



Draft

Installation Guidelines:

12 Volt DC Distribution Panel

to replace original equipment on the
J/30 Sailboat

Prepared by:

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Purpose of Document

This document was prepared to assist J/30 owners who desire to replace original equipment no longer manufactured. This document was created by class members and owners using electrical and yachting industry standards to install a replacement DC distribution panel having additional capabilities. Any suggested changes or technical questions regarding this document should be directed to the current J/30 Class Chief Measurer, with contact information as listed on the J/30 Class Association web site.

Revision History

Description	Date	Pages Changed
Document originated at draft Rev 1	11/22/2012	All

DRAFT

1. Introduction:

This document provides guidelines for installing a DC distribution panel as a replacement for the original equipment supplied with the J/30 Sailboat. The replacement panel is intended to provide the necessary isolation and circuit protection for original J/30 load requirements, and provide additional circuits for equipment that owners may have installed. The replacement panel is also intended to provide measurement capability for voltage and current. This procedure was developed based on experience gained wiring the panel on *Rhapsody*, J/30 #348.

2. Installation Approach:

The installation approach covers the following:

- Options to consider (e.g. circuit protection, bilge pump, battery charger, etc.)
- How to run wiring between the DC Panel and the Battery area
- Wiring & changes near the Battery
- Wiring & mounting the DC panel

Planning for the installation means that you'll make fewer mistakes and have fewer trips to pick up supplies you need. The installation guide provides alternatives for consideration. Consider the alternatives and plan your required material and tools. Prior to working on or near the electrical system, make sure you disconnect the batteries to make sure there are no inadvertent short circuits, and for safety.

2.1 Options:

Installing the new panel provides an opportunity to easily connect additional electrical circuits. It also provides a perfect opportunity to clean up additional wiring that may have been added to the boat, but not installed per ABYC standards. The procedure includes the following options installed on *Rhapsody*.

- Electric bilge pump wired as a separate protected circuit connected directly to the battery (not connected to electric panel). The connection is protected with a fuse. On *Rhapsody*

Rule model number 43 three-way rocker panel switch was installed. This includes an integrated fuse socket and indicator light to show when the bilge pump is on.

- A multi-stage, dual output battery charger was installed on *Rhapsody*. The charger is Xantrex model 10TB. The connection near the battery is fuse protected per ABYC requirements. Although the manufacturer recommends installing close to the battery, the charger is installed in a location near the power panel so the indicator lights showing battery charge status can be easily seen.
- A stereo car radio is installed on *Rhapsody*. As with most marine and car radios, a constant source of power is required to maintain the internal radio memory. This must be installed upstream of the battery disconnect, and properly fused.
- **Inline Fuses, Fuse Panel or Circuit Breakers?** American Boat and Yacht Council (ABYC) Standard E-11 requires that wiring connected within close proximity to the battery have short circuit protection. There are some exceptions (e.g. wiring to the starter motor), but most everything requires either a properly sized circuit breaker or fuse. The J/30 comes with an inline fuse socket buried in the wiring on the output of the battery switch that feeds the DC distribution panel. Many owners have reported this fuse has corroded and ultimately caused loss of all DC power. It is recommended that this be replaced, either with a new in-line fuse socket, or an appropriately sized circuit breaker. The new electrical panel has remote monitoring of Battery 1 and Battery 2 voltage. These connections require fuse protection near the battery. On *Rhapsody*, the required protection for external circuits was accommodated by a main feed circuit breaker and fuse sockets mounted on a small panel near the battery switch shown in Figure 1.



Figure 1 - New Fuse Panel Near Battery Switch

- This offers the advantage of being able to pre-wire the panel off the boat, and making all fuses readily accessible (e.g. not buried in the wiring or underneath seat cushions). The fuse sockets and circuit breaker could also be mounted inside the battery compartment if additional holes are not desired by the battery switch.

2.2 Running New Wiring between the DC Panel and Battery Area:

The DC panel is on the starboard side, and the batteries on the port side. The wiring passes from the power panel through removable wooden trim piece that screws to the aft corner of the navigation table adjacent to the starboard hull as shown in Figure 2. This trim piece is held in place with three screws and exposes the wiring harness that passes underneath the stbd quarter berth, and crosses the boat through a conduit that is glassed under the forward end of the engine tray. The wiring exits the conduit in the battery compartment. The conduit entrance is shown in Figure 3, adjacent to the engine cooling intake valve. A messenger line is shown that has been run through the conduit on *Rhapsody*. You can easily run additional wiring through the conduit using fish tape or a straightened coat hanger, then pull a messenger line through and tie on new wiring to pull through.



Figure 2 - Wire Path Aft of Nav Table

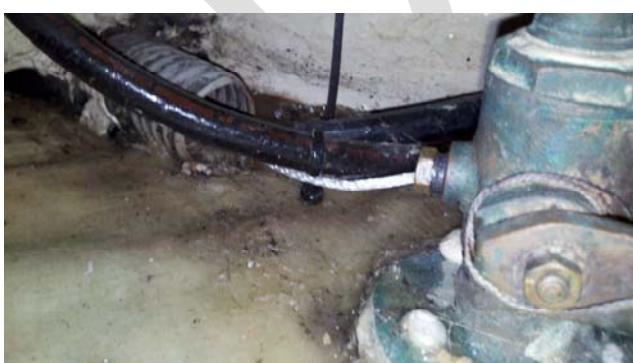


Figure 3 - Conduit That Crosses Under Engine Tray

2.3 Wiring Changes Near the Battery

The schematic in Figure 4 shows wiring near the battery and includes the optional equipment installed on *Rhapsody*. The optional wiring includes the Bilge Pump Switch, Stereo Memory Power and Battery Charger connections.

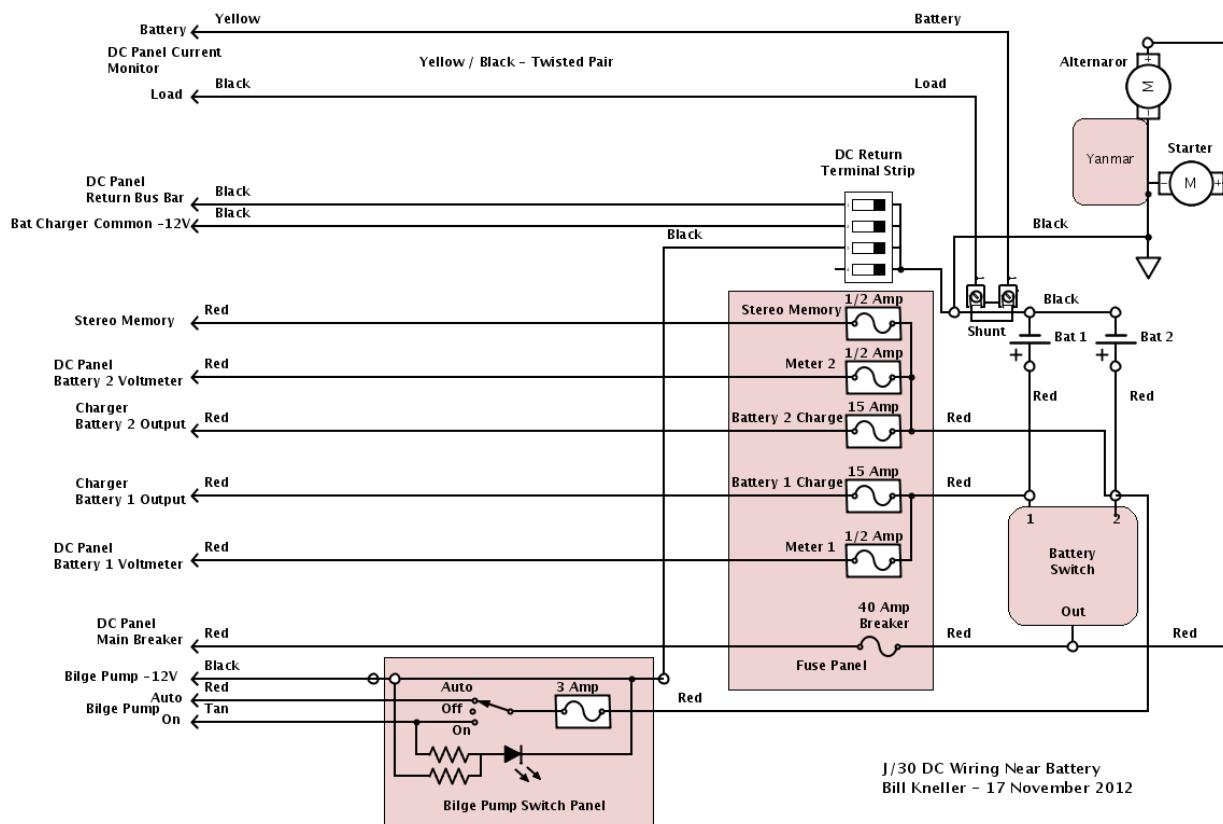


Figure 4 - Schematic of Wiring Near Battery

New components installed near the battery include the meter shunt provided with the new DC panel, a 4 position terminal strip for connecting various DC return wires, and the fuse sockets / circuit breakers.

2.3.1 DC Return (12V battery negative) changes:

The shunt and terminal strip are installed on the aft lip that surrounds the batteries as shown in Figure 5. This provides a convenient location close to the battery terminals, yet out of the bilge. The thick black wire that runs from the engine chassis to the battery should be disconnected from the battery and installed on the load side of the shunt. Additionally this shunt terminal has a 10

gauge jumper that connects to the new DC return terminal block. The battery side of the shunt is attached to the negative battery terminal using the new 18" 4 gauge battery cable. The black-yellow 16 gauge twisted pair originating at the DC Distribution Panel is connected to the shunt screw terminals – black to the load side, and yellow to the battery side. These wires are terminated using crimp on ring terminals.

Insert Figure 5 here – Shunt & DC Return Terminal Block

2.3.2 12V Positive Connections Near the Battery:

The 40 Amp circuit breaker and fuse holders for meter isolation need to be mounted near the battery. Refer to paragraph 2.1 that describes alternatives and locate these components where you desire. The existing 12V supply to the DC panel is connected to the common output of the battery switch, via an inline fuse. This connection is removed from the battery switch. Locate the inline fuse holder currently installed and cut this out of the harness. The wire left in the harness needs to be marked, and reterminated using a ring connector. This is connected to the new 40 amp circuit breaker. The other side of the breaker has a new red 10 gauge jumper connected using a ring terminal, and the wire cut to length with a large ring terminal installed on the battery switch common output. This should be the same location where the old inline fuse was connected.

Add fuse holder and DC meter wiring here

2.4 Wiring and Mounting the New DC Distribution Panel:

TBD

3. Materials:

Material required to install the DC Distribution Panel is as follows:

Part #	Qty	Description	Comment
Ancor Marine 102050	20 feet	16 Gauge Black Marine Grade tinned wired	15 feet twisted with yellow wire for shunt connection
Ancor Marine 103011	15 feet	16 Gauge Yellow Marine Grade tinned wired	twisted with black wire for shunt connection
Ancor Marine 102850	30 feet	16 Gauge Red Marine Grade tinned wired	For remote battery meter – additional required if

Part #	Qty	Description	Comment
			optional equipment is installed
Ancor Marine 108010	2 feet	10 Gauge Black Marine Grade tinned wired	Jumper from shunt to DC return terminal block
Ancor Marine 189130	1 ea	4AWG Battery Cable Assembly, 18" Length; 5/16" Hole Diameter	Jumper from shunt to battery negative terminal
Blue Sea Systems 2504	1 ea	4 Circuit Marine Terminal Block 30A AC/DC, 600V, 1.31" Wide, #8 Screws, 4 Circuits, 3.22" Length	Used as DC return bus bar for connections near battery
Blue Sea Systems 9217	1 pack	5 Jumpers for 30A Connector	Used to create DC return bus bar for connections near battery
Blue Sea Systems 5021	2 ea	Panel Mount Fuse Holder	Remote Meter protection near battery. Additional required if installing battery charger, or other accessories.
Blue Sea Systems 2137	1 ea	Circuit Breaker, Push-Button 40 Amp with Screw Terminals	DC main breaker near battery. Could use inline fuse holder as alternate
Blue Sea Systems 5202	2 ea	0.5A AGC Fuses	Remote Meter protection near battery
Ancor Marine 230226	1 ea	Package of 4 - Ring Terminal, 10 Ga 3/8" hole	Connections to battery switch. Check your installation, as some use 5/16" terminals
Ancor Marine 230212	1 ea	Package of 6 - Ring Terminal, 16 Ga 3/8" hole	Connections to battery switch. Check your installation, as some use 5/16" terminals
Ancor Marine 300145	1 ea	Package of 10 – White Write on Heat Shrink Tubing	Used to mark all connections. Can get 20 to 30 wire markers if cut each in 2 to 3 pieces
Ancor Marine 231418	1 ea	Package of 4 - Female Insulated Blade Connector for 16 Ga Wire	Used to connect to fuse holder terminals. Alternative is to solder and cover connections with heat shrink
Ancor Marine 231428	1 ea	Package of 3 - Female Insulated Blade Connector for 10 Ga Wire	Only required if optional battery charger installed

3.1 New or Modified Wiring Requirements:

The replacement DC Panel has remote voltage and current monitoring capability that was not part of the original DC panel. This requires additional wiring and modifications to the existing wiring harness. An owner supplied fuse panel is needed to be located near the batteries, so that the wire between the battery and the fuse panel is less than 72 inches. The purpose of this panel is to provide overcurrent safety protection for the remote wiring per ABYC specification E-11.

Function	From	To	Wire Size/Color	Comment
Battery 1 Voltage Monitor +	DC Panel Voltage Monitor Switch Terminal 1	Fuse Panel Batt 1 +	16 AWG Red	Protected by 0.5 amp fuse
Battery 2 Voltage Monitor +	DC Panel Voltage Monitor Switch Terminal 2	Fuse Panel Batt 2 +	16 AWG Red	Protected by 0.5 amp fuse
Current Monitor Load	DC Panel Meter Terminal 5	Shunt Load Side Screw Terminal	16 AWG Black	Twist Black & Yellow Current Monitor wires for entire length, approximately one turn per inch for noise immunity.
Current Monitor Battery	DC Panel Meter Terminal 4	Shunt Battery Side Screw Terminal	16 AWG Yellow	
DC Return Battery	Shunt Battery Side Bolt	Battery 1 & 2 Negative Terminal	4 AWG Black	Shunt & DC Return terminal strip mounted in battery compartment above bilge.
DC Return Load	Shunt Load Side Bolt	Engine Frame & DC Return Terminal Strip	4 AWG Black & 16 AWG Black	