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# Ampair®

## Wind and water power 2008 catalogue

## issue 5

www.ampair.com

ampair®

# Ampair ®

## the company behind the products.

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### History.

For more than 35 years Ampair has been working in the renewable energy field. Ampair wind driven generators have been designed to survive the severest environments on land and sea.

Low speed turbines, aerodynamic blades and rugged construction ensures long life and reliability in situations where maintenance can often be difficult.

Mounting systems, regulators and accessories are all manufactured or selected for long life.

As well as our Ampair wind turbines, other Ampair generators include our Aquair hybrid wind/water driven (towed) generators which have shown their worth in thousands of ocean crossings while our Underwater submerged generators have been used by the commercial market for many years. Interestingly these Underwater units are now providing power from the fast flowing streams near many remote “wilderness” homes.

Understanding the need for strength and reliability in the environment where their products are used, all Ampair designs are built up to a high standard and not down to a price. Ampair also provide spares and comprehensive manuals for servicing in use.

Ampair generators have always been designed with low noise as a priority. In tests they have consistently been considerably quieter than competitive products. More recently Ampair has been at the forefront of pioneering, grid-connected, microwind systems including constructing our own advanced test sites.

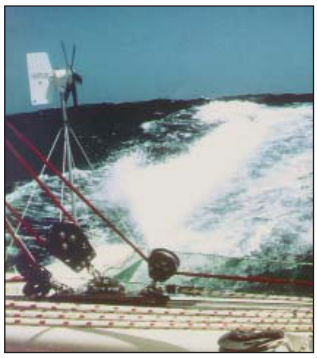
*“Greetings from the Frozen North, our Ampair 100 has stood in an extremely exposed spot for 4 months and endured winds of force 11 and flying ice. A great bit of kit”.* *Mark Evans Arctic Year, 2002*

*“We have trailed our Aquair 100 for 10,000 miles and it’s still on the job. At 30°S 110°W and heading for the Horn”.* *Tim Trafford*

*“Excellent, after sales service is really good, outstanding” and - interestingly - “saved our bacon”*

*“The Ampair 600 is working great, it’s good to have power when the clouds are out, but we have wind. We now often wake up with 0.2 to 0.8 volts higher in our batteries”.* *Taos, New Mexico*

*“The Ampair 100 was so quiet that its noise was difficult to measure”.* *Paul Gipe - www.wind-work.org*




# Ampair ®

## selecting your system.

### Which product.

**Ampair 600 for 230V grid connection.**
Wind generator for higher power land based applications where the connection is to an electrical network (the 'grid').

page 4/7

**Ampair 600 for 24 or 48 V battery charging.**
Wind generator for larger yachts and higher power land based applications.

page 4/7

**Ampair 300 for 12 or 24 or 48 V battery charging.**
Wind generator for medium sized yachts and medium power land based applications.

page 8/9

**Ampair 100 for 12 or 24 or 48 V battery charging.**
Wind generator for small sized yachts and lower power land based applications.

page 10/11

**Aquair 100 for 12 or 24 or 48 V battery charging.**
Towed turbine generator with optional wind powered conversion kit. Ideal for long distance sailing. Standard and coarse turbines available for different water speeds.

page 12/13

**Underwater 100 for 12 or 24 or 48 V battery charging.**
Subsurface generator for boats or microhydro power in fast flowing streams & rivers. Standard and coarse propellors for different water speeds. Left and right handed rotating propellors for twin units.

page 14/15

# Ampair® 600 wind turbine.

## 24 or 48 V battery charging or 230 V grid connection


Ampair 600 on brick wall mount

**The Ampair 600** is the latest micro wind turbine from Ampair. Built on the same platform as the renowned Ampair 100 and the newer Ampair 300 it has a 1.7m diameter blade optimized for low and medium speed winds. It incorporates the PowerFurl™ system first seen in the Ampair 300 which slows the turbine down in high winds, reducing noise and mounting system loads. It is available in two versions depending on whether the need is for high capacity 24 or 48 V battery charging or for 230V grid connection. It can be used on land or on larger vessels and, like all Ampair products, is built to full marine grade specifications.

### Battery charge

The Ampair 600-24/48 is designed for charging high capacity 24/48V DC battery systems and must be installed in conjunction with the 600-TS regulator which includes the regulator; the dump load; rectifier; fuses; and heatsinks. Loads can be either 24 or 48 V DC equipment or a stand-alone sine wave inverter can be used to power 115V or 230V AC equipment.

Ampair 600 on telegraph pole mount

### Grid connect

The Ampair 600-230 is designed for connecting to 230V 50Hz grid systems. It is ordinarily connected on the client's side of the electrical utility supply meter and is ideally connected into the consumer unit (or fuse box). Electricity generated by the wind turbine is then used in preference to that supplied by the utility. If more electricity is required by the client then extra supply comes from the utility, and if more is generated than is consumed on site then the surplus is exported to the utility grid. The Ampair 600-230 must be installed in conjunction with the Ampair interconnect set which includes a G83 grid tie sine wave inverter; stop switches; overloads; power conditioning; and isolation.


Ampair 600 on tilt up mast

### Mounting options

The Ampair 600 system includes a range of mounting systems for land and marine use. The only marine mount that we recommend is the stern mount kit co-developed by Ampair and Scanstrut. On land the same stern mount can be used and we also offer a wide range of other mountings:

- Steel unguyed masts of 8m and 10m in height with options for hinged or unhinged access; and for flange mounted or rooted foundations.
- Wooden unguyed 10m and 13m telegraph poles and conversion kits.
- Guyed steel masts from 12m.
- Non penetrating flat roof mounts of 5m height.
- Various mounts suitable for fixing on to suitable vertical structures.

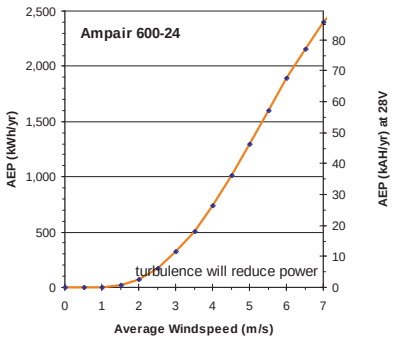

Non penetrating roof mast

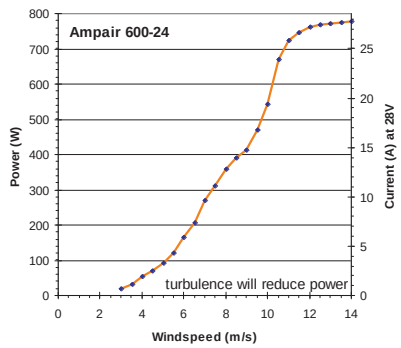
# Ampair® 600 wind turbine.

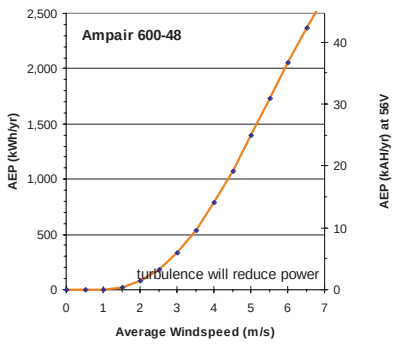
**24 or 48 V battery charging**
**230 V grid connection**

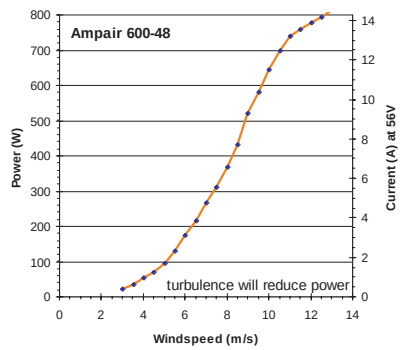
| | 24 V DC battery charge | 48 V DC battery charge | 230 V AC grid connected |
|---|---|---|---|
| Reference power at 11.0m/s (24.6mph) | 723 W (into battery) | 741 W (into battery) | 698 W (into grid) |
| Reference annual energy at 5.0 m/s | 1300 kWh/yr; 48 kAh/yr | 1394 kWh/yr;25 kAh/yr | 1232 kWh/yr (to grid) |
| Cut-in windspeed | 3.0 m/s | 3.0 m/s | 3.0 m/s |
| Cut-out windspeed | n/a | n/a | n/a |
| Maximum power | 1050 W | 1140 W | 730 W |
| Maximum voltage | 24 V nominal | 48 V nominal | 230 V nominal |
| Maximum current | 30 A | 17 A | 3.2 A |
| Power form | 24 V DC | 48 V DC | 230 V AC single phase 50Hz |
| Power input | <0.5 W | <0.5 W | 0.1 W sleep, <4 W standby |

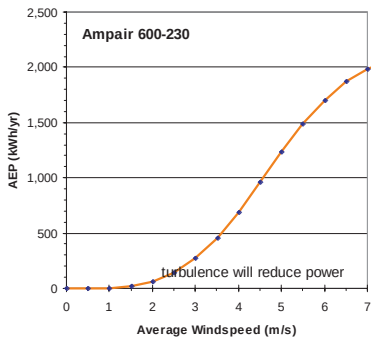
| | |
|---|---|
| Rotor swept area | 2.27m$^2$ |
| Generator output | 3-phase AC (to external rectifier) |
| Turbine diameter | 1.70 m |
| Overspeed control | Blade pitch control and dump load |
| Weight | 16.0 kg (turbine h ead including blades & tail fin) |
| Construction | powder coated die cast aluminium body; 3 blades of GRP construction |
| Generator | direct drive NeFeBr permanent magnet generator producing three phase |
| Noise | Max 1-3 dBA above background |
| Longevity | Expected 15 ye ar operational life |

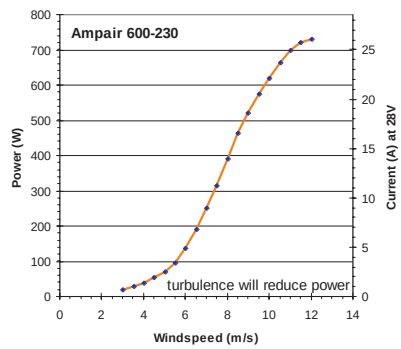


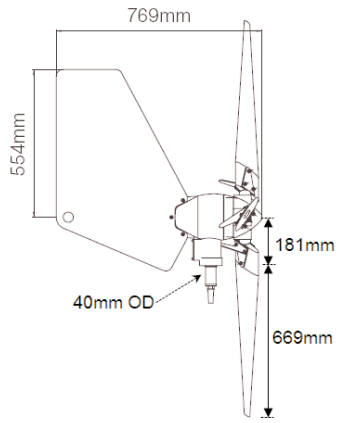



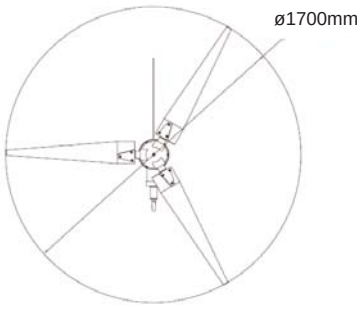




**Restricted Availibility:** Items shaded in gold are only available to or from selected, authorised Ampair installers and distributors.

# Ampair® 600 Accessories.

## 24 or 48 V battery charging or 230 V grid connection

**Restricted Availibility:** Items shaded in gold are only available to or from selected, authorised Ampair installers and distributors.

| | Model | | Name | Description |
|---|---|---|---|---|
| generators | A06 1024 |  | Ampair 600-24 | Ampair 600 Watt, 24 Volt; marine grade; white (package excludes regulator assembly A06 RG TS24) |
| | A06 1048 |  | Ampair 600-48 | Ampair 600 Watt, 48 Volt; marine grade; white (package excludes regulator assembly A06 RG TS48) |
| | A06 20230 |  | Ampair 600-230 | Ampair 600 Watt, 230 Volt ; marine grade; white (package includes interconnect unit & G83 grid tie inverter described in A06 IC 700) |
| regulators & stop switch | A06 RG TS24 |  | Regulator 600 TS24 | regulator, 600W x 24V single battery (includes regulator, rectifier, dump load, stop switch, fuses) |
| | A06 RG TS48 |  | Regulator 600 TS48 | regulator, 600W x 48V, single battery (includes regulator, rectifier, dump load, stop switch, fuses) |
| | A06 IC 700 |  | Grid connect set | Ampair IC-700 interconnect unit with stop switch, isolation, overloads; G83/1 inverter; and 2 x 1m connection cables; complies with G83/1 |
| mounting systems (marine) | A00 MO 33 |  | Scanstrut stern mount | Ampair / Scanstrut stern mount kit (2.5m free standing c/w stainless steel struts; places blade tips 1.8m above deck height) |
| | A06 MO 35 |  | Waterproof deck plug & socket | waterproof deck plug & socket |
| mounting systems (land) | A00 MO 40 |  | DIY adaptor, 48mm | DIY adaptor - pivot shaft to 48mm OD tube |
| | A00 MO 43 |  | DIY adaptor, 76mm | DIY adaptor - pivot shaft to 76mm OD tube |
| | A06 M00 |  | Wall mount kit | BWM: wall mount kit (3 galvanised brackets; 5m x 3" galvanised pole; AV clamps; turbine adaptor; no fixings) |
| | A06 M10 |  | Steel frame mount | SFM: steel frame mount kit (3 galvanised brackets; 5m x 3" galvanised pole; AV clamps; turbine adaptor) |
| | A06 M10-R |  | Steel frame mount (right angle) | SFM-R: steel frame mount kit (3 galvanised brackets; 5m x 3" galvanised pole; AV clamps; turbine adaptor) - as above, but suits webs at right angles |
| | A06 M20 |  | Non penetrating roof mount | NPRM: non penetrating flat roof mount (3m x 3m galvanised trays; 5m x 3.5" galvanised pole; AV clamps; turbine adaptor; no slabs) |
| | A06 M50-8 |  | 8m hinged mast (flanged) | TUM: tilt up 8m free standing galvanised steel mast (hinged, flanged; galvanised steel includes flange kit, foundation ties, and winch set |
| | A06 M60-00 |  | Pole mount kit | WPM: wooden pole adaptor kit (2.5m x 3" galvanised pole; 2 AV clamps; turbine adaptor; fixings) |
| | A06 M60-10 |  | 10m pole | WP: wooden pole, heavy duty, pressure treated, total length 10m, (undelivered) |
| | A06 M60-13 |  | 13m pole | WP: wooden pole, heavy duty, pressure treated, total length 13m, (undelivered) |
| | A06 M70-12HD |  | 12m guyed mast | GM-HD: 12m guyed mast, heavy duty |

# Ampair® 600 Accessories.

## 24 or 48 V battery charging or 230 V grid connection

**Restricted Availibility:** Items shaded in gold are only available to or from selected, authorised Ampair installers and distributors.

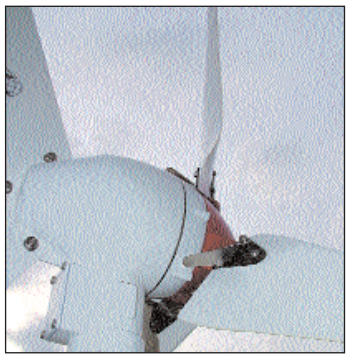
| | Model | | Name | Description |
|---|---|---|---|---|
| short term spares | A00 SP 30 |  | Pivot seal | pivot seal |
| | A03 SP 11 |  | Brush set | brush set |
| | A06 SP 12 |  | Turbine blades | turbine blades - set of 3 |
| long term spares | A00 SP 31 |  | Pivot bearing set | pivot bearing set (upper & lower bearing; 'O' ring; spiral lock ring) |
| | A36 SP 21 |  | Hub cap screw | hub cap screw<br>(this special high tensile screw must be used for the Ampair 600) |
| services | A06 SS 00 |  | Site survey | site survey (price depends on location) |
| | A06 SS 10 |  | Basic installation | basic installation: (includes installation, commissioning, and reasonable consumables; additional consumables charged separately; price is location & access dependent) |
| | A06 SS 20 |  | Cancellation | installation cancellation fee |
| | A06 SS 30 |  | Planning | planning application (price subject to survey) |
| | A06 SS 40 |  | Advanced install | advanced installation (price subject to survey) |
| | A06 SS 50 |  | Maintenance | two person team, ladder access, rate for two hour visit excluding materials |
| distributor support | A06 M80-01 |  | Test & display stand | test & display stand |
| | A06 M80-02 |  | Test pieces | Installation accessories - hub test bolt; 10m test lead |
| | A06 CAT-A4<br>A06 CAT-A5 |  | Ampair 600 brochure | Ampair 600 brochure (A4 x 8 pages)<br>Ampair 600 brochure (A5 x 2 pages) |
| | A00 CAT 2008<br>A00 FLY 2008 |  | Ampair catalogue<br>Ampair flyer | Ampair 2008 catalogue (A4 x 16 pages)<br>Ampair 2008 flyer (A4 x 4 pages) |
| various | ME AN 10 |  | Ampair Net | Ampair Net meteorology station and turbine performance datalogger (only for Ampair 600-230; requires internet access; complete with 3-yr. hosting fee; for educational and facilities' management use) |

## General Accessories for all Ampair®, Aquair® and UW models.

| | | | | |
|---|---|---|---|---|
| general accessories | FUS HLDR<br>FUS 04A<br>FUS 10A |  | Fuseholder<br>Fuse, 4A<br>Fuse, 10A | fuseholder (suits max 30A x 600V) 38mm x 10mm fuses<br>4A x 500V fuse<br>10A x 500V fuse |
| | FUS 16A<br>FUS 20A<br>FUS 32A |  | Fuse, 16A<br>Fuse, 20A<br>Fuse, 32A | 16A x 500V fuse<br>20A x 500V fuse<br>32A x 500V fuse |
| | .WRP 1x04.0 PVC<br>.WRT 2x01.5 T |  | 1 x 4mm² cable<br>2 x 1.5 mm² cable | 1 x 4mm² PV grade cable for extending distance between IC-700 and inverter<br>2 x 1.5 mm² tinned marine grade cable for Ampair 100 |
| | .WRT 3x02.5 T<br>.WRT 4x01.5 T |  | 3 x 2.5 mm² cable<br>4 x 1.5 mm² cable | 3 x 2.5 mm² tinned marine grade cable for Ampair 300/600<br>4 x 1.5 mm² tinned marine grade cable for UW 100 |
| | A00 SP 34 |  | In line connector | four pin in-line slim connector male & female (suits 600W; 300W; 100W generators); splashproof when assembled; fits inside 2" tube |

# Ampair® 300 wind turbine.

## 12 or 24 or 48 V battery charging power.

### Design.

The design of the Ampair 300 combines modern styling with low visual impact and quiet operation. It is suitable for larger yachts, small industrial & scientific locations, or remote holiday cabins. This microwind turbine has evolved from the outstandingly rugged Ampair 100 unit with the addition of the revolutionary PowerFurl™ blade pitch control system, advanced aerodynamic blade design and a more powerful generator.

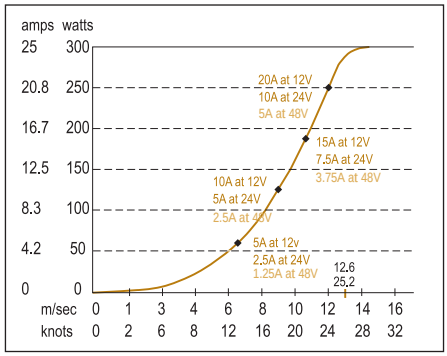
The accurate aerofoil construction of each turbine blade minimises noise and vibration optimising performance and improves the power to weight ratio. The rigid blade design avoids “whooping”, “motorboating”, or “screaming”, (vibration, resonance, and flutter).

### PowerFurl™ technology.

Automatic pitch control provides a smooth control of turbine speed in strong winds whilst continuing to generate. The Ampair 300 operates without the need for thermal cutouts, chokes, commutator brushes or complex control electronics.

### Sealing.

An integral sealing system protects internal components from condensation and corrosion. Revolutionary PowerFurl™ hub runs on low friction polymer bearings for long life with no lubrication requirement. Throughout the design all components are selected for corrosion resistance and durability - all our turbines are marine grade.




### Power.

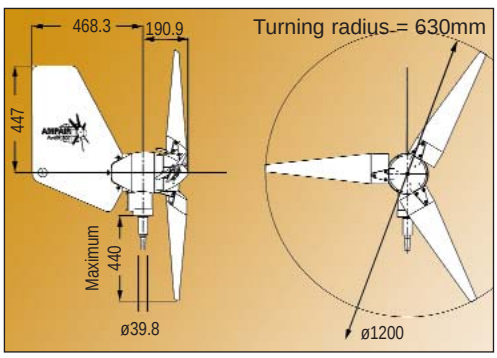
A powerful, low-speed alternator converts the turbine motion to 3 phase AC electricity. This allows use of lighter cables to feed the regulator whilst minimising voltage drop and power loss.

### Mounting.

Simple pole mounting allows easy fit to any existing mast or tower, or a range of stern mounts, gantry mounts, and mizzen brackets are available.

### Reliability.

Engineered to be smooth running, quiet and vibration free the Ampair 300 benefits from a pedigree stretching back well over 25 years.




### Technical Specifications:

| | |
|---|---|
| Power Rating | 300 Watts at 12.6 m/s (25 knots) windspeed |
| Voltage Options | 12 or 24 or 48 V DC |
| Output | 3 phase AC - external rectifier in regulator |
| Start-up Windspeed | 3 m/s (6 knots) |
| Over speed protection | Blade pitch control |
| Turbine Diameter | 1200mm |
| Weight | 10.5 kg |
| Blades (3) | GRP |
| Housing | Die cast aluminium (powder coated) |

# Ampair® 300 Accessories.

| | Model | | Name | Description |
|---|---|---|---|---|
| generators | A03 1012 |  | Ampair 300 Watt | 12 Volt marine - white. Must be used with Ampair regulator and rectifier. |
| | A03 1024 |  | Ampair 300 Watt | 24 Volt marine - white. Must be used with Ampair regulator and rectifier. |
| | A03 1048 |  | Ampair 300 Watt | 48 Volt marine - white. Must be used with Ampair regulator and rectifier. |
| regulators & stop switch | A03 REG S-12 |  | Regulator, 300 Watt | 12 Volt, single battery, including rectifier |
| | A03 REG S-24 |  | Regulator, 300 Watt | 24 Volt, single battery including rectifier |
| | A03 REG S-48 |  | Regulator, 300 Watt | 48 Volt, single battery including rectifier |
| | A03 SP 10 |  | Stop switch | to remotely stop the wind turbine rotating |
| mounting options | A03 MO 30 |  | Gantry mount | 550mm powder coated aluminium pole c/w flange |
| | A03 MO 31 |  | Gantry mount | 550mm stainless steel pole c/w flange |
| | A03 MO 33 |  | Scanstrut stern mount | Ampair / Scanstrut Stern Mount Kit (2.5m free standing c/w stainless steel struts; places blade tips 2.1m above deck height) |
| | A03 MO 34 |  | Mizzen bracket | welded, aluminium fabrication constructed from 100 x 50mm box section |
| | A03 MO 35 |  | Waterproof deck plug & socket | in-line plug & bulkhead socket |
| | A00 MO 42 |  | Ampair 300 DIY pole | 800mm x 48mm OD (drilled to suit pivot shaft) |
| | A00 MO 44 |  | Ampair 300 DIY pole | 1200mm x 48mm OD (drilled to suit pivot shaft) |
| | A00 MO 46 |  | Ampair 300 DIY pole | 2400mm x 48 mm OD (drilled to suit pivot shaft) |
| | A00 MO 47 |  | Extension | to extend stern & gantry mount of Ampair 100 to accept Ampair 300 |
| | A00 MO 40 |  | DIY adaptor | pivot shaft to 48mm OD tube |
| short term spares | A00 SP 30 |  | Pivot seal | neoprene V-seal, seals gap between pivot and pole |
| | A03 SP 11 |  | Brush set | set of three slip ring brushes |
| | A03 SP 12 |  | Turbine blades | set of 3 spare blades |
| long term spares | A00 SP 31 |  | Pivot bearing set | pivot bearing set (upper & lower bearing; 'O' ring; spiral lock ring) |
| | A36 SP 21 |  | Hub cap screw | bolts hub onto generator assembly |
| | A03 SP 22 |  | Rectifier assembly | rectifier aassembly and heat sink (suitable as emergency spare in case of regulator failure) |

# Ampair® 100 wind turbine.

## 12 or 24 or 48 V battery charging power.

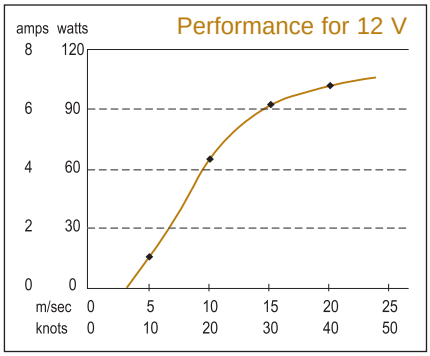
**Proven pedigree.**

The Ampair 100 is built up to a standard, not down to a price. It will contribute towards providing a free and non-polluting energy independent system. The latest version of this machine builds on the proven features of its predecessors; simplicity of the design and uncompromising engineering.

The 6 blade turbine feeds power directly to the generator. Up to 100 watts of continuous power can be produced by the permanent magnets rotating inside “heavy duty” windings that safeguard the generator from burn-out and eliminate the need for thermal cut-outs, chokes or ‘complex electronics.’ Electrical slip-rings and brushes allow the Ampair 100 to seek the wind and feed the simple two-wire battery connection.

**Performance.**

The mechanical and electrical design matches the turbine to the alternator, producing maximum conversion efficiency at normal everyday wind speeds (7-18 knots). The Ampair 100 out-performs many of its competitors at these windspeeds whilst still giving a safe and continuous output in storm force winds.

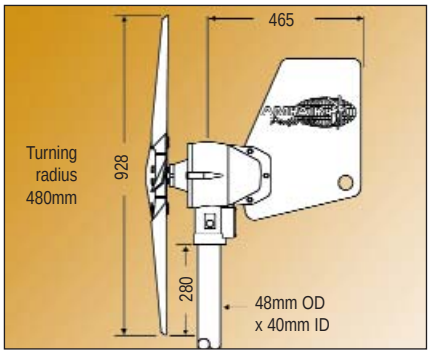



**Multiple applications.**

In addition to cruising yachts, Ampair wind generators can be found on hunting cabins in Scandinavia, beach chalets in Tasmania, radar stations in Finland, and are used for radio repeaters in South Africa, telecommunications in the Falklands and several Antarctic expeditions, in fact at any location where 12 or 24 or 48 V battery charging is required.

**Reliability.**

Engineered to be smooth running, quiet and vibration-free, the Ampair 100 is designed to survive the severest marine environments. All components are sealed to prevent corrosion.




**Technical Specifications:**

| | |
|---|---|
| Power Rating | 100 Watts maximum |
| Voltage Options | 12 or 24 or 48 V DC |
| Output | Rectified DC |
| Start-up Windspeed | 3 m/s (6 knots) |
| Turbine Diameter | 928mm |
| Weight | 12.5 kg |
| Blades (6) | Glass filled polypropylene |
| Housing | Die cast aluminium (powder coated) |

# Ampair® 100 Accessories.

| | Model | | Name | Description |
|---|---|---|---|---|
| generators | A01 1012 |  | Ampair 100 Watt | 12 Volt marine - white - with rectifier for battery charging |
| | A01 1024 |  | Ampair 100 Watt | 24 Volt marine - white - with rectifier for battery charging |
| | A01 1048 |  | Ampair 100 Watt | 48 Volt marine - white - with rectifier for battery charging |
| regulators | A00 RG S1B-12<br>A00 RG S1B-24<br>A00 RG S1B-48 |  | Regulator, 100 Watt<br>Regulator, 100 Watt<br>Regulator, 100 Watt | 12 Volt, single battery<br>24 Volt, single battery<br>48 Volt, single battery |
| | A00 RG S3B-12<br>A00 RG S3B-24 |  | Regulator, 100 Watt<br>Regulator, 100 Watt | 12 Volt, triple battery<br>24 Volt, triple battery |
| | A00 RG D1B-12<br>A00 RG D1B-24 |  | Regulator, 100 Watt<br>Regulator, 100 Watt | 12 Volt, 2 input x single battery<br>24 Volt, 2 input x single battery |
| mounting options | A01 MO 30 |  | Gantry mount | 400mm powder coated aluminium pole complete with flange |
| | A01 MO 31 |  | Stern mount | powder coated aluminium poles, struts & stays to raise generator above head height |
| | A01 MO 32 |  | Mizzen bracket | welded, aluminium fabrication constructed from 100 x 50mm box section |
| | A00 MO 42<br>A00 MO 44<br>A00 MO 46 |  | Ampair 100 DIY pole<br>Ampair 100 DIY pole<br>Ampair 100 DIY pole | 800mm x 48mm OD (drilled to suit pivot shaft)<br>1200mm x 48mm OD (drilled to suit pivot shaft)<br>2400mm x 48mm OD (drilled to suit pivot shaft) |
| | A01 MO 40 |  | DIY adaptor | pivot shaft to 48mm. OD tube |
| | A00 MO 41 |  | Adaptor - pre-2001 | for pre-2001 mounts to Ampair 100 2001 & onwards generators |
| short term spares | A00 SP 30 |  | Pivot seal | neoprene V-seal, seals gap between pivot and pole |
| | A01 SP 11 |  | Shaft seal | rubber covered, single lip seal protects front bearing |
| | A01 SP 12 |  | Brush set | set of 2 slip ring brushes |
| | A01 SP 13 |  | Turbine blades (pair) | Ampair 100 pre 2001, all Aquair |
| | A01 SP 14 |  | Turbine blades (pair) | Ampair 100 from 2001 |
| long term spares | A01 SP 21 |  | Shaft fasteners | stainless steel set - fits all taper shaft models |
| | A01 SP 22 |  | Rectifier assembly | complete, pre-wired rectifier assembly. consists of 2 bridge rectifiers |
| | A01 SP 24 |  | Shaft bearings (set of 2) | 40mm OD front bearing for 17mm shaft dia. and 35mm OD rear bearing for 15mm shaft dia |
| | A01 SP 07<br>A01 SP 26 |  | Hub extractor (2001-)<br>Hub extractor (2001+) | hub extractor (Ampair 100 pre 2001)<br>hub extractor (Ampair 100 from 2001) |
| | A00 SP 31<br>A01 SP 08 |  | Pivot bearing set<br>Pivot bearing set | (Ampair 100 from 2001)<br>(Ampair 100 pre 2001)<br>each pivot bearing set includes: (upper & lower bearing; 'O' ring; spiral lock ring) |

# Aquair® 100 water / wind turbine.

## 12 or 24 or 48 V battery charging power.

**Towed Turbine Generator when sailing. Wind Driven Generator when at anchor.**

### Hybrid wind and water drive.

Sailing downwind at 6 knots, the Aquair 100 water drive generates approximately 5 amps continuous charge. To obtain 5 amps at 12 Volts of generation from the wind driven version while underway, the wind speed required is typically 30 knots (24 knots plus 6 knots boat speed).

### Water mode.

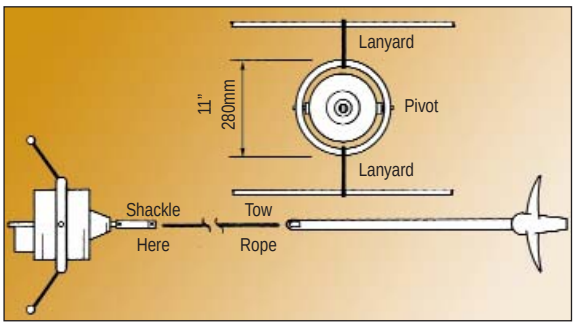
The Aquair 100 is designed for yachts cruising at 4-7 kts. The standard pitch turbine surfaces at 7-8 kts and skips at higher speeds. The coarse pitch turbine suits yachts which sail at 8-12 kts. The shaft connector is designed to break to save the generator and rail if the turbine becomes trapped. At normal cruising speeds the turbine will not noticeably slow the yacht.

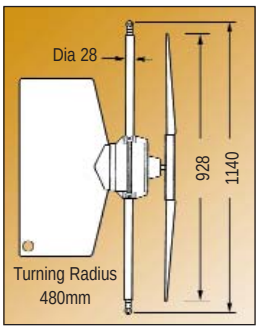
### Wind mode.

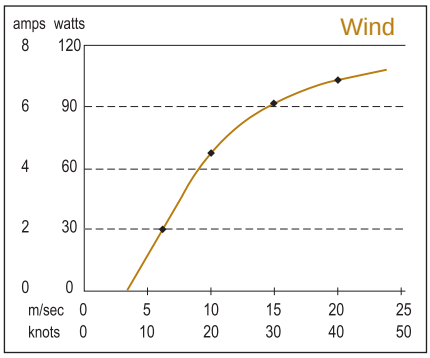
Uses a “rope only”, hoist-in-the-rigging system. A halyard lifts the Aquair 100 away from busy cockpit into clear air. No noise or vibration to worry about! A pole mount option is available for yachts with stern gantry or similar. A short pole is welded, clamped etc. to an existing structure. A single electrical connection then serves wind and water modes.

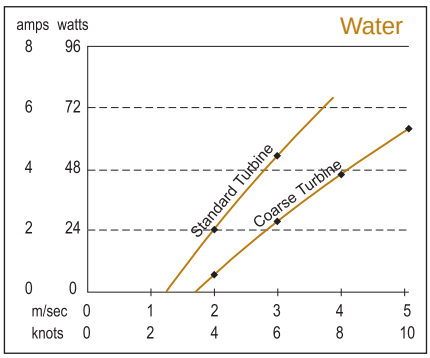
### Advantages.

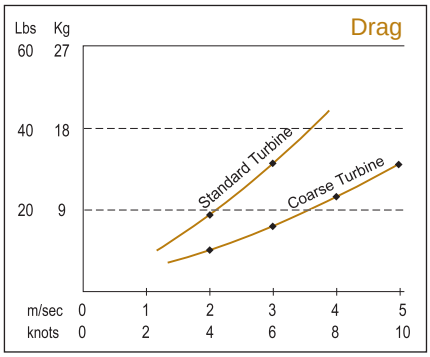
Use of an Aquair 100 greatly reduces the frequency of engine running to recharge service batteries. The turbine generates sufficient power to run an autopilot, maintain navigation equipment or support a fridge. It produces a continuous output of up to 6 Amps at 12 volts. Its permanent magnet alternator with built-in rectifiers has no commutator brushes and the windings cannot overheat so it requires no thermal cut-outs or protection choke.




### Technical Specifications- water mode:

| | |
|---|---|
| Power Rating | 5 Amps 12V at 3 m/s (6 knots) waterspeed |
| Voltage Options | 12 or 24 or 48 V DC |
| Output | Rectified DC |
| Start-up Waterspeed | 3 knots |
| Weight | 10kg Generator - 3kg Turbine |
| Propeller | Standard 7-8 knots or High speed 8-12 knots |
| Housing | Die cast aluminium (powder coated) |
| Wind Mode | See Ampair 100 |

# Aquair® 100 Accessories.

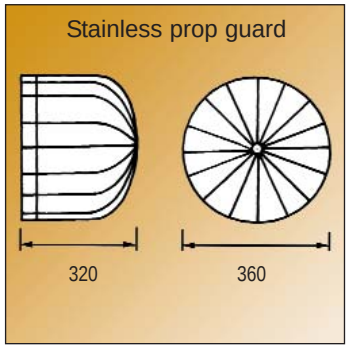
| | Model | | Name | Description |
|---|---|---|---|---|
| generators | Q01 1012 |  | Aquair 100 | 12 Volt, standard pitch turbine |
| | Q01 1024 |  | Aquair 100 | 24 Volt, standard pitch turbine |
| | Q01 1048 |  | Aquair 100 | 48 Volt, standard pitch turbine |
| | | | *For coarse pitch unit (high speed use), buy a spare coarse pitch turbine (Q01 SP 12) and keep the standard propeller for reserve.* | |
| regulators | Various |  | Regulators | regulators are available for use in wind mode as per Ampair 100 |
| wind conversion kits | Q01 WI 46 |  | Hoist in rigging kit | kit consists of 6-blade wind turbine, direction fin and 2 swivel poles |
| | Q01 WI 48 |  | Pole mounting kit | kit consists of 6-blade wind turbine, direction fin, and 44mm OD x 800mm long mounting pole |
| mounting accessories | Q01 WI 50 |  | Pole mount | 44mm OD x 800mm long pole with pivot sleeve, pivot shaft and pole clamp ring |
| | Q01 WI 51 |  | Pole mount adaptor | pivot sleeve, pivot shaft and pole clamp, but no pole or wind turbine |
| | Q01 MO 40 |  | Stern deck mount | stainless steel fabrication - enables use of Aquair 100 on vessels without a push-pit |
| | A00 SP 32 |  | Deck plug & socket | in-line plug & bulkhead socket |
| | A00 SP 33 |  | Deck gland | provides a waterproof seal around cables that pass though decks and bulkheads |
| short term spares | Q01 SP 11 |  | Standard towed turbine | suits yachts of cruising speed between 4-8 knots. |
| | Q01 SP 12 |  | Coarse towed turbine | suits yachts of cruising speed between 8-12 knots. |
| | Q01 SP 13 |  | Turbine blades | matched pair to maintain the overall balance of the turbine. |
| | Q01 SP 14 |  | Pivot set | set consists of 2 acetal plastic (delrin) bushes & one stainless steel pin |
| | Q01 SP 15 |  | Shaft connector | breaks if turbine becomes trapped in rocks or coral to protect generator and mounting |
| | Q01 SP 16 |  | Shaft seal | rubber covered, single lip seal protects front bearing |
| long term spares | Q01 SP 21 |  | Tow rope | 30 metres of 12mm, braid-on-braid, polyester |
| | Q01 SP 22 |  | Shaft bearings | (set of 2) 35mm OD bearings for 15mm shaft dia |
| | Q01 SP 23 |  | Rectifier assembly | complete, pre-wired rectifier assembly, consists of 2 bridge rectifiers |

# Underwater 100 micro hydro

## 12 or 24 or 48 V battery charging power.

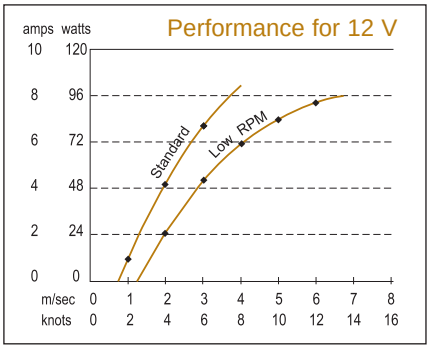
**Sub surface efficiency.**

The forward facing 3 bladed propeller of the Underwater 100 drives a permanent magnet alternator producing up to 8 Amps output current for a 12-volt system. The shaft rotates in triple seals for optimum protection, backed by twin “O” ring static seals at the rear of the casing. An internal moulding and external gland similarly double seals the cable exit. The alternator body is filled with hydraulic fluid to eliminate corrosion and to equalise pressure changes caused by ambient temperature. External rectifiers are supplied.




**Micro-hydro battery charging.**

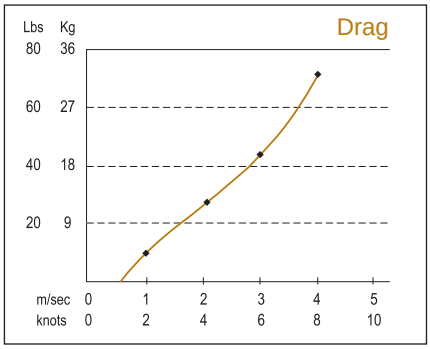
The UW 100 generates up to 2.4 Kilowatt hours per day from any 400mm deep fast flowing stream. When mounted in a stream that flows at 15kph (3.5m/s, slow jog), the unit produces 8 Amps continuously. This represents enough power to supply a typical remote home, independent of the mains supply. Even a stream flowing at 10kph (2.5m/s) will produce 1.5 Kilowatt hours per day and this output can be increased by diverting the flow into a narrow culvert to increase its speed.




**Propeller options.**

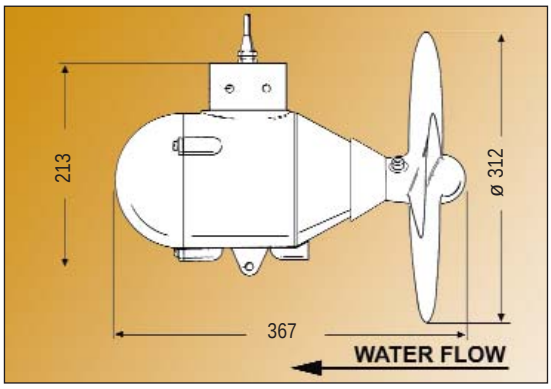
**Standard shrouded:**
Shroud prevents fine rope, fishing line or debris from winding around shaft and damaging seals. Ideal for low speed start-up (1.8kt). Charges at approximately 1 Amp/kt thereafter. Clockwise & counter clockwise propellers available, e.g. for twin installations on oceanographic floats.

**Low R.P.M.shrouded:**
Designed for fast flows or high speed boats. Delays charging and reduces drag until greater waterspeeds are reached.




**Mounting and protection.**
We offer 48mm dia. x 1.2m long mounting poles complete with cast socket to mate with UW. Matched clamps are available for fresh water use. A stainless steel guard is available to protect the unit from floating debris.

**Food grade version:**
A version of the UW is available for use in potable water systems such as reservoirs




**Technical Specifications:**

| | |
|---|---|
| Max. Power Rating | 100 Watts at 4 m/s (8 knots) waterspeed |
| Voltage Options | 12 or 24 or 48 V DC |
| Output | 2 phase AC - External rectifier supplied |
| Start-up Waterspeed | 1 m/s (2 knots) |
| Turbine Diameter | 312mm |
| Weight | 10 kg |
| Propellers | Standard 1-4 m/s (2-8 kts) |
| | low R.P.M. 4-6 m/s (8-12 kts) |
| Propeller & Housing | Die cast aluminium (epoxy coated) |

## Underwater 100 Accessories.

| | Model | | Name | Description |
|---|---|---|---|---|
| generators | W01 1012 |  | UW100 generator | 100W / 12 Volt - standard shrouded propeller; clockwise |
| | W01 1024 |  | UW100 generator | 100W / 24 Volt - standard shrouded propeller; clockwise |
| | W01 1048 |  | UW100 generator | 100W / 48 Volt - standard shrouded propeller; clockwise |

*For low RPM units, buy a spare low RPM propeller (W01 SP 23) and keep the standard, shrouded propeller for reserve.*

*For anti-clockwise units, buy a spare anti-clockwise propeller (W01 SP 22) and keep the standard, shrouded propeller for reserve.*

| | | | | |
|---|---|---|---|---|
| regulators | Various |  | Regulators | regulators are available for use as per Ampair 100 |
| mounting accessories | W01 MO 12 |  | Mounting pole | 1.2 metre aluminium pole & casting |
| | W01 MO 27 |  | Mounting pole clamps | one pair of 50mm clamps, aluminium for freshwater use |
| spares and accessories | W01 SP 22 |  | Spare propeller | standard shrouded - anti-clockwise (normal flow) |
| | W01 SP 23 |  | Spare propeller | low RPM shrouded clockwise - (fast flow) |
| | W01 SP 24 |  | Spare propeller | standard shrouded clockwise - (normal flow) |
| | W01 SP 29 |  | Propeller guard | protects propeller from damage from floating objects such as tree branches - stainless steel (316-grade) |
| | W01 SP 11 |  | Shaft seal and cover | spare seal supplied with stainless steel spring and protection cover. |
| | W01 SP 12 |  | Rectifier and heatsink | heatsink carries 2 pre-wired, full-wave bridge rectifiers - one per phase. |

## General Accessories for all Ampair®, Aquair® and UW models.

| | Model | | Name | Description |
|---|---|---|---|---|
| general accessories | WI WDTC-2 |  | Pocket anemometer | lightweight, hand held instrument for quick and accurate measurement of wind speed |
| | ME AMM 01<br>ME AMM 03 |  | 1 Amp ammeter<br>3 Amp ammeter | low cost, moving-coil ammeter<br>low cost, moving-coil ammeter |
| | ME AMM 05<br>ME AMM 10 |  | 5 Amp ammeter<br>10 Amp ammeter | suits 100W x 24V generators<br>suits 100W x 12V generators |
| | ME AMM 15 |  | 15 Amp ammeter | suits 300W x 24V generators<br>suits 300W x 48V generators |
| | ME AMM 30 |  | 30 Amp ammeter | suits 300W x 12V generators<br>suits 600W x 24V generators |
| | ME VOL 24 |  | 24 Volt voltmeter | panel meter, moving coil, (0-30V) suits 12V and 24V generators |
| | ME VOL 48 |  | 48 Volt voltmeter | panel meter, moving coil, (0-60V) suits 48V generators |

**Conformity:**
Where relevant the Ampair®, Aquair®, and UW systems conform to the following standards:

- G83/1: Recommendations for the connection of small-scale embedded generators (up to 16A per phase) in parallel with public low-voltage distribution networks.
- BS EN 61400 part 2 (1996): Wind turbine generator systems: Design requirements of small wind systems
- BS EN IEC 60335-1 (1994): Safety Of Household Electrical Appliances
- LV Directive 73/23/EC: EU Low Voltage Directive
- WEEE Directive 2002/96/EC: EU Waste Electrical & Electronic Equipment Directive
- RoHS Directive 2002/95/EC: EU Restriction of Hazardous Substances Directive
- EMC Directive 89/336/EC: EU Electromagnetic Compatibility Directive.

**1.** Power Curves and Annual Energy: The performance of wind turbine systems is impossible to predict with any certainty due to the variability in the wind from location to location and from year to year. These estimates are based upon the best available information but are given as guidance only and should not be considered as a guarantee. For a greater level of certainty we would recommend on-site wind speed monitoring for at least a year.

**2.** Variation: All values are nominal as there will be some variation in manufactured product.

**3.** Lifetime: Expected safe operational life excluding consumable items. Actual life will depend on local conditions. Note warranty period is different.

**4.** Terms and conditions apply

**5.** Specifications subject to change.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