

## Add-A-Battery


PN 7650

### SI-ACR Automatic Charging Relay with Start Isolation

- Automatically combines batteries during charging, isolates batteries when discharging and when starting engines
- Supports high-output alternators up to 120 Amps
- Ignition protected—safe for installation aboard gasoline powered boats
- LED light is ON when batteries are combined
- Allows temporary isolation of house loads from engine circuit during engine cranking to protect sensitive electronics—start isolation indicated by blinking LED
- Under voltage lockout—will not close when the lower battery is below 9.5V @ 12V systems or 19V @ 24V systems—lockout indicated by blinking LED
- For 12 or 24 volt systems
- Dual Sensing—senses charge source on either battery bank

### LED Status Chart

LED	BATTERY STATUS	REASON
On	Combined	Charging
Off	Isolated	Discharging
Slow Flash — — —	Isolated Start isolation	Start Isolation wire is energised
Fast Flash • • • • •	Isolated Under voltage lockout	One or both batteries are below 9.5V (12V System) 19V (24V System)



### Specifications

	12V DC	24V DC
Continuous Rating	120A	120 A
Intermittent Rating (5 min.)	210A	210A
Maximum Cable Size	1/0 AWG	1/0 AWG
Terminal Stud Size	3/8"-16 (M10)	3/8"-16 (M10)
Maximum Torque	140 in-lbs	140 in-lbs

### Relay Contact Position

	(30 sec.)	13.6V	27.2V
Combine	(2 min.)	13.0V	26.0V
Open Low	(10 sec.)	12.35V	24.7V
	(30 sec.)	12.75V	25.5V
Over Voltage Lockout		16.0V	30.0V
Under Voltage Lockout		9.5V	19V

### Regulatory

CE marked for ignition protection, meets ISO 8846, UL 1500 and SAE J1171 external ignition protection requirements

Rated IP67—temporary immersion for 30 minutes

### e-Series, Dual Circuit Plus™ Battery Switch

- Switches two battery banks simultaneously with one simple ON/OFF switch while maintaining battery bank isolation, minimizing the risk of a dead start battery
- The COMBINE BATTERIES function parallels two battery banks in the event of a low battery
- Meets external ignition protection requirements

### Specifications

Cranking Rating (10 sec.)	1,000 Amps
Cranking Rating (1 min.)	750 Amps
Intermittent Rating (5 min.)	525 Amps
Continuous Rating	350 Amps
Maximum Voltage	32 Volts
Cable Size to Meet Ratings	4/0 AWG
Terminal Stud Size	3/8"-16 (M10)
Maximum Torque	140 in-lbs

### Regulatory

CE marked for ignition protection, meets UL 1500 and SAE J1171 external ignition protection requirements

Rated IP66—protected against powerful water jets

## Installation Instructions

### Electrical Connections

- The wiring diagram illustrated on the back page represents a common installation and is not meant to be a guide for wiring a specific vessel.

**Caution:** Disconnect battery connections before beginning the installation.

Reconnect after the installation is complete.

Use the wire sizing chart below to select the appropriate wire sizes to prevent overheating the ACR.

Wire Size and Fuse Rating Chart (AWG)		
Charging Amps	Minimum Wire Size*	Fuse Rating
≤60	#6	75-90A
≤80	#4	100-125A
≤100	#2	150A
≤120	#1	175A

\* Larger wire sizes may be required to minimize voltage drop in long wire runs.

For more information please use the Circuit Wizard at [www.circuitwizard.blueseasystems.com](http://www.circuitwizard.blueseasystems.com).

### e-Series, Dual Circuit Plus™ Battery Switch Installation:

- Mount the battery switch in an easily accessible location close to the batteries.
- Attach one 4/0 AWG cable per terminal to meet ratings.
- Terminals must be attached under nut and lock washer. Torque to 140 in-lb (15.82 N-m)

### SI-ACR Installation:

- To minimize corrosion to wire and terminals, mount in a dry and protected location. Avoid locations directly above battery banks.
- To sense charging sources on either battery bank, connect one battery bank positive to stud terminal **A**. Connect the other battery bank positive to stud terminal **B**.
- Connect the quick connect terminal marked **GND** (ground) to the DC system ground through a ten to fifteen amp in-line fuse to prevent fault currents from flowing in this wire.
- Connect a wire from the quick connect terminal marked **SI** (start isolation) to the terminal or wire running from the start key switch to the starter solenoid. Make this connection through an in-line fuse of 1 to 10 Amps. This connection can be made at the start key switch or at the starter solenoid, but must be to the line that is positive only when cranking. Connection to a line that is positive while the engine is normally running will prevent the charging relay from working properly.
- To connect a remote LED indicator, connect the red wire of the LED to a positive source through a 2A inline fuse. Connect the yellow wire of the LED to the quick connect terminal marked LED.
- Remote indicator lamp – mirrors "COMBINED" LED on unit. Appropriate 12/24V LEDs include Blue Sea Systems PNs 8033 (amber), 8171 (red), or 8172 (green).

### Operation

- Turn all loads off before turning the battery switch to OFF.
- Do not switch to OFF while the engine is running.
- Open/Close Cycling—If your electrical system is configured with a charging source that cannot supply the full load current being drawn from the receiving batteries, an open/close cycling process can occur. If this cycling continues, the second battery bank could eventually discharge even though a charge source is present.
- The 120A SI ACR is not intended to carry starting currents. Use the battery switch COMBINE BATTERIES position to combine battery banks for emergency starting.

### Guarantee

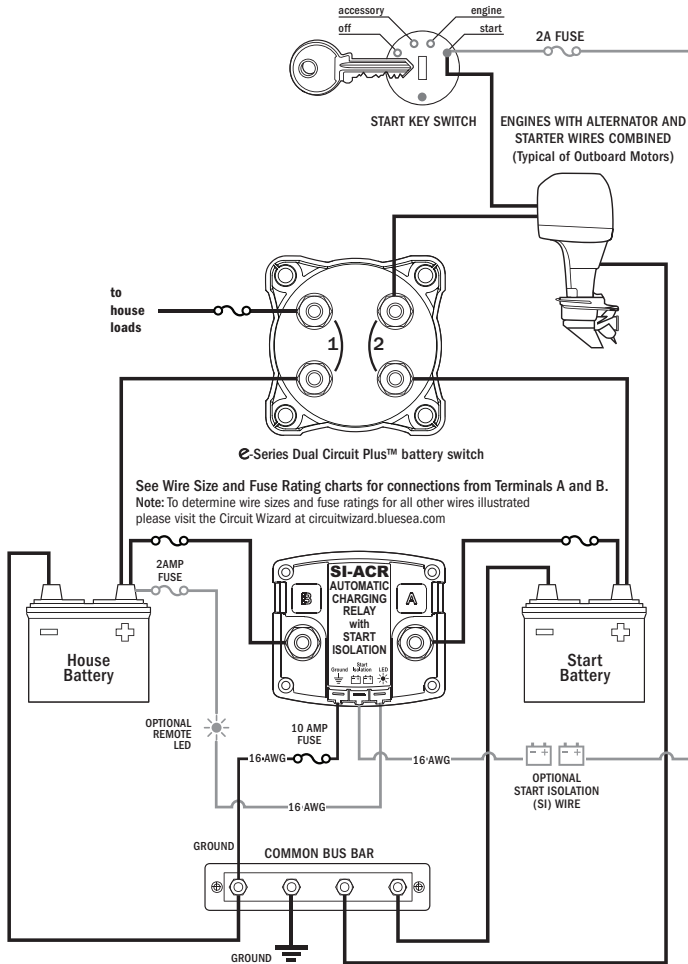
Blue Sea Systems stands behind its products for as long as you own them.

Find detailed information at [www.blueseasystems.com/about](http://www.blueseasystems.com/about).

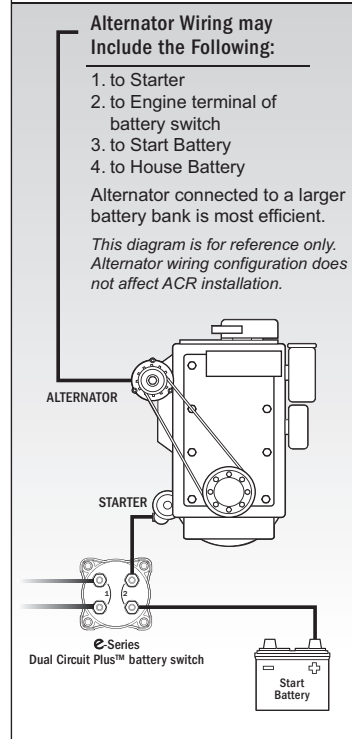
For customer service, call 800-222-7617.

# Installation Diagram

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



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



Alternator Wiring may Include the Following:

1. to Starter
2. to Engine terminal of battery switch
3. to Start Battery
4. to House Battery

Alternator connected to a larger battery bank is most efficient.

*This diagram is for reference only. Alternator wiring configuration does not affect ACR installation.*

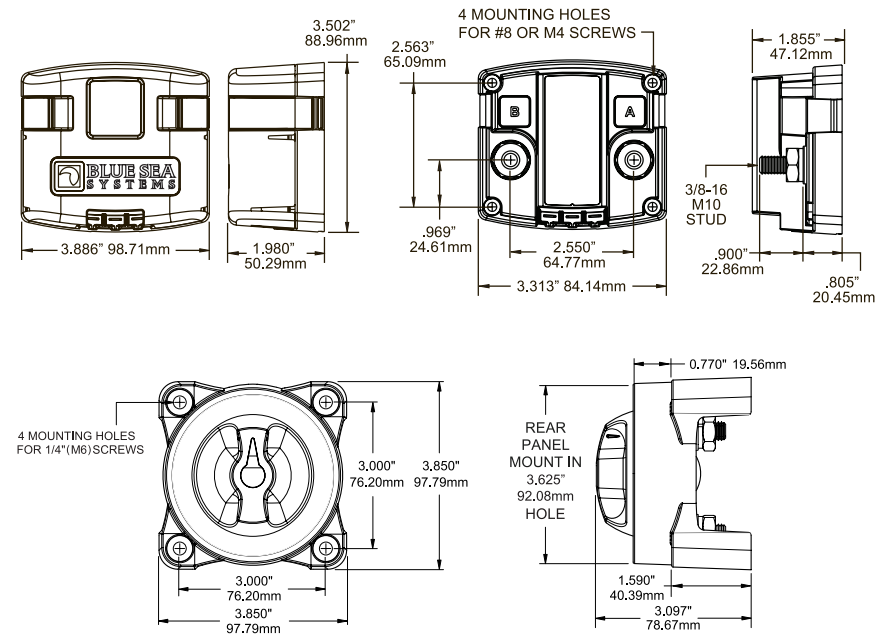
# Wire Size and Fuse Ratings

Wire Size and Fuse Rating Chart (AWG)		
Charging Amps	Minimum Wire Size*	Fuse Rating
≤60	#6	75-90A
≤80	#4	100-125A
≤100	#2	150A
≤120	#1	175A

Wire Size and Fuse Rating Chart (Metric)		
Charging Amps	Minimum Wire Size*	Fuse Rating
≤50	10 mm <sup>2</sup>	75-80A
≤70	16 mm <sup>2</sup>	80-90A
≤90	25 mm <sup>2</sup>	125-130A
≤110	35 mm <sup>2</sup>	150A
≤120	50 mm <sup>2</sup>	150-175A

\* 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](http://circuitwizard.bluesea.com)

# Dimension Drawings



\* These installation diagrams show typical applications only. Your application may differ. For further information, please go to [www.bluesea.com](http://www.bluesea.com) and navigate to Resources/Application Briefs and Technical Briefs.

\* Because the SI-ACR is Dual Sensing, terminals A and B are interchangeable. ACR function will not be affected by reversal of the starting and house batteries versus the diagram.

\* If the COMBINED indicator LED is flashing, the ACR is in a lockout state, and will not combine batteries until the lockout condition is removed. Ensure neither battery is below 9.5V for a 12V system or 19V for a 24V system. Also ensure positive voltage is not present on the Start Isolation terminal.

\* It is recommended that the ACR be connected directly to your battery positive terminals through appropriately sized fuses. Connecting in a different location such as a battery switch may affect accuracy because of voltage drop along current carrying conductors.

\* If you are not knowledgeable about electrical systems, please consult an electrical professional for help with installation.



425 Sequoia Drive  
Bellingham, WA 98226 USA  
p 360.738.8230  
p 800.222.7617 USA and Canada  
f 360.734.4195  
[conductor@bluesea.com](mailto:conductor@bluesea.com)  
[www.bluesea.com](http://www.bluesea.com)

990310020 Rev. 007