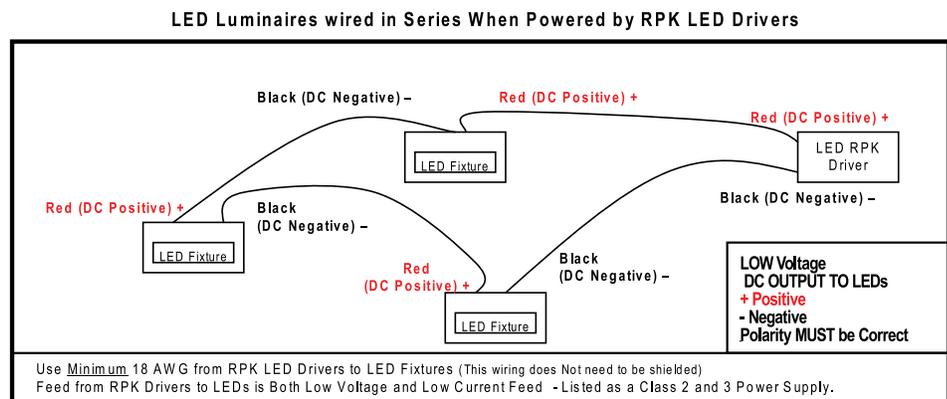
Most low voltage incandescent lighting products can be powered by AC or DC.

But, many products today require regulated DC voltage, and a transformer alone won't work.

Many LED products use resistors or voltage regulators to ballast the current to their LEDs and specify the use of a regulated DC voltage. The power module is what you need for these applications.

The use of power modules is the closest thing to complete silence. No more hum or buzz from lamps or transformers.

The power module can be used with low voltage AC or DC sources such as: transformers, batteries or renewable energy solutions like solar panels.



Therefore, they can be easily used around the world.

The power modules offer optional on board sensing with a view screen that allows the installer to monitor the power module's load, making installation easier.

The power module can also be controlled by wall box dimmers and control systems with the use of a dimmer interface.

Typical Powering Configurations

Model	Input	Max Fv Output	Max A Output
Power Modules			
PM-75	15 VAC(21VDC)	15VDC	5A
PM-100-30	30 VAC(42VDC)	30VDC	4A
PM-375	15 VAC(21VDC)	15VDC	25A
PM-750-30	30 VAC(42VDC)	30VDC	25A
Low Voltage Input Drivers			
RPK-LV-15	15 VAC(21VDC)	15VDC	1A
RPK-LV-40	30 VAC(42VDC)	40VDC	1A

Power Modules and LV drivers receive low voltage AC/DC input only.

Power Modules and LV drivers can be dimmed using 0-10VDC, PWM, integral or dimmer interface.

Line Voltage Input Drivers

RPK-120-15	Nominal 120VAC	15VDC	1A
RPK-120-40	Nominal 120VAC	40VDC	1A
RPK-120-60	Nominal 120VAC	60VDC	1A
RPK-120-15D	Nominal 120VAC	15VDC	1A
RPK-120-40D	Nominal 120VAC	40VDC	1A
RPK-120-60D	Nominal 120VAC	60VDC	1A

"D" designation supports dimming with incandescent wall box dimmer or control system.

Standard drivers can be dimmed using 0-10VDC, PWM, integral or dimmer interface.

For more information, refer to individual cut sheets.

Dimmer Interfaces

SF-120-DIM	Nominal 120VAC	10VDC	1A
SF-DMX-8	DMX	8 Channel	

Important Details

Forward Voltage and Voltage Drop

LEDs are current driven devices and the resulting voltage across the LED is its forward voltage (Fv). The Fv between LEDs varies and is impacted by junction temperature.

Calculating Driver Requirements

When using a remote driver, the LEDs are current driven, so the Fv accumulates on the circuit with each LED added. All fixtures powered by an RPK (Remote Driver) are marked with Fv in order to facilitate proper calculations and driver selection. The RPK drivers will not operate if the accumulated forward voltage exceeds the maximum rating of the driver. Drivers also have minimum load requirements requiring multiple models.

Long Wire Runs from RPK to LEDs

LEDs can be located hundreds of feet away (18 AWG wire minimum) from the driver, but all voltage drop between the driver and the LEDs must be added to the total Fv calculation. For example, if the combined fixtures' Fv=37.8 volts, then total voltage drop must not exceed 2.2 volts (40-37.8=2.2). If the LEDs are driven at 350ma and using 18 AWG wire, then, 350 feet of wire is approximately 2.0 volts of drop, which would be OK. Increasing wire size or reducing the number of LEDs per driver will extend wire run length.

Lumens Per Watt

Don't be so quick to throw low voltage incandescent away. As we've shown for the last 10-years, light output is maximized when low voltage lamps are driven properly. You lose half or more of your light output when the lamp is under driven. An efficient installation with properly driven lamps maximizes the lumens per watt of that installation.

LEDs are similar to low voltage lamps in that their performance is determined by how they are powered. A low voltage lamp is voltage driven and likes heat, but LEDs are current driven solid state devices that are impacted negatively by heat.

This impacts total system efficiency (LPW). LEDs should not be subjected to the same heat levels as low voltage incandescent. A watt is a watt, power is power. A fixture using 10 watts low voltage incandescent will run just as hot using 10 watts of LEDs. The fixture will use the same amount of electricity and may or may not put out the same amount of light, or last as long.

Misconceptions

Assuming stranded wire is more efficient than solid wire.

Assuming that using DC eliminates voltage drop.

Assuming toroidal transformer design is superior.

Assuming that all LEDs, drivers and power supplies are created equal.

Dimming Terms and Definitions

Linear Dimming – 0 to 10VDC

Linear dimming is done by driving an analog signal between 0 to 10VDC into the analog input of the driver/power module. The brightness is proportional to the magnitude of the analog signal. For example, at 0V the load is OFF and at 10V the load is fully ON, or at 100 percent brightness.

PWM (Pulse Width Modulation)

PWM is basically a TTL digital signal between 200Hz and 1.0KHz.

PWM is used to adjust the brightness by driving the PWM input in the driver/power module. The duty cycle of the signal dictates the brightness level of the load from 0 to 100 percent.

DMX - Digital Multiple Xed

DMX 512 is a standard protocol by means of which theatre lighting control can communicate with lighting equipment.

It was designed to enable equipment from different companies to operate together. The control channel information is transmitted in digital form, channel for channel, for successive transmission (multiplex) over the cable.

The speed in which this takes place is so high that it appears simultaneous. However, this speed requires that a DMX network must be properly structured.

Traditional Dimming

Traditional dimming typically adjusts the voltage to incandescent sources. But, LEDs are current driven devices. A dimmer will eventually drop the current to LEDs lowering light output, but is not considered controlled dimming.

Our patent pending "D" driver design solves this challenge and provides a controlled dimming range.

We reserve the right to change any information without advanced notice.

