

## Bilge Pump Control Panel

PN 8263 Water Resistant Panel

### Panel Specifications

|                     |   |                    |
|---------------------|---|--------------------|
| Material:           | 0.100" 5052-H32 Aluminum Alloy  |                    |
| Primary Finish:     | Chemical Treatment per Mil Spec C-5541C   |                    |
| Final Panel Finish: | Graphite color 2 part textured Polyurethane   |                    |
| Fuse Holder:        | Accepts commonly available AGC (fast acting) and MDL (slow blow) 1-1/4" x 1/4" glass fuses.   |                    |
| Fuse:               | 15 Ampere AGC (fast acting) fuse installed.   |                    |
| Amperage Rating:    | Switch and Fuse Holder,<br>20 amperes maximum for 12 volt system<br>15 amperes maximum for 24 volt system                                   |                    |
| Voltage Rating:     | Panels are rated for 12 or 24 volts DC.   |                    |
| Circuit Indicator:  | LED embedded in switch, rated 100,000 hour 1/2 life   |                    |
| Panel Depth:        | 2.75" 69.90mm   |                    |
|                     | <b>Inches</b>   | <b>Millimeters</b> |
| Overall Dimensions: | 2-1/4 x 3-3/4   | 57.20 x 95.30      |
| Mounting Centers:   | 1-13/32 x 2-29/32   | 36.10 x 74.20      |
| Water Resistant:    | Will withstand the water exposures normally encountered in above deck applications: Salt spray, rain, hose washdowns, momentary immersions. |                    |

### The Purpose of a Panel

There are five purposes of a marine electrical panel:

- Power distribution
- Circuit (wire) protection
- Circuit ON/OFF switching
- Metering of voltage and amperage (In panels with meters)
- Condition Indication (circuit energized)

Document 9838 Rev.H



**WARNING**

- ✓ It is not possible within the scope of these instructions to fully acquaint the installer with all the knowledge of electrical systems that may be necessary to correctly install this product. If the installer is not knowledgeable in electrical systems we recommend that an electrical professional be retained to make the installation.
- ✓ If the panel front is to be exposed to water it must be properly sealed to the instrument panel surface. The included gasket must be in place and the panel hold down screws tight.
- ✓ The panels must not be installed in explosive environments such as gas engine rooms or battery compartments as the switches are not ignition proof.
- ✓ 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.

### Guarantee

Any Blue Sea Systems product with which a customer is not satisfied may be returned for a refund or replacement at any time.

### Useful Reference Books

- Calder, Nigel, 1996: *Boatowner's Mechanical and Electrical Manual*, 2nd edition, Blue Ridge Summit, PA: TAB Books, Inc.
- Wing, Charlie, 1993: *Boatowner's Illustrated Handbook of Wiring*, Blue Ridge Summit, PA: TAB Books, Inc.

### 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 Voltmeters and Ammeters

## Wire Sizing Chart

1. Calculate the maximum sustained amperage of the circuit. Measure the length of the circuit from the power source to the load and back.
2. Decide whether the circuit runs in an **engine space** or **non engine space**. Engine spaces are assumed to be at 50 degrees C, non engine spaces are assumed to be at 30 degrees C.
3. Multiply the maximum current times the length of the circuit to calculate **Famps** (Feet x amps).
4. Base the wire on either the 3% or 10% **voltage drop**. In general, items which affect the safe operation of the boat and its passengers (running lights, bilge blowers, electronics and distribution panel supply circuits) use 3%; all other loads use 10% (cabin lights, bait pumps).
5. Starting in the column which has the right **voltage** and **voltage drop** shown at the top, run down the list of numbers until arriving at a value which is greater than the calculated **Famps**. Move left to the **Ampacity** column to verify that the total amperage of the circuit does not exceed the maximum allowable amperage of the wire size for that row. If it does, move down until the wire ampacity exceeds the circuit amperage. Finally, move left to the **wire size** column to select the wire size.

### Examples

- a. A 12 volt system at 10% drop with a 40' circuit x 45 amps = 1800 Famps. A wire size of 8 is required.
- b. A 24 volt system at 3% drop with a 10' circuit x 100 amps = 1000 Famps. A wire size of 6 is required.

| Wire Size<br>AWG | Metric* | Minimum<br>Acceptable<br>CM area | Wire                   |                    | 12 Volts<br>Volt Drop |              | 24 Volts<br>Volt Drop |              | 32 Volts<br>Volt Drop |              |
|------------------|---------|----------------------------------|------------------------|--------------------|-----------------------|--------------|-----------------------|--------------|-----------------------|--------------|
|                  |         |                                  | Ampacity<br>non-engine | Ampacity<br>engine | 3%<br>Famps           | 10%<br>Famps | 3%<br>Famps           | 10%<br>Famps | 3%<br>Famps           | 10%<br>Famps |
| 16               | 1       | 2336                             | 25.0                   | 21.3               | 86                    | 288          | 173                   | 576          | 230                   | 768          |
| 14               | 2       | 3702                             | 35.0                   | 29.8               | 138                   | 459          | 275                   | 918          | 367                   | 1223         |
| 12               | 3       | 5833                             | 45.0                   | 38.3               | 219                   | 729          | 437                   | 1458         | 583                   | 1944         |
| 10               | 5       | 9343                             | 60.0                   | 51.0               | 348                   | 1159         | 695                   | 2317         | 927                   | 3090         |
| 8                | 8       | 14810                            | 80.0                   | 68.0               | 553                   | 1843         | 1106                  | 3686         | 1474                  | 4915         |
| 6                | 13      | 24538                            | 120.0                  | 102.0              | 879                   | 2929         | 1757                  | 5858         | 2343                  | 7811         |
| 4                | 19      | 37360                            | 160.0                  | 136.0              | 1398                  | 4659         | 2796                  | 9319         | 3727                  | 12425        |
| 2                | 32      | 62450                            | 210.0                  | 178.5              | 2222                  | 7408         | 4445                  | 14815        | 5926                  | 19754        |
| 1                | 40      | 77790                            | 245.0                  | 208.3              | 2803                  | 9342         | 5605                  | 18684        | 7474                  | 24912        |
| 0                | 50      | 98980                            | 285.0                  | 242.3              | 3536                  | 11788        | 7073                  | 23576        | 9430                  | 31434        |
| 00               | 62      | 125100                           | 330.0                  | 280.5              | 4457                  | 14858        | 8915                  | 29715        | 11886                 | 39620        |
| 000              | 81      | 158600                           | 385.0                  | 327.3              | 5619                  | 18731        | 11239                 | 37462        | 14985                 | 49950        |
| 0000             | 103     | 205500                           | 445.0                  | 378.3              | 7086                  | 23620        | 14172                 | 47241        | 18896                 | 62988        |

Note: This chart assumes wire with 105°C insulation rating and AWG wire sizes.  
\*Metric wire sizes may be used if of equivalent circular mil area.

# 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. Select mounting location and cut opening

Select a mounting location which is not in an area where flammable vapors from propane, gasoline or lead acid batteries accumulate. This panel is 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. Select positive feed wire

Determine the positive feed (red) wire size by calculating the total amperage of the circuit that will be routed through the panel. The positive feed wire must be sized for 3% voltage drop at the panel rating (amperage 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 10 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 to the device 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.

## 4. Install LED negative feed wire

Use a 16 AWG wire to connect the LED negative feed (brass) terminal on the back of the switch to the DC Negative Bus.

## 5. Install bilge pump circuit wires

Determine the proper wire size for the bilge pump and float switch using the guidelines in step 3. Verify that the standard 15 amp fuse installed in the panel is appropriate for both the circuit wire and the bilge pump. Remove and replace with the bilge pump manufacturers recommended fuse size (20 amp maximum). Connect the float switch to the bilge pump and in accordance with the manufacturers instructions. As illustrated in the wiring diagram below, connect the positive (red) wire from the float switch to the switch terminal marked "Float" and the positive (red) wire from the bilge pump to the switch terminal marked "Pump". Connect the bilge pump negative (yellow or black) wire to a DC negative bus such as Blue Sea Systems' MiniBus PN 2304.

## 6. Mount panel with water resistant gasket

A gasket has been included for sealing the panel against the mounting surface. The gasket will easily stretch around the panel when applied from the front. Place the gasket between the panel and the mounting surface. Make sure all surfaces are clean and free from debris. Using the panel mounting screws supplied with the panel, screw down the panel to the mounting surface.

## 7. Testing

Reconnect the main positive cable to the battery terminals and turn the main switch on to supply power to the panel. Turn on the bilge pump and test the voltage at the panel. Compare this voltage to the battery terminal voltage to determine that the voltage drop is within 3%.



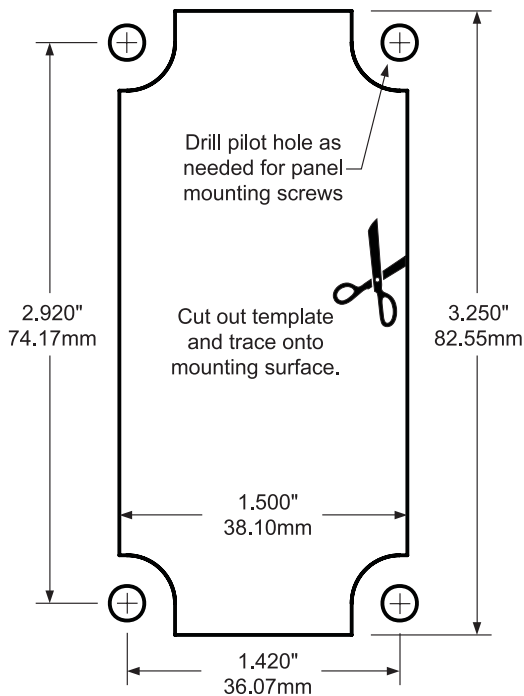
## Warning

This Blue Sea Systems water resistant power distribution panel is furnished with a 15 amp AGC (fast acting) glass fuse. This rating will not be appropriate for all bilge pumps. Remove and replace with the bilge pump manufacturers recommended fuse size (20 amp maximum). Failure to properly fuse your bilge pump is dangerous and may void the manufacturers warranty.

## Applicable Standards

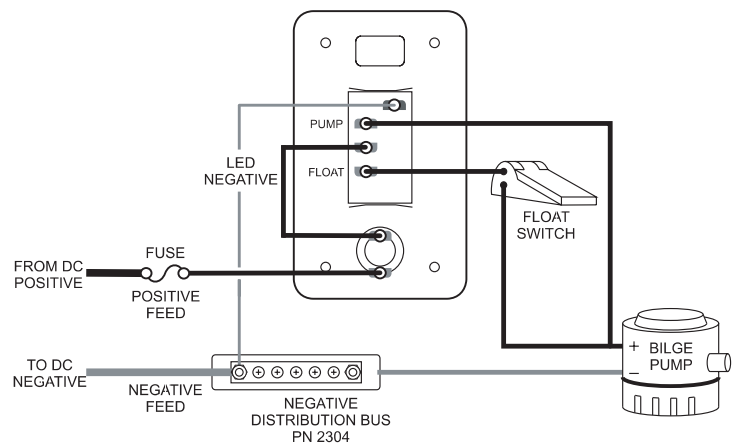
- American Boat and Yacht Council (ABYC) Standards and Recommended Practices for Small Craft sections: E-9.
- United States Coast Guard Code of Federal Regulations 33, Part 183, Subpart I, Electrical Systems on Boats.

This template has been provided to help you install your Blue Sea Systems' Water Resistant Bilge Pump Control Panel.



**Panel Template**

DC Water Resistant Power Distribution Panel  
PN 8263



**Wiring Diagram**

DC Water Resistant Power Distribution Panel  
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