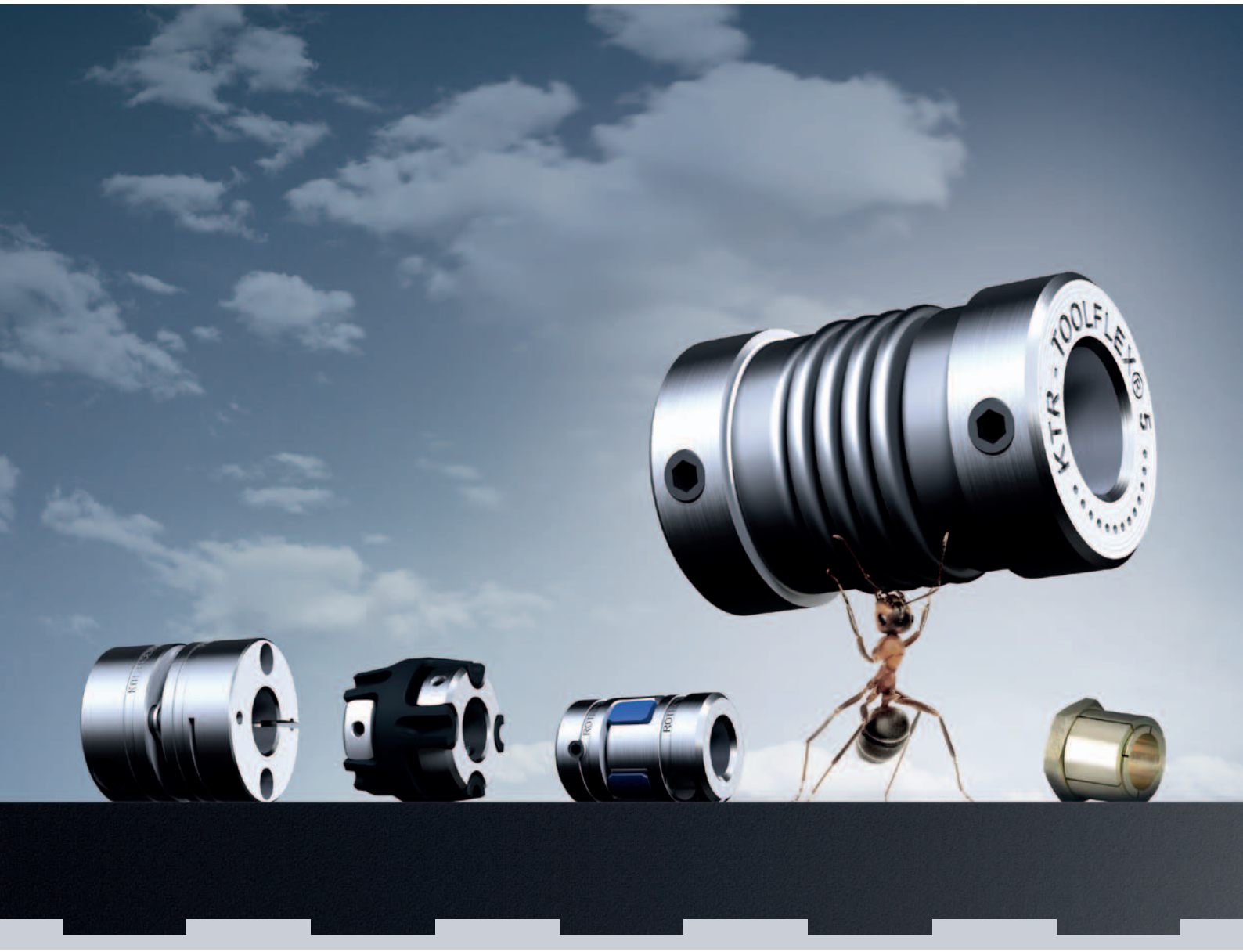


Miniature components of KTR

Small, light-weight and absolutely powerful

Made for Motion KTR

www.ktr.com

We move the world: KTR

Competence meets creativity

As a leading manufacturer of high-quality drive and brake components as well as hydraulic components, KTR supplies mechanical couplings, clamping sets, torque limiters, measuring systems, hydraulic components and high-power brakes 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 0,1 up to 1.000.000 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 or more. 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.

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

Table of contents

Great skill in tiny parts – miniature components of KTR

ROTEX® GS

- Backlash-free, flexible jaw-type coupling
- Axial plug-in
- Adjustment of stiffness via different kinds of elastomer hardness of spiders
- Electric insulation

For example in the food industry

COUNTEX®

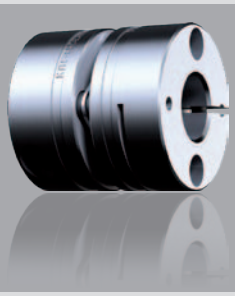
- Backlash-free torsionally stiff shaft encoder coupling
- Axial plug-in
- Temperature-resistant
- Double-cardanic
- Electric insulation

For example between shaft encoder and motor with high temperatures and a constant torsional stiffness required

TOOLFLEX®

- Backlash-free torsionally stiff metal bellow-type coupling
- Each two different lengths in every size available
- High torsion spring stiffness
- All-metal coupling

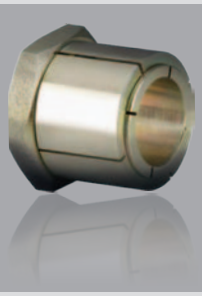
For example on an actuator in medical technology



RADEX®-NC

- Backlash-free torsionally stiff servo lamina coupling
- High torsion spring stiffness
- Temperature-resistant
- All-metal coupling
- Single and double cardanic types

For example for the smallest machine tools



CLAMPEX®

- Backlash-free shaft-hub-connection
- Various types available
- Easy assembly

For example in storage systems for the pharmaceutical industry

For further details, sizes, coupling systems and product data please have a look at our latest company catalogue which you can either order from us or download on our homepage.

Our smallest couplings having a big impact... powerful and filigree

Bigger, more sturdy, more powerful – that is how most customers know the products of KTR. However, the industrial development takes the opposite direction: smaller, less weight, smoother. That is why our "large ones" are available in a miniature design, too. Anyway, we do not fall below our standards with regard to quality, reliability and performance!

The trend towards miniaturization

The proceeding miniaturization of drives has become a vital trend in numerous industries: in medical technology, optics and precision engineering as well as with micro dosing systems and micro dosing pumps. No matter whether dental drills, eye lasers, camera lenses or SCARA robots are concerned, all of them have one thing in common: They have to deliver a high performance with maximum accuracy and reliability. This only works with such drive components which are powerful and filigree at the same time – just like the miniature components of KTR.

Small and perfectly shaped

All miniature couplings and clamping elements of KTR are characterized by extremely compact designs easy to assemble. At the same time they are highly specialized which will allow you to find the suitable coupling for every demand: for the high dynamics of servo drives as well as for the required torsion spring stiffness in measuring and control technology, for high ambient temperatures up to 200° C as well as for aggressive ambient conditions. KTR provides the "smallest" common denominator for each requirement.

Small and clean

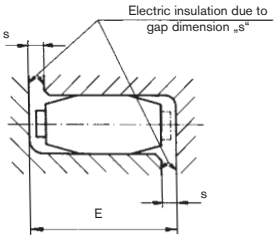
Another challenge: the micro system and medical technology preferably operates in dust-free rooms. Here again KTR's miniature couplings are a pure pleasure. In cooperation with the famous Fraunhofer Institut für Produktionstechnik und Automatisierung (IPA) (Fraunhofer Institute for production technology and automation), the three series ROTEX® GS, RADEX®-NC and TOOLFLEX® were tested for their suitability in dust-free rooms. The result was that all couplings released extremely few particle emissions. The couplings tested have reached the purity level 7 or 8 according to DIN EN ISO 14644-1. ISO 7 and ISO 8 correspond to the GMP class „C" in the pharmaceutical industry. As a result KTR's miniature couplings can be used in almost every range of dust-free room production.

Technical description

ROTEX® GS is a 3-part, axial plug-in coupling backlash-free under prestress. It is convincing even with critical applications by its backlash-free power transmission, its stiffness which is each adapted to the application and its optimum damping of vibrations. This principle of installation offers significant assembly possibilities which optimize the assembly times in production.

ROTEX® GS (straight tooth, backlash-free)

The straight toothing of the spider mounted under prestress results in a smaller surface pressure and consequently higher stiffness of the coupling system. The pegs arranged reciprocally on the spider prevent the spider from touching the hub over the entire surface. Observing the distance dimension E ensures the ability of the coupling to compensate for displacements. By observing the gap dimension „s“ the electrical insulation is ensured, as well as a high service life of the coupling. This fact is gaining more and more importance, due to the increasing precision of shaft encoders and the existing demand for electromagnetic compatibility.



Spider					
Description of spider hardness [Shore]	Identification Colour	Material	Permissible temperature range [° C]		Typical applications
			Dauertemperatur	Max. temperature short-term	
70 Sh-A-GS		Polyurethane	- 50 to + 80	- 60 to + 120	– drives of electric measuring systems
80 Sh-A-GS		Polyurethane	- 50 to + 80	- 60 to + 120	– drives of electric measuring systems
92 Sh-A-GS		Polyurethane	- 40 to + 90	- 50 to + 120	– drives of electric measuring and control systems – Hauptspindelantriebe
95/98-Sh A-GS		Polyurethane	- 30 to + 90	- 40 to + 120	– positioning drives – Hauptspindelantriebe – high load
64 Sh-D-H-GS		Hytrel	- 50 to + 120	- 60 to + 150	– planetary gears / backlash-free gears – higher torsional stiffness / high ambient temperature

The elastic spiders of the GS line are available in fi ve different kinds of Shore hardness, identifi ed by colour, the material being soft to hard. Due to these fi ve spiders with different kinds of Shore hardness it is easily possible to adjust the ROTEX® GS regarding the torsional stiffness and the vibration behaviour to the individual conditions of an application. The fl exible prestress varies depending on the coupling size, the spiders/material and the production tolerances. Resulting herefrom is the axial plug-in force starting from low as a close sliding fi t or with torsionally soft spider, respectively, to heavy with high prestress or torsionally rigid spider (see mounting instruction KTR-N 45510 at www.ktr.com).

Size	Spider Shore-GS	Shore-Skala	Max. speed [rpm] for hub design				Torques [Nm] [1]		Static torsion spring stiffness [1] [Nm/rad]	Dynamic torsion spring stiffness [1] [Nm/rad]	Radial spring stiffness Cr [N/mm]	Weight [kg]		Mass moment of inertia J [kgm²]	
			2.0 2.1	2.8 2.9	1.0 1.1	6.0 light[2]	T_{KN}	$T_{K\,max}$				Each hub [3]	Spider	Each hub [3]	Spider
5	70	A	38000	38000	47700	–	0,2	0,3	1,78	5	43	0,001	$0{,}2 \times 10^{-3}$	$0{,}015 \times 10^{-6}$	$0{,}002 \times 10^{-6}$
	80	A					0,3	0,6	3,15	10	82				
	92	A					0,5	1,0	5,16	16	154				
	98	A					0,9	1,7	8,3	25	296				
7	80	A	27000	27000	34100	–	0,7	1,4	8,6	26	114	0,003	$0{,}5 \times 10^{-3}$	$0{,}085 \times 10^{-6}$	$0{,}01 \times 10^{-6}$
	92	A					1,2	2,4	14,3	43	219				
	98	A					2,0	4,0	22,9	69	421				
	64	D					2,4	4,8	34,3	103	630				
8	80	A	–	23800	–	–	0,7	1,4	8,8	27	117	0,003	3×10^{-3}	$0{,}117 \times 10^{-6}$	$0{,}01 \times 10^{-6}$
	98	A					2,0	4,0	23,5	71	433				
NEW	64	D					2,4	4,8	35,3	106	648				
9	80	A	19000	19000	23800	–	1,8	3,6	17,2	52	125	0,01	$1{,}7 \times 10^{-3}$	$0{,}48 \times 10^{-6}$	$0{,}085 \times 10^{-6}$
	92	A					3,0	6,0	31,5	95	262				
	98	A					5,0	10,0	51,6	155	518				
	64	D					6,0	12,0	74,6	224	739				
12	80	A	15200	15200	19100	–	3,0	6,0	84,3	252	274	0,02	$2{,}3 \times 10^{-3}$	$1{,}5 \times 10^{-6}$	$0{,}139 \times 10^{-6}$
	92	A					5,0	10,0	160,4	482	470				
	98	A					9,0	18,0	240,7	718	846				
	64	D					12,0	24,0	327,9	982	1198				
13	80	A	–	12700	–	–	3,6	7,2	111	330	359	0,01	$1{,}3 \times 10^{-3}$	$1{,}1 \times 10^{-6}$	$0{,}155 \times 10^{-6}$
	98	A					11,0	22,0	316	941	1109				
NEW	64	D					14,5	29,0	430	1287	1570				
14	80	A	12700	12700	15900	32000	4,0	8,0	60,2	180	153	0,02	$4{,}7 \times 10^{-3}$	$2{,}8 \times 10^{-6}$	$0{,}509 \times 10^{-6}$
	92	A					7,5	15,0	114,6	344	336				
	98	A					12,5	25,0	171,9	513	654				
	64	D					16,0	32,0	234,2	702	856				
16	80	A	–	12000	–	–	5,0	10,0	157	471	400	0,02	$2{,}3 \times 10^{-3}$	$2{,}8 \times 10^{-6}$	$0{,}434 \times 10^{-6}$
	98	A					15,0	30,0	450	1341	1710				
NEW	64	D					19,0	38,0	612	1835	2238				

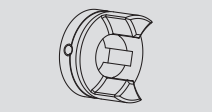
[1] Static and dynamic torsional stiffness with 0,5 x TKN
[2] Higher speeds on request
[3] Hubs with average bore type 1.0
The coupling has to be dimensioned in a way that the permissible coupling load is not exceeded during any operating condition. Please note coupling selection on our company catalogue on www.ktr.com We will be pleased to assist you with the coupling selection.

Technical data

Explosion protection use

ROTEX® GS couplings are suitable for the use on drives in hazardous areas. The couplings are certified according to EC Standard 94/9/EC (ATEX 95) and belong to category 2G/2D, are confirmed and thus suitable for the use in hazardous areas of zone 1, 2, 21 and 22. Please read our information in the respective Type Examination Certificate and the operating and mounting instructions at www.ktr.com.

Hub design

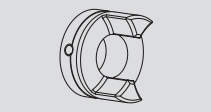


Design 1.0 with keyway and set screw

Positive locking torque transmission, permissible torque depending on the permissible surface pressure. Not suitable as backlash-free torque transmission with heavily reversing operation.

Design 1.3 with spline bore

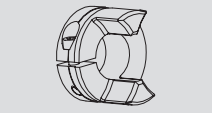
Spline on request of customers (e. g. spline D for shaft with flat)



Design 1.1 without keyway, with setscrew

Non-positive torque transmission, suitable for backlash-free transmission of very small torques. (Only for ATEX category 3)

Design 1.2 Hub without feather keyway, without thread for setscrews
Suitable for bonding or pressing onto the shaft.



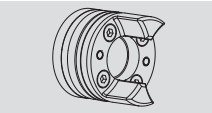
Design 2.0 clamping hub, single slotted, without keyway
Frictionally engaged, backlash-free shaft-hub-connection. Transmittable torques depending on bore diameter (Only for ATEX category 3)

Ausf. 2.8 short clamping hub C
ingle slotted, without feather keyway
Frictionally engaged, backlash-free shaft-hub-connec-tion-. Transmittable torques depending on bore diameter (Nur für ATEX Kat. 3)

Design 2.1 clamping hub, single slotted, with keyway

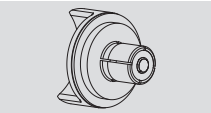
Positive locking power transmission with additional frictionally engaged condition. The frictionally engaged condition prevents or reduces reverse backlash, respectively. Surface pressure of the keyway connection is reduced.

Ausf. 2.9 short clamping hub C
single slotted, with feather keyway
Positive locking power transmission with additional frictionally engaged condition. The frictionally engaged condition prevents or reduces reverse backlash, respectively. Surface pressure of the keyway connection is reduced.



Design 6.0 clamping ring hub

Integrated frictionally engaged shaft-hub-connection for the transmission of higher torques. Screwing onelastomer side. Suitable for high speeds.

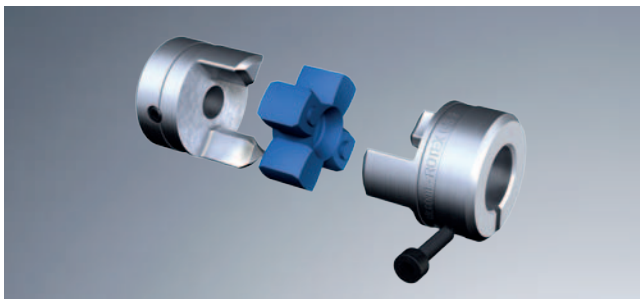


Design 9.0 Expansion hub

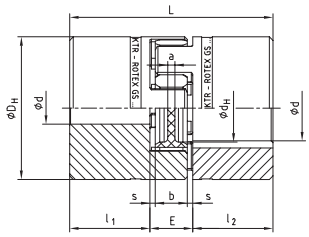
Frictionally engaged connection for hollow shaft. Transmittable torques depend on the bore diameter and the hollow shaft.

Due to the numerous applications of ROTEX® GS for many different mounting situations, this coupling system is available with various hub designs. The different hub designs can be combined optionally within one size. Futher hub design see company catalogue

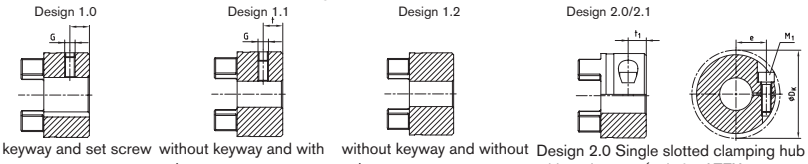
Standard types



- Backlash-free shaft connection under prestress
- Small dimensions – low flywheel mass
- Maintenance-free, easy to inspect visually
- Different elastomer hardness of spiders
- Finish bore according to ISO fit H7 (except for clamping hub), feather key optionally available from Ø 6 mm according to DIN 6885 sheet 1 – JS9.
- Ex Approved according to EC Standard 94/9/EC (without feather key according to category 3)
- Mounting instructions at www.ktr.com



Hub designs:



with keyway and set screw

without keyway and with set screw

without keyway and without set screw

Design 2.0 Single slotted clamping hub without keyway (only for ATEX category 3), torques depending on bore diameter
Design 2.1 Single slotted clamping hub with keyway

[1] Futher spiders page 6 [2] tightening torque T_A not defined (slotted screw)

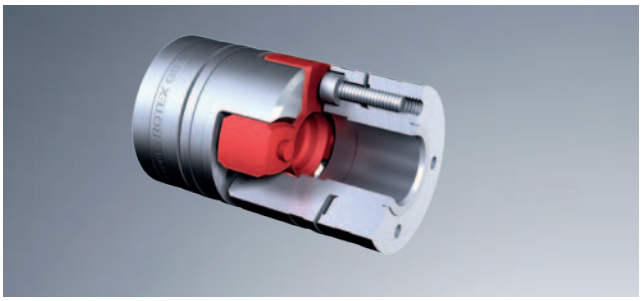
ROTEX® GS standard types material aluminium

Size	Spider torque T_{KN} [Nm] for 95/98Sh-A[1]	Maximuml finish bore Ød for hub design			Abmessungen [mm]										Setscrew DIN EN ISO 4029 Hub design 1.0/1.1		Clamping screw DIN EN ISO 4762 (ROTEX® 5 DIN 84) Hub design 2.0/2.1				
		1.0-1.2	2.0	2.1	D	D_H	d_H	L	l_1;l_2	M;N	E	b	s	a	G	t	M_1	t_1	e	D_K	T_A[Nm]
5	0,9	6	5	5	–	10	—	15	5	–	5	4	0,5	4,0	M2	2,5	M1,2	2,5	3,5	11,4	—[2]
7	2,0	7	7	7	–	14	—	22	7	–	8	6	1,0	6,0	M3	3,5	M2	3,5	5,0	16,5	0,37
9	5,0	11	11	11	–	20	7,2	30	10	–	10	8	1,0	1,5	M4	5,0	M2,5	5,0	7,5	23,4	0,76
12	9,0	12	12	12	–	25	8,5	34	11	–	12	10	1,0	3,5	M4	5,0	M3	5,0	9,0	27,5	1,34
14	12,5	16	16	16	–	30	10,5	35	11	–	13	10	1,5	2,0	M4	5,0	M3	5,0	11,5	32,2	1,34

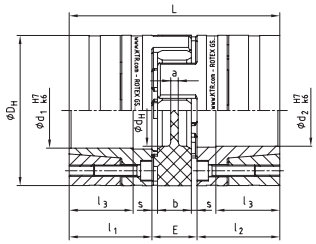
Transmittable friction torque T_R [Nm] of the clamping hub without keyway type 2.0

Size	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	Ø9	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16
7	0,8	0,9	0,95	1,0	1,1								
9		2,1	2,2	2,3	2,4	2,5	2,6	2,7	2,8				
12		3,6	3,8	4,0	4,1	4,3	4,5	4,7	4,8	5,0			
14			4,7	4,8	5,0	5,1	5,3	5,5	5,6	5,8	6,1	6,3	6,5

Clamping ring hubs light



- Torsionally flexible backlash-free shaft coupling with integrated clamping system
- Low weight and low mass moment of due to a design fully made from aluminium
- Easy assembly due to internal clamping screws and block assembly
- High friction torques
- High smoothness of running, application up to a peripheral speed of 50 m/s
- Ex-Approved according to EC Standard 94/9/EC
- Mounting instructions at www.ktr.com



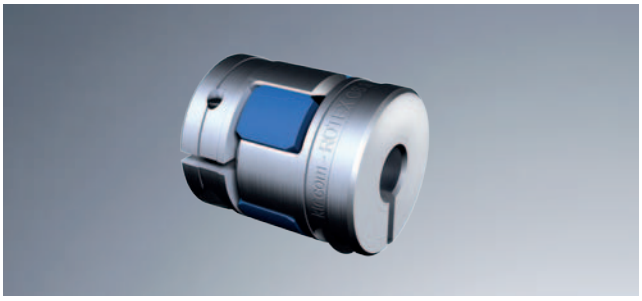
Pull-off thread M_1 between clamping screws

ROTEX® GS clamping ring hubs light Hub and clamping ring material aluminium																			
Size	Spider torque T_{KN} [Nm] 1)			Dimensions [mm]										Clamping screws DIN EN ISO 4762				Weight per hub with max. bore [kg]	Mass moment of inertia per hub with max. bore [kgm²]
	92 Sh-A	98Sh-A	64 Sh-D	maxi.d	D_H 2)	d_H	L	l_1; l_2	l_3	E	b	s	a	M	Anzahl z	T_A[Nm]	M_1		
14	7,5	12,5	16,0	14	30	10,5	50	18,5	13,5	13	10	1,5	2,0	M3	4	1,34	M3	0,032	0,04 x 10^{-4}

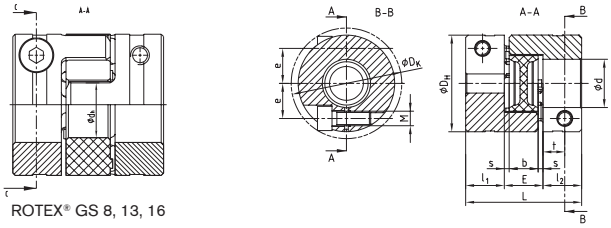
Transmittable friction torques T_R [Nm] of clamping ring hub type 6.0 light *				
Size	Ø6	Ø10	Ø11	Ø14
14	5,1	8,5	10,7	24

1) Futher spiders see page 6
2) $ØD_H$ + 2 mm with high speeds for expansion of spider
*The transmittable torques of the clamping connection consider the max. clearance with shaft fit k6/bore H7, from Ø55 G7/m6. With a higher clearance the torque is reduced. For the stiffness calculation of the shaft/hollow shaft please refer to KTR standard 45510 at our homepage www.ktr.com)

Compact



- Shorter by up to 1/3
- Finish bore from Ø 6 mm also available with feather key acc. to DIN 6885 sheet 1 – JS9
- Ex-Approved according to EC Standard 94/9/EC (hubs without feather key according to category 3)
- Mounting instructions at www.ktr.com

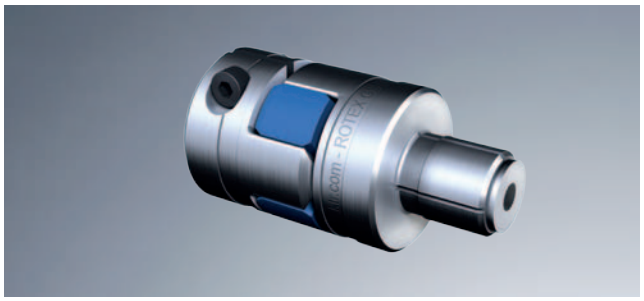


ROTEX® GS 8, 13, 16

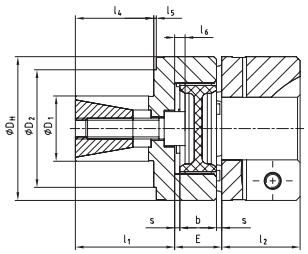
ROTEX® GS Compact Hub material aluminium																		
Size	Zahnkranz Drehmoment T_{KN} [Nm]1)				Dimensions [mm]													T_A [Nm]
	80Sh-A	92Sh-A	98Sh-A	64Sh-D	maximaler d	D_H	D_K	L	l_1, l_2	E	b	s	d_h	t	e	M		
	Einfach geschlitzte Nabenausführung 2.8/2.9																	
7	0,7	1,2	2,0	2,4	7	14	16,6	18	5	8	6	1,0	–	2,5	5,0	M2	0,37	
NEW 8	0,7	–	2,0	2,4	8	15	17,1	20	7	7	6	0,5	6,2	4,0	5,5	M2	0,52	
9	1,8	3,0	5,0	6,0	9	20	21,3	24	7	10	8	1,0	–	3,5	6,7	M2,5	0,76	
12	3,0	5,0	9,0	12,0	12	25	26,2	26	7	12	10	1,0	–	3,5	8,3	M3	1,34	
NEW 13	3,6	–	11,0	14,5	12,7	25	25,7	26	8	10	8	1,0	10	4,0	8,0	M3	1,9	
14	4,0	7,5	12,5	16,0	16 2)	30	30,5	32	9,5	13	10	1,5	–	4,5	9,6	M4	2,9	
NEW 16	5,0	–	15,0	19,0	16	30	–	32	10,3	11,4	9,4	1,0	14	5,3	10,5	M4	4,1	

Übertragbare Reibschlußmomente T_R [Nm] der Klemmnabe ohne Passfedernut Ausf. 2.8													
Size	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	Ø9	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16
7	0,8	0,9	1,0	1,0	1,1								
NEW 8	0,65	0,85	1,1	1,3	1,5	1,7							
9		1,9	2,0	2,1	2,2	2,3	2,4						
12		3,4	3,6	3,7	3,9	4,1	4,2	4,4	4,6	4,7			
NEW 13		2,2	2,75	3,3	3,8	4,4	4,9	5,5	6,0	6,6			
14			7,1	7,4	7,7	8,0	8,2	8,5	8,8	9,1	5,8 2)	5,9 2)	6,1 2)
NEW 16			4,8	5,8	6,4	7,7	8,7	9,6	10,5	11,6	13,5	14,5	15,4

Expansion hub for hollow shaft connection



- Backlash-free shaft coupling with integrated clamping system for hollow shaft connections
- Short design
- Quick assembly
- Good concentric running properties
- Can be combined with various hub designs
- Self-centering clamping connection
- Mounting instructions at www.ktr.com

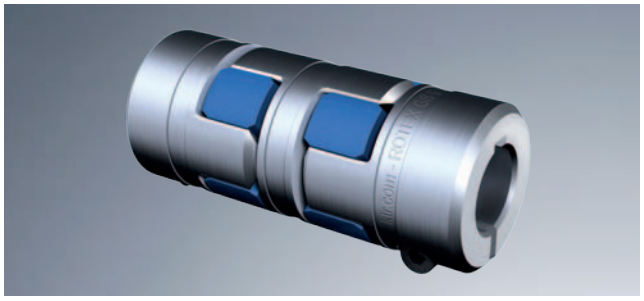


ROTEX® GS expansion hub type 9.0 with clamping hub [1]

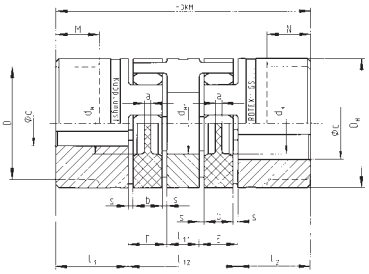
ROTEX® GS expansion hub						Material of expansion hub aluminium/material of clamp pin stainless steel									
Size	Spider torque T_{KN} [Nm] [2]					Dimensions									
	80 Sh-A	92 Sh-A	98 Sh-A	64 Sh-D	72 Sh-D	D_1	D_2	D_H	l_1	l_4	l_5	l_6	E	b	s
9	1,8	3,0	5,0	6,0	–	10	–	20	20	11	–	0	10	8	1,0
12	3,0	5,0	9,0	12,0	–	10	20	25	19	14	1,5	2	12	10	1,0
14	4,0	7,5	12,5	16,0	–	12	24	30	18,5	12,5	3	2	13	10	1,5

[1] Expansion hub can be combined with other hub designs as a counter side, too. l2 depending on hub design. Further hub designs see page 7
[2] Futher spiders see page 6
Transmittable friction torques for D[1] on request (depending on the hollow shaft)

DKM (double cardanic)



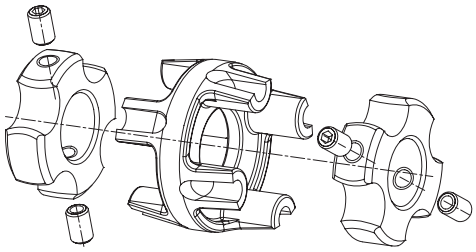
- Double cardanic design allowing to compensate for larger radial displacements
- For applications up to circumferential speeds of 30 m/s please also consider the hub design
- Finish bore according to ISO fit H7 (apart from clamping hub), keyway, from Ø 6 mm according to DIN 6885 sheet 1 - JS9
- Ex-Approved according to EC Standard 94/9/EC
- Mounting instructions at www.ktr.com



ROTEX® GS DKM																Spacer material aluminium/hub material depends on hub design
Size	Spider torque T_{KN} [Nm] [1]		Dimensions [mm]													
	98 Sh-A	64 Sh-D	max. d [2]	D	D_H	d_H	d_{H1}	l_1; l_2	M; N	l_{11}	l_{12}	L_{DKM}	E	b	s	a
5	0,9	—	5	—	10	—	—	5	—	3	13	23	5	4	0,5	4,0
7	2,0	2,4	7	—	14	—	—	7	—	4	20	34	8	6	1,0	6,0
9	5,0	6,0	11	—	20	7,2	—	10	—	5	25	45	10	8	1,0	1,5
12	9,0	12,0	12	—	25	8,5	—	11	—	6	30	52	12	10	1,0	3,5
14	12,5	16,0	16	—	30	10,5	—	11	—	8	34	56	13	10	1,5	2,0

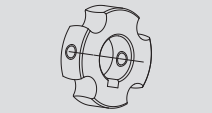
[1] Futher spiders see page 6
[2] Depending on hub design

Technical description



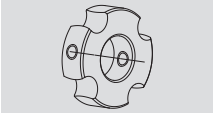
COUNTEX® is a three-parted, backlash-free and torsionally stiff coupling mainly used in measuring and control technology.
The measuring and control technology demands for a high torsion spring stiffness of the coupling in order to realize reproduceable positioning. The torques that arise are relatively low so that a backlash-free, torsional stiff power transmission is achieved subject to the prestress.
The double-cardanic principle of COUNTEX® reduces the restoring forces to a minimum. Its axial plug-in ability combined with the geometry of hubs results in a coupling system with a specifically easy assembly offering options of mounting fitting with processing. The material of the spacer is resistant to high temperatures ensuring almost continuous properties of the coupling system even with temperatures up to 160 °C.

Hub design



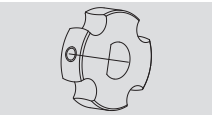
Design 1.0 with keyway and set screw

Positive locking power transmission. Not suitable for backlash-free power transmission with heavily reversing operation.

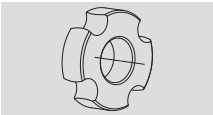


Design 1.1 without keyway, with setscrew

Non-positive torque transmission, suitable for backlash-free transmission of very small torques.

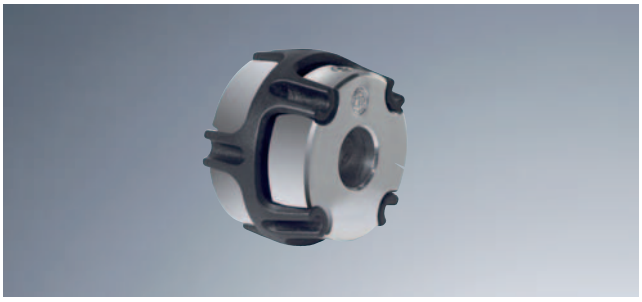


Design 1.3
with spline bore
Positive locking power transmission. Spline on request of customers (e. g. spline D for shaft with flat)

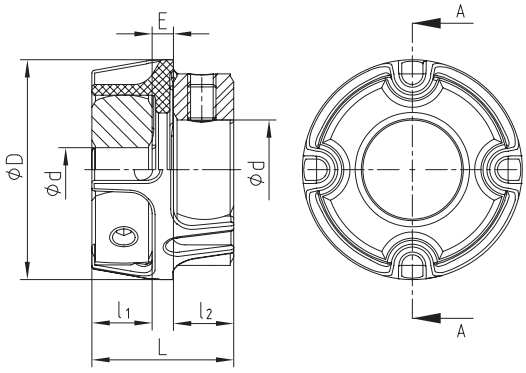


Design 1.2 Hub without feather keyway, without thread for setscrews
Suitable for bonding or pressing onto the shaft.

Standard types



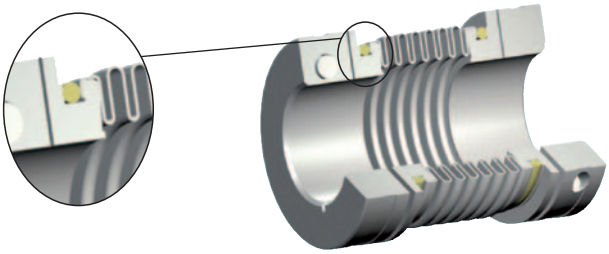
- Backlash-free shaft coupling for measurement drives swith small torques
- Axial plug-in – easy blind assembly
- Temperature range -40 °C to +160 °C
- Electric insulation
- Finish bore acc. to ISO fit H7, keyway from Ø 6 mm acc. to DIN 6885 sheet 1 - JS9
- Applicable to circumferential speeds up to 40 m/s (higher speeds on request)
- Mounting instructions at www.ktr.com



COUNTEX® Hub material aluminium/spacer PEEK														
Size	Torque [Nm]		Dimensions [mm]						Displacements			Torsional stiffness C_T [Nm/rad]	Radial stiffness C_R [N/mm]	Axial restoring force C_A [N]
	T_{KN}	$T_{Kmax.}$	min. d	max. d	D	l_1/l_2	E	L	radial ΔK_r [mm]	axial ΔK_a [mm]	angular ΔK_w [°]			
6	0,3	0,6	2	6	15	4	4	12	0,05	-0,3/+0,6	0,36	48	26	10
12	0,5	1,0	2	12	22	6	3,5	15,5	0,10	-0,5/+1,0	0,45	120	65	25
14	1,0	2,0	5	14	31	8	4	20	0,12	-0,5/+1,0	0,57	235	70	27

Technical description

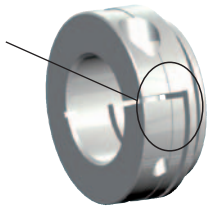
TOOLFLEX® is a metal bellow-type coupling, a coupling system which has proven its worth in the field in many cases. The metal bellow compensates perfectly for axial, radial and angular displacements. At the same time its geometric shape allows for high torsional stiffness and a low mass moment of inertia. TOOLFLEX® is manufactured in twelve sizes for maximum torques up to 600 Nm.
Its main application ranges are both positioning drives, e. g. ball spindles with a high incline, and indexing tables or planetary and worm gears with small gear ratios.



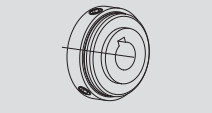
Subject to its well-proven joint procedure a non-positive, backlash-free connection of the aluminium hubs with the multilayer bellows made from stainless steel is produced. The flanged insert connection for sizes 16 to 45 ensures a torque transmission of every single bellow layer. Since TOOLFLEX® is a metal coupling, it remains fatigue-endurable in the high temperature range up to a maximum of 200 °C. Apart from that it is resistant to the effect of media or critical operating conditions, respectively.

The well-known shaft-hub-connection by means of clamping hubs ensures an easy assembly by a radial clamping screw. Subject to two slots in the hub there is no deformation of the bellow when tightening the clamping screw.

clamping hub with two slots

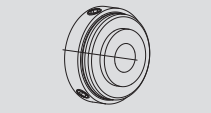


Hub design



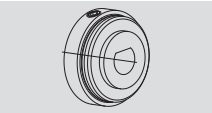
Design 1.0 with keyway and set screw

Positive locking power transmission. Not suitable for backlash-free power transmission with heavily reversing operation.

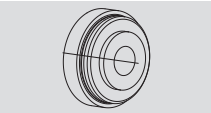


Design 1.1 without keyway, with setscrew

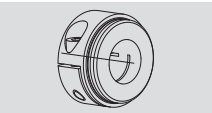
Non-positive torque transmission, suitable for backlash-free transmission of very small torques.



Design 1.3
with spline bore
Positive locking power transmission. Spline on request of customers (e. g. spline D for shaft with flat)



Design 1.2 Hub without feather keyway, without thread for setscrews
Suitable for bonding or pressing onto the shaft.



Design 2.5 clamping hub, double slotted, without keyway

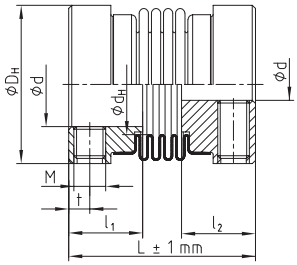
Frictionally engaged, backlash-free shaft-hub-connection. Transmittable torques depending on bore diameter.

Design 2.6 Double slot clamping hub, with keyway

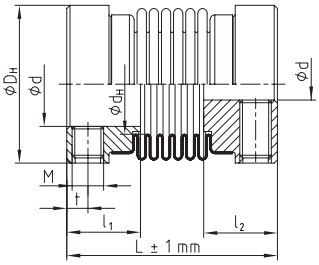
Positive locking shaft-hub-connection with additional frictionally engaged operation. The frictionally engaged operation prevents or reduces reverse backlash.

Type S and M with set screw

- Backlash-free, torsionally stiff, maintenance-free
- Easy assembly due to tolerance F7
- Temperature range for size 5 to 12: -30 °C to +100 °C
  Temperature range for size 16 to 20: max. 200 °C
- Finish bore from Ø 6 mm also available with feather key acc. to DIN 6885 sheet 1 – JS9
- Mounting instructions at www.ktr.com



TOOLFLEX® S design 1.1



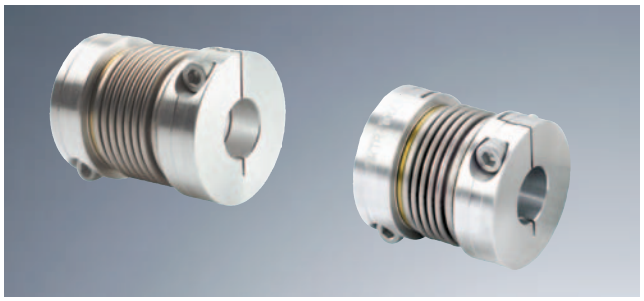
TOOLFLEX® M design 1.1

TOOLFLEX® type S and M with thread for set screw (type 1.1) Hub material aluminium/bellow material stainless steel

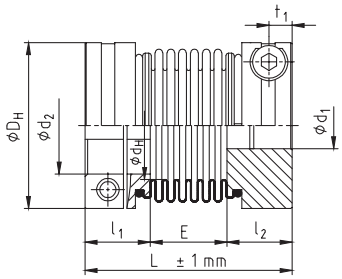
Size	Type [1/2]	Bellow-hub-connection	Bellow torque T_{KN} [3][Nm]	Dimensions [mm]									Perm. displacements			Torsional stiffness C_T [Nm/rad] [Nm/rad]	Weight [5] [kg]
				Finish bore		General				Set screw							
				min. d	max. d	D_H	d_H	L	l_1; l_2	M	t	number [4] z	Axial [mm]	Radial [mm]	Angular [degrees]		
5	S	Bonded	0,1	2	5	10	6	15 [1]	6	M2	1,8	1	±0,30	0,10	0,7	97	0,0027
	M							17 [2]					±0,40	0,15	1,0	75	0,003
7	S		1,0	3	8	15	9	18 [1]	7	M3	2,0	1	±0,30	0,10	0,7	390	0,005
	M							20 [2]					±0,40	0,15	1,0	300	0,006
9	S		1,5	4	10	20	12	21 [1]	8	M3	2,2	2	±0,35	0,15	1,0	750	0,010
	M							24 [2]					±0,50	0,20	1,5	580	0,011
12	S		2,0	5	14	25	16	27,5 [1]	11	M4	2,8	2	±0,40	0,15	1,0	1270	0,017
	M							31 [2]					±0,60	0,20	1,5	980	0,019
16	S	Flanged	5,0	6	18	32	20	37 [1]	13	M5	4	2	±0,30	0,15	1,0	4500	0,046
	M							41 [2]					±0,50	0,20	1,5	3050	0,049

[1] Type S = 4 section bellows (short design, higher stiffness of torsion spring)
[2] Type M = 6 section bellows
[3] Selection see company catalogue
[4] Quantity each hub, from size 9: 2x120° offset
[5] Figures refer to the complete coupling with max. bores
Circumferential speed v_{max} = 25 m/s

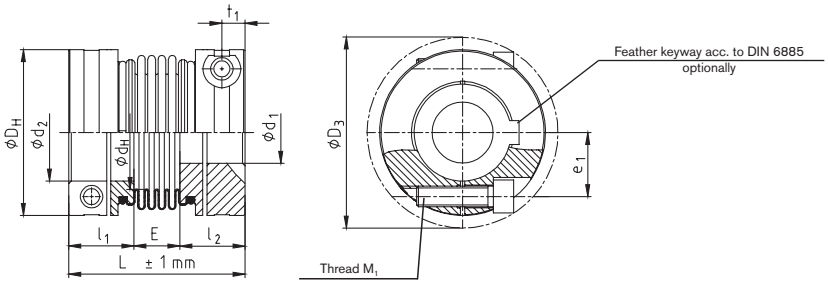
Type S and M with clamping hubs



- Backlash-free, torsionally stiff, maintenance-free
- Frictionally engaged clamping hubs
- Temperature range: for size 5 to 12: -30 °C to +100 °C
  from size 16: suitable for high temperatures due to flanged insert connection (max. 200 °C)
- Good resistance to corrosion
- Finish bore from Ø 6 mm also available with feather key acc. to DIN 6885 sheet 1 – JS9
- Mounting instructions at www.ktr.com



TOOLFLEX® M design 2.5



TOOLFLEX® S design 2.5

TOOLFLEX® Type S and M with clamping hubs, hub material aluminium/bellow material stainless steel																				
Size	Type [1) 2)]	Bellow-hub-connection	Bellow torque T_{KN} [3)] [Nm]	Dimensions [mm]												Perm. displacements			Torsional stiffness C_T [Nm/rad]	Weight [4)] [kg]
				min./max. finish bore		General					Clamping screws DIN EN ISO 4762					Axial [mm]	Radial [mm]	Angular [degrees]		
				min. d	max. d	L	l_1; l_2	E	D_H	d_H	M_1	D_3	t_1	e_1	T_A [Nm]					
7	S	Bonded	1,0	3	7	24	9	6	15	9	M2	16,5	3,2	5	0,37	±0,3	0,10	0,7	390	0,007
	M					26		8								±0,4	0,15	1,0	300	0,008
9	S		1,5	3	9	29	11	7	20	12	M2,5	21,5	3,5	7,1	0,76	±0,35	0,15	1,0	750	0,014
	M					32		10								±0,5	0,20	1,5	580	0015
12	S		2,0	4	12	34,5	13	8,5	25	16	M3	26,5	4,0	8,5	1,34	±0,4	0,15	1,0	1270	0,025
	M					38		12								±0,6	0,20	1,5	980	0,03
16	S	Flanged	5,0	5	16	45	17	11	32	20	M4	35,0	5,0	12	2,9	±0,3	0,15	1,0	4500	0,06
	M					49		15								±0,5	0,20	1,5	3050	0,06

Transmittable friction torques T_R [Nm] of the clamping hub without keyway type 2.5													
Size	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	Ø9	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16
7	0,84	0,91	0,97	1,04	1,10								
9	1,87	1,98	2,09	2,20	2,31	2,41	2,52						
12		3,48	3,65	3,81	3,98	4,14	4,31	4,48	4,64	4,81			
16			8,5	8,8	9,1	9,4	9,7	9,9	10,2	10,5	11,1	11,4	11,7

1) Type S = 4 section bellows (short design, higher stiffness of torsion spring)
2) Type M = 6 section bellows
3) Selection see company catalogue
4) Figures refer to the complete coupling with max. bores
Circumferential speed v_{max} = 20 m/s

Technical description

RADEX®-NC is a line particularly developed for servo technology. In this coupling a package of torsionally rigid steel laminas that are soft in bending ensures a reliable compensation for axial, angular and radial shaft displacements. As an all-metal coupling - the laminas are made of stainless steel - RADEX®-NC can even be used with high temperatures (up to 200 °C) and under aggressive ambient conditions. The RADEX®-NC is manufactured in 7 sizes from size 5 to 42 for max. torques of up to 360 Nm. The hubs are frictionally engaged clamping hubs made of aluminium (size 42 made of steel) and are thus backlash-free even in a reversing drive.
A typical application of the RADEX®-NC are backlash-free worm gear pairs with low transmissions. The rigidity of the coupling must be converted by reason of the transmission of the gearbox from the drive side to the driven side. Here the transmission itself has a decisive influence because it is squarely included in the calculation. This converted rigidity is added in line to the gearbox stiffness in order to get the total rigidity. In case of transmissions that are lower than i = 8 we recommend to use the RADEX®-NC due to the loss of rigidity of the total system arising if flexible couplings are used.

Explosion-protection use

RADEX®-NC-couplings are suitable for power transmission in drives in hazardous areas. The couplings are certified and confirmed according to EC standard 94/9/EC (ATEX 95) as units of category 2G/2D and thus suitable for the use in hazardous areas of zone 1, 2, 21 and 22. Please read through our information included in the respective Type Examination Certificate and the operating and mounting instructions at www.ktr.com.

Hub design

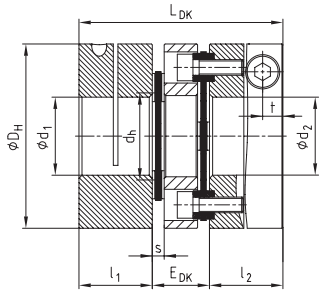
Design 2.5 clamping hub, double slotted, without keyway
Frictionally engaged, backlash-free shaft-hub-connection. Transmittable torques depending on bore diameter (Only for ATEX category 3)

Design 2.6 Double slot clamping hub, with keyway

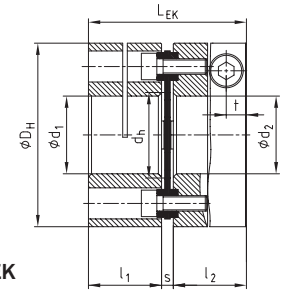
Positive locking shaft-hub-connection with additional frictionally engaged operation. The frictionally engaged operation prevents or reduces reverse backlash.

Standard types

- Backlash-free torque transmission with high torsion stiffness
- Backlash-free shaft-hub-connection
- Low mass moment of inertia
- High speeds
- Operating temperature up to 200 °C
- Finish bore from Ø 6 mm also available with feather key acc. to DIN 6885 sheet 1 – JS9
- Ex -Approved and confirmed according to EC Standard 94/9/EC (without feather key only for category 3)
- Mounting instructions at www.ktr.com



Type DK



Type EK

RADEX®-NC types DK and EK Hub and spacer material aluminium / laminas stainless steel													
Size	Dimensions [mm]									Clamping screw		Mass moment of inertia	
	max. d_1/d_2	D_H	$l_1;l_2$	L_{DK}	E_{DK}	L_{EK}	d_h	s	t	M	T_A [Nm]	DK [kgm²]	EK [kgm²]
5	12	26	12	34	10	26,5	12	2,5	3,5	M2,5	0,8	0,000004	0,000003
10	15	35	16	44	12	35	14,5	3	5,0	M4	3	0,000016	0,000012

Technical data												
Size	T_{KN} [1] [Nm]	$T_{K\,max}$ [1] [Nm]	Max. speed [rpm]	Torsional stiffness [Nm/rad]		Displacement type DK			Displacement type EK		
				Type EK	Type DK	Radial [mm]	Axial [mm]	Angular [°]	Radial [mm]	Axial [mm]	Angular [°]
5	2,5	5	25000	2400	1200	0,10	0,4	1	—	0,2	1
10	7,5	15	20000	5600	2800	0,14	0,8	1	—	0,4	1

Transmittable friction torque T_R [Nm] of the clamping hub without keyway type 2.5								
Size	Pilot bore	Ø3	Ø5	Ø8	Ø10	Ø12	Ø14	Ø15
5	2,5	2,2	2,3	2,4	2,5	2,7		
10	4,5		8	9	10	10	11	11

[1] Selection see company catalogue

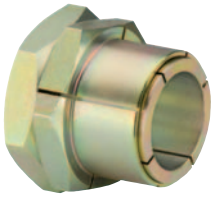
Technical description

Factors like cost reduction, material saving, simplified production processes, shorter delivery times of material are already determined by designing and development. Anyway, the growing demands can no longer be satisfied by keyway connections.

In this case the use of CLAMPEX® clamping elements offers new possibilities as a shaft-hub-connection

- Material saving by smaller shaft and hub dimensions
- Vereinfachte Fertigungsabläufe
- Suitable for modern drive systems
- Easy assembly and disassembly with standard tools
- Ideal for drives with high vibratory loads, e. g. acceleration and braking
- Produce connections that are permanently free from destruction, i. e. no shearing off of keyways, dowel pins, pins, etc.
- Specifically suitable for high-speed drives
- Insensitive to dirt
- Reusable repeatedly
- Overload protection of the machine components by slipping (repeated slipping should be avoided)
- Low stress concentration on the shaft (stress concentration factor on request)
- Corrosion- and acid-resistant surface coating for food-processing industry, marine industry and chemical industry on request
- Simple calculation of the clamping connection


KTR 130


KTR 131


KTR 105


KTR 250


SPH


SPB

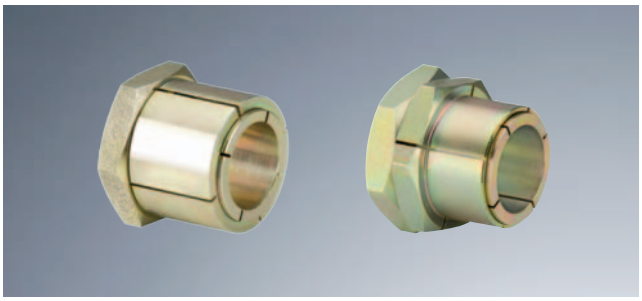

KTR 150

For this leaflet on miniature components we have summarized a small selection of our clamping sets for you. Other types and sizes are shown in our company catalogue at www.ktr.com

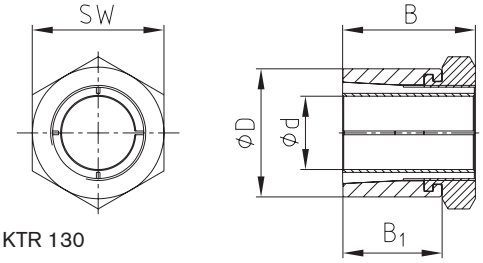
Advice for selection

The transmission data mentioned in the catalogue are parameters found out by calculations. Subject to tests and the physical coefficient of friction slight deviations from the transmission values may arise. Copyright according to ISO 16016. We reserve the right for modifications of dimensions and designs.

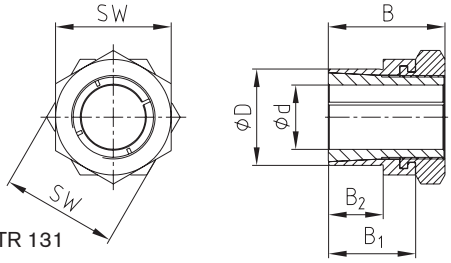
KTR 130 and KTR 131 (self-centering)



- Corrosion-protected surface
- Assembly and disassembly by means of central clamping nut
- Tolerance h8/H8 for shaft and hub
- KTR 131: Hexagon locking nuts for clamping on easily torsionable shafts
- During the process of tightening the hexagon nut the hub opposite to the shaft is displaced axially.
- Mounting instructions at www.ktr.com



KTR 130

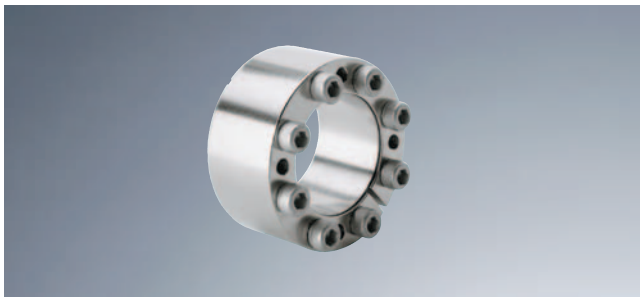


KTR 131

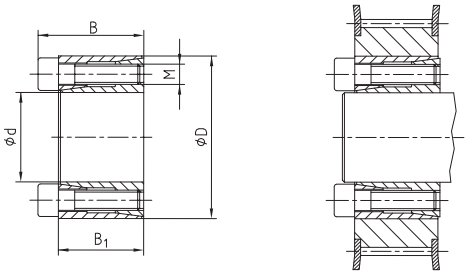
CLAMPEX® – KTR 130									
d x D [mm]	Dimensions [mm]		Hexagon nut		Transmittable torque or axial force		Surface pressure between clamping sets		Weight [~kg]
	B	B_1	Width across flats SW	T_A [Nm]	T [Nm]	F_{ax} [kN]	Shaft P_W [N/mm²]	Hub P_N [N/mm²]	
5 x 14	19	15	14	10	10,1	4,0	264	96	0,018
6 x 14	19	15	14	10	12,1	4,0	220	96	0,017
8 x 16	22	17	17	17	23,4	5,8	179	91	0,024
9 x 20	24	19	22	35	43,2	9,7	248	112	0,042
10 x 20	24	19	22	35	48,6	9,7	223	112	0,045
12 x 22	24	19	22	44	65,3	10,9	206	117	0,048
14 x 26	28	22	27	65	93,0	13,3	178	99	0,081
15 x 26	28	22	27	65	99,0	13,3	166	99	0,076
16 x 26	28	22	27	65	106	13,3	156	99	0,071
18 x 35	36	27	36	161	223	24,8	224	125	0,197
19 x 35	36	27	36	161	235	24,8	212	125	0,191
20 x 35	36	27	36	161	248	24,8	201	125	0,181

CLAMPEX® – KTR 131										
d x D [mm]	Dimensions [mm]			Hexagon nut/counter nut		Transmittable torque or axial force		Surface pressure between clamping set		Weight [~kg]
	B	B_1	B_2	Width across flats SW	T_A [Nm]	T [Nm]	F_{ax} [kN]	Shaft P_W [N/mm²]	Hub P_N [N/mm²]	
5 x 12	19	15	9	14	10	10,1	4,0	264	119	0,016
6 x 12	19	15	9	14	10	12,1	4,0	220	119	0,015
8 x 14	22	17	11	17	17	23,4	5,8	179	121	0,021
10 x 18	24	19	12	22	35	48,6	9,7	221	127	0,044
12 x 20	24	19	12	22	44	65,3	10,9	206	128	0,044
14 x 24	28	22	15	27	65	93,0	13,3	178	107	0,077
15 x 24	28	22	15	27	65	99,0	13,3	166	107	0,072
16 x 24	28	22	15	27	65	106	13,3	156	107	0,068
18 x 30	36	27	17	36	161	223	24,8	224	145	0,176
19 x 30	36	27	17	36	161	235	24,8	212	145	0,175
20 x 30	36	27	17	36	161	248	24,8	201	145	0,162
22 x 38	41	30	20	46	250	349	31,8	197	122	0,337
24 x 38	41	30	20	46	250	381	31,8	180	122	0,313
25 x 38	41	30	20	46	250	397	31,8	173	122	0,303

KTR 105 (self-centering)



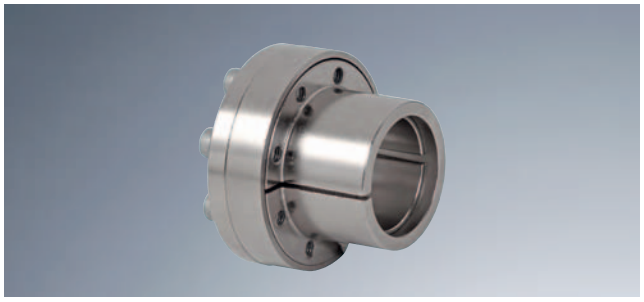
- Compact design
- Short assembly and disassembly times
- Suitable for small servo motors/pulleys
- QPQ surface protection on request
- During the assembly a slight axial displacement of the hub towards the shaft may arise.
- Mounting instructions at www.ktr.com



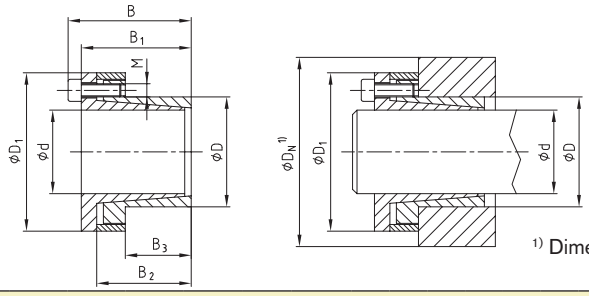
CLAMPEX® – KTR 105

d x D [mm]	Dimensions [mm]		Clamping screws DIN EN ISO 4762 - 12.9 $\mu_{ges.}$=0,14			Transmittable torque or axial force		Surface pressure between clamping sets		Weight [~kg]	d x D [mm]	Dimensions [mm]		Clamping screws DIN EN ISO 4762 - 12.9 $\mu_{ges.}$=0,14			Transmittable torque or axial force		Surface pressure between clamping sets		Weight [~kg]
	B	B1	M	z number	T_A [Nm]	T [Nm]	F_{ax} [kN]	Shaft P_W [N/mm²]	Hub P_N [N/mm²]			B	B1	M	z number	T_A [Nm]	T [Nm]	F_{ax} [kN]	Shaft P_W [N/mm²]	Hub P_N [N/mm²]	
5 x 16	13,5	11	M2,5	3	1,2	6	3	196	61	0,010	10 x 20	15,5	13	M2,5	4	1,2	17	3	109	54	0,019
6 x 16	13,5	11	M2,5	3	1,2	8	3	163	61	0,012	11 x 22	15,5	13	M2,5	4	1,2	19	3	99	50	0,024
6,35 x 16	13,5	11	M2,5	3	1,2	8	3	154	61	0,012	12 x 22	15,5	13	M2,5	4	1,2	21	3	91	50	0,022
7 x 17	13,5	11	M2,5	3	1,2	9	3	140	58	0,013	14 x 26	20	17	M3	4	2,2	40	6	97	52	0,039
8 x 18	13,5	11	M2,5	3	1,2	10	3	123	54	0,015	15 x 28	20	17	M3	4	2,2	43	6	90	48	0,044
9 x 20	15,5	13	M2,5	4	1,2	16	3	121	54	0,020	16 x 32	21	17	M4	4	4,9	80	10	149	74	0,067
9,53 x 20	15,5	13	M2,5	4	1,2	16	3	115	54	0,020											

KTR 250 (self-centering)



- Clamping set specifically suitable for hubs with a small wall thickness
- Reduction of costs by saving material
- Short assembly times
- Small radial mounting dimensions
- Clamping sets “stainless steel” on request (Please order dimension sheet M367697.)
- No axial displacement of the hub during the assembly
- Mounting instructions at www.ktr.com

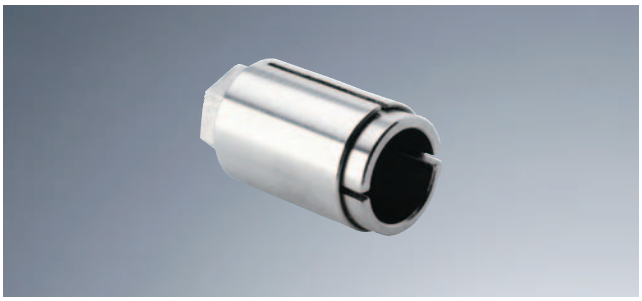


[1] Dimension D_N: For details of calculation see company catalogue.

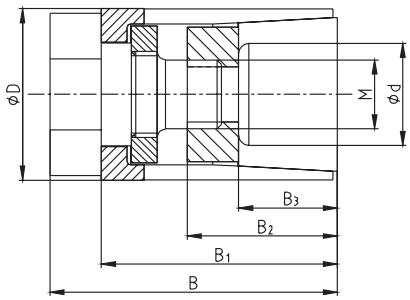
CLAMPEX® – KTR 250

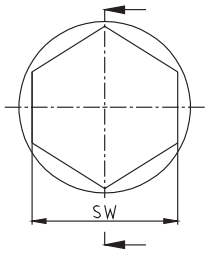
d x D [mm]	Dimensions [mm]					Clamping screws DIN EN ISO 4762			Torque or axial force		Furface pressure [N/mm²]		Weight [~kg]	d x D [mm]	Dimensions [mm]					Clamping screws DIN EN ISO 4762			Torque or axial force		Surface pressure [N/mm²]		Weight [~kg]
	B	B_1	B_2	B_3	D_1	M	z no	T_A [Nm]	T [Nm]	F_{ax} [kN]	Shaft P_W	Hub P_N			B	B_1	B_2	B_3	D_1	M	z no	T_A [Nm]	T [Nm]	F_{ax} [kN]	Shaft P_W	Hub P_N	
6 x 14	24	21,5	15,5	10	25	M3	4	2	14	5	252	108	0,10	16 x 24	42	36	27	16	44	M6	4	15	148	19	213	142	0,30
8 x 15	29	25	19	11,5	27	M4	3	5	27	7	210	112	0,12	18 x 26	44	38	30	18	47	M6	4	17	199	22	191	132	0,32
9 x 16	30	26	20	14	28	M4	4	5	40	9	207	116	0,15	19 x 27	44	38	30	18	48	M6	4	17	210	22	181	127	0,35
10 x 16	30	26	20	14	29	M4	4	5	46	9	192	120	0,15	20 x 28	44	38	30	18	49	M6	4	17	222	22	172	123	0,36
11 x 18	30	26	20	13,5	32	M4	4	5	49	9	169	103	0,18	22 x 32	51	45	37	25	54	M6	4	17	244	22	112	77	0,45
12 x 18	30	26	20	13,5	32	M4	4	5	55	9	160	106	0,18	24 x 34	51	45	37	25	56	M6	4	17	266	22	103	73	0,48
14 x 23	30	26	20,5	14	38	M4	6	5	96	14	205	125	0,20	25 x 34	51	45	37	25	56	M6	4	17	277	22	99	73	0,50
15 x 24	42	36	27	16	44	M6	4	15	139	19	227	142	0,31	28 x 39	51	45	37	25	61	M6	6	17	465	33	133	95	0,52

SPH Clamping sleeve



- Fast assembly and disassembly via one screw only
- Suitable for small hub dimensions
- Applications: sprockets, pulleys that are assembled to the shaft end

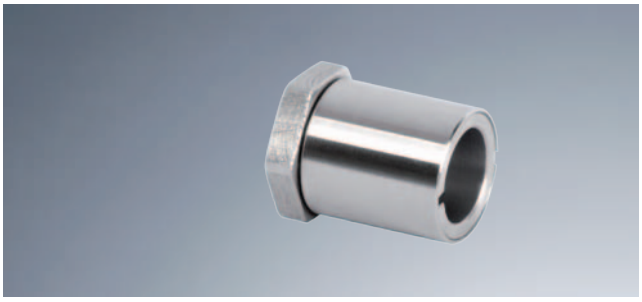




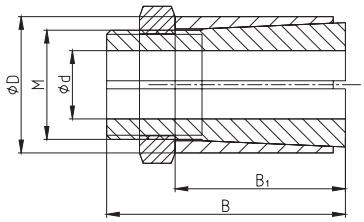
CLAMPEX® – SPH Clamping sleeve

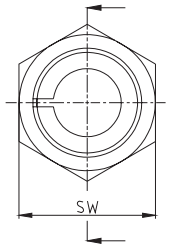
d x D [mm]	Abmessungen [mm]				Clamping screws DIN EN ISO 4762			Torque or axial force		Surface pressure [N/mm²]		Weight [~kg]	d x D [mm]	Dimensions [mm]				Clamping screws DIN EN ISO 4762			Drehmoment oder Axialkraft		Surface pressure [N/mm²]		Weight [~kg]
	B	B_1	B_2	B_3	M	SW	T_A [Nm]	T [Nm]	F_{ax} [kN]	Shaft P_W	Hub P_N			B	B_1	B_2	B_3	M	SW	T_A [Nm]	T [Nm]	F_{ax} [kN]	Shaft P_W	Hub P_N	
10x20	33,5	27,5	17,5	11,5	M8x1,0	17	27	27	5	150	75	0,061	19x28	44,5	37,5	25,5	17,5	M10x1,25	19	52	88	9	88	60	0,133
12x20	33,5	27,5	17,5	11,5	M8x1,0	17	27	33	5	125	75	0,058	20x28	44,5	37,5	25,5	17,5	M12x1,0	19	52	93	9	83	60	0,129
14x22	35,0	29,0	19,0	13,0	M8x1,0	17	27	38	5	95	60	0,071	22x35	61,5	51,5	37,0	25,0	M12x1,0	24	93	142	12	74	46	0,310
15x22	35,0	29,0	19,0	13,0	M8x1,0	17	27	41	5	89	60	0,069	24x35	61,5	51,5	37,0	25,0	M12x1,0	24	93	155	12	67	46	0,300
16x22	35,0	29,0	19,0	13,0	M10x1,25	17	27	44	5	83	60	0,066	25x35	61,5	51,5	37,0	25,0	M12x1,0	24	93	161	12	65	46	0,293
18x25	44,5	37,5	25,5	17,5	M10x1,25	17	52	84	9	93	67	0,102													

SPB Clamping sleeve



- Assembly via a central nut
- Suitable for small hub dimensions
- Applications: medical equipment, measuring and control technology, small gearboxes





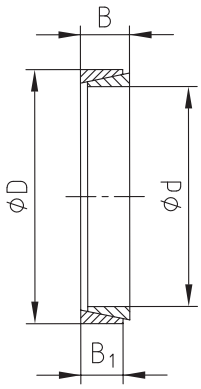
CLAMPEX® – SPB Clamping sleeve

d x D [mm]	Abmessungen [mm]		Clamping screws DIN EN ISO 4762			Torque or axial force		Surface pressure [N/mm²]		Weight [~kg]	d x D [mm]	Dimensions [mm]		Clamping screws DIN EN ISO 4762			Torque or axial force		Surface pressure [N/mm²]		Weight [~kg]
	B	B_1	M	SW	T_A [Nm] 1)	T [Nm]	F_{ax} [kN]	Shaft P_W	Hub P_N			B	B_1	M	SW	T_A [Nm] 1)	T [Nm]	F_{ax} [kN]	Shaft P_W	Hub P_N	
3x8	16,0	12,5	M6x0,5	8	4	2,6	1,7	167	63	0,006	10x17	23,0	18,5	M15x1,0	18	19	18,0	3,6	66	39	0,027
4x8	16,0	12,5	M6x0,5	8	4	3,4	1,7	125	63	0,005	11x17	23,0	18,5	M15x1,0	18	19	19,8	3,6	60	39	0,024
5x10	16,0	12,5	M8x0,5	10	5	4,1	1,6	96	48	0,007	12x17	23,0	18,5	M15x1,0	18	19	21,6	3,6	55	39	0,021
6x10	16,0	12,5	M8x0,5	10	8	7,8	2,6	128	77	0,006	14x20	29,0	23,0	M17x1,0	20	25	24,0	3,4	40	28	0,039
6,35x10	16,0	12,5	M8x0,5	10	8	7,9	2,6	120	77	0,006	15x20	29,0	23,0	M17x1,0	20	25	25,4	3,4	38	28	0,031
7x12	16,0	12,0	M10x0,75	12	9	8,4	2,4	102	59	0,009	16x23	29,0	23,0	M20x1,0	26	27	26,3	3,3	34	24	0,049
8x14	23,0	19,0	M12x1,0	16	15	13,0	3,2	73	42	0,019	17x23	29,0	23,0	M20x1,0	26	27	27,9	3,3	32	24	0,043
9x14	23,0	19,0	M12x1,0	16	15	14,3	3,2	65	42	0,016	19x25	29,0	23,0	M22x1,0	27	30	31,0	3,3	29	22	0,047
9,5x14	23,0	19,0	M12x1,0	16	15	15,1	3,2	62	42	0,015	20x28	29,0	23,0	M25x1,0	30	32	32,0	3,2	27	19	0,069
10x17	23,5	19,0	M14x1,0	17	15	15,9	3,2	59	35	0,027	20x28	29,0	23,0	M25x1,0	30	32	32,0	3,2	27	19	0,069

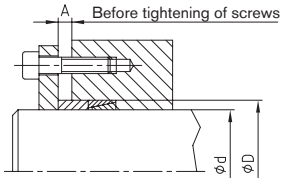
KTR 150 (not self-centering)

- Clamping set for small radial mounting dimensions
- Increase of torque by using several clamping sets in a series
- Mounting instructions at www.ktr.com

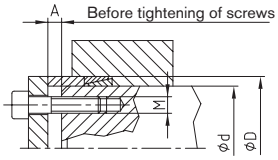
Before tightening of screws



Assembly 1
Clamping on hub side



Assembly 2
Clamping on shaft side

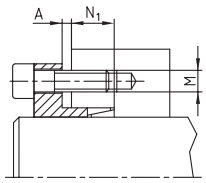


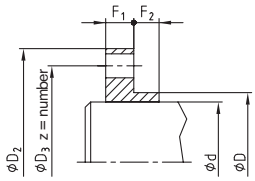
Up to 4 clamping sets can be used in a series.

The torques are increased as follows:

1 clamping element	$T = T_{catalogue} \times 1{,}00$
2 clamping elements	$T = T_{catalogue} \times 1{,}55$
3 clamping elements	$T = T_{catalogue} \times 1{,}85$
4 clamping elements	$T = T_{catalogue} \times 2{,}02$

Recommended pressure flanges*
(dimensions see table below)





CLAMPEX® – KTR 150														
d x D [mm]	Dimensions [mm]		Distance diemnsion A [mm]				Necessary clamping force for clamping screws $\mu_{ges.}$=0,14			Transmittable torque or axial force		Surface pressure between clamping sets		Weight [~kg]
	B	B_1	clamping elements				P_O [N]	P_S [N]	$P_A = P_O + P_S$ [N]	T [Nm]	F_{ax} [kN]	Shaft P_W [N/mm²]	Hub P_N [N/mm²]	
			1	2	3	4								
6 x 9	4,5	3,7	2,5	2,5	3,0	4,0	**	3000	3000	2	0,67	80	53	0,0012
7 x 10	4,5	3,7	2,5	2,5	3,0	4,0	**	5300	5300	4	1,19	121	85	0,0014
8 x 11	4,5	3,7	2,5	2,5	3,0	4,0	**	5600	5600	5	1,25	112	82	0,0015
9 x 12	4,5	3,7	2,5	2,5	3,0	4,0	7947	6653	14600	7	1,50	119	89	0,0017
10 x 13	4,5	3,7	2,5	2,5	3,0	4,0	7063	8937	16000	10	2,00	143	110	0,0018
12 x 15	4,5	3,7	2,5	2,5	3,0	4,0	7808	8192	16000	11	1,80	110	88	0,0021
13 x 16	4,5	3,7	2,5	2,5	3,0	4,0	7007	9693	16700	14	2,20	120	97	0,0023
14 x 18	6,3	5,3	3,5	3,5	4,5	5,5	11957	14043	26000	22	3,10	112	87	0,0049
15 x 19	6,3	5,3	3,5	3,5	4,5	5,5	12106	14894	27000	25	3,30	111	88	0,0053
16 x 20	6,3	5,3	3,5	3,5	4,5	5,5	12478	14522	27000	26	3,20	102	91	0,0055
17 x 21	6,3	5,3	3,5	3,5	4,5	5,5	11678	16822	28500	32	4,10	120	90	0,0058
18 x 22	6,3	5,3	3,5	3,5	4,5	5,5	14630	18370	33000	37	3,70	102	94	0,0061
19 x 24	6,3	5,3	3,5	3,5	4,5	5,5	14186	18814	33000	40	4,20	111	88	0,0078
20 x 25	6,3	5,3	3,5	3,5	4,5	5,5	13339	19661	33000	44	4,40	110	88	0,0082
22 x 26	6,3	5,3	3,5	3,5	4,5	5,5	13689	20311	34000	50	4,50	103	87	0,0072
24 x 28	6,3	5,3	3,5	3,5	4,5	5,5	8676	25324	34000	68	5,70	118	101	0,0080
25 x 30	6,3	5,3	3,5	3,5	4,5	5,5	10190	26810	37000	75	6,00	120	100	0,0100
28 x 32	6,3	5,3	3,5	3,5	4,5	5,5	11275	28725	40000	90	6,40	115	101	0,009
30 x 35	6,3	5,3	3,5	3,5	4,5	5,5	10211	29789	40000	100	6,70	111	95	0,012
32 x 36	6,3	5,3	3,5	3,5	4,5	5,5	6487	33513	40000	120	7,50	117	104	0,010

Recommended dimensions of pressure flange* for 1 to 4 clamping elements KTR 150																			
$d^{H8} \times D_{g7}$	9,1 x 12	10,1 x 13	12,1 x 15	13,1 x 16	14,1 x 18	15,1 x 19	16,2 x 20	17,2 x 21	18,2 x 22	19,2 x 24	20,2 x 25	22,2 x 26	24,2 x 28	25,2 x 30	28,2 x 32	30,2 x 35	32,2 x 36	35,2 x 40	36,2 x 42
D_2	36	37	39	40	44	45	46	47	48	52	53	54	56	58	60	63	64	68	70
D_3	28	29	31	32	35	36	37	38	39	42	43	44	45	48	50	53	54	58	60
M	M4	M4	M4	M4	M5	M5	M5	M5	M5	M6	M6	M6	M6	M6	M6	M6	M6	M6	M6
z	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	6	6
Tightening torque [Nm]	2,9	2,9	2,9	2,9	6	6	6	6	6	10	10	10	10	10	10	10	10	10	10
F_1	5,5	5,5	5,5	5,5	7	7	7	7	7	8	8	8	8	8	8	8	8	8	8
F_2	7	7	7	7	8,5	8,5	8,5	8,5	8,5	8,5	8,5	8,5	8,5	8,5	8,5	8,5	8,5	8,5	8,5
N_1	The hollow depth results from the number of clamping elements (max. 4-off) and the dimensions = F_2 - A.																		

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