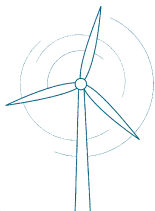




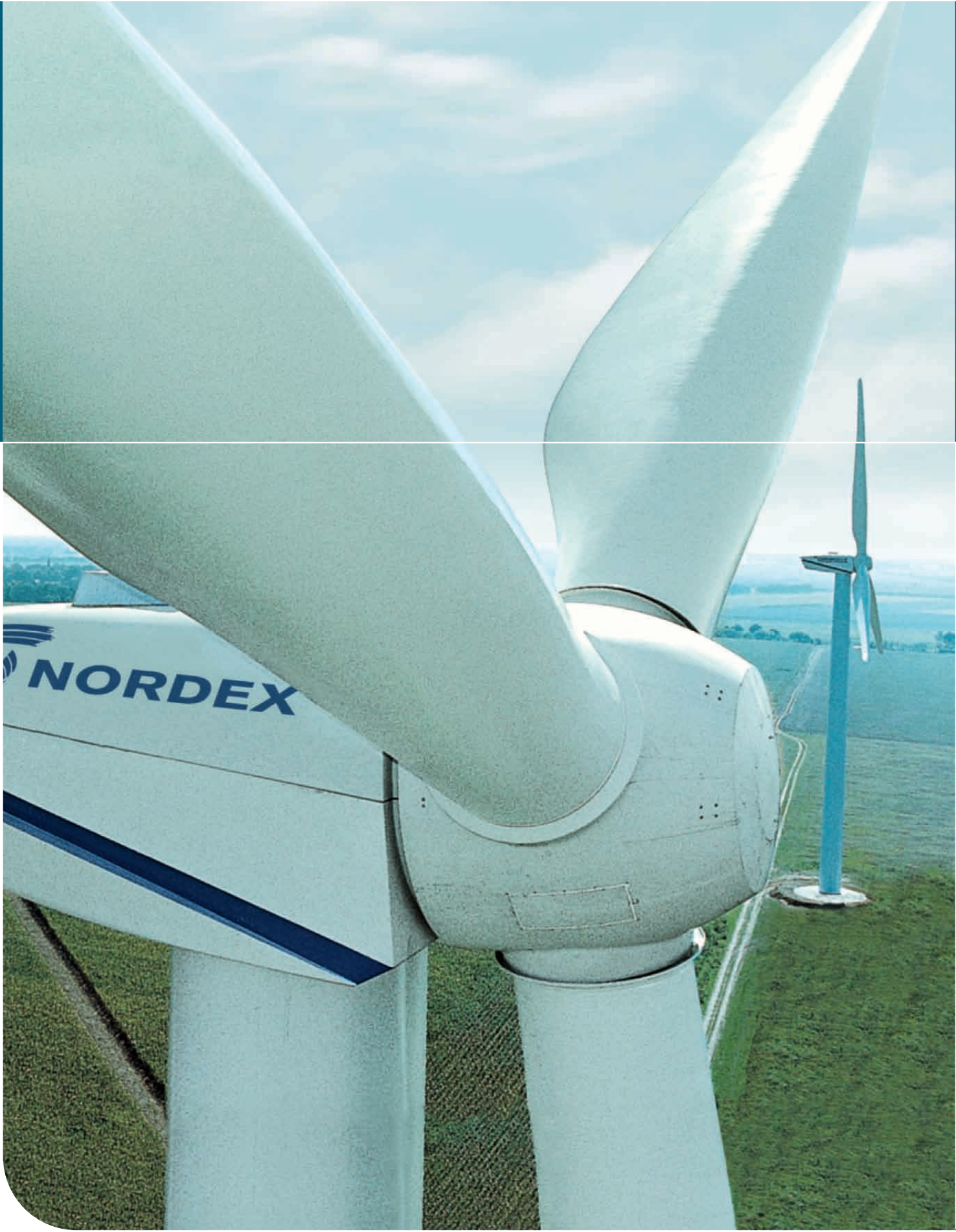
S70/1500 KW
S77/1500 KW



Nordex S70/S77

The perfect technology
for each location.





Remote monitoring in Rostock.

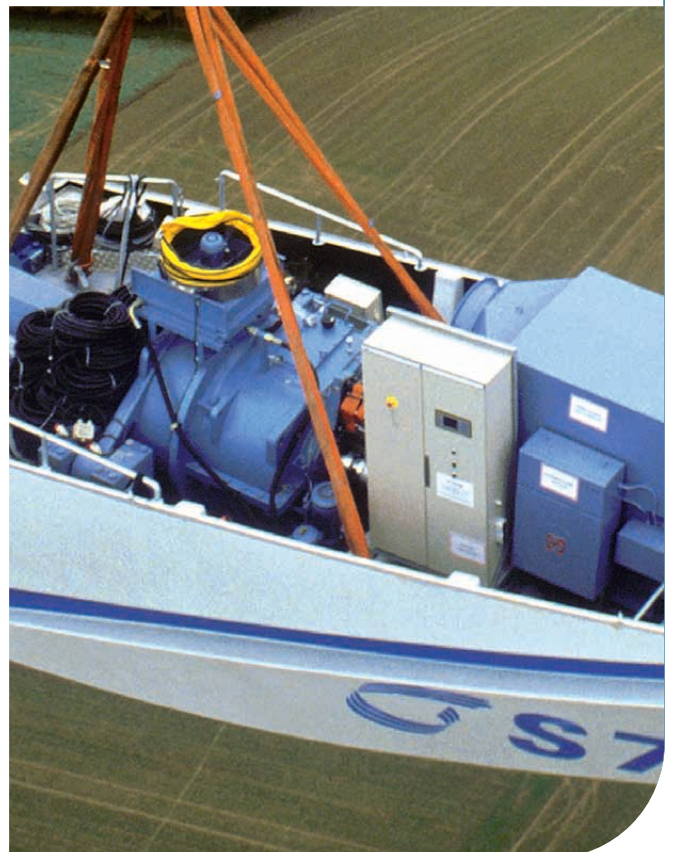


THE NORDEX S70/1500 KW AND THE NORDEX S77/1500 KW: TWO WIND TURBINES FOR IDEAL WIND HARVEST.

The concept behind the Nordex S70/1500 kW on the basis of pitch technology follows upon the successful solutions incorporated in the 600–750 kW turbines and transfers these to the requirements of the megawatt class. In this way, a tried and tested technology has been consistently implemented and the details optimised. The strategically planned long development and prototype phase ensures maximum reliability in series production.

The Nordex S77/1500 kW is the logical consequence of our platform strategy and picks up on the experience gained with the Nordex S70. As a result of the enlarged rotor diameter (77 metres) and the pitch technology used, the machine is optimally designed for use in areas with middle and low wind speeds.

With the Nordex S70 and Nordex S77 you acquire a modern and reliable system. It combines consistent engineering with technologically high-quality components in an efficient concept. Both wind turbines are designed for a service life of at least 20 years. And the ISO 9001 certification stands for the tested quality of our products.





Defective parts can be replaced within 24 hours of completion of the error analysis.

Your benefit at a glance:

- Location-specific control for individual turbines or windfarms
- Security due to redundant systems
- 24-hour remote monitoring
- Autonomous safety systems (emergency off in the event of power cut)

RELIABILITY, SERVICE, ENVIRONMENTAL SUSTAINABILITY: NORDEX ALWAYS OFFERS THAT BIT MORE.

The machines offer low-maintenance due to

- Access to the blade-adjustment system in the spinner
- Having no rotating hydraulics in the hub
- Maintenance-free blade-adjustment drives
- Easily accessible control cabinets
- User-friendly rotor lock and easy checking and monitoring of the elastomer bearings in the drive train
- Upper platform, which can be used as an uninterrupted working area
- Easy entrance to the system
- Control from the foot of the tower and from the nacelle, and the wide range of remote query possibilities for the control system and inverter

They are reliable

- As they have a long product cycle time and are a mature series product
- As all components are of guaranteed high quality due to our choice of certified and reputable manufacturers
- As the modified gearbox offers additional safety
- As resonances are avoided or minimised by design measures
- As we use well-proven technology based on long experience

They are environment-friendly due to

- Absence of a rotating hydraulic system
- Sealing of the spinner to prevent bearing grease from escaping
- Generous coaming plates in the rotor-bearing casing
- Enclosed grease pan below the rotor-bearing
- Enclosed oil pan below the gearbox
- Additional oil pan in the tower head
- Hydraulics with all lines in the area of the oil pan—meaning that no oil can escape into the environment

They are noise friendly due to

- As the generator, gearing and many other components are attached in such a way that vibrations are either not transmitted or are damped. In this way noises are immediately reduced at source
- As the helical gearing of all gearwheels reduces the noise level of the gearbox



NORDEX S70 AND NORDEX S77: OPTIMISED DETAILS FOR MAXIMISED RELIABILITY.

Rotor

The rotor is operated at variable speed. The blades are optimised for speed-variable operation and protected by an integrated lightning protection system.

Control and safety concept

In order to balance the wind turbine ideally between maximum yield and minimum load the pitch and rotor speed controls work together. At low wind speeds the turbine operates with a constant blade pitch and variable rotor speed. At high wind speeds the pitch and rotor speed controls work together to maintain a constant power output from the rotor. A safety system with triple redundancy protects in case of stormy conditions.

Drive train

The drive train is supported at three points immediately above the top flange of the tower. The inclination of the rotor axis, together with the rotor cone, allows for an extremely short distance between the rotor plane and the tower axis and thus reduces the wind turbine's 'nose-heaviness' with its high material requirements.

Gearbox

The gearbox is a three-stage design with one planetary and two spur gear stages. The toothing of the gears is optimised for efficiency and noise emission. Elastic bushings are integrated into the torque-bearing elements suspended on the main frame.

Generator

The double-fed asynchronous generator enables variable speed operation of the wind turbine without passing the total power through the power electronics of the converter, thus providing the most efficient conditions for this advantageous mode of operation.

Converter

The converter is fitted with the latest IGBT technology and is controlled via microprocessor-controlled power electronics using pulse width modulation.

Brake system

The aerodynamic braking is achieved by the rotor blades which are controlled independently and redundantly. The mechanical disc brake serves as the supplementary braking element to the safety system.

Hydraulic system

The hydraulic system provides the oil pressure for the operation of different main components: yaw brakes, rotor brake.

Nacelle

The nacelle cover combines compact external dimensions with elegant, attractive design.



Tower

The Nordex S70 and Nordex S77 can be erected on a tubular or a lattice tower. The modular tubular tower is cylindrical, the upper segment is conical. The lattice tower consists of a square angle iron construction.

Control system

All functions of the wind turbine are monitored and controlled by a microprocessor-based control system. Grid voltage, frequency and phase, rotor and generator speed, diverse temperatures, vibration levels, oil pressure, brake pad wear, cable twist as well as the meteorological conditions are all continuously monitored. In addition, the wind turbines are equipped with a remote monitoring system. The data and signal transfer only requires an ISDN connection. Different versions of appropriate communication software and hardware can be installed on any PC and are provided by Nordex.

FACTS AND FIGURES.

	S70/1500 kW	S77/1500 kW		S70/1500 kW	S77/1500 kW
Rotor			Yaw system		
Number of blades	3	3	Yaw bearing	Four-point bearing	Four-point bearing
Rotor speed	10.6 – 19 rpm	9.9 – 17.3 rpm	Brake	Hydraulic disc brake with 10 calipers	
Rotor diameter	70 m	77 m	Yaw drive	4 induction motors	4 induction motors
Swept area	3,848 m ²	4,657 m ²	Speed	c. 0.75 0/s	c. 0.75 0/s
Power regulation	Pitch	Pitch	Control system		
Cut-in wind speed	3 m/s	3 m/s	Type	Microprocessor	Microprocessor
Cut-out wind speed	25 m/s	for tubular towers 25 m/s for lattice tower 20 m/s	Grid connection	Via IGBT converter	Via IGBT converter
Survival wind speed	59.5 m/s (at 65 m hub height)	52.5 m/s	Scope of monitoring	Remote monitoring of more than 300 different parameters, e.g. temperature sensors, hydraulic sensors, pitch parameters, vibration, speed, generator torque, wind speed and direction, etc.	
Pitch regulation	individual electromotive pitch		Recording	Production data, event list, long and short-term trends	
Total weight	Approx. 32,000 kg	Approx. 34,000 kg	Brakes		
Blades			Design	Three independent systems, fail-safe (individual pitch)	
Blade length	34 m	37.5 m	Operational brake	Electromotive blade pitch	Electromotive blade pitch
Material	GRP		Secondary brake	Disc brake	Disc brake
Weight	Approx. 5,400–5,900 kg	Approx. 6,500 kg	Tower		
Gearbox			Type	modular steel tower, cylindrical, upper segment conical Lattice tower, hot-dip galvanised	
Type	Combined planetary and spur gear		Hub heights	Tubular tower 65 m, certificate DIBt 3, Tubular tower 85 m, certificate DIBt 2	Tubular tower 61.5 m, certificate IEC 3a, Tubular tower 80 m, 85 m, 90 m, 100 m, certificate DIBt 2 70 m IEC 3a, 85 m IEC 3a
Gear ratio	1 : 94	1 : 104			
Weight	Approx. 14,000 kg	Approx. 14,000 kg			
Oil quantity	350 l	350 l			
Oil change	Bi-annual check, change as required				
Main shaft bearing	Self-aligning roller bearing				
Generator					
Power	1,500 kW (adjustable)	1,500 kW (adjustable)			
Voltage	690 V	690 V			
Type	Double fed asynchronous generator, air cooled				
Speed	1,000–1,800 rpm ± 10 %	1,000–1,800 rpm ± 10 %			
Enclosure class	IP 54	IP 54			
Coupling	Multiple steel disc, insulated				
Efficiency	Efficiency c. 95% a full load, (electrical system overall)				
Weight	Approx. 7,000 kg	Approx. 7,000 kg			
Power factor	0.9 ind. 0.95 Kap.				

POWERCURVE S70/1500 KW

Windspeed [m/s]	Power [kW]	Cp
4	24	0,159
5	87	0,295
6	190	0,373
7	329	0,407
8	531	0,440
9	736	0,428
10	1016	0,431
11	1284	0,409
12	1426	0,350
13	1500	0,290
14	1500	0,232
15	1500	0,189
16	1500	0,155
17	1500	0,130
18	1500	0,109
19	1500	0,093
20	1500	0,080
21	1500	0,069
22	1500	0,060
23	1500	0,052
24	1500	0,046
25	1500	0,041

Rounded values based on measurement of WINDTEST GmbH, Report No. WT 1350/00 and WT 3599/04

POWERCURVE S77/1500 KW

Windspeed [m/s]	Power [kW]	Cp
4	44	0,241
5	131	0,367
6	244	0,396
7	400	0,409
8	600	0,411
9	854	0,411
10	1111	0,389
11	1331	0,351
12	1475	0,299
13	1500	0,239
14	1500	0,192
15	1500	0,156
16	1500	0,128
17	1500	0,107
18	1500	0,090
19	1500	0,077
20	1500	0,066
21	1500	0,057
22	1500	0,049
23	1500	0,043
24	1500	0,038
25	1500	0,034

Rounded values based on measurement of Windtest Grevenbroich Report No. LK02001B1A6.



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