

## Dimming Power Supplies (Drivers)

This family of dimming power supplies is a magnetic dimming solution for most 12 or 24 volt DC constant voltage LEDs, especially where the LED strips, under cabinet bars or other devices are installed into a home or office and need to be controlled from a wall switch/dimmer. Standard input is 120 VAC. Also available with 240 or 277 VAC input.



36W12VDim-120AC, 60W12VDim-120AC  
36W12VDim-240AC, 60W12VDim-240AC  
36W12VDim-277AC, 60W12VDim-277AC  
48W24VDim-120AC, 96W24VDim-120AC  
48W24VDim-240AC, 96W24VDim-240AC  
48W24VDim-277AC, 96W24VDim-277AC



4x60W12VDimX-120AC  
4x60W12VDimX-240AC  
4x60W12VDimX-277AC  
3x96W24VDimX-120AC  
3x96W24VDimX-240AC  
3x96W24VDimX-277AC



36 or 60 Watt 12 V Dimming Supply



240 Watt 12 V Dimming Supply



48 or 96 Watt 24 V Dimming Supply



288 Watt 24 V Dimming Supply

The 36, 48, 60 and 96 watt supplies are UL listed, Class 2 Power Supplies (file E345130); UL1310, UL48 Recognized Sign Accessories. The 240 and 288 watt supplies are UL 1310 recognized (file E345129).

## **MOUNTING AND INSTALLATION INSTRUCTIONS**

**WARNING:** The drivers specified here must be installed by a qualified electrician in accordance with the National Electrical Code (NEC) and local building codes. Failure to do so voids the warranty and may result in serious injury or permanent damage to the unit.

1. This unit must be located 1 foot or greater above the deck or ground level.
2. Mount this unit on a suitable vertical surface with conduit openings down.
3. Using a ruler, measure the vertical mounting point distance for the brackets provided on the back of the enclosure.
4. Mark the mounting surface and drill a minimum of 2 holes to match the bracket hole centers. Size the drill to accommodate #10 mounting hardware.
5. If keyhole mounting brackets are provided, insert the hardware at the mounting point to allow for 3/16" spacing between the screw head and the mounting surface to accommodate the bracket thickness.
6. Refer to the product labeling for detailed line and load wiring procedure.
  - a. For connection, use 12-22 AWG Cu wires insulated for a minimum of 90°C rated for 600 V. Tightening torque should be 7 in-lbs for output terminal block.
  - b. Use wire connectors suitable for the number and size conductors being connected and applied in accordance with the manufacturer's instructions.
  - c. Minimum 20 amp supply side branch current.
  - d. A disconnect device shall be located in the field wiring.

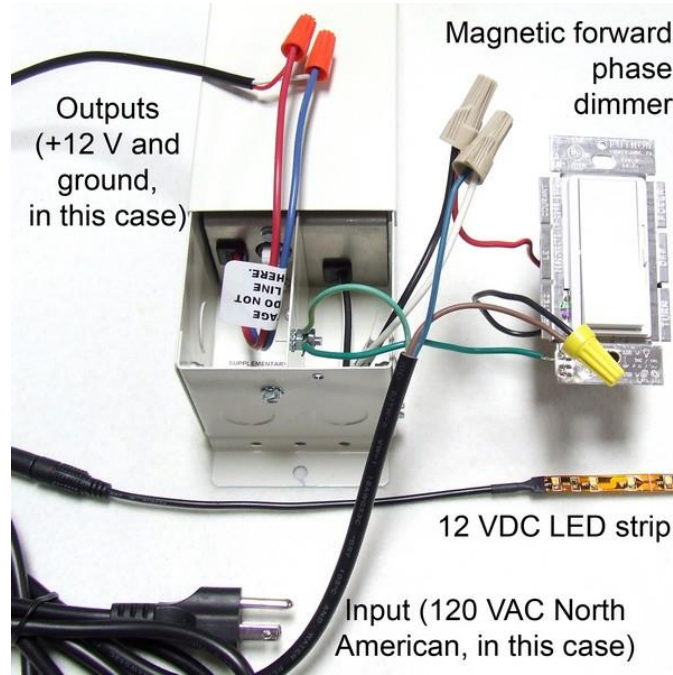
## **IMPORTANT SAFETY INSTRUCTIONS**

When using electrical products, basic precautions should be practiced including the following:

1. **READ AND FOLLOW ALL SAFETY INSTRUCTIONS.**
2. Read and follow all instructions that are on the product or provided with the product.
3. Reference the National Code, ANSI/NFPA 70, specifically for the installation of wiring and clearances from power and lighting conductors.
4. Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction.
5. **WARNING:** Risk of electric shock. When used outdoors, install only on a circuit protect by Class A GFCI.
6. **WARNING:** Risk of fire. Installation involves special wiring methods to run wiring through a building structure. Consult a qualified electrician.
7. **WARNING:** Risk of electric shock. Mount the unit at a greater height than 1 foot from the ground surface.

**SAVE THESE INSTRUCTIONS-**This manual contains important safety and operating instructions for power units.

You'll need a magnetic forward phase dimmer to control the dimming supply, which controls the LED strips, under cabinet or other lights. You may also need some wire and connectors. Here is an example of the 12 volt supply, wired to our 12 volt LED strips. Ordinarily, you would use the standard knockout holes and use code-conforming knockout fittings, and close the door of the supply. It is left open in the picture below for illustration purposes.



This dimming supply accepts a magnetic triac (forward phase-cut) signal and converts it to a constant voltage between 0 and 12 or 24 volts, depending on the dimmer signal. This is a Constant Voltage Reduction supply that dims constant voltage LED ladders, such as LED strip and some under cabinet lighting, using Constant Current Reduction (CCR) dimming technique. It is not a pulse width modulation dimming supply, and it is superior to other dimming supplies on the market that expose the LEDs to high ripple voltage (and current,) which can significantly shorten LED life.

It has all the required safety protection. It is suitable for indoor or outdoor installation. Outdoors, it should be mounted with the wiring compartment down to allow any moisture that accumulates in there to drain out through the weep holes at the bottom of the unit. The unit has 4 knockout holes for hardwire installation. You can also buy an optional cord kit that contains a 3-conductor plug and wire, along with wire nuts and suitable strain relief for the knockout.

Part Number	Maximum		
	Output Potential (Volts DC)*	Power per output (Watts)	Current per output (Amps)
36W12VDim-XXXAC	12	36	3
48W24VDim-XXXAC	24	48	2
60W12VDim-XXXAC	12	60	5
96W24VDim-XXXAC	24	96	4
4x60W12VDimX-XXXAC	12	60	5
3x96W24VDimX-XXXAC	24	96	4

\*+/- 0.3 volts ripple

## Features

- Your in-wall dimmer connects to this supply, which can then drive 12 or 24 volt DC LEDs.
- Works with most conventional household magnetic dimmers, except most digital ones. See detailed guidance about dimmer compatibility at the end of this note.
- This dimming driver is part of a family of drivers with wattages from 36 to 288 watts and DC output voltages of 12 or 24 volts. Choose an output voltage suitable for your product and a size (wattage) sufficient for your load.
- Designed to drive constant voltage LEDs. AC ripple <300 mV. This ensures the LEDs are not overdriven due to repeated excess current, which is a common fault of many other dimming supplies intended for use with constant voltage LED systems. LEDs last much longer on this driver than competing drivers that allow large ripple voltage.
- Very easy to wire: 2 input wires from the dimmer on the primary side and 2 output wires on the secondary side for the load. The 288 Watt 24 volt supply has 3 96-watt terminal block outputs and the 240 Watt 12 volt supply has 4 60-watt outputs.
- NEMA 3R rain tight wet location enclosure with Class 1 conduit access wiring compartment.
- Suitable for hardwiring (contains 7/8 inch knockouts.) Optional power plug kit is available.
- Manual reset overload protection.
- Operates on 50 or 60 hertz input.
- No external fusing required.
- We suggest de-rating the supplies by 20% in your designs, to be conservative.
- 3 year manufacturer warranty.
- Mean Time Between Failure: 100,000 hours.
- 80% efficiency, typically.
- Ambient operating temperature: -30 to +60°C (-22 to +140°F).
- Storage temperature: -65 to +90°C(-85 to 194°F).
- Humidity: up to 100%.
- Size: (LxWxH) 11.25" x 3.375" x 3.25" for small supplies; 14.25" x 8.437" x 4.437" for large supplies.
- Shipping weight: 7 pounds for small supplies; 24 pounds for large supplies.
- 240 VAC and 277 VAC input voltage versions are available; about 2 weeks lead time. Obviously, you must use a magnetic dimmer rated for 240 or 277 VAC. We do not sell such a dimmer. 240 and 277 VAC drivers are custom orders and not returnable.
- Made in America.

Wiring instructions and diagram are at the end of this note.

## **Dimmer Compatibility**

Use Magnetic Low Voltage Dimmers only. Do not use incandescent, Electronic Low Voltage or LED/CFL dimmers.

For lower wattages (36, 48, 60, 96), Lutron Diva (DVLV-603P) and Lutron Skylark (SLV-603P) because they will dim to less than 2%/13% (measured/perceived.) Those dimmers are not as recommended for the larger supplies (240 and 288) because Skylark may flicker slightly and Diva and Skylark will only dim the lights to around 50% perceived. For larger installations using multiple drivers you may have to use the Lutron DVLV-103P, as it can support larger loads. You can put more than one dimming driver on a dimmer, but we recommend keeping the total load wattage under 50% of the dimmer's rating.

For wireless control dimming, the Lutron Maestro Wireless MRF2-6ND-120 is magnificent on all 6 wattages (36, 48, 60, 90, 240, and 288). For large supplies (240 and 288 watts) the MRF2-6ND-120 is strongly recommended over all dimmers we have tested because it goes down to almost 0% with no flicker.

The only caveats regarding MRF2-6ND-120-WH are that the dimmer requires a neutral wire in the box and that most of the dimming occurs in the bottom travel of the slide. The top half of the slide is dead travel at full brightness. Of all dimming troubles, this is the least objectionable, and people tolerate it in order to achieve smooth dimming on a specification-grade wireless dimmer.

Our customers have also achieved success on the Crestron DIN-1DIMU4 commercial magnetic dimmer. We have tested the Smartlabs In-LineLinc Dimmer #2475D, and seen that it works acceptably, although it has slightly more dead travel at the top of the dimmer than the Lutron MRF2-6ND-120. Wireless remote controls for that dimmer are sold separate from that unit.

If you are using a dimmer other than the ones recommended, listen carefully to the dimming supply when you first connect it to your dimmer. It's also a good idea to try operating the dimming supply on your dimmer with no load (lights disconnected) at first. If the dimming supply makes strange noises or behaves badly, shut it off immediately and do not use that dimmer with this supply.

## **Dimmer Compatibility Problems**

You cannot tell how a dimmer operates by looking at the cosmetics of the front. For example, Lutron Diva dimmers all look the same; yet there are many different types of Lutron Diva dimmers: incandescent, 0-10 volt fluorescent, CFL/LED, magnetic and electronic low voltage, to name five. Do not just use any Diva dimmer.

Just as you cannot tell if a car uses gasoline or diesel by looking at it from a distance, you cannot tell how a dimmer operates by looking at it mounted on the wall behind a cover plate. You must look at identifying marks on the dimmer or car to know what type it is.

**DO NOT use:**

- Most digital dimmers, including Leviton MDM06-1LW.
- Incandescent dimmers. SAFETY HAZARD. Incandescent dimmers pass a DC voltage and should NEVER be used with a magnetic coil driver. You may cause a fire.
- LED/CFL dimmers, for the same reason.
- Electronic dimmers. This is a magnetic driver. Electronic dimmers DON'T work.
- Some home automation systems. The important consideration is how the dimmer output functions. If it is leading edge (forward phase) AND designed for magnetic loads AND analog, chances are that it will work. But we do not guarantee that it will work. There are thousands of dimmers on the market and we cannot test all.

**TESTING a non-approved dimmer:**

Wiring should be done by a trained electrician or other person who knows the proper safety precautions. We have given strong guidance above regarding what dimmers to use. If you insist on using a different dimmer, you can send it to us and we will test it for you. If you want to try it yourself, remember this:

- Test it before installing it. You don't want any installation wiring faults affecting your results. Just set the dimmer, driver, lights and connectors on the floor or a bench, follow proper safety procedures and make sure your dimmer is compatible before you punch out the knock-outs, install conduit and so forth. Drivers that have been installed are not returnable.
- If you want to use a non-approved analog magnetic low voltage dimmer, DO NOT test more than ONE dimming driver at a time. If your dimmer is not compatible with one of our dimming drivers, it will not be compatible with ten of them. **There is no excuse for destroying more than one dimming driver by conducting a test with an unknown dimmer.**

## Non-Dimming Applications

The dimming supply can also be configured as a normal non-dimming supply by simply omitting the dimmer. This can be useful for debugging your system, in case you suspect your dimmer may be faulty or incompatible with the supply. You may buy a 3-conductor power cord, which comes with wire nuts and strain relief. That cord can handle the current of any of the 6 supplies, including the 240 and 288 watt ones.



Supply Wired Without a Dimmer  
Outputs (secondary) at left. Input (primary) at right



Cord Kit for Dimming Power Supplies  
DPS Cord Kit

You may want to consider buying optional female mini plugs (20 inch whips) that mate with our ribbon reels and some of our under cabinet lighting connectors.

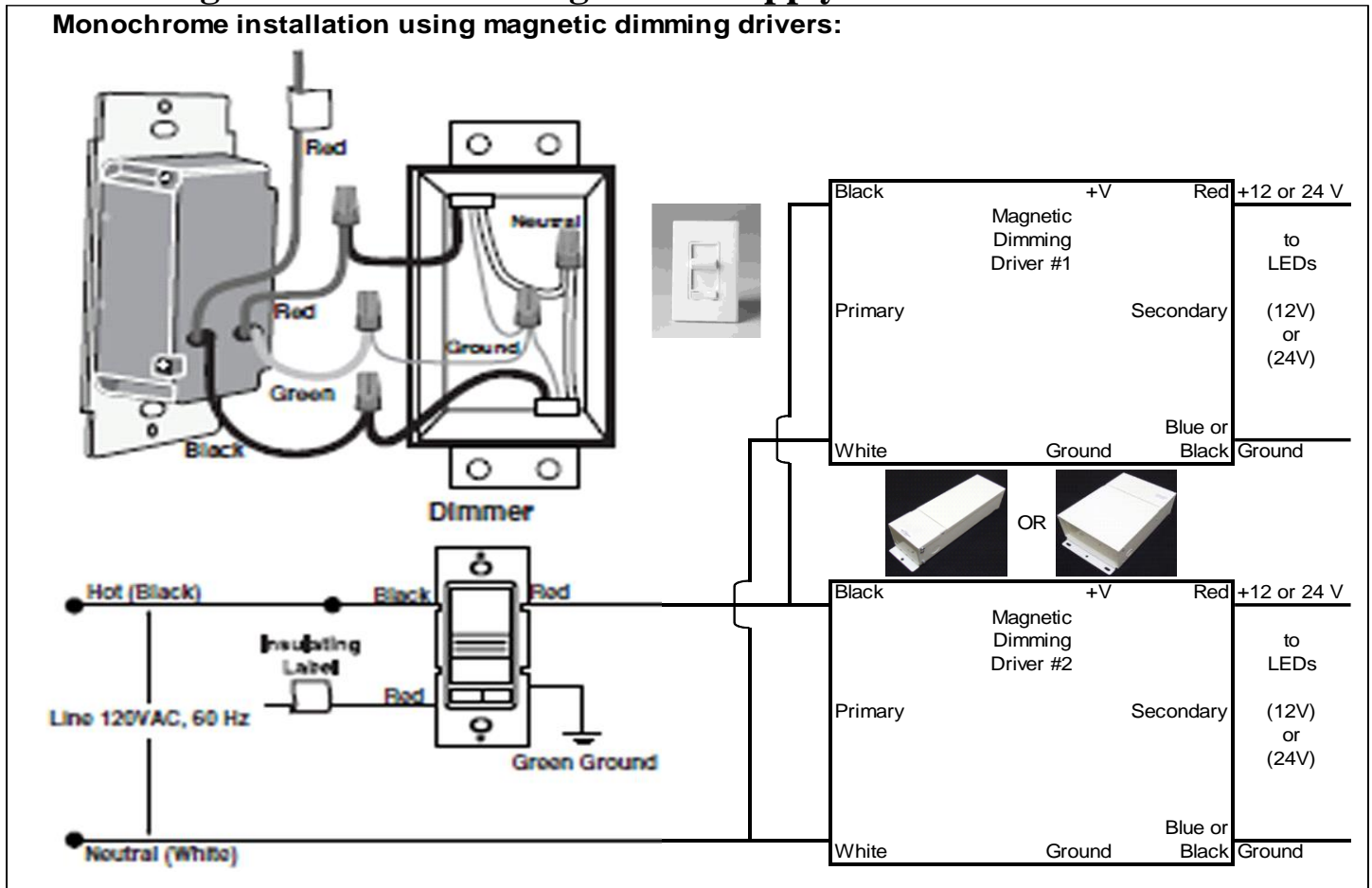


Male Mini Power Supply Plug and 20" Cord  
MaleMiniPlug



# Circuit Diagram for the Dimming Power Supply

Monochrome installation using magnetic dimming drivers:



Follow detailed installation instructions for the magnetic dimmer that come with the dimmer. Certain dimmers require a neutral wire in the gang box, and you must use it for them to function properly. Some older construction may not have a neutral wire in the gang box and you'll need to pull another wire or choose a dimmer that doesn't require it. Additional dimming supplies may be used. We recommend keeping the total load at or below 50% of the dimmer's capacity.

## Wiring instructions:

Turn off power at the building's breaker for safety. To wire primary side, connect hot 120 VAC (black) to black (input) of the dimmer. Connect red (output) of dimmer to black on primary side of the supply, as shown above. Connect neutral 120 VAC (white) to white on the primary side of the supply. White, therefore, bypasses the dimmer. To wire the secondary, connect +12 or 24 VDC (red) from the supply to +12 or 24 VDC of the lights. Connect ground (black or blue, bundled with the red) from the supply to ground on the lights. On the 20" whip, red (+12 or 24 VDC) is the center and ground is the barrel. **DO NOT confuse the black primary wire (HOT) with the black wire on the secondary of the 24-Volt supplies!** Be sure the white switch in the wiring compartment of the supply is "on." Turn the building circuit breaker back on and test.



## Troubleshooting

These power supplies are engineered and made in America. They almost never fail, and in thousands we have shipped, we have seen defect rates of approximately 0. Customers have very few problems, but when they do, essentially all of them are related to installation or use. Please follow these steps carefully if you are having trouble. Call if you need help. **Wiring should be done by qualified people only. “Qualified” means, among other things, knowing what safety precautions to take to avoid injury.**

1. If you believe you wired your circuit correctly and get no light, be sure the circuit breaker switch(es) on the power supply are “on.” They ship from the factory in the “off” position.
2. If, when you apply power to the supply, it makes a click and the switch turns itself off, you have shorted the output. That’s what the supply is supposed to do when you short the output. Fix your wiring. A low resistance path between secondary wires causes very large current to flow, which is dangerous and wrong, and the supply is protecting you and itself by turning itself off.
3. Be sure you are using the right primary voltage. In most cases, that’s 120 volts AC. We also sell 240 and 277 volt AC power supplies, and that would be marked on the packaging and on the power supply itself.
4. Check the secondary wiring. Red is positive and blue is ground for 12 volt supplies and black is ground for 24 volt supplies. If you wired it backwards, your LEDs will not light. Reverse polarity. You probably did not damage your lighting or power supply if you ran your LEDs backwards.
5. If your supply is behaving badly under dimmer control, it is not compatible with your dimmer. Bad behavior includes audible clicking or strobing the lights. If you witness bad behavior, shut the system down immediately. It will not get better with time. The only cure for this is to use a compatible dimmer, such as the dimmers we recommend. NEVER use an electronic, incandescent or LED/CFL dimmer. This is a magnetic supply. If you operate your supply with an incompatible dimmer, you will ruin the supply and possibly the dimmer; however, we have tested a very wide variety of dimmers on these supplies and have never ruined either a supply or a dimmer because we shut off the system after less than 2 seconds if it doesn’t work.
6. You don’t need a volt meter to test the secondary (output.) Your lights will tell you if there’s voltage. If you do use a volt meter, please be sure to use the DC setting and make sure your probes are plugged into the holes on your meter designated for DC voltage. These DC supplies generate about 0 volts AC, as you might guess. AC ripple is only a few tenths of a volt.

Level 2 troubleshooting. Still having problems? Try this:

1. With power off, take the dimmer out of the circuit. Just hook up the primary to building supply. That removes any dimmer issues. Dimmer defect rates are typically <<1%, but once in awhile, we run across a bad one. If your building’s power conditioning is poor, or if you are using an inverter (typically used in solar powered homes) you may not be able to use this supply. Some inverters generate pure sine waves under a wide variety of load conditions, but many don’t. If your power supply works great connected to the power grid but works poorly connected to your inverter or other local source, you have a power conditioning problem. You need to get a better inverter or don’t use this supply.
2. Take all the wiring off the secondary. That removes any installation problems you may have inadvertently created, including low resistance paths, which you’ll need to fix later.
3. Hook up your lights directly to the secondary on the supply, using proper polarity.
4. Power up. If you apply power directly to the primary and have nothing but very clean wiring directly to your lights (no installation wiring,) your polarity is correct, and your lights don’t light, that’s very unusual and unexpected.
5. If you have any other similar power supplies you bought from us, try those. If you have the same problem with the second supply, we can be almost certain the problem is usage or installation related because the defect rate on these supplies is so low.
6. You’re welcome to call for assistance and we’ll take you through the above steps. There’s no magic to trouble shooting these supplies. The above steps have resolved virtually every problem ever encountered with them.