

## **TECHNICAL NOTE**

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#### **SUBJECT: AC Load Sharing**

The Freedom series inverter / chargers automatically perform a function called "load sharing". Load sharing is a feature that is not mentioned in the manual, but is something the unit performs as part of its normal operation. This feature enables the inverter to protect AC loads connected to its output from fluctuations in shore power or generator power.

When shore power or generator power is available, the Freedom unit transfers this power to any AC loads connected to its output, and uses some of the power to charge the batteries. While the unit is in this charge/transfer mode, it constantly monitors the incoming AC power. If it detects a drop in voltage that lasts more than 8 milliseconds (one half cycle), it stops charging, stops transferring this marginal power to the loads, and starts inverting immediately. In this way, the inverter protects AC loads connected to its output from unacceptable AC power. The unit will perform the same sequence of operations if it sees the incoming frequency exceed defined limits.

Here is an example of how this feature would work. A motor home has a 3.5 or 4 kW generator directly running two roof air conditioners. The inverter / charger charges the batteries and transfers generator power through to the outlet circuits where the television is also turned ON. The user then starts the microwave oven, which also gets its power through the inverter / charger on an outlet circuit. The inrush current, demanded by the microwave in addition to all the other loads running, causes the generator to bog down. This results in a quick voltage dip and temporary drop in frequency. The Freedom unit will instantly detect this condition, and drop its loads from the generator and begin inverting to power the microwave and television. The generator will then recover quickly in the presence of a lower load and its voltage and frequency will stabilize. After about 8 to 10 seconds, the Freedom unit will transfer its loads back to the generator and slowly ramp up its charger again. By sharing some of the load with the generator in this way, the 'outlet powered' loads are protected and the generator can better cope with quick changes in load demand.