

March 10, 2009

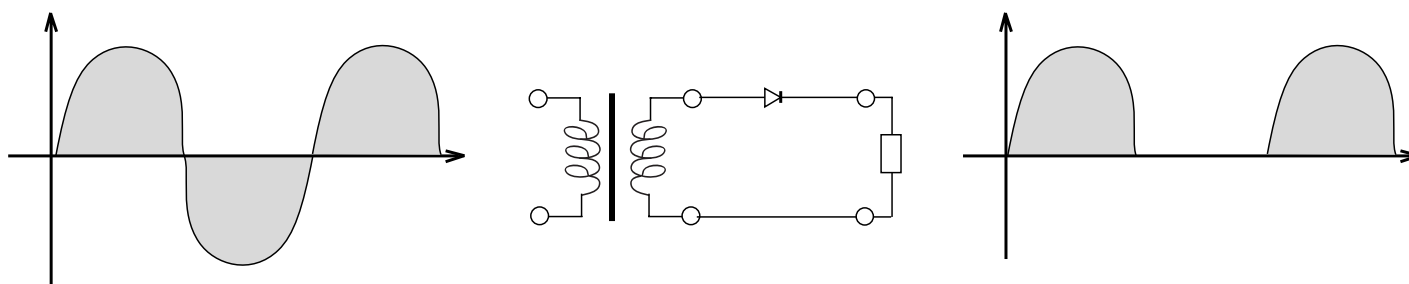
Lx5 Lighting Controllers Should Not Share Power with Half-wave Rectified Devices.

As is true of all full-wave rectified devices, Lumisys Lx5 controllers should not share power with half-wave rectified devices. Because of the differences between full-wave and half-wave rectified device internal circuitry, it is important that the two types are not connected in parallel from the same step-down (24v) transformer.

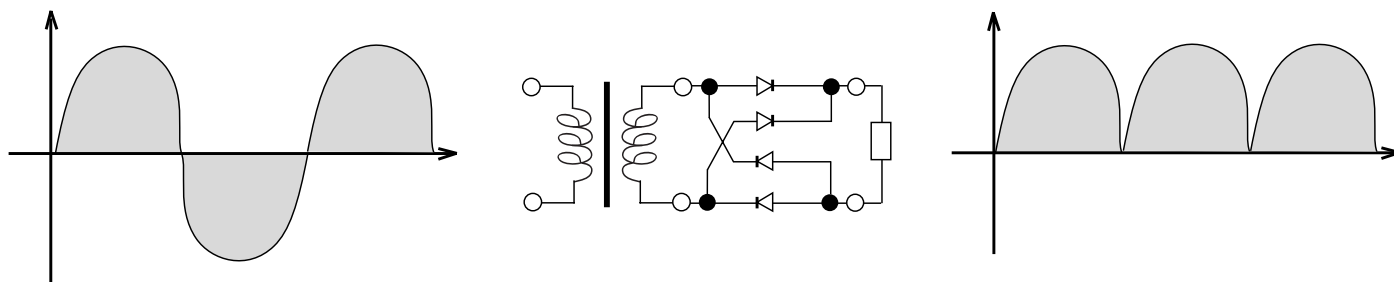
Issue:

The Lx5 takes the incoming 24VAC power and converts it to full-wave rectified 24VDC power to drive its internal circuitry:

While AC power is usually delivered to electronic control devices, the internal functions of the devices themselves typically require DC power. Two common ways devices convert the incoming AC power to DC is either by half-wave rectification or full-wave rectification. Half-wave rectification uses fewer electronic components and produces a ‘half-wave’ DC output through a single diode. Although half of the AC wave is lost it is adequate to power on-board electronics.



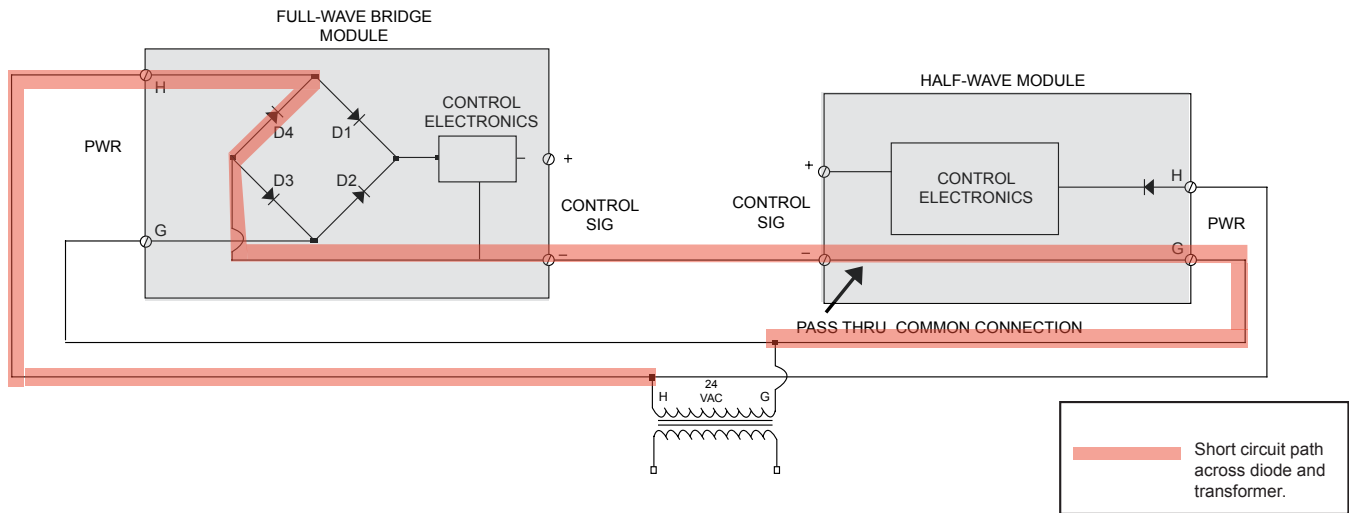
Full-wave rectification uses four diodes in the form of a bridge and converts the entire AC wave form into useful DC power.



Don't Do This:

The schematic below shows the full-wave rectified Lx5 and another half-wave rectified device sharing a single 24VAC power supply. Typical of half-wave rectified devices, its circuitry has a direct internal path connecting the common from 24VAC input to the common of the DC output. In contrast, the internal circuitry of full-wave rectified devices does not have an internal path between the input AC power and its DC output.

DON'T DO THIS!!



The common path between the input and output within devices utilizing half-wave rectification will lead to problems when mixed with full-wave devices on a single circuit. The highlighted path in the schematic shows that one of the diodes in the full-wave device is shorted directly across the 24VAC power. *The diode shorts the transformer every half cycle and results in diode / pcb trace failure, and possibly a blown fuse or a burned up transformer.*

Resolution:

1. Do not use the Lx5 auxiliary power tap to power half-wave rectified external devices or damage to the Lx5, and possibly the external devices and transformer will result.
2. It is ok to use the Lx5 auxiliary power tap to power other full-wave rectified devices (such as Lumisys approved sensors) as long as the total connected power of the devices to the 24VAC power supply is less than the transformer's total VA rating.
3. Be advised that your particular application may violate UL's definition of a Class 2 circuit, especially if the rated total power of the circuit is greater than 50 watts on the secondary side of the shared transformer.

Affected Products:

All products containing the Lx5 including Maxiom, FlexNet, Midori, Mezon, GL, Qwik Kits, and AutoPhos.

References:

1. Powering Multiple Devices from a Common Transformer
<http://www.kele.com/tech/Electric/TRefPS5.html>