

Application description

Solenoids, relays, and other devices which use magnetic stored energy are a common technique to operate valves, motors and other end actuators. When these devices are powered by dc voltages, they create special problems for solid state devices. This is because when they are turned off, the magnetic stored energy must go somewhere. Often this takes the form of a high energy pulse seen by the solid state switching device. These pulses, called "inductive kick back", can present much higher voltage surges than the dc power source and can cause damage to solid state switching devices.

In order to protect the solid state switching device, WRC provides a protective diode on dc switches, such as the 1781-OB5S, 1781-OC5S, 1781-OB5Q, 1781-OC5Q, WRC4-OB5S and WRC4-OC5S. Solenoid and relay manufacturers, however, recommend additional protection, called "commutating diodes", be placed around the inductive device as well. Manufacturers often recommend this diode be provided around the solenoid as shown, and located within 18" of the load.

For AC applications with motor starters, solenoids and similar magnetic stored energy devices, the inductive spike may be several orders of magnitude higher than the device rating. Installing a MOV varistor can provide additional protection. A Harris part #V250LA40C or equivalent will provide 170 joules energy withstand during switching transients with a continuous voltage rating of 250 Vac.

