

Renewable generators

Medium speed permanent magnet generator (MS PMG)

The highest efficiency and reliable slower speed design



Designed for renewable turbines, ABB renewable generator offers proven and cost-effective solutions that enable serial production and the highest efficiency.

- **Reliable slower speed design for powers up to 15 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**

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ABB Medium speed permanent magnet wind power generator

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” wind turbine in 2000, which created the basis for today we have designs for 1-15 MW generators.

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 onshore turbines needing the highest system efficiency to maximize energy yield in the lower wind speed areas.

In addition to wind turbines, ABB medium speed permanent magnet generators offers perfect fit in submerged tidal turbines and speed range match for direct drive mini-hydro applications.

Typical data for medium speed generators up to 15 MW

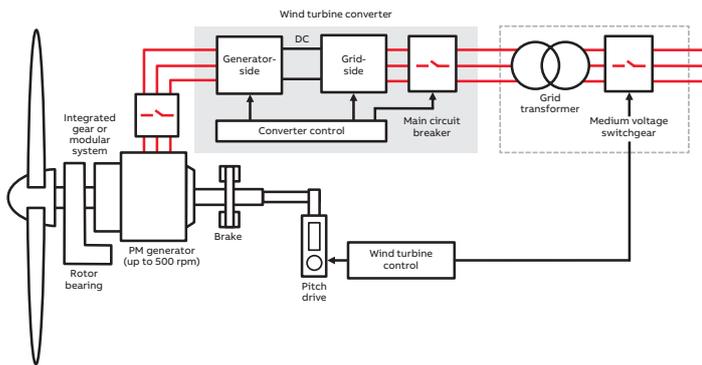
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| Frame size | 710 - 1600 |
| Power | 1 - 15 MW |
| Nominal speed | between 100 - 500 rpm |
| Efficiency | Over 98% (also at 20% load) |
| Cooling | Water cooled |
| Voltage | 690, 1000 - 3300 V or higher |
| Frequency | 50 and 60 Hz |
| Ambient | Standard: -20 °C ... +50 °C Low temp: -30 °C ... +50 °C |
| Typical dimensions in 500 rpm design (L x W x H, 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 |

Key advantages

- The highest efficiency, even at partial loads
- Reliable slower speed solution
- Compact size for multi-MW powers
- Low turbine top head mass
- Long lifetime and low maintenance
- Cost-efficient with low magnet mass
- All the benefits of the full converter concept

Medium speed design

There are three potential ways to implement a medium speed design. The construction can accommodate the brake disk, barring gear and the pitch tube, for the turbine pitch control cables. The nominal speed influences the generator size. In conventional designs, it can be selected from about 150 to 400 rpm, lower speeds down 50 rpm and higher speed up to 500 rpm are also available. The scope of supply can range from stator and rotor, 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. ABB scope is typically stator and rotor which are assembled with the gear in the OEM workshop.

Semi-integrated

This is a modular design where the generator and the 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 dismantling for servicing and testing as independent units at manufacturers workshops. The bearing current protection is easier to realize and there are also more cooling options available.

Non-integrated

The generator is a separate unit, mounted independently of the gearbox, representing a similar system to those used in high speed drivetrains. These are also generators for direct drive application where turbine speed is in range from 50 to 150 rpm.



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For more information please visit:

new.abb.com/motors-generators

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