

V47-660 kW

Pitch regulated wind turbine with OptiTip® and OptiSlip®



Vestas



One or two generators

The standard V47-660 kW is delivered with a single generator, which is highly efficient in the vast majority of wind conditions. A two-generator version is also available, containing a second, smaller generator for use in wind speeds as low as 7 m/s. The result is a lower sound level where it is most needed, as well as more efficient exploitation of modest wind conditions.

Optimal pitch with OptiTip®

As with all other Vestas turbines, the V47-660 kW turbine is equipped with microprocessor-controlled OptiTip® pitch regulation, ensuring continuous and optimal adjustment of the angles of the blades in relation to the prevailing wind. The OptiTip® system makes it possible to find the best solution to the often contradictory requirements for high output and low sound levels, depending on the location.



OptiSlip®

The V47-660 kW turbine features the unique generator principle OptiSlip®, which allows both the rotor and the generator to vary their RPM by up to 10% to cope with violent gusts of wind. In addition to reducing the load on various parts of the turbine, the OptiSlip® system also ensures an appreciably better power quality.

Lightning protection

The V47-660 kW turbine is equipped with Vestas Lightning Protection, to protect the entire turbine from the tips of the blades to the foundation.

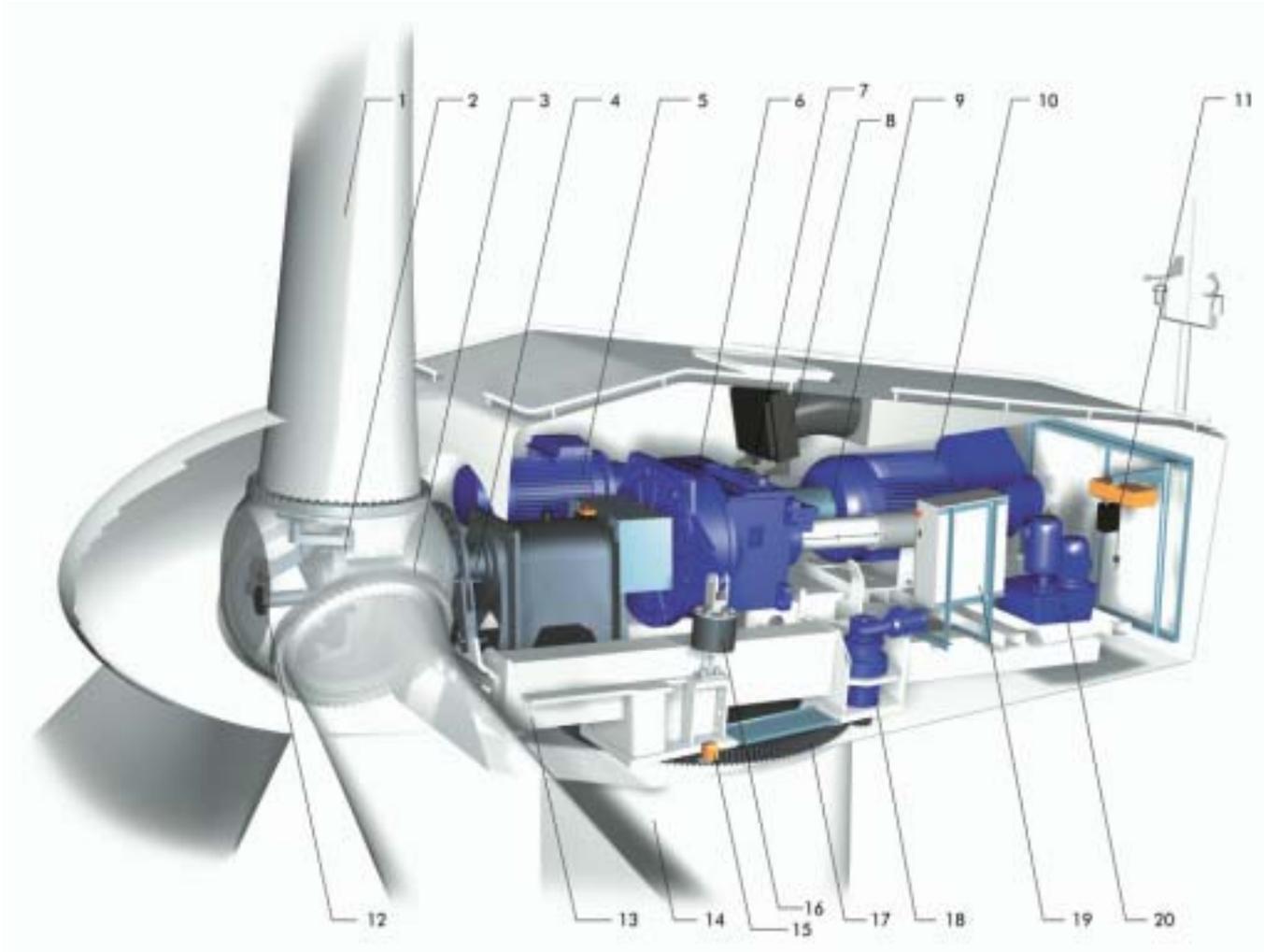
Flexible blades

Vestas always measures and tests all new products down to the smallest detail before releasing them to the market. The flexible blades underwent a 6-month dynamic distortion test under extreme loads – more than they would normally be exposed to in their 20-year service lives. The maximum loads and outward distortion of the blades were then checked in a static test. The blades passed all the tests and now make an appreciable contribution to the efficient production of the V47-660 kW turbine.

Proven Performance

We spend many months testing and documenting the performance of the Vestas turbines. When we are finally satisfied, we run one last check by allowing an independent organisation to verify the results. This is standard practice at Vestas – a procedure we call Proven Performance. It is our guarantee that your Vestas turbine meets the very highest requirements for energy production, availability factor, power quality and sound levels.

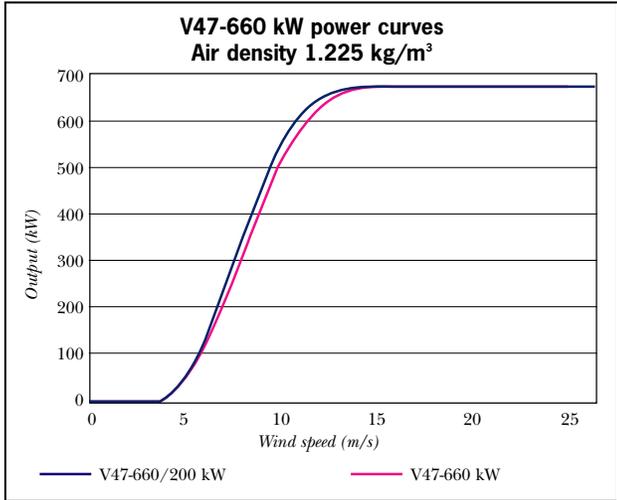
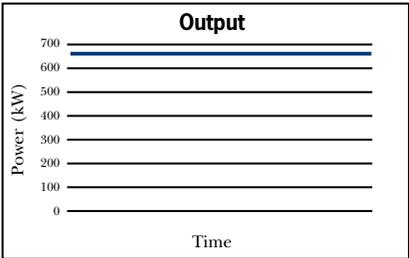
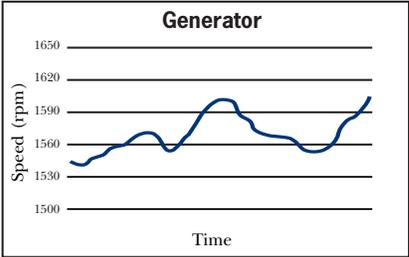
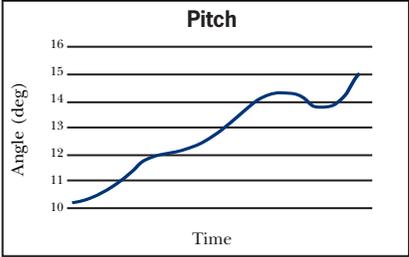
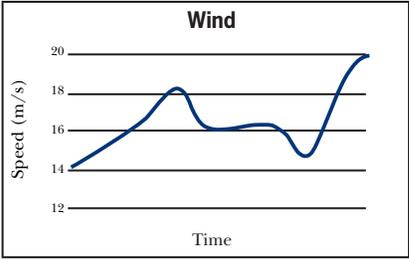




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|--|-----------------------------|
| 1. Blade | 11. Service crane |
| 2. Blade hub | 12. Pitch cylinder |
| 3. Blade bearing | 13. Machine foundation |
| 4. Main shaft | 14. Tower |
| 5. Secondary generator
(V47-660/200 kW) | 15. Yaw control |
| 6. Gearbox | 16. Gear tie rod |
| 7. Disc brake | 17. Yaw ring |
| 8. Oil cooler | 18. Yaw gears |
| 9. Cardan shaft | 19. VMP top
control unit |
| 10. Primary generator | 20. Hydraulic unit |

Rotor		
	V47-660 kW	V47-660/200 kW
Diameter:	47 m	47 m
Area swept:	1,735 m ²	1,735 m ²
Revolution speed:	28.5	26/20
Number of blades:	3	3
Power regulation:	Pitch/OptiSlip®	Pitch/OptiSlip®
Air brake:	Feathered	Feathered
Tower		
Hub height (approx.):	40 - 45 - 50 - 55 m	40 - 45 - 50 - 55 - 60 - 65 m
Operational data		
Cut-in wind speed:	4 m/s	4 m/s
Nominal wind speed (660 kW):	15 m/s	16 m/s
Stop wind speed:	25 m/s	25 m/s
Generator		
Large generator:	Asynchronous with OptiSlip®	Asynchronous with OptiSlip®
Nominal output:	660 kW	660 kW
Operational data:	50/60 Hz 690 V 1,515–1,650 rpm 1,818–1,980 rpm	50 Hz 690 V 1,515–1,650 rpm
Small generator:		Asynchronous
Nominal output:		200 kW
Operational data:		50 Hz 690 V 1,500–1,516 rpm
Gearbox		
Type:	Planet /parallel axles	Planet /parallel axles
Control		
Type:	Microprocessor-based control of all turbine functions with the option of remote monitoring. OptiSlip® output regulation and OptiTip® pitch regulation of the blades.	

Actual measurements of a Vestas 660 kW turbine with OptiSlip®



OptiSlip® allows the revolution speeds of both the rotor and the generator to vary by approx. 10%. This reduces both unwanted fluctuations in the grid supply and the loads on the vital parts of the construction.

Worldwide popularity



If you stand next to one of these turbines and look up, it is tempting to think that the V47-660 kW model must be the largest turbine Vestas has ever built. It is not, although it is no more than a few years since this turbine was launched as the Vestas flagship.

A genuine innovation when it was introduced in 1997, the V47-660 kW blade design set new standards, but the turbine as a whole, with its futuristic design and innovative technology, became a model for the giant turbines that have since begun to roll off the production lines.

Today, the V47-660 kW model remains a popular turbine that exploits the power of the wind reliably and efficiently. Turbines of this model currently operate in locations as diverse as New Zealand, California, Spain, Germany and South Korea – and in many other places where there is a demand for profitable wind power.

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