ACCIONA Windpower

AW-3000

acciona
Windpower

AW-3000
WIND TURBINE

The AW-3000 is based on Acciona´s experience of operating thousands of megawatts of wind turbines worldwide in all types of conditions. Like its successful predecessor the AW-1500, it has been designed to optimize the life-cycle cost of a wind turbine, not merely the upfront capital cost.

The turbine is designed from an owner´s perspective. Features include two bearings to reduce the axial loads on the gear box, access to the inside of the hub from the nacelle, and a wider nacelle for easier serviceabilty.

Rotor

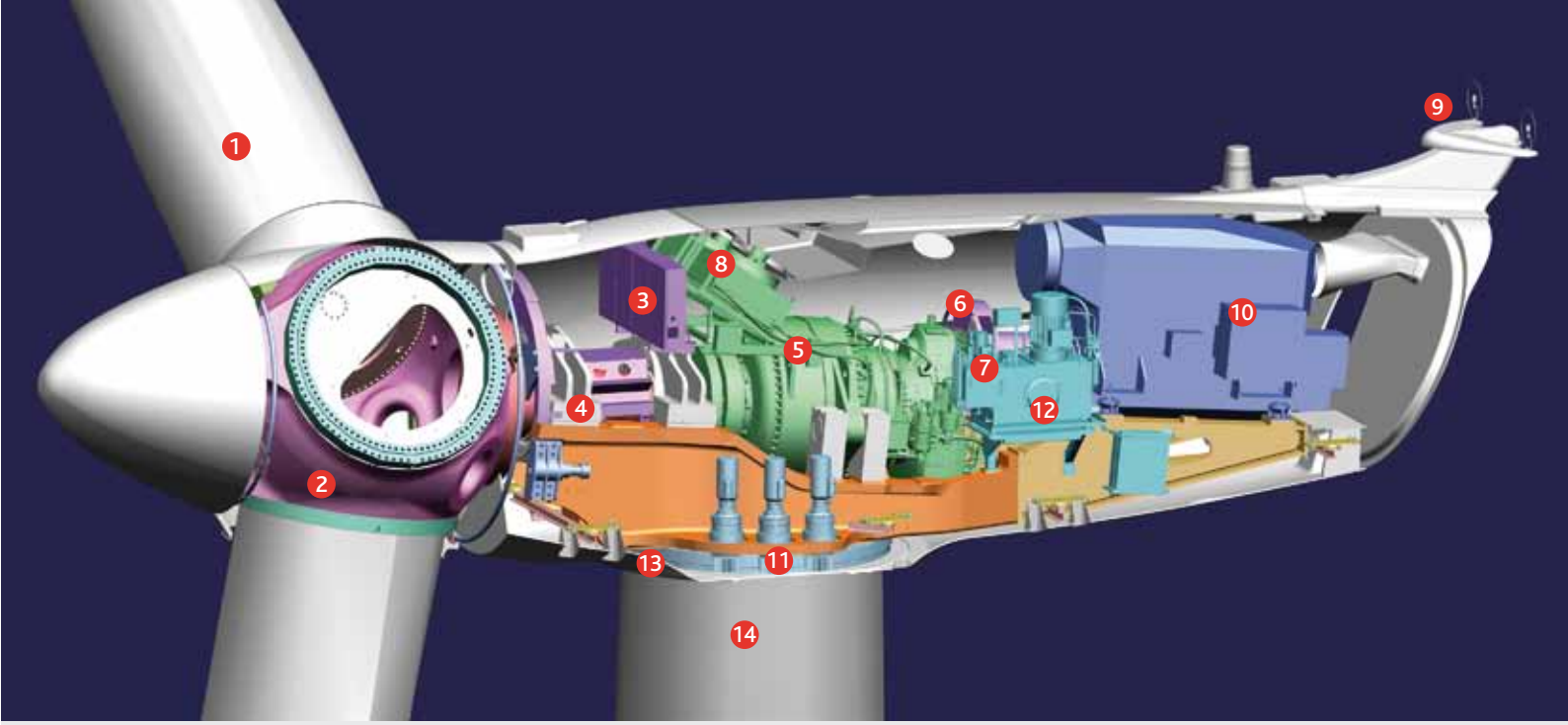
- Designed for three diameters, suitable for sites with different wind conditions: 100 m (class IEC Ia), 109 m (class IEC IIa) and 116 m (class IEC IIIa).
- Hub heights of 100 and 120 m with a concrete tower.
- Hub made of nodular cast iron. The hub contains the hydraulic pitch system capable of locking the blades in the event of an emergency stop.
- Designed for easy access to the interior of the hub from the nacelle. Eliminates the need to enter from outside.

Blades

- Made of polyester-reinforced fiberglass and coated with a special surface protection.
- Available in three lengths depending on the rotor diameter: 48.7 m, 53.2 m and 56.7 m.
- Equiped with an independent pitch system that allows the pitch angle of each blade to turn on its horizontal axis, to optimize the regulation of capacity generated at high winds and increase the safety of the aerodynamic braking system.

Nacelle

- Innovatively designed cover made from fiberglass-reinforced polyester.
- Spacious interior with easy access to the hub and the exterior.
- Crane to hoist materials up to 500 kg (1100 pounds).
- Robust double frame that reduces the stress on the drive train.
- Double-fed, three-phase asynchronous induction generator with wound rotor and excitation by collector rings. Generates at medium voltage (12 kV), which reduces losses and avoids the need for a transformer in many cases.
- Yaw system uses a gear ring integrated into the tower and six geared motors integrated into the nacelle.



1 Rotor blades
2 Hub
3 Control system monitoring
4 Main shaft
5 Gearbox
6 Disk brake
7 Generator coupling
8 Cooling radiator
9 Wind measuring system
10 Generator
11 Yaw drive
12 Hydraulic system
13 Yaw bearing
14 Tower

Concrete tower

- Innovative concrete tower design to cost-effectively reach taller heights and take advantage of increased production.

12.000 Volt Output

- Medium voltage output to optimize collection system designs. Ideal for small to medium size projects.

Remote Operating Center

- State-of-the art 24/7 remote operating capabilities to maximize performance and project avilability.

Technical information

	AW-100/3000	AW-109/3000	AW-116/3000
Rotor diameter	100 m	109 m	116 m
Wind class (IEC)	IEC Ia	IEC IIa	IEC IIIa

OPERATING DATA

Cut-in wind speed	4 m/s	3,5 m/s	3 m/s
Nominal power wind speed	11.7 m/s	11.1 m/s	10.6 m/s
Cut-out wind speed	25 m/s		20 m/s
Nominal power	3,000 kW		

LOW TEMPERATURE KIT

Cold Weather Operational temperature range (optional)	- 30° C to +40 °C

COMPONENT DATA

Diameter	100 m	109 m	116 m
Swept area	7,864 m^2	9,331 m^2	10,568 m^2
Nominal rotation speed	14.2 rpm	13.2 rpm	12.3 rpm
Power regulation Overspeed control	Full span blade pitch		
Nominal tip speed	74.3 m/s	74.7 m/s	74.7 m/s

PITCH SYSTEM

Pitch bearings	Double row four point contact
Actuation	Hydraulic
Failsafes	Accumulators on hub

DRIVE TRAIN

Gearbox	3 stages: 2 planetary/helical		
Gearbox nominal power	3,000 kW		
Gearbox ratio	1:77	1:83	1:89
Input nominal speed	14.2 rpm	13.1 rpm	12.3 rpm
Ouput nominal speed		1,100 rpm	
Lubrication	Pressure and splash with oil cooler/oil filter		
Condition Monitoring System	Optional		

ROTOR SHAFT

Support	2 bearings
Bearings	Double spherical roller bearings

YAW SYSTEM

Type	Four point ball bearing
Slewing ring	External
Braking system	Disk + callipers

YAW GEARS AND MOTORS

Type	5 planetary stages
Number of yaw gears	6

GENERATOR

Type	6 poles, double feeding
Insulation type (starto/rotor)	H/H
Rated power	3,000 kW
Frequency	50/60 Hz
Voltage	12,000 V
Speed range (50 Hz)	770 - 1,320 rpm 50 (Hz)/924 - 1,584 rpm 60 (Hz)

CONTROL SYSTEM

Type	Ingecon-W
Scada interface	OPMT

TOWER

Material	Concrete
Tower height (hub 100/120 m)	98.2 m/118.2 m
Access to tower	Door with lock system
Access to nacelle cabin	Ladder or lift
Weight (hub 100/120 m)	850 t/1,100 t
Foundation connection	Anchor bars embedded in the foundation and high quality grout

WEIGHT

Nacelle	118 t
Rotor (100 m)	66 t
Nacelle + hub	154 t

DIMENSIONS AND TRANSPORT

Nacelle + hub (L, W, H)	18 m, 4.5 m, 4 m
Nacelle + hub transport	Complete nacelle or w/out rotor shaft drivetrain
Blades	48.7 m, 53.2 m, 56.7 m

SERVICEBILITY

Automatic lubrication system	Pitch, yaw, main shaft and generator bearings
Service lift capacity	250 kg
Onboard crane	500 kg

AW-3000
Benefits

1 **Reliability**

Based on the same proven design concept that has made the AW-1500 one of the most reliable turbines in the market with a global fleet average availability of over 98%.

2 **Product flexibility**

Optimized design to maximize energy production in all wind classes. 12 kV output, which may eliminate the need for step up transformers under certain conditions, saving on collection system costs.

3 **Durability**

Double bearing support for the main shaft to reduce loads on the gearbox, robust main frame design, 6-pole generator, among other best-in-class design elements to extend the working life.

4 **Safety**

Safety features such as access to the hub from the nacelle, protection of rotating parts, anti-slip materials inside and outside the nacelle, and fireproof materials.

5 **Grid integration**

Double-fed asynchronous generator with IGBT pulses (PMW) that improves voltage and frequency stability. Power management capabilites that allow for the provision of reactive power without wind.

Polígono Industrial
Barásoain, parcela 2
31395 Barásoain.
Navarra. Spain
Tel.: (+34) 948 72 05 35
Fax: (+34) 948 72 05 31
www.acciona-energy.com
infowindpower@acciona.es

Barásoain (Spain)

Polígono Industrial
Barásoain, parcela 2
31395 Barásoain.
Navarra. Spain
Tel.: (+34) 948 72 05 35
Fax: (+34) 948 72 05 31

La Vall D'Uixó (Spain)

Polígono Industrial
La Mezquita, parcela 202, calle M
12600 La Vall D'Uixó.
Castellón. Spain
Tel.: (+34) 964 65 27 65
Fax: (+34) 964 65 27 67

West Branch (USA)

601 Fawcett Drive,
formerly 300th St.
and Sauer Blvd.
West Branch, Iowa
52358 USA
Tel.: (+1) 319 643 9463
Fax: (+1) 319 643 3584

**Parque Empresarial
La Moraleja (Spain)**

Avda. Europa 10
28108 Alcobendas
Madrid. Spain
Tel: (+34) 914 23 85 00
Fax: (+34) 914 90 38 55