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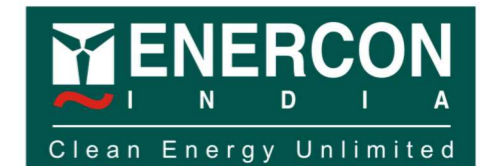
800 kW

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M/s. Enercon (India) Ltd

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A Germanischer Lloyd ISO 9001-2000 certified company

Enercon (India) Ltd. - A Snap Shot

The Enercon success story began in 1984 at Aurich, Germany. Today, many innovations later, Enercon GmbH is not only the market leader in Germany but also world's leading wind energy company.

When it comes to excellence in manufacturing wind energy converters, Enercon has always been a path breaker. Be it its gearless technology or its energy efficient grid feeding system or its long lasting, warp resistant blades, Enercon's innovations have consistently left the competition far behind.

Enercon India, since its inception in 1994, has been making giant strides. It has already installed more than

2000 wind energy converters in India with total installed capacity exceeding 1300 MW.

An ISO 9001 2000 certified company for manufacturing, installation and services.

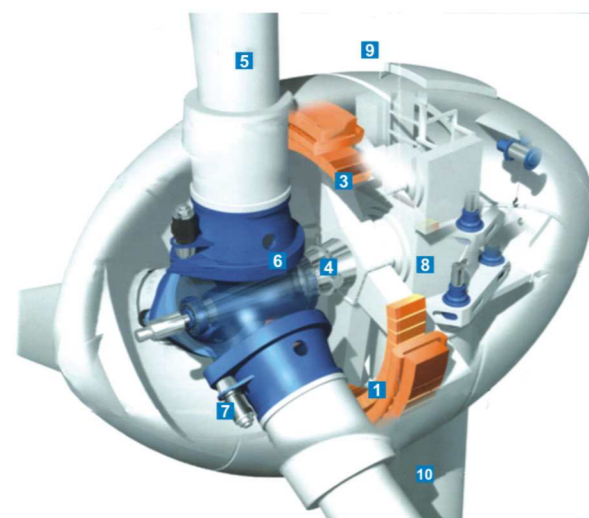
It has presence in seven high wind potential states viz, Karnataka, Maharashtra, Tamil Nadu, Rajasthan, Gujarat, Madhya Pradesh and Andhra Pradesh.

Enercon has set up a training Academy at Daman for training world class technical support team for Operation and Maintenance.

India can now wake up to a future full of clean energy.

TECHNICAL DATA

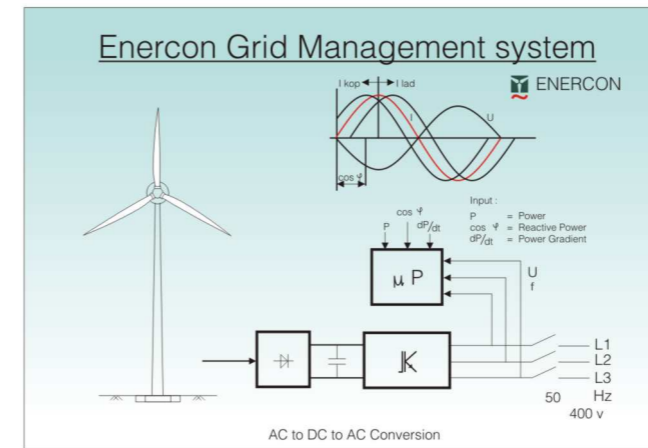
Rated power	: 800 kW
Rotor diameter	: 52,9 m
Tower height	: 72-74 m steel / concrete
Turbine concept	: Gearless, variable speed, variable pitch control
Rotor	
Type	: Upwind rotor with active pitch control
Direction of rotation	: Clockwise
Number of blades	: 3
Swept area	: 2,198 m ²
Blade material	: Fibreglass (epoxy resin); integrated lightning protection
Rotational speed	: Variable, 12 - 29 rpm
Pitch control	: ENERCON blade pitch system, one independent pitching system per rotor blade with allocated emergency supply
Drive train with generator	
Hub	: Rigid
Main bearings	: Single-row cylindrical roller bearings
Generator	: ENERCON direct-drive synchronous annular generator
Grid feeding	: ENERCON converter
Braking systems	: - 3 independent blade pitch systems with emergency supply - Rotor brake - Rotor lock
Yaw control	: Active via adjustment gears, load-dependent damping
Cut-out wind speed	: 28 - 34 m/s (with ENERCON storm control)



800 kW
E53

Enercon's Revolutionary Gearless Technology

- | | |
|---------------------|-----------------|
| 1. Generator | 6. Blade Flange |
| 2. Generator Stator | 7. Pitch Drive |
| 3. Generator Rotor | 8. Main Carrier |
| 4. Main Pin | 9. Wind Sensor |
| 5. Rotor Blade | 10. Tower |



Enercon Grid Management system

- ~ Generator is totally isolated from grid.
- ~ Power factor is near unity without use of capacitor bank.
- ~ Clean and harmonic free output ensuring highest degree of compatibility with grid.

Enercon's Unbeatable PLF Advantages

- ~ Gearless Construction
- ~ Operates at a continuous variable speed in synchronism with the varying wind speeds
- ~ Continuous variable pitch regulation of blades
- ~ For Blades, three independent braking & Lightning protection systems
- ~ Ability to withstand voltage fluctuations of -20% to +20% of nominal voltage
- ~ Wide frequency operation band: 46Hz to 54Hz
- ~ Synchronous Generator is directly connected to the turbine rotor.
- ~ The speed and power of the ring generator is influenced by the pitch control and the electrical excitation
- ~ The power generated by the ring generator passes through thyristor-based rectifier and IGBT based inverter, which ensures that the outgoing power is conditioned with the utility grid guidelines. These are controlled by Microprocessor based control circuit
- ~ Optimum adaptation to many different grid voltage at different location
- ~ Maximum utilization of grid connection capacity for feeding in power
- ~ During the start up procedure the turbine is connected with zero current and runs up to nominal power in a controlled manner
- ~ The power factor of the turbine can be electronically adjusted nearest to unity
- ~ Voltage regulating facility in distribution grids, therefore maintaining the voltage quality
- ~ Extensive infrastructure arrangement at the projects sites

The above unique features leads to higher PLF which in other words means higher return of investment.

Enercon care

Enercon believes in customer fulfillment... from concept, commissioning to lifetime care. Enercon India Limited manufactures not only WEC's it also straddles the entire spectrum of project development and 'Operation & Maintenance' Activities.

- ~ Manufacturing of Wind Energy Converters
- ~ Selection and acquisition of potential sites
- ~ Regulatory and statutory clearances.
- ~ Assistance in Financing
- ~ Infrastructure Development
- ~ Civil construction
- ~ Erection of wind energy converters
- ~ Creating evacuation facilities.
- ~ Project commissioning
- ~ Comprehensive operation and maintenance

Enercon's specially profiled Rotor Blades

- ~ Specially profiled rotor blades - fibre glass reinforcement with epoxy resin for light weight, long life and wrap resistant.
- ~ The embedded aluminium strips to make them lightning proof

