

# SI-ACR

## Automatic Charging Relay with Start Isolation

PN 7610

### Features

- Automatically combines batteries during charging, isolates batteries when discharging and when starting engines
- Allows temporary isolation of house loads from engine circuit during engine cranking to protect sensitive electronics—start isolation indicated by blinking LED
- 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
- Under voltage lockout—will not close when the lower battery is below 9.5V @ 12V System or 19V @ 24V System—lockout indicated by blinking LED
- Waterproof rated IP67—temporary immersion for 30 minutes
- 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	120A
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

Combine	(30 sec.)	13.6V DC	27.2V DC
	(2 min.)	13.0 V DC	26.0V DC
Open Low	(10 sec.)	12.35V DC	24.7V DC
	(30 sec.)	12.75V DC	25.5V DC
Over Voltage Lockout		16.0V DC	32.0V DC
Under Voltage Lockout		9.5V DC	19V DC

**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

### 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 Instructions

### Mounting

- To avoid corrosion to connecting wires and terminals, mount in a dry and protected location if possible. Avoid locations directly above the battery banks.

### Electrical Connections

- The wiring diagrams illustrated on the back page represent common installations and are not meant to be a guide for wiring a specific vessel.
- The 7610 ACR is not intended to carry starting currents. Use a battery switching system with a combine batteries/parallel function if batteries may need to be combined for emergency starting.

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

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).

### Voltage Sensing

- The 7610 ACR will sense charging sources available on either battery bank.

### Minimum connections for operation:

- Connect one battery bank to stud terminal **A**.
- Connect the other battery bank 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.

### Optional connections:

#### 1. Start Isolation (SI) Wire

- The 7610 ACR can be configured to automatically disconnect when the starting circuit is engaged. Enable this feature to isolate the start circuit from the house circuits and prevent starting currents from flowing through the ACR or starting current transients from interfering with loads on other batteries. The reaction time of the 7610 ACR is fast enough to disconnect the battery banks before the starting current rises in the starting circuit.

#### To enable start isolation:

- Connect a wire from the quick connect terminal marked **SI** (starting 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.

#### 2. Remote indicator lamp – mirrors “COMBINED” LED on unit.

- Appropriate 12/24V LEDs include Blue Sea Systems PNs 8033 (amber), 8171 (red), or 8172 (green).

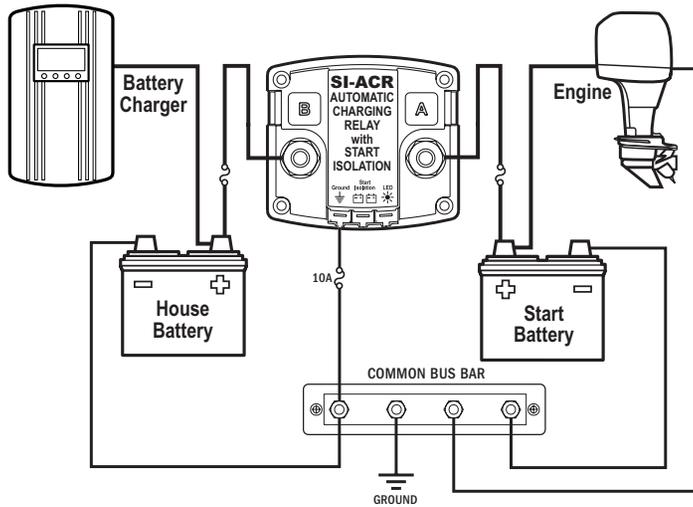
#### To connect a remote LED indicator:

- Connect the red wire of the LED to a 12/24V positive source through a 2A inline fuse.
- Connect the yellow wire of the LED to the quick connect terminal marked **LED**.

### 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.

## Quick Installation Diagram



See Wire Size and Fuse Rating charts for connections from Terminals A and B.

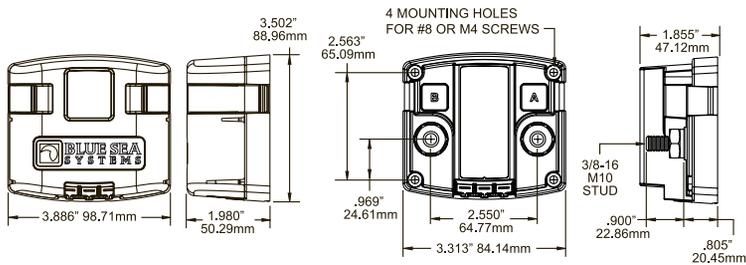
## Wire Size and Fuse Ratings

Wire Size and Fuse Rating Chart (AWG)		
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≤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

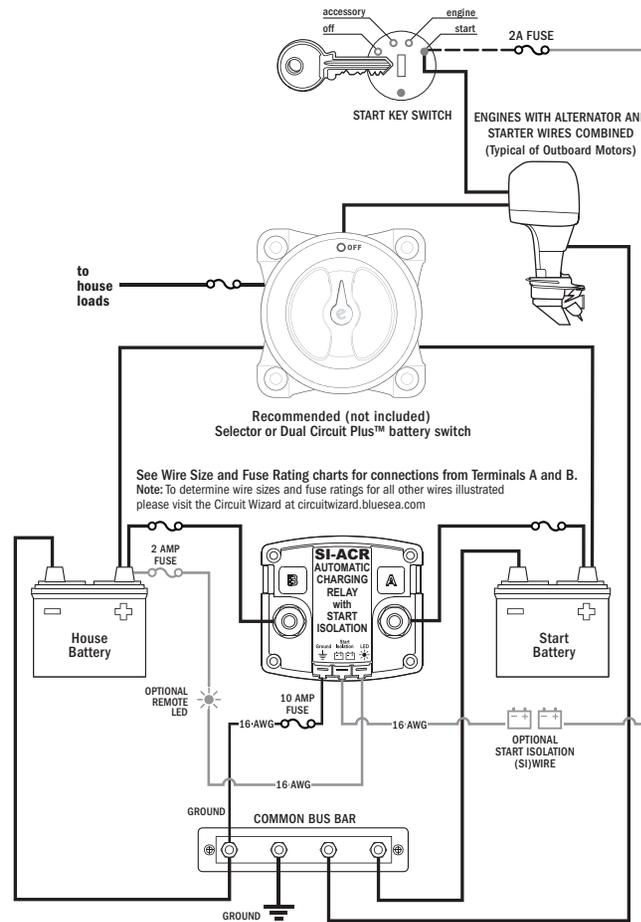
\* Larger wire sizes may be required to minimize voltage drop in long wire runs. For more information please use the Circuit Wizard at [www.circuitwizard.bluesea.com](http://www.circuitwizard.bluesea.com)

## Dimension Drawings



## Full Installation Diagram

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



\* 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.

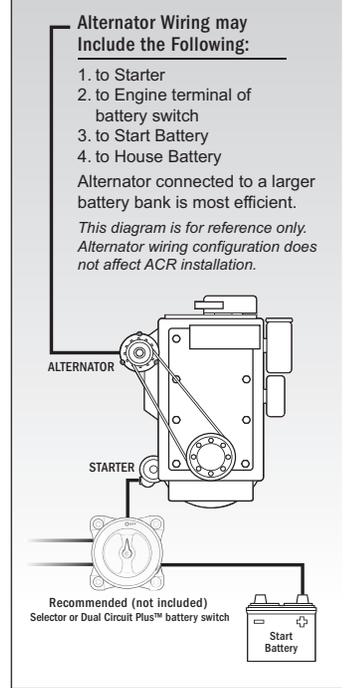
\* Because the SI-ACR is Dual Sensing, terminals A and B are interchangeable. ACR function will not be affected by reversal of the starting and house batteries versus the diagram.

\* 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.

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

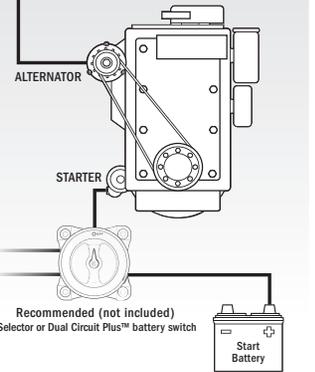


Alternator Wiring may Include the Following:

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.*



Recommended (not included) Selector or Dual Circuit Plus™ battery switch

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