AC Main Power Distribution Panels
PN 7371

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
Circuit Breakers: 50 amp Triple Pole AC Magnetic Breakers
Voltage Rating: Panels are rated for 120/240 volts AC and are so marked in order to comply with ABYC standards
Overall Dimensions: 5-1/4 x 11-1/4 133.4 x 285.8
Mounting Centers: 4-7/16 x 10-7/16 112.7 x 265.1

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
• United States Coast Guard Code of Federal Regulations 33, Part 183, Subpart I, Electrical Systems on Boats.

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 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.

Select a mounting location where the water will drain out of the mounting surface where the distribution panel is to be mounted. Do not yet fasten the panel to the mounting surface.

3. Install feed and output wires
Install the feed wires from the AC source. Install the output wires. Refer to the wire sizing chart to select the correct wire size. Connect the black AC hot, red AC hot, white AC neutral and green AC safety ground as shown in the illustration. The circuit breaker must have a rating less the allowable amperage of the wire, yet greater than the circuit’s continuous current.

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.

Use the wire sizing chart below to determine the minimum 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>178.5</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.
4. 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. Do not confuse the red DC positive with the red AC hot.

5. Apply 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 8067). 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.

6. 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 cord to a 120V/240V shore source and verify the Reverse Polarity light is not illuminated. If the red Reverse Polarity light is on then either a hot and ground or a hot and neutral wire have been crossed or the neutral wire is open. Disconnect the shore power and 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 7371 - 120/240 Volt AC
  - 120 volts between each hot and neutral (nominal, this may vary depending on source voltage)
  - 120 volts between each hot and ground
  - 240 volts between the two hots, L1 and L2
  - 0 volts between neutral and ground.

Check that the panel voltmeter reads L1 120V, L2 =120V, L1-L2 = 240V. These are nominal voltages, the exact reading will correspond to your local source. If the shore source is two feeds from a 3 phase system, L1-L2 will read approximately 208V.


7. Mounting

Support the wires and provide for the wires to fold into the wiring compartment without undue stress. Be sure no wires are in a position where the panel mounting screws will damage the wire installation when the panel is installed.

Fasten the panel to the mounting surface using the panel mounting screws supplied with the panel or other screws suitable to the mounting surface.

8. 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 appropriate branch circuit breaker.

Related Products from Blue Sea Systems

- PanelBack Insulating Covers
- 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

Installation (continued)

Wiring Diagram
Meter Wiring Installation
PN 7371