

Dual Battery Main Distribution Panel One Dual Circuit Plus™ Battery Switch 8686/8690

Features

- Power distribution, switching, and circuit protection combined in one panel
- Configurable to suit specific needs of individual boat owners
- Dual Circuit Plus™ Battery Switch: m-Series (8686) or e-Series (8690)
- Two 15A thermal circuit breakers provide 24-hour circuit protection
- Each circuit contains circuit labels and LED indicator lights that provide circuit status
- Blank slots to accommodate additional circuit breakers or switches

Panel Specifications

Material:	0.125" 5052-H32 Aluminum Alloy		
Primary Finish:	Chemical Treatment per MIL SPEC C-5541C		
Final Panel Finish:	Graphite color 2 part textured Polyurethane		
Maximum Voltage Rating:	24V DC		
House Amperage Rating:	100A Max (on installed circuit)		
Switch Amperage Ratings:		8686	8690
	Continuous:	300A per circ.	350A per circ.
	Intermittent (5 min.):	450A per circ.	525A per circ.
	Cranking (30 sec.):	675A per circ.	700A per circ.
Dimensions:		Inches	Millimeters
	8686	4.50 x 7.50	114.3 x 190.50
	8690	5.25 x 8.00	133.35 x 203.20
Mounting Centers:	8686	3.67 x 6.67	93.22 x 169.42
	8690	4.42 x 7.17	112.27 x 182.12
Switch Terminal Studs:	3/8"-16 (accepts M10 terminal)		
Torque:	140 in-lbs.		

Blue Sea Systems Inc.
4600 Ryzex Way
Bellingham, WA 98226 USA

p 360.738.8230
f 360.734.4195
www.blueseas.com

6343 Rev. 005



WARNING

- ✓ If the installer is not knowledgeable about electrical systems, consult an electrical professional.
- ✓ If either the panel front or back is to be exposed to water it must be protected with a waterproof shield.
- ✓ Standard Blue Sea Systems battery management panels are ignition protected as shipped.
- ✓ Custom panels are ignition protected when supplied with ignition protected circuit breakers.
- ✓ The main positive connection must be disconnected at the battery post to avoid the possibility of a short circuit during the installation of this distribution panel.

Guarantee:

Blue Sea Systems stands behind its products for as long as you own them. Find detailed information at www.blueseas.com/about. For customer service, call 800-222-7617.

Applicable Standards

- American Boat and Yacht Council (ABYC) Standards and Recommended Practices for Small Craft sections: E-1, E-3, E-11.
- United States Coast Guard 33 CFR Sub Part 1, Electrical Systems.
- National Fire Protection Agency (NFPA) 302

Useful Reference Books

- Calder, Nigel (2005). *Boatowner's Mechanical and Electrical Manual* (3d ed). Camden, ME: International Marine / McGraw-Hill.
- Wing, Charlie (2006): *Boatowner's Illustrated Electrical Handbook* (2d ed). Camden, ME: International Marine / McGraw-Hill.

Other Innovative Products from Blue Sea Systems

- 360 Panel System
- Battery management solutions
- AC and DC circuit protection devices
- Water-resistant and waterproof panels
- BusBars, fuses, and fuse blocks
- Analog and digital meters

How it works

The Dual Circuit Plus™ Battery Switch turns the house and start batteries on at the same time, but isolates them from each other. Battery isolation protects the start battery from being discharged from the many house loads like refrigerators, stereos, and lights, preserving it for starting the engine. Battery isolation also protects sensitive electronics from voltage spikes and sags that may occur during engine starting. The Dual Circuit Plus™ Battery Switch simplifies battery switch operation—it performs the same operation as three ON/OFF battery switches. The engine and house batteries are turned ON at the same time when the boat is boarded and OFF when the boat is not in use. This minimizes the opportunity for error. In an emergency requiring that both batteries be combined—e.g., a discharged start battery—the operator simply turns the switch knob to the COMBINE BATTERIES position.

The Dual Circuit Plus™ Battery Switch automates the charging of two battery banks when coupled with an Automatic Charge Relay (7610 or 9112). This combination creates a complete battery management system of isolated battery circuits, emergency cross connect (emergency parallel) functions, and automated charge management.

Installation

1. Disconnect all DC power

To eliminate the possibility of a short circuit while installing the panel, disconnect the main positive cable from all batteries.

2. Select mounting location and cut opening

Select a mounting location that is protected from water on the panel front and back and is not in an area where flammable vapors from propane, gas or lead acid batteries accumulate.

Using the panel template provided, make a cut out in the mounting surface where the panel is to be mounted. Do not fasten the panel to the mounting surface.

3. Install LED negative feed wire

Use a 16 AWG wire to connect the LED negative feed (Yellow) wires to a DC negative bus.

4. Electrical Connections

Battery cable terminals must be attached under battery switch stud nut and lock washer. The electrical connection illustration is general in nature and is not meant to be a guide for the wiring of any specific vessel. There are many possible wiring configurations. Consult your marine electrical professional for the wiring system applicable to your boat.

Make appropriate adjustments to the wiring diagram to suit your specific installation and equipment. Fusing may be appropriate in several of the lines depending on the proximity of components, conductor sheathing, and the conductivity of the surrounding structure. Consult the **Wire Sizing Chart** to determine the appropriate wire sizes.

5. Apply Labels and Mount Panel

Apply a label to each of the circuits from the label sheet provided. Additional labels are available from Blue Sea Systems. Fasten the panel to the mounting surface using the screws provided.

Wire Sizing Chart

1. Calculate the maximum sustained amperage of the circuit. Measure the length of the circuit from the power source to the load and back.
2. Calculate **Famps** (Feet x amps). Multiply circuit length by max. current.
3. Base the wire on either the 3% or 10% **voltage drop**. In general, items which affect the safe operation of the boat and its passengers (running lights, bilge blowers, electronics) use 3%; all other loads use 10%.
4. Are the circuit runs in an **engine space** or **non engine space**?
5. Starting in the **Famps** column with the right **voltage** and **voltage drop**, run down the list until arriving at a value which is greater than the calculated **Famps**. Move left to the **Ampacity** column to verify that the total amperage of the circuit does not exceed the maximum allowable amperage of the wire size for that row. If it does, move down until the wire ampacity exceeds the circuit amperage. Finally, move left to the **wire size** column to select the wire size.

Example

A 12 volt system at 10% drop with a 40' circuit x 45 amps = 1800 Famps. A wire size of 8 is required.

Wire Size	Wire Ampacity non-engine	Wire Ampacity engine	Voltage →		12		24		32	
			Volt Drop →	Famps	Famps	Famps	Famps	Famps	Famps	
16	25.0	21.3	3%	86	288	173	576	230	768	
14	35.0	29.8	10%	138	459	275	918	367	1223	
12	45.0	38.3	3%	219	729	437	1458	583	1944	
10	60.0	51.0	10%	348	1159	695	2317	927	3090	
8	80.0	68.0	3%	553	1843	1106	3686	1474	4915	
6	120.0	102.0	10%	879	2929	1757	5858	2343	7811	
4	160.0	136.0	3%	1398	4659	2796	9319	3727	12425	
2	210.0	178.5	10%	2222	7408	4445	14815	5926	19754	
1	245.0	208.3	3%	2803	9342	5605	18684	7474	24912	
0	285.0	242.3	10%	3536	11788	7073	23576	9430	31434	
00	330.0	280.5	3%	4457	14858	8915	29715	11886	39620	
000	385.0	327.3	10%	5619	18731	11239	37462	14985	49950	
0000	445.0	378.3	3%	7086	23620	14172	47241	18896	62988	

Note: For wire with 105°C insulation rating and AWG wire sizes.
Chart courtesy of the West Advisor

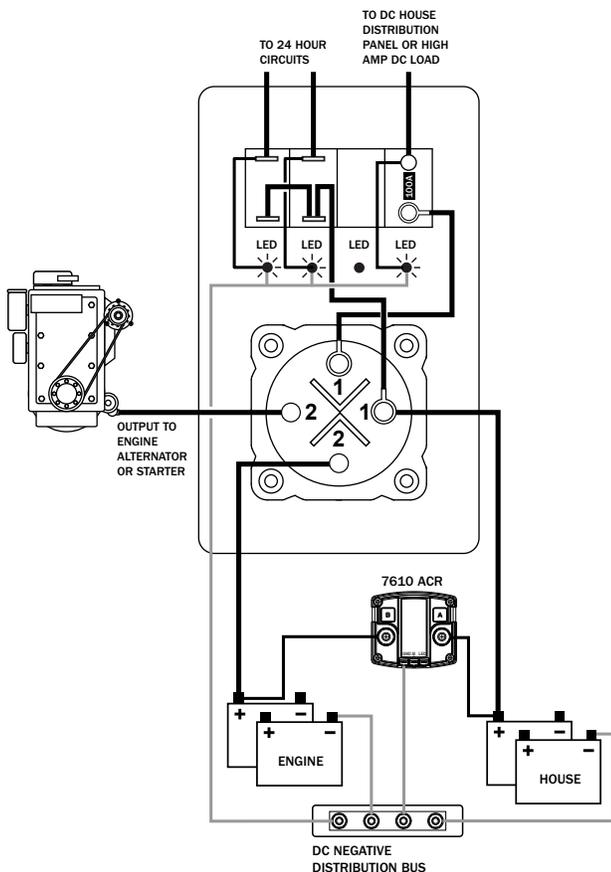
Caution: ABYC Interrupt

In certain circumstances, main DC circuit breakers may have to break very high amperages. The ability of a circuit breaker to safely break high amperage is its Ampere Interrupt Capacity (AIC) rating. AIC is a function of a battery's Cold Cranking Amperes (CCA) capacity. According to ABYC E-11 standards, circuit breakers shall have a DC voltage rating of not less than the nominal system voltage, be capable of an interrupting capacity according to the values in the table below, and remain operable after the fault. For example, a boat with a group 24 or 27 battery may have as much as 650 CCA. The DC main circuit breaker for this circuit must have an AIC rating of 1500 Amperes.

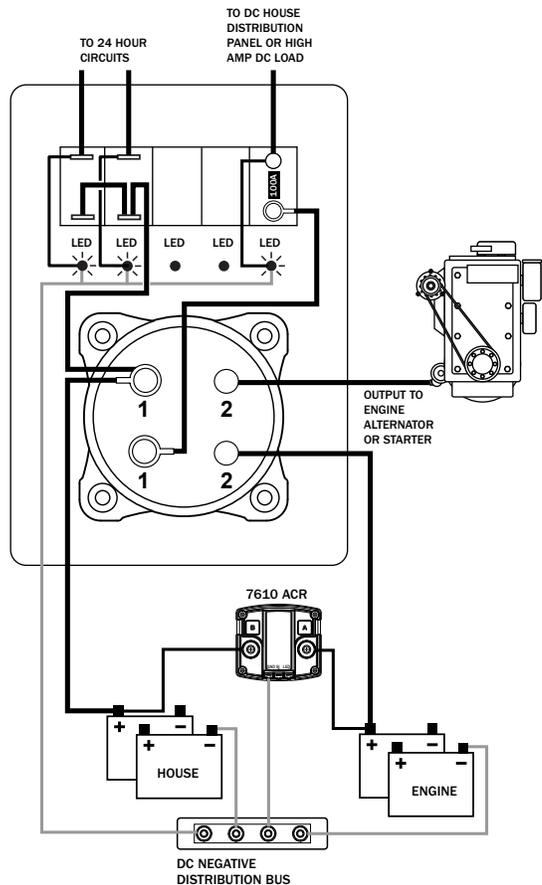
DC voltage rating	CCA of all connected batteries	Ampere Interrupt Capacity (AIC)	
		Main Circuit Breaker (Amperes)	Branch Circuit Breaker (Amperes)
12 Volt and 24 Volt	650 or less	1500	750
	651-1100	3000	750
	over 1100	5000	2500
32 Volts	1250 or less	3000	1500
	over 1250	5000	2500

Blue Sea Systems Battery Management Panels contain thermal (push button reset) circuit breakers rated at 15A. These circuit breakers are suitable for 24-hour circuits connected directly to 12V or 24V battery banks with CCA capacities less than 660A.

Installation of this panel in systems with battery banks of 660A or higher should include an additional fuse or circuit breaker of appropriate interrupt capacity in the line between the battery bank and the pushbutton circuit breakers to comply with ABYC E-11 and NFPA 302.



Wiring Diagram
8686



Wiring Diagram
8690