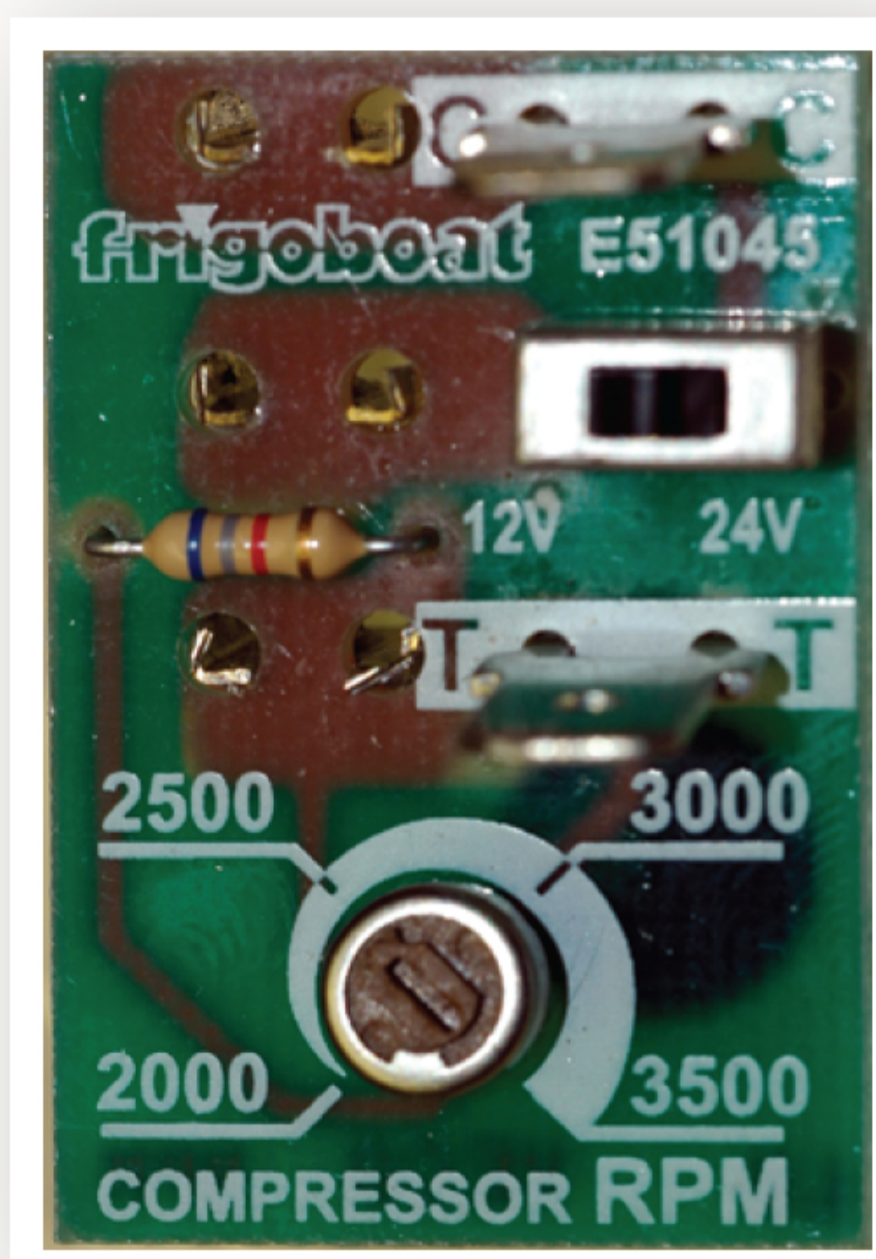


The graph above shows how the compressor reacts when heat is added. The compressor turns on more frequently and stays on longer, consuming more amp-hours. Frigoboat's manual controller (immediate right) and Smart Speed Control (far right) proved helpful to maximizing efficiency.



Achieving Energy Independence

Bob Williams, the electrical wizard of Sea Air Land Technology (SALT), once said that, “refrigeration problems usually need an electrical system solution.” Williams advises any boater considering a major equipment upgrade to do an energy audit, a simple amp-hour tally based upon the current draw of each electrical item and how much time it will actually operate over 24 hours. The sum reveals what the house battery bank must daily supply in order to make all gadgets function according to plan. The owner of a classic cruiser may get away with a paltry 50 or 60 amp-hours, while its modern counterpart may gobble up over 200 amp-hours a day. The bottom line is that there’s no free lunch, and when adding refrigeration and other gear, check what it costs in amp-hour as well as dollars.

Here are some of William’s other tips to ensure an energy-efficient upgrade:

- Always opt for heavier gauge wire to minimize voltage drops and make sure to use top-quality connectors that are carefully crimped and protected from moisture.
- Paralleled house batteries should be “from the same litter”— meaning the same brand, size, and date of purchase. In cases where paralleled batteries are being charged by either an alternator or charger, introduce the positive and negative leads at opposite ends of the paralleled batteries.
- If you opt for a high-output alternator, make sure that the belts and brackets can stand up to the loads. Double belts need very stable bracketing.
- Don’t use high-output alternator belts to drive coolant pumps because of the heavy, seal-damaging side loads that they impart on the pump.
- Some modern regulators for high-output alternators (like those from Balmar and Ample Power) offer further protection from mechanical loads by gradually ramping up alternator output, and monitoring the temperature of the battery cases and alternator frame. Many also include limiting features that allow a user to reduce the maximum output, a feature that can pay off in alternator longevity.
- Effective insulation, well-gasketed lids, and keeping the box’s interior volume to the minimum required offer the potential for great energy savings.
- Finally, a large house battery bank, 400 amp-hours or more, and an ability to add copious amps when the engine is running, beef up the power production and storage side of the equation. Add a high-output wind generator and some solar panels, and when diesel prices resume their climb, you can toast your newly engineered immunity with a cold beverage.