Dimming Control Information

Triac Dimming:

2-Wire Forward Phase Dimmers were originally designed for use with Incandescent (120V) lighting fixtures that use A19 lamps and PAR type lamps. They have evolved for use with other types of lighting loads including magnetic low voltage (MLV) and some types of LED Drivers. They are the least expensive and most widely installed dimmers in the marketplace. They are also known as Leading Edge Dimmers or **Triac Dimmers**. These dimmers use a silicon device, usually an SCR (silicon controled rectifier) or a Triac, to turn the AC waveform on part way through its cycle. By varying the point at which the waveform turns on, we can alter the amount of power delivered to the lamp.

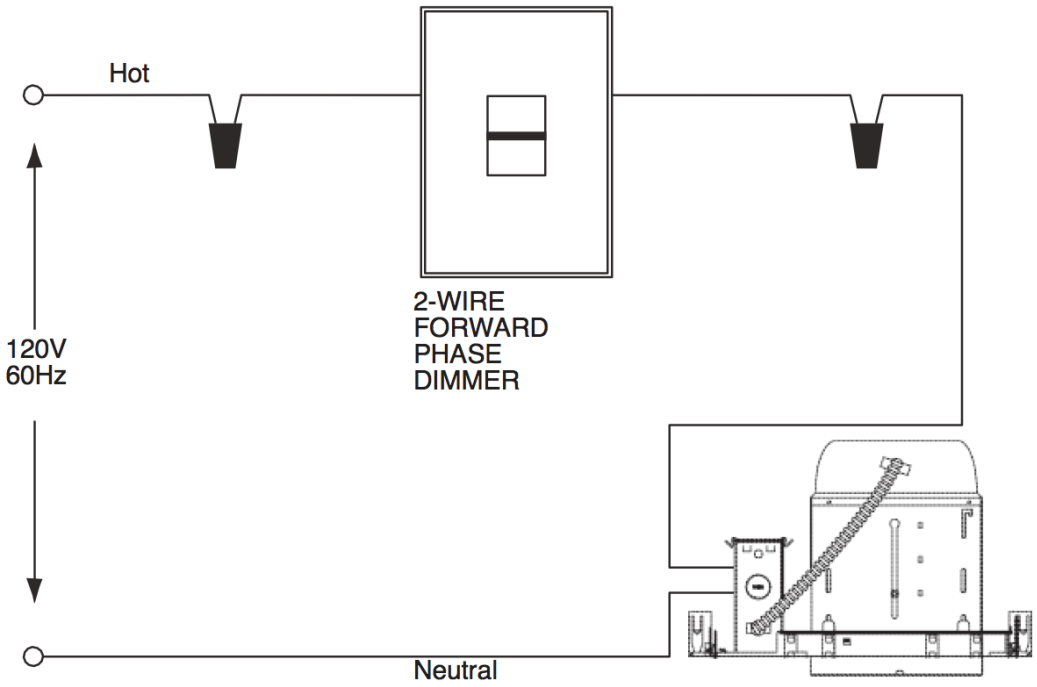
Benefits:

• Incandescent compatible LED Drivers/lamps work with most 2-wire forward phase dimmers making them perfect for many retrofit applications.
• Some LED Drivers are specially designed to eliminate the problems associated with using 2-wire forward phase Dimmers with LED fixtures including flicker, ghosting, pop on, drop out, etc.
• 2-wire forward phase dimmers are the least expensive and have the most installations in the marketplace. In many cases, these dimmers are less expensive than electronic low voltage dimmers or 0–10V dimmers.
• Generally provide smooth dimming down to 10% depending upon the dimmer's limitations.

Limitations:

• 2-wire forward phase dimmers should not be used with ELV (electronic low-voltage) drivers because doing so could cause any of the following malfunctions: dimmer buzz, lamp flicker, interaction between circuits or radio frequency interference (RFI).

Triac Dimmer Wiring Diagram:



Dimming Control Information

0-10V (4 wire, Low Voltage) Dimming:

0-10V (4-Wire, Low Voltage) Dimmers have been used in commercial applications for fluorescent lighting and occupancy and daylight sensor systems for years and are now becoming popular with LED products. One reason this standard is widely established is that it is defined in the IEC (International Electrotechnical Commission) standard number 60929 Annex E, making it acceptable to most engineers. However, many manufactures of dimming equipment and 0–10V ballasts/drivers do not always adhere to the standard resulting in unexpected incompatibilities between dimming control equipment and fixtures that employ 0–10V ballasts/drivers.

Benefits:
- Use existing 0–10V systems in retrofit applications.
- Large 0–10V install base in commercial applications due to IEC standards.
- Allows smooth dimming down to 5% depending upon the dimmer's limitations.
- Compatible with many daylight harvesting controls, occupancy sensors, and building automation.

Limitations:
- Some manufacturers do not follow the IES standard. This leads to LED Drivers and lamps that claim 0–10V compatibility but drop out or pop on, or dim backwards with the lowest output at the top and the highest output at the bottom. Also a function of correct pairing of LED Driver and LED load.
- The control signal is a small analog voltage and long wire runs can cause a signal level drop that can produce different light levels from different drivers on the same control circuit.

0–10V Dimmer Wiring Diagram: