

We Cut Confusion About Switching All Hot Legs!



A common question Watlow Technical Sales Support staff receives from the field about solid state switching is "Why don't they switch all electrically hot lines when controlling a load?"

On a single phase circuit, using 120 or 277VAC, one side of the load will always be grounded (neutral) and one wire will be electrically hot. Per the National Electric Code (NEC), the neutral must never be switched nor fused; not with solid state nor with mechanical switching.

On a single phase circuit using two "hot" wires, 240 and 480VAC, for example, technically only one hot line should be switched to control the circuit. In fact, poorer performance and additional cost is required when using solid state relays (SSR) for controlling all hot legs on ungrounded loads. Two SCRs wired in series will not conduct at the same time in the AC waveform. Thereby the first AC wave is clipped which causes harmonics to be generated. Additional heat is generated across the second SSR. In addition, both SSRs may not even turn on depending on the rate of voltage rise and suppression devices located with in the SSRs. .

However for over temperature protection and personnel safety reasons you must mechanically disconnect ALL hot lines. A solid state switch; triac, SSR, and SCR is considered to be a specialty device by Underwriters Laboratory (UL), and may NOT be used as an over temperature or safety disconnect. On three phase loads, the same basic rules apply. Anyone working on a heater must first disconnect the power to the application. There is no substitute for good safety procedures.

WARNING: AC Power control (power switching) wiring must conform to National Electric Code (NEC) safety practices, as well as to locally-applicable safety codes. Failure to conform could result in death or personal injury.