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# Ampair®

## Wind and water power 2011 catalogue

### issue 6

**Ampair 6000**  
6000W 48 / 115 / 230 / 240V



**Ampair 600**  
600W 12 / 24 / 48 / 230V



**Ampair 300**  
300W 12 / 24 / 48V



**Ampair 100**  
100W 12 / 24 / 48V



**Aquair 100**  
100W 12 / 24 / 48V



**Underwater 100**  
100W 12 / 24 / 48V



[www.ampair.com](http://www.ampair.com)

**ampair®**

# Ampair®

## the company behind the products.

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### History.

For nearly forty 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 developed the industry leading myAmpair™ communications model, enabling our larger turbines to provide detailed local weather data and to alert engineers remotely of turbine performance.

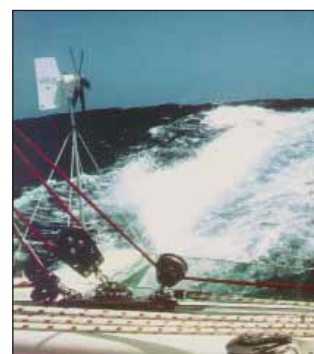
*"Greetings from the Frozen North, our Ampair 100 has stood in an extremely exposed spot for 4 months and endured winds of force 11 and flying ice. A great bit of kit".*  
Mark Evans Arctic Year, 2002

*"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<sup>®</sup> selecting your system.

## Which product.

### **Ampair 6000 for 115 / 230 / 240 V grid connection and 48 V battery charge.**

6 kW wind turbine for land based use to power homes, farms and industrial sites and to generate revenue from feed in tariffs where connected to the grid. Available in 115V/230V/240V grid connection or 48V battery charge version with various tower options from 10 metres to 36 metres.

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### **Ampair 600 for 230 V grid connection or 24 / 48 V battery charging.**

Smaller wind turbine for land based use to power homes, farms and industrial sites and to generate revenue from feed in tariffs where connected to the grid or as a wind generator for larger yachts and higher power land based battery systems.

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### **Ampair 300 for 12 or 24 or 48 V battery charging.**

Wind turbine for medium sized yachts and medium power land based applications.

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### **Ampair 100 for 12 or 24 or 48 V battery charging.**

Wind turbine for small sized yachts and lower power land based applications.

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### **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.

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### **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 propellers for different water speeds. Left and right handed rotating propellers for twin units.

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# Ampair® 6000 wind turbine.

115 / 230 / 240 V grid connection or 48 V battery charging

In creating the design for the Ampair 6000 we went back to the drawing board with the brief to create a low cost and virtually maintenance free turbine that could provide more than enough energy to power the average home or small holding and maximize revenue from feed in tariff's now offered by many countries.

Another key requirement in the brief was the need for each Ampair 6000 turbine to 'talk'. As a result, each Ampair 6000 includes a web communications package directly linked over standard GPRS mobile phone networks to the myAmpair™ internet server for remote monitoring of turbine performance and status.

## Features

- Class leading performance
- Industry first myAmpair™ GPRS performance and weather communications interface as standard
- Sealed marine grade powder coated alloy castings designed to withstand the harshest of environments
- Fully automatic electro-dynamic braking triggered by two independent control systems
- Reliability - built on Ampair turbines' reputation for longevity and minimal maintenance
- IEC 614000-2 compliant design

## Construction

The direct drive permanent magnet generator is made with the same marine grade construction as Ampair's tried and tested range of microwind turbines, its nacelle being made of coated alloy castings which are fully sealed to withstand the harshest of environments. As per Ampair's rugged smaller turbines the blades have been manufactured in highly flexible thermoplastic reinforced with continuous glass fibre which has proven to withstand severe wind conditions without blade deformation and failure.

## Performance

The advanced design of the blades and turbine deliver its rated power of 6kw in windspeed as low as 12 m/s making this turbine a class leader in energy yield. The turbines downwind tailfin-less design and radial flux generator makes for much smaller and visually more pleasing aesthetics than many designs currently in the market.

## Control

The Ampair 6000 has two automatic and independent over-speed controls that trigger the turbines highly redundant electro-dynamic braking system in high wind speeds or in fault control situations. An electro-dynamic brake has no moving parts and no friction surfaces and hence requires no maintenance unlike mechanical brakes.

## myAmpair™

Each Ampair 6000 turbine ships with a GPRS communications module\* that collects data from each site and transmits it to the myAmpair™ web interface. With myAmpair™ end users can monitor turbine performance and view local weather conditions such as pressure, wind speed and wind direction, both instantaneously and against historic data.

If the turbine owner or installer wishes, this information can be made available to the public, assisting educational users and others interested in seeing how an Ampair 6000 performs at different sites.

myAmpair™ also serves as an additional failsafe feature, automatically notifying installers and Ampair engineers if a turbine is operating outside of normal parameters. This feature allows engineers to establish the cause of a potential fault before attending site, ensuring that any maintenance costs can be kept to a minimum.

\* Requires GPRS signal or internet access. Communications costs not included





# Ampair® 6000 wind turbine.

115 / 230 / 240 V grid connection  
48 V battery charging

## Detailed specification:

	<b>PVI version</b> <b>220/240 V AC grid-tie</b>	<b>MWI version</b> <b>48V DC battery charge</b>
Reference power at 11.0 m/s (24.6 mph)	6000 W (into grid)	4600 W (into grid) 4800 W (into battery)
Power form	230 V AC, 50Hz 208 / 240 / 277 V AC, 60 Hz	48 V DC 115V AC or 230V AC
Reference annual energy at 5.0 m/s (11.2 mph)	8500 kWh/yr	
Type	Horizontal axis downwind three-blade with stall control	
Starting wind speed	3.0 m/s (6.7 mph)	
Cut-in wind speed	3.5 m/s (7.8 mph)	
Cut-out wind speed	15 - 35 m/s (33-56 mph)	
Survival wind speed	Vref: design reference wind speed = 50m/s (111.8mph) <sup>1</sup> Ve50: extreme wind speed = 70m/s (156.6mph) <sup>2</sup>	
Maximum power	6000 W continuous to grid	4600 W continuous to grid 8000 VA surge (5s)
Maximum voltage		
from turbine into interconnect unit	300 V <sub>rms</sub> AC	300 V <sub>rms</sub> AC
from interconnect unit into inverter	400 V DC	300 V <sub>rms</sub> AC
from interconnect/inverter into utility grid	240 V <sub>rms</sub> AC	240 V <sub>rms</sub>
Maximum current		
from turbine into interconnect unit	20A <sub>rms</sub> per phase	20A <sub>rms</sub> per phase
from interconnect unit into inverter	25A DC	17A <sub>rms</sub> per phase
from interconnect/inverter into utility grid	32A <sub>rms</sub>	25A <sub>rms</sub>
Direction of rotation	Clockwise looking downwind	
Rotor swept area	23.74 m <sup>2</sup> (255 feet <sup>2</sup> )	
Rotor diameter	5.5 m (18 feet)	
Rotor speed	70 - 250 rpm	
Tip speed	20 - 72 m/sec (65 - 236 ft/sec)	
Generator output	Three phase to interconnect unit	
Over speed control	Electronic speed control or dump load control, plus triple redundant relay brake	
Weight	120 kg body + 36 kg blades = 156 kg total (344 lbs)	
Body construction	Marine grade powder coated aluminium castings with marine grade stainless steel fittings	
Blade construction	Solid glass filled polypropylene (twintex™)	
Generator type	Direct drive NdFeB permanent magnet brushless	
Yaw control	Passive	
Towers	10m, 12m and 15m tilt-up unguyed monopole 60 foot, 80 foot, 100 foot, and 120 foot unguyed lattice Interface flange for any other suitable tower	
Noise	54 dBA at 30m from turbine in 11 m/s wind	
Longevity	20-year design life in IEC 61400 Class I conditions	
IEC 61400 class	Designed to comply with IEC 61400-2 as a Class I turbine: Vav: mean annual average windspeed = 10m/s (22.4mph) <sup>3</sup> Vref: design reference windspeed = 50m/s (111.8mph) <sup>4</sup> Ve50: extreme windspeed = 70m/s (156.6mph) <sup>5</sup>	
Inspection	Annual visual inspection from ground level Continuous automatic monitoring	
Environment	Marine grade (all Ampair models are fully sealed marine grade with stainless steel or powder coated aluminium components; we do not make cheaper land grade products)	
Temperature range	-20°C to +40°C ambient standard -40°C low temperature (LT) version available on request	

<sup>1</sup> The Vref windspeed definition per IEC 61400-2 (ed2, 2006) is for the design reference wind speed averaged over 10 minutes.

<sup>2</sup> The Ve50 windspeed definition per IEC 61400-2 (ed2, 2006) is for the expected extreme wind speed averaged over 3 seconds with a recurrence interval of 50 years. This is equivalent to the Vref definition used in EN40.

<sup>3</sup> The Vav windspeed definition per IEC 61400-2 (ed2, 2006) is for the annual average wind speed at hub height of the turbine.

<sup>4</sup> The Vref windspeed definition per IEC 61400-2 (ed2, 2006) is for the design reference wind speed averaged over 10 minutes.

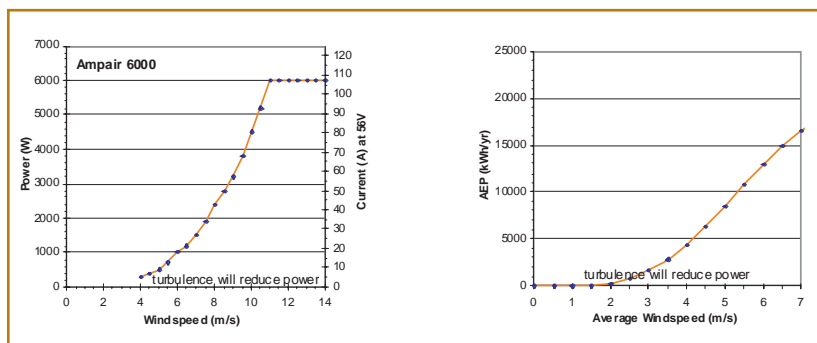
<sup>5</sup> The Ve50 windspeed definition per IEC 61400-2 (ed2, 2006) is for the expected extreme wind speed averaged over 3 seconds with a recurrence interval of 50 years. This is equivalent to the Vref definition used in EN40.

# Ampair® 6000 wind turbine.

115 / 230 / 240 V grid connection  
48 V battery charging

## Performance:

*all specifications are nominal pending completion of the test programme*



## Power curve:

*all specifications are nominal pending completion of the test programme*

Wind speed (m/s)	Wind speed (mph)	Power (W)
0.0	0.0	0
1.0	2.2	0
2.0	4.5	0
3.0	6.7	50
4.0	8.9	300
5.0	11.2	500
6.0	13.4	1000
7.0	15.7	1500
8.0	17.9	2400
9.0	20.1	3200
10.0	22.4	4500
11.0	24.6	6000
12.0	26.8	6000
13.0	29.1	6000
14.0	31.3	6000
15.0	33.6	6000
20.0	44.7	
25.0	55.9	
30.0	67.1	
35.0	78.3	



## Annual energy production curve:

*all specifications are nominal pending completion of the test programme*











Mean annual average wind speed		Annual energy production
(m/s)	(mph)	(kWh/yr)
0.0	0.0	0
0.5	1.1	0
1.0	2.2	0
1.5	3.4	26
2.0	4.5	226
2.5	5.6	732
3.0	6.7	1,583
3.5	7.8	2,802
4.0	8.9	4,399
4.5	10.1	6,335
5.0	11.2	8,507
5.5	12.3	10,757
6.0	13.4	12,921
6.5	14.5	14,867
7.0	15.7	16,509



# Ampair® 6000 wind turbine.

115 / 230 / 240 V grid connection  
48 V battery charging

## Turbine options:

	Model		Name	Description
generator package	A60-PVI-50-230		Ampair 6000-PVI-50-230	Ampair 6000 Watt x 5.5m diameter turbine system, 230 Volt single phase output; marine grade; white, includes: turbine head (with mast flange bolts), cable connectors, interconnect unit (with lockable isolator & stop switch; 40A SP+N RCD+MCB; fuses; class 1 Ofgem approved kWh meter, rectifier, overvoltage controller), inverter (to VDE 0126-1-1; G59; UL 1741) with multi-function LCD display (V, I, kWh, etc). Includes manuals and packaging. For 50Hz 230V countries such as Europe including UK
	A60-PVI-60-240		Ampair 6000-PVI-60-240	As above, but suits 60Hz countries such as USA
	A60-MWI-230		Ampair 6000-MWI-50/60-230	Ampair 6000 Watt x 5.5m diameter turbine system, 230 Volt AC single phase output and 48V DC output; marine grade; white, includes: turbine head (with mast flange bolts), cable connectors, interconnect unit (with lockable isolator & stop switch; 40A SP+N RCD+MCB; fuses; class 1 Ofgem approved kWh meter, rectifier, overvoltage controller), inverter (for on and off-grid use) with multi-function LCD display (V, I, kWh, etc). Includes manuals and packaging. For both 50 and 60Hz countries.
	A60-MWI-115		Ampair 6000-MWI-50/60-115	As above but suits 115V countries such as USA
Tower options	A60 M10-GP		10m hinge monopole tower	10m Stainton/Valmont monopole mast, includes: galvanised base hinged mast in two sections; baseplate; foundation bolts; baseplate nuts & bolts; removable ginpole; 7m ginpole sling; shackles. Excludes template as mast base can be used
	A60 M12-GP		12m hinge monopole tower	12m Stainton/Valmont monopole mast, includes: galvanised base hinged mast in three sections; baseplate; foundation bolts; baseplate nuts & bolts; removable ginpole; 7m ginpole sling; shackles. Excludes template as mast base can be used.
	A60 M15-GP		15m hinge monopole tower	15m Stainton/Valmont monopole mast, includes: galvanised base hinged mast in three sections; baseplate; foundation bolts; baseplate nuts & bolts; removable ginpole; 9m ginpole sling; shackles. Excludes template as mast base can be used.
Foundation bolt templates (for preparing concrete footing)	A60-M99-4		10m template	Reusable steel stemplate for Stainton/Valmont 10m mast foundation
	A60-M99-5		12m template	Reusable steel stemplate for Stainton/Valmont 12m mast foundation
	A60-M99-6		15m template	Reusable steel stemplate for Stainton/Valmont 15m mast foundation
Miscellaneous	A60-M99-1		bow shackle, 3.2t	bow shackle with pin, 3.2t SWL
	A60-M99-2		sling 7m x 3.2t	7m x 3.2t SWL SWR ginpole sling
	A60-M99-3		sling 9m x 3.2t	9m x 3.2t SWL SWR ginpole sling
	A60-M99 -11		electronic enclosure	IP65 rated external enclosure for turbine electronics
	A60-M99-12		anchor point	Winch base anchor point. Includes foundation bolt and winch anchor bracket

# Ampair® 600 wind turbine.

24 or 48 V battery charging or 230 V grid connection

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 VW-50 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.



## 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.



## 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.



Ampair 600 on brick wall mount



Ampair 600 on telegraph pole mount



Ampair 600 on tilt up mast



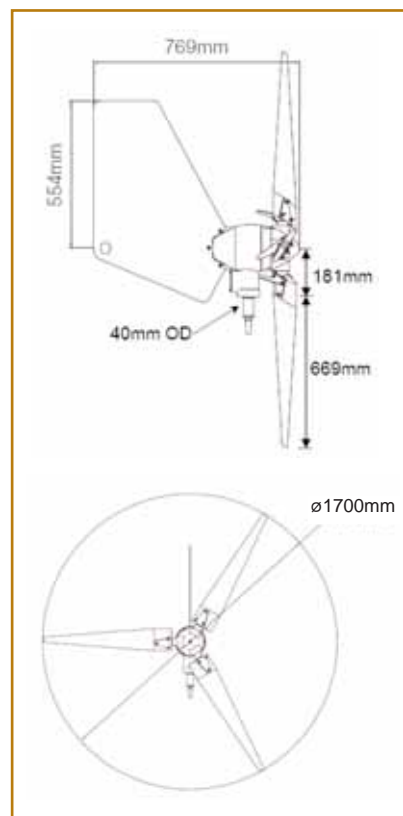
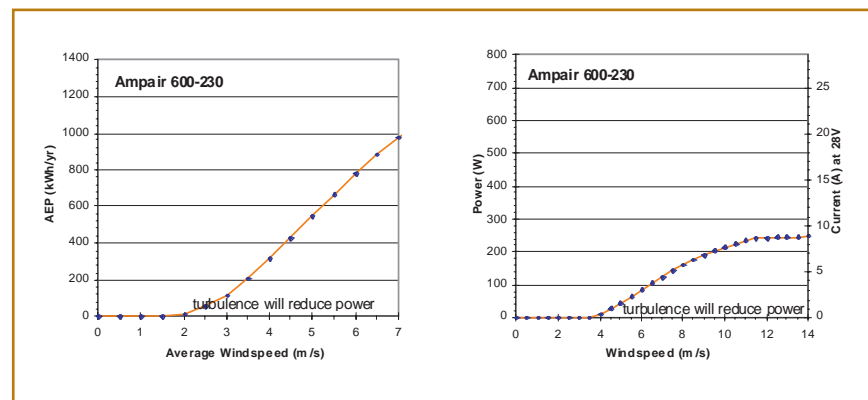
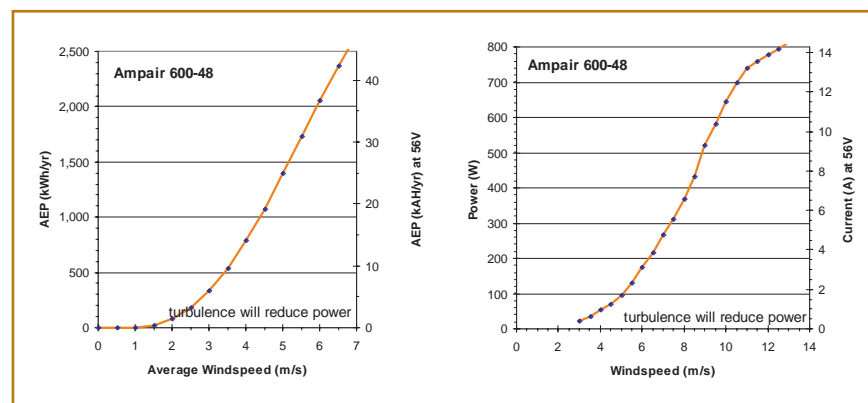
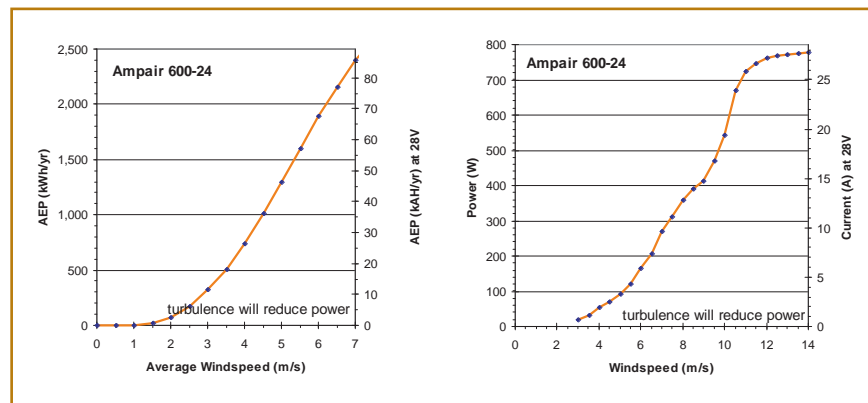
Non penetrating roof mast



# 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)	231 W (into grid)
Reference annual energy at 5.0 m/s	1300 kWh/yr; 48 kAh/yr	1394 kWh/yr; 25 kAh/yr	481 kWh/yr to grid
Cut-in windspeed	3.0 m/s	3.0 m/s	4.0 m/s
Cut-out windspeed	n/a	n/a	n/a
Maximum power	1050 W	1140 W	267 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	230V AC single phase 50 Hz
Power input	<0.5 W	<0.5 W	0.1W sleep, 7W standby
Rotor swept area	2.27m <sup>2</sup>		
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 head 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 year operational life		








## Ampair® 600 Accessories.

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












	Model		Name	Description
generators	A06 1024		Ampair 600-24	Ampair 600 Watt, 24 Volt; marine grade; white (package excludes regulator assembly VW-50)
	A06 1048		Ampair 600-48	Ampair 600 Watt, 48 Volt; marine grade; white (package excludes regulator assembly VW-50)
	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	A00 RG VW-50-24		Regulator VW-50	regulator, 600W x 24V single battery (includes regulator, rectifier, dump load, stop switch, fuses)
	A00 RG VW-50-48		Regulator VW-50	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		DIY adaptor	Pivot shaft to 48 OD x 41 ID (1.5" #40)
	A00 MO 43-2.0		DIY adaptor	Pivot shaft to 60 OD x 52 ID (2" #40)
	A00 MO 43-2.5		DIY adaptor	Pivot shaft to 73 OD x 63 ID (2.5" #40)
	A00 MO 43-3G		DIY adaptor	Pivot shaft to 76 OD x 66 ID
	A00 MO 43-3.0		DIY adaptor	Pivot shaft to 89 OD x 78 ID (3.0" #40)
	A00 MO 43-3.5		DIY Adaptor	Pivot shaft to 102 OD x 90 ID (3.5" #40)
	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 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

	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 (this special high tensile screw must be used for the Ampair 600)

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

general accessories	FUS HLDR FUS 04A FUS 10A		Fuseholder Fuse, 4A Fuse, 10A	fuseholder (suits max 30A x 600V) 38mm x 10mm fuses 4A x 500V fuse 10A x 500V fuse
	FUS 16A FUS 20A FUS 32A		Fuse, 16A Fuse, 20A Fuse, 32A	16A x 500V fuse 20A x 500V fuse 32A x 500V fuse
	.WRP 1x04.0 PVC .WRT 2x01.5 T		1 x 4mm <sup>2</sup> cable 2 x 1.5 mm <sup>2</sup> cable	1 x 4mm <sup>2</sup> PV grade cable for extending distance between IC-700 and inverter 2 x 1.5 mm <sup>2</sup> tinned marine grade cable for Ampair 100
	.WRT 3x02.5 T .WRT 4x01.5 T		3 x 2.5 mm <sup>2</sup> cable 4 x 1.5 mm <sup>2</sup> cable	3 x 2.5 mm <sup>2</sup> tinned marine grade cable for Ampair 300/600 4 x 1.5 mm <sup>2</sup> 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
meters	ME AMM 01 ME AMM 03		1 Amp ammeter 3 Amp ammeter	low cost, moving-coil ammeter low cost, moving-coil ammeter
	ME AMM 05 ME AMM 10		5 Amp ammeter 10 Amp ammeter	suits 100W x 24V generators suits 100W x 12V generators
	ME AMM 15		15 Amp ammeter	suits 300W x 24V generators suits 300W x 48V generators
	ME AMM 30		30 Amp ammeter	suits 300W x 12V generators 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

# 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.

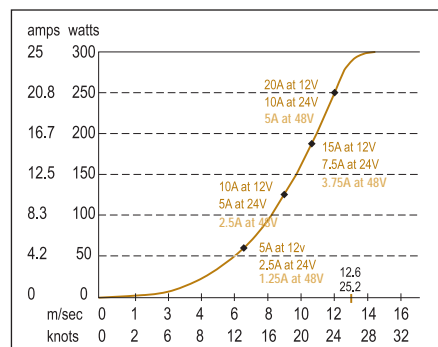
A powerful, low-speed alternator converts the turbine motion to 3 phase AC electricity. This allows use of lighter cables to feed the regulator whilst minimising voltage drop and power loss.

### 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.

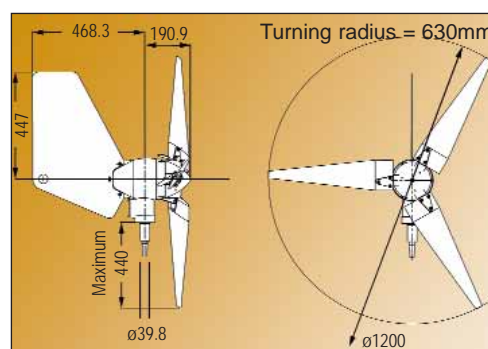
### Reliability.

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	A00 RG VS-50-12		Regulator, 300 Watt	Regulator, 50 Amps x 12V, 24V, 48V, (includes regulator, rectifier, wind & solar inputs, reverse polarity protection, dump loads, stop switch)
	A00 RG VS-50-24		Regulator, 300 Watt	Regulator, 50 Amps x 12V, 24V, 48V, (includes regulator, rectifier, wind & solar inputs, reverse polarity protection, dump loads, stop switch)
	A00 RG VS-50-48		Regulator, 300 Watt	Regulator, 50 Amps x 12V, 24V, 48V (includes regulator, rectifier, wind & solar inputs, reverse polarity protection, dump loads, stop switch)
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.

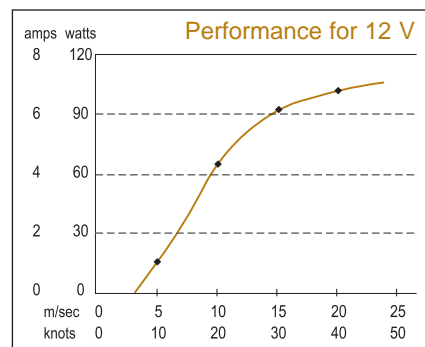
The mechanical and electrical design matches the turbine to the alternator, producing maximum conversion efficiency at normal everyday wind speeds (7-18 knots). The Ampair 100 out-performs many of its competitors at these windspeeds whilst still giving a safe and continuous output in storm force winds.

### 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.

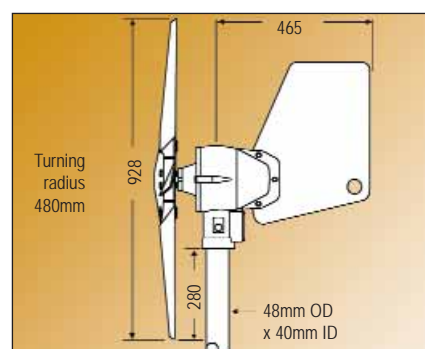
### Reliability.

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		Regulator, 100 Watt	12 Volt, single battery
	A00 RG S1B-24		Regulator, 100 Watt	24 Volt, single battery
	A00 RG S1B-48		Regulator, 100 Watt	48 Volt, single battery
	A00 RG S3B-12		Regulator, 100 Watt	12 Volt, triple battery
	A00 RG S3B-24		Regulator, 100 Watt	24 Volt, triple battery
mounting options	A00 RG D1B-12		Regulator, 100 Watt	12 Volt, 2 input x single battery
	A00 RG D1B-24		Regulator, 100 Watt	24 Volt, 2 input x single battery
	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		Ampair 100 DIY pole	800mm x 48mm OD (drilled to suit pivot shaft)
	A00 MO 44		Ampair 100 DIY pole	1200mm x 48mm OD (drilled to suit pivot shaft)
	A00 MO 46		Ampair 100 DIY pole	2400mm x 48mm OD (drilled to suit pivot shaft)
short term spares	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
	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		Hub extractor (2001-)	hub extractor (Ampair 100 pre 2001)
	A01 SP 26		Hub extractor (2001+)	hub extractor (Ampair 100 from 2001)
	A00 SP 31		Pivot bearing set	(Ampair 100 from 2001)
	A01 SP 08		Pivot bearing set	(Ampair 100 pre 2001) 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.

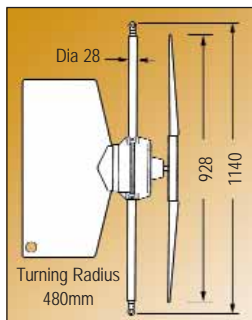
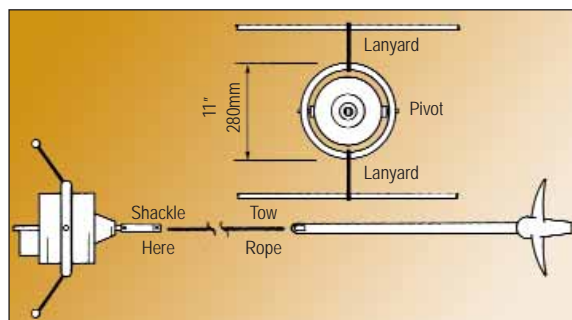
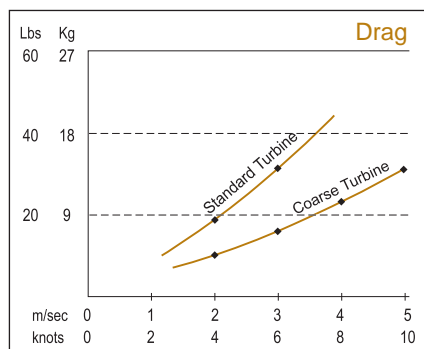
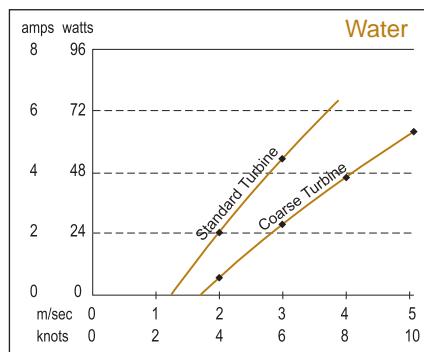
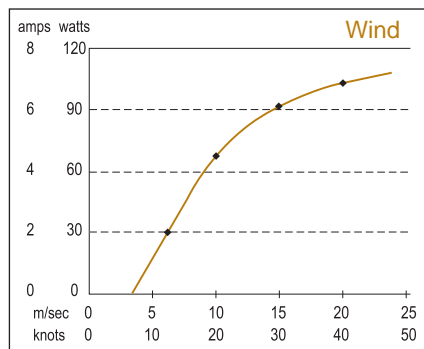
The Aquair 100 is designed for yachts cruising at 4-7 kts. The standard pitch turbine surfaces at 7-8 kts and skips at higher speeds. The coarse pitch turbine suits yachts which sail at 8-12 kts. The shaft connector is designed to break to save the generator and rail if the turbine becomes trapped. At 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
<i>For coarse pitch unit (high speed use), buy a spare coarse pitch turbine (Q01 SP 12) and keep the standard propeller for reserve.</i>				
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.

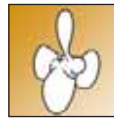
### Micro-hydro battery charging.

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.

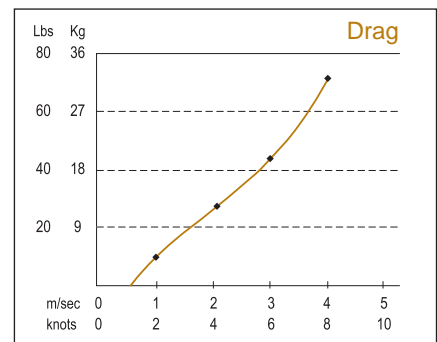
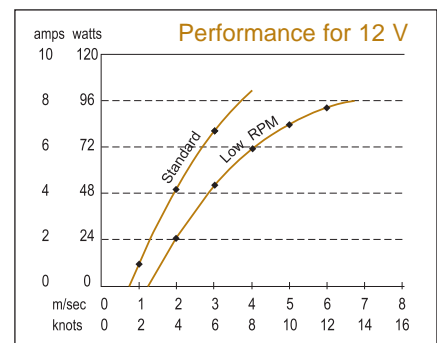
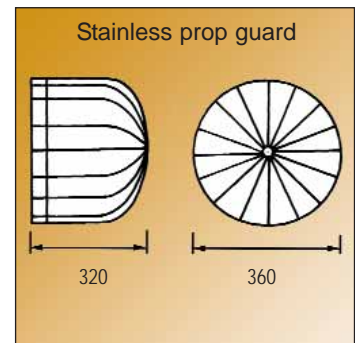


### Mounting and protection.

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.

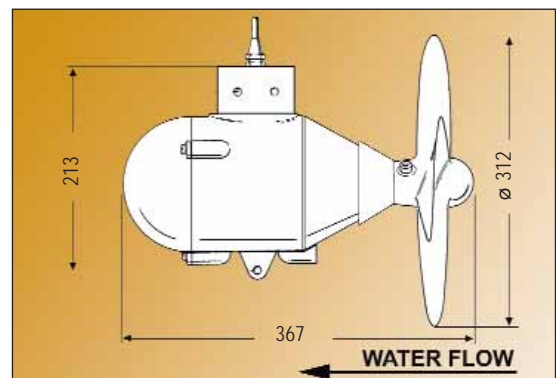
### Food grade version:

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
<p><i>For low RPM units, buy a spare low RPM propeller (W01 SP 23) and keep the standard, shrouded propeller for reserve.</i></p> <p><i>For anti-clockwise units, buy a spare anti-clockwise propeller (W01 SP 22) and keep the standard, shrouded propeller for reserve.</i></p>				
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.

### 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 (2006): 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.
- Machinery Directive 98/37/EC
- Ampair 6000 inverter conforms with VDE 0126-1-1; G83/G59 ; EMW 89/336/CEE ; DK5940 ; EN 50438 ; IEEE 1547.1

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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