# Protect Your Boat With the Correct Size Wire, Fuse, and Fuse Holder

**U.S. Coast Guard and other regulatory agencies require all circuits, except the starting circuit, to be protected with a circuit breaker or a fuse.**

**For 24V DC Systems divide distance by 2 or consult the Circuit Wizard at www.circuitwizard.bluesea.com**

## STEP 1 Choose the Correct Wire

Calculations are based on 105°C wire. For more detailed calculations, consult the Circuit Wizard at www.circuitwizard.bluesea.com

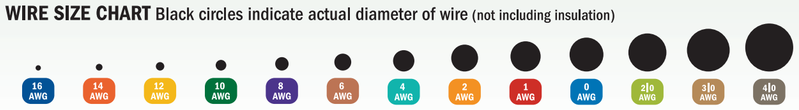
**A** Locate the **CURRENT FLOW IN AMPS** of your circuit along the top of the chart to the right.

**B** Select the **CIRCUIT TYPE.**
**Non-critical circuits with 10% allowable voltage drop include:** general lighting, windlasses, bait pumps, general appliances
**Critical circuits with 3% allowable voltage drop include:** panel main feeders, bilge blowers, electronics, navigation lights

**C** Find the **CIRCUIT LENGTH** along the left side of the chart.
The circuit length is the length of the negative wire added to the length of the positive wire.
Calculations are based on 105°C wire. For wire rated at 90°C or lower, or for wire that passes through an engine room, the first row of the chart, in gray, does not apply.

**D** Intersect the **CURRENT FLOW IN AMPS** with **CIRCUIT LENGTH** to identify the correct wire size.
***Example: A windlass rated 80A is 25 ft. from the battery. The circuit length is the total length of the positive and negative wire added together, which in this example is 50 ft. The circuit type is 'non-critical', and the correct wire size is 4 AWG.***

**WIRE SIZE CHART** Black circles indicate actual diameter of wire (not including insulation)




**Standard and Metric Wire Comparison Table**

| Available Wire Size AWG | Available Wire Size Metric |
|---|---|
| 16 | 1.5 |
| 14 | 2.5 |
| 12 | 4 |
| 10 | 6 |
| 8 | 10 |
| 6 | 16 |
| 4 | 25 |
| 2 | 35 |
| 1 | 50 |
| 0 | |
| 2\|0 | 70 |
| 3\|0 | 95 |
| 4\|0 | 120 |

KEY: AWG WIRE SIZE — CLOSEST EQUIVALENT IN METRIC

| CIRCUIT TYPE | | | | CURRENT FLOW IN AMPS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10% VOLTAGE DROP Non Critical | | 3% VOLTAGE DROP Critical | | 5A | 10A | 15A | 20A | 25A | 30A | 40A | 50A | 60A | 70A | 80A | 90A | 100A | 120A | 150A | 200A |
| CIRCUIT LENGTH | | | | | | | | | | | | | | | | | | | | |
| 0 to 20 ft | 0 to 6.1 M | 0 to 6 ft | 0 to 1.8 M | 16 AWG | 16 AWG | 14 AWG | 14 AWG | 12 AWG | 10 AWG | 8 AWG | 6 AWG | 6 AWG | 6 AWG | 4 AWG | 4 AWG | 4 AWG | 2 AWG | 1 AWG | 2\|0 AWG |
| 30 ft | 9.1 M | 10 ft | 3.0 M | 14 AWG | 14 AWG | 12 AWG | 12 AWG | 10 AWG | 8 AWG | 6 AWG | 4 AWG | 4 AWG | 4 AWG | 2 AWG | 2 AWG | 2 AWG | 1 AWG | 0 AWG | 3\|0 AWG |
| 50 ft | 15.2 M | 15 ft | 4.6 M | 12 AWG | 12 AWG | 10 AWG | 10 AWG | 8 AWG | 8 AWG | 6 AWG | 4 AWG | 2 AWG | 2 AWG | 1 AWG | 1 AWG | 1 AWG | 0 AWG | 0 AWG | 4\|0 AWG |
| 65 ft | 19.8 M | 20 ft | 6.1 M | 12 AWG | 10 AWG | 8 AWG | 8 AWG | 6 AWG | 6 AWG | 4 AWG | 2 AWG | 1 AWG | 1 AWG | 0 AWG | 0 AWG | 0 AWG | 2\|0 AWG | 2\|0 AWG | | |
| 80 ft | 24.4 M | 25 ft | 7.6 M | 10 AWG | 8 AWG | 6 AWG | 6 AWG | 4 AWG | 4 AWG | 2 AWG | 1 AWG | 0 AWG | 0 AWG | 2\|0 AWG | 2\|0 AWG | 2\|0 AWG | 3\|0 AWG | 3\|0 AWG | | |
| 100 ft | 30.5 M | 30 ft | 9.1 M | 8 AWG | 6 AWG | 4 AWG | 4 AWG | 2 AWG | 2 AWG | 1 AWG | 0 AWG | 2\|0 AWG | 2\|0 AWG | 3\|0 AWG | 3\|0 AWG | 3\|0 AWG | 4\|0 AWG | 4\|0 AWG | | |
| 130 ft | 39.6 M | 40 ft | 12.2 M | 6 AWG | 4 AWG | 2 AWG | 2 AWG | 1 AWG | 1 AWG | 0 AWG | 2\|0 AWG | 3\|0 AWG | 3\|0 AWG | 4\|0 AWG | 4\|0 AWG | 4\|0 AWG | | | | |
| 165 ft | 50.3 M | 50 ft | 15.2 M | | 2 AWG | 1 AWG | 1 AWG | 0 AWG | 0 AWG | 2\|0 AWG | 3\|0 AWG | 4\|0 AWG | 4\|0 AWG | | | | | | | |
| 200 ft | 61.0 M | 60 ft | 18.3 M | | | | | | | | | | | | | | | | | |
| | | 70 ft | 21.3 M | | | | | | | | | | | | | | | | | |
| | | 80 ft | 24.4 M | | | | | | | | | | | | | | | | | |
| | | 90 ft | 27.4 M | | | | | | | | | | | | | | | | | |
| | | 100 ft | 30.5 M | | | | | | | | | | | | | | | | | |
| | | 110 ft | 33.5 M | | | | | | | | | | | | | | | | | |
| | | 120 ft | 36.6 M | | | | | | | | | | | | | | | | | |
| | | 130 ft | 39.6 M | | | | | | | | | | | | | | | | | |

## STEP 2 Choose the Correct Fuse and Fuse Amperage

Calculations are based on 105°C wire. For lower temperature rated wire, consult the Circuit Wizard at www.circuitwizard.bluesea.com

**A** Choose a fuse from the list on the top of the chart to the right by following along the line of the **AWG WIRE SIZE** determined from Step 1. Appropriate fuses will have a gray bar that intersects the line.

**B** The appropriate fuse amperage will be found in one of the four gray bars below the selected fuse type.
- **Single Wire, Outside Engine Room** = First column dark gray bar
- **Single Wire, Inside Engine Room** = First column light gray bar
- **Bundled Wire, Outside Engine Room** = Second column dark gray bar
- **Bundled Wire, Inside Engine Room** = Second column light gray bar

***Example: For a 4 AWG single 105°C rated wire outside an engine room, the maximum fuse amperage is 150A.***

*Note:*
*Possible fuse amperages for a circuit can fall between a range of maximum and minimum fuse amperages. The procedure above calculates the maximum fuse amperage which reduces nuisance blows but may offer less protection than a lower amperage fuse. The minimum fuse amperage is calculated by multiplying the current flow in amps by 125%.*

*If the product instructions specify a fuse amperage, use that value if it is under the maximum amperage found in the above procedure. If the specified fuse amperage is over the maximum suggested, move down the column and choose the wire size that intersects with the specified fuse amperage.*

LEGEND: Outside Engine Room; Inside Engine Room

| AWG WIRE SIZE | AGC® MDL® .25A to 30A SINGLE WIRE | AGC® MDL® .25A to 30A BUNDLED WIRES | ATO® or ATC® Fuse 1A to 30A SINGLE WIRE | ATO® or ATC® Fuse 1A to 30A BUNDLED WIRES | MAXI™ Fuse 30A to 80A SINGLE WIRE | MAXI™ Fuse 30A to 80A BUNDLED WIRES | AMI® or MIDI® Fuse 30A to 200A SINGLE WIRE | AMI® or MIDI® Fuse 30A to 200A BUNDLED WIRES | MRBF TERMINAL Fuse 30A to 300A SINGLE WIRE | MRBF TERMINAL Fuse 30A to 300A BUNDLED WIRES | MEGA® or AMG® Fuse 100A to 300A SINGLE WIRE | MEGA® or AMG® Fuse 100A to 300A BUNDLED WIRES | CLASS T Fuse 225A to 400A SINGLE WIRE | CLASS T Fuse 225A to 400A BUNDLED WIRES | ANL® Fuse 35A to 400A SINGLE WIRE | ANL® Fuse 35A to 400A BUNDLED WIRES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 AWG | 25A 20A 30A | 20A 15A 25A 20A 30A 25A | 25A 20A 30A | 20A 15A 25A 20A 30A 25A | | | | | | | | | | | | |
| 14 AWG | | | | | 30A 30A | | 30A 30A | | 30A 30A | | | | | | | |
| 12 AWG | | | | | 50A 40A | 30A | 50A 40A | 30A | 50A 40A | 30A | | | | | 35A | |
| 10 AWG | | | | | 60A 50A | 40A 40A | 60A 50A | 40A 40A | 60A 50A | 40A 40A | | | | | 50A 40A | 40A 35A |
| 8 AWG | | | | | 80A 70A | 60A 50A | 80A 70A | 60A 50A | 80A 70A | 60A 50A | 125A 100A | | | | 80A 60A | 50A 40A |
| 6 AWG | | | | | | 80A 70A | 125A 100A | 80A 70A | 125A 100A | 80A 70A | 150A 125A | 125A 100A | | | 130A 100A | 70A 60A |
| 4 AWG | | | | | | | 150A 125A | 100A 80A | 150A 125A | 100A 80A | 200A 175A | 150A 125A | 125A 100A | | 150A 130A | 100A 80A |
| 2 AWG | | | | | | | 200A 175A | 150A 130A | 200A 175A | 150A 130A | 250A 225A | 200A 175A | 150A 125A | 250A | 200A 175A | 150A 130A |
| 1 AWG | | | | | | | | 175A 150A | 250A 200A | 175A 150A | 300A 250A | 250A 225A | 200A 175A | 300A 250A | 250A 200A | 175A 150A |
| 0 AWG | | | | | | | | 200A 175A | 300A 250A | 200A 175A | | 300A 250A | 225A 200A | 350A 300A | 300A 250A | 200A 175A |
| 2\|0 AWG | | | | | | | | | | 225A 200A | | | 250A 225A | 400A 350A | 350A 300A | 225A 200A |
| 3\|0 AWG | | | | | | | | | | 250A 225A | | | 300A 250A | 400A 400A | 400A 350A | 250A 225A |
| 4\|0 AWG | | | | | | | | | | 300A 250A | | | 300A 250A | | 400A 400A | 300A 250A |

## STEP 3 Choose a Fuse Holder

**A** Using the same colored headings as in the steps above, follow the columns down to find fuse holders or fuse blocks that meet your specific requirements.

**B** Consider environmental factors:
- Ignition protection is required where flammable vapors may accumulate.
  ***Example: Engine room and propane locker***
  *Consult American Boat and Yacht Council (ABYC) E-11.5.3 for Ignition Protection*
  **Ignition protection**
- Ingress protection protects fuses from spray, washdown, and humidity.
  IP66-protected against powerful water jets
  **Ignition protection**

**C** Decide between an in-line fuse holder or a fuse block:
- In-line fuse holders are compact and hold a single low-amperage fuse.
- Fuse blocks mount to a solid surface and may hold a single fuse or multiple fuses.

**MDL® AGC®**
- Crimpable In-Line Fuse Holder — 5060
- Waterproof In-Line Fuse Holders — 5061, 5062
- Heavy Duty In-Line Fuse Holder — 5063
- ST Glass Fuse Blocks — 5015, 5018

**ATO® or ATC® Fuse**
- ATO® or ATC® In-Line Fuse Holders — 5064, 5065
- ST Blade Fuse Blocks — 5025, 5026, 5028, 5029, 5035
- SafetyHub Fuse Blocks — 7725, 7748, 7727

**MAXI™ Fuse**
- MAXI™ Fuse Block — 5006

**AMI® or MIDI® Fuse**
- AMI® or MIDI® Safety Fuse Block — 7720
- SafetyHub Fuse Blocks — 7725, 7748, 7727

**MRBF TERMINAL Fuse**
- Terminal MRBF Fuse Blocks — 5191, 2151

**MEGA® or AMG® Fuse**
- MEGA® or AMG® Safety Fuse Block — 7721

**CLASS T Fuse**
- CLASS T Fuse Block — 5502

**ANL® Fuse**
- ANL® Fuse Blocks — 5005, 5503

Additional replacement fuses available from Blue Sea Systems:
- GMA® Fuse — 1A to 10A
- AGA® Fuse — 20A
- ATM® Fuse — 5A to 30A

LEGEND
- Ingress protection
- Ignition protection

*Although this process uses information from ABYC E-11 to recommend wire size and circuit protection, it may not cover all of the unique characteristics that may exist on a boat. If you have specific questions about your installation please consult an ABYC certified installer.*



Corporate Office
425 Sequoia Drive
Bellingham, WA 98226 USA

p 360.738.8230
p 800.222.7617 toll free
f 360.734.4195

www.bluesea.com
conductor@bluesea.com

BLUE SEA SYSTEMS

09.13.2011 20010 Rev.003