AC Main Source Electrical Selector Panel
PN 8496 / PN 3496 / PN 8596 / PN 3596

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
- Amperage Rating: All components are sized for 100 Amps of continuous current
- Voltage Rating: See Panel Features
- AC Digital Multimeter with Alarm PN 8247
- PN 8596 / PN 3596 - 230 Volts AC
- PN 8496 / PN 3496 - 120 Volts AC
- Meter: AC Main Source Selector Panel
- Overall Dimensions: 14-3/4 x 11-1/4
- Mounting Centers: 13-15/16 x 10-7/16
- PN 8496 / PN 3496 - 120 Volts AC
- PN 8596 / PN 3596 - 230 Volts AC

Panel Features
- AC Main Source Selector Panel
- AC Digital Multimeter with alarm
- AC Rotary Switch for selecting load groups for monitoring
- Inverter
- PN 8496 / PN 3496 - 120 Volts AC
- PN 8596 / PN 3596 - 230 Volts AC
- Three double-pole 30 Ampere and one 50 Ampere AC main world circuit breaker with lockout slides
- 15 Ampere world branch circuit breakers installed
- Three double-pole 16 Ampere and one 32 Ampere AC main world circuit breaker with lockout slides
- 8 Ampere world branch circuit breakers installed

Applicable Standards
- American Boat and Yacht Council (ABYC) Standards and
- United States Coast Guard 33 CFR Sub Part 1, Electrical Systems.
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Operation

AC Panel with metering switch for three load groups.
The AC multimeter is equipped with a selector switch that allows the operator to monitor the voltage and the current for three load groups, represented by the three columns of circuit breakers. When the panel is wired for two shore cords and a single generator set the switch positions are:

1. Off
2. ‘Bus 1’ Left Column of Breakers
3. ‘Bus 2’ Output from middle column selector group
4. ‘Bus 3’ Output from the right column selector group.

If dual shore power sources are selected, then ‘Bus 1’ represents the portion of the shore 1 load carried by the bus in the left column. ‘Bus 2’ indicates the total load on the shore 1 source and ‘Bus 3’ indicates the load on the shore 2 source.

If shore 1 is selected as the only shore source and “transfer” is chosen for the source for bus 3 on the right, then ‘Bus 2’ will indicate the full shore load as it is drawn from shore 1.

If generator is selected and “transfer” is selected, then the position ‘Bus 2’ will cause the meter to indicate the total load on the generator.

The ‘Bus 1’ meter position may become convenient if an inverter is also incorporated into the system. If the inverter has an automatic bypass selector, then it is convenient to group the loads for the inverter on Bus 1. The inverter should be fed AC from a circuit breaker on Bus 2 and return AC to Bus 1. The ‘Bus 1’ position will show the loading on the inverter.

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 then 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 then 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.

3. Install branch circuit wires
   Determine the minimum wire size for each branch circuit using the wire sizing chart. 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.

**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: 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. **Install feed circuit wires, source 1 and source 2**

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 fuse or circuit breakers 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 backlight board. When installing it in an AC panel, both wire leads must be connected to an appropriate DC source and ground.

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 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.

7. **Testing**

✓ Connect the shore power cables to the boat AC power inlet. Do not connect the shore power cables 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 1, shore 2, and genset 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 8496 / PN 3496 - 120 Volt AC

- 120 volts between hot and neutral (nominal, this may vary depending on source voltage)
- 120 volts between hot and ground.
- 0 volts between neutral and ground.

PN 8596 / PN 3596 - 230 Volt AC

- 230 volts between hot and neutral (nominal, this may vary depending on source voltage)
- 230 volts between hot and ground.
- 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.


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 branch circuit breaker.

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)

**Useful Reference Books**


Installation (continued)

Wiring Diagram
Meter Wiring Installation
(PN 8496 / PN 3496 shown for reference)