

# Ampair® 20 kW wind turbine

## TECHNICAL SPECIFICATIONS

MCS certified product

Eligible for Feed-in-tariffs

Generates power continuously from below 3 m/s

Simple robust design

Tested in the strongest IEC class I wind conditions

Suitable for coastal locations

Multiple tower options

Models for grid connection, battery charging, or direct heating

Photo of an Ampair 20 kW operating with a 230V grid connection at Aith RNLI lifeboat station in Shetlands, UK since 2009.

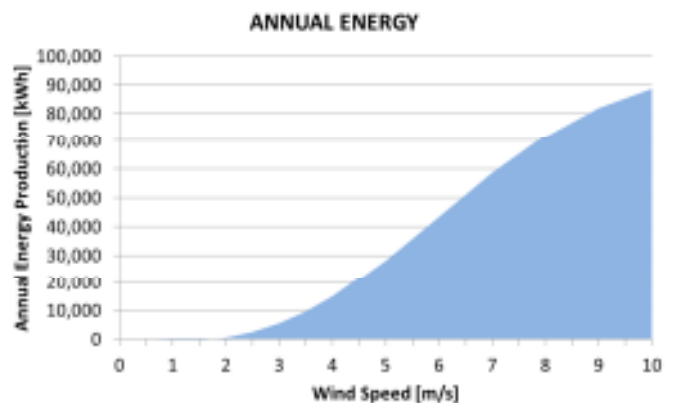
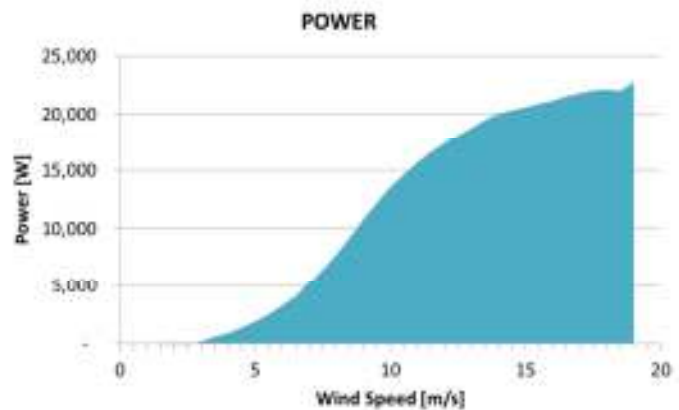


## Technical Specifications

<b>Reference Power</b>	15.68 kW at 11.0 m/s (24.6 mph)
<b>Maximum Power</b>	22.74 kW at 19.0 m/s (42.5 mph)
<b>Annual Energy Prod'n</b>	28,095 kWh at 5m/s (11.2 mph) (per IEC, MCS, AWEA, RUK standards)
<b>Rotor Diameter</b>	10.4 m (34.1 ft)
<b>Rotor Swept Area</b>	84.90 m <sup>2</sup> (914 ft <sup>2</sup> )
<b>Weight</b>	850 kg (1873 lb) for nacelle + blades
<b>Type</b>	Upwind 3-bladed HAWT
<b>Control</b>	Passive pitch-to-feather and passive side-furling with PWM dump load
<b>Direction of Rotation</b>	Clockwise looking downwind
<b>Blades</b>	3 fibreglass reinforced composite
<b>Rotor Speed Range</b>	Design operating 147rpm at 14m/s; maximum 368rpm
<b>Sound Power Level</b>	93 dB(A) at 8 m/s; slope 1.47 dB/m/s
<b>Generator</b>	Permanent magnet brushless
<b>Gearbox</b>	None (direct drive)
<b>Yaw Control</b>	Passive
<b>AC Grid Feeding</b>	Inverter connection for: single phase 220-240V; 50 or 60Hz split phase 440-480V; 50 or 60Hz three phase 380-415V; 50 or 60Hz
<b>DC Battery Charging</b>	n/a – use AC minigrid
<b>Heating Option</b>	With grid feed model or stand-alone
<b>Braking System</b>	Manually activated furling cable plus dump load and electrical shorting brake
<b>Cut-in Wind Speed</b>	2.77 m/s (6.2 mph)
<b>Reference Wind Speed</b>	11.0 m/s (24.6 mph)
<b>Cut-out Wind Speed</b>	None – continuous generation to survival wind speed
<b>Survival Wind Speed</b>	Tested for IEC class I: V <sub>ref</sub> (10-min avg) 50 m/s (112 mph) V <sub>e50</sub> (3-sec gust) 70 m/s (156 mph)
<b>Manufactured</b>	In the UK by Ampair
<b>Introduced</b>	2003
<b>Certification</b>	MCS certification by BRE (per IEC 61400-2; -12-1; -14)
<b>Warranty</b>	5 years per Ampair Terms & Conditions



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### Tower options:

Base hinged tilting monopoles with hydraulic raise/lower: 15 m (49 ft), 18 m (59 ft)

Base hinged tilting monopoles with ginpole winch raise/lower: 15 m (49 ft), 18 m (59 ft)

Guyed tubular with ginpole winch: 18m, 24m, 30m

### Ampair

3A Carmavy Road, Crumlin  
Co Antrim, BT29 4TF, UK

T. +44 (0) 028 9445 2437

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

E. [sales@ampair.com](mailto:sales@ampair.com)

Data taken from MCS Summary Report

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