**Installation**

1. **Disconnect all AC and DC power**
   Disconnect all AC power originating on or off the vessel. This includes inverters, generators, shore power attachments and any other device capable of supplying AC power to the ship’s circuits.

   Disconnect the main positive DC cable from all batteries to eliminate the possibility of a short circuit and to disable the inverter while installing the distribution panel.

2. **Optional - install label back lighting kit**
   If the optional backlighting kit has been purchased (PN 8065, 2 Req.), install it according to the instructions included with the backlighting kit.

3. **Select mounting location and cut opening**
   If this panel is to serve as your main shore power disconnect circuit breaker, select a location which is not more than 10 feet from the shore power inlet or the electrical attachment point of a permanently installed shore power cord as measured along the conductors of the feed wires. If it is more than 10 feet additional fuses or circuit breakers must be installed within 10 feet of the shore power inlet.

   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 cut out in the mounting surface where the distribution panel is to be mounted. Do not yet fasten the panel to the mounting surface.

4. **Install branch circuit wires**
   Determine the proper wire size for each branch circuit using the chart below. Verify that the standard circuit breakers installed in the panel are correct for each branch circuit. Remove and replace any that are incorrectly sized. The circuit breaker must have a rating less than the allowable amperage of the wire, yet greater than the circuit’s continuous current.

   Connect each branch circuit hot (black) to the appropriate load terminal. Connect each branch circuit neutral (white) to one of the screws on the neutral bus. Connect each branch safety ground wire (green) to one of the screws of the safety ground bus.

   Do not confuse the neutral current carrying wires (sometimes called ground) with the green normally non-current carrying wires (sometimes called grounding). These two wires must be connected only at the source of power, nowhere else.

**Wire sizing chart**
Use the wire sizing chart below to determine the proper branch and feed circuit wire sizes.

<table>
<thead>
<tr>
<th>Wire Size (AWG)</th>
<th>Outside Engine Spaces</th>
<th>Inside Engine Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>25.0</td>
<td>21.3</td>
</tr>
<tr>
<td>14</td>
<td>35.0</td>
<td>29.8</td>
</tr>
<tr>
<td>12</td>
<td>45.0</td>
<td>38.3</td>
</tr>
<tr>
<td>10</td>
<td>60.0</td>
<td>51.0</td>
</tr>
<tr>
<td>8</td>
<td>80.0</td>
<td>68.0</td>
</tr>
<tr>
<td>6</td>
<td>120.0</td>
<td>102.0</td>
</tr>
<tr>
<td>4</td>
<td>160.0</td>
<td>136.0</td>
</tr>
<tr>
<td>2</td>
<td>210.0</td>
<td>179.5</td>
</tr>
</tbody>
</table>

**Note:** This chart assumes wire with 105°C insulation rating and no more than 2 conductors are bundled. Not suitable for sizing flexible shore power cords.

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**Panel Specifications**

<table>
<thead>
<tr>
<th>Voltage Rating:</th>
<th>PN 8099/PN 3099/PN 8199/PN 3199 - 120 Volts AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amperage Rating:</td>
<td>Panel Buses are sized for 100 Amperes of continuous current.</td>
</tr>
<tr>
<td>Material:</td>
<td>0.125” 5052-H32 Aluminum Alloy</td>
</tr>
<tr>
<td>Primary Finish:</td>
<td>Chemical Treatment per Mil Spec C-5541C</td>
</tr>
<tr>
<td>Final Panel Finish:</td>
<td>Graphite color 2 part textured Polyurethane</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions:</th>
<th>PN 8099/3099/8199/3199 Centers: 9-11/16 x 2-15/16 246.10 x 74.60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PN 8099/3099/8199/3199 Centers: 9-11/16 x 3-11/16 246.10 x 93.70</td>
</tr>
</tbody>
</table>

**Panel Features**

- PN 8099/PN 3099/PN 8199/PN 3199/PN 8412/PN 3412/PN 8512/PN 3512
- C marked, Complies with European Standards
- One double-pole 30 Ampere main circuit breaker
- Four 15 Ampere branch circuit breakers
- One double-pole 16 Ampere main circuit breaker
- Four 8 Ampere branch circuit breakers

**Guarantee**

Any Blue Sea Systems product with which a customer is not satisfied may be returned for a refund or replacement at any time.
5. **Install feed circuit wires**

Install the feed wires from the shore power inlet or other AC source, referring to the wire sizing chart to select the correct wire size. Connect the black AC hot, white AC neutral and green AC safety ground as shown in the illustration.

If the feed wires are from the shore power inlet or the electrical attachment point of a permanently installed shore power cord and the inlet or attachment point is more than 10 feet from this panel, an additional fuses or circuit breakers must be installed within 10 feet of the shore power inlet. The measurement is made along the conductors.

6. **Apply branch circuit labels and mount panel**

Apply a label for each of the branch circuits from the 30 basic labels provided. If the appropriate label is not included, the Extended Label Set of 120 labels may be ordered from your marine supplier (PN 8087). Individual labels are also available from Blue Sea Systems for specific applications. Refer to the label order form for a complete listing of individual labels.

Fasten the panel to the mounting surface using the panel mounting screws supplied with the panel.

7. **Testing**

- Connect the vessel’s shore power and verify the Reverse Polarity light is not illuminated. If the red Reverse Polarity light is on then either the hot and ground or the hot and neutral wires have been crossed. Starting at the panel, trace the connections back as far as necessary to locate the error.
- Using a multimeter where the power source is connected to the panel verify:
  - PN 8099/PN 3099/PN 8412/PN 3412 - 120 Volt AC
    - a. 120 volts between hot and neutral (nominal, this may vary depending on source voltage)
    - b. 120 volts between hot and ground.
    - c. 0 volts between neutral and ground.
  - PN 8199/PN 3199/PN 8512/PN 3512 - 230 Volt AC
    - a. 230 volts between hot and neutral (nominal, this may vary depending on source voltage)
    - b. 230 volts between hot and ground.
    - c. 0 volts between neutral and ground.
- Turn on each branch circuit to verify power to each circuit.

**Note**

All Blue Sea Systems' AC electrical distribution panels are furnished with 15 amp or 8 amp circuit breakers for branch circuits. 15 amp circuit breakers are used in all 120 volt panels and 8 amp circuit breakers are used in all 230 volt panels. These ratings were selected to minimize the need for removing the panel's circuit breakers and reinstalling different size circuit breakers. It is very rare to have more than this amount of current flowing in any one circuit. Therefore, these circuit breakers will satisfy the vast majority of marine circuit protection situations.

**The Purpose of a Panel**

There are six purposes of a marine electrical panel:
- Power distribution
- Circuit (wire) protection
- Circuit ON/OFF switching
- Reverse Polarity Indication
- Metering of voltage and amperage (In panels with meters)
- Condition Indication (circuit energized)

**Applicable Standards**


**Related Products from Blue Sea Systems**

- High Amperage Fuses and Circuit Breakers for positive feed wires
- High Amperage Battery Switches
- Terminal Blocks and Common Bus Connectors
- AC Distribution Panels
- DC Distribution Panels
- AC and DC Digital and Analog Voltmeters and Ammeters

**Useful Reference Books**


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**Wiring Diagram**

AC Power Distribution Panel
(PN 8099 / PN 3099 shown for reference)