



FUSING CONSIDERATIONS FOR SCR POWER CONTROLS

Protection of systems for controlling electric heaters, require two types of fusing to protect both the system and the SCR's.

Branch Circuit Fuses are required by code to protect against fire/damage when heaters or wires short. The branch circuit fuses do not respond quickly enough to protect the SCR's from damage in the event of a heater or wire short.

A branch circuit fuse must open in one minute at 125 percent of the fuse's nameplate rating.

The fuse is selected that has a rating at a minimum of 125 percent of the connected load. Then a selection is made to go to the next size larger if the calculation results in a fuse size that is not available.

When changing to smaller wire gauge or splitting up the load, it may be necessary to add additional fusing for the smaller wire. See the Tap Rule in the NEC 240.21.

Semiconductor Fuses are a specialty fuse or sometimes called a supplemental fuse, that are only used to protect the SCR's. They can open in tenths of a millisecond on a high fault current short. Semiconductor fuses are not legal for branch circuit protection; as they do not have a defined overload rating.

Semiconductor fuses must be rated at a minimum of 125 percent for the RMS rating, but also must be rated in current squared multiplied by time (I^2T). The semiconductor fuse may be sized larger than the connected load calculation. Semiconductor fuses supplied with power controllers are rated at 125% of the rated current capabilities of the SCRs. Since the supplemental fuse is meant to protect the SCR, this is perfectly acceptable.

To protect the SCR, the I^2T rating of the fuse must be at or lower than the I^2T rating of the SCR.

Some products come standard with semiconductor fuses, while others must be ordered separately. Shorted SCR's are not covered under warranty when recommended semiconductor fuses are not used in all controlled legs.

Combination Fuses are available that combine branch circuit and semiconductor fusing in one package. Please contact Watlow for information on these fuses if you wish to utilize a combination fuse.

Short Circuit Current Rating – SCCR is only valid for power controllers if recommended fuses are used in the application. Please contact Watlow for information on SCCR ratings and methods to meet the requirement.