NEW WIRE MARINE

CUSTOM SWITCH PANELS

BOAT WIRING GUIDE

WITH DIAGRAMS

New Wire Marine.com
(843) 297-8348
sales@newwiremarine.com
Charleston, SC

Safe.
Reliable.
Understandable.
Expandable.

Hello! Thank you for visiting our site and requesting our boat wiring diagrams!

A little about us: **New Wire Marine** builds stunning custom switch panels and dashes for boat owners who demand quality, and our **online shop** contains nearly everything you'll need to fix, replace or upgrade your boat's electrical system.

We hope you'll consider using our products during your re-wire project. We're always available to our customers via phone or email with any technical questions.

Regardless of whether you're using our products or not, I hope you'll find this guide a helpful resource. Please keep in mind:

- Disconnect your battery while working – and substitute a lower than normal main fuse while testing. (I know everyone says that, but seriously… do it).
- Our wiring diagrams are notionally based on a 'generic' boat of various sizes, and will likely need to be tailored to your specific system.
- This guide is meant as an additional detail supplement to our **online Basic Wiring Guide**. It's probably best to read and understand that first.

Thank you!

Eric Steele

Eric Steele, Owner
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CONTENT

COMPONENT GUIDE (1/2)

BATTERIES

Batteries hold the energy your electrical devices consume. Your start battery is dedicated to starting the engine, and is generally isolated from your electrical loads. The House battery is used to power the electrical loads on the boat.

MASTER BATTERY SWITCH

Used to turn off your batteries and all components for storage. Also used to combine batteries in emergency or charging situations.

BUY NOW

BILGE PUMP

Pumps water out of the bilge. Often bypasses the master battery switch (24-hour operation).

BUY NOW

FLOAT SWITCH

Automatic switch, closed by raising water levels to trigger a pump or alarm.

BUY NOW

ACR (Automatic Charging Relay)

Used to automatically select what battery your engine's alternator is charging – used to insure your start battery is completely charged, then begin charging the house battery.

BUY NOW

SWITCH PANEL

The 'control center' of your boat. Allows loads to be switch on and off from the helm.

BUY NOW

CIRCUIT BREAKER

Used to open a circuit when a specified current is exceeded. Often included in the main switch panel. Unlike a fuse, circuit breakers can be reset without replacing.

BUY NOW

FUSE

Like a circuit breaker, it protects from high current conditions. Fuses are consumable, when it blows it needs to be replaced.

BUY NOW

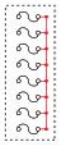
COMPONENT GUIDE (2/2)

POWER POST / STUD

Used as a breakout point for positive or negative junctions. High current capacity. Some studs also have auxiliary terminals for small wires.

BUY NOW

FUSE BLOCK



Holds fuses in a aligned way. Usually has one primary positive feed. Can also contain a build-in negative bus.

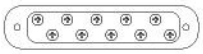
BUY NOW

TERMINAL BLOCK

Used to breakout, gang and troubleshoot positive load wires. Very useful, it's the typical connection point between the switch panel and the positive load wiring. Each screw is connected to the adjacent screw ONLY.

BUY NOW

NEGATIVE BUS



Unlike a terminal block, all posts on a Bus are connected. Most often used as to combine all load negatives together at the help, so a single negative conductor can be run back to the batteries.

BUY NOW

DIMMER

PWL (Pulse Width Modulated) dimmer is controlled by an (ON)-OFF-(ON) switch, and allows dimming of (primarily) lighting loads, such as switch backlights, courtesy lights, helm downlights, etc.

BUY NOW

RED WIRE

Red is a positive wire. It is important to maintain this convention for service and troubleshooting down that road. Many other colors are also used for positive wires in some boats – but BLACK, YELLOW, or GREEN should never he used for a positive.

BUY NOW

BLACK WIRE

Black is a negative wire. Some boats also use yellow for negative. NO color other than black or yellow should even be used for a negative wire.

BUY NOW

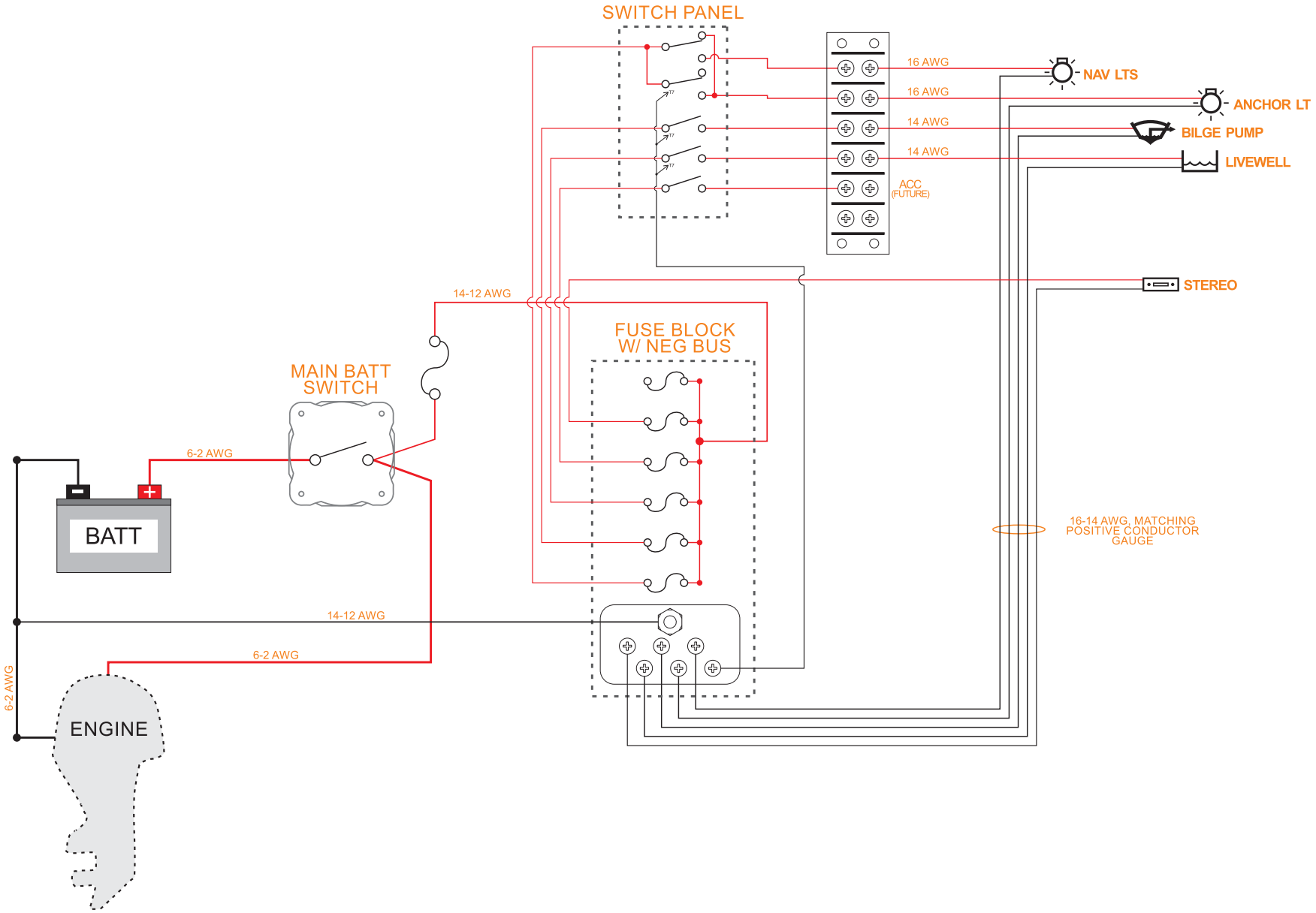
VOLTMETER

Used to display your boat's current battery voltage and thus: charge.

BUY NOW

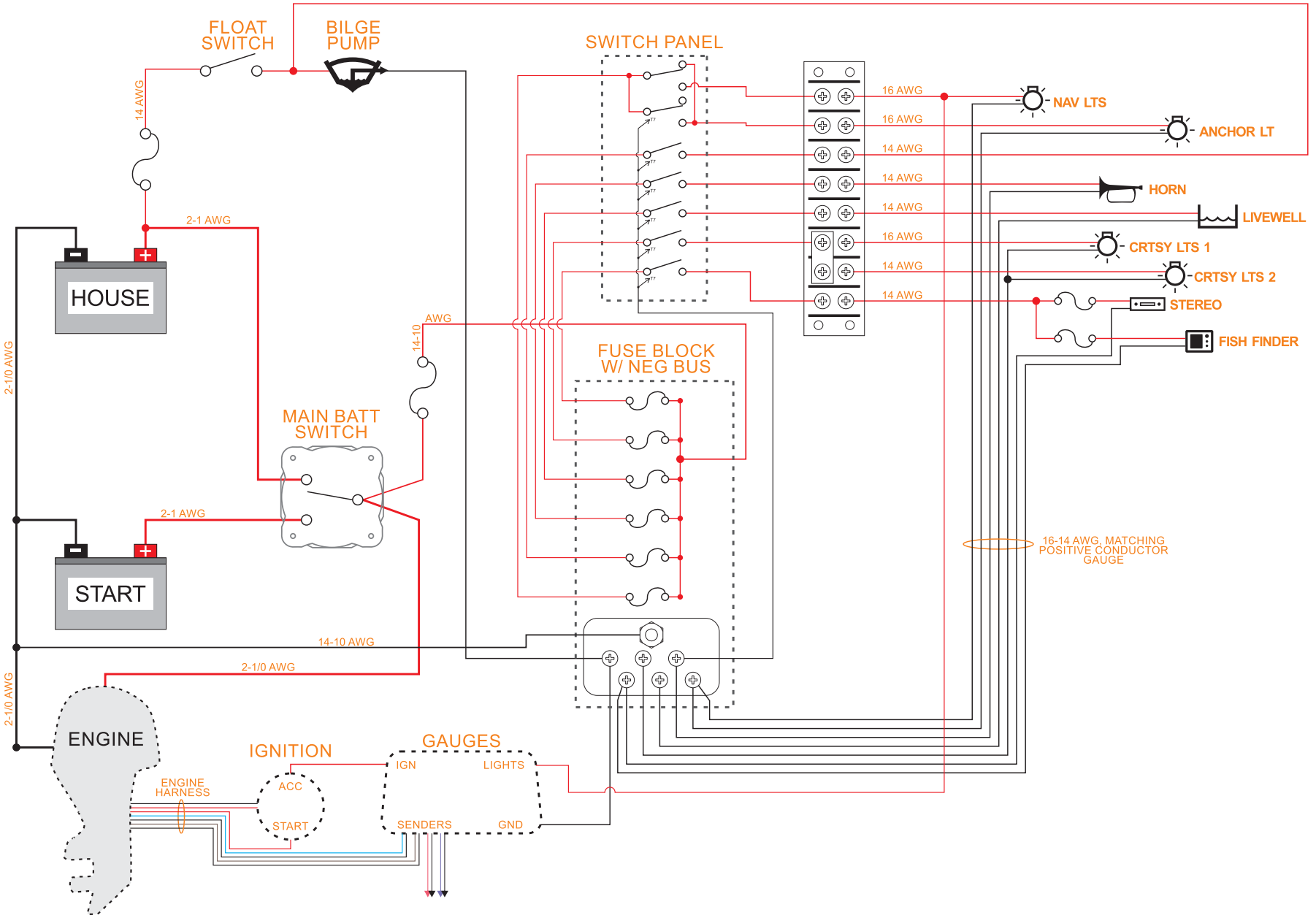
DIAGRAM

SINGLE ENGINE - SINGLE BATTERY - VERY SMALL



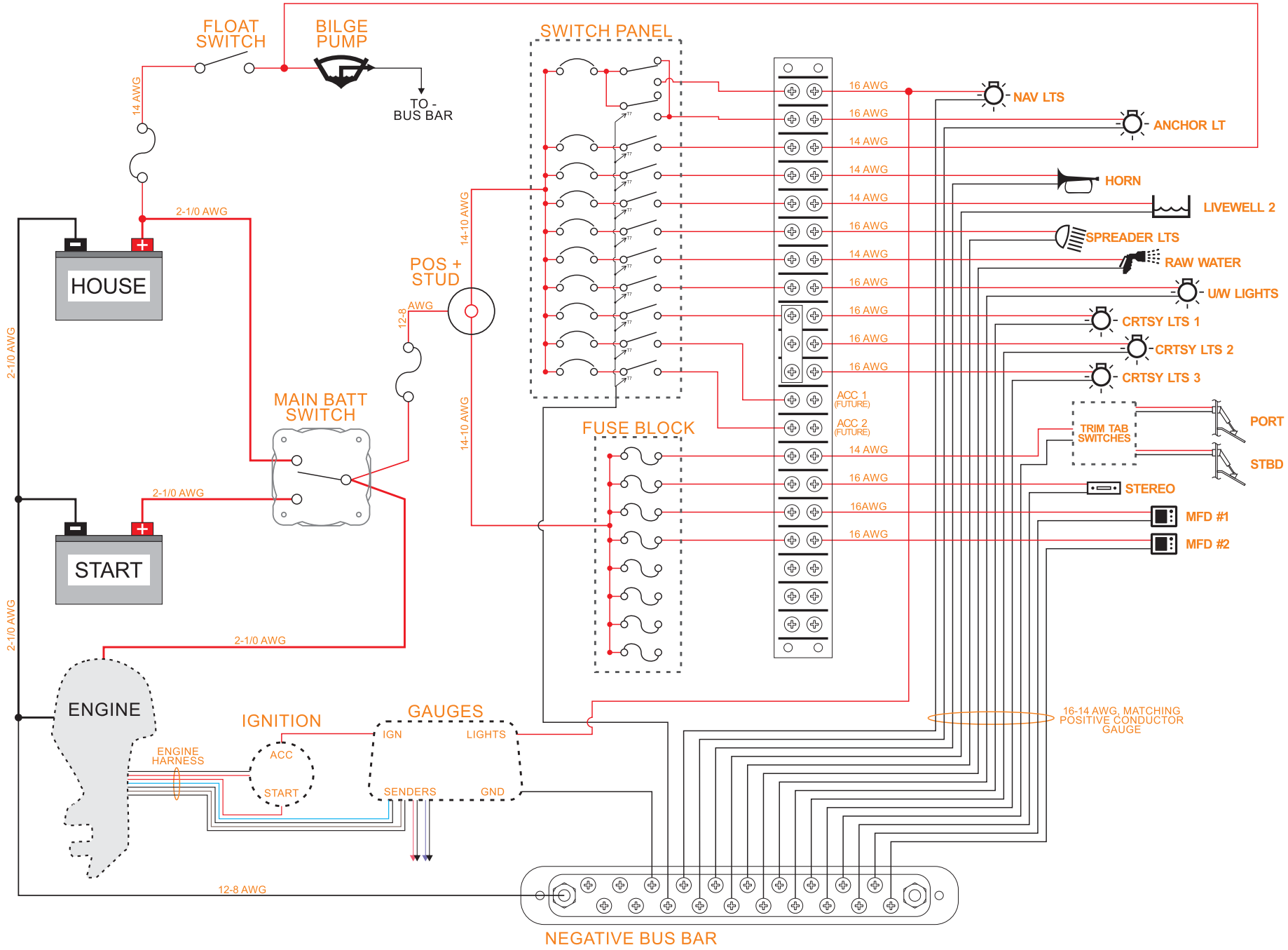
DIAGRAM

SINGLE ENGINE - TWO BATTERIES - SMALL



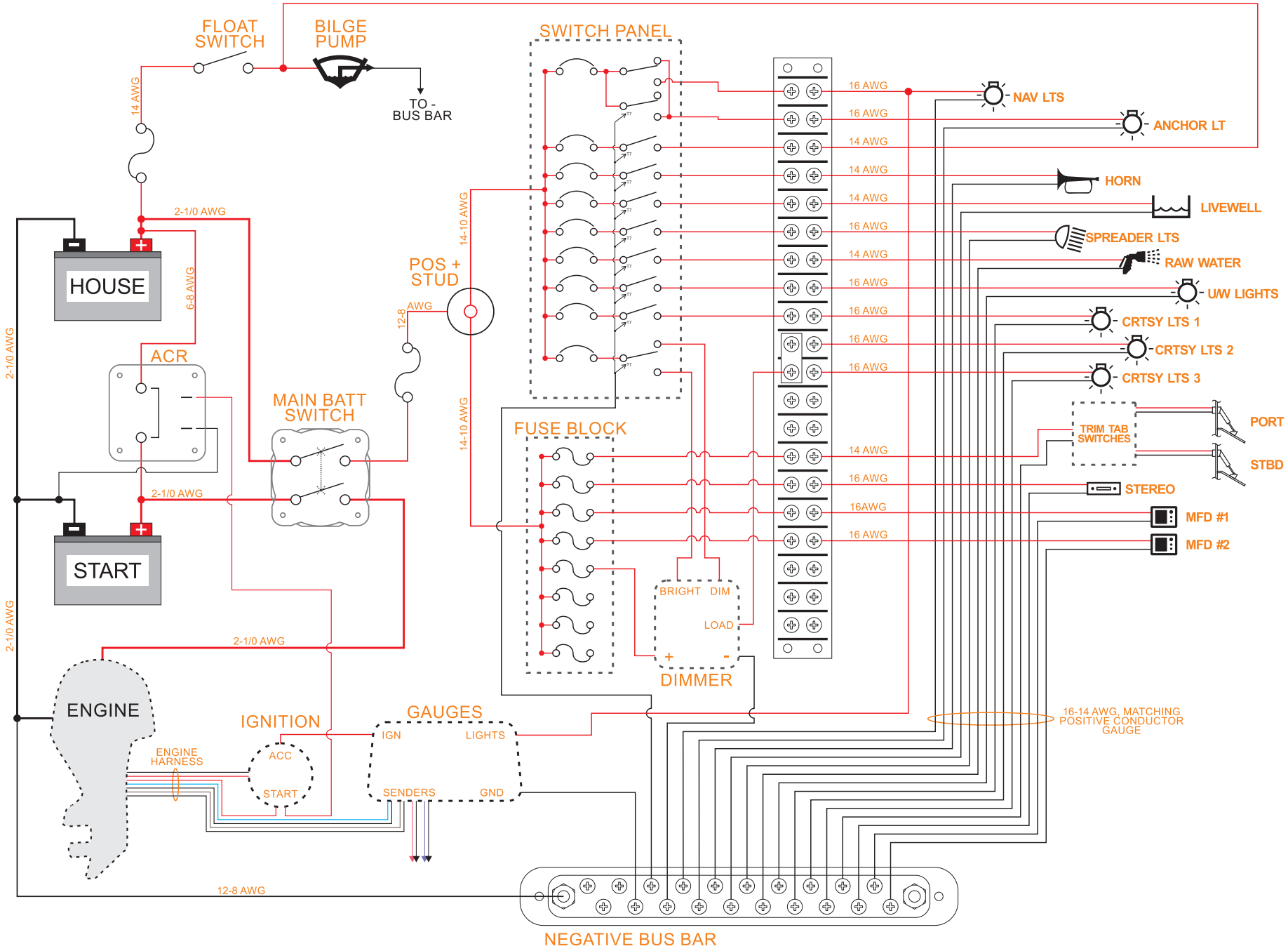
DIAGRAM

SINGLE ENGINE - TWO BATTERIES - MEDIUM



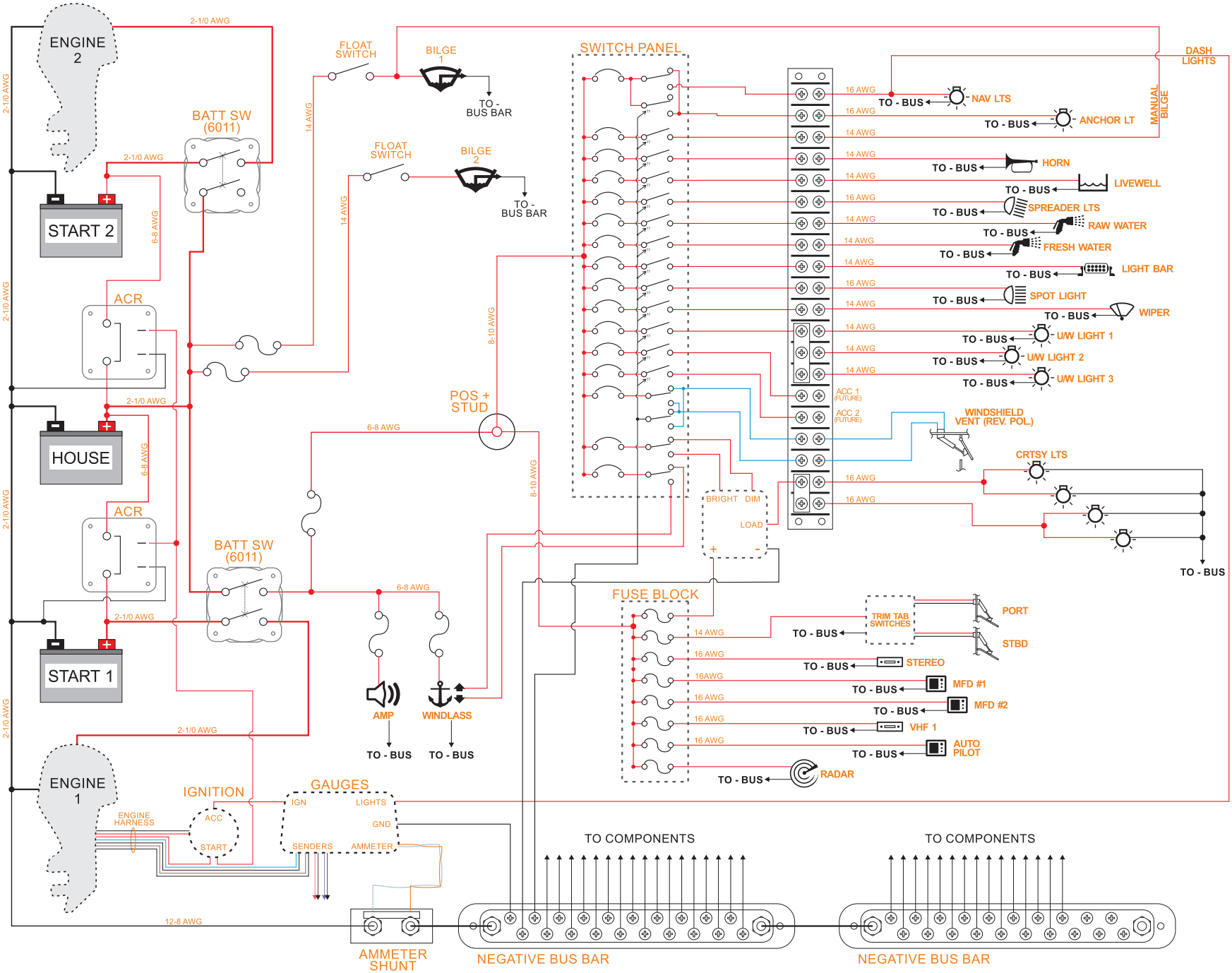
DIAGRAM

SINGLE ENGINE - TWO BATTERIES - MEDIUM - ACR - DIMMER



DIAGRAM

TWIN ENGINE - THREE BATTERIES - LARGE

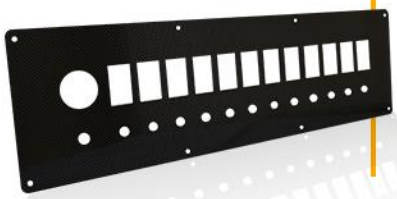


ABOUT NEW WIRE MARINE SWITCH PANELS

BLANK PLATE

BUY NOW

•Blank plates are as simple as they sound. **Pre-designed plates with rocker switch cutouts made to assemble yourself.**
•Made of durable UV resistant ABS plastic, our blank plates are available in several colors.



•We never put our branding on your switch plates. These are OEM quality, and when assembled with our Genuine Carling rocker switches are the most economical option for a **professional switch panel**.

E-PANEL BUILDER

BUY NOW

•The **E-Panel Builder** is **our awesome drag-and-drop capable panel design tool**. Anyone can easily create and simulate what their new marine switch panel will look like.

•We created our E-Panel Builder with thousands of custom switch panel designs in mind. We want this tool to be the **easiest, quickest and most economical way to create** a truly unique, yet super-customizable switch panel that works perfectly for your boat.

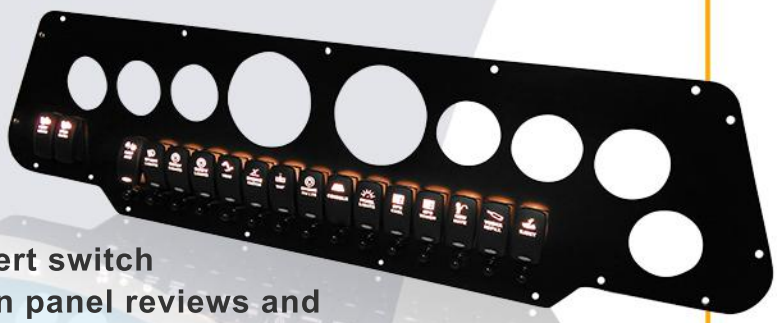
•Infinite possible rocker switch panel layouts and combinations. **Add gauge or instrument holes, accessories, choose your rocker switch panel labels and more.**

FULLY CUSTOM

BUY NOW

•Non-rectangular panel? Complex requirements? Want to work one-on-one with a human switch panel designer?

•No problem! We build around a thousand **completely custom designed panels** every year. Nearly any size and shape is possible. **Complex instrument holes, custom graphic engraving, unique wiring situations**, We're happy to help.



•We'll start by getting your requirements and developing a human quote. From there an **expert switch panel designer will work directly with you on panel reviews and revisions** to your production drawings.
•We've got a great **Buyer's Guide** that explains how this works – or give us a call: **(843) 297-8348**

WHY USE NEW WIRE MARINE

SERVICE EXCELLENCE

•We're no big-box store with 1,000's of drop-ship products. We're an American small business building **incredible switch panels**, and retailing select components we use ourselves, and love!

•**Real people** who care about you and your boat. Give us a call or contact us, and you'll see the difference

QUALITY COMPONENTS & CRAFTSMANSHIP

•We don't use cheap Chinese made "stick on" label parts. We don't have 10,000 sqft of workbenches packed with people who don't know a volt from an amp.

•We build panels with **industry leading quality** parts, and top notch **trained electrical assembly** services.

DONE QUICKLY

•We know you want to get your boat back on the water. We build your panels **quickly and we under promise and over deliver**.

•You won't be jerked around for 6 weeks waiting on "parts to come in". We stock a deep inventory of all parts, and move with focused intensity to get your product assembled and **out to you**.

TRULY CUSTOMIZED FOR YOU

•It's your boat, have your panel made how you want it.

•We don't mass produce a "one-size-fits-all" product. We build **fully customizable** products tailored to your specific requirements.

WIRE GAUGE SIZING CHART (1/2)

HOW TO CHOOSE MARINE WIRE SIZE

•There are three factors when choosing the right wire gauge:

Current draw of the device – measured in Amps
Total length of the run – measured in feet as a “round trip”
Allowable voltage drop – measured in % loss of voltage

•ABYC says that non-critical loads like a livewell, or courtesy lights should have mo more than a 10% voltage drop, while critical loads like a bilge pump or navigation lights should have no more than a 3% voltage drop.

•Remember, length of the run is a “round trip”… so from the battery, out to the load and back. Example calculations are below the table.

Length of Conductor from Source of Current to Device and Back to Source - Feet

12 Volts - 10% Drop Wire Sizes (gauge) - Based on Minimum CM Area

TOTAL CURRENT AMPS	10	15	20	25	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
5	18	18	18	18	18	16	16	14	14	14	12	12	12	12	12	10	10	10	10
10	18	18	16	16	14	14	12	12	10	10	10	10	8	8	8	8	8	8	6
15	18	16	14	14	12	12	10	10	8	8	8	8	8	6	6	6	6	6	6
20	16	14	14	12	12	10	10	8	8	8	6	6	6	6	6	6	4	4	4
25	16	14	12	12	10	10	8	8	6	6	6	6	6	4	4	4	4	4	2
30	14	12	12	10	10	8	8	6	6	6	6	4	4	4	4	2	2	2	2
40	14	12	10	10	8	8	6	6	6	4	4	4	2	2	2	2	2	2	2
50	12	10	10	8	8	6	6	4	4	4	2	2	2	2	2	1	1	1	1
60	12	10	8	8	6	6	4	4	2	2	2	2	2	1	1	1	0	0	0
70	10	8	8	6	6	6	4	2	2	2	2	1	1	1	0	0	0	2/0	2/0
80	10	8	8	6	6	4	4	2	2	2	1	1	0	0	0	2/0	2/0	2/0	2/0
90	10	8	6	6	6	4	2	2	2	1	1	0	0	0	2/0	2/0	2/0	3/0	3/0
100	10	8	6	6	4	4	2	2	1	1	0	0	0	2/0	2/0	2/0	3/0	3/0	3/0

12 Volts - 3% Drop Wire Sizes (gauge) - Based on Minimum CM Area

TOTAL CURRENT IN AMPS	10	15	20	25	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170
5	18	16	14	12	12	10	10	10	8	8	8	6	6	6	6	6	6	6	6
10	14	12	10	10	10	8	6	6	6	6	4	4	4	4	2	2	2	2	2
15	12	10	10	8	8	6	6	6	4	4	2	2	2	2	2	1	1	1	1
20	10	10	8	6	6	6	4	4	2	2	2	2	1	1	1	0	0	0	2/0
25	10	8	6	6	6	4	4	2	2	2	1	1	0	0	0	2/0	2/0	2/0	3/0
30	10	8	6	6	4	4	2	2	1	1	0	0	0	2/0	2/0	3/0	3/0	3/0	3/0
40	8	6	6	4	4	2	2	1	0	0	2/0	2/0	3/0	3/0	3/0	4/0	4/0	4/0	4/0
50	6	6	4	4	2	2	1	0	2/0	2/0	3/0	3/0	4/0	4/0	4/0				
60	6	4	4	2	2	1	0	2/0	3/0	3/0	4/0	4/0	4/0						
70	6	4	2	2	1	0	2/0	3/0	3/0	4/0	4/0								
80	6	4	2	2	1	0	3/0	3/0	4/0	4/0									
90	4	2	2	1	0	2/0	3/0	4/0	4/0										
100	4	2	2	1	0	2/0	3/0	4/0											

Example 1:
- Your livewell pulls 6A. There is 10 feet from the battery to the switch panel, then 5 more feet from the switch panel to the console livewell.
- Length of run is 10 + 5 + 5 + 10 = 30ft (from battery to load, and back again)
On a livewell a 10% voltage drop is acceptable, so we use the top table. We’ll round up the 6A, to 10A, and use 14AWG wire.

WIRE GAUGE SIZING CHART (2/2)

ABYC CURRENT RATING

BUY NOW

Full chart below. Use the 105°C rating… most often the column for outside engine spaces. Current ratings of the wire we carry, non-bundled, outside engine spaces is:

- **16AWG – 25A**
- **14AWG – 30A**
- **12 AWG – 40A**
- **10 AWG – 55A**

TABLE VI– A - AC & DCCIRCUITS – ALLOWABLE AMPERAGEOF SINGLE CONDUCTORS NOT BUNDLED, SHEATHED, OR IN CONDUIT

	TEMPERATURE RATING OF CONDUCTOR INSULATION												
	60°C (140°F)		75°C (167°F)		80°C (176°F)		90°C (194°F)		105°C (221°F)		125°C (257°F)		200°C (392°F)
CONDUCTOR SIZE (AWG)	OUTSIDE ENGINE SPACES	INSIDE ENGINE SPACES	OUTSIDE ENGINE SPACES	INSIDE ENGINE SPACES	OUTSIDE ENGINE SPACES	INSIDE ENGINE SPACES	OUTSIDE ENGINE SPACES	INSIDE ENGINE SPACES	OUTSIDE ENGINE SPACES	INSIDE ENGINE SPACES	OUTSIDE ENGINE SPACES	INSIDE ENGINE SPACES	OUTSIDE OR INSIDE ENGINE
18	10	NOT PERMITTED	10	7.5	15	11.7	20	16.4	20	17.0	25	22.3	25
16	15		15	11.3	20	15.6	25	20.5	25	21.3	30	26.7	35
14	20		20	15.0	25	19.5	30	24.6	35	29.8	40	35.6	45
12	25		25	18.8	35	27.3	40	32.8	45	38.3	50	44.5	55
10	40		40	30.0	50	39.0	55	45.1	60	51.0	70	62.3	70
8	55		65	48.8	70	54.6	70	57.4	80	68.0	90	80.1	100
6	80		95	71.3	100	78.0	100	82.0	120	102.0	125	111.3	135
4	105		125	93.8	130	101.4	135	110.7	160	136.0	170	151.3	180
3	120		145	108.8	150	117.0	155	127.1	180	153.0	195	173.6	210
2	140		170	127.5	175	136.5	180	147.6	210	178.5	225	200.3	240
1	165		195	146.3	210	163.8	210	172.2	245	208.3	265	235.9	280
0	195		230	172.5	245	191.1	245	200.9	285	242.3	305	271.5	325
00	225		265	198.8	285	222.3	285	233.7	330	280.5	355	316.0	370
000	260		310	232.5	330	257.4	330	270.6	385	327.3	410	364.9	430
0000	300		360	270.0	385	300.3	385	315.7	445	378.3	475	422.8	510

NOTE: For DC, cross reference with voltage drop tables and formula in E-11.14.1.2.7.1, NOTE 2.

WIRE REQUIRED CHEATSHEET

DON'T FORGET ANYTHING!
SCRATCH SHEET BELOW TO ADD UP YOUR WIRE LENGTH REQUIREMENTS!

	FROM	TO	DESCRIPTION	8 AWG	10 AWG	12 AWG	14 AWG	16 AWG
example	battery	positive stud	main feed		16ft			
example	battery	float switch	auto bilge pump			8ft		
example	terminal block	livewell	load wiring				10ft	
example	terminal block	fwd spreader	load wiring					15ft
1.								
2.								
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33.								
34.								
35.								
			ADD UP ALL YOUR LENGTHS:					
			MULTIPLY BY **1.2** FOR **20% EXCESS**:					
			YOU'LL NEED THE AMOUNT ABOVE OF **BOTH** RED(SUPPLY) AND BLACK(RETURN)					
			TOTAL RED:					
			TOTAL BLACK:					