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➤ pages 6-27

Available Fall, 2007

ML-Series Solenoid Switches
(Magnetic Latch)

Provides high-current remote battery switching

- 300 Ampere continuous rating for use as a remote battery switch for inboard gasoline or diesel engines, reducing long cable runs
- Magnetic latch only draws current when changing state of switch, drawing no current in "ON" or "OFF" state
- Silver alloy contacts provides high reliability for switching live loads

➤ page 39

Available Spring, 2008

7700

ML-Series Automatic Charging Relay
(Magnetic Latch)

Combines large battery banks for high current charging and emergency cross connect

- Combines battery banks during charging and isolates under discharge
- 300 Ampere continuous rating suitable for use with large battery banks, starters, alternators, and inverter/chargers
- Can be remotely combined with optional switch

➤ page 42

Available Spring, 2008

7620

Residual Current Circuit Breaker (RCBO)

Provides Main or Branch circuit protection

- Ground fault protection of a GFCI combined with the overcurrent trip characteristics of a circuit breaker
- Trips on short circuit, overload, or leakage to ground
- Front panel mount—installed in power distribution panel
- Available in rocker or toggle styles

➤ pages 20-21

Available Fall, 2007

3110

3102

Terminal Fuse Block and Fuse

Mounts on 3/8" (M10) battery post, battery switch, and busbar terminals

- Interrupt Rating satisfies ABYC requirements for DC Main circuit protection on large battery banks
- Ignition protected—safe for installation aboard gasoline powered boats
- Clear window—visual indication of blown condition
- Color coded for each amperage

➤ page 50

Available Fall, 2007

5191 (fuse not included)

PRODUCTS BY CATEGORY

360 PANEL SYSTEM 6–27

PRODUCTS BY APPLICATION

360 PANEL SYSTEM

DC MAIN BATTERY MANAGEMENT

DC MAIN CIRCUIT PROTECTION

DC BRANCH POWER DISTRIBUTION AND CIRCUIT PROTECTION

AC MAIN POWER DISTRIBUTION AND CIRCUIT PROTECTION

AC MAIN SOURCE SELECTION

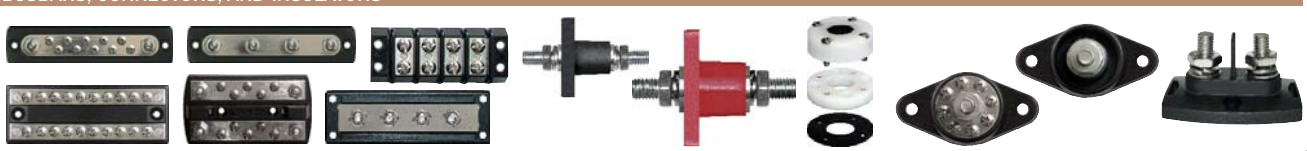
AC BRANCH POWER DISTRIBUTION AND CIRCUIT PROTECTION

AC/DC COMBINATION PANELS AND CIRCUIT PROTECTION

ACCESSORIES

METERING AND ACCESSORIES

BUSBARS, CONNECTORS, AND INSULATORS



QUICK GUIDE TO BLUE SEA SYSTEMS' FUSES AND FUSE BLOCKS

DC Current Ratings 0 **DC Current Ratings** (Amperes) 750

Fuses and Fuse Blocks

AGC/MDL Fuse—Appropriate for small electronic devices
Interrupt Rating: 1,000A DC **Maximum Voltage:** 32V DC

ST Glass Fuse Block (6 Circuit Models Available)—**Uses AGC/MDL Fuses**
Maximum Voltage: 32V DC **Maximum Amperage per circuit:** 30A DC **Maximum Amperage per block:** 100A DC
Page 63

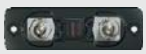
ATO/ATC Fuse—Appropriate for small electronic devices
Interrupt Rating: 1,000A DC **Maximum Voltage:** 32V DC
Page 65
1 2 3 4 5 7.5 10 15 20 25 30

ST Blade Fuse Block (6 and 12 Circuit Models Available)—**Uses ATO/ATC Fuses**
Maximum Voltage: 32V DC **Maximum Amperage per circuit:** 30A DC **Maximum Amperage per block:** 100A DC
Page 64

MAXI™ Fuse—Economical high amp branch circuit protection
Interrupt Rating: 1,000A DC **Maximum Voltage:** 32V DC
Page 65
30 40 50 60 70 80

MAXI™ Fuse Block—Uses MAXI™ Fuses
Maximum Voltage: 32V DC **Maximum Amperage:** 80A DC
Page 65

SEA Fuse—Appropriate for DC Main circuit protection with smaller battery banks or DC Branch circuits
Interrupt Rating: 2,000A DC **Maximum Voltage:** 32V DC
Page 51
100 125 150 175 200 225 250 300



SEA Fuse Block—Uses SEA Fuses
Maximum Voltage: 32V DC **Maximum Amperage:** 300A DC
Page 51

Terminal Fuse—Appropriate for DC Main circuit protection at the battery post, battery switch, or terminal block
Interrupt Rating: 10,000A@14V DC/5,000A@32V DC/2,000A@58V DC **Maximum Voltage:** 58V DC
IP **Ignition Protected**—safe for installation aboard gasoline powered boats
Page 50
30 40 50 60 75 80 90 100 125 150 175 200 225 250 300

Terminal Fuse Block—Uses Terminal Fuses
Maximum Voltage: 58V DC **Maximum Amperage:** 300A DC
Page 50

Class T Fuse—Appropriate for inverters and high amp equipment
Interrupt Rating: 20,000A DC **Maximum Voltage:** 160V DC
Page 53
110 125 150 175 200 225 250 300 350 400

Class T Fuse Block—Uses Class T Fuses
Maximum Voltage: 160V DC **Maximum Amperage:** 400A DC
Page 53

ANL Fuse—Appropriate for DC Main circuit protection
Interrupt Rating: 6,000A DC **Maximum Voltage:** 32V DC
IP **35-500 Ampere Fuses are Ignition Protected**—safe for installation aboard gasoline powered boats
Page 52
35 40 50 60 80 100 130 150 175 200 225 250 275 300 325 350 400 500 600 675 750

ANL Fuse Block—Uses ANL Fuses
Maximum Voltage: 32V DC
Maximum Amperage: 300A DC
Page 52

ANL Heavy Fuse Block—Uses ANL Fuses
Maximum Voltage: 32V DC
Maximum Amperage: 750A DC
Page 52

QUICK GUIDE TO BLUE SEA SYSTEMS' CIRCUIT BREAKERS

DC Current Ratings
AC Current Ratings

0 — **AC and DC Current Ratings** (Amperes) — 300

Thermal Circuit Breakers

Push Button Reset-Only—**Appropriate for 24-hour circuit protection**
Interrupt Rating: 3,000A@14.7V DC/2,500A@28V DC **IP Ignition Protected**—safe for installation aboard gasoline powered boats

Page 46

3 4 5 7 10 12 15 20 25 30 35 40

185-Series—**Appropriate for DC Main circuit protection with battery banks under 1,000 CCA in adverse environments**
Interrupt Rating: 3,000A DC **Maximum Voltage:** 42V DC **IP Ignition Protected**—safe for installation aboard gasoline powered boats

Page 46

25 30 35 40 50 60 70 80 90 100 110 120 135 150

187-Series—**Appropriate for DC Main circuit protection with battery banks over 1,000 CCA in adverse environments**
Interrupt Rating: 5,000A@12V DC / 3,000A@24V DC/1,500A@42 DC **Maximum Voltage:** 48V DC
IP Ignition Protected—safe for installation aboard gasoline powered boats

Page 47

25 30 35 40 50 60 70 80 90 100 110 120 135 150

Magnetic Hydraulic Circuit Breakers

RCBO Circuit Breaker Toggle and Rocker, 1 and 2 Pole—**Appropriate for ground fault and overcurrent trip protection**
Interrupt Rating: 5,000A AC **Maximum Voltage:** 240V AC

Page 21

15 16 30

A-Series Toggle, 1 Pole—**Appropriate for AC and DC Branch circuit protection**
Interrupt Rating: 7,500A@65V DC/3,000A@250V AC **Maximum Voltage:** 65V DC/250V AC

Page 62, 86

5 8 10 15 20 25 30 40 50

A-Series Toggle, 2 Pole—**Appropriate for 120V AC Main or 240V AC Branch circuit protection**
Interrupt Rating: 3,000A AC **Maximum Voltage:** 250V AC

Page 70

10 15 16 20 30 32 40 50

A-Series Flat and Restricted OFF Rocker, 1 Pole—**Appropriate for AC and DC Branch and 24-hour circuit protection**
Interrupt Rating: 5,000A@32V DC/3,000A@125V AC/1,500A@240V AC **Maximum Voltage:** 32V DC/240V AC

Page 62, 87

5 8 10 15 20 25 30 40 50

A-Series Flat and Raised Rocker, 2 Pole—**Appropriate for 120V AC Main or 240V AC Branch circuit protection**
Interrupt Rating: 3,000A AC **Maximum Voltage:** 240V AC

Page 71

10 15 16 20 30 32 40 50

C-Series Toggle, 1 Pole—**Appropriate for DC Main and AC and DC heavy load circuit protection**
Interrupt Rating: 10,000A AC **Maximum Voltage:** 80V DC/240V AC
IP 100 Ampere Circuit Breaker is Ignition Protected—safe for installation aboard gasoline powered boats

Page 48, 87

5 10 15 20 25 30 50 60 80 100

C-Series Toggle, 2 and 3 Pole—**Appropriate for DC heavy load circuit protection**
Interrupt Rating: 5,000A@65V DC **Maximum Voltage:** 65V DC

Page 48

150* 175* 200* 250† 300†

C-Series Toggle, 2 and 3 Pole—**Appropriate for 240V AC Main and AC heavy load circuit protection**
Interrupt Rating: 5,000A@250V AC **Maximum Voltage:** 250V AC

Page 72

30* 50‡ 60‡ 80‡ 100‡

C-Series Flat Rocker, 1 Pole—**Appropriate for DC Main and AC and DC heavy load circuit protection**
Interrupt Rating: 5,000A@32V DC/3,000A@125V AC **Maximum Voltage:** 32V DC/240V AC
IP Ignition Protected—safe for installation aboard gasoline powered boats

Page 49

5 10 15 20 25 30 50 60 80 100

C-Series Flat Rocker, 2 and 3 Pole—**Appropriate for DC heavy load circuit protection**
Interrupt Rating: 5,000A@48V DC **Maximum Voltage:** 48V DC

Page 49

150* 175* 200* 250† 300†

C-Series Flat and Raised Rocker, 2 and 3 Pole—**Appropriate for 240V AC Main and AC heavy load circuit protection**
Interrupt Rating: 5,000A AC **Maximum Voltage:** 240V AC

Page 73

30* 50‡ 60‡ 80‡ 100‡

* Available in 2 Pole / † Available in 3 Pole / ‡ Available in 2 and 3 Pole

The 360 Panel System—a new approach to power distribution panels

Working with our worldwide customer base of boat builders and electrical suppliers over the years, we have developed a new panel system that meets both the visual and functional demands of the most discerning boater.

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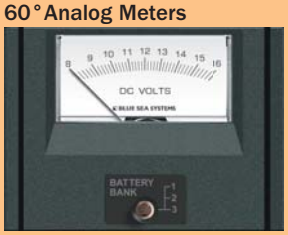
Broadest Range of Functionality—a modular approach allows the combining of functions including flat rocker or toggle magnetic circuit breakers, push button reset-only thermal circuit breakers, meters, gauges and battery switches to be installed in the same panel.

Advanced Design Features—easy to change backlit labels, hidden mounting screws and circuit breakers that meet the latest ABYC requirements are just some of the features you can expect.

Fast Shipment—custom panels can be designed and shipped in days not weeks. Custom panels are available for boat manufacturers and through a select group of distributors.

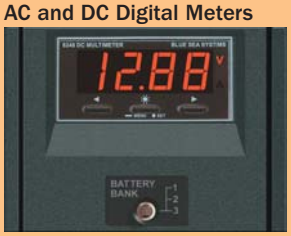
Broadest Range of Functionality

AC and DC 60° Analog Meters



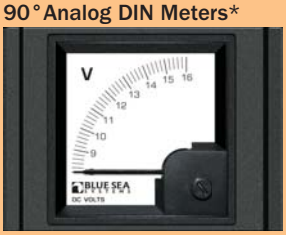
- Monitor volts and amperes

AC and DC Digital Meters



- Monitor volts, amperes, watts, frequency
- DC voltage alarms, AC voltage and amperage alarms

AC and DC 90° Analog DIN Meters*



- Monitor volts and amperes

Systems Monitor*

Available Spring 2008

- Monitor volts, amperes, watts, frequency, DC ampere-hours
- Monitor tanks and bilge condition
- Alarms for all measured values

2" Round Gauges

- Monitor engine, tanks, electrical, clock and hour meter values

DC Push Button Reset-Only Circuit Breakers

- Circuit protection only for un-switched 24 hour circuits or switches at other locations

DC Push Button Reset-Only Circuit Breakers with Rocker Switches

- Economical switched circuit protection for circuits less than 8 amperes

DC Battery Management*

Available Spring 2008

- Control and graphic connection state information for Blue Sea Systems solenoids and ACRs

---

DC 12 Volt Sockets*

- Twin 12 Volt receptacles integrated into the 360 Distribution Panel

m-Series Battery Switches

- ON/OFF, Selector, Dual Circuit™, and Dual Circuit Plus™ enable sophisticated battery management systems to be integrated into the 360 Distribution Panel

Rocker Style Circuit Breakers

- Modern styling, resistance to accidental switching and restricted switching models

Toggle Style Circuit Breakers

- For a traditional look and feel

AC Multiple Source Slide Management for Rocker-Style Circuit Breakers

- Safe management of multiple AC sources for Rocker-Style Circuit Breakers

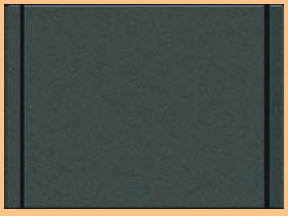
AC Multiple Source Slide Management for Toggle-Style Circuit Breakers

- Safe management of multiple AC sources for Toggle-Style Circuit Breakers

AC Multiple Source Rotary Switch-Type Management

- Safe management of multiple AC sources with a fully backlight Rotary Switch AC Management System

Blank Panel*



- Platform for a variety of controls and instruments that can be mounted into the 360 Distribution Panel for an integrated appearance

*** Available in custom panels only**

Advanced Design Features

AC Insulating Cover provides electrical insulation for exposed panel backs

Flat Rocker Circuit Breakers —Rocker actuator is flush in the "ON" position, eliminating the risk of accidental switching

LEDs on each circuit

Accepts a variety of gauges with a standard 2" mounting aperture

Blank module for mimic panel and other functions

Panel column identification

Snap-on end plates conceal mounting screws

Easy to change backlit labels

Available with rocker and toggle style circuit breakers

360 Custom Panel Program

Panels can be customized to accommodate 12 or 24 Volts DC or 120, 230, and 120/240 Volt AC system components.

- Panels configured exactly the way you want them
- Available in days, not weeks
- Comparable to standard panel prices

Custom panels are available for boat manufacturers and through a select group of distributors.

DC Main Battery Management and Power Distribution Panels Pages 10–16

AC Main Source Selection and Power Distribution Pages 17–21

AC/DC Combination Panels Pages 22–23

Meter Panels Pages 23

Gauges and Gauge Panels Pages 24–25

360 Panel System Accessories Pages 26–27

DC Single Battery m-Series ON/OFF Battery Switch Panels with Branch Circuit Protection

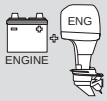
Designed for single battery single engine configurations

- Incorporates an m-Series ON/OFF Battery Switch 6006200 (pages 30–31)
- Includes 4218—Square Format Label Set (pages 100–101)
- **1400/1402:** Push Button Reset-Only Branch circuit breakers provide economical high-density circuit protection when switching is provided elsewhere —ideal for 24-hour circuit protection
- **1402/1403:** Provides DC Main circuit protection
- **1401/1402/1403:** Provides circuit switching

Specifications

m-Series Battery Switch 6006200 Ratings Pages 30–31
Nominal Voltage 12 Volts DC

Single Battery, Single Engine




1400


1401


1402


1403

PN	Description	Width in" (mm)	Height in" (mm)	Installed Flat Rocker Circuit Breaker		Installed Push Button Circuit Breaker		Installed Rocker Switch
				100A Main	15A	10A	15A	
1400	DC M-Series ON/OFF + 8 Pos CLB V[1]	4.875 (123.83)	7.750 (196.85)	-	-	-	8	-
1401	DC M-Series ON/OFF + 4 Pos Switch CLB V[1]	4.875 (123.83)	7.750 (196.85)	-	-	4	-	4
1402	DC M-Series ON/OFF + Main 3 Pos CLB V[1]	4.875 (123.83)	7.750 (196.85)	1	-	-	3	-
1403	DC M-Series ON/OFF + Main 3 Pos FR V[1]	4.875 (123.83)	7.750 (196.85)	1	3	-	-	-

DC Dual Battery m-Series ON/OFF Battery Switch Panels

Designed for dual battery single engine configurations

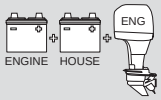
- Incorporates m-Series ON/OFF Battery Switches 6006200 (pages 30–31)
- Isolates the Engine circuit from the House circuit
- Protects electronics from sags and spikes caused by engine cranking
- Allows independent battery discharge
- Addition of an automatic charging relay automates charging of both batteries (pages 40–43)
- Includes 4218—Square Format Label Set (pages 100–101)
- 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

Specifications

m-Series Battery Switch 6006200 Ratings Pages 30–31
Nominal Voltage 12 Volts DC


1406

Dual Battery, Single Engine




1407

PN	Description	Width in" (mm)	Height in" (mm)	Installed Flat Rocker Circuit Breaker
				15A
1406	DC 3 M-Series ON/OFF H[2]	13.625 (346.08)	4.750 (120.65)	-
1407	DC 3 M-Series ON/OFF V[1]	4.875 (123.83)	10.750 (273.05)	-

DC Dual Battery m-Series ON/OFF Battery Switch Panels with Branch Circuit Protection

Designed for dual battery single engine configurations

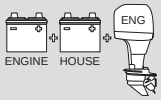
- Incorporates m-Series ON/OFF Battery Switches 6006200 (pages 30–31)
- Isolates the Engine circuit from the House circuit
- Protects electronics from sags and spikes caused by engine cranking
- Allows independent battery discharge
- Addition of an automatic charging relay automates charging of both batteries (pages 40–43)
- Includes 4218—Square Format Label Set (pages 100–101)
- Flat rocker Branch circuit breakers eliminate the risk of accidental switching

Specifications

m-Series Battery Switch 6006200 Ratings Pages 30–31
Nominal Voltage 12 Volts DC


1404

Dual Battery, Single Engine




1405

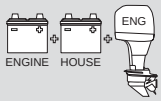
PN	Description	Width in" (mm)	Height in" (mm)	Installed Flat Rocker Circuit Breaker	
				100A Main	15A
1404	DC 2 M-Series ON/OFF + 4 Pos FR H[2]	13.625 (346.08)	4.750 (120.65)	1	3
1405	DC 2 M-Series ON/OFF + 4 Pos FR V[1]	4.875 (123.83)	10.750 (273.05)	1	3

NEW PRODUCT [1] Vertical / [2] Horizontal

DC Dual Battery m-Series Dual Circuit Plus™ Battery Switch Panels with Branch Circuit Protection

Designed for dual battery single engine configurations using a Dual Circuit Plus™ Battery Switch for simplified switching

Dual Battery, Single Engine



Common Features

- Incorporates m-Series Dual Circuit Plus™ Battery Switch 6011200 (pages 30–31)
- Includes 4218—Square Format Label Set (pages 100–101)

1408/1409: Provides DC Main circuit protection

1409:
Flat rocker Branch circuit breakers eliminate the risk of accidental switching

1408/1411:
Push button Branch circuit breakers provide economical high-density circuit protection when switching is provided elsewhere—ideal for 24-hour circuit protection


1408


1409


1410


1411

Specifications

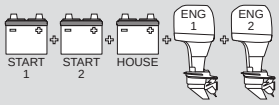
m-Series Battery Switch 6011200 Ratings	Pages 30–31
Nominal Voltage	12 Volts DC

PN	Description	Width in" (mm)	Height in" (mm)	Installed C-Series Flat Rocker Circuit Breaker		Installed Push Button Circuit Breaker		Installed Rocker Switches
				100A Main	15A	10A	15A	
1408	DC M-Series Dual Circuit Plus + Main 3 Pos CLB V[1]	4.875 (123.83)	7.750 (196.85)	1	-	-	3	-
1409	DC M-Series Dual Circuit Plus + Main 3 Pos FR V[1]	4.875 (123.83)	7.750 (196.85)	1	3	-	-	-
1410	DC M-Series Dual Circuit Plus + 4 Pos Switch CLB V[1]	4.875 (123.83)	7.750 (196.85)	-	-	4	-	4
1411	DC M-Series Dual Circuit Plus + 8 Pos CLB V[1]	4.875 (123.83)	7.750 (196.85)	-	-	-	8	-

DC Triple Battery m-Series Dual Circuit Plus™ Battery Switch Panels with Branch Circuit Protection

Designed for triple battery dual engine configurations using two Dual Circuit Plus™ Battery Switches for simplified switching

Triple Battery, Twin Engines



- Incorporates m-Series Dual Circuit Plus™ Battery Switch 6011200 (pages 30–31)
- Includes 4218—Square Format Label Set (pages 100–101)
- Push button Branch circuit breakers provide economical high-density circuit protection when switching is provided elsewhere—ideal for 24-hour circuit protection
- Flat rocker Branch circuit breakers eliminate the risk of accidental switching


1412

Specifications

m-Series Battery Switch 6011200 Ratings	Pages 30–31
Nominal Voltage	12 Volts DC

PN	Description	Width in" (mm)	Height in" (mm)	Installed C-Series Flat Rocker Circuit Breaker		Installed Push Button Circuit Breaker	
				100A Main	15A	10A	15A
1412	DC 2 M-Series Dual Circuit Plus + 4 Pos FR + 8 Pos CLB S[2]	9.250 (234.95)	7.750 (196.85)	1	3	-	8

NEW PRODUCT

[1] Vertical / [2] Square

DC Push Button Reset-Only Branch Circuit Breaker Panels

Designed as an economical solution for circuits that remain "ON" or are switched elsewhere

- High-density circuit protection
- Includes 4205—Square Format Label Set (pages 100–101)

8 Position CLB S

1450

16 Position CLB V

1452

24 Position CLB V

1454

16 Position CLB H

1451

24 Position CLB H

1453

PN	Description	Width in" (mm)	Height in" (mm)	Installed Push Button Circuit Breakers
				15A
1450	8 Position CLB S[1]	4.875 (123.83)	4.750 (120.65)	8
1451	16 Position CLB H[2]	9.250 (234.95)	4.750 (120.65)	16
1452	16 Position CLB V[3]	4.875 (123.83)	7.750 (196.85)	16
1453	24 Position CLB H[2]	13.625 (346.08)	4.750 (120.65)	24
1454	24 Position CLB V[3]	4.875 (123.83)	10.750 (273.05)	24

NEW PRODUCT [1] Square / [2] Horizontal / [3] Vertical

DC Push Button Reset-Only Circuit Breakers and Rocker Switch Panels

Designed as an economical solution for circuits requiring both circuit protection and switching

- Available with voltmeters and ammeters
- Includes 4205—Square Format Label Set (pages 100–101)

4 Position Switch CLB S

1455

8 Position Switch CLB + Meter H

1462

12 Position Switch CLB H

1460

4 Position Switch CLB + Meter V

1459

8 Position Switch CLB V

1457

See page 27 for full selection of Rocker Switches

4 Position Switch CLB + Meter H

1458

8 Position Switch CLB H

1456

8 Position Switch CLB + Meter V

1463

12 Position Switch CLB V

1461

12 Position Switch CLB + Meter S

1464

16 Position Switch CLB + Meters H

1466

20 Position Switch CLB Meter V

1471

16 Position Switch CLB S

1465

20 Position Switch CLB + Meter H

1470

24 Position Switch CLB V

1469

16 Position Switch CLB + Meters V

1467

24 Position Switch CLB H

1468

PN	Description	Meter Type	Meter PN	Meter Pages	Width in" (mm)	Height in" (mm)	Installed Push Button Circuit Breakers 10A	Installed Rocker Switches
1455	4 Position Switch CLB S[1]	-	-	-	4.875 (123.83)	4.750 (120.65)	4	4
1458	4 Position Switch CLB + Meter H[2]	Voltmeter	8003	110	9.250 (234.95)	4.750 (120.65)	4	4
1459	4 Position Switch CLB + Meter V[3]	Voltmeter	8003	110	4.875 (123.83)	7.750 (196.85)	4	4
1456	8 Position Switch CLB H[2]	-	-	-	9.250 (234.95)	4.750 (120.65)	8	8
1457	8 Position Switch CLB V[3]	-	-	-	4.875 (123.83)	7.750 (196.85)	8	8
1462	8 Position Switch CLB + Meter H[2]	Voltmeter	8003	110	13.625 (346.08)	4.750 (120.65)	8	8
1463	8 Position Switch CLB + Meter V[3]	Voltmeter	8003	110	4.875 (123.83)	10.750 (273.05)	8	8
1460	12 Position Switch CLB H[2]	-	-	-	13.625 (346.08)	4.750 (120.65)	12	12
1461	12 Position Switch CLB V[3]	-	-	-	4.875 (123.83)	10.750 (273.05)	12	12
1464	12 Position Switch CLB + Meter S[1]	Voltmeter	8003	110	9.250 (234.95)	7.750 (196.85)	12	12
1465	16 Position Switch CLB S[1]	-	-	-	9.250 (234.95)	7.750 (196.85)	16	16
1466	16 Position Switch CLB + Meters H[2]	Volt/Amp	8003/8022	110	13.625 (346.08)	7.750 (196.85)	16	16
1467	16 Position Switch CLB + Meters V[3]	Volt/Amp	8003/8022	110	9.250 (234.83)	10.750 (273.05)	16	16
1470	20 Position Switch CLB + Meter H[2]	Voltmeter	8003	110	13.625 (346.08)	7.750 (196.85)	20	20
1471	20 Position Switch CLB + Meter V[3]	Voltmeter	8003	110	9.250 (234.95)	10.750 (273.05)	20	20
1468	24 Position Switch CLB H[2]	-	-	-	13.625 (346.08)	7.750 (196.85)	24	24
1469	24 Position Switch CLB V[3]	-	-	-	9.250 (234.83)	10.750 (273.05)	24	24

NEW PRODUCT [1] Square / [2] Horizontal / [3] Vertical

DC Branch Circuit Breaker Panels with Hydraulic/Magnetic Circuit Breakers

Designed for circuits requiring both circuit protection and switching

Common Features

- 4 to 32 branch circuits with installed 15 Ampere circuit breakers
- Available with voltmeters, ammeters, and digital multimeters
- Includes 4205—Square Format Label Set (pages 100–101)

1221/1226: Installed 100A Main circuit breaker

4 Position FR S

1216

4 Position BT S

1116

8 Position Flat Rocker H

1225

8 Position Black Toggle H

1125

8 Position FR V

1200

8 Position BT V

1100

16 Position Flat Rocker S

1222

16 Position Black Toggle S

1122

24 Position Flat Rocker H

1220

24 Position Black Toggle H

1120

12 Position FR V

1223

12 Position BT V

1123

8 Position Flat Rocker + Meters S

1224

16 Position Flat Rocker + Meters H

1201

8 Position Black Toggle + Meters S

1124

16 Position Black Toggle + Meters H

1101

8 Position FR + Meter V

1227

8 Position BT + Meter V

1127

12 Position Flat Rocker + Meter S

1217

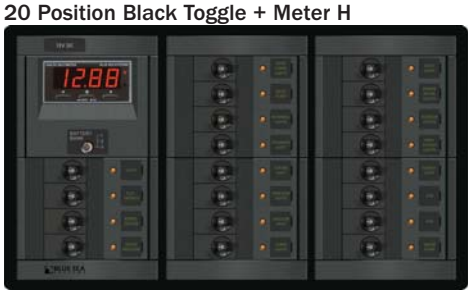
12 Position Black Toggle + Meter S

1117

Main + 19 Positions Flat Rocker + Meter H

1221

20 Position Black Toggle + Meter H

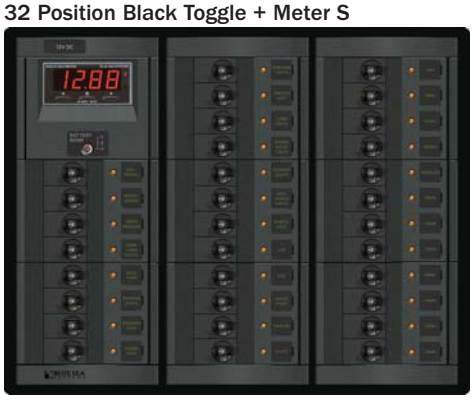


1121

Main + 31 Positions Flat Rocker + Meter S

1226

32 Position Black Toggle + Meter S



1126

PN	PN	Description	Meter Type	Meter PN	Meter Page	Width in" (mm)	Height in" (mm)	Installed Single Pole Circuit Breakers	Installed Main Circuit Breaker
								15A	100A
1216	1116	4 Position S[1]	-	-	-	4.875 (123.83)	4.750 (120.65)	4	-
1200	1100	8 Position V[2]	-	-	-	4.875 (123.83)	7.750 (196.85)	8	-
1225	1125	8 Position H[3]	-	-	-	9.250 (234.95)	4.750 (120.65)	8	-
1224	1124	8 Position + Meters S[1]	Amp/Volt	8003/8022	110	9.250 (234.95)	7.750 (196.85)	8	-
1227	1127	8 Position + Meter V[2]	Multimeter	8248	106	4.875 (123.83)	10.75 (273.05)	8	-
1223	1123	12 Position V[2]	-	-	-	4.875 (123.83)	10.75 (273.05)	12	-
1217	1117	12 Position + Meter S[1]	Multimeter	8248	106	9.250 (234.95)	7.750 (196.85)	12	-
1222	1122	16 Position S[1]	-	-	-	9.250 (234.95)	7.750 (196.85)	16	-
1201	1101	16 Position + Meters H[3]	Amp/Volt	8003/8022	110	13.625 (346.08)	7.750 (196.85)	16	-
1221	-	Main + 19 Positions + Meter H[3]	Multimeter	8248	106	13.625 (346.08)	7.750 (196.85)	19	1
-	1121	20 Position + Meter H[3]	Multimeter	8248	106	13.625 (346.08)	7.750 (196.85)	20	-
1220	1120	24 Position H[3]	-	-	-	13.625 (346.08)	7.750 (196.85)	24	-
1226	-	Main + 31 Positions + Meter S[1]	Multimeter	8248	106	13.625 (346.08)	10.750 (273.05)	31	1
-	1126	32 Position + Meter S[1]	Multimeter	8248	106	13.625 (346.08)	10.750 (273.05)	32	-

NEW PRODUCT [1] Square / [2] Vertical / [3] Horizontal

DC High-Amp C-Series Circuit Breaker Panels

Designed to switch and protect loads of 50–300 Amperes such as windlasses and bow thrusters

- 50 to 300 Ampere single, double, or triple pole DC C-Series circuit breakers
- "ON" indicating LED installed
- Also functions as a Main power switch
- Includes 4218—Square Format Label Set (pages 100–101)

Main Flat Rocker
Single and Double Pole

1490/1491/1492

Main Flat Rocker
Triple Pole

1493

PN	Description	Width in" (mm)	Height in" (mm)	Installed Single Pole Circuit Breakers	Installed Double Pole Circuit Breaker		Installed Triple Pole Circuit Breakers
				50A	150A	200A	300A
1490	Main FR 50A Single Pole	4.875 (123.83)	4.750 (120.65)	1	-	-	-
1491	Main FR 150A Double Pole	4.875 (123.83)	4.750 (120.65)	-	1	-	-
1492	Main FR 200A Double Pole	4.875 (123.83)	4.750 (120.65)	-	-	1	-
1493	Main FR 300A Triple Pole	4.875 (123.83)	4.750 (120.65)	-	-	-	1

DC 12 Volt Socket Panel

- 2 x 12 Volt sockets
- 15 Ampere maximum per socket

PN	Description	Width in" (mm)	Height in" (mm)
1472	2 x 12V Socket S*	4.875 (123.83)	4.750 (120.65)

2x 12V Socket S

1472

Blank Panel

Designed as a platform for mounting other equipment, switching, and monitoring functions

- Suitable for accessories and for user pad printing

PN	Description	Width in" (mm)	Height in" (mm)
1518	Panel 360 Blank S*	4.875 (123.83)	4.750 (120.65)

NEW PRODUCT

Panel 360 Blank S

1518

Pad Printed Boat

Push button starter

Examples of user customized blank panels

* Square

AC Magnetic Circuit Breaker Panels with Hydraulic/Magnetic Circuit Breakers

Designed to switch and protect 120 Volt and 230 Volt AC circuits

- All circuit label positions are backlit
- "ON" indicating LEDs installed in all circuit positions
- Includes 4206—Square Format Label Set (pages 100–101)

4 Position Flat Rocker S

1210/1211*

4 Position Black Toggle S

1110/1111*

Main + 2 Positions Flat Rocker S

1214/1215*

Main + 2 Positions Black Toggle S

1114/1115*

8 Position Flat Rocker V

1228/1229*

8 Position Black Toggle V

1128/1129*

Main + 6 Positions Flat Rocker V

1202/1203*

Main + 6 Positions Black Toggle V

1102/1103*

Main + 2 Positions Flat Rocker + Meter V

1206/1207*

Main + 2 Positions Black Toggle + Meter V

1106/1107*

Main + 6 Positions Flat Rocker H

1230/1131*

Main + 6 Positions Black Toggle H

1130/1233*

120 Volt Main and Branch Circuit Breaker Panels

PN	PN	Description	Meter Type	Meter PN	Meter Page	Width in" (mm)	Height in" (mm)	Installed Single Pole Circuit Breakers	Installed Double Pole Circuit Breakers
								15A	30A
1210	1110	4 Position S[1]	-	-	-	4.875 (123.83)	4.750 (120.65)	4	-
1228	1128	8 Position V[2]	-	-	-	4.875 (123.83)	7.750 (196.85)	8	-
1214	1114	Main + 2 Positions S[1]	-	-	-	4.875 (123.83)	4.750 (120.65)	2	1
1206	1106	Main + 2 Positions + Meter V[2]	Volt	9353	111	4.875 (123.83)	7.750 (196.85)	2	1
1230	1130	Main + 6 Positions H[3]	-	-	-	9.250 (234.95)	4.750 (120.65)	6	1
1202	1102	Main + 6 Positions V[2]	-	-	-	4.875 (123.83)	7.750 (196.85)	6	1

230 Volt Main and Branch Circuit Breaker Panels*

PN	PN	Description	Meter Type	Meter PN	Meter Page	Width in" (mm)	Height in" (mm)	Installed Single Pole Circuit Breakers	Installed Double Pole Circuit Breakers
								8A	16A
1211	1111	4 Position S[1]	-	-	-	4.875 (123.83)	4.750 (120.65)	4	-
1229	1129	8 Position V[2]	-	-	-	4.875 (123.83)	7.750 (196.85)	8	-
1215	1115	Main + 2 Positions S[1]	-	-	-	4.875 (123.83)	4.750 (120.65)	2	1
1207	1107	Main + 2 Positions + Meter V[2]	Volt	9354	111	4.875 (123.83)	7.750 (196.85)	2	1
1233	1133	Main + 6 Positions H[3]	-	-	-	9.250 (234.95)	4.750 (120.65)	6	1
1203	1103	Main + 6 Positions V[2]	-	-	-	4.875 (123.83)	7.750 (196.85)	6	1

NEW PRODUCT * 230 Volt (typical of Europe) / [1] Square / [2] Vertical / [3] Horizontal

AC Rotary Switch Source Selection Panels

Designed as a space saving solution to select between multiple AC sources

Common Features

- Red reverse polarity LED indicators
- Green power available LED indicators

120V AC Rotary 32A OFF + 2

1481
Switches two 120V AC sources

230V AC Rotary 32A OFF + 2

1484*
Switches two 230V AC sources

120V AC Rotary 63A OFF + 2

1483
Switches two 120V AC sources

230V AC Rotary 63A OFF + 2

1486*
Switches two 230V AC sources

120/240V AC Rotary 63A OFF + 2

1487
Switches two 120/240V AC sources

120/240V AC Rotary 30A OFF + 2 2x120V/1x240V

1489
Switches between two 120V AC shore power sources and one 240V AC source to two 120V AC load groups

120/240V AC Rotary 63A OFF + 2 2x120V/1x240V

1480
Switches between two 120V AC shore power sources and one 240V AC source to two 120V AC load groups

120V AC Rotary 32A OFF +3

1482
Switches three 120V AC sources

230V AC Rotary 32A OFF +3

1485*
Switches three 230V AC sources

120/240V AC Rotary 63A OFF + 3

1488
Switches three 120/240V AC sources

▶ See pages 79–81 for full selection of Rotary Switches

PN Panel	Description	PN Rotary Switch**	Switch		Mounting Depth in" (mm)	Width in" (mm)	Height in" (mm)
			Maximum Amperage	Maximum Voltage			
1481	120V AC Rotary 32A OFF + 2	9009	32A AC	120V AC	1.91 (48.51)	4.875 (123.83)	4.750 (120.65)
1484*	230V AC Rotary 32A OFF + 2	9009	32A AC	230V AC	1.91 (48.51)	4.875 (123.83)	4.750 (120.65)
1483	120V AC Rotary 63A OFF + 2	9011	63A AC	120V AC	2.41 (61.21)	4.875 (123.83)	4.750 (120.65)
1486*	230V AC Rotary 63A OFF + 2	9011	63A AC	230V AC	2.41 (61.21)	4.875 (123.83)	4.750 (120.65)
1487	120/240V AC Rotary 63A OFF + 2	9019	63A AC	240V AC	3.65 (92.71)	4.875 (123.83)	4.750 (120.65)
1489	120/240V AC Rotary 30A OFF + 2 2x120V/1x240V	6337	30A AC	240V AC	2.98 (75.69)	4.875 (123.83)	4.750 (120.65)
1480	120/240V AC Rotary 63A OFF + 2 2x120V/1x240V	9093	63A AC	240V AC	4.50 (114.30)	4.875 (123.83)	4.750 (120.65)
1482	120V AC Rotary 32A OFF + 3	9010	32A AC	120V AC	2.41 (61.21)	4.875 (123.83)	4.750 (120.65)
1485*	230V AC Rotary 32A OFF + 3	9010	32A AC	230V AC	2.41 (61.21)	4.875 (123.83)	4.750 (120.65)
1488	120/240V AC Rotary 63A OFF + 3	9077	63A AC	240V AC	5.50 (139.70)	4.875 (123.83)	4.750 (120.65)

NEW PRODUCT * 230 Volt (typical of Europe) / ** See page 79–81

AC A-Series Circuit Breaker Source Selection Panels

Designed to provide both source selection and circuit protection of multiple AC sources

- Double pole AC Main circuit breakers with installed lockout slides
- Prevents connecting multiple AC sources simultaneously
- Red reverse polarity indication LED
- All circuit label positions are backlit
- "ON" indicating LEDs installed in all circuit positions
- Includes 4206—Square Format Label Set (pages 100–101)

120V AC Source Selection 30A Raised Rocker

1208

120V AC Source Selection 30A Black Toggle

1108

120V AC Source Selection 50A Raised Rocker

1231

120V AC Source Selection 50A Black Toggle

1131

230V AC Source Selection 16A Raised Rocker

1209*

230V AC Source Selection 16A Black Toggle

1109*

230V AC Source Selection 32A Raised Rocker

1232*

230V AC Source Selection 32A Black Toggle

1132*

120V AC Source Selection Panels

PN	PN	Description	Width in" (mm)	Height in" (mm)	Installed Double Pole Circuit Breakers	
					30A	50A
1208	1108	120V AC Source Selection 30A	4.875 (123.83)	4.750 (120.65)	2	-
1231	1131	120V AC Source Selection 50A	4.875 (123.83)	4.750 (120.65)	-	2

230V AC Source Selection Panels*

PN	PN	Description	Width in" (mm)	Height in" (mm)	Installed Double Pole Circuit Breakers	
					16A	32A
1209	1109	230V AC Source Selection 16A	4.875 (123.83)	4.750 (120.65)	2	-
1232	1132	230V AC Source Selection 32A	4.875 (123.83)	4.750 (120.65)	-	2

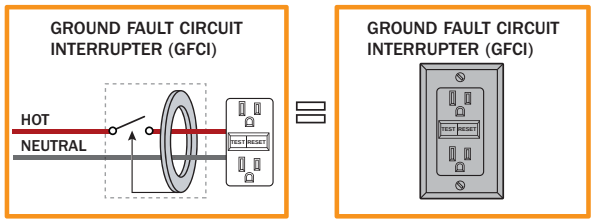
NEW PRODUCT

* 230 Volt (typical of Europe)

AC Branch and Main Circuit Ground Fault Protection

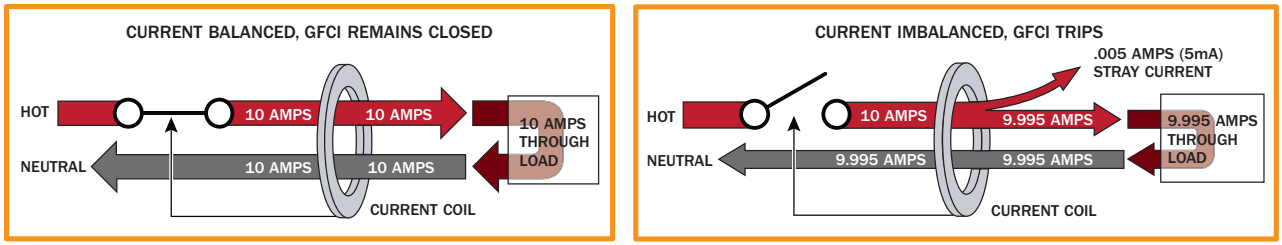
Reduce the risk of fire and shock hazards caused by defects in boat appliances and circuit wiring

1. Ground Fault Circuit Interrupter (GFCI) Explained – Boaters and home owners may be familiar with Ground Fault Circuit Interrupters (GFCI) mounted in AC outlet receptacles. A GFCI is a Residual Current Device (RCD) that trips at very low current levels. GFCIs are recommended for circuits supplying AC electrical receptacles in heads, galleys, machinery space, and weather decks.*



**ABYC Guideline: E11.15.3.5. If installed in a head, galley, machinery space, or on a weather deck, the receptacle shall be protected by a Type A (nominal 5 milliamperes) Ground Fault Circuit Interrupter (GFCI).*

RCDs immediately switch electricity off when electricity "leakage" to ground is detected. This leakage is detected as an imbalance in current between the Hot and Neutral AC wiring. The imbalance indicates a ground fault, current leaking from its proper circuit path to ground, and possibly through a human body in the process.



2. GFCI + Circuit Breaker = RCBO–The ground fault protection of a GFCI can be combined with the familiar overcurrent tripping characteristics of a normal circuit breaker in a single device. These devices are called RCBOs (Residual Current Breaker, Overload).
There are two main categories of RCBOs:

- RCBO-GFCIs that trip at 5mA are suitable for Branch circuit ground fault protection.
- RCBOs that trip at greater than 5mA, typically 30mA, are suitable for Main circuit ground fault protection.

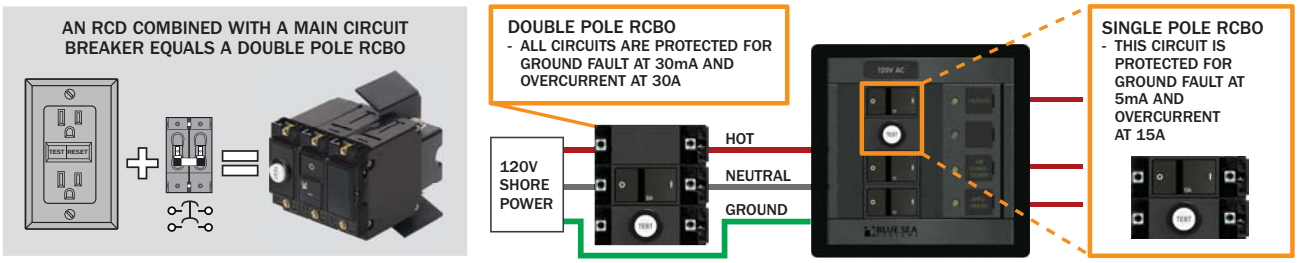
a. AC Branch Ground Fault Circuit Protection—5mA Single-Circuit Solution

RCBO's can be installed in a boat's power distribution panel to provide a single-circuit solution. These single pole devices combine the 5mA ground fault protection function of a GFCI with the over-current tripping characteristics of a typical circuit breaker. Panel mounted GFCIs are much easier to locate than tracking down the multiple locations where GFCIs mounted in receptacles can exist on a boat.

b. AC Main Ground Fault Circuit Protection—30mA Whole-System Solution

Ground fault protection also can be applied to a boat's entire AC electrical system. Main Circuit RCBOs typically have a 30mA trip level** compared to the 5mA trip level of Branch GFCIs. Main circuit RCBOs trip at 30mA instead of 5mA to reduce nuisance trips.

RCBOs are required in many marine applications in Europe, Australia, and New Zealand. While not required in the US, and while not providing 100% protection against fault hazard, RCBOs offer a considerable improvement in protection.



RCBOs are useful in reducing hazards occurring from ground faults in boat wiring and permanently installed appliances. These faults can be a hazard to swimmers in the water around the boat, a shock hazard to boat occupants, and a fire hazard. Recent investigations indicate that some drowning accidents in marinas may in fact be caused by electrical leakage from a boat into the water. RCBOs should be installed at the AC Main input or as far upstream in the wiring distribution system as possible.

**Devices with trip levels greater than 5mA sometimes are referred to as Ground Fault Equipment Protectors (GFEP or GFP) to indicate that they trip at a higher level than the most stringent level for personal protection.

Residual Current Circuit Breaker (RCBO)

Designed to provide both Ground Fault Circuit Interrupt (GFCI) and circuit protection in a panel mounted breaker

Common Features

- Trips on short circuit, overload, or leakage to ground
- "Trip Free"—cannot be held closed after trip
- Front panel mount—installed in a power distribution panel

3100/3110:
Branch circuit protection—5mA ground fault trip current
3101/3111/3102/3112:
Main circuit protection—30mA ground fault trip current

Specifications

Interrupt Rating	5,000A AC
Maximum Voltage	240 Volts AC
Circuit Breaker Type	Magnetic Hydraulic
Operating Temperature Range	-35°C to +66°C
Terminal Screw	#10-32 x 5/16 SS SEM external tooth lock washer - Recommended torque 14–15 in-lb
Trip Time Delay	See www.bluesea.com
Rated Switch Cycles	10,000@rated amperage and voltage
Mounting Screw	#6-32 - Recommended torque 6–8 in-lb

Certifications and Agency Standards

- UL 489, UL 943 Class A, and CSA certified


3100

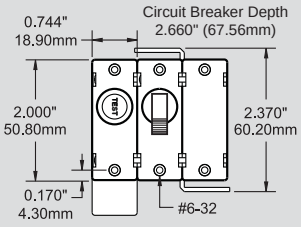

3110


3102

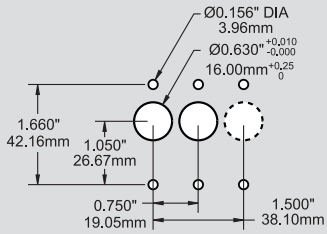

3112

PN	PN	Poles	Amperage	Leakage Trip Amperage	Weight Lb (Kg)
3100	3110	1	15A	5mA	0.38 (0.17)
3101	3111	2	16A	30mA	0.45 (0.20)
3102	3112	2	30A	30mA	0.45 (0.20)

Available Fall, 2007



Toggle Circuit Breaker Dimensions



Toggle Circuit Breaker Panel Cutout

▶ See page 71 for Rocker Circuit Breaker Panel Cutout

Residual Current Circuit Breaker (RCBO) Panels Available Fall, 2007

Designed to provide an easy method of mounting an RCBO breaker as a separate sub panel

1500:
120 Volt single pole branch circuit protection, 5mA ground fault trip current (two pole frame)

1501/1502:
120 or 230 Volt double pole Main circuit protection, 30mA ground fault trip current (three pole frame)

RCBO 15A Single Pole


1500

RCBO 16A Double Pole


1501*

RCBO 30A Double Pole


1502

PN	Description	Voltage	Width in" (mm)	Height in" (mm)	Installed Single Pole RCBO	Installed Double Pole RCBO	
					15A	16A	30A
1500	RCBO 15A Single Pole	120V AC	4.875 (123.83)	4.750 (120.65)	1	-	-
1501*	RCBO 16A Double Pole	230V AC	4.875 (123.83)	4.750 (120.65)	-	1	-
1502	RCBO 30A Double Pole	120V AC	4.875 (123.83)	4.750 (120.65)	-	-	1

NEW PRODUCT

* 230 Volt (typical of Europe)

Specifications subject to change. See www.bluesea.com for current information.

Combination AC/DC Circuit Breaker Panels with Hydraulic/Magnetic Circuit Breakers

Designed to conveniently combine all AC and DC switching and circuit protection into single power distribution panel

- Label backlighting
- "ON" indicating LEDs in all circuit positions
- AC insulation cover included (page 26)
- Includes 4205 and 4206—Square Format Label Set (pages 100–101)

1204/1205/1218/1219/1212/1213: 100 Ampere C-Series rocker circuit breaker provides Main circuit protection and switching for Branch circuits

DC Main + 15 Positions
AC Main + 6 Positions FR + Meters H

1204/1205*

DC 16 Position
AC Main + 6 Positions BT + Meters H

1104/1105*

DC Main + 19 Positions
AC Main + 6 Positions FR + Meters H

1218/1219*

DC 20 Position
AC Main + 6 Positions BT + Meters H

1118/1119*

DC Main + 15 Positions
AC 3 Sources + 8 Positions FR + Meters H

1212/1213*

DC 16 Position
AC 3 Sources + 8 Positions BT + Meters H

1112/1113*

120 Volt AC/12 Volt DC Circuit Breaker Panels

PN	PN	Description	Meter Type	Meter PN	Width in" (mm)	Height in" (mm)	Installed AC Circuit Breakers			Installed DC Circuit Breakers	
							Main 30A	Main 50A	Branch 15A	Main 100A	Branch 15A
1204	-	DC Main + 15 Positions AC Main + 6 Positions + Meters H[1]	DC Amp/Volt AC Volt	8017, 8003 9353	13.625 (346.08)	10.750 (273.05)	1	-	6	1	15
-	1104	DC 16 Position AC Main + 6 Positions + Meters H[1]	DC Amp/Volt AC Volt	8017, 8003 9353	13.625 (346.08)	10.750 (273.05)	1	-	6	-	16
1218	-	DC Main + 19 Positions AC Main + 6 Positions + Meters H[1]	DC Multimeter AC Multimeter	8248 8247	13.625 (346.08)	10.750 (273.05)	1	-	6	1	19
-	1118	DC 20 Position AC Main + 6 Positions + Meters H[1]	DC Multimeter AC Multimeter	8248 8247	13.625 (346.08)	10.750 (273.05)	1	-	6	-	20
1212	-	DC Main + 15 Positions AC 3 Sources + 8 Positions + Meters H[1]	DC Amp/Volt AC Amp/Volt	8017, 8003 9630, 9353	18.000 (457.20)	10.750 (273.05)	2	2	8	1	15
-	1112	DC 16 Position AC 3 Sources + 8 Positions + Meters H[1]	DC Amp/Volt AC Amp/Volt	8017, 8003 9630, 9353	18.000 (457.20)	10.750 (273.05)	2	2	8	-	16

230 Volt AC/12 Volt DC Circuit Breaker Panels*

PN	PN	Description	Meter Type	Meter PN	Width in" (mm)	Height in" (mm)	Installed AC Circuit Breakers			Installed DC Circuit Breakers	
							Main 16A	Main 32A	Branch 8A	Main 100A	Branch 15A
1205	-	DC Main + 15 Positions AC Main + 6 Positions + Meters H[1]	DC Amp/Volt AC Volt	8017, 8003 9354	13.625 (346.08)	10.750 (273.05)	1	-	6	1	15
-	1105	DC 16 Position AC Main + 6 Positions + Meters H[1]	DC Amp/Volt AC Volt	8017, 8003 9354	13.625 (346.08)	10.750 (273.05)	1	-	6	-	16
1219	-	DC Main + 19 Positions AC Main + 6 Positions + Meters H[1]	DC Multimeter AC Multimeter	8248 8247	13.625 (346.08)	10.750 (273.05)	1	-	6	1	19
-	1119	DC 20 Position AC Main + 6 Positions + Meters H[1]	DC Multimeter AC Multimeter	8248 8247	13.625 (346.08)	10.750 (273.05)	1	-	6	-	20
1213	-	DC Main + 15 Positions AC 3 Sources + 8 Positions + Meters H[1]	DC Amp/Volt AC Amp/Volt	8017, 8003 9630, 9354	18.000 (457.20)	10.750 (273.05)	2	2	8	1	15
-	1113	DC 16 Position AC 3 Sources + 8 Positions + Meters H[1]	DC Amp/Volt AC Amp/Volt	8017, 8003 9630, 9354	18.000 (457.20)	10.750 (273.05)	2	2	8	-	16

NEW PRODUCT * 230 Volt (typical of Europe) [1] Horizontal

DC Analog Voltmeter Panel

- Includes full-size 2-3/4" 8003 DC Analog Voltmeter (page 110)
- Displays voltage from 8–16 Volts DC
- 3 position switch for multiple battery banks

Specifications
Voltage 16 Volts DC Maximum

PN	Description	Width in" (mm)	Height in" (mm)
1473	DC 8-16V Meter	4.875 (123.83)	4.750 (120.65)


1473

DC Digital Voltmeter Panel

- Includes full-size 2-3/4" 8235 DC Digital Voltmeter (page 106)
- 4 digit LED display—Displays voltage from 7–60 Volts DC
- 3 position switch for multiple battery banks

Specifications
Voltage 60 Volts DC Maximum

PN	Description	Width in" (mm)	Height in" (mm)
1474	DC 7-60V Digital Meter 3 Bank	4.875 (123.83)	4.750 (120.65)


1474

Meter Mounting Panels

Designed to provide an easy method of mounting digital, analog, and analog DIN meters

1475/1476:
Surface mounts full-size 2-3/4" Analog or Digital Meters (page 106–107, 110–111)

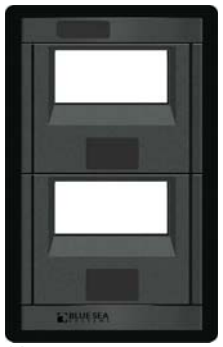
1516/1517:
Surface mounts Analog DIN Meters (page 108–109)

PN	Description	Width in" (mm)	Height in" (mm)
1475	Mounting Panel Single Meter	4.875 (123.83)	4.750 (120.65)
1476	Mounting Panel Dual Meter	4.875 (123.83)	7.750 (196.85)
1516	Mounting Panel Single Meter DIN	4.875 (123.83)	4.750 (120.65)
1517	Mounting Panel Dual Meter DIN	4.875 (123.83)	7.750 (196.85)

NEW PRODUCT


1475


1516


1476


1517

See full selection of Analog and Digital Meters on page 106–107 and 110–111

- Analog and Digital Meter can be mounted in stand alone panels above (1575/1576)
- Analog and Digital Meter module available for use in custom panels*

See full selection of Analog DIN Meters on page 108–109

- Analog DIN Meter can be mounted in stand alone panels above (1516/1517)
- Analog DIN Meter module available for use in custom panels*

* Custom panels are available for boat manufacturers and through a select group of distributors

2" Round Gauges* Faria

Euro-style design with black bezel and black face. Fog-resistant, anti-scratch glass lenses. All gauges are edge-lit.**

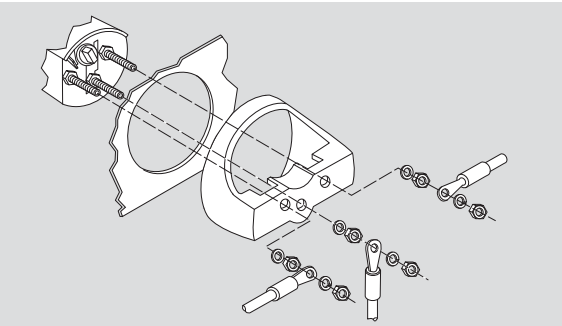
- Gauge diameter: 2"
- Bezel: Aluminum, water-tight face
- Will fit panels up to 0.8" thickness

Specifications

Mounting hole diameter	2 1/16" (53.00mm)
Edge-light voltage	11.5–16V DC
Operating temperature	-4°F to +158°F (-20°C to +70°C)
Back clamp nuts torque	5-7 in-lb
Maximum current draw—with edgelight	180mA
—without edgelight	<100mA

Certifications

- CE marked



General Exploded View

Fuel Level E-1/2-F

1020B

Portable Water Level E-1/2-F

1021B

Engine Temp 100–250°F

1022B

Oil Pressure 0–80 PSI/Bar

1023B

Water Pressure 0–30 PSI/kPa

1024B

Voltmeter 10–16 Volts

1025B

Hour Meter—10,000 hrs

1026B

- Hours + 1/10 hour increments
- Unlit
- Runs as long as the ignition switch remains in the "on" position

DC Ammeter 60-0-60 Amperes

1028B

- 12 Volts DC
- Used to indicate the charging rate of the generating system and to check on the current of the boat's lights, accessory and ignition equipment
- Internal shunt

Clock—Quartz Analog

1029B

- 12 hour analog display
- Quartz
- 12 Volts DC

Tank Level

1030B

Battery Condition Indicator

1027B

- Displays the relative state of charge of a 12 Volt battery

Relative Battery Condition	Battery Terminal Voltage
"Dead"	Below 11.600 Volts
E	11.600
1/4	11.875
1/2	12.150
3/4	12.425
F	12.700
"Charge"	Above 12.700 Volts

PN	Description	Operating Voltage	For Use With	Diameter in" (mm)	Depth in" (mm)	Weight Lb (Kg)
1020B	Fuel Level E-1/2-F	-	Gauge Sender 1040B—8–16" or 1041B—14–24"	2.030 (51.50)	1.75 (44.45)	0.33 (0.15)
1021B	Potable Water Level E-1/2-F	-	Gauge Sender 1040B—8–16" or 1041B—14–24"	2.030 (51.50)	1.75 (44.45)	0.33 (0.15)
1022B	Engine Temp 100–250°F	8–32V DC	Gauge Sender 1042B	2.030 (51.50)	1.75 (44.45)	0.33 (0.15)
1023B	Oil Pressure 0–80 PSI/Bar	-	Gauge Sender 1043B	2.030 (51.50)	1.75 (44.45)	0.33 (0.15)
1024B	Water Pressure 0-30 PSI/kPa	8–32V DC	-	2.030 (51.50)	2.10 (53.54)	0.69 (0.31)
1025B	Voltmeter 10–16 Volts	-	-	2.030 (51.50)	1.75 (44.45)	0.33 (0.15)
1026B	Hour Meter—10,000 hrs	8–32V DC	-	2.030 (51.50)	2.40 (60.96)	0.37 (0.17)
1027B	Battery Condition Indicator	-	-	2.030 (51.50)	3.00 (76.20)	0.37 (0.17)
1028B	DC Ammeter 60-0-60 Amperes	-	-	2.030 (51.50)	1.75 (44.45)	0.33 (0.15)
1029B	Clock—Quartz Analog	-	-	2.030 (51.50)	2.70 (68.58)	0.37 (0.17)
1030B	Tank Level	-	Gauge Sender 1040B—8–16" or 1041B—14–24"	2.030 (51.50)	1.75 (44.45)	0.33 (0.15)

Gauge Panels

Designed to provide an easy method for mounting gauges that provide critical functions

- Heavy 1/8" aluminum 5052 alloy
- UV stabilized thermoplastic bezel
- Tankage gauges includes switch to monitor two tanks

Gauge Blank

1510

Gauge Water, 2 Tanks

1511

Gauge Fuel, 2 Tanks

1512

Gauge Generic, 2 Tanks

1513

Gauge Voltage

1514

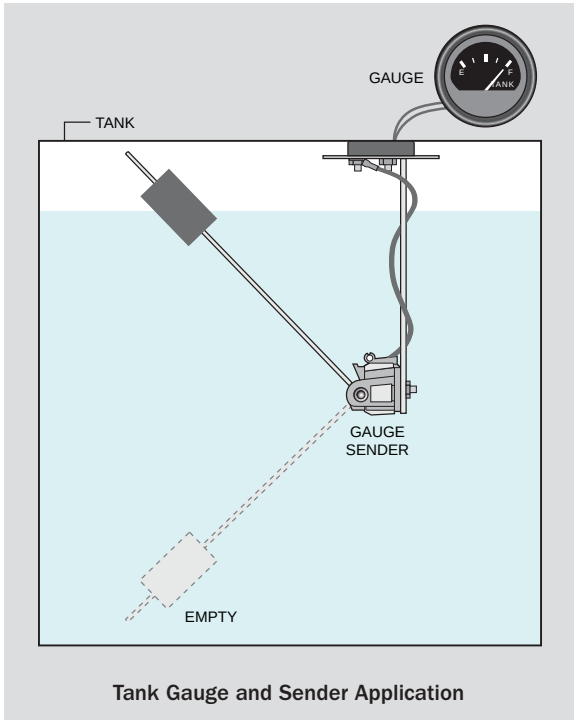
PN	Gauge PN	Description	Width in" (mm)	Height in" (mm)
1510	-	Gauge Blank	4.875 (123.83)	4.750 (120.65)
1511	1021B	Gauge Water, 2 Tanks	4.875 (123.83)	4.750 (120.65)
1512	1020B	Gauge Fuel, 2 Tanks	4.875 (123.83)	4.750 (120.65)
1513	1030B	Gauge Generic, 2 Tanks	4.875 (123.83)	4.750 (120.65)
1514	1025B	Gauge Voltage	4.875 (123.83)	4.750 (120.65)

Gauge Senders

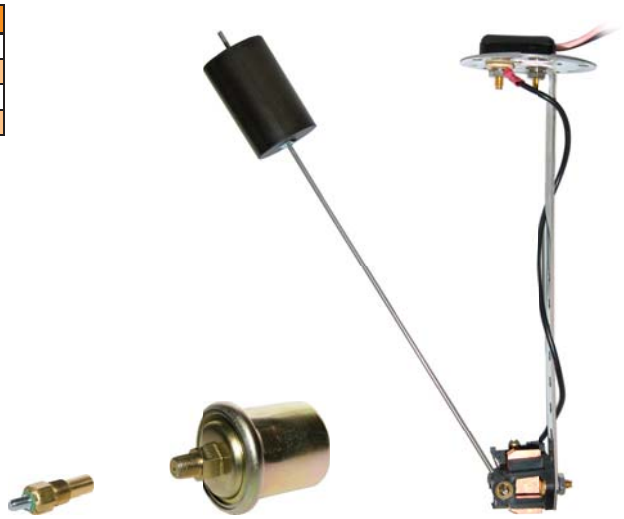
For use with Faria tank depth, engine temperature, and oil pressure gauges

Sender PN	Description	For Use With
1040B	Level 8–16" tank depth	1020B, 1021B, and 1030B
1041B	Level 14–24" tank depth	1020B, 1021B, and 1030B
1042B	Engine Temperature 1/8"	1022B
1043B	Oil Pressure 1/8" 80 PSI	1023B

NEW PRODUCT



Tank Gauge and Sender Application



1042B

1043B

1040B/1041B

12 to 24 Volt Conversion Kit

Designed to convert backlighting from standard 12 Volt panels to 24 Volt systems

- Convert a 12 Volt DC 360 Panel with rocker or toggle circuit breakers to a 24 Volt panel
- Requires one kit per 12 Volt DC circuit breaker module
- Includes wire harness and panel identification label

PN	Description	Weight Lb (Kg)
4113	Conversion Kit 12-24 Volt DC	0.05 (0.02)

4113

AC Panel Insulating Covers

Designed to provide electrical insulation for exposed panel backs

- Isolation of 360 panel AC components and circuits from DC system elements
- Meets ABYC safety requirements for panels with combined AC and DC loads
- Provides mechanical protection for panel backs protruding into lockers
- Modular design consists of three different interlocking components—SIDE, TOP, and END
- Interlocking companion pieces SIDE, TOP, and END can be stacked to accommodate large AC components
- Cover breakouts allow wire access in any direction

Specifications

Material UL94 V0 (Flame Retardant) Polycarbonate
Hardware 2 qty. 6-32 x .750 Phillips-drive machine screws
5 qty. 8-32 x .500 Phillips-drive machine screws with lock washers

1341 installed on an AC/DC Panel

PN	Description
1331	AC Insulating Cover 1 module
1341	AC Insulating Cover 2 module
1342	AC Insulating Cover 3 module
1343	AC Insulating Cover 4 module

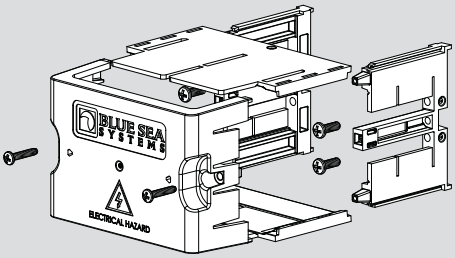
NEW PRODUCT

1331

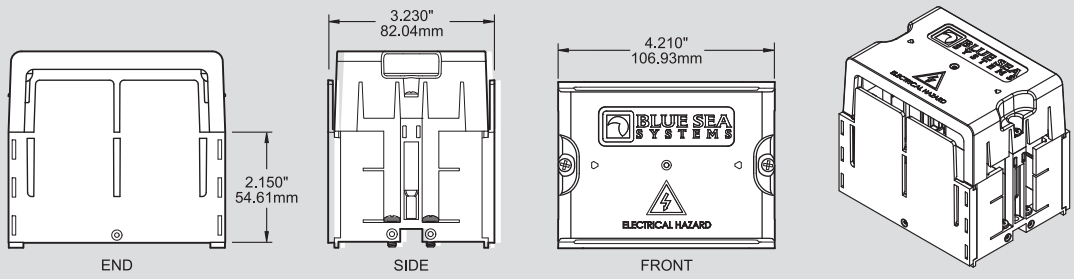
1341

1342

1343



Exploded View



Rocker Switches

Provide switching options for applications requiring different pole and throw configurations

- For use in 360 panels in the following modules: Gauge, DC Push Button + Switch, and DC Battery Management

Specifications	Single Pole	Double Pole
Terminal Type	Quick Connect Tab	6.00" (152.00mm) Wire Leads
Terminal Size	0.187" (4.80mm)	-

7480

PN	Pole/Throw	Action	Rating			
			14 Volts DC	28 Volts DC	125 Volts AC	250 Volts AC
7480	SPST	ON–OFF	10 Amperes	10 Amperes	10 Amperes	10 Amperes
7481	SPST	(ON)–OFF	10 Amperes	10 Amperes	12 Amperes	6 Amperes
7482	SPDT	ON–OFF–ON	8 Amperes	8 Amperes	8 Amperes	8 Amperes
7483	SPDT	ON–OFF–(ON)	8 Amperes	8 Amperes	8 Amperes	8 Amperes
7484	SPDT	(ON)–OFF–(ON)	8 Amperes	8 Amperes	8 Amperes	8 Amperes
7490	DPST	ON–OFF	8 Amperes	8 Amperes	8 Amperes	4 Amperes
7491	DPST	ON–ON	8 Amperes	8 Amperes	8 Amperes	4 Amperes
7493	DPDT	ON–(ON)	8 Amperes	8 Amperes	8 Amperes	4 Amperes
7492	DPDT	ON–OFF–ON	8 Amperes	8 Amperes	8 Amperes	4 Amperes
7494	DPDT	ON–OFF–(ON)	8 Amperes	8 Amperes	8 Amperes	4 Amperes
7495	DPDT	(ON)–OFF–(ON)	8 Amperes	8 Amperes	8 Amperes	4 Amperes

( ) = Momentary

360 Panel Plugs

4116:
Black plug fits standard rocker breaker aperture
4117:
Black plug fits standard rocker switch aperture

PN	Description	Weight Lb (Kg)
4116	Rocker Circuit Breaker Plug	0.03 (0.01)
4117	Rocker Switch Plug	0.03 (0.01)

4116 4117

Push Button Reset-Only Thermal Circuit Breaker Adapter

- Adapts Push Button Reset-Only Thermal Circuit Breaker (page 46) to Blue Sea Systems' 360 panels and battery management panels

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

4111

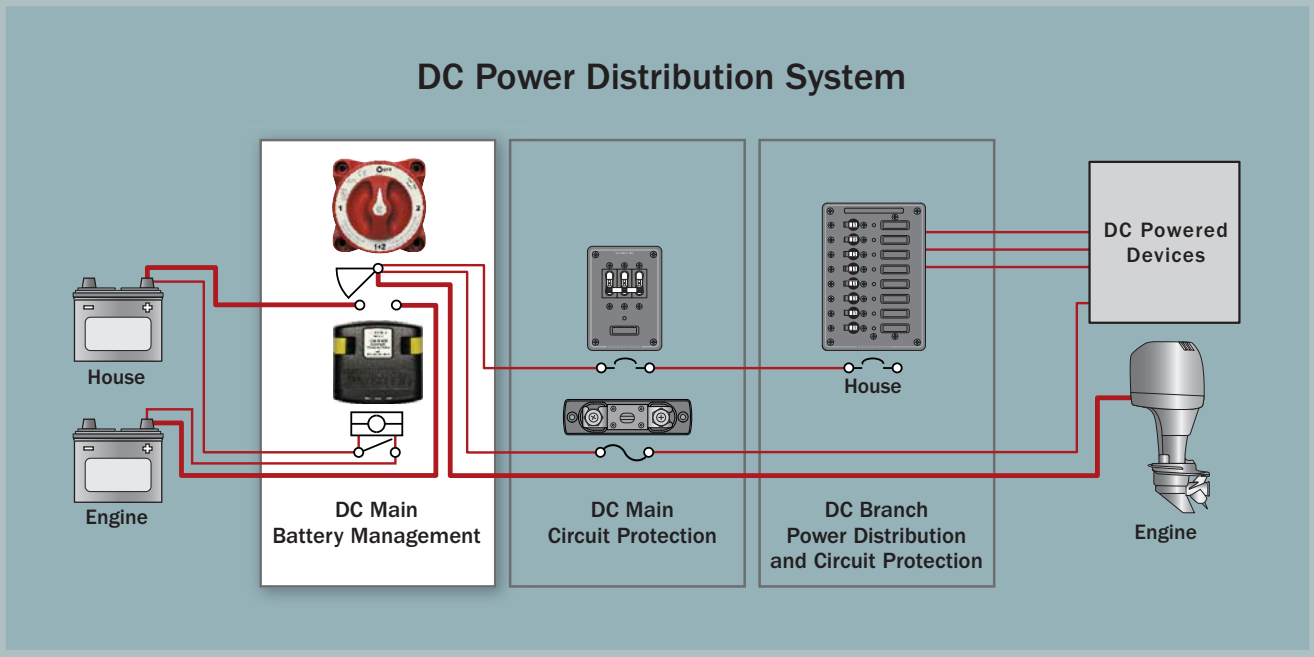
Rocker Toggle Adapter

- Adapts toggle A-Series Circuit Breakers or Panel Switches (page 96) to Blue Sea Systems' rocker panels, battery management, and 360 panels

PN	Description	Weight Lb (Kg)
4112	Rocker Toggle Adapter	0.03 (0.01)

NEW PRODUCT

4112



DC Main Battery Management

Definition

The DC Main battery management system controls the energy stored in the battery banks to ensure sufficient power for the ship's loads (including starting). It consists of battery switches that direct the power from the battery banks to the DC Main circuit protection. It also includes charge management devices that distribute charging source energy to the battery banks.

Purpose

Battery switches isolate the potentially destructive energy in the battery banks when the boat is not in use or in emergencies. When there are multiple battery banks, they determine which battery banks are connected. Blue Sea Systems provides mechanical battery switches, and electronic solenoid switches that function remotely. Multiple battery switches can be combined in panels to provide easy installation.

Charge management devices such as automatic charging relays (ACR) provide an automated means of combining two battery banks when charging, while keeping the battery banks isolated from each other when the charging source is not present.

Products in this Section

Battery Switches: Blue Sea Systems' three product lines of battery switches provide continuous current ratings from 300 to 600 Amperes. They are available in: ON/OFF, Selector, Dual Circuit™, and Dual Circuit Plus™ models. All battery switches are ignition protected, UL Marine Listed, CE marked, and meet ABYC requirements. All have tin-plated copper terminal studs for maximum conductivity and corrosion resistance. They are designed for convenient installation and ease of use.

Solenoid Switches: Solenoids can function as remote battery switches. They are available with a continuous current rating of 450 Amperes and are designed for 12, 24, or 12/24 Volt systems. All solenoid switches are ignition protected, CE marked, and meet ABYC requirements.

DC Battery Management Panels (switch panels and main distribution panels): Switch panels are available for dual-battery single-engine systems, and triple-battery twin-engine systems. Main distribution panels provide DC Main circuit protection and 24-hour circuit protection. DC battery management panels simplify battery switch operation and isolate start circuits from house circuits.

Automatic Charging Relays (ACR): ACRs automatically allow a second battery to be charged from a single charging source. They do this by combining battery banks during charging, and isolate them under discharge. Models are available in continuous current ratings of 60, 120, and 450 Amperes, are ignition protected, and meet ABYC requirements.

For more information about DC main battery management, refer to pages 126–128 in this catalog.

DC Current Ratings — 0 Amperes — **DC Current Ratings** (Amperes) — 600 Amperes

Battery Switches Pages 30–35

m-Series, Continuous Rating: 300 Amperes

Pages 30–31 — 300

e-Series, Continuous Rating: 350 Amperes

Pages 32–33 — 350

HD-Series, Continuous Rating: 600 Amperes for Single Circuit ON/OFF
Continuous Rating: 500 Amperes for Selector

Pages 34–35 — 600

Solenoid Switches Pages 38–39

L-Series with Coil Economizer, Continuous Rating: 450 Amperes

Page 38 — 450

ML-Series, Continuous Rating: 300 Amperes

Page 39 — 300

Automatic Charging Relays Pages 40–43

CL-Series BatteryLink™, Continuous Rating: 60 Amperes

Page 40 — 60

SI-Series, Continuous Rating: 120 Amperes

Page 41 — 120

ML-Series, Continuous Rating: 300 Amperes

Page 42 — 300

L-Series with Coil Economizer, Continuous Rating: 450 Amperes

Page 43 — 450

Battery Management Panels Pages 36–37

Parallel Circuit m-Series Battery Switch Panels
Dual Battery, Single Engine—Multiple Switches

Page 36

Battery Main Distribution Panels
Dual Battery, Single Engine—Single Switch

Page 37

Battery Main Distribution Panels
Triple Battery, Twin Engine
—Two Switches

Page 37

360 PANEL SYSTEM

See pages 10–11 for a full selection of related products located in the new 360 Panel System section of this catalog.

m-Series Battery Switches (mini) IP

300 Amperes Continuous Rating for outboards and small inboard gasoline engines

- Appropriate for marine or RV applications
- Removable knob or key remains positively retained
- Available in black or red
- Label with international legends
- Isolating cover with snap-in side sections to protect rear contacts
- Ignition protected—safe for installation aboard gasoline powered boats
- Accepts up to 4/0 AWG (95mm²) battery cables
- 7/8" (22.22mm) stud length to accept multiple cable terminals
- 3/8"-16 tin-plated copper studs for maximum conductivity and corrosion resistance, accepts 3/8" (M10) ring terminals
- Make-before-break contact design on 6007 and 6007200 models allow switching between battery banks without power interruption
- Meets American Boat and Yacht Council (ABYC) requirements for battery switches

Specifications	6005-6007 6005200-6007200	6010-6011 6010200-6011200
Inrush Rating: .25 sec (10 repeats)[1]	1,500 Amperes DC	1,200 Amperes DC*
Cranking Rating: 9.75 sec (10 repeats)[1]	700 Amperes DC	600 Amperes DC*
Intermittent Rating: 5 min (UL 1107)	500 Amperes DC	450 Amperes DC*
Continuous Rating: (UL 1107)	300 Amperes DC	300 Amperes DC*
Maximum Voltage Rating	48 Volts DC	32 Volts DC
Terminal Stud Size	3/8"-16 (M10)	3/8"-16 (M10)
Terminal Stud Torque	140 in-lb (15.82 N·m)	140 in-lb (15.82 N·m)
Cable Size to Meet Ratings**	4/0 AWG (95mm²)	4/0 AWG (95mm²)
Cable Clearance For 4/0 Cables	1.12" (28.4mm)	1.12" (28.4mm)
Case Material	Reinforced Polycarbonate	Reinforced Polycarbonate

Certifications and Agency Standards

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

[1] Blue Sea Systems Engine Starting Standard (page 126)
* Per Circuit
** Reducing cable size will reduce current rating

Available in red or black

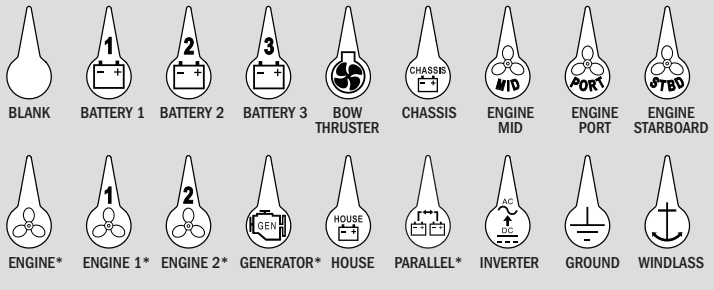
Red Switch PN	Black Switch PN	Battery Switch Description	Weight Lb (Kg)
6005	6005200	SINGLE CIRCUIT ON/OFF with Key	0.62 (0.28)
6006	6006200	SINGLE CIRCUIT ON/OFF with Knob	0.65 (0.29)
6007	6007200	SELECTOR	0.77 (0.35)
6010	6010200	DUAL CIRCUIT™	0.80 (0.36)
6011	6011200	DUAL CIRCUIT PLUS™	0.80 (0.36)
7901	7901200	Spare Knob	0.10 (0.05)
7900	7900200	Spare Key	0.10 (0.05)
7902		ICON Circuit Identification Label Kit	0.02 (0.01)
9159		m-Series Paralleling Link Bus	0.14 (0.06)

Case design allows three mounting options

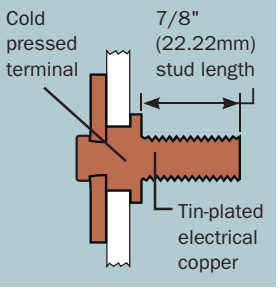
Rear Panel | Front Panel | Surface

NEW PRODUCT IP IGNITION PROTECTED

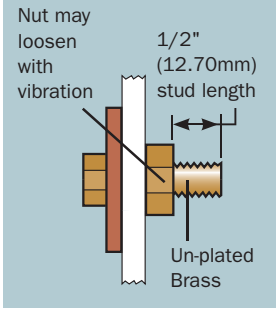
7902 ICON Circuit Identification Label Kit (Sold Separately)



Blue Sea Systems Superior One Piece Stud Design



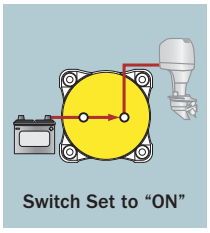
Common Two Piece Stud



* Included with m-Series Battery Switch

Single Circuit ON/OFF
6006/6006200

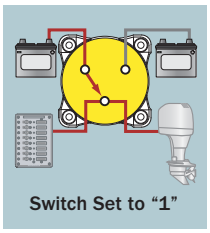
Single Circuit ON/OFF
6005/6005200

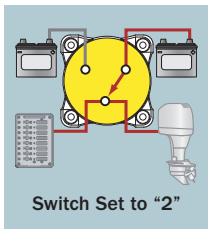


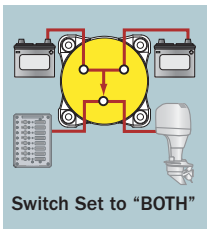
APPLICATIONS

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



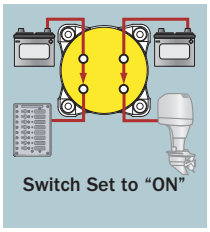


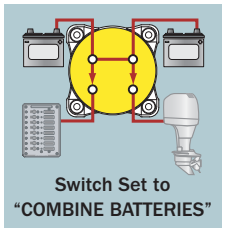


Selector 6007/6007200

APPLICATION

1. Switches battery bank 1 or battery bank 2 or battery banks 1 and 2 to all loads using one switch.

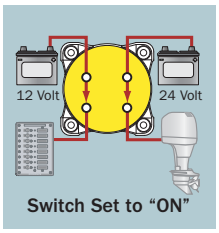


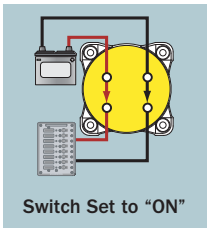


Dual Circuit Plus™ 6011/6011200

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 COMBINE BATTERIES function offers the ability to combine two battery banks in the event of a low battery.

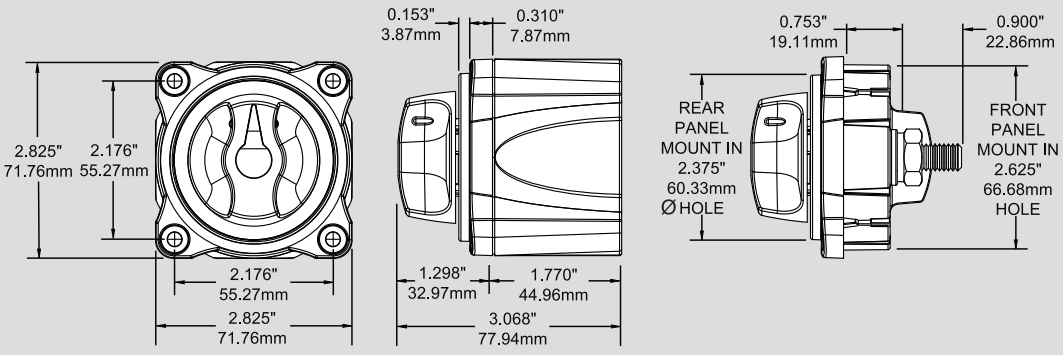




Dual Circuit™ 6010/6011200

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.

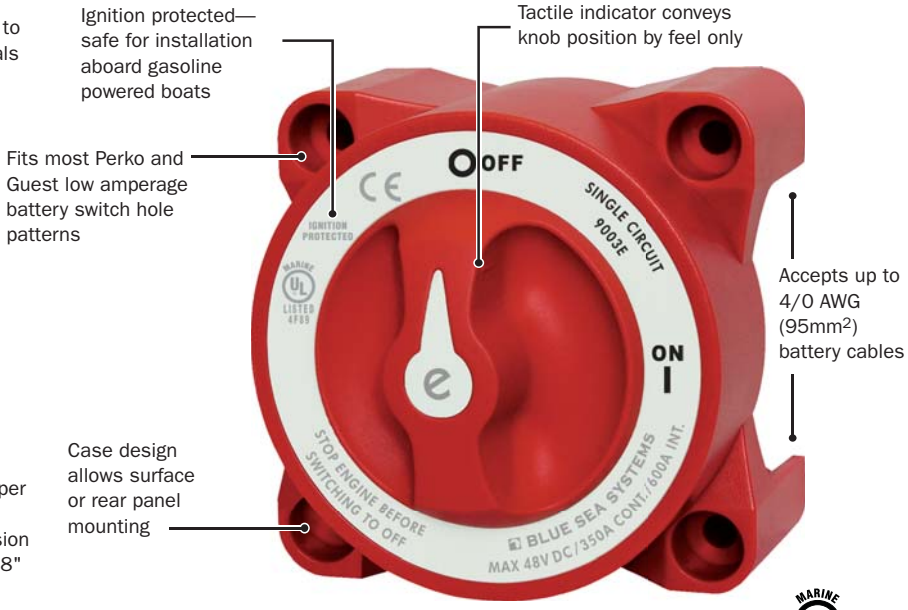


360 PANEL SYSTEM

See pages 10–11 for a full selection of related products located in the new 360 Panel System section of this catalog.

e-Series Battery Switches (IP)

350 Amperes Continuous Rating for small inboard gasoline or diesel engines



- Alternator Field Disconnect (AFD) feature on 9002e, 9004e, 9004e200, and 9004e200 models
- Meets American Boat and Yacht Council (ABYC) requirements for battery switches
- Make-before-break contact design on 9001e, 9002e, 9001e200, and 9002e200 models allows switching between battery banks without power interruption

Specifications	**9001e-9004e 9001e200-9004e200**	**5510e-5511e 5510e200-5511e200**
Inrush Rating: .25 sec (10 repeats)[1]	1,750 Amperes DC	1,500 Amperes DC*
Cranking Rating: 9.75 sec (10 repeats)[1]	900 Amperes DC	700 Amperes DC*
Intermittent Rating: 5 min (UL 1107)	600 Amperes DC	525 Amperes DC*
Continuous Rating: (UL 1107)	350 Amperes DC	350 Amperes DC*
Maximum Voltage Rating	48 Volts DC	32 Volts DC
Terminal Stud Size	3/8"-16 (M10)	3/8"-16 (M10)
Terminal Stud Torque	140 in-lb (15.82 N·m)	140 in-lb (15.82 N·m)
Cable Size to Meet Ratings**	4/0 AWG (95mm²)	4/0 AWG (95mm²)
Cable Clearance For 4/0 Cables	1.10" (27.9mm)	1.10" (27.9mm)
Case Material	Reinforced Polycarbonate	Reinforced Polycarbonate

Available in red or black

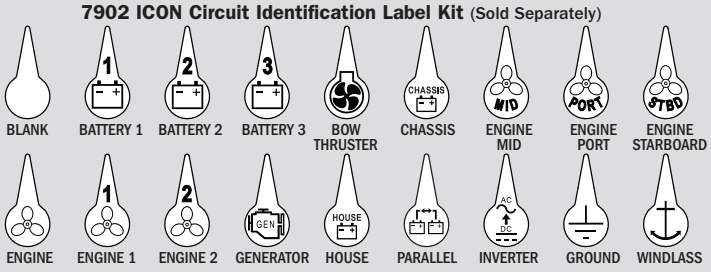
Certifications and Agency Standards

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

[1] Blue Sea Systems Engine Starting Standard (page 126)
* Per Circuit
** Reducing cable sizes will reduce current ratings

Red Switch PN	Black Switch PN	Battery Switch Description	Weight Lb (Kg)
9003e	9003e200	SINGLE CIRCUIT ON/OFF	0.95 (0.43)
9004e	9004e200	SINGLE CIRCUIT ON/OFF with AFD*	0.95 (0.43)
9001e	9001e200	SELECTOR	1.15 (0.52)
9002e	9002e200	SELECTOR with AFD*	1.15 (0.52)
5511e	5511e200	DUAL CIRCUIT PLUS™	1.16 (0.53)
5510e	5510e200	DUAL CIRCUIT™	1.16 (0.53)
7902		ICON Circuit Identification Label Kit	0.02 (0.01)

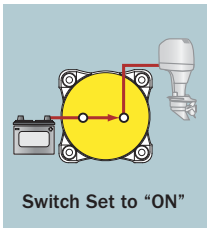
7902 ICON Circuit Identification Label Kit (Sold Separately)



NEW PRODUCT (IP) IGNITION PROTECTED

If the AFD is not used to protect the alternator, an LED can be connected to the AFD terminals to indicate when the battery switch is in any position but OFF: • ON for the Single Circuit ON/OFF • 1, 2, or 1+2 for the Selector

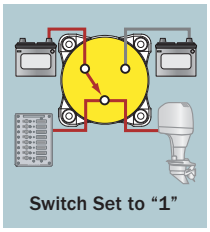
* Alternator Field Disconnect (AFD) protects the diodes in the alternator in the event of the switch being switched to the OFF position while the engine is running.

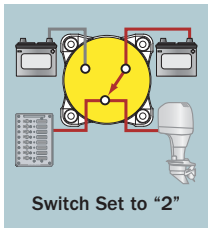


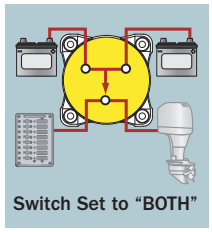
APPLICATIONS

1. Switches a single battery to a single load group.
2. Can be used in multiples to manage several isolated circuits including cross connecting for emergency paralleling.
   9004℮ - includes AFD*

Single Circuit ON/OFF
9003℮-9004℮/9003℮200-9004℮200



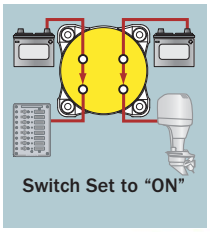


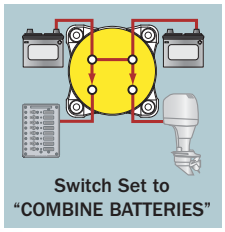


APPLICATION

1. Switches battery bank 1 or battery bank 2 or battery banks 1 and 2 to all loads using one switch.
   9002℮ - includes AFD*

Selector 9001℮-9002℮/9001℮200-9002℮200



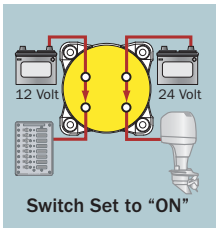


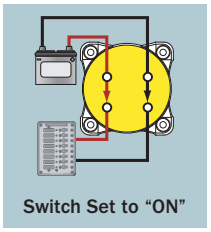
APPLICATIONS

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 COMBINE BATTERIES function offers the ability to combine two battery banks in the event of a low battery.

Dual Circuit Plus™ 5511℮/5511℮200

IBEX INNOVATION AWARD

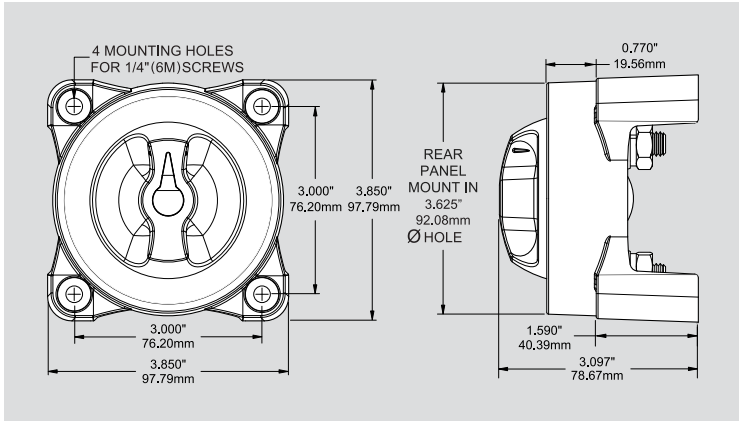




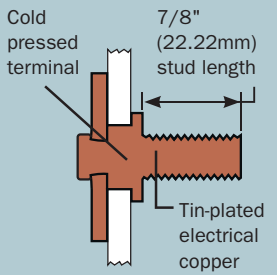
APPLICATIONS

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.

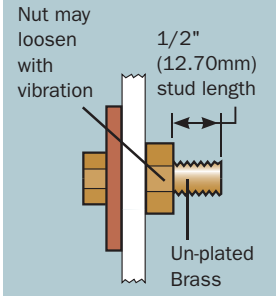
Dual Circuit™ 5510℮/5510℮200



Blue Sea Systems Superior One Piece Stud Design



Common Two Piece Stud



HD-Series Battery Switches (Heavy Duty) IP

Up to 600 Amperes Continuous Rating for large diesel engines

- AFD (Alternator Field Disconnect) switch on 3001 and 3003 models
- Meets American Boat and Yacht Council (ABYC) requirements for battery switches
- Make before break contact design on 3002 and 3003 models allows switching between battery banks without power interruption

Specifications	**3000-3001**	**3002-3003**
Inrush Rating: .25 sec (10 repeats)[1]	2,000 Amperes DC	1,750 Amperes DC
Cranking Rating: 9.75 sec (10 repeats)[1]	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
Maximum Voltage Rating	48 Volts DC	48 Volts DC
Terminal Stud Size	1/2" (M12)	1/2" (M12)
Terminal Stud Torque	220 in-lb (24.86 N·m)	220 in-lb (24.86 N·m)
Cable Size to Meet Ratings*	4/0 AWG (95mm²)	4/0 AWG (95mm²)
Cable Quantity to Meet Ratings*	Two Cables**	Two Cables/Terminal
Cable Clearance For 4/0 Cables	1.10" (27.9mm)	1.10" (27.9mm)
Case Material	Reinforced Polycarbonate	Reinforced Polycarbonate

Certifications and Agency Standards

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

[1] Blue Sea Systems Engine Starting Standard (page 126)

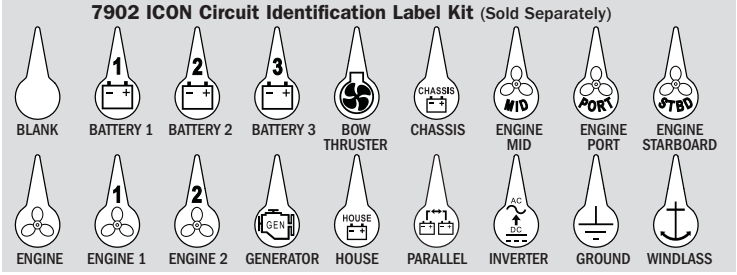
* Reducing cable sizes or quantities will reduce current ratings

** Two cables on battery terminal, one cable on each common terminal

PN	Battery Switch Description	Weight Lb (Kg)
3000	SINGLE CIRCUIT ON/OFF	1.30 (0.59)
3001	SINGLE CIRCUIT ON/OFF with AFD*	1.30 (0.59)
3002	SELECTOR	1.25 (0.57)
3003	SELECTOR with AFD*	1.25 (0.57)
7902	ICON Circuit Identification Label Kit	0.02 (0.01)

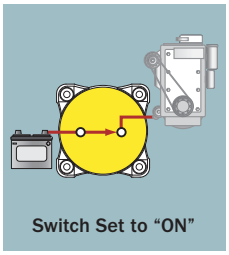
IP IGNITION PROTECTED

7902 ICON Circuit Identification Label Kit (Sold Separately)



If the AFD is not used to protect the alternator, an LED can be connected to the AFD terminals to indicate when the battery switch is in any position but OFF: • ON for the Single Circuit ON/OFF • 1, 2, or 1+2 for the Selector

* 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.

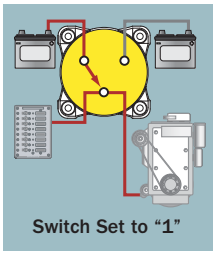


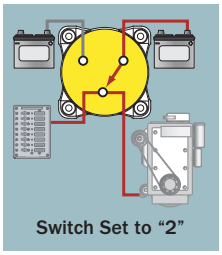
Single Circuit ON/OFF
3000-3001

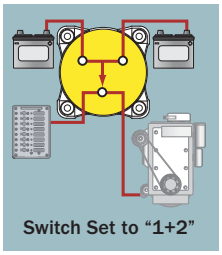
APPLICATIONS

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 - includes AFD*



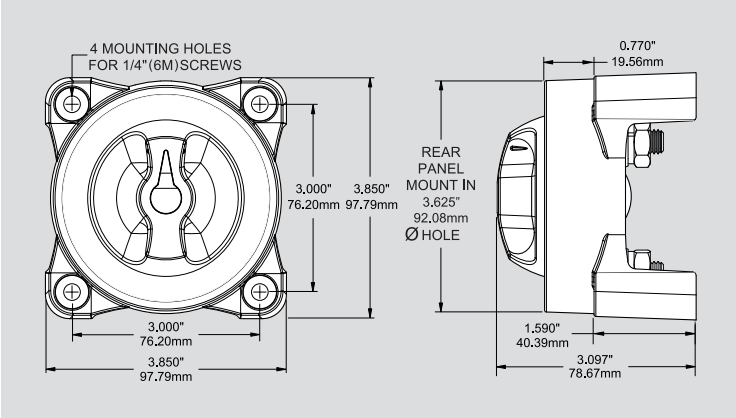




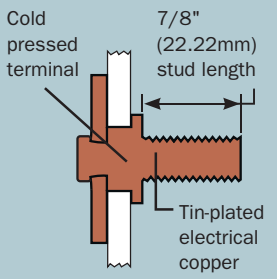
Selector 3002-3003

APPLICATION

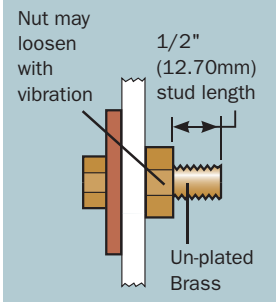
1. Switches battery bank 1 or battery bank 2 or battery banks 1 and 2 to all loads using one switch.
   3003 - includes AFD*



Blue Sea Systems Superior One Piece Stud Design



Common Two Piece Stud



Squalicum Harbor—Blue Sea Systems' home port

Parallel Circuit m-Series Battery Switch Panels IP

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.

Common Features

- Isolates Engine circuit from House circuit
- Protects electronics from sags and spikes caused by engine cranking
- Allows independent battery discharge
- Addition of an Automatic Charging Relay (ACR) automates charging both batteries (pages 40–43)
- Ignition protected—safe for installation aboard gasoline powered boats

8080 Features

- 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

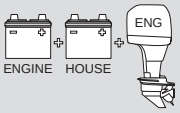
Specifications	**8280/ 8370**	**8080**
Inrush Rating: .25 sec (10 repeats)*	1,500 Amperes DC	1,500 Amperes DC
Cranking Rating: 9.75 sec (10 repeats)*	700 Amperes DC	700 Amperes DC
Intermittent Rating: 5 min (UL 1107)	500 Amperes DC	500 Amperes DC
Continuous Rating: (UL 1107)	300 Amperes DC	300 Amperes DC
Maximum Voltage Rating	48 Volts DC	48 Volts DC
House Circuit Protection	300 Amperes DC	100 Amperes DC
Terminal Stud Size	3/8"-16 (M10)	3/8"-16 (M10)
Terminal Stud Torque	140 in-lb (15.82 N·m)	140 in-lb (15.82 N·m)
Cable Size to Meet Ratings**	4/0 AWG (95mm²)	4/0 AWG (95mm²)
Cable Clearance For 4/0 Cables	1.12" (28.4mm)	1.12" (28.4mm)

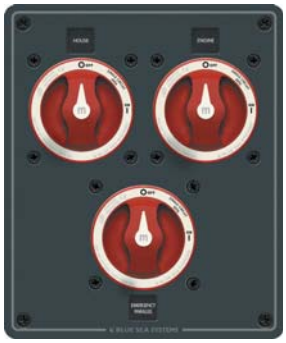
Certifications and Agency Standards

- Battery switches are CE marked
- Battery switches are UL Listed—UL 1107 electric power switches
- Meets UL 1500 and SAE J1171 external ignition protection requirements

* Blue Sea Systems Engine Starting Standard (page 126)
** Reducing cable sizes will reduce current ratings

Dual Battery, Single Engine





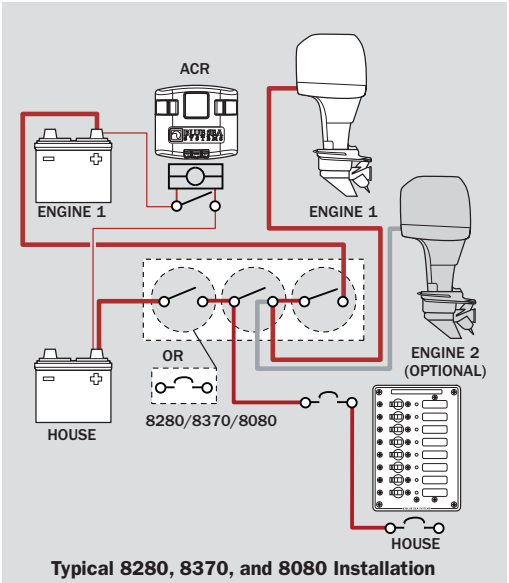
8280

8370

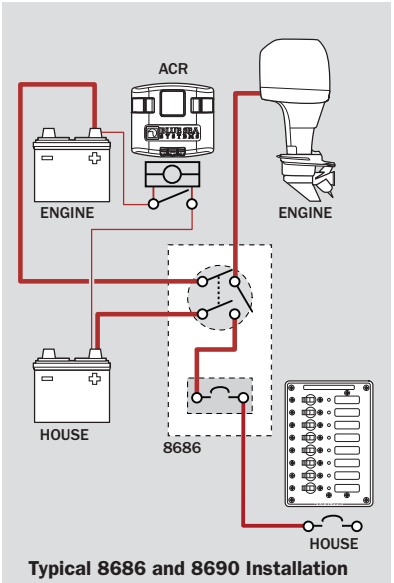
8080

Panel PN	Battery Switch PN	Switch Pages	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	C-Series Flat Rocker Circuit Breaker
						100A
8280	SINGLE CIRCUIT ON/OFF 3 of 6006, m-Series	30–31	6.25 (158.75)	7.50 (190.50)	3.20 (1.45)	-
8370	SINGLE CIRCUIT ON/OFF 3 of 6006, m-Series	30–31	9.50 (241.30)	4.38 (111.25)	3.10 (1.41)	-
8080	SINGLE CIRCUIT ON/OFF 2 of 6006, m-Series	30–31	5.25 (133.35)	6.50 (165.10)	2.20 (1.00)	1

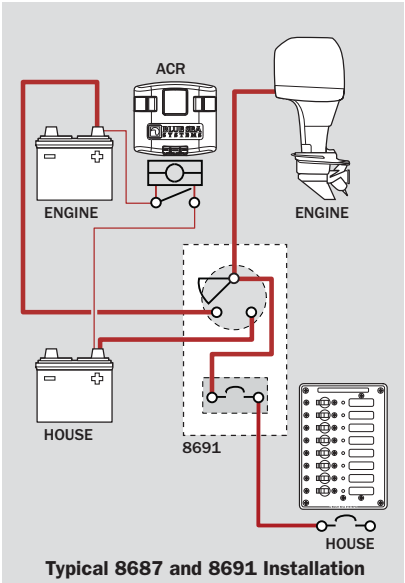
IP IGNITION PROTECTED



Typical 8280, 8370, and 8080 Installation



Typical 8686 and 8690 Installation



Typical 8687 and 8691 Installation

Battery Main Distribution Panels IP

Common Features

- Provides 24 hour circuit protection
- Provides main DC circuit protection in addition to high ampere load protection
- Isolates the Engine circuit from the House circuit reducing the chance of fully discharging both batteries (does not apply to 8687/8691)
- Protects electronics from sags and spikes caused by engine cranking (does not apply to 8687/8691)
- Addition of an Automatic Charging Relay (ACR) automates charging both batteries (pages 40–43)
- Includes 4218—Square Format Label Set (pages 100–101) and 4140—24 Hour Round Labels (page 100)

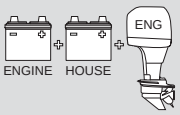
8686/8690 Features

- Dual battery, single engine main distribution panels
- Allows emergency cross connect between isolated battery banks
- Allows independent battery discharge

8689/8693 Features

- Triple battery, twin engine main distribution panels
- Allows emergency cross connect between isolated battery banks
- Allows independent battery discharge

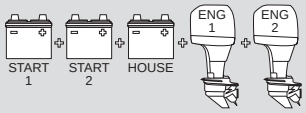
Dual Battery, Single Engine



8686

8691

Triple Battery, Twin Engines



8689

8693

Specifications	8686/8689	8687	8690/8693	8691
Inrush Rating: .25 sec. (10 repeats)*	1,200A DC[1]	1,500A DC	1,500A DC[1]	1,750A DC
Cranking Rating: 9.75 sec. (10 repeats)*	600A DC[1]	700A DC	700A DC[1]	900A DC
Intermittent Rating: 5 min. (UL 1107)	450A DC[1]	500A DC	525A DC[1]	600A DC
Continuous Rating: (UL 1107)	300A DC[1]	300A DC	350A DC[1]	350A DC
Nominal Voltage	12/24V DC	12/24V DC	12/24V DC	12/24V DC
House Circuit Protection	100A DC	100A DC	100A DC	100A DC

Certification

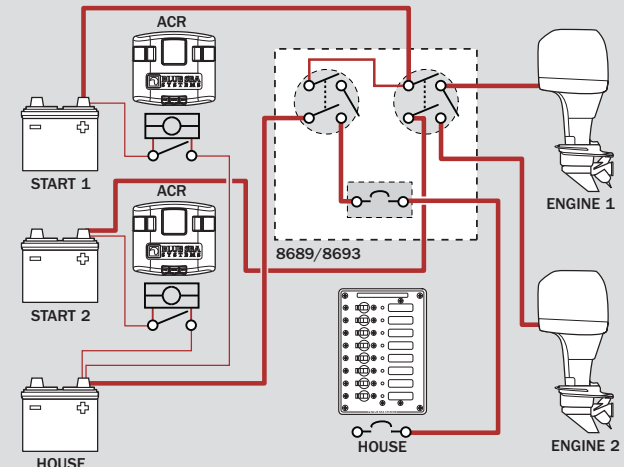
- All components are CE marked

* Blue Sea Systems Engine Starting Standard (page 126)

[1] Per Circuit

Panel PN	Battery Switch PN	Switch Pages	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	C-Series Flat Rocker Circuit Breaker	Push Button Thermal Circuit Breakers
						100A	15A
8686	DUAL CIRCUIT PLUS™ 6011, m-Series	30–31	4.50 (114.30)	7.50 (190.50)	1.85Lb (0.84Kg)	1	2
8687	SELECTOR 6007, m-Series	30–31	4.50 (114.30)	7.50 (190.50)	1.80Lb (0.82Kg)	1	2
8690	DUAL CIRCUIT PLUS™ 5511e, e-Series	32–33	5.25 (133.35)	8.00 (203.20)	2.64Lb (1.20Kg)	1	2
8691	SELECTOR 9001e, e-Series	32–33	5.25 (133.35)	8.00 (203.20)	2.60Lb (1.18Kg)	1	2
8689	DUAL CIRCUIT PLUS™ 2 of 6011, m-Series	30–31	7.25 (184.15)	8.00 (203.20)	3.46Lb (1.57Kg)	1	3
8693	DUAL CIRCUIT PLUS™ 2 of 5511e, e-Series	32–33	10.50 (266.70)	8.00 (203.20)	4.42Lb (2.00Kg)	1	4

IP IGNITION PROTECTED



Typical 8689 and 8693 Installation

NORMAL OPERATION: Start battery 1 is connected to Engine 1. Start battery 2 is connected to Engine 2. House battery is connected to House loads.

IF EITHER START BATTERY IS DISCHARGED: Start batteries are combined for emergency start of either engine.

IF START BATTERY 1 OR HOUSE BATTERY ARE DISCHARGED: Start battery 1 and House battery are combined for emergency start of Engine 1, or to boost House battery.

IF EITHER OR BOTH START BATTERIES ARE DISCHARGED: Combine Start battery 1, Start battery 2, and House battery for emergency start of either engine.

8689 and 8693 Dual Circuit Plus™ Battery Switch Positions

L-Series Solenoid Switch with Coil Economizer IP

450 Ampere Class, Designed for 12 or 24 Volt Systems

- Hermetically sealed contacts/vaporproof
- Ignition protected—safe for installation aboard gasoline powered boats
- Can function as a remote battery switch
- Activated by an ON–OFF switch mounted anywhere
- Integrated coil control minimizes heating and amperage draw

Specifications	**9012** - 12/24 Volt
Main Power Contacts	
Inrush Rating: 2.5 sec.	2,000 Amperes
Maximum Voltage Rating	60 Volts DC
Terminal Stud Size	M8 (5/16")
Terminal Stud Torque	80-100 in-lb
Contact Form	SPST-NO
Mechanical Life	1,000,000 Cycles
Coil Circuit	
Input Voltage	9-36 Volts
Power Consumption	
– Inrush max, 130ms	3.80 Amperes
– Holding	12 Volts—0.13 Amperes
	24 Volts—0.07 Amperes

Certifications and Agency Standards

- CE marked
- UL Recognized—UL 508 industrial control equipment
- Meets SAE J1171 external ignition protection requirements

9012

8230 4150 8204

Blue Sea Systems' ON-OFF switches

- Provides ON-OFF switching

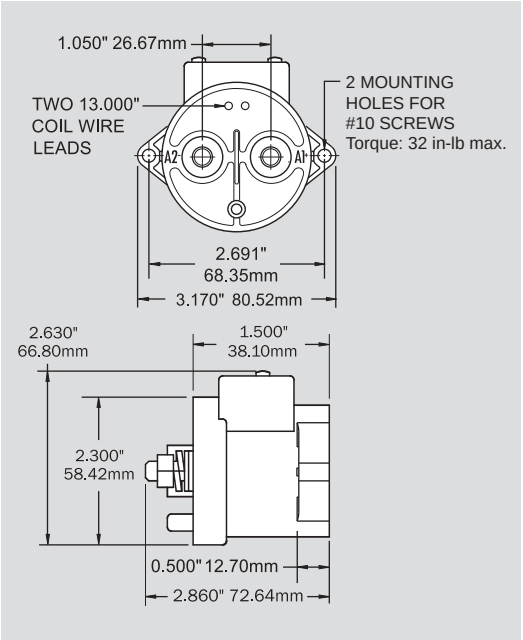
▶ See pages 94, 95, and 96

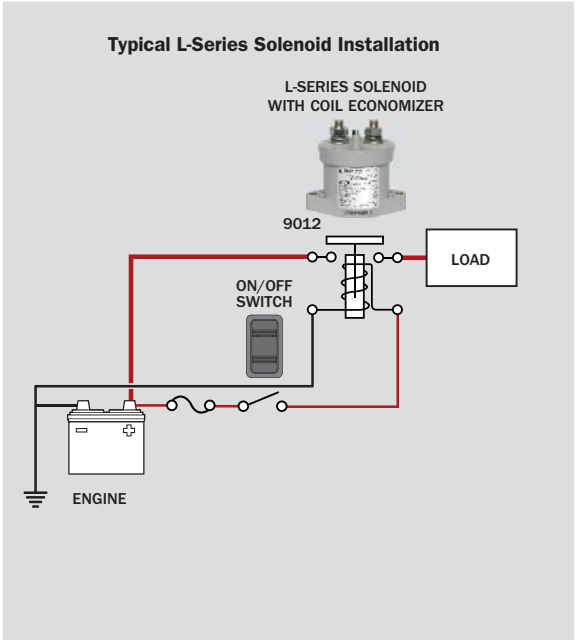
Wire Size	Cranking Rating 9.75 sec. (10 repeats)*	Intermittent Rating 5 min. (UL 1107)	Continuous Rating (UL 1107)
1/0	500A	275A	250A
2/0	500A	400A	300A
2x2/0	800A	600A	450A

* Blue Sea Systems Engine Starting Standard (page 126)

PN	Description	Voltage	Weight Lb (Kg)
9012	Solenoid Switch with Coil Economizer	12/24	1.00 (0.45)

IP IGNITION PROTECTED





ML-Series Solenoid Switches
(Magnetic Latch)

Provides high-current remote battery switching

- 300 Ampere continuous rating for use as a remote battery switch for inboard gasoline or diesel engines, reducing long cable runs
- Magnetic latch only draws current when changing state of switch, drawing no current in "ON" or "OFF" state
- Silver alloy contacts provides high reliability for switching live loads
- Optional manual switch provides an added level of safety allowing control with or without power, and offering lockout capability for servicing
- 3/8" copper studs, using Blue Sea Systems' superior one piece technology, suitable for 300 Amperes continuous rating and large cable connections

Specifications

Inrush Rating: .25 sec (10 repeats)[1]	1,500 Amperes DC
Cranking Rating: 9.75 sec (10 repeats)[1]	700 Amperes DC
Intermittent Rating: 5 min (UL 1107)	500 Amperes DC
Continuous Rating: (UL 1107)	300 Amperes DC
Maximum Voltage Rating	32 Volts DC
Terminal Stud Size	3/8"-16 (M10)
Terminal Stud Torque	140 in-lb (15.82 N·m)
Cable Size to Meet Ratings*	4/0 AWG (95mm²)
Cable Clearance For 4/0 Cables	1.12" (28.4mm)

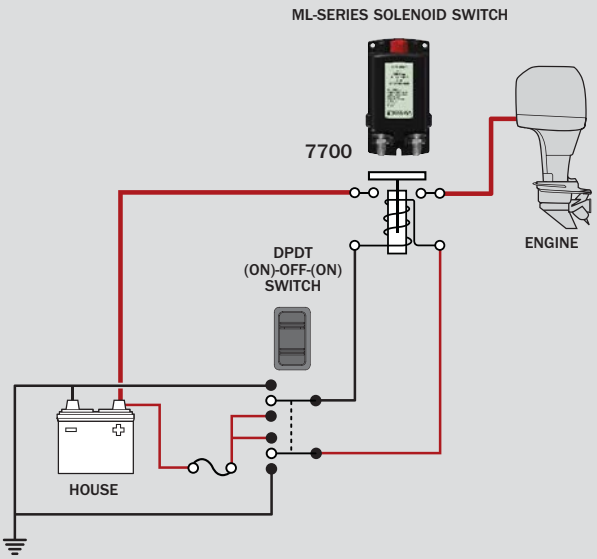
[1] Blue Sea Systems Engine Starting Standard (page 126)
* Reducing cable size will reduce current rating

7700
Available Spring, 2008

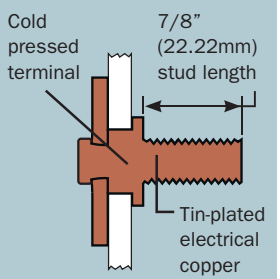
PN	Description	Manual Control	Coil Voltage
7700	ML-Series Solenoid Switch with Manual Control 12V DC	Yes	12V DC
7701	ML-Series Solenoid Switch 12V DC	No	12V DC
7702	ML-Series Solenoid Switch with Manual Control 24V DC	Yes	24V DC
7703	ML-Series Solenoid Switch 24V DC	No	24V DC

NEW PRODUCT

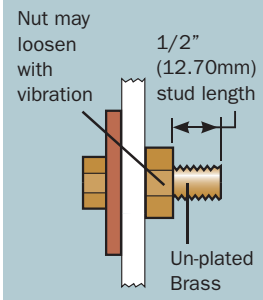
Typical ML-Series Solenoid Switch Installation



Blue Sea Systems Superior One Piece Stud Design



Common Two Piece Stud



ML-Series Solenoid Switch Silver Alloy Contacts

Before Electrical Life Endurance Test

After Electrical Life Endurance Test—silver contact surface remains intact

CL-Series BatteryLink™ Automatic Charging Relay IP

(Current Limiting) with Overcurrent Protection

- Automatically combines battery banks during the charging cycle and isolates under discharge
- Limits current flow allowing smaller wire size
- Adjustable high voltage disconnect
- Adjustable low voltage disconnect and combine voltages
- Activates from any charging source—alternators, battery chargers, or solar panels
- Senses charge voltages on up to two battery banks
- Ignition protected—safe for installation aboard gasoline powered boats
- Noise free circuitry will not interfere with other devices
- Low current draw when closed: <0.2A

Specifications

Main Power Contacts

Continuous Rating	60 Amperes DC
7 Minute Rating	90 Amperes DC
2 Minute Rating	120 Amperes DC
Voltage Rating	16 Volts DC for 12 Volts DC Nominal Systems
Current Limiting	60A at 25°C ambient
Stud Terminal Size	3/8" (M10)
Contact Form	SPST-NO
Mechanical Life	1,000,000 Cycles

Coil Circuit

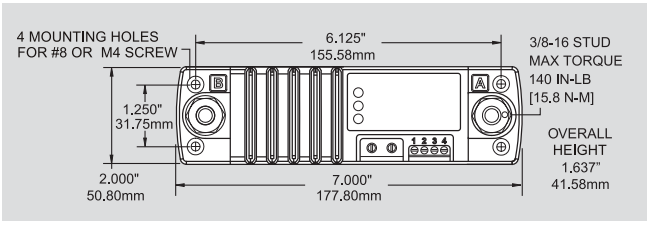
Input Voltage	9–16 Volts DC Maximum

Automatic Operation

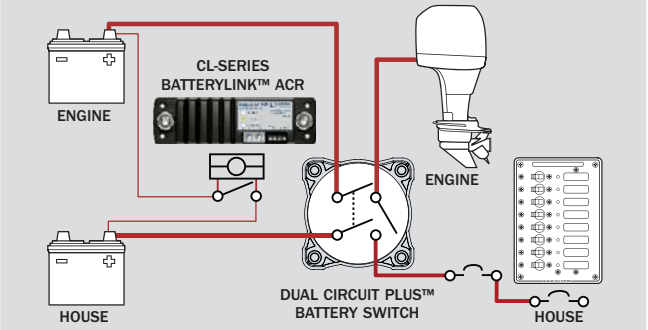
Combines when the higher battery has remained at the required voltage for at least 30 seconds. Disconnects when the voltage drops below the charging voltage to prevent accidental discharge of a battery bank.

Certification and Agency Standards

- CE marked
- Meets SAE J1171 external ignition protection requirements



Typical CL-Series BatteryLink™ ACR Installation



PN	Description	Weight Lb (Kg)
7600	CL-Series BatteryLink™ ACR	0.85 (0.39)

IP IGNITION PROTECTED

Can be used as a DC Low Voltage Disconnect (DC Load Manager) and as a means of charging a battery installed at a distance from a main battery bank (Battery Link). For more information, please see www.bluesea.com.

Add A Battery (Dual Circuit System) IP

5511e, Dual Circuit Plus™ Battery Switch (pages 32–33)

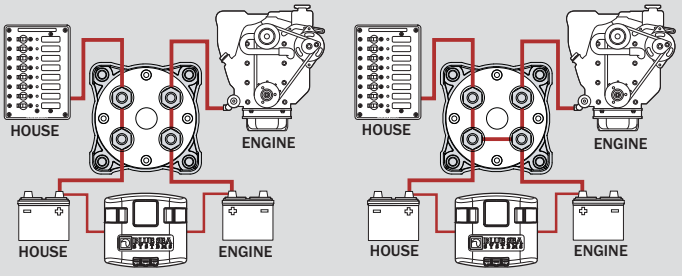
- Simplifies switching
- Isolates engine and house circuits
- Combines batteries for emergency starting

7610, 120 Amp SI* Automatic Charging Relay *Starting Isolation (page 41)

- Automatically combines batteries during charging
- Isolates batteries when discharging and when starting engines

PN	Description	Weight Lb (Kg)
7650	Add A Battery (Dual Circuit System)	0.85 (0.39)

IP IGNITION PROTECTED



Switch Set to "ON" Batteries Isolated

Switch Set to "COMBINE BATTERIES" Batteries Combined

7650, The power of two great products in one package

SI-Series Automatic Charging Relay IP

Automatically combines batteries during charging and isolates batteries when discharging and starting engines

- Protects sensitive electronics by temporary isolation of house loads from engine circuit during engine cranking
- Designed for 12 or 24 volt systems
- 12/24 volt auto ranging voltage input
- Hermetically sealed contacts/vaporproof
- Waterproof rated IP67—temporary immersion for 30 minutes
- Ignition protected—safe for installation aboard gasoline powered boats
- Remote LED output indicates relay state away from ACR
- Supports high-output alternators up to 120 Amperes
- Dual sensing

Specifications		12 Volt	24 Volt
Continuous Rating		120 Amps	120 Amps
Intermittent Rating		210 Amps	210 Amps
Inrush Rating		280 Amps	280 Amps
Closed Current Draw		175mA	115mA
Open Current Draw		15mA	15mA
Maximum Cable Size		1/0 AWG	1/0 AWG
Terminal Stud Size		3/8"-16 (M10)	3/8"-16 (M10)
Maximum Torque		140 in-lbs	140 in-lbs
Relay Contact Position			
Combine	(30 sec.)	13.6 Volts	27.2 Volts
	(2 min.)	13.0 Volts	26.0 Volts
Open Low	(10 sec.)	12.35 Volts	24.7 Volts
	(30 sec.)	12.75 Volts	25.5 Volts
Open High		16.0 Volts	30.0 Volts

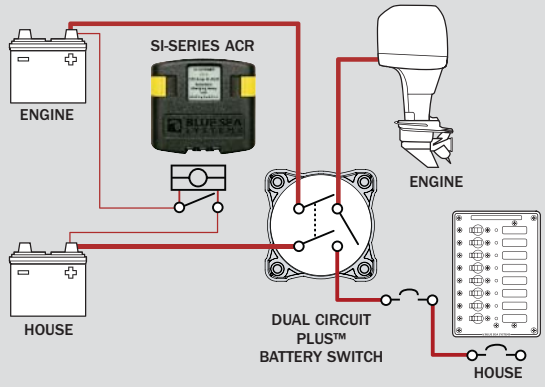
Certifications and Agency Standards

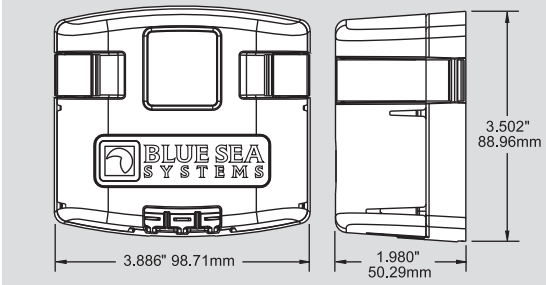
- CE marked
- Meets ISO 8846, ignition protection, and UL 1500 and SAE J1171 external ignition protection requirements

PN	Description	Weight Lb (Kg)
7610	12/24 Volt SI-Series ACR	1.26 (0.57)

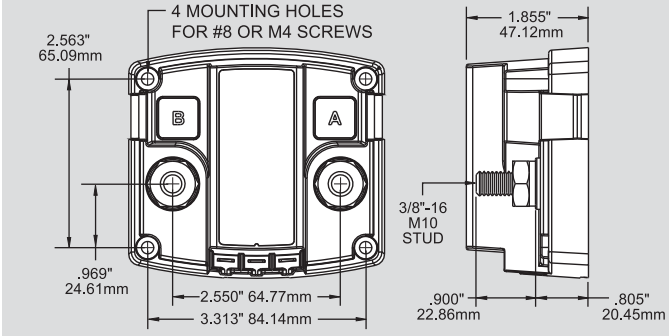
IP IGNITION PROTECTED

Typical SI-Series ACR Installation





Cover On Dimensions



Cover Off Dimensions

ML-Series Automatic Charging Relays
(Magnetic Latch)

Combines large battery banks for high current charging and emergency cross connect

- Combines battery banks during charging and isolates under discharge
- 300 Ampere continuous rating suitable for use with large battery banks, starters, alternators, and inverter/chargers
- Can be remotely combined with optional switch
- Silver alloy contacts provide high reliability
- 3/8" copper studs, using Blue Sea Systems' superior one piece stud technology, suitable for 300 Ampere continuous rating and large cable connections

Specifications

Main Power Contacts

Inrush Rating: .25 sec (10 repeats)[1]	1,500 Amperes DC
Cranking Rating: 9.75 sec (10 repeats)[1]	700 Amperes DC
Intermittent Rating: 5 min (UL 1107)	500 Amperes DC
Continuous Rating: (UL 1107)	300 Amperes DC
Maximum Voltage Rating	32 Volts DC
Terminal Stud Size	3/8"-16 (M10)
Terminal Stud Torque	140 in-lb (15.82 N·m)
Cable Size to Meet Ratings*	4/0 AWG (95mm²)
Cable Clearance For 4/0 Cables	1.12" (28.4mm)

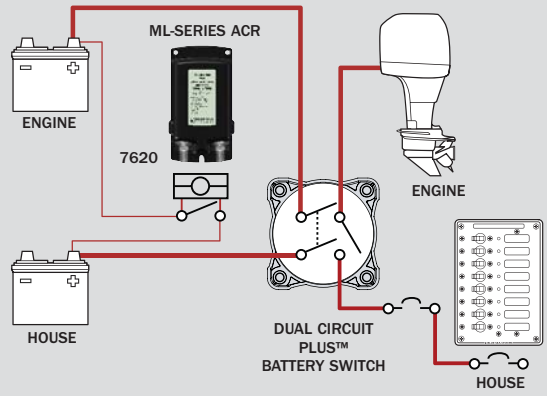
[1] Blue Sea Systems Engine Starting Standard (page 126)
* Reducing cable size will reduce current rating

7620
Available Spring, 2008

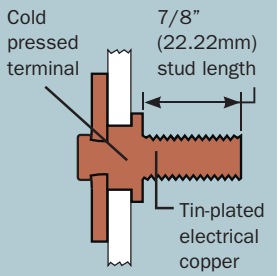
PN	Description	Coil Voltage
7620	ML-Series Automatic Charging Relay 12V DC	12V DC
7621	ML-Series Automatic Charging Relay 24V DC	24V DC

NEW PRODUCT

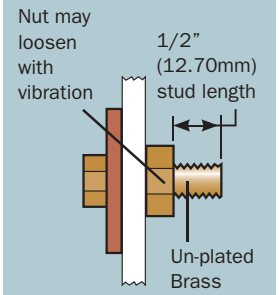
Typical ML-Series ACR Installation



Blue Sea Systems Superior One Piece Stud Design



Common Two Piece Stud



ML-Series ACR Silver Alloy Contacts

Before Electrical Life Endurance Test

After Electrical Life Endurance Test—silver contact surface remains intact

L-Series ACR with Coil Economizer (IP)

450 Ampere Class, Override for emergency engine paralleling to start an engine

- Automatically combines battery banks during the charging cycle and isolates under discharge
- Activates whether the charging source is an alternator or battery charger
- Output for “ON” indicating LED
- Integrated coil control minimizes heating and amperage draw
- Hermetically sealed contacts
- Ignition protected—safe for installation aboard gasoline powered boats
- Single or dual sensing
- Pulse circuit requires very low current draw when contact is closed
- Designed for 12 or 24 volt systems

Specifications

Coil Circuit

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

Main Power Contacts

Inrush Rating: 0.25 sec. (10 repeats)*	2,000 Amperes DC
Voltage Rating	60 Volts DC
Stud Terminal Size	M8 (accepts 5/16" ring terminals)
Stud Terminal Torque	80-100 in-lb
Contact Form	SPST-NO
Mechanical Life	1,000,000 Cycles
Relay Contact Position	
– Combine	12 Volts DC/13.6 Volts DC, 24 Volts DC/27.2 Volts DC
– Open Low	12 Volts DC/12.6 Volts DC, 24 Volts DC/25.2 Volts DC
– Open High	12 Volts DC/15.0 Volts DC, 24 Volts DC/30.0 Volts DC

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.

Agency Standards

- Meets SAE J1171 external ignition protection requirements
- UL Recognized - UL 508 industrial control equipment

Wire Size	Cranking Rating 9.75 sec. (10 repeats)*	Intermittent Rating 5 min. (UL 1107)	Continuous Rating (UL 1107)
1/0	500A	275A	250A
2/0	500A	450A	300A
2x2/0	800A	600A	450A

*Blue Sea Systems Engine Starting Standard (page 126)

PN	Description	Weight Lb (Kg)
9112	450 Ampere Class, 12/24 Volt ACR	0.95 (0.43)
8270	Switch Panel	0.27 (0.12)

(IP) IGNITION PROTECTED

9112

(Optional)

8232

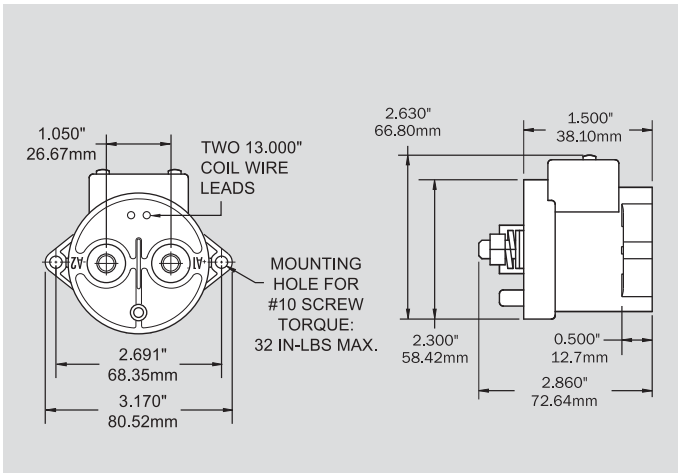
- Provides manual operation - When connected, the ACR can be turned off, set to automatic, or manually closed.

▶ See page 95 for full selection of Water Resistant Contura Switches

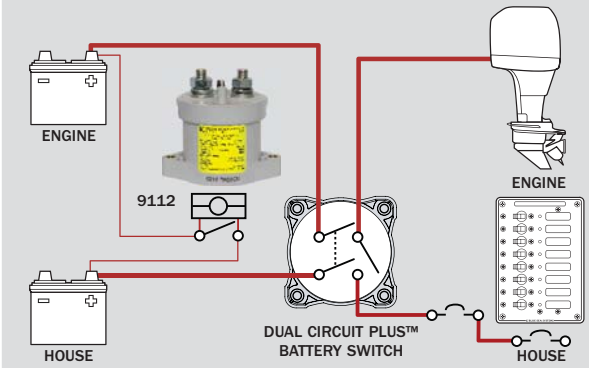
(Optional)

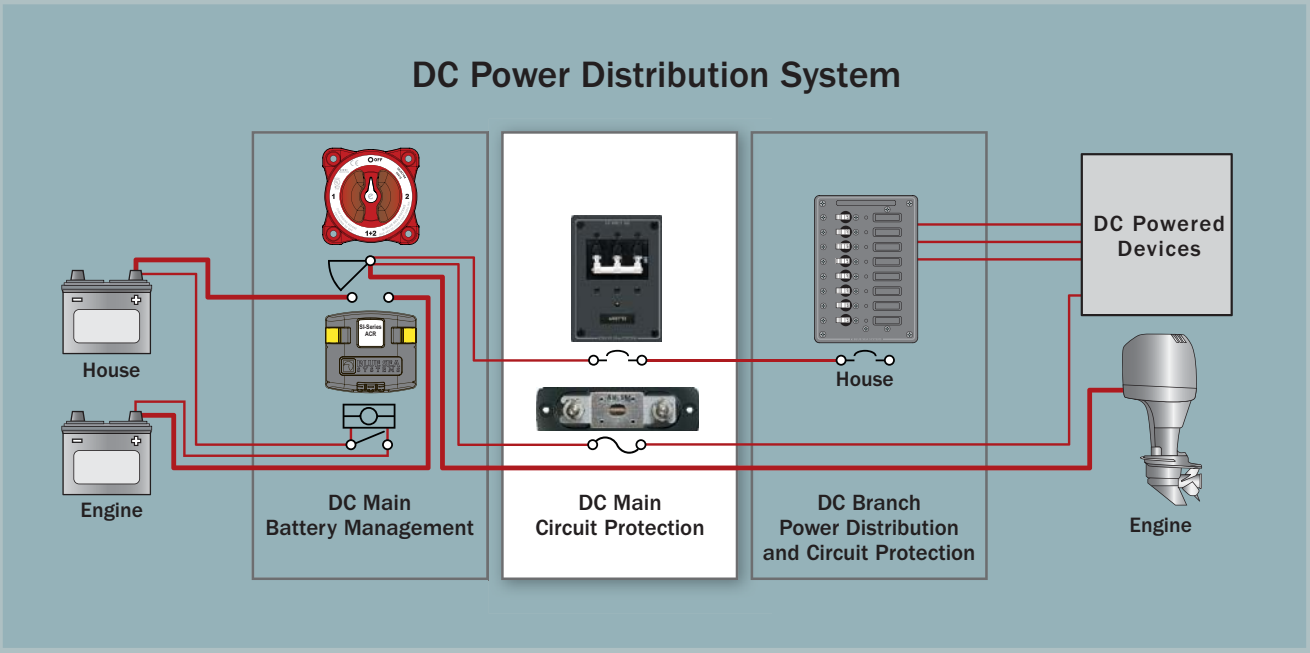
8270

- Provides manual operation - When connected, the ACR can be turned off, set to automatic, or manually closed.



Typical 9112 Installation





DC Main Circuit Protection

Definition
DC main circuit protection consists of the fuses and circuit breakers that are closest to the battery.

Purpose
Fuses and circuit breakers are used to protect wire insulation from melting and starting fires in the event of a circuit overload, 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
What distinguishes DC main circuit protection from DC branch circuit protection is the ampere interrupt capacity (AIC) rating. AIC is defined as the fault current that a device is capable of breaking and remaining operational after the fault. In certain circumstances, main circuit protection devices may have to break very high amperages.

Circuit protection devices that qualify for main circuit protection must meet the AIC ratings found in the ABYC Interrupt Rating Table (page 129). Look for the Interrupt Ratings for the fuses and circuit breakers in this section.

Products in this Section
Circuit Breakers: Circuit breakers used for main circuit protection are single, double, and triple pole paralleled, and range in current rating from 3 to 300A. They have AIC ratings suitable for main circuit protection. Circuit breakers with lower AIC ratings are found in the DC Branch Power Distribution and Circuit Protection section of this catalog.

Fuse Blocks and Fuses: Fuses that have AIC ratings suitable for main circuit protection range in current rating from 35 to 750 Amperes. Fuses with lower current ratings and lower AIC ratings are found in the DC Branch Power Distribution and Circuit Protection section of this catalog.

For more information about selecting suitable DC Main circuit protection, refer to pages 128–130 in this catalog or try the online Circuit Wizard found at www.bluesea.com.

DC Current Ratings — 0 Amperes — **DC Current Ratings** (Amperes) — 750 Amperes

Circuit Breakers Pages 46–49

Push Button Reset-Only, **Interrupt Rating:** 3,000A@14.7V DC/2,500A@28V DC

Page 46

3 4 5 7 10 12 15 20 25 30 35 40

185-Series, **Interrupt Rating:** 3,000A DC **Maximum Voltage:** 42V DC

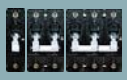
Page 46

25 30 35 40 50 60 70 80 90 100 110 120 135 150

187-Series, **Interrupt Rating:** 5,000A@12V DC/3,000A@24V DC/1,500A@42 DC **Maximum Voltage** – 48V DC

Page 47

25 30 35 40 50 60 70 80 90 100 110 120 135 150



C-Series Toggle, **Interrupt Rating:** See page xxx **Maximum Voltage:** See page xxx

Page 48

5 10 15 20 25 30 50 60 80 100 150 175 200 250 300

C-Series Flat Rocker, **Interrupt Rating:** See page xx **Maximum Voltage:** See page xxx

Page 49

5 10 15 20 25 30 50 60 80 100 150 175 200 250 300

Fuses Pages 50–53

Terminal Fuse, **Interrupt Rating:** 10,000A@14V DC/5,000A@32V DC/2,000A@58V DC **Maximum Voltage:** 58V DC

Page 50

30 40 50 60 75 80 90 100 125 150 175 200 225 250 300

Sea Fuses, **Interrupt Rating:** 2,000A DC **Maximum Voltage:** 32V DC

Page 51

100 125 150 175 200 225 250 300

ANL Fuses, **Interrupt Rating:** 6,000A DC **Maximum Voltage:** 32V DC

Page 52

35 40 50 60 80 100 130 150 175 200 225 250 275 300 325 350 400 500 600 675 750

Class T Fuses, **Interrupt Rating:** 20,000A DC **Maximum Voltage:** 160V DC

Page 53

110 125 150 175 200 225 250 300 350 400

DC Main Circuit Breakers Detailed information about these circuit breakers is located in the DC Branch section Page 62

A-Series Toggle, **Interrupt Rating:** 7,500A@65V DC/3,000A@250V AC **Maximum Voltage:** 65V DC/250V AC

Page 62

5 8 10 15 20 25 30 40 50

A-Series Flat and Restricted OFF Rocker, **Interrupt Rating:** 5,000A@32V DC/3,000A@125V AC/1,500A@240V AC **Maximum Voltage:** 32V DC/240V AC

Page 62

5 8 10 15 20 25 30 40 50

Fuse Blocks Pages 50–53

Terminal Fuse Block—Uses Terminal Fuses **Maximum Voltage:** 58V DC **Maximum Amperage:** 300A DC

Page 50

SEA Series Fuse Block—Uses Sea Fuses **Maximum Voltage:** 32V DC **Maximum Amperage:** 300A DC

Page 51

ANL Fuse Blocks—Uses ANL Fuses **Maximum Voltage:** 32V DC **Maximum Amperage:** 300A DC
ANL Heavy Fuse Blocks—Uses ANL Fuses **Maximum Voltage:** 32V DC **Maximum Amperage:** 750A DC

Page 52

Class T Fuse Block—Uses Class T Fuses **Maximum Voltage:** 160V DC **Maximum Amperage:** 400A DC

Page 53

Push Button Reset-Only Thermal Circuit Breakers (IP)

- Branch circuit breakers (can be used for 24-hour circuit protection)
- Incorporated into Blue Sea Systems' waterproof circuit breaker panels (pages 56–57, 59), Battery Main Distribution Panels (page 37), and 360 Distribution Panels (pages 10–13)
- 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
- Optional Push Button Waterproof Boot protects circuit breaker in wet environments, replaces dress nut mounting on circuit breakers, and resists discoloration and cracking

7056

4135 4136 4137

Push Button Circuit Breakers	
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

(IP) IGNITION PROTECTED

Specifications

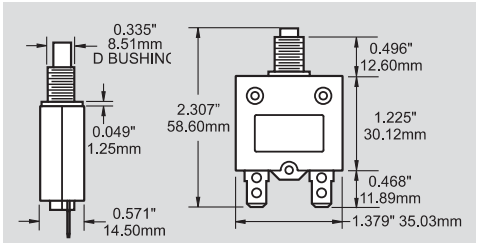
Interrupt Rating	3,000 Amperes@14.7 Volts DC/2,500 Amperes@28 Volts DC
Circuit Breaker Type	Thermal trip, manual push button reset only
Operating Temperature Range	-10°C to +60°C
Trip Time Delay	See www.bluesea.com
Weight Circuit Breaker	0.06Lb (0.03Kg)
Weight Waterproof Boots (pkg. of 5)	0.04Lb (0.02Kg)
Boot Material	UV Resistant Silicone Rubber
Boot Thread Material	Nickel-Plated Brass
Boot Thread	3/8"-27

Push Button Boots	
PN	Color
4135	Clear
4136	White
4137	Black

Certifications and Agency Standards

- CE marked
- Meets UL 1500 and ISO 8846 external ignition protection requirements
- UL Recognized—UL 1077–UL/cUL (USA and Canada), TUV certified

See page 129 for ABYC Interrupt Rating Requirements.



See pages 10–13 for a full selection of related products located in the new 360 Panel System section of this catalog.

185-Series Thermal Circuit Breakers (IP)

- Ignition protected—safe for installation aboard gasoline powered boats
- Weather Resistant
- Combines switching and circuit breaker function into one unit
- "Trip Free"—cannot be held closed after trip

7010 Panel Mount

7110 Surface Mount

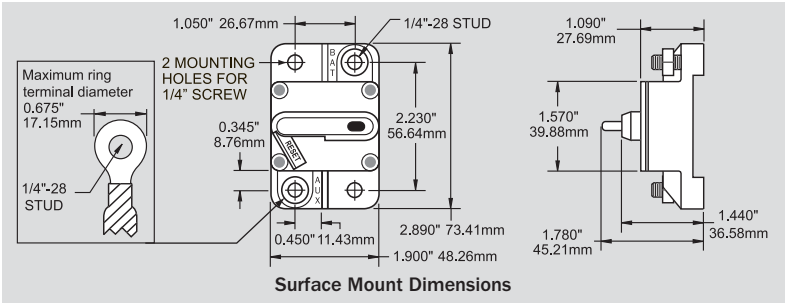
Specifications

Interrupt Rating		3,000 Amperes DC
Maximum Voltage		42 Volts DC
Circuit Breaker Type		Thermally Responsive Bi-Metal Blade
Circuit Breaker Class		Type III—Switchable/Manual Reset - Trip Free
Operating Temperature Range		-25°C to +82°C
Terminal Stud Torque		70 in-lb
Trip Time Delay		See www.bluesea.com
Case Material		Phenolic
Weight	Panel Mount	0.25 lb (0.11 Kg)
	Surface Mount	0.30 lb (0.14 Kg)

Certifications and Agency Standards

- CE marked
- Meets SAE J1171 external ignition protection requirements

See page 129 for ABYC Interrupt Rating Requirements.

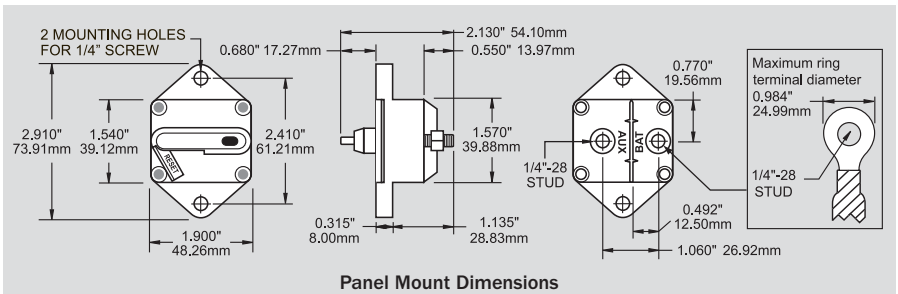


Surface Mount Dimensions

Panel Mount	
PN	Amperage
7008	25A
7009	30A
7010	35A
7005	40A
7000	50A
7011	60A
7012	70A
7014	80A
7006	90A
7002	100A
7007	110A
7013	120A
7015	135A
7004	150A

Surface Mount	
PN	Amperage
7108	25A
7109	30A
7110	35A
7105	40A
7100	50A
7111	60A
7112	70A
7114	80A
7106	90A
7102	100A
7107	110A
7113	120A
7115	135A
7104	150A

(IP) IGNITION PROTECTED



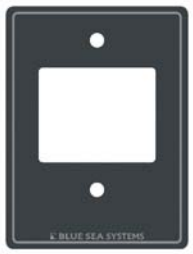
Panel Mount Dimensions

185-Series Thermal Circuit Breaker Mounting Systems

- Used with 185-Series Thermal Panel Mount Circuit Breakers (page 46)
- 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

187-Series Thermal Circuit Breakers IP

- Ignition protected—safe for installation aboard gasoline powered boats
- Waterproof
- Combines switching and circuit protection into a single device
- Single lever operation—clearly visible
- "Trip Free" design cannot be held "ON" during fault current condition
- Recessed mounting holes for clean appearance
- Robust 5/16"-18 terminals provide high torque connections

Specifications

Interrupt Rating		5,000 Amperes@12 Volts DC 3,000 Amperes@24 Volts DC 1,500 Amperes@42 Volts DC
Maximum Voltage Rating		48 Volts DC
Circuit Breaker Type		Thermally Responsive Bi-Metal Blade
Circuit Breaker Class		Type III—Switchable/Manual Reset—Trip Free
Operating Temperature Range		-25°C to +82°C
Terminal Stud Torque		90 in-lb
Trip Time Delay		See www.bluesea.com
Case Material		Thermoset Polyester
Weight	Panel Mount	0.50 lb (0.23 Kg)
	Surface Mount	0.58 lb (0.26 Kg)

Certifications and Agency Standards

- CE marked
- Meets SAE J1171 external ignition protection requirements

▶ See page 129 for ABYC Interrupt Rating Requirements.

7039
Panel Mount

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

Round case for easy installation with standard sized hole saw

7139
Surface Mount

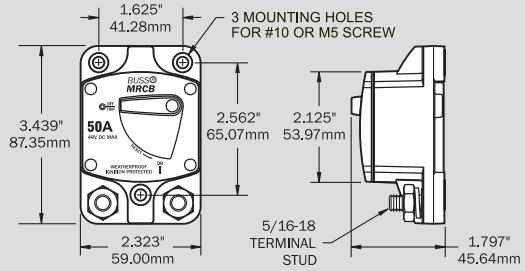
Robust 5/16" terminals provide high torque connections

Large clearance around terminal studs accepts up to 1/0 AWG lugs

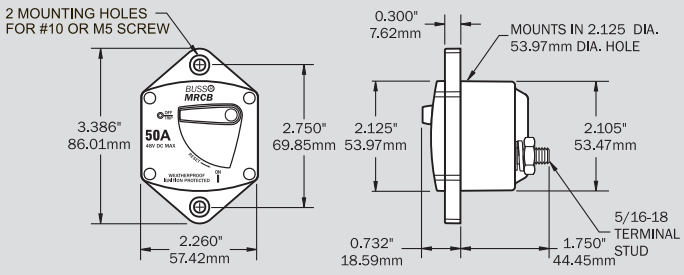
Panel Mount	
PN	Amperage
7035	25A
7036	30A
7037	35A
7038	40A
7039	50A
7040	60A
7041	70A
7042	80A
7043	90A
7044	100A
7045	110A
7046	120A
7047	135A
7048	150A

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

IP IGNITION PROTECTED



Surface Mount Dimensions



Panel Mount Dimensions

C-Series Toggle Circuit Breakers

- Provides overcurrent protection 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 meets UL 1500 and ISO 8846 external ignition protection requirements

Specifications

Interrupt Rating	See Interrupt Ratings tables below
Maximum Voltage	See Interrupt Ratings tables below
Circuit Breaker Type	Magnetic Hydraulic
Operating Temperature Range	-40°C to +85°C
Terminal Stud	1/4"-20 Tin-Plated Brass - Maximum torque 35 in-lb
Trip Time Delay	See www.bluesea.com
Rated Switch Cycles	10,000 @ rated amperage and voltage
Case Material	Phenolic
Mounting Screw	Stainless Steel #6-32—Recommended torque 6-8 in-lb

Agency Standards

- Meets SAE J1171 external ignition protection requirements—7250I Only

7250

IP 7250I

7267

7270

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	IP	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)

IP IGNITION PROTECTED

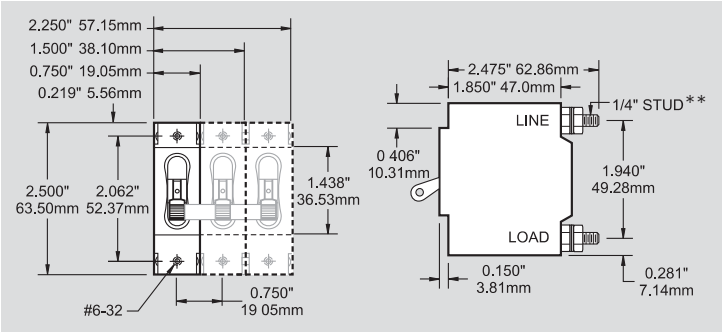
Interrupt Ratings (see ABYC Interrupt Rating Requirements page 129)

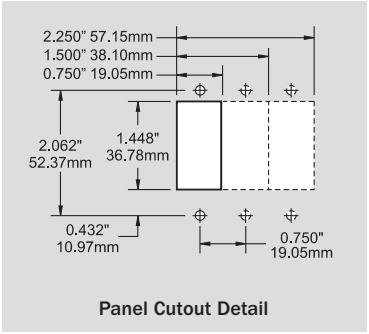
C-Series Toggle Circuit Breakers - Single Pole			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - TUV (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
80V DC	5-100A	10,000A	-
125V AC	5-100A	5,000A	-
250V AC	5-100A	5,000A	5,000A

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

C-Series Toggle 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





Panel Cutout Detail

* Single pole circuit breakers are AC/DC rated
** Multiple pole versions have 5/16" stud on bus

▶ See page 49 for C-Series Toggle Circuit Breaker Mounting Panels.

C-Series Toggle Circuit Breaker Panels

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

Specifications

LED Power Consumption 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)

* Paralleled Poles

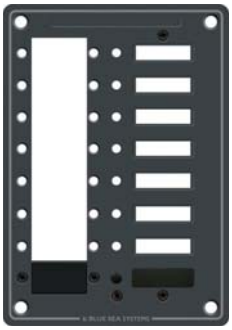
7266

C-Series Toggle Circuit Breaker Mounting Panels

- Designed for C-Series Toggle Circuit Breakers
- Heavy 1/8" aluminum 5052 Alloy
- Two-part polyurethane slate gray finish
- Accepts Blue Sea Systems Large Format Labels (page 100)
- Accepts Blue Sea Systems “ON” indicating LEDs (page 97)
- Industry standard height and width
- Panel Plug Kit included
- Panel plugs can be inserted to fill blank positions
- 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)	0.24 (0.11)
8089	Panel Plug Kit	-	-	0.10 (0.04)

8088



8087

▶ See page 48 for C-Series Toggle Circuit Breakers.

C-Series Flat Rocker Circuit Breakers

- Rocker actuator is flush in the “ON” position, eliminating the risk of accidental switching, color actuator indicates “OFF” position
- Provides overcurrent protection for inverters, bow thrusters, and windlasses
- Combines switching and circuit protection into a single device
- “Trip Free”—cannot be held closed after trip
- Single poles are ignition protected—safe for installation aboard gasoline powered boats

7540

7551

7554

Specifications

Interrupt Rating	See Interrupt Ratings tables below
Maximum Voltage	See Interrupt Ratings tables below
Circuit Breaker Type	Magnetic Hydraulic
Operating Temperature Range	-40°C to +85°C
Terminal Stud	1/4"-20 Tin-Plated Brass—Maximum torque 35 in-lb
Trip Time Delay	See www.bluesea.com
Rated Switch Cycles	10,000 @ rated amperage and voltage
Case Material	Phenolic
Mounting Screw	Stainless Steel #6-32—Recommended torque 6-8 in-lb

Certifications and Agency Standards

- Single poles meet SAE J1171, UL 1500 and ISO 8846 external ignition protection requirements

Interrupt Ratings (see ABYC Interrupt Rating Requirements page 129)

C-Series Flat Rocker Circuit Breakers - Single Pole (Ignition Protected)			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - TUV (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
32V DC	5-100A	5,000A	-
125V AC	5-100A	3,000A	-
240V AC	5-50A	3,500A	-

C-Series Flat Rocker Circuit Breakers - Double and Triple Pole			
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
48V DC	150-300A	5,000A	-
48V DC	150-200A	-	5,000A

[1] UL Recognized

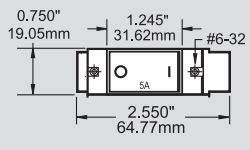
PN	Poles	IP	Amperage	Weight Lb (Kg)
7540	1	IP	5A	0.28 (0.13)
7541	1	IP	10A	0.28 (0.13)
7542	1	IP	15A	0.28 (0.13)
7543	1	IP	20A	0.28 (0.13)
7544	1	IP	25A	0.28 (0.13)

PN	Poles	IP	Amperage	Weight Lb (Kg)
7545	1	IP	30A	0.28 (0.13)
7546	1	IP	50A	0.36 (0.17)
7547	1	IP	60A	0.36 (0.17)
7548	1	IP	80A	0.36 (0.17)
7549	1	IP	100A	0.36 (0.17)

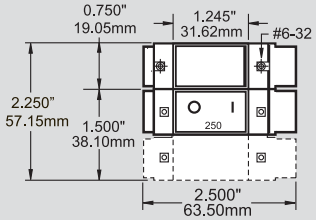
PN	Poles	Amperage	Weight Lb (Kg)
7475	2*	150A	0.64 (0.31)
7551	2*	175A	0.64 (0.31)
7476	2*	200A	0.64 (0.31)
7477	3*	250A	0.93 (0.46)
7554	3*	300A	0.93 (0.46)

* Paralleled Poles

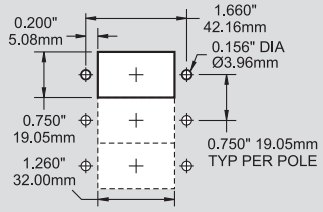
NEW PRODUCT IP IGNITION PROTECTED



Single Pole



Double and Triple Pole



Cutout Detail

Terminal Fuse Block

Easy and economical solution for satisfying ABYC 7" circuit protection rule. Mounts on 3/8" (M10) battery post, battery switch, and busbar terminals.

- Compact, high-amp fuse—Appropriate for DC Main, inverter, windlass, and bow thruster circuit protection
- Provides high current protection in tight space constraints
- Weatherproof—suitable for small open-cockpit boats and other harsh environments
- Insulating nut and cap prevents accidental shorts

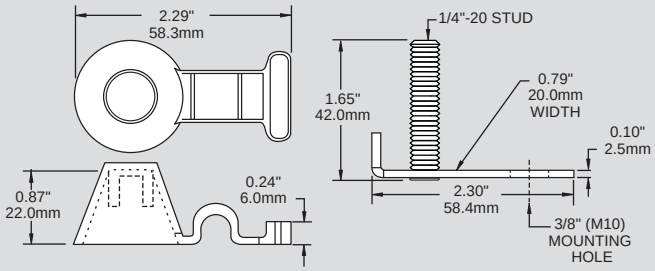
5191 (fuse not included)

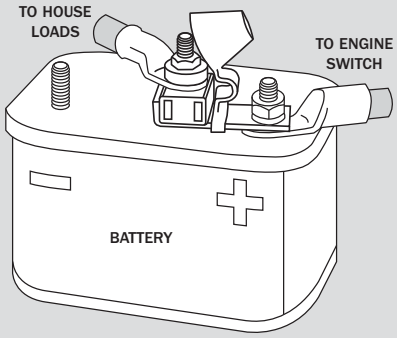
Specifications

Maximum Voltage	58 Volts DC
Recommended Torque	75 in-lbs Maximum
Terminal Stud	1/4"-20
Fuses Available	30–300 Amperes DC

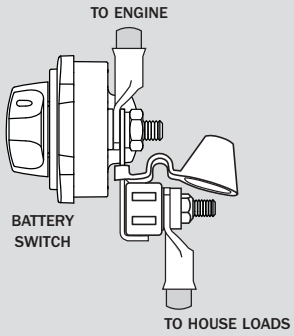
PN	Description	Weight Lb (Kg)
5191	Terminal Fuse Block	0.16 (0.07)

Available Fall, 2007

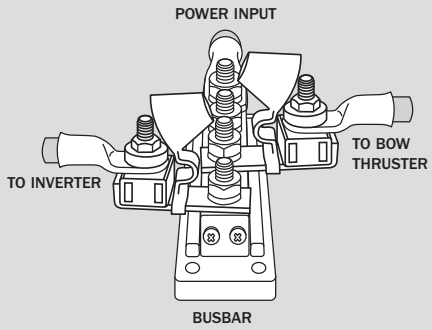




Single Battery Solution:
1. No battery switch
2. 24 hour circuits off of battery



Dual Battery Solution:
1. ON/OFF battery switch
2. Selector battery switch
3. Dual Circuit Plus™ battery switch



High-Amp Load Solution:
1. Windlass
2. Bow Thruster
3. Inverter

Terminal Fuse* IP Available Fall, 2007

- Interrupt Rating satisfies ABYC requirements for DC Main circuit protection on large battery banks
- Ignition protected—safe for installation aboard gasoline powered boats
- Clear window—visual indication of blown condition
- Color coded for each amperage

Specifications

Interrupt Rating	10,000 Amperes@14 Volts DC 5,000 Amperes@32 Volts DC 2,000 Amperes@58 Volts DC
Maximum Voltage	58 Volts DC
Trip Time Delay	See www.bluesea.com

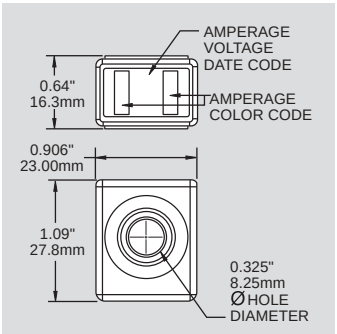
Certifications and Agency Standards
- Meets SAE J1171 external ignition protection requirements
- Rated IP66—withstands water from heavy seas

ABYC E-11.12.1.1.1. Each ungrounded conductor connected to a battery charger, alternator, or other charging source, shall be provided with overcurrent protection within a distance of seven inches (175mm) of the point of connection to the DC electrical system or to the battery.

*** For use only with Terminal Fuse Block**

PN	Amperage	Color	Weight Lb (Kg)
5175	30A	LT Green	0.06 (0.02)
5176	40A	LT Blue	0.06 (0.02)
5177	50A	Red	0.06 (0.02)
5178	60A	Gold	0.06 (0.02)
5180	75A	Brown	0.06 (0.02)
5181	80A	Lime	0.06 (0.02)
5182	90A	Purple	0.06 (0.02)
5183	100A	Yellow	0.06 (0.02)
5184	125A	Green	0.06 (0.02)
5185	150A	Orange	0.06 (0.02)
5186	175A	white	0.06 (0.02)
5187	200A	Blue	0.06 (0.02)
5188	225A	Tan	0.06 (0.02)
5189	250A	Pink	0.06 (0.02)
5190	300A	Grey	0.06 (0.02)

5189



NEW PRODUCT IP IGNITION PROTECTED

SEA Fuse Blocks

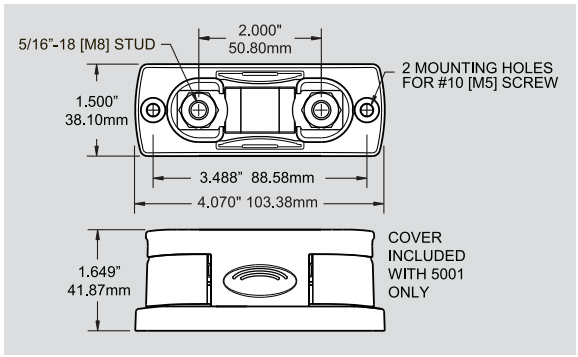
- Economical system for 100–300 Ampere fusing
- Insulating cover satisfies ABYC/USCG insulation requirements and protects conductive components
- Cover breakouts allow wire access in any direction
- For use on systems up to 32 Volts DC
- Insert molded studs ensure secure fuse mounting
- Stainless steel studs provide resistance to corrosion and allow high torque for excellent electrical contact
- 5/16"-18 studs accept 5/16" (M8) ring terminals, 14 AWG to 2/0 AWG wire
- UL 94-V0 base resists high heat

Specifications

Maximum Amperage	300 Amperes DC
Maximum Voltage	32 Volts DC
Maximum Torque	110 in-lb (12.40 N-m)
Base Material	Reinforced PBT
Cover Material	Polycarbonate
SEA Fuses available	100-300 Amperes 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	0.35 (0.16)

5001 (fuse not included)



SEA Fuses

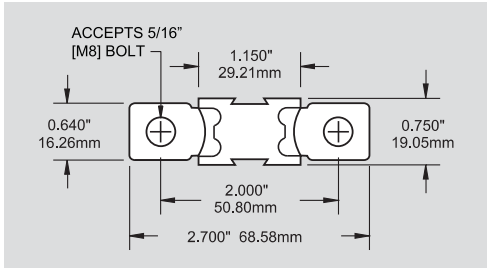
- Economical fuse for 100–300 Ampere circuit protection

Specifications

Interrupt Rating	2,000 Amperes DC
Maximum Voltage	32 Volts DC
Trip Time Delay	See www.bluesea.com

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)

5106



Pursuit C310 Center Console—Courtesy of Pursuit Boats

ANL Fuse Blocks

Common Features

- For use on systems up to 32 Volts DC

5003:
Large terminals accept 5/16" (M8) ring terminals up to 4/0 AWG
5003/5005:
Insulating cover satisfies ABYC/USCG insulation requirements
5004/5005:

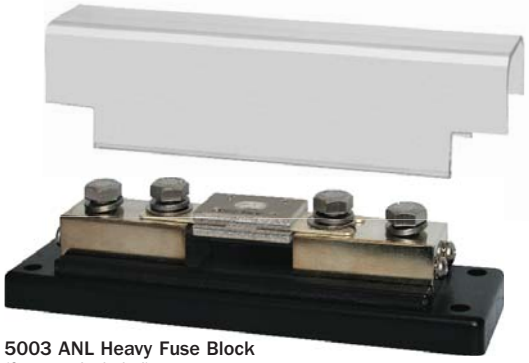
- Large 5/16"-18 studs accept 5/16" (M8) ring terminals, from 14 AWG to 2/0 AWG wire
- Stainless steel studs provide resistance to corrosion and high torque for excellent electrical contact
- Swing out design allows replacement of the fuse without removing fasteners
- UL 94-V0 base resists high heat

5005:
Cover breakouts allow wire access in any direction

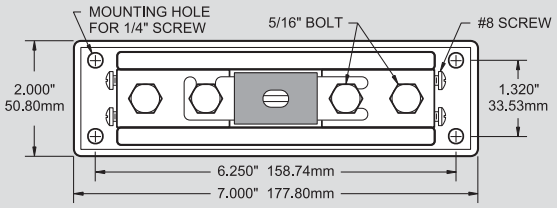
Specifications	5003	5004	5005
Maximum Amperage	750 Amperes DC	300 Amperes DC	300 Amperes DC
Maximum Voltage	32 Volts DC	32 Volts DC	32 Volts DC
Maximum Torque	110 in-lb (12.40 N-m)	132 in-lb (14.91 N-m)	132 in-lb (14.91 N-m)
Base Material	Reinforced PBT	Reinforced PBT	Reinforced PBT
Cover Material	Polycarbonate	-	Polycarbonate
Fuse Mounting Blocks	Tin-Plated Copper	-	-
ANL Fuses Available	35–750 Amperes	35–300 Amperes	35–300 Amperes

PN	Description	Amperage	Weight Lb (Kg)
5003	ANL Heavy Fuse Block with Cover	35-750A	1.45 (0.66)
5004	ANL Fuse Block without Cover	35-300A	0.18 (0.08)
5005	ANL Fuse Block with Cover	35-300A	0.35 (0.16)

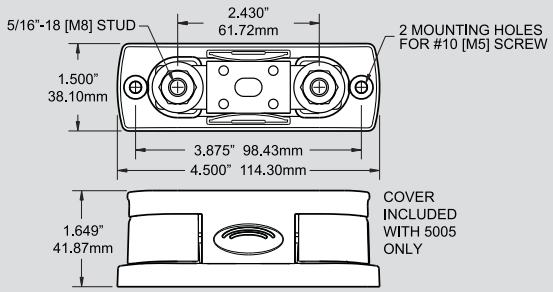
5005 ANL Fuse Block
(fuse not included)



5003 ANL Heavy Fuse Block
(fuse not included)



5003 Dimensions



5005 Dimensions

35-750 Ampere ANL Fuses

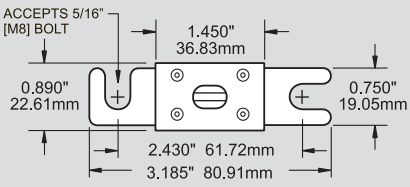
- 6,000 Ampere Interrupt Rating satisfies ABYC requirements for main DC circuit protection on large battery banks
- Ignition protected—safe for installation aboard gasoline powered boats (35–500 Amperes only)
- Silver-plated connector blades for corrosion resistance
- Visible indication of blown fuse condition

Specifications

Interrupt Rating	6,000 Amperes DC
Maximum Voltage	32 Volts DC
Trip Time Delay	See www.bluesea.com

Certifications and Agency Standards
ISO 8846

- Meets ISO 8846 and SAE J1171 external ignition protection requirements (35–500 Amperes only)
- USCG Title 33 CFR 183.410(a) and UL 1500 (35–500 Amperes only)



ANL Fuse

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

Class T Fuse Blocks

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

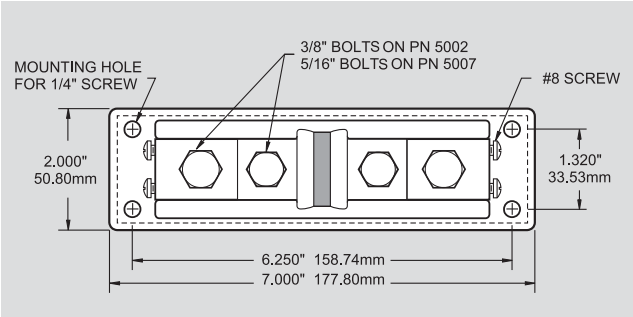
- Insulating cover, satisfies ABYC/USCG insulation requirements
- For use on systems up to 160 Volts DC
- Large terminals (3/8" on 5002, 5/16" on 5007) accept ring terminals for wire up to 4/0 AWG
- Large heat dissipating tin-plated copper mounting blocks
- Two #8 accessory terminals located on each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

Specifications

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

5007 (fuse not included)

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



Class T Fuses

- 20,000 Ampere Interrupt Rating
- Extremely fast short-circuit response

Specifications

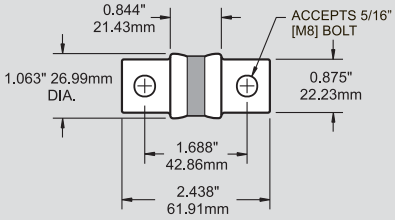
Interrupt Rating	20,000 Amperes DC
Maximum Voltage	160 Volts DC
Trip Time Delay	See www.bluesea.com

Agency Standards

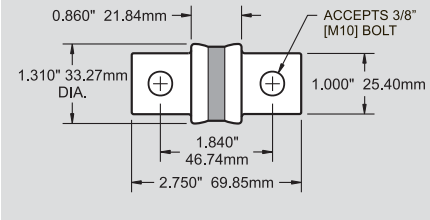
- UL listed to standard 248-15
- DC tested to UL standard 198L

5112

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	0.30 (0.14)
5118	250A	0.30 (0.14)
5119	300A	0.30 (0.14)
5120	350A	0.30 (0.14)
5121	400A	0.30 (0.14)



110 to 200 Amperes



225 to 400 Amperes

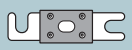
ANL Fuses vs. Class T Fuses

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:

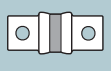
ANL Fuse Advantages:

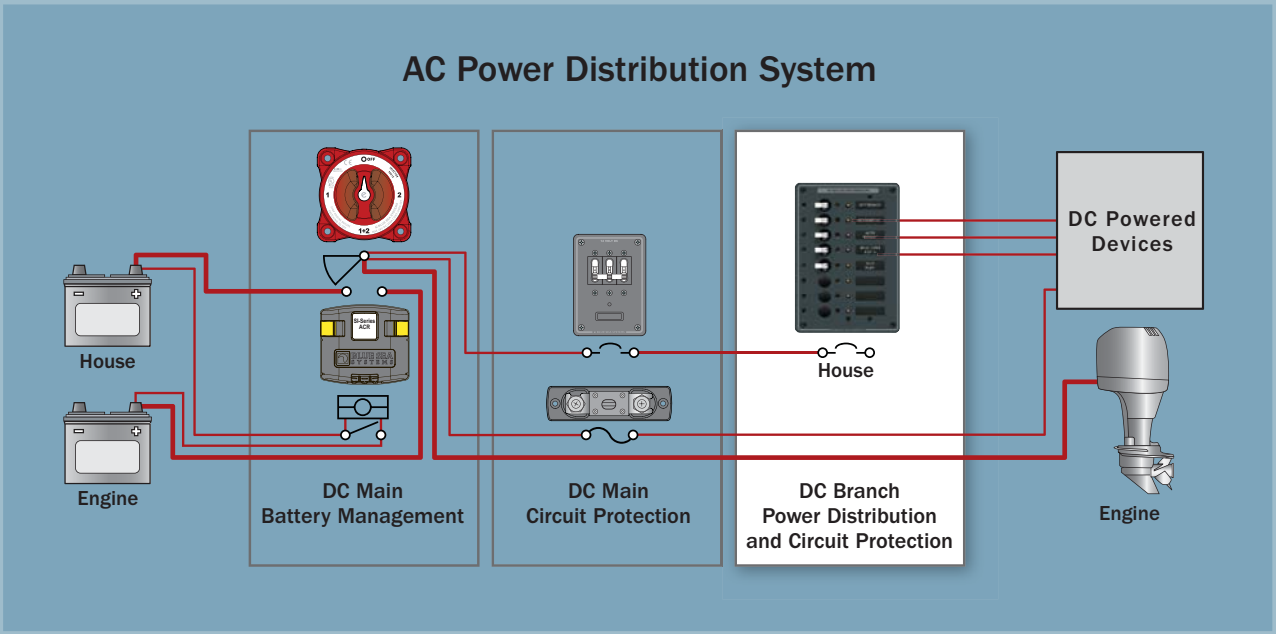
- Lower cost than Class T fuses
- Available in a wider amperage range than Class T Fuses
- Single mounting hole dimension allows all ANL Fuses to be used with the same fuse block
- Fusible link window gives visual indication of fuse being blown
- Ignition protected—safe for installation aboard gasoline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



Class T Fuse Advantages:

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





DC Branch Power Distribution and Circuit Protection

Definition

The portion of the DC power distribution system that conducts power from the DC Main Circuit Protection to the load devices at the end of the circuit. Typically, the DC Branch Distribution System carries lower DC current, roughly 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 in separate devices.

Products in this Section

WeatherDeck™ Waterproof Circuit Breaker Panels and Fuse Panels are designed for flybridge and open cockpit applications. They contain toggle switches, backlit circuit labels, and either push-button-reset circuit breakers or blade fuses. These panels are rated IP67—temporary immersion for 30 minutes.

Contura Waterproof Circuit Breaker Panels and Fuse Panels also are designed for flybridge and open cockpit applications. They contain water resistant ON/OFF Contura switches with embedded ON-indicating LEDs, and either push-button-reset circuit breakers or glass fuses. Contura Waterproof panels are available with 3, 4, 6, and 8 circuit positions. These panels are rated IP66—able to withstand water from heavy seas.

A-Series Toggle Circuit Breaker Panels: There are a wide variety of circuit breaker panels for below deck applications. Panels are available with 3 to 35 circuits, some panels have analog or digital meters, and some have main circuit protection.

Fuse Blocks and Fuses: Blue Sea Systems' multi-circuit fuse blocks are available for below deck applications. ST Glass Fuse Blocks have 6 circuits and are available with and without a negative bus. ST Blade Fuse Blocks are available with 6 or 12 circuits, and with and without a negative bus. Maxi fuse blocks are economical and convenient single circuit devices.

Circuit Breakers: Blue Sea Systems' single pole circuit breakers for branch circuit protection range in current rating from 3 to 100A, and are available in toggle, rocker, and push button thermal models.

Look for the Interrupt Ratings for the fuses and circuit breakers in this section.

Circuit breakers and fuses with higher current ratings and AIC ratings are found in DC Main Circuit Protection.

For more information about selecting suitable DC branch circuit protection, refer to pages 128–130 in this catalog.

DC Current Ratings — 0 Amperes — DC Current Ratings (Amperes) — 150 Amperes

Single Pole Circuit Breakers Page 62

A-Series Toggle, 1 Pole—**Appropriate for DC Branch circuit protection**
Interrupt Rating: 7,500A@65V DC / 3,000A@250V AC **Maximum Voltage:** 65V DC/250V AC
Page 62
5 | 8 | 10 | 15 | 20 | 25 | 30 | 40 | 50

A-Series Flat Rocker, 1 Pole—**Appropriate for DC Branch and 24-hour circuit protection**
Interrupt Rating: 5,000A@32V DC/3,000A@125V AC/1,500A@250V AC **Maximum Voltage:** 32V DC/250V AC
Page 62
5 | 8 | 10 | 15 | 20 | 25 | 30 | 40 | 50

A-Series Restricted OFF Rocker, 1 Pole—**Appropriate for DC Branch and 24-hour circuit protection**
Interrupt Rating: 5,000A@32V DC/3,000A@125V AC/1,500A@250V AC **Maximum Voltage:** 32V DC/250V AC
Page 62
5 | 8 | 10 | 15 | 20 | 25 | 30 | 40 | 50

Fuses Page 65

ATO/ATC Fuse—**Appropriate for small electronic devices** **Interrupt Rating:** 1,000A DC **Maximum Voltage:** 32V DC
Page 65
1 | 2 | 3 | 4 | 5 | 7.5 | 10 | 15 | 20 | 25 | 30

MAXI™ Fuse—**Economical high amp branch circuit protection** **Interrupt Rating:** 1,000A DC **Maximum Voltage:** 32V DC
Page 65
30 | 40 | 50 | 60 | 70 | 80

DC Main Circuit Breakers

Detailed information about these circuit breakers is located in the DC Main Section Pages 46–49

Push Button Reset-Only—**Appropriate for 24-hour circuit protection** **Interrupt Rating:** 3,000A@14.7V DC/2,500A@28V DC
Page 46
3 | 4 | 5 | 7 | 10 | 12 | 15 | 20 | 25 | 30 | 35 | 40

C-Series Toggle, 1 Pole—**Appropriate for DC Main circuit protection**
Interrupt Rating: 10,000A@80V DC/5,000A@250V AC **Maximum Voltage:** 80V DC/250V AC
Page 48
5 | 10 | 15 | 20 | 25 | 30 | 50 | 60 | 80 | 100

C-Series Flat Rocker, 1 Pole— **Appropriate for DC Main circuit protection**
Interrupt Rating: 5,000A@32V DC/3,000A@125V AC **Maximum Voltage:** 32V DC/240V AC
Page 49
5 | 10 | 15 | 20 | 25 | 30 | 50 | 60 | 80 | 100

185-Series—**Appropriate for DC Main circuit protection with battery banks under 1,000 CCA in adverse environments**
Interrupt Rating: 3,000A DC **Maximum Voltage:** 42V DC
Page 46
25 | 30 | 35 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 135 | 150

187-Series—**Appropriate for DC Main circuit protection with battery banks over 1,000 CCA in adverse environments**
Interrupt Rating: 5,000A@12V DC / 3,000A@24V DC/1,500A@42 DC **Maximum Voltage:** 48V DC
Page 47
25 | 30 | 35 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 135 | 150

Circuit Protected Panels Pages 56–61

Waterproof Fuse and Circuit Breaker Panels
Pages 56–59

A-Series Circuit Breaker Panels
Pages 60–61

Fuse Blocks Pages 63–65

ST Glass and ST Blade Fuse Blocks
(Screw Terminal)
Pages 63–64

MAXI™ Fuse Block
Page 65

360 PANEL SYSTEM

See page 9 for a full selection of related products located in the new 360 Panel System section of this catalog.

WeatherDeck™ Waterproof Circuit Breaker Panels

- Designed for flybridge and open cockpit applications
- Designed for 12 or 24 Volt systems
- Constructed from corrosion resistant materials
- Integrated Push Button Reset Only Circuit Breakers for circuit protection
- Independent label backlighting allows switching and dimming
- Backlighting is compatible with all Blue Sea Systems' Digital Dimmers (page 99)
- UV stabilized and weather resistant faceplate
- Rated IP67—temporary immersion for 30 minutes
- Rugged UV stabilized waterproof boots
- Green LEDs illuminate circuit labels
- Panels can be mounted in four different orientations (page 57)
- Available in 4 and 6 circuit models
- Includes 4215—Square Format Label Set (pages 100–101)

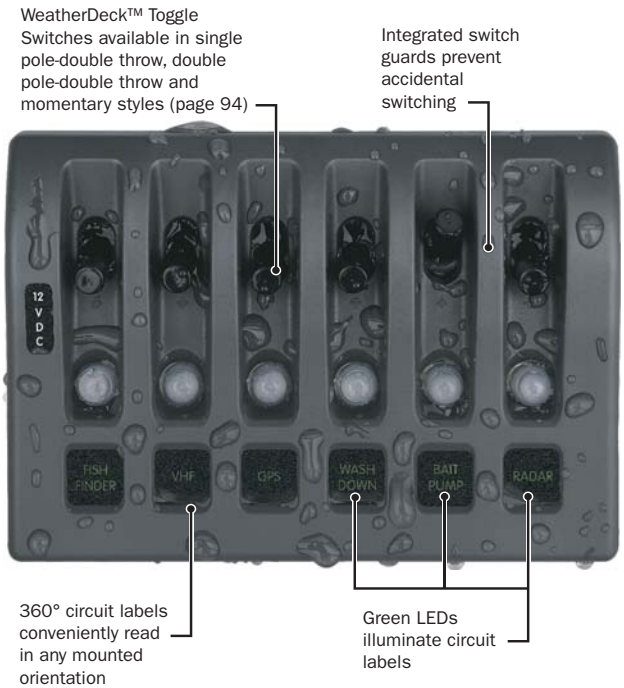
Specifications

Maximum Voltage	24 Volts DC
Maximum Amperage Per Circuit	15 Amperes@12 Volts DC 9 Amperes@24 Volts DC
Panel Cumulative Rating	45 Amperes
Switch Type	OFF/ON Toggle with Waterproof boot (page 94)
Switch Rating	15 Amperes Maximum
Backlighting Voltage	12 Volts DC Nominal
Backlighting Amperage Draw	10mA/Illuminated Circuit
Circuit Breaker Type	Thermal Trip, Manual Reset Only with waterproof boot (page 46)
Circuit Breaker Rating	15 Amperes
Panel Material	Reinforced Thermoplastic
Cover Material	UV Resistant Thermoplastic

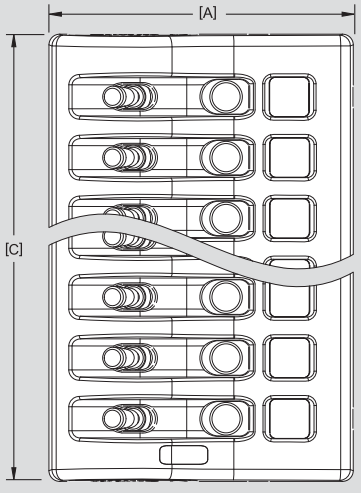
Agency Standards

- Rated IP67—temporary immersion per IEC60529-degree of protection provided by enclosure

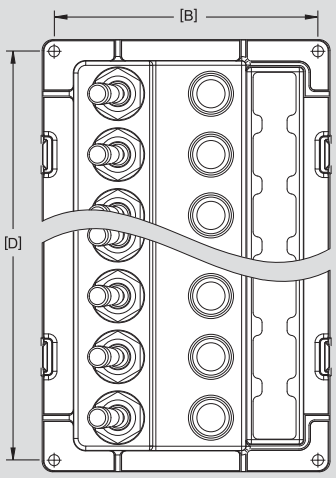
Waterproof rated IP67-temporary immersion for 30 minutes



PN	Color	Description	[A] Width in" (mm)	[B] Mounting Centers in" (mm)	[C] Height in" (mm)	[D] Mounting Centers in" (mm)	Mounting Depth in" (mm)	Weight Lb (Kg)
4374	Gray	4 Position	4.25 (107.95)	3.69 (93.73)	4.30 (109.22)	3.74 (95.00)	3.50 (88.90)	0.97 (0.44)
4376	Gray	6 Position	4.25 (107.95)	3.69 (93.73)	6.00 (152.40)	5.44 (138.18)	3.50 (88.90)	1.36 (0.62)
4384	White	4 Position	4.25 (107.95)	3.69 (93.73)	4.30 (109.22)	3.74 (95.00)	3.50 (88.90)	0.97 (0.44)
4386	White	6 Position	4.25 (107.95)	3.69 (93.73)	6.00 (152.40)	5.44 (138.18)	3.50 (88.90)	1.36 (0.62)



With Cover



Without Cover

Rugged UV stabilized waterproof boots protect WeatherDeck™ Toggle Switches (page 94)

Rugged UV stabilized waterproof boots protect Push Button Reset Only Thermal Circuit Breakers (page 46)

4 Position - Gray

4374

4 Position - White

4384

6 Position - Gray

4376

6 Position - White

4386

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

Waterproof boots protect Push Button Circuit Breakers

Labels can be rotated 360° according to mounting orientation

30 Square Format Labels (4215) included for circuit identification (pages 100–101)

Four Mounting Orientations

Panels can be mounted in 4 orientations to expand location possibilities—Circuit labels can be applied accordingly.

WeatherDeck™ Waterproof Fuse Panels

- Designed for flybridge and open cockpit applications
- Designed for 12 Volt systems
- Constructed from corrosion resistant materials
- Integrated ATO/ATC fuse-based circuit protection
- Independent label backlighting circuit for remote switching and dimming
- Backlighting is compatible with all Blue Sea Systems' Digital Dimmers (page 99)
- UV stabilized and weather resistant faceplate
- Rated IP67—temporary immersion for 30 minutes
- Rugged UV stabilized waterproof boots
- Panels can be mounted in four different orientations
- Available in 2, 4, 6, and 8 circuit models
- Includes 4215—Square Format Label Set (pages 100–101)

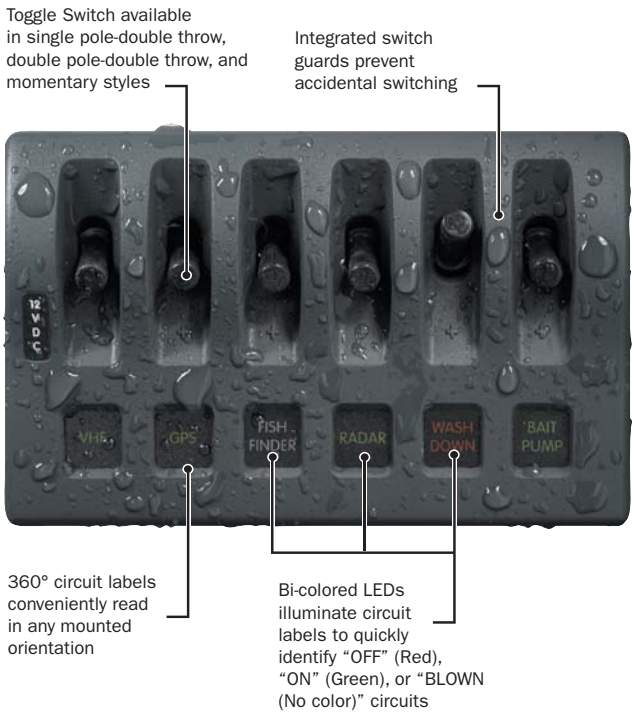
Specifications

Maximum Voltage	12 Volts DC
Maximum Amperage Per Circuit	15 Amperes
Panel Cumulative Rating	2 Position—30 Amperes 4 Position—60 Amperes 6 Position—90 Amperes 8 Position—100 Amperes
Switch Type	OFF/ON Toggle with waterproof boot (page 94)
Switch Rating	15 Amperes maximum
Backlighting Voltage	12 Volts DC Nominal
Backlighting Current	10mA/Illuminated Circuit
Fuse Type	ATO/ATC Automotive Blade-Type
Fuses Available	1–40 Amperes
Panel Material	Reinforced Thermoplastic
Cover Material	UV Resistant Thermoplastic

Agency Standards

- Rated IP67—temporary immersion per IEC60529-degree of protection provided by enclosure

Waterproof rated IP67—temporary immersion for 30 minutes



PN	Description	Color	Width in" (mm)	Height in" (mm)	Width Mounting Centers in" (mm)	Height Mounting Centers in" (mm)	Weight Lb (Kg)
4302	2 Position	Gray	3.88 (98.55)	2.60 (66.04)	3.31 (84.07)	2.04 (51.82)	0.52 (0.24)
4304	4 Position	Gray	3.88 (98.55)	4.30 (109.22)	3.31 (84.07)	3.74 (95.00)	0.90 (0.41)
4306	6 Position	Gray	3.88 (98.55)	6.00 (152.40)	3.31 (84.07)	5.44 (138.18)	1.15 (0.52)
4308	8 Position	Gray	3.88 (98.55)	7.70 (195.58)	3.31 (84.07)	7.14 (181.36)	1.55 (0.70)
4312	2 Position	White	3.88 (98.55)	2.60 (66.04)	3.31 (84.07)	2.04 (51.82)	0.52 (0.24)
4314	4 Position	White	3.88 (98.55)	4.30 (109.22)	3.31 (84.07)	3.74 (95.00)	0.90 (0.41)
4316	6 Position	White	3.88 (98.55)	6.00 (152.40)	3.31 (84.07)	5.44 (138.18)	1.15 (0.52)
4318	8 Position	White	3.88 (98.55)	7.70 (195.58)	3.31 (84.07)	7.14 (181.36)	1.55 (0.70)

2 Position - Gray

4302

4 Position - Gray

4304

8 Position - Gray

4308

6 Position - Gray

4306

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

Four Mounting Orientations

Panels can be mounted in 4 orientations to expand location possibilities - Circuit labels can be applied accordingly.

Contura Waterproof Panels

Common Features

- Designed for flybridge and open cockpit applications
- Designed for 12 or 24 Volt systems
- ON-OFF Contura Switches
- Watertight mounting gasket
- Rated IP66—withstands water from heavy seas
- Countersunk mounting holes throughout
- Heavy 1/8" aluminum material
- “ON” indicating LEDs embedded in switch
- MIL-C-5541C or equivalent immersion undercoating for lifetime corrosion resistance
- Completely wired and ready to install

Circuit Breaker Panel Features (IP)

- Push Button Circuit Breaker with waterproof boot (page 46)
- Ignition protected—safe for installation aboard gasoline powered boats
- Two-part polyurethane white or black finish

Fuse Panel and Bilge Pump Control Panel Features

- Fuse holders accept commonly available AGC and MDL glass fuses
- Two-part polyurethane slate gray finish
- Industry standard height and width
- 8053 and 8054 Includes 8030—Large Format Label Set (pages 100–101)
- 8261 and 8262 Includes DC 30 common labels

NOTE: Waterproof panel labels are not backlit

Specifications

Maximum Voltage	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
Fuse Holder Rating	20 Amperes maximum
Panel Cumulative Rating	45 Amperes

Certifications and Agency Standards

- Rated IP66—withstands water from heavy seas per IEC60529-degree of protection provided by enclosure
- Meets UL 1500 and ISO 8846 ignition protection requirements (Contura Waterproof Circuit Breaker Panels only)

Waterproof rated IP66—withstands water from heavy seas

3 Position - Vertical

8374

6 Position - Vertical

8373

4 Position - Horizontal

8272

8 Position - Horizontal

8271

3 Position - Vertical

8054

4 Position - Horizontal

8262

8 Position - Horizontal

8261

6 Position - Vertical

8053

8263

Contura Waterproof Circuit Breaker Panels					
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)	0.75 (0.34)
8272	4 Position Horizontal	White	5.25 (133.35)	4.25 (107.95)	0.90 (0.41)
8273	6 Position Vertical	White	4.50 (114.30)	7.50 (190.50)	1.35 (0.61)
8271	8 Position Horizontal	White	9.37 (238.00)	4.25 (107.95)	1.75 (0.79)
8374	3 Position Vertical	Black	4.50 (114.30)	3.75 (95.25)	0.75 (0.34)
8372	4 Position Horizontal	Black	5.25 (133.35)	4.25 (107.95)	0.90 (0.41)
8373	6 Position Vertical	Black	4.50 (114.30)	7.50 (190.50)	1.35 (0.61)
8371	8 Position Horizontal	Black	9.37 (238.00)	4.25 (107.95)	1.75 (0.79)

Contura Waterproof Fuse Panels					
PN	**Description**	**Color**	**Width in" (mm)**	**Height in" (mm)**	**Weight Lb (Kg)**
8054	3 Position Vertical	Slate Gray	5.25 (133.35)	3.75 (95.25)	0.70 (0.32)
8053	6 Position Vertical	Slate Gray	5.25 (133.35)	7.50 (190.50)	1.20 (0.54)
8262	4 Position Horizontal	Slate Gray	5.25 (133.35)	3.75 (95.25)	0.75 (0.34)
8261	8 Position Horizontal	Slate Gray	9.37 (238.00)	3.75 (95.25)	1.40 (0.64)
8263	Bilge Pump Control Panel	Slate Gray	2.25 (57.15)	3.75 (95.25)	0.25 (0.11)

(IP) IGNITION PROTECTED

Specifications subject to change. See www.bluesea.com for current information.

A-Series Circuit Breaker Panels

Common Features

- All positive, negative and grounding buses installed
- Panels with meters include a toggle switch for monitoring up to 3 battery banks
- All panels with analog meters are owner upgradable to 24 Volts with 8240 or 8243 18-32V DC meters (page 110)
- All circuit label positions are backlit on standard panels—No kit required
- "ON" indicating LEDs installed in all circuit positions
- MIL-C-5541C or equivalent immersion undercoating for lifetime corrosion resistance

▷ **Panels are available with white or black circuit breakers installed.**

- Two-part polyurethane slate gray finish
- Heavy 1/8" aluminum 5052 alloy
- Industry standard height and width
- Countersunk mounting holes throughout
- Detailed installation instructions and cutout template included
- Includes 8030—Large Format Label Set (pages 100–101)
- Over 500 individual labels available (102–103)

3 Position

8025 3025

6 Position

8096 3096

8 Position

8385 3385

12 Position

8375 3375

8 Position

8023 3023

5 Position

8401 3401

5 Position

8081 3081

13 Position

8068 3068

13 Position

8403 3403

16 Position

8377 3377

24 Position

8264 3264

Main + 20 Positions

8379 3379

18 Position

8378 3378

10 Position

8402 3402

10 Position

8082 3082

13 Position

8376 3376

Main + 22 Positions

8380 3380

Main + 32 Positions

8381 3381

Main + 35 Positions

8382 3382

A-Series Toggle Main Circuit Breaker Panels

PN	PN	Description	Meter Type PN	Meter Page	Voltage	Amperage	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed C-Series Main Circuit Breakers	Installed Single Pole Circuit Breakers
										100A	15A
8379	3379	Main + 20 Positions	Multimeter 8248	106	12/24V	100A	14.75 (374.65)	7.50 (190.50)	8.40 (3.81)	1	14
8380	3380	Main + 22 Positions	Volt, Amp 8028, 8250	110	12V	100A	10.50 (266.70)	11.25 (285.75)	8.25 (3.74)	1	16
8381	3381	Main + 32 Positions	Volt, Amp 8003, 8017	110	12V	100A	14.75 (374.65)	11.25 (285.75)	8.60 (3.89)	1	23
8382	3382	Main + 35 Positions	Multimeter 8248	106	12/24V	100A	14.75 (374.65)	11.25 (285.75)	10.80 (4.92)	1	26

A-Series Toggle Branch Circuit Breaker Panels

PN	PN	Description	Meter Type PN	Meter Page	Voltage	Amperage	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed C-Series Main Circuit Breakers	Installed Single Pole Circuit Breakers
										100A	15A
8025	3025	3 Position	-	-	12/24V	100A	5.25 (133.35)	3.75 (95.25)	1.15 (0.52)	-	3
8401	3401	5 Position	Multimeter 8248	106	12/24V	100A	5.25 (133.35)	7.50 (190.50)	3.45 (1.56)	-	5
8081	3081	5 Position	Volt, Amp 8028, 8041	110	12V	50A	5.25 (133.35)	7.50 (190.50)	2.25 (1.02)	-	5
8096	3096	6 Position	-	-	12/24V	100A	10.50 (266.70)	3.75 (95.25)	2.25 (1.02)	-	6
8023	3023	8 Position	-	-	12/24V	100A	5.25 (133.35)	7.50 (190.50)	1.95 (0.88)	-	5
8385	3385	8 Position	-	-	12/24V	100A	10.50 (266.70)	4.50 (114.30)	2.70 (1.22)	-	6
8402	3402	10 Position	Multimeter 8248	106	12/24V	100A	5.25 (133.35)	11.25 (285.75)	4.21 (1.91)	-	7
8082	3082	10 Position	Volt, Amp 8028, 8041	110	12V	50A	5.25 (133.35)	11.25 (285.75)	3.35 (1.52)	-	7
8375	3375	12 Position	-	-	12/24V	100A	14.75 (374.65)	4.50 (114.30)	5.84 (2.65)	-	10
8376	3376	13 Position	-	-	12/24V	100A	5.25 (133.35)	11.25 (285.75)	2.76 (1.25)	-	10
8403	3403	13 Position	Multimeter 8248	106	12/24V	100A	10.50 (266.70)	7.50 (190.50)	5.15 (2.34)	-	10
8068	3068	13 Position	Volt, Amp 8028, 8041	110	12V	50A	10.50 (266.70)	7.50 (190.50)	4.20 (1.91)	-	10
8377	3377	16 Position	-	-	12/24V	100A	10.50 (266.70)	7.50 (190.50)	3.68 (1.67)	-	10
8378	3378	18 Position	Volt, Amp 8003, 8017	110	12V	50A	14.75 (374.65)	7.50 (190.50)	7.80 (3.54)	-	15
8264	3264	24 Position	-	-	12/24V	100A	14.75 (374.65)	7.50 (190.50)	7.45 (3.38)	-	15

360 PANEL SYSTEM

See pages 14–15 for a full selection of related products located in the new 360 Panel System section of this catalog.

A-Series Toggle Circuit Breakers Single Pole

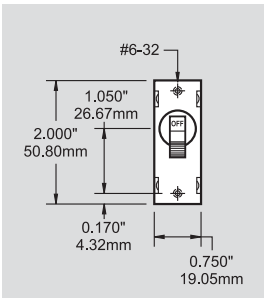
- Meets American Boat and Yacht Council (ABYC) standards
- The industry standard circuit breaker for Blue Sea Systems' electrical panels
- Combines switching and circuit protection into a single device
- "Trip Free" design cannot be held "ON" during fault current condition

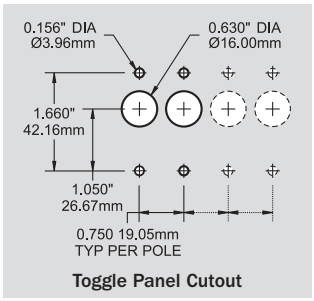
Specifications

Interrupt Rating	See Interrupt Rating Table below
Maximum Voltage	See Interrupt Rating Table below
Circuit Breaker Type	Magnetic Hydraulic—Trip free
Operating Temperature Range	-40°C to +85°C
Terminal Screw	#10-32 SS with external tooth lock washer - Recommended torque 14–15 in-lb
Trip Time Delay	See www.bluesea.com
Rated Switch Cycles	10,000@rated amperage and voltage
Mounting Screw	#6-32 - Recommended torque 6–8 in-lb
Weight	0.17Lb (0.08Kg)

Certifications and Agency Standards

- CE marked, TUV certified, CSA certified
- UL 1077 recognized





Toggle Panel Cutout

7200 7202

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
7218	White	25A

PN	Color	Amperage
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

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

[1] UL Recognized

A-Series Flat and Restricted Off Rocker Circuit Breakers Single Pole

- Rocker actuator is flush in the "ON" position, eliminating the risk of accidental switching
- Color actuator indicates "OFF" position
- "Trip Free" design cannot be held "ON" during fault current condition
- 2 different actuator styles available
- Prevents accidental switching of 24 hour circuits
- International ON/OFF symbols support vertical or horizontal mounting

Specifications

Interrupt Rating	See Interrupt Rating table below
Maximum Voltage	See Interrupt Rating table below
Circuit Breaker Type	Magnetic Hydraulic—Trip free
Operating Temperature Range	-40°C to +85°C
Terminal Screw	30° Angled #10-32 x 5/16 SS SEM LOAD external tooth lock washer - Recommended torque 14–15 in-lb
Trip Time Delay	See www.bluesea.com
Rated Switch Cycles	10,000@rated amperage and voltage
Mounting Screw	#6-32 SS - Recommended torque 6–8 in-lb
Weight	0.16Lb (0.07Kg)

Certifications and Agency Standards

- CE marked, TUV certified, CSA certified
- UL 1077 recognized

Interrupt Ratings (see ABYC Interrupt Rating Requirements page 129)

A-Series Flat and Restricted Off Rocker Circuit Breakers			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - TUV (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
32V DC	5-50A	5,000A	-
120V AC	5-50A	3,000A	-
240V AC	5-50A	1,500A	1,500A

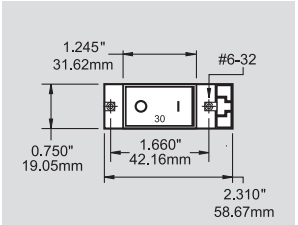
[1] UL Recognized

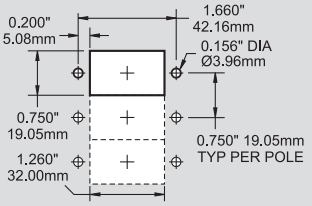
Flat

7403

Restricted Off

7425





Rocker Panel Cutout

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

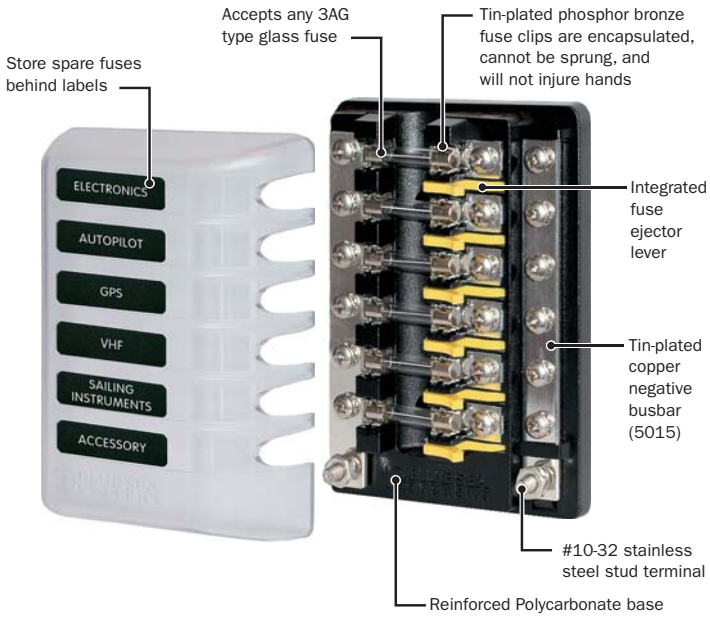
PN	Actuator	Poles	Amperage
7425	Restricted Off	1	5A
7426	Restricted Off	1	8A
7427	Restricted Off	1	10A
7428	Restricted Off	1	15A
7429	Restricted Off	1	20A
7430	Restricted Off	1	25A
7431	Restricted Off	1	30A
7432	Restricted Off	1	40A
7433	Restricted Off	1	50A

ST Glass Fuse Blocks (Screw Terminal)

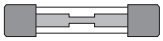
- Clear insulating cover with label recesses accepts Large Format Labels (page 100)
- Cover satisfies ABYC/USCG insulation requirements
- Tin-plated copper buses and phosphor bronze fuse clips give 30 Amperes rating per circuit
- Accepts AGC (Fast Acting), MDL (Time-Delay) and all other 3AG Glass Fuses

Specifications

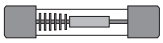
Maximum Voltage	32 Volts DC
Maximum Amperage per circuit	30 Amperes DC
Maximum Amperage per block	100 Amperes DC
Fuse Type	AGC/MDL Fuses
Fuse Rating	1/8 to 30 Amperes DC
Screw Terminal	#8-32 with Captive Star Lockwasher
Base Material	Reinforced Polycarbonate
Cover Material	Polycarbonate



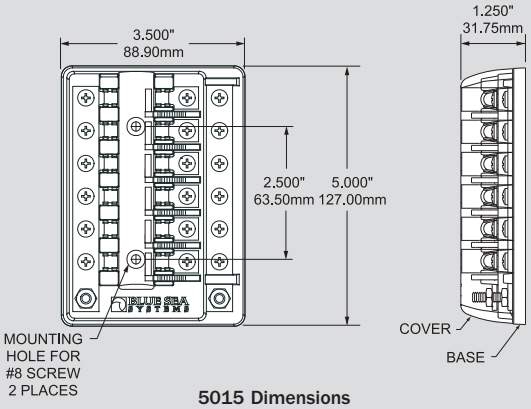
PN	Description	Weight Lb (Kg)
5015	6 circuit with negative bus	0.55 (0.25)
5018	6 circuit without negative bus	0.48 (0.22)



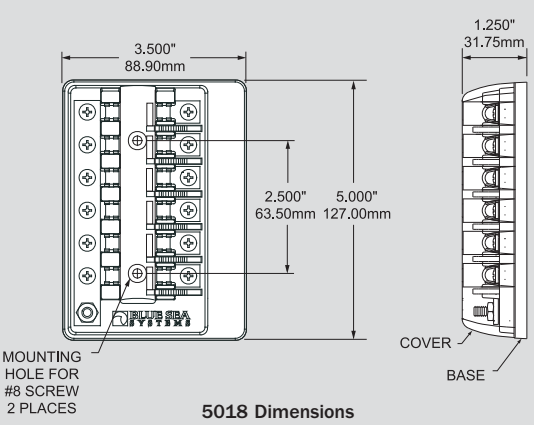
AGC Fuse



MDL Fuse



5015 Dimensions



5018 Dimensions

6 Circuit with Negative Bus

5015

6 Circuit

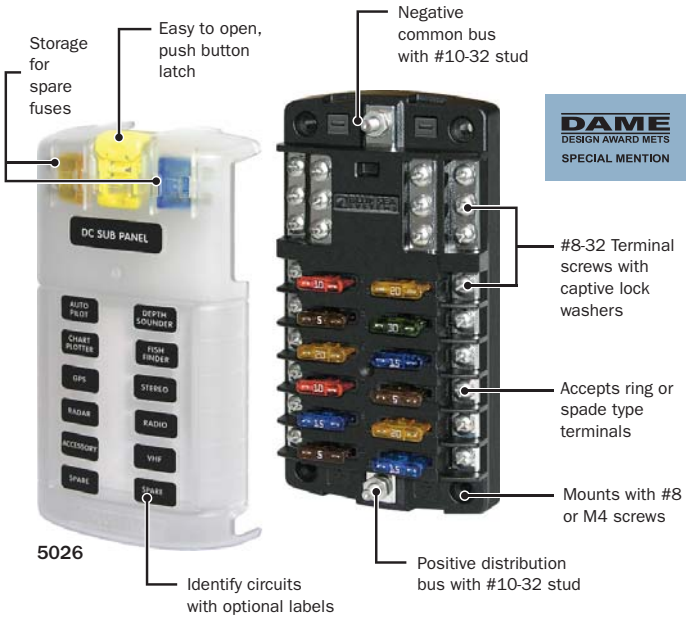
5018

ST Blade Fuse Blocks (Screw Terminal)

- Clear insulating cover with label recesses accepts Small Format Labels (page 100)
- Cover satisfies ABYC/USCG insulation requirements
- Tin-plated copper buses and fuse clips give 30 Amperes rating per circuit
- Accepts ATO and ATC fast acting blade fuses (page 65)
- ST Blade Fuse Blocks with covers include 20 write-on circuit labels

Specifications

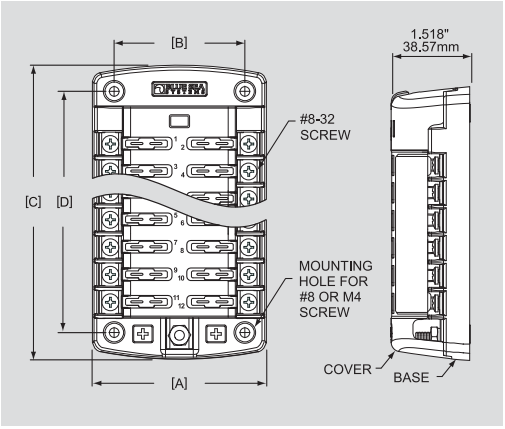
Maximum Voltage	32 Volts DC
Maximum Amperage per circuit	30 Amperes DC
Maximum Amperage per block	100 Amperes DC
Fuse Type	ATO/ATC Fuses
Fuse Rating	1 to 30 Amperes DC
Screw Terminal	#8-32 Screws with Captive Star Lockwasher
Base Material	Reinforced Polycarbonate
Cover Material	Polycarbonate



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	0.42 (0.19)
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)

▶ See page 65 for ATO/ATC Fuses.



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

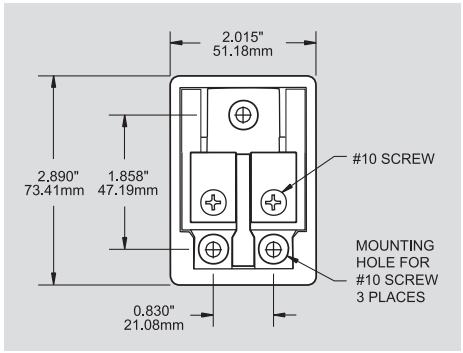
- The most economical fuse block for 30–80 Ampere fusing
- Snap-on terminal cover insulates all conductive parts, satisfying ABYC/USCG requirements
- Accepts wire sizes 18–4 AWG from sides or bottom
- For use on systems up to 32 Volts DC
- Terminal screws compress fuse blades within blocks for low resistance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

Specifications

Maximum Voltage	32 Volts DC
Maximum Amperage	80 Amperes
Fuse Type	MAXI™ Fuses
Fuse Rating	30–80 Amperes
Base Material	Reinforced Polycarbonate

PN	Description	Weight Lb (Kg)
5006	30–80A	0.25 (0.11)

5006



▶ **See MAXI™ Fuses below**

ATO/ATC Fuses

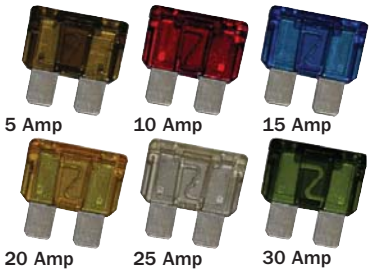
- Fast-acting type fuses ideal for electronic devices
- Standard circuit protection device for automobiles and trucks
- Tin-plated connector blades for corrosion resistance
- Visible indication of blown condition
- Sold in packages of 2

Specifications

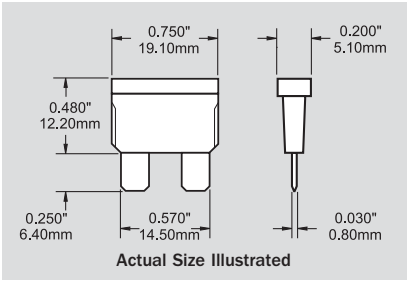
Interrupt Rating	1,000 Amperes DC
Maximum Voltage	32 Volts DC
Blow Time Delay	See www.bluesea.com
Weight per package	0.03Lb (0.01Kg)

▶ **See page 64 for ST Blade Fuse Blocks** (Screw Terminal)
▶ **See page 58 for WeatherDeck™ Waterproof Fuse Panels**

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



5 Amp 10 Amp 15 Amp
20 Amp 25 Amp 30 Amp



Actual Size Illustrated

MAXI™ Fuses

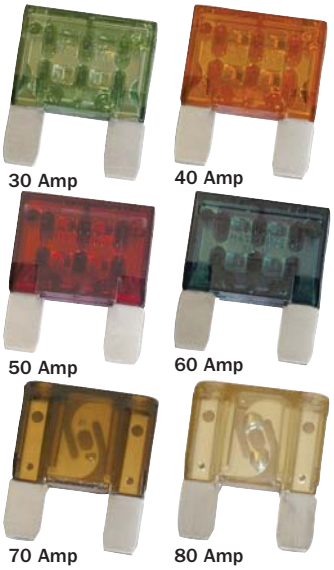
- Economical
- Tin-plated connector blades for corrosion resistance
- Visible indication of blown condition
- Sold in packages of 2

Specifications

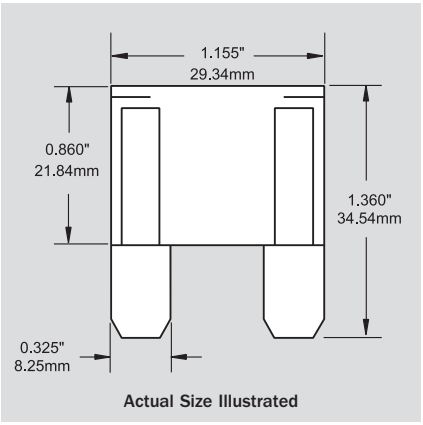
Interrupt Rating	1,000 Amperes DC
Maximum Voltage	32 Volts DC
Blow Time Delay	See www.bluesea.com
Weight per package	0.04Lb (0.02Kg)

PN	Amperage
5138	30A
5139	40A
5140	50A
5141	60A
5142	70A
5143	80A

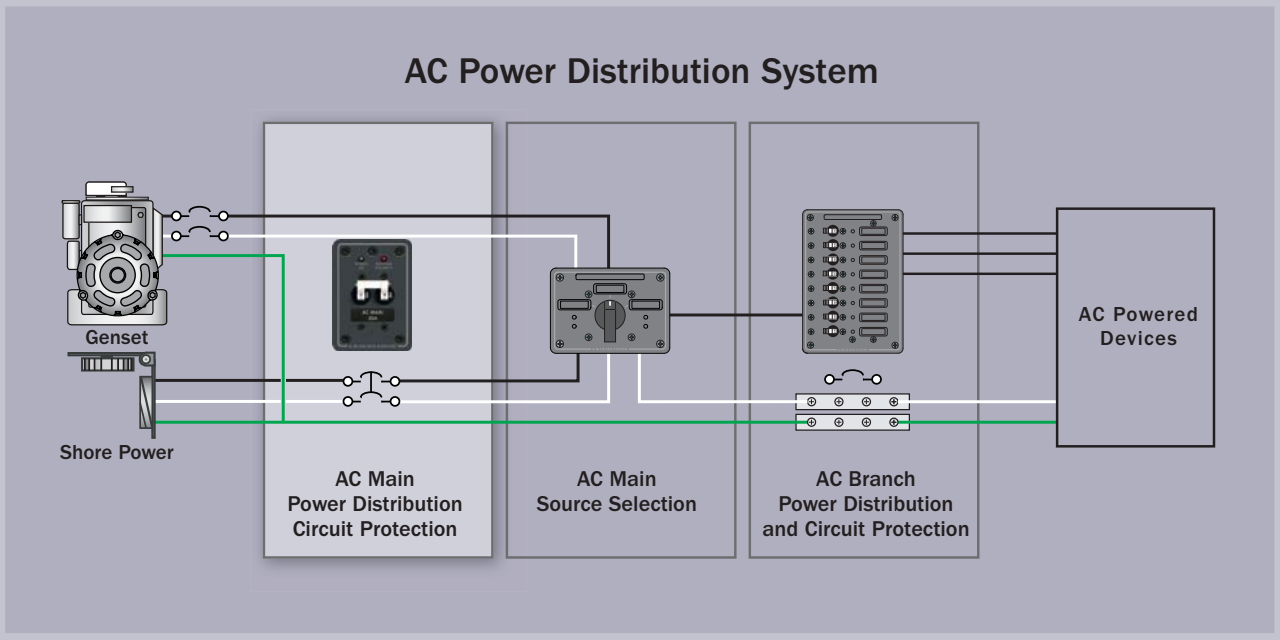
▶ **See MAXI™ Fuse Block above**



30 Amp 40 Amp
50 Amp 60 Amp
70 Amp 80 Amp



Actual Size Illustrated



AC Main Power Distribution and Circuit Protection

Definition

The AC Main power system begins at the AC power sources (shore power, genset, or inverter), and 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

AC Main power distribution provides a path for delivering power from the ship's source of AC power to the AC branch distribution system. The devices used to distribute AC power are frequently the same as the devices that provide AC circuit protection. Sources of AC power, whether shore power or on-board generators and inverters, always have a circuit breaker near the power source. It is designated the AC main circuit breaker.

Considerations

In order to qualify as an AC main circuit breaker, four requirements must be met:

- The circuit breaker must have a suitable AIC rating
- The circuit breaker must be multiple pole, usually double or triple
- The circuit breaker must be rated for the appropriate AC system voltage in which it will be used
- 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.

Products in this Section

Circuit Breakers: Circuit breakers used for AC Main circuit protection are double and triple pole, they are available in rocker and toggle models, and range in continuous current ratings from 10 to 100A. Circuit breaker mounting panels are available.

Power Distribution and Circuit Protection Panels: Blue Sea Systems' AC Main power distribution panels are available in a variety of configurations. There are Main Only panels in 120V, 120/240V, and 230V (typical of Europe) ratings. There are C-Series Toggle circuit breaker panels available in 120/240V ratings, and A-Series Toggle available in 120V and 230V (Typical of Europe) ratings. Panels are available with and without meters, with and without main circuit breakers, and from 1 to 34 positions.

For more information about AC Main Power Distribution and Circuit Protection, refer to pages 131–132 in this catalog.

AC Current Ratings — 0 Amperes — **AC Current Ratings** (Amperes) — 200 Amperes

Double and Triple Pole Circuit Breakers and Mounting Panel Pages 70–73

A-Series Toggle, 2 Pole **Interrupt Rating:** 3,000A AC **Maximum Voltage:** 250V AC

Page 70

10 | 15 | 16 | 20 | 30 | 32 | 40 | 50

A-Series Flat Rocker, 2 Pole **Interrupt Rating:** 3,000A AC **Maximum Voltage:** 240V AC

Page 71

10 | 15 | 16 | 20 | 30 | 32 | 40 | 50

A-Series Raised Rocker, 2 Pole **Interrupt Rating:** 3,000A AC **Maximum Voltage:** 240V AC

Page 71

10 | 15 | 16 | 20 | 30 | 32 | 40 | 50

C-Series Toggle, 2 Pole **Interrupt Rating:** 5,000A AC **Maximum Voltage:** 250V AC

Page 72

30 | 50 | 60 | 80 | 100

C-Series Toggle, 3 Pole **Interrupt Rating:** 5,000A AC **Maximum Voltage:** 250V AC

Page 72

50 | 60 | 80 | 100

C-Series Flat Rocker, 2 Pole **Interrupt Rating:** 5,000A AC **Maximum Voltage:** 240V AC

Page 73

30 | 50 | 60 | 80 | 100

C-Series Raised Rocker, 2 Pole **Interrupt Rating:** 5,000A AC **Maximum Voltage:** 240V AC

Page 73

30 | 50 | 60 | 80 | 100

C-Series Flat Rocker, 3 Pole **Interrupt Rating:** 5,000A AC **Maximum Voltage:** 240V AC

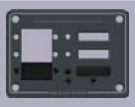
Page 73

50 | 60 | 80 | 100

C-Series Raised Rocker, 3 Pole **Interrupt Rating:** 5,000A AC **Maximum Voltage:** 240V AC

Page 73

50 | 60 | 80 | 100



Toggle Circuit Breaker Mounting Panels

Page 70

Toggle Circuit Breaker Panels Pages 68–69, 73

120 Volt AC Main A-Series Circuit Breaker Panels

Pages 68–69

230 Volt AC Main A-Series Circuit Breaker Panels
(Typical of Europe)

Pages 68–69

120/240 Volt AC C-Series Toggle Circuit Breaker Panels

Page 73

360 PANEL SYSTEM

See page 17 for a full selection of related products located in the new 360 Panel System section of this catalog.

AC Main A-Series Circuit Breaker Panels

▷ **Panels available with white or black circuit breakers installed.**

Common Features

- Red reverse polarity indication LED
- All hot, neutral, and safety ground buses installed, fully pre-wired
- All circuit label positions are backlit on standard panels - No kit required
- "ON" indicating LEDs installed in all circuit positions
- MIL-C-5541C or equivalent immersion undercoating for lifetime corrosion resistance
- Two-part polyurethane slate gray finish
- Heavy 1/8" aluminum 5052 alloy
- Industry standard height and width
- Countersunk mounting holes throughout
- Detailed installation instructions and cutout template included
- Includes 8031—Large Format Label Set (pages 100–101)
- Over 500 individual labels available (pages 102–103)
- Maximum panel amperage - 50 Amperes

Main Only

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

Main + 1 Positions[1]

8029/8129*
3029/3129*

Main + 4 Positions

8099/8199* 3099/3199*

Main + 6 Positions

8412/8512* 3412/3512*

Main + 6 Positions

8027/8127*
3027/3127*

Main + 3 Positions

8043/8143*
3043/3143*

Main + 3 Positions

8409/8509*
3409/3509*

Main + 3 Positions

8405/8505*
3405/3505*

Main + 14 Positions

8464/8564* 3464/3564*

Main + 11 Positions

8076/8176* 3076/3176*

Main + 11 Positions

8407/8507* 3407/3507*

Main + 22 Positions

8465/8565* 3465/3565*

Main + 16 Positions

8471/8571* 3471/3571*

Main + 11 Positions

8485/3485*
8585/3585*

Main + 8 Positions

8488/8588*
3488/3588*

Main + 8 Positions

8074/8174*
3074/3174*

Main + 8 Positions

8406/8506*
3406/3506*

Main + 31 Positions

8486/8586* 3486/3586*

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

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 desired.

120 Volt Main Only A-Series 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			
								16A	30A	32A	50A
8077	3077	Main Only	-	-	2.63 (66.80)	3.75 (95.25)	3.75 (95.25)	-	1	-	
8079	3079	Main Only	-	-	2.63 (66.80)	3.75 (95.25)	3.75 (95.25)	-	-	-	1

230 Volt Main Only A-Series 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			
								16A	30A	32A	50A
8177	3177	Main Only	-	-	2.63 (66.80)	3.75 (95.25)	3.75 (95.25)	1	-	-	-
8179	3179	Main Only	-	-	2.63 (66.80)	3.75 (95.25)	3.75 (95.25)	1	-	1	-

120 Volt Main A-Series 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
8029	3029	Main + 1 Position	-	-	5.25 (133.35)	3.75 (95.25)	1.05 (0.48)	1	-	-
8043	3043	Main + 3 Positions	Analog/9353	111	5.25 (133.35)	7.50 (190.50)	2.00 (0.91)	1	-	3
8409	3409	Main + 3 Positions	Analog/8246, 8244	111	5.25 (133.35)	7.50 (190.50)	4.06 (1.84)	1	-	3
8405	3405	Main + 3 Positions	Digital/8247	107	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)	2.00 (0.91)	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	111	5.25 (133.35)	11.25 (285.75)	3.00 (1.36)	1	-	5
8074	3074	Main + 8 Positions	Analog/8244, 8246	111	5.25 (133.35)	11.25 (285.75)	3.28 (1.49)	1	-	5
8406	3406	Main + 8 Positions	Digital/8247	107	5.25 (133.35)	11.25 (285.75)	3.18 (1.44)	1	-	5
8076	3076	Main + 11 Positions	Analog/8244, 8246	111	10.50 (266.70)	7.50 (190.50)	4.24 (1.92)	1	-	8
8407	3407	Main + 11 Positions	Digital/8247	107	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	111	14.75 (374.65)	7.50 (190.50)	5.96 (2.70)	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	111	14.75 (374.65)	11.25 (285.75)	8.94 (4.05)	1	-	22

230 Volt Main A-Series 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
8129	3129	Main + 1 Position	-	-	5.25 (133.35)	3.75 (95.25)	1.05 (0.48)	1	-	-
8143	3143	Main + 3 Positions	Analog/9354	111	5.25 (133.35)	7.50 (190.50)	2.00 (0.91)	1	-	3
8509	3509	Main + 3 Positions	Analog/8246, 8245	111	5.25 (133.35)	7.50 (190.50)	4.06 (1.84)	1	-	3
8505	3505	Main + 3 Positions	Digital/8247	107	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)	2.00 (0.91)	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	111	5.25 (133.35)	11.25 (285.75)	3.00 (1.36)	1	-	5
8174	3174	Main + 8 Positions	Analog/8246, 8245	107	5.25 (133.35)	11.25 (285.75)	3.28 (1.49)	1	-	5
8506	3506	Main + 8 Positions	Digital/8247	107	5.25 (133.35)	11.25 (285.75)	3.18 (1.44)	1	-	5
8176	3176	Main + 11 Positions	Analog/8246, 8245	111	10.50 (266.70)	7.50 (190.50)	4.24 (1.92)	1	-	8
8507	3507	Main + 11 Positions	Digital/8247	107	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/9354, 9630	111	14.75 (374.65)	7.50 (190.50)	5.96 (2.70)	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/9354, 9630	111	14.75 (374.65)	11.25 (285.75)	8.94 (4.05)	1	-	22

360 PANEL SYSTEM

See page 17 for a full selection of related products located in the new 360 Panel System section of this catalog.

A-Series Toggle Circuit Breakers Double Pole

- Meets American Boat and Yacht Council (ABYC) standards
- The industry standard circuit breaker for Blue Sea Systems electrical panels
- Combines switching and circuit protection into a single device
- Used as AC main circuit protection
- "Trip Free" design cannot be held "ON" during fault current condition
- For circuit breaker mounting panel 8173 (see below)

7233

Specifications

Interrupt Rating	See Interrupt Rating Table below
Maximum Voltage	See Interrupt Rating Table below
Circuit Breaker Type	Magnetic Hydraulic - Trip free
Operating Temperature Range	-40°C to +85°C
Terminal Screw	#10-32 SS with external tooth lockwasher - Recommended torque 14-15 in-lb
Trip Time Delay	See www.bluesea.com
Rated Switch Cycles	10,000 @ rated amperage and voltage
Mounting Screw	#6-32 SS - Recommended torque 6-8 in-lb
Weight	0.30Lb (0.14Kg)

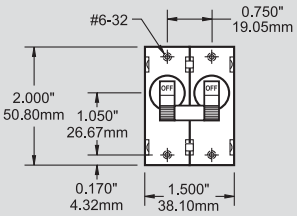
Certifications and Agency Standards

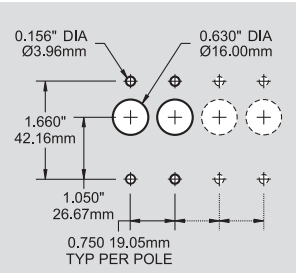
- CE marked, TUV certified, CSA certified
- UL 1077 recognized

Interrupt Ratings (see ABYC Interrupt Rating Requirements page 129)

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

[1] **UL Recognized**





Panel Cutout

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

PN	Color	Amperage
7237	Black	30A
7238	White	30A
7349	Black	32A
7295	White	32A
7239	Black	40A
7240	White	40A
7241	Black	50A
7242	White	50A

A-Series Toggle Circuit Breaker Mounting Panel Double Pole

- Mounts A-Series Double Pole Toggle Circuit Breakers (see above)
- Slate gray matches standard panel color

Specifications

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
Dimensions	2.63" (66.80mm) x 3.75" (95.25mm)

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

8173

A-Series Raised and Flat Rocker Circuit Breakers Double Pole

- Color actuator indicates "OFF" position
- "Trip Free" design cannot be held "ON" during fault current condition
- 2 different styles available
- International ON/OFF symbols support vertical or horizontal mounting

Specifications

Interrupt Rating	See Interrupt Rating table below
Maximum Voltage	See Interrupt Rating table below
Circuit Breaker Type	Magnetic Hydraulic - Trip free
Operating Temperature Range	-40°C to +85°C
Terminal Screw	30° Angled #10-32 x 5/16 SS SEM LOAD external tooth lock washer - Recommended torque 14-15 in-lb trip time delay See www.bluesea.com
Rated Switch Cycles	10,000@rated amperage and voltage
Mounting Screw	#6-32 SS - Recommended torque 6-8 in-lb

Certifications and Agency Standards

- CE marked, TUV certified, CSA certified
- UL 1077 recognized

Raised

7574

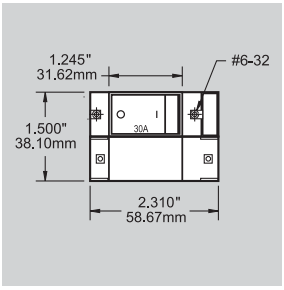
Flat

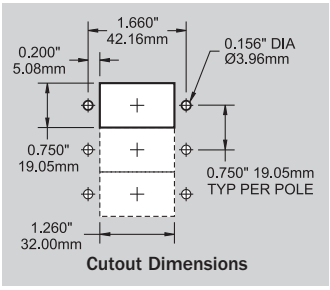
7414

Interrupt Ratings (see ABYC Interrupt Rating Requirements page 129)

A-Series Raised and Flat Rocker Circuit Breakers			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - TUV (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
32V DC	10-50A	5,000A	-
120/240V AC	10-50A	3,000A	-
240V AC	10-50A	3,000A	1,500A

[1] **UL Recognized**





Cutout Dimensions

PN	Actuator	Poles	Amperage	Weight Lb (Kg)
7570	Raised	2	10A	0.38 (0.17)
7571	Raised	2	15A	0.38 (0.17)
7572	Raised	2	16A	0.38 (0.17)
7573	Raised	2	20A	0.38 (0.17)
7574	Raised	2	30A	0.38 (0.17)
7575	Raised	2	32A	0.38 (0.17)
7576	Raised	2	40A	0.38 (0.17)
7577	Raised	2	50A	0.38 (0.17)

PN	Actuator	Poles	Amperage	Weight Lb (Kg)
7410	Flat	2	10A	0.38 (0.17)
7411	Flat	2	15A	0.38 (0.17)
7412	Flat	2	16A	0.38 (0.17)
7413	Flat	2	20A	0.38 (0.17)
7414	Flat	2	30A	0.38 (0.17)
7415	Flat	2	32A	0.38 (0.17)
7416	Flat	2	40A	0.38 (0.17)
7417	Flat	2	50A	0.38 (0.17)

NEW PRODUCT

RAMPAGE 33 EXPRESS - Rampage Sport Fishing Yachts

C-Series Toggle Circuit Breakers Double and Triple Pole

- 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 hot and neutral
- Triple pole can be used as 240 Volt AC main circuit breaker to switch both lines (hots) and neutral
- 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

Interrupt Rating	See Interrupt Rating Table below
Maximum Voltage	See Interrupt Rating Table below
Maximum Amperage	100 Amperes AC
Circuit Breaker Type	Magnetic Hydraulic
Terminal Studs	1/4"-20 Tin-Plated Brass - Maximum torque 35 in-lb
Operating Temperature Range	-40°C to +85°C
Mounting Screw	#6-32 SS - Recommended torque 6-8 in-lb
Trip Time Delay	See www.bluesea.com

Certifications and Agency Standards

- VDE certified, CSA certified
- UL 1077 recognized

Interrupt Ratings (see ABYC Interrupt Rating Requirements page 129)

C-Series Toggle 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

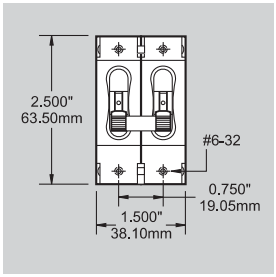
[1] UL Recognized

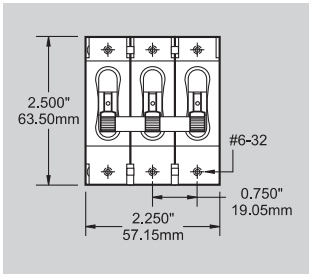

7251

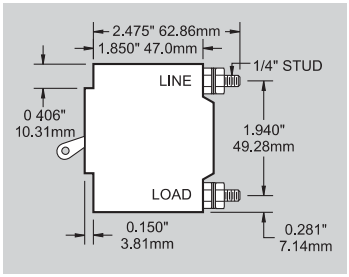

7287

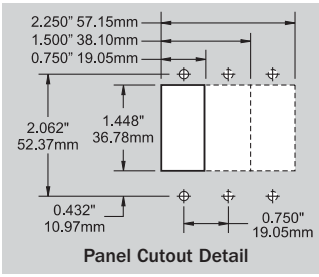
PN	Color	Poles	Amperage	Weight Lb (Kg)
7365	White	2	30A	0.60 (0.27)
7251	White	2	50A	0.60 (0.27)
7254	White	2	60A	0.60 (0.27)
7256	White	2	80A	0.60 (0.27)
7258	White	2	100A	0.60 (0.27)
7287	White	3	50A	0.90 (0.41)
7288	White	3	60A	0.90 (0.41)
7289	White	3	80A	0.90 (0.41)
7290	White	3	100A	0.90 (0.41)

▶ See page 48 for single pole C-Series Toggle Circuit Breakers.







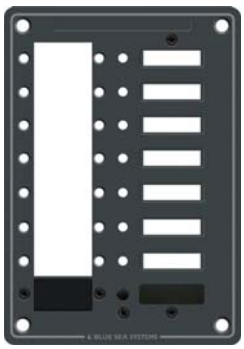


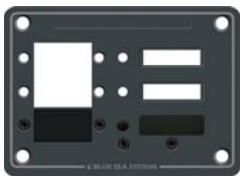
Panel Cutout Detail

C-Series Toggle Circuit Breaker Mounting Panels

- Designed for C-Series Toggle Circuit Breakers (see above and page 48)
- Heavy 1/8" aluminum 5052 alloy
- Two-part polyurethane slate gray finish
- Accepts standard Blue Sea Systems Large Format Labels (pages 102–103)
- Accepts standard Blue Sea Systems "ON" indicating LEDs (page 97)
- Panel Plug Kit included
- Panel plugs can be inserted to fill blank positions
- 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)	0.24 (0.11)
8089	Panel Plug Kit	-	-	0.10 (0.04)


8087


8088

C-Series Raised and Flat Rocker Circuit Breakers Double and Triple Pole

- 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 hot and neutral
- Triple pole can be used as 240 Volt AC main circuit breaker to switch both lines (hots) and neutral
- 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

Interrupt Rating	See Interrupt Rating Table below
Maximum Voltage	See Interrupt Rating Table below
Maximum Amperage	100 Amperes AC
Circuit Breaker Type	Magnetic
Terminal Studs	1/4"-20 Tin-Plated Brass - Maximum torque 35 in-lb
Operating Temperature Range	-40°C to +85°C
Mounting Screw	#6-32 SS - Recommended torque 6-8 in-lb
Trip Time Delay	See www.bluesea.com

Certifications and Agency Standards

- TUV certified, CSA certified
- UL 1077 recognized

Interrupt Ratings (see ABYC Interrupt Rating Requirements page 129)

C-Series Toggle Circuit Breakers - Double and Triple Pole			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - TUV (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
125/240V AC	30-100A	5,000A	-
240V AC	30-100A	-	5,000A

[1] UL Recognized

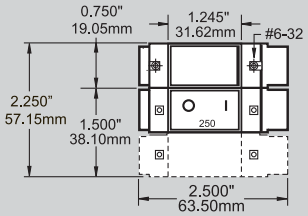
▶ See page 49 for single pole C-Series Rocker Circuit Breakers

Raised

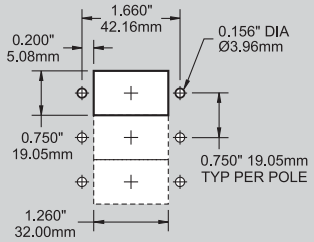
7580

Flat

7568



Double and Triple Pole



Cutout Dimensions

PN	Actuator	Poles	Amperage
7580	Raised	2	30A
7581	Raised	2	50A
7582	Raised	2	60A
7583	Raised	2	80A
7584	Raised	2	100A
7585	Raised	3	50A
7586	Raised	3	60A
7587	Raised	3	80A
7588	Raised	3	100A

PN	Actuator	Poles	Amperage
7560	Flat	2	30A
7561	Flat	2	50A
7562	Flat	2	60A
7563	Flat	2	80A
7564	Flat	2	100A
7565	Flat	3	50A
7566	Flat	3	60A
7567	Flat	3	80A
7568	Flat	3	100A

NEW PRODUCT

120/240 Volt AC C-Series Toggle Circuit Breaker Panels

- Red reverse polarity indicating LED
- All neutral and safety ground buses installed
- Label backlighting pre-installed
- All LEDs installed
- Extra positions available for double pole A-Series Toggle Circuit Breakers (page 72)
- Maximum panel amperage - 50 Amperes

120/240 Volt AC Main C-Series Toggle Circuit Breaker Panels

PN	Description	Meter Type PN	Meter Page	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed C-Series Toggle 3 Pole Main 50A
7370	**Main + 3 Positions**	Analog Volt 9354	111	5.25 (133.35)	11.25 (285.75)	2.98 (1.35)	1
7371	**Main + 3 Positions**	Digital Multimeter 8247	107	5.25 (133.35)	11.25 (285.75)	3.37 (1.53)	1
7372	**Main Only**	-	-	5.25 (133.35)	3.75 (95.25)	1.38 (0.63)	1

Blue Sea Systems recommends using double pole circuit breakers to fill blank positions.

Main Only

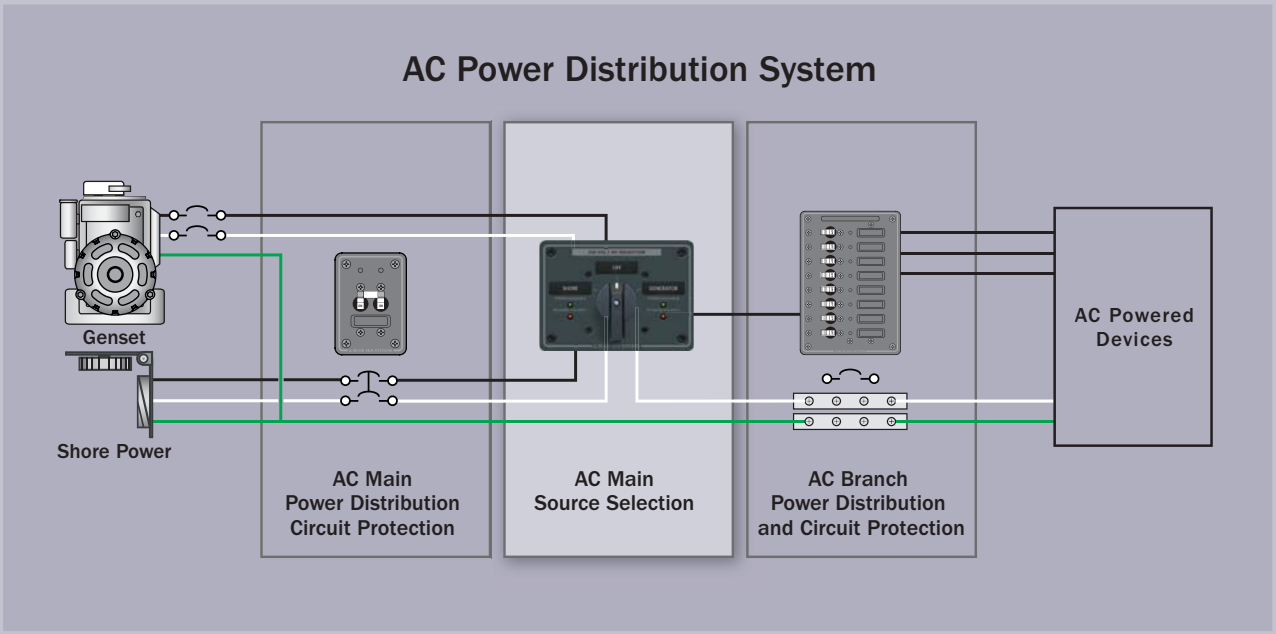
7372

Main + 3 Positions

7370

Main + 3 Positions

7371



AC Main Source Selection

Definition

Source selection devices select between two or more sources of AC power and allow only one AC source to be connected at a time.

Purpose

AC sources from shore power, gensets, 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. 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.

Products in this Section

In marine AC systems, there are two common methods used to switch AC sources—circuit breaker panels with lockout slides and rotary switches. AC Lockout Slides are devices that slide between circuit breaker handles and allow only one handle to be in the ON position, allowing only one source of AC power at a time. AC Rotary Switches use a switching mechanism to prevent connection of different sources at the same time.

Circuit Breaker Panels: Blue Sea Systems' AC Main source selection panels are available for 120V, 120/240V, and 230V (typical of Europe) ratings, with toggle style circuit breakers. They are available with and without meters, switch 2 and 3 sources, and have from 2 to 32 positions. Often, AC Main circuit protection, source selection, and branch circuit protection are combined in one panel.

Rotary Switch Panels: Blue Sea Systems' AC Main source selection rotary switches are available in 120V, 120/240V, and 230V (typical of Europe) ratings.

For more information about AC main source selection, refer to pages 133 in this catalog.

A-Series Source Selection Toggle Circuit Breaker Panels Pages 76–77

120 Volt A-Series Source Selection Circuit Breaker Panels

Pages 76–77

230 Volt A-Series Source Selection Circuit Breaker Panels
(Typical of Europe)

Pages 76–77

120/240 Volt Source Selection Toggle Circuit Breaker Panels Page 78

120/240 Volt, C-Series Source Selection Circuit Breaker Panels

Page 78

Source Selection Rotary Switches and Panels Pages 79–81

Rotary Switch and Panels
32 Ampere 2 Positions + OFF, 2 Pole
Maximum Amperage: 32 Amperes AC

Rotary Switch and Panels
65 Ampere 2 Positions + OFF, 2 Pole
Maximum Amperage: 65 Amperes AC

Rotary Switch and Panel
65 Ampere 2 Positions + OFF, 3 Pole
Maximum Amperage: 65 Amperes AC

Rotary Switch and Panels
32 Ampere 3 Positions + OFF, 2 Pole
Maximum Amperage: 32 Amperes AC

Rotary Switches and Panels
30 or 65 Ampere 2 Positions + OFF, 4 Pole
Maximum Amperage: 30 and 65 Amperes AC

Rotary Switch and Panel
65 Ampere 3 Positions + OFF, 3 Pole
Maximum Amperage: 65 Amperes AC

360 PANEL SYSTEM

See pages 18–19 for a full selection of related products located in the new 360 Panel System section of this catalog.

A-Series Source Selection Circuit Breaker Panels

Common Features

- Double pole AC main circuit breakers with installed lockout slides
- Prevent connecting multiple AC sources simultaneously
- Red reverse polarity indication LED
- All hot, neutral, and safety ground buses installed, fully pre-wired
- All circuit label positions are backlit on standard panels—no kit required
- "ON" indicating LEDs installed in all circuit positions
- MIL-C-5541C or equivalent immersion undercoating for lifetime corrosion resistance
- Two-part polyurethane slate gray finish

▷ **Panels available with white or black circuit breakers installed.**

- Heavy 1/8" aluminum 5052 alloy
- Industry standard height and width
- Countersunk mounting holes throughout
- Detailed installation instructions and cutout template included
- Includes 8031—Large Format Label Set (pages 100–101)
- Over 500 individual labels available (pages 102–103)
- Maximum panel amperage—50 Amperes

2 Sources[1]

8032/8061
8132*/8161*

3032/3061
3132*/3161*

2 Sources + 4 Positions

8499/8599* 3499/3599*

3 Sources[1]

8498/8598* 3498/3598*

2 Sources + 8 Positions

8459/8559* 3459/3559*

2 Sources + 4 Positions

8467/8567*
3467/3567*

2 Sources + 12 Positions

8468/8568* 3468/3568*

2 Sources + 9 Positions

8462/8562* 3462/3562*

2 Sources + 14 Positions

8473/8573* 3473/3573*

3 Sources + 28 Positions

8496/8596* 3496/3596*

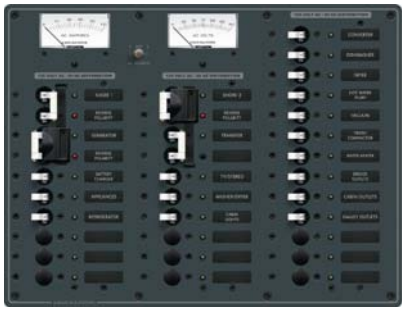
2 Sources + 9 Positions

8466/8566*
3466/3566*

2 Sources + 6 Positions

8489/8589*
3489/3589*

3 Sources + 25 Positions



8494/8594* 3494/3594*

2 Sources + 17 Positions

8475/8575* 3475/3575*

3 Sources + 18 Positions

8458 3458*

360 PANEL SYSTEM

See page 19 for a full selection of related products located in the new 360 Panel System section of this catalog.

[1] Includes set of 10 source selection labels 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 A-Series Source Selection 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
8032	3032	2 Sources	-	-	5.25 (133.35)	3.75 (95.25)	1.35 (0.61)	2	-	-
8061	3061	2 Sources	-	-	5.25 (133.35)	3.75 (95.25)	1.84 (0.83)	-	2	-
8498	3498	3 Sources	-	-	10.50 (266.70)	4.50 (114.30)	1.90 (0.86)	3	1	-
8467	3467	2 Sources + 4 Positions	-	-	5.25 (133.35)	7.50 (190.50)	2.15 (0.98)	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	Volt/9353	111	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	Volt/9353	111	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	Volt, Amp/9353, 9630	111	14.75 (374.65)	7.50 (190.50)	6.00 (2.72)	2	-	11
8475	3475	2 Sources + 17 Positions	Multimeter/8247	107	14.75 (374.65)	7.50 (190.50)	5.30 (2.40)	2	-	11
8458	3458	3 Sources + 18 Positions	Volt, Amp/9353, 9630	111	10.50 (266.70)	13.75 (349.25)	9.10 (4.12)	3	1	12
8494	3494	3 Sources + 25 Positions	Volt, Amp/9353, 9630	111	14.75 (374.65)	11.25 (285.75)	9.00 (4.08)	3	1	16
8496	3496	3 Sources + 28 Positions	Multimeter/8247	107	14.75 (374.65)	11.25 (285.75)	10.10 (4.58)	3	1	19

230 Volt A-Series Source Selection Toggle Circuit Breaker Panels (Typical of Europe)

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
								16A	32A	8A
8132	3132	2 Sources	-	-	5.25 (133.35)	3.75 (95.25)	1.35 (0.61)	2	-	-
8161	3161	2 Sources	-	-	5.25 (133.35)	3.75 (95.25)	1.84 (0.83)	-	2	-
8598	3598	3 Sources	-	-	10.50 (266.70)	4.50 (114.30)	1.90 (0.86)	3	1	-
8567	3567	2 Sources + 4 Positions	-	-	5.25 (133.35)	7.50 (190.50)	2.15 (0.98)	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	Volt/9354	111	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	Volt/9354	111	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	Volt, Amp/9354, 9630	111	14.75 (374.65)	7.50 (190.50)	6.00 (2.72)	2	-	11
8575	3575	2 Sources + 17 Positions	Multimeter/8247	107	14.75 (374.65)	7.50 (190.50)	5.30 (2.40)	2	-	11
8594	3594	3 Sources + 25 Positions	Volt, Amp/9354, 9630	111	14.75 (374.65)	11.25 (285.75)	9.00 (4.08)	3	1	16
8596	3596	3 Sources + 28 Positions	Multimeter/8247	107	14.75 (374.65)	11.25 (285.75)	10.10 (4.58)	3	1	19

Photo Courtesy of Hanse Yachts

120/240 Volt Source Selection Circuit Breaker Panels

- Triple pole AC Main circuit breakers with installed lockout slides
- Red reverse polarity indication LED
- All neutral, and safety ground buses installed, fully pre-wired
- Extra positions available for double pole A-Series Toggle Circuit Breakers (page 70)
- All circuit label positions are backlit on standard panels—No kit required
- "ON" indicating LEDs installed in all circuit positions
- MIL-C-5541C or equivalent immersion undercoating for lifetime corrosion resistance
- Two-part polyurethane slate gray finish
- Heavy 1/8" aluminum 5052 alloy
- Includes 8031—Large Format Label Set (pages 100–101)
- Over 500 individual labels available (pages 102–103)
- Maximum panel amperage—50 Amperes

Blue Sea Systems recommends using double pole circuit breakers to fill the open positions.

Source Selector + 2 Positions with Analog Meter

7374

Source Selector + 2 Positions with Digital Meter

7373

120/240 VOLT	Source Selection Circuit Breaker Panels						
PN	Description	Meter Type/PN	Meter Page	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed C-Series Toggle 3 Pole Main 50A
7374	Source Selector + 2 Positions	Volt/9354	111	5.25 (133.35)	11.25 (285.75)	3.70 (1.68)	2
7373	Source Selector + 2 Positions	Multimeter/8247	107	5.25 (133.35)	11.25 (285.75)	4.09 (1.85)	2

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 240 Volt AC Distribution Panel is wired to the 120 Volt AC Distribution Panel powering the 120 Volt AC branch circuits.

Photo Courtesy of Hunt Yachts, Inc.

Rotary Switch and Panels

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

9009 Front


9009 Side

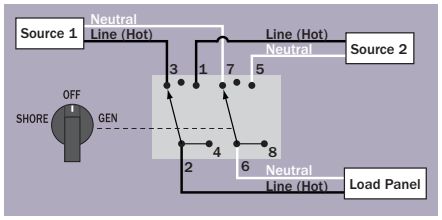
Rotary Switch Panels

- **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
Maximum Wire Size	10 AWG
Minimum Wire Size	14 AWG
Recommended Terminal Torque	12 in-lb



Certifications

- CE marked, UL listed

PN	Description	Voltage	Mounting Depth in" (mm)	Width in" (mm)	Height in" (mm)
9009	Rotary Switch	600V Max.	1.91 (48.51)	1.89 (48.00)	1.89 (48.00)
8367	Rotary Switch Panel	120V	1.91 (48.51)	5.25 (133.35)	3.75 (95.25)
8359	Rotary Switch Panel	230V	1.91 (48.51)	5.25 (133.35)	3.75 (95.25)

Rotary Switch and Panels

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

9011 Front


9011 Side

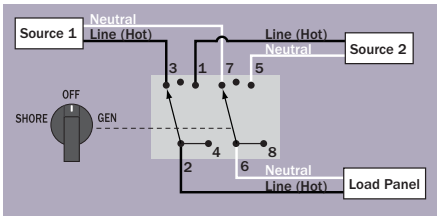
Rotary Switch Panels

- **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
Maximum Wire Size	6 AWG
Minimum Wire Size	12 AWG
Recommended Terminal Torque	40 in-lb



Certifications

- CE marked, UL listed

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	Rotary Switch Panel	120V	2.41 (61.21)	5.25 (133.35)	3.75 (95.25)
8357	Rotary Switch Panel	230V	2.41 (61.21)	5.25 (133.35)	3.75 (95.25)

See page 18 for a full selection of related products located in the new 360 Panel System section of this catalog.

Rotary Switch and Panel

65 Ampere 2 Positions + OFF, 3 Pole

Rotary Switch

- Switches 2—120/240 Volt AC sources
- Switches both lines (hots) 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

Rotary Switch Panel

- Includes 9019 Rotary 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
Maximum Wire Size	6 AWG
Minimum Wire Size	12 AWG
Recommended Terminal Torque	40 in-lb

Certifications

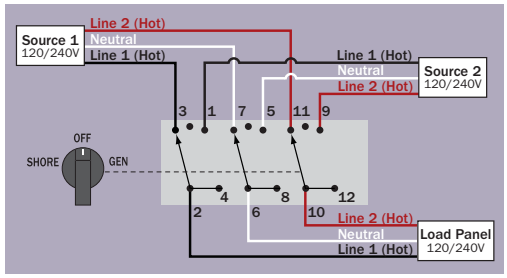
- CE marked, UL listed

PN	Description	Voltage	Mounting Depth in" (mm)	Width in" (mm)	Height in" (mm)
9019	Rotary Switch	600V Max.	3.65 (92.71)	2.52 (64.00)	2.52 (64.00)
8363	Rotary Switch Panel	120/240V	3.65 (92.71)	5.25 (133.35)	3.75 (95.25)

9019 Front

9019 Side

8363



Rotary Switches and Panels

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 (hots) 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

Rotary Switch Panel

- **8386**—Includes 6337 Rotary Switch, **8369**—Includes 9093 Rotary Switch
- Two-part polyurethane slate gray finish
- Heavy 1/8" aluminum 5052 alloy
- Red reverse polarity LED indicators
- Green power available LED indicators

Specifications	**6337/8386**	**9093/8369**
Maximum Amperage	30 Amperes AC	65 Amperes AC
Maximum Voltage	600 Volts AC	600 Volts AC
Maximum Wire Size	6 AWG	6 AWG
Minimum Wire Size	12 AWG	12 AWG
Recommended Terminal Torque	40 in-lb	40 in-lb

Certifications

- CE marked, UL listed

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	Rotary Switch Panel	120V, 120/240V	2.98 (75.69)	5.25 (133.35)	3.75 (95.25)
8369	Rotary Switch Panel	120V	4.50 (114.30)	5.25 (133.35)	3.75 (95.25)

6337 Front

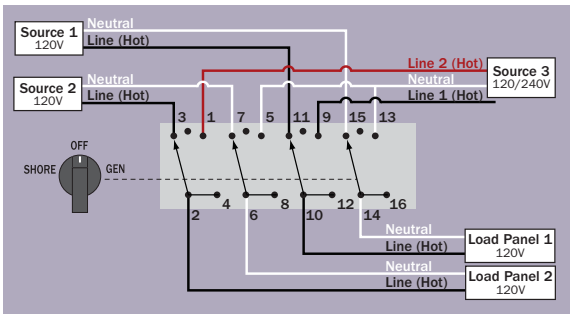
6337 Side

9093 Front

9093 Side

8386

8369



Rotary Switch and Panels

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

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

Specifications

Maximum Amperage	32 Amperes AC
Maximum Voltage	600 Volts AC
Maximum Wire Size	10 AWG
Minimum Wire Size	14 AWG
Recommended Terminal Torque	12 in-lb

Certifications

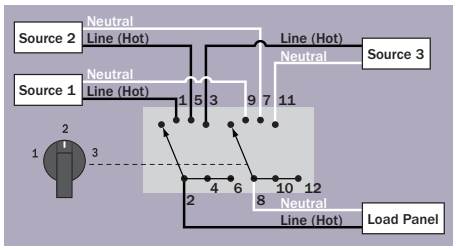
- CE marked, UL listed

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	Rotary Switch Panel	120V	2.41 (61.21)	5.25 (133.35)	3.75 (95.25)
8358	Rotary Switch Panel	230V	2.41 (61.21)	5.25 (133.35)	3.75 (95.25)

9010 Front

9010 Side

8366/8358



Rotary Switch and Panel

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

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

Specifications

Maximum Amperage	65 Amperes AC
Maximum Voltage	600 Volts AC
Maximum Wire Size	6 AWG
Minimum Wire Size	12 AWG
Recommended Terminal Torque	40 in-lb

Certifications

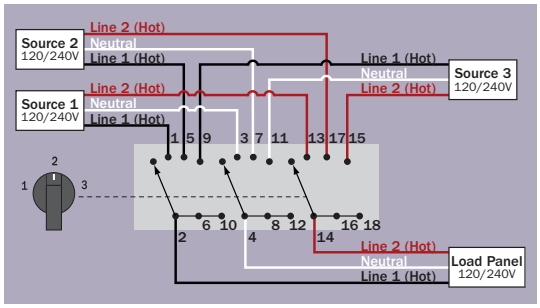
- CE marked, UL listed

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	Rotary Switch Panel	120/240V	5.50 (139.70)	5.25 (133.35)	3.75 (95.25)

9077 Front

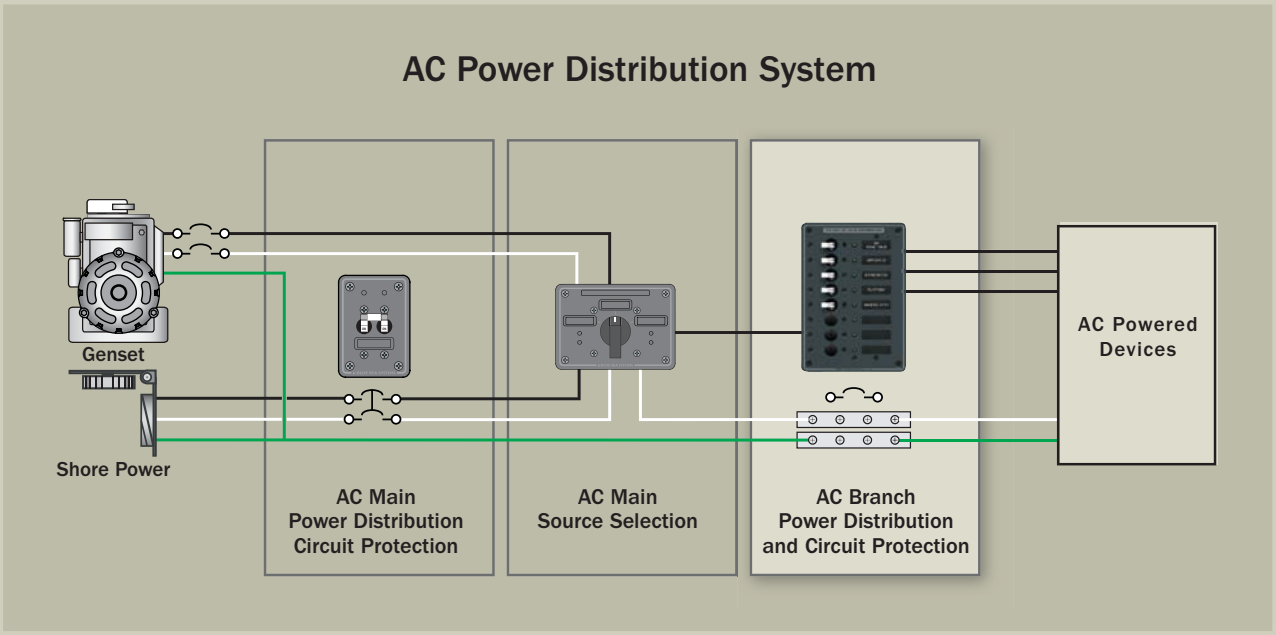
9077 Side

8361



360 PANEL SYSTEM

See page 18 for a full selection of related products located in the new 360 Panel System section of this catalog.



AC Branch Power Distribution and Circuit Protection

Definition

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 often the same devices used for AC branch circuit protection.

Purpose

The purpose of AC Branch power distribution and circuit protection is to distribute high amperage currents from a single cable into lower amperages in multiple wires, and provide circuit protection and switching. 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.

Products in this Section

Circuit Breakers: Circuit breakers used in AC branch power systems may be single or double pole, rocker or toggle, with current ratings from 5 to 100A.

Power Distribution and Circuit Protection Panels: Panels are available with 3 to 26 positions, toggle circuit breakers for 120V and 230V (Typical of Europe) ratings, with and without meters.

For more information about AC Branch Power Distribution and Circuit Protection, refer to page 134 in this catalog.

AC Current Ratings — 0 Amperes — **AC Current Ratings** (Amperes) — 200 Amperes

Single Pole Circuit Breakers and Mounting Panel Pages 86–87

A-Series Toggle: **Interrupt Rating:** 7,500A@65V DC/3,000A@250V AC **Maximum Voltage:** 65V DC/250V AC

Page 86 — 5 | 8 | 10 | 15 | 20 | 25 | 30 | 40 | 50

A-Series Flat Rocker: **Interrupt Rating:** 5,000A@32V DC/3,000A@125V AC/1,500A@250V AC
Maximum Voltage: 32V DC/250V AC

Page 87 — 5 | 8 | 10 | 15 | 20 | 25 | 30 | 40 | 50

A-Series Restricted Off Rocker: **Interrupt Rating:** 5,000A@32V DC/3,000A@125V AC / 1,500A@250V AC
Maximum Voltage: 32V DC/250V AC

Page 87 — 5 | 8 | 10 | 15 | 20 | 25 | 30 | 40 | 50

C-Series Toggle: **Interrupt Rating:** 10,000A AC **Maximum Voltage:** 80V DC/240V AC

Page 87 — 5 | 10 | 15 | 20 | 25 | 30 | 50 | 60 | 80 | 100

A-Series Toggle Circuit Breaker Panels Pages 84–86

120 Volt A-Series Toggle Circuit Breaker Panels

Pages 84–85

230 Volt A-Series Toggle Circuit Breaker Panels
(Typical of Europe)

Pages 84–85

A-Series Toggle Circuit Breaker Mounting Panel

Page 86

360 PANEL SYSTEM

See page 17 for a full selection of related products located in the new 360 Panel System section of this catalog.

A-Series Circuit Breaker Panels

▷ Panels available with white or black circuit breakers installed.

Common Features

- All hot, neutral, and safety ground buses installed, fully pre-wired
- All circuit label positions are backlit on standard panels—No kit required
- "ON" indicating LEDs installed in all circuit positions
- MIL-C-5541C or equivalent immersion undercoating for lifetime corrosion resistance
- Two-part polyurethane slate gray finish
- Heavy 1/8" aluminum 5052 alloy
- Industry standard height and width
- Countersunk mounting holes throughout
- Detailed installation instructions and cutout template included
- Includes 8031—Large Format Label Set (pages 100–101)
- Over 500 individual labels available (pages 102–103)
- Maximum amperage—100 Amperes per bus

3 Position

8058/8158*
3058/3158*

6 Position

8097/8197* 3097/3197*

8 Position

8411/8511* 3411/3511*

12 Position

8460/8560* 3460/3560*

8 Position

8059/8159*
3059/3159*

16 Position

8461/8561* 3461/3561*

13 Position

8479/8579* 3479/3579*

24 Position

8265/8165* 3265/3165*

13 Position

8480/8580*
3480/3580*

10 Position

8478/8578*
3478/3578*

36 Position

8484/8584* 3484/3584*

*230 Volt (typical of Europe)

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 A-Series 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)	1.20 (0.54)	-	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)	2.00 (0.91)	-	5
8411	3411	8 Position	-	-	10.50 (266.70)	4.50 (114.30)	1.90 (0.86)	-	6
8478	3478	10 Position	Analog Volt/9353	111	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 Volt/9353	111	10.50 (266.70)	7.50 (190.50)	4.05 (1.84)	-	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
8265	3265	24 Position	-	-	14.75 (374.65)	7.50 (190.50)	5.12 (3.32)	-	15
8484	3484	36 Position	Digital Multimeter/8247	107	14.75 (374.65)	11.25 (285.75)	10.00 (4.54)	-	27

230 Volt A-Series 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)	1.20 (0.54)	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)	2.00 (0.91)	5	-
8511	3511	8 Position	-	-	10.50 (266.70)	4.50 (114.30)	1.90 (0.86)	6	-
8578	3578	10 Position	Analog Volt/9354	111	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 Volt/9354	111	10.50 (266.70)	7.50 (190.50)	4.05 (1.84)	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	-
8165	3165	24 Position	-	-	14.75 (374.65)	7.50 (190.50)	5.12 (3.32)	15	-
8584	3584	36 Position	Digital Multimeter/8247	107	14.75 (374.65)	11.25 (285.75)	10.00 (4.54)	27	-

360 PANEL SYSTEM

See page 17 for a full selection of related products located in the new 360 Panel System section of this catalog.

Photo Courtesy of CABO® Yachts—CABO Yachts 45 Express

A-Series Toggle Circuit Breakers Single Pole

- The industry standard circuit breaker for Blue Sea Systems' electrical panels
- Combines switching and circuit protection into a single device
- "Trip Free" design cannot be held "ON" during fault current condition
- Used with A-Series Toggle Circuit Breaker Mounting Panel (see below)

Specifications

Interrupt Rating	See Interrupt Rating Table below
Maximum Voltage	See Interrupt Rating Table below
Circuit Breaker Type	Magnetic Hydraulic—Trip free
Operating Temperature Range	-40°C to +85°C
Terminal Screw	#10-32 SS with external tooth lockwasher —Recommended torque 14–15 in-lb
Trip Time Delay	See www.bluesea.com
Rated Switch Cycles	10,000@rated amperage and voltage
Mounting Screw	#6-32 SS—Recommended torque 6–8 in-lb
Weight	0.17Lb (0.08Kg)

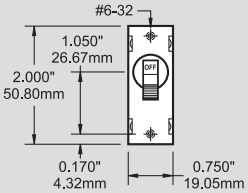
Certifications and Agency Standards

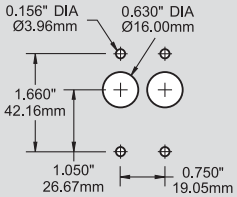
- CE marked, TUV certified, CSA certified
- UL 1077 recognized

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

PN	Color	Amperage
7214	White	20A
7216	Black	25A
7217	Red	25A
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

7200





Panel Cutout Detail

Interrupt Ratings (see ABYC Interrupt Rating Requirements page 129)

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

[1] UL Recognized

A-Series Toggle Circuit Breaker Mounting Panel Single Pole

- Mounts A-Series Toggle Circuit Breaker *single pole* (see above) or Panel Switch (page 96)
- Slate gray matches standard panel color

Specifications

Panel Material: Heavy 1/8" aluminum 5052 alloy

PN	Description	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)
8072	Mounting Panel - Single Pole	2.63 (66.80)	3.75 (95.25)	0.08 (0.04)


8072


Photo Courtesy of Hunt Yachts—Surfhunter 29

A-Series Flat and Restricted Off Rocker Circuit Breakers Single Pole

- Rocker actuator is flush in the "ON" position, eliminating the risk of accidental switching, color actuator indicates "OFF" position
- "Trip Free" design cannot be held "ON" during fault current condition
- 2 different styles available to prevent accidental switching of 24 hour circuits
- International ON/OFF symbols support vertical or horizontal mounting

Flat

7403

Restricted Off

7425

Specifications

Interrupt Rating	See Interrupt Rating Table below
Maximum Voltage	See Interrupt Rating Table below
Circuit Breaker Type	Magnetic Hydraulic—Trip free
Operating Temperature Range	-40°C to +85°C
Terminal Screw	30° Angled #10-32 x 5/16 SS SEM LOAD external tooth lock washer —Recommended torque 14-15 in-lb
Trip Time Delay	See www.bluesea.com
Rated Switch Cycles	10,000@rated amperage and voltage
Mounting Screw	#6-32 SS—Recommended torque 6-8 in-lb
Weight	0.16Lb (0.07Kg)

Certifications and Agency Standards

- CE marked, TUV certified, CSA certified
- UL 1077 recognized

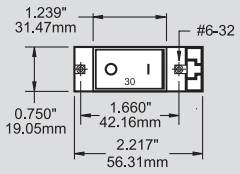
PN	Actuator	Poles	Amperage
7400	Flat	1	5A
7401	Flat	1	8A
7402	Flat	1	10A
7403	Flat	1	15A
7404	Flat	1	20A
7405	Flat	1	25A
7406	Flat	1	30A
7407	Flat	1	40A
7408	Flat	1	50A

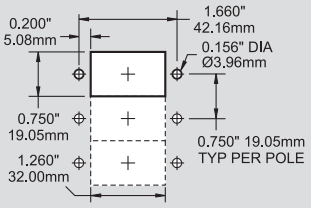
PN	Actuator	Poles	Amperage
7425	Restricted Off	1	5A
7426	Restricted Off	1	8A
7427	Restricted Off	1	10A
7428	Restricted Off	1	15A
7429	Restricted Off	1	20A
7430	Restricted Off	1	25A
7431	Restricted Off	1	30A
7432	Restricted Off	1	40A
7433	Restricted Off	1	50A

Interrupt Ratings (see ABYC Interrupt Rating Requirements page 129)

A-Series Flat and Restricted Off Rocker Circuit Breakers			
		UL 1077 - UL/CSA (US/Canada)[1]	EN60934 - TUV (Europe)
Voltage	**Current**	**Interrupt Ratings**	**Interrupt Ratings**
32V DC	5-50A	5,000A	-
120V AC	5-50A	3,000A	-
240V AC	5-50A	1,500A	1,500A

[1] UL Recognized





Panel Cutout Detail

C-Series Toggle Circuit Breakers Single Pole

- "Trip Free" design cannot be held "ON" during fault current condition

7250

Specifications

Interrupt Rating	See Interrupt Rating Table below
Maximum Voltage	See Interrupt Rating Table below
Terminal Stud	1/4"-20 tin plated brass—Maximum torque 35 in-lb
Circuit Breaker Type	Magnetic Hydraulic—Trip free
Delay	See www.bluesea.com
Mounting Screw	#6-32 SS—Recommended torque 6-8 in-lb

Certifications and Agency Standards

- UL 1077 recognized, TUV certified

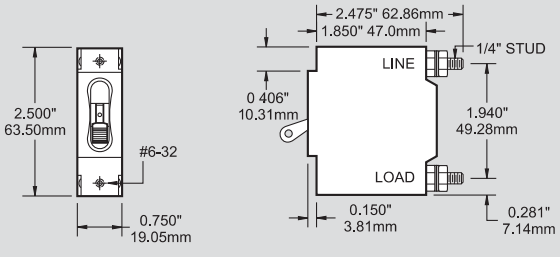
PN	Amperage	Weight Lb (Kg)
7350	5A	0.28 (0.13)
7351	10A	0.28 (0.13)
7352	15A	0.28 (0.13)
7353	20A	0.28 (0.13)
7354	25A	0.28 (0.13)
7355	30A	0.28 (0.13)
7244	50A	0.36 (0.17)
7246	60A	0.36 (0.17)
7248	80A	0.36 (0.17)
7250	100A	0.36 (0.17)

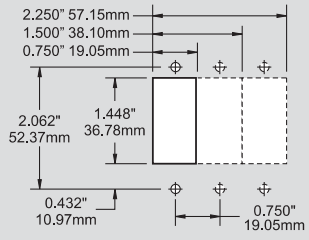
Interrupt Ratings (see ABYC Interrupt Rating Requirements page 129)

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	-
125V AC	5-100A	5,000A	-
250V AC	5-100A	5,000A	5,000A

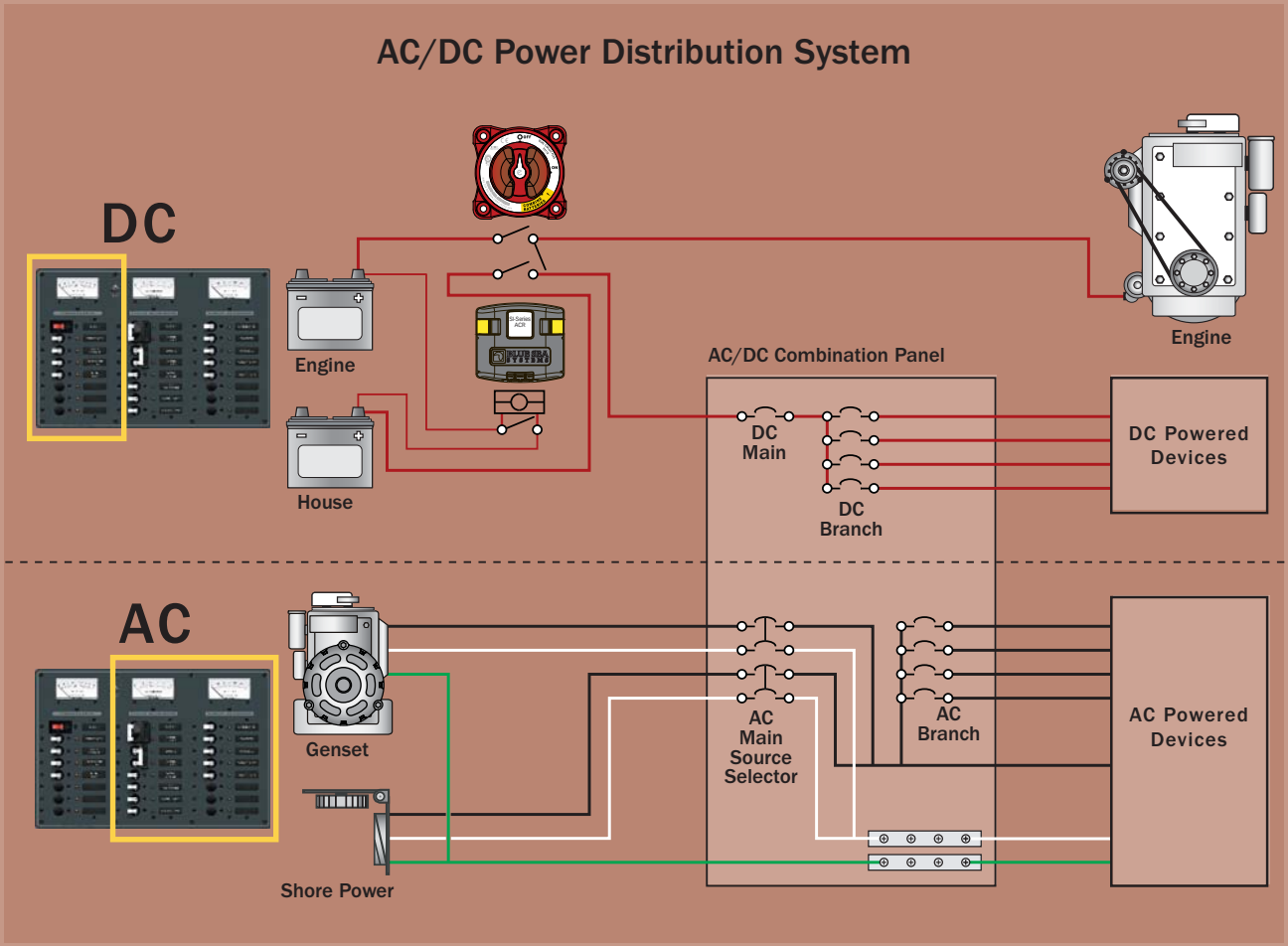
[1] UL Recognized

▶ See page 72 for C-Series Toggle Circuit Breaker Mounting Panels.





Panel Cutout Detail



AC/DC Combination Panels and Circuit Protection

Definition

Power distribution panels that contain AC power distribution and circuit protection, and DC power distribution and circuit protection.

Purpose

AC/DC combination panels provide AC power distribution and DC power distribution in one panel for convenience of installation, and to centralize the control of both the AC and DC systems into one location.

Products in this Section

AC/DC Combination Power Distribution and Circuit Protection Panels: The AC side of the panel contains AC main circuit protection plus 6 to 12 positions. The DC side of the panel contains DC main circuit protection plus 7 to 29 positions. All AC/DC combination panels have meters.

Circuit Breakers: Toggle circuit breakers rated for both AC and DC are available from Blue Sea Systems. They have current ratings from 5 to 100 Amperes, and maximum voltage ratings of 125 and 250 Volts AC, and up to 65 and 80 Volts DC.

DC Current Ratings
AC Current Ratings

0 Amperes — **AC and DC Current Ratings** (Amperes) — 200 Amperes

Single Pole AC/DC Circuit Breakers Pages 48, 86–87

Detailed information about these circuit breakers is located in the DC Main Circuit Protection and AC Branch Power Distribution and Circuit Protection Sections

A-Series Toggle, 1 Pole: **Interrupt Rating:** 7,500A@65V DC/ 3,000A@250V AC **Maximum Voltage:** 65V DC/250V AC

Page 86

5 8 10 15 20 25 30 40 50

A-Series Flat Rocker, 1 Pole: **Interrupt Rating** – 5,000A@32V DC/3,000A@125V AC/1,500A@240V AC
Maximum Voltage: 32V DC/240V AC

Page 87

5 8 10 15 20 25 30 40 50

A-Series Restricted Off, 1 Pole: **Interrupt Rating:** 5,000A@32V DC/3,000A@125V AC/1,500A@240V AC
Maximum Voltage: 32V DC/240V AC

Page 87

5 8 10 15 20 25 30 40 50

C-Series Toggle, 1 Pole: **Interrupt Rating:** 10,000A AC **Maximum Voltage:** 80V DC/240V AC

Page 48

5 10 15 20 25 30 50 60 80 100

A-Series Main Toggle Circuit Breaker Panels Pages 90–91

120 Volt Combination AC/DC Circuit Breaker Panels

Pages 90–91

230 Volt Combination AC/DC Circuit Breaker Panels
(Typical of Europe)

Pages 90–91

A-Series Source Selection Toggle Circuit Breaker Panels Pages 90–91

120 Volt Combination AC/DC Source Selection Circuit Breaker Panels

Pages 90–91

230 Volt Combination AC/DC Source Selection Circuit Breaker Panels
(Typical of Europe)

Pages 90–91

360 PANEL SYSTEM

See page 22 for a full selection of related products located in the new 360 Panel System section of this catalog.

Combination AC/DC Circuit Breaker Panels

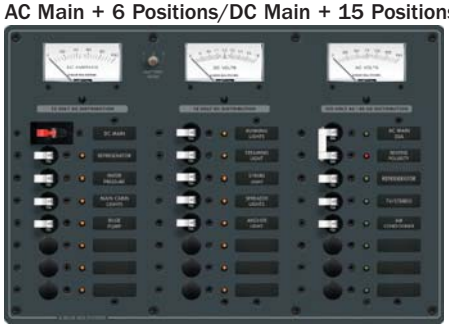
Common Features

- All AC and DC buses installed, fully pre-wired
- Label backlighting pre-installed
- "ON" indicating LEDs installed in all circuit positions
- 100 Ampere C-Series Toggle Circuit Breaker provides main circuit protection and switching for DC branch circuits
- MIL-C-5541C or equivalent immersion undercoating for lifetime corrosion resistance

▷ **Panels available with white or black circuit breakers installed.**

- Two-part polyurethane slate gray finish
- Heavy 1/8" aluminum 5052 alloy
- Countersunk mounting holes throughout
- Detailed installation instructions and cutout template included
- Includes 8030 and 8031 Large Format Label Sets (pages 100–101)
- Over 500 individual labels available (pages 102–103)
- Maximum panel amperage—100 Amperes DC/50 Amperes AC

AC Main + 6 Positions/DC Main + 15 Positions



8084/8184* **3084/3184***

AC Features
- Ready for installation of optional 4029 AC Isolation Cover (page 98)

DC Features
- Owner upgradable to 24 Volt DC with 8240, 18-32 Volt DC Voltmeter (page 110)

AC Main + 6 Positions/DC Main + 18 Positions

8408/8508* **3408/3508***

AC Features
- Ready for installation of optional 4029 AC Isolation Cover (page 98)

DC Features
- Owner upgradable to 24 Volt DC with 8240, 18-32 Volt DC Voltmeter (page 110)

AC Main + 8 Positions/DC Main + 29 Positions

8095/8195* **3095/3195***

DC Features
- Owner upgradable to 24 Volt DC with 8240, 18-32 Volt DC Voltmeter (page 110)

* 230 Volt (typical of Europe)

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 (page 98)

DC Features
- Owner upgradable to 24 Volts DC with 8240, 18-32 Volt DC Voltmeter (page 110)

AC 3 Sources + 12 Positions/DC Main + 19 Positions

8086/8186* **3086/3186***

AC Features
- Ready for installation of optional 4031 AC Isolation Cover (page 98)

DC Features
- Owner upgradable to 24 Volt DC with 8240, 18-32 Volt DC Voltmeter (page 110)

120 Volt AC/DC Toggle Circuit Breaker Panels

PN	PN	Description	Voltage	Meter Type/PN	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed AC Circuit Breakers			Installed DC Circuit Breakers	
								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)	8.75 (3.97)	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)	8.75 (3.97)	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 3 Sources + 12 Positions DC Main + 19 Positions	120V AC 12V DC	Analog*/8003, 8017, 9630, 9353	19.50 (495.30)	11.50 (292.10)	12.45 (5.65)	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)	12.45 (5.65)	1	-	5	1	20

230 Volt AC/DC Toggle Circuit Breaker Panels (Typical of Europe)

PN	PN	Description	Voltage	Meter Type/PN	Width in" (mm)	Height in" (mm)	Weight Lb (Kg)	Installed AC Circuit Breakers			Installed DC Circuit Breakers	
								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)	8.75 (3.97)	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)	8.75 (3.97)	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 3 Sources + 12 Positions DC Main + 19 Positions	230V AC 12V DC	Analog*/8003, 8017, 9630, 9354	19.50 (495.30)	11.50 (292.10)	12.45 (5.65)	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)	12.45 (5.65)	1	-	5	1	20

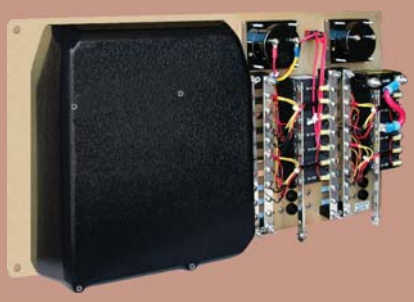
* Analog meters see pages 110–111
** Digital meters see pages 106–107

360 PANEL SYSTEM

See page 22 for a full selection of related products located in the new 360 Panel System section of this catalog.

Combined AC/DC panels require an AC Insulating Cover (page 98) 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 (page 98) Installed on PN 8086 AC/DC Toggle Style Circuit Breaker Panel (pages 90–91)

Panel Accessories

Blue Sea Systems provides accessories for all of its above deck waterproof panels and below deck panels.

Accessories for Above Deck Waterproof Panels
Components installed on Blue Sea Systems' waterproof panels are available individually. These components include: switches, fuses, circuit breakers, fuse holders, waterproof boots, plugs and sockets, and labels.

Accessories for Below Deck Panels
Components installed on Blue Sea Systems' panels for below deck applications are available individually. These components include: mounting panels, switches, screws, plugs, LED indicator lights, backlight systems, labels, and toggle guards.

Labels
There are 4 label formats:

- **Round "24-Hour"** label that fits over any Blue Sea Systems' LED on any standard panel
- **Square Format Labels** used with Blue Sea Systems' Battery Main Distribution Panels, WeatherDeck™ Waterproof Panels, and 360 Panels can be purchased in sets of common labels, or as individual labels
- **Small Format Labels** used with Blue Sea Systems' Contura Waterproof Panels and ST Blade Fuse Blocks can be purchased as sets of common labels only.
- **Large Format Labels** used with Blue Sea Systems' power distribution panels can be purchased in sets of common labels, or as individual labels.

WeatherDeck™ Waterproof Panel Accessories Pages 94, 100

Toggle Switches Single Pole
page 94

Toggle Switch Boot
page 94

Toggle Switches Double Pole
page 94

Square Format Labels
page 100

Contura Waterproof Circuit Breaker Panel Accessories Pages 95, 100

Contura Switches
page 95

Contura Switch Actuators
page 95

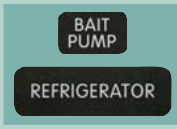
Small Format Labels
page 100

Contura Waterproof Fuse Panel Accessories Pages 94–95, 100

Contura Switches
page 95

Contura Switch Actuators
page 95

Water Resistant
Fuse Holder
page 94



Small and Large
Format Labels
page 100

Labels Pages 100–103

24 Hour Round Labels (Actual Size Illustrated)
- Fits over any Blue Sea Systems' LED
- Available in packages of 12

page 100

Square Format Labels (Actual Size Illustrated)
- Available in sets of common labels or as individual labels

pages 100–103

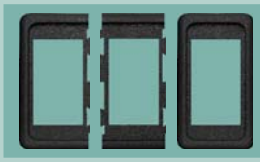
Small Format Labels (Actual Size Illustrated)
- Available in sets of 60 common labels

page 100

Large Format Labels (Actual Size Illustrated)
- Available in sets of common labels or as individual labels

pages 100–103

Panel Accessories continued Pages 95–99



Contura Switch Mounting Panels
- Modular design permits easy assembly in groups

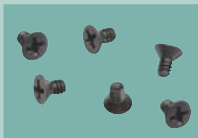
page 95

Contura Switch Mounting Panel Plug
- For use with Contura Switch Mounting Panels

page 95

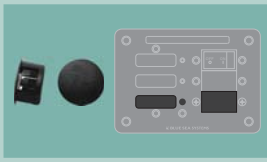
Panel Switches
- Perfect for generator starters, bilge pumps, horns, wipers, and engine controls

page 96



Circuit Breaker Mounting Screws
- Fits all A-Series and C-Series Circuit Breakers

page 96



Rocker and Toggle Circuit Breaker Panel Plug

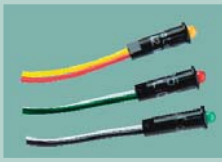
page 96

Push Button Reset-Only Thermal Circuit Breaker Adapter
- Adapts Push Button Reset-Only Thermal Circuit Breakers to Blue Sea Systems' 360 Distribution Panels and Battery Management Panels

page 96

Label Backlight Systems
- Designed for 12 or 24 Volt systems

page 97



LED Indicator Lights
- Useful as general indicator and alarm lights

page 97

12 Volt DC Socket
- Watertight cap, easy installation and interlocks with plug

page 97

12 Volt DC Plug
- LED ON-indicating light, moisture proof sealing ring, strain relief, and built-in 10 Ampere fuse

page 97

Toggle Guard
- Protects circuit breakers from being accidentally switched ON or OFF

page 98

AC A-Series Circuit Breaker Lockout Slides
- Allows only 1 double pole circuit breaker to be activated at a time

page 98

AC C-Series Circuit Breaker Lockout Slides
- Allows only 1 of a pair of double or triple pole circuit breakers to be activated at a time

page 98

AC Insulating Covers
- Provides electrical insulation for exposed panel backs

page 98

Digital Dimmers
- Water resistant, sealed housings

page 99

Dimmer Switches
- For use with Digital Dimmers

page 99

360 PANEL SYSTEM

See page 16 for a full selection of related products located in the new 360 Panel System section of this catalog.

WeatherDeck™ Toggle Switches Single Pole

- Specially manufactured for use in WeatherDeck™ Waterproof Panels (pages 56–58)
- Rated IP67—temporary immersion for 30 minutes, when mounted with a WeatherDeck™ Toggle Switch Boot (see below)
- Nickel-plated brass and phenolic non-corrosive construction

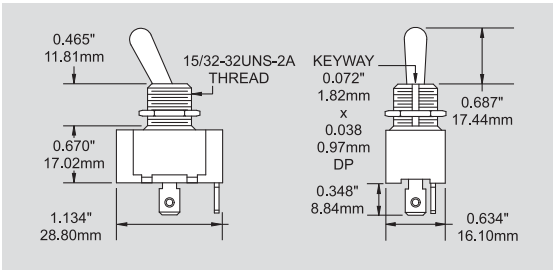
4150

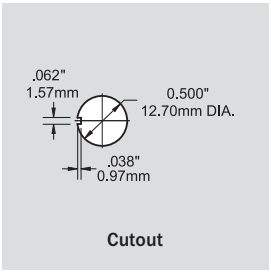
Specifications

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





WeatherDeck™ Toggle Switch Double Pole

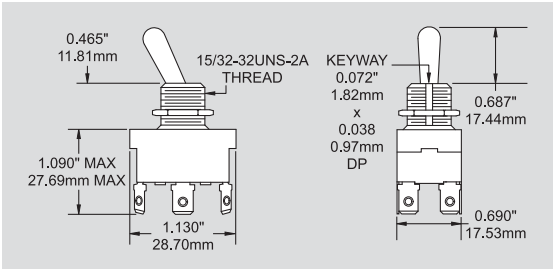
- For use in WeatherDeck™ Waterproof Panels (pages 56–58)
- Rated IP67—temporary immersion for 30 minutes, when mounted with a WeatherDeck™ Toggle Switch Boot (see below)
- Nickel-plated brass and phenolic non-corrosive construction

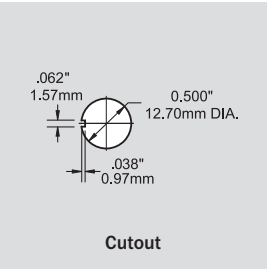
4155

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





WeatherDeck™ Toggle Switch Boots

- Replaces dress nut for mounting on WeatherDeck™ Waterproof Panel Switches
- Rated IP67—temporary immersion for 30 minutes
- UV resistant material resists discoloration and cracking

4138

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	0.04 (0.02)

Water Resistant Fuse Holder

- Easy to open
- Rated IP66 on front—withstands water from heavy seas

Specifications

Rating: 32 Volts DC	20 Amperes
Mounting Hole	0.50" (12.70mm)

5021

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

Water Resistant Contura Switches (IP)

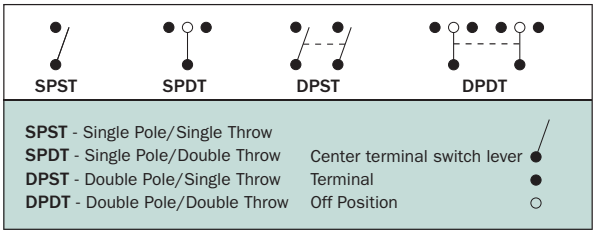
- Vibration, shock, thermoshock, moisture and salt spray resistant
- Specially manufactured for use in Blue Sea Systems' Contura Waterproof Panels* (page 59)
- Ignition Protected - safe for installation aboard gasoline powered boats
- Meets UL 1500 and ISO 8846 ignition protection requirements

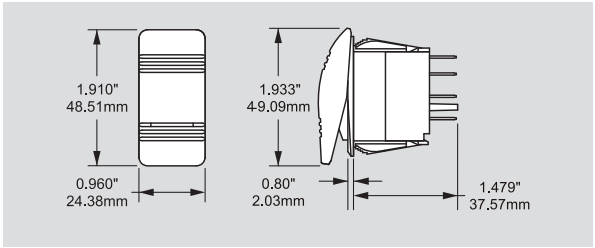
Specifications

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





(IP) IGNITION PROTECTED

* Use of standard Contura Switches will not maintain the integrity of the Contura Waterproof Panels.

Contura Switch Actuators

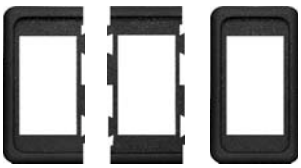
- Mounts on any Blue Sea Systems' Water Resistant Contura Switch
- Constructed of thermal plastic polycarbonate with a hard nylon surface overlay
- For each embedded LED, there is a corresponding number of lenses

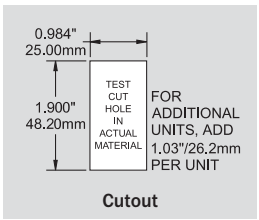
PN Gray	PN Black	Number of Lenses
8299	8296	None
8297	8294	Single
8298	8295	Double
8293	Actuator Removal Tool	

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:
  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 (30.23)	2.30 (58.42)
8266	Center Mounting Panel	1.03 (26.16)	2.30 (58.42)
8268	1 Position Mounting Panel	1.34 (34.04)	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)

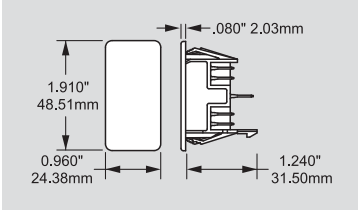




Contura Switch Mounting Panel Plug

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

PN	Description
8278	Mounting Panel Plug



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
- Panel switches mount in Blue Sea Systems' A-Series Toggle Circuit Breaker Panels
- For use with A-Series Toggle Circuit Breaker Mounting Panel (page 86)
- 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

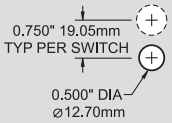
* Progressive Two Circuit Switch - maintains circuit one while momentarily switching circuit two

Push Button Switch

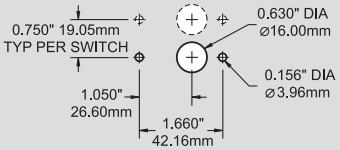
8200

Toggle Switch

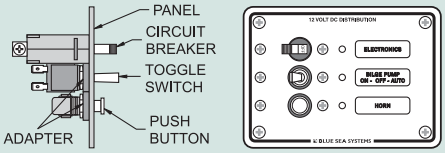
8204-8212



Cutout Without Adapter



Cutout With Adapter



Panel Switch Mounting Diagram

Circuit Breaker Mounting Screws

- Fits all A-Series 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

Toggle Circuit Breaker Panel Plug

- Black plug fits standard A-Series Toggle Circuit Breaker apertures

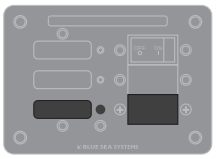
PN	Description	Weight Lb (Kg)
8037	Toggle Circuit Breaker Plug	0.03 (0.01)

8037

Rocker Circuit Breaker Panel Plug

- Black plug fits Rocker Circuit Breaker aperature
- Includes circuit breaker mounting screws, circuit breaker panel plug, LED plug and blank label

PN	Description
4110	Rocker Circuit Breaker Plug



4110

Push Button Reset-Only Thermal Circuit Breaker Adapter

- Adapts Push Button Reset-Only Thermal Circuit Breaker (page 46) to Blue Sea Systems' 360 panels and battery management panels

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

4111

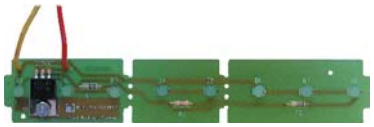
Label Backlight System

- Designed for 12 or 24 Volt systems
- Connects to 12 or 24 Volt sources via two 20 AWG wire leads
- Reverse polarity protection built-in
- 8065 snaps apart for 5 or 3 positions

Specifications

Maximum Voltage	24 Volts DC
Amperage Draw	<7 mA per label

PN	Description	Weight Lb (Kg)
8065	8/5/3 Positions	0.08 (0.04)
8384	4 Positions	0.05 (0.02)
8069	10 Positions	0.09 (0.04)
8383	13 Positions	0.11 (0.05)



8065

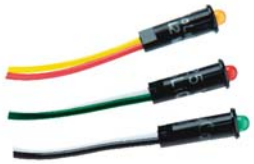
LED Indicator Lights

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

Specifications

Mounting Hole Size	11/64" (4.36mm)
Power Consumption	5 Milliwatts

CE marked



PN	Color	Voltage	Amperage Draw	Weight Lb (Kg)
8033	Amber	12/24V DC	5 Milliamperes	0.03 (0.01)
8171	Red	12/24V DC	5 Milliamperes	0.03 (0.01)
8172	Green	12/24V DC	5 Milliamperes	0.03 (0.01)
8169	Amber	120V AC	0.5 Milliamperes	0.03 (0.01)
8066	Red	120V AC	0.5 Milliamperes	0.03 (0.01)
8034	Green	120V AC	0.5 Milliamperes	0.03 (0.01)
8167	Amber	230V AC	0.25 Milliamperes	0.03 (0.01)
8166	Red	230V AC	0.25 Milliamperes	0.03 (0.01)
8134	Green	230V AC	0.25 Milliamperes	0.03 (0.01)

12 Volt Socket-Plug System

- Designed to withstand the rigors of wet environments and constant vibration
- Large contact surfaces for good electrical connection
- Twist lock system—plug locks securely into socket
- Corrosion-resistant materials to ensure solid contact and low voltage drop
- Internal strain relief and cord seal
- Nickel plated copper alloy used for all current carrying components
- Plug has a sealing ring around the shaft to keep out spray and make it seat firmly in the outlet
- Plug features an LED ON-indicating light, moisture proof sealing ring, strain relief and built-in 10A fuse
- Front panel, rear panel, or surface mount
- Socket features a watertight cap, easy installation and interlocks with plug
- 1012 and 1013 Heavy duty 18 gauge wire
- 1012 Cord reaches up to 6 feet

Specifications

Maximum Voltage	15 Volts DC
Maximum Socket Amperage	15 Amperes DC
Maximum Plug Amperage	10 Amperes DC

PN	Description	Weight Lb (Kg)
1010	12V DC Plug	0.08 (0.04)
1011	12V DC Socket	0.10 (0.05)
1012	Single 12V DC Plug with Single 12V DC Socket Extension	0.54 (0.24)
1013	Single 12V DC Plug with Dual 12V DC Socket Extensions	0.50 (0.23)
1014	Mounting Bracket for 12V DC Socket (1011)	0.07 (0.03)
1015	12 Volt DC Plug and 12V DC Socket Set Includes 1010 and 1011	0.20 (0.09)

NEW PRODUCT

1010

1011

1012

1013

1014

360 PANEL SYSTEM

See page 16 for a full selection of related products located in the new 360 Panel System section of this catalog.

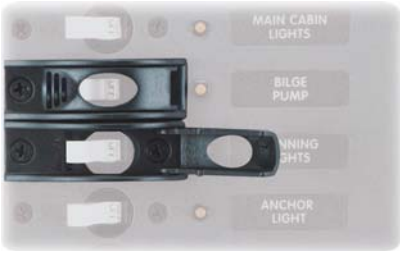
Toggle Guard

- Protects circuit breakers from being accidentally switched ON or OFF
- Fits all A-Series single pole toggle circuit breakers
- Fits all panel switches (page 96)
- 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)

AC A-Series Circuit Breaker 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 A-Series Toggle Circuit Breakers (page 70)
- 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	0.04 (0.02)
4126	2	3	0.06 (0.03)

4125

4126

AC C-Series Toggle 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 or triple pole C-Series Toggle Circuit Breakers (page 72)
- 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

AC 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
- Meet ABYC safety requirements for panels with combined AC and DC loads
- PN 4029 and 4031–Used only for Blue Sea Systems' toggle circuit breaker panels

Specifications

Material ABS

PN	Description	Weight Lb (Kg)
4026	Cover for 5-1/4" x 3-3/4"	0.12 (0.05)
4027	Cover for 5-1/4" x 7-1/2"	0.20 (0.09)
4028	Cover for 10-1/2" x 7-1/2"	0.50 (0.23)
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 (pages 90–91)

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
- Supports multiple switch locations
- -20°C to +85°C operating temperature range
- Water resistant, sealed housings
- Operates on 10 to 32 Volt DC systems
- Requires SPDT momentary (ON)–OFF–(ON) switch such as PN 8216, 8291 or 8208 (see below)

7501
- Rated for dashboard gauge or small single fixture interior dimming

7502
- Rated for medium to large single fixture interior dimming

7503 and 7505
- Rated for multiple fixture area lighting dimming
- Robust aluminum housing


7501


7502


7503


7505

Specifications	7501	7502	7503	7505
Surge Rating: 10 sec	5 Amperes	10 Amperes	25 Amperes	50 Amperes
Internal Over Current Protection	10 Amperes	20 Amperes	50 Amperes	70 Amperes
Draw 0% output	5mA (0.005A)	5mA (0.005A)	5mA (0.005A)	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)	0.28 (0.13)
7502	5A	2.16 (54.86)	3.06 (77.72)	1.60 (40.64)	0.40 (0.18)
7503	10A	2.16 (54.86)	3.06 (77.72)	1.60 (40.64)	0.58 (0.26)
7505	20A	2.16 (54.86)	3.06 (77.72)	1.60 (40.64)	0.56 (0.25)

Water Resistant Contura Dimmer Switches IP

- Mounts in Blue Sea Systems' waterproof panels
- Legend–BRIGHT and DIM
- Contura Switch Mounting Panels (page 95)
- For use with Digital Dimmers (see above)

8216

8291

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)

IP IGNITION PROTECTED

Toggle Panel Switch

- Mounts in Blue Sea Systems toggle panels
- For use with Digital Dimmer (see above)


8208

Specifications

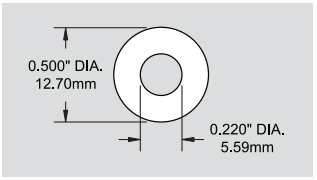
Voltage 250 Volts AC	10 Amperes
Voltage 125 Volts AC	15 Amperes
Voltage 32 Volts AC	15 Amperes
Terminal Size	0.25" (6.35mm)
Terminal Type	Quick Connect Tab
Actuator Color	White

PN	Poles/Throw	Action	Weight Lb (Kg)
8208	Single/Double	(ON)-OFF-(ON)	0.08 (0.04)

24 Hour Round Label

- Reinforced, weatherproof material
- Fits over any Blue Sea Systems LED
- Sold in packages of 12
- Used on any standard panel
- Included with Battery Main Distribution Panels (page 37)

PN	Color	Description
4140	Black	24 Hour Round Label

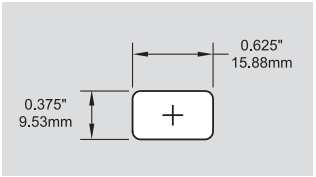


4140

Small Format Labels

- Reinforced, weatherproof material
- Used on Contura Waterproof Panels (page 59)
- Used on ST Blade Fuse Blocks (page 64)

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



Small Format Label Sets (8214 and 8217)

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

8214

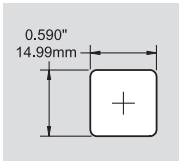
8217

Square Format Labels

- Reinforced, weatherproof material
- Used on 360 Distribution Panels (pages 10–17, 19, 21–22, 25), Battery Management Panels (pages 36–37), and WeatherDeck™ Waterproof Panels (pages 56–58)
- Available for purchase in sets (page 101) or individually (pages 102–103)

To purchase individual labels online go to www.bluesea.com.

PN	Color	Description	Quantity
4215	Black	DC Labels	30 Labels
4218	Black	DC Labels	30 Labels
4216	Black	DC Labels	60 Labels
4217	Black	DC Labels	120 Labels
4205	Black	DC Panel Basic	30 Labels
4206	Black	AC Panel Basic	30 Labels
4207	Black	DC Panel Extended	120 Labels
4208	Black	AC Panel Extended	120 Labels



4216

4217

4215

4218

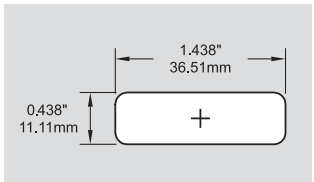
Large Format Labels

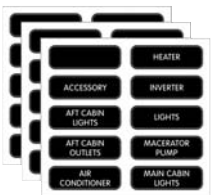
- Reinforced, weatherproof material
- Used on Contura Waterproof Fuse Panels 8053, 8054 (page 59)
- Used on ST Glass Fuse Blocks (page 64)
- Used on all Toggle Circuit Breaker Panels
- Available for purchase in sets (page 101) or individually (page 102–103)

To purchase individual 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
6398	Black	AC Panel Extended (French)	120 Labels
6399	Black	DC Panel Extended (French)	120 Labels

Note: 6398 is based on 8067 and 6399 is based on 8039





8031

Square and Large Format Panel Label Sets

DC Label Set (4215)

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

DC Label Set (4218)

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

DC Panel Basic (4205 and 8030)

ACCESSORY	LIGHTS
ANCHOR LIGHT	MACERATOR PUMP
AUTOPILOT	MAIN CABIN LIGHTS
BILGE PUMP	RADAR
BLOWER	REFRIGERATOR
COMPASS LIGHT	RUNNING LIGHTS
DEPTH SOUNDER	SAILING INSTRUMENTS
ELECTRONICS	SPARE
ENGINE INSTRUMENTS	SPREADER LIGHTS
FAN	STEAMING LIGHT
FOREDECK LIGHT	STEREO
FWD CABIN LIGHTS	STROBE LIGHT
GPS	TRICOLOR LIGHT
HORN	VHF
KNOTMETER	WATER PRESSURE

AC Panel Basic (4206 and 8031)

(BLANK)	HEATER
ACCESSORY	INVERTER
AFT CABIN LIGHTS	LIGHTS
AFT CABIN OUTLETS	MACERATOR PUMP
AIR CONDITIONER	MAIN CABIN LIGHTS
AIR CONDITIONER 2	MAIN CABIN OUTLETS
APPLIANCES	MICROWAVE
BATTERY CHARGER	OUTLETS
CABIN OUTLETS	REFRIGERATOR
COMPUTER	SPARE
ENTERTAINMENT CENTER	STOVE
FWD CABIN LIGHTS	TV/STEREO
FWD CABIN OUTLETS	VCR
GALLEY	WASHER/DRYER
GALLEY OUTLETS	WATER HEATER

DC Label Set (4216)

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

DC Label Set (4217)

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

DC Panel Extended Label Sets (4207 and 8039)

(BLANK)	CHART LIGHT	DOCKING LIGHTS	HAM RADIO	LOG	SATELLITE DISH	VIDEO PLOTTER
12 VOLT DC	CHART PLOTTER	EMERGENCY LIGHTS	HEAD	LORAN	SEARCHLIGHT	WATER ALARM
12 VOLT DC OUTLETS	COCKPIT LIGHTS	ENGINE ROOM BILGE ALARM	HEAD LIGHTS	MAIN CABIN	SEAWATER TEMP	WATER MAKER
AFT CABIN	COLOR SOUNDER	ENGINE ROOM LIGHTS	HEAD LIGHTS 2	MAP LIGHT	SEAWATER WASH DOWN	WATER PUMP
AFT HEAD	COMM ELECTRONICS	ENGINE ROOM PANEL MAIN	HEATER 2	MAST LIGHTS	SECURITY SYSTEM	WEATHER FAX
ALARM SYSTEM	DC LIGHTS	ENGINE ALARM	HELM ELECTRONICS	NAV STATION ELECTRONICS	SHOWER SUMP PUMP	WEATHER INSTRUMENT
ANCHOR WASH DOWN	DC MAIN	EXTERIOR LIGHTS	HELM GAUGES	NAV STATION GAUGES	SONAR	WINCHES
BAIT PUMP	DC OUTLETS	FAN 2	HELM INSTRUMENTS	NAV STATION INSTRUMENTS	SPEED/LOG	WIND INSTRUMENTS
BILGE ALARM	DC REFRIGERATOR	FIRE ALARM	HIGH WATER ALARM	NAV STATION LIGHTS	SSB	WINDEX LIGHT
BILGE PUMP 2	DC SUB PANEL	FISHING LIGHT	HOLDING TANK	NAVIGATION ELECTRONICS	SUB PANEL	WIPER PORT
BRIDGE INSTRUMENTS	DECK LIGHTS	FLOOD LIGHTS	HOLDING TANK ALARM	NAVIGATION INSTRUMENTS	SUMP PUMP	WIPER STBD
CABIN 2 LIGHTS	DECK LIGHTS AFT	FLYBRIDGE ELECTRONICS	HOLDING TANK PUMP	NAVIGATION LIGHTS	TELEPHONE SYSTEM	WIPERS
CABIN 3 LIGHTS	DECK LIGHTS FWD	FLYBRIDGE LIGHTS	INSTRUMENT LIGHTS	RACK LIGHTS	TRACK LIGHTS	
CABIN 4 LIGHTS	DEPTH RECORDER	FRESH WATER PUMP	INSTRUMENTS	RADIO	TRANSFER PUMP	
CABIN FANS	DEPTH/SPEED	FRESH WATER WASH DOWN	INTERCOM	SALOON	TRIM TABS	
CABIN LIGHTS	DESALINATOR	GALLEY LIGHTS	INTERIOR LIGHTS	SALOON LIGHTS	TV	
CB RADIO	DIMMER	GPS/PLOTTER	LIGHTS 2	SAT/COM	TV/VCR	
CELLULAR PHONE	DINING AREA LIGHTS	HAILER	LIVEWELL	SAT/NAV	UTILITY	

AC Panel Extended Label Sets (4208 and 8067)

(BLANK)	BRIDGE LIGHTS	COMPARTMENT LIGHT	FLOOD LIGHTS	HEATER 2	NAV STATION LIGHTS	SHORE POWER
120 VOLT AC OUTLETS	BRIDGE OUTLETS	COOKTOP	FREEZER	HEATER 3	OUTLETS 2	STEREO
120 VOLTS AC / 60 HZ	CABIN	DECK LIGHTS	FURNACE	HEATER 4	OUTLETS 3	STOVE/MICROWAVE
AC COMPRESSOR	CABIN 2	DIMMER	GALLEY APPLIANCES	HOOD FAN	OUTLETS 4	SUB PANEL
AC FAN	CABIN 2 LIGHTS	DINING AREA LIGHTS	GALLEY LIGHTS	ICEMAKER	OUTLETS DECK	TELEPHONE SYSTEM
AC MAIN	CABIN 2 OUTLETS	DINING AREA OUTLETS	GARBAGE DISPOSAL	INTERIOR LIGHTS	OUTLETS EXTERIOR	TRACK LIGHTS
AC PANEL	CABIN 3	DISHWASHER	GENERATOR 1	INVERTER OUTLET	OUTLETS INTERIOR	TRASH COMPACTOR
AC POWER	CABIN 3 LIGHTS	DISPOSAL	GFI OUTLET	ISOLATION TRANSFORMER	RACK OUTLETS	TV
AC REFRIGERATOR	CABIN 3 OUTLETS	DRYER	HALLWAY LIGHTS	LAZARETTE LIGHTS	RANGE	UPS SYSTEM
AC SUB PANEL	CABIN 4	EMERGENCY LIGHTS	HEAD 2 OUTLETS	LECTRASAN	REFRIGERATOR/FREEZER	VACUUM
AFT CABIN	CABIN 4 LIGHTS	ENGINE ROOM LIGHTS	HEAD 3 OUTLETS	LIGHTS 2	REVERSE POLARITY	VIDEO SYSTEM
AFT HEAD	CABIN 4 OUTLETS	ENGINE ROOM OUTLETS	HEAD 4 OUTLETS	LIGHTS 3	SALOON	WASHER
AIR CONDITIONER 3	CABIN HEATER	EXHAUST FAN	HEAD LIGHTS	LIGHTS 4	SALOON HEATER	WATER MAKER
AIR CONDITIONER 4	CABIN LIGHTS	EXTERIOR LIGHTS	HEAD LIGHTS 2	LIGHTS AFT	SALOON LIGHTS	
ALARM SYSTEM	CCTV	FAN	HEAD LIGHTS 3	LIGHTS FWD	SALOON OUTLETS	
AMPLIFIER	CHARGER/INVERTER	FAN 2	HEAD LIGHTS 4	MAIN	SATELLITE DISH	
AUDIO/VIDEO SYSTEM	COCKPIT LIGHTS	FAN 3	HEAD OUTLETS	MAIN BREAKER	SHIP	
BATTERY CHARGER 2	COCKPIT REFRIGERATOR	FAN 4	HEADLIGHTS	MAIN CABIN	SHORE	

Individual Square and Large Format Panel Labels

To order individual labels please indicate the PN (6520 or 8063) **and the Label Number**

Square Format PN 6520 

Large Format PN 8063 

Label Number	Label Text
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
7	120 VOLT AC / 60 HZ
6	120 VOLT AC OUTLETS
502	120 VOLT/60HZ SHORE POWER
517	120/240V 60HZ SHORE POWER
516	120/240V AC / 60HZ
526	230 VOLT AC / 50 HZ
10	24 VOLT DC
9	24 VOLT DC OUTLETS
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
530	AFT DISCHARGE PUMP
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
525	AUTO FILL
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
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 REFRIGERATOR
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
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
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
529	FWD DISCHARGE PUMP
528	FWD HEAD
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

Individual Square and Large Format Panel Labels

To order individual labels please indicate the PN (6520 or 8063) **and the Label Number**

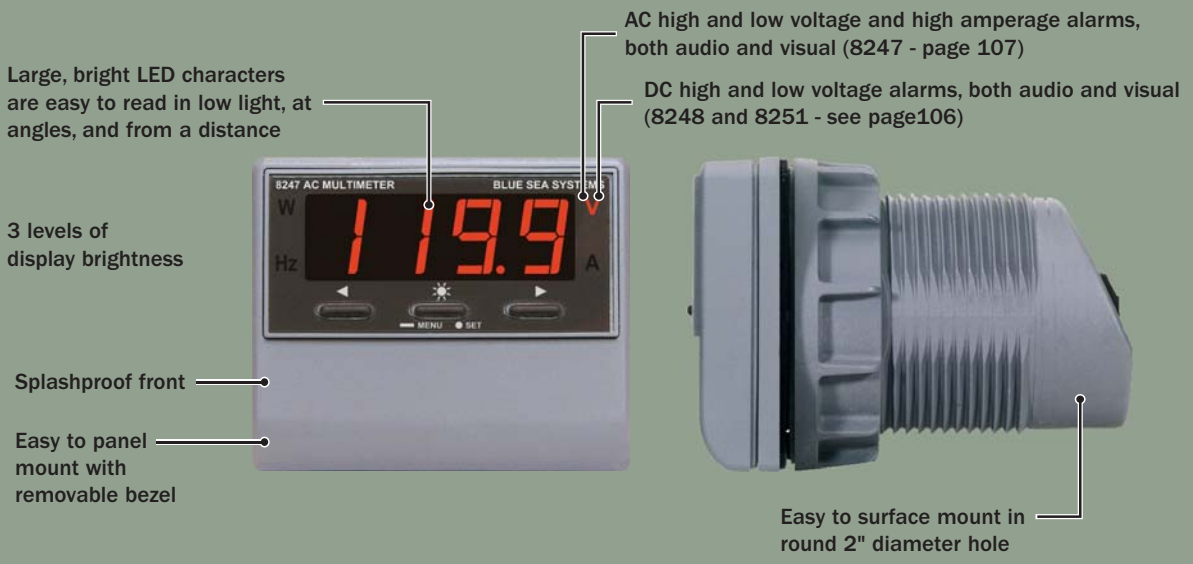
Square Format PN 6520 

Large Format PN 8063 

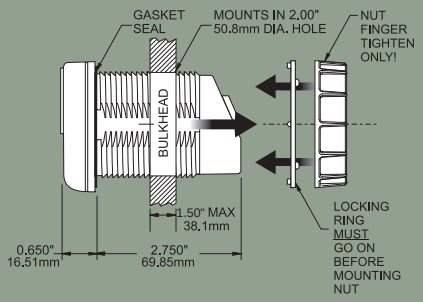
Label Number	Label Text
233	GPS/LORAN
234	GPS/PLOTTER
510	GUN LOCKS
235	GYRO COMPASS
236	HAILER
237	HALLWAY LIGHTS
238	HALON FIRE SYSTEM
239	HAM RADIO
240	HEAD
241	HEAD 2
242	HEAD 2 FAN
243	HEAD 2 OUTLETS
244	HEAD 3
245	HEAD 3 FAN
246	HEAD 3 OUTLETS
247	HEAD 4
248	HEAD 4 FAN
249	HEAD 4 OUTLETS
250	HEAD 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	ICEMAKER
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
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 GUAGES
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
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
527	TROLLING MOTOR
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

Digital Meters

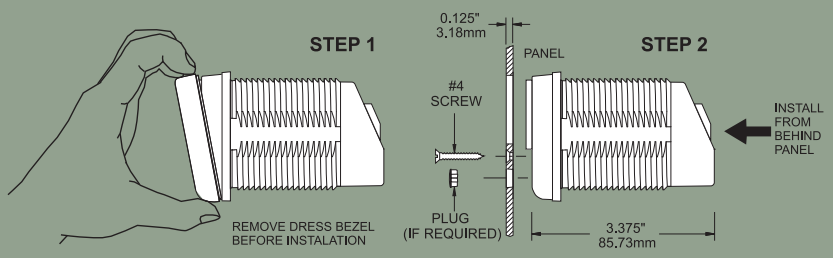
- Voltmeters, Ammeters, Frequency Meters, and Multimeters
- Easy spin on mounting system
- Readable in low light
- Can be rear or front panel mounted
- Direct replacement for standard size analog meters
- Scan mode on multi-function units
- Low current drain
- Sleep mode on all units



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



Meters and Accessories

Definition

Meters are used to monitor a boat's:

- DC electrical system—voltage and current
- AC electrical system—voltage, current, and frequency

Purpose

Meters are necessary in a boat's electrical system to manage the system: avoiding overload of shore cords, when to charge battery banks and when chargers and alternators are not functioning properly, etc.

According to ABYC, "System voltmeters shall be installed in a main panel if the system is permanently connected to motor circuits, generators, and inverters". Frequency meters are useful for the management of generators.

Products in this Section

Meters: There are two styles of meter: Analog and digital. There are three sizes of analog meters: standard, compact, and DIN. There are two digital meters: standard and clamp. Some digital meters have alarms to warn when there is a malfunction. Digital multimeters allow for multiple functions in a single meter.

Meter Accessories: Panels are available to mount meters. There are DC shunts, shunt shifters that allow DC digital ammeters to read positive side shunt applications such as alternator measurement, AC current transformers, and switches.

DC Digital Meters Page 106

Digital Multimeter with Alarm

Digital Voltmeter

Digital Voltmeter with Alarm

Digital Ammeter

AC Digital Meters Page 107

Digital Multimeter with Alarm

Digital Ammeter

Digital Frequency Meter

Digital Voltmeter

DC DIN Meters Page 108

DIN Voltmeters

DIN Ammeters

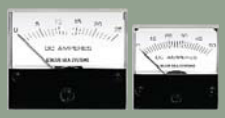
AC DIN Meters Page 109

DIN Voltmeters

DIN Ammeters

DC Analog Meters Page 110

Analog Voltmeters



Analog Ammeters

Analog Zero Center Ammeters

AC Analog Meters Page 111

Analog Voltmeters

Analog Ammeters

DC Meter Panels and Clamp Meter Page 112

Analog Voltmeter Panel

Digital Voltmeter Panel

Digital Mini Clamp Multimeter

Meter Accessories Pages 112–113

DC Shunts

AC Current Transformer

Shunt Shifter

Meter Mounting Panels

360 PANEL SYSTEM

See page 9 for a full selection of related products located in the new 360 Panel System section of this catalog.

DC Digital Meters

Common Features

- Splashproof front
- 3 levels of display brightness

8248 Multimeter with Alarm Features

- High and low voltage, audio and visual alarms
- Programmable sleep mode blanks display for power conservation
- Standard meter operates in negative side of circuit only. Shunt shifter 8242 (page 113) required for positive side installation such as alternators
- Includes 500 Amp Shunt 8255 (page 113)

8251 Voltmeter with Alarm Features

- High and low voltage, audio and visual alarms
- Programmable sleep mode blanks display for power conservation

8235 Voltmeter Features

- Manual sleep mode blanks display for power conservation

8236 Ammeter Features

- Standard meter operates in negative side of circuit only. Shunt shifter 8242 (page 113) required for positive side installation such as alternators
- Includes 500 Amp Shunt 8255 (page 113)
- Manual sleep mode blanks display for power conservation

Specifications

Input Voltage		7–60V DC[1]
Minimum Power Consumption		0.60 Watt[2]
Maximum Power Consumption		1.00 Watt[2]
Display Character Size		9/16" (14.29mm)
Dimensions	Width	2.90" (73.66mm)
	Height	2.43" (61.72mm)
	Depth	3.40" (86.36mm)

[1] Applicable for 12, 24, 32, 36, and 42 Volt DC systems

[2] Variable with voltage, display intensity, segments illuminated and sleep mode

8248

8251

8235

8236

PN	Description	Amperage Display	Voltage Display	Current Measurement	Voltage Measurement	Weight Lb (Kg)
8248	Digital Multimeter with Alarm	–500 to +500A DC	0–60V DC	✓	✓	1.12 (0.51)
8251	Digital Voltmeter with Alarm	N/A	0–60V DC	-	✓	0.45 (0.20)
8235	Digital Voltmeter	N/A	0–60V DC	-	✓	0.45 (0.20)
8236	Digital Ammeter	–500 to +500A DC	N/A	✓	-	1.11 (0.50)

Current Measurement

Shunt:	500A–50mV
Range:	±500A DC
Resolution (0.0–99.9):	0.1A DC
Resolution (100–500):	1.0A DC
Accuracy (% of Reading):	±0.5%*

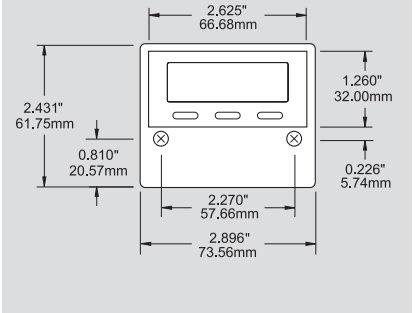
Voltage Measurement

Range:	0–60V DC
Resolution:	0.01V DC
Accuracy (% of Reading):	±0.5%*

* ±1 least digit of resolution

360 PANEL SYSTEM

See page 9 for a full selection of related products located in the new 360 Panel System section of this catalog.



AC Digital Meters

Common Features

- Splashproof front
- 3 levels of display brightness

8247 Multimeter with Alarm Features

- High and low voltage and high amperage audio and visual alarms
- Programmable sleep mode blanks display for power conservation
- Includes current transformer (page 113)

8239 Frequency Meter Features

- Manual sleep mode blanks display for power conservation

8237 Voltmeter Features

- Manual sleep mode blanks display for power conservation

8238 Ammeter Features

- Manual sleep mode blanks display for power conservation
- Includes current transformer (page 113)

8247

8239

8238

8237

Specifications

Input Voltage		80–270V AC[1]
Minimum Power Consumption		0.010 Watt[2]
Maximum Power Consumption		0.027 Watt[2]
Display Character Size		9/16" (14.29mm)
Dimensions	Width	2.90" (73.66mm)
	Height	2.43" (61.72mm)
	Depth	3.40" (86.36mm)

[1] Applicable for 120 and 240 Volt AC single phase systems
[2] Variable with voltage, display intensity, segments illuminated and sleep mode

PN	Description	Amperage Display	Voltage Display	Power Display	Frequency Display	Current[3]	Voltage[4]	Frequency[5]	Power[6]	Weight Lb (Kg)
8247	Digital Multimeter with Alarm	0–150 Amperes AC	80–270 Volts AC	0–45 Kilowatts	40–90 Hertz	✓	✓	✓	✓	0.78 (0.35)
8239	Digital Frequency Meter	N/A	N/A	N/A	40–90 Hertz	-	-	✓	-	0.72 (0.35)
8237	Digital Voltmeter	N/A	80–270 Volts AC	N/A	N/A	-	✓	-	-	0.72 (0.35)
8238	Digital Ammeter	0–150 Amperes AC	N/A	N/A	N/A	✓	-	-	-	0.78 (0.35)

[3] 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% **

[5] Frequency Measurement

Range:	40–90Hz
Resolution:	0.1Hz
Accuracy (% of Reading): (Calibrated with sine wave input)	±1.0% **

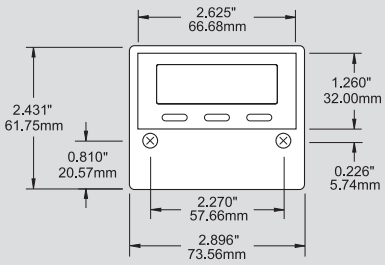
[4] Voltage Measurement

Range:	80–270V AC *
Resolution:	0.1V AC
Accuracy (% of Reading)	
90-270V AC (RMS):	±1.0% **
80-90V AC (RMS):	±5.0% **

[6] Power Measurement

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

* For 120 & 240 Volt AC single phase systems
** ±1 least digit of resolution



DC DIN Meters

Standard European 72mm design. White matte dial with black printed scale and knife-edge pointer.

Common Features
- Back-lit meter face
- Terminal cover included to prevent accidental short circuit

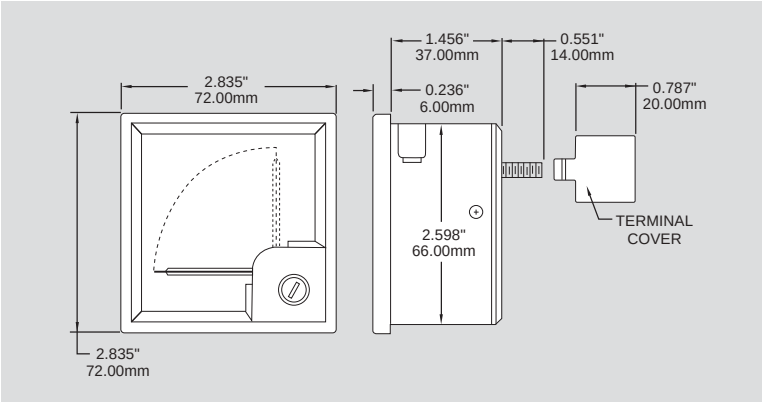
1050 and 1051 Voltmeter Features
- 8–16 and 18–32 Volt ranges
- Simple 2-wire connection to DC positive and negative
- Meter senses and powers from same connections

1052 Ammeter Features
- 0–25 Ampere range
- Simple 2-wire connection, no other power required

1053, 1054, and 1055 Ammeter Features
- 0–50, 0–100, 0–150 Ampere ranges
- Simple 2-wire connection from shunt—no other power required
- Meter senses and powers from shunt connections
- Includes appropriate DC shunt (page 113)

Specifications
Meter Current = 1 mA at full scale

PN	Description	Shunt Type	External Shunt Type	Weight Lb (Kg)
1050	Voltmeter 8–16V DC	-	-	0.33 (0.15)
1051	Voltmeter 18–32V DC	-	-	0.33 (0.15)
1052	Ammeter 0–25A DC	Internal	-	0.33 (0.15)
1053	Ammeter 0–50A DC	External	50 Millivolt at full scale	0.53 (0.24)
1054	Ammeter 0–100A DC	External	50 Millivolt at full scale	0.53 (0.24)
1055	Ammeter 0–150A DC	External	50 Millivolt at full scale	0.53 (0.24)



360 PANEL SYSTEM

See page 23 for a full selection of related products located in the new 360 Panel System section of this catalog.

1050

1051

1052

1053

1054

1055

AC DIN Meters

Standard European 72mm design. White matte dial with black printed scale and knife-edge pointer.

Common Features

- Back-lit meter face
- Terminal cover included to prevent accidental short circuit

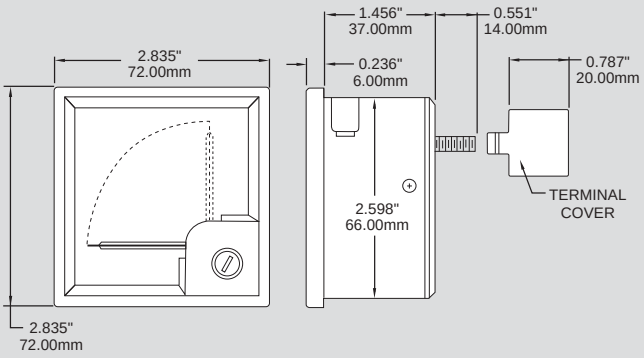
1056 and 1057 Voltmeter Features

- 0–150 and 0–250 Volt ranges
- Simple 2-wire connection to AC hot and neutral
- Meter senses and powers from same connections

1058 Ammeter Features

- 0–50 Ampere range
- Simple 2-wire connection
- Meter senses and powers from coil slipped over wire to be measured
- 50 Milliamperes AC at full scale

PN	Description	Weight Lb (Kg)
1056	Voltmeter 0–150V AC	0.33 (0.15)
1057	Voltmeter 0–250V AC	0.33 (0.15)
1058	Ammeter 0–50A AC	0.43 (0.19)



1056

1057

1058

360 PANEL SYSTEM

See page 23 for a full selection of related products located in the new 360 Panel System section of this catalog.

Photo Courtesy of Hanse Yachts

DC Analog Voltmeters

- Simple 2-wire connection to DC positive and negative
- Meter senses and powers from same connection

Specifications

Meter Current 1 Milliampere at full scale

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)

8240

8028

DC Analog Ammeters

8016, 8017, 8018, 8019, 8022, 8041, and 8250

- Simple 2-wire connection from shunt—no other power required
- Meter senses and powers from shunt connection
- Includes appropriate DC shunt (page 113)

8005 and 8038

- Simple 2-wire connection—no other power required
- Internal shunt

Specifications

External Shunt Type 50 Millivolt at meter full scale
Meter Current 1 Milliampere at full scale

Standard Size 2-3/4" Face Meters			
PN	**Description**	**Shunt Type**	**Weight Lb (Kg)**
8005	Ammeter 0–25A DC	Internal	0.25 (0.11)
8022	Ammeter 0–50A DC + Shunt	External	0.60 (0.27)
8016	Ammeter 0–75A DC + Shunt	External	0.60 (0.27)
8017	Ammeter 0–100A DC + Shunt	External	0.60 (0.27)
8018	Ammeter 0–150A DC + Shunt	External	0.60 (0.27)
8019	Ammeter 0–200A DC + Shunt	External	0.60 (0.27)

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)

8005

8041

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 appropriate DC shunt (page 113)

Specifications

External Shunt Type 50 Millivolt at meter full scale
Meter Current 1 Milliampere at full scale

Standard Size 2-3/4" Face Meters			
PN	**Description**	**Shunt Type**	**Weight Lb (Kg)**
8252	Ammeter 50–0–50A DC +Shunt	External	0.58 (0.26)
8253	Ammeter 100–0–100A DC +Shunt	External	0.58 (0.26)

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

8253

8254

360 PANEL SYSTEM

See page 9 for a full selection of related products located in the new 360 Panel System section of this catalog.

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

Standard Size 2-3/4" Face Meters		
PN	**Description**	**Weight Lb (Kg)**
9353	Voltmeter 0–150V AC	0.25 (0.11)
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

- Simple 2-wire connection
- Meter senses and powers from coil slipped over wire to be measured
- Includes AC current transformer (page 113)

Specifications

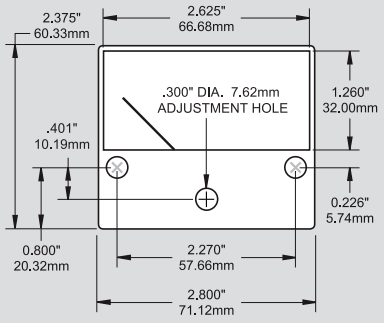
Meter Current 50 Milliamperes AC at full scale

Standard Size 2-3/4" Face Meters		
PN	**Description**	**Weight Lb (Kg)**
9630	Ammeter 0–50A AC + Transformer	0.30 (0.14)
8258	Ammeter 0–100A AC + Transformer	0.32 (0.15)

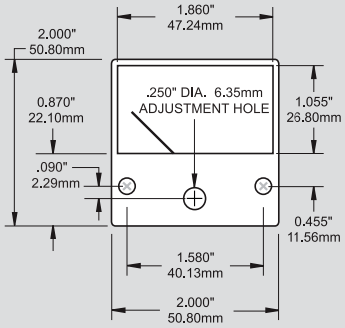
Compact 2" Face Micro Meter		
PN	**Description**	**Weight Lb (Kg)**
8246	Micro Ammeter 0–50A AC + Transformer	0.26 (0.12)

9630

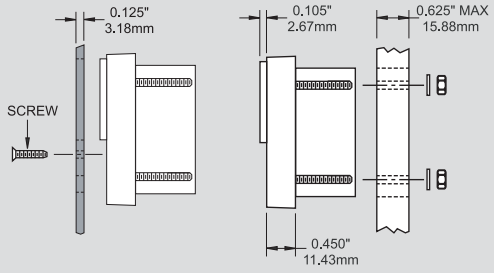
8246



Standard Meter Dimensions



Micro Meter Dimensions



Panel Mount Surface Mount

See page 9 for a full selection of related products located in the new 360 Panel System section of this catalog.

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
- Intended for use with 8247 AC Digital Multimeter (Not included) (page 107)
- Includes two additional Current Transformers 8256 (page 113)

PN	Description	Width in" (mm)	Height in" (mm)
8410	120/240V AC Digital Meter Panel	5.25 (133.35)	3.75 (95.25mm)

8410

DC Analog Voltmeter Panel

- Includes standard 2-3/4" 8003 DC Analog Voltmeter (page 110)
- Displays voltage from 8–16 Volts DC
- 3 position switch for multiple battery banks

Specifications

Voltage 16 Volts DC Maximum

PN	Description	Weight Lb (Kg)	Width in" (mm)	Height in" (mm)
8015	DC Analog Voltmeter Panel	0.49 (0.22)	5.25 (133.35)	3.75 (95.25mm)

8015

DC Digital Voltmeter Panel

- Includes 8235 DC Digital Voltmeter (page 106)
- 4 digit LED display—Display voltage from 0–60 Volts DC
- 3 position switch for multiple battery banks

Specifications

Voltage 60 Volts DC Maximum

PN	Description	Weight Lb (Kg)	Width in" (mm)	Height in" (mm)
8051	DC Digital Voltmeter Panel	0.64 (0.29)	5.25 (133.35)	3.75 (95.25mm)

8051

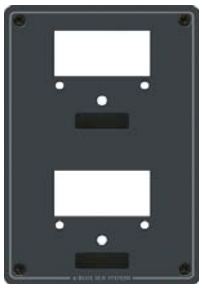
Meter Mounting Panels

- Surface mounts standard 2-3/4" Analog or Digital Meters (pages 110–111)

Specifications

Panel Material 0.125" Aluminum 5052 Alloy
Panel Undercoating Mil-C-5541C or equivalent immersion
Panel Front Coating Two-part polyurethane slate gray finish

PN	Description	Weight Lb (Kg)	Width in" (mm)	Height in" (mm)
8013	Meter Mounting Panel For (1) 2-3/4"	0.25 (0.11)	5.25 (133.35)	3.75 (95.25mm)
8014	Meter Mounting Panel For (2) 2-3/4"	0.36 (0.16)	5.25 (133.35)	7.50 (190.50mm)



8014

8013

Mini Clamp Multimeter

- Clamp allows measurement of AC and DC current in wires without disturbing the circuits or contacting live terminals
- Compact size allows comfortable hand operation, portability, and access to confined areas
- Auto range simplifies operation by automatically selecting the range that best fits the data
- Additional functions include: Data Hold, Overload Display, and Auto Power-Off
- True RMS AC measurement is accurate for normal sine waves and the modified sine wave outputs from inverters

Specifications

AC Amperes (Current)	0.01–400 Amperes DC
AC Voltage	0.001–600 Volts
DC Amperes (Current)	0.01–400 Amperes
DC Voltage	0.001–600 Volts
Resistance/Continuity Alarm	0.1–40M Ω
Measurement Resolution	4300 counts

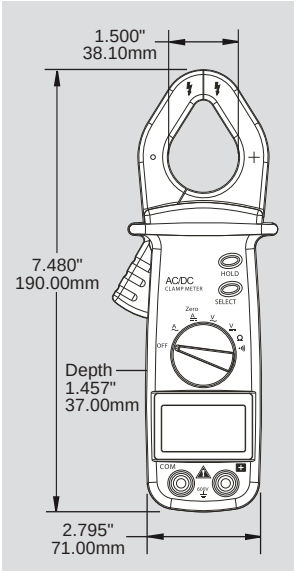
Certification and Agency Standards

CE marked
CAT II, 600 Volts

PN	Description	Weight Lb (Kg)
8110	Mini Clamp Multimeter	0.47 (0.21)

NEW PRODUCT

8110
(Includes test leads and carrying case)



DC Shunts

- For use with 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

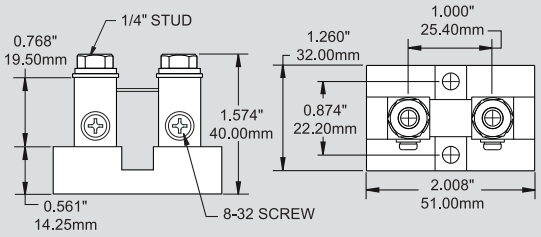
Shunt Type	Resistive
Full Scale	50 Millivolts
Continuous Duty	66% of Rated Current
Intermittent Duty	100%—5 Minutes
	300%—3 Seconds

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)

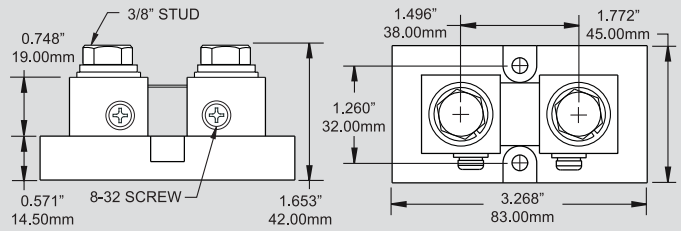
9228-9231

9233

8255



9228 - 9231



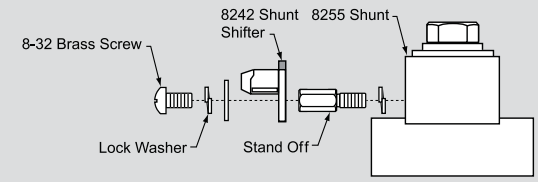
9233 and 8255

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 (see above)
- 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 (0.20)

8242



Mounting Diagram

AC Current Transformers

- For use with AC Ammeters (page 111)

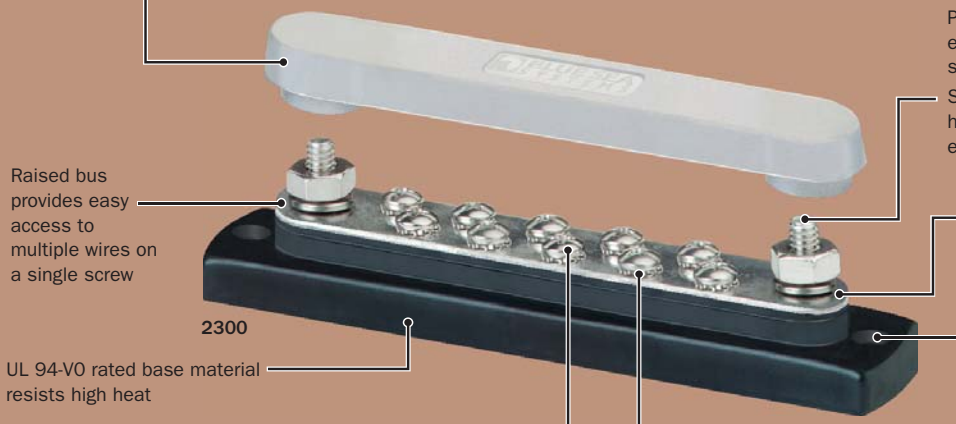
Specifications

Dimensions	0.60" (15.24mm) Inside Diameter
	1.38" (35.05mm) Outside Diameter

PN	Description	Ratio	Weight Lb (Kg)
8073	Analog Ammeter	50A AC/50mA AC	0.10 (0.05)
8257	Analog Ammeter	100A AC/50mA AC	0.20 (0.09)
8256	Digital Ammeter	150A AC/50mA AC	0.20 (0.09)

8073

The Industry Standard for Electrical BusBars



CE Conformance verified for AC circuits up to 250 volts

Busbars, Connectors, and Insulators

Definition

Connectors such as busbars and power posts provide a safe and convenient way to connect circuit wires together, to safely pass them through a surface such as a bulkhead or deck, and to insulate them. Insulators protect electrical connections. US Coast Guard regulations require that continuously energized non-grounded conductors are protected from accidental short circuits and to protect people from shock hazards.

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 is used to convert the large wire from the batteries to the smaller wires (with individual circuit protection) that carry current out to each load device. Similarly, a negative distribution bus is used to collect all of the small wires
from each device and convert them to the large wire from the batteries. 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:

- Solid copper construction for low voltage drop and low heat rise
- Tin plating to resist corrosion and maintain low resistance connections.
- 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 role is to carry current through the terminal and into the interior of the switch.
- Continuous rating equal to or greater than the maximum continuous amperage of the system in which it is installed.

Products in this Section

Blue Sea Systems provides an array of busbars, connectors, and insulators for DC and AC circuit applications.

Busbars: Busbars are available at current ratings from 100 to 600A. They are available with stud terminals for large cable connections, and screw terminals for small terminal connections. Insulating covers are available for most busbars.

Terminal Blocks: Terminal blocks are available with current ratings from 20 to 65A, with 2 to 12 circuits.

Feed-Through Connectors: Feed-through connectors are available with current ratings of 250 and 400A. They allow high currents to be passed through hull, deck, or bulkhead. They eliminate chafing and provide strain relief.

PowerPosts: PowerPosts are used to connect high-amperage cables. Some PowerPosts are not current rated because current flows between terminals stacked on the post. The PowerPost Plus allows small wire connections at high-amperage cable connections.

Cable Clams and Cable Caps: Use cable clams for secure, water-tight through-deck cable installations. Use cable-cap stud insulators for any terminal stud connection that should be protected.

DC Current Ratings

0 — **DC Current Ratings** (Amperes) — 600

BusBars Pages 116–120

MiniBus and DualBus Common BusBars, Continuous Rating: 100 Amperes

Pages 116–117 — 100

DualBus Plus Common BusBars, Continuous Rating: 150 Amperes

Page 117 — 150

Common BusBars, Continuous Rating: 150 Amperes

Page 118 — 150

MaxiBus Common BusBars, Continuous Rating: 250 Amperes

Page 119 — 250

PowerBar Common BusBars, Continuous Rating: 600 Amperes

Page 120 — 600

Terminal Blocks Pages 120–121

Terminal Blocks, Continuous Rating: 20 Amperes

Page 120 — 20

Terminal Blocks, Continuous Rating: 30 Amperes

Page 121 — 30

Terminal Blocks, Continuous Rating: 65 Amperes

Page 121 — 65

Feed Through Connectors and PowerPosts Pages 122–123

PowerPost Plus Cable Connectors, Continuous Rating: 150 Amperes

Page 123 — 150

Terminal Feed Through Connectors, Continuous Rating: 250 Amperes

Page 122 — 250

Terminal Feed Through Connectors, Continuous Rating: 400 Amperes

Page 122 — 400

PowerPost High Amperage Cable Connectors

Page 123

Dual PowerPost High Amperage Cable Connectors

Page 123

CableClams and CableCaps Pages 124–125

CableClam

Page 124

CableCaps

Page 125

MiniBus 100 Ampere Common BusBars

- Great for limited space applications

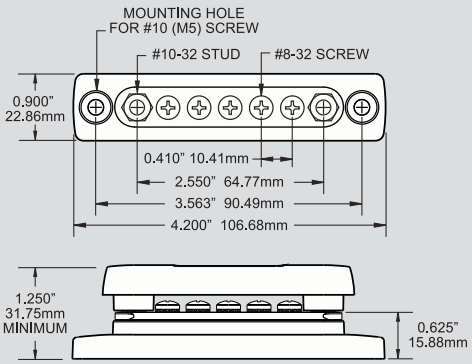
Specifications

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

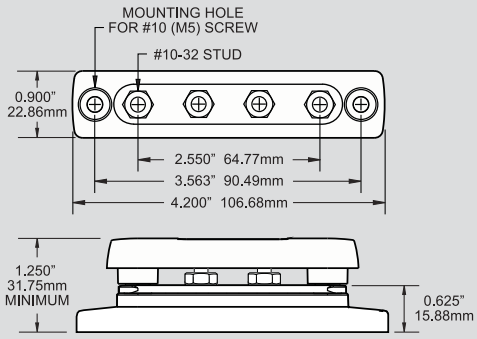
Certifications

- CE certified

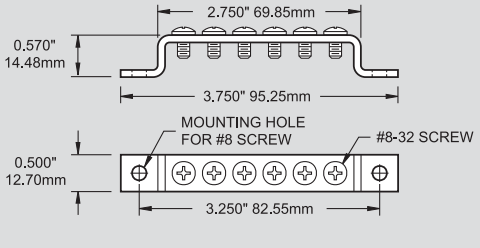
PN	Description	Weight Lb (Kg)
2304	5 x 8-32 Screw Terminal	0.15 (0.07)
2314	5 x 8-32 Screw Terminal with Cover	0.17 (0.08)
2305	4 x 10-32 Stud Terminal	0.15 (0.07)
2315	4 x 10-32 Stud Terminal with Cover	0.17 (0.08)
2306	Grounding BusBar 6 x 8-32 Screw Terminal	0.10 (0.05)
2713	Cover For MiniBus 2304 and 2305	0.05 (0.02)



2304 and 2314 (with Cover)



2305 and 2315 (with Cover)



2306

2304 CE

2314 CE

2305 CE

2315 CE

2713

2306

DualBus 100 Ampere Common BusBars

- Combines negative and positive buses on one block

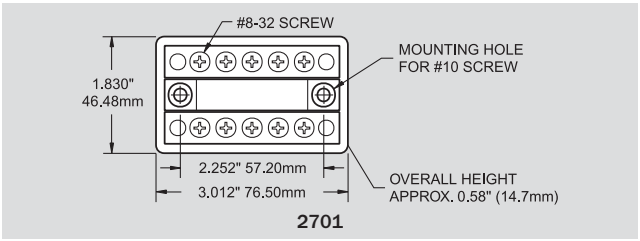
Specifications

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

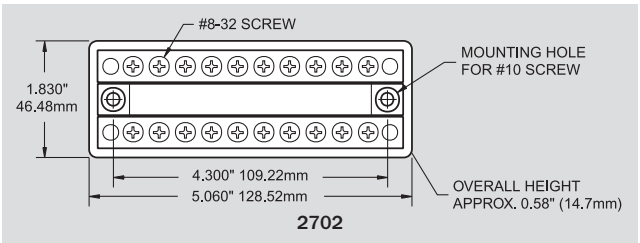
Certifications

- CE certified

PN	Description	Weight Lb (Kg)
2701	5 x 8-32 Screw Terminal	0.20 (0.09)
2702	10 x 8-32 Screw Terminal	0.30 (0.14)
2709	Cover For DualBus 2701	0.05 (0.02)
2710	Cover For DualBus 2702	0.05 (0.02)



2701



2702


2701


2702


2709


2710

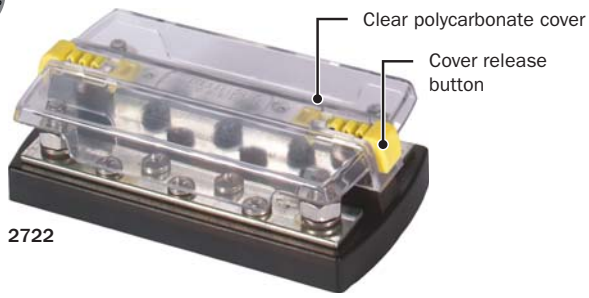
DualBus Plus 150 Ampere Common BusBars

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

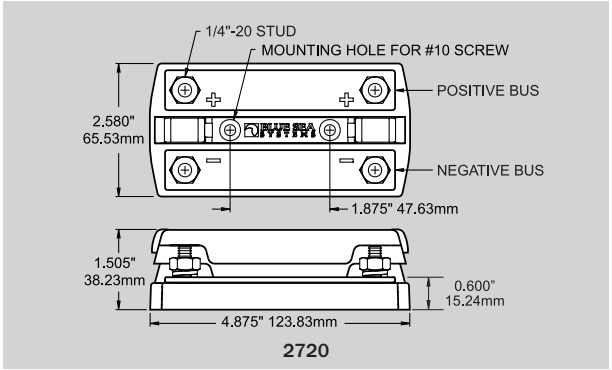
Specifications

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

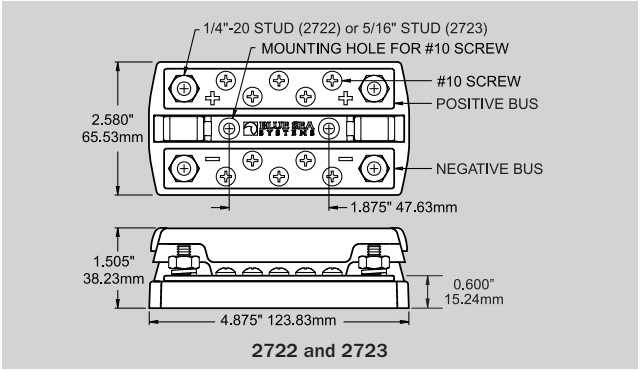
PN	Description	Weight Lb (Kg)
2720	1/4" Stud	0.61 (0.28)
2722	1/4" Stud, 5 x 10-32 Screw Terminal	0.66 (0.30)
2723	5/16" Stud, 5 x 10-32 Screw Terminal	0.61 (0.28)



2722



2720



2722 and 2723

150 Ampere Common BusBars

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

Specifications

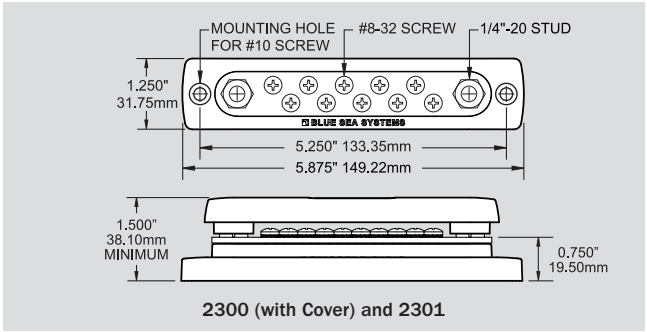
Continuous Rating	130 Amperes AC/150 Amperes DC
Maximum Voltage Rating	300 Volts AC/48 Volts DC
Bus Material	Tin-Plated Copper CDA 110/UNS11000
Base Material	Reinforced Polycarbonate
Cover Material	Clear Polycarbonate

Certifications

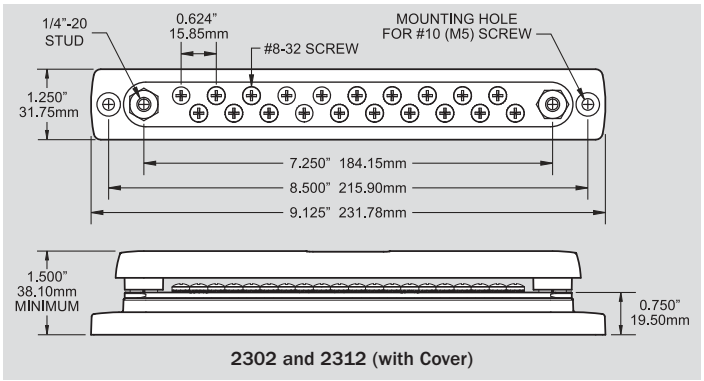
· CE certified

PN	Description	Weight Lb (Kg)
2301	10 x 8-32 Screw Terminal	0.34 (0.15)
2300	10 x 8-32 Screw Terminal with Cover	0.37 (0.16)
2302	20 x 8-32 Screw Terminal	0.53 (0.24)
2312	20 x 8-32 Screw Terminal with Cover	0.58 (0.26)
2303	4 x 1/4" Stud Terminal	0.35 (0.16)
2307	4 x 1/4" Stud Terminal with Cover	0.38 (0.17)
2715	Cover For BusBar 2301 and 2303	0.07 (0.03)
2716	Cover For BusBar 2302	0.13 (0.06)

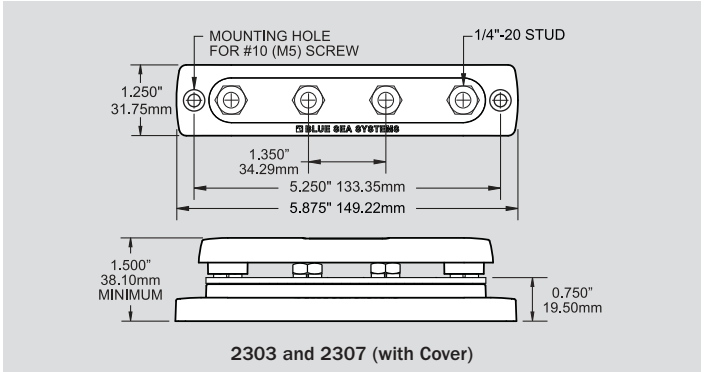
Note: 2715 replaces 2706 / 2716 replaces 2707



2300 (with Cover) and 2301



2302 and 2312 (with Cover)



2303 and 2307 (with Cover)

2301

2300

2302

2312

2303

2307

2715

2716

MaxiBus 250 Ampere Common BusBars

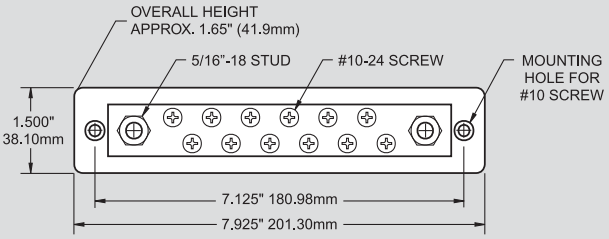
Specifications

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

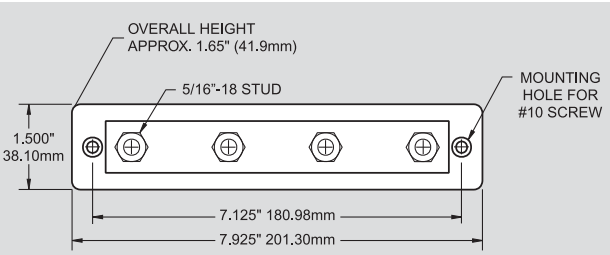
Certifications

· CE certified

PN	Description	Weight Lb (Kg)
2105	12 x #10-32 Terminal Screws	0.80 (0.36)
2106	4 x 5/16" Stud Terminals	0.90 (0.41)
2711	Cover For MaxiBus 2105 and 2106	0.06 (0.03)



2105



2106

2105

2106

2711

Squalicum Harbor - Bellingham, Washington

PowerBar 600 Ampere Common BusBars

Specifications

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

Certifications

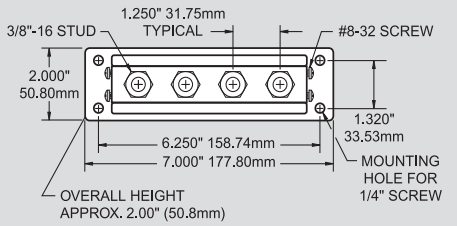
· CE certified

PN	Description	Weight Lb (Kg)
2104	4 x 3/8-16 Stud Terminal	1.75 (0.79)
2107	8 x 3/8-16 Stud Terminal	2.75 (1.25)
2708	Cover For 2104	0.25 (0.11)

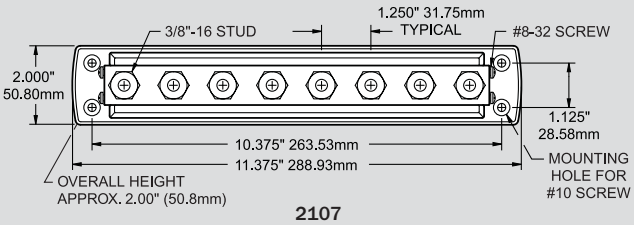
2104

2107

2708



2104



2107

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 122)

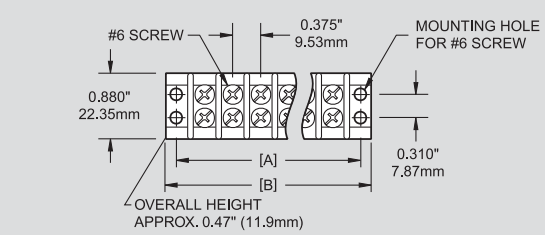
Specifications

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

Certifications

· CE certified

PN	Circuit	Weight Lb (Kg)	[A] in" (mm)	[B] Length in" (mm)
2402	2	0.05 (0.02)	1.13 (28.70)	1.41 (35.81)
2404	4	0.06 (0.03)	1.88 (47.75)	2.16 (54.86)
2406	6	0.08 (0.04)	2.63 (66.80)	2.91 (73.91)
2408	8	0.10 (0.05)	3.38 (85.85)	3.66 (92.96)
2410	10	0.11 (0.05)	4.13 (104.90)	4.41 (112.01)



2402

2404

2406

2408

2410

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 122)

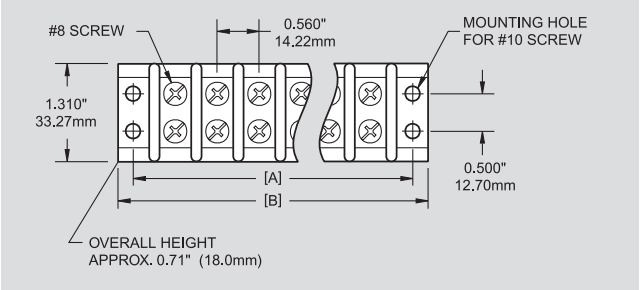
Specifications

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

Certifications

- CE certified

PN	Circuit	Weight Lb (Kg)	[A] in" (mm)	[B] Length in" (mm)
2502	2	0.11 (0.05)	1.69 (42.93)	2.10 (53.34)
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 (110.24)
2508	8	0.27 (0.12)	5.05 (128.27)	5.46 (138.68)
2510	10	0.33 (0.15)	6.17 (156.72)	6.58 (167.13)
2512	12	0.35 (0.16)	7.29 (185.17)	7.70 (195.58)



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 page 122)

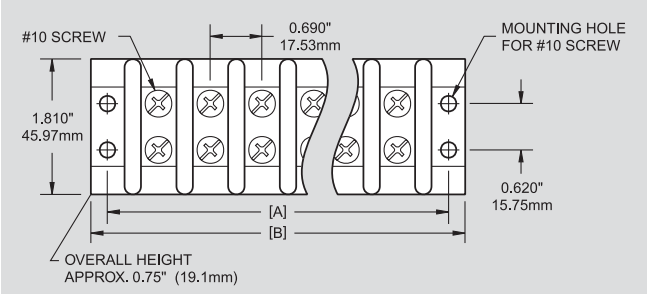
Specifications

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

Certifications

- CE certified

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	0.25 (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)



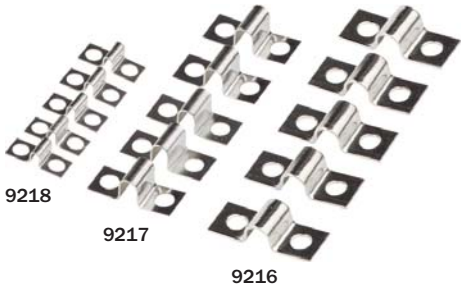
Terminal Block Jumpers

- Jumpers allow creation of common circuits on independent connectors
- **9218**–Fits 20 Ampere terminal blocks (2400 Series, page 120)
- **9217**–Fits 30 Ampere terminal blocks (2500 Series, page 121)
- **9216**–Fits 65 Ampere terminal blocks (2600 Series, page 121)

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)



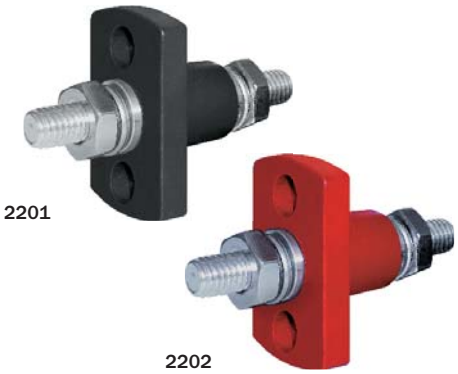
Terminal Feed Through Connectors

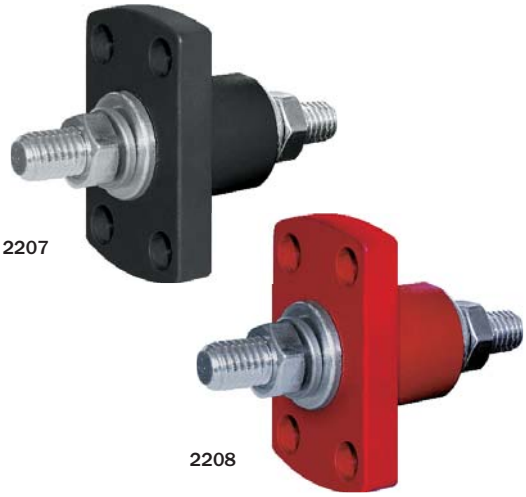
Perfect for passing high current through hulls, decks and bulkheads. Large cables passed through holes are subject to chafing even when a protective grommet is used. Terminal Feed Through Connectors eliminate chafing and provide excellent strain relief for the cables. The large terminals have a mounting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

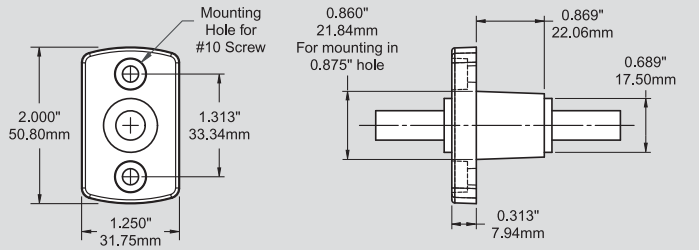
Specifications

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

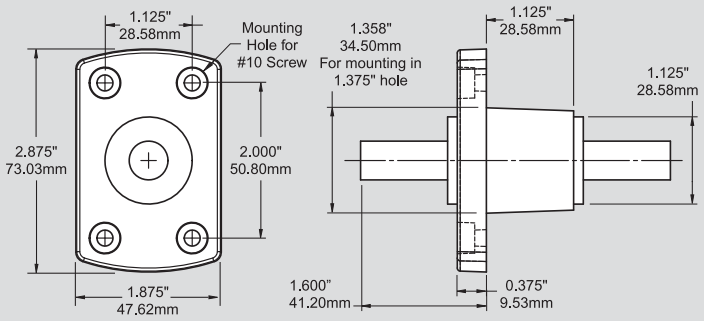
PN	Size	Description	Continuous Amperage	Color	Weight Lb (Kg)
2201	Small	5/16"-18 Stud	250A	Black	0.30 (0.14)
2202	Small	5/16"-18 Stud	250A	Red	0.30 (0.14)
2203	Small	3/8"-16 Stud	250A	Black	0.30 (0.14)
2204	Small	3/8"-16 Stud	250A	Red	0.30 (0.14)
2205	Large	3/8"-16 Stud	400A	Black	0.62 (0.28)
2206	Large	3/8"-16 Stud	400A	Red	0.62 (0.28)
2207	Large	1/2"-13 Stud	400A	Black	0.62 (0.28)
2208	Large	1/2"-13 Stud	400A	Red	0.62 (0.28)



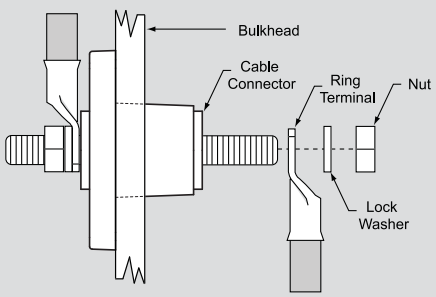




2201–2204



2205–2208



Mounting Diagram

PowerPost High Amperage Cable Connectors

- Connects high amperage cables securely

Specifications

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

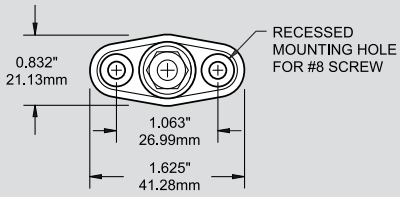
Certifications

- CE certified

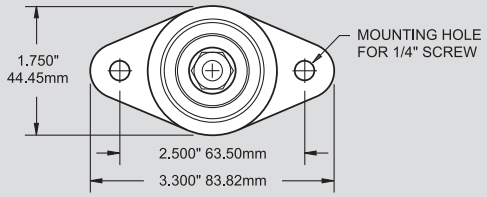
PN	Description	Weight Lb (Kg)
2010	#10-32 x 5/8" Stud	0.06 (0.03)
2011	1/4" x 3/4" Stud	0.10 (0.05)
2001	1/4" x 1-1/16" Stud	0.20 (0.09)
2002	5/16" x 7/8" Stud	0.25 (0.11)
2003	3/8" x 7/8" Stud	0.27 (0.12)

2010

2003



2010 and 2011



2001, 2002, and 2003

Dual PowerPost High Amperage Cable Connectors

- **2015/2016/2017:** are designed for connecting high amp conductors
- **2018:** is designed for outboard engine installation when factory cables need to be extended

Specifications

Continuous Rating	Not rated—amperage flows between terminals stacked on post and is determined by wire and terminals used.
Maximum Voltage Rating	48 Volts DC
Base Material	Reinforced PBT
Cover Material	Polycarbonate

PN	Description	Weight Lb (Kg)
2015	2 x 1/4" Studs with Cover	0.27 (0.12)
2016	2 x 5/16" Studs with Cover	0.27 (0.12)
2017	2 x 3/8" Studs with Cover	0.27 (0.12)
2018	1 x 5/16" Stud, 1 x 3/8" Stud with Cover	0.27 (0.12)

NEW PRODUCT

Available Spring, 2008

2017

PowerPost Plus Cable Connectors

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

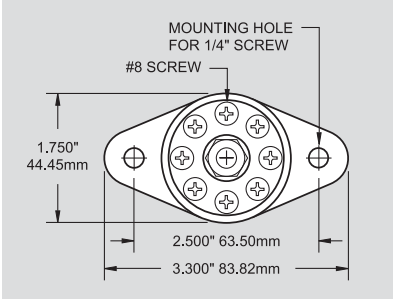
Specifications

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

Certifications

- CE certified

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

CableClams

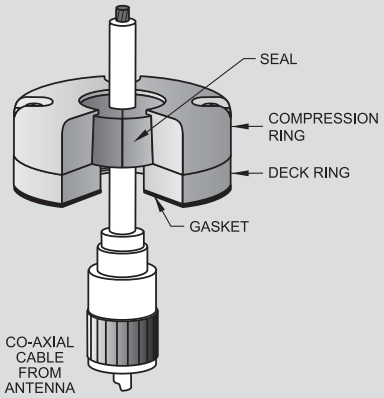
- Perfect for antenna installation
- Waterproof co-axial installation without removing connectors
- Save the expense of removing and replacing connectors
- Avoid poor connections from removing factory connectors

Specifications

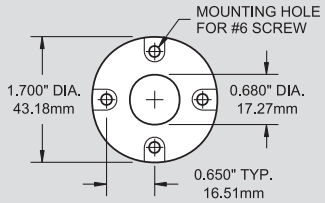
Body Material	Acetal
Seal Material	UV-Stabilized Buna-N Rubber
Screws	Stainless Steel

PN	Connector Opening in" (mm)	Weight Lb (Kg)
1001	0.63 (15.87)	0.15 (0.07)
1002	0.83 (20.95)	0.20 (0.09)
1003	1.39 (35.18)	0.30 (0.14)

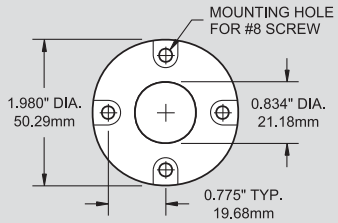
1001-1003



CableClam Drawing



1001



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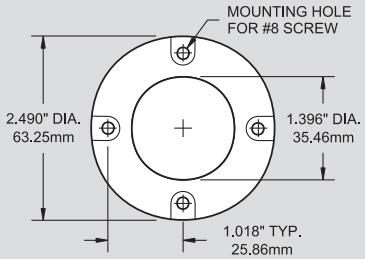
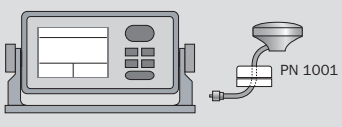
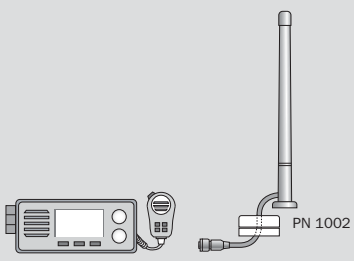


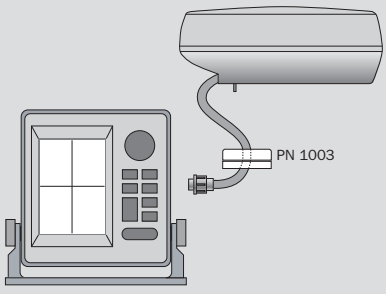
1003



Use 1001 for GPS antenna cables



Use 1002 for VHF antenna cables



Use 1003 for Radar antenna cables

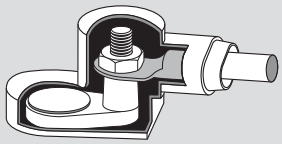
Rotating CableCaps

- 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	0.25 (0.11)
9030	All	Black	Bulk	0.10 (0.45)
9031	All	Red	Bulk	0.10 (0.45)

4001



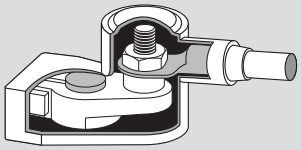
Standard CableCaps

- For batteries with marine adapter terminals added on

Specifications
Material PVC

PN	Cable Size	Color	Package	Weight Lb (Kg)
4005	4, 2, 1	Red/Black	Retail/Pair	0.22 (0.10)
4006	1/0, 2/0	Red/Black	Retail/Pair	0.22 (0.10)
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)

4005



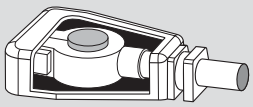
Automotive CableCaps

- Designed to fit standard automotive posts

Specifications
Material PVC

PN	Cable Size	Color	Package	Weight Lb (Kg)
4016	4, 2, 1	Red/Black	Retail	0.18 (0.08)
4017	1/0, 2/0	Red/Black	Retail	0.18 (0.08)
9176	1/0, 2/0	Red	Bulk	0.07 (0.03)
9177	1/0, 2/0	Black	Bulk	0.07 (0.03)

4016



CableCap Stud Insulators

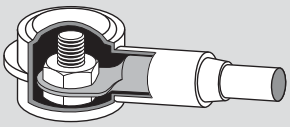
- Insulate stud type connectors on alternators, starters, windlasses and other high amperage devices

Specifications
Material PVC

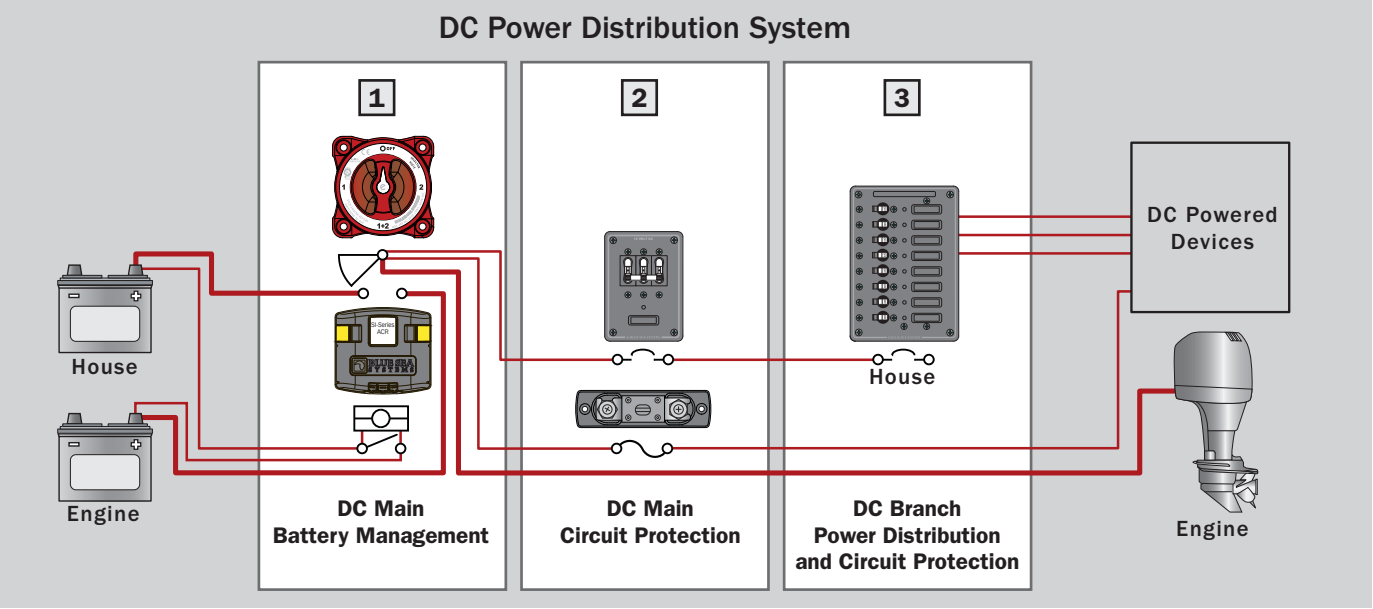
PN	Cable Size	Color	Package	Weight Lb (Kg)
4008	18-10	Red	Retail/3	0.05 (0.02)
4009	18-10	Black	Retail/3	0.05 (0.02)
4010	8-4	Red	Retail/2	0.05 (0.02)
4011	8-4	Black	Retail/2	0.05 (0.02)
4012	2-2/0	Red	Retail/1	0.07 (0.03)
4013	2-2/0	Black	Retail/1	0.07 (0.03)
4014	3/0-4/0	Red	Retail/1	0.07 (0.03)
4015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

4008

4009



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



1 DC Main Battery Management

DC Main Battery Management is made up of two product categories, Battery Switches and Charge Management, which are covered separately in this section.

Battery Switches

Purpose

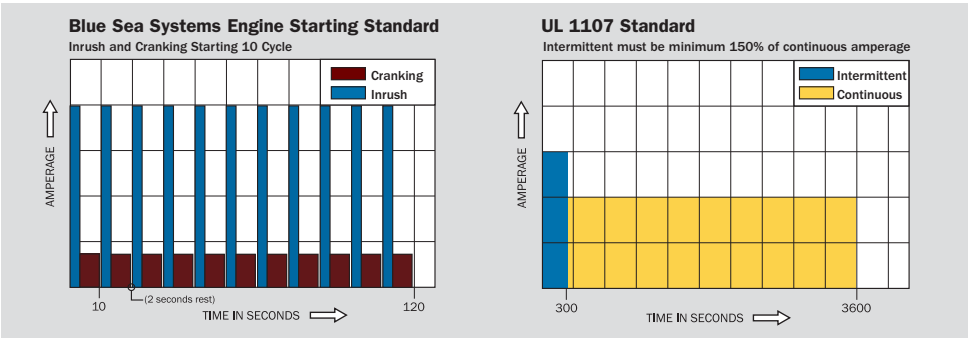
To isolate the potentially destructive energy in the battery banks when the boat is not in use or in emergencies.
ABYC 11.7.1.2.1. A battery switch shall be installed in the positive conductor(s) from each battery or battery bank with a CCA rating greater than 800 Amperes.

Considerations

Historically there have been two types of battery switches used on boats; Single Circuit and Battery Selector Switches. In 2006, Blue Sea Systems introduced a third option called a DUAL CIRCUIT PLUS™ Battery Switch as a better alternative.

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. The CE mark is not a substitution for the UL 1107 Listing as the CE mark covers only the Ignition Protection aspect of the battery switch and does not specify amperage ratings or the many other functional requirements of UL 1107.

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. Sherman, Ed, *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.

Charge Management

Purpose

In multiple battery bank systems, Charge Management Devices (CMDs) 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 Charging Relays (ACRs).

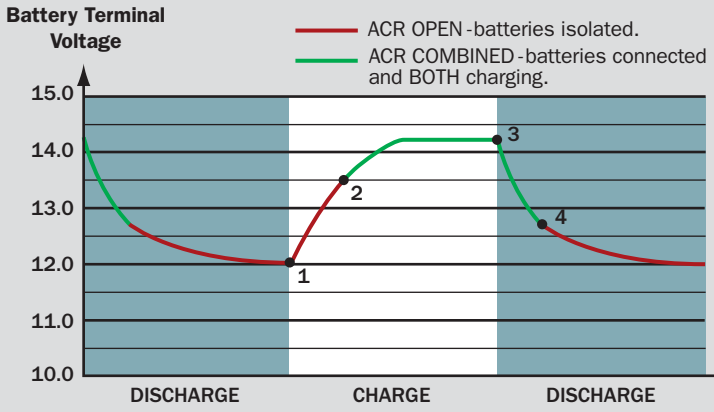
Considerations

Battery Isolators. 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 Charging Relays (ACRs). 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, ACRs 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 vs. Automatic Charging Relay (ACR)

Automatic Charging Relay (ACR) 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 Charging Relay

Current Management. Automatic Charging Relays (ACRs) 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 three methods for dealing with this. The CL-Series BatteryLink™ ACR has automatic current management circuits, the L-Series and ML-Series ACRs have high amperage contacts rated for engine starting and Blue Sea Systems' SI-Series ACRs momentarily opens the relay, isolating the two batteries during a starting event.

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.

2 and 3 DC Main Circuit Protection and Branch Circuit Protection

Purpose

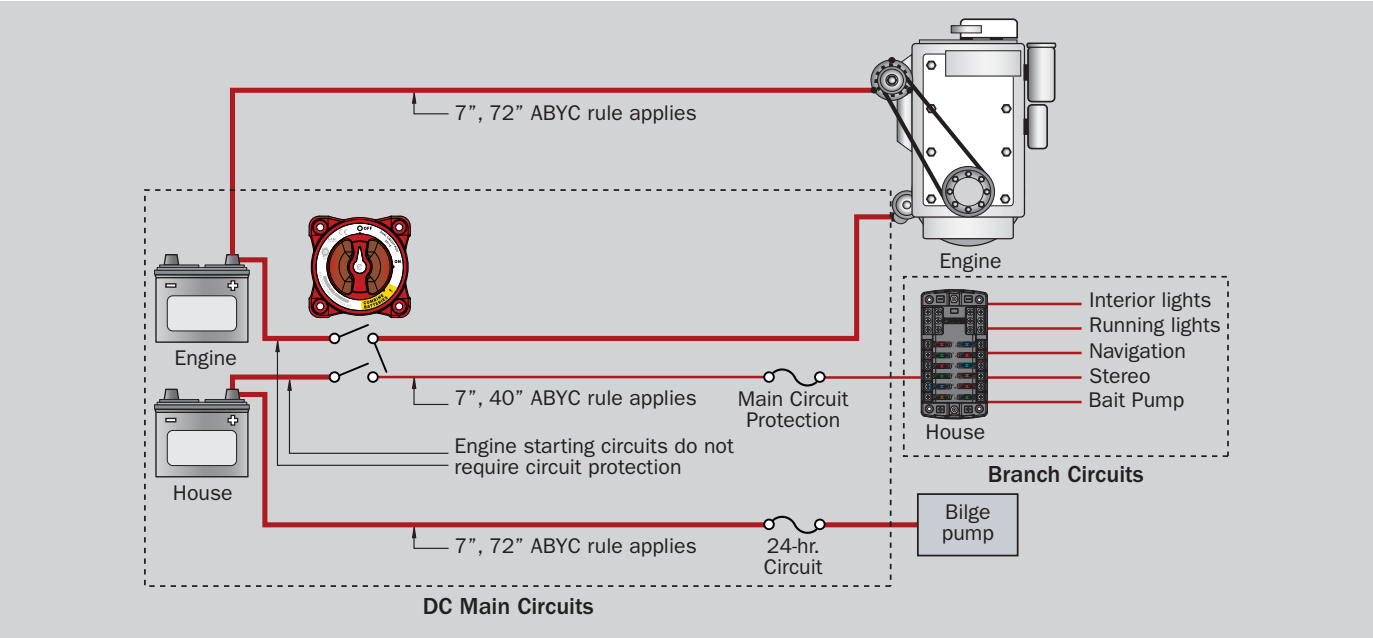
Fuses and circuit breakers are used to protect wire insulation from melting and starting fires in the event of over currents or short circuits which cause more amperage to flow in a wire than that wire is rated to handle. It is important to note that, except for those wires that are intended to carry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

Considerations for DC Main Circuit Protection

Mounting Placement - 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" maximum if the conductor is not housed in a sheath or enclosure in addition to the wire insulation, 40" maximum if the conductor is housed in a sheath or enclosure in addition to the wire insulation,

72" maximum if the conductor is connected directly to the battery and housed in a sheath or enclosure in addition to the wire insulation.

Mounting Placement - distance from power source



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 below for the required AIC ratings.

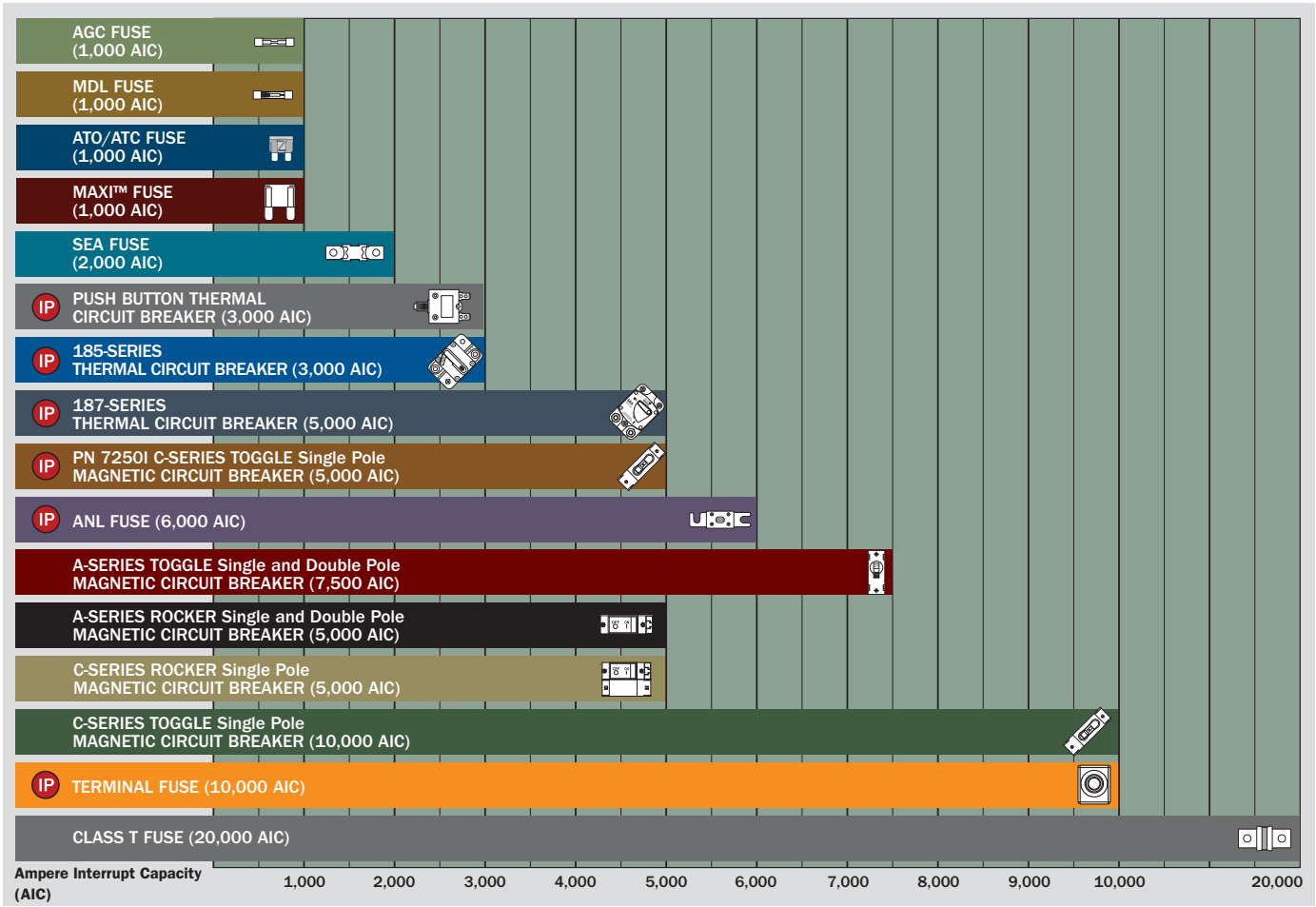
ABYC Interrupt Rating Table

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. e.g. 7.2 Volts for a 12 Volt battery. The CCA for the battery icons above is an approximation and could be slightly higher or lower. Consult the battery manufacturer's 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 @ 12 Volts DC



IP IGNITION PROTECTED

Specifications subject to change. See www.bluesea.com for current information.

Considerations for General Circuit Protection

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 129 with an IP icon.

Selecting a Fuse or Circuit Breaker. If the application requires the circuit protection device to be in an explosive area, including gasoline engine rooms or other areas susceptible to gasoline fumes, battery compartments, or propane lockers then an ignition protected circuit breaker or fuse is required.

1) **Fuse or circuit breaker?**

Fuse advantages: Available in higher amperage ratings, higher interrupt ratings, greater size ranges and generally lower cost

Circuit breaker advantages: Can be reset after opening, can be used as a switch, available in waterproof models, a wide range of opening speed characteristics are available

2) **What Interrupt Rating or Ampere Interrupt Capacity (AIC) is required?**
See the ABYC Interrupt Rating Table on page 129. 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 question 2?**
See the Circuit Protection Device Comparison Table on page 129.

4) **Does the circuit protection device need to be ignition protected?**
See the IP icon on the Circuit Protection Device Comparison Table on page 129.

5) **What should the appropriate amperage rating be for the circuit protection device?**
- The rating must be lower than the ampacity of the smallest wire in the circuit. See the ABYC Ampacity Rating Table below.
- 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

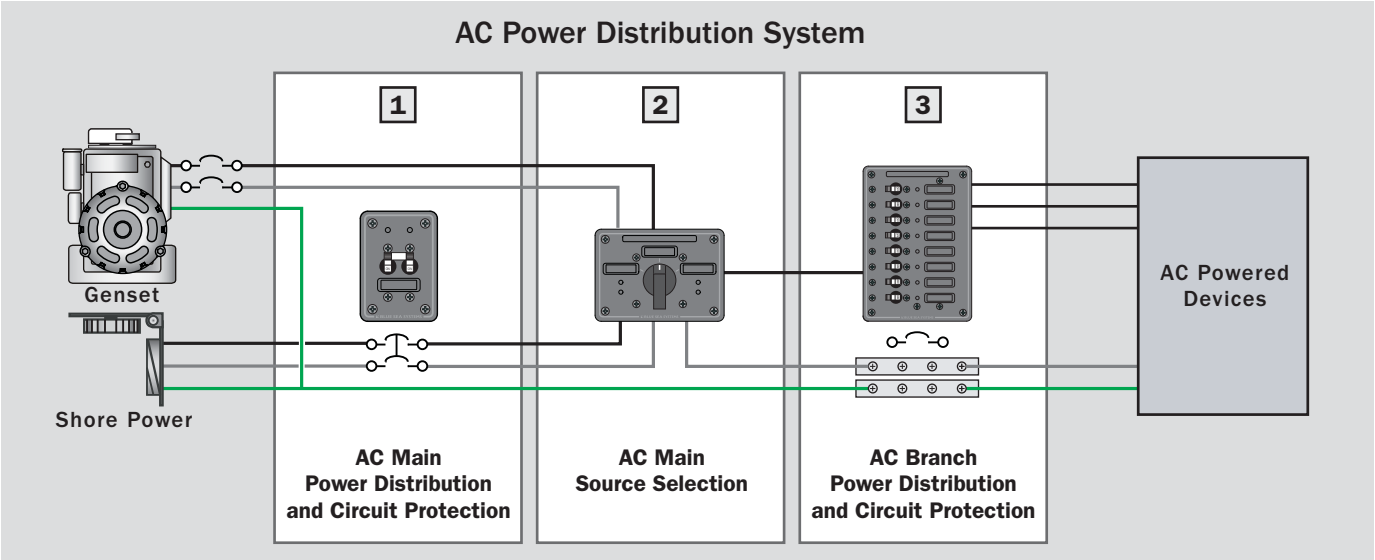
Allowable amperage for conductors under 50 Volts							Reference Data			
AWG Wire Size	Temperature Rating of Conductor Insulation									
	75°C (167°F)		90°C (194°F)		105°C (221°F)		Metric (Sq mm)	AWG CM Area	SAE CM Area	Ohms /1000ft
	Outside	Inside	Outside	Inside	Outside	Inside				
18	10	7.5	20	16.4	20	17	0.8	1,600	1,537	6.385
16	15	11.3	25	20.5	25	21.3	1	2,600	2,336	4.016
14	20	15	30	24.6	35	29.8	2	4,100	3,702	2.525
12	25	18.8	40	32.8	45	38.3	3	6,500	5,833	1.588
10	40	30	55	45.1	60	51	5	10,500	9,343	0.9989
8	65	48.8	70	57.4	80	68	8	16,800	14,810	0.6282
6	95	71.3	100	82	120	102	13	26,600	24,538	0.3951
4	125	93.8	135	110	160	136	19	42,000	37,360	0.2485
2	170	127	180	147	210	178	32	66,500	62,450	0.1563
1	195	146	210	172	245	208	40	83,690	77,790	0.1239
0	230	172	245	200	285	242	50	105,600	98,980	0.09827
2/0	265	198	285	233	330	280	62	133,100	125,100	0.07793
3/0	310	232	330	270	385	327	81	167,800	158,600	0.06180
4/0	380	270	385	315	445	378	103	211,600	205,500	0.04901

* Thermally limited amperage capacity

Wire selection for DC applications on boats is usually based on voltage drop requirements. However, there is a maximum continuous current that the wire can withstand without overheating. Higher grade marine wires are rated for service up to 105°C (221°F)—the ABYC wire capacity table for 105°C is most frequently quoted. The 105°C table accurately reflects the capacity of single conductors exposed to freely circulating cooling air. However, other factors, such as covering bundles of wire in outer jackets to form a cable, or use of conduits or structural voids to protect wires, can reduce the cooling and reduce the safe capacity of the wire.

A more conservative strategy is to use the 105°C wire, but treat it according to the 75°C table above when selecting circuit protection unless the wire is openly exposed for cooling.

The AC Main Power Distribution System begins at the sources of AC power (Shore Power, Genset, 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.



1 AC Main Power Distribution and Circuit Protection

Purpose

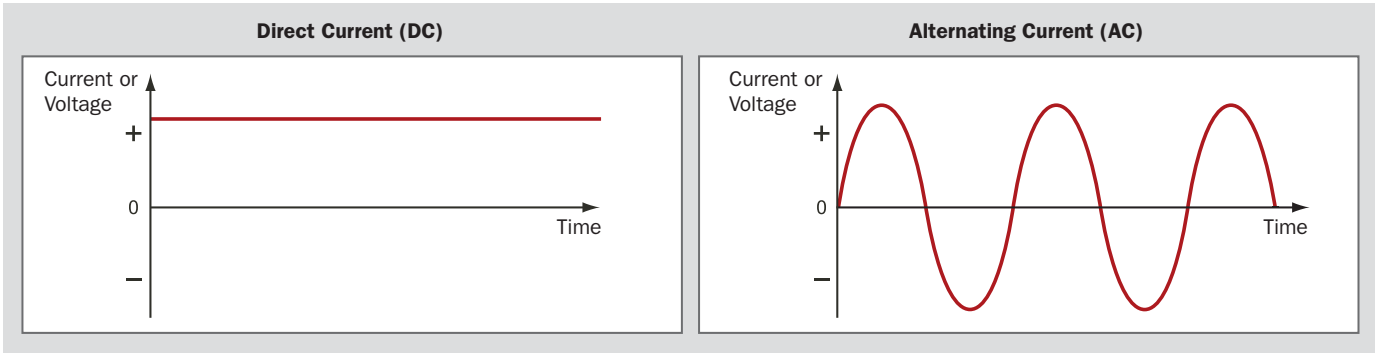
- Provide a path for delivering power from the ship's sources of AC power to the AC branch distribution system
- Provide a path for returning fault currents to ground via the green safety ground wire
- Provide a means for disconnecting AC power when the boat is not in use or in emergencies
- Provide 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 140)

Considerations

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. Before selecting components for an AC system, several important distinctions about AC power must be considered.

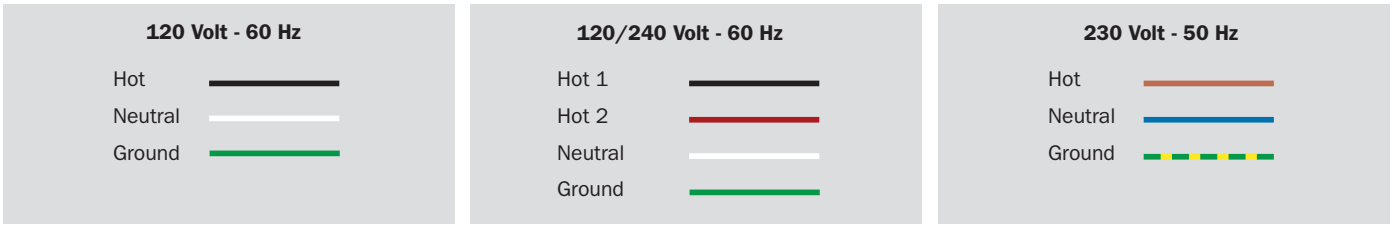
Direct Current (DC) vs. Alternating Current (AC). In DC systems, current flow is in one direction - from the point of higher voltage (electrical pressure) to lower voltage. In AC systems, the voltage reverses 60 times each second (50 times each second in Europe and other parts of the world), called "cycles" 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.

Direct Current vs. Alternating Current



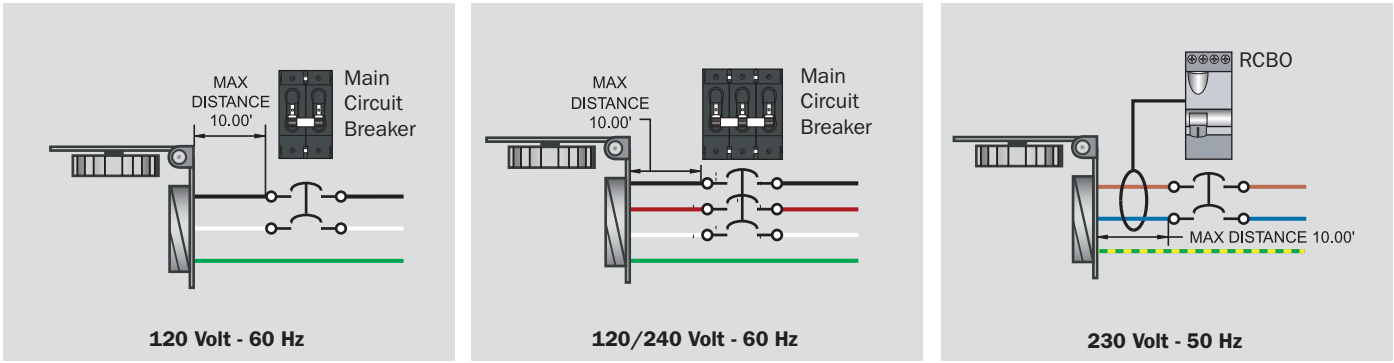
AC Wire Systems. The three most common AC systems used on boats are shown below. In all cases the ground, sometimes called safety ground to clarify its purpose and differentiate it from the DC ground or negative, is said to be a “normally non-current carrying wire”. Its purpose is to provide the lowest 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.

AC Wire Systems



Physical Configurations of AC Main Circuit Breakers. Sources of AC power, whether shore power or on-board generators and inverters, should always have a circuit breaker near the power source. This circuit breaker is designated the AC main circuit breaker. The AC main circuit breaker should always have a pole for each of the hot and neutral wires in the circuit assuring that circuit protection functions are not compromised in reverse polarity (page 140) situations. Therefore 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.

Physical Configurations of AC Main Circuit Breakers



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:
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.

ABYC Interrupt Rating 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

European systems also require that a Residual Current Device (RCD) (page 140) be installed on the entire AC system and this is generally implemented as Residual Current Breaker Overload (RCBO) (page 140) device which incorporates a double pole circuit breaker and an RCD into a single device.

2 AC Main Source Selection

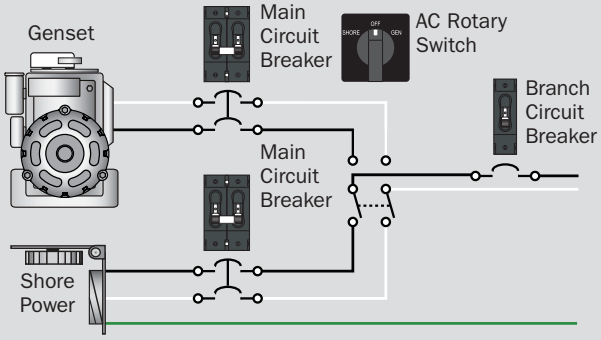
Purpose

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.

Considerations

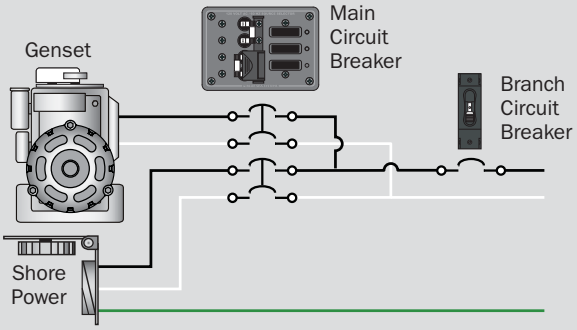
In marine AC systems there are two common methods used to assure that two different AC sources are never connected to each other. AC Lockout Slides are devices that slide between circuit breaker handles and allow only 1 handle to be in the "ON" position at a time. Circuit breakers with properly configured 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:

Rotary Switch Source Selector Wiring Diagram



Advantages: Compact, can handle up to 4 sources, intuitive operation
Disadvantages: Expensive relative to lockout slides, requires additional circuit protection

Lockout Slide Source Selector Wiring Diagram

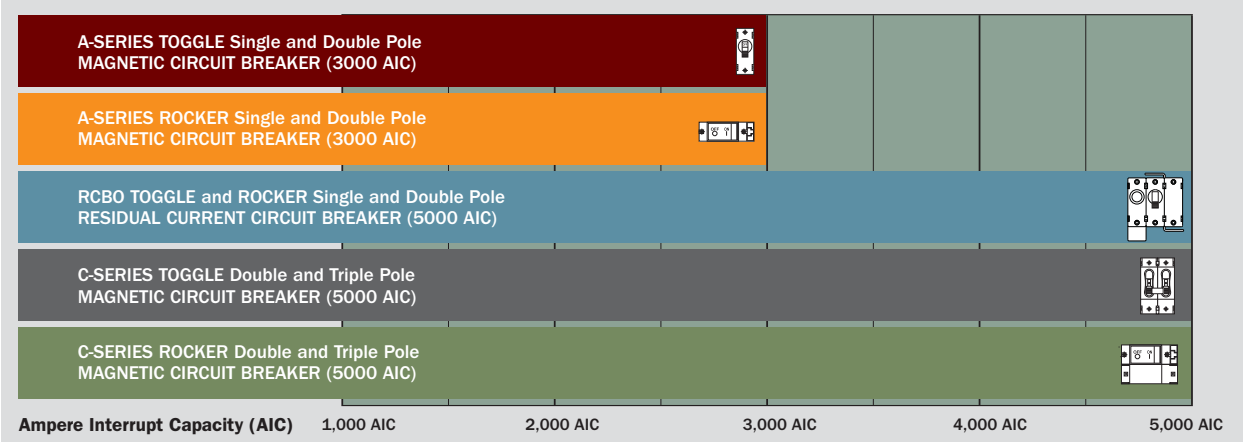


Advantages: Integrates circuit protection and source selection into 1 unit, lower cost for both circuit protection and source selection, flexible configurations for dual shore cords
Disadvantages: Requires more space, impractical for more than 3 sources

Follow These Steps to Select 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 130.
   b. The maximum continuous current that will flow in the circuit.
2) **Consult the ABYC Interrupt Rating Table on page 134 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-11.12.2 AC Circuit Protection.** See www.bluesea.com for ABYC Standards.

Circuit Protection Device Comparison Table @ 120 Volts AC



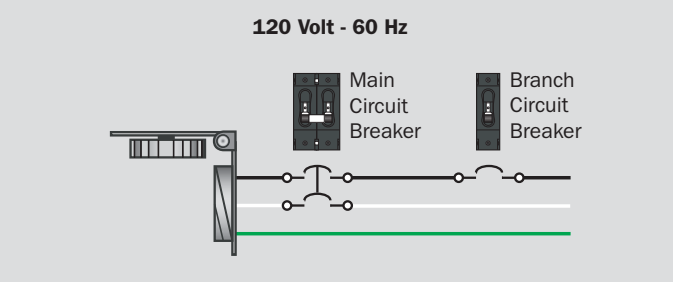
3 AC Branch Power Distribution and Circuit Protection

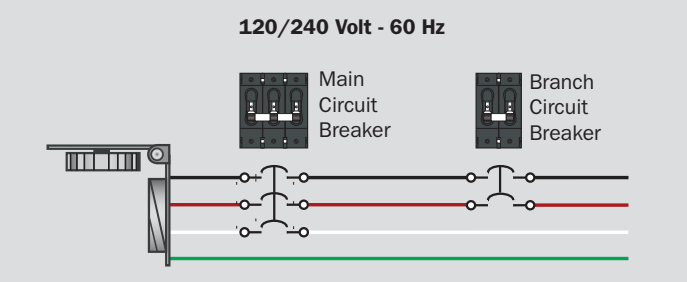
Purpose

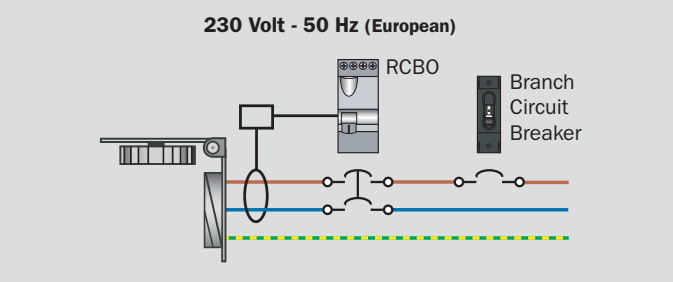
- Distribution of high amperage currents from a single cable into lower amperages in multiple wires
- Circuit protection
- Switching
- RCBO (page 140) in North American systems

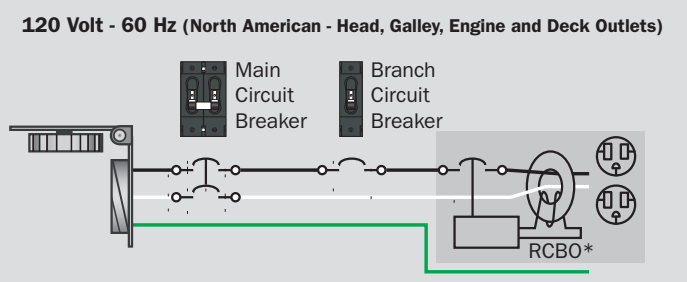
Considerations

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 ABYC Interrupt Rating Table below 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 133 for Steps to Selecting AC Circuit Protection).

ABYC Interrupt Rating Table

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

***ABYC Requirements**

11.15.3.5. If installed in a head, galley, machinery space, or on a weather deck, the receptacle shall be protected by a Type A (nominal 5 milliamperes) Ground Fault Circuit Interrupter (GFCI). (See E-11.13.)

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 10^{18} 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 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 photo voltaic 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 simultaneously 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 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
Belgium	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 80°F 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 other 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