



Couplings for Wind Power Technology

Power Transmission based on a system

Made for Motion



www.ktr.com



If you want to set things in motion: KTR

Competence meets creativity

As a leading manufacturer of high-quality drive components, KTR supplies mechanical couplings, clamping sets, torque limiters, torque measuring systems and hydraulic components all over the world. With more than 50 years experience in power transmission we are trendsetters in the development of coupling technology and offer customised solutions to all industries. The KTR trademark characterises quality and innovation, speed, reliability, flexibility and a close working relationship with customers.

Having started with the curved-tooth gear coupling® BoWex® and the torsionally flexible jaw coupling ROTEX®, KTR has built up an extensive product portfolio covering torques from 0,15 to over 750.000 Nm. The production by KTR's in-house, up-to-date machinery ensures that the couplings are made to the utmost accuracy. The couplings having a unit weight of up to 2 tons. Flexible automation ensures a quick and low-cost production even if the product has to be customised to meet customers individual specifications. KTR produce several million couplings a year.

Even though KTR's standard product portfolio is quite extensive, it only represents a fraction of the different options available. KTR is not only a subcontractor but also a solution provider.

The knowledge gained from thousands of applications in the field allows us to find optimum, low-cost solutions for customised applications. We will consult you during the planning stage providing drawings and prototypes or arranging for local discussions if required. Every year KTR produces more than 10.000 new products ordered by customers. This trend increases year on year. This leads to many special products becoming standard items: We permanently give vital ideas to the Power Transmission technology – in cooperation with our customers.



Accuracy meets speed

KTR products are evidence of well-designed, quality components resulting in improved characteristics of the drive system and as a consequence, a longer service life. It is our aim to continually improve the quality of our products and services. We can analyse the stiffness of components by utilising FEM (Finite Element Method) system and we can also perform torsional vibration calculations for entire drive systems. In our in-house Research and Development Centre we test our products on accurate test benches in realistic operating conditions. Our main objective is to provide the uppermost satisfaction to our customers.

Our technical sales engineers and our well-trained sales staff will be pleased to give you advice. KTR provides you with extensive services online, too: At www.ktr.com you can request information, including our product catalogue, 3D-CAD-models and assembly instructions. Depending on your application you can select your drive component from of more than 3.500 standard products. Having selected which one is the right component for your application by using our online calculation

program, you are now in a position to order the products by contacting your nearest KTR company. Alternatively our Euro shop is open 24 hours a day.

Our latest scheduling system SAP ERP ensures an optimum networking with our customers and allows for a quick and reliable delivery service. A selection of 3.500 couplings and hydraulic components are permanently available from stock. For orders placed by 2:00pm we guarantee the despatch of orders the same day! In the KTR Logistics Centre the overall flow of goods is supervised by radio-controlled barcode scanning. Leading distribution partners ensure delivery on time. Our tracking and tracing system allows you to follow the progress of your order at all times. KTR supplies to every location in the world.

For further details about us and our products:
www.ktr.com



Into the wind or down the wind, but always accompanied by KTR

Harness the wind and reap the current – provided that you are in a position to control the wind's power. The wind not only produces energy but also cold and moisture, gusts and turbulence resulting in continuous and extreme loads. It is good to see that KTR couplings ensure highest efficiency even with such tough conditions. KTR have operations in every part of the world.

Made in Germany – For the whole world

There is a lot of development in the international market for wind energy, but never without KTR! When we designed the first coupling for the use between gearbox and generator in 1988, we did not expect to become the world's market leader for this industry. More than 20 years later, and having continuously improved and reengineering our couplings, more than 25,000 KTR couplings are used in wind power applications around the world. Every year more than 10,000 new applications are being added.

Germany is the world leader in wind power: the biggest user of wind energy and at the same time the biggest exporter of knowledge and plant engineering. German engineers' work, combined with German quality, are welcome everywhere. A minor, but important part of this state of the art technology is the mechanical coupling which not only transmits the torque between gearbox and generator, but also protects the drive system of the wind power station which has a major influence on its service life.



Made by KTR – For highest power

Shaft couplings produced by KTR are used in wind power stations with a rated power from 250 kW to 6 MW throughout Europe, Asia and America. As a partner in development of some leading manufacturers we supplement our programme permanently with new designs for higher power. This allows us to offer tailor-made coupling systems for the latest generation of wind farms.

We not only design suitable couplings, but multifunctional sets consisting of coupling, electric separation, brake, sensor disk and overload system – based on individual components, which we have developed specifically for the use on wind power stations.

It goes without saying that the latest special generators, having low speeds and which are flanged directly to the gearbox do not require any conventional coupling. However, it is important to have a particularly powerful overload system to protect against extremely high torque peaks. KTR overload systems provide for the necessary safety on such drives.

Make use of the wind's enormous potential!

Wind power stations are systems which never stop. Swinging and vibrations are pervasive. The permanent alternating loads with difficult environmental conditions make the metals fatigue at an early stage and make the drives suffer from wear. In spite of that the expectations in efficiency increase continuously: The towers get higher and the wind farms are expanding in size. Of course, the expectations for the service life are growing along with it. If you want to harness the full potential from the wind, change to the partner with all the knowledge – KTR.

Based on our 20 years of experience with wind energy plants throughout the world, permanent innovations and re-designs, we will certainly succeed in finding the right solution for your projects. Remember the wind never stops – neither do we.



Components to control the power, designed by KTR

Efficiency even with turbulence

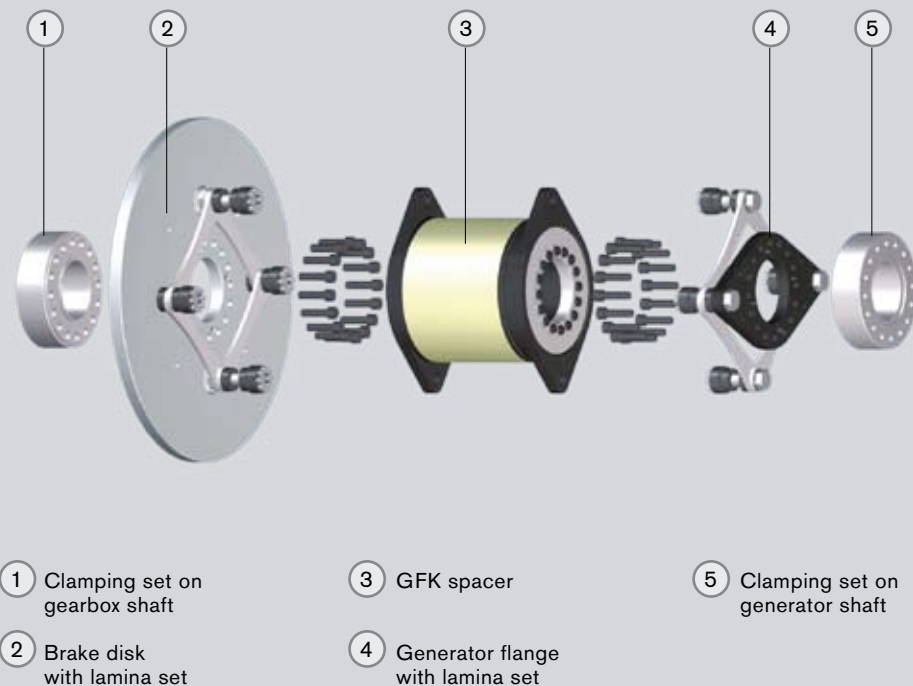
Normally gearboxes and generators for wind power stations are mounted on flexible dampers. In this way movement is produced which may cause very high displacements in the drive train. There are not many couplings which are able to compensate for such misalignments reliably in the long term.

KTR have developed the steel laminae coupling RADEX®-N specifically for wind power stations. The backlash-free, maintenance-free, all-steel coupling with laminae from highly stiff spring steel, compensates for high misalignment with at the same time low restoring forces, because of its extremely high torsional stiffness.

Between the coupling set on the gearbox and generator side a GFK spacer is mounted, which serves as electric insulation. In this way potential leakage currents cannot get from the generator to the gearbox where they might damage the bearings and splines. One beneficial side effect is that the total weight of the coupling is reduced and the ease of servicing is increased.



The KTR coupling system for wind power stations



Stiff laminae for a strong breeze

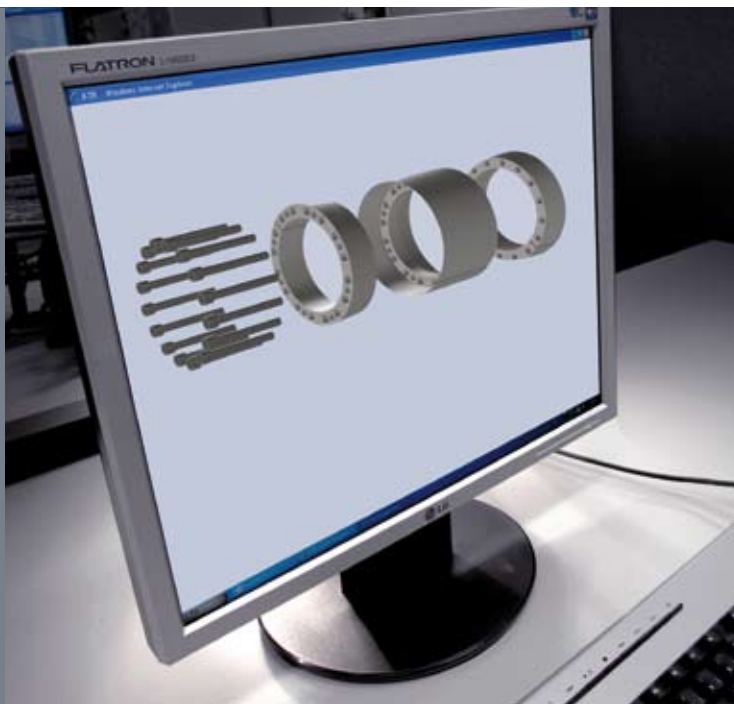
At the heart of the RADEX®-N are the surface-treated special laminae that are connected to the hub and spacer alternately by means of high-strength shoulder bolts. Apart from the ability to absorb high misalignments, this combination of frictional engagement and positive locking serves for increasing the power density.

KTR have developed the steel lamina packages using our state of the art FEM calculations. Our aim was to create the optimum design with regard to torque transmission and torsional rigidity, taking into account the necessary options of displacement. The result is a fitted shape – for a tight-fitting lamina.

No problem with overload

Part of the supply of our couplings for wind power technology is mostly a brake disk integrated on the gearbox side having a diameter of up to 1.500 mm and a sensor disk for speed monitoring. An overload system ensuring an accurate speed limitation even with unfavourable conditions is indispensable.

Our torque limiter RUFLEX® is perfectly suitable for this task, since, thanks to special friction linings it operates free from stick-slip, thus operating very smoothly and with a high resistance to wear. It is calibrated as per the manufacturer's configuration and integrated into the coupling spacer in a space-saving way. As soon as the slipping torque which is set accurately is reached, the power flow is limited so that your plant is protected against load peaks on the generator side. RUFLEX® is able to reproduce the slipping torque up to 1.000 times. The gearbox is protected against stress – in this way expensive servicing is considerably reduced.



The way from an initial outline to efficient energy production by KTR

Defined, designed, optimised

KTR's knowledge is growing along with a number of new innovations. If you intend to re-design the drive train of your wind power station completely, we are pleased to design a new coupling to suit. Even with well-known designs the coupling has to suit perfectly. That is why there is no such thing as a standard product in the wind industry, but a variation on a standard.

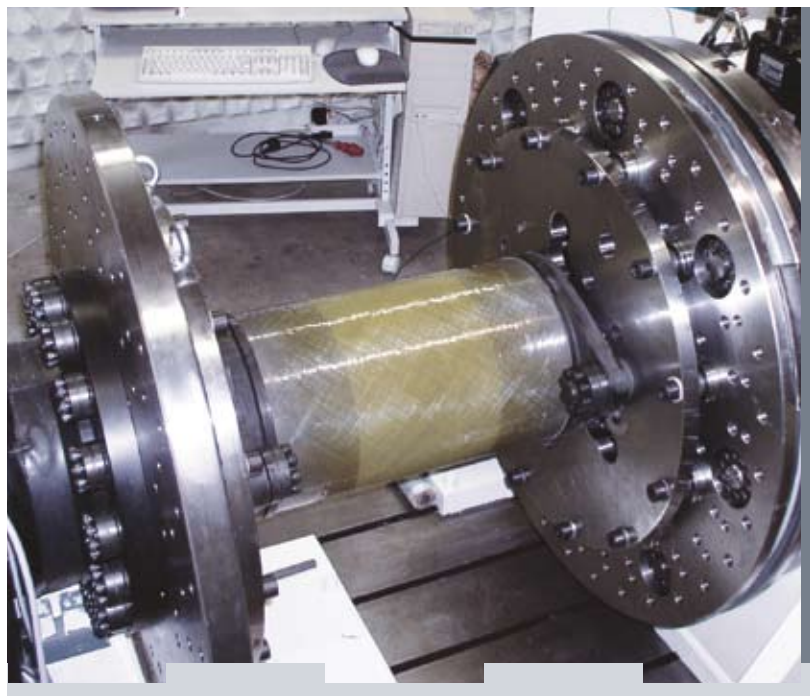
Based on our various experiences we have developed a kit system to adapt the components individually, which reduces the period between the order and the shipment considerably.

We will support you with your selection, among others, by use of computer-aided torsional vibration analysis, FEM calculations and tests in our laboratories. Our product specialists deliver their vast knowledge to any place you require.

Produced, calibrated, tested

The production of your customised coupling is carried out with highest accuracy in our up-to-date in-house machine shop. Thanks to our flexible automation we are in a position to complete the manufacture of individual products with the shortest lead time possible. Immediately afterwards the torque is set accurately in our test centre which is computer-aided. This makes sure that the customer does not need to adapt the coupling during the assembly process.





On our mechanical test benches we perform tests for service life and load. To simulate the environmental conditions, that the coupling will be expected to work in, we make use of, among others, our climatic chamber. We verify the dimensional accuracy of your coupling by utilising 3D coordinate measuring machines. For the torque limiter we perform an individual quality control to make sure that the power generation does not only work without any problems, but also over a long period.

Verified, documented, certified



Thanks to a complete documentation of our test results we are in a position to give full traceability of your coupling for manufacture including balancing. KTR couplings for the use on wind power stations are certified by all the leading test houses including Germanischer Lloyd. Before shipping to the customer, the components transmitting the torque have been inspected with regard to stiffness and service life. Extensive fracture and service life tests have been performed for the GFK spacers.

Easily assembled and well-informed

KTR makes the assembly of a coupling in a narrow space of a pod particularly easy. In contrast to the usual huge pins requiring large tools and high force you only require a conventional dynamometric screwdriver for RADEX®-N. From a thread size M24 we use special clamping nuts; i. e. the necessary prestress of the screws is achieved by the combination of several small screws. The disassembly is just as easy.

KTR will support you with the maintenance of your wind turbine. Our technical sales engineers are always pleased to assist you and our service network offers you competent advisory service all over the world. Our global locations allow us to react to your questions and requests quickly and flexibly. KTR keeps everything moving.



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