

# **Couplings for Railway and Traffic Engineering**

Comfort, control and more kilometres





## 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<sup>®</sup> BoWex<sup>®</sup> and the torsionally flexible jaw coupling ROTEX<sup>®</sup>, 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 lowcost 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



## Point the way ahead for more reliability!

Every rail vehicle has a different drive system and every drive system needs its own coupling. With 35 years of experience in railway technology KTR continuously deliver new products and ideas for classical mechanics in high technology, in this way ensuring that everything is well in modern railway traffic.

#### Always a good connection

The whole world wants to be mobile – and consequently the requirement for more commuter rail traffic increases. Global competition, for all manufacturers, ensures that all organisations look to provide high quality products at the lowest cost possible.

As a supplier of products and innovation for drive systems, KTR can make a considerable contribution to the perfect drive system of rail vehicles, at a low cost and operational over a long period. KTR shaft coupling systems facilitate space-saving and reliable solutions that are easy to assemble. This extends the service life of the drive system and also increases the comfort of the passengers. Leading manufacturers of commuter rail vehicles opt for KTR couplings time and time again.

- For fully spring-loaded drives equipped with motors having two bearings, the axial plug-in ROTEX<sup>®</sup> coupling is a well-known and popular solution.
- For the latest motors having single bearings we would recommend our new torsionally rigid steel membrane coupling RADEX<sup>®</sup>-MK.
- For non-spring-loaded drives with hollow shaft the torsionally rigid, backlash-free RIGIFLEX® is the right coupling.

To protect adjacent components all our couplings can be provided with a RUFLEX® overload system.



#### A clever move: design with the help of KTR

The quality of the drive components defines the quality of the overall drive system. The more complex the application, the more important it is to consider the drive system as a whole. This includes designing in the correct the component from the very beginning.

We produce our products for railway and traffic technology according to the demands of the specific application or as per your specific requirements and specifications. KTR couplings are not only used in traction drives of tramways, city railways, underground trains, railcars or railway construction vehicles, but also on auxiliary drives such as safety systems for doors and stairs, in current collectors and points setting systems. We are pleased to pass on the experience gained from such applications to you. We believe that this could lead to new products emerging from since spin-off effects. Our engineers will work with you during the design stage and will help find the optimum, low-cost solution for your specific application. Simply contact us and point the way ahead for progress – with products made by KTR.



## Twenty-five times around the world – with commuter rail traffic!

## One million reasons to use ROTEX®

Two thirds of all German tramways in operation today have our ROTEX<sup>®</sup> couplings as part of their drive system. We are seeing a trend whereby this development is becoming the norm across the world. The compact design of the ROTEX<sup>®</sup> coupling allows for easy assembly even in the latest bogies with low platforms and non-barrier entrances. In regional trains ROTEX<sup>®</sup> is used just as much. Some of the benefits of this coupling are:

- Quick and blind axial plug-in assembly
- Compensating for shaft misalignment
- Damping vibrations
- Reducing restoring forces
- Visual inspection of wear possible, therefore reduction of maintenance costs
- Low-wear operation: Performance of more than 1,000,000 kilometres
- Option with integrated overload protection.

The ROTEX<sup>®</sup> spider enables the drive system operate smoothly due to the material we have developed for railway technology in particular. Thanks to its perfect design the overall drive stays in good condition for a longer time.

#### High power in a small space

In order to achieve compact dimensions for train drives, singlebearing motors are used. For that purpose a torsionally rigid coupling is required to transmit the supporting forces of the rotor to the bearing at the first gear stage. The most suitable product for such a sophisticated function is our compact membrane coupling RADEX<sup>®</sup>-MK which we each adapt to motor and gearbox. The membranes made from highly stiff spring steel compensates for minimum displacements. Flexibility and high production accuracy ensure smooth running and operation without any wear.



#### To avoid stress and overload

RADEX<sup>®</sup>-MK can be combined with a RUFLEX<sup>®</sup> overload unit protecting the drive train against torque shocks, even with frequent load peaks. As soon as the overload torque, set by the manufacturer, is achieved, the power flow is interrupted. The compact design unit saves both mounting space and costs.

For rack railways and diesel engine locomotives a coupling overload system combination of ROTEX<sup>®</sup> and RUFLEX<sup>®</sup> is preferred. The overload unit integrated in the ROTEX<sup>®</sup> hub protects against torque peaks whilst increasing the service life of the adjacent components. This unit is characterised by its compact design as well as its easy and low-cost plug-in assembly. A special friction lining enables more frequent slipping – without the unfavourable stick-slip effect.

#### For high shaft displacements

Hollow shaft drives require torsionally rigid, backlash-free shaft connections. That is why the maintenance-free steel lamina coupling RIGIFLEX<sup>®</sup> is used in some locomotives, commuter trains and trams. As an individually adapted hollow shaft connection between motor and gearbox the double-cardanic coupling is able to compensate for very high displacements. RIGIFLEX<sup>®</sup> can be combined with the RUFLEX<sup>®</sup> torque limiter to become a unit. It is possible to supply this coupling in a form that means axial separation can be achieved without disassembly.

#### For gearbox protection

Trolley buses whose electric motors are driven by current from overhead wires benefit from KTR's insulation coupling. It fulfils particularly high demands, because it does not only transmit the torque reliably, but protects the gearbox against damages caused by current overloads.



# At 350 kph auxiliary drives are no longer of minor importance

KTR couplings not only have decisive benefits with traction drives. On secondary drives, for example door systems and braking devices, they help to protect man and machine. This applies for all trains in passenger and freight traffic.

Open and closed, in and out, up and down

For automatic door systems of rail vehicles the main criteria – even more important than comfort – is the safety of passengers. It goes without saying that the demands are high. No matter if it is a swing door, sliding door or a combination of swing and sliding door the highest reliability of the system is paramount. This kind of door drive has to stand extreme conditions: heat, cold, moisture, shocks, vibrations and the permanent change between open and close. Wear is already preprogrammed into the design – unless the drive is protected by a perfectly adapted shaft coupling. For example BoWex<sup>®</sup> or ROTEX<sup>®</sup>.

Passengers may become an obstacle during the process of the doors closing. Here it is good to see that the protection against squashing of the passengers is ensured by a mechanical overload protection switching off the door drive in case of overload. In this case the backlash-free overload system SYNTEX® or the torque limiter RUFLEX® is the most suitable product. Particularly on complex drives of safety closing systems and automatic entrance aids the coupling overload combination may aid longer service life.



Brake compressor

#### Step by step more powerful

For door systems with pneumatic drives, including brakes, current collectors and other applications, compressed air is required, through on board compressors. These compressors should operate as quietly as possible and should be as compact as they can be in order to save space.

KTR couplings aid the design and manufacture of compact compressors running at low noise. In addition they are easy to assemble, insensitive to temperature, maintenance-free and low-cost.

On brake compressors ROTEX<sup>®</sup> with an integrated fan has proven its worth- just like with the failsafe system on the ICE: the compressor produces the necessary operating pressure in order to release the brake clip. At the same time the fan serves to dissipate the heat in the compressor. If the compressor fails, for example because of power outage, the brake linings are automatically pressed against the brake disk – even at speeds exceeding 300 kph.

Since the compressors in rail vehicles are permanently in operation, noise has to be taken into account. KTR couplings dampen the noise even when they perform their function of damping vibrations at the same time, even if they rotate far away from the resonance points.

Subject to the high product quality and the perfect adaptation of products we are in a position to support you in the development of new compressed air systems: KTR couplings are an important factor for high power and safety in every drive system.



## Powerful benefits when you need them

#### Dual application - road or rail

Whenever two different drive systems are integrated in a vehicle, KTR couplings are important connections, for example on special-purpose vehicles for inspection, maintenance, repair and cleaning of railway plants.

A flange coupling BoWex<sup>®</sup> FLE-PA is often used between diesel engine and axial piston pump in rail-road vehicles to maintain overhead wires. This is also the case when converting road excavators to rail-road excavators. A new friction wheel driving system is connected to the body of the vehicle to enable it to operate both on the highway and on rails.

For tunnel rescue vehicles and fire engines with a wheel hub motor as its rail drive, ROTEX<sup>®</sup> ZR or RADEX<sup>®</sup>-N is needed, with bigger vehicles they are used in combination with CLAMPEX<sup>®</sup> clamping sets. For smaller performance vehicles the double-cardanic ROTEX<sup>®</sup> ZR with an intermediate shaft, that has to be disassembled radially, is particularly suitable. It is able to offset large shaft distances and compensate for high radial displacements. The double arrangement of spiders facilitates particularly good damping properties.

CLAMPEX<sup>®</sup> clamping sets are also used on test benches for locomotive gearboxes. The benefit of the frictionally engaged shaft-hub-connection compared to a positive-locking feather key connection is obvious: The frictionally engaged operation ensures an accurate, material-saving shaft connection free from wear even with high alternating loads.



# Special products for special-purpose vehicles

On railway track machines KTR couplings are used in the direct drives of rail axles. In this case a special design of ROTEX<sup>®</sup>, as a flange type coupling, has been used and has proven to be very successful.

In vehicles for trackbed cleaning and maintenance our couplings and components are indispensable. An example of this is when a ROTEX<sup>®</sup> coupling is used on the conveyor drive of trackbed cleaning machines. BoWex<sup>®</sup> curved-tooth gear couplings are used on the combustion engine and KTR steel tanks on the hydraulic system.

### A life full of changes

Points setting devices, signals and materials depot controls are other major applications for ROTEX<sup>®</sup> or ROTEX<sup>®</sup> GS. In electro-hydraulic points setting devices the coupling is installed between motor and pump. In mechanical systems devices the coupling is installed between motor and setting gear. The switching of the points are operated by electric signals controlling the drive of the point directly. KTR couplings have operated in some points setting systems for over 20 years, due to the couplings high quality, reliability and long service life, thus they meet with highest demands required – safely.

# KTR couplings for railway and traffic engineering

	<u>(</u> 56)			
Product	ROTEX®	ROTEX <sup>®</sup> GS	RADEX®-N	RADEX®-MK
Traction drives spring-loaded with double bearings	•			
Traction drives spring-loaded with single bearing				•
Traction drives non-spring-loaded supported on the axle	•			
Door drives	•	•		
Compressors	•			
Inclining technology	•	•		
Electro-hydraulic drives	•		•	
Diesel-hydraulic drives				
Points setting controls	•	•		
Trolley busses (insulation coupling)	•			
Rail-road drive	•		•	

POLY-NORM®	RIGIFLEX®	BoWex®	BoWex-ELASTIC® BoWex® FLE-PA	RUFLEX® SYNTEX®
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## **KTR Germany:**

#### Headquater:

KTR Kupplungstechnik GmbH Postfach 1763 D-48407 Rheine Phone: +49 5971 798-0 Fax: +49 5971 798-698 and 798-450 E-mail: mail@ktr.com Internet: www.ktr.com

#### Schleswig-Holstein, Nord-Niedersachsen, Hamburg, Bremen

Herr Martin Lau, Maschinenbautechniker KTR Kupplungstechnik GmbH Ingenieurbüro Itzehoe Geschwister-Scholl-Allee 44 25524 Itzehoe Phone: 04821 4050812 Fax: 04821 4050814 Mobile: 0172 5310014 E-mail: m.lau@ktr.com

#### NRW: Reg.-Bez.: Düsseldorf

Herr Franz-Josef Schulz, Dipl.-Ing. (FH) KTR Kupplungstechnik GmbH Ingenieurbüro Bocholt Am Hilteken 7 46397 Bocholt Phone: 02871 39080 Fax: 02871 32009 Mobile: 0172 5329968 E-mail: f.schulz@ktr.com

#### Hessen, Rheinland-Pfalz, Saarland

Herr Hansjürgen Leonhardt, Dipl.-Ing. (FH) KTR Kupplungstechnik GmbH Ingenieurbüro Frankfurt Theodor-Heuss-Str. 23 61118 Bad Vilbel Phone: 06101 129690 Fax: 06101 129691 Mobile: 0172 5331202 E-mail: h.leonhardt@ktr.com

#### Mitte- und Süd-Niedersachsen,

Ostwestfalen, Nord-Hessen Herr Lothar Monka, Ingenieur KTR Kupplungstechnik GmbH Ingenieurbüro Wunstorf Bordenauer Weg 4 31515 Wunstorf - Großenheidorn Phone: 05033 912740 Fax: 05033 912741 Mobile: 0172 5322164 E-mail: I.monka@ktr.com

#### Bayern-Süd

Herr Peter Benkard, Dipl.-Ing. (FH) KTR Kupplungstechnik GmbH Ingenieurbüro Augsburg Frickenlohweg 4 86465 Welden Phone: 08293 960504 Fax: 08293 960505 Mobile: 0172 5313059 E-mail: p.benkard@ktr.com

Emsland, Ruhrgebiet, Siegerland Herr Günter Enk, Dipl.-Ing. KTR Kupplungstechnik GmbH Ingenieurbüro Bocholt Stormstraße 35 46397 Bocholt Phone: 02871 227488 Fax: 02871 227489 Mobile: 0172 5355704 E-mail: g.enk@ktr.com

#### Berlin, Mecklenburg-Vorpommern Südost, Sachsen-Anhalt, Brandenburg

Thüringen Nord, Sachsen Herr Harald Scholze, Dipl.-Ing. (TU) KTR Kupplungstechnik GmbH Ingenieurbüro Wittenberg August-Bebel-Straße 7 06886 Lutherstadt-Wittenberg Phone: 03491 663526 Fax: 03491 610060 Mobile: 0172 5329887 E-mail: h.scholze@ktr.com

#### Baden-Württemberg Nord

Herr Reiner Till, Ingenieur KTR Kupplungstechnik GmbH Ingenieurbüro Kirchheim/Neckar Lissenstraße 28 74366 Kirchheim Phone: 07143 92840 Fax: 07143 92850 Mobile: 0172 5355056 E-mail: r.till@ktr.com

#### Baden-Württemberg Süd

Herr Jochen Glöckler, Maschinenbautechniker KTR Kupplungstechnik GmbH Ingenieurbüro Balingen Hölzlestraße 44 72336 Balingen Phone: 07433 91381 Fax: 07433 91382 Mobile: 0172 5310049 E-mail: j.gloeckler@ktr.com

Bayern-Nord, Thüringen Süd Herr Eduard Schadly, Ingenieur KTR Kupplungstechnik GmbH Ingenieurbüro Prebitz In der Heide 27 95473 Prebitz-Engelmannsreuth Phone: 09270 9666 Fax: 09270 9667 Mobile: 0172 5329967 E-mail: e.schadly@ktr.com

## **KTR worldwide:**

#### Australia

Deanquip PowerTrans Hydraulics & Tools Pty. Ltd., P. O. Box 849 16 Edelmaier Street AUS - Bayswater, Victoria 3153 Phone: +61 3 97 29 02 01 Fax: +61 3 97 29 02 02 E-mail: sales@deanquip.com

#### Austria

Lenze Verbindungstechnik GmbH lpf-Landesstr. 1 Å-4481 Asten Phone: +43 7224 210-0 Fax: +43 7224 210-998 E-mail: sale@lenze-verbindung.com

#### Belgium/Luxemburg

 KTR Benelux B. V. (Bureau Belgien) Blancefloerlaan 167/22 B-2050 Antwerpen Phone: +32 3 2110567 Fax: +32 3 2110568 E-mail: ktr-be@ktr.com

#### Brazil

KTR do Brasil Ltda. Rua Henrique Coelho Neto 381 -Barracao I, Nucleo C. Pinhais CEP: 83321-030, Pinhais, PR Brazil Phone: +55 41 36 68 99 26 Fax: +55 41 36 53 62 90 E-mail: ktr-br@ktr.com

#### Canada

Ontario Drive & Gear Ltd. 3551 Bleams Road New Hamburg Ontario, Canada N3A 2J1 Phone: +1 519 662 2840 +1 519 662 2127 Fax: E-mail: couplings@odg.com

#### China

 KTR Power Transmission Technology (Shanghai) Co. Ltd.
Floor 1 & 2, Bldg. B No. 1501 JinSui Road Pudong Shanghai 201206 China Phone: +86 21 50 32 08 80 Fax: +86 21 50 32 06 00 E-mail: ktr-cn@ktr.com

#### Czech Republic

KTR CR, spol. s. r. o. Olomoucká 226 CZ-569 43 Jevícko Phone: +420 461 325 014 +420 461 325 162 Fax: E-mail: ktr-cz@ktr.com

#### Denmark

Lönne Scandinavia A/S Bugattivej 5G 7100 Vejle, Denmark Phone: +45 76 40 87 00 Fax: +45 76 40 87 01 E-mail: info.denmark@lonne.com

#### Finland

KTR Finland OY Tiistinniityntie 2 SF-02230 Espoo PL 23 SF-02231 Espoo Phone: +358 2 07 41 46 10 +358 2 07 41 46 19 Fax: E-mail: ktr-fi@ktr.com

#### France

• KTR France S.A.R.L. 46 – 48 Chemin de la Bruyère F-69570 Dardilly Phone: +33 478 64 54 66 +33 478 64 54 31 Fax: E-mail: ktr-fr@ktr.com

#### Great Britain

KTR Couplings Ltd. Robert House Unit 7, Acorn Business Park Woodseats Close Sheffield, England, S8 0TB Phone: +44 11 42 58 77 57 Fax: +44 11 42 58 77 40 E-mail: ktr-uk@ktr.com

#### Indonesia

PT. Duta Rantai Mas Jl. Mangga Besar Raya No. 107 Block C3 RI - Jakarta 11170 P. O. Box 4597 RI - Jakarta 11045 Phone: +62 21 6 59 41 80 +62 21 6 59 45 94 Fax: E-mail: duta.rantai.mas@gmail.com

#### Iran

Paralog Engineering Co., Ltd. P. O. Box 19 395-7366 No. 35, Shangarf St. Mirdamad Blvd., IR - Tehran 15 489 Phone: +98 21 22 90 55 51 +98 21 22 90 55 50 Fax: E-mail: info@paralog.ir

#### India

KTR Couplings (India) Pvt. Ltd., T – 36 / 37 / 38, MIDC, Bhosari, Pune - 411026 India Phone: +91 20 65 10 56 31 or +91 20 27 45 81 45

#### +91 20 27 45 81 44 Fax: E-mail: ktr-in@ktr.com

Israel

G - G Yarom Getter Ltd. Rolling & Conveying Ltd. 6, Hamaktesh Street Industrial Zone IL - Holon 58810 Phone: +972 3 5 57 01 11 +972 3 5 59 32 46 Fax: E-mail: noam\_a@gg.co.il

#### Italy

KTR Kupplungstechnik GmbH Sede senza rappresentanza stabile sul Territorio Nazionale, Via Fermi, 25 I-40033 Casalecchio di Reno (BO) Phone: +39 051 613 32 32 +39 02 700 37 570 Fax: E-mail: ktr-it@ktr.com

Mondial S.p.A. sede: 20124 Milano via G. Keplero, 18 Phone: +39 02 66 81 01 +39 02 66 81 02 64 Fax: E-mail: mkt@mondial.it

#### Japan

KTR Japan Co., Ltd. 3-1-23 Daikaidori Hyogo-ku, Kobe-shi 652-0803 Japan Phone: +81 7 85 74 03 13 Fax: +81 7 85 74 03 10 E-mail: ktr-jp@ktr.com

KTR Japan Co., Ltd. 1-11-6, Higashi-Ueno, Taito-Ku, Tokyo 110-0015 Japan (Takeno-building, 5F) Japan Phone: +81 3 58 18 32 07 +81 3 58 18 32 08 Fax:

#### Korea

 KTR Korea Ltd. # 101, 978-10, Topyung-Dong Guri-City, Gyeonggi-Do 471-060 Korea Phone: +82 3 15 69 45 10 +82 3 15 69 45 25 Fax: E-mail: ktr-kr@ktr.com

### Netherlands

KTR Benelux B. V. Postbus 87 NL-7550 AB Hengelo (O) Adam Smithstraat 37 NL-7559 SW Hengelo (O) Phone: +31 74 2505526 Fax: +31 74 2502466 E-mail: ktr-nl@ktr.com

#### Norway

KTR Kupplungstechnik Norge AS Industriveien 21 N-2020 Skedsmokorset Phone: +47 64 83 54 90 Fax: +47 64 83 54 95 E-mail: ktr-no@ktr.com

#### Poland

KTR Polska SP. Z. O. O. Ceglarska 21/20 PL – 30-362 Kraków Phone: +48 12 267 28 83 +48 12 267 07 66 Fax: E-mail: ktr-pl@ktr.com

#### Portugal

KTR Kupplungstechnik GmbH c) Estartetxe, nº 5 - Oficina 218 E-48940 Leioa (Vizcaya) Phone: +34 9 44 80 39 09 Fax: +34 9 44 31 68 07 E-mail: ktr-es@ktr.com

Gustavo Cudell, LDA Rua Eng. Ferreira Dias, 954 P - 4149-008 Porto Phone: +351 22 615 80 00 Fax: +351 22 615 80 11 E-mail: info-e+s@cudell.pt Internet: www.cudell.pt

#### Russia

• KTR Privodnaya technika, LLC Sverdlovskaya Naberezhnaya 60, Litera A, Office 1-N 195027 St. Petersburg Russia Phone: +7 812 495 62 72 Fax: +7 812 495 62 73 E-mail: mail@ktr.ru Internet: www.ktr.ru

#### Singapore

Drives & Control (Sea) Pte. Ltd. Unit # 01-02 Block 26 Ayer Rajah Crescent 
 Ayer Rajah Industrial Estate

 Singapore 139944

 Phone: +65 67 77 57 77

 Fax: +65 67 78 43 26
 E-mail: drives@drivescontrol.com.sg

#### Spain

KTR Kupplungstechnik GmbH c) Estartetxe, nº 5 – Oficina 218 E-48940 Leioa (Vizcaya) Phone: +34 9 44 80 39 09 +34 9 44 31 68 07 Fax: E-mail: ktr-es@ktr.com

Aguirrezabal Hnos., S. A. Iruna 3 E - 48014 Bilbao Phone: +34 9 44 47 33 58 +34 9 44 47 63 20 Fax: E-mail: aguirrezabal@aguirrezabal.com

Brammer Iberia S. A. Plataforma D-152, Pab. 1 Poligono Ind. Erletxe E-48960 Galdácano (Vizcaya) Phone: +34 94 457 94 00 +34 94 457 94 20 Fax: E-mail: es@brammer.biz

South Africa Hytec Coupling Technology A division of Hydraulic & Automation Warehouse P. O. Box 2272 Kempton Park, 1620 28 Spartan Road, Spartan Ext 21 South Africa Phone: +27 11 281 3800 +27 11 281 3812 Fax: E-mail: info@hytec.co.za

#### Sweden

 KTR Sverige AB Box 742
S - 191 27 Sollentuna Phone: +46 86 25 02 90 +46 86 25 02 99 Fax: E-mail: info.se@ktr.com

#### Switzerland

 KTR Kupplungstechnik AG Bahnstr. 60 CH - 8105 Regensdorf Phone: +41 4 33 11 15 55 +41 4 33 11 15 56 Fax: E-mail: ktr-ch@ktr.com

#### Taiwan

KTR Taiwan Ltd. 1 F, No.: 17, Industry 38 Road Taichung Industry Zone Taichung Taiwan, R. O. C. Phone: +886 4 23 59 32 78 Fax: +886 4 23 59 75 78 E-mail: j.wu@ktr.com

Turkey HIDROPAR KOCAELI Hidrolik Otomasyon ve Elektronik San. ve Tic. Ltd. Sti. Osman Yılmaz Mah. İstanbul Cd. No: 80/A 41400 Gebze / Kocaeli Turkey Phone: +90 262 643 84 11 Fax: +90 262 643 84 14 E-mail: info@hidroparkocaeli.com.tr Internet: www.hidroparkocaeli.com.tr

## USA

KTR Corporation 122 Anchor Road Michigan City, Indiana 46360 USA Phone: +1 2 19 8 72 91 00 +1 2 19 8 72 91 50 Fax: E-mail: ktr-us@ktr.com

**KTR Kupplungstechnik GmbH** P.O. Box 1763 D-48407 Rheine Phone: +49(0)5971 798-0 Fax: +49(0)5971 798-698 and 798-450 E-mail: mail@ktr.com Internet: www.ktr.com

