

AC Power Switching with Air-Gap Relays vs. Solid-State Relays

By Shaun Johnson

Facilities with entertainment and architectural light “dimmer control systems” have been trending towards smaller more efficient lighting sources in recent years. The reasons are numerous and range from decreasing their lighting power costs and reducing their HVAC cooling requirements to utilizing newer lighting technologies such as LED’s.

Many of these newer technology lighting fixtures tend to require and are typically designed for “pure” sinusoidal AC power. Attempting to provide “full power” to such devices via existing SCR/SSR dimmers can result in either damage to the fixture and/or substantially reduced fixture life spans, not to mention a voided warranty depending on the manufacturer and resulting fixture damage.

Some facilities with existing SCR/SSR dimming systems have attempted to “by-pass” their dimmers in an attempt to provide this “pure” 100% AC power. This has traditionally had numerous shortcomings including:

1. Loss of circuit control (no DMX control) if the SCR/SSR had been “by-passed”.
2. If the “by-pass” did not include removal of the dimmer’s choke, numerous other issues can result due to the current lag that results from such a large inductor connected in series with the power line.
3. No visual indication of knowing when a given dimmer/circuit is “live” or energized.
4. Voiding the original safety approval that particular dimmer was designed to operate under.

JOHNSON SYSTEMS INC. (JSI) has developed a unique and cost-effective non-dim solution for existing Strand CD80 dimmer rack owners. Our CD80 Power Modules are designed as direct replacements for existing dual 2400 Watt dimmer modules. These new modules provide pure AC sinusoidal non-dim power control to modern loads that can be controlled via DMX, Ethernet and other modern communication protocols. Additional Power Module benefits include:

- A. Higher inrush surge current capacity than SCR/SSR dimmers with a greater tolerance for damaging short-circuits.
- B. Fully rated circuit protection via premium UL489 rated magnetic breakers.
- C. Onboard hi-speed microprocessor that permits precise switching and visual indication of a “live circuit” via face mounted blue LED indicators.
- D. “Air-Gap” relays are 250% current over-rated and spec’d at 1 million operations at 277 VAC. Each relay also has an easily accessible manual over-ride switch permitting ease of “by-pass” if it is desirable to use the module as a “constant power” module.
- E. In the “OFF” state there are no idle currents associated as there are with solid-state devices. Additionally, relay power switching is much more efficient than solid-state switching and results in significantly less heat produced in the dimmer rack and consequently, less HVAC cooling requirements/costs for the facility.
- F. Modules are ETL compliant and designed specifically for the application.
- G. Modules are available for all models of Strand CD80 dimmer racks.

For more information on CD80 Power Modules, [click here](#).

Johnson Systems (JSI) has introduced their J-PACK series of distributed hi-power relay packs.
For more information, [click here](#).