Moventas is a global manufacturer of intelligent multi-megawatt class wind turbine gearboxes. Moventas’ wind turbine know-how is based on decades of tradition and experience, as we began to develop wind turbine gearbox technology in early 1980’s. Our products are built with high standards of workmanship and continuous innovation.

We believe in developing quality drive solutions that provide our customers with reliable wind turbine gearboxes for all conditions, from the arctic tundra to deserts, from inland to offshore. Our strength lies in the ability to use our thorough understanding of our customers’ needs to develop innovative solutions that improve performance and lengthen the lifecycle of the machinery.

Moventas’ gearbox units offer flexible layout options for wind turbine manufacturers. Unique reliability, low noise and minimum vibration are some of the reasons why the most demanding wind turbine manufacturers around the world choose our gearboxes.

Wind turbine gearboxes in the multi-megawatt class must meet strict power-weight ratio requirements. Due to intensive R&D work, Moventas has been able to continuously increase the power-weight ratio of its gearboxes.

Our multi-megawatt gearbox solutions include the FusionDrive®, the smartest gear and generator combination in the market. Developed together with the leading megawatt-class permanent magnet generator supplier The Switch, the FusionDrive® provides not only the highest energy yield, but also significant cost savings through the smallest size, lightest weight and best serviceability in the market.

The newest addition to our series of innovations is the Exceed™ Series, a high torque density platform for 3MW+ turbines. See page 6 for our comprehensive product portfolio!
Three decades of experience & Product launches

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>2003</td>
<td>Semi-integrated 3MW medium speed</td>
</tr>
<tr>
<td>2006</td>
<td>CMaS™, Condition Management System</td>
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<tr>
<td>2007</td>
<td>Advanced load sharing system FlexSpider™</td>
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<tr>
<td>2009</td>
<td>Digital 3-axis accelerometer</td>
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<td>2010</td>
<td>Adaptive lubrication AMaS</td>
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<tr>
<td>2011</td>
<td>Simple up-tower repair system</td>
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<tr>
<td>2012</td>
<td>Unique FusionDrive™</td>
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<tr>
<td>2013</td>
<td>Innovative Multi-Megawatt Technology</td>
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<tr>
<td>2014</td>
<td>High torque density Exceed™ Series</td>
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</table>

Total installed base currently ~14,000
Quality begins with R&D, but doesn’t end there

Moventas’ innovative technology for wind turbine gearboxes is continuously developed to meet the increasing demands for reliability and low noise. Our in-house design and production combined with our in-depth product competence have led to a track record of proven technology and an installed base of thousands of units.

We have successfully reduced the noise level of gearboxes by improving tooth accuracy and choosing the optimal geometry and profile. Theoretical evaluations as well as on-site testing are used for eliminating any harmful resonance sounds of the structural elements. To achieve noiseless wind power, the gear unit must not vibrate. This is why our gear units are especially designed to prevent vibrations from passing through the gearbox fixing points to the foundation of the wind power plant.
Our wind turbine gearboxes are thoroughly tested in-house during the production process. We conduct a complete running-in procedure before delivery. Running-in under controlled load conditions reduces surface roughness of the teeth as well as the risk of micropitting and scuffing.

We use only selected high-grade steel in the gear unit wheels. To guarantee optimum gear wheel quality, we keep the critical heat treatment processes in-house. The housings ensure the rigidity of the gearboxes and allow flexible modifications to suit customer requirements.

Moventas is well-known for its high quality of both design and manufacturing. We are certified for that according to ISO 9001 and 14001 standards.

Reliability testing

To ensure ultimate quality, we go a little bit further. In addition to conventional prototype testing, we offer gearbox qualification with a reliability test. The test includes simulation of extreme conditions as well as an accelerated endurance test at elevated loads. We are also able to ensure system reliability by testing it under severe ambient conditions in the climate chamber, on both sub-system and component level.

The Moventas’ Gear Technology Center researches the dynamic behavior of gear unit components and enables testing of a wind turbine gear up to ten megawatts. At the center, we test prototype units under all load conditions to qualify their noise and vibration performance.
Comprehensive portfolio
From classics to pioneering designs

Exceed™ Series
- Highest torque carrying capacity
- For high and medium speed drivetrains in 3MW and up
- 20% more torque density
- 10% smaller size
- 100% proven technology
- Adaptable, scalable - cost effective

FusionDrive®
- Unbelievably small size
- Lowest weight in the market
- Reliable medium speed technology for highest availability and annual energy yield
- Best serviceability in the market with main components changeable up-tower
- Scalable platform extends from 3 MW to offshore class in onshore size

Offshore
- High-grade materials and innovative technology
- Case hardened ring wheel
- Provides low O & M costs
- Remote diagnostics system CMaS

MMW
- High power density
- Leading solution provider of its power class
- Field-proven product with excellent track record
- Superior technology with ten year delivery history

MW
- Wide variety in serial volumes
- Standby solutions for most wind turbines
- Reliability is based on field experience and wide installed base with excellent track record
- High quality product also for integrated drive train solution

kW
- Field-proven gear unit with the most robust bearing solution
- A classic – still in production, still running
- Wide installed base, over 5,000 units delivered
Why not think ahead?
Choose Service by Moventas

Moventas offers versatile solutions for improving the performance of your wind turbine gearbox throughout its lifecycle. Proactive service means that we are always close to you through our local presence and advanced remote diagnostics. All our services are aimed at increasing operational reliability and reducing unscheduled shutdowns.

Our service solutions include turnkey upgrade services regardless of the brand, to prolong your gearbox lifetime. Repair and maintenance services can be carried out on site, up-tower or in our modern service technology centers. Our 24-hour service provides quick, highly professional online support.

Peace of mind with CMaS
The Moventas Condition Management System, CMaS, is a state-of-the-art service for preventive maintenance, minimizing downtime and maximizing the lifetime of your machinery. CMaS offers you reliable, real-time, measurement-based information from the gearbox and associated equipment. CMaS can be retrofitted to existing gearboxes in the nacelle or factory fitted to new gearboxes.

With the Moventas Remote Diagnostics service you know your equipment is in good hands. A Moventas gear specialists monitor your equipment online and all the observations with recommendations are reported directly to you. If you prefer, you can even monitor your equipment and process the information yourself.
Moventas is a new energy technology expert and service provider. Moventas’ technology strives to lower the cost of energy across the lifecycle of renewable energy generation, from superior gearbox design and manufacture to extensive after sales service for most gearbox brands. Moventas is part of Santasalo Moventas and owned by the global engineering group Clyde Blowers.

Read more at

www.moventas.com

All the people in the pictures of this brochure are authentic Moventas employees.