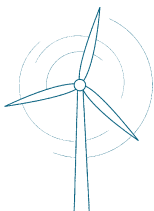




N100/2500 KW



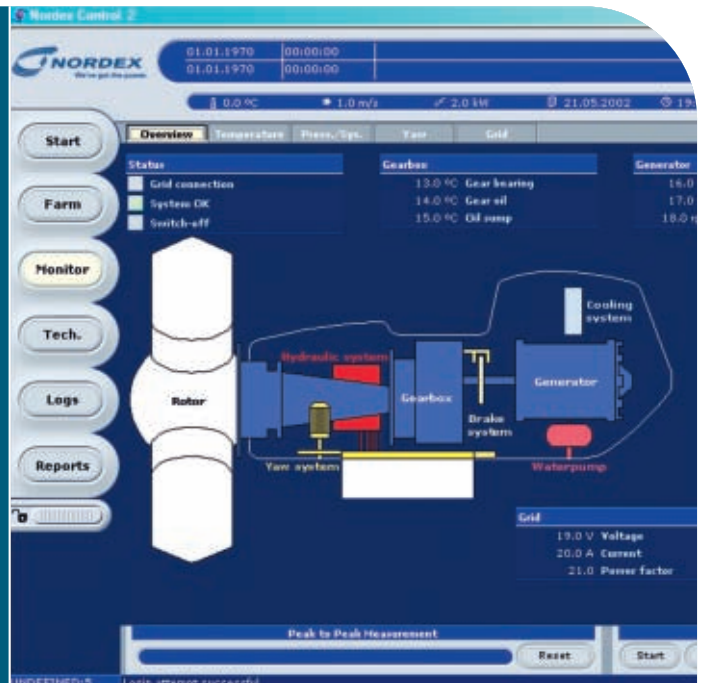
Nordex N100

High-yield wind turbine
for inland sites.





Visualisation of a turbine in the NC2 control system.



THE N100/2500 – HIGH-YIELD WIND TURBINE FOR INLAND SITES.

The Nordex N100/2500 is the latest version of the proven wind turbine design, which has been in production since 2000 and has so far been available as basic N90 turbine and as the high-wind N80 (2.3 MW/2.5 MW). It adds to the range a turbine suitable for inland sites with mean annual wind speeds of less than 7.5 m/s. All the turbines in this class are based on the same proven machine platform and are thus a logical development of the successful Nordex model. Over 700 N80/N90 turbines are currently operating successfully all around the world, with a further approx. 400 currently under execution (as of July 2008).

The rotor diameter is the main characteristic distinguishing each turbine type from others in the family. Thus, the N100 has a rotor diameter of 100 metres, providing a 23% greater swept area compared with the N90/2500. With its corresponding yield potential, the N100 is designed to make optimum use of inland locations.

Certification

The turbine is IEC 3a-certified. For German sites, the N100/2500 is certified in accordance with DIBt2 as an integrated structure on a modular steel tube tower with a hub height of 100 m.

Grid connection

Grid compliance is based on the proven engineering model used in the N90/2500. The N100/2500 is available in 50-Hz and 60-Hz versions.

Control

The Nordex N100 is supplied with the Nordex-Control automation software to provide turbine control and visualisation of all relevant data and, as a Web-based system, it sets new standards in ease of use.

Quality

Nordex is for manufacturing, installation, maintenance and service certified according to ISO 9001.



Your benefit at a glance:

- Site-specific control of individual turbines and windfarms
- 24-hour remote monitoring
- Advanced grid compliance with fault ride through

HIGH YIELD, LOW MAINTENANCE AND EXCELLENT RELIABILITY: SOLUTIONS FOR YOUR PROJECTS.

The N100/2500 achieves high yields

- thanks to its large rotor diameter of 100 metres and a swept area of 7,823 square metres
- with a cut-in wind speed of 3 m/s and rated power at 12.5 m/s

It offers low maintenance

- due to optimised design, minimising service cost
- with easy access thanks to the integrated crane installed in the interior for lifting materials weighing up to 1 t into the nacelle and inside the cabin
- thanks to the control from the bottom of the tower and from the nacelle and the wide range of remote query possibilities for the control system and converter

It is reliable

- as it is a further development of the 2.3/2.5 MW turbine class, which has proven itself hundreds of times all around the world since 2000
- as all components are supplied by renowned certified manufacturers, thus guaranteeing their quality
- as the rotor blades undergo stress testing beyond the design limits and are subject to regular extensive material testing
- as the high aluminium content in the tip acts as an extraordinarily effective lightning receptor
- as grid compliance is based on the proven electrical and mechanical model implemented in the N90/2500



THE N100: EACH COMPONENT IS AN ADVANTAGE.

Rotor

The rotor consists of three blades made of high-quality glass fibre-reinforced polyester, a hub, slewing rings and drives for adjusting the blades. A pitch system is used to control and optimise output. The variable-speed rotor enhances the aerodynamic effects and reduces the wind load on the system. If necessary, the pitch system can be locked in any position by means of an innovative parking system to facilitate servicing.

Drive train

The drive train consists of the rotor shaft, the gearbox, an elastic coupling and the generator.

Gearbox

The nacelle is equipped with a two-stage planetary gear box with a spur gear stage, as an option a differential gearbox is also available. The gearbox is fitted with a cooling circuit with variable cooling output. The gearbox bearing and tooth engagement are kept continuously lubricated with oil.

Generator

The generator is a double-fed asynchronous machine. Nordex has been using this type of generator with variable-speed turbines successfully for many years. The main advantage is that only 25–30% of the energy produced needs to be fed into the electricity grid via a frequency converter. The deployment of this generator/frequency converter system thus cuts the total cost of the wind power system.

Cooling and filtration

Gearbox, generator and converter of the N100 each have independent active cooling systems. The cooling system for the generator and frequency converter is based on a cooling water circuit, while the gearbox is cooled by an oil-based system. This ensures optimum operating conditions in all types of weather. A separate cooling system room at the rear of the nacelle facilitates access and ensures optimum performance of the individual systems.

Braking system

The three independently controlled rotor blades can be set at full right angles to the rotation direction for aerodynamic braking. In addition, the hydraulic disc brake provides additional support in the event of an emergency stop.

Nacelle

The nacelle consists of the cast main frame, a welded generator support frame, a steel structure for the crane and for supporting the cabin casing, which is made of glass fibre-reinforced plastic. Ergonomically designed, it is spacious and thus very service-friendly.

Yaw system

The wind direction is continuously monitored by two wind vanes on the nacelle. If the permissible deviation is exceeded, the nacelle yaw is actively adjusted by means of geared motors.

Tower

The tubular steel tower is designed and certified as a modular tower. For the design of tower internals (ladder, platforms, safety equipment) the requirements of EN 50308 have been particularly considered. Both internal and external transformer installation is possible.

Control and grid connection

The wind turbine has two anemometers. One anemometer is used for controlling the turbine, the second for monitoring the first one. On a control screen located in the switchboard, all operational data can be monitored and checked. The data and signals are transmitted via ISDN for remote monitoring. At the click of the mouse, the operator can download all key data from the Internet using Nordex-supplied communications software and hardware. The new optimised "Nordex AP" process instrumentation technology is also deployed.

Lightning protection

Lightning and over-voltage protection of the wind turbine is based on the lightning protection concept and is in accordance with IEC 61024 and DIN VDE 0185.

FACTS AND FIGURES.

N100/2500 kW		N100/2500 kW	
Rotor		Yaw system	
Number of blades	3	Yaw bearing	Ball bearing
Rotor speed	9.6 – 14.9 rpm	Brake	Hydraulic, disc brake
Rotor diameter	99.8 m	Yaw drive	Asynchronous motors with integrated brakes
Swept area	7,823 m ²	Speed	Approx. 0,4 deg/s
Power regulation	Pitch	Control system	
Cut-in wind speed	3 m/s	Type	SPS, Remote Field Controller (RFC)
Cut-out wind speed	20 m/s	Grid connection	Via IGBT converter
Rated output at	12.5 m/s	Scope of monitoring	Remote monitoring of over 300 different parameters, e.g. temperature, hydraulic pressure, pitch parameters, wind speed and direction
Survival wind speed	52.5 m/s	Recording	Production data, event lists with filter function, long and short-term trends
Pitchregulation	Individual blade pitch	Visualisation	Panel PC in control cabinet and Web-based access possible from any PC, adapter for laptop at the bottom of tower or in nacelle
Weight	Approx. 56,500 kg	Brakes	
Blades		Design	Three independent brake systems (single pitch)
Blade length	48.7 m	Aerodynamic	Individual pitching of blades
Material	GRP	Mechanical	Disc brake
Weight	Approx. 9,800 kg	Tower	
Gearbox		Type	Modular, steel tube tower
Type	Planetary/spur gear or differential gear box	Hub height	100 m, certificate DiBt 2, IEC 3a
Gear ratio	1:774 (50 Hz)/ 1:92.9 (60 Hz)	Generator	
Generator		Power	2,500 kW
Power	2,500 kW	Voltage	660 V
Voltage	660 V	Type	Double-fed asynchronous generator with partial frequency converter
Type	Double-fed asynchronous generator with partial frequency converter	Frequency	50 or 60 Hz
Frequency	50 or 60 Hz		

POWER CURVE N100/2500 KW

Windspeed [m/s]	Power [kW]	Cp
4	50	0.420
5	211	0.480
6	429	0.491
7	725	0.490
8	1111	0.490
9	1583	0.484
10	2023	0.472
11	2306	0.421
12	2458	0.324
13	2500	0.255
14	2500	0.204
15	2500	0.166
16	2500	0.137
17	2500	0.114
18	2500	0.096
19	2500	0.082
20	2500	0.070

Rounded values based on aerodynamic calculations 12/07, subject to change.



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