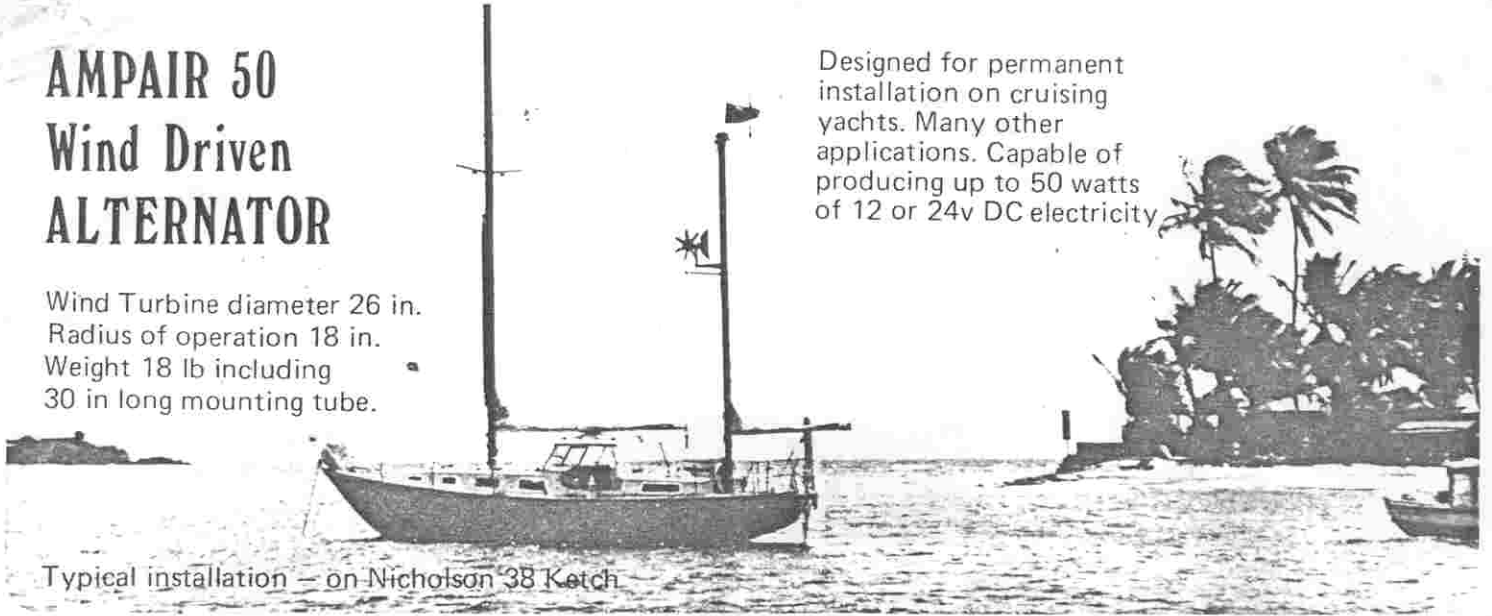


# AMPAIR 50 Wind Driven ALTERNATOR

Wind Turbine diameter 26 in.  
Radius of operation 18 in.  
Weight 18 lb including  
30 in long mounting tube.

Designed for permanent  
installation on cruising  
yachts. Many other  
applications. Capable of  
producing up to 50 watts  
of 12 or 24v DC electricity



Typical installation — on Nicholson 38 Ketch

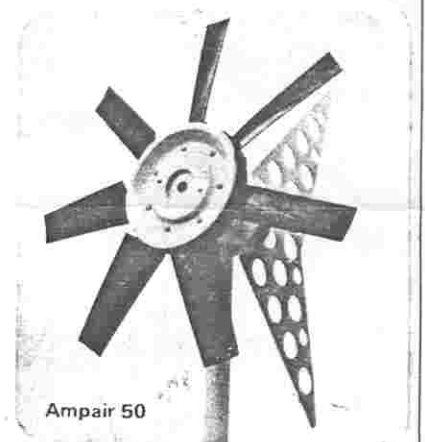
Normal 14 blade  
configuration



For low windspeed  
environment

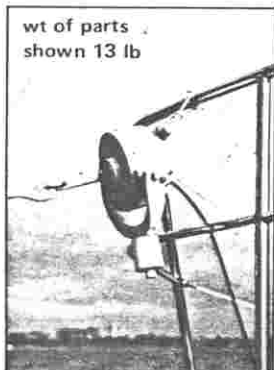
*Design and Development by*  
**AMPAIR PRODUCTS**  
Aston House, Blackheath, Guildford,  
Surrey GU4 8RD, England  
Telephone: Guildford (0483) 893413

Optional use with  
7 blades removed



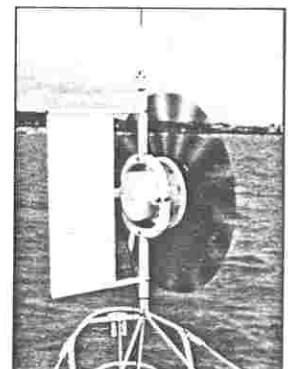
For better than normal  
windspeed environment

Driven by 11 in diameter  
trailed water turbine  
when under way.  
Alternator diameter 6 in.



## AQUAIR 50 Dual Capability ALTERNATOR

Driven by 26 in diameter  
wind turbine  
when at anchor.  
Suspended weight 21 lb.



Alternator

with optional  
voltage limiterread-out  
unit

Battery

## FURTHER INFORMATION ON THE AMPAIR 50 AND THE AQUAIR 50

**ALTERNATOR.** Though differently packaged, both alternators use the same rotor and stator. The stator has been developed for very low speed operation and the directly driven rotor incorporates permanent magnets, thus eliminating electrical excitation losses. A remotely located rectifier converts AC to DC. The alternators are sealed and incorporate double-sealed grease-packed ball bearings. The front bearing is further protected by a special V-seal.

**WIND TURBINE.** The Ampair 50 wind turbine, which can also power the Aquair 50, is about the maximum practical size for the average cruising yacht. It provides sufficient power to cope with most lighting requirements under typical unsheltered wind conditions, given fluorescent cabin lights and a single tri-colour masthead navigation light. Alternatively it can power a small autopilot or be looked upon as saving up to an hour of engine running per day.

The wind turbine incorporates individually replaceable polypropylene blades, mounted in an aluminium alloy hub. This is sleeved with stainless steel for easy removal from the alternator shaft. The blades are resilient and thus reduce the risk of any accidental personal injury.

The wind turbine has been satisfactorily tested to 85 knots windspeed and there are no known limitations within the conditions which any yacht is likely to survive. Drag is about 8 lb at 20 knots, 40 lb at 50 knots and 75 lb (estimated) at 85 knots. These values are minimal compared with the loads which masts and rigging must withstand. The same applies to the weight of the Ampair 50 and calculations show that any affect on the rolling stability of even a relatively small keel-boat is quite minor.

**WATER TURBINE.** The Aquair 50 water turbine has been specially developed to give the lowest possible cut-in-speed consistent with an acceptable level of drag. Drag is 10 lb at 3 knots, 20 lb at 5 knots and 30 lb at 7 knots. The turbine is towed by at least 60 feet of 8 mm or greater diameter braided rope, which transmits its torque to the alternator. A break-link at the alternator end of the rope is set to fail at a load of either 350 lb or 700 lb, in the event of snagging, to save the alternator and prevent damage to the boat.

The turbine is lead-filled to keep it submerged. Above 6–7 knots however the rope length must be increased or more weight added to the turbine, to prevent it from breaking surface. Basic turbine weight is 6 lb. Maximum permissible speed is 10 knots.

When water driven, the Aquair 50 alternator is slung from the stern pulpit, via a swinging ring system, which allows the alternator shaft to align itself with the rope under all conditions. This method of attachment has been chosen for its extreme simplicity and adaptability.

When at anchor, the Aquair 50 alternator can be fitted with a normal Ampair 50 wind turbine, a special wind vane and swivels (all available as an optional extra) and then slung between the fore-triangle rigging and the deck. This facility enormously increases the effectiveness of the Aquair 50, which would otherwise lie idle a great deal of the time.

**WEATHER-COCKING.** Unlimited weather-cocking of the Ampair 50 is allowed for by slip-rings within the body. In the case of the Aquair 50, when wind driven, the output wire may possibly wind up over a period and must be unwound from time to time, as necessary. Both the Ampair 50 and the Aquair 50 are balanced about their weather-cocking axes to prevent them from being affected by boat motion.

**MATERIALS.** Marine grade materials, mainly aluminium alloy and stainless steel (for shafts and fasteners), are used for all exposed parts. External surfaces are painted with white epoxy paint and oven baked. The Ampair 50 and the Aquair 50 have been built up to a standard rather than down to a price. They are sturdy top quality products which carry a one year guarantee and should last indefinitely.

**MOUNTING BRACKETS.** Special mounting bracket kits are available for attaching the Ampair 50 mounting tube to most masts. They incorporate specially developed rubber bushes to minimise the possibility of noise transmission down metal masts.

**VOLTAGE LIMITER.** An optional voltage limiter is available to prevent batteries from being overcharged, though this is not normally likely unless a boat is left unattended for prolonged periods. Its other use is to safeguard electrical equipment from over-voltage in the event of accidental battery disconnection.

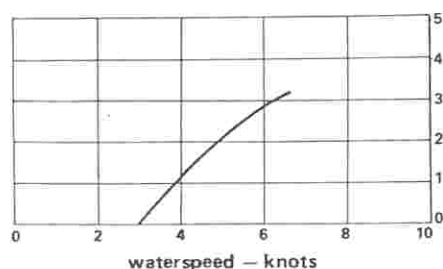
**READ-OUT UNIT.** An optional read-out unit is also available, to display amps, wind-force and battery volts. In the case of the Aquair 50 it can be calibrated to display boat speed, and a log facility can also be provided. In the absence of a read-out unit it is recommended that a sensitive ammeter be used to monitor system performance.

Battery charging performance @ 12 volts

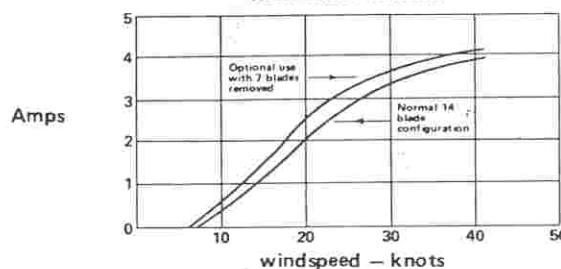
(halve amps for 24 volts)

Figures accurate to  $\pm 10\%$

Aquair 50 with water turbine

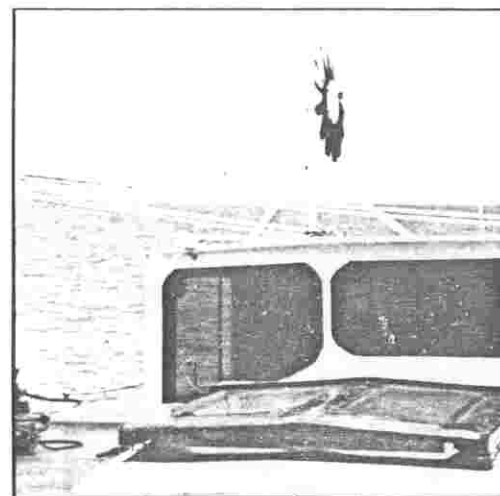
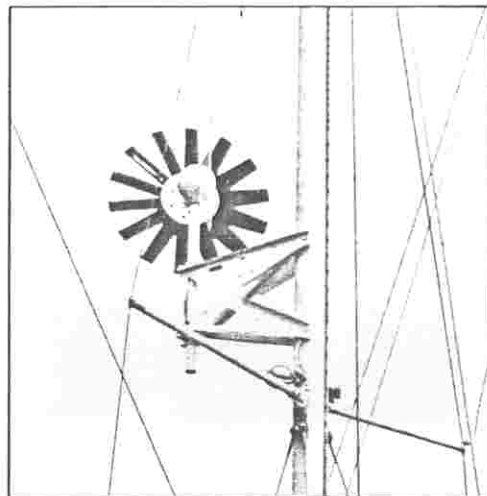


Ampair 50 or Aquair 50 with wind turbine



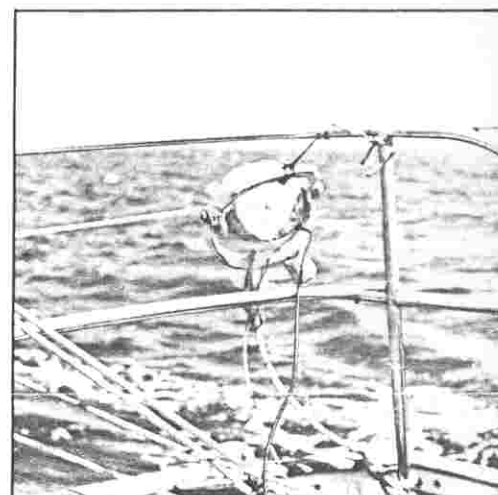
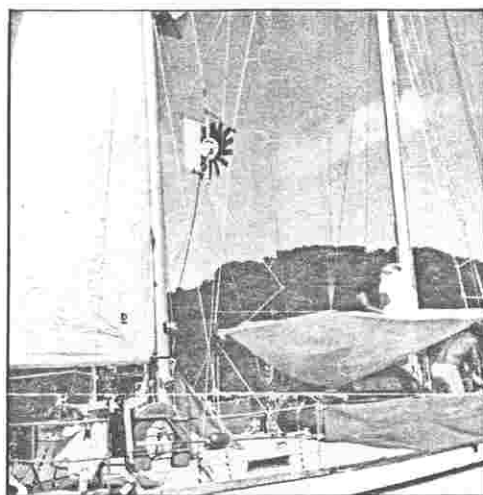
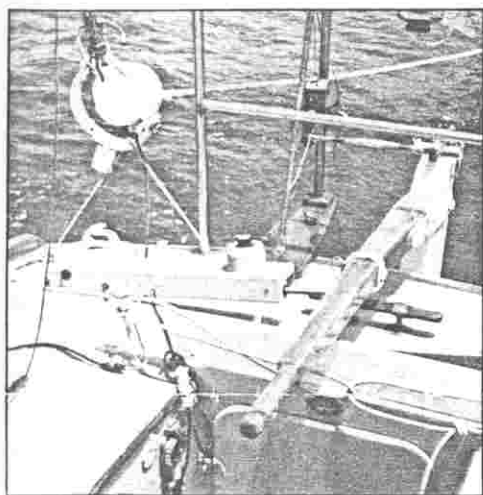
Once started both configurations continue rotating until windspeed falls below 3–4 kts. Gust of 10–11 kts needed to restart 14 blade configuration or 15–16 kts to restart 7 blade configuration. Choice of configuration therefore depends on windspeed environment.

The three photographs below show (left to right) Marcel Peltier's ketch Am Stram Gram in the Grenadines; Victor Poor's Texas based Ampair 50 installation, and John Grimsrud's Florida based motor-sailer Dursmirg. These are some typical and satisfied Ampair 50 users, with whom we have been in touch.



Other cruising owners include Jim Griffin of the Bahamas based gaff ketch Northern Light. After 4½ years use of an early Ampair 50 he writes "You are hearing from a satisfied customer. . . I have no criticisms of the design whatsoever. . . your high quality makes it worthwhile by comparison with alternative products. . . I haven't seen another comparable unit. . . we use no other generator for providing lighting in a 100% cruising home". Then Tom Mestrits of Parma Heights, Ohio, writes from Florida waters "My Ampair 50 is still pleasing us with its performance and has been in use 2 years now (1978). I am writing to you directly as you have been an excellent help to me in the past". And Karin Schultze-Roehl of the sloop Krios wrote from Barbados, after we serviced their Ampair 50 under guarantee "Hurra, we got it back. . . plus 4 spare blades and nothing to pay for this. We are very happy. Nearly too much to believe that it is still possible today to find such understanding and kindness for the lonely yachtsman away from home". The last two letters underline the personal after-sales service we try to provide for the roving yachtsman.

The further three photographs below show some typical Aquair 50 installations.



An early and very happy Aquair 50 owner is Mr W. A. van Dorp of Huizen, Holland and the 42ft ketch Lin-Fu. After his first season he wrote "I have become so enthusiastic about the Aquair 50 that I feel compelled to write and tell you that this is one of the most valuable pieces of equipment I have bought for many years". Recently, after a two year interval, he wrote again, "I have been using the Aquair for 3 years now and I find it an absolute and unmixed success. I cannot imagine how I have ever been cruising without it. My cruising pattern consists of no weekend sailing at all but one or two extensive trips from Holland and back again, totalling yearly between 3,000 and 5,000 miles. For instance, during the last 3 years, the Azores, the Mediterranean and Finland. The total distance covered to date would be in the order of 10,000 miles. . . I do not feel that the Aquair 50 has any real competition, at least to my knowledge".

Another early Aquair 50 owner is Commander Bob Menzies of Hermance, Switzerland and the 37ft sloop Dancing Dolphin. He has cruised to a similar pattern and covered some 8,000 trouble-free miles so far. He will be relying on his Aquair 50 for a busy schedule of trans-atlantic and other races in the next few years and we will support him to the hilt, as we have done all along.

Mr James O'Steen of Seattle, Washington, when about to sail for the far Pacific, wrote "We wish to compliment you for the good craftsmanship and design of your products. We shall recommend them to others on our travels". Many others have said the same.

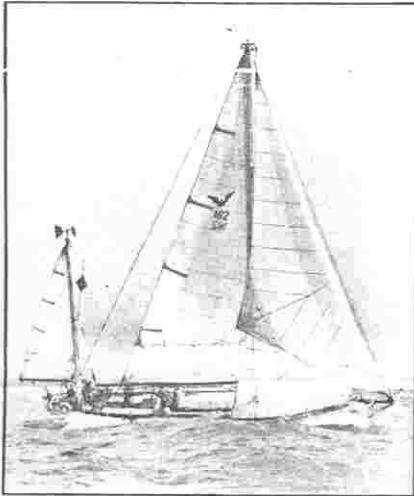
Verbal commendations of the Aquair 50 have come from numerous other owners, including Pete Crowther of Galway Blazer, survivor of several capsizes in the roaring forties, and Pat Patterson of the catamaran Ocean Winds 2, which recently completed a circumnavigation in the 400 year old wake of Sir Francis Drake.

The Ampair 50 and the Aquair 50 have evolved from experiments with wind and water driven alternators, started in 1974, to provide free electrical power for cruising yachts. The success of this work, coupled with the interest aroused, led to initial production of the Ampair 50 in 1975 and the Aquair 50 in 1977. Since then they have been used in increasing numbers around the world, in every sort of climate, by more than 500 enthusiastic owners.

As a qualified engineer and an ocean cruising yachtsman himself, the designer is only too well aware of the remorseless demands of the marine environment and the absolute necessity for robustness and weather-proofing. This knowledge, coupled with continuous monitoring of user experience, has enabled the Ampair 50 and the Aquair 50 to be brought to their present well developed state of dependability and usefulness. They can thus be offered to potential users with justifiable confidence.

This leaflet is intended to provide some independent corroboration of our claims, by use of photographs, case histories and quotations from letters in our files.

**NOTE ON PERFORMANCE** — we have been to endless trouble to establish accurate performance figures and guarantee ours to be within a 10% margin of error. It is therefore regrettable that we find ourselves competing with some absurd rival claims, such as one of 1 amp at 12v at 9kts windspeed for a wind driven generator having a 20" diameter wind turbine. This output is some 4 times its calculated value, bearing in mind the fact that no small wind driven generator is known to convert more than about 25% of its intercepted wind energy into electrical power.



*lolaire (Don Street)  
12,000 mile round Atlantic  
cruise with prototype — 1975*

**Ampair 50 evaluation by Don Street Jr.** (author of Ocean Sailing Yacht and other books)

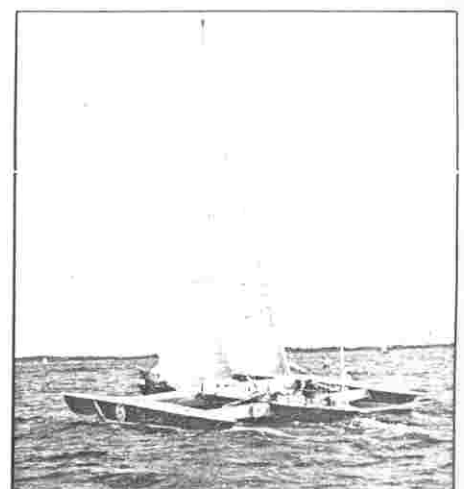
After spending ten years trying to find a suitable small wind charger for my yacht lolaire, and being completely unsuccessful, I stumbled across Hugh Merewether and his Nicholson 38 Blue Idyl, which sported a small wind charger. Hugh had made it as an experiment, a strictly one-off prototype. He is an ex test pilot and was one of the leading test pilots on the Harrier, the vertical take-off and landing jet which the U.S. Marines are buying from England. Obviously he knows a good deal about aerodynamics and has access to good aerodynamic consulting brains.

Hugh lent us the experimental model of his wind charger in April 1975. We mounted it at the top of the mizzen mast, and within the next seven months sailed a total of 12,000 miles, twice crossing the Atlantic, cruising and racing in Europe, and weathering numerous gales. We are completely sold on the Ampair wind charger.

It was particularly important to us in lolaire as we have no engine, having thrown it overboard five years ago. However with the aid of the wind generator we very seldom have to charge the batteries. For instance, we charged the batteries on 29th October 1975 in Ireland, and the next time the batteries went flat and had to be charged ashore was during a calm spell in Antigua in early February 1976 (some 3 months and 4,000 miles later).

Given fluorescent lights below deck and a single tri-colour masthead light plus careful conservation of electricity, the Ampair 50 will provide most if not all the electricity needed on a small cruising boat.

**Note** — Since this was written in 1976, Don Street has owned a production Ampair 50. He has also helped in the development of the Aquair 50 and has written about both in Ocean Sailing Yacht Vol 2.



Tom Grossman (centre above) of Rockport, Mass, bought our first production Ampair 50 and used it on Cap 33 (above left) which he sailed to 4th place in the 1976 single-handed trans-atlantic race. In 1980 he sailed Kriter 7 (above right) to 10th place in the same race, for which he started favourite, once again using an Ampair 50. He has since written "I can tell you that the next time I cross a starting line your fine Ampair will be along. I still find it a robust dependable instrument".

Two other participants in the 1980 OSTAR have reported back. Paul Rogers of the British trimaran Christian Saul 2 writes "I am putting together a book about the race and the Ampair figures well in it. I shall be writing highly of it. I was most impressed". And Victor Sagi of the Spanish sloop Geruda writes "The Ampair 50 gave me unexpected service. The performance was good".