



Electrician: Alejandro Calvo

Work History

Complete and New Wiring. The work to installed them included disassembling the old breaker setup. The positive cable #8, the last section was eliminated and replaced by a positive bus bar, which makes distribution safer and more organized. The bar incorporates a cover to prevent access to the positive side. The new breakers are in presentations of 15 and 20amps, depending on the circuit task. They had to be installed in an angle to facilitate the connection with each circuit switch. All the old extensions from the breaker to the switches were replaced by new 12 and 14 gauge wire with o-ring terminals. For the circuit of the water maker, a new pair of #12 wires (positive negative) was fish through the bilge all the way to the seat location. The new connection was made with heat shrink tubing and butt crimp connectors. Today after finishing the connection of the breakers the water maker pumps were tested and responded properly. It is protected by a new 20amp breaker. The main leads from the bus bars to the breakers were also made today, with a double connection to power 2 circuits. The solar panel circuit was checked and is working properly. A call was made to a solar supplier in San Jose to corroborate about the open voltage rating (37.7V) of the panel and its compatibility with the existing 12V bank and the controller. This type of panel is better to have a MMPT (maximum point of power) however with this controller it is working to an acceptable capability. About 80% for 12V bank. Schematic diagram was made for the main connections of the AC (shore and generator) and DC systems. At the end of the day the whole 12V DC panel with the 12 new breakers installed was tested, and it is operational and ready for load use. I also spoke with William about the generator; he needs my assistance to test the gauges and alarms of the engine. I took the control panel and tomorrow in the morning will go to his shop and proceed with provisional connections to test the function of the control and alarm system. The regulator and alternator were putted to test with the new starter install. The motor was left on for about 5 minutes and the output read gave a proper level of 14.4V. The new stereo was installed. The old battery charger was taken out from the base, supported with 4 bolts. Also the old water heater was disconnected and Minor took it out the following day. The installation for the new battery charger was done. The location included the installation of the drip proof cover. The old cables going to the battery banks were readjusted and connected accordingly. Also a provisional 110 extension cable was provided to test and be able to used the charger with shore power. The permanent feed will be done with the circuit previously used for the heater. On the process of inspection any old, damage, unused wire is eliminated. The back of the instrument panel for the engine was checked and needs a deep tune up and change of corroded terminals. The termination for the cable feed of the toilet was provided. And a 40 amp fuse with waterproof holder was installed. The solar panel wiring was replaced for 12AWG marine wire, and a new connection with heat shrink tubing protects the outdoor splice. The regulator was installed on the side cabinet and a load lamp was installed to provide a regulating load aid. The circuit for the water maker was chosen at the main panel DC.

The work this week was to disassemble the old breaker setup. The positive cable #8, the last section was eliminated and replaced by a positive bus bar, which makes distribution safer and more organized. The bar incorporates a cover to prevent access to the positive side. The new breakers are in presentations of 15 and 20amps, depending on the circuit task. They had to be installed in an angle to facilitate the connection with each circuit switch. All the old extensions from the breaker to the switches were replaced by new 12 and 14 gauge wire with o ring terminals. For the circuit of the water maker, a new pair of #12 wires (positive negative) was fish through the bilge all the way to the seat location. The new connection was made with heat shrink tubing and butt crimp connectors. Today after finishing the connection of the breakers the water maker pumps were tested and responded properly. It is protected by a new 20amp breaker. The main leads from the bus bars to the breakers were also made today, with a double connection to power 2 circuits. The solar panel circuit was checked and is working properly. A call was made to a solar supplier in San Jose to corroborate about the open voltage rating (37.7V) of the panel and its compatibility with the existing 12V bank and the controller. This type of panel is better to have a MMPT (maximum point of power) however with this controller it is working to an acceptable capability. About 80% for 12V bank. Schematic diagram was made for the main connections of the AC (shore and genset)

and DC systems. At the end of the day the whole 12V DC panel with the 12 new breakers installed was tested, and it is operational and ready for load use.

New distribution was planned for the AC installation. Two negative DC bars were dismantled to install a new main negative bar and allow more space in the area, and be able to organize the cables.

- A new AC bar was provided in order to eliminate a direct connection from the AC generator selector switch and allow the bar to be the distribution point.
- The DC light bar positive and negative were rearranged and installed next to the alternator regulator.
- A negative return connection from the generator case to the main negative terminal was made using new 1/0 marine cable, with o ring terminals and heat shrink insulation.
- A ground connection was made from the AC output terminals to the generator's case. The points where the terminals were to be secure were totally stripped from paint.
- The DC breakers were checked and adjusted to proper maximum tightness.
- Old unused sections of cables were eliminated.
- The new control panel was installed and the old panel from the previous generator was dismantled. The cable connection to the generator was made using the original wire harness.
- A separate switch with a small support base was provided for the water maker system. The positive wire was connected directly to the main positive bar, with a fuse in series.
- General cable support with tie raps and screwed clamps was used to secure the cables.
- The shore power switch selector was cleaned and reinstalled at the AC distribution panel. The selector appears to be in good condition and can still be used.
- The cables coming from the generator were checked. The old terminals were cut and new #4 terminals were crimped, and covered with heat shrink tubing.
- The main AC protection for the hot wire of the generator and shore power was reviewed and traditional type breakers can be used. A slight modification on the panel board might be needed to support the breakers.
- The work to prioritize the DC panel spaces/ breakers for the individual DC loads was started. This to make a complete list of all the loads to cover and organize the panel, at the same time to label it.

Materials used in the visit.

- Terminal bus bar (purchased at Apui)
- Pressure washers for the AC selector switch (purchased at Apui)
- Cable terminals for #4
- Heat shrink and other accessories.

Two bus terminals were installed for the final connection of the generator harness and control panel.

- Two telephone type distribution bars were installed to complete the harness for the generator gauges and start ignition. Supports to the wires along the run were provided. A start ignition test was done, and the control is responding ok. Also liquid tape was applied to the bus bars to provide better corrosion protection.
- The instrument panel at the cockpit, for the motor, was taken apart, the terminals were cleaned, several damaged wires and terminals were replaced. It was tested and working properly; it has been put back together and the whole plate and box secured permanently in place with silicon, and ready for use.

- Identification of cables from the instrument panel to the opposite end at the DC panel, motor, alternator and regulator was done, and a diagram provided.
- On the AC panel a new main overload and fault breaker was installed. This will provide protection for both Generator power and shore power. A new cut on the panel was needed to fit the new breaker and to be secure with screws. New cables with terminals and heat shrink tube were provided for connection between the switch selector, the breaker and the AC bus bar.
- The old soldered connections were removed, to be replaced with new wires coming from the AC bus bar.
- The Bilge pump system was redone and new wire section for the direct feed 12V with a waterproof fuse, wire for the connection of the manual control, and the negative return were installed. For this the pump had to be taken out and secure to the base. Also a new automatic switch was installed and a wood base provided and screwed to the base. The cable connections were all done with crimp terminals and heat shrink tubing. Also split loom tubing was provided to protect the 3 wires from damage.
- The blower was tested and it is working properly.
- The Air conditioning system was inspected. For this all the back structure of the main bedroom was exposed to follow the power and control wires as well as the water lines. A diagram was done and will be use to test the system on the next visits. The system was to be tested still.
- The autopilot drive unit was also inspected at this location. Split loom tubing was provided on several sections to provide protection of the wire from abrasion on some exposed.
- The battery charger input AC cables were installed and connected directly to the charger. This with the new configuration of the AC panel, where the position and new 15amp breaker has been installed for the charger.
- Old unused cables were removed from the AC current installation.
- On the DC panel labeling and circuit branch assignation was performed.

AC panel connection of the breakers final position for the battery charger and 3 active 110V outlets around the boat. The connection with cables and new terminals in the panel was done, and feed from the AC bus bar to the breaker and on-off switch.

- Replacement of the provisional wire with a #10 gauge wire from the cabin light switch to the distribution bus bar.
- New cable for the feed of the Air Conditioning circuit with #10 gauge wire.
- New terminals for neutral cable coming from the power switch selector.
- The filter for the in line diesel pipes for the generator was taken apart and cleaned. This is the Racor type filter and a replacement for the filtering unit was searched in Puntarenas. At the end it had to be ordered from San Jose and will be available for the next visit.
- Autopilot breaker inspection and terminal cable end adjusted and secured. The main head control was tested.
- New supports of the cables and split loom going on the saltwater pump circuit were reinstalled and properly secure. 3 in total.
- Labeling for the DC and AC panels was provided.
- New #12 terminals were provided for the navigation and electronics wiring. Also new supports, cable organization and distribution were done on the wiring of this equipment.
- On the shaft area, all the loose and clutter of cables were properly secure and moved away from the shaft and stuffing box area. Some of which were touching the shaft.
- A test for the AC conditioning compressor was performed. The unit started properly as did the 115V water pump.

- The stern light was readjusted. It is part of the navigation lights.
- Identification of the hot 110V cable for the outlets was done. These are wired from the AC bus bar on the panel to each individual outlet. Provisional 12V voltage was applied to identify each circuit. The cables that were not part of these 3 outlets were disconnected from the bar and their terminals taped.
- Old coaxial cable section was removed to free area of wire clutter. Also 2 speaker cables were cut and repositioned.
- The bilge pump automatic circuit response was tested with high water. When the boat is on the water, this circuit needs to be tested regularly each week, at least two times a week or as required.
- Replaced ammeter gauge with the newly acquired unit.
- Bilge pump automatic switch wiring adjustment and extension. This to bring the direct feed to the battery positive post terminal. The fuse was putted right at this place.
- Installed new 30amp breaker for the Air Conditioning circuit.
- Air Conditioning system was inspected and completed on. The control box was completely disassembled to check every component and make an electrical diagram. With the diagram the identification for the compressor, fan, and positive 24VAC wires was done. A temporary 120V feed was provided to perform all the tests on the system.
- Installed new capacitor for the compressor start up cycle.
- Installed new oil sender for the generator.
- A new Racor element filter was installed. Also a section of the hose to the generator was replaced.
- The generator was tested for initial start up. The system has air on the pipes and needs to be fully bled.
- Installed a direct connection for the grounding wire of the generator for the AC system. This to provide a more direct path of a fault current back to the power source. Previous cables between the bond bus bar and the negative DC bar was removed.
- For added safety precautions, exposed areas of the AC breakers and power selector were covered.
- Support and organization of cables and hoses was added around the propeller shaft area.
- The 115VAC pump for the air conditioning system was disassembled and tested outside with direct AC connection and upper water pressure provided. The pump is working properly and the impeller was checked and it is in working condition. It is not necessary to replace the AC pump.
- The neutral and hot wire on the generator were left isolated. This is to check for polarity on the first test start of the unit.
- A main DC diagram was completed. This to provide a representation of the main components and the new distribution including all the changes and adjustments that have been done.
- Oil sending unit was checked and working properly. With this test, it was possible to determine that the oil gauge is of the type with 0 ohm reading for the no pressure position.
- The neutral position on the power selector switch was changed to match the selector's activation of the pair between hot and neutral wires simultaneously.

In Summary:

We have made great advance on the boat, and one of the things I want is to put it on the water so that you can start enjoying and using the boat. We have reached that point.

The boat is ready to go on water, on the electrical part. With the new diesel filter installed we can put the AC voltage on a run for the boat; that will be done this week. The ammeter and breaker for the Air conditioning are already ordered and I will have them for this next visit.

We have been able to accomplish quite a bit with Sanctuary. Throughout this time I have been able to get extensive knowledge of its systems and wiring. It is important when having a boat, that you have consistency.

With the work that has been accomplished and by maintaining periodic maintenance, your boat will enjoy smooth and safe sailing.