Application Brief: Automatic Charging Relay - an alternative to multiple output charging systems

What do you do when the number of battery banks on your boat is greater than the number of charging outputs from your system’s battery charger, and you want to provide a charge to all batteries? How do you design a boat electrical system that charges two battery banks without adding the cost of a dual output charger? Instead of upgrading your charging system, or installing a system with multiple outputs, install an automatic charging relay (ACR). The cost of a charging system with multiple outputs is considerably more expensive than one with single output, making the installation of the ACR a less expensive option.

For example, consider a typical marine electrical system with two battery banks, a battery charger with one output, and an alternator. To charge both battery banks from your single output charger, connect the ACR between the battery banks. Connect the alternator to charge battery 1 (start battery), and connect the charger to charge battery 2 (house battery). When the charger is charging battery 2, the ACR will combine battery 2 and battery 1 for charging. When the alternator is charging battery 1, the ACR will connect battery 1 and battery 2, and both batteries will be charged. With the installation of the ACR, when at dock and plugged into shore power, the charger is supplying a charge to both battery banks; when the engine is running, the alternator is charging both battery banks.

Similarly, if you are adding an auxiliary battery to power a windlass, you can connect the auxiliary battery through an ACR to a battery bank that is attached to a charger. In this way, you are able to charge an additional battery bank without upgrading the charger to one with multiple outputs.

Blue Sea Systems provides three ACR options with 60A, 120A, and 450A continuous current ratings:

- **CL-Series BatteryLink™ ACR (PN 7600)** with a current rating of 60A, can be connected to sense one or two charging sources. By connecting a jumper wire between terminal 1 and B, the ACR will sense both batteries.
- **SI-Series ACR (PN 7610)** with a current rating of 120A (available in September 2006), automatically senses two charging sources.
- **L-Series ACR (PN 9112)** with a current rating of 450A, can be connected to sense one or two charging sources.

Each ACR automatically connects batteries during the charging cycle and disconnects them under discharge.
When combined with Blue Sea Systems’ Dual Circuit Plus™ Battery Switch (PN 5511e or 6011), all three ACR models fully automate the charging of two batteries. The combination of the Dual Circuit Plus™ Battery Switch and ACR provides a practical and less expensive solution to manage:

- Isolated battery circuits
- Emergency parallel backup operation
- Automated charge management

Simply turn the battery switch to the ON position when arriving on the boat, and turn it to the OFF position when leaving. You no longer have to worry about which batteries are charging or discharging.

Before replacing your charger or inverter/charger, consider the benefits of an ACR; and for a fully automatic system, add a Dual Circuit Plus™ Battery Switch.