

Solid State Relays



HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Follow safe electrical work practices. See NFPA 70E in the USA, or applicable local codes.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Read, understand and follow the instructions before installing this product.
- Turn off all power supplying equipment before working on or inside the equipment.
- Use a properly rated voltage sensing device to confirm power is off.
DO NOT DEPEND ON THIS PRODUCT FOR VOLTAGE INDICATION
- Only install this product on insulated conductors.

Failure to follow these instructions will result in death or serious injury.

The information provided herein is intended to supplement the knowledge required of an electrician trained in high voltage installations. There is no intent to foresee all possible variables in individual situations, nor to provide all training needed to perform these tasks. The installer is ultimately responsible to assure that a particular installation will be and remain safe and operable under the specific conditions encountered.

Introduction

A Solid State Relay (SSR) is an electronic switch that is activated by a light emitting diode. When the SSR input receives voltage, the diode transmits a light ray into a light-sensitive semiconductor, which controls the output switch. The SSR differs from the traditional EMR (electromagnetic relay) in that it contains no moving parts. The switch, therefore, occurs in a fraction of the time, with less wear on the relay.

Since their introduction, the major industrial applications for SSRs have been in temperature control, motors, light sources, solenoids, valves, and transformers. The potential for growth in new applications is almost limitless.

SSR Features

- No moving parts
- Long life (>109 operations)
- Fast response
- Quiet
- Arc-less switching
- Shock and vibration resistant
- Microprocessor compatible

Load Considerations

The primary concern when using SSRs is improper heat sinking. The type of load current should be evaluated when considering an SSR as a switching option. SSRs alone are not compatible with high inrush currents, but cautionary measures can be taken in high inrush applications to increase the SSR's versatility.

Load type	Cautionary action
All load types	Verify that the inrush current does not exceed the surge specifications of the SSR.
Steady-state resistance	Follow standard thermal considerations.
DC (inductive)	Place a diode across the load to absorb surges during turnoff.
Incandescent lamp	Use a zero voltage turn-on characteristic.
Capacitive	Verify that the rate of current rise capabilities are not exceeded. Zero voltage turn-on is an effective method for limiting this rate.
Motors and Solenoids	Use a current shunt and oscilloscope to examine the duration of the inrush current. Verify that back EMF does not create an overvoltage situation during turn-off.
Transformers	Use a zero cross turn-on device; verify that the half cycle surge capability is not exceeded. Rule of thumb: select an SSR with a half cycle current surge rating greater than the maximum applied line voltage divided by the transformer primary resistance.