

Automatic Charging Relay Installation by Tom Parkes, KI6DDB and Excerpted

From 10/2013 Boating Magazine

Our SOARA President, Tom Hobbs, has this type of automatic charging relay (ACR) set up in his RAM 4X4 pickup. Tom uses it for off road events like the upcoming High Desert Trails: May 3, 2014 (all day), Ridgecrest, Car Rally Race. The operating concept is "ALL DAY." Other "ALL DAY" events we Ham radio folks are involved in are Baker to Vegas: March 22, 2014 (all day), Field Day (24 hours), OC and other marathons, MS 150 cycling event, and emergency C.E.R.T., R.A.C.E.S., A.R.E.S. etc. events.

We don't want to enjoy a rewarding day of community service just to suffer a dead battery getting between us and that steak dinner, plus appropriate libation and "honey-do" list waiting at home.

Managing all your batteries while at a remote net is a cinch with an ACR system such as the Add-a-Battery kit (westmarine.com) from Blue Sea Systems (bluesease.com). Such a system allows charging current to flow to both your car's starting and your deep discharge ham radio batteries automatically, without your having to remember to throw a switch. Yet it prevents inadvertently draining the starting battery while using ham radio loads (radio, computer, lights, etc.) that might leave you dead in the water and unable to start your car.

ADD-A-BATTERY kit (westmarine.com) from **BLUE SEA** Systems (bluesease.com)



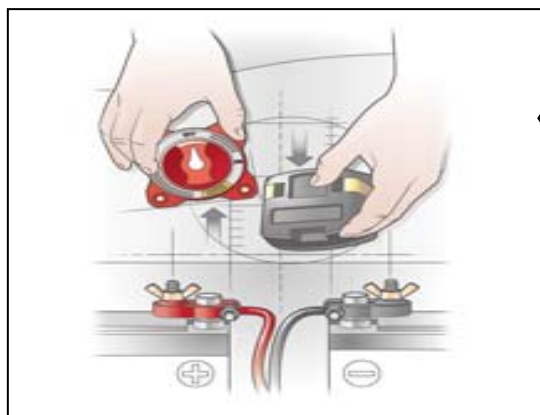
While there are a number of ACR configurations, here's how to set up a basic two-battery system on a single-engine boat or your car or truck, using the Add-a-Battery kit.

1. Select the Wire Size

Make sure you use marine wire and fuses sized to handle the engine's alternator output and starting requirements. Check the owner's manual to determine the amperage output and draw, and then go to boatingmag.com/amp-draw.

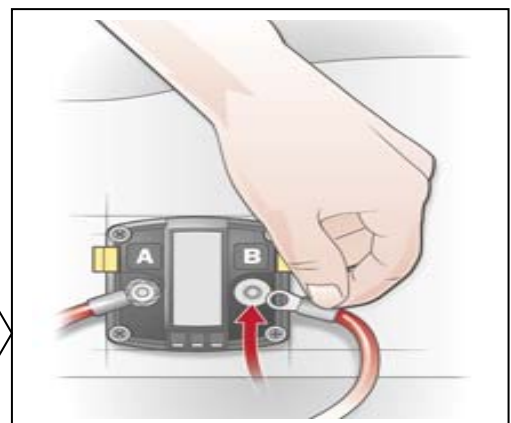
2. Plan the Layout

Choose a location close to the batteries to attach both main components — a Blue Sea Systems e-series Dual Circuit Plus battery switch and SI-ACR. It should be dry and well ventilated. Use stainless-steel fasteners to install them securely, and check behind bulkheads for wires, hoses and tanks before drilling any holes. You will need access to the back of the battery switch to connect wires, so don't mount it until after step 3.



2. Plan the Layout

3. Connect Positive Terminals

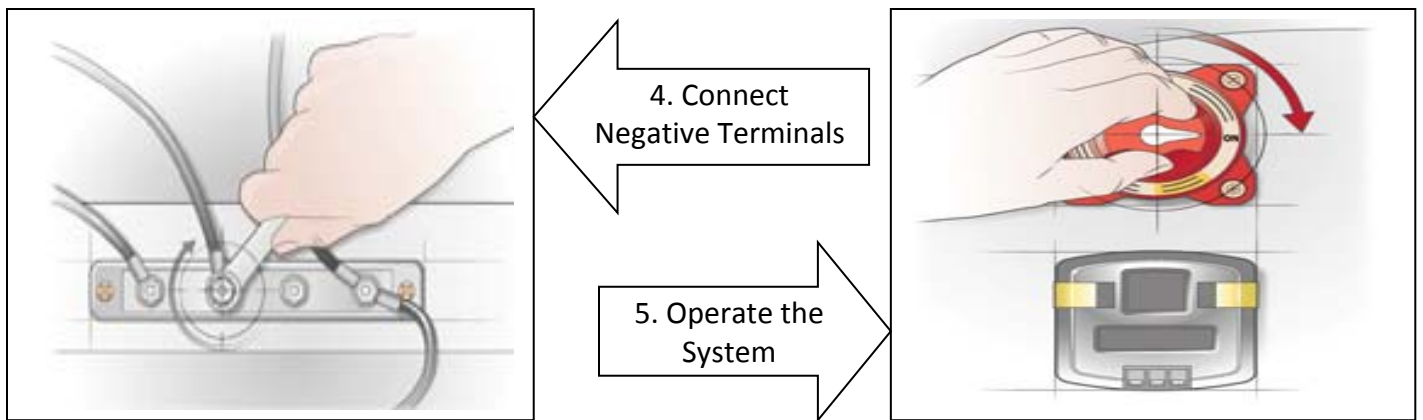


3. Connect Positive Terminals

Connect starting battery positive to ACR stud A and house battery positive to stud B, with fuses for both. (Always connect positive first in 12-volt systems.) Connect house and starting batteries' positives to the lower studs 1 and 2 on battery switch, respectively. Finally, connect switch panel positive with a fuse to upper stud 1 and engine starter/alternator positive to upper stud 2.

4. Connect Negative Terminals

Connect the negative terminals of both batteries to the negative bus bar. Next, connect the terminal marked GND on the ACR to the negative bus bar. Install a fuse in the ACR ground wire. Make sure all terminal connections are crimped firmly, tightened properly and coated with dielectric grease.



5. Operate the System

Turn the Dual Circuit Plus battery switch to "on." The SI-ACR will manage the charging of both batteries when under way and when plugged into a charger. In case you need the house battery to start your car in an emergency, turn the switch to "combine batteries." Rotate the battery switch to "off" when you leave your car.

Quick Tip

To fight corrosion, use marine crimp connectors with heat-shrink collars from companies like Ancor (marinco.com/brand/ancor). Then cover each crimp with a length of heat-shrink tubing, and coat each terminal with LubriMatic dielectric grease (etrailer.com).

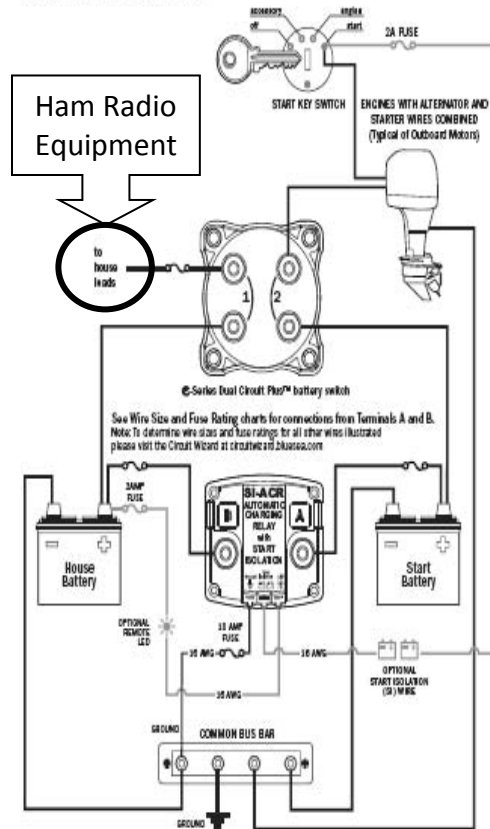
Please refer to the "Engines with Separate Alternator and Starter Wires."

Although this article and equipment are designed for marine applications, it can also be applied to our cars and trucks.

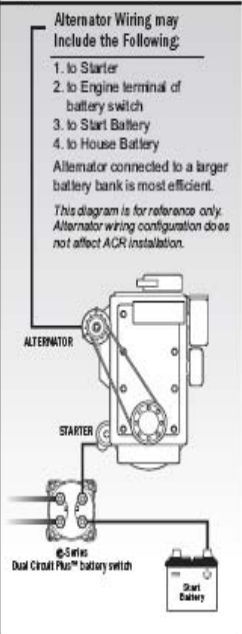
designed for marine applications, it can also be applied to our cars and trucks.

Installation Diagram Wire Size and Fuse Ratings

Engines With Combined Alternator and Starter Wires - typical of outboard motors



Engines With Separate Alternator and Starter Wires - typical of inboard engines

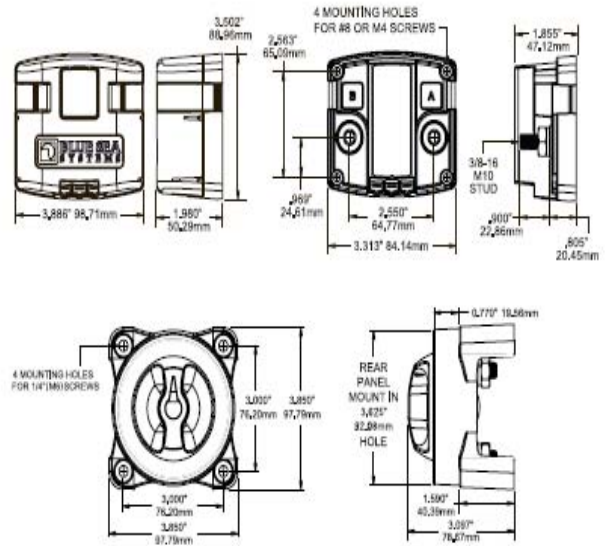


Charging Amps	Minimum Wire Size ^a	Fuse Rating
≤50	#6	75-90A
≤80	#4	100-125A
≤100	#2	150A
≤120	#1	175A

Charging Amps	Minimum Wire Size ^a	Fuse Rating
≤50	10 mm ²	75-90A
≤80	16 mm ²	80-90A
≤90	25 mm ²	125-130A
≤110	35 mm ²	150A
≤120	50 mm ²	150-175A

^a Larger wire sizes may be required to minimize voltage drop in long wire runs. For more information, please visit the Circuit Wizard at circuitwizard.bluesea.com

Dimension Drawings



^a These installation diagrams show typical applications only. Your installation may differ.