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. **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 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.

   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.

3. **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 minimum branch and feed circuit wire sizes.

   ![Wire Sizing Chart](chart)

   **Allowable Amperage of Conductors**

<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>178.5</td>
</tr>
</tbody>
</table>

   **Note:** For wire with 105°C insulation rating and no more than 2 conductors are bundled. Not suitable for sizing flexible shore power cords.
4. Install feed circuit wires, source 1 and source 2
   Install the feed wires from AC source 1 and AC source 2. Refer 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 fuse or circuit breaker must be installed within 10 feet of the shore power inlet. The measurement is made along the conductors.

5. Installation of Backlight System
   The backlight board is a DC device. When installing it in an AC panel both wire leads must be connected to an appropriate DC source and ground.

   Connect the yellow negative wire to a DC ground. Connect the red positive wire to any DC positive supply, usually a switch that controls the vessel’s other nighttime illumination.

6. Apply circuit labels and mount panel
   Apply a label for each source from the 10 basic labels provided. Remove the blank labels installed in the panel before installing your branch circuit labels. Apply a label for each of the branch circuits from the 30 basic labels provided. If the appropriate label is not included, individual labels are 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 shore power cable to the boat AC power inlet. Do not connect the shore power cable to the shore power pedestal. Instead run the shore power cable such that the shore power plug is next to the AC panel. With an Ohmmeter verify that the pins of the shore power plug are connected to the appropriate terminals of the panel. Refer to ABYC E-11 Figure 13 or 14 or NEC / NEMA documents for the standard pin arrangements for your plug.

   ⚠️ 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 8467 / PN 3467-120 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 8567 / PN 3567-230 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.

   ⚠️ Turn off the shore power and test with the alternate source.

Optional Branch LED’s
   This Panel is supplied with LED’s pre-installed in all optional branch positions. For future expansion of the panel remove the hot leg of the LED from the AC Neutral Bus and connect it to the Load side of the branch circuit breaker.

Note
   This Blue Sea Systems electrical distribution panels is 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 the AC Main Source Selector Panel
   Two live sources of AC power, such as shore power and inverter power, or shore power and a generator, cannot be electrically connected. The AC Main Source Selector panel is designed to prevent both sources from being connected to the circuit simultaneously.

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
   • American Boat and Yacht Council (ABYC) Standards and recommended Practices for Small Crafts sections: E-8, Alternating Current Electrical Systems on Boats.
   • United States Coast Guard Code of Federal Regulations 33, Part 183, Subpart I, Electrical Systems on Boats.

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
Wiring Diagram
AC Source Selector Power Distribution
Panel with AC Voltmeter
(Part Number 8462 / 3462 shown for reference)