

AC Rotary Switch Panel

3 Positions + OFF, 2 Pole

PN 8358

Features

- Switches 3 - 230 V AC Sources
- Compact solution when circuit protection is provided elsewhere
- Allows connecting one of three different AC sources to one circuit
- Heavy duty industrial rated switches
- Intuitive function - One handed operation
- Green power available LED indicators
- Red reverse polarity LED indicators
- UL listed switches

Panel Specifications

Voltage Rating:	Panels are rated for 230 volts AC	
Amperage Rating:	PN 8358 is rated for 32 amp maximum service	
Panel Material:	0.125" 5052-H32 Aluminum Alloy	
Primary Finish:	Chemical Treatment per Mil Spec C-5541	
Final Panel Finish:	Graphite color 2 part textured Polyurethane	
Maximum Wire Size:	10 AWG	
Minimum Wire Size:	14 AWG	
Terminal Recommended Torque:	12 lb-in.	
	Inches	Millimeters
Overall Dimensions:	5-1/4 x 3-3/4	133.35 x 95.25
Mounting Centers:	4-7/16 x 2-15/16	112.71 x 74.61
Mounting Depth:	2-5/8	66.7

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⚠ 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 strongly recommend that an electrical professional be retained to make the installation.
- ✔ If either the switch front or back is to be exposed to water it must be protected with a waterproof shield.
- ✔ The switch must not be installed in explosive environments such as gasoline engine rooms or battery compartments as the switches are not ignition proof.
- ✔ The vessel's shore power cord must be disconnected from shoreside power before installing this electrical switch.
- ✔ If an inverter is installed on the vessel its power leads must be disconnected at the battery before the panel installation. Be aware that many inverters have a "sleep mode" in which their voltage potential may not be detectable with measuring equipment.
- ✔ If an AC Generator is installed aboard it must be stopped and rendered inoperable before the switch is installed.
- ✔ Verify that no other AC or DC source is connected to the vessel's wiring before the switch is installed.

Guarantee

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

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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 switch.

2. Select mounting location and cut opening

Select a mounting location which is protected from water on the front and back of the switch and is not in an area where flammable vapors from propane, gas or lead acid batteries accumulate. AC rotary switches 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 source 1, source 2, source 3 and output wires

Install the feed wires from AC Shore Power and AC Generator. Install the output wires. Refer to the wire sizing chart to select the minimum wire size. Connect the brown AC hot, light blue AC neutral and green AC safety ground as shown in the illustration. To avoid excess wire temperatures when cooling may be limited, we recommend using at least 12 gauge wire for 30A and 8 gauge wire for 50A.

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.

A double pole circuit breaker must be installed within 10 feet of the shore power inlet, ahead of this switch. The measurement is made along the conductors.

The switch provides switching, but does not provide circuit protection. It is not a substitute for a main circuit breaker.

Wire sizing chart

Use the wire sizing chart below to determine the proper branch and feed circuit wire sizes.

Allowable Amperage of Conductors

Wire Size (AWG)	Outside Engine Spaces	Inside Engine Spaces
16	25.0	21.3
14	35.0	29.8
12	45.0	38.3
10	60.0	51.0
8	80.0	68.0
6	120.0	102.0
4	160.0	136.0
2	210.0	178.5

*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. Testing Connections

It is very important that the wiring be connected according to the diagram. The line and neutral from each source must be paired together and not connected such that the switch selects line from one source and neutral from another. Verify the connections and see that each connection is securely tightened, including the terminals for the jumpers installed on the switch where no wires are attached.

It is possible to verify the connections using an ohmmeter before power is applied. These procedures take a little time, but are recommended, especially if some elements of a previous installation might not have been properly labeled or followed the expected color codes.

Installation (continued)

✓ Test Shore Connection to Switch

Disconnect the shore power cord from the shore power source and bring the shore plug aboard to a point close to the switch panel. Connect the other end of the shore cord to the boat's power inlet. Turn ON the shore power circuit breaker between the inlet and the selector switch. Set the selector switch to OFF.

- Use an ohmmeter to check for continuity from the shore ground plug to the green wire at the electrical panel.
- Check for continuity from the power cord plug neutral pin to the neutral wire (white typically in US, light blue typically in Europe) at the selector switch.
- Check for continuity between the line pin of the shore plug and the line wire (typically black in US, brown in Europe) at the selector switch.
- Check that there is a high resistance between (>1000 Ohms) the neutral conductor and the grounding conductor.
- Verify that there is a high resistance between (>1000 Ohms) between the shore cord plug neutral pin and line pin. There may be indicator lamps in the circuit, but no more than that with the selector switch in the off position.

✓ Verify Switch Selects Shore Input

With the shore cord still disconnected from the shore and available onboard, and the generator set not operating, set the load circuit breakers to off, so there is no load at the output side of the selector switch.

- Verify that there is a high resistance between the line and neutral of the load side terminals of the selector switch. There may be indicator lamps still attached, so it may not read open circuit.
- Set the selector switch to SHORE. The ohmmeter should still indicate a high resistance.
- Short the line pin to the neutral pin of the shore cord and verify that the line and neutral at the load side of the selector show a low resistance when these are shorted and a high resistance when they are not.

✓ Verify the Generator Wiring

Turn the generator circuit breaker to OFF and set the selector switch to the generator position. All load circuit breakers should still be off. Leave the shore input circuit breaker in the on position.

- Verify that there is a high resistance (>1000 Ohms) from the line to neutral.
- Verify that there is a low resistance from the neutral to ground at the load connections.
- With the generator still not running, close the generator circuit breaker at the generator. Verify that there is a now a low resistance from line to neutral where the generator windings are now connected across the circuit.
- Verify that there is still a high resistance from neutral to ground and neutral to line at the shore power plug.

✓ Set the Selector switch to **OFF**, turn the shore power breaker to **OFF**, and leave the load panel circuit breakers in the **OFF** position. Complete the mounting of the switch.

✓ Test the third source in a similar manner.
Set your multimeter to volts.

5. Apply circuit labels and mount panel

Apply a label for the circuit from the 10 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 included with the panel 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 Performance

✓ Test Shore Power

Connect the shore power cable to the shore power source. Turn on the shore source to make power available to the boat.

- Turn the selector switch to **SHORE**. No Reverse Polarity lights should be lit, and power available should be indicated. If any red Reverse Polarity lights are on, turn off the shore power circuit breaker and disconnect the shore cord at the shore source. Either the hot and neutral or hot and ground wires have been reversed. Starting at the distribution panel, trace the connections as far back as necessary to locate the error.
- If there are no indications of reverse polarity, check to see that power is available. If the electrical distribution panel has a meter, verify that shore power is available and at the proper voltage. If there is no meter, turn on the load circuit breaker for an AC circuit powering a convenience outlet and use a voltmeter to verify that power is available from line to neutral at the plug. Verify that there is no voltage between ground and neutral.

✓ Test Generator System

Turn the circuit breaker at the shore source to **OFF**. Set the selector switch to **OFF**. The shore power available lights should all be off. Start the generator and turn the generator breaker to **ON**.

- The power available light for the generator output should light. The reverse polarity light should be off.
- There should be no power available indication at the shore power circuit breaker.
- Set the selector switch to **GENERATOR**. Power should be available at the power distribution panel. If the electrical distribution panel has a meter, verify that power is available and at the proper voltage.
- There should be no power available lights indicating at the shore circuit breaker, or the shore indicator of this panel.

✓ Test the third source in a similar manner.

The Purpose of the AC Main Source Selector Panel

Alternating Current (AC) power changes polarity 60 times per second in the US, Canada and Latin America and 50 times per second in Europe. This is the frequency of the power and is referred to as Hertz (or the now outdated term "cycle"). Because of this alternating nature of AC power, 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 connect two sources of AC power to a common circuit while preventing both sources from being connected to the circuit simultaneously.

Related Products from Blue Sea Systems

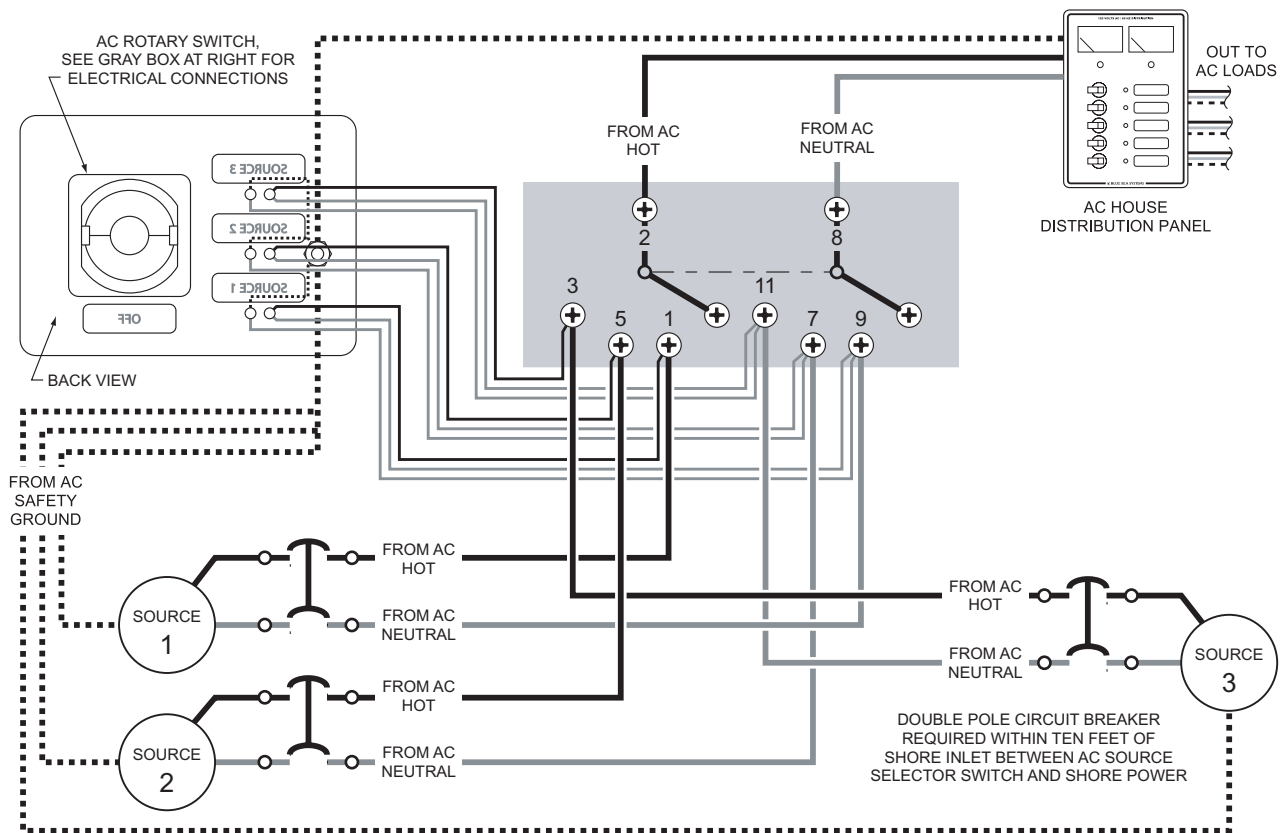
- High Amperage Fuses and Circuit Breakers for positive feed wires
- High Amperage Battery Switches
- Terminal Blocks and Common Bus Connectors
- AC Distribution Panels
- DC Distribution Panels
- AC and DC Digital and Analog Voltmeters and Ammeters

Useful Reference Books

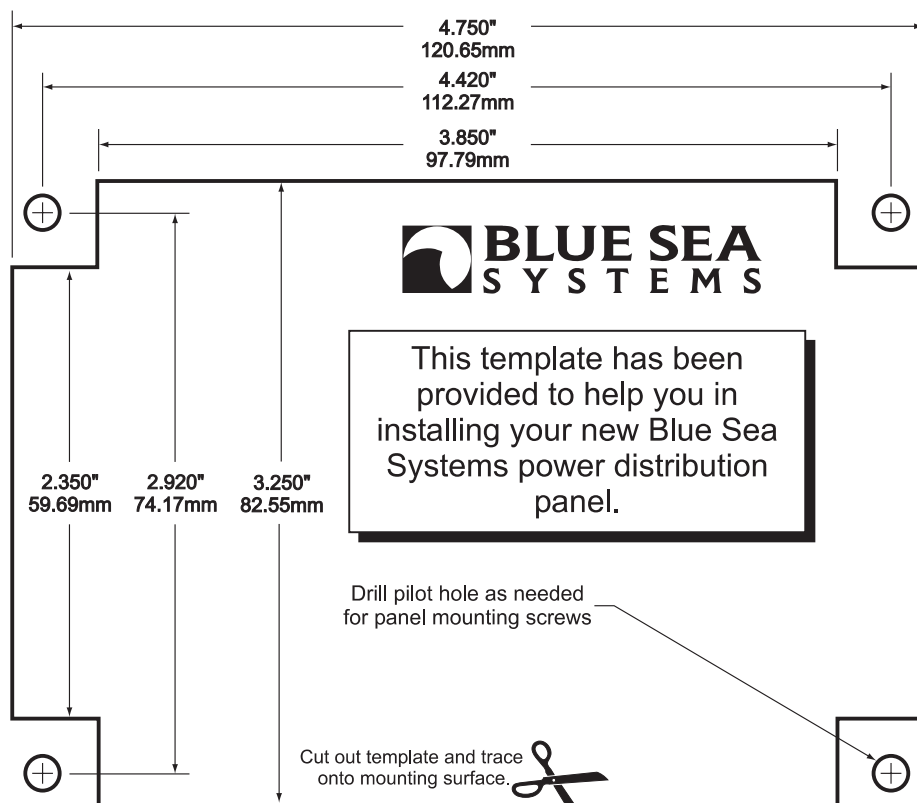
Calder, Nigel, 1996: *Boatowner's Mechanical and Electrical Manual*, 2nd edition, Blue Ridge Summit, PA: TAB Books, Inc.

Wing, Charlie, 1993: *Boatowner's Illustrated Handbook of Wiring*, Blue Ridge Summit, PA: TAB Books, Inc.

Installation (continued)



Wiring Diagram
AC Source Selector Panel
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Panel Template
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