

# C-Series Toggle Circuit Breakers for High Load Applications

7244/7246/7248/7250/7250I/7267/7268/7269/7270/7271

## Panel Specifications

Circuit Breaker Type: Magnetic  
Body Material: Phenolic  
Interrupt Rating DC: 10,000 Amperes @ ≤80 Volts DC 5-100 Amps  
5,000 Amperes @ ≤65 Volts DC 150-300 Amps\*  
5,000 Amperes @ 48 Volts DC 100 Amps  
Rated Switch Cycles: 10,000 ON-OFF with rated current and voltage

## C-Series Toggle Circuit Breaker

- 50 to 300 Ampere range provides overcurrent protection previously only available in fuses for: Inverters/Bow Thrusters/Windlasses
- Combines switching and circuit protection into a single device
- "Trip Free" - Cannot be held closed after trip

## Applicable Standards

- American Boat and Yacht Council (ABYC) Standards and Recommended Practices for Small Craft sections: E-1, E-3, E-9.
- United States Coast Guard 33 CFR Sub Part 1, Electrical Systems.

## Agency Standards

- Meets SAE J1171 external ignition protection requirements - **7250I only**
- \* No Agency Approvals

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**WARNING**

- ✓ It is not possible within the scope of these instructions to fully acquaint the installer with all the knowledge of electrical systems that may be necessary to correctly install this product. If the installer is not knowledgeable in electrical systems we strongly recommend that an electrical professional be retained to make the installation.
- ✓ If either the C-Series Toggle Circuit Breaker front or back is to be exposed to water it must be protected with a waterproof shield.
- ✓ The C-Series Toggle Circuit Breaker must not be installed in explosive environments such as gas engine rooms or battery compartments as the circuit breakers are not ignition proof.
- ✓ The main positive connection must be disconnected at the battery post to avoid the possibility of a short circuit during the installation of this circuit breaker.

## Guarantee

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

## Useful Reference Books

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

## Related Products from Blue Sea Systems

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

# Wire Sizing Chart

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

Wire Size	Wire Ampacity		Voltage →		12		24		32	
	non-engine	engine	Volt Drop →	3%	10%	3%	10%	3%	10%	
			Famps	Famps	Famps	Famps	Famps	Famps	Famps	
16	25.0	21.3	86	288	173	576	230	768		
14	35.0	29.8	138	459	275	918	367	1223		
12	45.0	38.3	219	729	437	1458	583	1944		
10	60.0	51.0	348	1159	695	2317	927	3090		
8	80.0	68.0	553	1843	1106	3686	1474	4915		
6	120.0	102.0	879	2929	1757	5858	2343	7811		
4	160.0	136.0	1398	4659	2796	9319	3727	12425		
2	210.0	178.5	2222	7408	4445	14815	5926	19754		
1	245.0	208.3	2803	9342	5605	18684	7474	24912		
0	285.0	242.3	3536	11788	7073	23576	9430	31434		
00	330.0	280.5	4457	14858	8915	29715	11886	39620		
000	385.0	327.3	5619	18731	11239	37462	14985	49950		
0000	445.0	378.3	7086	23620	14172	47241	18896	62988		

Note: For wire with 105°C insulation rating and AWG wire sizes.  
Chart courtesy of the West Advisor.

## Examples

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

# Installation

## 1. Disconnect all DC power

Before installing, disconnect the main positive cable from all batteries to eliminate the possibility of a short circuit while installing the circuit breaker.

## 2. Select mounting location and cut opening

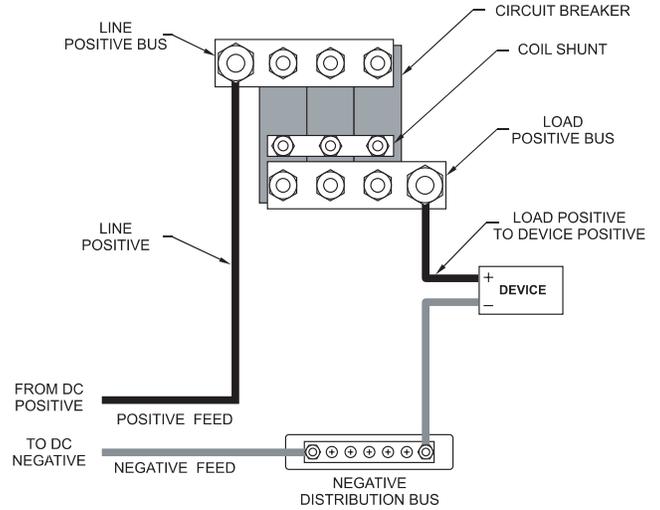
Select a mounting location which is protected from water on the panel front and back and is not in an area where flammable vapors from propane, gasoline or lead acid batteries accumulate.

## 3. Install positive feed wires

Determine the positive (red) wire size by calculating the total amperage of the circuits that will be routed through the circuit breaker using the Wire Sizing Chart. Remember that the length of the circuit is the total length of the positive wire from the power source to the device and the length of the negative wire back to the DC negative bus.

Rotating the line positive bus on the line side of the breaker 180 degrees will allow the line positive and load positive wires to hang down from the panel without interfering with each other. If rotated re-torque the 1/4-20 Nuts to 35 inch lbs maximum.

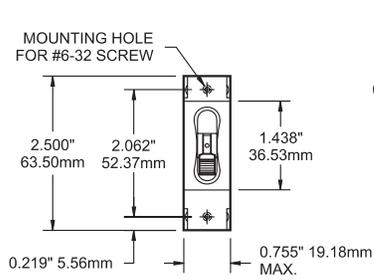
Connect the line positive and load positive wires to the circuit breaker. DO NOT make any connections to the coil shunt (see diagram).



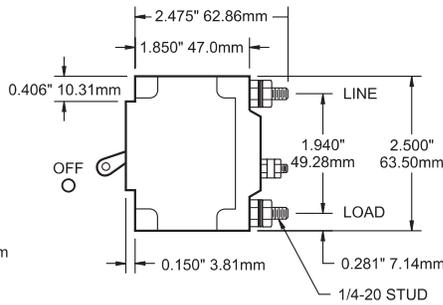
**Wiring Diagram**  
C-Series Toggle Circuit Breaker  
(300 Amp Shown)

## WARNING!

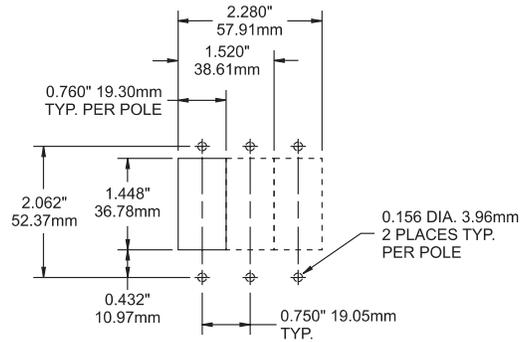
- ☑ This is a DC device! It should not be confused with AC double pole circuit breakers used for simultaneously breaking AC hot and neutral circuits.
- ☑ Do not make any connections to the coil shunt (see diagram).



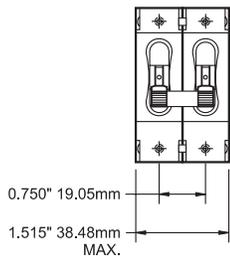
**50-100 Ampere**



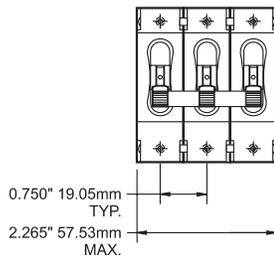
**Side View**



**Panel Cutout Detail**



**150-200 Ampere**



**250-300 Ampere**