



WWD-3 Wind Turbine

WinWinD has developed the three megawatt WWD-3 wind turbine based on the Multibrid®-technology. The most significant benefits obtained will be operating reliability and high availability.

Reliable Wind Turbine

An advanced planetary gear solution and low speed synchronous generator form the heart of the Multibrid®-concept, which combines the reliability of a modern direct drive and the compactness of the traditional high speed gear system. Low rotational speed together with the proper dimensioning ensures reliability and high availability.

3MW
www.WinWinD.FI



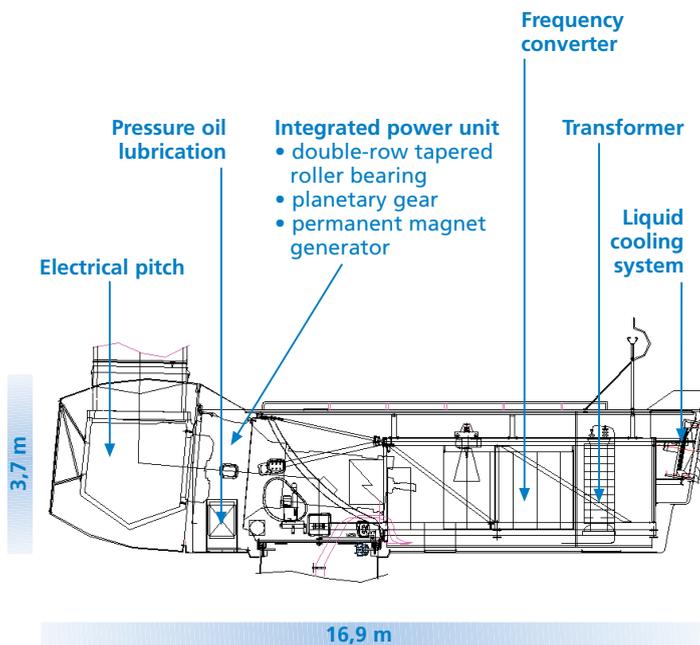
Reliable • Effective • Maintenance friendly

Principles of the Multibrid concept

The rotor hub is connected to the gearbox casing using a play-free double-row tapered roller bearing. The bearing transfers the rotor loads directly to the main casing, keeping the whole drive train free from deformation and rotor loads.

The planetary gear increases the rotating speed modestly and transfers the torque to the low speed permanent magnet generator. All connection flanges are round and concentric, resulting in clearly defined borders. This "black-box" design philosophy eases assembly and results in a well-defined load distribution.

The frequency converter transfers the full generator power. As a result the machine can use also low wind speeds with optimum low rotational speed, and there is no need for slip rings as with a double-fed generator solution.



Developed by top professionals

WWD3 is a modern innovative wind turbine which has been designed by top professionals. The WinWinD design team, based on over 20 years know how in the wind turbine branch, coordinated the work. Close cooperation together with experienced world-class component manufacturers and partners gave an up-to-date product as a result. Moventas Oy, the world's leading wind turbine gear manufacturer, supplies the planetary gear. The generator is made by ABB, one of world's top companies in developing and supplying wind turbine generators.

General

Type	3 blades, up-wind
Power control	Pitch, variable speed
Rated power	3000 kW (grid side)
Rotor diameter	90 and 100 meter
Cut-in wind speed	4 m/s
Rated wind speed	12 m/s (D100 m) 13 m/s (D90 m)
Cut-out wind speed	20 m/s (D100 m) 25 m/s (D90 m)
Rotor speed	5–16 rpm (D90 m) 5–15 rpm (D100 m)
Classification	IEC II-A, 18%, -8.5 m/s, 20 years (D90 m) IEC III-B-16%, -7.5 m/s, 20 years (D100 m)
Hub heights	80–100 meter
Generator	Synchronous generator with permanent magnets
Cooling	Water jacket cooling around stator, Air cooling with air/water heat exchanger
Frequency converter	Located in nacelle IGBT -Bridges on both generator and grid side
Filter generator side	dU/dt-Filter and common-mode filter
Filter grid side	LCL-Filter
Transformer	Located in nacelle



Main designer of WWD-3, Georg Böhmeke, Technical Director of WinWinD, took the opportunity to develop WWD-3 wind turbine. "The wind energy branch has developed rapidly within the last ten years, we and our partners have been actively involved in the development process. The good and bad experiences gained in numerous former projects were used to avoid known and foreseeable problems and select well-proven solutions"



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