

Solid Statements: What are “Dual” Solid-State Relays?



Crydom recently implemented a global launch of a new range of dual solid-state relays. This new family, known as the “Evolution” series, was designed with a focus on the requirements of the European market and makes significant advances over older versions of commercially available dual relays. These include:

- Higher capacity outputs (50A per channel) and significantly increased power density.
- Screw terminal output connections in either vertical or horizontal configuration
- Available with an integral IP20 “touch safe” cover
- LED Input status indicator for each channel

- Four different input termination options
- Optional “wide” input range (4-32Vdc)

That being said, the obvious ensuing question is “what exactly is a dual solid-state relay?”

Two Relays in One Package!

A “Dual” SSR is simply a relay that combines two individual single-phase SSRs into one industry-standard package. Unlike a typical three-phase relay, the two output sections of an Evolution Dual SSR are controlled by individual inputs. This allows each channel to operate independently of the other.

Dual solid-state relays offer several advantages over standard single-phase “hockey puck” SSRs. Since the package size of a dual SSR is identical to a traditional single-phase SSR, the most obvious advantage is space savings. Applications that use more than one relay per panel can potentially replace two single SSRs with one dual SSR. Moreover, using a dual reduces assembly time as only one relay package must be mounted to provide two SSR functions.

However, we should always be aware of the fact that we cannot escape from physics! Simply reducing the package size of the solid-state relay does not reduce the amount of power dissipated by the individual relays. In other words, if you have two relays

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dissipating 25 Watts each inside of a panel, then replacing both with one Dual SSR will result in one SSR package dissipating 50 Watts of power. Therefore, the heat sink efficiency must be improved in order to accommodate the additional dissipation when replacing two single-phase relays with one Dual SSR

How They Work!

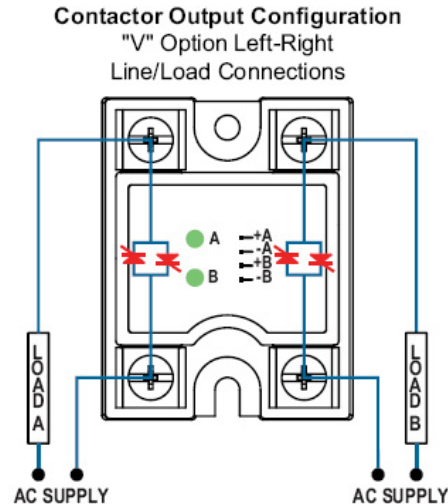
The Evolution Series Dual SSRs operate in exactly the same manner as a single-phase SSR. Each relay has two individual inputs, with each controlling its own individual output. The output connections can either be configured “vertically” or “horizontally”, depending upon the version selected. This allows for greater flexibility inside the panel. Customers using contactors or 22.5mm single-phase relays will tend to select the “vertical” option, while others may prefer the more traditional “horizontal” configuration of a “hockey puck” SSR.

“... the heat sink efficiency must be improved in order to accommodate the additional dissipation when replacing two single-phase relays with one Dual SSR”

Each output of the Evolution Dual SSR is capable of switching loads up to 50 amps at line voltages up to 600Vac. Of course, as we’ve all learned in previous editions (and mentioned above), the relay must be mounted to a

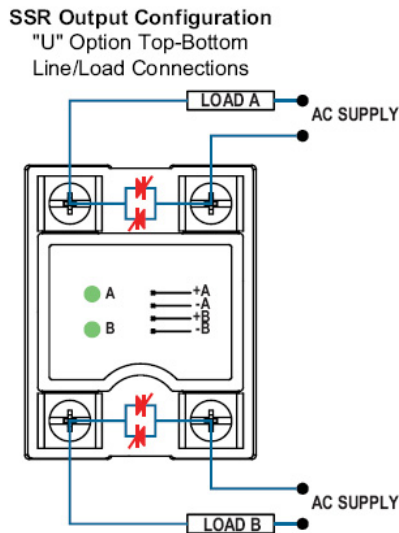
heat sink that can manage the full power dissipation of both outputs combined (0.5°C/W for 100A @ 40°C).

The input circuit of the Evolution Dual SSR is also the same as a traditional single-phase relay. The presence of a control signal (4-15Vdc, 15-32Vdc, or 4-32Vdc) on one input channel turns on the corresponding output channel. There are four input terminal configurations available; Option #1 is the traditional four-pin connector seen on many industry-standard dual SSRs. Option #2 is a positive latch crimp housing (keyed and locking). Option #3 is an industry standard connector that accepts a variety of common plugs. Option #4 is a spring-terminal connector.



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Where They Work!

Dual solid-state relays are found in a wide variety of applications, including Professional Cooking Equipment, Plastics and Packaging Machinery, Lighting Systems, Medical Equipment, Laboratory Ovens, Beverage Dispensing Equipment, and many other industrial or commercial applications. The most common application is resistive heating, such as controlling the temperature inside a commercial oven or injection molding machine. Each output can control an individual heating element or, in some cases, only one element where both the line and neutral legs must be switched. However, lighting is also a popular application for Dual SSRs, where random turn-on

versions are used to provide a dimming function.

Dual solid-state relays can also be used to control three-phase loads in a delta configuration, or in a wye / star configuration without a neutral connection. In such applications, two of the three phases are wired through the outputs of the dual SSR. The third phase is wired directly to the load. The inputs are then wired in either series or parallel to provide simultaneous switching of the loads. This is common in many resistive heating and motor control applications and provides several advantages to the common practice of switching all three phases. One advantage is (again) space savings, as an Evolution Dual SSR is significantly smaller than a typical three-phase SSR. But the biggest advantage of using an Evolution Dual SSR to switch a three-phase load is reduced power dissipation. A Dual SSR dissipates 33% less power than a three-phase SSR in a given application since only two outputs are conducting load current. This allows for the use of a smaller heat sink, which reduces overall cost and, once again, panel space.

In short, Dual SSRs can be used in nearly any application utilizing more than one single-phase SSR, or where both line and neutral must be controlled. They are also possible solutions to three-phase load control when switching two of the three phases is acceptable.

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Marketing Stuff:

Additional information on Crydom's Evolution Series Dual Solid-state Relays is available on our website (links below).

[Evolution Dual SSR Press Release](#)

[Evolution Dual SSR Brochure](#)

[Evolution Dual SSR Online Catalogue](#)

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