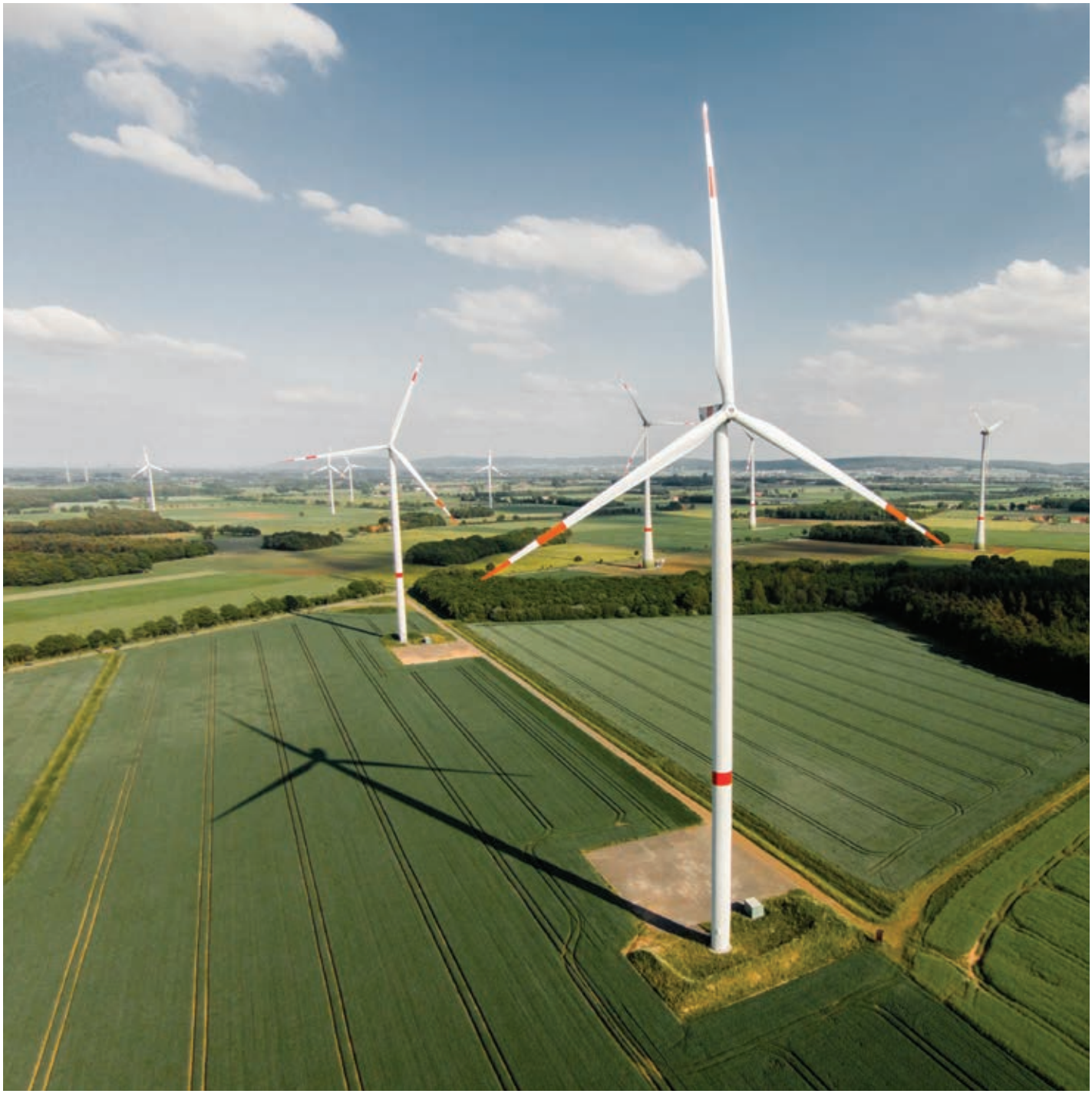
The Drive & Control Company

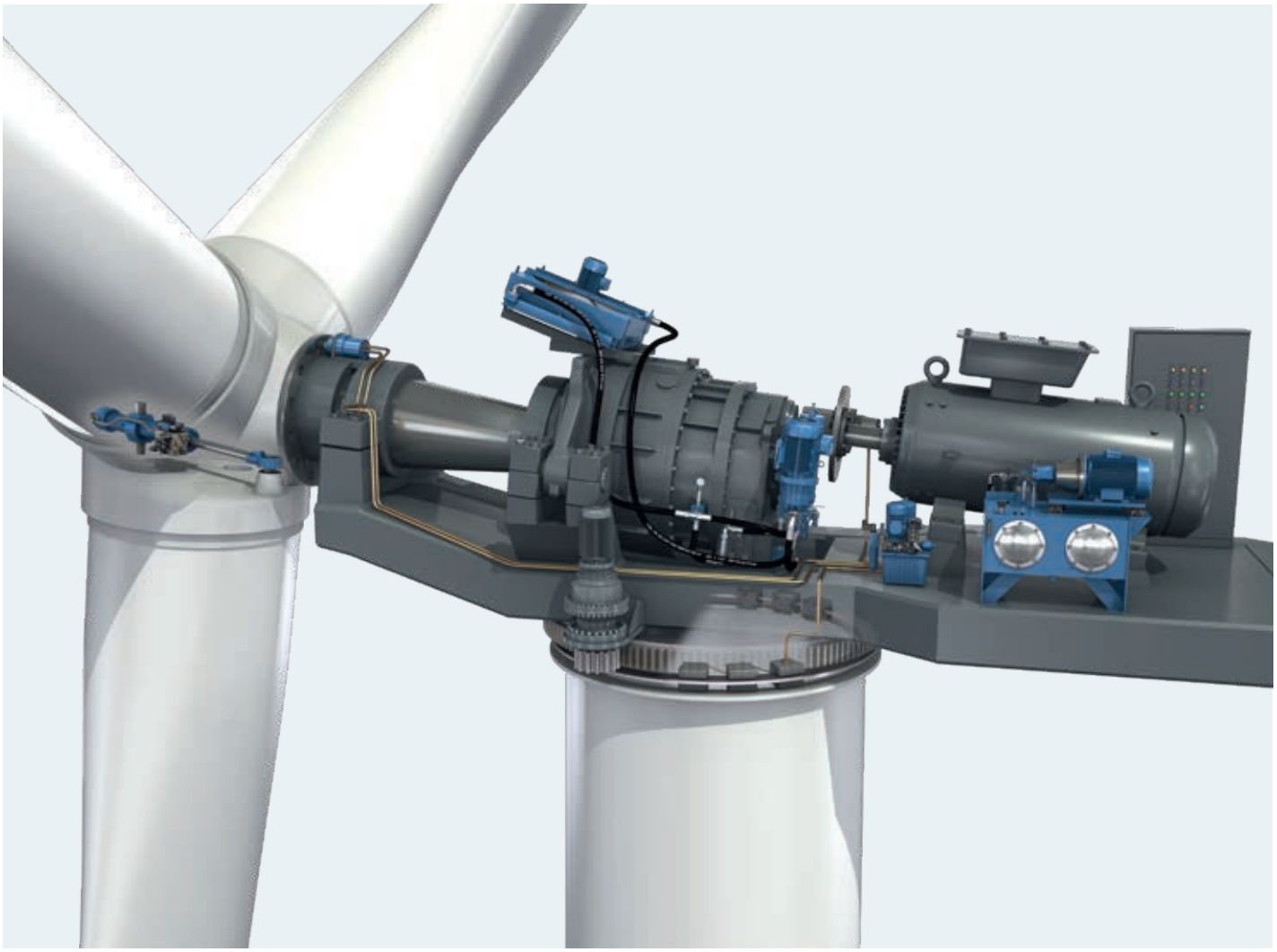
Rexroth
Bosch Group

Reliable hydraulics for wind energy systems



Robust, compact, customized

Wind energy is the key technology for renewable energy production. Intelligent hydraulics from Bosch Rexroth steadily extends the availability and life cycle of the systems. This increases the yield and reduces the Levelized Cost of Energy (LCOE) in thousands of onshore and offshore installations.



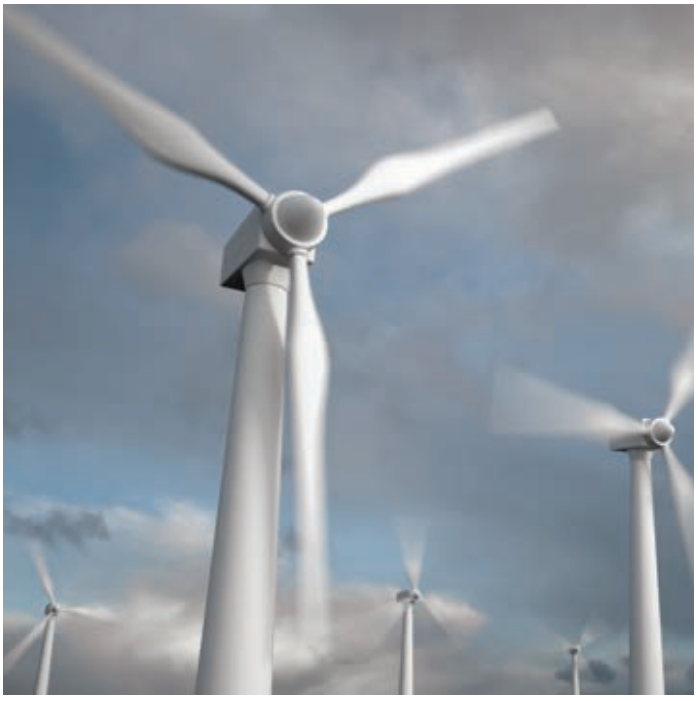
Many years of experience
From the 1980s, when wind energy was still in an early stage of development, to modern industrialized series production of multi-megawatt systems, Bosch Rexroth has supported manufacturers around the world with tailor-made hydraulics solutions. We master the requirements for the highest energy yield at the lowest cost, whether onshore or offshore, in the Arctic cold or in hot deserts with fine dust. Hydraulics is always the technology of choice when robustness, compactness and the highest power density matters. The higher the power required, the more hydraulics show their strengths.

Modern hydraulics: intelligent and easily networked
Hydraulics are more than just powerful, together with digital control electronics that are also intelligent and can be easily networked using Ethernet based fieldbus systems. Intelligent hydraulics provide distributed control by closing the control loop internally. Using sensors they continually monitor the operating data in real time and thus enhance the capabilities of your condition monitoring systems.

Development expertise
We systematically develop tailor-made modules and systems according to your specifications using certified processes and methods.

Using large scale simulation programs, at a component and system level, we produce complete sub-systems which integrate seamlessly into your overall system connected at the interface of your choice. This can go as far as virtual commissioning and programming of the automation solution in a digital twin.

These measures combine to reduce your engineering costs and significantly shorten development time.



Global partnership
The modular solutions are based on components in large scale production. In most cases they are used in a wide variety of certified applications from many system manufacturers and are field proven to fulfill the strict requirements of EMC, environmental conditions and machine safety compliance.

As a system partner, we use our international production network to deliver components and systems to your assembly line pre-assembled and tested – anywhere in the world. One particular benefit of using our international production network is that we can help you increase the local content of your systems, thereby increasing your sales opportunities in all regions of the world.

Always at the optimum angle to the wind – pitch systems for maximum yield

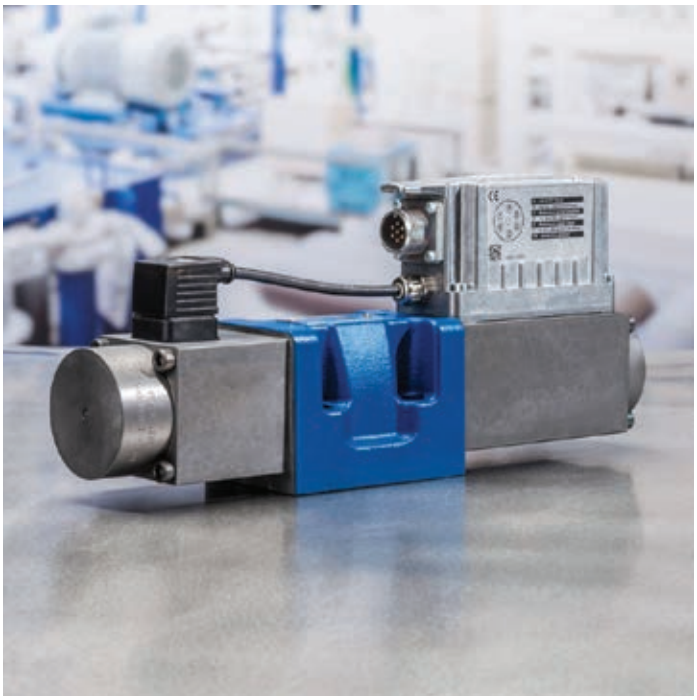
Whether it's the finest adjustment or rapid blade feathering: Pitch control of the blades has a pivotal impact on the amount of energy generated and the prevention of damaging overloads. Bosch Rexroth has been significant in the shaping and development of this technology.

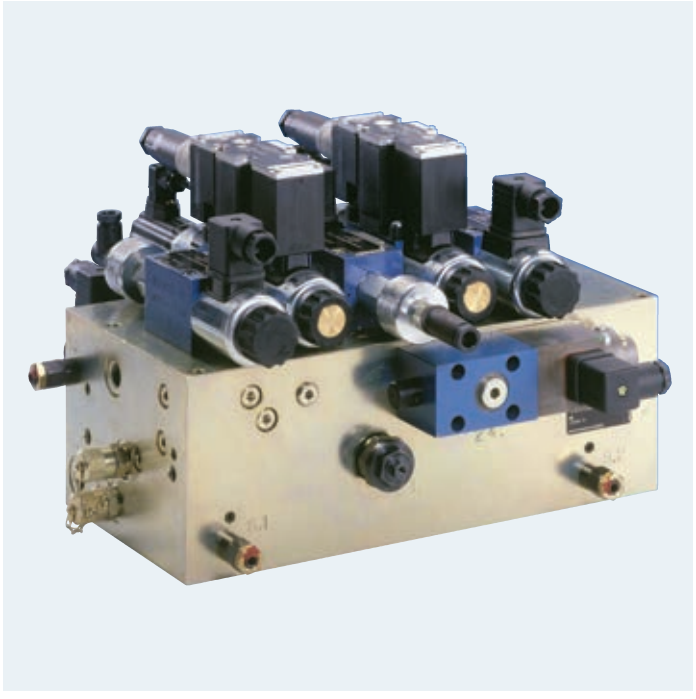
Pitch adjustment is the power regulator for wind energy systems, it must precisely follow the control system command values. In normal operation, pitch position control occurs smoothly and without shock to the blades. However, in an emergency it must be able to react rapidly to prevent damage to the system. Rexroth has developed complete modular solutions for this task. Thanks to the modular construction of the hydraulics, compact solutions can be installed even in the most restricted installation spaces. Our customers thus save on cost thanks to optimized hub geometry.

The core elements are directly operated high response valves, available with external or integrated electronics and position feedback options. These have been specifically developed and tested for use in wind energy systems. The control system issues commands either via analogue or standard digital protocols. The Multi-Ethernet interface supports all common fieldbusses and reduces wiring complexity. The intelligent proportional valve closes the control loop internally.

Hydraulic control combined with the mechanical system ensures effective protection of your systems in all situations – even in the event of power failure. Screw-in cartridge valves within a compact manifold control secondary functions, such as diagnosis cycles.

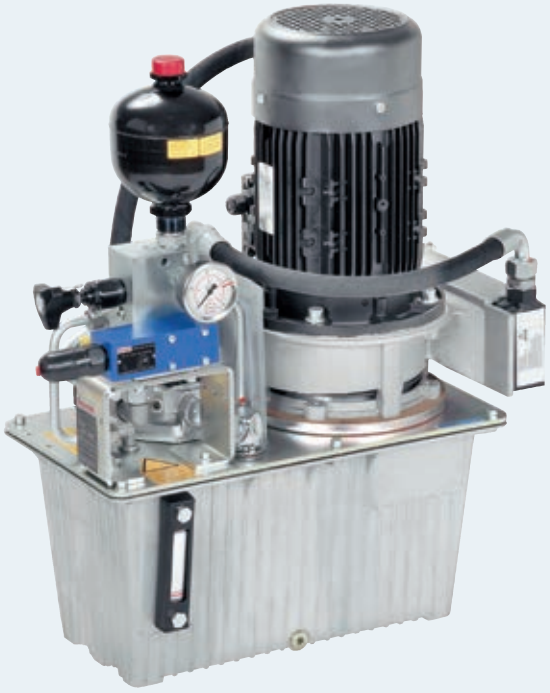
The use of environmentally friendly coating processes guarantee the high levels of corrosive protection required. Obviously all products are free from harmful substances. The cylinders are available in a variety of different dimensions and designs, such as seal systems and an optional integrated position feedback system. They cover all current requirements, even the most powerful multi-megawatt offshore systems.





Single Source Supply For Hydraulics

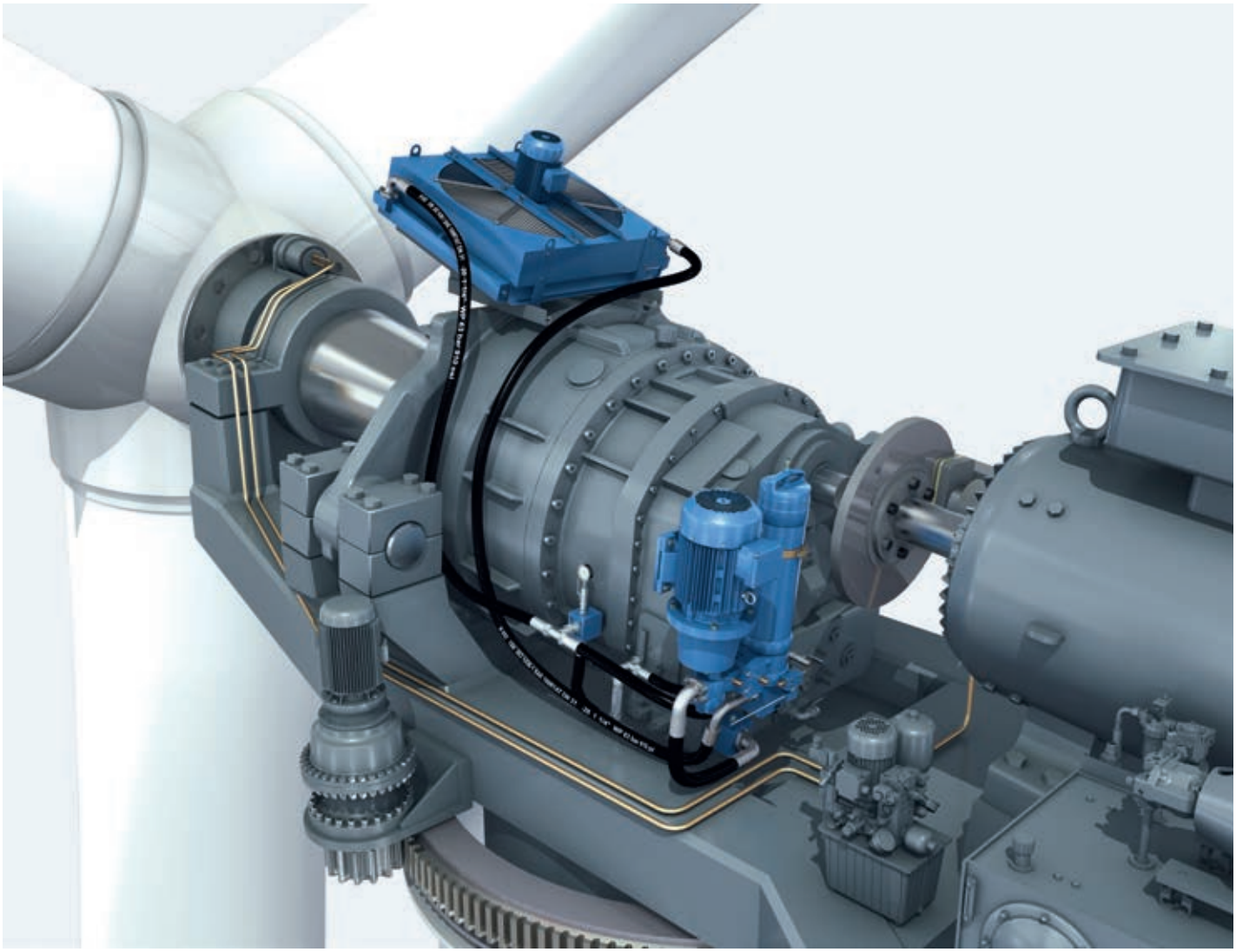
Hydraulics modules perform a wide variety of tasks in wind energy systems. Bosch Rexroth offers complete solutions in which all of the components and assemblies are perfectly tailored to the power and function of your system, from a single source.



Modular kits for brake functions
- Simple in design
- Flexible in application
- Robust and durable
- Functional even during power failure

Braking – strong but gentle
Hydraulic braking systems provide very high power, work largely without wear and achieve a high lifetime. Their simple design makes them particularly cost effective. Thanks to hydraulic accumulator units, they reliably carry out their tasks even in the event of a power failure. They are vibration-resistant and are not sensitive to changes in the ambient temperature in which condensation forms. The Bosch Rexroth portfolio includes a modular unit kit for azimuth and power train brakes as well as rotor locking. Alongside large scale production components, we also develop and manufacture components custom designed to meet your specifications.

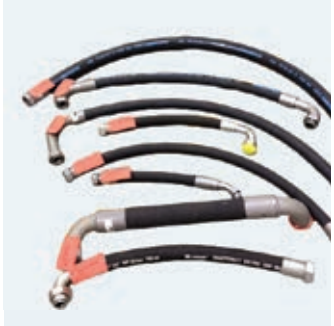
Accumulator stations
Hydraulic accumulators provide multiple functions in wind energy systems. They provide stored energy for a safe system shutdown and for feathering the rotor blades in the event of power failure. In addition, with intelligent design, they can be used to smooth out power peaks and reduce both the installed power and component sizes required. Saving cost and installation space.

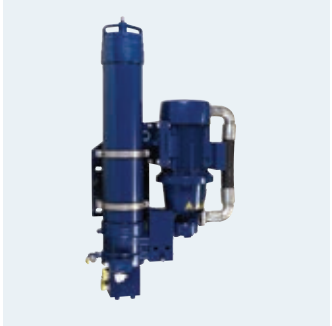


Filtering and cooling

Hydraulic systems and gears only achieve their maximum life expectancy with clean and cool oil. Bosch Rexroth offer filter housings with standardized filter media and cooling systems in a wide range of performance categories especially for use in wind energy systems. You can easily integrate these into your systems thanks to a wide variety of options.

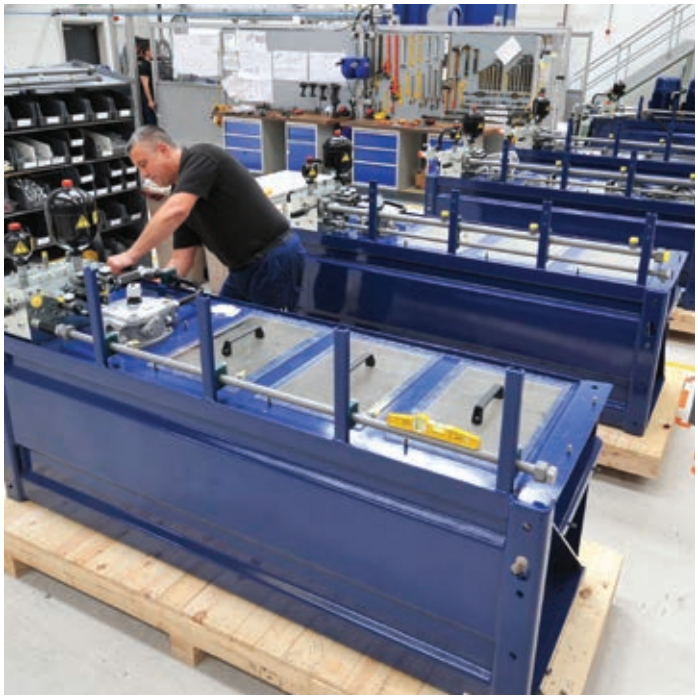
Simply configure the filtering and cooling unit according to your system size and climatic conditions. You thus put together ready-to-install assemblies which reduce your installation and logistics costs. Thanks to filter media in internationally accepted standard sizes, you reduce your operating costs and have long-term investment security.





Made-to-measure hydraulic power units

Produce hydraulic energy as required and continually record operating data: Modern hydraulic power units combine power with energy efficiency and intelligence, and contribute to higher availability across the entire life cycle of the wind energy system.



Energy generation as required
Hydraulic power units from Bosch Rexroth are based on the world's largest portfolio of hydraulic pumps and electric drives which can be freely combined with each other. We offer vane and piston gear pumps, with fixed or variable displacement and mechanical or electrical control. Here, demand-based control asserts itself as the state-of-the-art. It significantly reduces power consumption and, in combination with accumulator circuits, helps to shave the power peaks. As a result, all of the components can be smaller and you thus gain valuable installation space.

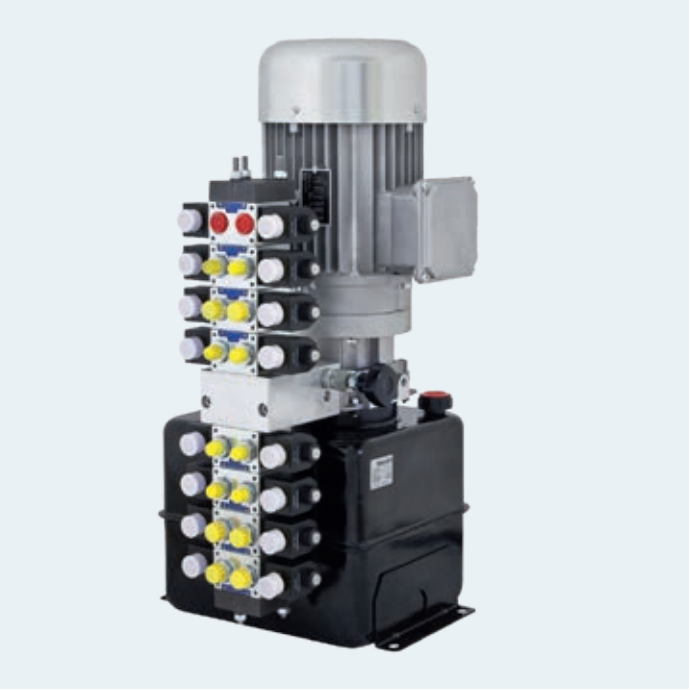
Variable displacement pumps control the pressure and flow. Mechanical or electronic pressure controllers continually adjust the system pressure so that the pumps only convey as much oil as is required.

Sytronix, variable speed pump drive from Bosch Rexroth, regulates the motor speed as required. Reducing the speed reduces the unit's power consumption and significantly reduces the average noise emissions. In addition, Sytronix reduces the heat input into the oil. You thus save even more money and installation space because smaller tanks with smaller quantities of oil are sufficient and, under certain conditions, costly cooling systems can be eliminated entirely.

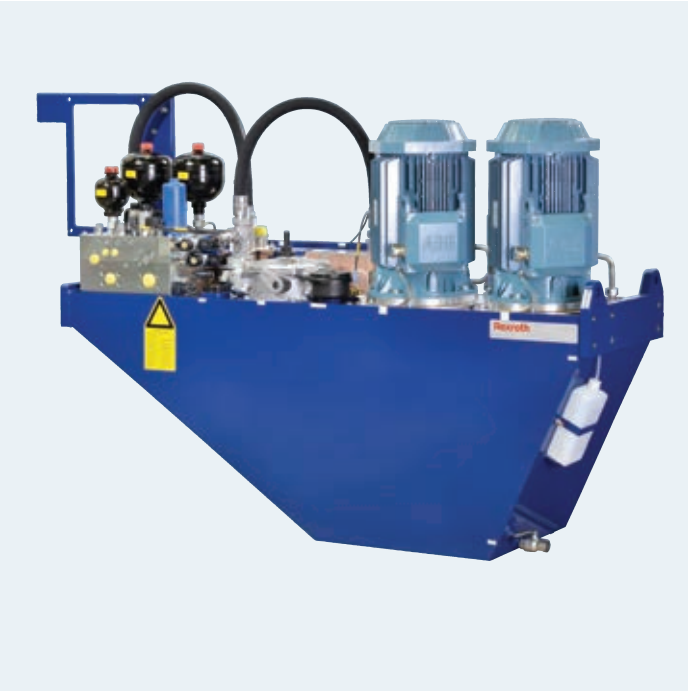
Standard or individual
Bosch Rexroth offers the optimal solution for every application from its comprehensive portfolio – from modular standard units through to custom designed units.

The small power units are compelling with their extremely compact design and a favorable price-performance ratio. The ABPAC and CytroPac standard ranges have digital intelligence and, in combination with sensors, record all of the key operating conditions. Hydraulics can be integrated into a condition monitoring system using standardized communication interfaces and can improve the availability of the system. Individual units are specially designed for the customer's system and particular operating conditions.

Multi-functional blocks built on the units cover all of the necessary functions – from pressure limitation for the system through to individual control functions. This design saves space and reduces the complexity of the piping.



Economical and technical advantages
- Modular kits based on tried and tested components
- Control functions integrated into multi-functional blocks
- Solutions optimized for the installation space
- Optional integration into condition monitoring systems



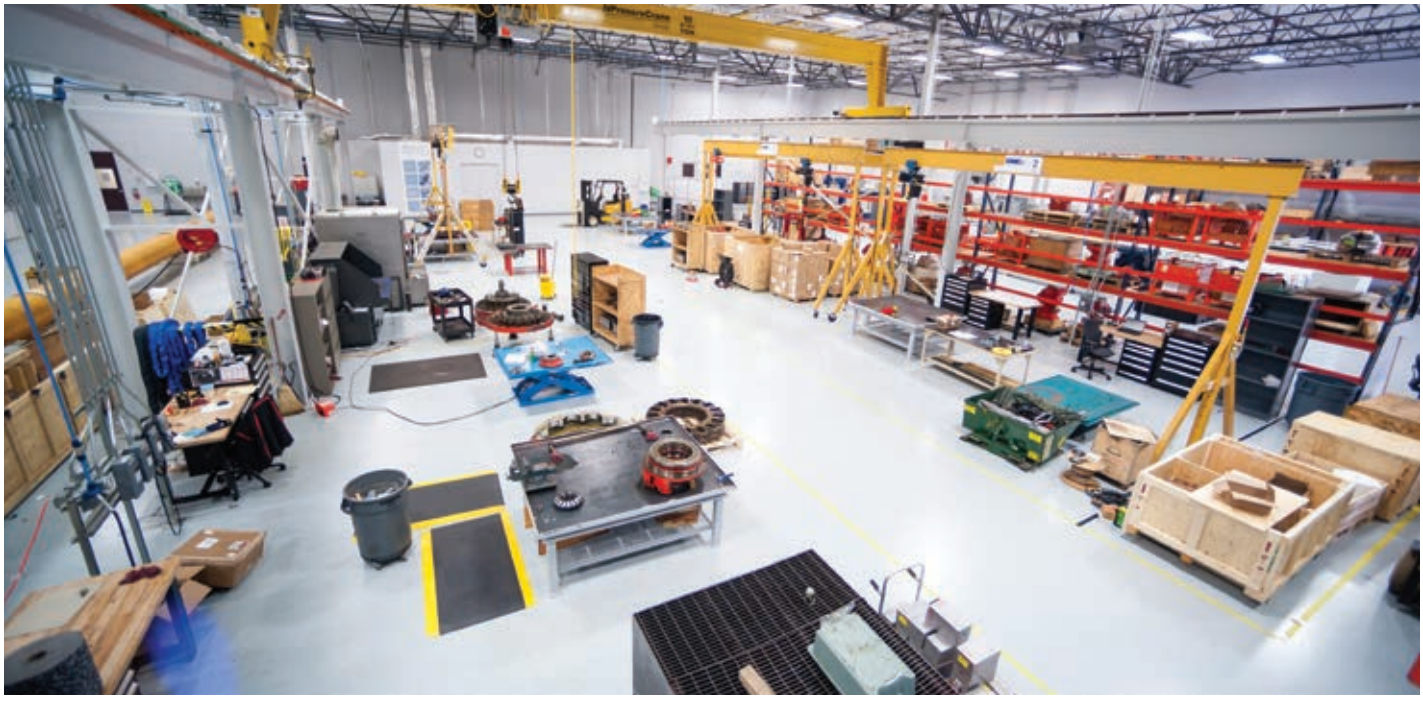
Further information:
www.boschrexroth.de/abpac

At your side throughout the life cycle

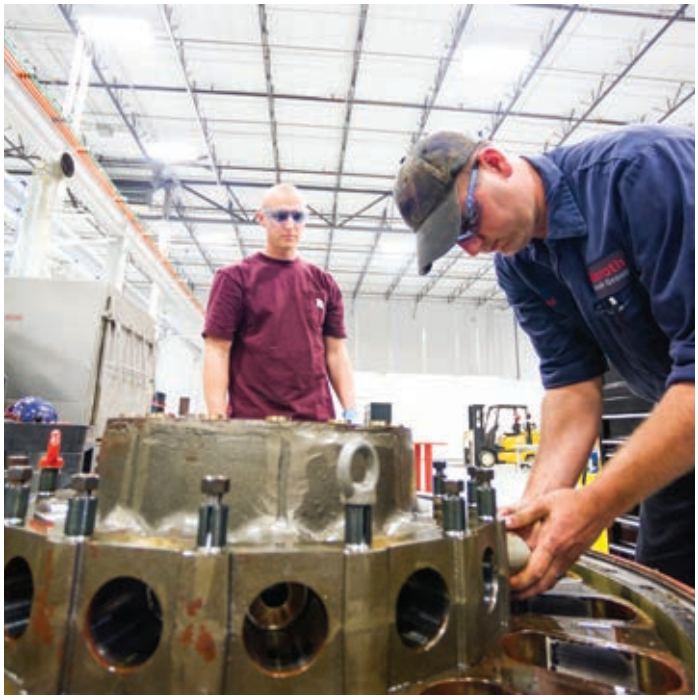
With locations around the world and always the same high quality: Bosch Rexroth is represented in more than 80 countries and maintains warehouses for original spare parts and service capacities in all regions. We offer you technical support from factory trained and qualified employees. In addition, we carry out factory repairs and support your field service with trained experts with many years of operational experience.

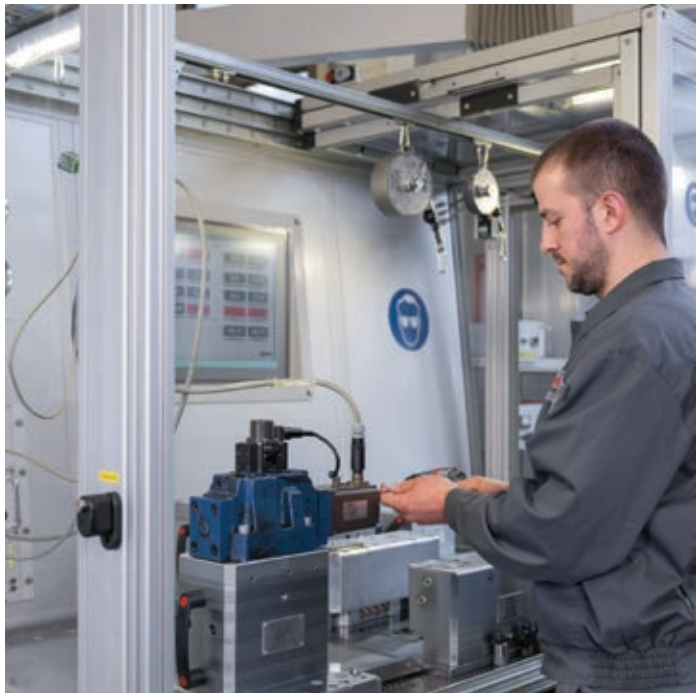
Helpdesk/technical support
Our experts are on hand with all their experience if you need rapid technical help over the phone for troubleshooting or for identifying spare parts. They support you in the handling of repairs.

Spare parts
We deliver original parts worldwide. Strategic warehouses in all regions ensure short delivery times to any location in the world. The life cycle of wind energy systems has increased in recent decades, and the expectations for the availability of spare parts have increased accordingly. We guarantee the long-term availability of spare part kits and upgrade sets even after our products are no longer in series production through systematic obsolescence management.



1st Level Support | Spare Parts | Repair

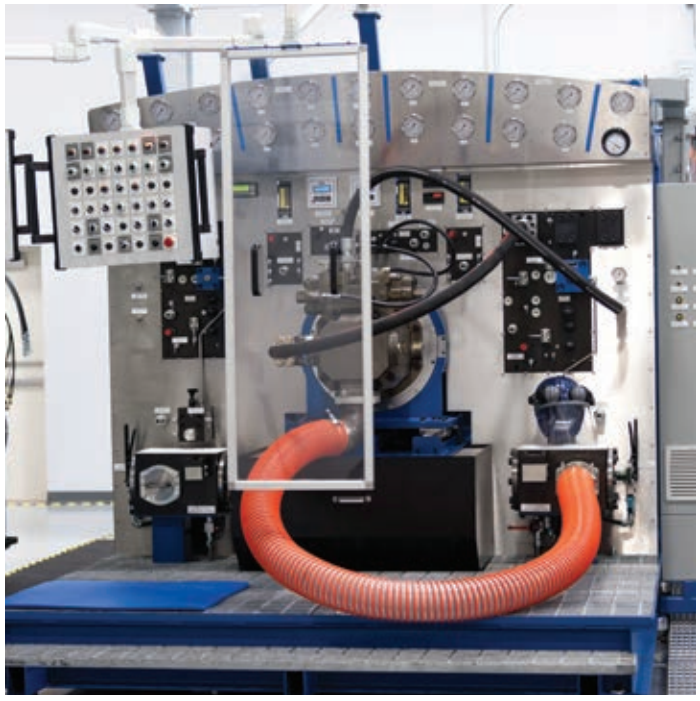




Repair

Parts do not always need to be completely replaced, in many cases we are able to economically repair components and assemblies. Our highly trained, certified technicians always carry out repair works cost-efficiently and to a high quality standard.

We use exclusively original components for repairs. Before delivery, each part is tested in accordance with the strictest quality criteria. You can rely on global standards for emergency repairs and urgent repairs, and a warranty for repaired products.



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