

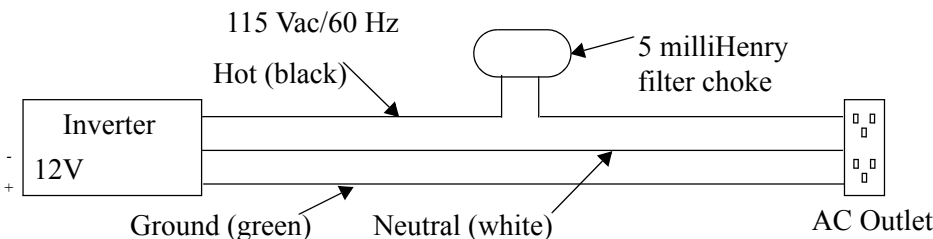
## Operating Air Conditioner and Refrigerator Compressors

Application Note  
976-0163-10-01 Rev A

We do not have specific model test data regarding compressors, however, it appears there is considerable variation in start surge from model to model of air conditioner or fridge compressors. In our experience the newer small rooftop-style air conditioners (5000-7000 BTU) used on RVs in some cases actually draw only 8 amps running (with moderate start surge), and can usually be operated by a 1500 W inverter. The older models may not be as efficient, and may draw a much higher surge, causing even a 1500 W inverter to trip into overload. A 2500 W inverter in most cases can operate air conditioning units up to 11 A/10,000 BTU. The DC wiring and battery capacity must be optimal to provide the large start surge without starving the inverter of power during a surge.

A three-foot-high, bar-style fridge, which draws up to 2.5 A, in most cases can be run by an 800 W or larger inverter. Full height fridge rated from 2.5-5 A can usually be operated by a 1500 W or larger inverter. A 2500 W or larger inverter would be more suitable to operate compressors up to 5-8 A.

The compressor amp/watt rating does not tell the whole story. The compressor spec plate rating is usually the max running draw. The start surge can range far higher; the rule of thumb is 5-10 times the spec plate rating. If the compressor demands more surge than the inverter can provide, the inverter would go into overload and shut down the AC output until the overload is removed, and the inverter reset (switch off, then on again). In a borderline situation (i.e. inverter surge capacity is just short of compressor surge demand) the addition of an inductor, or filter choke of 5 mHenry/10-30 amp rating may be sufficient to buffer the surge spikes and get the compressor started. The inductor would be wired in series in the hot lead between inverter AC output and load/compressor (see Figure 1). The start surge typically lasts less than two seconds until the motor's magnetic field and motor impedance rises, which lowers the current demand from the inverter to a manageable level for continuous running.



Hammond makes a 5 milliHenry filter choke, available at Electrosonic (Canada - 1 800 567 6642) or Newark Electronics (USA - 1 800 463 9275)

Figure 1

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