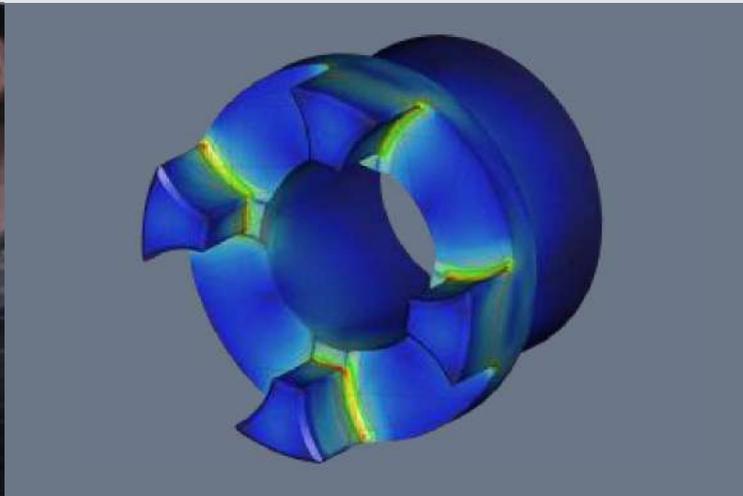


**Better Components Make Better Drives**

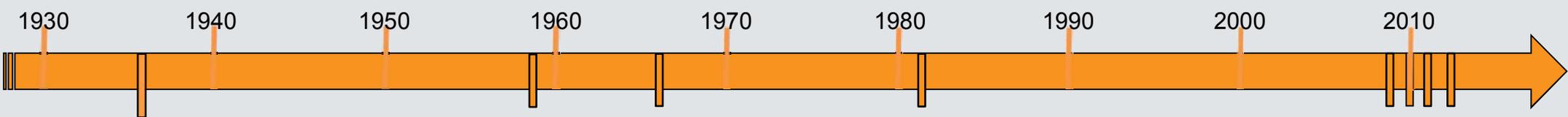


## Engineering

- 20,000 new customer-specific variants every year
- In-house R & D center with 23 test benches
- 3D CAD systems (PRO-ENGINEER) and Finite Element Analysis
- Industry-specific know-how



# „Knowledge“-Driven Company



- 1936**

Invention of curved-tooth gear coupling (Albert Tacke)
- 1959**

Foundation of KTR  
Development of **BoWex®**
- 1966**

Launch of **ROTEX®** jaw coupling
- 1982**

1<sup>st</sup> subsidiary in Switzerland  
Today 23 in total all over the world.
- 2008**

Launch of **Cooling Systems**  
Oil-/Air and Water/Air
- 2010**

Launch of **Brake Systems**  
(Wind Power & Industry)
- 2012**

**KTR 400 Innovation Team**
- 2015**

Opening of **PTC** Power Transmission Center

## Production

- In-house production locations in Germany, Poland, USA, China and India, each of them certified to ISO 9001
- Production of serial- and customer-specific components
- Production lines with latest CNC machining centres and gear cutting machines
- High degree of automation with machining centres being interlinked
- Use of robot technology



## Business Units for optimal customer service

**C**ore **B**usiness  
Couplings

Catalog couplings

**C**ore **B**usiness  
Hydraulics

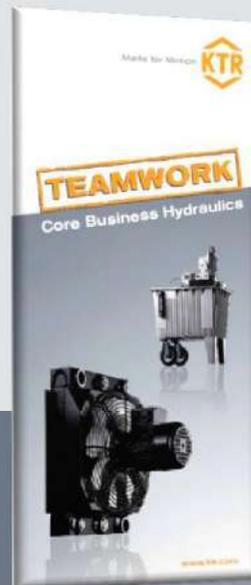
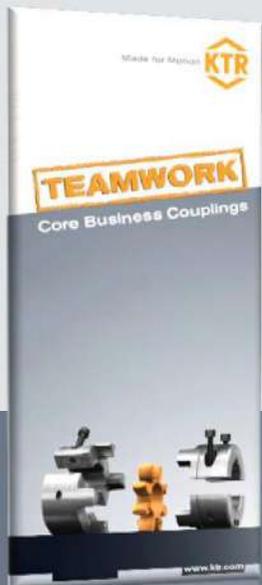
Components and tanks for hydraulics

**E**ngineered **B**usiness  
Couplings

Tailor-made couplings

**E**ngineered **B**usiness  
Mobile Machines

Couplings/cooling systems for construction and agricultural machines as well as brake systems



## Logistics Centre (Figures)

### Warehouse logistics:

4,500	Various products continuously available from stock
16,000	Various products as per customers' specifications
2,000	m <sup>2</sup> of loading and unloading area
10,000	Places in the high-rack warehouse (HRL)
62,000	Places in the automatic small-parts warehouse (AKL)
12	Places for commission and packing
7	Loading racks

### Transport logistics:

Up to 3	Collections every day
800	Consignments every day
200,000	Consignments annually comprising
600,000	Individual items per annum
8,000	Tons of total weight per annum
85%	of all materials being available from stock



# The Integrated Quality Management System

## Our company objectives:

- Highest customer satisfaction
- Continuous quality improvements
- Protection of natural resources

## Integrated quality management system:

- Quality management certified to ISO 9001
- Environmental management certified to ISO 14001
- Occupational safety management
- Idea management

Certified by all major classification companies



## KTR Being Competent With Applications In The Industries

- Railway and traffic technology
- Construction machinery industry
- Printing and paper industry
- Materials-handling technology including packaging industry
- Forestry and agriculture
- Steel works and foundries
- Hydraulics
- Marine technology
- Medical technology
- Pumps and compressors
- Machine tools
- Wind power stations



## References Of KTR



**BOMAG**

**BOMBARDIER**



**DYNAPAC**



**SENVION**  
wind energy solutions



**KOMATSU**

**SUZLON**  
POWERING A GREENER TOMORROW



**Gamesa**

**Rexroth**  
Bosch Group

**SEW**  
EURODRIVE

**SIEMENS**



**TOSHIBA**

**VICKERS**

**ALSTOM**



**HITACHI**  
Inspire the Next

**Vestas**

# New Products presented by KTR in 2015

**NEW**



**ROTEX® SP non-sparking**



**ROTEX® with KTL coating**



**ROTEX® with ETP® Clamping Set**



**KTR-STOP® NC**

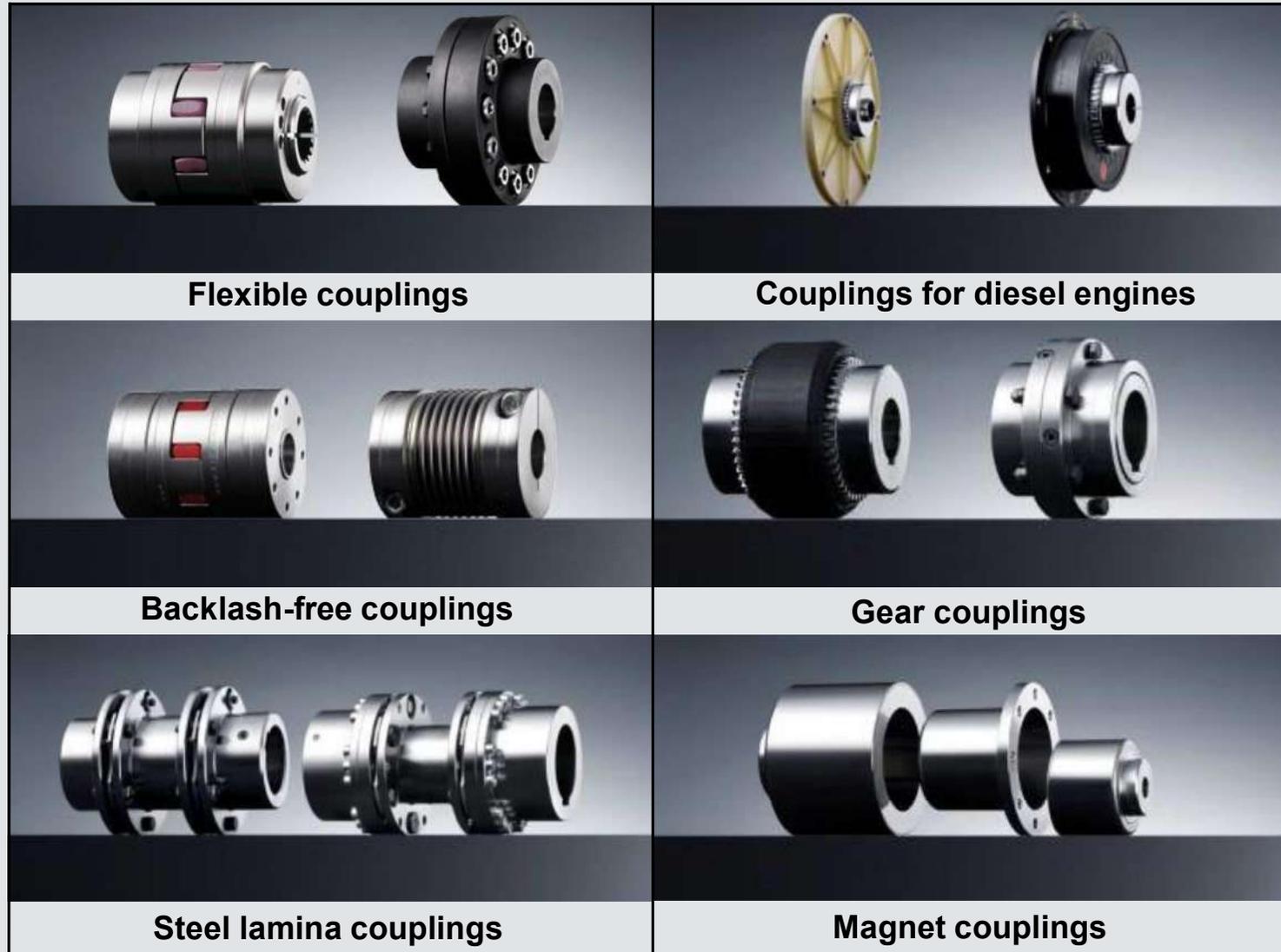


**OPC Cooler with Bypass**



**RADEX® FNZ**

# KTR Products – The Couplings At One Glance



# KTR Products – Flexible Couplings

				
Product	ROTEX®	POLY-NORM®	POLY	REVOLEX® KX
Type	Jaw-type couplings			Pin & bush couplings
Torque range up to	35,000 Nm	67,000 Nm	14,300 Nm	1,220,000 Nm
Torsionally flexible	●	●	●	●
Axial plug-in	●	●	●	●
Fail-safe	●	●		●
Single cardanic	●	●	●	●
Double cardanic	●*			
Shaft-to-shaft connection	●	●	●	●
Flange-hub connection	●	●		
ATEX	●	●	●	●

\* optional

## KTR Products – Couplings For Diesel Engines

			
Product	BoWex® FLE-PA	BoWex-ELASTIC®	MONOLASTIC®
Type	Flange couplings		
Engine power up to	800 kW	2,500 kW	250 kW
Torsionally stiff	●		
Torsionally flexible			●
Highly flexible		●	
Axial plug-in	●	●	●
Maintenance-free	●	●	●
Shaft-to-shaft connection		●	
Flange-to-shaft connection	●	●	●
ATEX		●	

## KTR Products – Backlash-Free Couplings

				
<b>Product</b>	<b>ROTEX® GS</b>	<b>TOOLFLEX®</b>	<b>RADEX®-NC</b>	<b>COUNTEX®</b>
Type	Jaw-type coupling	Bellow-type coupling	Lamina coupling	Shaft encoder coupling
Torque range	0.2 to 4,500 Nm	0.1 to 600 Nm	2.5 to 300 Nm	0.3 to 1 Nm
Torsionally stiff		●	●	●
Torsionally flexible	●			
Backlash-free	●	●	●	●
Axial plug-in	●	●*		●
Fail-safe	●		●	●
Maintenance-free	●	●	●	●
Single cardanic	●		●	
Double cardanic	●*	●	●	●
Shaft-to-shaft connection	●	●	●	●
ATEX	●		●	●

\* optional

## KTR Products – Gear Couplings

		
Product	BoWex®	GEARex®
Type	Gear coupling®	All-steel gear coupling
Torque range	5 to 2,500 Nm	Up to 2,750,000 Nm
Torsionally stiff	●	●
Axial assembly	●	●
Fail-safe		●
Maintenance-free	●	
Single cardanic		
Double cardanic	●	●
Shaft-to-shaft connection	●	●
Flange-to-shaft connection	BoWex® FLE-PA	●
ATEX	●	●

# KTR Products – Lamina Couplings And Magnet Couplings

			
<b>Product</b>	<b>RADEX®-N</b>	<b>RIGIFLEX®-N</b>	<b>MINEX®-S</b>
Type	All-steel lamina couplings		Magnetic coupling
Torque range	15 to 280,000 Nm	240 to 280,000 Nm	0.15 to 1,000 Nm
Torsionally stiff	●	●	
Torsionally flexible			●
Backlash-free	●	●	●
Fail-safe	●	●	
Maintenance-free	●	●	●
Single cardanic	●*		●
Double cardanic	●	●	
Shaft-to-shaft connection	●	●	●
Flange-to-shaft connection	●	●	
ATEX	●	●	●

\* optional

## KTR Products – High Performance – Steel Lamina Couplings

		
<b>Product</b>	<b>RIGIFLEX®-HP</b>	<b>RIGIFLEX®-HP</b>
Type	Type C	Type L
Torque range	20.000 bis 330.000 Nm	20.000 bis 330.000 Nm
Torsionally stiff	●	●
Torsionally flexible		
Backlash-free	●	●
Fail-safe	●	●
Maintenance-free	●	●
Single cardanic		
Double cardanic	●	●
Shaft-to-shaft connection	●	●
Flange-to-shaft connection	●	●
ATEX	●	●

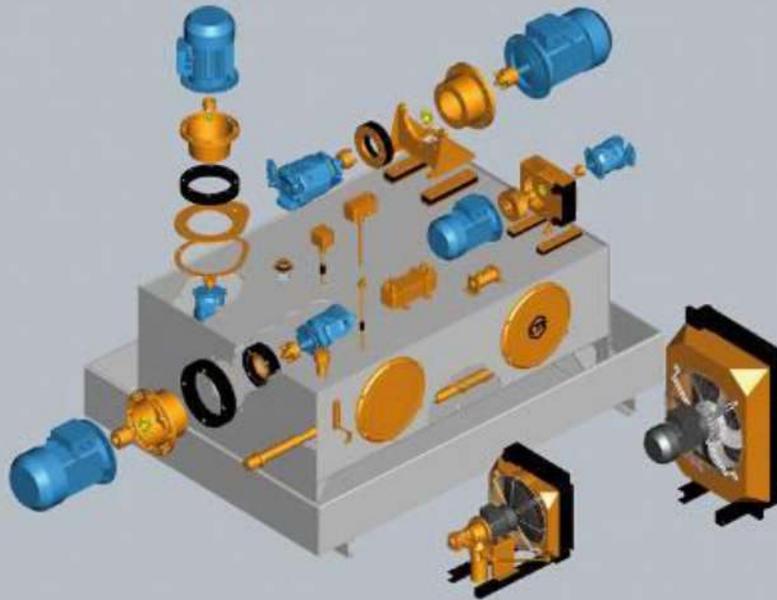
## KTR Products – Torque Limiters

		
<b>RUFLEX® Torque limiter</b>	<b>SYNTEX®-NC Overload system</b>	<b>SYNTEX® Overload system</b>
<ul style="list-style-type: none"> <li>● Overload protection up to 6,800 Nm</li> <li>● Frictionally engaged</li> <li>● Easy setting of slipping torque</li> <li>● High power density</li> <li>● Surfaces zinc-plated and passivated</li> </ul>	<ul style="list-style-type: none"> <li>● Overload protection up to 265 Nm</li> <li>● Positive-locking</li> <li>● Backlash-free</li> <li>● High precision</li> <li>● Synchronous and ratchet design</li> <li>● Light design for dynamic drives</li> <li>● Speed up to 3,000 rpm</li> <li>● Signal with overload</li> </ul>	<ul style="list-style-type: none"> <li>● Overload protection up to 400 Nm</li> <li>● Positive-locking</li> <li>● Backlash-free</li> <li>● High accuracy</li> <li>● Synchronous and ratchet design</li> <li>● Signal with overload</li> </ul>

## KTR Products – Torque Limiters

		
KTR-SI Safety system	KTR-SI Compact	KTR-SI FRE
<ul style="list-style-type: none"> <li>● Overload protection up to 8,200 Nm</li> <li>● Positive-locking</li> <li>● Ratchet, synchronous and fail-safe design</li> <li>● Available as an idle-rotating design (load separation)</li> <li>● Speed up to 5,000 rpm</li> <li>● Signal with overload</li> </ul>	<ul style="list-style-type: none"> <li>● Overload protection up to 3,100 Nm</li> <li>● Positive-locking</li> <li>● Solid type</li> <li>● Synchronous (SK) and ratchet design (DK)</li> <li>● Max. shaft diameter up to 80 mm</li> <li>● Backlash-free, frictionally engaged shaft-hub-connection on driving and driven side</li> </ul>	<ul style="list-style-type: none"> <li>● Overload protection up to 60,000 Nm (higher torques possible on request)</li> <li>● Positive-locking</li> <li>● Load-separating type</li> <li>● Can be combined with ROTEX®, GEARex® or RADEX®-N as shaft-to-shaft connection</li> </ul>

## KTR Products – Hydraulic Components



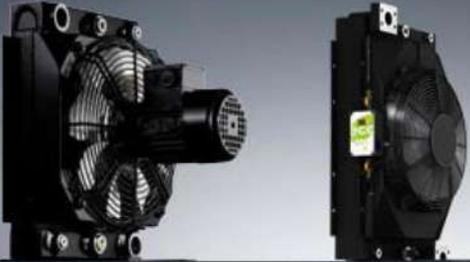
**Everything from one source:**

- Bellhousings
- Foot flanges
- PIK oil coolers
- Oil-water coolers
- Damping elements
- Oil tanks
- Accessories
- Controllers and monitoring
- Tank heaters

## KTR Products – Hydraulic Components

		
<p><b>Bell housings and accessories</b></p>	<p><b>Tanks</b></p>	<p><b>Thermo management</b></p>
<ul style="list-style-type: none"> <li>● Bell housings from aluminium, cast iron and nylon</li> <li>● Foot flanges</li> <li>● Mounting flanges and gaskets</li> <li>● Damping elements</li> </ul>	<ul style="list-style-type: none"> <li>● From steel and aluminium</li> <li>● Oil sump pans</li> <li>● Cleaning covers</li> <li>● Accessories</li> </ul>	<ul style="list-style-type: none"> <li>● Oil-air coolers</li> <li>● Oil-water coolers</li> <li>● Tank heaters</li> <li>● Industrial controllers, level and temperature switches</li> </ul>

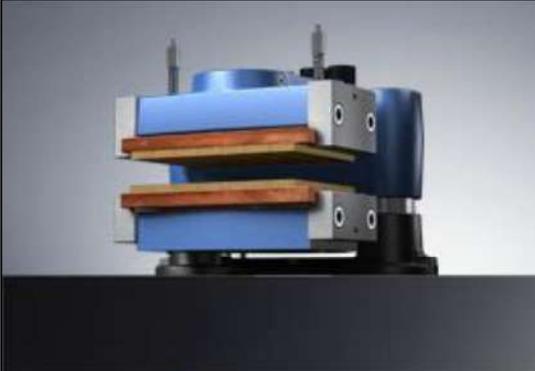
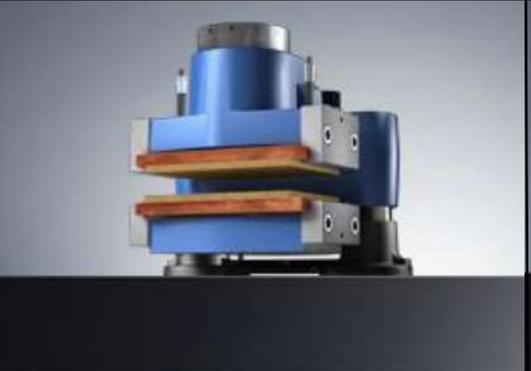
## KTR Products – Cooling systems

			
<p><b>MMC combined cooler</b></p>	<p><b>Oil-air cooler type OAC and OAC eco</b></p>	<p><b>OPC Oil-air cooler</b></p>	<p><b>Oil-water cooler</b></p>
<ul style="list-style-type: none"> <li>● Solid design made of aluminium in plate and bar</li> <li>● Use for air, water-glycol, oil and fuel</li> <li>● Customer-specific solution relating to installation space and thermal specifications</li> <li>● Supplied as a system incl. fan and drive</li> </ul>	<ul style="list-style-type: none"> <li>● High-performance cooler net made of aluminium</li> <li>● Hydraulic fan drive, 12 V, 24 V, 230 V/400 V and special engines</li> <li>● Marine design</li> <li>● ATEX design according to EC standard 94/9/EG</li> <li>● OAC eco (24 V) with intelligent motor control</li> </ul>	<ul style="list-style-type: none"> <li>● High-performance bypass flow cooler</li> <li>● Driving motor 230V / 400V IP55</li> <li>● Easy to maintain</li> <li>● Available with filter</li> <li>● Marine design</li> <li>● ATEX design according to EC standard 94/9/EG</li> </ul>	<ul style="list-style-type: none"> <li>● Shell and tube oil cooler</li> <li>● Oil cooler as plate heat exchanger PHE</li> <li>● High performance of up to 340 kW</li> <li>● Available in marine version (seawater)</li> <li>● Easy cleaning by dismountable tube stacks</li> </ul>

## KTR Products – Others

		
<p><b>CLAMPEX® Clamping sets</b></p>	<p><b>Torque measuring shaft</b></p>	<p><b>Precision joints</b></p>
<ul style="list-style-type: none"> <li>● Self-centering</li> <li>● Not self-centering</li> <li>● Internal clamping set</li> <li>● External clamping set</li> <li>● Rigid shaft coupling</li> <li>● For torques from 2 Nm to 1,644,606 Nm</li> </ul>	<ul style="list-style-type: none"> <li>● Accurate measurement of torque and speed</li> <li>● Maintenance-free, contactless</li> <li>● Performance ranges from 10 Nm up to 50,000 Nm</li> <li>● Integrated 2-channel speed sensor</li> <li>● High measuring frequency for detecting short peaks</li> </ul>	<ul style="list-style-type: none"> <li>● Precision single and double joints</li> <li>● Designs with plain bearing or needle bearing</li> <li>● For all applications in mechanical engineering</li> </ul>

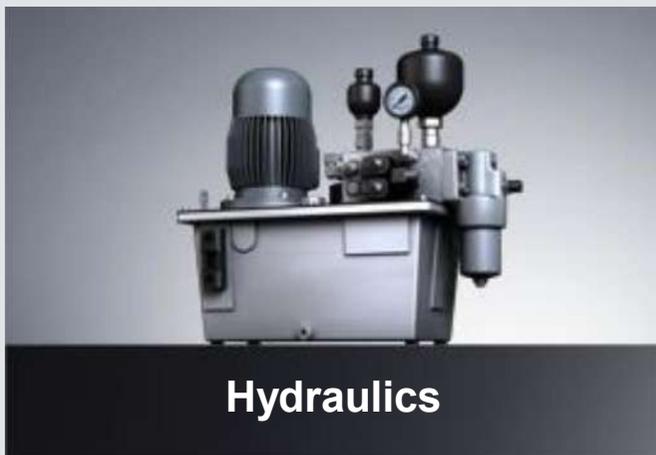
# KTR Products – Hydraulic Brake System

		
<b>KTR-STOP® (active)</b>	<b>KTR-STOP® (passive)</b>	<b>KTR-STOP® YAW</b>
<ul style="list-style-type: none"> <li>● Short reaction times</li> <li>● Low wear of pads and low temperature</li> <li>● Low maintenance expenses</li> <li>● Drain ports avoid leakages</li> <li>● Easy replacement of brake pads</li> <li>● Various materials of brake pads</li> </ul>	<ul style="list-style-type: none"> <li>● Sealed shafts</li> <li>● Low wear of pistons</li> <li>● High power density</li> <li>● Low maintenance expenses</li> <li>● Drain ports avoid leakages</li> <li>● Easy replacement of brake pads</li> </ul>	<ul style="list-style-type: none"> <li>● Short reaction periods</li> <li>● Low wear of pads and low temperature</li> <li>● Low maintenance expenses</li> <li>● Drain ports avoid leakages</li> <li>● Easy replacement of brake pads</li> <li>● Various materials of brake pads</li> </ul>

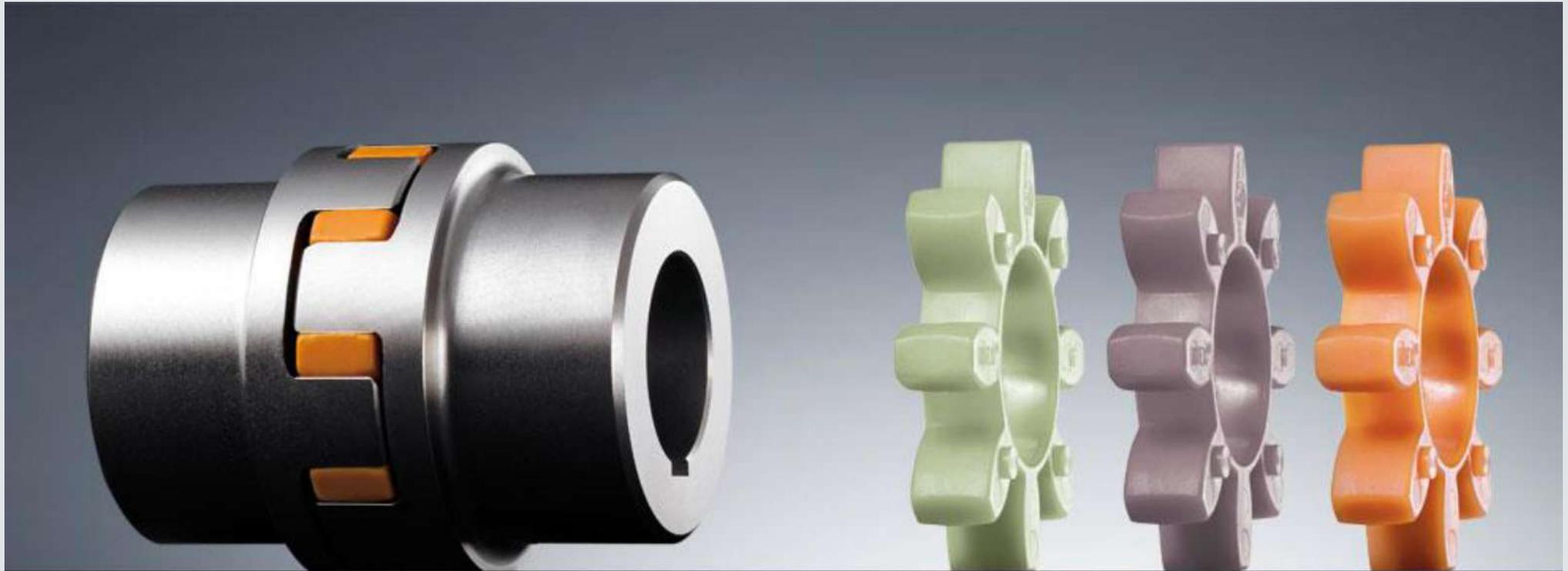
## KTR Products – Electromechanical Brake Systems

		
<b>EMB-STOP (active)</b>	<b>EMB-STOP (passive)</b>	<b>EMB-STOP (Rotor Lock)</b>
<ul style="list-style-type: none"> <li>● Easy replacement of pads</li> <li>● Mechanical manual actuation possible</li> <li>● Suitable for rough ambient conditions</li> <li>● Variable setting of clamping force ex works</li> <li>● Current mechanical interfaces available</li> </ul>	<ul style="list-style-type: none"> <li>● Easy replacement of pads</li> <li>● Mechanical manual actuation possible</li> <li>● Suitable for rough ambient conditions</li> <li>● Variable setting of clamping force ex works</li> <li>● Spring-actuated „failsafe“ principle</li> </ul>	<ul style="list-style-type: none"> <li>● Easy assembly</li> <li>● Mechanical manual actuation possible</li> <li>● Suitable for rough ambient conditions</li> <li>● Electrical interface by industrial plug</li> <li>● Signal generation by limit switch</li> </ul>

## KTR's Scope Of Delivery In Brake Technology



## ROTEX® spider elements from T-PUR®



**Higher temperature resistance –  
higher life expectation**

## New Spider Material T-PUR®

		
<p><b>T-PUR® (92Sh-A)</b></p>	<p><b>T-PUR® (98Sh-A)</b></p>	<p><b>T-PUR® (64Sh-D)</b></p>
<ul style="list-style-type: none"> <li>● Significantly longer service life</li> <li>● Permissible continuous temperature range -50 °C to +120 °C</li> <li>● Improved damping of vibrations</li> <li>● Good damping, average elasticity</li> </ul>	<ul style="list-style-type: none"> <li>● Significantly longer service life</li> <li>● Permissible continuous temperature range -50 °C to +120 °C</li> <li>● Improved damping of vibrations</li> <li>● Transmission of high torques with average damping</li> </ul>	<ul style="list-style-type: none"> <li>● Significantly longer service life</li> <li>● Permissible continuous temperature range -50 °C to +120 °C</li> <li>● Improved damping of vibrations</li> <li>● Transmission of very high torques with high torsional stiffness</li> </ul>

## KTR as a Subsystem Supplier

**KTR supplies extensive solutions, e. g. for wind power stations:**

- 1 Cooling system
- 2 Hydraulic components
- 3 RADEX®-N Steel laminae coupling
- 4 KTR-STOP® Brake systems for main drive
- 5 DATAFLEX® Torque measuring shaft
- 6 KTR-STOP® YAW
- 7 KTR-STOP® RL Rotor Lock



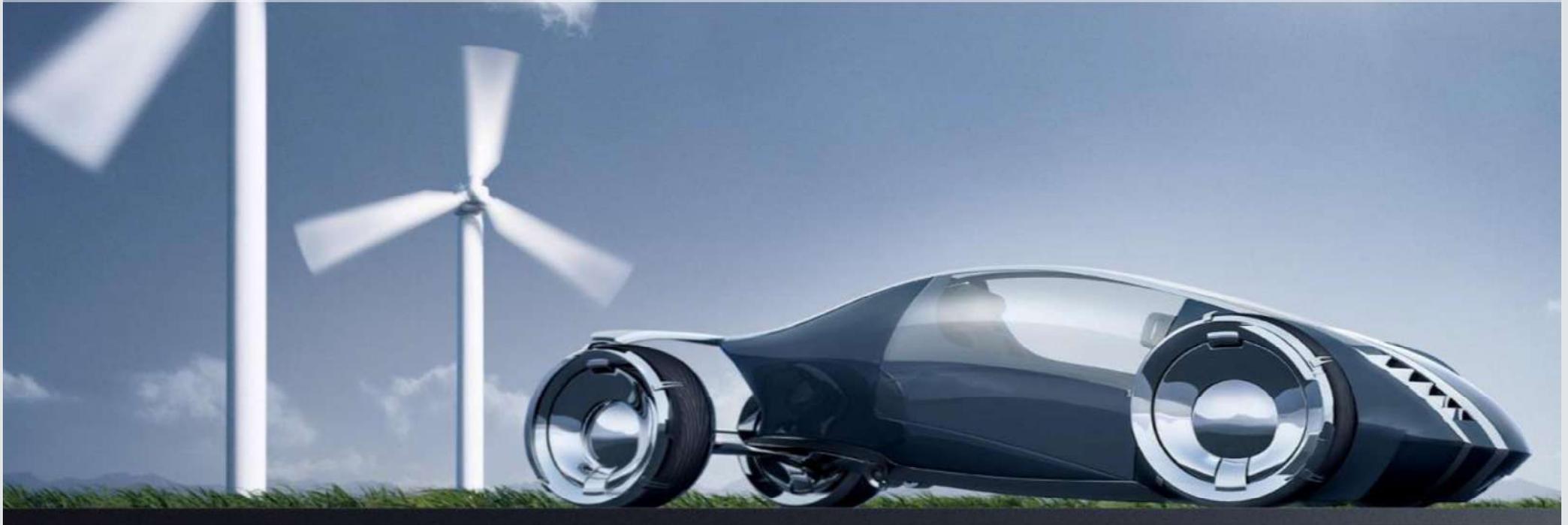
## Innovative Engineering Forms The Future

- Big onshore potentials are still undeveloped, the offshore use is continuously extended and wind power stations of the first generation are gradually replaced by modern units of a higher capacity.
- So far more than 70,000 KTR couplings have been installed in wind power units with nominal powers of 25 kW to 8 MW.
- The sun, wind and sea offer enormous growth potentials to KTR.



## Innovative Engineering Forms The Future

- The machine construction range is becoming „greener“ – e. g. the trend towards electromobility.
- The all-electric drive makes new demands on the connection of engine and gearbox.
- KTR offers coupling solutions for the automotive range meeting all requirements: a specifically adjusted BoWex® as a further development of the classic BoWex® that KTR developed 50 years ago. It was successfully tested in the MINI E and others.





If You Want to Set Things in Motion ...

Made for Motion

