

Catalina

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MAINSHEET

C470 Association Technical Editor

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Wind Generators and the C470

The C470 electrical systems, other than air conditioning and heating, can be powered exclusively from the 12-volt system. Televisions/VCR's/DVD's, microwaves, hair dryers and toasters can be routinely and freely used via an inverter which converts 12volt power to 110v power. Bilge pumps, lights, electronic navigation gear, watermakers, windlasses and navigation lights are all directly powered by the 12-volt systems. Thus, for those contemplating

long cruises or retirement aboard, the issue of how to inexpensively and reliably produce 12-volt power looms large. There are many solutions!

Solar panels, towed 12v generators, diesel or gasoline powered internal combustion gensets and wind generators are workable solutions for the C470 owner/cruiser. Some owners have all or most of the above and they work!! For the purposes of this article the wind generator, its installation, testing and electrical production will be considered.

As sailors we are aware of the axiom:

"The available energy in the wind scales with the cube of the wind speed. This means that each time you double the wind speed you get eight times the power".

In years past, the wind generator was a simple affair. It had 3 to 6 blades

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connected to an unregulated electrical turbine which was connected directly to the ships batteries; it was mounted on a tall post to keep the fast moving blades from injuring those aboard; it was stoutly built to withstand strong winds but had to be tied down and unused in very strong conditions thus requiring owner intervention in difficult weather; its electrical production, due to lack of computer control

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coupled with blade design and materials which varied greatly with manufacturer, was not as efficient as modern day designs.

Other than still being mounted on a tall post, all the above has changed for the better! New HMW (High Molecular Weight) plastics used in blade design allow for stronger yet lighter and more aerodynamically refined blades that can withstand higher winds and greater stress. Better fan blades spin faster at lower wind speeds thus widening the "power curve" from the generator. Additionally, the new blades tolerate high winds due to their designed-in ability to aerodynamically "feather" at extreme rotation speeds without inducing fracture-generating stress levels. The benefits of technology do not stop there. The new-generation wind generators have microprocessors which sense the loading of the gensets' alternator and allow the blades to spin faster or slower as required to maintain optimum power generating efficiency. A side benefit of this technology is lower blade noise.

The hi-tech wind generators available today also regulate when they operate. Microprocessors sense battery voltage and compare it to an owner-adjustable (but factory pre-set) set point. When the battery voltage drops below a preset, the wind generator "chip" allows the turbine to spin and generate electricity. Indeed, the brain of the wind genset is so sophisticated that it can detect high temporary electrical line loss versus low battery voltage, adjust the turbine operation accordingly and continue to generate power with the owner uninvolved and unaware of the process! Conversely, once the batteries are charged, the blades stop rotating, turbine wear is minimized and no blade noise is encountered.

Installation on the C470 can easily be accomplished by the owner. The AirX Marine wind generator weighs in (with

aluminum pole) at only 55lbs. Unless you have a Wells Arch Davit, the logical location for the foot of the mast is just aft of the end of the toerail on either side. The hull is quite thick there and drilling through it, using a backing plate and 5200, along with 5/16 bolts to hold the supplied mount will provide plenty of strength. A large cable clam for the power and ground wires and you are thru the hull in watertight fashion. Two stainless steel 1" diameter, 9' long tubes are provided for the owner to cut to fit for bracing. The forward brace was mounted directly onto the deck with lag screws and 5200. Since I have a cover over my dinghy I elected to use rubber cushioned stainless U-bolts to hold the mounting pole to the bimini frame. One short stanchion was run from the mounting pole to the upper bimini brace to add stability. The entire assembly is quite strong and does not vibrate.

The ground wire, (on Beconing, Hull #76) was run behind the aft stateroom starboard drawers, thru the openings under the bed into the fuel tank area and to the center of the hull. There is a very small opening thru which the wire will pass into the area of the shaft seal and then into the engine compartment for attachment to the engine or transmission for a proper ground. The power wires, as they are #4 wires, require a different approach.

The power wires were run from the battery shunt (black wire) and the aft battery negative post (red wire) thru the engine compartment and into the above mentioned shaft seal area. From there, I drilled three adjacent 1.5" holes (be certain to take the pointed bit off the drill before you do this as you can end up going into the hull itself) under the floorboard at the forward starboard side of the bed. This allowed me to fish the power wires from the shaft seal area into the area behind the starboard set of storage drawers and then directly to the generator via the control panel. The AirX wind generator, as most of them do now, comes with an optional control panel. The control panel was mounted on the bulkhead, starboard side of the bed where the small table and light are located. The control panel encompasses a circuit breaker, shunt and on/off switch. Also co-located with the control panel behind the above-mentioned bulkhead is a 50-amp slo-blow fuse required by code.

It works! On the first time out sailing with the generator operational we encountered 22-30kts of wind right on the stern. The wind generator began to turn and produce power as advertised. When we arrived at the dock some three hours later, the batteries were charged, the wind generator had shut off and I was a happy boater. For long periods at anchor or at sea with reasonable winds and a close eye on power usage the new generation of wind generators can really light up a Catalina 470.

SUNGLASSES

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