



aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



Wind Turbines

Dedicated Products and Solutions



ENGINEERING YOUR SUCCESS.

Dedicated products and solutions for

Parker – an experienced partner at your service

For many years, Parker Hannifin has been a major supplier of quality components and system solutions to the wind turbine industry, with manufacturing and engineering facilities around the world, including the United States, China and Europe's leading wind power nations, such as Denmark, Germany, Spain and the Netherlands, ensuring global aftermarket support.

Parker has dedicated teams of wind turbine specialists working

globally to assist our clients in the design of systems, sub-systems and solutions to meet the most demanding requirements, offering unbeatable global product availability and service.

There are several immediate value-adding benefits from utilising our expertise and our advanced technology.

For the manufacturer, time-to-market can be cut by several (very important) months, while pro-

duction time and cost can be reduced by up to 15 percent, thanks to integrated solutions, unique design features, globally synchronized logistics and services such as Kan-Ban, Kitting and Pre-assembly, which also cut inventories and simplify purchase routines significantly.

For the end-user, benefits such as greater efficiency, reduced downtime and less maintenance contribute to an improved profitability.



► Specially designed cylinders

Parker's hydraulic cylinders for wind turbine applications deliver reliable performance under tough operating conditions. Typically, cylinders incorporate a manifold with control valves and feature a built-in position sensor. The system maintains selected rotor pitch during normal operation. In the event of e.g. grid loss, the rotor blades are quickly feathered.



▲ Integrated functionality

Customised system blocks simplify installation and servicing. These can include threaded cartridges, manifold mounted valves and, in addition, servo proportional valves. Pre-assembled and tested, they offer great value in reducing assembly and installation costs. Save on aftermarket purchasing and servicing!



◀ Quiet power

Parker offers a range of pumps, from variable piston pumps to fixed displacement vane pumps with high pressure and high speed capacities, low weight and exceptionally low levels of noise. A wide range of frame sizes and controls makes this range the obvious choice for modern wind turbine designs. All pumps are performance-matched to the other system components, for optimum performance and reliability.

► Measuring devices

A broad range of sensors and adaptors is available in our SensoControl® product offering, all designed to meet global standards. A wide variety of mounting styles, pressure ranges and monitoring systems accommodates all types of application demands. Combined pressure and temperature sensor units are available. Parker's diagnostic equipment can identify hard-to-detect variations in pressure, temperature and flow quickly and easily.



wind turbines

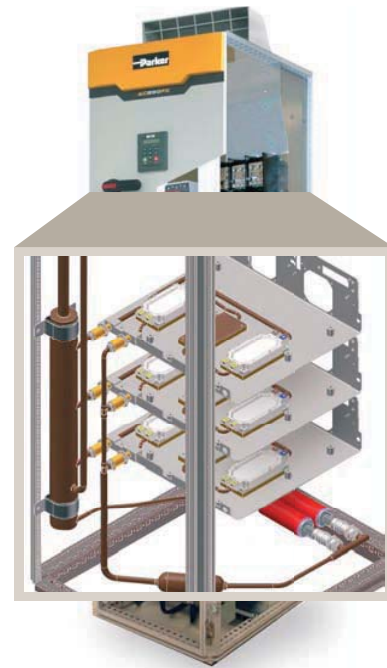
▼ Grid-Tie Inverter Systems

With more than 30 years of experience in inverter technology, Parker SSD Drives provides grid-tie inverter systems using innovative filtering and cooling methods to maximize energy recovery and ensure quality power to the grid. Parker SSD Drives inverter systems deliver efficient and reliable performance with compact mechanical designs, ensuring minimum footprint and easy handling. They include function-block programming, modular design scalable for solutions from 1MW to hundreds of megawatts, applicationspecific control logic, PWM switching technology, and integral harmonic filtering. Pluggable power modules mean simple, on-site service and repair without the need for expensive shipping or handling.



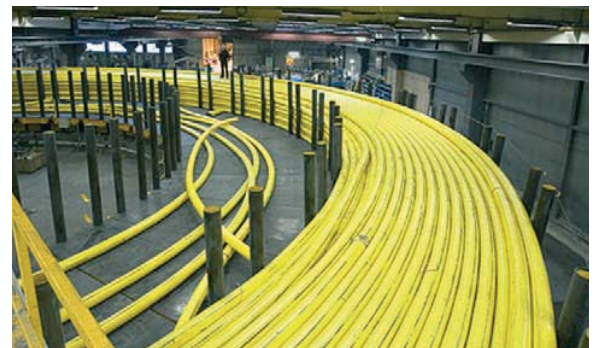
► High Density Electronic Cooling

These best-in-class extreme cooling systems provide high performance and maximum power in a lightweight, compact system architecture. Advanced Parker Vaporizable Dielectric Fluid (VDF) cooling technology is 1000 times more effective than air at heat removal, with no condensation. Parker offers plug-in modularity with integrated bus system and minimal power wiring. These rugged sealed modules are easy to install and service.



▲▼ Subsea power cables

Parker Scanrope is a global supplier of subsea power cables and associated termination equipment to the offshore wind turbine and wave power industry. With our Engineering and Development staff, we have the experience and technical qualifications to supply customers with the necessary information for choosing the best design, customized to meet specific needs.





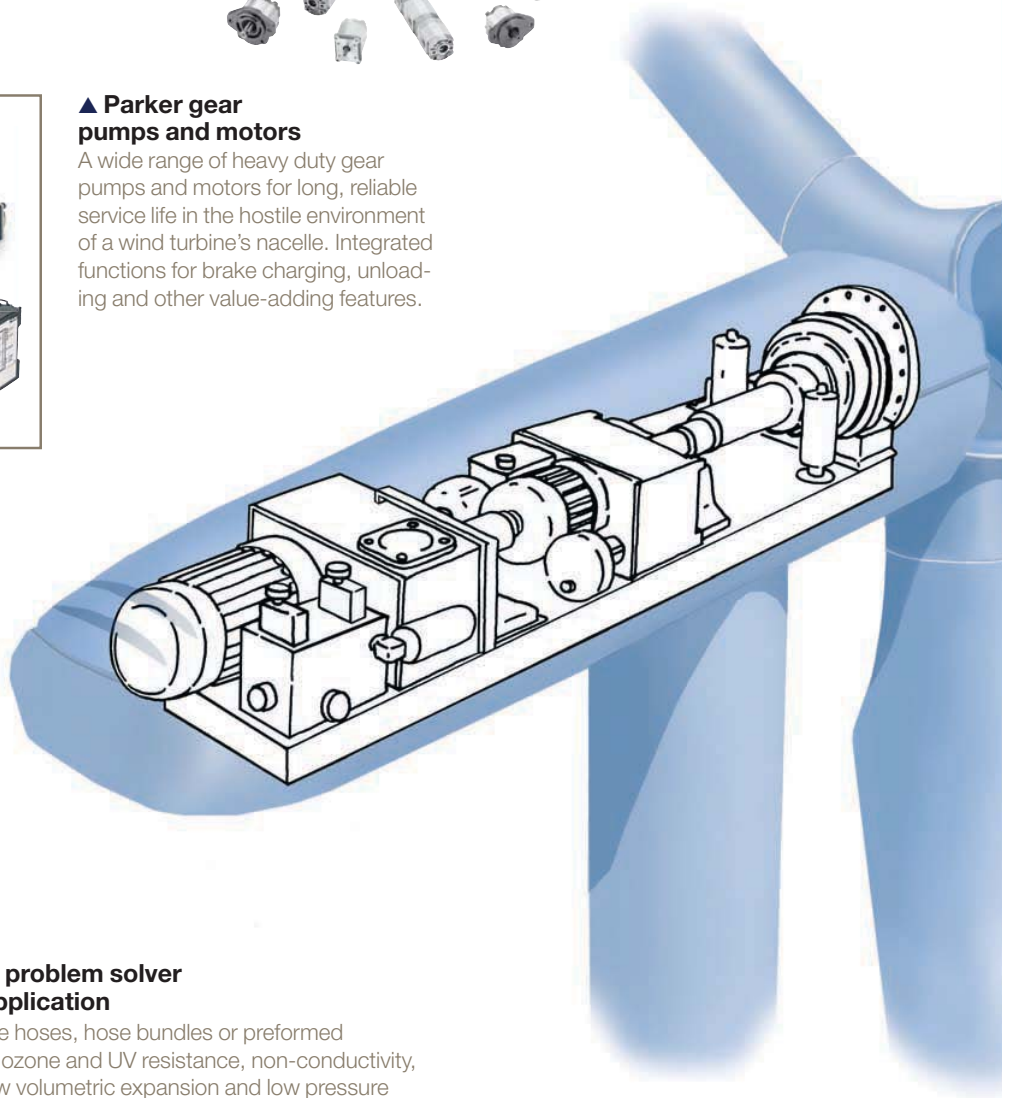
▲ Parker gear pumps and motors

A wide range of heavy duty gear pumps and motors for long, reliable service life in the hostile environment of a wind turbine's nacelle. Integrated functions for brake charging, unloading and other value-adding features.



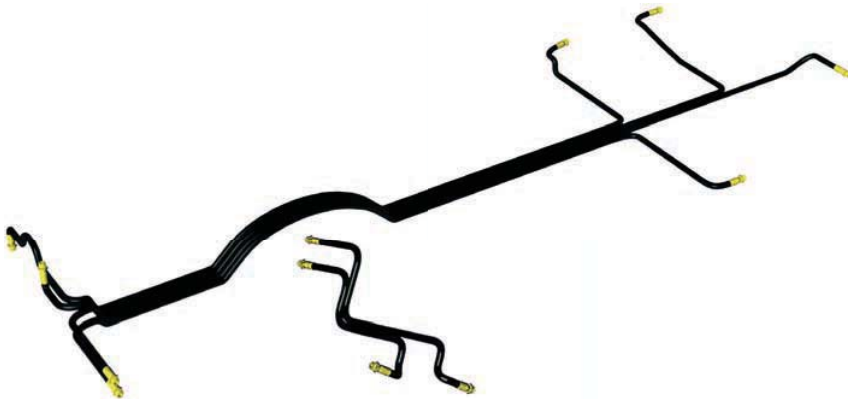
▲ Precision hydraulic valves and electronics

Proportional valves for accurate and smooth control, high response valves for closed loop applications. From Parker's wide range of analogue and digital electronic controls, we can help you select the proper components and system solutions for superior performance at a competitive cost.



▼ Thermoplastic hoses – a problem solver for almost any hydraulic application

Available as single hoses, multiple hoses, hose bundles or preformed hoses, offering superb durability, ozone and UV resistance, non-conductivity, excellent chemical resistance, low volumetric expansion and low pressure drop. In combination with easy assembly, minimised downtime, and space saving compact design, these features guarantee brilliant performance and contribute to system profitability. Especially with customised solutions, the polyflex product range can perfectly meet the requirements of wind turbine applications. Guaranteed cleanliness level.





▼ Steel and stainless steel quick couplings

A complete range of quick couplings for any tough environment application.



▲ Store energy

Our complete range of CE approved piston, bladder and diaphragm accumulators maintains high pressure for safe braking and dynamic control. Greater system efficiency and reduced pump sizes gives longer life, lower costs and reduced noise levels. Piston position sensors for monitoring our piston accumulators are also available.



◀▶ Hydraulic fittings

These high-pressure fittings are used in all fields of hydraulic applications. A wide range of designs and materials makes them particularly suitable for wind turbine applications where safety, corrosion resistance, leak free connections and ease of assembly are important factors.



► Unique Parflange® F37 technology makes welding unnecessary

With the new Parflange® F37 system you are signalling the future: from now on, non-welded tube connections for the largest tube dimensions and pressures up to 420 bar (6,000 psi) can be prepared quickly, cleanly and with reduced costs. Traditional welding is a thing of the past.



◀ Parker Hoses

The best hose for your operation is the one that gets the job done right. At Parker, we offer the most comprehensive line of hoses and all the fittings and options you'll need, including UV resistance, maximum flexibility, a wide range of media compatibility, and hoses that are made to meet or exceed ISO and EN specifications. Additionally, we can provide guaranteed cleanliness levels for all your hose assemblies. These characteristics make Parker the hose supplier of choice for you.

Complete systems

► Power units

The power unit is the heart of the turbine, supplying the power necessary to operate pitch, yaw and braking systems and providing back-up in case of power failure, providing a safe stop. Our hydraulic power units are designed with reliability, ease of maintenance and a wide operating temperature range in mind.



▲ Integrating real-time intelligence in the gearbox filtration system

Parker's system-matched filtration solutions have proven to be effective to extend the life time of critical components such as bearings. Combined with long filter element life time, the utilisation rate of the complete wind turbine is increased – an important aspect when service costs are at a premium. Our Condition Monitoring product offering integrates real-time accurate and low cost monitoring of the lubrication fluids condition. Our sensing and communication modules ensure an easy 'plug and operate' linkage with control management systems.



◀ Added life

Parker filtration technology extends the life and increases the reliability of wind turbines by using environmental solutions. In addition to a wide range of hydraulic filters, lube filters and reservoir accessories, Parker offers you the global leader in fluid condition monitoring with the Laser CM portable particle counter. A comprehensive range of quality products to cover all your needs!

Parker advantages in short:

- **Global presence**
- **Outstanding wind turbine experience**
- **Dry Technology™**
- **Full line of filters**
- **Time-saving kitting and pre-assembly**
- **Product availability**
- **Extended warranty**

▼ Pitch systems

Dynamic pitch systems with specially designed cylinders, with fully protected internal transducers on which integrated blocks containing all necessary valves are mounted, are placed inside the hubs. This necessitates reliable performance, maintenance accessibility and integrated safety functions. Parker can supply integrated systems with every component needed, including high performance electronic control valves compatible with any modern wind turbine control system. The pitch control can be combined with a technically advanced axis controller for pitch and maximum force control, bringing about high-accuracy blade control and permanent control of the mechanical load on the blades.



▼ Braking systems

Braking systems are used as a parking brake for servicing, for slowing down to a halt safely and to maintain a constant speed when the turbine is transmitting power. The components face serious demands on reliability, low leakage, long stand-by-time and compactness to survive tough operating conditions and comply with safety regulations – demands that are surpassed by Parker's dedicated products.



▼ Electromechanical Blade Pitch Control Systems

In addition to hydraulically controlled and actuated blade pitch control systems, Parker can also provide the components and systems to achieve highly dynamic performance with electromechanical technologies. Parker's electromechanical solutions include: DC drives with robust design and flexible connectivity; brushless servomotors in a full power range with flexible connection options; multi-axis motion controllers providing high speed coordinated multi-axis motion; servo drives with compact power and full programmability and electric cylinders offering compact power in a rugged package.



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