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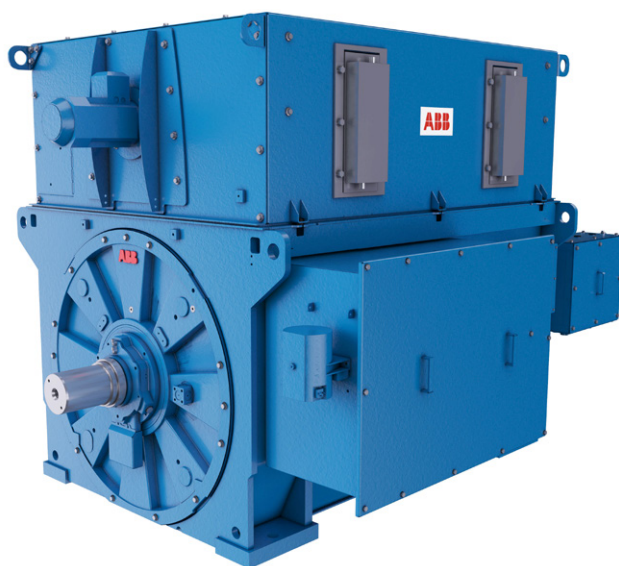
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PRODUCT NOTE

Wind power generators

Standard doubly-fed induction generators



ABB's standard doubly-fed (DF) generators are rated for powers of 1.5-3.5 MW. Their modular component structure provides great versatility, with both air and water cooling available.

Customer specific modifications enable the generators to fit most turbines in use today. The rotor design offers wide safety margins to withstand overspeeds and converter voltage stresses. Overall reliability is further enhanced by the low maintenance slip ring unit.

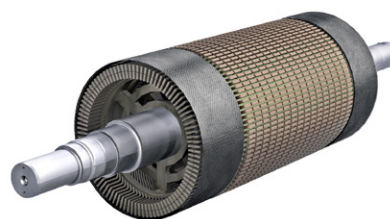
The doubly-fed generator concept

DF generators are wound rotor asynchronous machines, with the rotor windings connected to a small converter via slip rings and brushes. The generator feeds power from both the directly connected stator (approx. 2/3 of P_n) and the rotor (approx. 1/3 of P_n).

The converter enables the generator's speed, power and power factor to be controlled. This gives the generator a wider speed range for production, as well as the capability to feed reactive power to support the grid.

Proven rotor design

Patented carbon-fiber winding-end support rings ensure the rotor can withstand sudden uncontrolled overspeeds. The mica based insulation is rated for 2.5 kV, providing a good margin of safety against converter induced voltage stresses.



The rotor is designed to minimize Total Harmonic Distortion (THD), especially the 5th and 7th harmonics. Advanced cooling techniques keep temperatures down, even during demanding reactive power production.

Delivering maximum energy production with the lowest lifetime cost

Low maintenance slip ring unit

Slip ring units (SRUs) for ABB DF generators are sourced from a leading manufacturer with an excellent track record for reliability.

Robust, straightforward construction ensures high endurance for both overspeeds and reactive power production. The modular setup for load optimization enables effective cooling and easy servicing.

ABB's dedicated in-house SRU testing laboratory runs simulations of load and environmental conditions at generator installation sites. This allows the modular SRUs to be customized for each generator's specific operating site, providing improved SRU performance and an extended service life.

Your reliable partner

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

Over the last 30 years ABB has delivered 35,000 generators to leading wind turbine customers all over the world – corresponding to a total of 45 GW of power.

The first ABB megawatt class doubly-fed generator was built in 1997, based on more than 120 years of experience in electric motors and generators.

Typical performance characteristics of the AMK series < 3.5 MW	
Frame / power	500: up to 2.2 MW 560: up to 3.2 MW 630: up to 3.6 MW
Efficiency at rated speed	appr. 97...97.5%
Cooling (air or water)	IC 616/666, IC81/86W, SRU IC01/06
Mounting and protection	IM1001 (inclined 4...8 deg), IP54, SRU IP23
Voltage	690-1000 V +/-10%, 50 or 60 Hz 3-6 kV +/-10%, 50 or 60 Hz (630 frame)
Locked rotor voltage	approx. 1800 V or 2000 V
Rated speed (typical)	1750 rpm, 1200 rpm (50 Hz) 2100 rpm, 1440 rpm (60 Hz)
Operation speed range	1000...2000 rpm / 670...1330 rpm (50 Hz) 1200...2400 rpm / 800...1600 rpm (60 Hz)
Max. overspeed	3000/2300 rpm depending on size
Power factor	p.f. 0.90 cap ...1.0 ... 0.90 ind
Insulation class / Temp. rise	F / B (at Un, p.f. 0.95 cap and 40 °C), or F / F -20 °C...+40 °C; extended -30 °C...+50 °C
Temperature range	
Dimensions and weight (depending on power)	500: L3150 x W1600 x H1850 mm, 6-6.7 tn 560: L3300 x W1650 x H2050 mm, 7-10 tn 630: L3500 x W1700 x H2250 mm, 9-12 tn

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