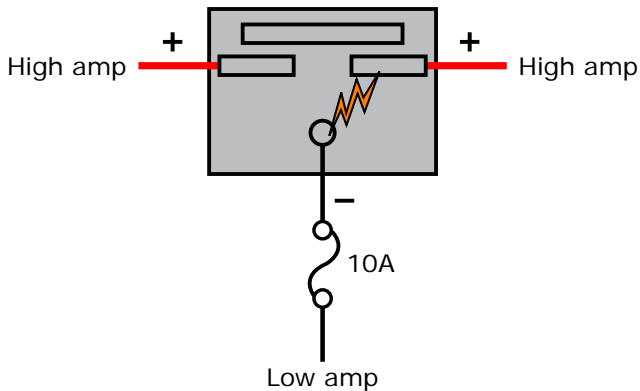


## Technical Brief: Fusing the Negative Circuit of ACRs and Other Electric Relays

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**Problem.** Electric switches such as automatic charging relays (ACRs), battery combiners load shedding devices, and zero-drop isolators all contain a high-amp circuit and a low-amp circuit. Wires connected to the high-amp circuit typically are large; wires connected to the low-amp circuit typically are small. Many of these devices have suitable insulation or separation between the low-amp circuit and the high-amp circuit to prevent a short from occurring between the low-amp circuit and high-amp circuit. Some of these devices especially those containing electronic circuits, may not have sufficient separation or insulation to prevent a short circuit if exposed to moisture or damage.

If a short circuit occurs between the high-amp circuit and the low-amp circuit, high current flows through the low-amp circuit. The low-amp circuit small gauge wire isn't suitable to carry high current. When high current flows through this small gauge wire, it may heat up enough for the insulation to melt and to cause a fire.

**Solution.** A solution is to add a fuse to the negative wire in the low amp circuit. A 10A fuse is adequate protection for the small wires typically used in the low-amp circuits, and it won't result in nuisance trips. A fuse will blow before fault currents exceed the capacity of the negative wire. Fusing in the negative is unusual, but in this case it makes sense because the capacity in the high-amp wiring is so much higher than the capacity of the low-amp wire.