

DC Power Distribution Panel

PN 8081 / PN 3081 5 Position

PN 8082 / PN 3082 10 Position

Panel Specifications

Material:	0.125" 5052-H32 aluminum alloy		
Primary Finish:	Chemical treatment per MILE SPEC C-5541C		
Final Panel Finish:	Graphite color 2 part textured polyurethane		
Circuit Breakers:	15A single-pole AC/DC magnetic		
Maximum Amperage:	Varies by components; busbar maximum 100A		
Voltage Rating:	Panels are rated for 12 volts DC. Panels can be upgraded to 24 volts with PN 8243, 18-32V DC Micro Voltmeter.		
Voltmeter Rating:	8-16 Volt DC meter. Accuracy 3% of scale		
Ammeter Rating:	0-50 Ampere DC meter. Accuracy 3% of scale		
External Shunt:	50 Millivolt = 50 Ampere remote shunt		

	PN	Inches	Millimeters
Overall Dimensions:	8082/3082	5-1/4 × 11-1/4	133.40 × 190.50
	8081/3081	5-1/4 × 7-1/2	133.40 × 190.50
Mounting Centers:	8082/3082	4-7/16 × 10-7/16	112.70 × 265.10
	8081/3081	4-7/16 × 6-11/16	112.70 × 169.90

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WARNING

- ✓ These instructions are intended to provide assistance with the installation of this product, and are not a substitute for a more comprehensive understanding of electrical systems. We strongly recommend that a competent electrical professional perform the installation of this product.
- ✓ If either the panel front or back is to be exposed to water it must be protected with a waterproof shield.
- ✓ The panels must not be installed in explosive environments such as gasoline engine rooms or battery compartments as the circuit breakers are not ignition protected.
- ✓ 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.

Applicable Standards

- United States Coast Guard 33 CFR Sub Part 1, Electrical Systems.
- American Boat and Yacht Council (ABYC) Standards and Recommended Practices for Small Craft sections: E-1, E-3, E-9.

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
- WeatherDeck waterproof circuit breaker panels
- Fuses, fuse blocks, and BusBar
- Analog and digital meters

Installation

1. Disconnect all AC and DC power

Before starting, disconnect the main positive cable from all batteries to eliminate the possibility of a short circuit while installing the distribution panel. Also disconnect the AC shore power cord from the boat to eliminate the possibility of electrocution from AC wiring in the proximity of the DC distribution panel.

2. Optional—Upgrading to 24 Volts

Remove and replace the existing 8-16V DC voltmeter with an 18-32V DC voltmeter (PN 8243). Connect the existing meter sense wires to the new meter, Red positive wire to "+" and Yellow negative wire to "-".

3. Select mounting location and cut opening

Select a mounting location which is protected from water on the panel front and back and is not in an area where flammable vapors from propane, gasoline or lead acid batteries accumulate. The circuit breakers used in marine electrical panels are not ignition protected and may ignite such vapors.

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

4. Select positive feed wire and negative return

Determine the positive feed (red) and negative return (black or yellow) wire size by calculating the total amperage of the circuits that will be routed through the panel. Blue Sea Systems' electrical panels are rated at 100 ampere total capacity. The positive feed wire must be sized for 3% voltage drop at the 100 ampere panel rating or the maximum amperage that will be routed through the panel in any particular installation, whichever is less. It is recommended that the positive feed wire be sized for the full panel capacity, which in most cases, will require at least 2 AWG wire, assuming a 10 foot wire run between the panel and the batteries in 12 volt systems. Refer to the Wire Sizing Chart for other situations.

Remember that the length of the circuit is the total of the positive wire from the power source and the negative wire back to the DC negative bus. Be certain that there is a fuse or circuit breaker of the correct size protecting the positive feed wire.

5. Install shunt, positive feed wire and negative return

The panel is supplied with an external shunt ammeter that must be connected in the positive feed line to the panel. The shunt may be mounted at any point in the feed line, but mounting it close to the panel will keep the sense wires that run to the meter short, minimizing voltage loss and interference, creating the most accurate meter reading.

Connect the positive feed wire from the positive source to either of the two large bolt terminals on the shunt top. This is now the shunt positive terminal. Connect an additional length of feed wire from the remaining shunt terminal, now the negative terminal, to the panel positive bus. Next, connect a minimum 16 AWG red wire from the screw on the side of the shunt positive terminal to the meter positive terminal and connect a black or yellow wire from the shunt negative terminal to the meter negative terminal. There should be a 1 ampere fuse in the positive sense wire near the shunt terminal. Be certain that on all four shunt connections the wire ring terminals sit directly on the brass blocks of the shunt without any washers in between.

Connect a negative return wire from the negative bus on the panel to DC negative.

6. Install battery bank voltage monitor wires

The panel is supplied with a voltmeter and switch to monitor the voltage of three separate sources, usually the batteries. Connect a minimum 16 AWG red wire from each source to be monitored to each of the corresponding input wires of the switch. There should be a 1 ampere fuse in each positive wire near each source.

7. Install branch circuit wires

Determine the proper wire size for each branch circuit. Verify that the standard 15 ampere circuit breakers installed in the panel are large enough for each branch circuit. Remove and replace with a higher amperage any that are undersized.

Connect the positive (red) branch circuit wires to the load terminals of each circuit breaker.

Installation (continued)

Connect each negative (black or yellow) branch circuit wire to the DC negative bus. **DO NOT CONFUSE THE DC NEGATIVE BUS WITH THE DC GROUNDING BUS.**

8. Optional—install grounding system wire

The grounding wire (bare, green or green with yellow stripe and normally non-current carrying) should not be confused with the negative ground wire (black or yellow and normally current carrying).

In *Boatowner's Illustrated Electrical Handbook*, Charlie Wing identifies three purposes of DC grounding:

1. Holding conductive housings of low voltage (under 50 volts) DC devices at ground potential by providing a low resistance return path for currents accidentally coming into contact with the device cases.
2. Providing a low resistance return path for electrical current, preventing stray currents that may cause corrosion.
3. Grounding metal electrical cases to prevent emission from inside or absorption from outside of radio frequency interference (RFI).

ABYC requires that grounding wires be sized no smaller than one wire size under that required for current carrying conductors supplying the device to which the grounding wire is connected.

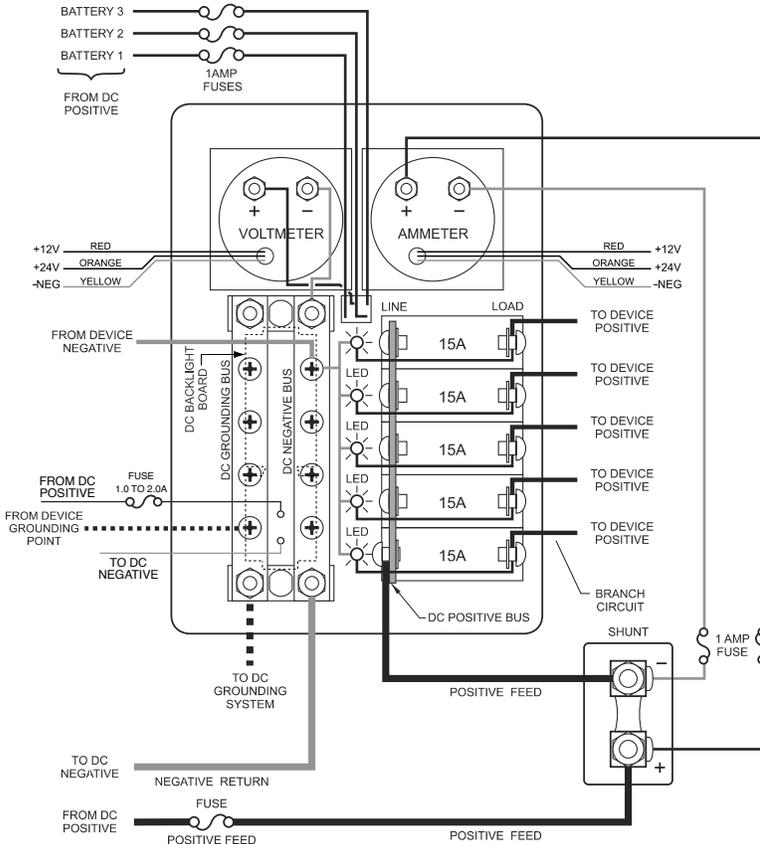
A full treatment of this subject is not possible within the scope of these instructions and there is controversy surrounding the general subject of DC bonding, of which DC grounding is a component. It is suggested that installers not familiar with this subject consult one of the reference books listed elsewhere in these instructions.

9. Installation of Backlight System

Connect the yellow negative wire to the panel negative bus.

To activate the label lights by the boat's battery switch, connect the red positive wire to the DC panel positive bus.

To activate the label lights by an independent switch or breaker, connect the red positive wire to the load side of the switch or breaker.



Wiring Diagram

DC Power Distribution Panel with Voltmeter and Ammeter
(PN 8081 / PN 3081 shown for reference)

10. Apply branch circuit labels and mount panel

Apply a label for each circuit from the label set provided. Extended label sets are available through retail suppliers, and over 500 individual labels are available directly from Blue Sea Systems. Please go to www.bluesea.com to order individual labels for specific applications.

Fasten the panel to the mounting surface using the screws provided.

11. Testing

Reconnect the main positive cable to the battery terminals and turn the main switch on to supply power to the panel. Turn on all branch circuits and test the voltage at the panel. Compare this voltage to the battery terminal voltage to determine that the voltage drop is within 3%. With all branch circuits still on, test the voltage at one device on each circuit to determine that there is a 3% or 10% drop as is appropriate.

12. Optional Branch LEDs

This panel is supplied with LEDs pre-installed in all optional branch positions. For future expansion of the panel remove the positive leg of the LED from the negative bus and connect it to the load side of the corresponding branch circuit breaker.

Note

This Blue Sea Systems electrical distribution panel is furnished with 15A circuit breakers for DC branch circuits. These ratings will satisfy the vast majority of marine circuit protection situations. Even 16 AWG wire, which is the minimum wire size recommended by ABYC, has an allowable amperage greater than 20A. For more information please use the Circuit Wizard at www.circuitwizard.bluesea.com.