DC Power Distribution Panel
PN 8378 / PN 3378 18 Position

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: 15 Ampere AC/DC magnetic
- Amperage Rating: All components are sized for 100 Amperes of continuous current
- Voltage Rating: Panels are rated for 12 volts DC. Panels can be upgraded to 24 volts with PN 8240, 18-32V DC Voltmeter.
- Voltmeter Rating: 8-16 Volt DC meter. Accuracy 3% of scale
- Ammeter Rating: 0-100 Ampere DC meter. Accuracy 3% of scale
- External Shunt: 50 Millivolt = 100 Ampere resistive manganin element
- Overall Dimensions: 14-3/4 x 7-1/2 374.65 x 190.50

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)

Applicable Standards
- United States Coast Guard 33 CFR Sub Part 1, Electrical Systems.

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. Optional - Upgrading to 24 Volts
Remove and replace the existing 8-16V DC voltmeter with an 18-32V DC voltimeter (PN 8240). Connect the existing meter sense wires to the new meter, Red Positive wire to + and Yellow negative wire to -.

3. Select mounting location and cut opening
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, gas or lead acid batteries accumulate. The circuit breakers used in marine electrical panels are not ignition proof.

4. Select positive feed wire and negative return
Determine the positive feed (red) and negative return (black or yellow) wire size by calculating the total amperage of the circuits that will be routed through the panel. Blue Sea Systems' electrical panels are rated at 100 amperes total capacity. The positive feed wire must be sized for 3% voltage drop at the 100 ampere panel rating or the maximum amperage that will be routed through the panel in any particular installation, whichever is less.

5. Install shunt, positive feed wire and negative return
Connect the positive feed wire from the positive source to either of the 2 large bolt terminals on the shunt top. This is now the shunt positive terminal. Connect two additional lengths of feed wire from the remaining shunt terminal, now the negative terminal, to both panel positive buses. Next, connect a minimum 16 AWG red wire from the screw on the side of the shunt positive terminal to the meter positive terminal and connect another identifying color wire from the shunt negative terminal to the meter negative terminal. There should be a 1 ampere fuse in the sense wires near the shunt terminal. Be certain that on all 4 shunt connections the wire ring terminals sit directly on the brass blocks of the shunt without any washers in between.

Connect a negative return wire from both negative buses on the panel to DC negative.

Related Products from Blue Sea Systems
- PanelBack Insulating Covers
- High Amperage Battery Switches
- High Amperage Fuses and Circuit Breakers for positive feed wires
- Terminal Blocks and Common Bus Connectors
- AC and DC Voltmeters and Ammeters

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

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www.bluesea.com

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 either the panel front or back is to be exposed to water it must be protected with a waterproof shield.
- The panels must not be installed in explosive environments such as gas engine rooms or battery compartments as the circuit breakers 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.

Applicable Standards
- United States Coast Guard 33 CFR Sub Part 1, Electrical Systems.
- United States Coast Guard 33 CFR Sub Part 1, Electrical Systems.

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6. Install battery bank voltage monitor wires
The panel is supplied with a voltmeter and switch to monitor the voltage of three separate sources, usually the batteries. Connect a minimum 16 AWG red wire from each source to be monitored to each of the corresponding input wires of the switch. There should be a 1 ampere fuse in each positive wire near each source.

7. Install branch circuit wires
Determine the proper wire size for each branch circuit using the guidelines in step 4. Verify that the standard 15 ampere circuit breakers installed in the panel are large enough for each branch circuit. Remove and replace with a higher amperage any that are undersized.

Connect the positive (red) branch circuit wires to the load terminals of each circuit breaker.

Connect each negative (yellow or black) branch circuit wire to the DC negative bus. DO NOT CONFUSE THE DC NEGATIVE BUS WITH THE DC GROUNDING BUS.

8. Optional - install grounding system wire
The grounding wire (bare, green or green with yellow stripe and normally non-current carrying) should not be confused with the negative ground wire (black or yellow and normally current carrying).

In *Boatowner’s Illustrated Handbook of Wiring*, Charlie Wing identifies three purposes of DC grounding:
1. Holding conductive housings of low voltage (under 50 volts) DC devices at ground potential by providing a low resistance return path for currents accidentally coming into contact with the device cases.
2. Providing a low resistance return path for electrical current, preventing stray currents that may cause corrosion.
3. Grounding metal electrical cases to prevent emission from inside or absorption from outside of radio frequency interference (RFI).

ABYC requires that grounding wires be sized no smaller than one wire size under that required for current carrying conductors supplying the device to which the grounding wire is connected.

A full treatment of this subject is not possible within the scope of these instructions and there is controversy surrounding the general subject of DC bonding, of which DC grounding is a component. It is suggested that installers not familiar with this subject consult one of the reference books listed elsewhere in these instructions.

9. Installation of Backlight System
Connect the yellow negative wire to the panel negative bus.
To activate the label lights by the boat’s battery switch, connect the red positive wire to the DC panel positive bus.
To activate the label lights by an independent switch or breaker, connect the red positive wire to the load side of the switch or breaker.

10. 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 8039). 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.

11. Testing
Reconnect the main positive cable to the battery terminals and turn the main switch on to supply power to the panel. Turn on all branch circuits and test the voltage at the panel. Compare this voltage to the battery terminal voltage to determine that the voltage drop is within 3%. With all branch circuits still on, test the voltage at one device on each circuit to determine that there is a 3% or 10% drop as is appropriate.

12. 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 positive leg of the LED from the negative bus and connect it to the load side of the corresponding branch circuit breaker.

Note
This Blue Sea Systems electrical distribution panel is furnished with 15 amp AC/DC circuit breakers. This rating was selected to minimize the need for removing the panel’s circuit breakers and reinstalling different size circuit breakers. As shown in the Wire Sizing Chart included with these instructions, even 16 AWG wire, which is the minimum wire size recommended by ABYC, has an allowable amperage greater than 20 amperes. Additionally, it would be rare to have more than 15 amperes of current flowing in any one circuit. Therefore, 15 ampere circuit breakers will satisfy the vast majority of marine circuit protection situations.