

Product note

Wind power generators

Medium speed permanent magnet generator (MS PMG)

Reliable slower speed design

- for powers up to 8 MW and more

Compact size

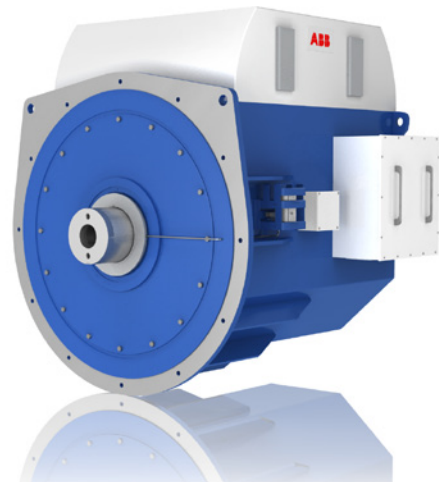
- enabling low turbine top head mass

The highest efficiency of over 98 %

- for maximum kWh production

Low magnet mass

- resulting in a cost-effective construction



Proven slower speed drivetrain

Medium speed permanent magnet generators (MS PMGs) represent a very compact, slower speed solution offering the highest efficiency with low maintenance needs. ABB built the first MS PMG for the “Multibrid-type” fully integrated design in 2000, which created the basis for today’s economical models.

Developers, utilities and finance providers demand proven products. Track records and the cost of electricity produced over the plant lifetime are the decisive factors. The drivetrain selection is therefore one of the most important decisions to make.

The proven medium speed generator is the optimal platform both for large offshore projects operating in extreme conditions, and for on-land turbines needing the highest system efficiency to operate in the lower wind speed areas that are being exploited today.

Medium speed design

There are three potential ways to implement a medium speed design. In all cases the construction must accommodate the brake disk and the pitch tube, which carries the cables from the hub. The nominal speed influences the generator size. In conventional designs it can be selected from about 150 to 400 rpm using a single or 2-stage gear, and in future gear concepts it can be 500 rpm or more, enabling even smaller generators. The scope of supply can range from stator and rotor parts only, to the complete generator.

Fully integrated:

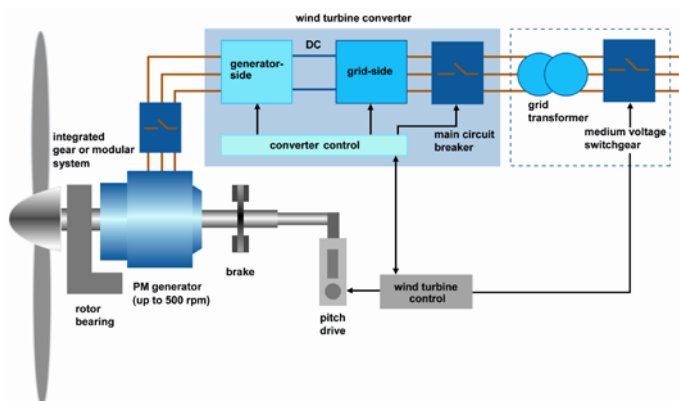
The gearbox and generator share the same frame, bearings and shaft. This solution requires a joint development project between the gear and generator manufacturers.

Semi-integrated:

This is a new modular design where the generator and two-stage gear are integrated via a flange connection. Only the mounting interface flange and coupling need to be agreed. The modular design with low component weight enables dismounting for servicing. There are also more cooling options available. For OEM’s, new semi-integrated MS PMGs offer a fast route to serial production and to the offshore markets.

Non-integrated:

The generator is a separate unit, mounted independently of the gearbox, representing a similar system to those used in high speed drivetrains.





1 MW fully integrated MS PMG.



New semi-integrated MS PMG prototype with gear.

Offshore turbines need proven, cost-effective solutions that enable serial production and the highest efficiency.

Key advantages:

- compact size for multi-MW powers
- low turbine top head mass
- reliable slower speed solution
- long lifetime and low maintenance
- the highest efficiency, even at partial loads
- cost-efficient with low magnet mass
- savings in tower, foundation and logistics costs
- all the benefits of the full converter concept

Typical data for medium speed generators up to 8 MW:	
Frame size	710 - 1120
Power	1 - 8 MW
Nominal speed	between 100 - 500 rpm
Efficiency	Over 98 %
Cooling	Typically water cooled
Voltage	690 - 3 300 V or higher
Frequency	50 and 60 Hz
Ambient	Standard: - 20°C ... +50°C Low temp: - 30°C ... +50°C
Typical dimensions in 500 rpm design (LxWxH, weight)	3 MW: 2400 x 1800 x 2000 ; ~ 12.5 tn 5 MW: 2900 x 3000 x 3350 ; ~ 18.2 tn 7 MW: 2900 x 3300 x 3600 ; ~ 24.9 tn

© Copyright 2011 ABB. All Rights Reserved

We reserve all rights in this document and in the subject matter and illustrations contained herein. Any reproduction, disclosure to third parties or utilization of its contents - in whole or in part- is forbidden without prior written consent of ABB Ltd.

Your reliable partner

ABB is a leader in power and automation technologies that enable utility and industry customers to improve performance while lowering environmental impact. The ABB group of companies operates in around 100 countries and employs about 130 000 people.

In the wind power sector, ABB is the largest worldwide supplier of electrical solutions. ABB is the market and technology leader in generators, converters, transformers, motors, circuit breakers/contactors and HVDC transmission systems.

ABB has supplied more than 30 000 wind power generators over the last 30 years, based on more than 120 years of experience in manufacturing motors and generators. Leading turbine manufacturers of all drivetrain types rely on ABB technology for induction, doubly-fed and permanent magnet generators. ABB offers solutions including inner or outer rotor direct drive, integrated medium speed generators and the flexible high speed platform. ABB introduced the first MW class PM generator for wind power in 1999.

Proven ABB solutions provide continuous operation for maximum energy production with the lowest lifetime cost.

For more information please contact:
www.abb.com/motors&generators