Products By Category

Products By Application

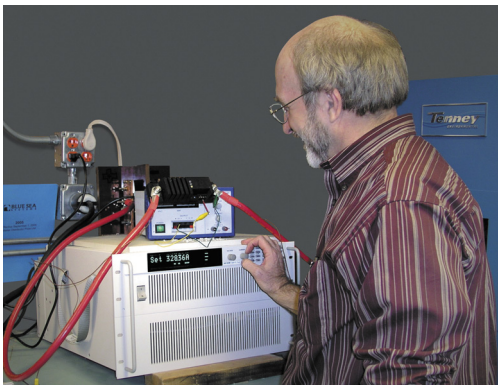
Blue Sea Systems Engineering

Blue Sea Systems designs quality, reliable, and innovative products for the marine industry. The company is comprised of avid boaters with decades of experience in craft ranging from 16' runabouts to sailboats and have years of blue water sailing experience.

The company boat, a 36' express trawler, is used to test Blue Sea Systems products and ideas and improve the products offered. The engineering staff applies their previous experience designing test equipment, medical lasers, high amperage bus systems, circuit breakers, and marine systems to the Blue Sea Systems products they design. This results in the delivery of innovative, reliable products for the marine industry that exceed the quality standards of other companies. Blue Sea Systems in house lab is used to load test and thermal test products to ensure they will perform under marine conditions.

Indigo - Blue Sea Systems Boat

Thermal Testing



Load Testing

Technical Support

The Blue Sea Systems support team and engineers are available to answer questions about products and their applications. Application and technical information is available online at www.bluesea.com including product instructions. Access to Blue Sea Systems technical staff, combined with the website, ensure industry leading support for your needs.

Look For Blue Sea Systems Copper Icon (your assurance of genuine copper construction)

Tin-Plated Copper is 250% More Conductive Than Brass

Blue Sea Systems uses tin-plated pure electrical copper where appropriate, rather than the lower cost brass alloys used by some manufacturers. Just as electrical wire is always copper, so are the Blue Sea Systems products to which this wire is attached made with pure CDA 11000 Electrical Grade Copper.

Copper is 250% more conductive than brass. Electrical devices made with copper are capable of handling higher amperages at lower temperatures. Blue Sea Systems tin-plating adds additional performance by protecting the copper from corrosion that can produce poor conductivity at connection points.

Plated brass can look just like tin-plated copper; Blue Sea Systems tin-plated copper icon assures that the product to which it is attached is made of pure electrical grade copper.

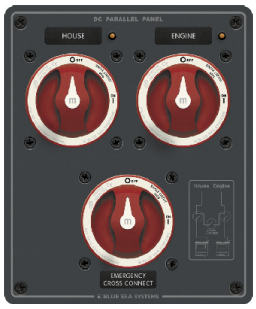
Parallel Circuit Mini Switch Battery Management Panels

Now includes the NEW M-Series Battery Switches with ONE PIECE studs that eliminate the need for a securing nut and provide easy access to battery cables

▷ See pages 18-19

Upated Version Available January, 2006

8080



8280

8370

2301 Busbar

Optional snap on insulating cover that attaches to studs, pressed-on busbar that eliminates the need for a securing nut, and unobstructed wire access

▷ See pages 106, 108

Updated Version Available January, 2006

2301 (cover not included)

ANL Light Fuse Block

Now includes a NEW snap on insulating cover that attaches to studs, NEW swing out design that allows replacement of fuse without removing fasteners, and unobstructed wire access

▷ See page 35

Updated Version Available January, 2006

5005

Sea Fuse Block

Now includes a NEW snap on insulating cover that attaches to studs and unobstructed wire access

▷ See page 34

Updated Version Available January, 2006

5001

Look For UPDATED PRODUCT Throughout

M-Series Battery Switches (Mini)

Redesigned popular Mini Battery Switch with ONE PIECE studs, new front panel mounting option, and three new switch configurations

- Case design allows front panel, rear panel and surface mounting
- Removable knob or key remains positively retained at all times
- Ideal for marine or RV applications

▷ See pages 12-13

Note: 6005 replaces 9005
6006 replaces 9006

Available January, 2006

6005
Single Circuit ON/OFF

6006
Single Circuit ON/OFF

6007
Selector

6011
Dual Circuit Plus™

6010
Dual Circuit

e-Series Battery Switches

New DUAL CIRCUIT PLUS™ simplifies switch operation and reduces the risk of a dead Start battery

- Keeps House and Start battery banks isolated while there is current flow from both battery banks
- The BOTH function offers the ability to combine two battery banks in the event of a low Start battery
- Luminous label for low light reading

▷ See pages 14-15

Available January, 2006

5511e
Dual Circuit Plus™

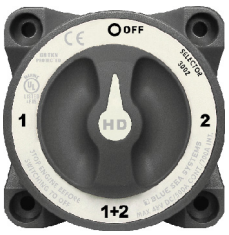
5510e
Dual Circuit

HD-Series Battery Switch (Heavy Duty)

New Heavy Duty SELECTOR Battery Switch

- Up to 600 Ampere Continuous Rating for large diesel engines, high power output, and low heat generation
- M12 (1/2") Tin-plated copper studs for maximum conductivity and corrosion resistance
- Luminous label for low light reading

▷ See pages 16-17



3002-3003
Selector

L-Series Solenoid Switches

New 250 Ampere class, 12 or 24 Volt

- Ignition protected - Safe for installation aboard gasoline powered boats
- Functions as a remote battery switch
- Noise free circuitry will not interfere with other devices

▷ See page 22

Available January, 2006

5301 - 12 Volt
5302 - 24 Volt

WeatherDeck™ Water Resistant Circuit Breaker Panels

New WeatherDeck™ Circuit Breaker Panels designed for flybridge and open cockpit applications

- Easy to identify tripped circuit breakers
- Bi-colored LEDs illuminate circuit labels to quickly identify “OFF” or “ON”
- Each panel can be mounted in four different orientations

▷ See pages 48-49

Available January, 2006

4374

4376

Dual Battery Main Distribution Panels

For dual battery, single engine systems to manage all DC Main circuit demands including 24 hour circuits in one panel

- Provides main DC circuit protection in addition to high ampere loads
- Simplifies battery switch operation
- Discharges batteries independently

▷ See page 20

Available January, 2006

8686

8690

Triple Battery Main Distribution Panels

For triple battery, twin engine systems to manage all DC Main circuit demands including 24 hour circuits in one panel

- Provides 24 hour circuit protection
- Simplifies battery switch operation
- Discharges batteries independently

▷ See page 21

Available January, 2006

8689

8693

Rocker Circuit Breakers (Small Case 2” and Large Case 2.5”)

Two new modern FLAT actuator designs, including a version with a built-in reset SLOT

- Highly resistant to accidental switching
- International ON/OFF symbols for vertical or horizontal mounting
- Mounting aperture can accommodate breakers from 5A to 250A

▷ See pages 33, 42, 43, 73

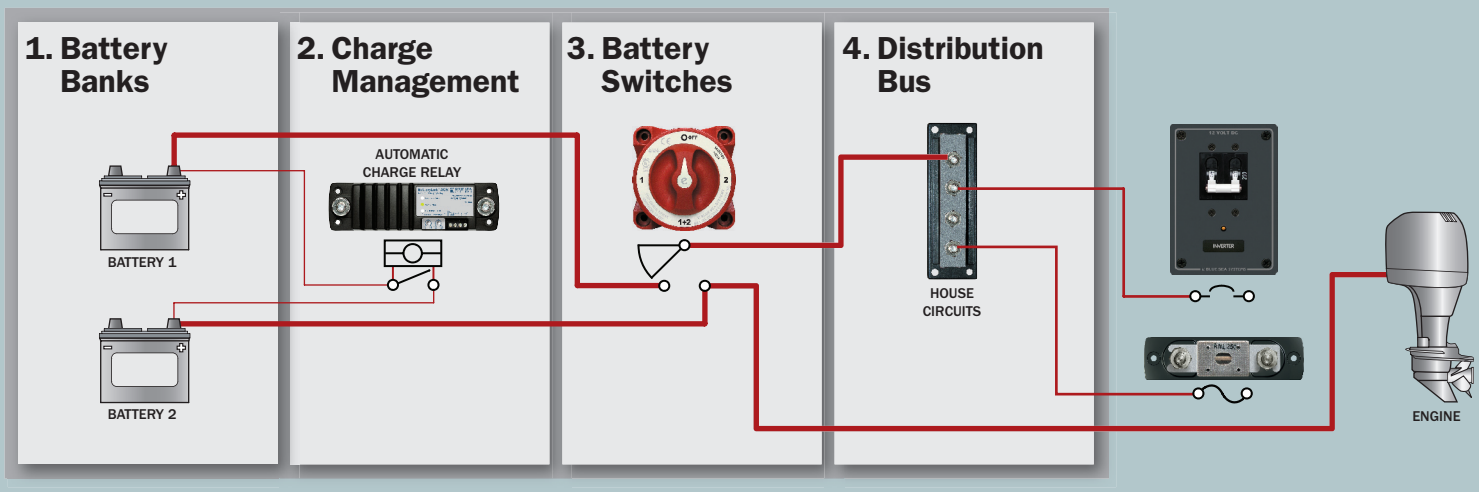
7433 Small Case

7450 Large Case

7408 Small Case

Look For NEW PRODUCT Throughout

The DC Main Power Distribution System conducts power from the battery banks to the beginning of the DC Branch Distribution System. The four elements of the DC Main Power Distribution System are illustrated below:



1. Battery Banks

Purpose

To store sufficient energy to power the ship's loads between charging cycles. Charging is typically provided by the alternator while under way and the battery charger when connected to shore power. Additionally, for boats with two battery banks, to provide a second source of energy storage isolated from the first, sufficient to start the engine and recharge all battery banks.

Considerations

Blue Sea Systems advises having a second battery bank for emergency engine starting while attempting to avoid having more than two. Some engine manufacturers recommend having a separate battery bank dedicated to each engine in addition to the House battery bank. Limiting the boat to two battery banks, however, will provide the greatest simplicity and reliability.

2. Charge Management

Purpose

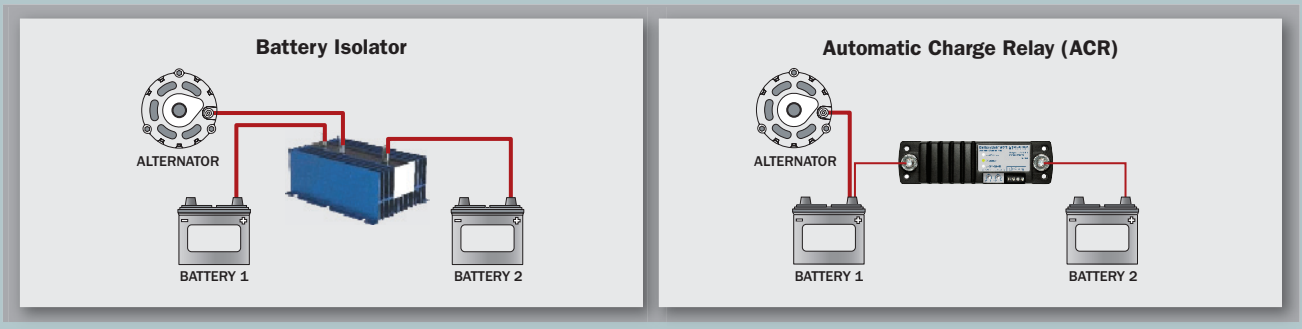
In multiple battery bank systems, Charge Management Devices (CMD's) provide a means of combining two battery banks when charging, while keeping the battery banks isolated from each other when the charging source is not charging. This assures that even if one battery bank is depleted there will always be a charged battery bank available for engine starting. Some devices can also provide a means of connecting both battery banks together for additional power while starting engines. There are many types of CMD's that fulfill this role; the two main categories are Battery Isolators and Automatic Charge Relays (ACR's).

Considerations

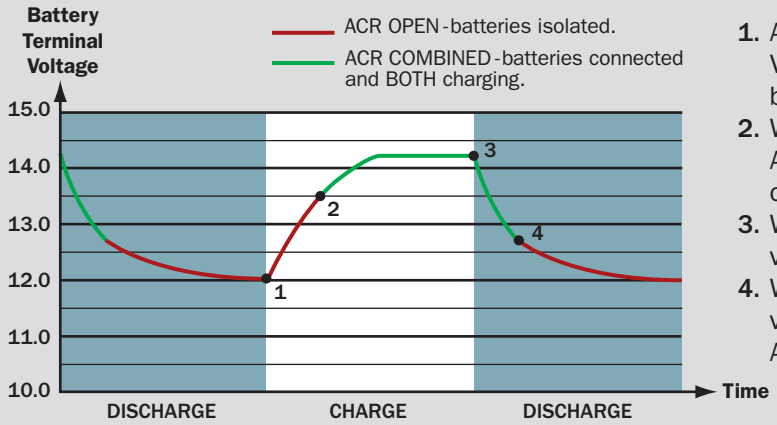
Battery Isolators are a common method of distributing charging current to multiple battery banks while assuring that they remain electrically isolated during discharge. These devices are electrical "one way check valves" that allow current flow to, but not from, the battery. Their disadvantage is that the diodes used to achieve this cause a voltage drop that consumes charging energy, creates heat, and causes batteries to be undercharged. Alternators with external voltage sensing can correct for the undercharging problem, but voltage drop and the heat generated remain a problem.

Automatic Charge Relays (ACR's) are becoming the popular method for achieving the same goal as isolators, but they work on a different principle. Instead of using diodes to block current from flowing in both directions, ACR's use mechanical relays combined with a circuit that senses when a charging source is being applied to either battery. When a charge is being applied, the ACR closes; and when the circuit senses that the charge is no longer present, the ACR opens after a short time delay which assures that the ACR does not open during temporary voltage sags due to load start-ups. The most common method of determining that a charge is being applied to the system is to sense voltages in the region above 12.6 Volts DC.

Battery Isolator and Automatic Charging Relay Comparison



Automatic Charge Relay Operation



1. ACR relay is open and batteries are isolated. Voltage begins to rise slowly after engine starts or battery charger is turned on.
2. When voltage rises to "COMBINE" voltage set on ACR (13.5 volts in this example), ACR relay closes, connecting and charging both batteries.
3. When engine stops or battery charger is turned off, voltage rapidly begins falling.
4. When voltage falls to 6% less than "COMBINE" voltage (13.5 volts - 6% = 12.7 volts in this example), ACR relay opens isolating batteries after 1 minute.

Considerations when selecting an Automatic Charge Relay:

- **Current Management**
  Automatic Charge Relays (ACR's) can potentially be exposed to very high currents if the engine is cranked while the ACR is closed, paralleling the battery banks. This can occur when an alternate charge source causes the ACR to close. Blue Sea Systems uses two methods for dealing with this. Smaller ACR's such as the CL-Series BatteryLink™ ACR have automatic current management circuits, while larger ACR's like the L-Series ACR have high amperage contacts rated for engine starting.
- **Over Voltage Adjustability**
  This allows the ACR to be used between different type battery banks in which one battery bank requires lower maximum charging voltages than the other battery bank.
- **Combining and Disconnecting Voltage Adjustability**
  This allows the voltage at which the ACR closes and its associated cut-out voltage to be adjusted for the specific requirements of each boat's electrical system.
- **Manual Override**
  This allows the ACR to be manually opened, set to automatic, or manually combined from a remote location.

3. Battery Switches

Purpose

To isolate the potentially destructive energy in the battery banks when the boat is not in use or in emergencies.
ABYC *11.7.1.2.1. A battery switch shall be installed in the positive conductor(s) from each battery or battery bank with a CCA rating greater than 800 Amperes.*

Considerations

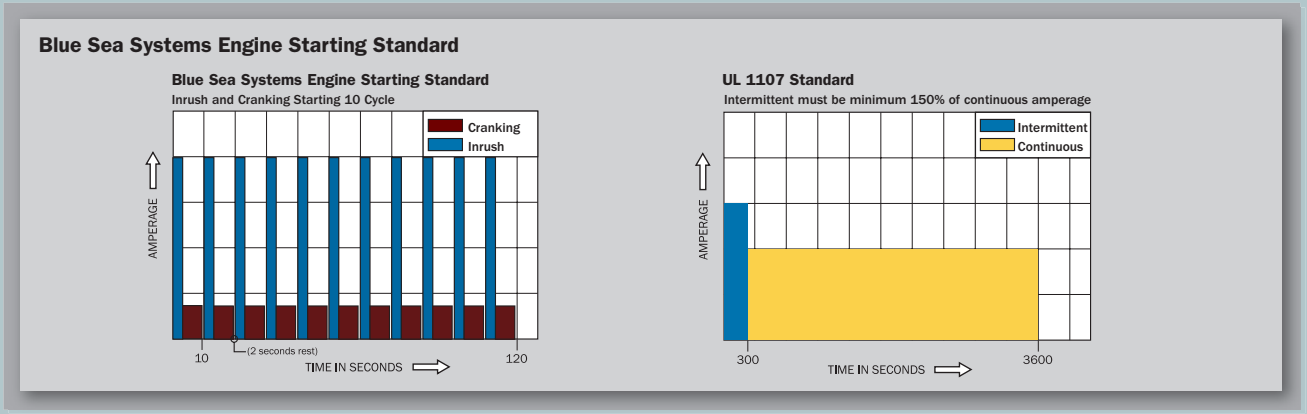
Historically there have been two types of battery switches used on boats; Single Circuit and Battery Selector Switches. In 2006, Blue Sea Systems is introducing a third option called a DUAL CIRCUIT PLUS Battery Switch as a better alternative. On page 9 are schematics for each type of switch and the advantages and disadvantages of each.

Selecting a Battery Switch

Any battery switch used in a marine application should be UL Listed to UL Standard 1107 or should be tested to this standard by a Nationally Recognized Testing Laboratory, of which UL is only one of many. In particular, any amperage rating other than those determined by UL 1107, or a standard whose details are publicly stated by the manufacturer, should be treated with skepticism.

Battery Switch Ratings

The UL standard for marine battery switches is UL Standard 1107. This standard rates switches only for 5 minute and 1 hour time periods. Clearly, these ratings are not useful for the boater using a switch in the engine starting circuit where current durations may be 10 seconds or less. For this reason, Blue Sea Systems has created an additional standard called the **Engine Starting Standard**. The **Engine Starting Standard** is 10 cycles, each consisting of an Inrush Current spike of 1/4 second duration, a Cranking period of 9-3/4 seconds duration, and a 2 second rest period for a total of 120 seconds. This is representative of the load imposed on a battery switch in the starting circuit under very difficult starting conditions. Blue Sea Systems battery switches, in addition to being tested to UL 1107, are also tested to the **Engine Starting Standard** by a United States Coast Guard certified Nationally Recognized Testing Laboratory.



When determining the proper size battery switch, consult your engine manufacturer for the amperage requirements of your engine starter motor. If this information is not available from the engine manufacturer you may refer to the following rule of thumb used by mechanics to roughly estimate the cranking requirement of various type and sizes of engines.

Estimating starter motor amperage draw to determine size of battery switch

Gasoline engines - 1 amp/cubic inch of engine displacement = cranking rating

Diesel engines - 2 amps/cubic inch of engine displacement = cranking rating

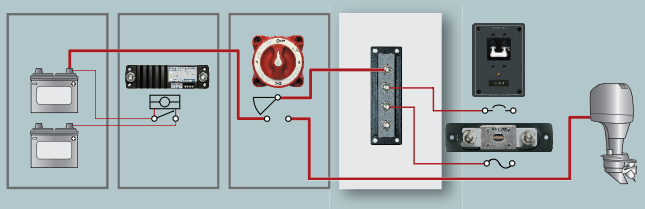
* These values are intended to be general estimates and do not apply to gear reduction starter motors. Ed, Sherman, *Power Boaters Guide to Electrical Systems*, 2000

ABYC Requirements

11.7.1.2.3. Battery Switch Ratings – The intermittent rating of a battery switch shall not be less than the maximum cranking current of the largest engine cranking motor that it serves. The minimum continuous rating of a battery switch shall be the total of the ampacities of the main overcurrent protection devices connected to the battery switch, or the ampacity of the feeder cable to the switch, whichever is less.

ABYC Standards for battery switches are currently under review by the ABYC Project Technical Committee for battery switches. The two major changes likely to be made are that allowable temperature rise will decrease, thereby lowering the amperage ratings that switches currently carry, and the Engine Starting Standard developed by Blue Sea Systems will be incorporated into the standard.

4. Distribution Bus



Purpose

On any but the smallest boats it is impractical to attach all of the wires from each load directly to the battery terminal or the battery switch terminal. For this reason, a positive distribution bus, (a solid bar of tin-plated electrical copper) is used to convert the large wire from the batteries to the smaller wires that carry current out to the each load device. Large boats may have many layers of progressively smaller busbars, while small boats may have only a small busbar attached to the back of the electrical distribution panel.

Considerations

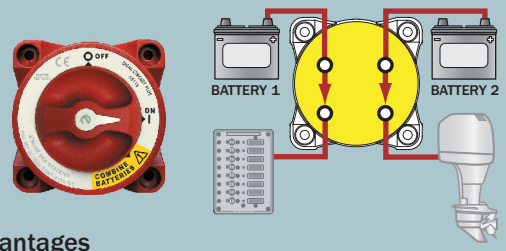
When selecting a distribution bus, Blue Sea Systems suggests it have the following qualities:

1. Solid copper construction for low voltage drop and low heat rise.
2. Stainless steel terminals for strength and corrosion resistance. In a distribution bus, the terminal is a compressive element, not a conductive element. Its purpose is to press the ring terminal against the busbar. This is different from a battery switch in which the terminal's job is to carry current through the terminal and into the interior of the switch.
3. Tin plating to resist corrosion and maintain low resistance connections.
4. Continuous rating equal to or greater than the maximum continuous amperage of the system in which it will be installed.

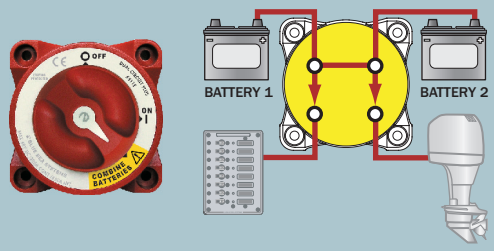
New DUAL CIRCUIT PLUS™ Battery Switch for 2006!

Dual Circuit switching technology offers the advantages of MULTIPLE Single Circuit ON/OFF switches in ONE switch

Switch Set to "ON"
Batteries isolated - Current flow from both House and Start batteries



Switch Set to "COMBINE BATTERIES" ⚠ SEE BELOW
Batteries combined - Current flow from both House and Start batteries



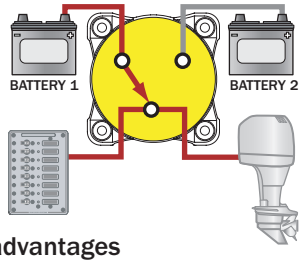
Advantages

1) Simple ON/OFF switching in NORMAL operation (with an ACR or isolator installed)
2) Isolates Start and House circuits reducing the chance of fully discharging both batteries
3) Isolates Start and House circuits protecting electronics from engine starting sags and spikes

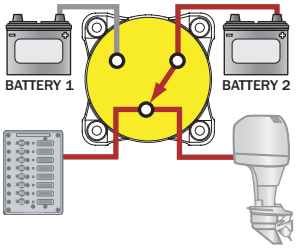
Compare with the alternatives

SELECTOR Battery Switch

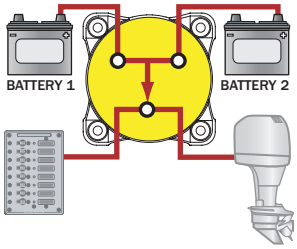
Switch Set to "1"
Current flow from Battery 1 to both House and Start circuits



Switch Set to "2"
Current flow from Battery 2 to both House and Start circuits



Switch Set to "1+2" ⚠ SEE BELOW
Batteries combined - Current flow from both House and Start batteries

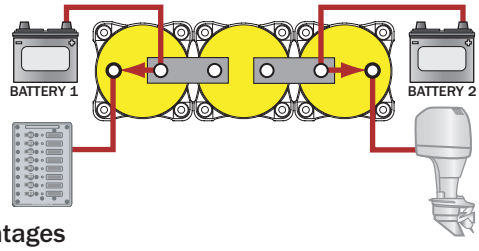


Disadvantages

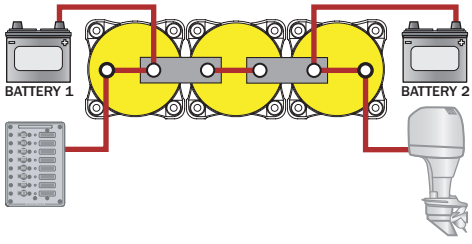
1) Not intuitive to operate
2) When the switch is left in "1+2" position all batteries can be discharged
3) The Engine circuit and House circuit are combined exposing electronics to sags and spikes caused by engine starting

Multiple SINGLE CIRCUIT ON/OFF Battery Switches

Battery 1 Switch Set to "ON"
Battery 2 Switch Set to "ON"
Current flow from Battery 1 to House circuit and Battery 2 to Start circuit



Battery 1 Switch Set to "ON" ⚠ SEE BELOW
Battery 2 Switch Set to "ON"
Emergency Parallel Battery Switch Set to "ON"
Batteries combined - Current flow from both House and Start batteries



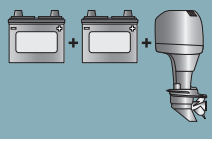
Disadvantages

1) Most expensive option
2) Requires more space
3) Not intuitive to operate- user must operate 3 switches
4) Wiring and switch interconnection complexity

⚠ **NORMAL OPERATION** - Batteries combined for charging when no Automatic Charging Relay or Isolator is installed
EMERGENCY OPERATION - Batteries combined when Start battery is low

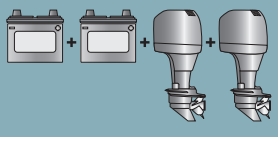
Products to consider for common electrical system configurations with various motor and battery bank combinations.

Dual Battery, Single Engine

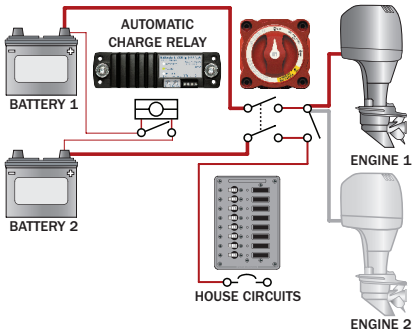


OR

Dual Battery, Twin Engine

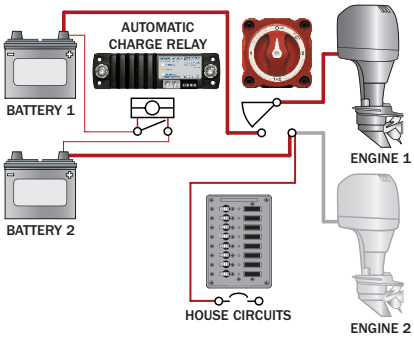


DUAL CIRCUIT PLUS™ Battery Switch



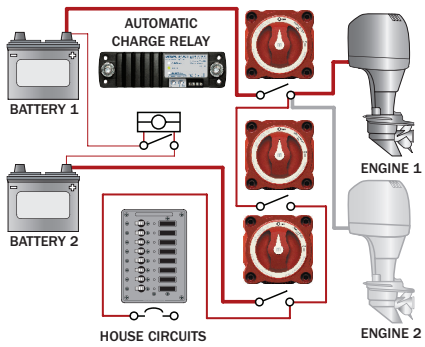
Products To Consider			
Product	**Outboard Engine***	**Small Inboard Gasoline or Diesel***	**Large Inboard Gasoline or Diesel***
Automatic Charge Relay	7600 pages 24, 26 	7600 pages 24, 26 	9112 pages 25-26 
DUAL CIRCUIT PLUS Battery Switch	6011 pages 12-13 	5511ℰ pages 14-15 	5511ℰ pages 14-15 

SELECTOR Battery Switch



Products To Consider			
Product	**Outboard Engine***	**Small Inboard Gasoline or Diesel***	**Large Inboard Gasoline or Diesel***
Automatic Charge Relay	7600 pages 24, 26 	7600 pages 24, 26 	9112 pages 25-26 
SELECTOR Battery Switch	6007 pages 12-13 	9001ℰ pages 14-15 	3002 pages 16-17 

Multiple SINGLE CIRCUIT ON/OFF Battery Switches

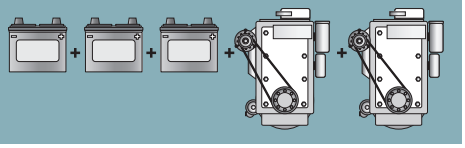


Products To Consider			
Product	**Outboard Engine***	**Small Inboard Gasoline or Diesel***	**Large Inboard Gasoline or Diesel***
Automatic Charge Relay	7600 pages 24, 26 	7600 pages 24, 26 	9112 pages 25-26 
SINGLE CIRCUIT ON/OFF Battery Switch	6006 pages 12-13 	9003ℰ pages 14-15 	3000 pages 16-17 

*Engine sizes are suggested only as general categories and are not intended to represent the variety of engine sizes. Please go to the product pages in this catalog for the detailed specifications of each product.

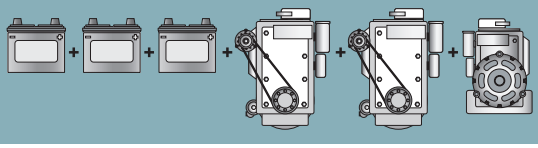
Products to consider for common electrical system configurations with various motor and battery bank combinations.

Triple Battery, Twin Engine

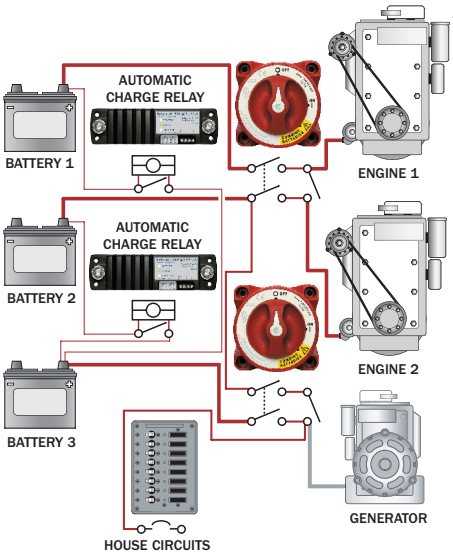


OR

Triple Battery, Twin Engine + Generator



DUAL CIRCUIT PLUS™ Battery Switch and SINGLE CIRCUIT ON/OFF Battery Switch

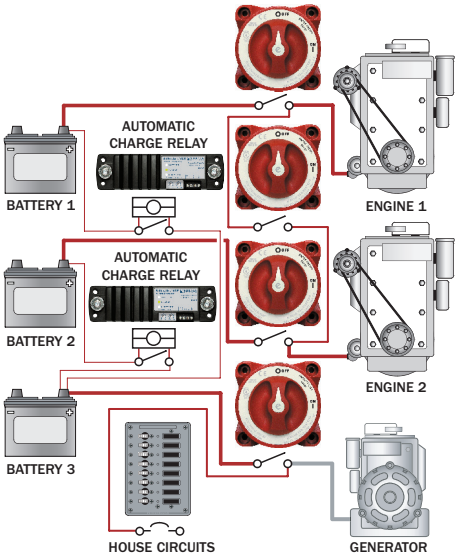


Products To Consider			
Product	**Outboard Engine***	**Small Inboard Gasoline or Diesel***	**Large Inboard Gasoline or Diesel***
Automatic Charge Relay	7600 pages 24, 26 	7600 pages 24, 26 	9112 pages 25-26 
DUAL CIRCUIT PLUS Battery Switch	6011 pages 12-13 	5511℮ pages 14-15 	5511℮ pages 14-15 

SELECTOR Battery Switch

The use of multiple SELECTOR Battery Switches is highly discouraged. Since the large number of possible switch settings is etremely confusing to the boat operator, and the possibility of operator error is very high. Two SELECTOR Battery Switches offer the operator 16 different combinations of settings.

Multiple SINGLE CIRCUIT ON/OFF Battery Switches



Products To Consider			
Product	**Outboard Engine***	**Small Inboard Gasoline or Diesel***	**Large Inboard Gasoline or Diesel***
Automatic Charge Relay	7600 pages 24, 26 	7600 pages 24, 26 	9112 pages 25-26 
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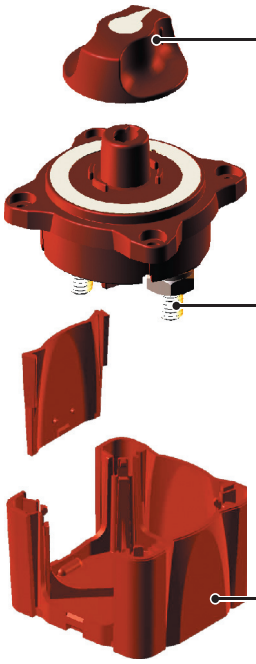
*Engine sizes are suggested only as general categories and are not intended to represent the variety of engine sizes. Please go to the product pages in this catalog for the detailed specifications of each product.

Available January, 2006

M-Series Battery Switches (Mini) NEW PRODUCT

300 Amperes Continuous Rating for outboards and small inboard gasoline engines



Removable knob or key remains positively retained

3/8" M10 Tin-plated copper studs for maximum conductivity and corrosion resistance

7/8" Long stud length to accept multiple cable terminals

Isolator cover protects rear contacts

Ignition protected - Safe for installation aboard gasoline powered boats

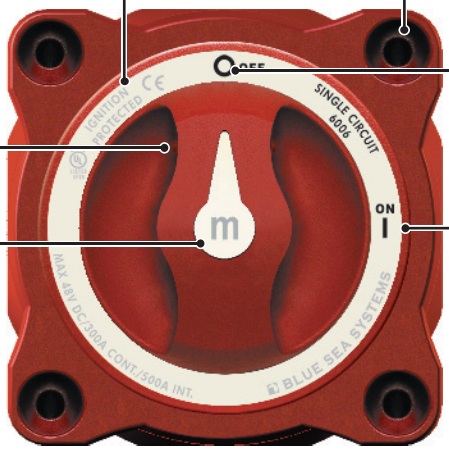
Case design allows surface, front panel, or rear panel mounting

Label with international ON/OFF legends

Tactile textures indicate knob position by feel only

ICON label set included for circuit identification

ENGINE
ENGINE 1
ENGINE 2
HOUSE
GENERATOR
PARALLEL



- Ideal for marine or RV applications
- Accepts up to 4/0 battery cables
- All non-corrosive marine grade metals
- Molded in durable reinforced polycarbonate

MARINE UL LISTED POWER SWITCH

Specifications	6005-6007	6010-6011
Inrush Rating: .25 sec (10 repeats)*	1,500 Amperes DC	1,200 Amperes DC
Cranking Rating: 9.75 sec (10 repeats)*	700 Amperes DC	500 Amperes DC
Intermittent Rating: 5 min (UL 1107)	500 Amperes DC	300 Amperes DC
Continuous Rating: (UL 1107)	300 Amperes DC	200 Amperes DC
Terminal Stud, Tin-Plated Copper	3/8" (M10)	3/8" (M10)
Torque	140 in-lbs.	140 in-lbs.
Cable Size to Meet Ratings[1]	4/0 Cables	4/0 Cables
Voltage Rating	48 Volts DC Maximum	48 Volts DC Maximum
Cable Clearance For 4/0 Cables	1.12" (25.4mm)	1.12" (25.4mm)
Case Material	Reinforced Polycarbonate	Reinforced Polycarbonate

CE marked

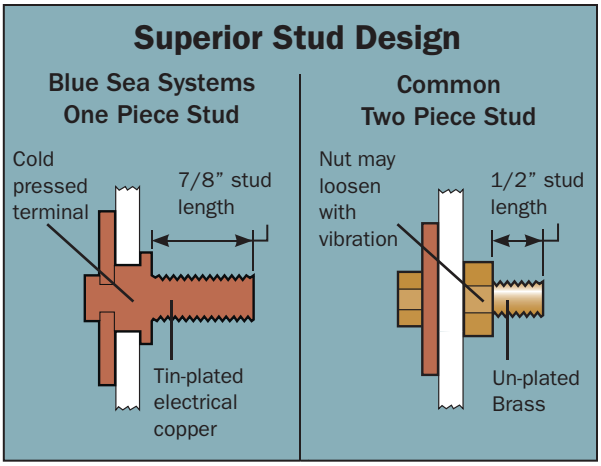
Agency Specifications

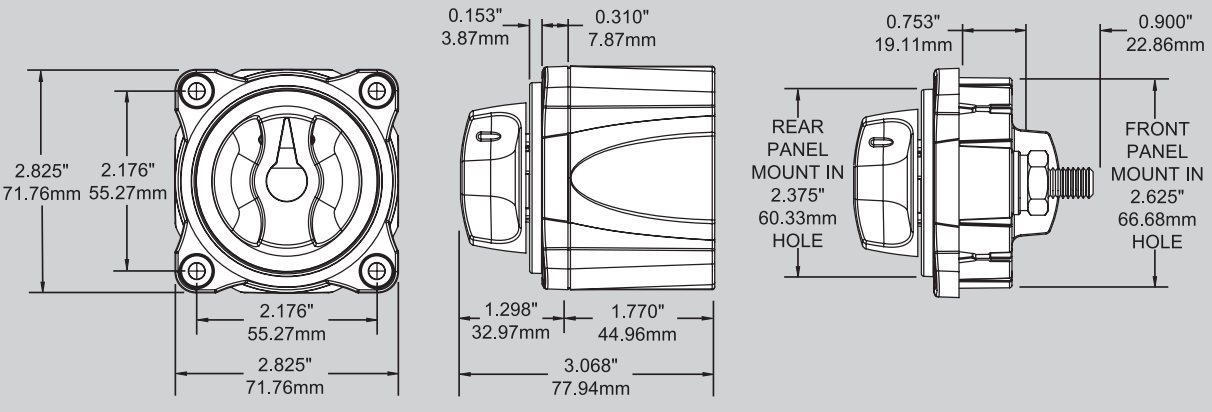
- UL Listed - UL 1107 electric power switches**
- Meets UL 1500 and SAE J1171 external ignition protection requirements

* Blue Sea Systems Engine Starting Standard (see page 8)
** Pending testing

[1]Reducing cable size will reduce current rating

Superior Stud Design

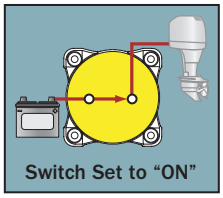




M-Series Battery Switch Dimensions

IP **Single Circuit ON/OFF**
6006

IP **Single Circuit ON/OFF**
6005

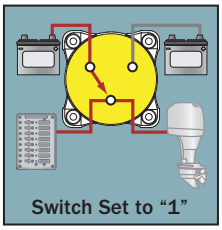


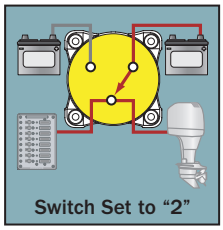
APPLICATIONS

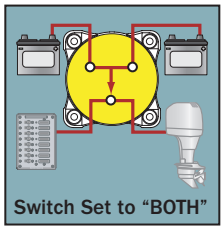
1. Switches a single battery to a single load group.
2. Multiple switches can be used to manage several isolated circuits including cross connecting for emergency paralleling.

Note: 6005 replaces 9005
6006 replaces 9006

IP **Selector** 6007



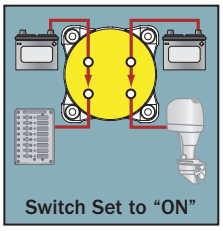


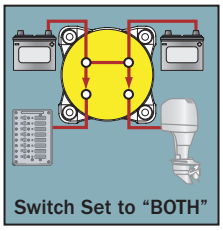


APPLICATION

Switches battery bank 1 or battery bank 2 or BOTH to a single load using one switch.

IP **Dual Circuit Plus™** 6011

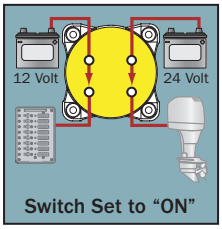




APPLICATIONS

1. Switches two battery banks simultaneously with one simple ON/OFF switch while maintaining battery bank isolation, minimizing the risk of a dead Start battery.
2. The BOTH function offers the ability to combine the two battery banks in the event of a low Start battery.

IP **Dual Circuit** 6010



APPLICATIONS

1. Switches both positive and negative lines simultaneously with one simple ON/OFF switch meeting European and metal boat requirements for a double pole switch.
2. Switches circuits of different voltages, such as 12 Volt and 24 Volt, simultaneously with one simple ON/OFF switch.

PN	Description	Weight Lb (Kg)
6005	SINGLE CIRCUIT ON/OFF Battery Switch	0.62 (0.28)
6006	SINGLE CIRCUIT ON/OFF Battery Switch	0.63 (0.29)
6007	SELECTOR Battery Switch	0.77 (0.35)
6010	DUAL CIRCUIT Battery Switch	0.80 (0.36)
6011	DUAL CIRCUIT PLUS™ Battery Switch	0.80 (0.36)
7901	Spare Knob for PN 6006	0.10 (0.05)
7900	Spare Key for PN 6005	0.10 (0.05)
7902	Luminous ICON Circuit Identification Label Kit	0.02 (0.01)

7902 Luminous ICON
Circuit Identification Label Kit

BATTERY 1	HOUSE
BATTERY 2	BOW THRUSTER
BATTERY 3	WINDLASS
ENGINE	GENERATOR
ENGINE 1	PARALLEL
ENGINE 2	INVERTER
ENGINE PORT	WINCH
ENGINE STAR	CHASSIS
ENGINE MID	

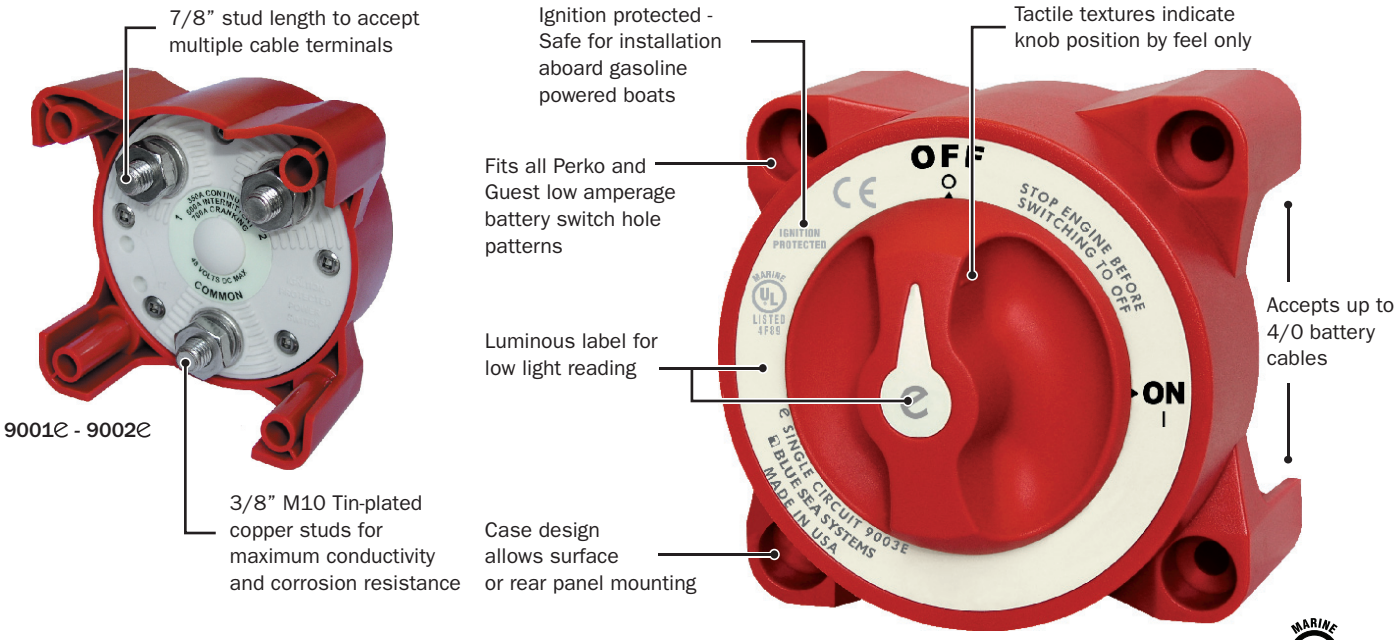
NEW PRODUCT

IP IGNITION PROTECTED

e-Series Battery Switches

Rated the top standard-duty switch by Powerboat Reports*

350 Amperes Continuous Rating for small inboard gasoline or diesel engines



- AFD (Alternator Field Disconnect) feature on 9002e and 9004e models
- Meets all American Boat and Yacht Council (ABYC) requirements for battery switches
- Make-before-break contact design on 9001e and 9002e models allows switching between battery banks without power interruption

LISTED POWER SWITCH

** "Blue Sea Systems' switch (9001e) is our choice for best value in a standard-duty battery selector switch. It's made in the U.S. with high grade materials, comes with a lifetime warranty, and is the least expensive switch in our test."* - Powerboat Reports , June 2005

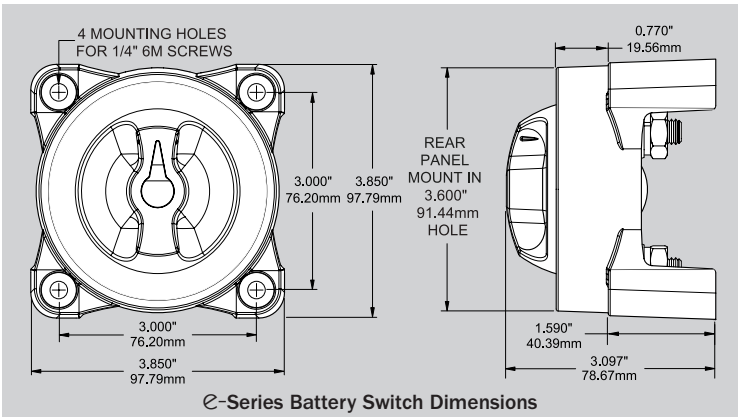
Specifications	**9001e-9004e**	**5510e-5511e**
Inrush Rating: .25 sec (10 repeats)*	1,750 Amperes DC	1,500 Amperes DC
Cranking Rating: 9.75 sec (10 repeats)*	900 Amperes DC	600 Amperes DC
Intermittent Rating: 5 min (UL 1107)	600 Amperes DC	450 Amperes DC
Continuous Rating: (UL 1107)	350 Amperes DC	300 Amperes DC
Terminal Stud, Tin-Plated Copper	3/8" (M10)	3/8" (M10)
Torque	140 in-lbs.	140 in-lbs.
Cable Size to Meet Ratings[1]	4/0 Cables	4/0 Cables
Voltage Rating	48 Volts DC Maximum	48 Volts DC Maximum
Cable Clearance For 4/0 Cables	1.10" (28.0mm)	1.10" (28.0mm)
Case Material	Reinforced Polycarbonate	Reinforced Polycarbonate
CE marked		

Agency Specifications

- UL Listed - UL 1107 electric power switches
- Meets UL 1500 and SAE J1171 external ignition protection requirements

* Blue Sea Systems Engine Starting Standard (see page 8)

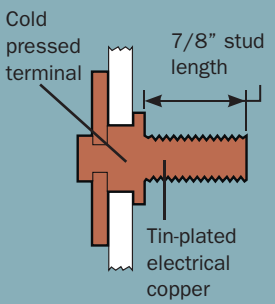
1 Reducing cable sizes will reduce current ratings



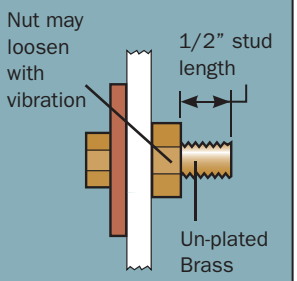
e-Series Battery Switch Dimensions

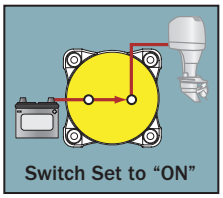
Superior Stud Design

Blue Sea Systems One Piece Stud



Common Two Piece Stud



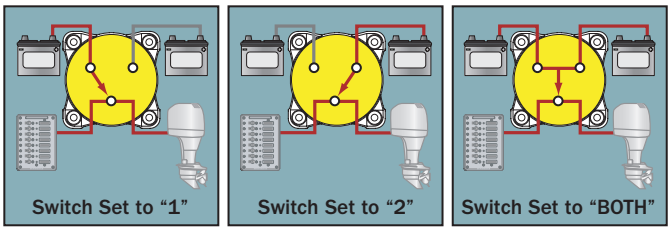


IP **Singe Circuit ON/OFF**
9003e-9004e

APPLICATIONS

1. Switches a single battery to a single load group.
2. Multiple switches can be used to manage several isolated circuits including cross connecting for emergency paralleling.

9004e only - includes AFD*

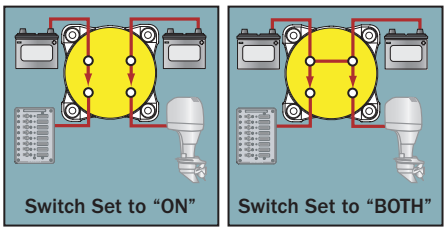


IP **Selector** 9001e-9002e

APPLICATION

9001e and 9002e switches battery bank 1 or battery bank 2 or both to a single load using one switch.
9002e only - includes AFD*

Available January, 2006

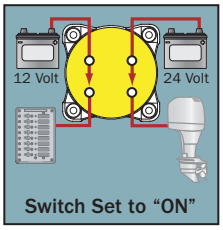


IP **Dual Circuit Plus™** 5511e

APPLICATIONS

1. Switches two battery banks simultaneously with one simple ON/OFF switch while maintaining battery bank isolation, minimizing the risk of a dead Start battery.
2. The BOTH function offers the ability to combine the two battery banks in the event of a low Start battery.

Available January, 2006



IP **Dual Circuit™** 5510e

APPLICATIONS

1. Switches both positive and negative lines simultaneously with one simple ON/OFF switch meeting European and metal boat requirements for a double pole switch.
2. Switches circuits of different voltages, such as 12 Volt and 24 Volt, simultaneously with one simple ON/OFF switch.

PN	Description	AFD*	Weight Lb (Kg)
9003e	SINGLE CIRCUIT ON/OFF Battery Switch	-	0.92 (0.42)
9004e	SINGLE CIRCUIT ON/OFF Battery Switch	Yes	0.96 (0.44)
9001e	SELECTOR Battery Switch	-	1.10 (0.50)
9002e	SELECTOR Battery Switch	Yes	1.15 (0.52)
5511e	DUAL CIRCUIT PLUS™ Battery Switch	-	1.27 (0.57)
5510e	DUAL CIRCUIT Battery Switch	-	1.27 (0.57)
7902	Luminous ICON Circuit Identification Label Kit	-	0.02 (0.01)

7902 Luminous ICON Circuit Identification Label Kit

BATTERY 1	HOUSE
BATTERY 2	BOW THRUSTER
BATTERY 3	WINDLASS
ENGINE	GENERATOR
ENGINE 1	PARALLEL
ENGINE 2	INVERTER
ENGINE PORT	WINCH
ENGINE STAR	CHASSIS
ENGINE MID	

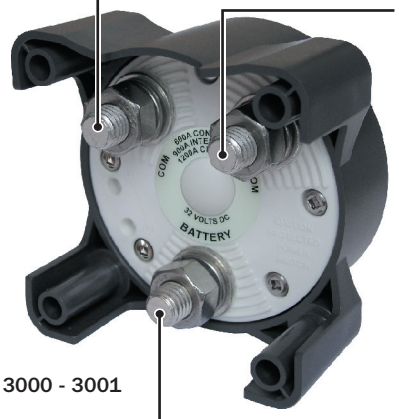
NEW PRODUCT

IP IGNITION PROTECTED

* Alternator Field Disconnect (AFD) protects the diodes in the alternator in the event of the switch being switched to the OFF position while the engine is running.

HD-Series Battery Switches (Heavy Duty)

Up to 600 Amperes Continuous Rating for large diesel engines, high power output, and low heat generation

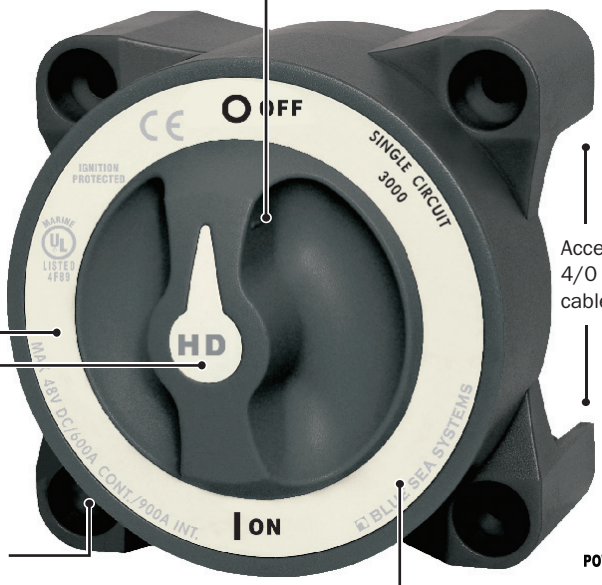


3000 - 3001

Two studs for load connections permit up to eight load cables to be connected (PN 3000 and PN 3001)

M12 (1/2") Tin-plated copper studs for maximum conductivity and corrosion resistance

7/8" stud length to accept multiple cable terminals



Tactile textures indicate knob position by feel only

Accepts two 4/0 battery cables

Luminous label for low light reading

Case design allows surface or rear panel mounting

Ignition protected - Safe for installation aboard gasoline powered boats

MARINE UL LISTED POWER SWITCH

- AFD (Alternator Field Disconnect) switch on PN 3001 and PN 3003 models
- Meets all American Boat and Yacht Council (ABYC) requirements for battery switches

Specifications	3000-3001	3002-3003
Inrush Rating: .25 sec (10 repeats)*	2,000 Amperes DC	1,750 Amperes DC
Cranking Rating: 9.75 sec (10 repeats)*	1,200 Amperes DC	1,000 Amperes DC
Intermittent Rating: 5 min (UL 1107)	900 Amperes DC	700 Amperes DC
Continuous Rating: (UL 1107)	600 Amperes DC	500 Amperes DC
Terminal Stud, Tin-Plated Copper	1/2" (M12)	1/2" (M12)
Torque	220 in-lbs.	220 in-lbs.
Cable Size to Meet Ratings[1]	4/0 Cables	4/0 Cables
Cable Quantity to Meet Ratings[1]	Two Cables[2]	Two Cables[3]
Voltage Rating	48 Volts DC Maximum	48 Volts DC Maximum
Cable Clearance For 4/0 Cables	1.10" (28.0mm)	1.10" (28.0mm)
Case Material	Reinforced Polycarbonate	Reinforced Polycarbonate

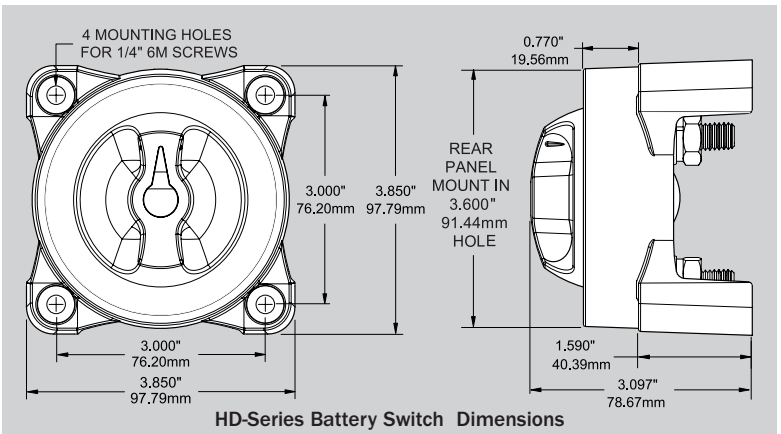
CE marked

Agency Specifications

- UL Listed - UL 1107 electric power switches
- Meets UL 1500 and SAE J1171 external ignition protection requirements

* Blue Sea Systems Engine Starting Standard (see page 8)

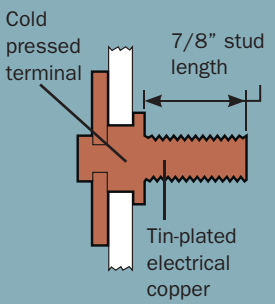
[1] Reducing cable sizes or quantities will reduce current ratings
[2] Two cables on battery terminal, one cable on each common terminal
[3] Per terminal



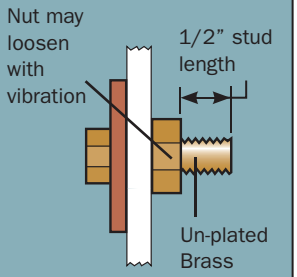
HD-Series Battery Switch Dimensions

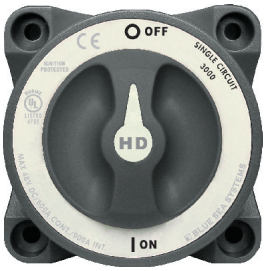
Superior Stud Design

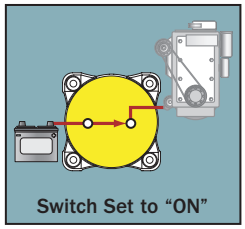
Blue Sea Systems One Piece Stud



Common Two Piece Stud





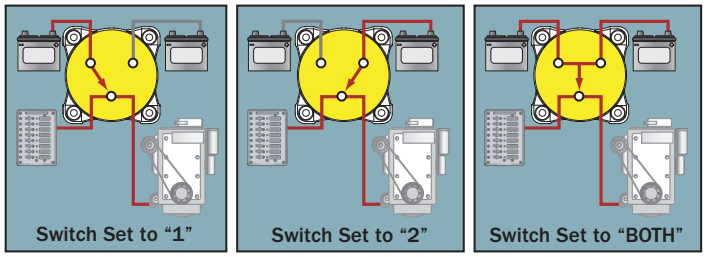


IP **Single Circuit ON/OFF**
3000-3001

APPLICATIONS

1. Switches a single battery to a single load group.
2. Multiple switches can be used to manage several isolated circuits including cross connecting for emergency paralleling.

3001 only - includes AFD*



IP **Selector** 3002-3003

APPLICATION

3002 and 3003 switches battery bank 1 or battery bank 2 or both to a single load using one switch.
3003 only - includes AFD*

PN	Description	AFD*	Weight Lb (Kg)
3000	SINGLE CIRCUIT ON/OFF Battery Switch	-	1.20 (0.54)
3001	SINGLE CIRCUIT ON/OFF Battery Switch	Yes	1.25 (0.56)
3002	SELECTOR Battery Switch	-	1.20 (0.54)
3003	SELECTOR Battery Switch	Yes	1.25 (0.56)
7902	Luminous ICON Circuit Identification Label Kit	-	0.02 (0.01)

NEW PRODUCT

IP IGNITION PROTECTED

7902 Luminous ICON Circuit Identification Label Kit

BATTERY 1	HOUSE
BATTERY 2	BOW THRUSTER
BATTERY 3	WINDLASS
ENGINE	GENERATOR
ENGINE 1	PARALLEL
ENGINE 2	INVERTER
ENGINE PORT	WINCH
ENGINE STAR	CHASSIS
ENGINE MID	

* Alternator Field Disconnect (AFD) protects the diodes in the alternator in the event of the switch being switched to the OFF position while the engine is running.


Squalicum Harbor - Blue Sea Systems’ home port

Updated Version Available January, 2006

Parallel Circuit Mini Battery Switch Panels UPDATED PRODUCT

Enables a failed House or Start battery bank to be isolated from the electrical system and both House and Start loads to be operated from the remaining battery bank.

- Isolates Start circuit from House circuit
- Simplifies battery switch operation
- Protects electronics from sags and spikes caused by engine cranking
- Discharges batteries independently
- Addition of an Automatic Charging Relay automates charging both batteries (see pages 24-26)
- Ignition protected - Safe for installation aboard gasoline powered boats

Specifications

Inrush Rating: .25 sec (10 repeats)*	1,500 Amperes DC
Cranking Rating: 9.75 sec (10 repeats)*	700 Amperes DC
Intermittent Rating: 5 min (UL 1107)	500 Amperes DC
Continuous Rating: (UL 1107)	300 Amperes DC
Voltage	48 Volts DC Maximum

* Blue Sea Systems Engine Starting Standard (see page 8)

CE marked

Agency Specifications

- All components meet SAE J1171 external ignition protection requirements

IP 8280

IP 8370

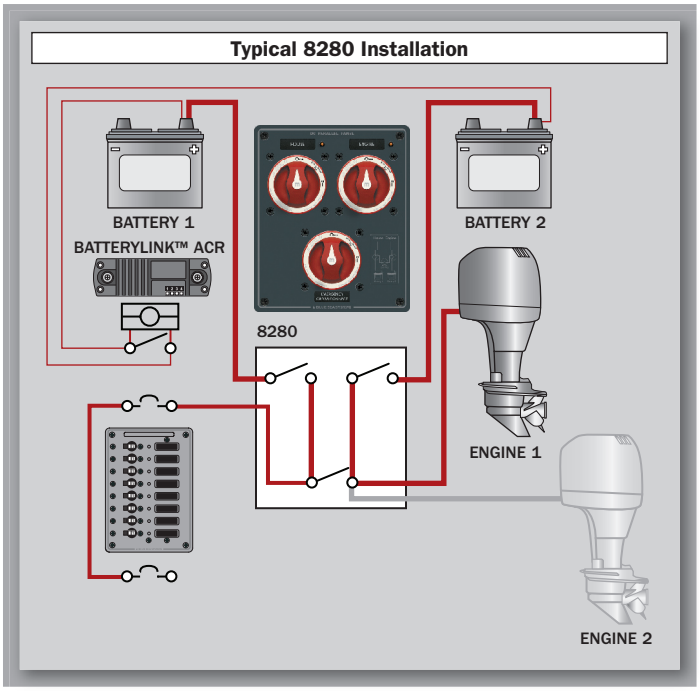
Combine with Blue Sea Systems CL-Series BatteryLink™ ACR (see page 24, 26) for a complete DC management solution.

Panel PN	Installed Battery Switch PN	Battery Switch Pages	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)
8280	M-Series SINGLE CIRCUIT ON/OFF 3 of 6006	13-14	6.25 (158.75)	7.50 (190.50)	2.98 (1.35)
8370	M-Series SINGLE CIRCUIT ON/OFF 3 of 6006	13-14	9.50 (95.25)	3.75 (95.25)	2.30 (1.04)

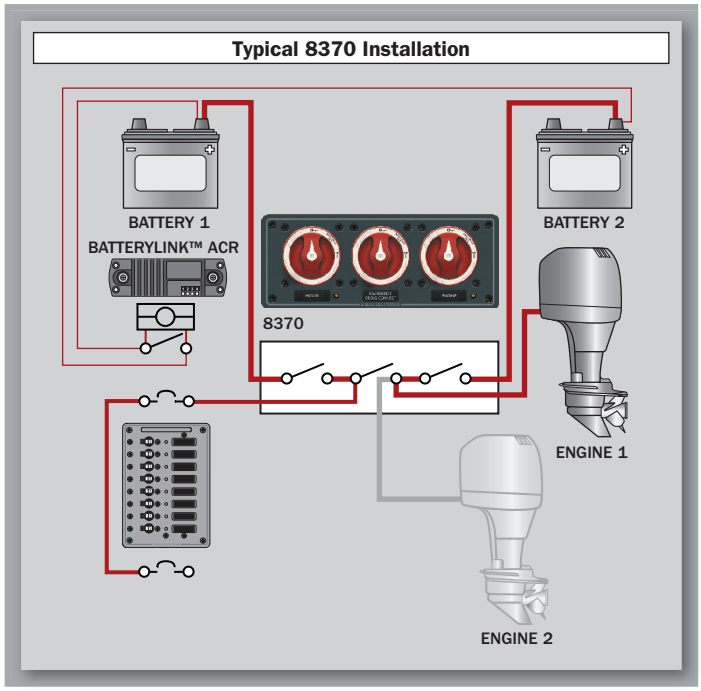
UPDATED PRODUCT

IP IGNITION PROTECTED

Typical 8280 Installation



Typical 8370 Installation



Updated Version Available January, 2006

Parallel Circuit Mini Battery Switch Plus Main Panel UPDATED PRODUCT

IP 8080

Isolates batteries and provides DC main circuit protection.

- Ignition protected - Safe for installation aboard gasoline powered boats
- Isolates the Start circuit from the House circuit
- Simplifies battery switch operation
- Protects electronics from sags and spikes caused by engine cranking
- Discharges batteries independently
- Addition of an Automatic Charging Relay automates charging of both batteries (see pages 24-26)
- Enables a failed Start battery to be isolated from the electrical system and both House and Start loads to be operated from the remaining battery bank
- Provides main circuit protection for DC House power system

Specifications

Inrush Rating: .25 sec (10 repeats)*	1,500 Amperes DC
Cranking Rating: 9.75 sec (10 repeats)*	700 Amperes DC
Intermittent Rating: 5 min (UL 1107)	500 Amperes DC
Continuous Rating: (UL 1107)	300 Amperes DC
Voltage	48 Volts DC Maximum
House Circuit Protection	100 Amperes DC

* Blue Sea Systems Engine Starting Standard (see page 8)

Agency Specifications

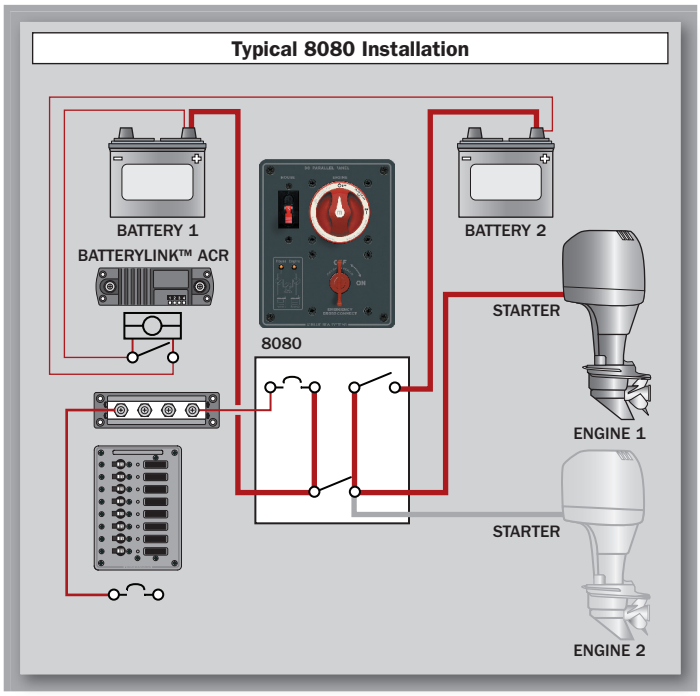
- All components meet SAE J1171 external ignition protection requirements

Combine with Blue Sea Systems CL-Series BatteryLink™ ACR (see page 24, 26) for a complete DC management solution.

Panel PN	Installed Battery Switch PN	Battery Switch Pages	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)
8080	M-Series SINGLE CIRCUIT ON/OFF 6006, 6005	13-14	5.25 (133.40)	6.50 (165.10)	2.20 (1.00)

UPDATED PRODUCT

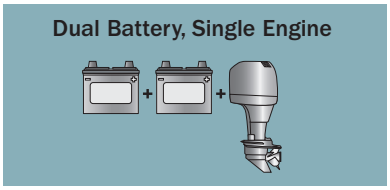
IP IGNITION PROTECTED

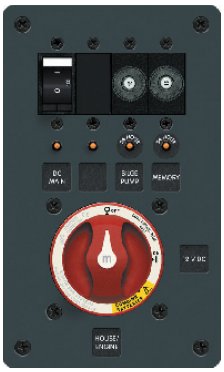


Available January, 2006

Dual Battery Main Distribution Panels NEW PRODUCT

- Available in four configurations
- Each panel can be mounted in four different orientations
- Isolates the Start circuit from the House circuit
- Simplifies battery switch operation
- Protects electronics from sags and spikes caused by engine cranking
- Discharges batteries independently
- Addition of an Automatic Charging Relay automates charging both batteries (see pages 24-26)
- Designed for single engine configurations
- Allows emergency cross connect between separate engine battery banks
- Provides main DC circuit protection in addition to high ampere loads
- Provides 24 hour circuit protection
- Includes 4218 - Set of 30 common DC labels (see page 89)




8686

8691

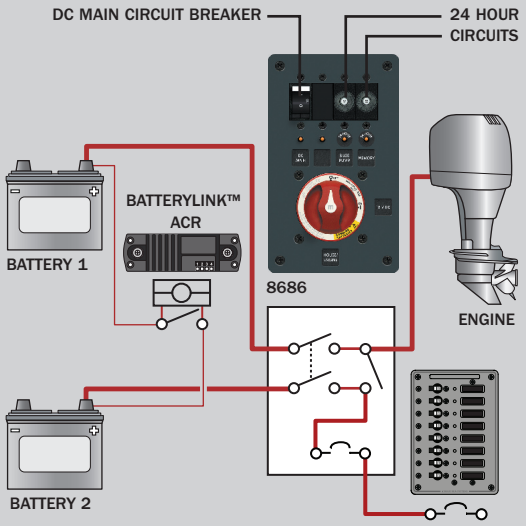
Specifications	8686	8687	8690	8691
Inrush Rating: .25 sec (10 repeats)*	1,200 Amperes DC	1,500 Amperes DC	1,500 Amperes DC	1,750 Amperes DC
Cranking Rating: 9.75 sec (10 repeats)*	500 Amperes DC	700 Amperes DC	600 Amperes DC	900 Amperes DC
Intermittent Rating: 5 min (UL 1107)	300 Amperes DC	500 Amperes DC	450 Amperes DC	600 Amperes DC
Continuous Rating: (UL 1107)	200 Amperes DC	300 Amperes DC	300 Amperes DC	350 Amperes DC
Voltage	12-24 Volts DC	12-24 Volts DC	12-24 Volts DC	12-24 Volts DC
House Circuit Protection	100 Amperes DC	100 Amperes DC	100 Amperes DC	100 Amperes DC

* Blue Sea Systems Engine Starting Standard (see page 8)

Panel PN	Installed Battery Switch PN	Switch Pages	Width in" (mm)	Height in" (mm)	Installed Large Case Rocker Circuit Breaker	Installed Push Button Circuit Breakers
					100A	15A
8686	M-Series, DUAL CIRCUIT PLUS™ 6011	12-13	4.50 (114.30)	7.50 (190.50)	1	2
8687	M-Series, SELECTOR 6007	12-13	4.50 (114.30)	7.50 (190.50)	1	2
8690	C-Series, DUAL CIRCUIT PLUS™ 5511C	14-15	5.25 (139.70)	9.00 (228.60)	1	2
8691	C-Series, SELECTOR 9001C	14-15	5.25 (139.70)	9.00 (228.60)	1	2

NEW PRODUCT

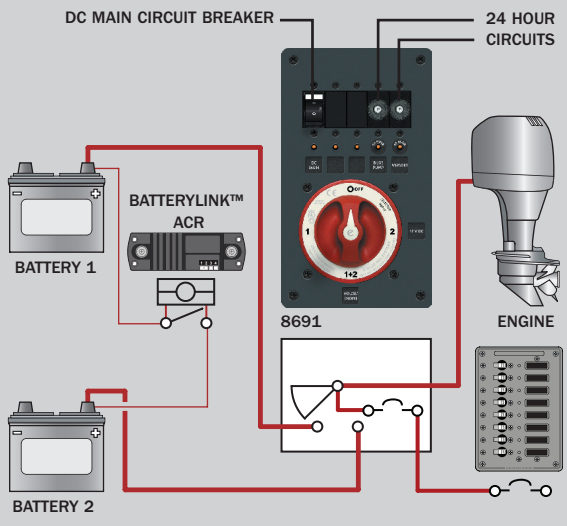
DUAL CIRCUIT PLUS Battery Switch Panels
Typical 8686/8690 Installation



Advantages

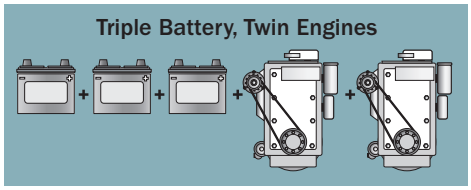
1) Simple ON/OFF switching in NORMAL operation (with ACR or isolator installed)
2) Isolates Start and House circuits reducing chance of fully discharging both batteries
3) Isolates Start and House circuits protecting electronics from engine starting sags and spikes

SELECTOR Battery Switch Panels
Typical 8687/8691 Installation



Advantage

1) Familiar SELECTOR Battery Switch



Available January, 2006

Triple Battery Main Distribution Panels NEW PRODUCT

- Available in two configurations
- Each panel can be mounted in four different orientations
- Isolates the Start circuit from the House circuit
- Simplifies battery switch operation
- Protects electronics from sags and spikes caused by engine cranking
- Discharges batteries independently
- Addition of an Automatic Charging Relay automates charging both batteries (see page 24-26)
- Designed for twin engine configurations
- Allows emergency cross connect between separate engine battery banks
- Provides main DC circuit protection in addition to high ampere loads
- Provides 24 hour circuit protection
- Includes 4218 - Set of 30 common DC labels (see page 89)

Specifications	**8689**	**8693**
Inrush Rating: .25 sec (10 repeats)*	1,200 Amperes DC	1,500 Amperes DC
Cranking Rating: 9.75 sec (10 repeats)*	500 Amperes DC	600 Amperes DC
Intermittent Rating: 5 min (UL 1107)	300 Amperes DC	450 Amperes DC
Continuous Rating: (UL 1107)	200 Amperes DC	300 Amperes DC
Voltage	12-24 Volts DC	12-24 Volts DC
House Circuit Protection	100 Amperes DC	100 Amperes DC

* Blue Sea Systems Engine Starting Standard (see page 8)

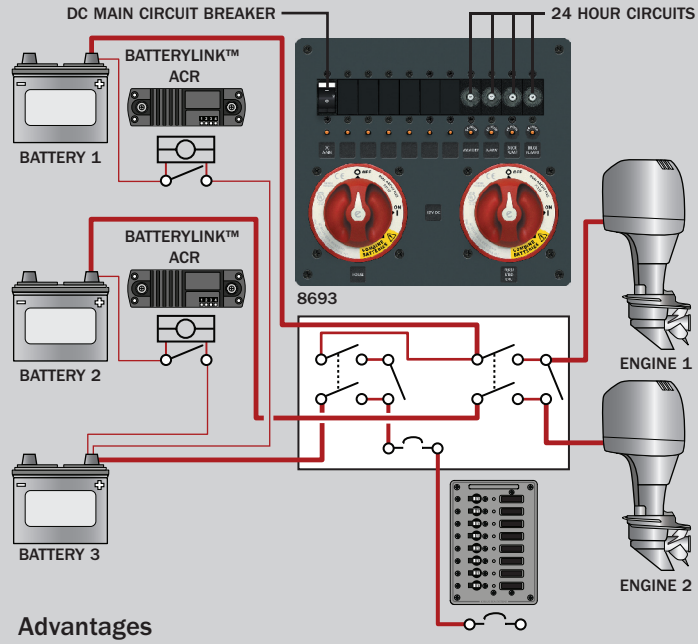
8689

8693

Panel PN	Installed Battery Switch PN's	Switch Pages	Width in" (mm)	Height in" (mm)	Installed Large Case Rocker Circuit Breaker	Installed Push Button Circuit Breakers
					100A	15A
8689	M-Series, DUAL CIRCUIT PLUS™ 2 of 6011	12-13	7.25 (184.15)	8.00 (203.20)	1	3
8693	ℰ-Series DUAL CIRCUIT PLUS™ 2 of 5511ℰ	12-13	10.00 (254.00)	9.00 (228.60)	1	4

NEW PRODUCT

DUAL CIRCUIT PLUS™ Battery Switch Panels
Typical 8689/8693 Installation



Advantages

1) Simple ON/OFF switching in NORMAL operation (with ACR or isolator installed)
2) Isolates Start and House circuits reducing chance of fully discharging both batteries
3) Isolates Start and House circuits protecting electronics from engine starting sags and spikes

Available January, 2006

L-Series Solenoid Switches NEW PRODUCT

250 Ampere Class, 12 or 24 Volt

- Hermetically sealed contacts
- Vaporproof
- Ignition protected - Safe for installation aboard gasoline powered boats
- Meets SAE J1171 - External ignition protection requirements
- Functions as a remote battery switch
- Activated by an ON-OFF switch mounted anywhere
- Used as a manual battery paralleling switch
- Noise free circuitry will not interfere with other devices

IP 5301-5302

Specifications

Coil Circuit

Input Voltage	12 Volts/9.6-13.2 Volts DC Maximum 24 Volts/19.2-26.9 Volts DC Maximum
Power Consumption	
– inrush max, 130ms	12-36 Volts/2.0 Amperes
– holding	12 Volts/1.0 Ampere 24 Volts/0.59 Ampere

Main Power Contacts

Inrush Rating: 0.25 sec. (10 repeats)*	2,000 Amperes DC
Voltage Rating	60 Volts DC
Stud Terminal Size	5/16" (M8)
Contact Form	SPST-NO
Mechanical Life	100,000 Cycles

CE marked

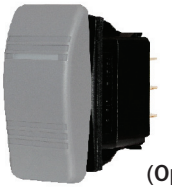
Wire Size	Cranking Rating 9.75 sec. (10 repeats)*	Intermittent Rating 5 min. (UL 1107)	Continuous Rating (UL 1107)
1/0	450A	375A	250A
2/0	500A	450A	300A
2x2/0	800A	600A	450A

*Blue Sea Systems Engine Starting Standard (see page 8)

PN	Description	Weight Lb (Kg)
5301	250 Ampere Class, 12 Volt Solenoid	1.30 (0.60)
5302	250 Ampere Class, 24 Volt Solenoid	1.30 (0.60)

NEW PRODUCT

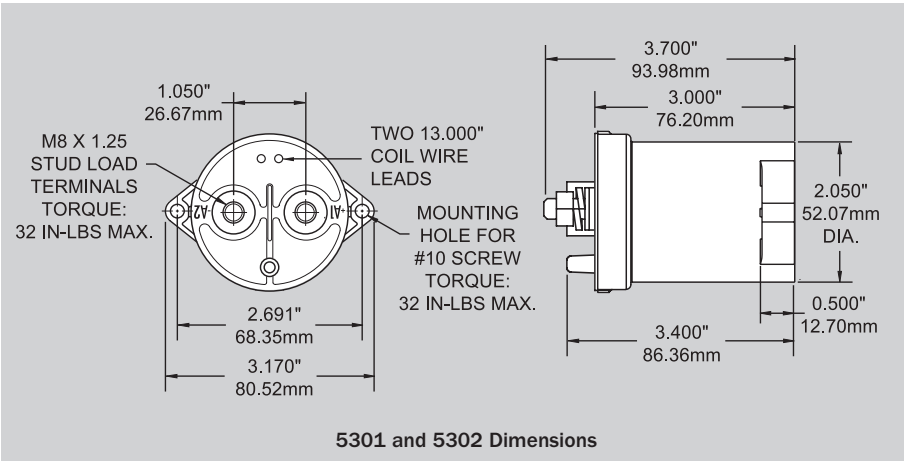
IP IGNITION PROTECTED



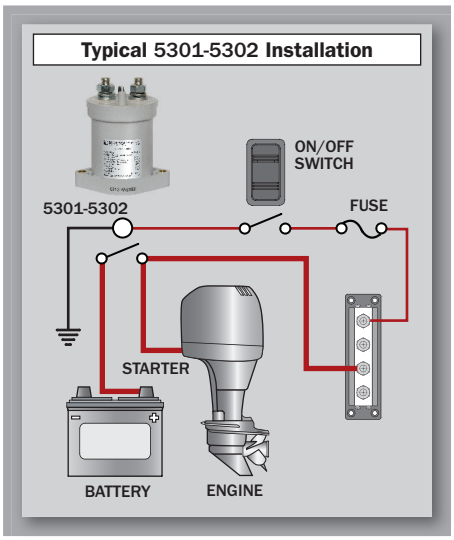
(Optional)

8230 · Provides ON/OFF switching

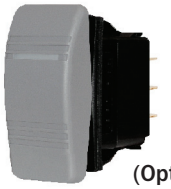
▶ See page 55 for full selection of Contura Rocker Switches and accessories.



5301 and 5302 Dimensions



IP 9012



(Optional)

8230 · Provides ON/OFF switching

▶ **See page 55 for full selection of Contura Rocker Switches and accessories.**

L-Series Solenoid Switch with Coil Economizer

250 Ampere Class, 12/24 Volt

- Hermetically sealed contacts
- Vaporproof
- Ignition protected - Safe for installation aboard gasoline powered boats
- Pulse circuit requires low current draw when contact is closed
- UL Recognized - UL 508 industrial control equipment
- Meets SAE J1171 - External ignition protection requirements
- Functions as a remote battery switch
- Activated by an ON-OFF switch mounted anywhere
- Used as a manual battery paralleling switch
- Integrated coil control minimizes heating and amperage draw

Specifications

Coil Circuit

Input Voltage	9-36 Volts DC Maximum
Power Consumption	
– inrush max, 130ms	12-36 Volts/3.80 Amperes
– holding	12 Volts/0.13 Amperes 24 Volts/0.07 Amperes

Main Power Contacts

Inrush Rating: 0.25 sec. (10 repeats)*	2,000 Amperes DC
Voltage Rating	60 Volts DC
Stud Terminal Size	5/16" (M8)
Contact Form	SPST-NO
Mechanical Life	1,000,000 Cycles

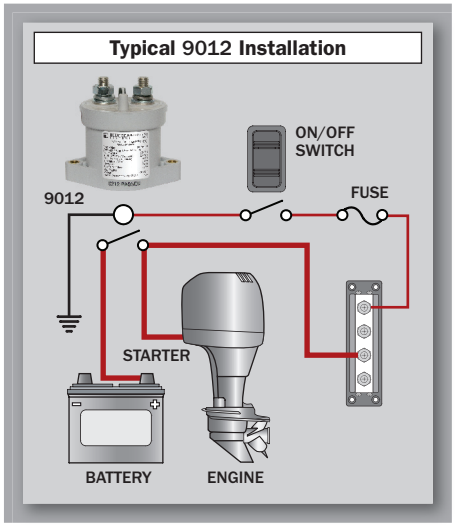
CE marked

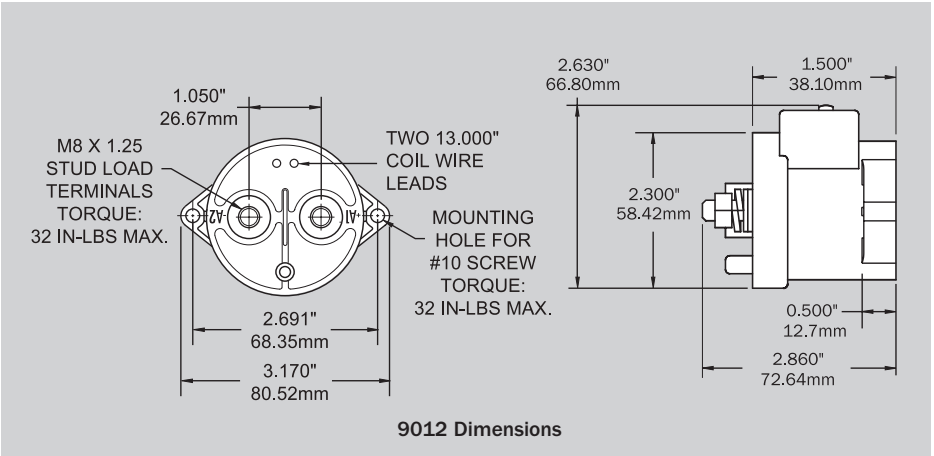
Wire Size	Cranking Rating 9.75 sec. (10 repeats)*	Intermittent Rating 5 min. (UL 1107)	Continuous Rating (UL 1107)
1/0	450A	375A	250A
2/0	500A	450A	300A
2x2/0	800A	600A	450A

* Blue Sea Systems Engine Starting Standard (see page 8)

PN	Description	Weight Lb (Kg)
9012	250 Ampere Class, 12/24 Volt Solenoid with Coil Economizer	0.95 (0.43)

IP IGNITION PROTECTED



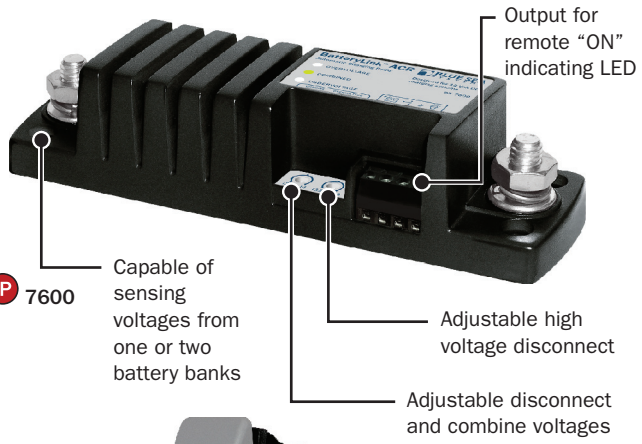


9012 Dimensions

CL-Series BatteryLink™ ACR (Current Limiting)

with Over Current Protection

- Automatically combines battery banks during the charging cycle and isolates under discharge
- Activates from any charging source - alternators, battery chargers, or solar panels
- Senses charge voltages on up to two battery banks
- Sealed contact assembly
- Meets SAE J1171 - External ignition protection requirements
- Noise free circuitry will not interfere with other devices
- Limits current flow allowing smaller wire size
- Low current draw when closed: <0.2A



Specifications

Coil Circuit

Input Voltage	9-16 Volts Maximum

Main Power Contacts

Voltage Rating	16 Volts DC for 12 Volts DC Nominal Systems
Contact Form	SPST-NO
Stud Terminal Size	3/8" (M10)
Mechanical Life	1,000,000 Cycles

Automatic Operation

Automatically combines when the higher battery has remained at the required voltage for at least 30 seconds. The CL-Series BatteryLink™ ACR disconnects when the voltage drops below the charging voltage to prevent accidental discharge of an unintended bank.

Manual Operation

When connected to an optional ON-OFF-ON switch the CL-Series BatteryLink™ ACR can be turned off, set to automatic, or manually combined.

PN	Description	Weight Lb (Kg)
7600	CL-Series BatteryLink™ ACR with over current protection	0.63 (0.29)
8232	Contura Rocker Switch	0.24 (0.11)
8270	Switch Panel	0.27 (0.12)

The BatteryLink™ ACR may also be used as a DC Low Voltage Disconnect (DC Load Manager) and as a means for charging a battery installed at a distance from a main battery bank (Battery Link). For these uses, please see the Application Brief section of our website at www.bluesea.com.

IP IGNITION PROTECTED

(Optional)

8232

- Provides manual operation explained at left

See page 55 for full selection of Contura Rocker Switches and accessories.

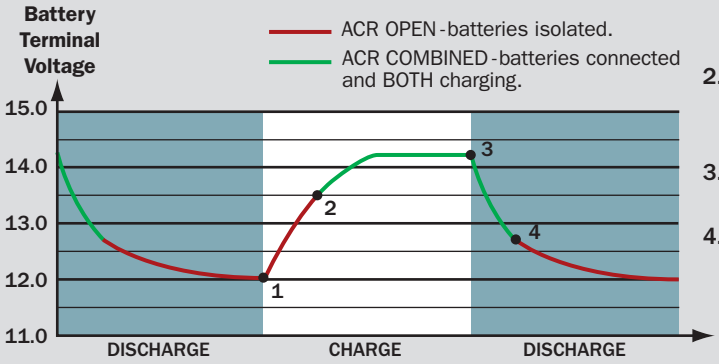
NEW PRODUCT

(Optional)

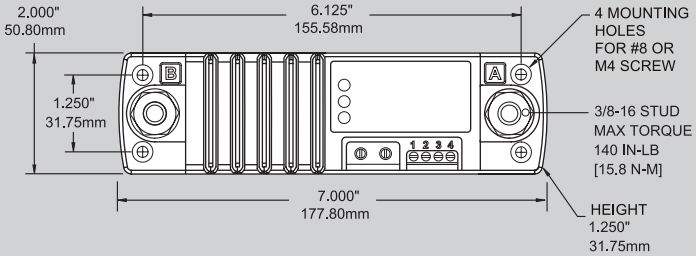
8270

- Provides manual operation explained at left

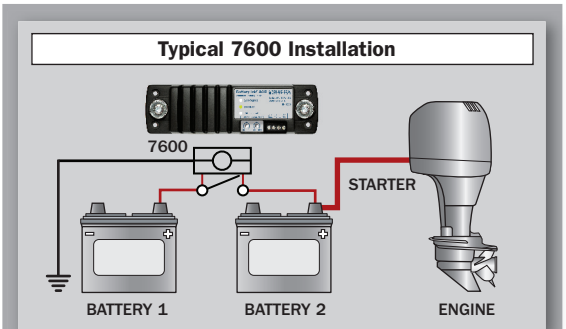
Automatic Charge Relay Operation



1. ACR relay is open and batteries are isolated. Voltage begins to rise slowly after engine starts or battery charger is turned on.
2. When voltage rises to "COMBINE" voltage set on ACR (13.5 volts in this example), ACR relay closes, connecting and charging both batteries.
3. When engine stops or battery charger is turned off, voltage rapidly begins falling.
4. When voltage falls to 6% less than "COMBINE" voltage (13.5 volts 6% = 12.7 volts in this example), ACR relay opens isolating batteries after 1 minute.



7600 Dimensions



IP 9112

(Optional)

8232

· Provides manual operation explained at left

▶ **See page 55 for full selection of Contura Rocker Switches and accessories.**

NEW PRODUCT

(Optional)

8270

· Provides manual operation explained at right

L-Series ACR with Coil Economizer

250 Ampere Class, 12/24 Volt

- Hermetically sealed contacts
- Vaporproof
- Ignition protected - Safe for installation aboard gasoline powered boats
- Single or double sensing
- Pulse circuit requires very low current draw when contact is closed
- UL Recognized - UL 508 industrial control equipment
- Meets SAE J1171 - External ignition protection requirements
- Automatically connects battery banks during the charging cycle and disconnects under discharge
- Override for emergency engine paralleling to start an engine
- Activates whether the charging source is an alternator or battery charger
- Output for "ON" indicating LED
- Integrated coil control minimizes heating and amperage draw

Specifications

Coil Circuit

Input Voltage	9-36 Volts Maximum
Power Consumption	
– inrush max, 130ms	12-36 Volts/3.80 Amperes
– holding	12 Volts/0.13 Amperes, 24 Volts DC/0.07 Amperes

Main Power Contacts

Inrush Rating: 0.25 sec. (10 repeats)*	2,000 Amperes DC
Voltage Rating	60 Volts DC
Stud Terminal Size	5/16" (M8)
Contact Form	SPST-NO
Mechanical Life	1,000,000 Cycles

Automatic Operation

Automatic closure occurs when the higher battery has remained at the required voltage for at least 30 seconds. The ACR opens when the voltage drops below the charging voltage to prevent accidental discharge of an unintended bank.

	Relay Contact Position		
	Combine	Open Low	Open High
12 Volt System	13.6V	12.6V	15.0V
24 Volt System	27.2V	25.2V	30.0V

Manual Operation

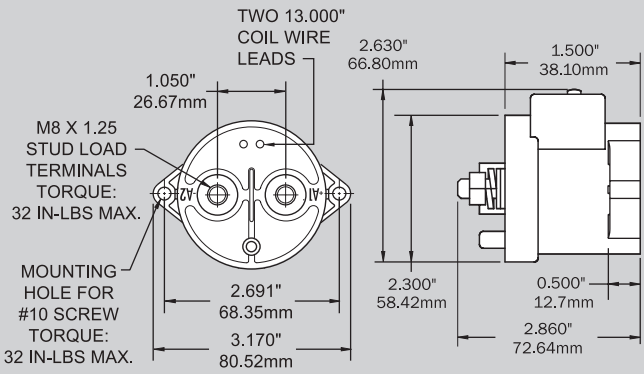
When connected to an ON-OFF-ON switch the ACR can be turned off, set to Automatic, or manually closed.

Wire Size	Cranking Rating 9.75 sec. (10 repeats)*	Intermittent Rating 5 min. (UL 1107)	Continuous Rating (UL 1107)
1/0	450A	375A	250A
2/0	500A	450A	300A
2x2/0	800A	600A	450A

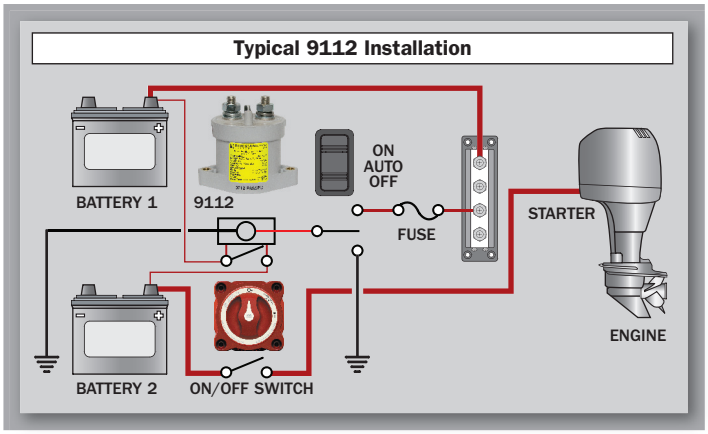
*Blue Sea Systems Engine Starting Standard (see page 8)

PN	Description	Weight Lb (Kg)
9112	250 Ampere Class, 12/24 Volt ACR with Coil Economizer	0.95 (0.43)
8232	Water Resistant Contura Rocker Switch	0.24 (0.11)
8270	Switch Panel	0.27 (0.12)

IP IGNITION PROTECTED



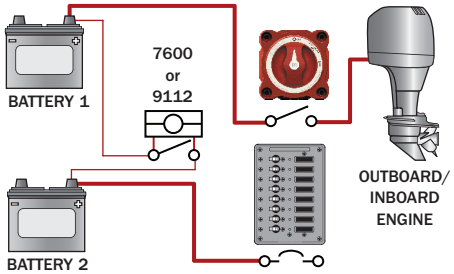
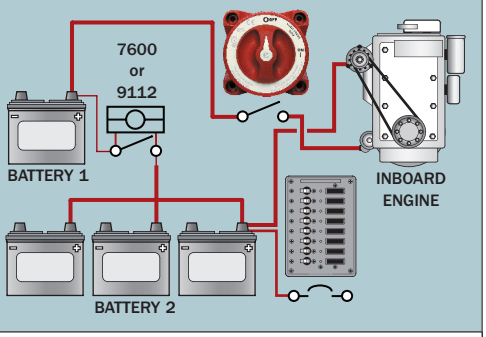
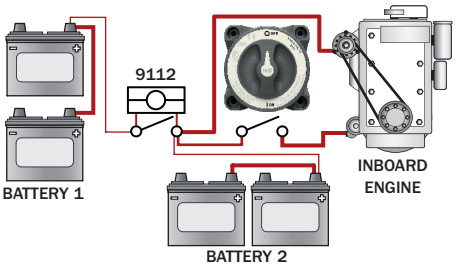
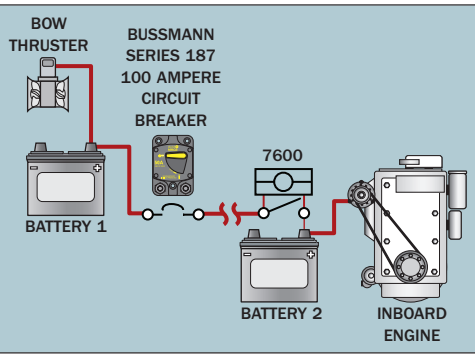
9112 Dimensions



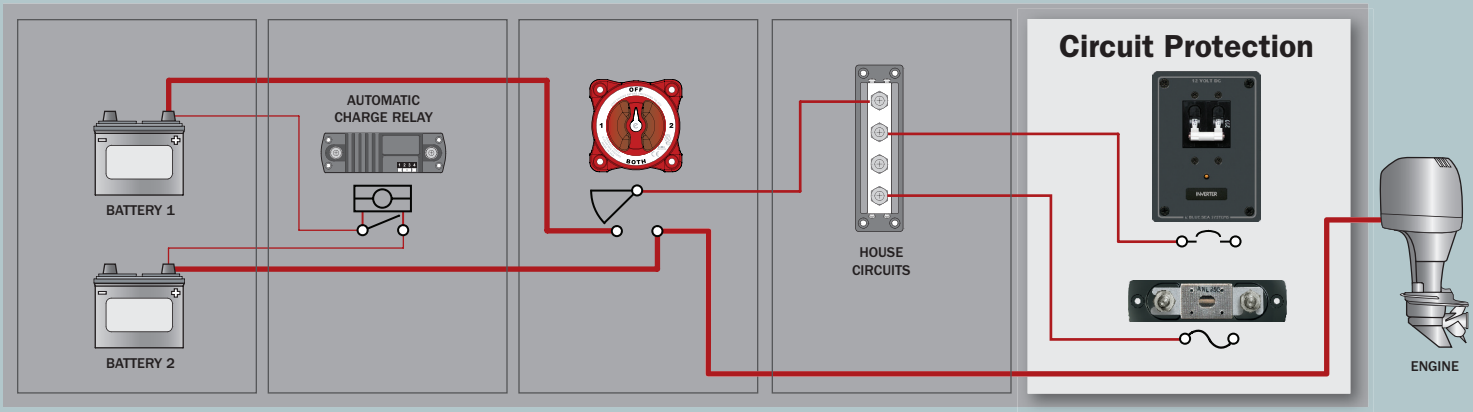
7600 BATTERYLINK™ ACR and 9112 ACR Comparison

Features	7600	9112
Auto Current Management	Yes	No
High Amperage Contacts	No	Yes
High Voltage Adjustability	Yes	No
Adjustable Combining	Yes	No
Manual Override	Yes	Yes
System Voltage	12 Volts	12/24 Volts

Ratings	7600	9112
Continuous	60 Amperes	250 Amperes
7 Minute	90 Amperes	275 Amperes
2 Minute	120 Amperes	600 Amperes

Applications	7600	9112	Schematic Diagrams
Fishing or Sport Boats • Outboard / small Inboard • Charge priority is to the Start battery			
Sailing Auxiliary or Power Boats with a Large House Battery • Small inboard • Charge priority is to the House battery			
Large Power Cruisers • Large Inboard engine • Large alternator • Charges either House or Start batteries	Does Not Apply		
Remote Battery Charging For: • Anchor Windlasses • Bow Thrusters • Nav Station	 Current limiting feature allows sizing wire for charging current	Does Not Apply	

DC Main Circuit Protection - the fuses and circuit breakers that are closest to the batteries



Purpose

Fuses and circuit breakers are used to protect wire insulation from melting and starting fires in the event of over currents or to protect from short circuits which cause more amperage to flow in a wire than that wire is rated to handle. It is important to note that, except for those wires that are intended to carry starting currents, every positive wire in the DC Main Power Distribution System must be protected by a fuse or circuit breaker.

Considerations

1) Ignition Protection

ABYC E-11.5.1.3 and US Coast Guard regulations require that electrical sources of ignition located in spaces containing gasoline powered machinery, gasoline fuel tanks, locations where fumes from gasoline or LP gas fumes can accumulate, comply with standards for ignition protection. To be ignition protected, these devices must have any spark producing mechanisms sealed and low enough surface temperatures that they will not ignite gas fumes. Even diesel powered vessels have suffered major fires and explosions as a result of fumes from dinghy fuel or stored painting supplies. Switches, circuit breakers, and fuses are all considered to be potential sources of ignition. Many of the circuit protection devices offered by Blue Sea Systems comply with ignition protection standards and are identified on the Circuit Protection Device Comparison Table on page 29 with an IP icon.

2) Mounting Placement

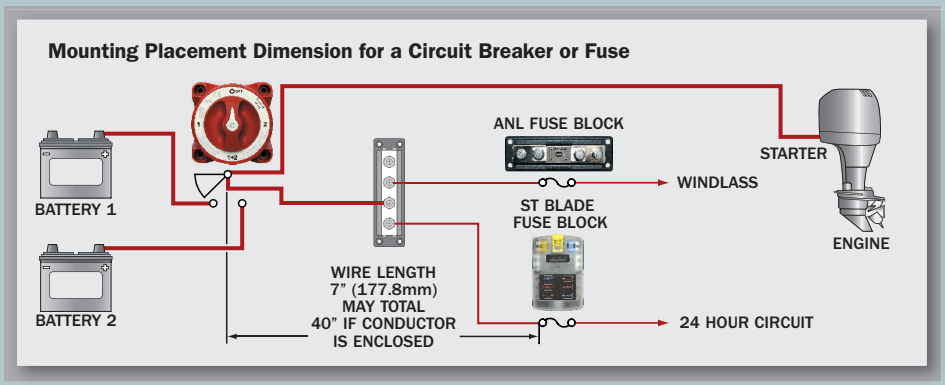
a) Distance from power source

The DC Main circuit protection system uses circuit breakers or fuses to protect the wires of the DC main distribution system. The American Boat and Yacht Council (ABYC) publishes voluntary standards for the type and placement of the fuse or circuit breaker to be used as a DC main circuit protection device.

The diagram below shows the required placement of main circuit protection devices. Note that wire intended to carry engine starting currents between the batteries, the switch and the starter, is not required to have main circuit protection devices installed.

Mounting placement dimensions for a fuse or circuit breaker:

- 7” if the conductor is not housed in a sheath or enclosure in addition to the wire insulation
- 40” if the conductor is housed in a sheath or enclosure in addition to the wire insulation
- 72” if the conductor is connected directly to the battery and housed in a sheath or enclosure in addition to the wire insulation



b) Above or below deck?

Most circuit protection devices are designed to be used in a protected environment; below deck in a boat with an enclosed cabin, or inside a console or locker in an open boat. There are a number of electrical panels designed for exterior mounting and designated waterproof or water resistant. In some cases, the selection of a circuit protection panel will be made on the basis of the environment where it will be mounted.

c) Wire Installation

Most circuit protection devices suitable for marine use are designed to have wires connected using ring terminals, but a few are designed to accept push-on connectors. Because large wire sizes may be chosen to minimize voltage drop in low voltage DC systems, the wire choice may make one circuit protection device more suitable than another. If large conductors are used, you may want to choose protective devices that can accommodate and support larger wire. In some cases the wire may be so large that it is necessary to place a power post or wire connection point near the circuit protection device and transition from the large wire to a smaller wire to connect to the protection device.

Questions to answer when selecting the type and size of fuse or circuit breaker:

1) Do I need a fuse or circuit breaker?

Fuse advantages:

- Generally lower cost
- Available in higher amperage ratings
- Available in higher interrupt ratings
- Available in greater size ranges

Circuit Breaker advantages:

- Re-settable after opening
- Can be used as a switch
- Available in vaporproof or waterproof models
- A wide range of opening speed characteristics are available

If the application requires the circuit protection device to be in an explosive area, as in a, b, or c below, then an ignition protected circuit breaker or fuse is required:

a) Gasoline engine room or other area susceptible to gasoline fumes
b) Battery compartments
c) Propane lockers

2) What Interrupt Rating or Ampere Interrupt Capacity (AIC) is required?

See the ABYC Interrupt Rating Table on the following page.
Limit the selection to a fuse or circuit breaker type that meets the AIC of each.

3) What type of circuit protection device meets the AIC rating requirements from step 2?

See the Circuit Protection Device Comparison Table on the following page.

4) Does the circuit protection device need to be ignition protected?

See the IP icon on the Circuit Protection Comparison Table on following page.

5) What should the appropriate Amperage rating be for the circuit protection device?

a) The rating must be lower than the ampacity of the smallest wire in the circuit.
See the ABYC Ampacity Rating Table below.
b) The rating must be higher than the maximum continuous current that will flow in the circuit.

* Special considerations should be made for electrical systems that exceed 32 Volts
** There are other issues that may be considered by reading ABYC E-11.12 circuit protection

ABYC Ampacity* Rating Table

Allowable amperage of conductors under 50 Volts with 105°C insulation						
AWG Wire Size	Metric (Sq mm)	AWG CM Area	SAE CM Area	Ohms /1000ft	Ampacity Engine Space	
					Outside	Inside
18	0.8	1,600	1,537	6.385	20	17
16	1	2,600	2,336	4.016	25	21
14	2	4,100	3,702	2.525	35	29
12	3	6,500	5,833	1.588	45	38
10	5	10,500	9,343	0.9989	60	51
8	8	16,800	14,810	0.6282	80	68
6	13	26,600	24,538	0.3951	120	102
4	19	42,000	37,360	0.2485	160	136
2	32	66,500	62,450	0.1563	210	178
1	40	83,690	77,790	0.1239	245	208
0	50	105,600	98,980	0.09827	285	242
2/0	62	133,100	125,100	0.07793	330	280
3/0	81	167,800	158,600	0.06180	385	327
4/0	103	211,600	205,500	0.04901	445	378

* Thermally limited amperage capacity

Selecting DC Main Circuit Protection

DC Main Circuit Protection Devices are characterized by one principal attribute, their Ampere Interrupt Capacity (AIC) rating. Specifications listed in the ABYC standards determine the AIC a Main Circuit Protection Device must have. The total Cold Cranking Amperes (CCA) of the batteries installed that can be connected to the circuit to be protected determine the required AIC rating. See the tables on the following page, for the required AIC ratings.

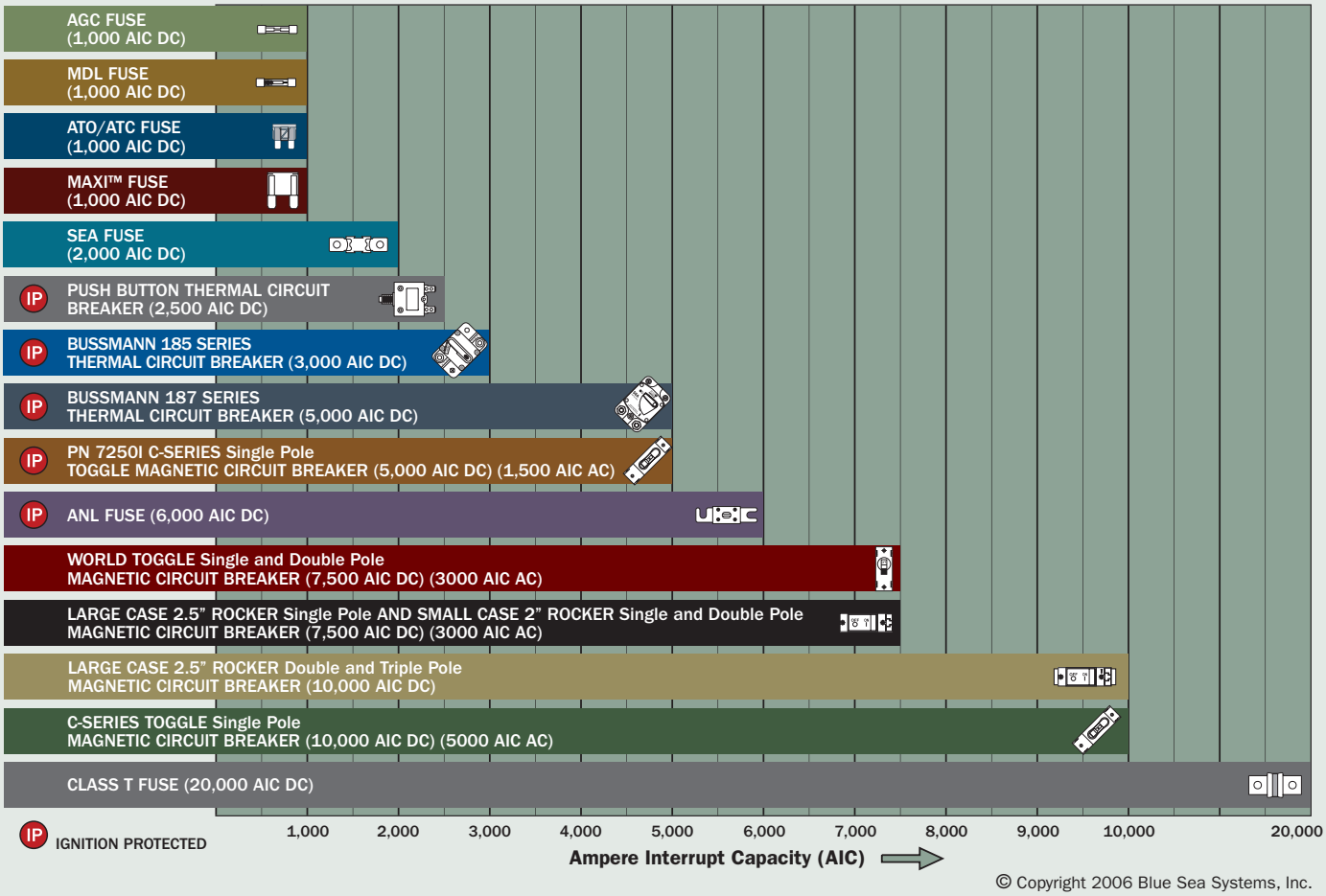
ABYC Interrupt Rating Table

Total Connected Battery Cold Cranking Amperes (CCA) *		Ampere Interrupt Capacity	
12 VOLTS AND 24 VOLTS			
The white boxes identify two batteries, of the same size, placed in parallel configuration.		**DC MAIN**	**DC BRANCH**
G24 OR G27	650 CCA or Less	1,500 AIC	750 AIC
G24 + G24 OR G27 + G27 OR 4D	651-1,100 CCA	3,000 AIC	1,500 AIC
GOLF CART OR 8D OR 4D + 4D	Over 1,100 CCA	5,000 AIC	2,500 AIC
32 VOLTS			
	1,250 CCA or Less	3,000 AIC	1,500 AIC
	Over 1,250 CCA	5,000 AIC	2,500 AIC

* Battery cold cranking performance rating at 17.8°C (0°F) - The discharge load in amperes that a battery at 17.8°C (0°F) can deliver for 30 seconds, and maintain a voltage of 1.2 Volts per cell or higher. eg. 7.2 Volts for a 12 Volt battery.
The CCA for the batteries represented is an approximation and could be slightly higher or lower. Consult the battery manufacturers specifications for precise CCA ratings.

ABYC standard E-11 requires that only circuit breakers be applied according to the above table and requires that the circuit breaker can be reset and reusable. The standard does not strictly require that fuses be applied in the same way, but it is an issue to consider, especially with high amperage fuses used to protect panel feeders or inverters. Fuses under 10 Ampere rating generally have such a high internal resistance they prevent fault currents from reaching 1000 Amperes in 12 Volt circuits. The apparent contradiction when using these fuses for bilge pumps and other circuits directly off the battery is less an issue than it might seem. If a fuse blows, and the case appears to be cracked or metal has been ejected, the fuse holder should be replaced.

Circuit Protection Device Comparison Table



Bussmann Series 185 Circuit Breakers

- Ignition protected - Safe for installation aboard gasoline powered boats
- All components meet SAE J1171 external ignition protection requirements
- Waterproof
- Combines switching and circuit breaker function into one unit
- "Trip Free" - cannot be held closed after trip

Specifications

Interrupt Capacity	3,000 Amperes DC
Circuit Breaker Type	Thermal
Case Material	Phenolic
Maximum Voltage	42 Volts DC
Delay	See www.bluesea.com

CE marked

See page 29 for ABYC Interrupt Rating Requirements.

IP 7010 Panel Mount

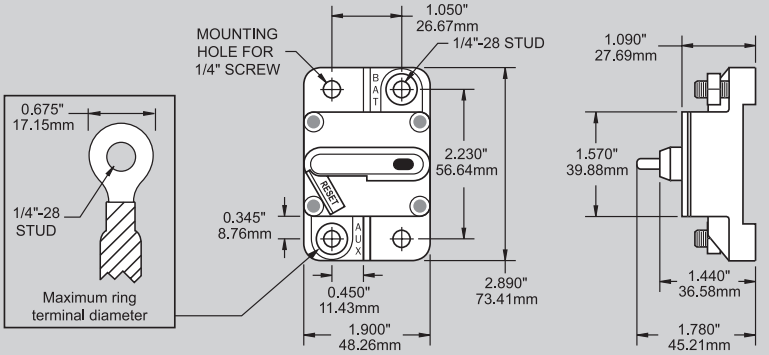
IP 7110 Surface Mount

Panel Mount		
PN	Amperage	Weight Lb (Kg)
7008	25A	0.24 (0.11)
7009	30A	0.24 (0.11)
7010	35A	0.24 (0.11)
7005	40A	0.24 (0.11)
7000	50A	0.24 (0.11)
7011	60A	0.24 (0.11)
7012	70A	0.24 (0.11)

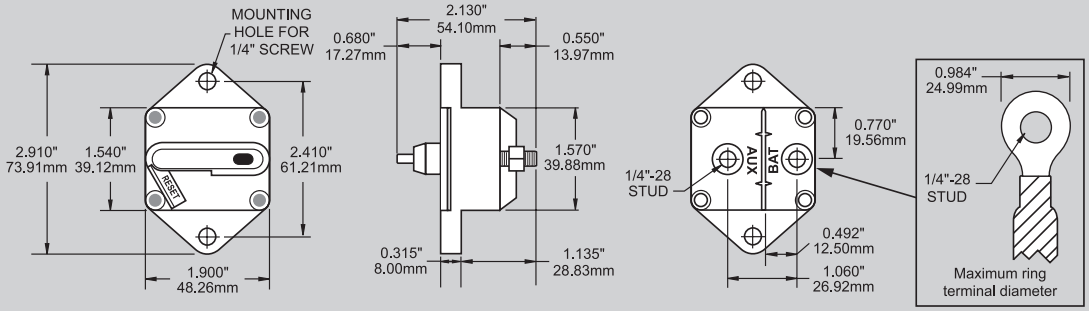
Panel Mount		
PN	Amperage	Weight Lb (Kg)
7014	80A	0.24 (0.11)
7006	90A	0.24 (0.11)
7002	100A	0.24 (0.11)
7007	110A	0.24 (0.11)
7013	120A	0.24 (0.11)
7015	135A	0.24 (0.11)
7004	150A	0.24 (0.11)

Surface Mount		
PN	Amperage	Weight Lb (Kg)
7108	25A	0.30 (0.14)
7109	30A	0.30 (0.14)
7110	35A	0.30 (0.14)
7105	40A	0.30 (0.14)
7100	50A	0.30 (0.14)
7111	60A	0.30 (0.14)
7112	70A	0.30 (0.14)

Surface Mount		
PN	Amperage	Weight Lb (Kg)
7114	80A	0.30 (0.14)
7106	90A	0.30 (0.14)
7102	100A	0.30 (0.14)
7107	110A	0.30 (0.14)
7113	120A	0.30 (0.14)
7115	135A	0.30 (0.14)
7104	150A	0.30 (0.14)



Bussmann Series 185 Thermal Circuit Breaker Surface Mount Dimensions



Bussmann Series 185 Thermal Circuit Breaker Panel Mount Dimensions

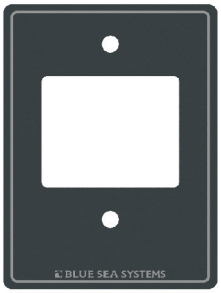
IP IGNITION PROTECTED

Bussmann Series 185 Circuit Breaker Mounting Options

- Used with Bussmann Series 185 Panel Mount Circuit Breakers
- 7199 Heavy 1/8" aluminum 5052 Alloy
- 7199 Two-part polyurethane slate gray finish
- 7198 Self trimming molded rubber bezel

PN	Description	Height in" (mm)	Width in" (mm)	Weight Lb (Kg)
7198	Trim Bezel	3.34 (84.71)	2.44 (61.90)	0.04 (0.02)
7199	Mounting Panel	4.00 (101.60)	3.00 (76.20)	0.12 (0.05)

7198



7199

Self-trimming case eliminates need for mounting panels or trim bezels

Round case for easy installation with standard sized hole saw

IP 7039
Panel Mount

Robust 5/16" terminals provide high torque connections

IP 7139
Surface Mount

Large clearance around terminal stud accepts heavy gauge wire lugs

Bussmann Series 187 MRCB

Marine Rated Circuit Breakers

- Combines switching and circuit protection into a single device
- Clear, single lever operation
- "Trip Free" design cannot be held "ON" during fault current condition
- Vaporproof
- Weatherproof
- Recessed mounting holes for clean appearance
- Large clearance around terminal studs accept heavy gauge wire lugs
- Robust 5/16" M8 terminals provide high torque connections
- Large lever with vertical/horizontal orientation provides indication of trip status
- Ignition protected - Safe for installation aboard gasoline powered boats

Specifications

Circuit Breaker Class	Type III - Switchable/Manual Reset - Trip Free
Type	Thermally Responsive Bi-Metal Blade
Case Material	Thermoset Polyester
Available Amperage	25-150 Amperes
Voltage Rating	48 Volts DC Maximum
Delay	See www.bluesea.com
Interrupt Rating:	5,000 Amperes@12 Volts DC 3,000 Amperes@24 Volts DC 1,500 Amperes@42 Volts DC

Agency Specifications

- All components meet SAE J1171 external ignition protection requirements

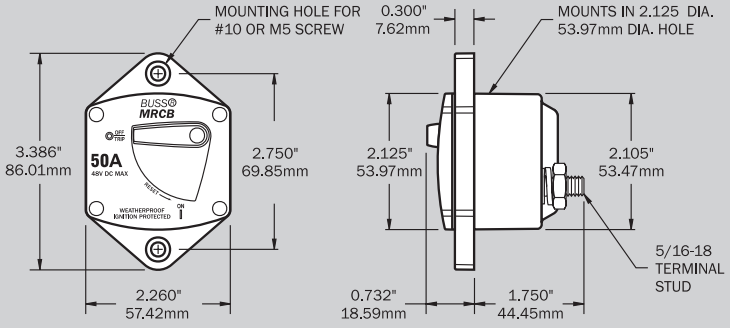
CE marked

▶ See page 29 for ABYC Interrupt Rating Requirements.

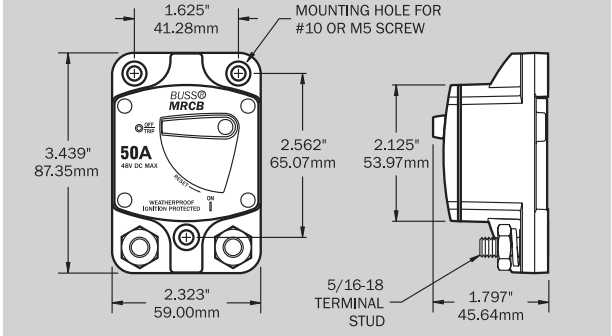
Panel Mount		
PN	**Amperage**	**Weight Lb (Kg)**
7035	25A	0.50 (0.23)
7036	30A	0.50 (0.23)
7037	35A	0.50 (0.23)
7038	40A	0.50 (0.23)
7039	50A	0.50 (0.23)
7040	60A	0.50 (0.23)
7041	70A	0.50 (0.23)
7042	80A	0.50 (0.23)
7043	90A	0.50 (0.23)
7044	100A	0.50 (0.23)
7045	110A	0.50 (0.23)
7046	120A	0.50 (0.23)
7047	135A	0.50 (0.23)
7048	150A	0.50 (0.23)

Surface Mount		
PN	**Amperage**	**Weight Lb (Kg)**
7135	25A	0.58 (0.26)
7136	30A	0.58 (0.26)
7137	35A	0.58 (0.26)
7138	40A	0.58 (0.26)
7139	50A	0.58 (0.26)
7140	60A	0.58 (0.26)
7141	70A	0.58 (0.26)
7142	80A	0.58 (0.26)
7143	90A	0.58 (0.26)
7144	100A	0.58 (0.26)
7145	110A	0.58 (0.26)
7146	120A	0.58 (0.26)
7147	135A	0.58 (0.26)
7148	150A	0.58 (0.26)

IP IGNITION PROTECTED



Bussmann Series 187 MRCB Panel Mount Dimensions



Bussmann Series 187 MRCB Surface Mount Dimensions

Important Information about the Bussmann 187 Series Circuit Breaker

The Cooper Bussmann 187 Series Thermal Circuit Breaker is based on the T-1 Thermal Circuit Breaker that was designed and developed by Blue Sea Systems engineers in 1999. In 2003 Cooper Bussmann purchased the T-1 tooling and patents from Blue Sea Systems. In 2005 Cooper Bussmann introduced the 187 Series Thermal Circuit Breaker based in part on the T-1 design. Using their long experience in thermal circuit breaker design, Cooper Bussmann enhanced the original T-1 internal mechanism & current path via several design changes. The 187 Series retains all the features that made the T-1 so popular – robust construction, easy mounting, large terminal studs and attractive styling.

Cooper Bussmann has certified that the 187 Series Thermal Circuit Breaker meets SAE J1171 for ignition protection and has a 5,000 Ampere interrupt capacity per ABYC E-11 at 12 Volts DC. The yellow handle and text of 187 Thermal Circuit Breaker clearly distinguish it from the T-1 Circuit Breaker's red handle. Please visit our website at www.bluesea.com for information on the T-1 recall initiated in 2003.

C-Series Toggle Circuit Breakers

5 to 300 Ampere DC range provides overcurrent protection previously only available in fuses for inverters, bow thrusters, and windlasses.

- Combines switching and circuit protection into a single device
- "Trip Free"- cannot be held closed after trip
- 7250I Ignition protected - Safe for installation aboard gasoline powered boats
- 7250I All components meet UL 1500 and ISO 8846 external ignition protection requirements

Specifications

Circuit Breaker Type	Magnetic
Body Material	Phenolic
Maximum Voltage	See Interrupt Ratings table below
Rated Switch Cycles	10,000 @ rated amperage and voltage
Delay	See www.bluesea.com

PN	Color	Poles	Amperage	Weight Lb (Kg)
7350	White	1*	5A	0.28 (0.13)
7351	White	1*	10A	0.28 (0.13)
7352	White	1*	15A	0.28 (0.13)
7353	White	1*	20A	0.28 (0.13)
7354	White	1*	25A	0.28 (0.13)
7355	White	1*	30A	0.28 (0.13)
7244	White	1*	50A	0.36 (0.17)
7246	White	1*	60A	0.36 (0.17)
7248	White	1*	80A	0.36 (0.17)
7250	White	1*	100A	0.36 (0.17)
7250I	Red	1*	100A	0.36 (0.17)
7267	White	2	150A	0.64 (0.31)
7268	White	2	175A	0.64 (0.31)
7269	White	2	200A	0.64 (0.31)
7270	White	3	250A	0.93 (0.46)
7271	White	3	300A	0.93 (0.46)

* Single pole circuit breakers are AC/DC rated

▶ **See page 33 for Magnetic Circuit Breaker Mounting Panels.**

7250

IP 7250I

7267

7270

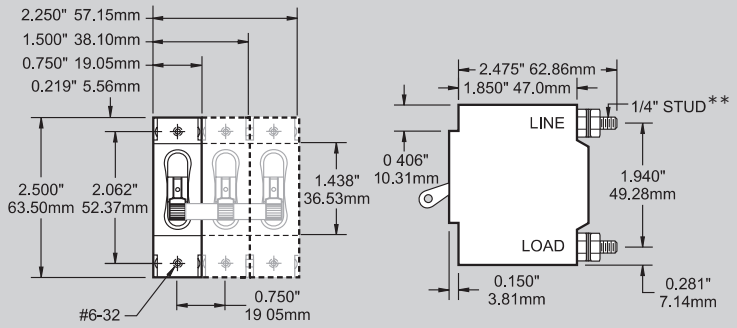
Interrupt Ratings (see ABYC Interrupt Rating Requirements page 29)

C-Series Circuit Breakers - Single Pole			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - TUV (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
80V DC	5-100A	10,000A	5,000A
125V AC	5-100A	5,000A	5,000A
250V AC	5-100A	5,000A	5,000A

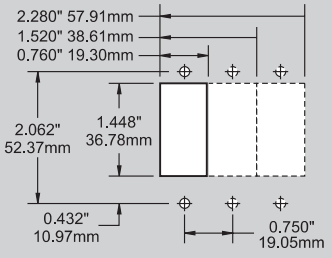
C-Series Circuit Breakers - 7250I Single Pole (Ignition Protected)			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - TUV (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
48V DC	5-100A	5,000A	5,000A
125V AC	5-100A	1,500A	1,500A

C-Series Circuit Breakers - Double and Triple Pole			
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
65V DC	150-300A	5,000A[2]	-

[1] **UL Recognized**
[2] **No Agency Approvals**



C-Series Circuit Breaker Dimensions



Panel Cutout Detail

** Multiple pole versions have 5/16" terminal on bus

IP **IGNITION PROTECTED**

C-Series Magnetic Circuit Breaker Panels

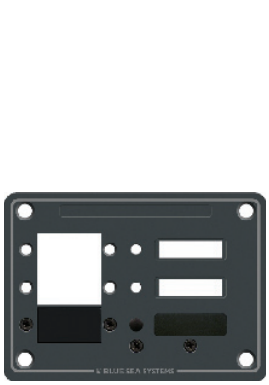
- Heavy 1/8" aluminum 5052 Alloy
- Two-part polyurethane slate gray finish
- LED indicates power "ON"

Specifications

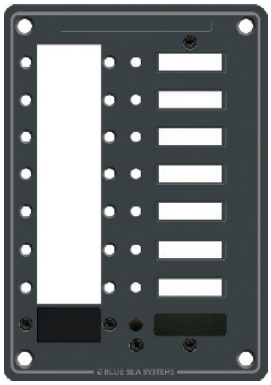
LED Amperage	5 Milliwatts

PN Panel	PN Circuit Breaker Installed	Poles	Amperage	Weight Lb (Kg)
7262	7267	2	150A	0.95 (0.45)
7263	7268	2	175A	0.95 (0.45)
7264	7269	2	200A	0.95 (0.45)
7265	7270	3	250A	1.21 (0.59)
7266	7271	3	300A	1.21 (0.59)

7266



8088



8087

See page 32 for C-Series Magnetic Circuit Breakers.

Magnetic Circuit Breaker Mounting Panels

- Designed for C-Series Magnetic Circuit Breakers
- Heavy 1/8" aluminum 5052 Alloy
- Two-part polyurethane slate gray finish
- Accepts standard Blue Sea Systems backlightable labels
- Accepts standard Blue Sea Systems "ON" indicating LEDs
- Industry standard height and width
- Optional panel plugs can be inserted to fill blank positions
- Optional Panel Plug Kit 8089 includes Circuit Breaker Mounting Screws, panel plug, LED plug, and blank label

PN	Description	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)
8087	8 Position	5.25 (133.35)	7.50 (190.50)	0.40 (0.18)
8088	3 Position	5.25 (133.35)	3.75 (95.25)	0.28 (0.13)
8089	Panel Plug Kit	-	-	0.10 (0.04)

7450

7475

7477

AIRPAX®

Available January, 2006

Large Case 2.5" Rocker Circuit Breakers NEW PRODUCT

- Color actuator indicates "OFF" position
- "Trip Free" design cannot be held "ON" during fault current condition
- Flat actuator protects against accidental switching

Specifications

Circuit Breaker Type	Magnetic Hydraulic - Trip free
Maximum Amperage	See table below
Maximum Voltage	See table below
Rated Switch Cycles	10,000@rated amperage and voltage
Delay	See www.bluesea.com
Mounting screw	#6-32 SS - Recommended torque 6-8 in-lb
Terminal stud	1/4"-20 x 0.545" SS - Recommended torque 40-45 in-lb

CE marked

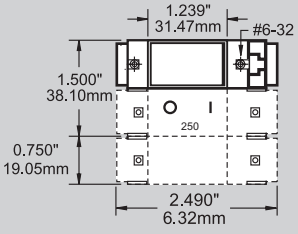
See page 42 for more details

Interrupt Ratings (see ABYC Interrupt rating Requirements page 29)

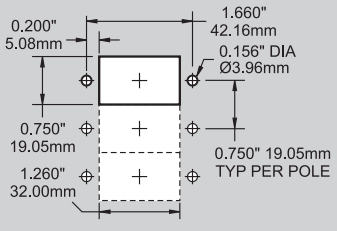
IELBX Rocker Circuit Breakers - Single Pole			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - VDE (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
65V DC	60-100A	7,500A	-
65V DC	60A	-	4,000A
125V AC	60-100A	3,000A	-
250V AC	60-100A	-	2,000A

CELBX Rocker Circuit Breakers - Double and Triple Pole			
		UL 489A - UL/CSA (US/Canada)[2]	EN60934 - VDE (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
80V DC	150-250A	10,000A	2,000A

[1] UL Recognized [2] UL Listed



Large Case 2.5" Rocker Circuit Breaker Dimensions



Rocker Panel Cutout Detail

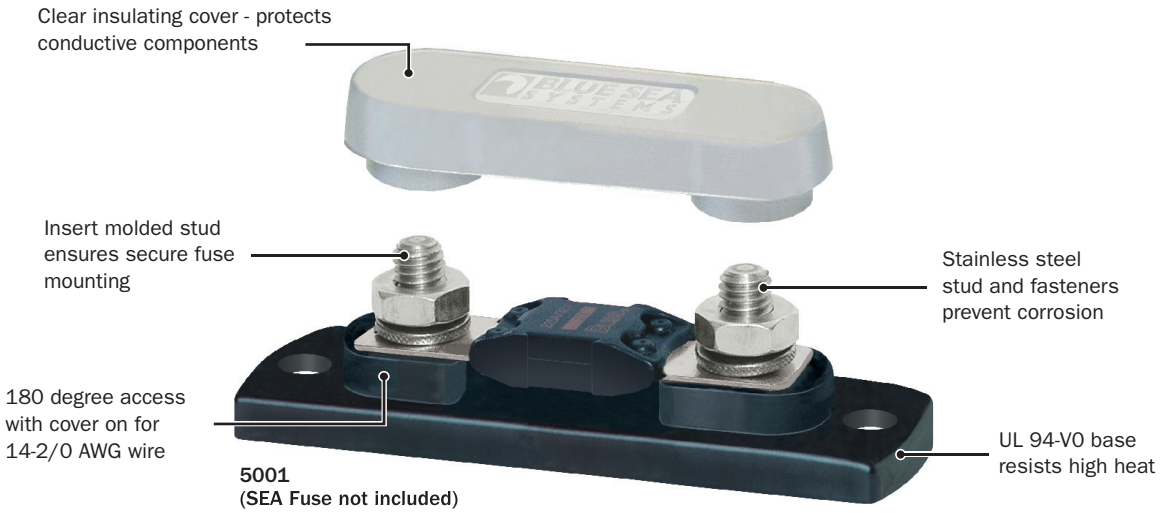
PN	Actuator	Poles	Amperage
7450	Flat	1	60A
7451	Flat	1	80A
7452	Flat	1	100A
7475	Flat	2*	150A
7476	Flat	2*	200A
7477	Flat	3*	250A
4110	Panel Plug Kit	-	-

NEW PRODUCT

* Paralleled Poles

Update Available January, 2006

SEA Fuse Block UPDATED PRODUCT



5001
(SEA Fuse not included)

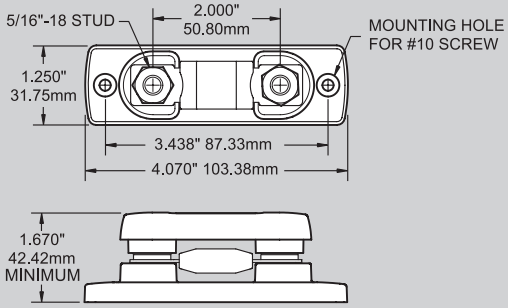
- The most economical system for 100-300 Ampere fusing
- Insulating cover satisfy ABYC/USCG requirements
- For use on systems up to 48 Volts DC
- Large stud terminals accept 5/16" or M8 ring terminals up to 2/0 AWG

Specifications

Base Material	Black Thermoplastic
Cover Material	Clear Thermoplastic
SEA Fuses available	100-300 Amperes DC
Maximum Amperage	300 Amperes DC
Maximum Voltage	48 Volts DC

PN	Description	Amperage	Weight Lb (Kg)
5000	Fuse Block without Cover	100-300A	0.17 (0.07)
5001	Fuse Block with Cover	100-300A	0.20 (0.09)

UPDATED PRODUCT



PN 5001 Dimensions

SEA Fuses

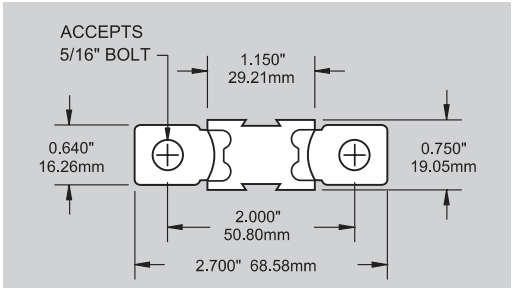
- Most economical fuse for 100-300 Ampere circuit protection

Specifications

Interrupt Capacity	2,000 Amperes DC
Maximum Voltage	48 Volts DC
Delay	See www.bluesea.com

5106

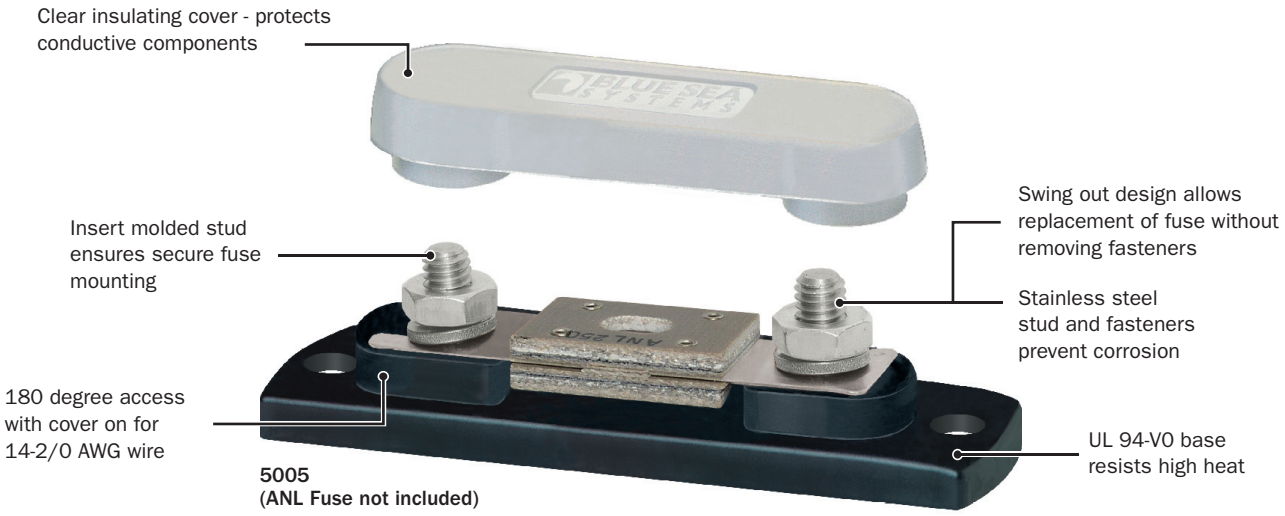
PN	Amperage	Weight Lb (Kg)
5101	100A	0.06 (0.03)
5102	125A	0.06 (0.03)
5103	150A	0.06 (0.03)
5104	175A	0.06 (0.03)
5105	200A	0.06 (0.03)
5106	225A	0.06 (0.03)
5107	250A	0.06 (0.03)
5108	300A	0.06 (0.03)

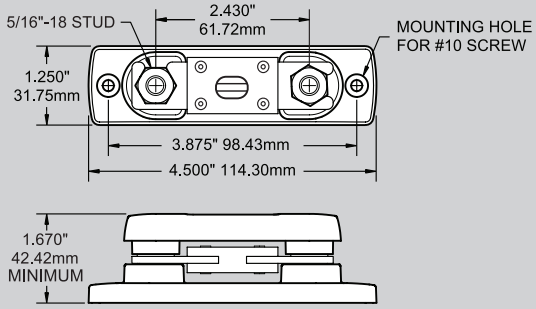


PN 5160 Dimensions

Update Available January, 2006

ANL Light Fuse Block UPDATED PRODUCT





PN 5005 Dimensions

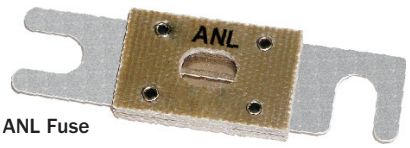
- Insulating cover satisfies ABYC/USCG requirements
- For use on systems up to 48 Volts DC
- Large 5/16" M8 studs accept 5/16" or M8 ring terminals up to 14-2/0 AWG

Specifications

Base Material	Black Thermoplastic
Cover Material	Clear Thermoplastic
Maximum Amperage	300 Amperes DC
Maximum Voltage	48 Volts DC

PN	Description	Amperage	Weight Lb (Kg)
5004	Fuse Block without Cover	35-300A	0.18 (0.08)
5005	Fuse Block with Cover	35-300A	0.21 (0.09)

UPDATED PRODUCT



ANL Fuse

35-300 Ampere ANL Fuses

- Ignition protected (conforming to SAE J1171)
  - Safe for installation aboard gasoline powered boats (35-300 Amperes only)
- Silver-plated connector blades for corrosion resistance
- Visible indication of blown fuse condition
- 6,000 Ampere Interrupt Capacity (AIC) satisfies ABYC requirements for main DC circuit protection on large battery banks

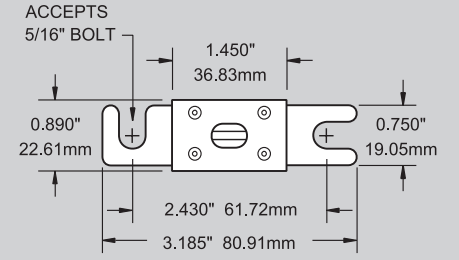
Specifications

Interrupt Capacity	6,000 Amperes DC
Maximum Voltage	48 Volts DC
Delay	See www.bluesea.com

Agency Specifications

- **35-500 Ampere Fuses** meet the requirements of ISO 8846, SAE J1171, ABYC, USCG Title 33 CFR 183.410(a) and UL 1500

▶ **See page 36 for high amperage ANL Fuses.**



ANL Fuse Dimensions

PN		Amperage	Weight Lb (Kg)
5164	IP	35A	0.05 (0.02)
5165	IP	40A	0.05 (0.02)
5122	IP	50A	0.05 (0.02)
5123	IP	60A	0.05 (0.02)
5124	IP	80A	0.05 (0.02)
5125	IP	100A	0.05 (0.02)
5126	IP	130A	0.05 (0.02)

PN		Amperage	Weight Lb (Kg)
5127	IP	150A	0.06 (0.03)
5128	IP	175A	0.06 (0.03)
5129	IP	200A	0.06 (0.03)
5130	IP	225A	0.06 (0.03)
5131	IP	250A	0.07 (0.03)
5132	IP	275A	0.07 (0.03)
5133	IP	300A	0.07 (0.03)

IP IGNITION PROTECTED

ANL Fuse Block

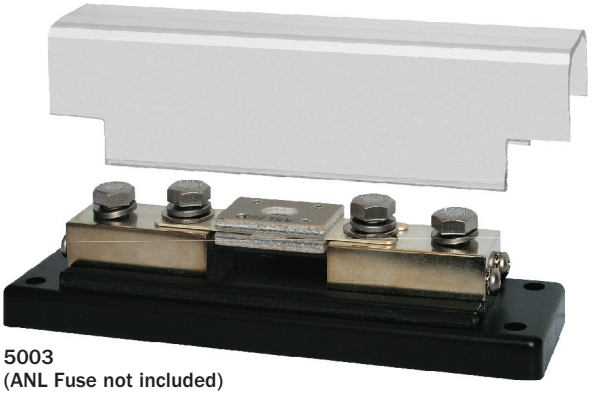
5003 Features

- 750 Ampere rating achieved with large heat dissipating tin-plated copper mounting blocks
- Clear insulating cover satisfies ABYC/USCG requirements
- For use on systems up to 48 Volts DC
- Large terminals accept 5/16" or M8 ring terminals up to 4/0 AWG

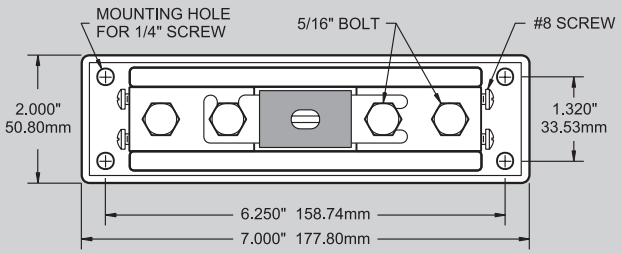
Specifications

Base Material	Black Reinforced Polycarbonate
Cover Material	Clear Reinforced Polycarbonate
Maximum Amperage	750 Amperes DC
Maximum Voltage	48 Volts DC
Fuse Mounting Blocks	Tin-Plated Copper

PN	Amperage	Weight Lb (Kg)
5003	35-750A	1.55 (0.70)



5003
(ANL Fuse not included)



PN 5003 Dimensions

35-750 Ampere ANL Fuses

- Ignition protected (conforming to SAE J1171)
  - Safe for installation aboard gasoline powered boats (35-500 Amperes only)
- Silver-plated connector blades for corrosion resistance
- Visible indication of blown condition
- 6,000 Ampere Interrupt Capacity (AIC) satisfies ABYC requirements for main DC circuit protection on large battery banks

Specifications

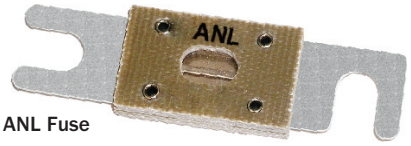
Interrupt Capacity	6,000 Amperes DC
Maximum Voltage	48 Volts DC
Delay	See www.bluesea.com

Agency Specifications

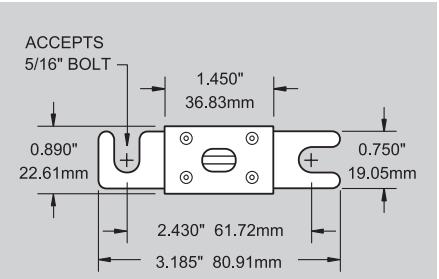
- **35-500 Ampere Fuses** meet the requirements of ISO 8846, SAE J1171, ABYC, USCG Title 33 CFR 183.410(a) and UL 1500

PN		Amperage	Weight Lb (Kg)
5164	IP	35A	0.05 (0.02)
5165	IP	40A	0.05 (0.02)
5122	IP	50A	0.05 (0.02)
5123	IP	60A	0.05 (0.02)
5124	IP	80A	0.05 (0.02)
5125	IP	100A	0.05 (0.02)
5126	IP	130A	0.05 (0.02)
5127	IP	150A	0.06 (0.03)
5128	IP	175A	0.06 (0.03)
5129	IP	200A	0.06 (0.03)
5130	IP	225A	0.06 (0.03)
5131	IP	250A	0.07 (0.03)
5132	IP	275A	0.07 (0.03)
5133	IP	300A	0.07 (0.03)
5134	IP	325A	0.07 (0.03)
5135	IP	350A	0.07 (0.03)
5136	IP	400A	0.08 (0.04)
5137	IP	500A	0.08 (0.04)
5161	-	600A	0.08 (0.04)
5162	-	675A	0.08 (0.04)
5163	-	750A	0.08 (0.04)

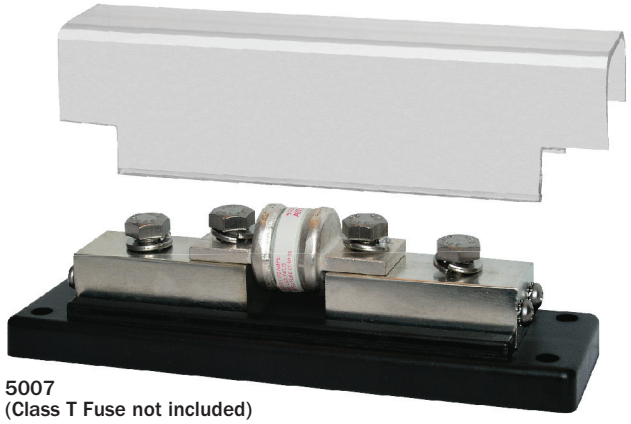
IP IGNITION PROTECTED



ANL Fuse



ANL Fuse Dimensions



5007
(Class T Fuse not included)

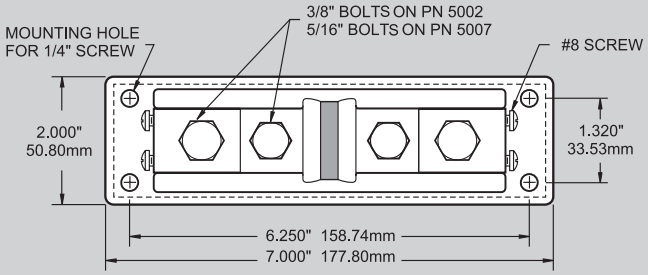
Class T Fuse Blocks

The fuse system recommended by most inverter manufacturers for high speed response to short circuits.

- Clear insulating cover, satisfies ABYC/USCG requirements
- For use on systems up to 160 Volts DC
- Large stud terminals (3/8" on 5002, 5/16" on 5007) accept ring terminals for wire up to 4/0 AWG
- Large heat dissipating tin-plated copper mounting blocks
- Two #8 accessory terminals located on each end

Specifications

Base Material	Black Reinforced Polycarbonate
Cover Material	Clear Reinforced Polycarbonate
Class T Fuses available	110-400 Amperes DC
Maximum Amperage	400 Amperes DC
Maximum Voltage	160 Volts DC
Fuse Mounting Blocks	Tin-Plated Copper



PN 5002 and PN 5007 Dimensions

PN	Amperage	Weight Lb (Kg)	Accepts Fuse PN
5007	110-200A	1.40 (0.64)	5112, 5113, 5114, 5115, 5116
5002	225-400A	1.55 (0.70)	5117, 5118, 5119, 5120, 5121

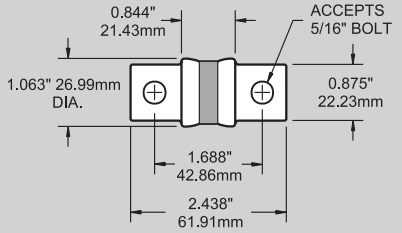
5112

Class T Fuses

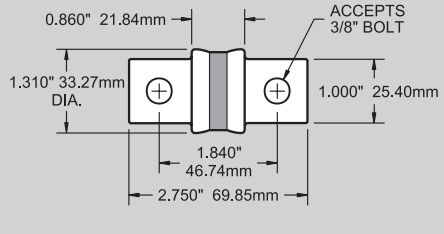
- Extremely fast short-circuit response
- 20,000 Ampere Interrupt Capacity (AIC)
- UL listed to standard 248-15
- DC tested to UL standard 198L

Specifications

Interrupt Capacity	20,000 Amperes DC
Maximum Voltage	160 Volts DC
Delay	See www.bluesea.com



110 to 200 Amperes Dimensions



225 to 400 Amperes Dimensions

PN	Amperage	Weight Lb (Kg)
5112	110A	0.19 (0.09)
5113	125A	0.19 (0.09)
5114	150A	0.19 (0.09)
5115	175A	0.19 (0.09)
5116	200A	0.19 (0.09)
5117	225A	0.29 (0.13)
5118	250A	0.29 (0.13)
5119	300A	0.29 (0.13)
5120	350A	0.29 (0.13)
5121	400A	0.29 (0.13)

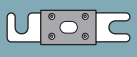
ANL Fuses vs. Class T Fuses

What is the difference between an ANL and a Class T fuse?

These two fuses are the most common high amperage fuses used in marine applications and there are significant differences between the two:

ANL Fuse Advantages:

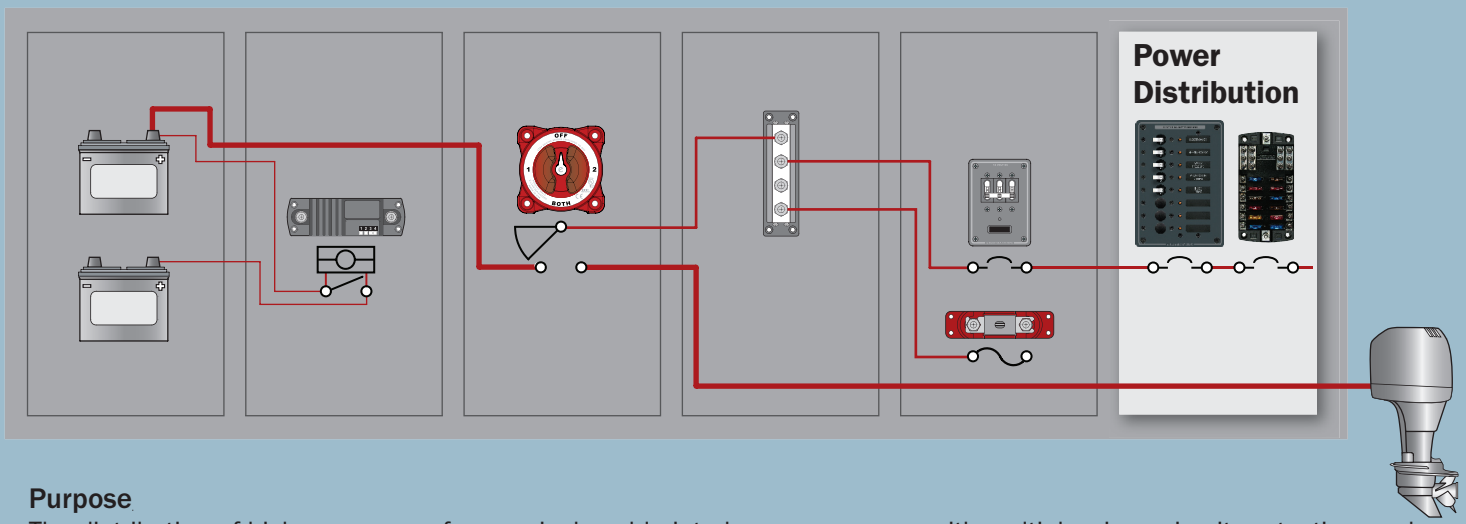
- Lower cost than Class T fuses
- Available in a wider amperage range (35A - 750A) than Class T Fuses
- Single mounting hole dimension allows all ANL Fuses to be used with the same fuse block
- Fusible link window gives visual indication of fuse being blown
- Ignition protected - Safe for installation aboard gasoline powered boats



Class T Fuse Advantages:

- The only UL 248-15L listed fuse commonly available in the marine industry
- Fast response to short circuits protects high amperage electronic equipment such as inverters

The portion of the DC Distribution System that conducts power from the end of the DC Main Power Distribution System (the end of the wire protected by a DC Main circuit protection device) to the load devices at the end of the circuit. Typically, the DC Branch Power Distribution System carries lower DC current, roughly those currents below 50 Amperes.



Purpose

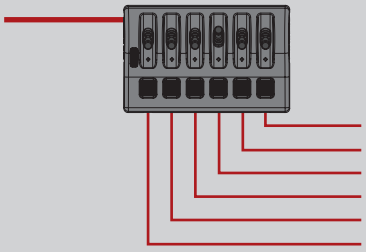
The distribution of high amperages from a single cable into lower amperages with multiple wires, circuit protection, and switching. These three functions may be consolidated into a single device as in the case of a circuit breaker distribution panel or each function may reside as separate devices as shown in the system configuration diagrams below.

Configurations

1) A switch panel with fuses or circuit breakers for circuit protection is common for small distribution applications.

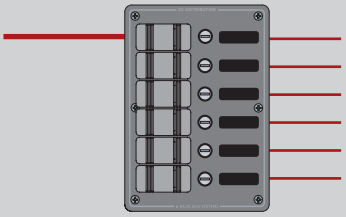
a. Water resistant WeatherDeck™ Switch Panels with integral ATO fuse circuit protection. (**Figure 1**)
b. Water resistant Contura Switch Panels with integral AGC fuse circuit protection. (**Figure 2**)
c. Water resistant WeatherDeck™ Switch Panel with integral Push Button Circuit Breaker circuit protection. (**Figure 3**)

WeatherDeck™ Water Resistant Fuse Panels



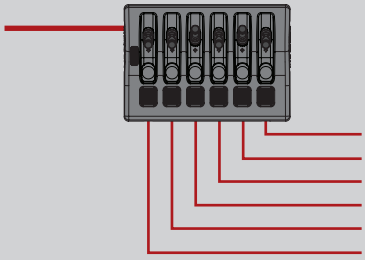
(See pages 50-51) Figure 1

Water Resistant Fuse Panels



(See page 53) Figure 2

WeatherDeck™ with Circuit Breaker Water Resistant Panels

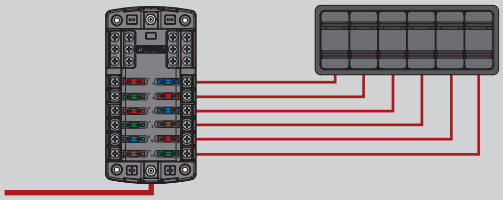


(See pages 48-49) Figure 3

2) A panel with switches only combined with separate circuit protection which can be mounted remotely.

a. ST Blade Fuse Block combined with a Contura Switch Only Panel. (**Figure 4**)

ST Blade Fuse Block Combined with a Contura Switch Only Panel



(See pages 57, 55) Figure 4

3) A circuit breaker distribution panel with or without a sub-panel.

a. A distribution panel with circuit breakers combining switching and circuit protection. (**Figure 5**)

b. A distribution panel with circuit breakers combined with a fuse block for load switched electronics. (**Figure 6**)

c. A distribution panel with circuit breakers combined with a remote switch and fuse/circuit breaker panel. (**Figure 7**)

Circuit Breaker Panel Combining Switching and Circuit Protection

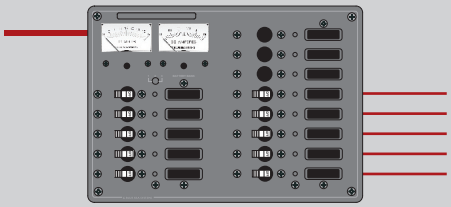


Figure 5

Circuit Breaker Panel Combined with ST Blade Fuse Block

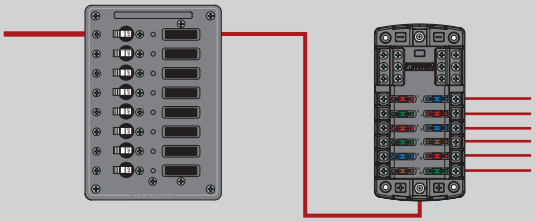


Figure 6

Circuit Breaker Panel Combined with WeatherDeck™ Panel with Circuit Protection

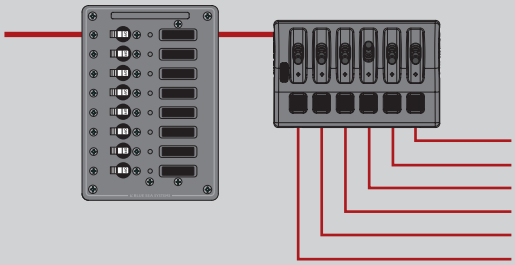


Figure 7

4) A busbar combined with three MAXI™ Fuse Blocks for higher amperage (30-80 Amperes DC) loads (Figure 8)

Busbar Combined with Three MAXI™ Fuse Blocks

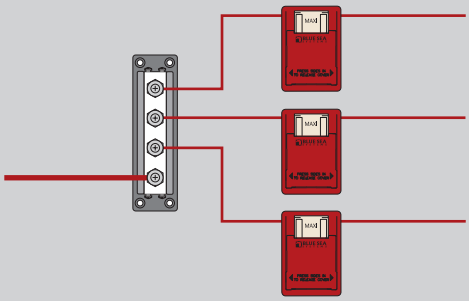


Figure 8

5) ST Blade Fuse Block (Figure 9)

ST Blade Fuse Block

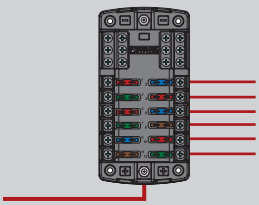
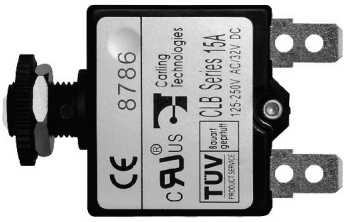


Figure 9

Push Button Reset Only Circuit Breakers

- Lowest cost circuit breaker available
- Incorporated into Blue Sea Systems Water Resistant Circuit Breaker Panels (see page 48-49) and Battery Management Panels (see page 20-21,52)
- Compact design enables high density circuit protection configurations
- Push to reset operation
- "Trip Free" design cannot be held "ON" during fault current condition
- Ignition protected - Safe for installation aboard gasoline powered boats



IP 7056

Specifications

Circuit Breaker Type	Thermal reset only - Trip free
Maximum Voltage	28 Volts DC
Delay	See www.bluesea.com
Weight	0.24Lb (0.11Kg)

CE marked

Agency Specifications

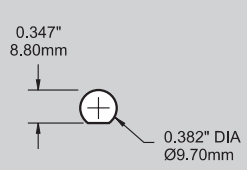
- All components meet UL 1500 and ISO 8846 external ignition protection requirements

Interrupt Ratings (see ABYC Interrupt rating requirements page 29)

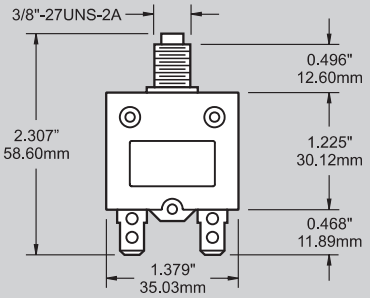
CLB Thermal Circuit Breaker		
		UL 1077 - UL/CUL (US/Canada)[1]
Voltage	**Current**	**Interrupt Ratings**
28V DC	3-40A	2,500A

Note: AC ratings have been omitted. They do not meet minimum ABYC requirements.
[1] **UL Recognized**

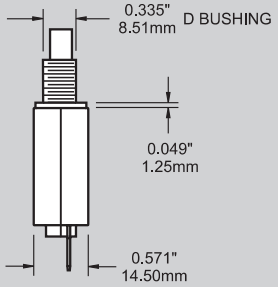
PN	Amperage
7050	3A
7051	4A
7052	5A
7053	7A
7054	10A
7055	12A
7056	15A
7057	20A
7058	25A
7059	30A
7060	35A
7061	40A



Push Button Panel Cutout



Push Button Circuit Breaker Dimensions



Push Button Circuit Breaker Dimensions

IP IGNITION PROTECTED

Push Button Waterproof Boots

- Replaces standard mounting nut for mounting Push Button Thermal Circuit Breakers
- UV resistant material resists discoloration and cracking
- Protects Push Button Circuit Breaker in wet environments

4135

4136

4137

Specifications

Case Material	UV Resistant Silicone Rubber
Thread Material	Nickel-Plated Brass
Thread	3/8"-27
Weight	0.03Lb (0.02Kg)

PN	Color
4135	Clear
4136	White
4137	Black

Push Button Circuit Breakers with waterproof boots are used in the Water Resistant Circuit Breaker Panels (see page 48-49, 52)

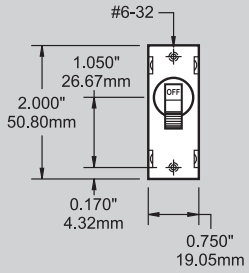
8272

8371

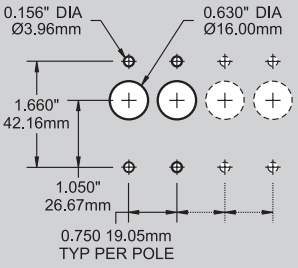
4376

7200

7202



Circuit Breaker Dimensions



Toggle Panel Cutout

Single Pole Toggle World Circuit Breakers

- Meets all American Boat and Yacht Council (ABYC) standards
- UL 1077 recognized, TUV certified, CE marked for Europe, and CSA certified for Canada
- The industry standard circuit breaker for Blue Sea Systems electrical panels
- Combines switching and circuit protection into a single device
- Single pole "Quick Trip" models are designed specifically for electronics protection
- "Trip Free" design cannot be held "ON" during fault current condition

Specifications

Circuit Breaker Type	Magnetic Hydraulic - Trip free
Maximum Amperage	50 Amperes
Maximum Voltage	277 Volts AC/65 Volts DC
Rated Switch Cycles	10,000@rated amperage and voltage
Trip Time Delay	See www.bluesea.com
Weight	0.17Lb (0.08Kg)
Mounting screw	#6-32
Terminal screw	#10-32 SS with external tooth lock washer

CE marked

Interrupt Ratings (For ABYC Interrupt rating requirements, see page 29)

World Circuit Breakers - Single Pole			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - TUV (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
65V DC	1-50A	7,500A	1,500A
120V AC	1-50A	3,000A	1,500A
250V AC	1-50A	3,000A	1,500A

[1] UL Recognized

PN	Color	Amperage	Delay
7291	White	1A	Quick Trip
7292	White	2.5A	Quick Trip
7293	White	5A	Quick Trip
7200	Black	5A	Standard
7201	Red	5A	Standard
7202	White	5A	Standard
7347	Black	8A	Standard
7299	White	8A	Standard
7204	Black	10A	Standard
7205	Red	10A	Standard
7206	White	10A	Standard
7208	Black	15A	Standard
7209	Red	15A	Standard
7210	White	15A	Standard

NEW PRODUCT

PN	Color	Amperage	Delay
7212	Black	20A	Standard
7213	Red	20A	Standard
7214	White	20A	Standard
7216	Black	25A	Standard
7217	Red	25A	Standard
7218	White	25A	Standard
7220	Black	30A	Standard
7221	Red	30A	Standard
7222	White	30A	Standard
7224	Black	40A	Standard
7225	Red	40A	Standard
7226	White	40A	Standard
7228	Black	50A	Standard
7229	Red	50A	Standard
7230	White	50A	Standard

▶ For Double Pole AC World Circuit Breakers, see page 63 and 72
▶ For circuit breaker mounting panels, see page 87

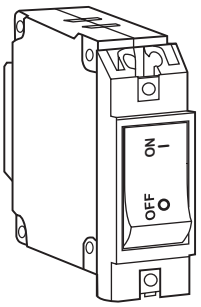
Rocker Style Magnetic Circuit Breakers

Rocker Circuit Breakers offer several advantages over the traditional toggle style circuit breakers long used in the marine industry. The Rocker Circuit Breaker body and mechanical components are identical to toggle magnetic circuit breakers; it is only the actuation mechanism that is different.

Rocker Circuit Breakers have five distinct advantages over traditional toggle circuit breakers:

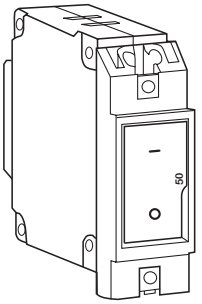
1) They offer a contemporary styling more appropriate for today's boats.
2) Rocker Circuit Breakers "color indicate" their ON/OFF status for rapid identification of circuit breaker status.
3) All Rocker Circuit Breakers are resistant to accidental switching and the Flat and Slot Reset styles are completely immune to accidental switching.
4) Within their standard rectangular mounting aperture both small case 2" circuit breakers up to 50 Amperes and large case 2.5" circuit breakers up to 250 Amperes can be used in the same panel.
5) Rocker Circuit Breakers are available in a wide variety of actuator styles, as exemplified by the three actuator styles shown below:

Raised Rocker - Small Case 2" Rocker Circuit Breaker (see pages 43, 64, and 73)



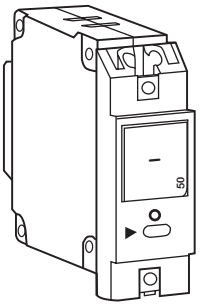
Features
- **Good** resistance to accidental switching
  - Better than traditional toggle circuit breakers
- Red color indicates ON condition
- International ON/OFF symbol

Flat Rocker - Small Case 2" and Large Case 2.5" Rocker Circuit Breakers (see pages 33, 43, and 73)



Features
- **Better** resistance to accidental switching
- White color indicates OFF condition
- Rocker actuator is flush in the ON position, eliminating risk of accidental switching
- International ON/OFF symbols support vertical or horizontal mounting

Slot Reset - Small Case 2" Rocker Circuit Breakers (see pages 43 and 73)



Features
- **Best** resistance to accidental switching
- White color indicates OFF condition
- Can only be turned OFF by inserting small screw driver into slot
- International ON/OFF symbols support vertical or horizontal mounting

7300

AIRPAX

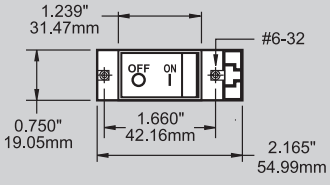
Single Pole Small Case 2" Rocker Circuit Breakers

- Rocker actuator offers modern appearance to electrical distribution panels
- Dual color rocker gives clear visual indication of handle position
- "Trip Free" design cannot be held "ON" during fault current condition

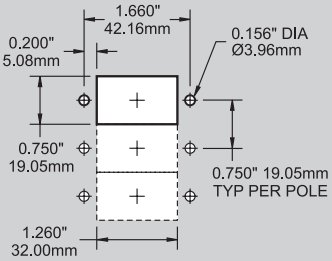
Specifications

Circuit Breaker Type	Magnetic Hydraulic - Trip free
Case Material	Polyester
Maximum Amperage	See table below
Maximum Voltage	See table below
Rated Switch Cycles	10,000@rated amperage and voltage
Trip Time Delay	See www.bluesea.com
Weight	0.19Lb (0.09Kg)
Mounting screw	#6-32
Terminal screw	#10-32 SS with external tooth lock washer

CE marked



Single Pole Small Case 2" Rocker Circuit Breaker Dimensions



Rocker Panel Cutout

PN	Amperage
7300	5A
7301	8A
7302	10A
7303	15A
7304	20A
7305	25A
7306	30A
7307	40A
7308	50A

For Double Pole AC Rocker Circuit Breakers, see pages 64 and 73

Interrupt Ratings (see ABYC Interrupt rating requirements page 29, 61)

Small Case Rocker Circuit Breakers - Single Pole			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - VDE (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
65V DC	5-50A	-	2,000A
80V DC	5-30A	-	4,000A
80V DC	5-50A	7,500A	-
125V AC	5-50A	3,000A	-
240V AC	5-50A	2,000A	-
250V AC	5-30A	2,000A	2,000A
250V AC	5-50A	-	2,000A

[1] UL Recognized

Flat

7408

Slot Reset

7433

AIRPAX

Available January, 2006

Single Pole Small Case 2" Rocker Circuit Breakers

NEW PRODUCT

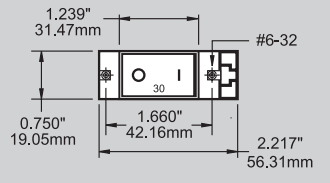
- Color actuator indicates "OFF" position
- "Trip Free" design cannot be held "ON" during fault current condition
- 2 different styles available to protect accidental switching of 24 hour circuits

Specifications

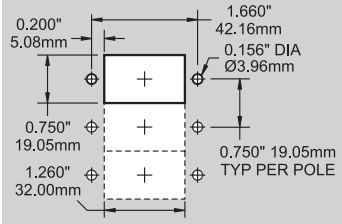
Circuit Breaker Type	Magnetic Hydraulic - Trip free
Maximum Amperage	See table below
Maximum Voltage	See table below
Rated Switch Cycles	10,000@rated amperage and voltage
Delay	See www.bluesea.com
Mounting screw	#6-32 SS - Recommended torque 6-8 in-lb
Terminal screw	45° Angled #10-32 x 5/16 SS SEM external tooth lock washer - Recommended torque 14-15 in-lb

CE marked

See page 42 for more details



Single Pole Small Case 2" Rocker Circuit Breaker Dimensions



Rocker Panel Cutout

Interrupt Ratings (see ABYC Interrupt rating Requirements page 29)

Small Case IEGBX Rocker Circuit Breakers - Single Pole			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - VDE (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
65V DC	5-50A	-	2,000A
80V DC	5-30A	-	4,000A
80V DC	5-50A	7,500A	-
125V AC	5-50A	3,000A	-
240V AC	5-50A	2,000A	-
250V AC	5-30A	2,000A	2,000A
250V AC	5-50A	-	2,000A

[1] UL Recognized

PN	Actuator	Poles	Amperage
7400	Flat	1	5A
7401	Flat	1	8A
7402	Flat	1	10A
7403	Flat	1	15A
7404	Flat	1	20A
7405	Flat	1	25A
7406	Flat	1	30A
7407	Flat	1	40A
7408	Flat	1	50A

PN	Actuator	Poles	Amperage
7425	Slot Reset	1	5A
7426	Slot Reset	1	8A
7427	Slot Reset	1	10A
7428	Slot Reset	1	15A
7429	Slot Reset	1	20A
7430	Slot Reset	1	25A
7431	Slot Reset	1	30A
7432	Slot Reset	1	40A
7433	Slot Reset	1	50A

NEW PRODUCT

DC Rocker and Toggle Panels

Powerboat Reports choice for Electrical Distribution Panels*

Common Features

- MIL-C-5541C or equivalent immersion undercoating for lifetime corrosion resistance
- DC panels with meters include toggle switch for monitoring up to 3 battery banks
- DC panels are available in 12 or 24 Volt DC configuration except panels with analog meters*
- All circuit label positions are backlit on standard panels - No kit required
- "ON" indicating LEDs installed in all circuit positions
- Countersunk mounting holes throughout
- Two-part polyurethane slate gray finish
- Heavy 1/8" aluminum 5052 alloy
- Industry standard height and width

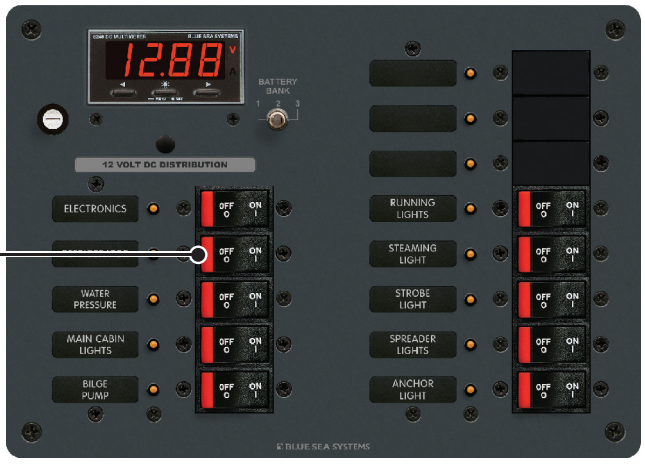
* Panels with analog meters are upgradeable to 24 Volts DC

Tin-Plated Copper bussing for high conductivity

DC Toggle style Circuit Breaker Panels are now available with black World Magnetic Circuit Breakers (see pages 46-47)

A wide range of DC digital and analog meters are available (see pages 95-101)

Industry standard, toggle style, World Magnetic Circuit Breakers available in white or black (see pages 41, 63, 72)



Rocker style Magnetic Circuit Breakers offer modern styling and improved resistance to accidental switching (see pages 43, 64, 73)

** "Blue Sea Systems' excellent warranty, intuitive labeling, and bright night lighting, is our choice for an accessory DC panel."* - Powerboat Reports, June 2005

DC Rocker Circuit Breaker Panels

Common Features

- All positive, negative and grounding buses installed, fully pre-wired
- Includes set of 30 common backlightable DC labels (see page 90)
- Label backlighting pre-installed
- All LEDs installed
- Configure for 12 or 24 Volt DC distribution with supplied labels
- Panel Main Bus 100 Amperes
- Detailed installation instructions and cutout template included
- Over 500 individual labels to choose from (see pages 91-94)

13 Position

8679

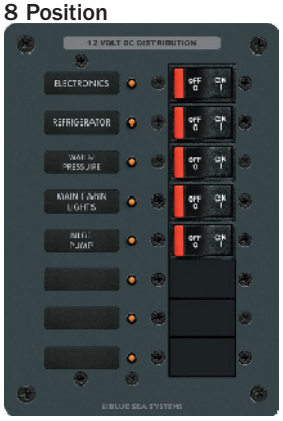
10 Position

8680

5 Position

8678

8 Position



8676

6 Position

8677

3 Position

8675

PN	Description	Meter Type/PN	Meter Page	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed Single Pole Circuit Breakers
							15A
8675	3 Position	-	-	5.25 (133.35)	3.75 (95.25)	1.12 (0.61)	3
8678	5 Position	Digital/8248	98	5.25 (133.35)	7.50 (190.50)	3.45 (1.56)	5
8677	6 Position	-	-	10.50 (266.70)	3.75 (95.25)	2.20 (1.00)	6
8676	8 Position	-	-	5.25 (133.35)	7.50 (190.50)	1.84 (0.83)	5
8680	10 Position	Digital/8248	98	5.25 (133.35)	11.25 (285.75)	4.21 (1.92)	7
8679	13 Position	Digital/8248	98	10.50 (266.70)	7.50 (190.50)	5.15 (2.34)	10

Squalicum Harbor, Bellingham Bay, and San Juan Islands

DC Toggle Circuit Breaker Panels

Common Features

- All positive, negative and grounding buses installed, fully pre-wired
- Includes set of 30 common backlightable DC labels (see page 90)
- Label backlighting pre-installed
- All LEDs installed
- Detailed installation instructions and cutout template included
- Over 500 individual labels to choose from (see pages 91-94)
- Maximum panel amperage - 100 Amperes

Main + 35 Positions

8382 3382

Main + 32 Positions

8381 3381

Main + 20 Positions

8379 3379

18 Position

8378 3378

24 Position

8264 3264

12 Position

8375 3375

13 Position

8403 3403

13 Position

8068 3068

16 Position

8377 3377

Main + 22 Positions

8380 3380

10 Position

8402 3402

10 Position

8082 3082

13 Position

8376 3376

8 Position

8385 3385

5 Position

8401 3401

5 Position

8081 3081

8 Position

8023 3023

3 Position

8025 3025

6 Position

8096 3096

DC Main Circuit Breaker Panels

PN	PN	Description	Meter Type/PN	Meter Page	Voltage	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed C-Series Main Circuit Breaker	Installed Single Pole Circuit Breaker
									100A	15A
8379	3379	Main + 20 Positions	Digital/8248	98	12/24V DC	14.75 (374.65)	7.50 (190.50)	7.20 (3.27)	1	14
8380	3380	Main + 22 Positions	Analog/8028, 8250	101	12V DC	10.50 (266.70)	11.25 (285.75)	6.10 (2.76)	1	16
8381	3381	Main + 32 Positions	Analog/8003, 8017	101	12V DC	14.75 (374.65)	11.25 (285.75)	8.60 (3.89)	1	23
8382	3382	Main + 35 Positions	Digital/8248	98	12/24V DC	14.75 (374.65)	11.25 (285.75)	10.80 (4.92)	1	26

DC Branch Circuit Breaker Panels

PN	PN	Description	Meter Type/PN	Meter Page	Voltage	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed C-Series Main Circuit Breaker	Installed Single Pole Circuit Breaker
									100A	15A
8025	3025	3 Position	-	-	12/24V DC	5.25 (133.35)	3.75 (95.25)	1.12 (0.61)	-	3
8401	3401	5 Position	Digital/8248	98	12/24V DC	5.25 (133.35)	7.50 (190.50)	3.45 (1.56)	-	5
8081	3081	5 Position	Analog/8028, 8041	101	12V DC	5.25 (133.35)	7.50 (190.50)	4.06 (1.84)	-	5
8096	3096	6 Position	-	-	12/24V DC	10.50 (266.70)	3.75 (95.25)	2.20 (1.00)	-	6
8023	3023	8 Position	-	-	12/24V DC	5.25 (133.35)	7.50 (190.50)	1.84 (0.83)	-	5
8385	3385	8 Position	-	-	12/24V DC	10.50 (266.70)	4.50 (114.30)	1.95 (0.88)	-	6
8402	3402	10 Position	Digital/8248	98	12/24V DC	5.25 (133.35)	11.25 (285.75)	4.21 (1.91)	-	7
8082	3082	10 Position	Analog/8028, 8041	101	12V DC	5.25 (133.35)	11.25 (285.75)	4.06 (1.84)	-	7
8375	3375	12 Position	-	-	12/24V DC	14.75 (374.65)	4.50 (114.30)	3.10 (1.41)	-	10
8376	3376	13 Position	-	-	12/24V DC	5.25 (133.35)	11.25 (285.75)	2.76 (1.25)	-	10
8403	3403	13 Position	Digital/8248	98	12/24V DC	10.50 (266.70)	7.50 (190.50)	5.15 (2.34)	-	10
8068	3068	13 Position	Analog/8028, 8041	101	12V DC	10.50 (266.70)	7.50 (190.50)	4.06 (1.84)	-	10
8377	3377	16 Position	-	-	12/24V DC	10.50 (266.70)	7.50 (190.50)	3.68 (1.67)	-	10
8378	3378	18 Position	Analog/8003, 8017	101	12V DC	14.75 (374.65)	7.50 (190.50)	5.70 (2.59)	-	15
8264	3264	24 Position	-	-	12/24V DC	14.75 (374.65)	7.50 (190.50)	5.12 (2.32)	-	15

Available January, 2006

WeatherDeck™ Water Resistant Circuit Breaker Panels NEW PRODUCT

Water resistant panel front withstands rain, sea spray, and hose spray washdown

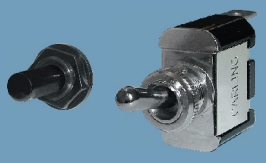
- Designed for flybridge and open cockpit applications
- Constructed from corrosion resistant materials
- Independent label backlighting circuit for remote switching and dimming
- Compatible with all Blue Sea Systems Digital Dimmers (see page 104)
- UV stabilized and weather resistant faceplate
- Rated IP67 - "Temporary Immersion"
- Rugged UV stabilized waterproof boots protect switches and circuit breakers
- Each panel can be mounted in four different orientations (see page 49)
- Available in 4 and 6 circuit models
- Includes 4215 - 30 label set (see page 89)

Specifications

Panel Material	Reinforced Polycarbonate
Cover Material	Weather Resistant Thermoplastic
Maximum Voltage	12 Volts DC
Maximum Amperage Per Circuit	15 Amperes
Switch Type	OFF/ON Toggle with waterproof boot (see page 54)
Switch Rating	15 Amperes Maximum
Backlighting Voltage	12 Volts DC Nominal
Backlighting Amperage Draw	10mA/Illuminated Circuit
Circuit Breaker Type	Push Button Reset Only with waterproof boot (see page 40)
Circuit Breaker Rating	15 Amperes

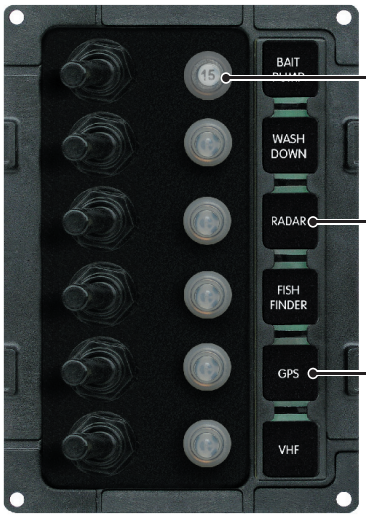
Carling Technologies®

Rugged UV stabilized waterproof boots protect Toggle Switches (see page 54)



Carling Technologies®

Rugged UV stabilized waterproof boots protect Push Button Thermal Circuit Breakers (see page 40)



4 Position - Gray

4374

4 Position - White

4384

6 Position - Gray

4376

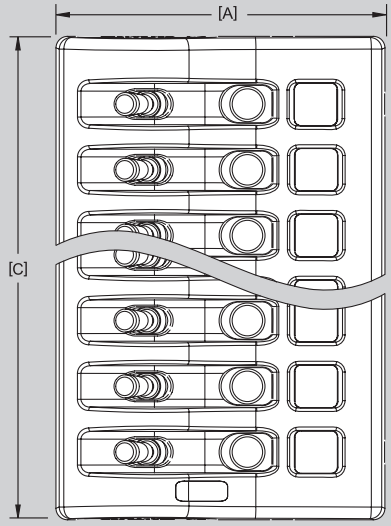
6 Position - White

4386

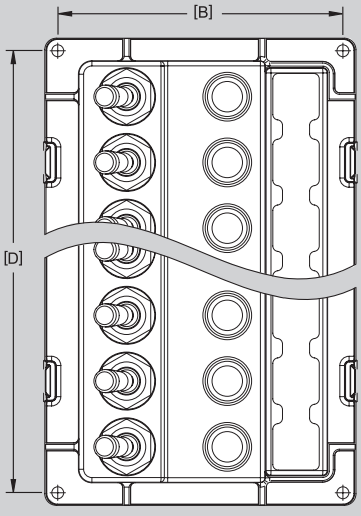
PN	Description	Weight Lb (Kg)
4374	4 Position - Gray	0.97 (0.44)
4376	6 Position - Gray	1.36 (0.62)
4384	4 Position - White	0.97 (0.44)
4386	6 Position - White	1.36 (0.62)

NEW PRODUCT

For high volume applications contact Blue Sea Systems about custom configurations. Call 1-800-222-7617 for information.



With Cover



Without Cover

Description	[A] Width in" (mm)	[B] Mounting Centers in" (mm)	[C] Height in" (mm)	[D] Mounting Centers in" (mm)
4 Position	4.25 (107.95)	3.69 (93.73)	4.30 (109.22)	3.74 (95.00)
6 Position	4.25 (107.95)	3.69 (93.73)	6.00 (152.40)	5.44 (138.18)

Four Mounting Orientations

Each panel can be mounted in 4 orientations to expand location possibilities - Circuit labels can be rotated accordingly.

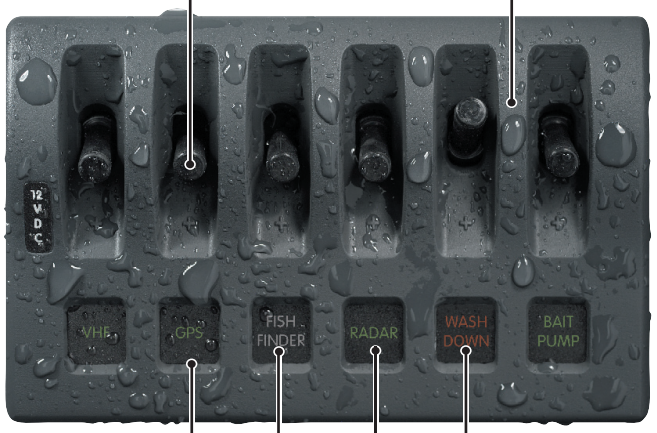
WeatherDeck™ Water Resistant Fuse Panels

Water resistant panel front withstands rain, sea spray, and hose spray washdown

- Designed for flybridge and open cockpit applications
- Constructed from corrosion resistant materials
- Independent label backlighting circuit for remote switching and dimming
- Compatible with all Blue Sea Systems Digital Dimmers (see page 104)
- UV stabilized and weather resistant faceplate
- Rated IP67 - “Temporary Immersion”
- Rugged UV stabilized waterproof boots
- Each panel can be mounted in four different orientations (see page 51)
- Available in 2, 4, 6, and 8 circuit models
- Includes 4215 - 30 label set (see page 89)
- Integrated ATO/ATC fuse based circuit protection

Specifications

Panel Material	Reinforced Polycarbonate
Cover Material	Weather Resistant Thermoplastic
Maximum Voltage	12 Volts DC
Maximum Amperage Per Circuit	15 Amperes
Switch Type	OFF/ON Toggle with waterproof boot (see page 54)
Switch Rating	15 Amperes maximum
Backlighting Voltage	12 Volts DC Nominal
Backlighting Amperage Draw	10mA/Illuminated Circuit
Fuse Type	ATO/ATC Automotive Blade-Type
Fuse Available	1-40 Amperes



Carling Toggle Switch available in single pole-double throw, double pole-double throw, and momentary styles

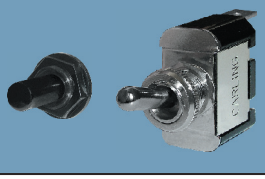
Integrated switch guards prevent accidental switching

360° circuit labels conveniently read in any mounted orientation

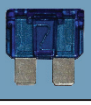
Bi-colored LEDs illuminate circuit labels to quickly identify “OFF” (Red), “ON” (Green), or “BLOWN (No color)” circuits

Carling Technologies®

Rugged UV stabilized waterproof boots protect Carling Toggle Switches (see page 54)



ATO/ATC Blade Fuse on each circuit simplifies identification of Amperage (see page 59)



UV stabilized weather resistant faceplate snaps easily on and off, providing access to components, and concealing mounting screws

Fuses are easily accessed from the front of the panel

Labels can be rotated 360°

30 Common DC backlightable labels included for circuit identification (see page 89)

Fuses fully sealed with silicone rubber cover for water resistance

2 Position - Gray

4302

4 Position - Gray

4304

6 Position - Gray

4306

8 Position - Gray

4308

8 Position - White

4318

6 Position - White

4316

4 Position - White

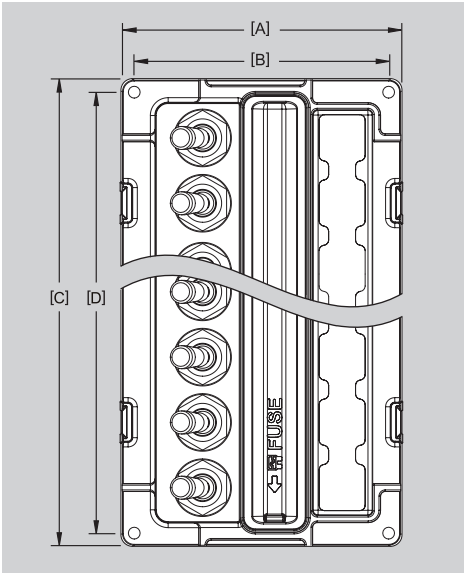
4314

2 Position - White

4312

PN	Description	Weight Lb (Kg)
4302	2 Position - Gray	0.67 (0.30)
4304	4 Position - Gray	0.90 (0.41)
4306	6 Position - Gray	1.13 (0.51)
4308	8 Position - Gray	1.37 (0.62)
4312	2 Position - White	0.67 (0.30)
4314	4 Position - White	0.90 (0.41)
4316	6 Position - White	1.13 (0.51)
4318	8 Position - White	1.37 (0.62)

▶ For high volume applications Contact Blue Sea Systems about custom configurations. Call 1-800-222-7617 for information.



Description	[A] Width in" (mm)	[B] Mounting Centers in" (mm)	[C] Height in" (mm)	[D] Mounting Centers in" (mm)
2 Position	3.88 (98.40)	3.31 (84.14)	2.60 (66.00)	2.04 (51.75)
4 Position	3.88 (98.40)	3.31 (84.14)	4.30 (109.20)	3.74 (94.93)
6 Position	3.88 (98.40)	3.31 (84.14)	6.00 (152.40)	5.44 (138.11)
8 Position	3.88 (98.40)	3.31 (84.14)	7.70 (195.60)	7.14 (181.29)

Four Mounting Orientations

Each panel can be mounted in 4 orientations to expand location possibilities - Circuit labels can be rotated accordingly.

Water Resistant Circuit Breaker Panels

Water resistant panel front withstands rain, sea spray, and hose spray washdown

Common Features

- Designed for flybridge and open cockpit applications
- Water resistant ON-OFF Contura Switches
- Watertight mounting gasket
- Push Button Circuit Breaker with waterproof boot (see page 40)
- Rated IP66 - “Use on Shipdecks”
- Ignition protected - Safe for installation aboard gasoline powered boats
- Meets UL1500 and ISO 8846 ignition protection requirements
- Countersunk mounting holes throughout
- Heavy 1/8” aluminum material
- Two-part polyurethane white or black finish
- “ON” indicating LEDs embedded in switch
- MIL-C-5541C or equivalent immersion undercoating for lifetime corrosion resistance
- Completely wired and ready to install
- Includes set of 60 common DC labels (see page 90)

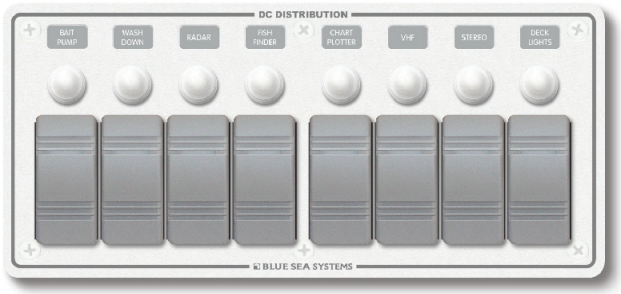
NOTE: Water resistant panel labels are not backlightable

Specifications

Voltage	12 or 24 Volts DC
Switch Rating	20 Amperes@12 Volts DC 15 Amperes@24 Volts DC
Switch LED Amperage Draw	18 Milliamperes each
Circuit Breaker Rating	15 Amperes
Panel Cumulative Rating	45 Amperes

CE marked

8 Position - Horizontal

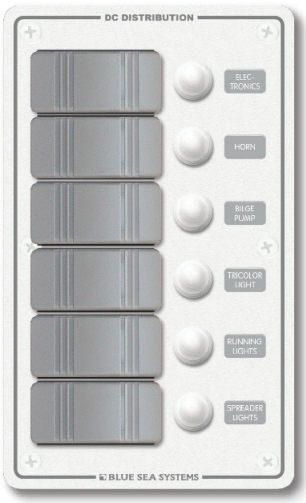


8271

8 Position - Horizontal

8371

6 Position - Vertical

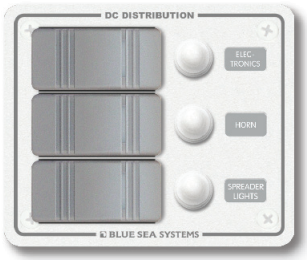


8273

6 Position - Vertical

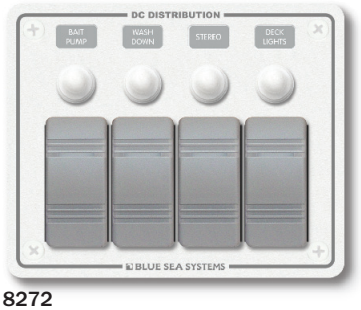
8373

3 Position - Vertical



8274

4 Position - Horizontal



8272

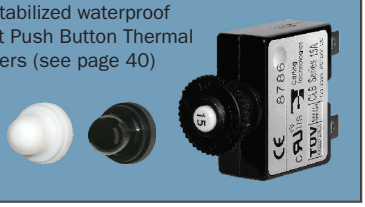
3 Position - Vertical

8374

4 Position - Horizontal

8372

PN	Description	Color	Width in” (mm)	Height in” (mm)	Weight Lb (Kg)
8274	**3 Position - Vertical**	White	4.50 (114.30)	3.75 (95.25)	0.60 (0.27)
8272	**4 Position - Horizontal**	White	5.25 (133.35)	4.25 (107.95)	0.77 (0.35)
8273	**6 Position - Vertical**	White	4.50 (114.30)	7.50 (190.50)	0.90 (0.41)
8271	**8 Position - Horizontal**	White	9.37 (238.00)	4.25 (107.95)	1.34 (0.61)
8374	**3 Position - Vertical**	Black	4.50 (114.30)	3.75 (95.25)	0.60 (0.27)
8372	**4 Position - Horizontal**	Black	5.25 (133.35)	4.25 (107.95)	0.77 (0.35)
8373	**6 Position - Vertical**	Black	4.50 (114.30)	7.50 (190.50)	0.90 (0.41)
8371	**8 Position - Horizontal**	Black	9.37 (238.00)	4.25 (107.95)	1.34 (0.61)



Water resistant panel front withstands rain, sea spray, and hose spray washdown

Water Resistant Fuse Panels

Common Features

- Designed for flybridge and open cockpit applications
- Water resistant ON-OFF Contura Switches
- Watertight mounting gasket included
- Water resistant fuse holders accept commonly available AGC (Fast Acting) and MDL (Slow Blow) glass fuses (see page 59)
- Countersunk mounting holes throughout
- Heavy 1/8" aluminum material
- Two-part polyurethane slate gray finish
- "ON" indicating LEDs embedded in switches
- Over 500 labels available (see pages 91-94)
- Industry standard height and width
- Mil-Spec chemical treatment via immersion to protect every surface detail from corrosion
- Completely wired and ready to install

NOTE: Water resistant panel labels are not backlightable

Vertical Fuse Panel Features

- Industry standard height and width
- Includes set of 30 standard format common DC labels*

Horizontal Fuse Panel Features

- Designed for height restricted installations
- Compact labels minimize panel space requirements
- Includes set of 60 small format common DC labels*

* See page 81

Specifications

Voltage	12 or 24 Volts DC
Switch Rating	20 Ampere@12 Volts DC 15 Ampere@24 Volts DC
Switch LED Amperage Draw	18 Milliamperes each
Fuse Holder Rating	20 Amperes maximum
Panel Cumulative Rating	45 Amperes

6 Position - Vertical

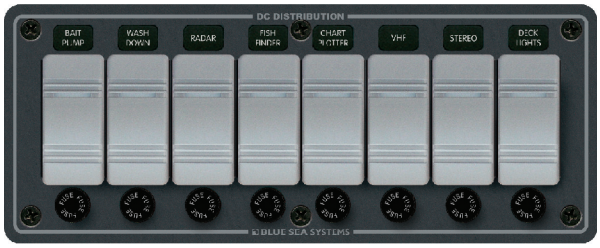
8053

Easy to open, water resistant fuse holder (see page 54)

3 Position - Vertical

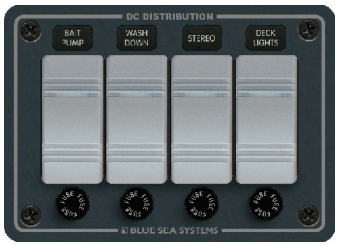
8054

8 Position - Horizontal



8261

4 Position - Horizontal



8262

PN	Description	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)
8054	3 Position - Vertical	5.25 (133.35)	3.75 (95.25)	0.60 (0.27)
8053	6 Position - Vertical	5.25 (133.35)	7.50 (190.50)	0.90 (0.41)
8262	4 Position - Horizontal	5.25 (133.35)	3.75 (95.25)	0.77 (0.35)
8261	8 Position - Horizontal	9.37 (238.00)	3.75 (95.25)	1.34 (0.61)

Water resistant panel front withstands rain, sea spray, and hose spray washdown

Water Resistant Bilge Pump Control Panel

- Designed for flybridge and open cockpit applications
- Water resistant (ON)-OFF-AUTO Contura Switch
- Watertight mounting gasket
- Water resistant fuse holders accept commonly available AGC (Fast Acting) and MDL (Slow Blow) glass fuses (see page 59)
- Countersunk mounting holes throughout
- Heavy 1/8" aluminum material
- Two-part polyurethane slate gray finish
- "ON" indicating LEDs embedded in switch
- Industry standard height and width
- Mil-Spec chemical treatment via immersion to protect every surface detail from corrosion
- Completely wired and ready to install

NOTE: Water resistant panel labels are not backlightable

Specifications

Specifications match Water Resistant Fuse Panels (See above)

Easy to open, water resistant fuse holder (see page 54)

8263

PN	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)
8263	2.25 (57.15)	3.75 (95.25)	0.43 (0.20)

WeatherDeck™ Single Pole Toggle Switches

- Specially manufactured by Carling Technologies® for use in Blue Sea Systems WeatherDeck™ Water Resistant Panels (see pages 48-51)
- Nickel-plated brass and phenolic non-corrosive construction

Specifications

Rating: 250 Volts AC	10 Amperes
Rating: 125 Volts AC	15 Amperes
Rating: 12 Volts DC	15 Amperes
Terminal Size	0.25” (6.35mm)
Terminal Type	Quick Connect Tab

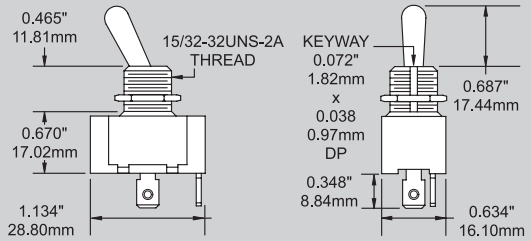
PN	Pole/Throw	Action
4150	SPST	OFF - ON
4151	SPST	OFF - (ON)
4152	SPDT	ON - OFF - ON
4153	SPDT	(ON) - OFF - ON
4154	SPDT	(ON) - OFF - (ON)

( ) = Momentary

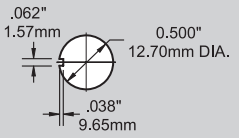
▶ See pages 48-51 for Blue Sea Systems DC Water Resistant WeatherDeck™ Panels.

4150

Carling Technologies®



WeatherDeck™ Panel Switch Dimensions



WeatherDeck™ Panel Switch Cutout

WeatherDeck™ Double Pole Toggle Switch NEW PRODUCT

- For use in Blue Sea Systems WeatherDeck™ Water Resistant Panels (see pages 48-51)
- Nickel-plated brass and phenolic non-corrosive construction

Specifications

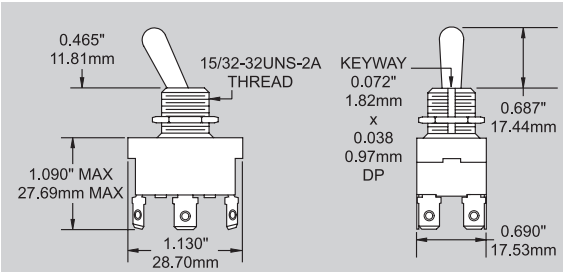
Rating: 30 Volts DC	5 Amperes
Terminal Size	0.25” (6.35mm)
Terminal Type	Quick Connect Tab

PN	Pole/Throw	Action
4155	DPDT	ON-OFF-ON

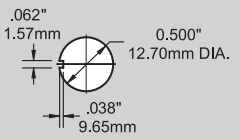
NEW PRODUCT

▶ See pages 48-51 for Blue Sea Systems DC Water Resistant WeatherDeck™ Panels.

4155



WeatherDeck™ Panel Switch Dimensions



WeatherDeck™ Panel Switch Cutout

WeatherDeck™ Toggle Switch Waterproof Boots

- Replaces dress nut for mounting on WeatherDeck™ Panel Switches
- UV resistant material resists discoloration and cracking

Specifications

Case Material	UV Resistant Silicone Rubber
Thread Material	Nickel Plated Brass
Thread	15/32”-32UNS-2A

PN	Description	Weight Lb (Kg)
4138	Black Toggle Switch waterproof boot	0.03 (0.01)

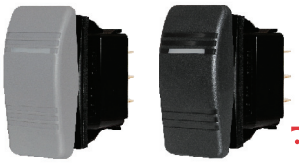
4138

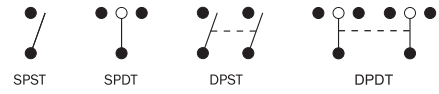
Water Resistant Fuse Holder

- Improved, easy to open, water resistant fuse holder
- Withstands water exposure normally encountered in above deck applications: rain, sea spray or hose spray washdown

PN	Description	Weight Lb (Kg)
5021	Water Resistant Fuse Holder	0.02 (0.01)

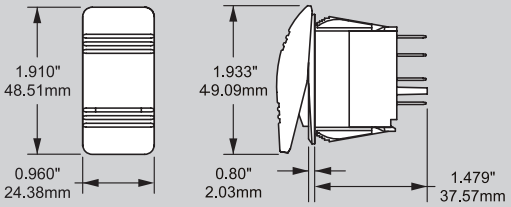
5021





Pole/Throw
SPST - Single Pole Single Throw
SPDT - Single Pole Double Throw
DPST - Double Pole Single Throw
DPDT - Double Pole Double Throw

Legend
Center terminal switch lever
Terminal
Off Position



Water Resistant Contura Switch Dimensions

▶ See pages 52-53 for Blue Sea Systems DC Water Resistant Panels.

IP IGNITION PROTECTED

Water Resistant Contura Switches IP

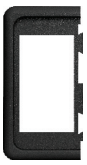
- Vibration, shock, thermoshock, moisture and salt spray resistant
- Specially manufactured for use in Blue Sea Systems Water Resistant Panels
- Ignition Protected - Safe for installation aboard gasoline powered boats
- Meets UL 1500 and ISO 8846 ignition protection requirements

Specifications

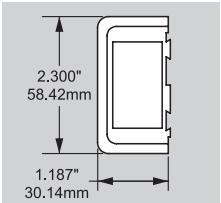
Rating: 12 Volts DC	20 Amperes
Rating: 24 Volts DC	15 Amperes
Lighted	LED rated 100,000 hours 1/2 life
Seals	Internal and external gasket panel seal
Temperature Rating	-40°C to 85°C
Mounting Hole	1.45" x 0.83" (36.83mm x 21.08mm)
LED Amperage	18 Milliamperes

PN Gray	PN Black	Pole/Throw	Action	Embedded LEDs
8230	8282	SPST	OFF - ON	1
8231	8292	SPST	OFF - (ON)	0
8232	8283	SPDT	ON - OFF - ON	2
8233	8284	SPDT	(ON) - OFF - ON	1
8234	8285	SPDT	(ON) - OFF - (ON)	0
8218	8287	DPST	OFF - ON	1
8219	8288	DPST	OFF - (ON)	0
8220	8286	DPDT	ON - OFF - ON	2
8221	8289	DPDT	(ON) - OFF - ON	1
8222	8290	DPDT	(ON) - OFF - (ON)	0
8275	-	DPDT	ON - ON	2

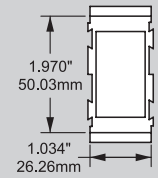
( ) = Momentary



8267

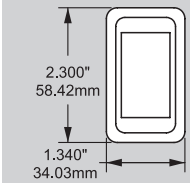


8267 Dimensions



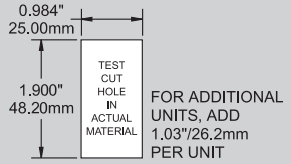
8266 Dimensions

8266



8268 Dimensions

8268

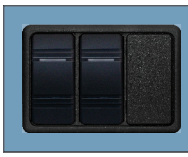


Panel Cutout

Contura Switch Mounting Panels

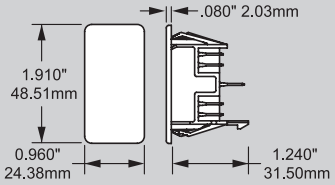
- Modular design permits easy assembly in groups of varying sizes
- Mounting panels available in 1, 3 and 6 fixed position models
- Designed for mounting in 6 different panel thicknesses (see below):
  0.06" (1.57mm) 0.09" (2.36mm) 0.13" (3.17mm)
  0.19" (4.75mm) 0.25" (6.35mm) 0.38" (9.52mm)

PN	Description	Width in" (mm)	Height in" (mm)
8267	End Mounting Panel	1.19 (30.14)	2.30 (58.42)
8266	Center Mounting Panel	1.03 (26.26)	2.30 (58.42)
8268	1 Position Mounting Panel	1.34 (34.03)	2.30 (58.42)
8259	3 Position Mounting Panel	3.40 (86.36)	2.30 (58.42)
8260	6 Position Mounting Panel	6.49 (164.85)	2.30 (58.42)



8259 Mounting Panel with Installed Switches and Plug

8278



8278 Dimensions

Contura Switch Mounting Panel Plug

- For use with Contura Switch Mounting Panels (see above)

PN	Description
8278	Mounting Panel Plug

8297 8294

PN Gray	PN Black	Number of Lenses
8299	8296	None
8297	8294	Single
8298	8295	Double
8293	Actuator Removal Tool	

Contura Switch Actuators

- Mounts on any Blue Sea Systems Contura switch
- Constructed of thermal plastic polycarbonate with a hard nylon - surface overlay
- For each embedded LED, there is a corresponding number of lenses

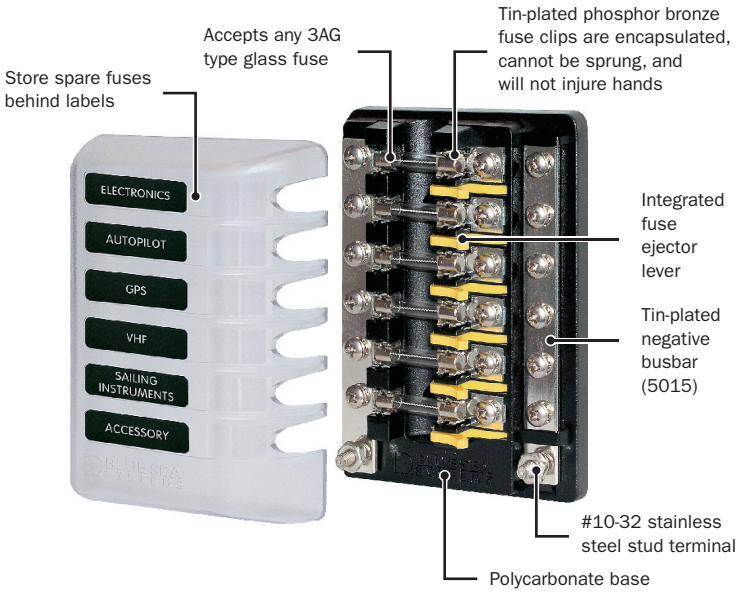
ST* Glass Fuse Blocks

***Screw Terminal**

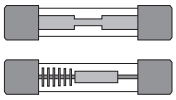
- Clear insulating cover with label recesses accept large format Blue Sea Systems labels (see pages 90-94)
- Cover insulates all conductive parts, satisfying ABYC/USCG requirements and stores spare fuses
- Tin-plated copper buses and Phosphor Bronze fuse clips give 30 Amperes rating per circuit
- Accepts AGC (Fast Acting), MDL (Time-Delay) and all other 3AG Glass Fuses (see page 59)

Specifications

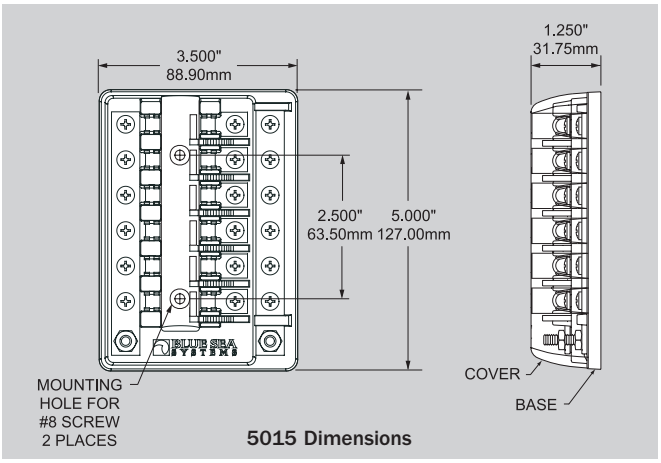
Base Material	Reinforced Polycarbonate
Cover Material	Polycarbonate
AGC/MDL Fuses available	1/8 to 30 Amperes
Screw Terminal	#8-32 with Captive Star Lockwasher
Maximum Amperage per circuit	30 Amperes
Maximum Amperage block	100 Amperes
Maximum Voltage	32 Volts DC



PN	Description	Weight Lb (Kg)
5015	6 circuit with negative bus	0.52 (0.24)
5018	6 circuit	0.42 (0.19)



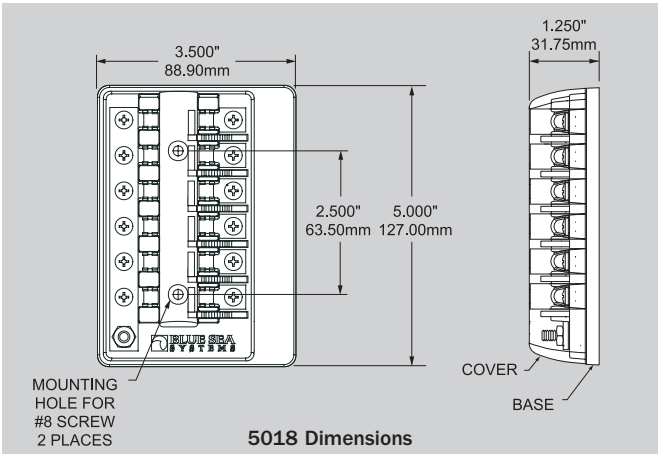
▶ See page 59 for AGC and MDL Fuses.



5015 Dimensions

6 Circuit with Negative Bus

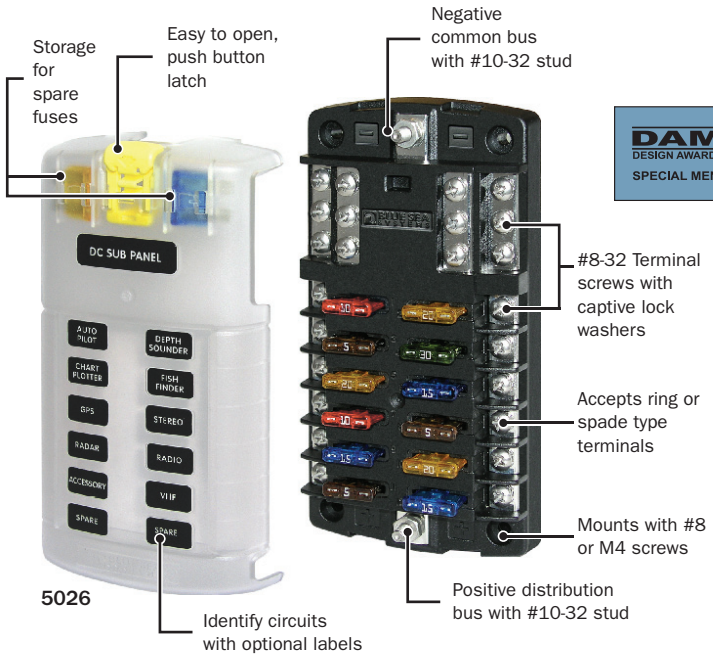
5015



5018 Dimensions

6 Circuit

5018



ST* Blade Fuse Blocks

***Screw Terminal**

- Clear insulating cover with label recess accept small format Blue Sea Systems labels (see pages 90-94)
- Cover satisfies all ABYC/USCG requirements
- Tin-plated copper buses and fuse clips give 30 Amperes rating per circuit
- Accepts ATO and ATC fast acting blade fuses (see page 59)
- A wide variety of circuit identification labels available (see pages 90)
- 20 write-on circuit labels included, excluding 5030, 5031, 5033, and 5034

Specifications

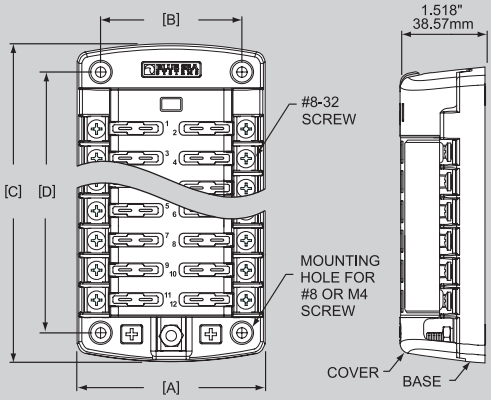
Base Material	Reinforced Polycarbonate
Cover Material	Polycarbonate
ATO/ATC Fuses available	1 to 40 Amperes
Maximum Amperage per circuit	30 Amperes
Maximum Amperage per block	100 Amperes
Maximum Voltage	32 Volts DC

ST Blade Fuse Block With Cover		
PN	**Description**	**Weight Lb (Kg)**
5025	6 circuit with negative bus	0.55 (0.25)
5026	12 circuit with negative bus	0.75 (0.34)
5028	6 circuit	0.50 (0.23)
5029	12 circuit	0.68 (0.31)

ST Blade Fuse Block Without Cover		
PN	**Description**	**Weight Lb (Kg)**
5030	6 circuit with negative bus	0.47 (0.21)
5031	12 circuit with negative bus	0.65 (0.29)
5033	6 circuit	0.42 (0.19)
5034	12 circuit	0.59 (0.27)

Now accepts all European Blade Type fuses

▶ See page 59 for ATO/ATC Fuses.

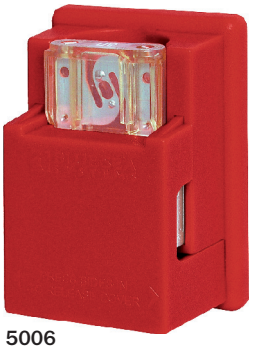


ST Blade Fuse Block Dimensions

PN	[A] Width in" (mm)	[B] Mounting Centers in" (mm)	[C] Height in" (mm)	[D] Mounting Centers in" (mm)
5028/5033	3.315 (84.20)	2.500 (63.50)	3.652 (92.76)	2.639 (67.03)
5025/5030	3.315 (84.20)	2.500 (63.50)	4.894 (124.31)	3.881 (95.58)
5029/5034	3.315 (84.20)	2.500 (63.50)	5.230 (132.84)	4.217 (107.11)
5026/5031	3.315 (84.20)	2.500 (63.50)	6.472 (164.39)	5.459 (138.66)

MAXI™ Fuse Block

- The most economical fuse block for 30-80 Ampere fusing
- Snap-on terminal cover insulates all conductive parts, satisfying ABYC/USCG requirements
- Accepts wire sizes 18-4 AWG from sides or bottom
- For use on systems up to 32 Volts DC
- Ring terminal screws compress fuse blades within blocks for low resistance connections
- Accepts Maxi™ Fuses (see below)



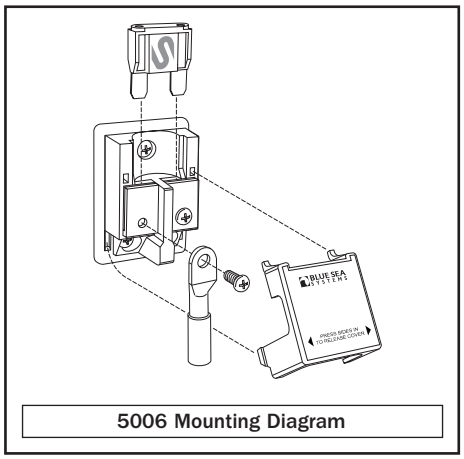
5006

Specifications

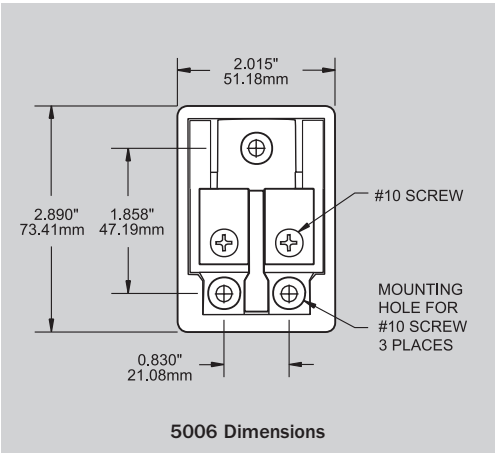
Base Material	Red Reinforced Polycarbonate
MAXI™ Fuses Available	30-80 Amperes
Maximum Amperage	80 Amperes
Maximum Voltage	32 Volts DC
Fuse Mounting Blocks	Tin-plated Brass

PN	Description	Weight Lb (Kg)
5006	30-80A	0.26 (0.12)

▶ See below for MAXI™ Fuses.



5006 Mounting Diagram



5006 Dimensions

MAXI™ Fuses

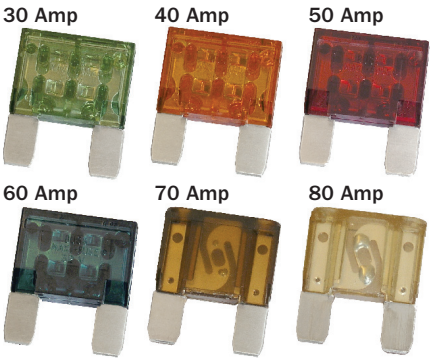
- Economical
- Tin-plated connector blades for corrosion resistance
- Visible indication of blown condition

Specifications

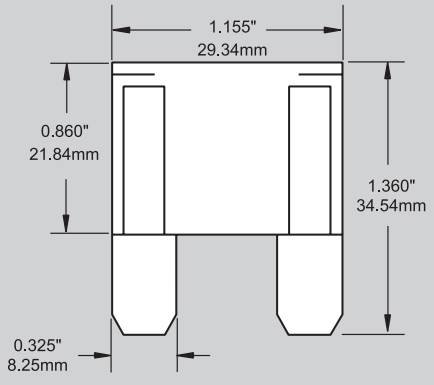
Maximum Voltage	32 Volts DC
Interrupt Capacity	1,000 Amperes DC
Delay	See www.bluesea.com

PN	Amperage	Weight Lb (Kg)
5138	30A	0.04 (0.02)
5139	40A	0.04 (0.02)
5140	50A	0.04 (0.02)
5141	60A	0.04 (0.02)
5142	70A	0.04 (0.02)
5143	80A	0.04 (0.02)

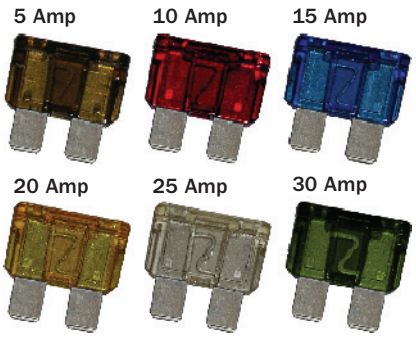
▶ See above for Blue Sea Systems' MAXI™ Fuse Block.



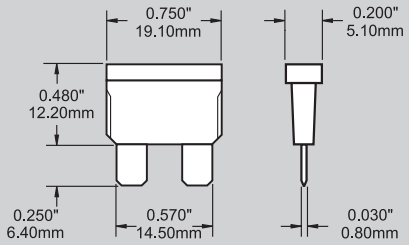
Actual Size Illustrated



MAXI™ Fuse Dimensions



Actual Size Illustrated



ATO/ATC Fuse Dimensions

ATO/ATC Fuses

- Fast-acting type fuses ideal for electronic devices
- Standard circuit protection device for automobiles and trucks
- Tin-plated connector blades for corrosion resistance
- Visible indication of blown condition
- Sold in packages of 2

Specifications

Maximum Voltage	32 Volts DC
Interrupt Capacity	1,000 Amperes DC
Delay	See www.bluesea.com
Weight per package	0.03Lb (0.01Kg)

PN	Amperage
5235	1A
5236	2A
5237	3A
5238	4A
5239	5A
5240	7.5A
5241	10A
5242	15A
5243	20A
5244	25A
5245	30A
5246	40A

▶ See page 57 for Blue Sea Systems ST* Blade Fuse Blocks.
* Screw Terminal
▶ See pages 50-51 for Blue Sea Systems WeatherDeck™ Water Resistant Fuse Panel

AGC

MDL

AGC Fuse Dimensions

MDL Fuse Dimensions

AGC/MDL 3AG Fuses

AGC
- UL listed 248-14/CSA certified
- Fast-acting glass fuses
- Sold in packages of 5

MDL
- UL listed 248-14/CSA certified
- Time-delay glass fuses for high inrush motor type loads
- Sold in packages of 2

Specifications

Maximum Voltage	32 Volts DC
Interrupt Capacity	1,000 Amperes DC
Delay	See www.bluesea.com
AGC - Weight per package	0.04Lb (0.02Kg)
MDL - Weight per package	0.03Lb (0.01Kg)

Automotive Blade Fuses (ATO/ATC) vs. Glass Fuses (AGC/MDL)

ATO/ATC Fuse Advantages:

- Color-coding makes determining amperage quick and easy.
- Body size and configuration makes inserting and extracting easier.
- Visibility of the fuse element makes identifying blown fuses easier.

AGC/MDL Fuse Advantages:

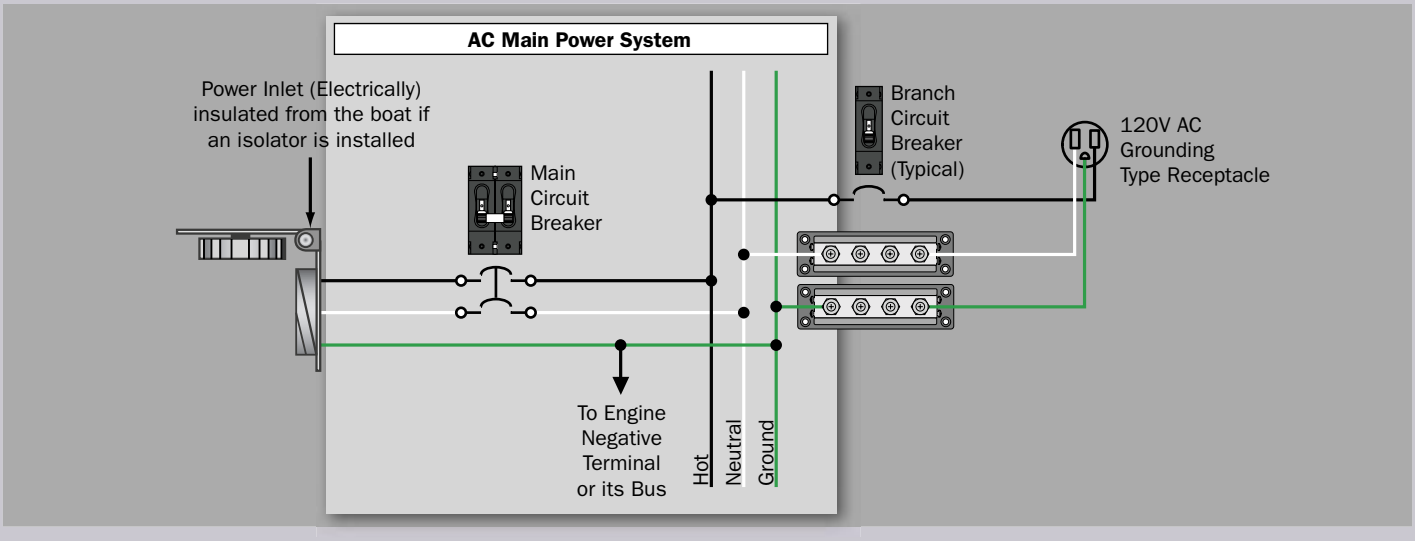
- Available in "fractional" sizes to protect delicate electronic circuits.
- Suitable for applications where both electronic and motor loads are being protected in the same fuse block.
- Less expensive and more widely available throughout the world.

PN AGC	PN MDL	Amperage
5200	-	1/8A
5201	-	1/4A
5202	5221	1/2A
5203	-	3/4A
5204	5222	1A
5205	5223	1.5A
5206	5224	2A
5207	5225	2.5A
5208	5226	3A
5209	-	4A
5210	5227	5A

PN AGC	PN MDL	Amperage
5211	-	6A
-	5228	6.25A
5212	-	7A
5213	5229	7.5A
5214	-	8A
5215	5230	10A
5216	-	12A
5217	5231	15A
5218	5232	20A
5219	5233	25A
5220	5234	30A

▶ See page 53 for Blue Sea Systems DC Water Resistant Fuse Panels.
▶ See page 56 for Blue Sea Systems ST* Glass Fuse Blocks.
* Screw Terminal

The AC Main Power System begins at the sources of AC power (Shore Power, Generator or Inverter). It ends at the Line terminal connection of the AC branch circuit breaker for the Hot wire and at the branch circuit connection block for the Neutral and Safety ground wires.



Purpose

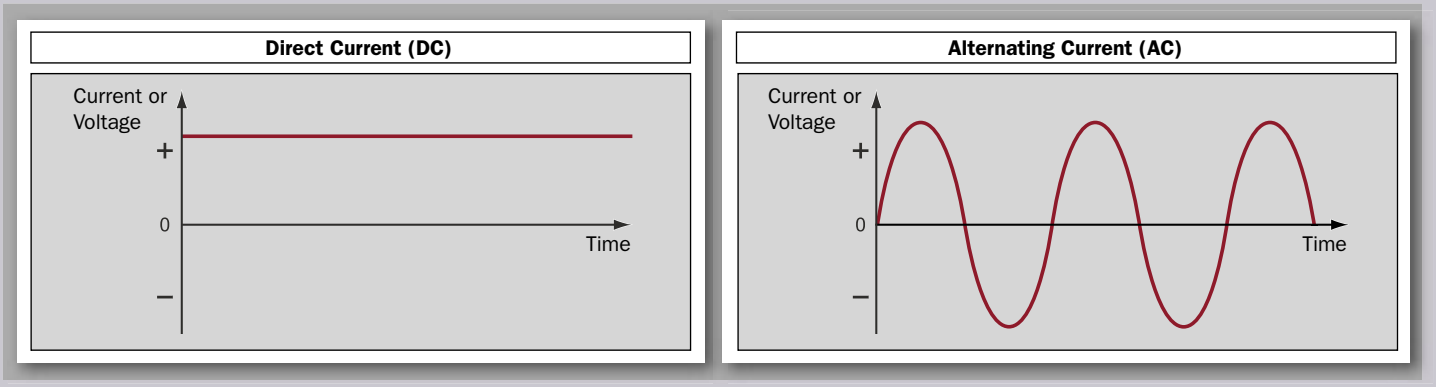
- Provide a path for delivering power from the ship's sources of AC power to the AC branch distribution system
- Provide a path for returning fault currents to ground via the green safety ground wire
- Provide galvanic Isolation in the green safety ground wire
- Provide a means for disconnecting AC power when the boat is not in use or in emergencies
- Provide electrical separation to insure that two sources of AC power are never connected
- Provide circuit protection for neutral and line wires in the AC main system
- Provide ground fault protection (See RCD in Glossary page 124) in European Systems

System Configurations

Due to the nature of alternating current, the devices used to distribute AC power are frequently the same as the devices that perform AC circuit protection. Therefore, this section of the catalog contains both AC main distribution systems and AC main circuit protection, referred to collectively as AC main power systems. Before selecting components for an AC system, several important distinctions about AC power must be considered.

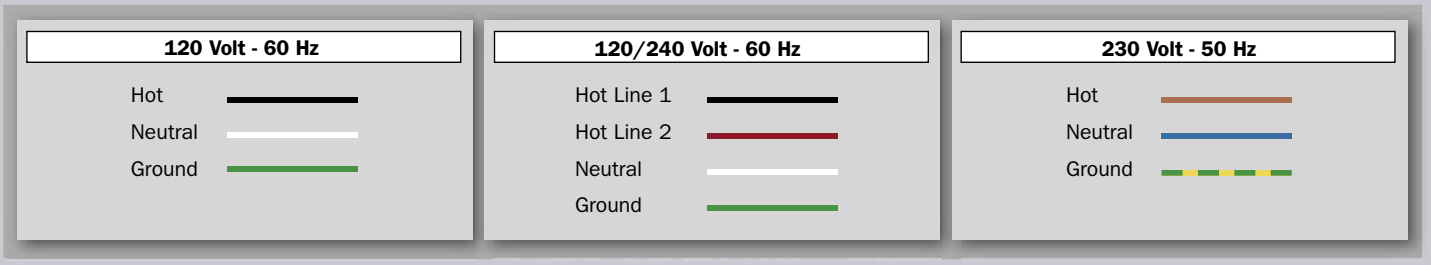
Direct Current (DC) vs. Alternating Current (AC)

In DC systems current flow is in one direction - from the point of higher voltage (electrical pressure) to lower voltage. In AC systems the voltage reverses 60 times each second (50 times each second in Europe and other parts of the world), called "cycles" or "Hertz" (Hz). This voltage reversal also reverses the current flow and gives this type of power its name - Alternating Current (AC). Because of this alternating current and the higher voltages it uses, (120 and 240 Volts AC vs. 12 or 24 Volts DC) the wiring configurations and components for AC current are different than DC.



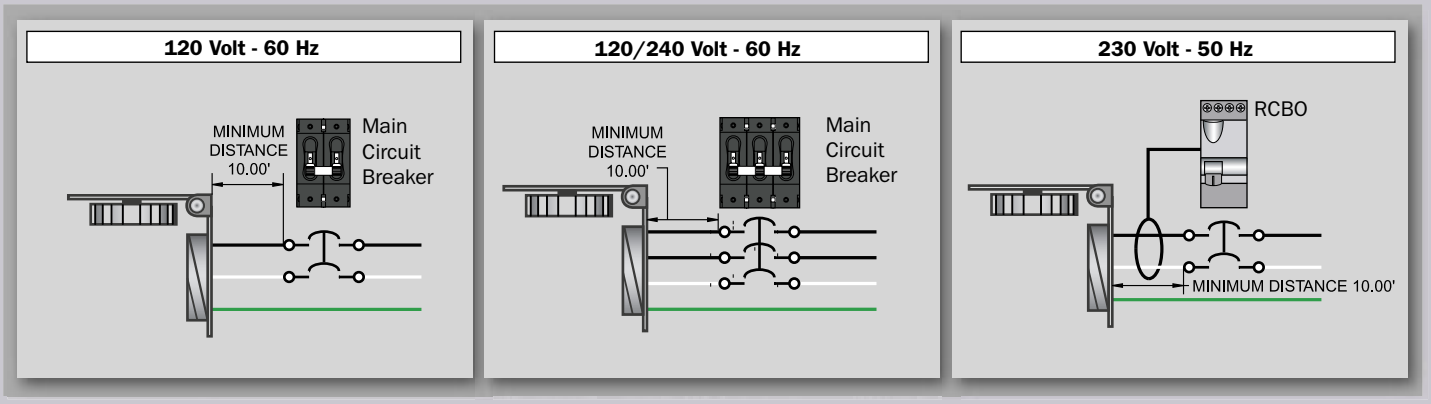
AC Wire Systems

The three most common AC systems used on boats are shown below. In all cases the ground, sometimes called safety ground to clarify its purpose and differentiate it from the DC ground or negative, is said to be a “normally non-current carrying wire”. Its purpose is to provide the lowest resistance path for AC currents that have strayed from their proper containment in the normally current carrying hot and neutral wires. The ground wire is connected to the exterior conductive parts of AC devices that could be touched by a person during normal operation and conducts errant AC currents safely to ground rather than passing them through a human body. The ground wire is never passed through a switch or circuit breaker.



Physical configuration of AC Main circuit breakers

Sources of AC power, whether shore power or on board generators and inverters, always have a circuit breaker near the power source. This circuit breaker is designated the AC main circuit breaker. The AC main circuit breaker always has a pole for each of the hot and neutral wires in the circuit assuring that circuit protection functions are not compromised in reverse polarity (see page 124) situations. The requirement stipulates that 120 Volt systems use a double pole main circuit breaker. Although not required by the ABYC Standards, three pole circuit breakers with the Neutral connected through the third pole are sometimes used on 120/240 Volt systems. In cases where the main circuit breaker is also used for source selection the Neutral must be switched to maintain the correct Neutral connection.



Devices Qualifying as AC Main Circuit Breakers

In order to qualify as an AC main circuit breaker four primary characteristics must be present:

1. The circuit breaker must have an Ampere Interrupt Rating (AIC) meeting those requirements of the table below:

Ampere Interrupt Rating - ABYC Table

AC Shore Power Source	Main Circuit Breaker	Branch Circuit Breaker
120V - 30A	3,000	3,000
120V - 50A	3,000	3,000
120/240V - 50A	5,000	3,000
240V - 50A	5,000	3,000

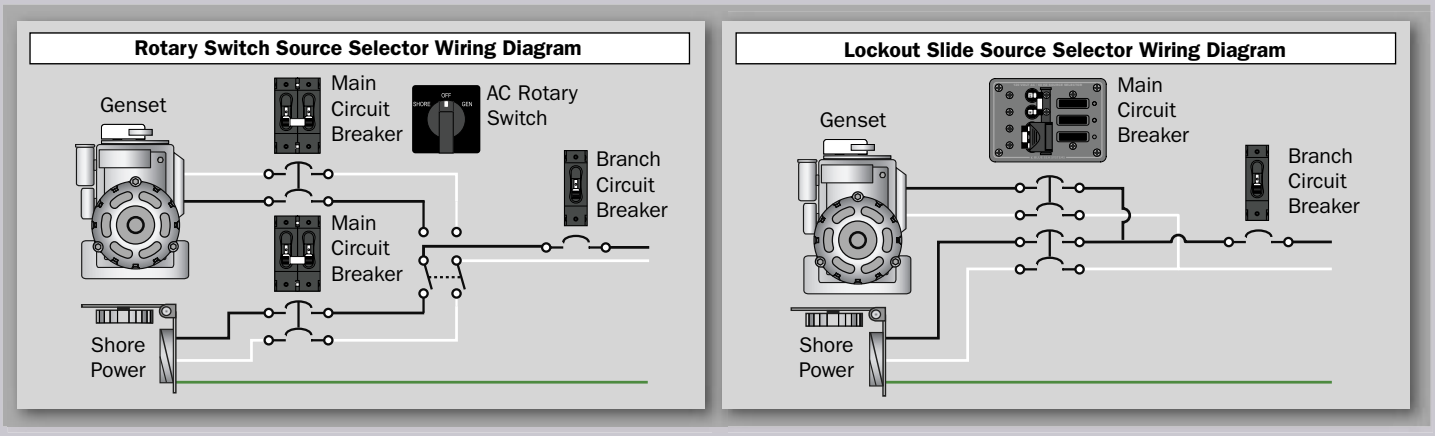
2. The circuit breaker must be multiple pole, usually 2 or 3 (see “AC Wire Systems” above).
3. The circuit breaker must be rated for the appropriate AC system voltage in which it will be used.
4. The circuit breaker must be available in amperages appropriate to the design amperage of the system. In the USA, this is generally 30 and 50 Amperes, while European systems are generally 16 and 32 Amperes.

European systems also require that a Residual Current Device (RCD) (see page 124) be installed on the entire AC system and this is generally implemented as Residual Current Breaker Overload (RCBO) (see page 124) device which incorporates a double pole circuit breaker and an RCD into a single device.

AC Source Selectors

AC sources from shore power, generator sets, inverters, and isolation transformers must be switched in such a way that ensures only one AC source is connected and all other AC sources are completely disconnected. Hazards to personnel and damage to equipment can occur if sources are improperly connected to each other. A properly designed selector system will allow only the appropriate neutral and hot source conductors to connect to the load without allowing the system to supply power backwards to unused connections or sources. Neutrals and grounds are treated differently with on board sources than with shore power and the system must handle each accordingly.

In marine AC systems there are two common methods used to assure that two different AC sources are never connected to each other. AC Lockout Slides are devices that slide between circuit breaker handles and allow only 1 handle to be in the "ON" position at a time. Circuit breakers with properly configured slides can have different numbers of poles and different current ratings for each breaker. AC Rotary Switches use a switching mechanism to prevent connection of different AC sources. Each system has its advantages and disadvantages as shown below:



Advantages
- Compact
- Can handle up to 4 sources
- More intuitive operation

Disadvantage
- Expensive relative to lockout slides
- Requires additional circuit protection

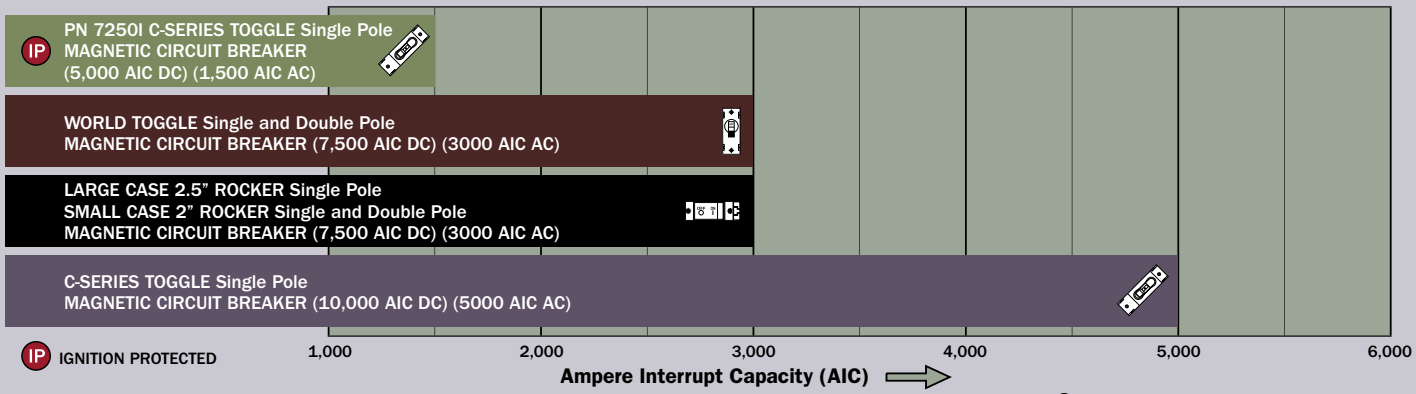
Advantages
- Integrates circuit protection and source selection into 1 unit
- Lower cost for both circuit protection and source selection
- Flexible configurations for dual shore cords

Disadvantages
- Require more space
- Impractical for more than 3 sources

Selecting AC Circuit Protection

1) **Determine these two numbers:**
   a. The amperage capacity of the smallest wire in the circuit to be protected. See the ABYC Ampacity Rating Table on page 28.
   b. The maximum continuous current that will flow in the circuit.
2) **Consult the ABYC Interrupt Rating table on page 61 for the minimum Interrupt rating required for the application.** Limit the selection to a circuit breaker type that meets the interrupt capacity requirement.
3) **Select a circuit breaker amperage rating that is:**
   a. Smaller than the amperage capacity of the smallest wire (from step 1a)
   b. Larger than the maximum continuous current that will flow in the circuit (from step 1b) It is recommended that the amperage rating be at the upper end of this range to allow for surge currents and increase in the number of devices on the circuit.
4) **Verify that the voltage rating of the selected circuit breaker meets or exceeds the circuit voltage.**
5) **There are other issues that may be considered by reading ABYC E-11.12 Circuit Protection.** See www.bluesea.com for ABYC Standards.

Circuit Protection Device Comparison Table



7200

7233

Single and Double Pole Toggle World Circuit Breakers

The World Circuit Breaker meets all American Boat and Yacht Council (ABYC) standards, is UL 1077 recognized, TUV certified, CE marked for Europe, and CSA certified for Canada.

- The industry standard circuit breaker for Blue Sea Systems electrical panels
- Combines switching and circuit protection into a single device
- Double pole used as 120/240 Volt AC branch circuit breakers to switch line 1 and line 2
- "Trip Free" design cannot be held "ON" during fault current condition
- For circuit breaker mounting panels (see page 87)

Specifications

Circuit Breaker Type		Magnetic Hydraulic - Trip free
Maximum Amperage		50 Amperes AC/DC
Maximum Voltage		277 Volts AC/65 Volts DC
Rated Switch Cycles		10,000 @ rated amperage and voltage
Delay		See www.bluesea.com
Weight	Single Pole	0.17Lb (0.08Kg)
	Double Pole	0.34Lb (0.15Kg)
Mounting screw		#6-32
Terminal screw		#10-32 SS with external tooth lockwasher

CE marked

Interrupt Ratings (see ABYC Interrupt rating Requirements page 62)

World Circuit Breakers - Single and Double Pole			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - TUV (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
65V DC	5-50A	7,500A	1,500A
120V AC	5-50A	3,000A	1,500A
120/240V AC	10-50A	3,000A	1,500A
250V AC	10-50A	3,000A	1,500A

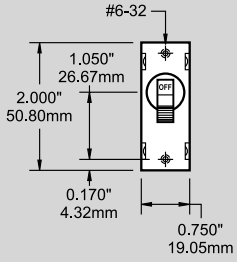
[1] UL Recognized

Single Pole		
PN	**Color**	**Amperage**
7200	Black	5A
7201	Red	5A
7202	White	5A
7347	Black	8A
7299	White	8A
7204	Black	10A
7205	Red	10A
7206	White	10A
7208	Black	15A
7209	Red	15A
7210	White	15A
7212	Black	20A
7213	Red	20A
7214	White	20A
7216	Black	25A
7217	Red	25A

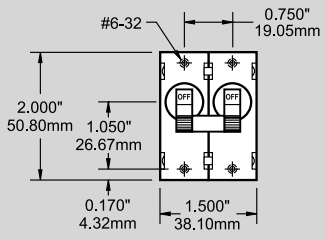
Single Pole		
PN	**Color**	**Amperage**
7218	White	25A
7220	Black	30A
7221	Red	30A
7222	White	30A
7224	Black	40A
7225	Red	40A
7226	White	40A
7228	Black	50A
7229	Red	50A
7230	White	50A

Double Pole		
PN	**Color**	**Amperage**
7232	Black	10A
7233	White	10A
7234	Black	15A
7235	White	15A
7348	Black	16A
7294	White	16A
7236	Black	20A
7260	White	20A
7237	Black	30A
7238	White	30A
7349	Black	32A
7295	White	32A
7239	Black	40A
7240	White	40A
7241	Black	50A
7242	White	50A

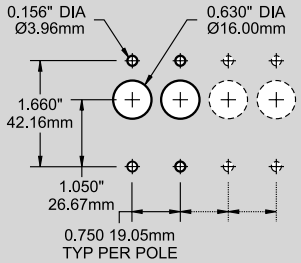
NEW PRODUCT



Single Pole
Toggle Circuit Breaker Dimensions



Double Pole
Toggle Circuit Breaker Dimensions



Toggle Panel Cutout Detail

Single and Double Pole Small Case 2" Rocker Circuit Breakers

- Rocker actuator gives modern appearance to electrical distribution panels
- Dual color rocker gives clear visual indication of handle position
- Double pole used as 120/240 Volt AC branch circuit breakers to switch line 1 and line 2
- "Trip Free" design cannot be held "ON" during fault current condition

7300

7320

AIRPAX®

Specifications

Circuit Breaker Type	Magnetic Hydraulic - Trip free
Maximum Amperage	See table below
Maximum Voltage	See table below
Rated Switch Cycles	10,000@rated amperage and voltage
Delay	See www.bluesea.com
Mounting screw	#6-32
Terminal screw	#10-32 SS with external tooth lockwasher

CE marked

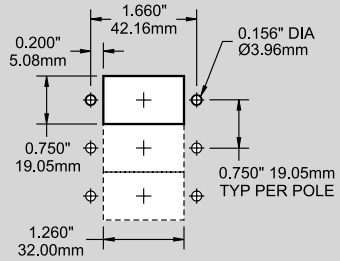
Interrupt Ratings (see ABYC Interrupt rating Requirements page 62)

Small Case Rocker Circuit Breakers - Single and Double Pole			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - VDE (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
65V DC	5-50A	-	2,000A
80V DC	5-30A	-	4,000A
80V DC	5-50A	7,500A	-
125V AC	5-50A	3,000A	-
240V AC	5-50A	2,000A	-
250V AC	5-30A	2,000A	2,000A
250V AC	5-50A	-	2,000A

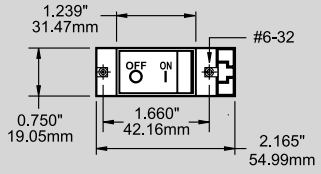
[1] UL Recognized

PN	Poles	Amperage	Weight Lb (Kg)
7300	1	5A	0.19 (0.09)
7301	1	8A	0.19 (0.09)
7302	1	10A	0.19 (0.09)
7303	1	15A	0.19 (0.09)
7304	1	20A	0.19 (0.09)
7305	1	25A	0.19 (0.09)
7306	1	30A	0.19 (0.09)
7307	1	40A	0.19 (0.09)
7308	1	50A	0.19 (0.09)

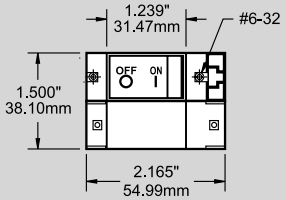
PN	Poles	Amperage	Weight Lb (Kg)
7320	2	10A	0.36 (0.16)
7321	2	15A	0.36 (0.16)
7322	2	16A	0.36 (0.16)
7323	2	20A	0.36 (0.16)
7324	2	30A	0.36 (0.16)
7325	2	32A	0.36 (0.16)
7326	2	40A	0.36 (0.16)
7327	2	50A	0.36 (0.16)
4110	-	Panel Plug Kit	-



Rocker Panel Cutout Detail



Single Pole Small Case 2" Rocker Circuit Breaker Dimensions



Double Pole Small Case 2" Rocker Circuit Breaker Dimensions

7251

7287

C-Series Double and Triple Pole Circuit Breakers

- 5,000 Ampere interrupt capacity to meet ABYC requirements for 120/240 Volt 50 Ampere main protection
- Double pole can be used as 120 Volt AC main circuit breaker to switch line 1 and line 2
- Triple pole can be used as 240 Volt AC main circuit breaker to switch line 1 and line 2
- Double and triple pole circuit breakers will trip all poles if any one pole trips
- "Trip Free" design cannot be held "ON" during fault current condition

Specifications

Circuit Breaker Type	Magnetic
Maximum Amperage	100 Amperes AC
Maximum Voltage	250 Volts AC
Delay	See www.bluesea.com

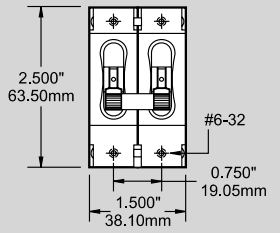
Interrupt Ratings (see ABYC Interrupt rating Requirements page 62)

C-Series Circuit Breakers - Double and Triple Pole			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - TUV (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
125/250V AC	30-100A	5,000A	5,000A
250V AC	30-100A	5,000A	5,000A

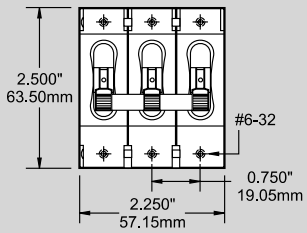
[1] UL Recognized

▶ See page 74 for single pole C-Series Magnetic Circuit Breakers.

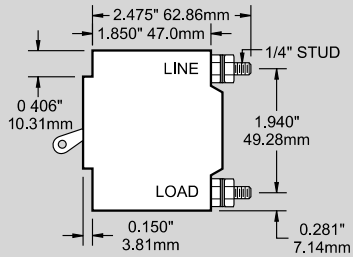
PN	Color	Poles	Amperage	Weight Lb (Kg)
7365	White	2	30A	0.56 (0.26)
7251	White	2	50A	0.56 (0.26)
7254	White	2	60A	0.56 (0.26)
7256	White	2	80A	0.56 (0.26)
7258	White	2	100A	0.56 (0.26)
7287	White	3	50A	0.93 (0.46)
7288	White	3	60A	0.93 (0.46)
7289	White	3	80A	0.93 (0.46)
7290	White	3	100A	0.93 (0.46)



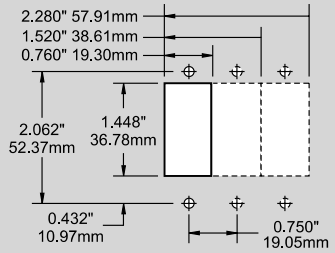
Double Pole Dimensions



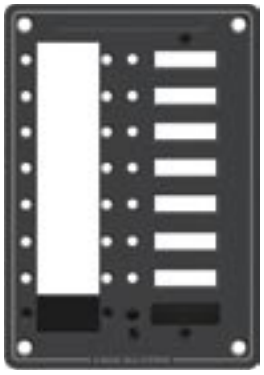
Triple Pole Dimensions



C-Series Circuit Breaker Dimensions



Panel Cutout Detail



8087

8088

Magnetic Circuit Breaker Mounting Panels

- Designed for C-Series Magnetic Circuit Breakers (see above and page 32 and 74)
- Panel plugs can be inserted to fill blank positions
- Heavy 1/8" aluminum 5052 alloy
- Two-part polyurethane slate gray finish
- Accepts standard Blue Sea Systems backlightable labels (see pages 90-94)
- Accepts standard Blue Sea Systems "ON" indicating LEDs (see page 87)
- Industry standard height and width
- Optional Panel Plug Kit 8089 includes Circuit Breaker Mounting Screws, panel plug, LED plug, and blank label

PN	Description	Width in" (mm)	Height in"	Weight Lb (Kg)
8087	8 Position	5.25 (133.35)	7.50 (190.50)	0.40 (0.18)
8088	3 Position	5.25 (133.35)	3.75 (95.25)	0.28 (0.13)
8089	Panel Plug Kit	-	-	0.10 (0.04)

AC Main Only Toggle Circuit Breaker Panels

- Red reverse polarity indicating LED
- Safety ground screw on panel back
- Combines switching and circuit protection into a single device
- "Trip Free" design cannot be held "ON" during fault current condition

▷ Available with a choice of white or black circuit breakers installed.

Specifications

Circuit Breaker Type	Magnetic Hydraulic - Trip free
Panel Material:	Heavy 1/8" aluminum 5052 alloy
Primary Finish:	Mil-C-5541C or equivalent immersion undercoating for lifetime corrosion resistance
Final Panel Finish:	2-part polyurethane slate gray finish
Circuit Breakers:	Double Pole AC/DC Magnetic Toggle Circuit Breaker (see pages 63 and 72)
Ratings:	65 Volts DC 277 Volts AC Maximum
Delay	See www.bluesea.com
CE marked	

Main Only

8077/8079/8177*/8179*
3077/3079/3177*/3179*

* 230 Volt
(typical for European applications)

120 VOLT		AC Main Only Toggle Circuit Breaker Panels							
PN	PN	Description	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed Double Pole Circuit Breakers 16A	30A	32A	50A
8077	3077	Main Only	2.63 (66.68)	3.75 (95.25)	0.51 (0.23)	-	1	-	-
8079	3079	Main Only	2.63 (66.68)	3.75 (95.25)	0.51 (0.23)	-	-	-	1

230 VOLT		AC Main Only Toggle Circuit Breaker Panels (Typical of Europe)							
PN	PN	Description	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed Double Pole Circuit Breakers 16A	30A	32A	50A
8177	3177	Main Only	2.63 (66.68)	3.75 (95.25)	0.51 (0.23)	1	-	-	-
8179	3179	Main Only	2.63 (66.68)	3.75 (95.25)	0.51 (0.23)	-	-	1	-

▶ See page 76-83 For full selection of AC Circuit Breaker Panels.

AC Main Only Rocker Circuit Breaker Panels

- Red reverse polarity indicating LED
- Safety ground screw on panel back
- Rocker actuator gives modern appearance to electrical distribution panels
- Dual color rocker gives clear visual indication of handle position
- "Trip Free" design cannot be held "ON" during fault current condition

Specifications

Circuit Breaker Type	Magnetic Hydraulic - Trip free
Panel Material:	Heavy 1/8" aluminum 5052 alloy
Primary Finish:	Mil-C-5541C or equivalent immersion undercoating for lifetime corrosion resistance
Final Panel Finish:	2-part polyurethane slate gray finish
Circuit Breakers:	Double Pole AC/DC Magnetic Rocker Circuit Breaker (See pages 64 and 73)
Ratings:	65 Volts DC 277 Volts AC Maximum
Delay	See www.bluesea.com
CE marked	

Main Only

8604/8605/8606*/8607*

* 230 Volt
(typical for European applications)

120 VOLT	AC Main Only Rocker Circuit Breaker Panels							
PN	Description	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed Double Pole Circuit Breakers 16A	30A	32A	50A
8604	Main Only	3.75 (95.25)	2.63 (66.68)	0.51 (0.23)	-	1	-	-
8605	Main Only	3.75 (95.25)	2.63 (66.68)	0.51 (0.23)	-	-	-	1

230 VOLT	AC Main Only Rocker Circuit Breaker Panels (Typical of Europe)							
PN	Description	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed Double Pole Circuit Breakers 16A	30A	32A	50A
8606	Main Only	3.75 (95.25)	2.63 (66.68)	0.51 (0.23)	1	-	-	-
8607	Main Only	3.75 (95.25)	2.63 (66.68)	0.51 (0.23)	-	-	1	-

▷ Available with white or black circuit breakers installed.

Source Selection Toggle Circuit Breaker Panels

- Provides source selection and circuit protection in one unit
- Pairs of double pole AC main circuit breakers with lockout slide
- All hot, neutral and safety ground buses installed, fully pre-wired
- Allows connecting one of multiple different AC sources to one circuit
- Prevents connecting both AC sources simultaneously
- Red reverse polarity LED indicators
- Green power available LED indicators
- Label backlighting pre-installed

2 Sources

8032/8061/8132*/8161*
3032/3061/3132*/3161*

3 Sources - Horizontal

8498/8598* 3498/3598*

3 Sources - Vertical

8495/8595* 3495/3595*

* 230 Volt
(typical for European applications)

120 VOLT		AC Toggle Source Selection Panels							
						Installed Double Pole Circuit Breakers			
PN	PN	Description	Height in" (mm)	Width in" (mm)	Weight Lb (Kg)	16A	30A	32A	50A
8032	3032	2 Sources	3.75 (95.25)	5.25 (133.35)	1.84 (0.83)	-	2	-	-
8061	3061	2 Sources	3.75 (95.25)	5.25 (133.35)	1.84 (0.83)	-	-	-	2
8498	3498	3 Sources - Horizontal	4.50 (114.30)	10.50 (266.70)	3.68 (1.67)	-	3	-	1
8495	3495	3 Sources - Vertical	7.50 (190.50)	5.25 (133.35)	3.68 (1.67)	-	3	-	1

230 VOLT		AC Toggle Source Selection Panels (Typical of Europe)							
						Installed Double Pole Circuit Breakers			
PN	PN	Description	Height in" (mm)	Width in" (mm)	Weight Lb (Kg)	16A	30A	32A	50A
8132	3132	2 Sources	3.75 (95.25)	5.25 (133.35)	1.84 (0.83)	2	-	-	-
8161	3161	2 Sources	3.75 (95.25)	5.25 (133.35)	1.84 (0.83)	-	-	2	-
8598	3598	3 Sources - Horizontal	4.50 (114.30)	10.50 (266.70)	3.68 (1.67)	3	-	1	-
8595	3595	3 Sources - Vertical	7.50 (190.50)	5.25 (133.35)	3.68 (1.67)	3	-	1	-

▶ See pages 78, 79, 84 for full sized panels with embedded lockout systems.

Source Selection Rocker Circuit Breaker Panels

- Provides source selection and circuit protection in one unit
- Two double pole AC main circuit breakers with lockout slide
- All hot, neutral and safety ground buses installed, fully pre-wired
- Allows connecting one of two different AC sources to one circuit
- Prevents connecting both AC sources simultaneously
- Red reverse polarity LED indicator
- Green power available LED indicators
- Label backlighting pre-installed

2 Sources

8600/8602*

* 230 Volt (typical for European applications)

120 VOLT	AC Rocker Source Selection Panels							
					Installed Double Pole Circuit Breakers			
	Description	Height in" (mm)	Width in" (mm)	Weight Lb (Kg)	16A	30A	32A	50A
8600	2 Sources	4.25 (107.95)	5.25 (133.35)	1.84 (0.83)	-	2	-	-

230 VOLT	AC Rocker Source Selection Panels (Typical of Europe)							
					Installed Double Pole Circuit Breakers			
	Description	Height in" (mm)	Width in" (mm)	Weight Lb (Kg)	16A	30A	32A	50A
8602	2 Sources	4.25 (107.95)	5.25 (133.35)	1.84 (0.83)	2	-	-	-

32 Ampere 2 Positions + OFF, 2 Pole

Rotary Switch

- Switches 2 - 120 or 230 Volt AC Sources
- Compact solution when circuit protection is provided elsewhere
- Allows connecting one of two different AC sources to one circuit
- Mounts in panels up to 0.16" (4.00mm) thick
- Heavy duty industrial rated switch
- Intuitive function - One hand operation
- UL listed

9009 Front


9009 Side

Rotary Switch Panel

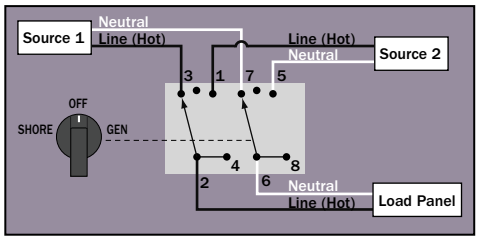
- **8367** Switches 2 - 120 Volt AC Sources
- **8359** Switches 2 - 230 Volt AC Sources
- Includes 9009 heavy duty industrial rated switch
- Two-part polyurethane slate gray finish
- Heavy 1/8" aluminum 5052 alloy
- Red reverse polarity LED indicators
- Green power available LED indicators


8367/8359

Specifications

Maximum Amperage	32 Amperes AC
Maximum Voltage	600 Volts AC

PN	Description	Voltage	Mounting Depth in" (mm)	Width in" (mm)	Height in" (mm)
9009	Rotary Switch	600V Max.	1.91 (48.60)	1.89 (48.00)	1.89 (48.00)
8367	Switch Panel	120V	1.91 (48.60)	5.25 (133.35)	3.75 (95.25)
8359	Switch Panel	230V	1.91 (48.60)	5.25 (133.35)	3.75 (95.25)



65 Ampere 2 Positions + OFF, 2 Pole

Rotary Switch

- Switches 2 - 120 or 230 Volt AC Sources
- Compact solution when circuit protection is provided elsewhere
- Allows connecting one of two different AC sources to one circuit
- Mounts in panels up to 0.16" (4.00mm) thick
- Heavy duty industrial rated switch
- Intuitive function - One hand operation
- UL listed

9011 Front


9011 Side

Rotary Switch Panel

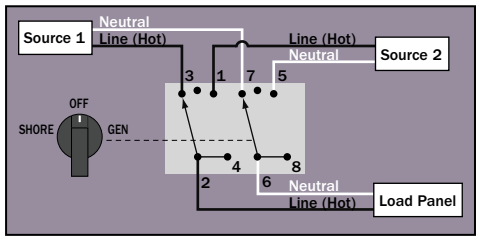
- **8365** Switches 2 - 120 Volt AC Sources
- **8357** Switches 2 - 230 Volt AC Sources
- Includes 9011 heavy duty industrial rated switch
- Two-part polyurethane slate gray finish
- Heavy 1/8" aluminum 5052 alloy
- Red reverse polarity LED indicators
- Green power available LED indicators


8365/8357

Specifications

Maximum Amperage	65 Amperes AC
Maximum Voltage	600 Volts AC

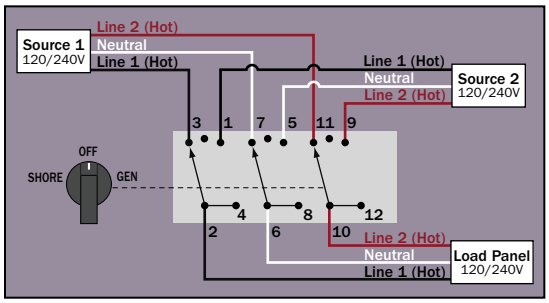
PN	Description	Voltage	Mounting Depth in" (mm)	Width in" (mm)	Height in" (mm)
9011	Rotary Switch	600V Max.	2.41 (61.21)	2.52 (64.00)	2.52 (64.00)
8365	Switch Panel	120V	2.41 (61.21)	5.25 (133.35)	3.75 (95.25)
8357	Switch Panel	230V	2.41 (61.21)	5.25 (133.35)	3.75 (95.25)



9019 Front

9019 Side

8363



65 Ampere 2 Positions + OFF, 3 Pole

Rotary Switch

- Switches 2 - 120/240 Volt AC Sources
- Switches both lines (hot) and neutral
- Compact solution when circuit protection is provided elsewhere
- Allows connecting one of two different AC sources to one circuit
- Mounts in panels up to 0.16" (4.00mm) thick
- Heavy duty industrial rated switch
- Intuitive function - One hand operation
- UL listed

Rotary Switch Panel

- Switches 2 - 120/240 Volt AC Sources
- Includes 9019 heavy duty industrial rated switch
- Two-part polyurethane slate gray finish
- Heavy 1/8" aluminum 5052 alloy
- Red reverse polarity LED indicators
- Green power available LED indicators

Specifications

Maximum Amperage 65 Amperes AC
Maximum Voltage 600 Volts AC

PN	Description	Voltage	Mounting Depth in" (mm)	Width in" (mm)	Height in" (mm)
9019	Rotary Switch	600V Max.	3.65 (92.78)	2.52 (64.00)	2.52 (64.00)
8363	Switch Panel	120/240V	3.65 (92.78)	5.25 (133.35)	3.75 (95.25)

NEW PRODUCT

6337 Front

6337 Side

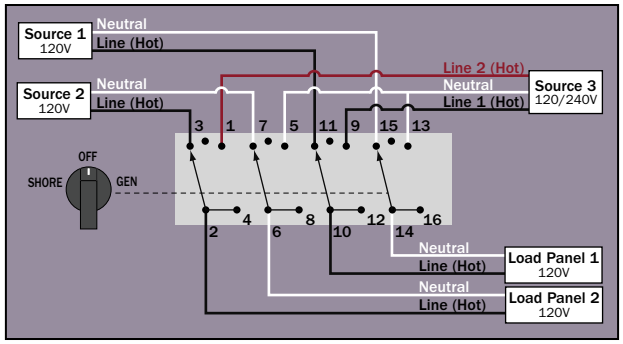
9093 Front

9093 Side

NEW PRODUCT

8386

8369



30 and 65 Ampere 2 Positions + OFF, 4 Pole

Rotary Switch

- Switches between 2 - 120 Volt AC shore power sources and 1 - 240 Volt AC source to 2 - 120 Volt AC load groups
- Switches both lines (hot) and neutral
- Compact solution when circuit protection is provided elsewhere
- Allows connecting one of two different AC sources to one circuit
- Mounts in panels up to 0.16" (4.00mm) thick
- Heavy duty industrial rated switch
- Intuitive function - One hand operation
- UL listed

Rotary Switch Panel

- Switches between 2 - 120 Volt AC shore power sources and 1 - 240 Volt AC source to 2 - 120 Volt AC load groups
- **8386** - Includes 6337 heavy duty industrial rated switch
- **8369** - Includes 9093 heavy duty industrial rated switch
- Two-part polyurethane slate gray finish
- Heavy 1/8" aluminum 5052 alloy
- Red reverse polarity LED indicators
- Green power available LED indicators

Specifications

Maximum Amperage **6337**/**8386** - 30 Amperes AC
9093/**8369** - 65 Amperes AC
Maximum Voltage 600 Volts AC

PN	Description	Voltage	Mounting Depth in" (mm)	Width in" (mm)	Height in" (mm)
6337	Rotary Switch	600V Max.	2.98 (75.69)	1.89 (48.00)	1.89 (48.00)
9093	Rotary Switch	600V Max.	4.50 (114.30)	2.52 (64.00)	2.52 (64.00)
8386	Switch Panel	120V	2.98 (75.69)	5.25 (133.35)	3.75 (95.25)
8369	Switch Panel	120V	4.50 (114.30)	5.25 (133.35)	3.75 (95.25)

NEW PRODUCT

32 Ampere 3 Positions + OFF, 2 Pole

Rotary Switch

- Switches 3 - 120 or 230 Volt AC Sources
- Compact solution when circuit protection is provided elsewhere
- Allows connecting three different AC sources to one circuit
- Mounts in panels up to 0.16” (4.00mm) thick
- Heavy duty industrial rated switch
- Intuitive function - One hand operation
- UL listed

9010 Front

9010 Side

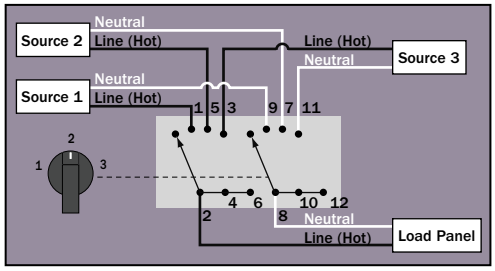
Rotary Switch Panel

- **8366** - Switches 3 - 120 Volt AC Sources
- **8358** - Switches 3 - 230 Volt AC Sources
- Includes 9010 heavy duty industrial rated switch
- Two-part polyurethane slate gray finish
- Heavy 1/8” aluminum 5052 alloy
- Red reverse polarity LED indicators
- Green power available LED indicators

8366/8358

Specifications

Maximum Amperage 32 Amperes AC
Maximum Voltage 600 Volts AC



PN	Description	Voltage	Mounting Depth in” (mm)	Width in” (mm)	Height in” (mm)
9010	Rotary Switch	600V Max.	2.41 (61.21)	1.89 (48.00)	1.89 (48.00)
8366	Switch Panel	120V	2.41 (61.21)	5.25 (133.35)	3.75 (95.25)
8358	Switch Panel	230V	2.41 (61.21)	5.25 (133.35)	3.75 (95.25)

65 Ampere 3 Positions + OFF, 3 Pole

Rotary Switch

- Switches 3 - 120/240 Volt AC Sources
- Switches both lines (hot) and neutral
- Compact solution when circuit protection is provided elsewhere
- Allows connecting one of three different AC sources to one circuit
- Mounts in panels up to 0.16” (4.00mm) thick
- Heavy duty industrial rated switch
- Intuitive function - One hand operation
- UL listed

9077 Front

9077 Side

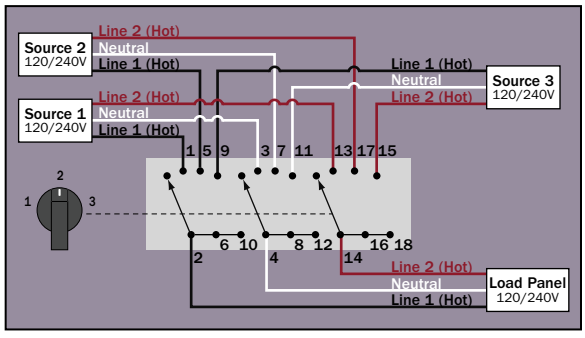
Rotary Switch Panel

- Switches 3 - 120/240 Volt AC Sources
- Includes 9077 heavy duty industrial rated switch
- Two-part polyurethane slate gray finish
- Heavy 1/8” aluminum 5052 alloy
- Red reverse polarity LED indicators
- Green power available LED indicators

8361

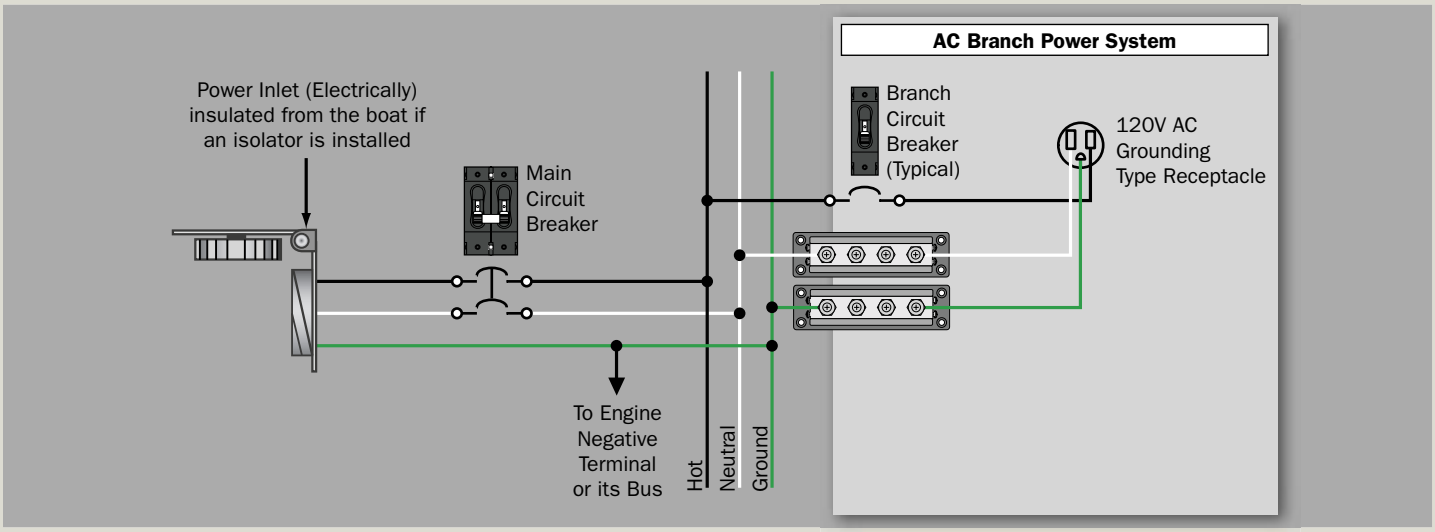
Specifications

Maximum Amperage 65 Amperes AC
Maximum Voltage 600 Volts AC



PN	Description	Voltage	Mounting Depth in” (mm)	Width in” (mm)	Height in” (mm)
9077	Rotary Switch	600V Max.	5.50 (139.70)	2.52 (64.00)	2.52 (64.00)
8361	Switch Panel	120/240V	5.50 (139.70)	5.25 (133.35)	3.75 (95.25)

The AC Branch Power System begins at the Line terminal connection of the AC branch circuit breaker for the Hot wire and at the branch circuit connection block for the neutral and safety ground wires. It ends at the AC outlet or the AC device that is powered. The devices used for AC branch power distribution are the same devices used for AC branch circuit protection. For this reason these two product areas are combined into AC branch power systems in this section of the catalog.

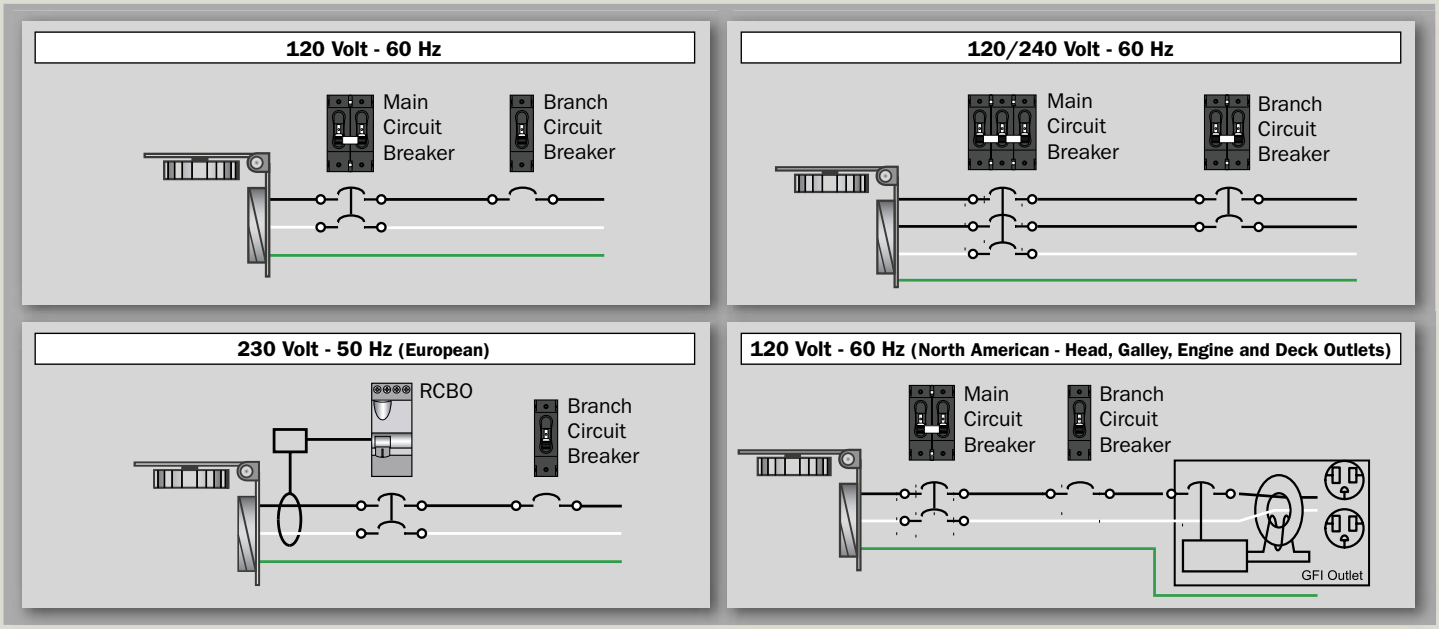


Purpose

- Distribution of high amperage currents from a single cable into lower amperages in multiple wires
- Circuit protection
- Switching
- GFCI (see page 122) in North American systems

System Configurations - Physical configuration of AC Branch circuit breakers

Circuit breakers used for AC branch switching and circuit protection always have one pole less than the AC main installed between the branch circuit breaker and the AC power source. This circuit breaker is installed in the AC hot conductor.



The Devices

AC branch circuit breakers are distinguished by their AIC rating. The table on the right shows the AIC required in AC branch circuit breakers for each type of shore power commonly found in marinas.

As it is only in 120 Volt and 120/240 Volt systems that AC main circuit and AC branch circuit requirements differ, the same circuit breakers that are used in AC main systems are used in AC branch applications. It is only in the number of poles that main and branch circuit breakers differ (See page 62 for Selecting AC Circuit Protection).

Ampere Interrupt Rating - ABYC Table

AC Shore Power Source	Main Circuit Breaker	Branch Circuit Breaker
120V - 30A	3,000	3,000
120V - 50A	3,000	3,000
120/240V - 50A	5,000	3,000
240V - 50A	5,000	3,000

Single and Double Pole Toggle World Circuit Breakers

The World Circuit Breaker meets all American Boat and Yacht Council (ABYC) standards, is UL 1077 recognized, TUV certified, CE marked for Europe, and CSA certified for Canada.

- The industry standard circuit breaker for Blue Sea Systems electrical panels
- Combines switching and circuit protection into a single device
- Double pole used as 120/240 Volt AC branch circuit breakers to switch line 1 and line 2
- "Trip Free" design cannot be held "ON" during fault current condition
- For circuit breaker mounting panels (see page 87)

7200

7233

Specifications

Circuit Breaker Type		Magnetic Hydraulic - Trip free
Maximum Amperage		50 Amperes
Maximum Voltage		277 Volts AC/65 Volts DC
Rated Switch Cycles		10,000@rated amperage and voltage
Delay		See www.bluesea.com
Weight	Single Pole	0.17Lb (0.08Kg)
	Double Pole	0.34Lb (0.15Kg)
Mounting screw		#6-32
Terminal screw		#10-32 SS with external tooth lockwasher

CE marked

Interrupt Ratings (see ABYC Interrupt rating Requirements page 71)

World Circuit Breakers - Single and Double Pole			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - TUV (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
65V DC	5-50A	7,500A	1,500A
120V AC	5-50A	3,000A	1,500A
120/240V AC	10-50A	3,000A	1,500A
250V AC	10-50A	3,000A	1,500A

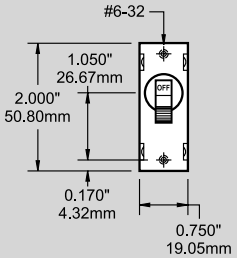
[1] UL Recognized

Single Pole		
PN	**Color**	**Amperage**
7200	Black	5A
7201	Red	5A
7202	White	5A
7347	Black	8A
7299	White	8A
7204	Black	10A
7205	Red	10A
7206	White	10A
7208	Black	15A
7209	Red	15A
7210	White	15A
7212	Black	20A
7213	Red	20A
7214	White	20A
7216	Black	25A
7217	Red	25A

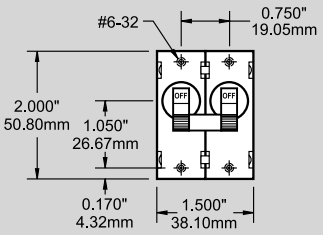
Single Pole		
PN	**Color**	**Amperage**
7218	White	25A
7220	Black	30A
7221	Red	30A
7222	White	30A
7224	Black	40A
7225	Red	40A
7226	White	40A
7228	Black	50A
7229	Red	50A
7230	White	50A

Double Pole		
PN	**Color**	**Amperage**
7232	Black	10A
7233	White	10A
7234	Black	15A
7235	White	15A
7348	Black	16A
7294	White	16A
7236	Black	20A
7260	White	20A
7237	Black	30A
7238	White	30A
7349	Black	32A
7295	White	32A
7239	Black	40A
7240	White	40A
7241	Black	50A
7242	White	50A

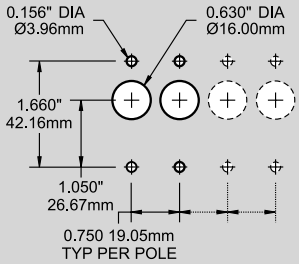
NEW PRODUCT



Single Pole
Toggle Circuit Breaker Dimensions



Double Pole
Toggle Circuit Breaker Dimensions



Toggle Panel Cutout Detail

7300

7320

AIRPAX®

Single and Double Pole Small Case 2" Rocker Circuit Breakers

- Rocker actuator gives modern appearance to electrical distribution panels
- Dual color rocker gives clear visual indication of handle position
- Double pole used as 120/240 Volt AC branch circuit breakers to switch line 1 and line 2
- "Trip Free" design cannot be held "ON" during fault current condition

Specifications

Circuit Breaker Type		Magnetic Hydraulic - Trip free
Maximum Amperage		See table below
Maximum Voltage		See table below
Rated Switch Cycles		10,000@rated amperage and voltage
Delay		See www.bluesea.com
Weight	Single Pole	0.19Lb (0.09Kg)
	Double Pole	0.36Lb (0.16Kg)
Mounting screw		#6-32
Terminal screw		#10-32 SS with external tooth lockwasher

CE marked

Interrupt Ratings (see ABYC Interrupt rating Requirements page 71)

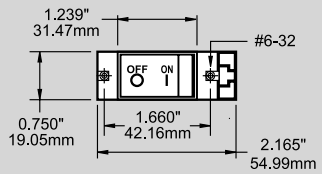
Rocker Circuit Breakers - Single and Double Pole			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - VDE (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
65V DC	5-50A	-	2,000A
80V DC	5-30A	-	4,000A
80V DC	5-50A	7,500A	-
125V AC	5-50A	3,000A	-
240V AC	5-50A	2,000A	-
250V AC	5-30A	2,000A	2,000A
250V AC	5-50A	-	2,000A

[1] UL Recognized

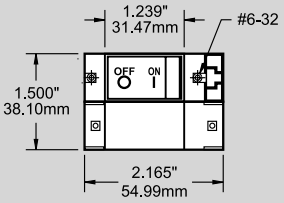
PN	Pole	Amperage
7300	1	5A
7301	1	8A
7302	1	10A
7303	1	15A
7304	1	20A
7305	1	25A

PN	Pole	Amperage
7306	1	30A
7307	1	40A
7308	1	50A
7300	1	5A
7301	1	8A
7302	1	10A

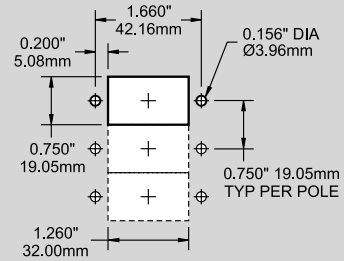
PN	Pole	Amperage
7303	1	15A
7304	1	20A
7305	1	25A
7306	1	30A
7307	1	40A
7308	1	50A
7320	2	10A
7321	2	15A
7322	2	16A
7323	2	20A
7324	2	30A
7325	2	32A
7326	2	40A
7327	2	50A
4110	-	Panel Plug Kit



Single Pole Small Case 2" Rocker Circuit Breaker Dimensions



Double Pole Small Case 2" Rocker Circuit Breaker Dimensions



Rocker Panel Cutout Detail

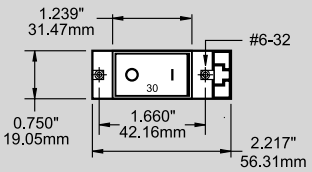
Flat

7408

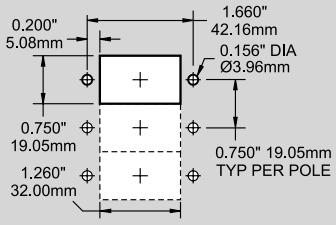
Slot Reset

7433

AIRPAX®



Single Pole Small Case 2" Rocker Circuit Breaker Dimensions



Rocker Panel Cutout Detail

Single Pole Small Case 2" Rocker Circuit Breakers NEW PRODUCT

- Color actuator indicates "OFF" position
- "Trip Free" design cannot be held "ON" during fault current condition
- 2 different actuator styles available to protect accidental switching

Specifications

Circuit Breaker Type	Magnetic Hydraulic - Trip free
Maximum Amperage	See tables below
Maximum Voltage	See tables below
Rated Switch Cycles	10,000@rated amperage and voltage
Delay	See www.bluesea.com
Mounting screw	#6-32 SS - Recommended torque 6-8 in-lb
Terminal screw	45° Angled #10-32 x 5/16 SS SEM external tooth lock washer - Recommended torque 14-15 in-lb

CE marked

See page 42 for more details

Interrupt Ratings (see ABYC Interrupt rating Requirements page 71)

Small Case IEGBX Rocker Circuit Breakers - Single Pole			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - VDE (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
65V DC	5-50A	-	2,000A
80V DC	5-30A	-	4,000A
80V DC	5-50A	7,500A	-
125V AC	5-50A	3,000A	-
240V AC	5-50A	2,000A	-
250V AC	5-30A	2,000A	2,000A
250V AC	5-50A	-	2,000A

[1] UL Recognized

PN	Actuator	Poles	Amperage
7400	Flat	1	5A
7401	Flat	1	8A
7402	Flat	1	10A
7403	Flat	1	15A
7404	Flat	1	20A
7405	Flat	1	25A
7406	Flat	1	30A
7407	Flat	1	40A
7408	Flat	1	50A

PN	Actuator	Poles	Amperage
7425	Slot Reset	1	5A
7426	Slot Reset	1	8A
7427	Slot Reset	1	10A
7428	Slot Reset	1	15A
7429	Slot Reset	1	20A
7430	Slot Reset	1	25A
7431	Slot Reset	1	30A
7432	Slot Reset	1	40A
7433	Slot Reset	1	50A

NEW PRODUCT

C-Series Circuit Breakers

- 5,000 Ampere interrupt capacity to meet ABYC requirements for 120/240 Volt AC 50 Ampere main protection
- Double pole can be used as 120 Volt AC main circuit breaker to switch line 1 and line 2
- Triple pole can be used as 240 Volt AC main circuit breaker to switch line 1 and line 2
- Double and triple pole circuit breakers will trip all poles if any one pole trips
- "Trip Free" design cannot be held "ON" during fault current condition

Specifications

Circuit Breaker Type	Magnetic Hydraulic - Trip free
Maximum Amperage	100 Amperes
Maximum Voltage	250 Volts AC
Delay	See www.bluesea.com

PN	Color	Poles	Amperage	Weight Lb (Kg)
7350	White	1*	5A	0.28 (0.13)
7351	White	1*	10A	0.28 (0.13)
7352	White	1*	15A	0.28 (0.13)
7353	White	1*	20A	0.28 (0.13)
7354	White	1*	25A	0.28 (0.13)
7355	White	1*	30A	0.28 (0.13)
7244	White	1*	50A	0.36 (0.17)
7246	White	1*	60A	0.36 (0.17)
7248	White	1*	80A	0.36 (0.17)
7250	White	1*	100A	0.36 (0.17)
7365	White	2	30A	0.56 (0.26)
7251	White	2	50A	0.56 (0.26)
7254	White	2	60A	0.56 (0.26)
7256	White	2	80A	0.56 (0.26)
7258	White	2	100A	0.56 (0.26)
7287	White	3	50A	0.93 (0.46)
7288	White	3	60A	0.93 (0.46)
7289	White	3	80A	0.93 (0.46)
7290	White	3	100A	0.93 (0.46)

* Single pole breakers are AC/DC rated

▶ **See page 65 for C-Series Circuit Breaker Mounting Panels.**

7250

7251

7287

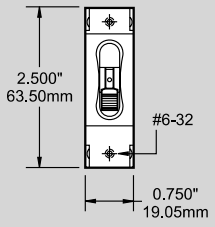
Interrupt Ratings (see ABYC Interrupt Rating Requirements page 71)

C-Series Circuit Breakers - Single Pole			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - TUV (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
80V DC	5-100A	10,000A	5,000A
125V AC	5-100A	5,000A	5,000A
250V AC	5-100A	5,000A	5,000A

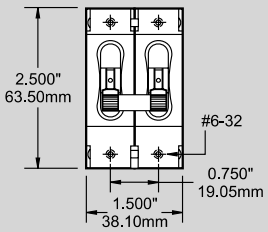
[1] **UL Recognized**

C-Series Circuit Breakers - Double and Triple Pole			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - TUV (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
125/250V AC	50-100A	5,000A	5,000A
250V AC	50-100A	5,000A	5,000A

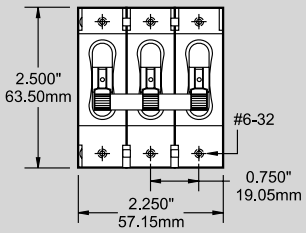
[1] **UL Recognized**



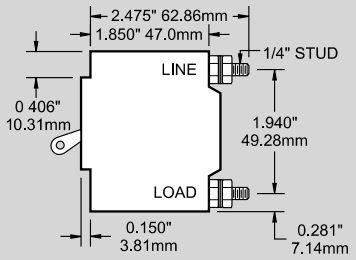
Single Pole Dimensions



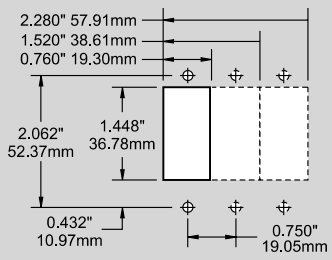
Double Pole Dimensions



Triple Pole Dimensions



C-Series Circuit Breaker Dimensions



Panel Cutout Detail

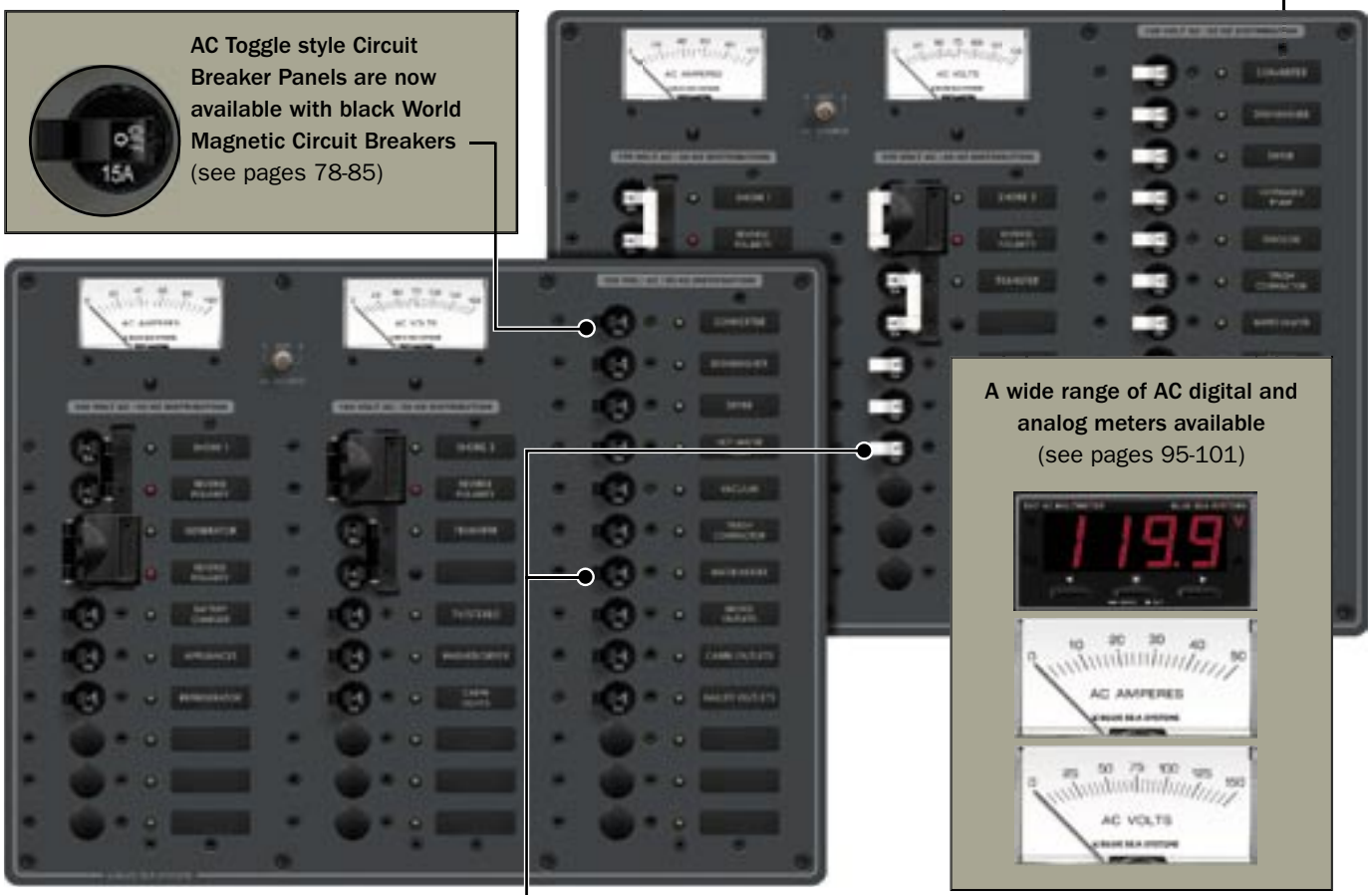
AC Rocker and Toggle Panels

Common Features

- MIL-C-5541C or equivalent immersion undercoating for lifetime corrosion resistance
- All circuit label positions are backlit on standard panels - No kit required
- "ON" indicating LEDs installed in all circuit positions
- Countersunk mounting holes throughout
- Two-part polyurethane slate gray finish
- Heavy 1/8" aluminum 5052 alloy
- Industry standard height and width
- Over 500 individual labels to choose from (see pages 91-94)

Tin-Plated Copper bussing for high conductivity

AC Toggle style Circuit Breaker Panels are now available with black World Magnetic Circuit Breakers (see pages 78-85)



A wide range of AC digital and analog meters available (see pages 95-101)

Industry standard, toggle style, World Magnetic Circuit Breakers available in white or black (see pages 41, 63, and 72)

Rocker style Magnetic Circuit Breakers offer modern styling and improved resistance to accidental switching (see pages 43, 64, 73)

AC Rocker Circuit Breaker Panels

Common Features

- Panels with a Main Circuit Breaker have a red reverse polarity LED indicator
- All hot, neutral, and safety ground buses installed, fully pre-wired
- Includes set of 30 common AC labels (see page 90)
- Label backlighting pre-installed excluding AC Main Only panels
- All LEDs installed

Main + 8 Positions

8620/8621*

Main + 3 Positions

8618/8619*

Main + 6 Positions

8616/8617*

8 Position

8612/8613*

Main Only[1]

8604/8605/8606*/8607*

Main + 1 Position[1]

8614/8615*

3 Position

8610/8611*

* 230 Volt (typical of Europe)

120 VOLT	AC Rocker Circuit Breaker Panels											
PN	Description	Meter Type/PN	Meter Page	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed Double Pole Circuit Breaker				Installed Single Pole Circuit Breakers	
							16A	30A	32A	50A	8A	15A
8604	Main only[1]	-	-	3.75 (95.25)	2.63 (66.68)	0.51 (0.23)	-	1	-	-	-	-
8605	Main only[1]	-	-	3.75 (95.25)	2.63 (66.68)	0.51 (0.23)	-	-	-	1	-	-
8614	Main + 1 Position[1]	-	-	5.25 (133.35)	3.75 (95.25)	0.95 (0.43)	-	1	-	-	-	-
8618	Main + 3 Positions	Digital/8247	96	5.25 (133.35)	7.50 (190.50)	2.94 (1.33)	-	1	-	-	-	3
8616	Main + 6 Positions	-	-	5.25 (133.35)	7.50 (190.50)	1.87 (0.85)	-	1	-	-	-	3
8620	Main + 8 Positions	Digital/8247	96	5.25 (133.35)	11.25 (285.75)	3.18 (1.44)	-	1	-	-	-	5
8610	3 Position	-	-	5.25 (133.35)	3.75 (95.25)	1.14 (0.52)	-	-	-	-	-	3
8612	8 Position	-	-	5.25 (133.35)	7.50 (190.50)	1.85 (0.84)	-	-	-	-	-	5

230 VOLT	AC Rocker Circuit Breaker Panels (Typical of Europe)											
PN	Description	Meter Type/PN	Meter Page	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed Double Pole Circuit Breaker				Installed Single Pole Circuit Breakers	
							16A	30A	32A	50A	8A	15A
8606	Main only[1]	-	-	3.75 (95.25)	2.63 (66.68)	0.51 (0.23)	1	-	-	-	-	-
8607	Main only[1]	-	-	3.75 (95.25)	2.63 (66.68)	0.51 (0.23)	-	-	1	-	-	-
8615	Main + 1 Position[1]	-	-	5.25 (133.35)	3.75 (95.25)	0.95 (0.43)	1	-	-	-	-	-
8619	Main + 3 Positions	Digital/8247	96	5.25 (133.35)	7.50 (190.50)	2.94 (1.33)	1	-	-	-	3	-
8617	Main + 6 Positions	-	-	5.25 (133.35)	7.50 (190.50)	1.87 (0.85)	1	-	-	-	3	-
8621	Main + 8 Positions	Digital/8247	96	5.25 (133.35)	11.25 (285.75)	3.18 (1.44)	1	-	-	-	5	-
8611	3 Position	-	-	5.25 (133.35)	3.75 (95.25)	1.14 (0.52)	-	-	-	-	3	-
8613	8 Position	-	-	5.25 (133.35)	7.50 (190.50)	1.85 (0.84)	-	-	-	-	5	-

[1] Includes labels illustrated only

Blue Sea Systems 11-1/4" height 240 Volt AC Distribution Panels are designed as companion panels to the 11-1/4" height 120 Volt AC panels.

The 240 Volt AC Distribution Panel supplies main circuit protection, AC source management, 240 Volt AC metering and 240 Volt AC branch circuits. Each 120 Volt AC leg from the 240V AC Distribution Panel is wired to the 120 Volt AC Distribution Panel powering the 120 Volt AC branch circuits.

120/240 Volt AC Circuit Breaker Panels

Common Features

- Red reverse polarity indicating LED
- All hot, neutral, and safety ground buses installed, fully pre-wired
- Label backlighting pre-installed
- All LEDs installed
- Maximum panel amperage - 50 Amperes

Main Only

7372

Source Selector + 2 Positions

7374

Source Selector + 2 Positions

7373

AC Main + 3 Positions

7370

AC Main + 3 Positions

7371

240 VOLT	AC Main Only Circuit Breaker Panel						
PN	Description	Meter Type/PN	Meter Page	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed C-Series 3 Pole Main 50A
7372	Main Only	-	-	5.25 (133.35)	3.75 (95.30)	1.38 (0.63)	1

120/240 VOLT	AC Main and Source Selection Circuit Breaker Panels						
PN	Description	Meter Type/PN	Meter Page	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed C-Series 3 Pole Main 50A
7370	Main + 3 Positions	Analog/9354	100	5.25 (133.35)	11.25 (285.75)	2.98 (1.35)	1
7371	Main + 3 Positions	Digital/8247	96	5.25 (133.35)	11.25 (285.75)	3.37 (1.53)	1
7374	Source Selector + 2 Positions	Analog/9354	100	5.25 (133.35)	11.25 (285.75)	3.70 (1.68)	2
7373	Source Selector + 2 Positions	Digital/8247	96	5.25 (133.35)	11.25 (285.75)	4.09 (1.85)	2

AC Source Selector Circuit Breaker Panels

▷ Available with white or black circuit breakers installed.

Common Features

- Red reverse polarity indication LED
- Double pole AC main circuit breakers with installed lockout slides
- All hot, neutral, and safety ground buses installed, fully pre-wired
- Includes set of 30 common AC labels (see page 90)
- Prevent connecting multiple AC sources simultaneously
- Label backlighting pre-installed
- All LEDs installed
- Maximum panel amperage - 50 Amperes

2 Sources + 32 Positions

8476/8576* 3476/3576*

2 Sources + 29 Positions

8477/8577* 3477/3577*

3 Sources + 28 Positions

8496/8596* 3496/3596*

2 Sources + 8 Positions

8459/8559* 3459/3559*

3 Sources + 25 Positions

8494/8594* 3494/3594*

2 Sources + 20 Positions

8469/8569* 3469/3569*

2 Sources + 17 Positions

8475/8575* 3475/3575*

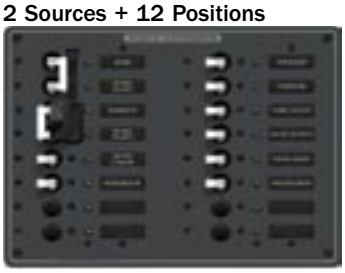
2 Sources + 14 Positions

8473/8573* 3473/3573*

2 Sources + 18 Positions

8458 3458

2 Sources + 12 Positions



8468/8568* 3468/3568*

2 Sources + 9 Positions

8462/8562* 3462/3562*

3 Sources - Horizontal[1]

8498/8598* 3498/3598*

2 Sources + 4 Positions

8499/8599* 3499/3599*

[1] Includes labels illustrated only

* 230 Volt (typical of Europe)

2 Sources + 9 Positions

8466/8566*
3466/3566*

2 Sources + 6 Positions

8489/8589*
3489/3589*

3 Sources - Vertical[1]

8495/8595*
3495/3595*

3 Sources + 2 Positions[1]

8474/8574*
3474/3574*

2 Sources + 4 Positions

8467/8567*
3467/3567*

2 Sources[1]

8032/8061/8132*/8161*
3032/3061/3132*/3161*

[1] Includes labels illustrated only
* 230 Volt (typical of Europe)

Use the tables below to select AC Distribution Panels with AC Source Selectors where multiple sources must be managed on the panel.

120 VOLT		AC Source Selector Circuit Breaker Panels								
								Installed Double Pole Circuit Breakers		Installed Single Pole Circuit Breakers
PN	PN	Description	Meter Type/PN	Meter Page	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	30A	50A	15A
8032	3032	2 Sources	-	-	5.25 (133.35)	3.75 (95.25)	1.84 (0.83)	2	-	-
8061	3061	2 Sources	-	-	5.25 (133.35)	3.75 (95.25)	1.84 (0.83)	-	2	-
8495	3495	3 Sources - Vertical	-	-	5.25 (133.35)	7.50 (190.50)	2.24 (1.00)	3	1	-
8498	3498	3 Sources - Horizontal	-	-	10.50 (266.70)	4.50 (114.30)	1.90 (0.86)	3	1	-
8474	3474	3 Sources + 2 Positions	-	-	5.25 (133.35)	7.50 (190.50)	1.90 (0.86)	3	-	-
8467	3467	2 Sources + 4 Positions	-	-	5.25 (133.35)	7.50 (190.50)	1.90 (0.86)	2	-	2
8499	3499	2 Sources + 4 Positions	-	-	10.50 (266.70)	4.50 (114.30)	1.90 (0.86)	2	-	2
8489	3489	2 Sources + 6 Positions	Analog/9353	100	5.25 (133.35)	11.25 (285.75)	3.00 (1.36)	2	-	3
8459	3459	2 Sources + 8 Positions	-	-	14.75 (374.65)	4.50 (114.30)	3.15 (1.43)	2	-	6
8466	3466	2 Sources + 9 Positions	-	-	5.25 (133.35)	11.25 (285.75)	2.81 (1.27)	2	-	6
8462	3462	2 Sources + 9 Positions	Analog/9353	100	10.50 (266.70)	7.50 (190.50)	3.80 (1.72)	2	-	6
8468	3468	2 Sources + 12 Positions	-	-	10.50 (266.70)	7.50 (190.50)	3.75 (1.70)	2	-	8
8473	3473	2 Sources + 14 Positions	Analog/9630, 9353	100	14.75 (374.65)	7.50 (190.50)	6.00 (2.72)	2	-	11
8475	3475	2 Sources + 17 Positions	Digital/8247	96	14.75 (374.65)	7.50 (190.50)	5.30 (2.40)	2	-	11
8458	3458	2 Sources + 18 Positions	Analog/9630, 9353	100	10.50 (266.70)	13.75 (349.25)	9.10 (4.12)	3	1	12
8469	3469	2 Sources + 20 Positions	-	-	14.75 (374.65)	7.50 (190.50)	5.30 (2.40)	2	-	14
8494	3494	3 Sources + 25 Positions	Analog/9630, 9353	100	14.75 (374.65)	11.25 (285.75)	9.00 (4.08)	3	1	16
8496	3496	3 Sources + 28 Positions	Digital/8247	96	14.75 (374.65)	11.25 (285.75)	10.10 (4.58)	3	1	19
8477	3477	2 Sources + 29 Positions	Analog/9630, 9353	100	14.75 (374.65)	11.25 (285.75)	9.20 (4.17)	2	-	20
8476	3476	2 Sources + 32 Positions	Digital/8247	96	14.75 (374.65)	11.25 (285.75)	10.30 (4.67)	2	-	23

230 VOLT		AC Source Selector Circuit Breaker Panels (Typical of Europe)								
								Installed Double Pole Circuit Breakers		Installed Single Pole Circuit Breakers
PN	PN	Description	Meter Type/PN	Meter Page	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	16A	32A	8A
8132	3132	2 Sources	-	-	5.25 (133.35)	3.75 (95.25)	1.84 (0.83)	2	-	-
8161	3161	2 Sources	-	-	5.25 (133.35)	3.75 (95.25)	1.84 (0.83)	-	2	-
8595	3595	3 Sources - Vertical	-	-	5.25 (133.35)	7.50 (190.50)	2.24 (1.00)	3	1	-
8598	3598	3 Sources - Horizontal	-	-	10.50 (266.70)	4.50 (114.30)	1.90 (0.86)	3	1	-
8574	3574	3 Sources + 2 Positions	-	-	5.25 (133.35)	7.50 (190.50)	1.90 (0.86)	3	-	-
8567	3567	2 Sources + 4 Positions	-	-	5.25 (133.35)	7.50 (190.50)	1.90 (0.86)	2	-	2
8599	3599	2 Sources + 4 Positions	-	-	10.50 (266.70)	4.50 (114.30)	1.90 (0.86)	2	-	2
8589	3589	2 Sources + 6 Positions	Analog/9354	100	5.25 (133.35)	11.25 (285.75)	3.00 (1.36)	2	-	3
8559	3559	2 Sources + 8 Positions	-	-	14.75 (374.65)	4.50 (114.30)	3.15 (1.43)	2	-	6
8566	3566	2 Sources + 9 Positions	-	-	5.25 (133.35)	11.25 (285.75)	2.81 (1.27)	2	-	6
8562	3562	2 Sources + 9 Positions	Analog/9354	100	10.50 (266.70)	7.50 (190.50)	3.80 (1.72)	2	-	6
8568	3568	2 Sources + 12 Positions	-	-	10.50 (266.70)	7.50 (190.50)	3.75 (1.70)	2	-	8
8573	3573	2 Sources + 14 Positions	Analog/9630, 9354	100	14.75 (374.65)	7.50 (190.50)	6.00 (2.72)	2	-	11
8575	3575	2 Sources + 17 Positions	Digital/8247	96	14.75 (374.65)	7.50 (190.50)	5.30 (2.40)	2	-	11
8569	3569	2 Sources + 20 Positions	-	-	14.75 (374.65)	7.50 (190.50)	5.30 (2.40)	2	-	14
8594	3594	3 Sources + 25 Positions	Analog/9630, 9354	100	14.75 (374.65)	11.25 (285.75)	9.00 (4.08)	3	1	16
8596	3596	3 Sources + 28 Positions	Digital/8247	96	14.75 (374.65)	11.25 (285.75)	10.10 (4.58)	3	1	19
8577	3577	2 Sources + 29 Positions	Analog/9630, 9354	100	14.75 (374.65)	11.25 (285.75)	9.20 (4.17)	2	-	20
8576	3576	2 Sources + 32 Positions	Digital/8247	96	14.75 (374.65)	11.25 (285.75)	10.30 (4.67)	2	-	23

AC Main Circuit Breaker Panels

▷ Available with white or black circuit breakers installed.

Common Features

- Red reverse polarity indiction LED
- All hot, neutral, and safety ground buses installed, fully pre-wired
- Includes set of 30 common AC labels (see page 90)
- Label backlighting pre-installed excluding AC Main Only panels
- All LEDs installed
- Maximum panel amperage - 50 Amperes

Main + 34 Positions

8487/8587* 3487/3587*

AC Main + 31 Positions

8486/8586* 3486/3586*

Main + 19 Positions

8472/8572* 3472/3572*

Main + 16 Positions

8471/8571* 3471/3571*

Main + 22 Positions

8465/8565* 3465/3565*

Main + 10 Positions

8463/8563* 3463/3563*

Main + 11 Positions

8407/8507* 3407/3507*

Main + 11 Positions

8076/8176* 3076/3176*

Main + 11 Positions

8470/8570* 3470/3570*

Main + 14 Positions

8464/8564* 3464/3564*

Main + 6 Positions

8412/8512* 3412/3512*

Main + 4 Positions

8099/8199* 3099/3199*

Main + 8 Positions

8406/8506* 3406/3506*

Main + 8 Positions

8488/8588* 3488/3588*

Main + 11 Positions

8485/3485* 8585/3585*

Main + 8 Positions

8074/8174* 3074/3174*

Main + 3 Positions

8405/8505* 3405/3505*

Main + 3 Positions

8409/8509* 3409/3509*

Main + 3 Positions

8043/8143* 3043/3143*

Main + 6 Positions

8027/8127* 3027/3127*

Main + 1 Position[1]

8029/8129* 3029/3129*

Main Only[1]

8077/8079/8177*/8179* 3077/3079/3177*/3179*

[1] Includes labels illustrated only
* 230 Volt (typical of Europe)

Use the tables below to select AC Distribution Panels with AC Main Circuit Breakers where a single AC electrical source is brought to the panel and AC Main Circuit Protection is required.

120 VOLT		AC Main Toggle Circuit Breaker Panels								
PN	PN	Description	Meter Type/PN	Meter Page	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed Double Pole Circuit Breakers		Installed Single Pole Circuit Breakers
								30A	50A	15A
8077	3077	Main only	-	-	2.63 (66.68)	3.75 (95.25)	0.51 (0.23)	1	-	-
8079	3079	Main only	-	-	2.63 (66.68)	3.75 (95.25)	0.51 (0.23)	-	1	-
8029	3029	Main + 1 Position	-	-	5.25 (133.35)	3.75 (95.25)	0.95 (0.43)	1	-	-
8043	3043	Main + 3 Positions	Analog/9353	100	5.25 (133.35)	7.50 (190.50)	2.00 (0.91)	1	-	3
8409	3409	Main + 3 Positions	Analog/8246, 8244	100	5.25 (133.35)	7.50 (190.50)	4.06 (1.84)	1	-	3
8405	3405	Main + 3 Positions	Digital/8247	96	5.25 (133.35)	7.50 (190.50)	2.94 (1.33)	1	-	3
8099	3099	Main + 4 Positions	-	-	10.50 (266.70)	3.75 (95.25)	2.22 (1.00)	1	-	4
8027	3027	Main + 6 Positions	-	-	5.25 (133.35)	7.50 (190.50)	1.87 (0.85)	1	-	3
8412	3412	Main + 6 Positions	-	-	10.50 (266.70)	4.50 (114.30)	1.90 (0.86)	1	-	4
8488	3488	Main + 8 Positions	Analog/9353	100	5.25 (133.35)	11.25 (285.75)	3.00 (1.36)	1	-	5
8074	3074	Main + 8 Positions	Analog/8246, 8244	100	5.25 (133.35)	11.25 (285.75)	3.18 (1.44)	1	-	5
8406	3406	Main + 8 Positions	Digital/8247	96	5.25 (133.35)	11.25 (285.75)	3.18 (1.44)	1	-	5
8463	3463	Main + 10 Positions	-	-	14.75 (374.65)	4.50 (114.30)	3.15 (1.43)	1	-	8
8470	3470	Main + 11 Positions	Analog/9353	100	10.50 (266.70)	7.50 (190.50)	3.74 (1.70)	1	-	8
8076	3076	Main + 11 Positions	Analog/8246, 8244	100	10.50 (266.70)	7.50 (190.50)	4.24 (1.92)	1	-	8
8407	3407	Main + 11 Positions	Digital/8247	96	10.50 (266.70)	7.50 (190.50)	4.78 (2.17)	1	-	8
8485	3485	Main + 11 Positions	-	-	5.25 (133.35)	11.25 (285.75)	2.81 (1.27)	1	-	8
8464	3464	Main + 14 Positions	-	-	10.50 (266.70)	7.50 (190.50)	3.74 (1.70)	1	-	8
8471	3471	Main + 16 Positions	Analog/9630, 9353	100	14.75 (374.65)	7.50 (190.50)	5.96 (2.70)	1	-	13
8472	3472	Main + 19 Positions	Digital/8247	96	14.75 (374.65)	7.50 (190.50)	6.72 (3.05)	1	-	13
8465	3465	Main + 22 Positions	-	-	14.75 (374.65)	7.50 (190.50)	5.25 (2.38)	1	-	13
8486	3486	Main + 31 Positions	Analog/9630, 9353	100	14.75 (374.65)	11.25 (285.75)	8.94 (4.05)	1	-	22
8487	3487	Main + 34 Positions	Digital/8247	96	14.75 (374.65)	11.25 (285.75)	10.00 (4.54)	1	-	25

230 VOLT		AC Main Toggle Circuit Breaker Panels (Typical of Europe)								
PN	PN	Description	Meter/PN	Meter Page	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed Double Pole Circuit Breakers		Installed Single Pole Circuit Breaker
								16A	32A	8A
8177	3177	Main only	-	-	2.63 (66.68)	3.75 (95.25)	0.51 (0.23)	1	-	-
8179	3179	Main only	-	-	2.63 (66.68)	3.75 (95.25)	0.51 (0.23)	-	1	-
8129	3129	Main + 1 Position	-	-	5.25 (133.35)	3.75 (95.25)	0.95 (0.43)	1	-	-
8143	3143	Main + 3 Positions	Analog/9354	100	5.25 (133.35)	7.50 (190.50)	2.00 (0.91)	1	-	3
8509	3509	Main + 3 Positions	Analog/8246, 8245	100	5.25 (133.35)	7.50 (190.50)	4.06 (1.84)	1	-	3
8505	3505	Main + 3 Positions	Digital/8247	96	5.25 (133.35)	7.50 (190.50)	2.94 (1.33)	1	-	3
8199	3199	Main + 4 Positions	-	-	10.50 (266.70)	3.75 (95.25)	2.22 (1.00)	1	-	4
8127	3127	Main + 6 Positions	-	-	5.25 (133.35)	7.50 (190.50)	1.87 (0.85)	1	-	3
8512	3512	Main + 6 Positions	-	-	10.50 (266.70)	4.50 (114.30)	1.90 (0.86)	1	-	4
8588	3588	Main + 8 Positions	Analog/9354	100	5.25 (133.35)	11.25 (285.75)	3.00 (1.36)	1	-	5
8174	3174	Main + 8 Positions	Analog/8246, 8245	100	5.25 (133.35)	11.25 (285.75)	3.18 (1.44)	1	-	5
8506	3506	Main + 8 Positions	Digital/8247	96	5.25 (133.35)	11.25 (285.75)	3.18 (1.44)	1	-	5
8563	3563	Main + 10 Positions	-	-	14.75 (374.65)	4.50 (114.30)	3.15 (1.43)	1	-	8
8570	3570	Main + 11 Positions	Analog/9354	100	10.50 (266.70)	7.50 (190.50)	3.74 (1.70)	1	-	8
8176	3176	Main + 11 Positions	Analog/8246, 8245	100	10.50 (266.70)	7.50 (190.50)	4.24 (1.92)	1	-	8
8507	3507	Main + 11 Positions	Digital/8247	96	10.50 (266.70)	7.50 (190.50)	4.78 (2.17)	1	-	8
8585	3585	Main + 11 Positions	-	-	5.25 (133.35)	11.25 (285.75)	2.81 (1.27)	1	-	8
8564	3564	Main + 14 Positions	-	-	10.50 (266.70)	7.50 (190.50)	3.74 (1.70)	1	-	8
8571	3571	Main + 16 Positions	Analog/9630, 9354	100	14.75 (374.65)	7.50 (190.50)	5.96 (2.70)	1	-	13
8572	3572	Main + 19 Positions	Digital/8247	96	14.75 (374.65)	7.50 (190.50)	6.72 (3.05)	1	-	13
8565	3565	Main + 22 Positions	-	-	14.75 (374.65)	7.50 (190.50)	5.25 (2.38)	1	-	13
8586	3586	Main + 31 Positions	Analog/9630, 9354	100	14.75 (374.65)	11.25 (285.75)	8.94 (4.05)	1	-	22
8587	3587	Main + 34 Positions	Digital/8247	96	14.75 (374.65)	11.25 (285.75)	10.00 (4.54)	1	-	25

AC Branch Circuit Breaker Panels

▷ Available with white or black circuit breakers installed.

Common Features

- All hot, neutral, and safety ground buses installed, fully pre-wired
- Includes set of 30 common AC labels (see page 90)
- Label backlighting pre-installed
- All LEDs installed
- Maximum panel amperage - 100 Amperes

36 Position

8484/8584* 3484/3584*

33 Position[1]

8483/8583* 3483/3583*

21 Position

8482/8582* 3482/3582*

18 Position[1]

8481/8581* 3481/3581*

[1] Maximum panel amperage - 50 Amperes
*230 Volt (typical of Europe)

24 Position

8265/8165* 3265/3165*

12 Position

8460/8560* 3460/3560*

13 Position

8479/8579* 3479/3579*

16 Position

8461/8561* 3461/3561*

8 Position

8411/8511* 3411/3511*

6 Position

8097/8197* 3097/3197*

10 Position

8478/8578*
3478/3578*

13 Position

8480/8580*
3480/3580*

8 Position

8059/8159*
3059/3159*

3 Position

8058/8158*
3058/3158*

Use the tables below to select AC Distribution Panels with AC Branch Circuit Breakers where a single AC electrical source is brought to the panel and AC Main Circuit Protection has been provided elsewhere.

120 VOLT		AC Branch Toggle Circuit Breaker Panels							
PN	PN	Description	Meter Type/PN	Meter Page	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed Single Pole Circuit Breakers	
								8A	15A
8058	3058	**3 Position**	-	-	5.25 (133.35)	3.75 (95.25)	1.14 (0.52)	-	3
8097	3097	**6 Position**	-	-	10.50 (266.70)	3.75 (95.25)	2.22 (1.00)	-	6
8059	3059	**8 Position**	-	-	5.25 (133.35)	7.50 (190.50)	1.85 (0.84)	-	5
8411	3411	**8 Position**	-	-	10.50 (266.70)	4.50 (114.30)	1.90 (0.86)	-	6
8478	3478	**10 Position**	Analog/9353	100	5.25 (133.35)	11.25 (285.75)	3.00 (1.36)	-	7
8460	3460	**12 Position**	-	-	14.75 (374.64)	4.50 (114.30)	3.15 (1.43)	-	10
8479	3479	**13 Position**	Analog/9353	100	10.50 (266.70)	7.50 (190.50)	3.74 (1.70)	-	10
8480	3480	**13 Position**	-	-	5.25 (133.35)	11.25 (285.75)	2.81 (1.27)	-	10
8461	3461	**16 Position**	-	-	10.50 (266.70)	7.50 (190.50)	3.74 (1.70)	-	10
8481	3481	**18 Position**	Analog/9630, 9353	100	14.75 (374.64)	7.50 (190.50)	5.96 (2.70)	-	15
8482	3482	**21 Position**	Digital/8247	96	14.75 (374.64)	7.50 (190.50)	6.72 (3.05)	-	15
8265	3265	**24 Position**	-	-	14.75 (374.64)	7.50 (190.50)	5.12 (3.32)	-	15
8483	3483	**33 Position**	Analog/9630, 9353	100	14.75 (374.64)	11.25 (285.75)	8.94 (4.05)	-	24
8484	3484	**36 Position**	Digital/8247	96	14.75 (374.64)	11.25 (285.75)	10.00 (4.54)	-	27

230 VOLT		AC Branch Toggle Circuit Breaker Panels (Typical of Europe)							
PN	PN	Description	Meter/PN	Meter Page	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed Single Pole Circuit Breakers	
								8A	15A
8158	3158	**3 Position**	-	-	5.25 (133.35)	3.75 (95.25)	1.14 (0.52)	3	-
8197	3197	**6 Position**	-	-	10.50 (266.70)	3.75 (95.25)	2.22 (1.00)	6	-
8159	3159	**8 Position**	-	-	5.25 (133.35)	7.50 (190.50)	1.85 (0.84)	5	-
8511	3511	**8 Position**	-	-	10.50 (266.70)	4.50 (114.30)	1.90 (0.86)	6	-
8578	3578	**10 Position**	Analog/9354	100	5.25 (133.35)	11.25 (285.75)	3.00 (1.36)	7	-
8560	3560	**12 Position**	-	-	14.75 (374.64)	4.50 (114.30)	3.15 (1.43)	10	-
8579	3579	**13 Position**	Analog/9354	100	10.50 (266.70)	7.50 (190.50)	3.74 (1.70)	10	-
8580	3580	**13 Position**	-	-	5.25 (133.35)	11.25 (285.75)	2.81 (1.27)	10	-
8561	3561	**16 Position**	-	-	10.50 (266.70)	7.50 (190.50)	3.74 (1.70)	10	-
8581	3581	**18 Position**	Analog/9630, 9354	100	14.75 (374.64)	7.50 (190.50)	5.96 (2.70)	15	-
8582	3582	**21 Position**	Digital/8247	96	14.75 (374.64)	7.50 (190.50)	6.72 (3.05)	15	-
8165	3165	**24 Position**	-	-	14.75 (374.64)	7.50 (190.50)	5.12 (3.32)	15	-
8583	3583	**33 Position**	Analog/9630, 9354	100	14.75 (374.64)	11.25 (285.75)	8.94 (4.05)	24	-
8584	3584	**36 Position**	Digital/8247	96	14.75 (374.64)	11.25 (285.75)	10.00 (4.54)	27	-

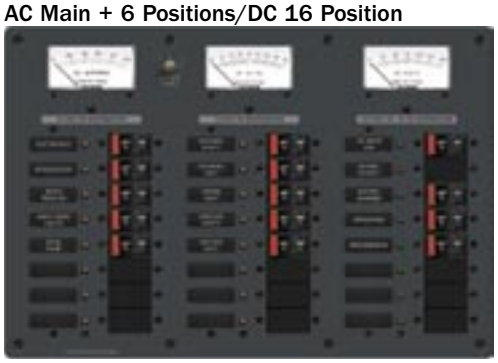
Combination AC/DC Circuit Breaker Panels

▷ Available with white or black circuit breakers installed.

Common Features

- Includes set of 30 common AC and 30 common DC labels (see page 90)
- All AC and DC buses installed, fully pre-wired
- Label backlighting pre-installed
- Red reverse polarity indicating LED
- All LEDs installed
- Maximum panel amperage - 100 Amperes DC/50 Amperes AC

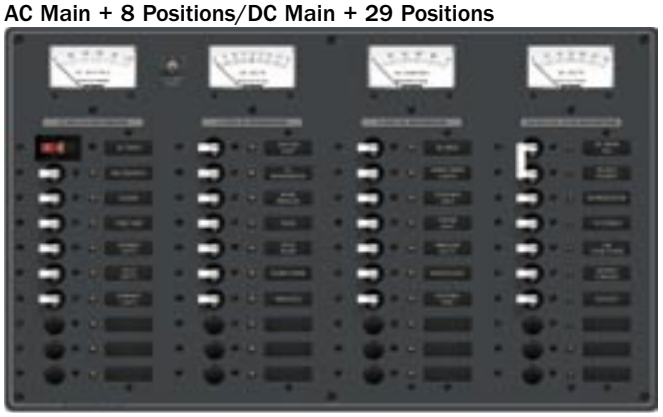
AC Main + 6 Positions/DC 16 Position



8684/8685*

DC Features
- Owner upgradeable to 24 Volt DC with 8240, 18-32 Volt DC Voltmeter

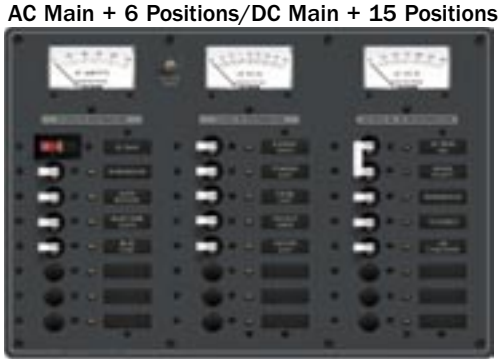
AC Main + 8 Positions/DC Main + 29 Positions



8095/8195* 3095/3195*

DC Features
- Owner upgradeable to 24 Volt DC with 8240, 18-32 Volt DC Voltmeter

AC Main + 6 Positions/DC Main + 15 Positions

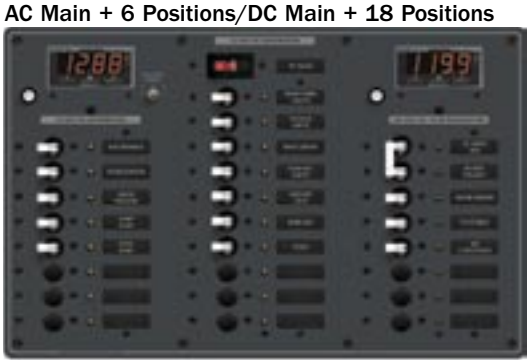


8084/8184* 3084/3184*

AC Features
- Ready for installation of optional 4029 AC Isolation Cover - 2 required (see page 88)

DC Features
- 100 Ampere C-Series Circuit Breaker provides main circuit protection and switching for DC branch circuits
- Owner upgradeable to 24 Volt DC with 8240, 18-32 Volt DC Voltmeter

AC Main + 6 Positions/DC Main + 18 Positions

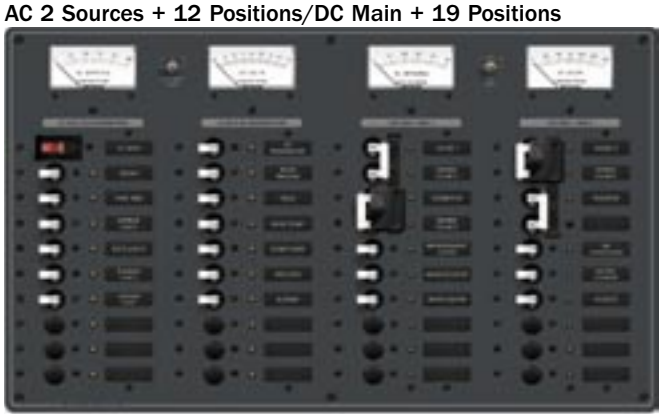


8408/8508* 3408/3508*

AC Features
- Ready for installation of optional 4029 AC Isolation Cover (see page 88)

DC Features
- 100 Ampere C-Series Circuit Breaker provides main circuit protection and switching for DC branch circuits
- All positive, negative and grounding buses installed fully prewired

AC 2 Sources + 12 Positions/DC Main + 19 Positions



8086/8186* 3086/3186*

AC Features
- Ready for installation of optional 4031 AC Isolation Cover (see page 88)

DC Features
- 100 Ampere C-Series Circuit Breaker provides main circuit protection and switching for DC branch circuits
- All positive, negative and grounding buses installed fully prewired

AC 2 Sources + 12 Positions/DC Main + 7 Positions

8085/8185* 3085/3185*

AC Features
- Ready for installation of optional 4029 AC Isolation Cover - 2 required (see page 88)

DC Features
- 100 Ampere C-Series Circuit Breaker provides main circuit protection and switching for DC branch circuits
- Owner upgradeable to 24 Volts DC with 8240, 18-32 Volt DC Voltmeter

* 230 Volt (typical of Europe)

120 VOLT	AC/DC Toggle Circuit Breaker Panels												
								Installed AC Circuit Breakers			Installed DC Circuit Breakers	
PN	PN	Description	Voltage	Meter Type/PN	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	30A	50A	15A	100A Main	15A
8085	3085	AC 2 Sources + 12 Positions DC Main + 7 Positions	120V AC 12V DC	Analog*/8003, 9630, 9353	14.75 (374.65)	10.00 (254.00)	6.50 (2.95)	2	-	9	1	4
8084	3084	AC Main + 6 Positions DC Main + 15 Positions	120V AC 12V DC	Analog*/8003, 8017, 9353	14.75 (374.65)	10.00 (254.00)	6.50 (2.95)	1	-	3	1	9
8408	3408	AC Main + 6 Positions DC Main + 18 positions	120V AC 12/24V DC	Digital**/8247, 8248	15.75 (400.05)	10.00 (254.00)	8.73 (3.96)	1	-	3	1	12
8086	3086	AC 2 Sources + 12 Positions DC Main + 19 Positions	120V AC 12V DC	Analog*/8003, 8017, 9630, 9353	19.50 (495.30)	11.50 (292.10)	12.80 (5.81)	3	1	6	1	13
8095	3095	AC Main + 8 Positions DC Main + 29 Positions	120V AC 12V DC	Analog*/8003, 8017, 9630, 9353	19.50 (495.30)	11.50 (292.10)	12.80 (5.81)	1	-	5	1	20

230 VOLT	AC/DC Toggle Circuit Breaker Panels (Typical of Europe)											
								Installed AC Circuit Breakers			Installed DC Circuit Breakers	
PN	PN	Description	Voltage	Meter Type/PN	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	16A	32A	8A	100A Main	15A
8185	3185	AC 2 Sources + 12 Positions DC Main + 7 Positions	230V AC 12V DC	Analog*/8003, 9630, 9354	14.75 (374.65)	10.00 (254.00)	6.50 (2.95)	2	-	9	1	4
8184	3184	AC Main + 6 Positions DC Main + 15 Positions	230V AC 12V DC	Analog*/8003, 8017, 9354	14.75 (374.65)	10.00 (254.00)	6.50 (2.95)	1	-	3	1	9
8508	3508	AC Main + 6 Positions DC Main + 18 positions	230V AC 12/24V DC	Digital**/8247, 8248	15.75 (400.05)	10.00 (254.00)	8.73 (3.96)	1	-	3	1	12
8186	3186	AC 2 Sources + 12 Positions DC Main + 19 Positions	230V AC 12V DC	Analog*/8003, 8017, 9630, 9354	19.50 (495.30)	11.50 (292.10)	12.80 (5.81)	3	1	6	1	13
8195	3195	AC Main + 8 Positions DC Main + 29 Positions	230V AC 12V DC	Analog*/8003, 8017, 9630, 9354	19.50 (495.30)	11.50 (292.10)	12.80 (5.81)	1	-	5	1	20

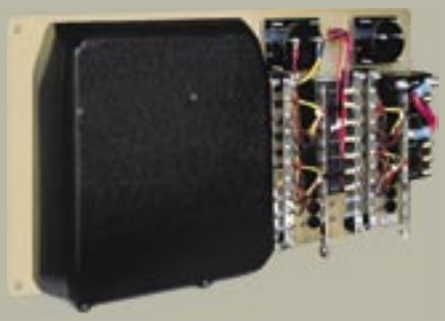
120 VOLT	AC/DC Rocker Circuit Breaker Panels											
							Installed AC Circuit Breakers				Installed DC Circuit Breakers	
PN	Description	Voltage	Meter Type/PN	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	16A	30A	8A	15A	100A Main	15A
8684	AC Main + 6 Positions DC 16 Positions	120V AC 12V DC	Analog*/8003, 8017, 9353	14.75 (374.65)	10.00 (254.00)	6.50 (2.95)	-	1	-	3	-	10

230 VOLT	AC/DC Rocker Circuit Breaker Panels (Typical of Europe)											
							Installed AC Circuit Breakers				Installed DC Circuit Breakers	
PN	Description	Voltage	Meter Type/PN	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	16A	30A	8A	15A	100A Main	15A
8685	AC Main + 6 Positions DC 16 Position	230V AC 12V DC	Analog*/8003, 8017, 9354	14.75 (374.65)	10.00 (254.00)	6.50 (2.95)	1	-	3	-	-	10

* Analog meters see pages 100-102
** Digital meters see pages 95-99, 102

Combined AC/DC panels require a Circuit Breaker Isolating Cover to meet ABYC Standards.

ABYC E11.11.1.1. In the case of systems with a combined AC and DC panel, the panel shall be designed so that when the panel is open there is no access to energized AC parts without the use of tools.



PN 4031 Circuit Breaker Isolating Cover (see page 88) Installed on PN 8086 AC/DC Circuit Breaker Panel (see page 84)

Panel Switches

- Perfect for generator starters, bilge pumps, horns, wipers, engine controls and any other application that requires switching action other than ON-OFF or different pole configuration separate from circuit protection
- All panel switches mount in Blue Sea Systems toggle type circuit breaker panels
- Supplied with mounting adapter for standard 5/8" circuit breaker mounting hole
- Nickel-plated brass and phenolic non-corrosive construction

Specifications	Toggle Switches	Push Button Switch
Rating 250 Volts AC	10 Amperes	3 Amperes
Rating 125 Volts AC	15 Amperes	6 Amperes
Rating 32 Volts DC	15 Amperes	6 Amperes
Terminal Size	0.25" (6.35mm)	0.25" (6.35mm)
Terminal Type	Quick Connect Tab	Quick Connect Tab
Actuator Color	White	White

PN	Type	Pole/Throw	Action	Weight Lb (Kg)
8200	Push Button	SPST	OFF-(ON)	0.07 (0.03)
8204	Toggle	SPST	OFF-ON	0.08 (0.04)
8205	Toggle	SPST	OFF-(ON)	0.08 (0.04)
8206	Toggle	SPDT	ON-OFF-ON	0.08 (0.04)
8207	Toggle	SPDT	(ON)-OFF-ON	0.08 (0.04)
8208	Toggle	SPDT	(ON)-OFF-(ON)	0.08 (0.04)
8209	Toggle	DPST*	OFF-ON-(ON) OFF-OFF-(ON)	0.08 (0.04)
8210	Toggle	DPST	OFF-ON	0.08 (0.04)
8211	Toggle	DPDT	ON-OFF-ON	0.08 (0.04)
8212	Toggle	DPDT	(ON)-OFF-ON	0.08 (0.04)

( ) = momentary

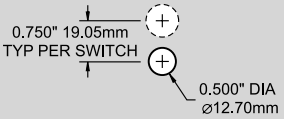
*Progressive Two Circuit Switch - maintains circuit one while momentarily switching circuit two

Push Button Switch

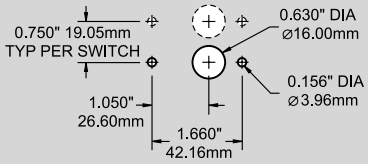
8200

Toggle Switch

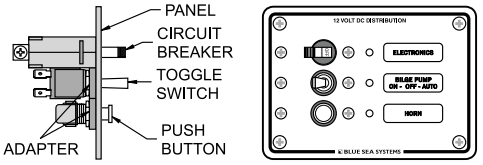
8204-8212



Panel Cutout Without Adapter



Panel Cutout With Adapter



Panel Switches Mounting Diagram

Circuit Breaker Mounting Screws

- Fits all single and double pole Toggle Type, Rocker and C-Series circuit breakers
- Sold in packages of 6

PN	Description	Weight Lb (Kg)
8035	6-32 x 1/4" Flat Head	0.03 (0.01)

8035

Circuit Breaker Panel Plug

- Black plug fits standard toggle World Circuit Breaker hole

PN	Description	Weight Lb (Kg)
8037	Circuit Breaker Panel Plug	0.03 (0.01)

8037

Rocker Series CLB Adapter

- Fits on Blue Sea Systems Rocker Panels and new Battery Management Panels (see pages 20-21, 45, 76)

PN	Description	Weight Lb (Kg)
4111	Circuit Breaker Panel Adapter	0.03 (0.01)

NEW PRODUCT

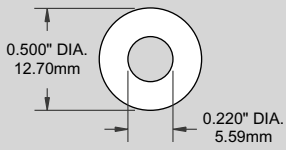
4111

24 Hour Round Label

- Tough, weatherproof material
- Fits over any Blue Sea Systems LED
- Sold in packages of 12
- Used on any standard panel
- Included with Battery Management Panels (see pages 20-21)

PN	Description
4140	24 Hour Round Label

NEW PRODUCT



Large Format Panel Label Dimensions

4140

5021

Water Resistant Fuse Holder

- Improved, easy to open, water resistant fuse holder
- Withstands water exposure normally encountered in above deck applications: rain, sea spray or hose spray washdown

Specifications

Mounting Hole Size 0.506" (12.8mm)

PN	Description	Weight Lb (Kg)
5021	Water Resistant Fuse Holder	0.02 (0.01)

LED Indicator Lights

- Easily installed in any Blue Sea Systems circuit breaker panel
- Simple push-in installation mounts in any thickness material
- Useful as general indicator and alarm lights

Specifications

Mounting Hole Size 11/64" (4.36mm)

CE marked

PN	Color	Voltage	Amperage Draw	Weight Lb (Kg)
8033	Amber	12/24V DC	5 Milliamperes	0.07 (0.03)
8171	Red	12/24V DC	5 Milliamperes	0.07 (0.03)
8172	Green	12/24V DC	5 Milliamperes	0.07 (0.03)
8169	Amber	120V AC	0.5 Milliamperes	0.07 (0.03)
8066	Red	120V AC	0.5 Milliamperes	0.07 (0.03)
8034	Green	120V AC	0.5 Milliamperes	0.07 (0.03)
8167	Amber	230V AC	0.25 Milliamperes	0.07 (0.03)
8166	Red	230V AC	0.25 Milliamperes	0.07 (0.03)
8134	Green	230V AC	0.25 Milliamperes	0.07 (0.03)

8072

8173

Mounting Panel for Toggle Type Magnetic Circuit Breakers

- Mounts any World or A-Series single or double pole circuit breaker or panel switch
- Slate gray matches standard panel color

Specifications

Panel Material 0.125" Aluminum 5052 Alloy

Dimensions 2.63" (66.68mm) x 3.75"(95.25mm)

PN	Description	Weight Lb (Kg)
8072	Mounting Panel - Single Pole	0.08 (0.04)
8173	Mounting Panel - Double Pole	0.08 (0.04)

▶ **See page 54 for single and double pole World Circuit Breakers**

RATED 12 or 24 VOLT DC

8065

Label Backlight System

- Easily installed in Blue Sea Systems circuit breaker panels
- Connects to 12 or 24 Volt sources via two 6" 18 AWG wire leads
- Backlighting is standard on panels - No kit required
- Reverse polarity protection built-in
- PN 8065 snaps apart for 5 or 3 positions

Specifications

Voltage 12 or 24 Volts DC

Amperage Draw <7 mA per label

PN	Description	Weight Lb (Kg)
8065	8/5/3 Positions	0.07 (0.03)
8384	4 Positions	0.05 (0.02)
8069	10 Positions	0.09 (0.04)
8383	13 Positions	0.11 (0.05)

Toggle Guard

- Protects circuit breakers from being accidentally switched ON or OFF
- Fits all World or A-Series single pole toggle circuit breakers
- Fits all panel switches (see page 86_
- Can be used on any brand of circuit breaker panel using standard toggle type circuit breakers
- Uses circuit breaker mounting screw hole
- Includes 2 mounting screws

Specifications

Material Acetal
Mounting Hole Size #6 Flat Head Screw

PN	Description	Weight Lb (Kg)
4100	Toggle Guard	0.05 (0.02)

4100 (2 shown)

World and Rocker AC Lockout Slide

- Allows only 1 double pole AC circuit breaker to be activated at a time
- Guarantees that AC power from 2 or 3 sources (shore power, genset, or inverter) will not be mixed
- Fits all double pole World or A-Series and Rocker Circuit Breaker Panels (see page 63, 72)
- Uses circuit breaker mounting screw holes - Requires no modification
- Includes mounting screws

Specifications

Material Acetal
Mounting Screw Size #6 Flat Head Screw

PN	Poles	AC Sources	Weight Lb (Kg)
4125	2	2	0.06 (0.03)
4126	2	3	0.07 (0.03)

4125

4126

AC C-Series Circuit Breaker Lockout Slide

- Allows only 1 of a pair of double pole or triple pole AC circuit breakers to be activated at a time
- Guarantees that AC power from 2 sources (shore power, genset, or inverter) will not be mixed
- Fits all double pole or triple pole C-Series Circuit Breakers shown (see page 65, 74)
- Uses circuit breaker mounting screw holes
- Requires no special panel modification
- Includes mounting screws

Specifications

Material Acetal
Mounting Screw Size #6 Flat Head Screw

PN	Poles	Positions	Weight Lb (Kg)
4130	2	2	0.06 (0.03)
4131	3	2	0.17 (0.08)

4130

4131

Circuit Breaker Insulating Covers

- Provides electrical insulation for exposed panel backs
- Provides mechanical protection for panel backs protruding into lockers
- Lightweight material is easily drilled for wire entrance and exit
- AC isolation covers meet ABYC safety requirements for panels with combined AC and DC loads

Specifications

Material ABS

PN	Description	Weight Lb (Kg)
4026	Cover for 5-1/4" x 3-3/4"	0.09 (0.04)
4027	Cover for 5-1/4" x 7-1/2"	0.14 (0.06)
4028	Cover for 10-1/2" x 7-1/2"	0.39 (0.18)
4029	Cover for 1 Column x 8 Position + Meter	0.24 (0.11)
4031	Cover for 2 Column x 10 Position + Meter	0.38 (0.17)

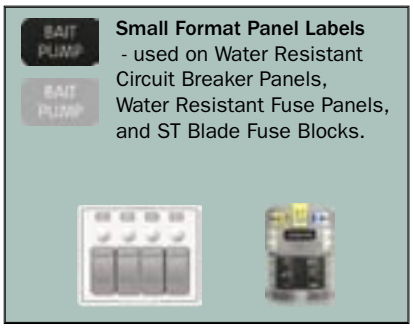
4031

4027

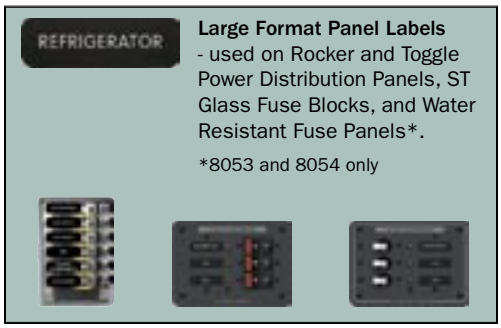
4031 installed on
8086 AC/DC Circuit Breaker Panel
(see pages 84-85)

Blue Sea Systems Label Formats

WeatherDeck™ Water Resistant Panel Labels
- used on WeatherDeck™ Water Resistant Panels and new DC Battery Management Panels.

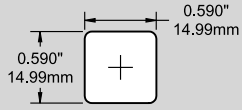


Small Format Panel Labels
- used on Water Resistant Circuit Breaker Panels, Water Resistant Fuse Panels, and ST Blade Fuse Blocks.



Large Format Panel Labels
- used on Rocker and Toggle Power Distribution Panels, ST Glass Fuse Blocks, and Water Resistant Fuse Panels*.

*8053 and 8054 only



WeatherDeck™ Panel Label Dimensions

WeatherDeck™ Water Resistant Panel Labels

- Tough, weatherproof material
- Used on WeatherDeck™ Water Resistant Panels (see page 48-51)
- 4215 included with WeatherDeck™ Water Resistant Panels (see pages 48-51)
- 4218 included with DC Management Panels - 8686, 8687, 8689, 8690, 8691, and 8693 (see pages 20-21)

PN	Color	Description	Quantity
4215	Black	DC Labels	30 Labels
4218	Black	DC Labels	30 Labels

PN	Color	Description	Quantity
4216	Black	DC Labels	60 Labels
4217	Black	DC Labels	120 Labels

NEW PRODUCT

▶ See pages 48-51 for Blue Sea Systems WeatherDeck™ Panels

Order labels online at www.bluesea.com.

4215 Label Kit

ACCESSORY
AERATOR
ANCHOR LIGHT
AUTOPILOT
BAIT PUMP
BILGE PUMP
BLOWER
CABIN LIGHTS
DEPTH SOUNDER
ELECTRONICS
GPS
HORN
INSTRUMENTS
KNOTMETER
NAVIGATION LIGHTS
RADAR
REFRIGERATOR
RUNNING LIGHTS
SEARCHLIGHT
SPARE
SPREADER LIGHTS
STEAMING LIGHT
STEREO
TRIM TABS
VHF
WASHDOWN
WATER PRESSURE
WATER PUMP
WINDLASS
WIPERS

4218 Label Kit

12 V DC
24 V DC
ALARM
BILGE PUMP
BILGE PUMP 2
BILGE PUMP 3
BILGE PUMP 4
BOW THRUSTER
CLOCK
DC MAIN
DC SUB PANEL
ELECTRONICS
ENGINE
ENGINES
ENG 1/ENG 2
GENERATOR
HOUSE
HOUSE/ENG
HOUSE/GEN
INVERTER
LIGHTS
MEMORY
PORT/STBD ENG
RADAR
RADIO
SOLAR PANEL
VHF
WINCH
WINDLASS
BLANK (WRITE-ON)

4216 Label Kit

(BLANK)
12 VOLT DC
12 VOLT DC OUTLETS
ANCHOR WASH DOWN
BAITWELL
BATTERY
BATTERY PARALLEL
BILGE
BILGE PUMP 2
BILGE PUMP ON-OFF-AUTO
BOW LIGHT
CABIN
CB RADIO
CELLULAR PHONE
CHART LIGHT
CHART PLOTTER
COCKPIT LIGHTS
COMPASS LIGHT
COURTESY LIGHTS
DAVIT
DC OUTLETS
DC SUB PANEL
DECK LIGHTS
DOCKING LIGHTS
DOWN RIGGER
ELECTRIC HATCH
ENGINE ROOM BLOWER
ENGINE ROOM LIGHTS
FAN
FISH FINDER
FISHING LIGHT
FISHWELL PUMP
FLOOD LIGHTS
FRESH WATER PUMP
FUEL PUMP
GALLEY OUTLETS
GAS ALARM
GPS/PLOTTER
HEAD
IGNITION
INSTRUMENT LIGHTS
LIGHTS
LIVEWELL
MACERATOR PUMP
NAV LIGHT ANCHOR OFF NAV
OUTLETS
PUMPOUT
RADIO
SEAWATER WASH DOWN
SHOWER SUMP PUMP
SSB
STERN LIGHT
STROBE LIGHT
TRICOLOR LIGHT
TROLLING MOTOR
WASHDOWN
WATER MAKER
WINCHES
WIPER PORT
WIPER STBD

4217 Label Kit

(BLANK)
12 VOLT DC
12 VOLT DC OUTLETS
24V DC
AIR HORN
ANCHOR LIGHT MAIN
ANCHOR LIGHT MIZZEN
ANCHOR WASH DOWN
APPLIANCES
ARCH LIGHTS
AUTO/MAN
BAITWELL
BATTERY
BATTERY PARALLEL
BILGE ALARM
BILGE PUMP 2
BILGE PUMP ON-OFF-AUTO
BOW LIGHT
BOW THRUSTER
BRIDGE INSTRUMENTS
BRIDGE LIGHTS
CABIN
CB RADIO
CD PLAYER
CHART LIGHT
CHART PLOTTER
COCKPIT LIGHTS
COMPASS LIGHT
COURTESY LIGHTS
DAVIT
DC OUTLETS
DC SUB PANEL
DECK LIGHTS
DEFROSTER
DEPTH/SPEED
DIMMER
DISCHARGE PUMP
DOCKING LIGHT PORT
DOCKING LIGHT STBD
DOCKING LIGHTS
DOWN RIGGER
ELECTRIC HATCH
ENGINE HATCH
ENGINE INSTRUMENTS
ENGINE ROOM BLOWER
ENGINE ROOM LIGHTS
ENGINE SHUTDOWN
ENTRY STEP
FAN
FAN 2
FIRE ALARM
FIRE EXT
FISH FINDER
FISHING LIGHT
FISHWELL PUMP
FLOOD LIGHTS
FLYBRIDGE
FLYBRIDGE ELECTRONICS
FLYBRIDGE LIGHTS
FOG LIGHTS
FOREDECK LIGHT
FRESH WATER PUMP
FRESH WATER WASH DOWN
FUEL PUMP
FUEL TRANSFER
FURLER JIB
FURLER MAINSAIL
GALLEY
GAS ALARM
GPS/PLOTTER
HAILER
HAM RADIO
HEAD
HEATER
IGNITION
INSTRUMENT LIGHTS
INTERCOM HAILER
LAZARETTE LIGHTS
LIGHTS
LIGHTER
LIVEWELL
LOCKER LIGHTS
LPG CONTROL
MAIN
MAST LIGHTS
MASTHEAD LIGHT
MIZZEN FLOOD
NAVIGATION ELECTRONICS
NAVIGATION INSTRUMENTS
NAV LIGHT ANCHOR OFF NAV
ON-OFF
OUTLETS
PUMP
PUMPOUT
RADIO
ROD LOCKER
RUDDER ANGLE INDICATOR
SAILING CONTROLS
SAILING INSTRUMENTS
SALT WATER PUMP
SEAWATER WASH DOWN
SHOWER SUMP PUMP
SOLAR PANEL
SSB
START-STOP
STERN LIGHT
STROBE LIGHT
SUMP PUMP
TRANSFER
TRICOLOR LIGHT
TROLLING MOTOR
WASHDOWN PUMP
WASHDOWN
WINCHES
WIND GENERATOR
WIND INSTRUMENTS
WINDSHIELD WASHER
WIPER CENTER
WIPER PORT
WIPER STBD

Small Format Panel Labels

- Tough, weatherproof material
- 8214 and 8217 - Includes 60 common DC labels
- 8214 and 8217 - Used on DC Water Resistant Panels (pages 52-53) and ST Blade Fuse Blocks (see page 57)
- 4139 - Write-on circuit labels used on ST Blade Fuse Blocks (see page 57)

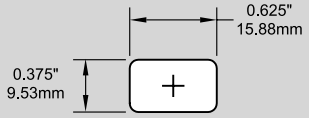
PN	Color	Description	Quantity
8214	Black	Small Format Panel Labels	60 Labels
8217	Gray	Small Format Panel Labels	60 Labels

▶ **See page 57 for Blue Sea Systems ST Blade Fuse Blocks.**

▶ **See pages 52, 53 for Blue Sea Systems Water Resistant Circuit Breaker Panels and Water Resistant Fuse Panels (8261 and 8262).**

8214

8217



Small Format Panel Label Dimensions

Order labels online at www.bluesea.com.

DC Small Format Label Listing

(BLANK)	CABIN	GAS ALARM	SEARCH LIGHT
12 VOLT DC	CABIN LIGHTS	GPS	SPARE
24 VOLT DC	CB RADIO	HORN	SPREADER LIGHTS
ACCESSORY	CELLULAR PHONE	IGNITION	STEAMING LIGHT
AERATOR	CHARGER INVERTER	INSTR. LIGHTS	STEREO
ANCHOR LIGHT	CHART PLOTTER	INVERTER	STROBE LIGHT
AUTO PILOT	DECK LIGHTS	KNOT METER	TRICOLOR LIGHT
BAIT PUMP	DEPTH SOUNDER	LIGHTS	TRIM TABS
BAITWELL	DOWN RIGGER	LIVEWELL	VHF
BATTERY	ELECTRONICS	NAV LIGHTS	WASH DOWN
BATTERY CHARGER	FAN	OUTLETS	WATER PRESSURE
BILGE	FISH FINDER	RADIO	WATER PUMP
BILGE PUMP	FISHING LIGHT	RADAR	WINCHES
BLOWER	FLOOD LIGHTS	REFRIGERATOR	WINDLASS
BOW LIGHT	FUEL PUMP	RUNNING LIGHTS	WIPERS

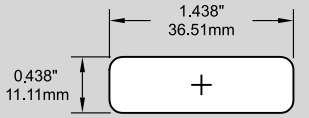
Large Format Panel Labels

For use with Blue Sea Systems Rocker and Toggle Power Distribution Panels, ST Glass Fuse Blocks, and Water Resistant Fuse Panels (8053 and 8054).

- Tough, weatherproof material
- Used on water resistant panels
- Large Format Panel Labels are available for purchase individually or in sets. Individual labels and label sets are listed on pages 91-94. To purchase individual Large Format Panel Labels online go to www.bluesea.com.

PN	Color	Description	Quantity
8031	Black	AC Panel Basic	30 Labels
8067	Black	AC Panel Extended	120 Labels
8030	Black	DC Panel Basic	30 Labels
8039	Black	DC Panel Extended	120 Labels

▶ **See pages 90-94 for label listing and part numbers.**



Large Format Panel Label Dimensions

Order labels online at www.bluesea.com.

REFRIGERATOR

Label Number	Description	8030 DC Basic	8039 DC Extended	8031 AC Basic	8067 AC Extended
1	#1				
2	#2				
3	(BLANK)		✓	✓	✓
5	12 VOLT DC		✓		
4	12 VOLT DC OUTLETS		✓		
499	12 VOLT OUTLETS INSIDE				
500	12 VOLT OUTLETS OUTSIDE				
502	120 VOLT 60Hz SHORE POWER				
6	120 VOLT AC OUTLETS				✓
7	120 VOLT AC / 60 HZ				✓
516	120/240V 60Hz				
517	120/240V 60Hz SHORE POWER				
10	24 VOLTS DC				
9	24 VOLT DC OUTLET				
8	240 VOLTS AC				
460	240 VOLTS AC / 60 HZ				
515	250 VOLT 50Hz SHORE POWER				
468	250 VOLTS AC / 50 HZ				
462	AC BUS 1				
11	AC COMPRESSOR				✓
12	AC FAN				✓
13	AC MAIN				✓
14	AC PANEL				✓
15	AC POWER				✓
16	AC REFRIGERATOR				✓
17	AC SUB PANEL				✓
18	ACCESSORY	✓		✓	
19	ADF				
20	AERATOR				
21	AFT CABIN		✓		✓
22	AFT CABIN LIGHTS			✓	
23	AFT CABIN OUTLETS			✓	
24	AFT HEAD		✓		✓
25	AIR COMPRESSOR				
26	AIR CONDITIONER			✓	
27	AIR CONDITIONER 2			✓	
28	AIR CONDITIONER 3				✓
29	AIR CONDITIONER 4				✓
30	AIR CONDITIONER PUMP				
31	AIR HORN				
32	ALARM SYSTEM		✓		✓
461	ALTERNATOR				
33	ALTERNATOR DISCONNECT				
34	AMPLIFIER				✓
35	ANCHOR LIGHT	✓			
36	ANCHOR LIGHT MAIN				
37	ANCHOR LIGHT MIZZEN				
38	ANCHOR WASH DOWN		✓		
39	APPLIANCES			✓	
40	ARCH LIGHTS				
41	AUDIO/VIDEO SYSTEM				✓
42	AUTO/MAN				
524	AUTOMATIC CHARGING RELAY				
43	AUTOPILOT	✓			
44	BAIT PUMP		✓		
45	BAITWELL				
46	BALLAST CONTROLS				
47	BALLAST PUMP				
48	BAR				
481	BATHROOM				
49	BATTERY				
473	BATTERY 1				
474	BATTERY 2				
50	BATTERY CHARGER			✓	
51	BATTERY CHARGER 2				✓
52	BATTERY COMPARTMENT				
53	BATTERY PARALLEL				
54	BEACON				
480	BEDROOM				

Label Number	Description	8030 DC Basic	8039 DC Extended	8031 AC Basic	8067 AC Extended
485	BEDROOM SLIDEOUT				
55	BILGE				
56	BILGE ALARM		✓		
57	BILGE ALARM 2				
58	BILGE ALARM 3				
59	BILGE ALARM 4				
60	BILGE LIGHTS				
61	BILGE PUMP	✓			
62	BILGE PUMP 2		✓		
63	BILGE PUMP 3				
64	BILGE PUMP 4				
453	BILGE PUMP ON-OFF-AUTO				
65	BLOWER	✓			
66	BOAT DAVIT				
67	BOOM LIGHT				
68	BOW LIGHT				
69	BOW THRUSTER				
70	BRIDGE				
71	BRIDGE INSTRUMENTS		✓		
72	BRIDGE LIGHTS				✓
73	BRIDGE OUTLETS				✓
74	CABIN				✓
75	CABIN 2				✓
501	CABIN 2 FAN				
76	CABIN 2 LIGHTS		✓		✓
77	CABIN 2 OUTLETS				✓
78	CABIN 3				✓
79	CABIN 3 LIGHTS		✓		✓
80	CABIN 3 OUTLETS				✓
81	CABIN 4				✓
82	CABIN 4 LIGHTS		✓		✓
83	CABIN 4 OUTLETS				✓
84	CABIN FAN		✓		
85	CABIN HEATER				✓
86	CABIN LIGHTS		✓		✓
87	CABIN OUTLETS			✓	
88	CABLEMASTER				
89	CASSETTE PLAYER				
90	CB RADIO		✓		
91	CCTV				✓
92	CD PLAYER				
93	CELLULAR PHONE		✓		
94	CHARGER/INVERTER				✓
95	CHART LIGHT		✓		
96	CHART PLOTTER		✓		
97	CHOKE				
98	CIRCULATOR PUMP				
508	CLOCK				
99	CLOSET LIGHT				
100	COCKPIT LIGHTS		✓		✓
101	COCKPIT REFRIG				✓
102	COLOR SOUNDER		✓		
103	COMM ELECTRONICS		✓		
104	COMPARTMENT HEATER				
105	COMPARTMENT LIGHT				✓
106	COMPASS LIGHT	✓			
107	COMPUTER			✓	
514	COMPUTER DISPLAY				
108	CONDENSER PUMP				
109	CONSOLE LIGHT				
110	CONVERTER				
111	COOKING GRILL				
112	COOKTOP				✓
113	COOLING PUMP				
114	COURTESY LIGHTS				
115	CREW LIGHTS				
116	CREW QUARTERS				
117	DAVIT				
118	DC LIGHTS		✓		

REFRIGERATOR

Label Number	Description	8030 DC Basic	8039 DC Extended	8031 AC Basic	8067 AC Extended
119	DC MAIN		✓		
120	DC OUTLETS		✓		
121	DC REFRIGERATOR		✓		
122	DC SUB PANEL		✓		
123	DECK				
124	DECK LIGHTS		✓		✓
125	DECK LIGHTS AFT		✓		
126	DECK LIGHTS FWD		✓		
127	DECK LIGHTS PORT				
128	DECK LIGHTS STBD				
129	DEFROSTER				
130	DEPTH RECORDER		✓		
131	DEPTH SOUNDER	✓			
132	DEPTH/SPEED		✓		
133	DESALINATOR		✓		
134	DIMMER		✓		✓
135	DINING AREA LIGHTS		✓		✓
136	DINING AREA OUTLETS				✓
137	DISCHARGE PUMP				
138	DISHWASHER				✓
139	DISPOSAL				✓
140	DIVE COMPRESSOR				
141	DOCKING LIGHT PORT				
142	DOCKING LIGHT STBD				
143	DOCKING LIGHTS		✓		
144	DOWN RIGGER				
145	DRYER				✓
146	DUMP VALVES				
147	ELECTRIC HATCH				
469	ELECTRONIC CONTROL UNIT				
148	ELECTRONICS	✓			
149	EMERGENCY BACKUP SYS				
150	EMERGENCY LIGHTS		✓		✓
151	EMERGENCY PUMPS				
158	ENGINE ALARM		✓		
159	ENGINE BLOCK HEATER				
160	ENGINE CONTROL PORT				
161	ENGINE CONTROL STBD				
162	ENGINE CONTROLS				
163	ENGINE DRIVEN REFRIG				
164	ENGINE EXHAUST FAN				
165	ENGINE HATCH				
166	ENGINE HEATER PORT				
167	ENGINE HEATER STBD				
168	ENGINE INSTRUMENTS	✓			
169	ENGINE OIL PAN PUMP				
152	ENGINE ROOM BILGE ALARM		✓		
153	ENGINE ROOM BLOWER				
154	ENGINE ROOM HEATER				
155	ENGINE ROOM LIGHTS		✓		✓
156	ENGINE ROOM OUTLETS				✓
157	ENGINE ROOM PANEL MAIN		✓		
170	ENGINE SHUTDOWN				
171	ENGINE TEMP				
172	ENTERTAINMENT CENTER			✓	
173	ENTRANCE DOOR				
174	ENTRY STEP				
175	EXHAUST FAN				✓
176	EXHAUST TEMP				
177	EXTERIOR				
178	EXTERIOR LIGHTS		✓		✓
179	FAN	✓			✓
180	FAN 2		✓		✓
181	FAN 3				✓
182	FAN 4				✓
183	FAX				
184	FILLING PUMP				
185	FIRE ALARM		✓		
186	FIRE EXT				

Label Number	Description	8030 DC Basic	8039 DC Extended	8031 AC Basic	8067 AC Extended
187	FIRE HORN				
459	FISH FINDER				
188	FISHBOX ICEMAKER				
520	FISHBOX PUMP				
521	FISHBOX REFRIGERATOR				
189	FISHING LIGHT		✓		
487	FISHWELL PUMP				
488	FISHWELL PUMP 2				
190	FLOOD LIGHTS		✓		✓
191	FLOSCAN				
192	FLYBRIDGE				
193	FLYBRIDGE ELECTRONICS		✓		
194	FLYBRIDGE LIGHTS		✓		
195	FLYBRIDGE OUTLETS				
196	FOG LIGHTS				
197	FOREDECK LIGHT	✓			
198	FREEZER				✓
199	FRESH WATER				
200	FRESH WATER PUMP		✓		
201	FRESH WATER PUMP 2				
202	FRESH WATER PUMP 3				
203	FRESH WATER PUMP 4				
204	FRESH WATER WASH DOWN		✓		
482	FRONT SLIDEOUT				
205	FUEL PRIMER PUMP				
206	FUEL PUMP				
207	FUEL PUMP 2				
208	FUEL PUMP 3				
209	FUEL PUMP 4				
210	FUEL TANK HEATER				
211	FUEL TRANSFER				
507	FUME DETECTOR				
212	FURLER JIB				
213	FURLER MAINSAIL				
214	FURLER SPINNAKER				
215	FURNACE				✓
216	FWD CABIN				
217	FWD CABIN LIGHTS	✓		✓	
218	FWD CABIN OUTLETS			✓	
219	GALLEY			✓	
220	GALLEY APPLIANCES				✓
221	GALLEY DRAIN				
222	GALLEY FAN				
223	GALLEY LIGHTS		✓		✓
224	GALLEY OUTLETS			✓	
490	GALVANIC ISOLATOR				
225	GARBAGE DISPOSAL				✓
226	GAS ALARM				
227	GENERAL PURPOSE				
523	GENERATOR				
228	GENERATOR 1				✓
229	GENERATOR 2				
454	GENERATOR OFF ON START				
230	GENERATOR ROOM BLOWER				
466	GENERATOR RUNNING				
455	GENERATOR STOP				
231	GFI OUTLET				✓
232	GPS	✓			
233	GPS/LORAN				
234	GPS/PLOTTER		✓		
510	GUN LOCKS				
235	GYRO COMPASS				
236	HAILER		✓		
237	HALLWAY LIGHTS				✓
238	HALON FIRE SYSTEM				
239	HAM RADIO		✓		
240	HEAD		✓		
241	HEAD 2				
242	HEAD 2 FAN				

Label Number	Description	8030 DC Basic	8031 AC Basic	8039 DC Extended	8067 AC Extended
243	HEAD 2 OUTLETS				✓
244	HEAD 3				
245	HEAD 3 FAN				
246	HEAD 3 OUTLETS				✓
247	HEAD 4				
248	HEAD 4 FAN				
249	HEAD 4 OUTLETS				✓
250	HEAD FAN				
251	HEAD LIGHTS		✓		✓
252	HEAD LIGHTS 2		✓		✓
253	HEAD LIGHTS 3				✓
254	HEAD LIGHTS 4				✓
255	HEAD OUTLETS				✓
256	HEADLIGHTS				
257	HEATER			✓	
519	HEATER & AIR CONDITIONER				
258	HEATER 2		✓		✓
259	HEATER 3				✓
260	HEATER 4				✓
261	HELM ELECTRONICS		✓		
262	HELM GAUGES		✓		
263	HELM INSTRUMENTS		✓		
264	HIGH WATER ALARM		✓		
265	HOLDING TANK		✓		
266	HOLDING TANK ALARM		✓		
267	HOLDING TANK PUMP		✓		
268	HOOD FAN				✓
269	HOOD LIGHT				
270	HORN	✓			
475	HOT TUB				
271	HOT WATER PUMP				
272	HYDRAULIC ALARM				
273	HYDRAULIC SYSTEM				
274	HYDRAULIC TANK ALARM				
275	ICE MAKER				✓
276	IGNITION				
277	IGNITION PORT				
278	IGNITION STBD				
279	INSTRUMENT LIGHTS		✓		
280	INSTRUMENTS		✓		
281	INTERCOM		✓		
282	INTERCOM HAILER				
283	INTERCOM/TELEPHONE				
284	INTERIOR LIGHTS		✓		✓
285	INVERTER			✓	
467	INVERTER 2				
476	INVERTER AC BUS				
471	INVERTER AC SUPPLY				
470	INVERTER DC SUPPLY				
286	INVERTER OUTLET				✓
287	ISOLATION TRANSFORMER				✓
479	KITCHEN				
484	KITCHEN SLIDEOUT				
288	KNOTMETER	✓			
289	LAZARETTE LIGHTS				✓
290	LECTRASAN				✓
291	LIGHTER				
292	LIGHTS	✓		✓	
293	LIGHTS 2		✓		✓
294	LIGHTS 3				✓
295	LIGHTS 4				✓
296	LIGHTS AFT				✓
494	LIGHTS AFT CABIN				
297	LIGHTS FWD				✓
493	LIGHTS MASTER CABIN				
495	LIGHTS PANTRY				
492	LIGHTS PILOTHOUSE				
298	LIGHTS PORT				
491	LIGHTS SETTEE				

Label Number	Description	8030 DC Basic	8031 AC Basic	8039 DC Extended	8067 AC Extended
299	LIGHTS STBD				
300	LIVEWELL		✓		
301	LIVEWELL INPUT				
302	LIVEWELL OUTPUT				
303	LOCKER LIGHTS				
304	LOG		✓		
305	LORAN		✓		
306	LPG CONTROL				
307	LUBE OIL PUMP				
308	MACERATOR PUMP	✓		✓	
309	MAIN				✓
310	MAIN BREAKER				✓
311	MAIN CABIN		✓		✓
312	MAIN CABIN LIGHTS	✓		✓	
313	MAIN CABIN OUTLETS			✓	
314	MAIN SAIL FURLING				
315	MAP LIGHT		✓		
316	MAST LIGHTS		✓		
317	MASTHEAD LIGHT				
318	MICROWAVE			✓	
319	MINI DISC PLAYER				
320	MIZZEN FLOOD				
456	NAV LIGHT ANCHOR OFF NAV				
321	NAV STATION ELECTRONICS		✓		
322	NAV STATION GAUGES		✓		
323	NAV STATION INSTRUMENTS		✓		
324	NAV STATION LIGHTS		✓		✓
325	NAVIGATION ELECTRONICS		✓		
326	NAVIGATION INSTRUMENTS		✓		
327	NAVIGATION LIGHTS		✓		
328	NIGHT LIGHTS				
329	OFF				
331	OIL CHANGE PUMP				
332	ON				
330	ON-OFF				
333	OUTLETS			✓	
334	OUTLETS 2				✓
335	OUTLETS 3				✓
336	OUTLETS 4				✓
505	OUTLETS AFT				
337	OUTLETS DECK				✓
506	OUTLETS ENGINE ROOM				
338	OUTLETS EXTERIOR				✓
503	OUTLETS FORWARD				
339	OUTLETS INTERIOR				✓
504	OUTLETS PILOT HOUSE				
458	PANEL LIGHTS				
496	PILOT HOUSE FAN				
340	PORT				
341	PORT THRUSTER				
342	POWER				
343	POWER WASHER				
457	PRE-HEAT				
344	PRIMARY WINCHES				
345	PRINTER				
346	PUMP				
497	PUMP BLACK WATER				
498	PUMP GRAY WATER				
347	RACK LIGHTS		✓		
348	RACK OUTLETS				✓
349	RADAR	✓			
350	RADAR ARCH LIGHTS				
351	RADIO		✓		
352	RANGE				✓
353	RDF				
483	REAR SLIDEOUT				
354	RECEIVER				
355	RECEPTACLE				
356	REFRIGERATOR	✓		✓	

REFRIGERATOR

Label Number	Description	8030 DC Basic	8039 DC Extended	8031 AC Basic	8067 AC Extended
357	REFRIGERATOR PUMP				
358	REFRIGERATOR/FREEZER				✓
359	REGULATOR				
360	REVERSE POLARITY				✓
361	ROD LOCKER				
489	RUDDER ANGLE INDICATOR				
362	RUNNING LIGHTS	✓			
363	SAILING CONTROLS				
364	SAILING INSTRUMENTS	✓			
365	SALOON		✓		✓
366	SALOON HEATER				✓
367	SALOON LIGHTS		✓		✓
368	SALOON OUTLETS				✓
369	SALT WATER PUMP				
370	SAT/COM		✓		
371	SAT/NAV		✓		
372	SATELLITE DISH		✓		✓
373	SCRUBBER				
374	SEARCHLIGHT		✓		
375	SEARCHLIGHT HAND HELD				
376	SEARCHLIGHT REMOTE				
377	SEAWATER TEMP		✓		
378	SEAWATER WASH DOWN		✓		
379	SECURITY SYSTEM		✓		
380	SHIP				✓
381	SHORE				✓
463	SHORE 1				
464	SHORE 2				
382	SHORE CORD REEL				
383	SHORE POWER				✓
384	SHORE POWER CORD				
385	SHOWER SUMP PUMP		✓		
386	SINK DRAIN				
486	SLIDEOUT				
387	SOLAR PANEL				
388	SONAR		✓		
389	SPARE	✓		✓	
390	SPEED/LOG		✓		
391	SPREADER LIGHTS	✓			
392	SPREADER LT MIZZEN				
393	SSB		✓		
394	STABILIZER				
395	STARBOARD				
396	START				
398	START PORT				
399	START STBD				
397	START-STOP				
400	STBD THRUSTER				
401	STEAMING LIGHT	✓			
402	STEP LIGHT				
403	STEREO	✓			✓
404	STERN LIGHT				
509	STERN THRUSTER				
405	STOP				
406	STOVE			✓	
407	STOVE/MICROWAVE				✓
408	STROBE LIGHT	✓			
409	SUB PANEL		✓		✓
410	SUMP PUMP		✓		
411	SUMP PUMP 2				
412	SYNCHRO				
413	TAPE DECK				
414	TELEPHONE SYSTEM		✓		✓
415	TEST				
416	TOWING LIGHTS				
417	TRACK LIGHTS		✓		✓
465	TRANSFER				
418	TRANSFER PUMP		✓		
419	TRANSFORMER				
518	TRANSFORMER SECONDARY				
420	TRASH COMPACTOR				✓
478	TRAVEL LOCKS				
421	TRICOLOR LIGHT	✓			
422	TRIM TABS		✓		
423	TV		✓		✓
424	TV ANTENNA				
425	TV/STEREO			✓	
426	TV/VCR		✓		
427	UPS SYSTEM				✓
428	UTILITY		✓		
429	VACUUM				✓
430	VACUUM PUMP				
431	VCR			✓	
432	VHF	✓			
511	VHF 1				
512	VHF 2				
433	VIDEO PLOTTER		✓		
434	VIDEO SYSTEM				✓
513	WASHDOWN PUMP				
435	WASHER				✓
436	WASHER/DRYER			✓	
437	WATER ALARM		✓		
438	WATER HEATER			✓	
439	WATER LEVEL				
440	WATER MAKER		✓		✓
441	WATER PRESSURE	✓			
442	WATER PUMP		✓		
443	WEATHER FAX		✓		
444	WEATHER INSTRUMENT		✓		
445	WINCHES		✓		
477	WIND GENERATOR				
446	WIND INSTRUMENTS		✓		
447	WINDEX LIGHT		✓		
448	WINDLASS				
522	WINDSHIELD VENT				
449	WINDSHIELD WASHER				
472	WIPER CENTER				
450	WIPER PORT		✓		
451	WIPER STBD		✓		
452	WIPERS		✓		

AC and DC Digital Meters

- DC Digital Meters for Voltage and Amperage
- AC Digital Meters for Voltage, Amperage, Frequency, and Watts
- Voltmeters, Ammeters, Frequency Meters, and Multimeters
- Easy spin on mounting system
- Readable in low light
- Can be rear or front panel mounted
- Direct replacement for analog meters
- Scan mode on multi-function units
- Low current drain

3 levels of display brightness

Large, bright LED characters are easy to read in low light, at angles, and from a distance

AC high and low voltage and high amperage alarms, both audio and visual (8247 - see page 96)

DC high and low voltage, both audio and visual (8248 and 8251 - see page 98)

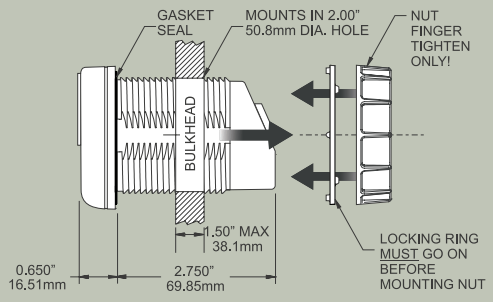
Splashproof front

Easy to panel mount with removable bezel - see below

Easy to surface mount in round 2” diameter hole - see below

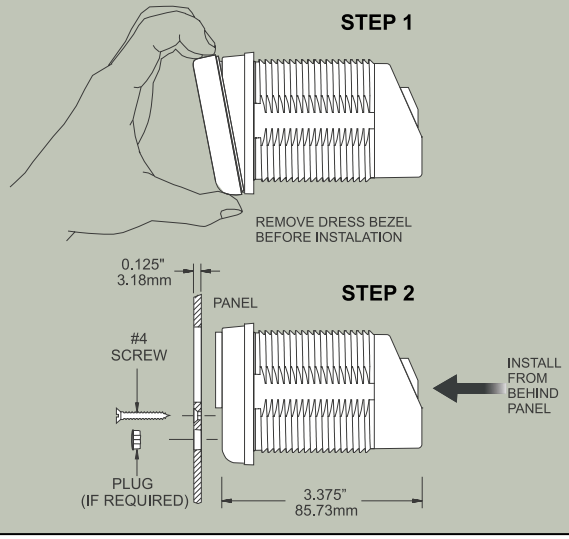
Digital Meter Front Panel Mount

Surface mounting features a finger nut and locking ring for quick and easy installation into a 2.00” (52.00mm) diameter hole.



Digital Meter Rear Panel Mount

To panel mount simply remove the bezel and mount in any Blue Sea Systems full sized meter cutout



AC Digital Multimeter with Alarm

- Displays amperage from 0 to 150 Amperes
- Displays voltage from 80 to 270 Volts AC
- Displays power from 10 to 45 Kilowatts
- Displays frequency from 40 to 90 Hertz
- High and low voltage and high amperage alarms, both audio and visual
- 3 levels of display brightness
- Programmable sleep mode blanks display for power conservation
- Splashproof front
- Includes current transformer - reference 8256, (see page 103)

8247

Specifications

Display Character Size	9/16” (14.29mm)	
Input Voltage	80-270V AC*	
Minimum Power Consumption	0.010 Watt**	
Maximum Power Consumption	0.027 Watt**	
Dimensions	Width	2.90” (73.56mm)
	Height	2.43” (61.75mm)
	Depth	3.40” (86.36mm)
Weight	0.78Lb (0.35Kg)	

* For 120 & 240 Volt AC single phase systems
** Variable with voltage, display intensity, segments illuminated and sleep mode

AC Digital Frequency Meter

- Displays frequency from 40 to 90 Hertz
- 3 levels of display brightness
- Splashproof front
- Manual sleep mode blanks display for power conservation

8239

Specifications

Display Character Size	9/16” (14.29mm)	
Input Voltage	80-270V AC*	
Minimum Power Consumption	0.010 Watt**	
Maximum Power Consumption	0.027 Watt**	
Dimensions	Width	2.90” (73.56mm)
	Height	2.43” (61.75mm)
	Depth	3.40” (86.36mm)
Weight	0.72Lb (0.35Kg)	

* For 120 & 240 Volt AC single phase systems
** Variable with voltage, display intensity, segments illuminated and sleep mode

AC Digital Ammeter

- Displays amperage from 0 to 150 Amperes
- 3 levels of display brightness
- Splashproof front
- Includes current transformer - reference 8256, (see page 103)
- Manual sleep mode blanks display for power conservation

8238

Specifications

Display Character Size	9/16” (14.29mm)	
Input Voltage	80-270V AC*	
Minimum Power Consumption	0.010 Watt**	
Maximum Power Consumption	0.027 Watt**	
Dimensions	Width	2.90” (73.56mm)
	Height	2.43” (61.75mm)
	Depth	3.40” (86.36mm)
Weight	0.78Lb (0.35Kg)	

* For 120 & 240 Volt AC single phase systems
** Variable with voltage, display intensity, segments illuminated and sleep mode

8237

AC Digital Voltmeter

- Displays voltage from 80 to 270 Volts AC
- 3 levels of display brightness
- Splashproof front
- Manual sleep mode blanks display for power conservation

Specifications

Display Character Size	9/16" (14.29mm)
Input Voltage	80-270V AC*
Minimum Power Consumption	0.010 Watt**
Maximum Power Consumption	0.027 Watt**
Dimensions	Width 2.90" (73.56mm)
	Height 2.43" (61.75mm)
	Depth 3.40" (86.36mm)
Weight	0.72Lb (0.33Kg)

* For 120 & 240 Volt AC single phase systems
** Variable with voltage, display intensity, segments illuminated and sleep mode

AC Digital Meter Specifications

PN	Description	Current Measurement	Voltage Measurement	Frequency Measurement	Power Measurement
8247	AC Digital Multimeter with Alarm	✓	✓	✓	✓
8239	AC Digital Frequency Meter	-	-	✓	-
8238	AC Digital Ammeter	✓	-	-	-
8237	AC Digital Voltmeter	-	✓	-	-

Current Measurement

Current Transformer:	150A-50mV
Range 1 (Resolution 0.01A):	0.00-9.99A AC (RMS)
Range 2 (Resolution 0.10A):	10-150A AC (RMS)
Accuracy (% of Reading):	±1.0% [2]

Frequency Measurement

Range:	40-90Hz
Resolution:	0.1Hz
Accuracy (% of Reading):	±1.0% [2]

(Calibrated with sine wave input)

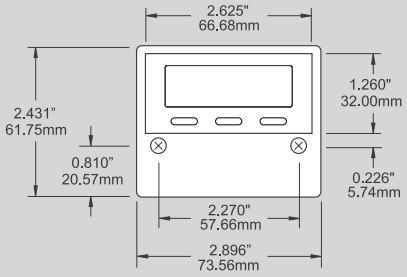
Voltage Measurement

Range:	80-270V AC [1]
Resolution:	0.1V AC
Accuracy (% of Reading) 90-270V AC (RMS):	±1.0% [2]
Accuracy (% of Reading) 80-90V AC (RMS):	±5.0% [2]

Power Measurement

Range 1 (Resolution 10W):	0.00-9990W
Range 2 (Resolution 0.1kW):	10-45kW
Accuracy (% of Reading):	±5.0% [2]

[1] For 120 & 240 Volt AC single phase systems
[2] ±1 least digit of resolution



Digital Meter Dimensions

8410

120/240V AC Digital Meter Panel

8410 Digital Meter Panel (see page 102) for use with 8247 Digital Multimeter with Alarm

DC Digital Multimeter with Alarm

- Displays amperage from -500 to +500 Amperes
- Displays voltage from 0 to 60 Volts DC in 0.01 Volt increments
- High and low voltage, audio and visual alarms
- Standard meter operates in negative side of circuit only. Shunt shifter required for positive side installation such as alternators - reference 8242 (see page 103)
- 3 levels of display brightness
- Programmable sleep mode blanks display for power conservation
- Splashproof front
- Includes 500 Amp shunt - reference 8255 (see page 103)

Specifications

Display Character Size	9/16” (14.29mm)	
Input Voltage	7-60V DC*	
Minimum Power Consumption	0.60 Watt**	
Maximum Power Consumption	1.00 Watt**	
Dimensions	Width	2.90” (73.56mm)
	Height	2.43” (61.75mm)
	Depth	3.40” (86.36mm)
Weight	1.12Lb (0.51Kg)	

* Applicable for 12, 24, 32, 36, and 42 Volt DC systems
** Variable with voltage, display intensity, segments illuminated and sleep mode

8248

DC Digital Voltmeter with Alarm

- Displays voltage from 0 to 60 Volts DC
- High and low voltage audio and visual alarms
- 3 levels of display brightness
- Programmable sleep mode blanks display for power conservation
- Splashproof front

Specifications

Display Character Size	9/16” (14.29mm)	
Input Voltage	7-60V DC*	
Minimum Power Consumption	0.60 Watt**	
Maximum Power Consumption	1.00 Watt**	
Dimensions	Width	2.90” (73.56mm)
	Height	2.43” (61.75mm)
	Depth	3.40” (86.36mm)
Weight	0.44Lb (0.20Kg)	

* Applicable for 12, 24, 32, 36, and 42 Volt DC systems
** Variable with voltage, display intensity, segments illuminated and sleep mode

8251

DC Digital Voltmeter

- Displays voltage from 0 to 60 Volts DC
- 3 levels of display brightness
- Splashproof front
- Manual sleep mode blanks display for power conservation

Specifications

Display Character Size	9/16” (14.29mm)	
Input Voltage	7-60V DC*	
Minimum Power Consumption	0.60 Watt**	
Maximum Power Consumption	1.00 Watt**	
Dimensions	Width	2.90” (73.56mm)
	Height	2.43” (61.75mm)
	Depth	3.40” (86.36mm)
Weight	0.44Lb (0.20Kg)	

* Applicable for 12, 24, 32, 36, and 42 Volt DC systems
** Variable with voltage, display intensity, segments illuminated and sleep mode

8235

8236

DC Digital Ammeter

- Displays amperage from -500 to +500 Amperes
- 3 levels of display brightness
- Splashproof front
- Manual sleep mode blanks display for power conservation
- Standard meter operates in negative side of circuit only. Shunt shifter required for positive side installation such as alternators - reference 8242 (see page 103)
- Includes 500 Ampere shunt - reference 8255 (see page 103)
- Manual sleep mode blanks display for power conservation

Specifications

Display Character Size	9/16" (14.29mm)	
Input Voltage	7-60V DC*	
Minimum Power Consumption	0.60 Watt**	
Maximum Power Consumption	1.00 Watt**	
Dimensions	Width	2.90" (73.56mm)
	Height	2.43" (61.75mm)
	Depth	3.40" (86.36mm)
Weight	1.12Lb (0.51Kg)	

* Applicable for 12, 24, 32, 36, and 42 Volt DC systems

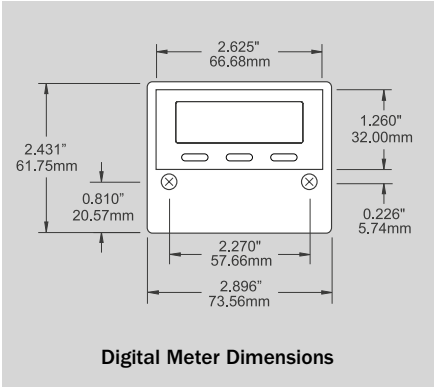
** Variable with voltage, display intensity, segments illuminated and sleep mode

DC Digital Meter Specifications

PN	Description	Current Measurement	Voltage Measurement
8248	DC Digital Multimeter with Alarm	✓	✓
8251	DC Digital Voltmeter with Alarm	-	✓
8235	DC Digital Voltmeter	-	✓
8236	DC Digital Ammeter	✓	-

Current Measurement		Voltage Measurement	
Shunt:	500A-50mV	Range:	0-60V DC
Range:	±500A DC	Resolution:	0.01V DC
Resolution (0.0-99.9):	0.1A DC	Accuracy (% of Reading)	±0.5% [1]
Resolution (100-500):	1.0A DC		
Accuracy (% of Reading):	±0.5% [1]		

[1] ±1 least digit of resolution



Digital Meter Dimensions

8403 with Digital Meter
(see page 46-47)

8678 with Digital Meter
(see page 45)

AC Analog Voltmeters

- Dial marked in 5 Volt increments
- Simple 2-wire connection to AC hot and neutral
- Meter senses and powers from same connection

Specifications

Accuracy ±2.5% of scale range

Standard Size 2-3/4" Face Meters		
PN	**Description**	**Weight Lb (Kg)**
9353	Voltmeter 0-150V AC	0.26 (0.12)
9354	Voltmeter 0-250V AC	0.26 (0.12)

Compact 2" Face Micro Meters		
PN	**Description**	**Weight Lb (Kg)**
8244	Micro Voltmeter 0-150V AC	0.19 (0.09)
8245	Micro Voltmeter 0-250V AC	0.19 (0.09)

9353

8245

AC Analog Ammeters

- 50 Amp dial marked in 2 Amperes increments
- Simple 2-wire connection
- Meter senses and powers from coil slipped over wire to be measured
- Includes AC current transformer (see page 103)

Specifications

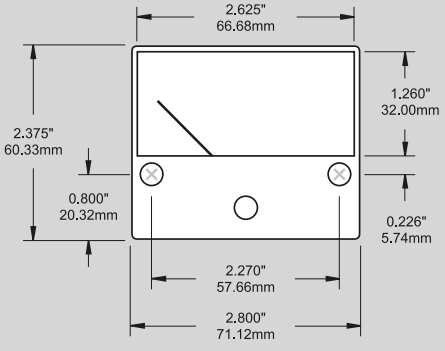
Accuracy ±2.5% of scale range
Meter Current 50 Milliamperes AC at full scale

Standard Size 2-3/4" Face Meters		
PN	**Description**	**Weight Lb (Kg)**
9630	Ammeter 0-50A AC + Transformer	0.32 (0.15)
8258	Ammeter 0-100A AC + Transformer	0.32 (0.15)

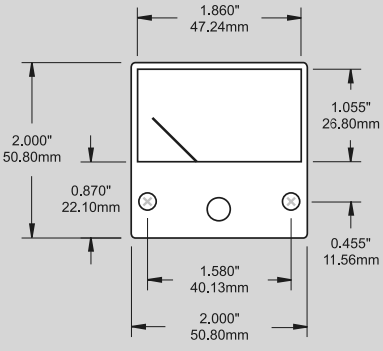
Compact 2" Face Micro Meter		
PN	**Description**	**Weight Lb (Kg)**
8246	Micro Ammeter 0-50A AC + Transformer	0.26 (0.12)

9630

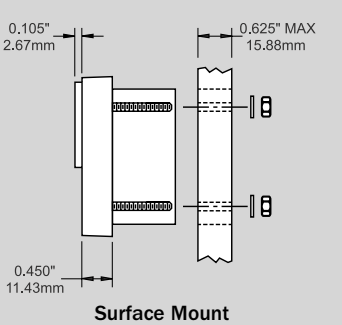
8246



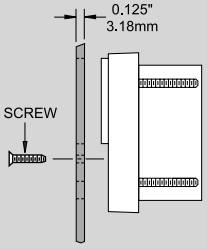
Standard Meter Dimensions



Micro Meter Dimensions



Surface Mount



Panel Mount

AC Current Transformers
(see page 103)

8073

8240

8028

DC Analog Voltmeters

- Simple 2-wire connection

Specifications

Meter Current	1 Milliampere at full scale
Accuracy	±2.5% of scale range

Standard Size 2-3/4" Face Meters		
PN	**Description**	**Weight Lb (Kg)**
8003	Voltmeter 8-16V DC	0.25 (0.11)
8240	Voltmeter 18-32V DC	0.25 (0.11)

Compact 2" Face Micro Meters		
PN	**Description**	**Weight Lb (Kg)**
8028	Micro Voltmeter 8-16V DC	0.19 (0.09)
8243	Micro Voltmeter 18-32V DC	0.19 (0.09)

8005

8041

DC Analog Ammeters

- Simple 2-wire connection from shunt - no other power required
- Meter senses and powers from shunt connection
- Includes DC shunt (see page 103)
  (Except 8005 and 8038 meters with internal shunts)

Specifications

External Shunt Type	50 Millivolt at meter full scale
Meter Current	1 Milliampere at full scale
Accuracy	±2.5% of scale range

Standard Size 2-3/4" Face Meters			
PN	**Description**	**Shunt Type**	**Weight Lb (Kg)**
8005	Ammeter 0-25A DC	Internal	0.26 (0.12)
8022	Ammeter 0-50A DC + Shunt	External	0.54 (0.24)
8016	Ammeter 0-75A DC + Shunt	External	0.54 (0.24)
8017	Ammeter 0-100A DC + Shunt	External	0.54 (0.24)
8018	Ammeter 0-150A DC + Shunt	External	0.54 (0.24)
8019	Ammeter 0-200A DC + Shunt	External	0.54 (0.24)

Compact 2" Face Micro Meters			
PN	**Description**	**Shunt Type**	**Weight Lb/Kg**
8038	Micro Ammeter 0-15A DC	Internal	0.20 (0.09)
8041	Micro Ammeter 0-50A DC + Shunt	External	0.40 (0.18)
8250	Micro Ammeter 0-100A DC + Shunt	External	0.40 (0.18)

8253

8254

DC Analog Zero Center Ammeters

- Meters read both discharge and charge current
- Simple 2-wire connection from shunt - no other power required
- Meter senses and powers from shunt connection
- Includes DC shunt (see page 103)

Specifications

External Shunt Type	50 Millivolt at meter full scale
Meter Current	1 Milliampere at full scale
Accuracy	±2.5% of scale range

Standard Size 2-3/4" Face Meters			
PN	**Description**	**Shunt Type**	**Weight Lb (Kg)**
8252	Ammeter 50-0-50A DC +Shunt	External	0.54 (0.24)
8253	Ammeter 100-0-100A DC +Shunt	External	0.54 (0.24)

Compact 2" Face Micro Meter			
PN	**Description**	**Shunt Type**	**Weight Lb (Kg)**
8254	Ammeter 50-0-50A DC +Shunt	External	0.40 (0.18)

DC Shunts power Blue Sea Systems DC Ammeters with external shunt (see page 103).


9228

120/240V AC Digital Meter Panel

- Perfect solution for monitoring 120/240 Volt AC systems
- Monitor Line 1 or Line 2 to Neutral and Line 1 to Line 2 voltages
- Monitor 120 Volt and 240 Volt currents
- Intended for use with 8247 AC Digital Multimeter (Not included) (see page 96)
- Includes two additional Current Transformers 8256 (see page 103)

Specifications

8247 AC Digital Multimeter	See page 96
Dimensions	5.25” (133.35mm) x 3.75” (95.25mm)

PN	Description
8410	120/240V AC Digital Meter Panel

8410

DC Voltmeter Panel

- 8003 DC Analog Voltmeter (see page 101)
- 8-16 Volts DC
- 3 position switch for multiple battery banks
- Full-size 2-3/4” meter

Specifications

Voltage	16 Volts DC Maximum
Dimensions	5.25” (133.35mm) x 3.75” (95.25mm)

PN	Description	Weight Lb (Kg)
8015	Panel with Analog Voltmeter	0.49 (0.22)

8015

DC Digital Voltmeter Panel

- 8235 DC Digital Meter (see page 98)
- 7-60 Volts DC
- 4 digit display
- Full-size 2-3/4” meter

Specifications

Voltage	60 Volts DC Maximum
Dimensions	5.25” (133.35mm) x 3.75” (95.25mm)

PN	Description	Weight Lb (Kg)
8051	Panel with Digital Voltmeter	0.64 (0.29)

8051

Meter Mounting Panels

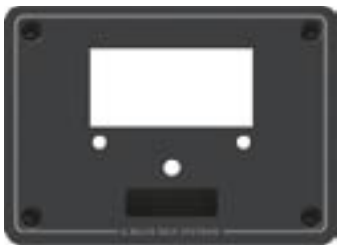
- Surface mounts Blue Sea Systems 2-3/4” Analog or Digital Meters

Specifications

Panel Material	0.125” Aluminum 5052 Alloy
Panel Undercoating	Chemical Treatment Mil-C-5541C or equivalent
Panel Front Coating	Two part polyurethane slate gray finish
Dimensions 8013	5.25” (133.35mm) x 3.75” (95.26mm)
Dimensions 8014	5.25” (133.35mm) x 7.50” (190.50mm)

PN	Description	Weight Lb (Kg)
8013	Mounting Panel For (1) 2-3/4” Meter	0.22 (0.10)
8014	Mounting Panel For (2) 2-3/4” Meters	0.36 (0.16)

8014



8013

8255

9228

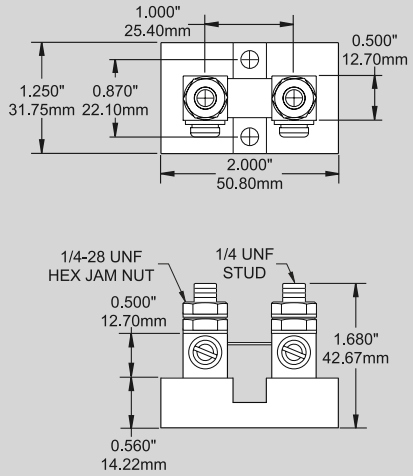
DC Shunts

- Power all Blue Sea Systems external shunt, DC ammeters
- For continuous operation, it is recommended that shunts not be run at more than two-thirds (66%) the rated current under normal conditions

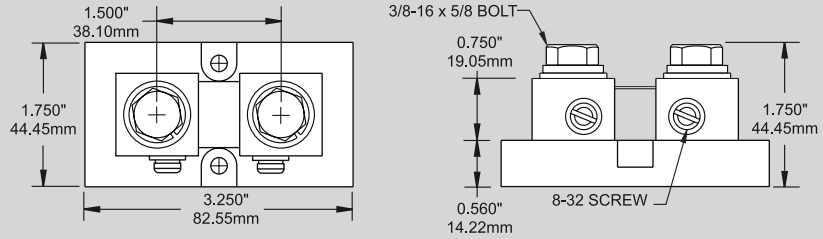
Specifications

Shunt Type	Resistive, Manganin Metal Element
Full Scale Resistance	50 Millivolts
Accuracy	±0.25% Rated Current
Continuous Duty	66% of Rated Current
Intermittent Duty	100% - 5 Minutes
	300% - 3 Seconds

PN	Description	Weight Lb (Kg)
9228	Analog Meter Shunt 50A/50mV	0.20 (0.09)
9229	Analog Meter Shunt 75A/50mV	0.20 (0.09)
9230	Analog Meter Shunt 100A/50mV	0.20 (0.09)
9231	Analog Meter Shunt 150A/50mV	0.20 (0.09)
9233	Analog Meter Shunt 200A/50mV	0.71 (0.32)
8255	Digital Meter Shunt 500A/50mV	0.71 (0.32)

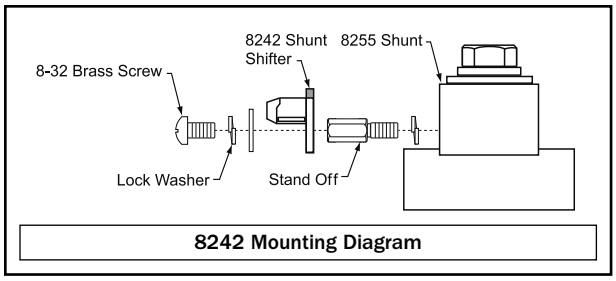


9228 - 9231 Dimensions



9233 and 8255 Dimensions

8242



8242 Mounting Diagram

Shunt Shifter

- Shunt adapter for DC Digital Ammeter positive side shunt applications, such as alternator measurement
- The Shunt Shifter is designed for use with Blue Sea Systems 8255 Digital Meter Shunt
- Advanced technology shifts the shunt's positive reference to negative as required by digital meters
- Easily installs directly onto shunt using existing sense screws
- Ideal for use with 12-36 Volt DC systems
- Includes all necessary hardware

PN	Description	Weight Lb (Kg)
8242	Shunt Adapter for DC Digital Ammeter	0.42 (0.02)

8073

AC Current Transformers

- For use with AC meters

Specifications

Dimensions	0.60" (15.24mm) Inside Diameter
	1.38" (35.05mm) Outside Diameter
Accuracy	±1%

PN	Description	Ratio	Weight Lb (Kg)
8073	Analog Ammeter	50A AC/50mA AC	0.20 (0.09)
8257	Analog Ammeter	100A AC/50mA AC	0.20 (0.09)
8256	Digital Ammeter	150A AC/50mA AC	0.20 (0.09)

2 Ampere Digital Dimmer

- Continuous voltage control from 0 to 100% of input voltage
- Last setting memory - Power returns to previous setting with optional ON/OFF switch
- -20°C to +85°C operating temperature range
- Water resistant, sealed housings
- Operates on 10 to 32 Volt DC systems
- Rated for dashboard gauge or small single fixture interior dimming
- Small fans

Specifications

Surge Rating: 10 sec	5 Amperes
Internal Over Current Protection	10 Amperes
Draw 0% output	5mA (0.005A)

PN	Continuous Rating	Width in" (mm)	Height in" (mm)	Depth in" (mm)	Weight Lb (Kg)
7501	2A	1.67 (42.42)	2.05 (52.07)	1.50 (38.10)	0.35 (0.16)


7501

5 Ampere Digital Dimmer

- Continuous voltage control from 0 to 100% of input voltage
- Last setting memory - Power returns to previous setting with optional ON/OFF switch
- -20°C to +85°C operating temperature range
- Water resistant, sealed housings
- Operates on 10 to 32 Volt DC systems
- Rated for medium to large single fixture interior dimming
- Most fans and small blowers

Specifications

Surge Rating: 10 sec	10 Amperes
Internal Over Current Protection	20 Amperes
Draw 0% output	5mA (0.005A)

PN	Continuous Rating	Width in" (mm)	Height in" (mm)	Depth in" (mm)	Weight Lb (Kg)
7502	5A	2.16 (54.86)	3.06 (77.72)	1.60 (40.64)	0.62 (0.28)


7502

10 Ampere Digital Dimmer

- Continuous voltage control from 0 to 100% of input voltage
- Last setting memory - Power returns to previous setting with optional ON/OFF switch
- -20°C to +85°C operating temperature range
- Water resistant, sealed housings
- Operates on 10 to 32 Volt DC systems
- Rated for multiple fixture area lighting dimming
- Large fans and blowers
- Robust aluminum housing

Specifications

Surge Rating: 10 sec	25 Amperes
Internal Over Current Protection	50 Amperes
Draw 0% Output	5mA (0.005A)

PN	Continuous Rating	Width in" (mm)	Height in" (mm)	Depth in" (mm)	Weight Lb (Kg)
7503	10A	2.16 (54.86)	3.06 (77.72)	1.60 (40.64)	0.97 (0.44)


7503

20 Ampere Digital Dimmer

- Continuous voltage control from 0 to 100% of input voltage
- Last setting memory - Power returns to previous setting with optional ON/OFF switch
- -20°C to +85°C operating temperature range
- Water resistant, sealed housings
- Operates on 10 to 32 Volt DC systems
- Rated for multiple fixture area lighting dimming
- Large fans and blowers
- Robust aluminum housing

Specifications

Surge Rating: 10 sec	50 Amperes
Internal Over Current Protection	70 Amperes
Draw 0% Output	5mA (0.005A)

PN	Continuous Rating	Width in" (mm)	Height in" (mm)	Depth in" (mm)	Weight Lb (Kg)
7505	20A	2.16 (54.86)	3.06 (77.72)	1.60 (40.64)	1.10 (0.50)


7505

8216 8291

Water Resistant Contura Switches

- Mounts in Blue Sea Systems water resistant panels
- Legend - BRIGHT and DIM
- Contura switch mounting panel and accessories (see page 55)

Specifications

Rating: 12 Volts DC	20 Amperes
Rating: 24 Volts DC	15 Amperes
Terminal Size	0.25" (6.35mm)
Terminal Type	Quick Connect Tab
Seals	Internal and External Gasket Panel Seal
Temperature Rating	-40°C to 85°C
Mounting Hole	1.45" (36.83mm) x 0.83" (21.08mm)

PN	Color	Pole/Throw	Action
8216	Gray	Single/Double	(ON)-OFF-(ON)
8291	Black	Single/Double	(ON)-OFF-(ON)

▶ For use with Blue Sea Systems DC Digital Dimmers (page 104)

8208

Toggle Panel Switch

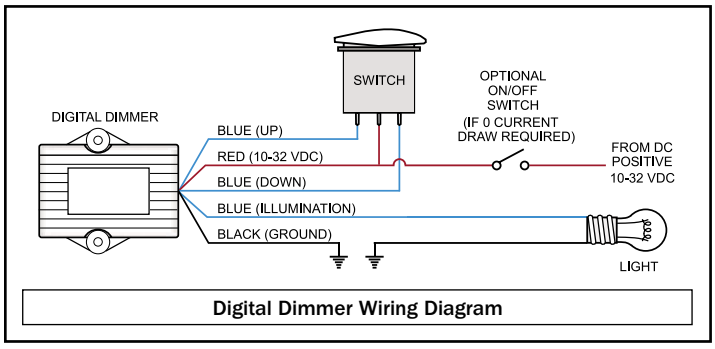
- Mounts in Blue Sea Systems toggle panels

Specifications

Voltage 250 Volts AC	10 Amperes
Voltage 125 Volts AC	15 Amperes
Voltage 32 Volts AC	15 Amperes
Terminal Size	0.25" (6.35mm)
Terminal Type	Quick Connect Tab
Actuator Color	White

PN	Poles/Throw	Action	Weight Lb (Kg)
8208	Single/Double	(ON)-OFF-(ON)	0.42 (0.02)

▶ For use with Blue Sea Systems DC Digital Dimmers (page 104)



Digital Dimmer Wiring Diagram

Updated Version Available January, 2006

Redesign of Popular 2301 150 Ampere BusBar

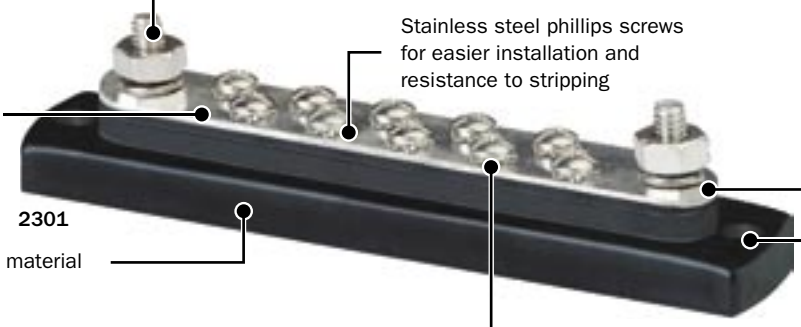
Pressed on busbar eliminates need for securing nut

Stainless steel studs allow high torquing for excellent electrical contact

Stainless steel phillips screws for easier installation and resistance to stripping

Raised bus provides easy access to multiple wires on a single screw

Tin-plated copper bus for maximum conductivity and resistance to corrosion



2301

Recessed mounting holes eliminate accidental shorts to aluminum and steel mounting surfaces

UL 94-V0 rated base material resists high heat

Optional snap on insulating cover attaches to studs and allows unobstructed wire access

Captive star type lock washers meet CE requirements for anti-rotation and eliminate handling of small, easily dropped parts

CE Conformance verified for AC circuits up to 250 volts

MiniBus 100 Ampere Common BusBars

- Great for limited space applications

Specifications

Continuous Amperage	100 Amperes AC/DC
Voltage Rating	300 Volts AC Maximum/48 Volts DC Maximum
Bus Material	Tin-Plated Copper CDA 110/UNS11000
Base Material	ABS
Cover Material	ABS

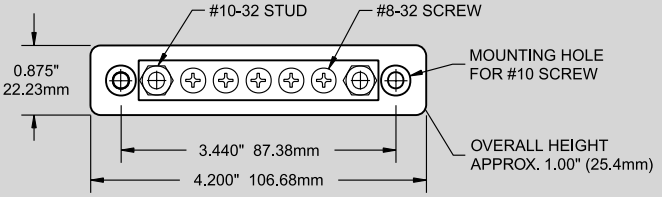
PN	Description	Weight Lb (Kg)
2304	5 x 8-32 Screw Terminal	0.14 (0.06)
2305	4 x 10-32 Stud Terminal	0.15 (0.07)
2306	Grounding BusBar 6 x 8-32 Screw Terminal	0.08 (0.04)
2714	Cover For MiniBus 2304 and 2305	0.03 (0.01)

2304 CE

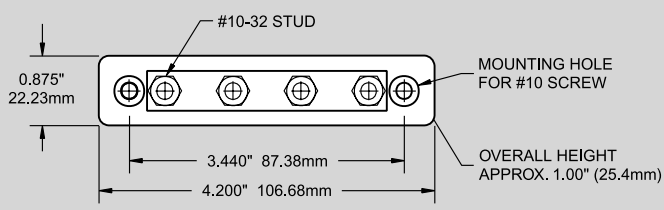
2305 CE

2306

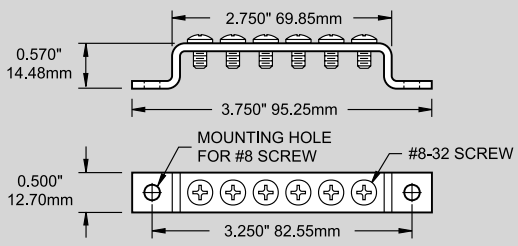
2714



2304 Dimensions



2305 Dimensions



2306 Dimensions

2701

2702

DualBus 100 Ampere Common BusBars

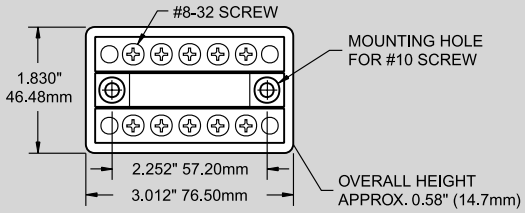
- Combines negative and positive buses on one block

Specifications

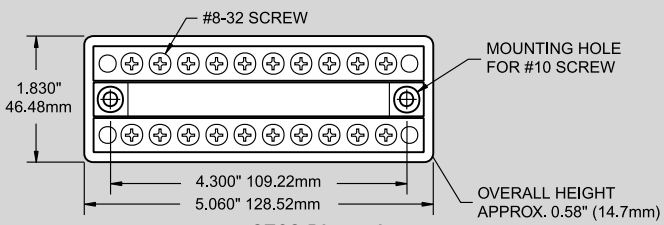
Continuous Amperage	100 Amperes AC/DC
Voltage Rating	300 Volts AC Maximum/48 Volts DC Maximum
Bus Material	Tin-Plated Copper CDA 110/UNS11000
Base Material	ABS
Cover Material	ABS

CE marked

PN	Description	Weight Lb (Kg)
2701	5 x 8-32 Screw Terminal	0.17 (0.08)
2702	10 x 8-32 Screw Terminal	0.27 (0.12)



2701 Dimensions



2702 Dimensions

Cover For DualBus 100 Ampere Common BusBars

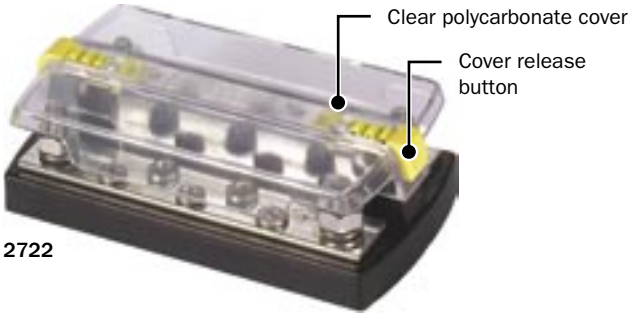
Specifications

Cover Material	ABS

2709

2710

PN	Description	Weight Lb (Kg)
2709	Cover For DualBus 2701	0.04 (0.02)
2710	Cover For DualBus 2702	0.05 (0.02)



2722

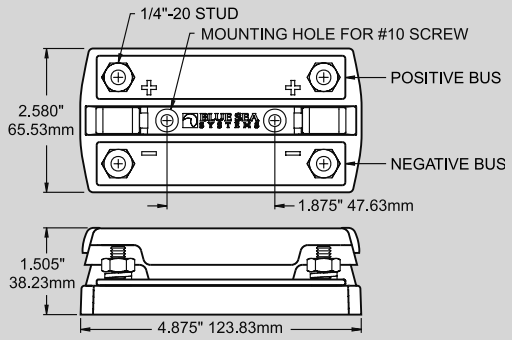
DualBus Plus

- Combines negative and positive buses on one block
- Clear polycarbonate cover snaps on to meet Coast Guard and ABYC insulation requirements

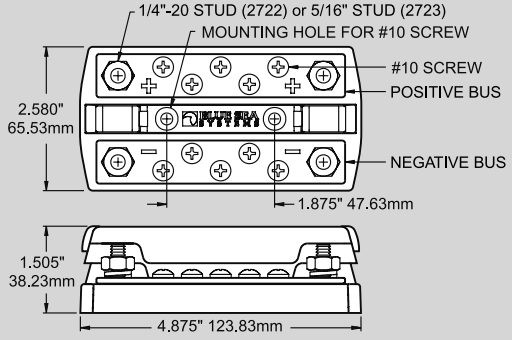
Specifications

Continuous Amperage	130 Amperes AC/150 Amperes DC
Voltage Rating	300 Volts AC Maximum/48 Volts DC Maximum
Bus Material	Tin-Plated Copper CDA 110/UNS11000
Base Material	Reinforced Polycarbonate
Cover Material	Clear Polycarbonate

PN	Description	Weight Lb (Kg)
2720	1/4" Stud	0.61 (0.28)
2722	1/4" Stud, 5 x 10-32 Screw Terminal	0.61 (0.28)
2723	5/16" Stud, 5 x 10-32 Screw Terminal	0.61 (0.28)



2720 Dimensions



2722 and 2723 Dimensions

CONNECTORS

150 Ampere Common BusBars

- The industry standard busbar for positive distribution (2301)
- The industry standard busbar for the collection of negative or AC ground circuits (2301)

Specifications

Continuous Amperage	130 Amperes AC 150 Amperes DC
Voltage Rating	300 Volts DC Maximum 48 Volts DC Maximum
Bus Material	Tin-Plated Copper CDA 110/UNS11000
Base Material	Reinforced Nylon

CE marked

PN	Description	Weight Lb (Kg)
2300	10 x 8-32 Screw Terminal with Cover	0.34 (0.15)
2301	10 x 8-32 Screw Terminal	0.28 (0.13)
2302	20 x 8-32 Screw Terminal	0.40 (0.18)
2303	4 x 1/4" Stud Terminal	0.34 (0.15)

NEW PRODUCT

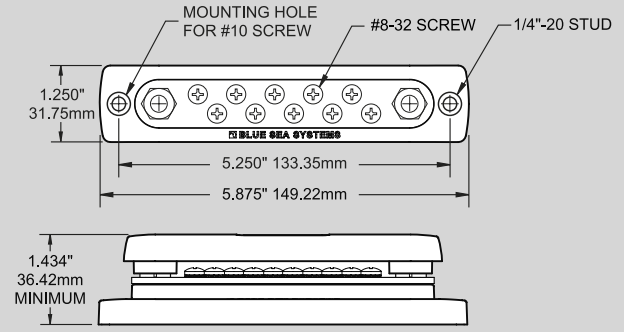
UPDATED PRODUCT

2300

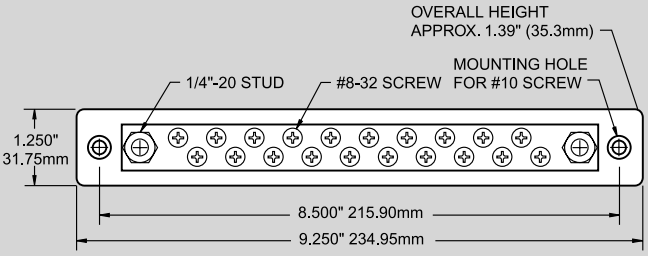
2301

2302

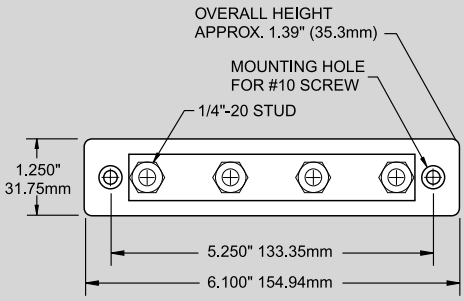
2303



2300 Dimensions



2302 Dimensions



2303 Dimensions

Covers For 150 Ampere Common BusBars

Specifications

Cover Material	ABS

PN	Description	Weight Lb (Kg)
2715	Cover For BusBar 2301 and 2303	0.07 (0.03)
2707	Cover For BusBar 2302	0.06 (0.03)

NEW PRODUCT

Note: 2715 replaces 2706

2715

2707

2105

2106

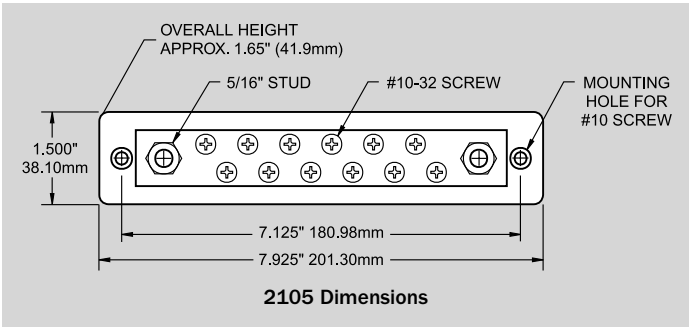
MaxiBus 250 Ampere Common BusBars

Specifications

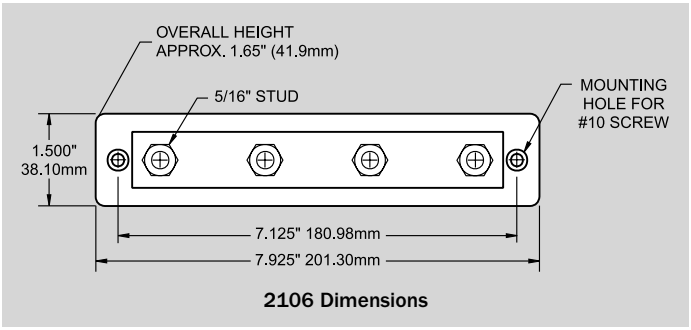
Continuous Amperage	250 Amperes AC/DC
Voltage Rating	300 Volts AC Maximum 48 Volts DC Maximum
Bus Material	Tin-Plated Copper CDA 110/UNS11000
Base Material	Reinforced Polycarbonate

CE marked

PN	Description	Weight Lb (Kg)
2105	12 x #10-32 Terminal Screws	0.17 (0.08)
2106	4 x 5/16" Stud Terminals	0.27 (0.12)



2105 Dimensions



2106 Dimensions

2711

Cover For MaxiBus 250 Ampere Common BusBars

Specifications

Cover Material	ABS

PN	Description	Weight Lb (Kg)
2711	Cover For MaxiBus 2105 and 2106	0.06 (0.03)

Squalicum Harbor - Bellingham, Washington

PowerBar 600 Ampere Cable Connectors

Specifications

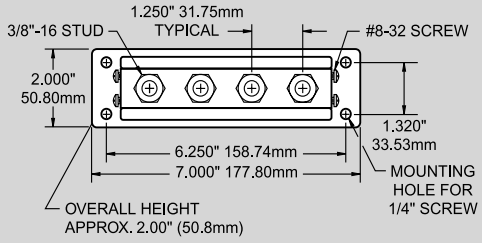
Continuous Amperage	545 Amperes AC 600 Amperes DC
Voltage Rating	300 Volts AC Maximum 48 Volts DC Maximum
Bus Material	Tin-Plated Copper CDA 110/UNS11000
Base Material	Reinforced Polycarbonate

CE marked

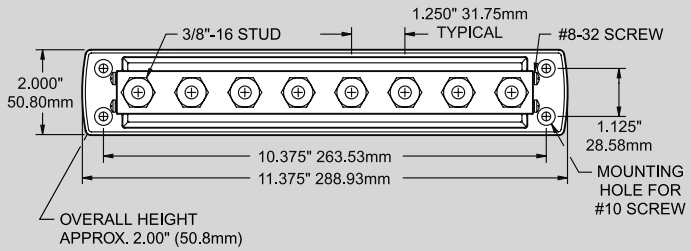
PN	Description	Weight Lb (Kg)
2104	4 x 3/8-16 Stud Terminal	1.71 (0.78)
2107	8 x 3/8-16 Stud Terminal	3.42 (1.55)

2104

2107



2104 Dimensions



2107 Dimensions

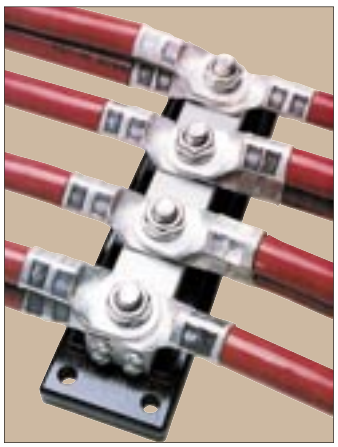
Cover For 600 Ampere Cable Connector

Specifications

Cover Material	ABS

PN	Description	Weight Lb (Kg)
2708	Cover For PN 2104	0.09 (0.04)

2708



2104 with 1 AWG Cables


2402


2404


2406


2408


2410

20 Ampere Terminal Blocks

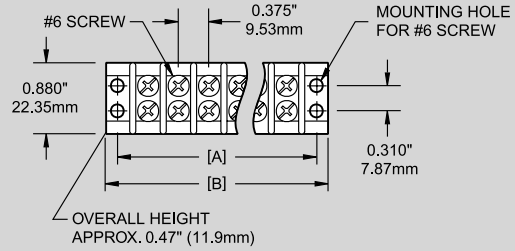
- Closed back design completely insulates power from the mounting surface
- Each screw pair is 1 isolated circuit
- Jumpers allow creation of common circuits (9218 - see page 112)

Specifications

Bus Material	Nickel-Plated Brass
Base Material	Nylon
Screw Size	#6
Continuous Rating	20 Amperes AC/DC
Voltage Rating	300 Volts AC/DC Maximum

CE marked

PN	Circuit	Weight Lb (Kg)	[A] in" (mm)	[B] Length in" (mm)
2402	2	0.05 (0.02)	1.13 (28.70)	1.41 (35.70)
2404	4	0.06 (0.03)	1.88 (47.73)	2.16 (54.76)
2406	6	0.08 (0.04)	2.63 (66.80)	2.91 (73.82)
2408	8	0.10 (0.05)	3.38 (85.85)	3.66 (92.88)
2410	10	0.13 (0.06)	4.13 (104.90)	4.41 (111.94)



20 Ampere Terminal Block Dimensions


2502


2504


2506


2508


2510


2512

30 Ampere Terminal Blocks

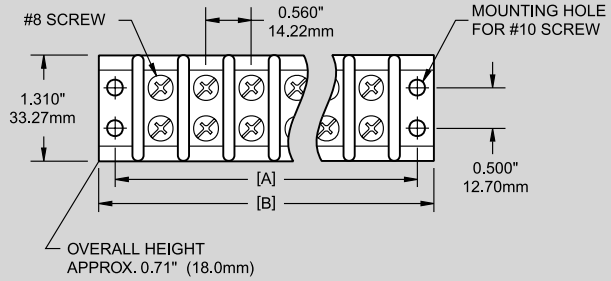
- Closed back design completely insulates power from the mounting surface
- Each screw pair is 1 isolated circuit
- Jumpers allow creation of common circuits (9217 - see page 112)

Specifications

Bus Material	Nickel-Plated Brass
Base Material	Phenolic
Screw Size	#8
Continuous Rating	30 Amperes AC/DC
Voltage Rating	600 Volts AC/DC Maximum

CE marked

PN	Circuit	Weight Lb (Kg)	[A] in" (mm)	[B] Length in" (mm)
2502	2	0.11 (0.05)	1.69 (42.93)	2.10 (59.35)
2504	4	0.15 (0.07)	2.81 (71.37)	3.22 (87.79)
2506	6	0.21 (0.10)	3.93 (99.82)	4.34 (116.23)
2508	8	0.27 (0.12)	5.05 (128.27)	5.46 (144.67)
2510	10	0.33 (0.15)	6.17 (156.72)	6.58 (173.11)
2512	12	0.44 (0.20)	7.29 (185.17)	7.70 (201.55)



30 Ampere Terminal Block Dimensions

65 Ampere Terminal Blocks

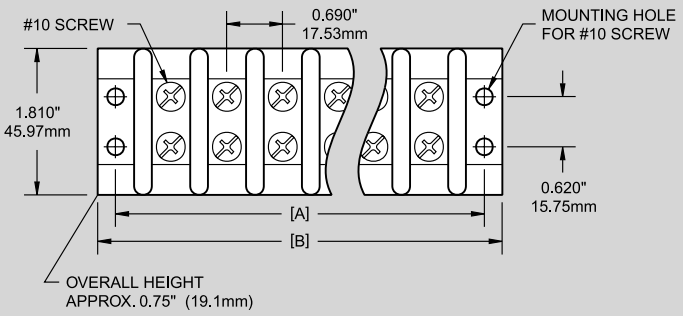
- Closed back design completely insulates power from the mounting surface
- Each screw pair is 1 isolated circuit
- Jumpers allow creation of common circuits (9216 - see below)

Specifications

Bus Material	Nickel-Plated Brass
Base Material	Phenolic
Screw Size	#10
Continuous Rating	65 Amperes AC/DC
Voltage Rating	600 Volts AC/DC Maximum

CE marked

PN	Circuit	Weight Lb (Kg)	[A] in" (mm)	[B] Length in" (mm)
2602	2	0.15 (0.07)	2.06 (52.32)	2.50 (63.49)
2604	4	0.23 (0.11)	3.44 (87.38)	3.88 (98.55)
2606	6	0.34 (0.16)	4.82 (122.43)	5.26 (133.61)
2608	8	0.43 (0.20)	6.20 (157.48)	6.64 (168.67)
2610	10	0.52 (0.24)	7.58 (192.53)	8.02 (203.73)



65 Ampere Terminal Block Dimensions


2602


2604


2606


2608


2610

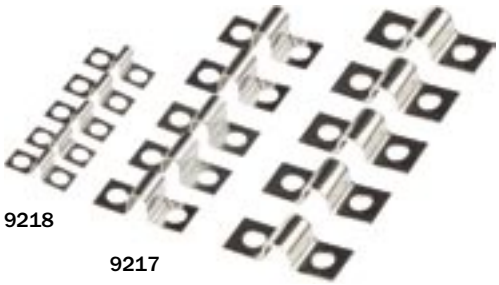
Terminal Block Jumpers

- Jumpers allow creation of common circuits on independent connectors
- **9218** - Fits 20 Ampere terminal blocks (2400 Series)
- **9217** - Fits 30 Ampere terminal blocks (2500 Series)
- **9216** - Fits 65 Ampere terminal blocks (2600 Series)

Specifications

Bus Material	Nickel-Plated Brass
Continuous Amperage	Equivalent to matching block

PN	Description	Weight Lb (Kg)
9218	Terminal Block Jumpers for 2400 Series	0.03 (0.01)
9217	Terminal Block Jumpers for 2500 Series	0.04 (0.02)
9216	Terminal Block Jumpers for 2600 Series	0.05 (0.03)


9218

9217

9216

2808

2908

Euro Style Terminal Blocks

- Stainless Steel pressure plates meet ABYC requirements for stranded wire connections without the use of crimp-on terminals
- Strips are easily cut to required length
- Screw and pressure plate construction meet ABYC pull-out strength requirements
- Nylon insulating body meets ABYC and USCG insulating requirements without the use of external covers

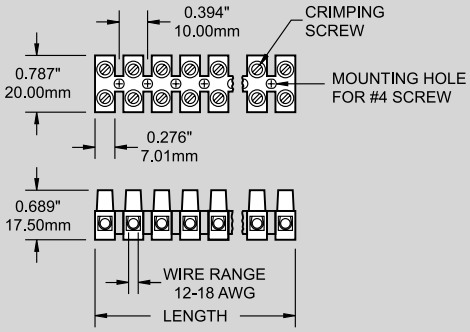
Specifications

Bus Body	Nickel-Plated Brass
Clamping Screw Material	Nickel-Plated Brass
Wire protection pressure plate	Stainless Steel
Body Material	Polyamide 6 Nylon
Voltage Rating	600 Volts AC/DC Maximum
Wire Size Range PN 28XX	12-18 AWG
Wire Size Range PN 29XX	8-14 AWG
Continuous Rating PN 28XX	27 Amperes
Continuous Rating PN 29XX	45 Amperes

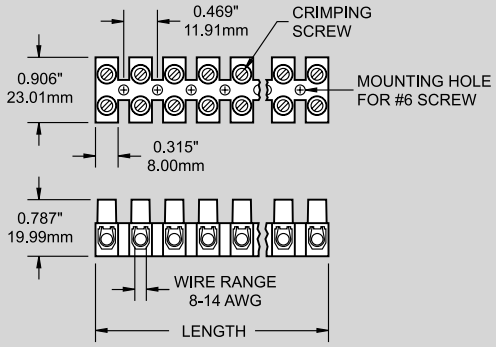
CE marked

27 Ampere Euro Style Connectors			
PN	**Position**	**Weight Lb (Kg)**	**Length in" (mm)**
2804	4	0.06 (0.14)	1.46 (37.00)
2808	8	0.09 (0.20)	3.03 (77.00)
2812	12	0.12 (0.26)	4.61 (117.00)

45 Ampere Euro Style Connectors			
PN	**Position**	**Weight Lb (Kg)**	**Length in" (mm)**
2904	4	0.11 (0.23)	1.46 (37.00)
2908	8	0.18 (0.39)	3.61 (91.70)
2912	12	0.25 (0.55)	5.47 (138.93)



28XX Dimensions



29XX Dimensions

Pressure Connections vs. Crimp Terminal Connections

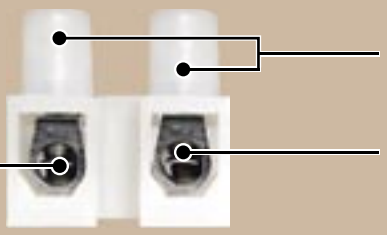
The majority of the terminations performed in marine applications are crimped barrel style. This has come to be the preferred termination method due to the high vibration environment and the fine strand of marine wire. However, pressure terminations are superior to barrel crimp terminations in marine situations where either very small wires are being used or where high quality ratcheting wire crimpers are not available.

If a pressure connector is used, it is crucial that it meets ABYC standards.

ABYC E-11.16.3.5 Connections may be made using a set screw pressure type conductor, providing a means is used to prevent the set screw from bearing directly on the conductor strands.

A well constructed pressure connector meeting ABYC Standards has the following attributes of Blue Sea Systems Euro Style Connectors:

Pressure plates protect delicate wire strands from cutting action of terminal screw. Stainless steel pressure plates are non-corrosive and exert uniform pressure to meet ABYC pull-out requirements



Nylon body meets ABYC and USCG requirements for insulation

Nickel-plated brass screw and connector body will not corrode, maintaining long term conductivity and pressure

A pressure connection that uses an ABYC compliant connector block provides a superior connection in situations where either very small wires are being used or where high quality ratcheting wire crimpers are not available.

Terminal Feed Through Connectors

Perfect for passing high current through hulls, decks and bulkheads. Large cables passed through holes are subject to chafing even when protective grommeting is used. Terminal Feed Through Connectors eliminate chafing and provide excellent strain relief for the cables. The large terminals have a mounting face that can be gasketed or bedded to provide a water tight installation.

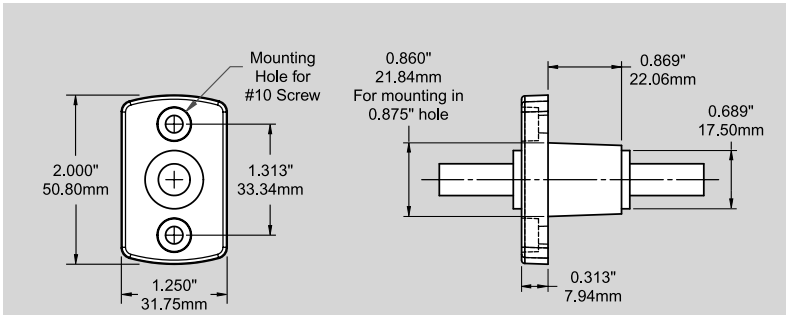
Specifications

Voltage Rating	48 Volts DC Maximum
Base Material	Reinforced Thermoplastic
Stud Material	Tin-Plated Copper Alloy

PN	Size	Description	Continuous Amperage	Color	Weight Lb (Kg)
2201	Small	5/16”-18 Stud	250A	Black	0.23 (0.10)
2202	Small	5/16”-18 Stud	250A	Red	0.23 (0.10)
2203	Small	3/8”-16 Stud	250A	Black	0.23 (0.10)
2204	Small	3/8”-16 Stud	250A	Red	0.23 (0.10)
2205	Large	3/8”-16 Stud	400A	Black	0.69 (0.31)
2206	Large	3/8”-16 Stud	400A	Red	0.69 (0.31)
2207	Large	1/2”-13 Stud	400A	Black	0.69 (0.31)
2208	Large	1/2”-13 Stud	400A	Red	0.69 (0.31)

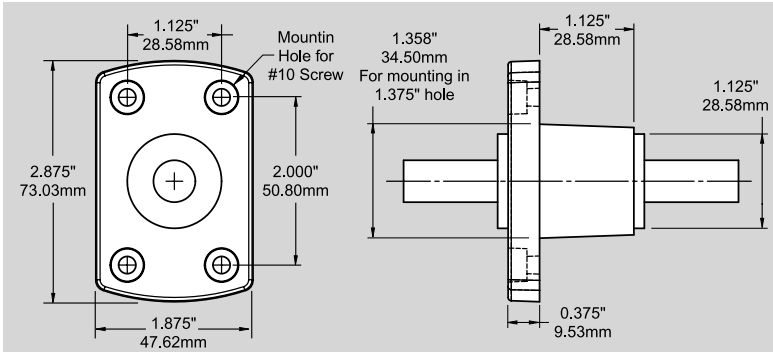
2201

2202



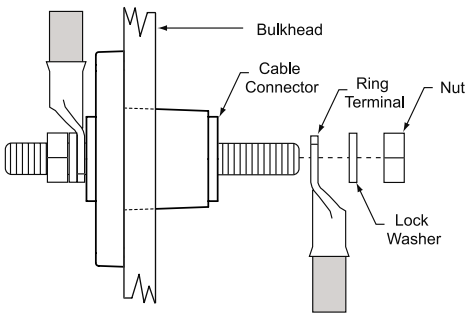
Small Terminal Feed Through Connector
2201, 2202, 2203, and 2204 Dimensions

2207



Large Terminal Feed Through Connector
2205, 2206, 2207, and 2208 Dimensions

2208



Feed Through Terminal Mounting Diagram

PowerPost High Amperage Cable Connectors

- Connects high amperage cables securely

Specifications

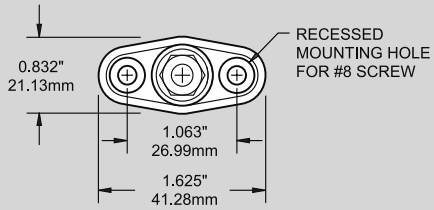
Continuous Amperage	Not rated - Amperage flows between terminals stacked on post and is determined by wire and terminals used.
Voltage Rating	48 Volts DC Maximum
Base Material	Reinforced Thermoplastic

CE marked

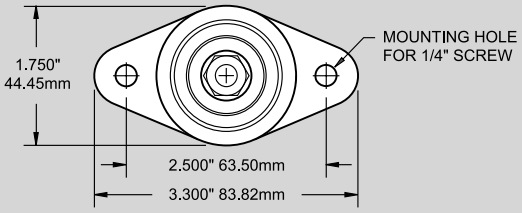
PN	Size	Description	Weight Lb (Kg)
2010	Small	#10-32 x 5/8" stud	0.06 (0.03)
2011	Small	1/4" x 3/4" Stud	0.08 (0.04)
2001	Large	1/4" x 1-1/16" Stud	0.21 (0.10)
2002	Large	5/16" x 7/8" Stud	0.23 (0.11)
2003	Large	3/8" x 7/8" Stud	0.27 (0.12)

2010

2003



Small PowerPost High Amperage Cable Connector
2010 and 2011 Dimensions



Large PowerPost High Amperage Cable Connector
2001, 2002, and 2003 Dimensions

PowerPost Plus Cable Connectors

- 150 Ampere bus allows small wire connections at high amperage cable connections

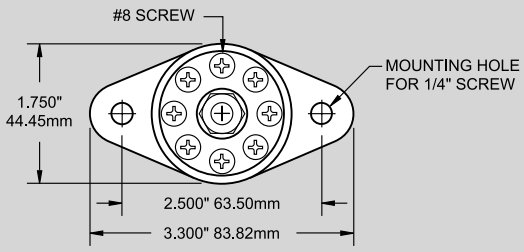
Specifications

Bus Continuous Amperage	150 Amperes AC/DC
Voltage Rating	48 Volts DC Maximum
Bus Material	Tin-Plated Copper
Base Material	Reinforced Thermoplastic

CE marked

PN	Description	Weight Lb (Kg)
2101	1/4" x 1" Stud	0.29 (0.13)
2102	5/16" x 3/4" Stud	0.30 (0.14)
2103	3/8" x 3/4" Stud	0.34 (0.15)

2103



2101, 2102, and 2103 Dimensions

CableClams

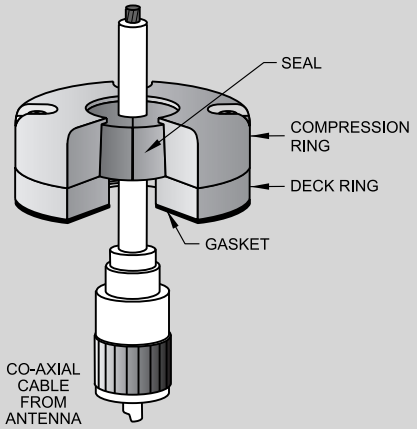
- Perfect for antenna installation
- Waterproof co-axial installation without removing connectors
- Save the expense of removing and replacing connectors
- Avoid poor connections from removing factory connectors

Specifications

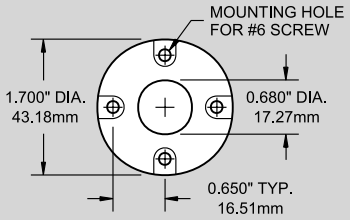
Body Material	Acetal
Seal Material	UV-Stabilized Buna-N Rubber
Screws	Stainless Steel

PN	Connector Opening in" (mm)	Weight Lb (Kg)
1001	0.63 (15.87)	0.15 (0.07)
1002	0.83 (20.95)	0.19 (0.09)
1003	1.39 (35.18)	0.22 (0.10)

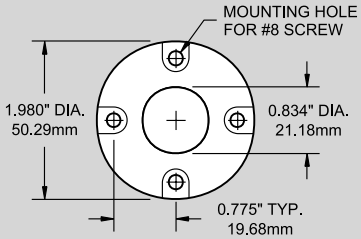
1001-1003



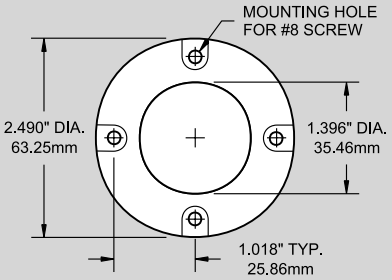
CableClam Drawing



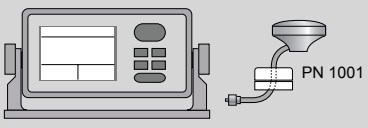
1001 Dimensions



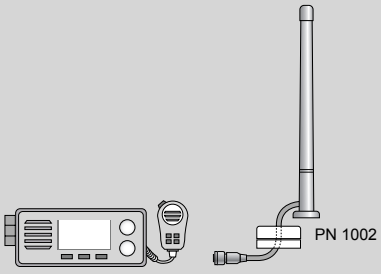
1002 Dimensions



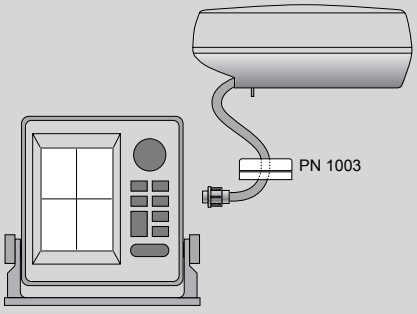
1003 Dimensions



Use 1001 for GPS antenna cables

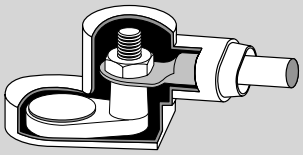


Use 1002 for VHF antenna cables



Use 1003 for Radar antenna cables

4001



Rotating CableCaps

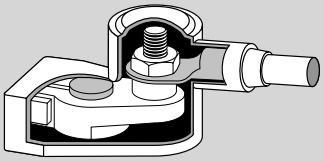
- Top rotates 360 degrees to allow cable entry from any angle
- For batteries with integral marine wing nut posts

Specifications

Material PVC

PN	Cable Size	Color	Package	Weight Lb (Kg)
4001	All	Red/Black	Retail/Pair	0.24 (0.11)
9030	All	Black	Bulk	0.10 (0.45)
9031	All	Red	Bulk	0.10 (0.45)

4005



Standard CableCaps

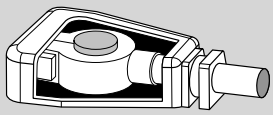
- For batteries with marine adaptor terminals added on

Specifications

Material PVC

PN	Cable Size	Color	Package	Weight Lb (Kg)
4005	4, 2, 1	Red/Black	Retail/Pair	0.17 (0.08)
4006	1/0, 2/0	Red/Black	Retail/Pair	0.17 (0.08)
9038	4, 2, 1	Black	Bulk	0.07 (0.03)
9039	4, 2, 1	Red	Bulk	0.07 (0.03)
9040	1/0, 2/0	Black	Bulk	0.07 (0.03)
9041	1/0, 2/0	Red	Bulk	0.07 (0.03)

4016



Automotive CableCaps

- Designed to fit standard automotive posts

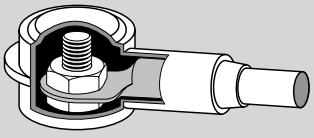
Specifications

Material PVC

PN	Cable Size	Color	Package	Weight Lb (Kg)
4016	4, 2, 1	Red/Black	Retail	0.15 (0.07)
4017	1/0, 2/0	Red/Black	Retail	0.15 (0.07)
9174	4, 2, 1	Black	Bulk	0.07 (0.03)
9175	4, 2, 1	Red	Bulk	0.07 (0.03)
9176	1/0, 2/0	Red	Bulk	0.07 (0.03)
9177	1/0, 2/0	Black	Bulk	0.07 (0.03)

4008

4009



CableCap Stud Insulators

- Insulate stud type connectors on alternators, starters, windlasses and other high amperage devices

Specifications

Material PVC

PN	Cable Size	Color	Package	Weight Lb (Kg)
4008	18-10	Red	Retail/3	0.05 (0.02)
4009	18-10	Black	Retail/3	0.05 (0.02)
4010	8-4	Red	Retail/2	0.05 (0.02)
4011	8-4	Black	Retail/2	0.05 (0.02)
4012	2-2/0	Red	Retail/1	0.07 (0.03)
4013	2-2/0	Black	Retail/1	0.07 (0.03)
4014	3/0-4/0	Red	Retail/1	0.07 (0.03)
4015	3/0-4/0	Black	Retail/1	0.07 (0.03)

Battery Boxes

The most advanced design available for Golf Cart, 4-D and 8-D batteries.

- Direct restraint system - the easiest installation of any box
- Straight cable entry path - no awkward bending of heavy cables
- Electrolyte reservoir - the battery is held away from spilled electrolyte
- Captive lid hold-down system - no more lost nuts in the bilge
- When installed according to instructions this battery box satisfies the following:
  - United States Coast Guard Code of Federal Regulations Title 33, Subpart I, Part 183.420
  - American Boat and Yacht Council (ABYC) Standards and Recommended Practices for small craft section E-10.7

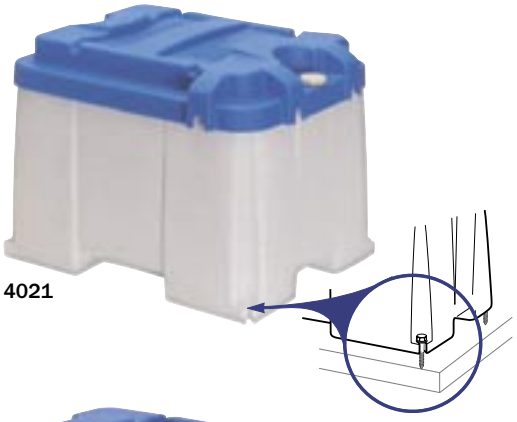
Specifications

Material UV Stabilized Polyethylene

PN	Description	Weight Lb (Kg)
4021	Twin Golf Cart	10.70 (4.86)
4022	4D	12.50 (5.68)
4023	8D	13.90 (6.32)

INDUSTRIAL DESIGN EXCELLENCE AWARDS

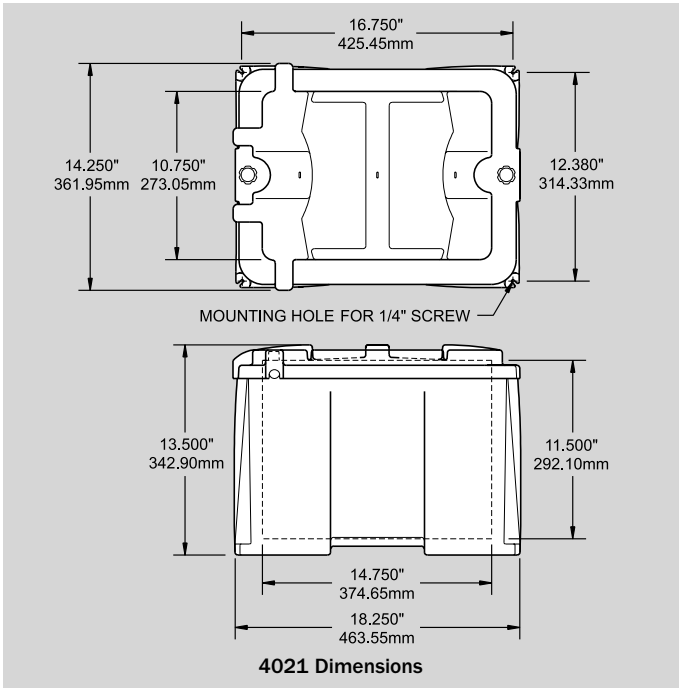
Winner Industrial Design Excellence Award



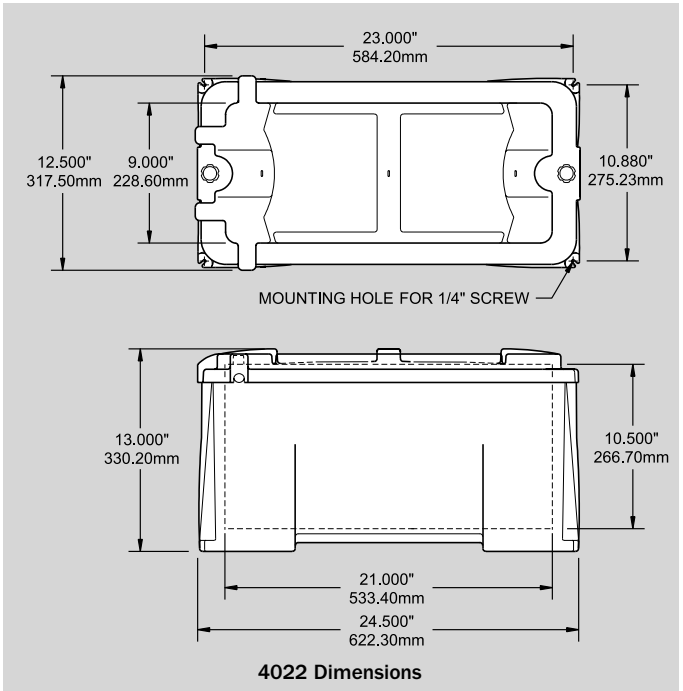
4021

4022

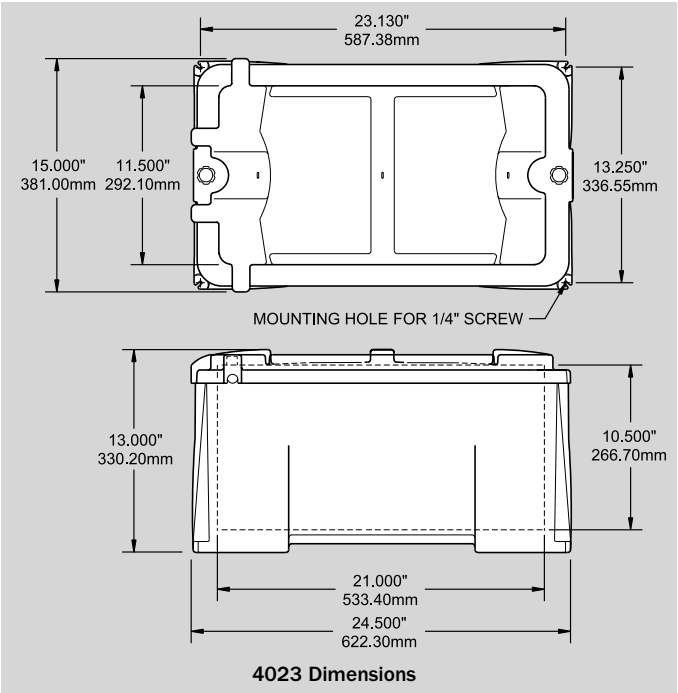
4023



4021 Dimensions



4022 Dimensions



4023 Dimensions

NUMERIC

120V AC
The line to neutral voltage in a single-phase two wire AC, not including green safety ground, system as commonly found in the US.

240V AC
The line to line voltage in a single-phase three wire (not including green safety ground) AC system as commonly found in the US.

230V AC
The line to neutral voltage in a single-phase two wire (not including green safety ground) AC system as commonly found in Europe and many other parts of the world.

3 phase *see also Single Phase*
Refers to 3 phase power generation typically 480V AC and higher. The AC utility is a three-phase system. In its simplest form there are three conductors connected to three conductive coils, which pass through a magnetic field, thus, inducing the electrons in the wires to flow. As the polarity of the magnetic field changes from North to South, electrons are induced to flow first one way then the other. This produces AC current flow. The current that is induced in the three wires is 120° out of phase. The current flow in the first conductor starts 120° before the second and it starts 120° before the third. Three phase generators are only found on the largest boats.

3 stage charging
A technique of battery charging that uses three distinct stages to ensure a fast and complete charge and a safe maintenance voltage. As there are several manufacturers of multiple stage charging systems, there is a slight difference in terminology in the field. See each key word for a more complete definition.

Stage 1: Charge or Bulk Mode
Stage 2: Acceptance or Absorption
Stage 3: Float

A

ABYC
American Boat and Yacht Council, a voluntary standards creating body for the marine industry responsible for Standards and Recommended Practices.

AC
see Alternating Current

AFD
see Alternator Field Disconnect

AGC Fuse
A 1-1/4 inch long x 1/4 inch diameter glass fuse with fast blow characteristics.

AIC Amperes Interrupt Capacity
see Interrupt Rating

ATO/ATC Fuse
The blade type fuse now commonly used in the automobile industry. It has fast blow characteristics like the AGC fuse.

AWG (American Wire Gauge)
see also SAE Wire Gauge
AWG (American Wire Gauge) is a U.S. standard set of non-ferrous (copper or aluminum) wire conductor sizes. The “gauge” refers to the diameter. Typical household wiring is AWG number 12 or 14. Telephone wire is usually 22, 24, or 26. The higher the gauge number, the smaller the diameter and the thinner the wire. Thicker wire can carry more current because it has less electrical resistance over a given length. Also larger wire is used when the voltage drop along its length must be minimized. For example: High output alternator wiring might be a 2 AWG while the starter cable for a modest engine a 1 or 0 AWG.

absorption *see 3 Stage Charging*
see also Float Charge, Bulk, Equalization
Absorption refers to the second phase of a multistage charging system, also called acceptance by some manufacturers. During the absorption cycle the battery is maintained at the maximum charging voltage. Typically about 2.4V per cell or 14.4V for a typical 12V system. (28.8V for a 24V system). This is the gassing voltage for a liquid battery. Gelled batteries are typically charged at slightly lower voltages. The gassing voltage is also temperature dependent. The battery cannot be maintained for long periods of time in the absorption phase.

acceptance
see absorption

alternating current
A periodic current (sine wave) with an average value over a cycle of zero. The current reverses at regular intervals of time and has alternately positive and negative values.

alternator
Commonly refers to the DC charging source on an engine. The alternator is a three-phase AC device that produces alternating current, which is then rectified by a diode bridge to create direct current. Three-phase AC devices are reliable and inexpensive to make compared to a DC generator of the same ampacity.

alternator field disconnect
The alternator field is created by a coil of wire surrounded by ferrous metals. When the coil is energized with electric current it becomes an electro-magnet. This electromagnet is rotated, inducing current flow in the three phase coils that surround it. By controlling the strength of the magnetic field, the output of the alternator may be controlled. If the output of the alternator is open circuited there is no place for the energy to go. The voltage rises to a dangerous level. By disconnecting the alternator field, the magnetic field is turned off, thus the voltage cannot soar. This is a safety feature on some battery switches.

ambient temperature
The temperature of the medium in which the heat of a device is dissipated. The ambient temperature is often specified in standards for device performance (such as the UL Standards) as the basis for determining the heat rise of the component.

ammeter
Ammeter measures current flow in a circuit. An ammeter is inserted in series in the circuit. We consider four types:

Analog
The classic analog ammeter uses the magnetic field associated with current flow through a moving coil of wire, to in turn move a needle over a meter face which displays amps. This type of meter can only measure very small current, micro-amps, before the moving coil becomes too large to be practical. To measure higher currents a shunt resistor is inserted into the circuit. (see Shunt). Most of the current flows through the shunt resistor but some passes through a meter movement as described to read amps when the movement is scaled appropriately.

Digital DC
The digital DC ammeter uses a shunt resistor to measure current flow. (see Shunt). The shunt is connected in series in the wiring of the circuit whose current is to be measured. The shunt sense leads are connected to the DC ammeter, which is really a millivolt meter. The millivolt input from the shunt is scaled to read amps per the resistance of the shunt. For example, a current flow of 10 amps through a 100A-100mV shunt would result in a voltage of 10mV across the sense leads. A millivolt meter would display 10, which we would interpret as 10 Amps.

Digital AC
The digital AC ammeter also uses a shunt resistor to measure a voltage drop, which is then scaled to read amps. The difference, however, is that the resistor is not normally connected directly in the AC wire of the circuit to be measured. A device called a current transformer (CT, see Current Transformer) is placed around the AC wire. A current is induced in the CT, which is then passed through a load resistor. The digital meter actually measures the voltage across this load resistor and internally scales it to read the appropriate number of amps.

Portable
Most portable meters today are digital and use the same techniques of measurement as described above. However, they are commonly limited to a few amps when connected in series to measure current. If high currents are to be measured, the portable meter must use some external sensing means. Commonly these consist of shunt resistors and clamp-on ammeter sensors that use Hall Effect sensors. (Operation of which are beyond the scope of this appendix. In short, they generate a voltage, which can be scaled to read amps just as the shunt resistor.)

ampacity
The current carrying capacity of a conductor or device.

ampere *see Coulomb*

Definition 1
The classic definition of an ampere is a unit of electric current flow equivalent to the motion of 1 coulomb of charge, or 6.25 X 1018 electrons, past any cross section in 1 second. This is an intuitive way to think about an ampere. It is the flow of a huge number of electrons through a conductor.

Definition 2
In 1948 this alternative definition was adopted: A unit of electric current in the meter-kilogram-second system. It is the steady current that when flowing in straight parallel wires of infinite length and negligible cross section, separated by a distance of one meter in free space, produces a force between the wires of 2 x 10-7 newtons per meter of length.

ampere-hour
The electric charge transferred past a specified circuit point by a current of one ampere in one hour.

Amp-Hour Rating (AH)
This is a common rating for batteries. This is the total number of ampere-hours that a battery can deliver over 20 hours at a constant rate of discharge before the battery voltage falls below 10.5 volts.

analog
Refers to a signal or input that varies continuously over time. Voltages and currents are analog signals, as are temperature and pressure.

anode
The electrode of an electrochemical cell with the more negative potential. The less noble metal of an electrolytic cell that tends to corrode.

B

battery *see also Cell*
Two or more cells connected together. Thus a group of batteries connected together can also be referred to as a battery.

battery bank
When groups of batteries are wired in series or parallel or a combination to increase voltage or capacity the entire group is referred to as a battery bank. When batteries are connected in series the amp-hour rating is the same and the voltage is additive. When batteries are connected in parallel the voltage is the same and the amp-hour rating is additive.

battery state-of-charge
The term is used to describe and estimate of how much energy the battery is able to deliver. There have been many attempts to develop improved state-of-charge estimates. The most common methods include: specific gravity, at-rest open-circuit voltage, and amp-hour measurement.

battery switch rating
see Continuous Switch Rating and Intermittent Switch Rating

battery types

AGM (Absorbed Glass Mat)
A technique for sealed lead-acid batteries. The electrolyte is absorbed in a matrix of glass fibers, which holds the electrolyte next to the plate, and immobilizes it, preventing spills. AGM batteries tend to have good power characteristics, low internal resistance, and good behavior during charging.

Flooded
A design for lead-acid batteries. The electrolyte is an ordinary liquid solution of sulfuric acid. Flooded cells are prone to making gas while being charged. Flooded cells must be periodically checked for fluid level and water added as necessary. Flooded cells are also typically less expensive than AGM or gel cell type lead-acid batteries.

Gel cell
Gel or sealed lead acid batteries are basically the same chemistry as a wet (flooded cell) battery. The batteries' electrolyte is in a gelatin form and is absorbed into the plates and the battery is sealed with epoxies. The batteries are exceptionally leak resistant and may be used in any position. Battery uses include UPS, emergency lights, and camcorders. These batteries are 2 volts per cell, so the common batteries are 4, 6, and 12 volt.

blade
That portion of a fuse to which the fuse block connects.

bonding, cathodic
The electrical interconnection of metal objects in common contact with water, to the engine negative terminal, or its bus, and to the source of cathodic protection.

branch circuit *see also Main*
The portion of the wiring system after the main circuit protection device.

break (rating)
The amount of current that can be passing through a set of contacts, such as those in a solenoid, when they open, without damaging the contacts. This can be a rating for a single event or over some number of cycles, generally 1000, 10,000 or 1,000,000.

bulk
That part of a multi-stage charge regime at which the maximum amount of current is flowing. This is normally limited by the size of the charging source. Lead acid batteries have the ability to accept, or absorb, large charging currents as long as they do not overheat or begin gassing. The bulk cycle allows the fastest possible charge.

bus, busbar
A bus is a group of common connections, often consisting of a strip of copper or brass with a number of screws or bolt studs for the connection of wires. It may be a negative or a positive bus.

C

CE (Conformité Européenné)
The CE marking is a conformity marking consisting of the letters "CE". The CE marking is applied to products regulated by certain European health, safety and environmental protection legislation. The CE marking is obligatory for products it applies to. The manufacturer affixes the marking certifying that the product conforms to applicable regulations, in order to be allowed to sell the product in the European market.

CFR (Code of Federal Regulations)
The written regulations of the United States Federal Government.

cathode
The electrode of an electrochemical cell with the more positive potential. The more noble metal of an electrolytic cell that tends not to corrode.

cell
An electrochemical system that converts chemical energy into electrical energy. Typically consisting of two conductive plates with different galvanic potential immersed in an electrolyte.

cell, primary
An electrochemical device, which is discharged only once and then, discarded.

cell, secondary
see also Battery
An electrochemical device, which may be discharged and recharged a number of times.

charge
Classically refers to an accumulation of electrons producing an electrostatic charge. In common use it often refers to restoring energy to a battery. Specifically, it would refer to the part of a multi-stage battery charging cycle when the voltage was held constant at or about the gassing voltage.

charge cycle
The stages through which a multi-stage charging source restores energy to a battery. A four-stage charge cycle includes:

bulk or charge cycle
Constant current for fast charging

acceptance or absorption cycle
Constant voltage for thorough charging

float cycle
For maintenance and long life

equalization cycle
Controlled overcharge for maximum capacity.
see key words above

circuit
A closed path of electrically, or electro-magnetically connected, components or devices that is capable of current flow. Typically consisting of loads, sources, conductors, and circuit protection (circuit breakers and fuses). For example: A battery, fuse, and bilge pump connected together with wire are a circuit. The path must be continuous and closed.

circuit breaker
A device that, like a fuse, interrupts current in an electric circuit when the current becomes too high. Unlike a fuse, a circuit breaker can be reset after it has tripped. When high current passes through the circuit breaker, the heat it generates or the magnetic field it creates causes a trigger to rapidly separate the pair of contacts that normally conduct the current.

Circular mils
A method of specifying wire size mathematically. One Circular Mil is a unit of area equal to that of a circle .001" in diameter. The actual area of a Circular Mil is:

$A = \pi r^2$
$A = 3.1428 \times (.0005)^2$ inches
$A = .0000007857$ square inches

Class-T fuse
A very robust fuse with a 20,000 AIC. It also has very fast response to short circuit currents.

coil
see inductor

Cold Cranking Amperes (CCA)
see also Marine Cranking Amperes
CCA is the discharge load in amps which a battery can sustain for 30 seconds at 0° F. (-18° C) and not fall below 1.2 volts per cell (7.2V on 12V battery). This battery rating measures a burst of energy that an engine needs to start in a cold environment. This rating is used mainly for rating batteries for engine starting capacity and does not apply to NiCad batteries, NiMH batteries or Alkaline batteries.

common
May have more than one meaning. Typically denotes a bus that is at ground potential most often. The negative bus is called "the common"; sometimes the neutral bus is also called "the common". May also mean a group of connections that are connected together "in common" even though they are at a different potential than ground.

conductivity
Conductance is the reciprocal of resistance, which depends on the resistivity constant of the material. Resistivity is the resistance of a conductor having unit cross section and unit length. Conductivity is the reciprocal of the resistivity. Its units are 1/ohm-cm or ohm/cm, or 1/ohm-circular mils/ft.

conductor
That part of an electrical circuit whose resistance relative to the balance of the circuit is zero. For example, in a circuit consisting of a light bulb and a battery, connected together with wire, the wire is referred to as the conductor.

Conformité Européenné
see CE

continuous current
The current flow, which a device or a conductor can carry, consume, or supply with no time limit. The continuous current rating is normally dependent on the temperature, since resistance increases with temperature. For battery switches the continuous current rating is established by testing for one hour at the rating. This is reasonable since thermal equilibrium would be reached within one hour.

continuous switch rating (UL 1107)
The two ratings in the UL marine battery switch standard are Intermittent and Continuous. Intermittent is a 5 minute rating and is based on temperature rise of various sections of the switch as the rated current is applied over a 5 minute period. The Continuous rating is the same, but the time period is 1 hour.

converter
An electrical device that converts one type of electrical energy into another. Battery chargers convert AC power to DC to charge the battery. Inverters convert DC power into AC, both are converters. Often used in RV industry to mean a power supply that runs the domestic DC loads when shore power is available.

coulomb *see also Ampere*
The measurement unit of electric charge, which is determined by the number of electrons in excess (or less than) the number of protons. Classically a charge of 1 coulomb = 6.25×10^{18} electrons. The meter-kilogram-second unit of electrical charge equal to the quantity of charge transferred in one second by a steady current of one ampere.

counterpoise
That portion of an antenna system composed of wires or other types of conductor arranged in a circular pattern at the base of the antenna at a certain distance above ground. Insulated from the ground, it forms the lower system of antenna conductors.

cranking (starting)
Normally associated with "cranking current" which is the current required by the starter circuit prior to engine starting. The cranking current varies significantly during the starting cycle. Initially, there is a large surge of current required to overcome the inertia and compression of the engine. This surge can be two to four times the average cranking current. Once the engine is turning there are peaks and valleys as the pistons go through the compression and exhaust cycles. The cranking current rating is used for sizing batteries, cables, and battery switches.

current *see also Amperage*
Current is a flow of electrical charge carriers, usually electrons or electron-deficient atoms. The common symbol for current is the uppercase letter I. The standard unit is the ampere, symbolized by A. Physicists consider current to flow from relatively positive points to relatively negative points; this is called conventional current or Franklin current. Electrons, the most common charge carriers, are negatively charged. They flow from relatively negative points to relatively positive points.
Electric current can be either direct or alternating. Direct current (DC) flows in the same direction at all points in time, although the instantaneous magnitude of the current might vary. In an alternating current (AC), the flow of charge carriers reverses direction periodically. The number of complete AC cycles per second is the frequency, which is measured in Hertz. An example of pure DC is the current produced by an electrochemical cell. The output of a power-supply rectifier, prior to filtering, is an example of pulsating DC. The output of common utility outlets is AC.

current rating
The maximum current in amperes that a device will carry continuously under defined conditions without exceeding specified performance limits.

current transformer *see also Ammeter*
The "CT", as current transformers are commonly referred to, is used by AC ammeters to "sense" current flow in a wire in an AC circuit. It is a toroidal coil of wire through which a wire whose current we wish to measure is passed. It is normally encapsulated and looks like a "doughnut", which is how electricians commonly refer to it. The doughnut has two wires coming out of it, which are connected to the AC ammeter. As current flows in the AC wire we wish to measure, it induces a current flow in the current transformer. The magnitude of the current varies directly with the current flowing in the AC wire. Current transformers are rated by the number of maximum amps that can flow in the measured wire and the current generated, by the CT, at that current flow. For example: A 50:5 CT is rated for 50 amps flowing in the measured wire, and it generates 5 amps of current as a consequence.

cycle
A cycle of a battery is a discharge plus a charge. For example, if a fully charged battery has a load applied, is then discharged and recharged, that is one cycle. Cycle life is the total number of cycles a battery yields.

D

DC *see Direct Current*

deep-cycle batteries
Batteries with thick plates to allow for reserve energy to be stored within the battery plate and released during slow discharge for prolonged periods. The high-density active material remains within the batteries' plate/grid structure longer, resisting the normal degradation found in cycling conditions. Deep cycle batteries are typically used where the battery is discharged to a great extent and then recharged.

delay
A difference in time between the initiation of an event and its occurrence, or between an event's observation and enunciation of it. This is usually used to refer to the time between the application of current through to a fuse or circuit breaker and the time when the device opens.

derating
A decrease in a device's rating, usually amperage, due to its application in ambient conditions different from those in which it was tested or for which it was designed originally.

dielectric strength
The maximum voltage that a material can withstand without allowing the two voltage potentials to short together.

digital
A digital signal is one which has only two valid values denoted as 1 or 0. Commonly these are equated to distinctly different voltage. For example: A voltage of +5V would equal a 1 and a voltage of 0V would equal a 0.

A digital meter is one that displays values as numerical values rather than as the position of a meter on a relative scale.

Direct Current (DC)
An electric current that always flows in the same direction. The magnitude may vary but the current direction is always the same. Commonly referred to as DC. Examples of direct current sources are batteries, fuel cells, and photovoltaic cells. DC sources such as battery chargers and alternators actually use rectified AC current as the source.

discharge
Refers to the consumption of energy from a battery, or to the electrostatic discharge associated with a lightning bolt, capacitor, etc.

double insulation system
An insulation system comprised of basic insulation and supplementary insulation, with the two insulations physically separated and arranged so they are not simultaneously subjected to the same deteriorating influences to the same degree.

double pole
Indicates a switch, relay, or circuit breaker with two separate conductive paths, which are opened or closed simultaneousy when the device is operated.

E

Earth
The third planet from the sun in Astronomy, but in electrical terms it refers to a connection, which is made to a conductor that is connected to the planet Earth. In grounded electrical systems there is a connection, which is a copper rod or some other highly electrically conductive connection, to the actual Earth. This is to ensure a safe conductive path for a short circuit, which in turn helps prevent electrocution.

electrode
A conductive material, in an electrolyte, through which electrical current enters or leaves.

electrolysis
Chemical changes in a solution, or electrolyte, due to the passage of electric current.

electrolyte
A liquid in which ions are capable of migrating and, therefore capable of conducting current. Solutions of acids, bases, and salts in water are electrolytes.

electron *see also Coulomb*
An electron is a negatively charged subatomic particle. It can be either free (not attached to any atom), or bound to the nucleus of an atom. In electrical conductors, current flow results from the movement of free electrons from atom to atom individually, and from negative to positive electric poles in general.

The charge on a single electron is considered as the unit electrical charge. It is assigned negative polarity. Electrical charge quantity is not usually measured in terms of the charge on a single electron, because this is an extremely small charge. Instead, the standard unit of electrical charge quantity is the coulomb, symbolized by C, representing about 6.25×10^{18} electrons.

Electromotive Force (EMF)
Commonly referred to as voltage, electromotive force is the energy per unit of charge that is supplied by a source of electrical energy such as a battery, charger or alternator.

Electromagnetic Interference (EMI)
Noise generated by a load (typically by electrical switching action). Usually specified as meeting agency limits for conducted EMI (noise conducted back onto the power bus) or radiated EMI (noise emitted into the area surrounding a device).

energy *see also Power*
The classically simple definition is, the capacity to do work. Energy may be manifested as, mechanical motion, thermal heat, or electrical power, which is consumed, radiated, dissipated, or stored over a period of time. The energy in a direct-current circuit is equal to the product of the voltage in volts, the current in amperes, and the time in seconds. The units for energy are Watt-hours. In alternating current (AC) circuits, the expression for energy is more complex.

engine negative terminal
The point at which the engine negative, generally the engine block, is connected to the negative of the battery.

equalization *see Charge Cycle*
Equalization is a controlled overcharge, which removes lead-sulfate that is not converted during normal charging. Equalization is best accomplished by using a constant current of 2-7% of battery capacity while allowing the battery voltage to rise to its highest "natural voltage". For a 12V battery this can be as high as 16.2V. The equalization cycle is continued until the specific gravity of all cells cease to continue to rise and are approximately equal. The equalization cycle should only be used on liquid electrolyte batteries and only while the operator is on the premises.

equalizer
A device wired across the same potential poles of a multiple bank battery bank consisting of serially wired batteries, i.e., two 12 volt batteries in series to produce 24 volts. An equalizer maintains half its input voltage at its output terminals. When loads are taken off one of the batteries in the bank at that batteries voltage, which is half of the bank voltage, the equalizer senses that battery's voltage is no longer the one half the voltage of the entire bank and the equalizer "recharges" the lower voltage battery from the higher voltage battery.

F

fast, fast acting *see also Delay*
Refers to the amount of time that a fuse can endure an over-current before blowing. Fast fuses are used to protect sensitive equipment.

fault
A defect in the normal circuit configuration, usually due to unintentional grounding. Commonly referred to as a short circuit.

field
Typically refers to a magnetic field. Specifically used when discussing the rotating electo-magnetic field associated with an alternator. By varying the field current, thus its strength, the output of the alternator may be controlled.

float charge
see also Bulk, Acceptance, Equalization
A constant voltage, well below the gassing point, that is applied to a battery to maintain its capacity. The voltage is such that neither charging nor discharging is occurring.

frequency *see also Hertz*
For an oscillating or varying current, frequency is the number of complete cycles per second in alternating current direction. The standard unit of frequency is the hertz, abbreviated Hz. If a current completes one cycle per second, then the frequency is 1 Hz; 60 cycles per second equals 60 Hz (the standard alternating-current utility frequency).

fuse
A fuse is a safety device, consisting of a strip of low-melting-point alloy, which is inserted in an electric circuit to prevent excess current from flowing. If the current becomes too high the alloy strip melts, opening the circuit.

fusible link
A type of fuse with a replaceable conductive alloy link that may be replaced if it "blows" due to over-current.

G

galvanic corrosion
The corrosion that occurs at the anode(s) of a galvanic cell.

galvanic isolator
A device installed in series with the (AC) grounding (green) conductor of the shore-power cable to effectively block low voltage DC galvanic current flow, but permit the passage of alternating current (AC) normally associated with the (AC) grounding (green) conductor. This is typically two diodes wired in parallel facing opposite directions, sized to meet full fault current.

galvanic compatibility chart
A list of metals and alloys arranged in order of their potentials as measured in relation to a reference electrode when immersed in seawater. The table of potentials is arranged with the anodic or least noble metals at one end, and the cathodic or most noble metals at the other.

generator
A rotating machine capable of generating electrical power. In the narrow definition generator refers to a DC machine and alternator refers to an AC machine. However, in common use the term generator is used to refer to AC machines as well.

green wire
The green wire is the non-current carrying safety grounding wire in an AC system in the United States. It is connected to an exposed metal part in the electrical system to provide a path for fault current in the case of a short circuit.

ground fault
GFI (Ground Fault Interrupter)
GFI is a generic term referring to both GFCI and GFP

GFCI (Ground Fault Circuit Interrupter) see GFI
A device intended for the protection of personnel that functions to de-energize a circuit, or portion there of, within an established period of time when a current to ground exceeds some predetermined value that is less than that required to operate the overcurrent protective device of the supply circuit.

GFP (Ground Fault Protector) see GFI
A device intended to protect equipment by interrupting the electric current to the load when a fault current to ground exceeds some predetermined value that is less than that required to operate the overcurrent protection device of that supply circuit.

ground, ground conductor
A point in a circuit which is at zero potential with respect to the Earth, or which is at the lowest potential in the system, (as with a floating ground).

grounded
The AC current carrying conductor that is intentionally maintained at ground potential, also called neutral.

grounding, grounding conductor
The AC conductor, not normally carrying current, used to connect the metallic non-current carrying parts of electrical equipment to the AC system and engine negative terminal, or its bus, and to the shore AC grounding conductor through the shore power cable. This term can also refer to the normally non-current carrying conductor used to connect metallic non-current carrying parts of direct current devices to the engine negative terminal, or its bus, to minimize stray current corrosion.

ground plate
A conductive plate, commonly sintered copper, that is placed in contact with seawater to provide a connection to earth for a boat's ground systems.

H

Hertz *see Frequency*
Hertz is a unit of frequency of one cycle per second. It replaces the earlier term of "cycle per second (cps)." The abbreviation for Hertz is Hz.

hot
Hot usually refers to the ungrounded current carrying conductors in an AC system. These would typically have a voltage of 120V or 240V in the United States. The term Hot is also used to describe a circuit that is energized, and has a potential greater than ground.

I

IACS
see International Annealed Copper Standard

Impressed current
Direct current supplied by a device employing a power source external to the electrode system of a cathodic protection installation. The impressed current is used to counteract the undesired galvanic current.

inductance
An effect in electrical systems in which electrical currents store energy temporarily in magnetic fields before that energy is returned to the circuit.

inductor *see Coil*
A length of wire that is wound around a core that is used as a storage element for a magnetic field in an electric circuit.

inrush
The momentary steep wave front of very high current exhibited by a load on initial application of power.

Intermittent switch rating (UL 1107)
The two ratings in the UL marine battery switch standard are Intermittent and Continuous. Intermittent is a 5 minute rating and is based on temperature rise of various sections of the switch as the rated current is applied over a 5 minute period. The Continuous rating is the same, but the time period is 1 hour.

International Annealed Copper Standard
Abbreviated as IACS, this is a measurement of relative electrical conductivity that uses copper as the standard of 100%. The expression "Brass 28 IACS" would mean that the brass under discussion had 28% of the electrical conductivity of an identically sized piece of copper.

interrupt rating (AIC)
The fault current that a device, normally a fuse or circuit breaker, is capable of breaking without damage to the circuit.

inverter
An inverter converts DC power stored in a battery to AC power which is used by most household appliances.

ignition protection (IP)
Devices, which operate in a potentially explosive environment, must be ignition protected. This would include engine rooms with gasoline engines. There is a very specific set of tests which a device must pass to claim ignition protection. They include operating safely in an explosive mixture of propane and air.

isolation transformer
A transformer that is inserted in series with the incoming AC power to provide a magnetic coupling for power between the ship's systems and the AC grid. By magnetically coupling the power there is no direct connection by wires, which isolates the ships AC system from the AC grid.

isolator
Refers to two or more diodes wired in parallel and then inserted in series with the output of an alternator. This allows for the alternator to charge multiple batteries. The voltage drop across the diodes can cause incomplete charging. Isolators should not be used with alternators that use internal voltage sensing for regulation. To be properly installed the voltage sense lead must come from the house battery.

J, K

kilo
A prefix in the metric system equal to 1000 times, as in kilohertz, 1000 cycles per second.

L

line *see also Load*
The conductors that are at the supply of energy to a circuit. Line normally refers to the current carrying non-grounded conductors in an AC system.

line loss *see Voltage Drop*
The power loss that occurs due to amperage flowing through the resistance of conductors over their length.

listed (UL Listed)
Indicates that a device or component has met certain specifications as set forth by Underwriters Laboratory. Further, it means that the device or component has been tested for conformance and 'listed' with UL so it can use the UL logo and claim conformance to the specification.

load *see also Line*
A device that consumes power and does work.

load group
A collection of loads, which normally have similar characteristics. For example the lighting circuits might be considered a load group. Also implies that the loads are supplied by a common bus.

lockouts (AC)
A device allowing the selection of only one source from multiple AC sources, preventing the connection of more than one source of AC power to a bus at the same time.

M

magnetic
Displaying the characteristics of a magnet, including being able to induce current flow in a conductor when relative motion exists between them and being able to attract ferrous materials.

main *see also Branch Circuit*
Refers to the main circuit breaker or bus in a power distribution system. This is the input power source for the system.

make (rating)
The current that a breaker, switch, or relay can connect into without damaging the device.

make before break
Describes a switch action that connects the new circuit before disconnecting the old. This type of switch action is required for battery selector switches in order to avoid an open circuit for the engine alternator, which can cause extreme voltages that can damage the alternator and accessory electronics.

Marine Cranking Amperes (MCA)
MCA is the discharge load in amps, which a battery can sustain for 30 seconds at 32°F (0° C). and not fall below 1.2 volts per cell (7.2V on 12V battery). This battery rating measures a burst of energy that an engine needs to start in a cold environment.

modified sine wave
A marketing term to describe an AC waveform, created by an inverter that is a pulse width controlled square wave. While an improvement on the classic square wave inverter, it is not actually a sine wave or a close approximation.

motor circuit protection
Motors require circuit breakers or fuses that are specifically designed for their current requirements. This is because motors require a high initial surge of current to get them started.

N

NEC *see National Electrical Code*

NEMA
National Electrical Manufacturers Association

N-type (alternator)
An N-type alternator has a set of diodes, called the diode trio, which supply the positive DC potential required for the rotating field current. The actual regulator switches the negative to achieve the proper field strength to create the desired correct alternator output.

National Electrical Code NEC
The NEC is developed and maintained by the National Fire Protection Association which describes how residential, commercial, and RV electrical systems must be installed. The NEC is adopted, sometimes with revision, by states that also adopt the Uniform Building Code. Electrical inspections required by most building permits follow the NEC. While not required aboard boats, the NEC is a valuable guide to safe electrical systems. The goal of the NEC is personal safety and fire prevention.

neutral *see also Single Phase*
The neutral is the grounded current carrying conductor in a single phase, four wire, 120/240V AC system.

neutral-to-ground bonding
Connecting the ground and the neutral together via an electrical conductor.

neutral-to-ground switching
In the US, inverter/charger installations that are used in marine applications must have neutral-to-ground switching. This guarantees that the neutral and the green wire are common after the green wire connection to neutral that is achieved through the shore power cord no longer exists after the cord is disconnected and shore AC is no longer serving as the boat's AC source. There must also be only a single ground point in the AC system. This prevents a voltage differential from developing between the boat's AC neutral and the shore or genset AC neutral, which may cause an electric shock or nuisance tripping of GFI's.

non-inverter loads
Non-inverter loads are heavy loads that are not appropriate to run from an inverter because the load on the batteries would be excessive or illogical. They include hot water heater, electric space heat, air conditioning, heavy pumping loads, etc. A battery charger that supplies the same battery as is being used by the inverter would also be a non-inverter load.

nuisance trip
A circuit breaker or fuse, which trips or blows without the circuit actually being overloaded. This may be due to weak breaker or a surge current which requires a slow tripping breaker or a slow blow fuse.

O

ohm
The unit for resistance equals V/I = volts/amps. The unit of resistance is the ohm, symbol Ω, the Greek letter Omega.

Ohm's law
States that the ratio of the EMF (Electromotive Force) applied to a closed circuit to the current in the circuit is a constant. That constant is the resistance of the circuit. It may be stated as V= IR (or E=IR, using E as the abbreviation of EMF whose units are volts). The unit of resistance is the ohm.

open
Indicates a condition in an electric circuit in which there is a break in the conductive path. The break may be intentional such as an open switch or relay or it may be unintentional such as a broken wire or a blown fuse. In any case, the continuous conductive path required for an electric circuit is not available.

open circuit voltage
Generally, the voltage of a source when it is not connected to a load through an electrical circuit. Specifically, the voltage of a battery when it is not delivering or receiving power. A typical value for a liquid lead acid battery is 12.8V for a fully charged battery which has not been charged or used for 24 hours. Open circuit voltage is sometimes used as an indicator of the state-of-charge of a battery.

The table below gives typical open circuit voltages for both liquid and gelled electrolyte lead-acid batteries at various states-of-charge. These voltages should be considered approximations and may vary according to manufacturer and the specific gravity of the electrolyte the battery is initially filled with.

Typical Open Circuit Voltage After 24 Hours for Liquid and Gelled Electrolyte Batteries

Percent Charge	Liquid Electrolyte per cell voltage	Liquid Electrolyte Nominal 12V Battery	Gelled Electrolyte per cell voltage	Gelled Electrolyte Nominal 12V Battery
100%	2.10	12.60	2.175	13.05
80%	2.09	12.54	2.13	12.78
60%	2.07	12.42	2.08	12.48
40%	2.04	12.24	2.05	12.30
20%	1.98	11.80	2.02	12.12
0%	1.95	11.70	1.98	11.88

overcurrent
When the current in a circuit exceeds the rating of the devices or conductors in it. Fuses and circuit breakers protect from overcurrent by opening the circuit if such a condition exists and/or persists.

P

PE
see Protective Earth

P-type (alternator)
A P-type alternator is one which one end of the coil which supplies the rotating magnetic field is connected to the negative and the regulator controls the positive side of the coil to regulate the alternator output.

panelboard
A collection of circuit breakers, switches, and instrumentation installed into a panel which provides the central point for power distribution and monitoring for the electrical system. May also refer to a smaller panel which is located remotely from the main panel which is used to supply loads in the adjacent area. In the marine industry they are usually called "panels", or "circuit breaker panels", or "distribution panels".

parallel circuit
An electrical circuit in which the positive connections are all in common and the negative connections are all in common. The voltage of the system appears across each branch of the circuit. The current varies as required by each load or source.

parallel device
A switch, solenoid, relay, or solid state device which is used to connect multiple batteries or busses together.

paralleling switch
Typically refers to a battery switch that allows multiple batteries to be connected together for engine starting. Often used to connect the battery serving the domestic system to the engine starting circuit for emergencies.

percent of charge
An estimate of the remaining charge in a battery. Percent of charge is very difficult to determine accurately without sophisticated microprocessor based calculations.

Peukert's equation
A formula that shows how the available capacity of a lead-acid battery changes according to the rate of discharge. The capacity of a battery is expressed in Amp-Hours, but the simple formula of current times hours does not accurately represent the situation. Peukert found that the equation: $C = I^n T$ fits the observed behavior of batteries. "C" is the theoretical capacity of the battery, "I" is the current, "T" is time, and "n" is the Peukert number, a constant for the given battery. The equation captures the fact that at higher discharge current, there is less available energy in the battery.

pigtail
Wires which protrude from a device to connect it to the circuit. Often used in encapsulated products. Sometimes refers to a method of hooking up circuits in which a group of conductors are connected together and then one wire is connected to the circuit. This is done in order to simplify wiring.

plate (battery)
Flat, typically rectangular components that contain the active material, lead or lead compound, and a mechanical support structure called a grid, which also has an electrical function, carrying electrons to and from the active material. Plates are either positive or negative, depending on the active material they hold.

polarity
Refers to the electrical charge, which may be positive or negative. It also refers to the positive and negative terminals of a battery or load in a DC system. In AC systems it refers to the connections made to the hot and neutral. There is often a reverse polarity light that indicates if the neutral and hot are reversed.

polarized system
An electrical system in which the positive and negative or the hot and neutral must be connected in a particular way and cannot be switched. Sometimes there are mechanical preventions to insure the correct polarity. For example, in an AC plug the physical configuration of the plug and receptacle force a polarized connection.

pole
Indicates a conductive path in a switch or relay. Switches that are single pole have one conductive path, switches that are two pole have two conductive paths. Also refers to the magnetic poles on an electromagnet or a permanent magnet.

potential
The voltage across a circuit element. Implies the potential to do work.

power
Electrical power is the rate at which electrical energy is converted to another form, such as motion, heat, or an electromagnetic field. The common symbol for power is the uppercase letter P. The standard unit is the watt, symbolized by W. In utility circuits, the kilowatt (kW) is often specified instead; 1 kW = 1000W.

Power in a direct current (DC) circuit is equal to the product of the voltage in volts and the current in amperes. This rule also holds for low-frequency

alternating current (AC) circuits in which energy is neither stored nor released. At high AC frequencies, in which energy is stored and released (as well as dissipated or converted), the expression for power is more complex.

In a DC circuit, a source of *V* volts, delivering *I* amperes, produces *P* watts according to the formula: $P = VI$

When a current of *I* amperes passes through a resistance of *R* ohms, then the power in watts dissipated or converted by that component is given by: $P = I^2R$

When a potential difference of *V* volts appears across a component having a resistance of *R* ohms, then the power in watts dissipated or converted by that component is given by: $P = V^2/R$

power factor
In an AC, circuit loads other than resistance shift the phase angle between the voltage and the current. This shift is the result of energy being stored and released in inductors and capacitors. Since this storage does not represent a consumption of power, a power measurement must take the relative phase of voltage and current into account. The ratio of actual power to the simple product of measured voltage and measured current is called the power factor. Modern electronic devices such as microwave ovens, battery chargers, and computers do not draw current in the same sinusoidal wave shape as the incoming voltage. These distorted wave shapes are also less effective at delivering power and give rise to a power factor less than unity because of the additional frequencies present in the current waveform.

propagation
The transmission of an electrical or electromagnetic signal through a medium such as air or a conductor.

Q, R

RCBO or RCCB
Residual Current Circuit Breaker is a circuit breaker that includes an overcurrent trip mechanism like a conventional breaker and includes a leakage current trip that responds to current returning through a ground path instead of the neutral conductor or the other wires of a circuit with multiple live lines. The principle is the same as a Ground Fault Circuit Interrupter but RCCB's typically have a ground fault limit of 30mA or 100mA instead of 6mA of a GFCI used for personnel protection. GFCI's are generally useful for protecting a single load or a single branch circuit but are too sensitive for use as main circuit breakers. RCCB's are used for main circuit protection in Europe for boats, houses and commercial power distribution. Without this additional protection, as much as 40 Amps can flow in the ground wire, or into the water without tripping a conventional main circuit breaker.

RCD *see also Residual Current Device*
Recreational Craft Directive - European Directive 94/25-EC relating to recreational craft.

Following are special definitions related to the RCD:

CD
Committee Draft – the first draft circulated for comment by ISO Small Craft Technical Committee Working Group developing the standard.

CEN
The European Committee for Standardization.

DIS
Draft International Standard – an advanced draft where comments on the CD have been taken into account. Minor comments accepted by the Working Group will be incorporated in the FDIS, major changes will result in a second circulation as a DIS.

EN
European Standard (Norme).

FDIS
Final Draft International Standard – the last voting stage where standard bodies can only vote "yes" or "no" and the only changes will be editorial.

ICOMIA
The International Council of Marine Industry Associations – the International Marine Industry Trade Association, which represents 24 national marine industry associations. That includes virtually all countries with an active marine industry in Europe, North America, Asia and Australia. Its officers and members represent its members' views at the EU Commission, ISO, and CEN and its members' representatives are actively involved in all the RSG Standards Working Groups.

ISO
International Standards Organization

PREN
The abbreviation used by CEN to identify a draft standard at any stage.

WG
Working Group – the committee whose members have been nominated by their national standards body to develop any new standard required by the ISO Small Craft Tec. Committee (TC188) one of whom is chosen to act as the Convenor (Chairman/Secretary) by the TC188 members.

LIST OF EUROPEAN UNION (EU) & EUROPEAN ECONOMIC AREA (EEA) NATIONAL STANDARDS BODIES

Austria	ON	Italy	UNI
Belguim	IBN	Luxembourg	ITM
Denmark	DS	Netherlands	NNI
Finland	SFS	Norway*	NSF
France	AFNOR	Portugal	IPQ
Germany	DIN	Spain	AENOR
Greece	ELOT	Sweden	SIS
Iceland*	STRI	Switzerland	SNV
Ireland	NSIA	UK	BSI

** EEA countries – whose national standards bodies are participants in CEN debates, but have a non-voting status.*

recognized (UL recognized)
A device that is UL Recognized differs from a device that is UL Listed. A Recognized device is expected to be installed within a larger assembly by a manufacturer, not in the field, and this larger assembly is then expected to be tested by UL. The UL Recognition then allows UL to skip testing of the specific embedded Recognized component. UL Recognition has little value for end users installing devices in the field.

rectifier
A device that allows current to flow in only one direction, such as a diode. Used to convert, or rectify AC current into DC.

regulator (voltage regulator)
A device, which uses a feedback loop to control the output of an alternator or other source. By measuring the output voltage and controlling the alternator field current, for example, the regulator is able to continuously adjust the alternator output to the desired voltage.

reserve capacity (battery)
RC is the number of minutes a new, fully charged battery at 80ºF will sustain a discharge load of 25 amps to a cut-off voltage of 1.75 volts per cell (10.5V on 12V battery). This battery rating measures more of a continuous load on the battery.

residual current device
An RCD is an electrical safety device specially designed to immediately switch the electricity off when electricity is "leaking" to earth is detected at a level harmful to electrical equipment. In most countries using 50Hz power, an RCD is considered to provide personnel protection.

An RCD offers a high level of personal protection from electric shock when installed on a boat because the additional grounding through hull fittings is sufficient to trip and RCD during a fault. RCD's offer a backup level of safety if the green ground wire of a shore cable or a galvanic isolator has failed. Fuses or overcurrent circuit breakers do not offer the same level of personal protection against faults involving current flow to earth. RCDs are designed to operate within 10 to 50 milliseconds and to disconnect the electricity supply when they sense harmful leakage, typically 30 milliamps. See also GFI or GFCI devices which are similar in nature, but trip at 5mA for personnel protection. GFCI devices are required by ABYC standards for AC outlets in galleys, on deck and in machinery spaces. These cannot usually be used for the entire system because normal stray currents can cause nuisance tripping.

resistance
The opposition to the flow of current in an electric circuit as defined by Ohm's law. The unit of resistance is the ohm, symbol Ω, the Greek letter Omega.

reverse polarity
Describes a situation where the neutral and hot wires of an AC system are reversed. Most AC panels have an indicator to annunciate this condition, as it can be very dangerous.

RMS (Root-mean-square)
Root-mean-square (RMS) refers to the most common mathematical method of defining the effective voltage or current of an AC sine wave.
To determine RMS value, three mathematical operations are carried out on the function representing the AC waveform:

(1) The square of the waveform function (usually a sine wave) is determined.

(2) The function resulting from step (1) is averaged over time.

(3) The square root of the function resulting from step (2) is found.

In a circuit whose impedance consists of a pure resistance, the RMS value of an AC wave is often called the effective value or DC-equivalent value. For example, if an AC source of 100 volts RMS is connected across a resistor, and the resulting current causes 50 watts of heat to be dissipated by the resistor, then 50 watts of heat will also be dissipated if a 100-volt DC source is connected to the resistor.

For a sine wave, the RMS value is 0.707 times the peak value, or 0.354 times the peak-to-peak value. Household utility voltages are expressed in RMS terms. A so-called "117-volt" AC circuit has a voltage of about 165 volts peak (pk), or 330 volts peak-to-peak (pk-pk).

S

SAE (Society of Automotive Engineers)
An organization which sets standards for various equipment used in the automotive industry. Since much of the basic equipment used in the marine industry originates in the automotive industry it can be a relevant specifications body for the marine industry as well.

SAE wire gauge
Wire sizes as specified by the SAE, specifically for stranded wire, similar to the AWG, see also AWG. The same gauge in SAE wire has a smaller conductor than in AWG wire.

sacrificial anode
A less noble metal intentionally connected to form a galvanic cell with a more noble metal for the purpose of protecting the more noble metal from corrosion. Most commonly zinc.

safety green (ground) wire

The non-current carrying conductor in a three wire 120V or four wire 240V AC circuit, it provides a safe path for fault current. See also green ground wire.

sealed lead-acid
see Gel Cell **self-limiting**
A device whose ability to limit output power regardless of input power is intrinsic to its design.

sheath
A material used as a continuous protective covering around one or more insolated conductors. The ABYC uses this term when discussing the allowable length of a conductor before it must have over current protection. The distance is extended if it is in a sheath.

shore power
AC utility power that is available when plugged into an outlet that is supplied from the main utility system.

short circuit
A conductive path of zero resistance. Typically refers to an unintentional connection between two conductors of opposite polarity. If a voltage is applied to a short circuit the current becomes very large and can start a fire, thus the need for short circuit, or overcurrent, protection in the form of fuses or circuit breakers.

shunt
A shunt resistor is a precise, low Ohm resistor that is temperature stable. It is used as a current "sensor" by using a millivolt meter to measure the voltage drop across it. Large current shunts are commonly made of one or more strips of manganin, a copper alloy capable of carrying high currents, that are soldered between machined blocks of brass with connecting bolts.

Shunts are rated according to the number of Amps they are capable of carrying and the voltage which is generated across the shunt when the rated current is being passed through it. Common shunt ratings include 100A 100mV or 500A 50mV. The resistance can be calculated by using Ohms Law, V=IR, 50mV=500A(R), therefore R=0.1mΩ, or 0.0001Ω. This is a very small value of resistance; it must be in order to minimize the power loss when large currents are flowing.

The shunt normally has two separate screws with which the sense leads are attached. It is important to realize that the integrity of these connections are critical to accurate measurement and should not be used as current carrying connections.

sine wave
A waveform that can be expressed as the graph of the equation y = sin x. The utility AC power is a sine wave.

single phase
The typical 120/240V AC system in the United States is a single phase system, meaning that the current flow in the two conductors is in phase or that they both cross zero at the same time.

skin effect
Skin effect refers to the phenomena of conductors' propagating AC current more efficiently on the conductors' surface than in its interior.

slow, slow blow *see also Delay*
A fuse that is a slow blow has a longer delay when subjected to over-current, before it fails. Slow blow fuses are required for loads that have high starting surges, like motors.

solenoid (relay)
An electromechanical device that is used to switch large currents. It consists of a coil of wire and a moving contact that makes an electrical connection when the coil of wire is energized.

source isolation (AC)
The arrangement of multiple AC power sources in such a manner that two AC sources cannot be connected to the same circuit simultaneously.

source selector
A switch or breaker configuration, which allows the user to pick which source to have connected to the bus. Typically used in AC systems with multiple sources such as shore power and one or more generators.

speed *see Delay*
Indicates how fast circuit protection devices react, specifically with respect to over circuit breakers and fuses.

square wave
An electrical waveform in which the current quickly goes from zero to its peak value in a step fashion. This is typical of inexpensive inverters.

starting bank
An arrangement of batteries that is designated for the function of engine starting.

storage battery
An electrochemical device capable of storing energy and releasing it and then able to be re-charged and repeat the process.

stray current
Unwanted current flows which occur due to a partial short circuit.

stray current corrosion
Corrosion that results when current from a battery or other external electrical (DC) source causes a metal in contact with an electrolyte to become anodic with respect to another metal in contact with the same electrolyte.

sulfation
Sulfation is the formation or deposit of lead sulfate on the surface and in the pores of the active material of the batteries' lead plates. If the sulfation becomes excessive and forms large crystals on the plates, the battery will not operate efficiently and may not work at all. Common causes of battery sulfation are standing a long time in a discharged condition, operating at excessive temperatures, and prolonged under or over charging.

surge
A large amount of current during the initial starting phase of a motor for example.

surge capacity
The measurement of the ability to withstand surge currents without damage.

surge current *see also Continuous Current*
The pulse of current that is associated with the initial large current required to start an electric motor, large resistive loads, and engine cranking.

switch
An electro-mechanical device that is intended to open an electrical circuit and thus turn a load or source on or off.

switchboard
see Panelboard

T

terminal
A connection point or device for an electrical circuit. A terminal strip is a series of screws which may or may not be connected to which wires are connected. Also refers to the connecting device which may be crimped on the end of a wire to enable it to be connected to the circuit with a screw, such as a ring terminal.

terminal studs
A threaded bolt onto which ring terminals may be placed and then fastened with a nut. Normally used for high current connections.

thermal
In a marine context thermal most commonly refers to a thermal circuit breaker, which uses the thermal effect of excess current flow to create differential expansion in a bi-metallic blade to open a circuit.

time-current curve *see also Delay*
A curve which depicts the relationship between the amount of current a fuse or breaker can hold with respect to time before opening the circuit.

tin plating
A plating of the element tin, which prevents corrosion. Commonly used to plate copper components such as a power bus.

toggle *see also Pole*
A switch which has a handle type actuator that can be placed in, at the most, three positions.

transfer switch, AC
see source selector, Source Isolation
An electrical relay or manual switch which selects an AC source alternative, such as a generator, shore power, or inverter.

transformer
see Isolation Transformer

trip free
A circuit breaker designed to trip when subjected to a fault current, even if the reset lever is held in the ON position.

U, V

ungrounded conductor
Any conductor that is not connected to the Earth ground system

volt (voltage)
The unit of electric potential and electromotive force, equal to the difference of electric potential between two points on a conducting wire carrying a constant current of one ampere when the power dissipated between the points is one watt.

volt-amps
The product of volts and amps, which is watts in a DC system and the apparent power in an AC system.

voltage drop
see line loss

W

watt
The unit of power which for a DC circuit is equal to volts times amps.

weatherproof
Constructed or protected so that exposure to the weather will not interfere with successful operation in rain, spray, and splash.

wire amperage rating
The current a conductor can carry under a set of specified conditions such as open air, in an enclosure, and at a specified temperature.

wire sizing
The process of selecting the appropriate sized conductor for the amount of current to be carried while considering the length of the circuit.

withstand voltage
The maximum voltage level that can be applied between circuits or components without causing insulation breakdown.

X, Y, Z