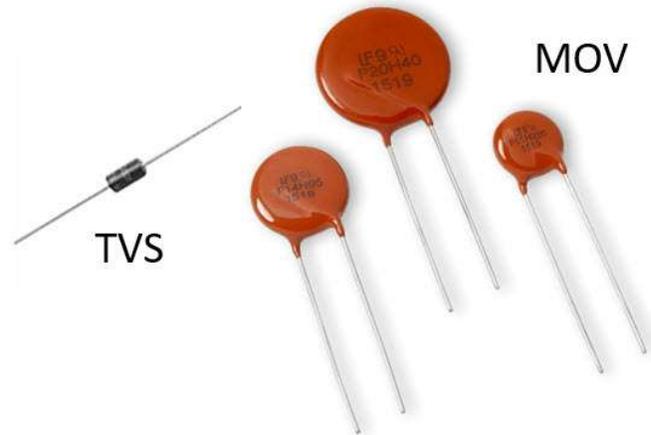


Overvoltage Protection for Solid State Relays & Power Controllers

When utilized properly, solid-state relays (SSRs) and power controllers can long outlive the equipment in which they are used. The typical MTBF (mean time between failures) of an SSR is >7 million hours, which roughly translates to 800+ years. However, as with any electrical system, SSRs can fail prematurely for a variety of reasons. Frequent and extreme thermal excursions are one of the most common reasons for SSRs to fail prematurely, but damage from voltage transients is likely a close second.



HBCcontrols offers two types of voltage protection for SSRs and power controllers; metal oxide varistors (MOVs) and transient voltage suppressors (TVS diodes). MOVs are the most common and are usually denoted by a -M suffix in the part number. These devices are connected directly across the output terminals of the SSR and are very effective at absorbing short-term voltage transients that may otherwise damage the output circuit of an SSR when it's in the off state. The downside to MOVs is that their ability to suppress transients degrades over time, depending upon how much energy they're required to absorb. Fortunately, they're easy to replace. Unfortunately, unless the mode-of-failure is catastrophic, it's almost impossible to visually identify an MOV that is no longer providing adequate overvoltage protection.

Unlike MOVs, TVS diodes are integral to the SSRs design, connected in parallel with the optical isolator(s) and in series with the gates of the output SCRs. They do not absorb the full energy of the transient voltage spike whenever such a phenomenon occurs. Instead, they bypass the optical isolators by shunting enough energy into the gates of the output semiconductors to trigger them into full conduction for the remainder of the half-cycle of the AC sine wave. This effectively suppresses the transient by passing it through the SCRs and onto the load. Since the TVS itself does not absorb the energy from the transient, this option is highly repeatable and often preferred over MOVs.

One cautionary note with regards to integral TVS diodes; they are not suitable for use in motor-reversing applications or applications where a momentary, uncontrolled pulse of energy to the load poses a threat to personnel and/or equipment. In such applications, alternative methods for providing overvoltage protection must be considered.

For additional information or support, please visit us at www.hbcontrols.com or contact our support team @ 800.879.7918 / support@hbcontrols.com.