

A passion for offshore: Reliable performance

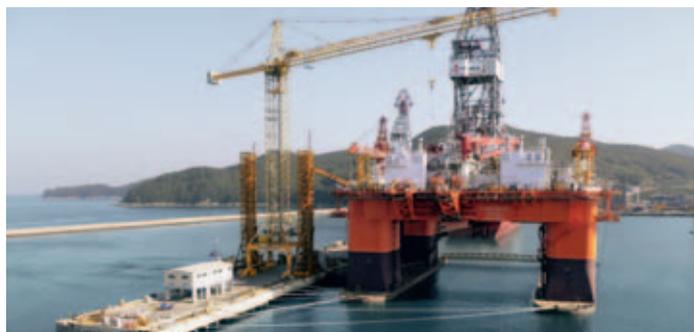




The new frontier: Utilising the resources of the sea

The offshore industry is opening up the resources of the sea with a great pioneering spirit, thus safeguarding the energy supply of humanity. Courageous companies are forging ahead towards new frontiers of technological feasibility. By doing so, they have to fully rely on technology. Rexroth has supported you for more than 50 years with reliable solutions, experience and a passion for technical challenges. And we will continue that support.

In tropical seas or the arctic sea, in coastal waters or at a depth of 5,000 meters: Offshore applications always have to withstand the tests of extremely harsh environments. Raising platforms and wind energy turbines, the exploration of oil and gas and the production in the open sea requires great strength and involves complex motion sequences. Reliability and safety always take centre stage for every offshore solution – from the engineering and design phase through to everyday operation.



Reliable performance and safety start with components and modules. At Rexroth you can find a uniquely wide spectrum of products that are certified by international classification societies: From seawater-proof hydraulic components to heavy duty drives, and from large cylinders manufactured specifically for offshore applications through to electric drives and controls.



But Rexroth is also a development and engineering partner with distinctive experience. We help bring your ideas into reality. For us, no task is too small or too big because we share your passion for offshore technology. Active heave compensation systems, continuous jacking and deck-mating, skidding or lifting equipment for complete topsides: Rexroth has made decisive contributions to the development of numerous offshore technologies in the last decades.



Also, after commissioning, we accompany you through the entire lifecycle. As your global partner we support you worldwide with fast spare parts supplies and experienced on site technicians. We even carry out overhauls and modernisations of your systems. We are always at your doorstep when you need us, in more than 80 countries around the world.



◀ **Deep-sea crawler for exploiting raw materials**

Further information can be found at www.boschrexroth.com/offshore

From innovation to standard

Do you have an idea for a new offshore solution, and are you looking for an automation partner who will develop it together with you? When you need reliably working solutions, you can count on Rexroth's experience. Our talented offshore specialists walk you through the first rough sketch, all the way to commissioning and beyond. As an innovation partner we are ready to break new grounds with you, for example, by developing equipment that lifts heavy loads more safely and quickly at sea.

Wouldn't it be great to stabilise offshore cranes automatically so that loads could be lifted safely, even in rough seas? Why not develop a solution to compensate for heave on supply vessel helicopter landing platforms? When these ideas came up more than twenty years ago, Rexroth was the development partner who worked on developing – and building – drive and control solutions for these kind of active heave compensations. Since then, Rexroth has set standards for a wide variety of active heave compensation solutions

in hundreds of systems: linear, rotary; with primary control or secondary controlled variants.

Our offshore specialists often work on such ideas for several years, from the first idea through to commissioning and beyond. Even before the first design sketch is drawn, they can test with simulation software developed by Rexroth for offshore applications. To see whether and how the idea can be put into practice. They determine all drive components to suit your individual requirements and program safety controls. Our components are manufactured worldwide in accordance with the highest quality standards. Thanks to proven reliability, project management and risk management, our projects reach their set milestones. The financial strength of the Bosch Group is guaranteed: we complete every project successfully.

The Dutch company Barge Master, for example, joined forces with us to develop a completely new approach for lifting heavy loads at sea: a standard pontoon, combined with a cost-effective onshore crane and a tailored heave compensation system in between. The crane is able to safely lift and put down loads, even at maximum wave heights of up to 3 meters. Particular advantages: these ships can change their position very quickly, start their work immediately and consequently cut costs. What is your next big idea?





With courtesy of ODIM/Rolls-Royce

Be safe – with us

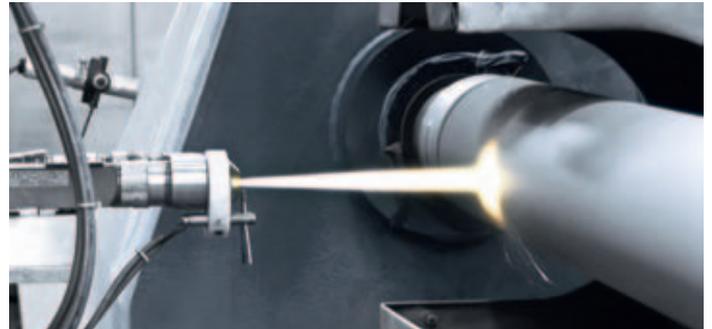
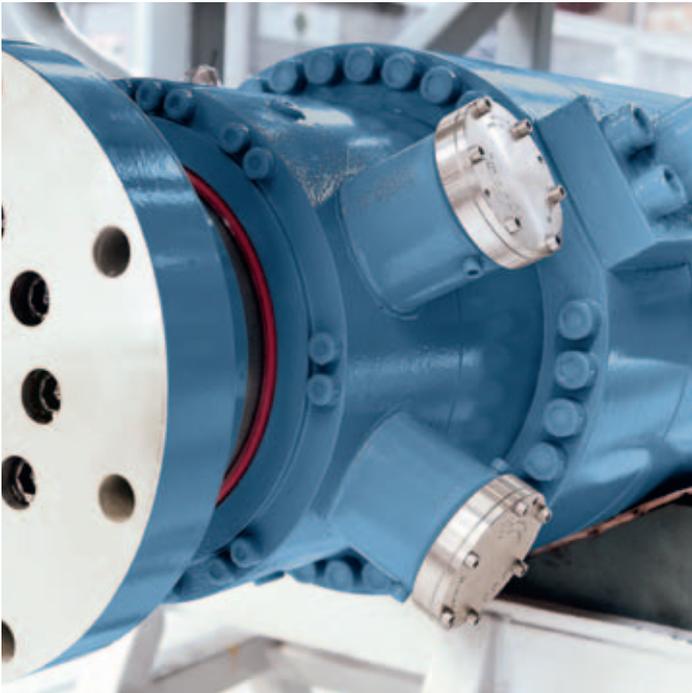
Safety means reliable performance of all components 24 hours a day, 365 days a year. This starts with a safe design that uses redundant components. Rexroth components and solutions have demonstrated their strength on all the world's oceans for more than five decades.

You want to create new paths, but need to rely on tried and tested materials. You are right; the rough environment is problematic enough. Demonstrated quality standards and certifications are important, but even more important are proofs. Rexroth furnishes them every day with many tens of thousands of components, modules and complete system solutions installed in offshore applications.

Example Deck mating: We understand that you have to rely on the function and accuracy of every single cylinder, which positions the topside on the jackets. Rexroth has engineered and manufactured large hydraulic cylinders for offshore operations for decades. We check their function on our own test benches, and run them through Hardware In the Loop (HIL) testing. Production operations are perfectly attuned, and we apply only the highest quality standards.



◀ Deck-mating system

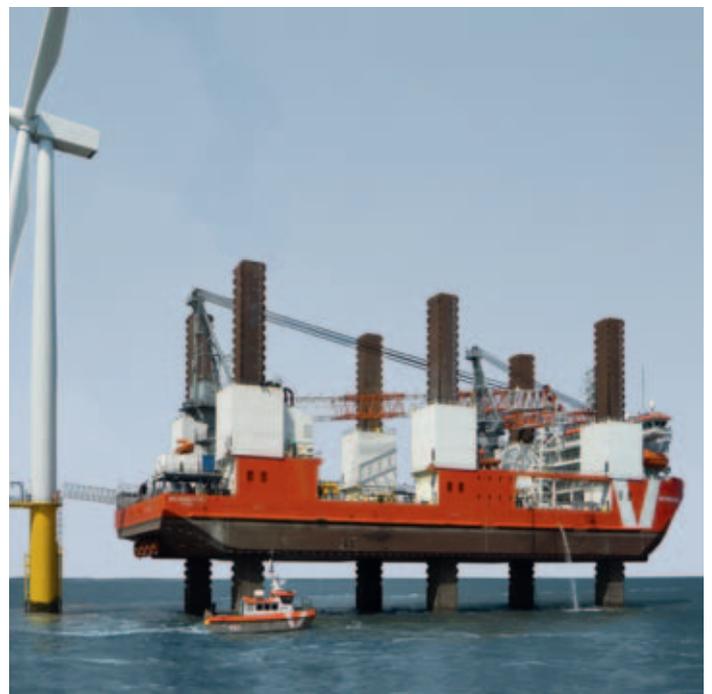


- ▲ Enduroq surface technologies for cylinders
- ◀ CIMS position measuring system
- ▶ Hägglunds heavy duty drive
- ▼ Continuous jacking system operating at a constant velocity of 1 meter per minute



We pioneered surface technologies that protect your cylinders from corrosion reliably and for long periods of time. Our Enduroq surface technology represents the current state of the art. The CIMS measuring systems integrated in the cylinders are designed for rough environments and ensure the highest and most durable precision. Also, for the jack-up of self-elevating platforms or the continuous jacking with large cylinders, you can rely on a multitude of Rexroth solutions. Solutions that have proven their reliability on the job. Rotary Hägglunds heavy duty drives, for example, allow continuous jacking up with low speed and the highest force, reducing space and height of the system significantly.

For this system solution we also systematically identified and eliminated all fault sources as early as the concept and design stage. Be safe – with us.



Protecting the environment – every day

When it comes to the environment, there is almost no other sector watched as closely as the offshore industry. It must observe strict regulations with regard to permitted emissions during operation and, of course, reliably eliminate risks for the sea and the environment. Rexroth shares your great responsibility, and supports you with reliable and sustainable solutions.



Environmental protection starts with the smallest component. Hydraulic systems from Rexroth have been working for many years without any leakage, and prevent operating fluids from getting accidentally into the sea. Naturally, Rexroth works with biological biodegradable fluids. A topic that is gaining in importance is energy consumption and its related emissions in the generation of electricity. The universal approach “Rexroth for Energy Efficiency” (4EE) opens up the potential of considerably reducing the energy consumption of hydraulic and electric drives, while offering at least the same power. The Modular Flywheel System from Rexroth, for example, utilises kinetic energy to store recurring energy fluctuations. Although, this is nothing unusual when it comes to cranes and winches in heavy-duty operation. Installed power is dramatically reduced, thus benefiting significantly in total cost of ownership.

It is impossible to avoid critical situations in a rough offshore environment, but you can have them safely under control with the right technology. An additional valve in the DSE manifold block for winches ensures that holding forces remain available, even when the brake is inactive. Riser tensioner systems, designed and manufactured by Rexroth in all kinds of variants, reliably keep the tension in the drill string within the defined, uncritical range – which has been proven for many years. If it’s one thing we all know for sure: every potential accident with an environmental impact that can be avoided is worth the expense.



- ◀ DSE winch manifold
- ▶ Modular Flywheel System for winches and cranes
- ▶ Riser Tensioner System with large cylinders from Rexroth



Global partnership

Offshore applications in the Western Atlantic Ocean generate different demands than those in the Indian Ocean or the North Sea. Even if the technology basically looks identical, the difference is in the details. Our local offshore specialists know this technology down to the least nut and bolt, and can implement it to form tailored solutions.



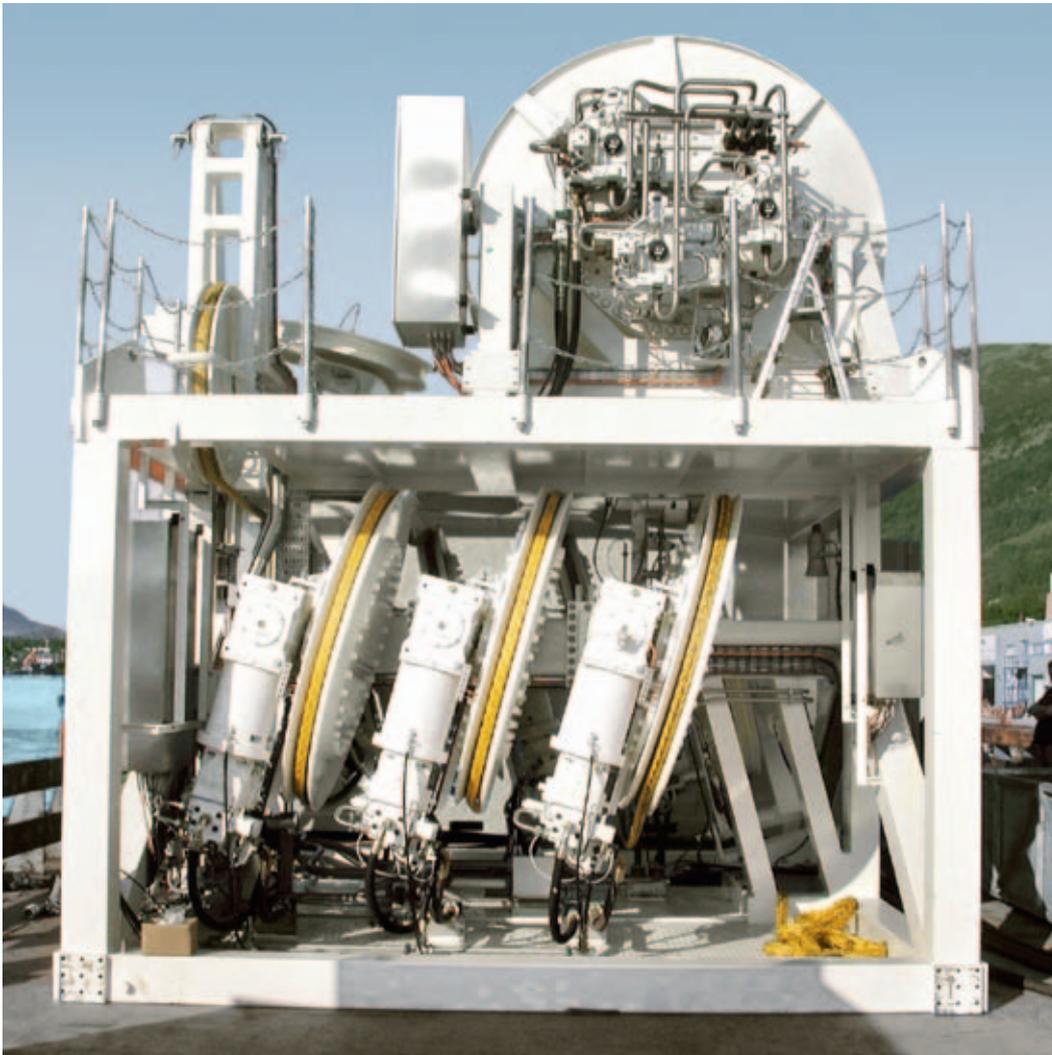
At Rexroth, we think globally while taking the local conditions into account. The offshore industry is greatly influenced by regional, legal and climatic requirements. In Arctic waters, the technology must work trouble-free even though temperatures can reach minus 40 degrees Celsius or lower; tropical locations require just the opposite extreme. Big operators work out their own standards and specifications. In short, there is no singular worldwide solution. Instead, it is a matter of adapting solutions that have been proven in the field to suit regional and company-specific requirements.

This is exactly what our worldwide offshore network stands for. Experienced specialists from Europe, the Americas and Asia interlink their know-how of offshore applications. And they have access to the worldwide development and production resources of Bosch Rexroth. In this way, tailored solutions are created near you.

◀ **Rexroth technology operates reliably, also under extreme climatic conditions**

Take our work in Brazil for example. Here, in cooperation with a local partner, Rexroth planned and designed a fire extinguishing system for platforms. This system can make available and distribute 3.5 million litres of fire-fighting water per hour in the event of an emergency. The specialty of this ready-to-install package solution with its own energy supply is that it works almost wear-free for many years.

Be it deck-mating systems in Asia, skidding systems for the Gulf of Mexico, active heave compensation for the North Sea or direct riser tensioner systems for the Arctic sea. Rexroth perfectly adapts proven technology to individual conditions – and is always in your vicinity. We are present in more than 80 countries around the world, thus guaranteeing short distances and reaction times.



- ▲ **Manufacture, maintenance and repair of large cylinders**
- ◀ **Components for heave compensation**
- ▼ **Skidding system**





World records in a row

We tackle every challenging project for the offshore industry with full enthusiasm. And there are always special projects that take things one step further. We are proud of constantly being asked to contribute our know-how and products to the success of unique worldwide projects. Your advantage: even more experience, safety and reliable performance.

An idea so audacious that it can only be born in the offshore Industry: a vessel that lifts complete topsides, weighing up to 48,000 tonnes, in one piece from an offshore platform and transporting it to shore.

As an important engineering partner of the Allseas Group, Bosch Rexroth developed and designed components of the drive and control solution for this topside lifting system. Together, we determined the foundations for all functions of the vessel. In complex collaboration, Rexroth verified the design and dimensioning of important components. Especially with such large-scale projects, structured, international project management is of the utmost importance. Bosch Rexroth can look back on a unique history of successes in mastering such challenges, and can demonstrably control even the most complex supply chains – both in our own international production network and in the network of external suppliers.

- ◀ **Topside transporters carry offshore platform piggyback fashion**
- ▶ **Ekofisk Oil Field, August 1987, the "great hydraulic jack up" by Rexroth, a landmark in the history of offshore technology**

This project is just one in a long list of world records in which Rexroth was significantly involved. From the simultaneous lifting of four interconnected platforms in the Ekofisk field, to the greatest pipeline laying vessels, through to the largest topside lifting system in the world. Each of these projects extends our wealth of experience and our understanding of reliable performance. Best of all, you can utilise our experience at any time for your projects.



Even more solutions for rough environments

Offshore technology comprises a multitude of individual solutions. Each of them requires the same attention and must meet the same requirements with regard to reliability, performance and safety – over the entire lifecycle. We support you with a service network specialised in offshore applications at all important locations in the world.

Bosch Rexroth has been an established partner for the international offshore industry for about 60 years. We have planned and installed thousands of large cylinders and complex drive systems around the world. We know that this also implies long-term responsibility.

From our location in Boxtel experienced specialists coordinate our offshore service locations in Houston, Singapore, Rio de Janeiro, and Changzhou. They have the know-how and offer the possibilities of significantly extending the availability of your offshore application. You can contact them directly at specialized.service@boschrexroth.nl.

Rexroth may not have realised all conceivable offshore applications, But we have certainly engineered our share. You can find an overview at www.boschrexroth.com/offshore on the Internet.

Be it large hydraulic cylinders, winch control blocks, axial piston units, heavy duty drives, hydraulic systems and controls or project partnerships for your next big idea. Send us a brief email or call us so that we can discuss how Rexroth can help you reliably increase your company's performance.



Tough application,
ingenious solution } Exactly



Your benefits

- ✓ Certified components
- ✓ Proven reliability
- ✓ Increased performance
- ✓ Fulfilled safety
- ✓ Preserved environment

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