

Backlash-free servo couplings

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ROTEX® GS **TOOLFLEX®** **RADEX®-NC** **COUNTEX®**



BACKLASH-FREE SERVO COUPLINGS
TYPES AND OPERATING DESCRIPTION

Properties of backlash-free couplings



Product	ROTEX® GS	TOOLFLEX®	RADEX®-NC	COUNTEX®
Type	Jaw-type coupling	Metall bellow-type coupling	Servo lamina coupling	Shaft encoder coupling
Properties				
Backlash-free	●	●	●	●
Torsionally rigid		●	●	●
Damping vibrations	●			
Maintenance-free	●	●	●	●
Axial plug-in	●	optional		●
Compensating for misalignment	●	●	●	●
Electric insulation	●			●
Fail-safe	●		●	●
Shear type		●		
Special features				
Applications	Backlash-free drives			
Core industries	Machine tools, automation technology, drive technology, medical technology, packaging technology	Drive technology, automation technology, medical technology, packaging technology, machine tools	Automation technology, drive technology, packaging technology, machine tools, medical technology	Automation technology, drive technology, medical technology
Applications	Main spindles Control & positioning technology Gearboxes Measuring & testing technology Miniature drives	Gearboxes Miniature drives Control & positioning technology	Gearboxes Measuring & testing technology Miniature drives Control & positioning technology Main spindles	Measuring & control technology Miniature drives
Variation of components	very high	average	low	low
Torque range TKN [Nm]				
Min.	0,2	0,1	2,5	0,3
Max.	5.850	600	300	1,0
Max. circumferential speed v [m/s]				
Steel	depending on hub type up to 40 80 (type P)	depending on hub type up to 40	35	–
Aluminium	depending on hub type up to 50		35	40
Torsion spring stiffness C_T [Nm/rad]				
Up to	1.308.850	322.740	240.000	235
Radial spring stiffness C_R [Nm/rad]				
Up to	20.290	1.365		70
Spiders / bellow / laminas / spacer				
Material	Polyurethane, Hytrel	Stainless steel	Stainless steel	PEEK
Elastomer hardness	flexible to torsionally rigid	-	-	torsionally rigid
Temperature range [°C] min. / max.	- 50 / + 120	- 30 / + 100 (bonded) - 30 / + 200 (flanged/welded)	- 30 / + 200	- 40 / + 160

● ≈ Standard

BACKLASH-FREE SERVO COUPLINGS
TYPES AND OPERATING DESCRIPTION

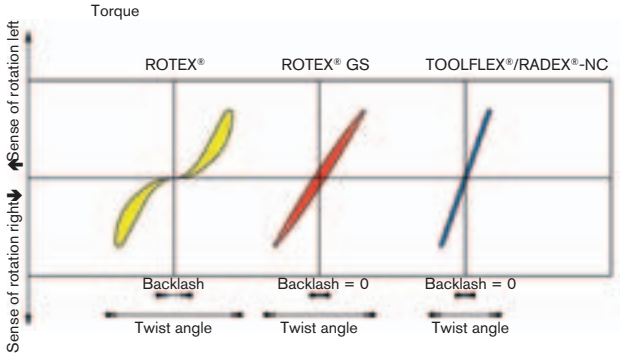
Product finder of backlash-free couplings

				
Product	**ROTEX® GS**	**TOOLFLEX®**	**RADEX®-NC**	**COUNTEX®**
Type	Jaw-type coupling	Metall bellow-type coupling	Servo lamina coupling	Shaft encoder coupling
Geometries				
Design	compact	compact, short	compact, short	short
Mass moment of inertia	low	low	low	low
Shaft distance dimension	average	average	average	low
Shaft-hub-connection				
Positive locking	●	optional	optional	optional
Non-positive (frictionally engaged)	●	●	●	●
Types (extract)				
Elastomers can be disassembled radially » with no need of displ. driving/driven side	A-H	-	-	-
Intermediate shaft type » bridging larger shaft distances	ZR1, ZR2, ZR3	-	-	-
Shaft-to-shaft connection	standard	standard	standard	standard
Flange-to-shaft connection	CFN, DFN, CF-DKM	CF	-	-
Flange-to-flange connection » particularly short mounting lengths	Optional	Optional	-	-
Single-cardanic	standard	-	EK	-
Double-cardanic » compensating for big displacements » lower restoring forces	DKM	standard	DK	standard
Certifications				
ATEX	●		●	●
Clean room	●	●	●	

● ≈ Standard

Twist angle

The diagram alongside this text clarifies the influence of ROTEX®, ROTEX® GS, RADEX®-NC and TOOLFLEX® couplings regarding backlash and torsion angle. Due to the high stiffness of RADEX®-NC and TOOLFLEX® the torsion angle is very low under torque. However, contrary to the flexible ROTEX® and the backlash-free ROTEX® GS a damping of torsional vibrations etc. is not possible.



ROTEX® GS
Backlash-free jaw couplings

Technical description



ROTEX® GS is a three-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.

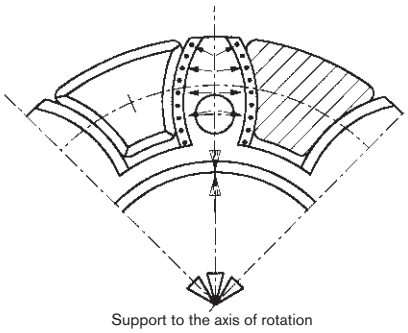
ROTEX® GS (straight tooth, backlash-free)

The straight spline of the spider mounted under prestress results in a smaller surface pressure and consequently higher stiffness of the coupling system. The flexible teeth compensate for misalignment but are supported radially in the inside diameter by a central web. This avoids too high internal or external deformation by high acceleration or high speeds. This is vital for a smooth operation and long service life of the coupling.

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.

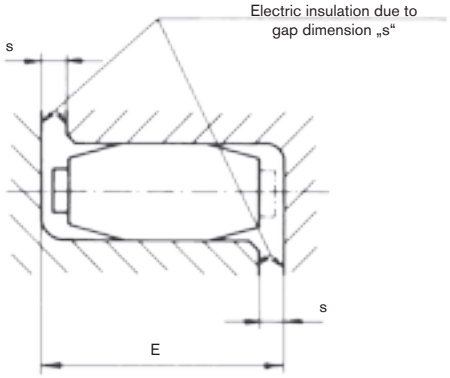
By observing the gap dimension „s“ the electrical insulation is ensured, as well as a high service life of the coupling. This fact is gaining more and more importance, due to the increasing precision of shaft encoders and the existing demand for electro-magnetic compatibility.

Limitation by concave cams in case of too high speeds/centrifugal forces and prestress of elastomer parts



Support to the axis of rotation

Electric insulation due to gap dimension „s“



Notes

- Feather keyways available from a bore ≥Ø6
- Finish bore tolerance H7 (except for clamping hubs), from Ø55 G7 with clamping ring hubs
- Finish bore tolerance H6 for ROTEX® GS P
- Recommended insertion dimension of shafts into the coupling hubs: l_1/l_2; for clamping ring hubs l_3
- Spider available with bore on request

Use in explosive applications

ROTEX® GS 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.

Selection: In case of use in hazardous areas the clamping ring hubs (clamping hubs without feather keyway only for use in category 3) must be selected such that there is a minimum safety factor of s = 2 between the peak torque (including all operating parameters) and the nominal torque and frictional torque of engagement of the coupling.

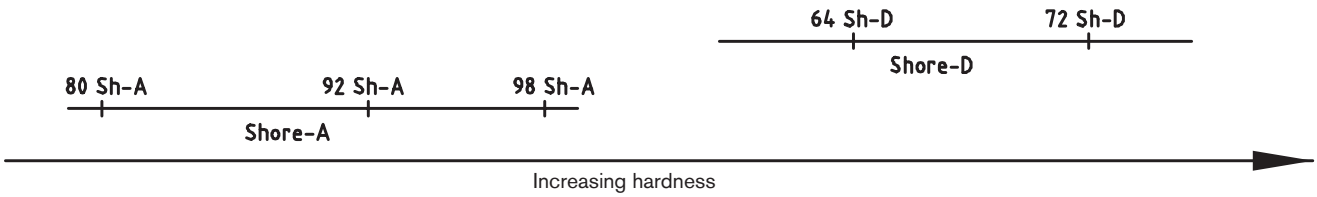
ROTEX® GS
Backlash-free jaw couplings

Spiders

The elastic spiders of the GS line are available in five different kinds of Shore hardness, identified by colour, the material being soft to hard. Due to these five spiders with different kinds of Shore hardness it is easily possible to adjust the ROTEX® GS with regard to torsional stiffness and the vibration behaviour to the individual conditions of an application. The flexible 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 fit 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).
Along with an increasing hardness of the spider the torques to be transmitted and the stiffness of the spider increase, too. Along with a reduced hardness of the spider the ability of compensating for displacements and damping the spider is increased.

Properties						
Description of spider hardness [Shore]	Identification Colour	Material	Perm. temperature range [°C]		Available for coupling size	Typical applications
			Permanent temperature	Max. temperature short-term		
80 Sh-A-GS		Polyurethane	- 50 to + 80	- 60 to + 120	size 5 to 24	– drives of electric measuring systems
92 Sh-A-GS		Polyurethane	- 40 to + 90	- 50 to + 120	size 5 to 55	– drives of electric measuring and control systems – main spindle drives
98-Sh A-GS		Polyurethane	- 30 to + 90	- 40 to + 120	size 5 to 90	– positioning drives – main spindle drives – high load
64 Sh-D-H-GS		Hytrel	- 50 to + 120	- 60 to + 150	size 7 to 38	– planetary gears / backlash-free gears – higher torsion spring stiffness / high ambient temperatures
64 Sh-D-GS		Polyurethane	- 20 to + 110	- 30 to + 120	size 42 to 90	– higher load – higher torsion spring stiffness
72 Sh-D-H-GS		Hytrel	- 50 to + 120	- 60 to + 150	size 24 to 38	– very high torsion spring stiffness / high ambient temperature – very high load
72 Sh-D-GS		Polyurethane	- 20 to + 110	- 30 to + 120	size 42 to 90	– very high torsion spring stiffness – very high load

Degree of hardness



Spider material	Polyurethane			Hytrel
Degree of hardness	92 Shore-A	98 Shore-A	64 Shore-D	64 Shore-D
Relative Damping ψ [-]	0,80	0,80	0,75	0,60
Resonance factor VR [-]	7,90	7,90	8,50	10,5

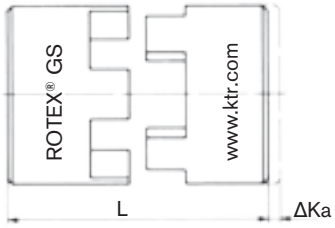
Technical data

Size	Spider Shore GS	Shore range	Max. speed [rpm] for type						Torque [Nm]		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 2.5 / 2.6	2.8 2.9	1.0 1.1	6.0 light 2)	6.0 P 2)	DKM	T_{KN}	$T_{K\,max}$				Each hub 5)	Spider	Each hub 5)	Spider
5	70	A	38000	38000	47700			57300	0,2	0,3	1,78	5	43	0,001	0,2 x 10^{-3}	0,015 x 10^{-6}	0,002 x 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			40900	0,7	1,4	8,6	26	114	0,003	0,5 x 10^{-3}	0,085 x 10^{-6}	0,01 x 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 x 10^{-3}	0,117 x 10^{-6}	0,01 x 10^{-6}
	98	A							2,0	4,0	23,5	71	433				
	64	D							2,4	4,8	35,3	106	648				
9	80	A	19000	19000	23800			28600	1,8	3,6	17,2	52	125	0,01	1,7 x 10^{-3}	0,48 x 10^{-6}	0,085 x 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			22900	3,0	6,0	84,3	252	274	0,02	2,3 x 10^{-3}	1,5 x 10^{-6}	0,139 x 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 x 10^{-3}	1,1 x 10^{-6}	0,155 x 10^{-6}
	98	A							11,0	22,0	316	941	1109				
	64	D							14,5	29,0	430	1287	1570				
14	80	A	12700	12700	15900	32000	47700	19100	4,0	8,0	60,2	180	153	0,02	4,7 x 10^{-3}	2,8 x 10^{-6}	0,509 x 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 x 10^{-3}	2,8 x 10^{-6}	0,434 x 10^{-6}
	98	A							15,0	30,0	450	1341	1710				
	64	D							19,0	38,0	612	1835	2238				
19	80	A	9550	9550	11900	24000	35800	14300	6,0	12,0	618	1065	582	0,09	7 x 10^{-3}	19,5 x 10^{-6}	1,35 x 10^{-6}
	92	A							12,0	24,0	1090	1815	1120				
	98	A							21,0	42,0	1512	2540	2010				
	64	D							26,0	52,0	2560	3810	2930				
24	92	A	6950	10400	8650	17000	26000	10400	35	70	2280	4010	1480	0,2	0,02	81,9 x 10^{-6}	6,7 x 10^{-6}
	98	A							60	120	3640	5980	2560				
	64	D							75	150	5030	10896	3696				
	72 3)	D							97	194	9944	17095	5799				
28	92	A	5850	8800	7350	15000	22000	8800	95	190	4080	6745	1780	0,3	0,03	184,2 x 10^{-6}	14,85 x 10^{-6}
	98	A							160	320	6410	9920	3200				
	64	D							200	400	10260	20177	4348				
	72 3)	D							260	520	21526	36547	7876				
38	92	A	4750	7150	5950	12000	17900	7150	190	380	6525	11050	2350	0,6	0,05	542,7 x 10^{-6}	39,4 x 10^{-6}
	98	A							325	650	11800	17160	4400				
	64	D							405	810	26300	40335	6474				
	72 3)	D							525	1050	44584	71180	11425				
42	92	A	4000		5000	10000 8050 4)	15000	6000	265	530	10870	15680	2430	2,4	0,08	2802 x 10^{-6}	85 x 10^{-6}
	98	A							450	900	21594	37692	5570				
	64	D							560	1120	36860	69825	7270				
	72 3)	D							728	1456	58600	93800	9766				
48	92	A	3600		4550	9100 7200 4)	13600	5450	310	620	12968	18400	2580	3,3	0,09	4709 x 10^{-6}	135 x 10^{-6}
	98	A							525	1050	25759	45620	5930				
	64	D							655	1310	57630	99750	8274				
	72 3)	D							852	1704	80000	136948	11359				
55	92	A	3150		3950	6350 4)	11900	4750	410	820	15482	21375	2980	5,1	0,12	9460 x 10^{-6}	229 x 10^{-6}
	98	A							685	1370	42117	61550	6686				
	64	D							825	1650	105730	130200	9248				
	72 3)	D							1072	2144	150000	209530	12762				
65	98	A	2800		3500	5650 4)	11000		940	1880	48520	71660	6418	6,7	0,2	15143 x 10^{-6}	437 x 10^{-6}
	64	D							1175	2350	118510	189189	8870				
	72 3)	D							1527	3054	160000	310000	11826				
75	98	A	2350		2950	4750 4)	8950		1920	3840	79150	150450	8650	10,5	0,3	32750 x 10^{-6}	1179 x 10^{-6}
	64	D							2400	4800	182320	316377	11923				
	72 3)	D							3120	6240	360540	586429	16454				
90	98	A	1900		2380	3800 4)	7150		3600	7200	204500	302900	10700	18,2	0,6	87099 x 10^{-6}	3362 x 10^{-6}
	64	D							4500	9000	429450	908700	14700				
	72 3)	D							5850	11700	847440	1308852	20290				

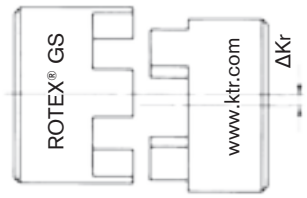
1) Static and dynamic torsion spring stiffness with 0,5 x T_{KN}
2) Higher speeds on request
3) With the use of the 72Sh-D spider we recommend to use hubs made of steel
4) Clamping ring hubs 6.0 made of steel
5) Hubs with an average bore type 1.0
The coupling has to be dimensioned in a way that the permissible coupling load is not exceeded with any operating condition. (see coupling selection on page 18 et seqq.).
The torques TKN/TKmax specified refer to the spider. The shaft-hub-connection has to be investigated by the customer.

Notes for displacements

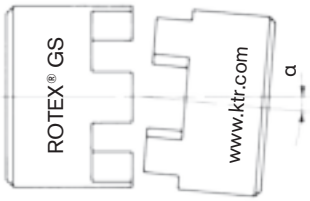
Axial displacement



Radial displacement



Angular displacement



Due to its design the ROTEX® GS is able to absorb axial, angular and radial displacement, without causing any wear or premature failure of the coupling. As the spider is only stressed under pressure it is ensured that the coupling will remain backlash-free even after a longer operation period.

As an example, axial displacement may be produced by different tolerances of the connecting elements during the assembly or by alteration of the shaft length if fluctuation of temperature occurs. As the shaft bearings usually cannot be axially stressed to a big extent, it is the task of the coupling to compensate for this axial displacement and to keep the reaction forces low.

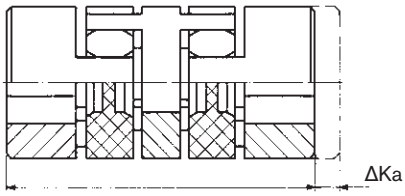
In case of pure angular displacement the imagined bisecting lines of the shafts intersect in the middle of the coupling. Up to a certain permissible extent this displacement can be absorbed by the coupling without any danger of extensive restoring forces.

Radial displacement results from parallel displacement of the shafts towards each other, caused by different tolerances at the centerings or by mounting of the power packs on different levels. Due to the kind of displacement the largest restoring forces are produced here, consequently causing the highest stresses for the adjacent components.

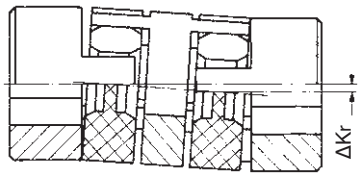
In case of larger displacements (especially radial displacements) the ROTEX® GS DKM double-cardanic design should be applied in order to avoid excessive restoring forces.

The above-mentioned permissible displacement figures of the flexible ROTEX® GS couplings are standard values, considering the coupling load up to the rated torque TKN of the coupling and with an ambient temperature of + 30 °C. The ROTEX® GS couplings are in a position to compensate for radial and angular displacements. Careful and accurate alignment of the shafts increases the service life of the coupling.

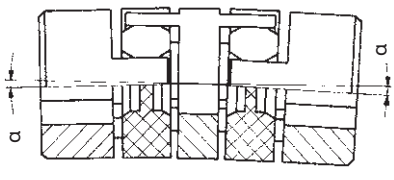
Axial displacement



Radial displacement



Angular displacement



Shaft misalignment ROTEX® GS type DKM

This design reduces the restoring forces arising with radial displacement to a minimum, due to the double-jointed operation, additionally the coupling is able to compensate for higher axial and angular misalignment.

Displacements

Displacements							
Size	Spider GS	Displacements standard			Displacements DKM		
		[mm] axial ΔKa[1)]	[mm] radial ΔKr	[degree] angular α	[mm] axial ΔKa[1)]	[mm] radial ΔKr	[degree] angular α
5	70 Sh-A	+0,4 -0,2	0,14	1,2°	+0,4 -0,4	0,17	1,2°
	80 Sh-A		0,12	1,1°		0,15	1,1°
	92 Sh-A		0,06	1,0°		0,14	1,0°
	98 Sh-A		0,04	0,9°		0,13	0,9°
7	80 Sh-A	+0,6 -0,3	0,15	1,1°	+0,6 -0,6	0,23	1,1°
	92 Sh-A		0,10	1,0°		0,21	1,0°
	98 Sh-A		0,06	0,9°		0,19	0,9°
	64 Sh-D		0,04	0,8°		0,17	0,8°
8	80 Sh-A	±1	0,15	1,1°	—	—	—
	98 Sh-A		0,08	0,9°			
	64 Sh-D		0,06	0,8°			
9	80 Sh-A	+0,8 -0,4	0,19	1,1°	+0,8 -0,8	0,29	1,1°
	92 Sh-A		0,13	1,0°		0,26	1,0°
	98 Sh-A		0,08	0,9°		0,24	0,9°
	64 Sh-D		0,05	0,8°		0,21	0,8°
12	80 Sh-A	+0,9 -0,4	0,20	1,1°	+0,9 -0,9	0,35	1,1°
	92 Sh-A		0,14	1,0°		0,32	1,0°
	98 Sh-A		0,08	0,9°		0,29	0,9°
	64 Sh-D		0,05	0,8°		0,25	0,8°
13	80 Sh-A	±1	0,20	1,1°	—	—	—
	98 Sh-A		0,08	0,9°			
	64 Sh-D		0,05	0,8°			
14	80 Sh-A	+1,0 -0,5	0,21	1,1°	+1,0 -1,0	0,40	1,1°
	92 Sh-A		0,15	1,0°		0,37	1,0°
	98 Sh-A		0,09	0,9°		0,33	0,9°
	64 Sh-D		0,06	0,8°		0,29	0,8°
16	80 Sh-A	±1	0,21	1,1°	—	—	—
	98 Sh-A		0,10	0,9°			
	64 Sh-D		0,08	0,8°			
19	80 Sh-A	+1,2 -0,5	0,15	1,1°	+1,2 -1,0	0,49	1,1°
	92 Sh-A		0,10	1,0°		0,45	1,0°
	98 Sh-A		0,06	0,9°		0,41	0,9°
	64 Sh-D		0,04	0,8°		0,36	0,8°
24	92 Sh-A	+1,4 -0,5	0,14	1,0°	+1,4 -1,0	0,59	1,0°
	98 Sh-A		0,10	0,9°		0,53	0,9°
	64 Sh-D		0,07	0,8°		0,47	0,8°
	72 Sh-D		0,04	0,7°		0,42	0,7°
28	92 Sh-A	+1,5 -0,7	0,15	1,0°	+1,5 -1,4	0,66	1,0°
	98 Sh-A		0,11	0,9°		0,60	0,9°
	64 Sh-D		0,08	0,8°		0,53	0,8°
	72 Sh-D		0,05	0,7°		0,46	0,7°
38	92 Sh-A	+1,8 -0,7	0,17	1,0°	+1,8 -1,4	0,77	1,0°
	98 Sh-A		0,12	0,9°		0,69	0,9°
	64 Sh-D		0,09	0,8°		0,61	0,8°
	72 Sh-D		0,06	0,7°		0,54	0,7°
42	92 Sh-A	+2,0 -1,0	0,19	1,0°	+2,0 -2,0	0,84	1,0°
	98 Sh-A		0,14	0,9°		0,75	0,9°
	64 Sh-D		0,10	0,8°		0,67	0,8°
	72 Sh-D		0,07	0,7°		0,59	0,7°
48	92 Sh-A	+2,1 -1,0	0,23	1,0°	+2,1 -2,0	0,91	1,0°
	98 Sh-A		0,16	0,9°		0,82	0,9°
	64 Sh-D		0,11	0,8°		0,73	0,8°
	72 Sh-D		0,08	0,7°		0,64	0,7°
55	92 Sh-A	+2,2 -1,0	0,24	1,0°	+2,2 -2,0	1,01	1,0°
	98 Sh-A		0,17	0,9°		0,91	0,9°
	64 Sh-D		0,12	0,8°		0,81	0,8°
	72 Sh-D		0,09	0,7°		0,71	0,7°
65	98 Sh-A	+2,6 -1,0	0,18	0,9°	—	—	—
	64 Sh-D		0,13	0,8°			
	72 Sh-D		0,10	0,7°			
75	98 Sh-A	+3,0 -1,5	0,21	0,9°	—	—	—
	64 Sh-D		0,15	0,8°			
	72 Sh-D		0,11	0,7°			
90	98 Sh-A	+3,4 -1,5	0,23	0,9°	—	—	—
	64 Sh-D		0,17	0,8°			
	72 Sh-D		0,13	0,7°			

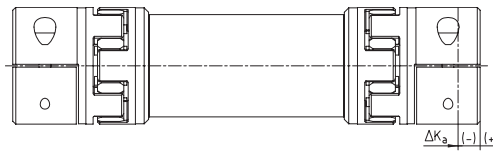
[1)] The Ka figures mentioned above have to be added to the length of the respective coupling type.

Displacements of intermediate shaft coupling

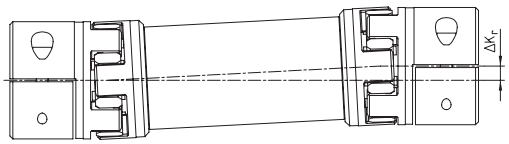
Displacements of intermediate shaft coupling			
ROTEX® GS size with 98 Sh-A-GS	Axial ΔK_a [mm]	Radial ΔK_r [1] [mm]	Angular α [degree]
14	+1,0 / -1,0	15	0,9°
19	+1,2 / -1,0	14	0,9°
24	+1,4 / -1,0	14	0,9°
28	+1,5 / -1,4	14	0,9°
38	+1,8 / -1,4	14	0,9°
42	+2,0 / -2,0	14	0,9°
48	+2,1 / -2,0	13	0,9°
55	+2,2 / -2,0	13	0,9°
65	+2,6 / -2,0	13	0,9°

1) Radial displacements based on a coupling length LZR = 1000 mm

Axial displacement

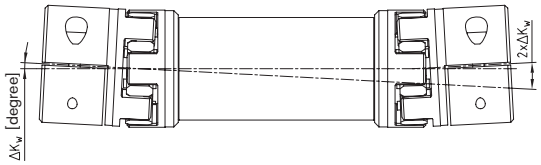


Radial displacement



$$\Delta K_r = (L_{ZR} - 2 \bullet l_1 - E) \cdot \tan \alpha$$

Angular displacement



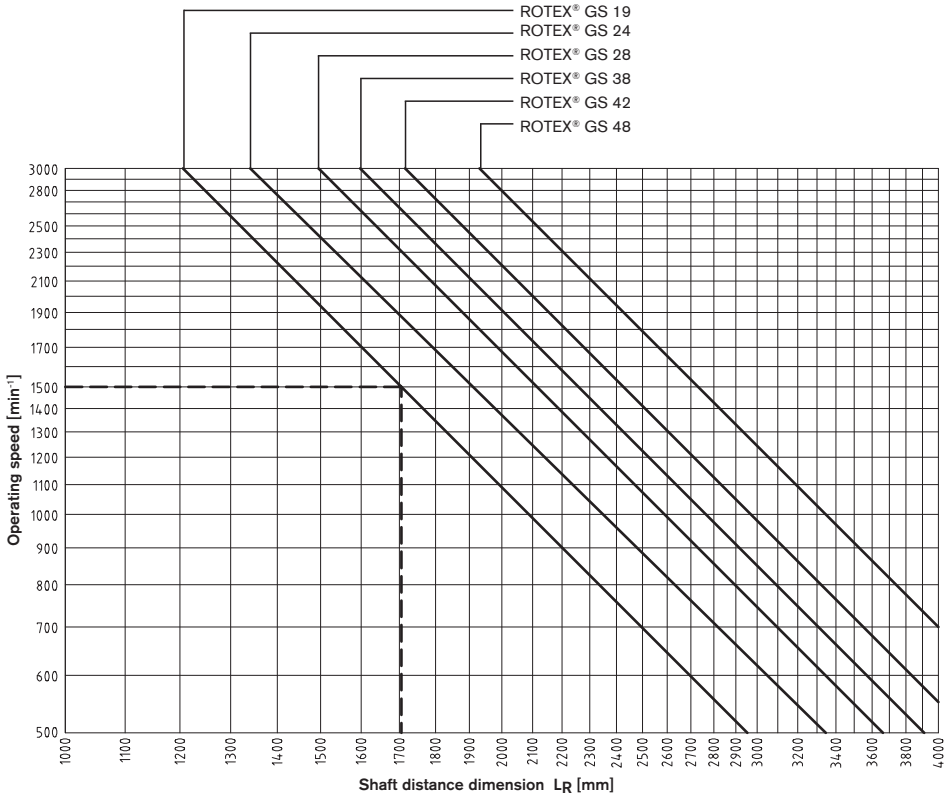
Calculation of overall torsion spring stiffness:

$$C_{ges.} = \frac{1}{2 \bullet \left(\frac{1}{C_1} + \frac{L_{pipe}}{C_2} \right)} \quad [Nm/rad]$$

$$\text{with } L_{pipe} = \frac{L_{ZR} - 2 \bullet L}{1000\ [m]}$$

C_1 = torsion spring stiffness for spider see page 120
C_2 = from table on page 140-143

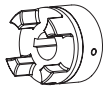
Chart of critical bending speeds for type ZR3



Example:
ROTEX® GS 19
Operating speed: 1500 min^{-1}
Max. permissible shaft distance dimension:: 1700 mm
Operating speed = n_{krit}/1,4

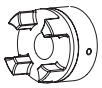
Hub types

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



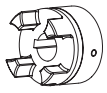
Type 1.0
with feather keyway and setscrew

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



Type 1.1 without keyway, with setscrew

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



Type 2.0 clamping hub, single slotted, without feather keyway

Frictionally engaged, backlash-free shaft-hub-connection-. Transmittable torques depending on bore diameter Type 2.0 up to size 14 as standard. (For ATEX category 3 only)



Type 2.1 clamping hub, 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. Type 2.1 up to size 14 as standard.



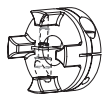
Type 2.5 Clamping hub double slot, without feather keyway

Frictionally engaged, backlash-free shaft-hub-connection-. Transmittable torques depending on bore diameter Type 2.5 from size 19 as standard. (For ATEX category 3 only)



Type 2.6 Clamping hub double slot, 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. Type 2.5 from size 19 as standard.



Type 2.8 short clamping hub C with axial slots without feather keyway

Frictionally engaged, backlash-free shaft-hub-connection, good properties of concentric running. Transmittable torques depending on bore diameter Type 2.8 from size 24 as standard. Size 7-19 type 2.8 single slotted (for ATEX cat. 3 only)



Type 2.9 short clamping hub C with axial slots with feather keyway

Positive locking power transmission with additional frictionally engaged condition. Surface pressure of the keyway connection is reduced. Type 2.9 from size 24 as standard, size 7-19 type. 2.9 single slotted.



Type 6.0 Clamping ring hub

Integrated frictionally engaged shaft-hub-connection for the transmission of higher torques. Screwing on elastomer side. For details about torque and dimensions see page 156/157. Suitable for high speeds.



Type 6.0 P Precision clamping ring hub

Operating principle equal to type 6.0, but highly accurate machining with slight modifications of design, see page 132.



Type Design 7.5 clamping hub type DH without feather keyway for double-cardanic connections

Frictionally engaged, backlash-free shaft-hub-connection for radial assembly of coupling. Transmittable torques depending on bore diameter For torques see page 140.



Type 7.6 clamping hub type DH with feather keyway for double-cardanic connections

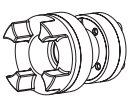
Positive shaft-hub connection with additional frictional engagement for the radial assembly of the coupling. The frictional engagement avoids or reduces the reverse backlash. Surface pressure of the keyway connection is reduced.



Type 7.8 clamping hub type H without feather keyway, single-cardanic connection

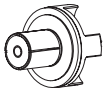


Type 7.9 clamping hub type H with feather keyway for singe-cardanic connection



Type 4.2 with CLAMPEX® KTR 250

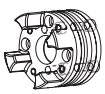
Frictionally engaged shaft-hub-connection to transmit high torques with clamping screws externally



Type 9.0 expansion hub

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

Special designs on request of customers



Type 6.5 Clamping ring hub

Design equal to 6.0, but clamping screws on the outside. As an example for radial disassembly of intermediate pipe (special design).

ROTEX® GS
Backlash-free jaw couplings

Stock programme

Finish bore [mm] according to ISO fit H7 / feather keyway with thread according to DIN 6885 sheet 1 - JS9

Size	Hub type	Un-/pilot bored	Ø2	Ø3	Ø4	Ø5	Ø6	Ø 6,35	Ø7	Ø8	Ø9	Ø9,5	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16	Ø18	Ø19	Ø20	Ø22	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45
	1.1	●			●	●	●																									
7	2.0	●		●	●	●	●	●	●																							
	2.8	●																														
8	2.8	●				●	●			●																						
	1.0	●					●			●	●		●																			
	1.1	●			●	●	●		●	●			●																			
9	2.0	●		●	●	●	●	●	●	●	●	●	●	●																		
	2.1	●					●			●	●		●																			
	2.8	●																														
	1.0	●													●																	
	1.1	●																														
12	2.0	●			●	●	●	●		●	●		●	●	●																	
	2.1	●											●		●																	
	2.8	●																														
13	2.8	●					●			●			●		●																	
	1.0	●					●			●	●		●	●	●	●	●	●														
	1.1	●					●			●			●	●	●	●																
	2.0	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●														
14	2.1	●								●	●		●	●	●	●	●	●														
	2.8	●								●	●		●	●																		
	6.0 light						●			●	●		●	●	●	●																
	6.0 P															●																
16	2.8	●								●			●			●		●														
	1.0	●											●	●	●	●	●	●	●	●	●	●	●									
	2.5	●				■				●		●	●	●	●	●	●	●	●	●	●	●	●									
	2.6	●								●			●	●	●	●	●	●	●	●	●		●									
19	2.8	●									●		●	●		●	●	●	●	●	●		●									
	6.0 light												●	●	●	●	●	●	●	●	●											
	6.0 steel															●		●		●												
	6.0 P37.5																	●														
	6.0 P																			●												
	1.0	●													●	●	●	●	●	●	●	●	●	●	●							
	2.5	●								■					●	●	●	●	●	●	●	●	●	●	●							
	2.6	●													●	●		●	●	●	●	●	●	●	●							
24	2.8															●	●	●		●	●		●	●	●	●						
	6.0 light													●		●	●	●	●	●	●	●	●	●	●							
	6.0 steel																					●	●	●	●							
	6.0 P 50																						●									
	6.0 P																							●								
	1.0	●																		●	●	●	●	●	●	●	●	●				
	2.5	●											■						●	●	●	●	●	●	●	●	●	●	●			
	2.6	●																●			●	●	●	●	●	●	●	●	●			
28	2.8																			●		●	●	●	●	●		●				
	6.0 light																		●	●	●	●	●	●	●	●	●	●	●			
	6.0 steel																					●	●	●	●	●	●	●	●			
	6.0 P																					●					●	●	●			
	1.0	●																			●			●	●	●	●	●	●	●		
	2.5	●												■										●			●	●	●	●		
	2.6	●																			●			●	●	●	●	●	●	●		
38	2.8																				●			●	●		●	●		●		
	6.0 light																				●	●	●	●	●	●	●	●	●	●	●	
	6.0 steel																							●	●	●	●	●	●	●		●
	6.0 P																										●		●	●		

Taper bores for Fanuc motors:
GS 19 1:10 Ø 11
GS 24 1:10 Ø 16

Finish bores [mm]

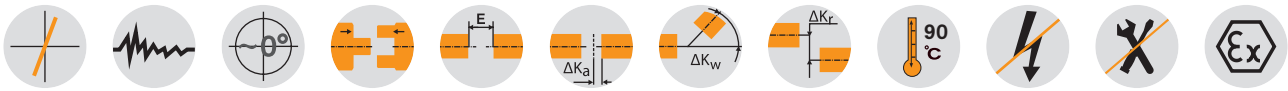
Size	Hub type	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø48	Ø50	Ø55	Ø60	Ø65	Ø70	Ø80
42	6.0 light	●		●	●	●		●	●		●					
	6.0 steel	●	●	●	●	●	●	●	●	●	●					
48	6.0 light			●			●		●	●		●				
	6.0 steel			●	●	●	●	●	●	●	●	●				
55	6.0 steel					●	●	●	●	●	●	●	●			
65	6.0 steel						●	●	●	●	●	●		●	●	
75	6.0 steel										●	●	●	●	●	●
90	6.0 steel	Bores on request														

■ = Pilot bored clamping hubs
● = Standard bore from stock
Unbored hubs up to size 65 available from stock.
Other dimensions on request

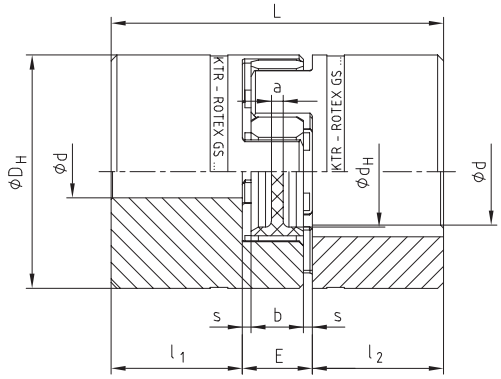
ROTEX® GS
Backlash-free jaw couplings

Standard types

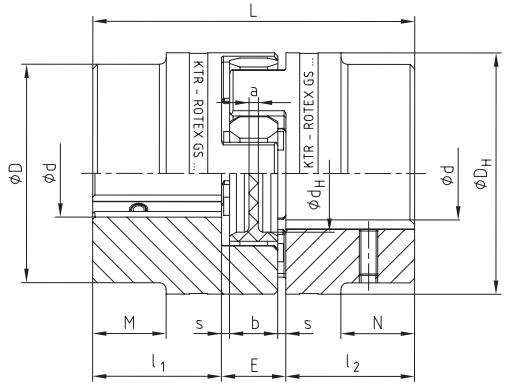




ROTEX® GS 5 - 38

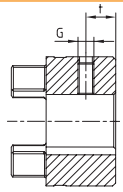


ROTEX® GS 42 - 90



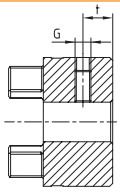
Hub types:

Type 1.0



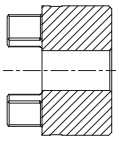
with keyway
and set screw

Type 1.1



without keyway and with
set screw

Type 1.2



without keyway and
without set screw

ROTEX® GS standard types For size 5 to 38 hub material aluminium/for size 42 to 90 hub material steel

Size	Spider torque T_{KN} [Nm] for 98Sh-A[1)]	Maximum finish bore Ød for hub type			Dimensions [mm]										Setscrew DIN EN ISO 4029 hub type 1.0/1.1		
		1.0	1.1	1.2	D	D_H	d_H	L	l_1;l_2	M;N	E	b	s	a	G	t	T_A
5	0,9	-	6	5	–	10	—	15	5	–	5	4	0,5	4,0	M2	2,5	0,2
7	2,0	7	7	7	–	14	—	22	7	–	8	6	1,0	6,0	M3	3,5	0,3
9	5,0	10	11	11	–	20	7,2	30	10	–	10	8	1,0	1,5	M4	5,0	1,5
12	9,0	12	12	12	–	25	8,5	34	11	–	12	10	1,0	3,5	M4	5,0	1,5
14	12,5	16	16	16	–	30	10,5	35	11	–	13	10	1,5	2,0	M4	5,0	1,5
19	21	24	-	–	–	40	18	66	25	–	16	12	2,0	3,0	M5	10	2,0
24	60	28	–	–	–	55	27	78	30	–	18	14	2,0	3,0	M5	10	2,0
28	160	38	–	–	–	65	30	90	35	–	20	15	2,5	4,0	M8	15	10
38	325	45	–	–	–	80	38	114	45	–	24	18	3,0	4,0	M8	15	10
42	450	55	–	–	85	95	46	126	50	28	26	20	3,0	4,0	M8	20	10
48	525	62	–	-	95	105	51	140	56	32	28	21	3,5	4,0	M8	20	10
55	685	74	–	–	110	120	60	160	65	37	30	22	4,0	4,5	M10	20	17
65	940	80	–	–	115	135	68	185	75	47	35	26	4,5	4,5	M10	20	17
75	1920	95	–	–	135	160	80	210	85	53	40	30	5,0	5,0	M10	25	17
90	3600	110	–	–	160	200	104	245	100	62	45	34	5,5	6,5	M12	30	40

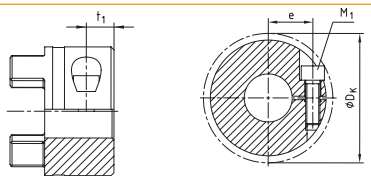
[1)] Other spiders/selection see page 142/143

Ordering example:

ROTEX® GS 24	98 Sh-A-GS	d20	2.5 – Ø 24		1.0 – Ø 20	
Coupling size	Spider hardness	Optional: Bore in spider	Hub type	Finish bore	Hub type	Finish bore

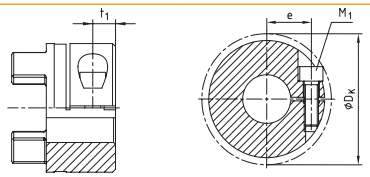
Hub types:

Type 2.0
Type 2.1



size 5 to 14
Type 2.0: Single slotted clamping hub without feather keyway (only for ATEX cat. 3), torque depending on bore Ø.
Type 2.1: single slotted clamping hub with feather keyway

Type 2.5
Type 2.6



from size 19
Type 2.5: double slotted clamping hub without feather keyway (only for ATEX cat. 3), torque depending on bore Ø.
Type 2.6: double slotted clamping hub with feather keyway

ROTEX® GS standard types For size 5 to 38 hub material aluminium/for size 42 to 90 hub material steel

Size	Spider torque T_{KN} [Nm] for 98Sh-A[1]	Maximum finish bore Ød for hub type				Dimensions [mm]										Clamping screw DIN EN ISO 4762 (ROTEX® 5 DIN 84) hub type 2.0/2.1/2.5/2.6				
		2.0	2.1	2.5	2.6	D	D_H	d_H	L	l_1;l_2	M;N	E	b	s	a	M_1	t_1	e	D_K	T_A[Nm]
5	0,9	5	5	–	–	–	10	—	15	5	–	5	4	0,5	4,0	M1,2	2,5	3,5	11,4	—[2]
7	2,0	7	7	–	–	–	14	—	22	7	–	8	6	1,0	6,0	M2	3,5	5,0	16,5	0,37
9	5,0	11	11	–	–	–	20	7,2	30	10	–	10	8	1,0	1,5	M2,5	5,0	7,5	23,4	0,76
12	9,0	12	12	–	–	–	25	8,5	34	11	–	12	10	1,0	3,5	M3	5,0	9,0	27,5	1,34
14	12,5	16	16	–	–	–	30	10,5	35	11	–	13	10	1,5	2,0	M3	5,0	11,5	32,2	1,34
19	21	–	–	24	24	–	40	18	66	25	–	16	12	2,0	3,0	M6	11,0	14,5	46	10,5
24	60	–	–	28	28	–	55	27	78	30	–	18	14	2,0	3,0	M6	10,5	20,0	57,5	10,5
28	160	–	–	38	38	–	65	30	90	35	–	20	15	2,5	4,0	M8	11,5	25,0	73	25
38	325	–	–	45	45	–	80	38	114	45	–	24	18	3,0	4,0	M8	15,5	30,0	83,5	25
42	450	–	–	50	45	85	95	46	126	50	28	26	20	3,0	4,0	M10	18	32,0	93,5	69
48	525	–	–	55	55	95	105	51	140	56	32	28	21	3,5	4,0	M12	21	36,0	105	120
55	685	–	–	68	68 [3]	110	120	60	160	65	37	30	22	4,0	4,5	M12	26	42,5	119,5	120
65	940	–	–	70	70 [3]	115	135	68	185	75	47	35	26	4,5	4,5	M12	33	45,0	124	120
75	1920	–	–	80	80	135	160	80	210	85	53	40	30	5,0	5,0	M16	36	51,0	147,5	295
90	3600	–	–	90	90	160	200	104	245	100	62	45	34	5,5	6,5	M20	40	60,0	192	580

[1] Other spiders/selection see page 18 et seqq.
[2] No T_A defined (slotted screw)
[3] From Ø60 keyway opposite to the clamping screw
[4] Clamping hub single slotted with 2-off clamping screws M4 and dimension e=15

Review of shaft-hub-connection: Friction torques for hub type 2.0

Size	Ø2	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

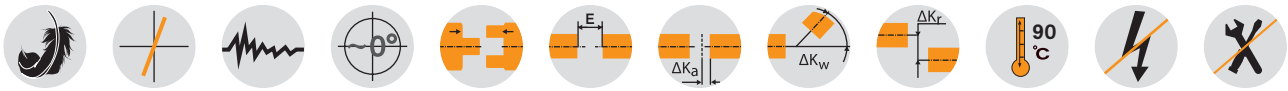
Review of shaft-hub-connection: Friction torques for hub type 2.5

Size	Ø8	Ø10	Ø11	Ø14	Ø15	Ø16	Ø18	Ø19	Ø20	Ø22	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø48	Ø50	Ø55	Ø60	Ø65	Ø70	Ø75	Ø80	Ø90
19	25	27	27	29	30	31	32	32	34	30 [4]	32 [4]																		
24		34	35	36	38	38	39	40	41	42	43	45	46																
28				80	81	81	84	85	87	89	91	92	97	99	102	105	109												
38					92	94	97	98	99	102	104	105	109	112	113	118	122	123	126	130									
42									232	238	244	246	255	260	266	274	283	288	294	301	309	315							
48												393	405	413	421	434	445	454	462	473	486	494	514						
55															473	486	498	507	514	526	539	547	567	587	608				
65																507	518	526	535	547	559	567	587	608	627	648			
75																			1102	1124	1148	1163	1201	1239	1278	1316	1354	1393	
90																			1944	1980	2016	2040	2100	2160	2220	2280	2340	2400	2520

ROTEX® GS Compact
Backlash-free jaw couplings

Compact design





ROTEX® GS Compact																	
Size	Spider torque T_{KN} [Nm] [1]				Dimensions [mm]												T_A [Nm]
	80Sh-A	92Sh-A	98Sh-A	64Sh-D	maximum d	D_H	D_K	L	l_1, l_2	E	b	s	d_H	t	e	M	
Single slotted hub design 2.8/2.9																	
7	0,7	1,2	2,0	2,4	7	14	16,6	18	5	8	6	1	–	2,5	5	M2	0,37
8	0,5	–	2,0	2	8	16	17,1	20	7	6	5	0,5	6,2	4	5,5	M2	0,52
9	1,8	3,0	5,0	6	9	20	21,3	24	7	10	8	1	–	3,5	6,7	M2,5	0,76
12	3,0	5,0	9,0	12	12	25	26,2	26	7	12	10	1	–	3,5	8,3	M3	1,34
13	3,6	–	11	14,5	12,7	25	25,7	26	8	10	8	1	10	4	8	M3	1,9
14	4,0	7,5	12,5	16	16[2]	30	30,5	32	9,5	13	10	1,5	–	4,5	9,6	M4	2,9
16	5,0	–	15	19	16	30	32,5	32	10,3	11,4	9,4	1	14	5,3	10,5	M4	4,1
19	6,0	12,0	21,0	26,0	24[2]	40	45,0	50	17	16	12	2	–	9	14,0	M6	10
Axially slotted hub design 2.8/2.9																	
24	–	35	60	75	32	55	57,5	54	18	18	14	2	–	11	20,0	M6	10
28	–	95	160	200	35	65	69,0	62	21	20	15	2,5	–	12	23,8	M8	25
38	–	190	325	405	45	80	86,0	76	26	24	18	3	–	16	30,5	M10	49

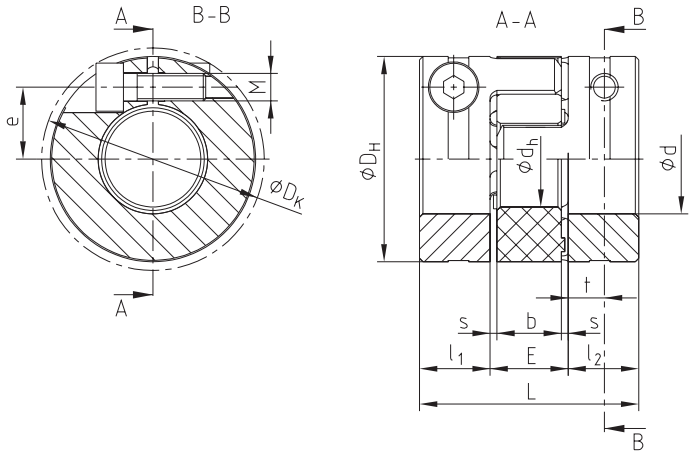
Review of shaft-hub-connection: Friction torques for hub type 2.8																									
Size	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	Ø9	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16	Ø18	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45
Single slotted hub design 2.8																										
7	0,8	0,9	1,0	1,0	1,1																					
8	0,65	0,85	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																
13		2,2	2,75	3,3	3,8	4,4	4,9	5,5	6	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]													
16			4,8	5,8	6,4	7,7	8,7	9,6	11,6	11,5	13,5	14,5	15,4													
19						24,3	25,0	25,7	26,3	27,0	28,4	29,0	29,7	31,1	31,7	32,4	25,0[2]									
Axially slotted hub design 2.8																										
24								21	23	25	30	32	34	38	40	42	51	53	59	63	68					
28											54	58	62	70	74	78	93	97	109	116	124	136				
38												92	99	111	117	123	148	154	173	185	197	216	234	247	259	278

[1] Other spiders/selection see page 18 et seqq.
[2] Size 14 with screw M3 and dimension e=10.4, size 19 with screw M5 and dimension e=15.5
2.8 = Without feather keyway
2.9 = With feather keyway

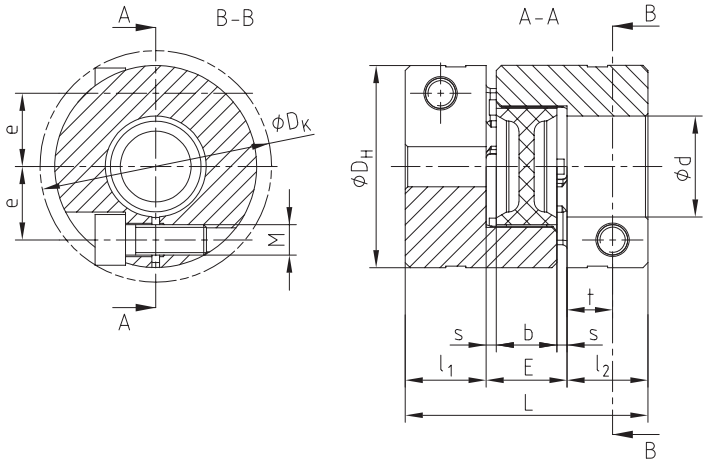
Ordering example:

ROTEX® GS 38	Compact	98 Sh-A-GS	d28	2.8 - Ø28		2.8 - Ø45	
Coupling size	Type	Spider hardness	**Optional** Bore in spider	Hub type	Finish bore	Hub type	Finish bore

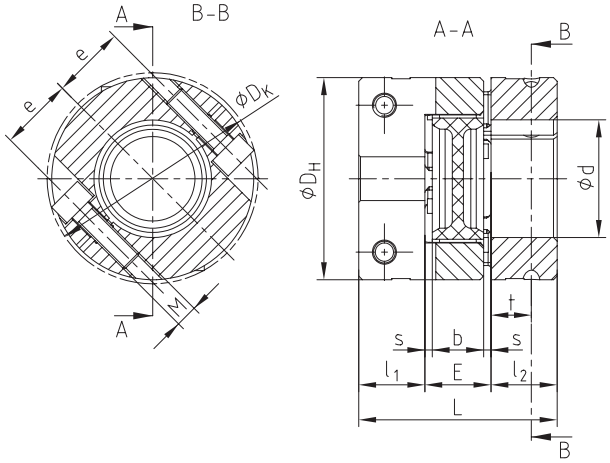
ROTEX® GS 8, 13, 16
Compact
Single slotted type 2.8



ROTEX® GS 7, 9, 12, 14, 19
Compact
Single slotted type 2.8

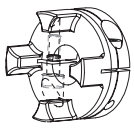


ROTEX® GS 24 - 38 Compact
Axially slotted type 2.8



Hub types

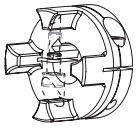
Type 2.8



Short clamping hub C with axial slots without feather keyway

Type 2.8 from size 24 standard, size 7-19 type 2.8 single slotted

Type 2.9

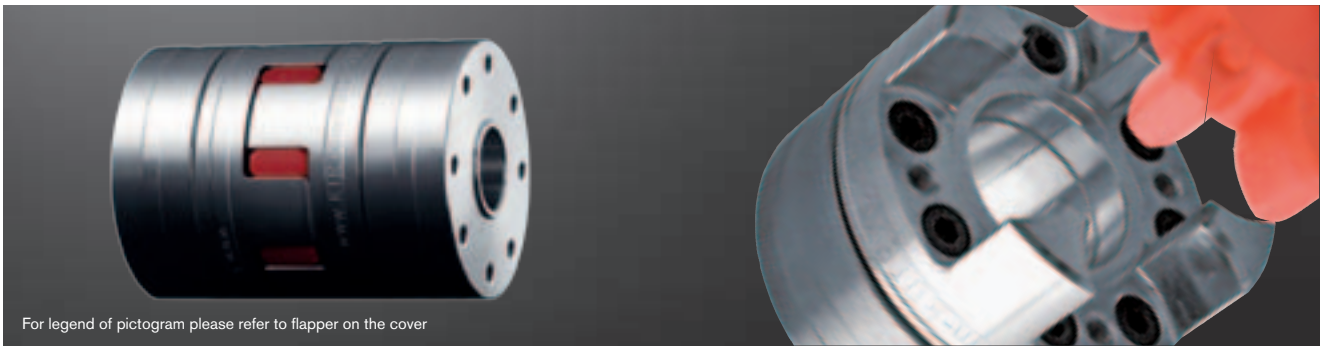


Short clamping hub C with axial slots with feather keyway

Type 2.9 from size 24 standard, size 7-19 type 2.9 single slotted

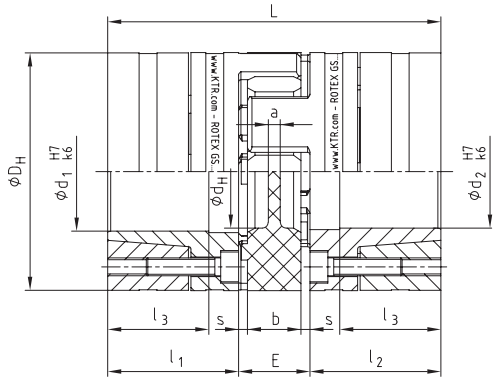
ROTEX® GS Clamping ring hubs light
Backlash-free jaw couplings

Integrated clamping system made of aluminium





Tack thread M1 between clamping screws



ROTEX® GS clamping ring hubs light

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 [kg m²]
	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	Number 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}
19	12	21	26	20	40	18	66	25	18	16	12	2,0	3,0	M4	6	3	M4	0,077	0,19 x 10^{-4}
24	35	60	75	32	55	27	78	30	22	18	14	2,0	3,0	M5	4	6	M5	0,162	0,78 x 10^{-4}
28	95	160	200	38	65	30	90	35	27	20	15	2,5	4,0	M5	8	6	M5	0,240	1,70 x 10^{-4}
38	190	325	405	48	80	38	114	45	35	24	18	3,0	4,0	M6	8	10	M6	0,490	5,17 x 10^{-4}
42	265	450	560	51	95	46	126	50	35	26	20	3,0	4,0	M8	4	25	M8	0,772	11,17 x 10^{-4}
48	310	525	655	55	105	51	140	56	41	28	21	3,5	4,0	M10	4	49	M10	1,066	18,81 x 10^{-4}

[1] Other spiders/selection see page 18 et seqq.
[2] $ØD_H$ + 2 mm with high speeds for expansion of spider

Review of shaft-hub-connection: Friction torques for hub type 6.0 light

Size		Ø6	Ø10	Ø11	Ø14	Ø15	Ø16	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø48	Ø50	Ø55*
14	H7/k6	6,9	17	22	31																	
	H7/h6	4,7	14	19	22																	
19	H7/k6		28	35	51	61	43	68	78													
	H7/h6		23	30	44	55	32	58	70													
24	H7/k6				72	85	79	119	134	145	160	211										
	H7/h6				64	79	67	106	124	108	123	172										
28	H7/k6						120	177	161	247	271	305	355	294	366	382						
	H7/h6						102	160	132	224	250	281	336	222	294	311						
38	H7/k6								248	376	411	486	563	553	673	665	748	832	732	848		
	H7/h6								210	344	382	453	536	454	577	550	632	718	614	732		
42	H7/k6											559	645	666	806	859	957	924	1069	1221	1229	
	H7/h6											522	616	558	703	800	909	806	960	1125	1173	
48	H7/k6												706	795	962	1047	1165	1160	1339	1527	1393	1652
	H7/h6												650	735	914	983	1110	1025	1216	1422	1207	—

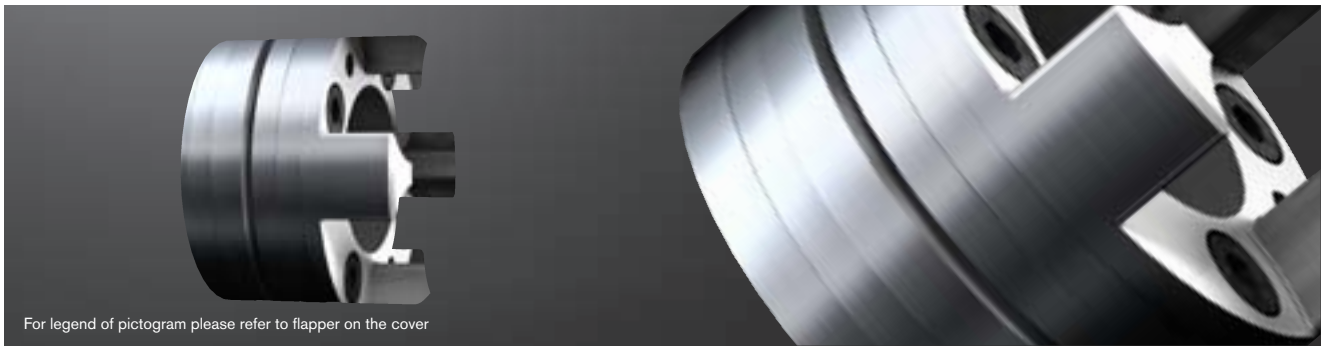
* From Ø55 tolerance G7/m6
With bigger clearance the torque is reduced. As shaft material steel or nodular iron with a yield point of approx. 250 N/mm2 or more can be used. For the stiffness calculation of the shaft/hollow shaft see KTR standard 45510 at our homepage www.ktr.com.

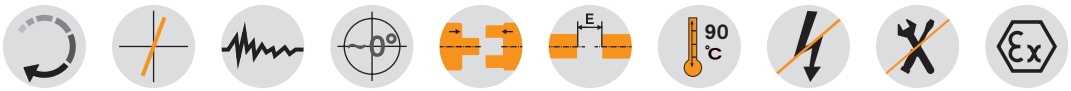
Ordering example:

ROTEX® GS 24	98 Sh-A-GS	d20	6.0 light – Ø 24		6.0 light – Ø 20	
Coupling size	**Spider** hardness	Optional: Bore in spider	Hub type	Finish bore	Hub type	Finish bore

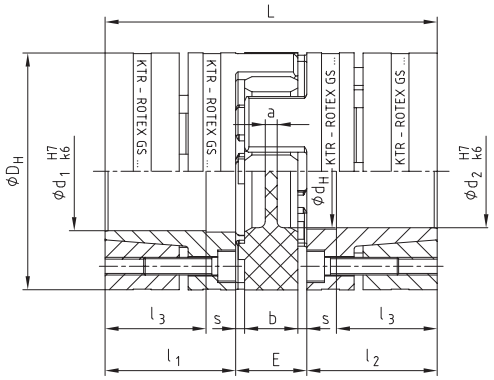
ROTEX® GS Clamping ring hubs made of steel
Backlash-free jaw couplings

Integrated clamping system made of steel





Tack thread M1 between clamping screws



ROTEX® GS clamping ring hubs made of steel

Size	Spider torque T_{KN} [Nm] [1]			Dimensions [mm]										Clamping screws DIN EN ISO 4762				Weight per hub with max. bore [kg]	Mass moment per hub with max. bore [kg m²]
	98 Sh-A	64 Sh-D	72 Sh-D	maxi.d	D_H [2]	d_H	L	l_1; l_2	l_3	E	b	s	a	M	Number z	T_A[Nm]	M_1		
19	21	26	–	20	40	18	66	25	18	16	12	2,0	3,0	M4	6	4,1	M4	0,179	0,44 x 10^{-4}
24	60	75	97	28	55	27	78	30	22	18	14	2,0	3,0	M5	4	8,5	M5	0,399	1,91 x 10^{-4}
28	160	200	260	38	65	30	90	35	27	20	15	2,5	4,0	M5	8	8,5	M5	0,592	4,18 x 10^{-4}
38	325	405	525	48	80	38	114	45	35	24	18	3,0	4,0	M6	8	14	M6	1,225	12,9 x 10^{-4}
42	450	560	728	51	95	46	126	50	35	26	20	3,0	4,0	M8	4	35	M8	2,30	31,7 x 10^{-4}
48	525	655	852	55	105	51	140	56	41	28	21	3,5	4,0	M10	4	69	M10	3,08	52,0 x 10^{-4}
55	685	825	1072	70	120	60	160	65	45	30	22	4,0	4,5	M10	4	69	M10	4,67	103,0 x 10^{-4}
65	940	1175	1527	70	135	68	185	75	55	35	26	4,5	4,5	M12	4	120	M12	6,70	191,0 x 10^{-4}
75	1920	2400	–	80	160	80	210	85	63	40	30	5,0	5,0	M12	5	120	M12	9,90	396,8 x 10^{-4}
90	3600	4500	–	105	200	104	245	100	75	45	34	5,5	6,5	M16	5	295	M16	17,7	1136 x 10^{-4}

[1] Other spiders/selection see page 18 et seqq.
[2] $ØD_H$ + 2 mm with high speeds for expansion of spider

Review of shaft-hub-connection: Friction torques for hub type 6.0 steel

Size		Ø10	Ø11	Ø14	Ø15	Ø16	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø48	Ø50	Ø55*	Ø60*	Ø65*	Ø70*	Ø80*	Ø90*	Ø95*	Ø100*	Ø105*
19	H7/k6	27	32	69	84	57	94	110																					
	H7/h6	15	18	57	74	38	76	94																					
24	H7/k6			70	87	56	97	114	116	133	192																		
	H7/h6			55	74	32	72	93	84	103	173																		
28	H7/k6				108	131	207	148	253	285	315	382	330	433	503														
	H7/h6				74	97	172	94	207	242	267	343	260	377	453														
38	H7/k6							208	353	395	439	531	463	603	593	689	793	776											
	H7/h6							136	290	337	373	476	367	525	491	601	721	677											
42	H7/k6									358	398	483	416	547	536	625	571	704	851	865									
	H7/h6									299	331	428	320	470	434	537	452	605	778	781									
48	H7/k6											616	704	899	896	1030	962	1160	1379	1222	1543								
	H7/h6											513	590	806	775	924	822	1042	1290	1073	–								
55	H7/k6													863	856	991	918	1119	1110	1247	1277	1665	1605	2008					
	H7/h6													750	710	863	750	976	934	1089	–	–	–	–					
65	H7/k6															1446	1355	1637	1635	1827	1887	2429	2368	2930					
	H7/h6															1275	1135	1447	1404	1619	–	–	–	–					
75	H7/k6																1710	2053	2059	2294	2384	3040	2983	3664	4293				
	H7/h6																1460	1836	1797	2056	–	–	–	–	–				
90	H7/k6																			3845	4249	4794	5858	5900	7036	8047	9247	9575	10845
	H7/h6																			3445	–	–	–	–	–	–	–	–	–

* From Ø55 tolerance G7/m6
With bigger clearance the torque is reduced. For the stiffness calculation of the shaft/hollow shaft see KTR standard 45510 at our homepage at www.ktr.com.

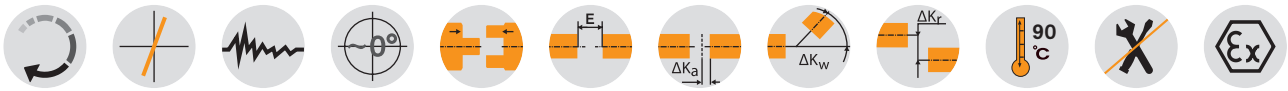
Ordering example:

ROTEX® GS 24	98 Sh-A-GS	d20	6.0 steel	Ø24	6.0 steel	Ø20
Coupling size	Spider hardness	Optional: Bore in spider	Hub type	Finish bore	Hub type	Finish bore

ROTEX® GS P
Backlash-free jaw couplings

Highly accurate type P according to DIN 69002





ROTEX® GS type P material of hub/clamping ring steel

Size	Spider torque T_{KN} [Nm] [1]		Dimensions [mm]											Tightening torque of clamping screws TA [Nm]	Weight per hub with bore Ød standard [kg]	Mass moment of inertia with bore Ø d standard [kgm2]
	98 Sh-A	64 Sh-D	maximum d	D_H [2]	d_H	L	l_1;l_2	l	E	b	s	a	d_3			
14 P	12,5	16	15	32	10,5	50	18,5	15,5	13	10	1,5	2	—	1,89	0,08	0,011 x 10^{-3}
19 P	21	26	20	40	18	66	25	21	16	12	2	3	—	3,05	0,19	0,046 x 10^{-3}
24 P	60	75	28	55	27	78	30	25	18	14	2	3	—	8,5	0,44	0,201 x 10^{-3}
28 P	160	200	38	65	30	90	35	30	20	15	2,5	4	—	8,5	0,64	0,438 x 10^{-3}
38 P	325	405	48	80	38	114	45	40	24	18	3	4	—	14	1,32	1,325 x 10^{-3}
42 P	450	560	51	95	46	126	50	45	26	20	3	4	18,5	35	2,23	3,003 x 10^{-3}
48 P	525	655	55	105	51	140	56	50	28	21	3,5	4	20,5	69	3,09	5,043 x 10^{-3}
55 P	685	825	70	120	60	160	65	58	30	22	4	4,5	22,5	69	4,74	10,02 x 10^{-3}
65 P	940	1175	70	135	68	185	75	55	35	26	4,5	4,5	30	120	6,70	191,0 x 10^{-4}
75 P	1920	2400	80	160	80	210	85	63	40	30	5,0	5,0	40	120	9,90	396,8 x 10^{-4}
90 P	3600	4500	105	200	104	245	100	75	45	34	5,5	6,5	50	120	17,7	1136 x 10^{-4}

[1] Other spiders/selection see page 18 et seqq.
[2] Ø D_H + 2 mm with high speeds for expansion of spider
For the stiffness calculation of the shaft/hollow shaft see KTR standard 45510 on our homepage www.ktr.com

Review of shaft-hub-connection: Friction torques for hub type 6.0P steel

Size		Ø10	Ø11	Ø14	Ø15	Ø16	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø48	Ø50	Ø55*	Ø60*	Ø65*	Ø70*	Ø80*	Ø90*	Ø95*	Ø100*	Ø105*
14	H6/k6	11	13	29																									
19	H6/k6	34	41	75	90	68	104	119																					
24	H6/k6			79	95	70	110	126	134	149	201																		
28	H6/k6				128	150	225	177	278	307	341	403	366	461	528														
38	H6/k6							247	386	426	475	560	511	641	644	733	828	825											
42	H6/k6									389	433	512	464	585	586	669	631	753	888	906									
48	H6/k6											672	762	945	957	1082	1033	1219	1423	1296	1606								
55	H6/k6													920	929	1055	1002	1190	1198	1325	1388	1743	1722	2088					
65	H6/k6															1532	1465	1731	1750	1931	2034	2534	2521	3038					
75	H6/k6																1835	2161	2190	2413	2551	3161	3158	3789	4421				
90	H6/k6																			4046	4503	5057	6079	6181	7324	8398	9530	9892	11084

*From Ø55 G6/m6.
With bigger clearance the torque is reduced. For the stiffness calculation of the shaft/hollow shaft see KTR standard 45510 at our homepage at www.ktr.com.

Selection for stub spindles according to DIN 69002

Spindle drive	ROTEX® GS P size	Dimensions to DIN 69002										
		Standard spindle shaft diameter d	d_1	d_2	d_3	D_H	l_1; l_2	L	E	Transmittable torque T_R with Ød [Nm] [3]	Weight per hub with bore Ød standard [kg] [3]	Mass moment of inertia with bore Ø d standard [kgm²] [3]
25 x 20	14 P	14	17	17	8,5	32	18,5	50	13	25	0,08	0,011 x 10^{-3}
32k x 25	19 P37.5	16	20	19	9,5	37,5	25	66	16	60	0,16	0,037 x 10^{-3}
32g x 30	19 P	19	23	22	9,5	40	25	66	16	71	0,19	0,046 x 10^{-3}
40 x 35	24 P50	24	28	29	12,5	50	30	78	18	108	0,331	0,136 x 10^{-3}
50 x 45	24 P	25	30	30	12,5	55	30	78	18	170	0,44	0,201 x 10^{-3}
63 x 55	28 P	35	40	40	14,5	65	35	90	20	506	0,64	0,438 x 10^{-3}
80 x 75	38 P	40	46	46	16,5	80	45	114	24	821	1,32	1,325 x 10^{-3}

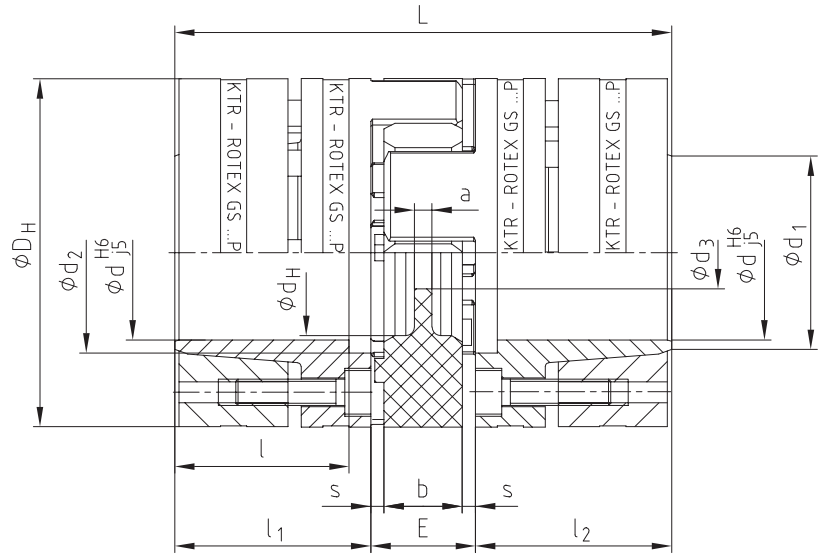
[3] Standard spindle shaft diameters

Ordering example:

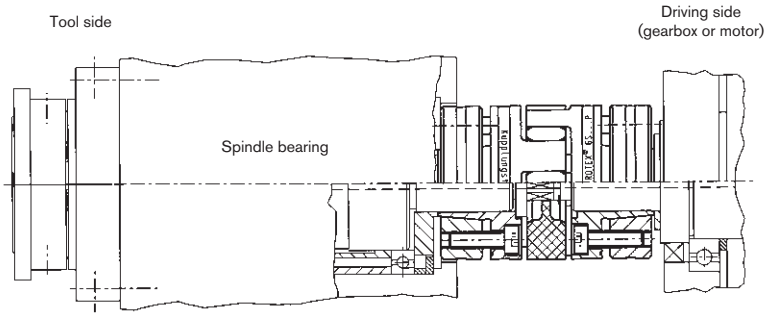
ROTEX® GS 24	P	98 Sh-A-GS	6.0 - Ø25		6.0 - Ø25	
Coupling size	Type	Spider hardness	Hub type	Finish bore	Hub type	Finish bore

Components

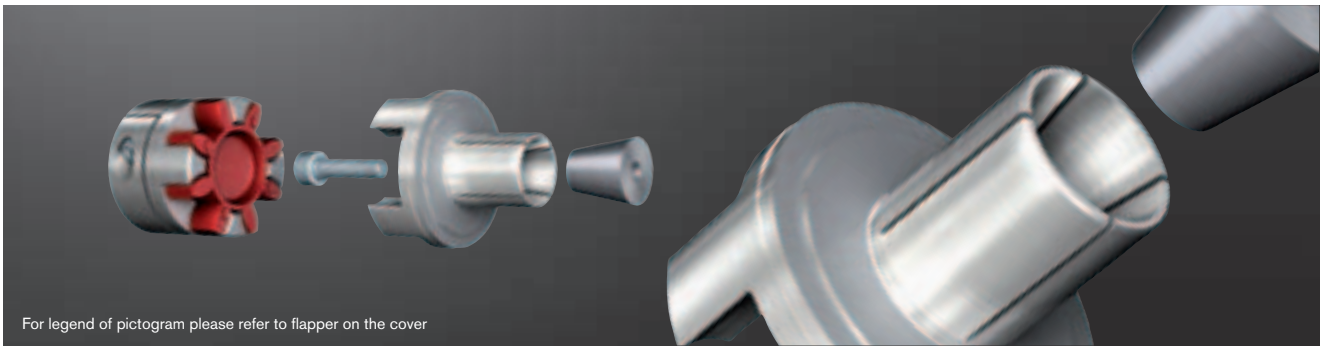
Tack thread M1 between clamping screws

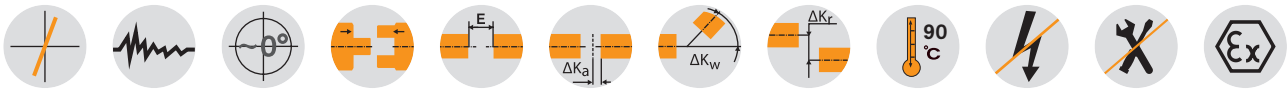


ROTEX® GS type P with central coolant supply for stub spindles and multiple spindle heads



Clamping system for hollow shaft connection





ROTEX® GS expansion hub						Material of expansion hub aluminium/material of clamp pin stainless steel									
Size	Spider torque TKN [Nm] 2)					Dimensions [mm]									
	80 Sh-A	92 Sh-A	98 Sh-A	64 Sh-D	72 Sh-D	D_1 3)	D_2	D_H	l_1 3)	l_4 3)	l_5 3)	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
19	6,0	12,0	21,0	26,0	–	20	35	40	28	20	1	0	16	12	2,0
24	–	35	60	75	97	25	45	55	38	30	1	4	18	14	2,0
28	–	95	160	200	260	35	55	65	44	36	1	5	20	15	2,5

1) Expansion hub can be combined with other hub designs as a counter side, too. l2 depending on hub design. Other hub types see page 124
2) For selection see page 18 et seqq.
3) The dimensions D_1; l_1, l_4 and l_5 are examples. Other dimensions on customers' request.

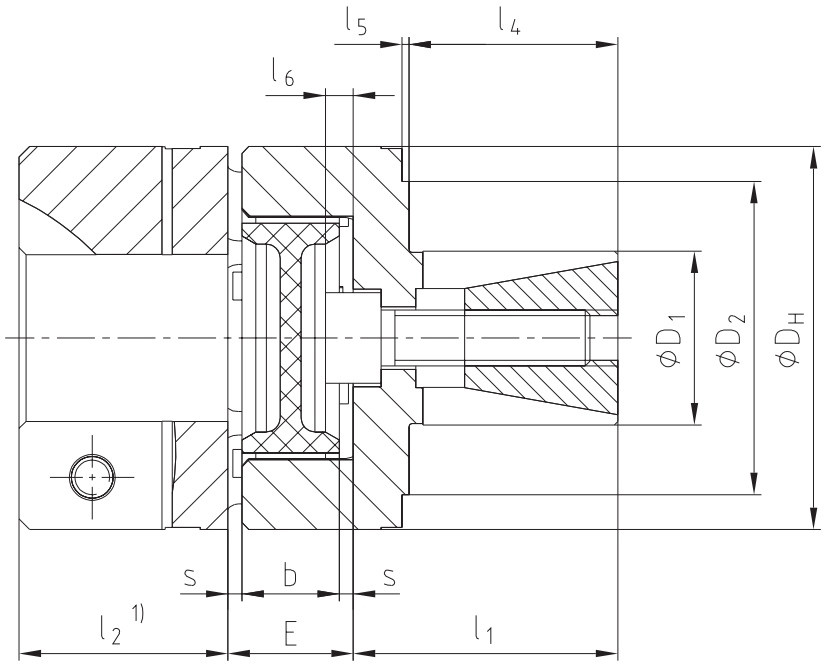
Review of shaft-hub-connection: Friction torques for hub type 9.0*						
Size	D_1	D_2	l_1	l_4 3	l_5	Friction torque [Nm]
9	10	–	20	11	–	6,4
12	10	20	19	14	1,5	7,7
14	12	24	18,5	12,5	3	7,7
19	20	35	28	20	1	35,7
24	25	45	38	30	1	82
28	35	55	44	36	1	182

* The transmittable torques of the clamping connection consider the dimensions D_1, D_2, l_4 and l_5 as specified with steel being the material of the hollow shaft.

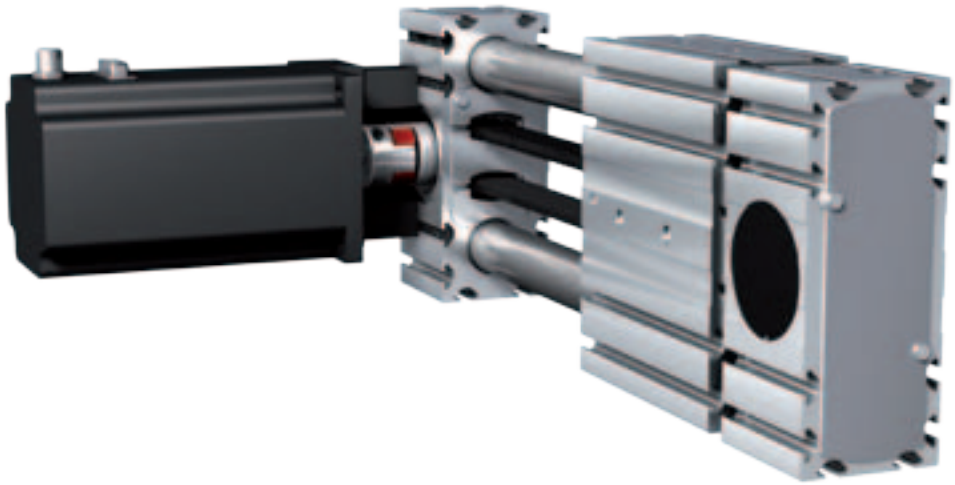
Ordering example:

ROTEX® GS 24	98 Sh-A-GS	d20	9.0 – Ø 24		2.5 – Ø 20	
Coupling size	Spider hardness	Optional: Bore in spider	Hub type	D_1	Hub type	Finish bore

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

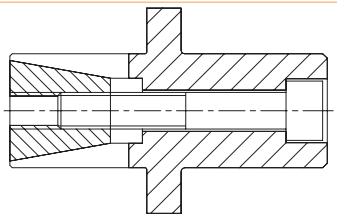


ROTEX® GS expansion hub for axis of belt

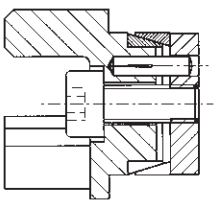


Special types for hollow shaft connections

Shaft extension

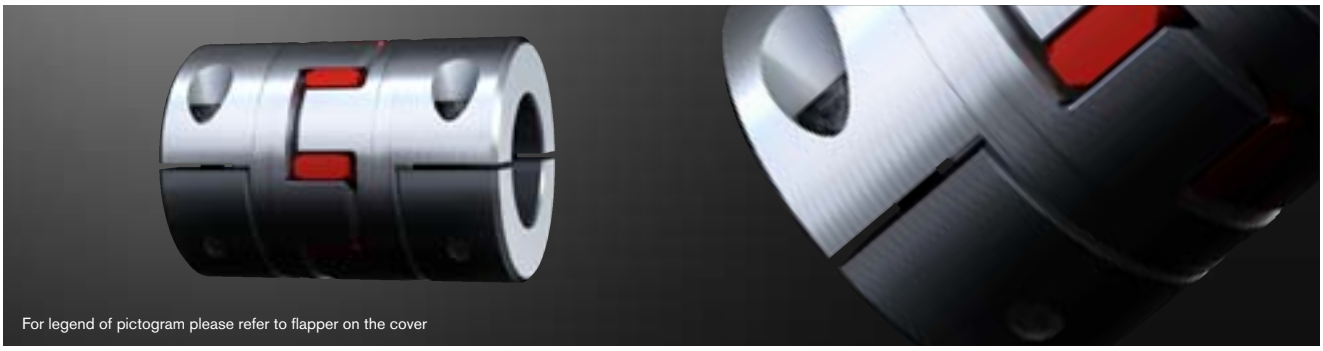


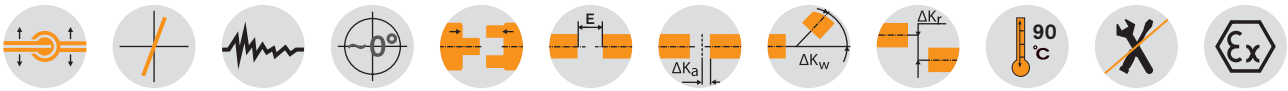
ROTEX® GS hub with CLAMPEX® KTR 150



ROTEX® GS A-H
Backlash-free jaw couplings

Drop-out center design coupling





ROTEX® GS Type A-H hub material aluminium												
Size	Max. finish bore Ød [mm]	Dimensions [mm]									Cyl. screws DIN EN ISO 4762	
		L	l_1; l_2	E	b	s	D_H	D_K	x_1/x_2	E_1	Mxl	T_A [Nm]
19	20	66	25	16	12	2,0	40	46	17,5	31	M6x16	10
24	28	78	30	18	14	2,0	55	57,5	22,0	34	M6x20	10
28	38	90	35	20	15	2,5	65	73	25,0	40	M8x25	25
38	45	114	45	24	18	3,0	80	83,5	33,0	48	M8x30	25
42	50	126	50	26	20	3,0	95	93,5	39	48	M10x30	49

Technical data								
Size	Spider Shore-GS 1)	Shore range	Max. speed [rpm]	Torque [Nm]		Static torsion spring stiffness 2) [Nm/rad]	Weight per hub with max. bore [kg]	Mass moment of inertia J of each hub with max. bore diameter [kgm2]
				T_{KN}	T_{Kmax}			
19	80	A	9550	6,0	12,0	618	77 x 10^{-3}	19,6 x 10^{-6}
	92	A		12,0	24,0	1090		
	98	A		21,0	42,0	1512		
	64	D		26,0	52,0	2560		
24	92	A	6950	35	70	2280	161 x 10^{-3}	77,3 x 10^{-6}
	98	A		60	120	3640		
	64	D		75	150	5030		
28	92	A	5850	95	190	4080	240 x 10^{-3}	173 x 10^{-6}
	98	A		160	320	6410		
	64	D		200	400	10260		
38	92	A	4750	190	380	6525	470 x 10^{-3}	496 x 10^{-6}
	98	A		325	650	11800		
	64	D		405	810	26300		
42	92	A	4000	265	530	10870	1770 x 10^{-3}	2409 x 10^{-6}
	98	A		450	900	21594		
	64	D		560	1120	36860		

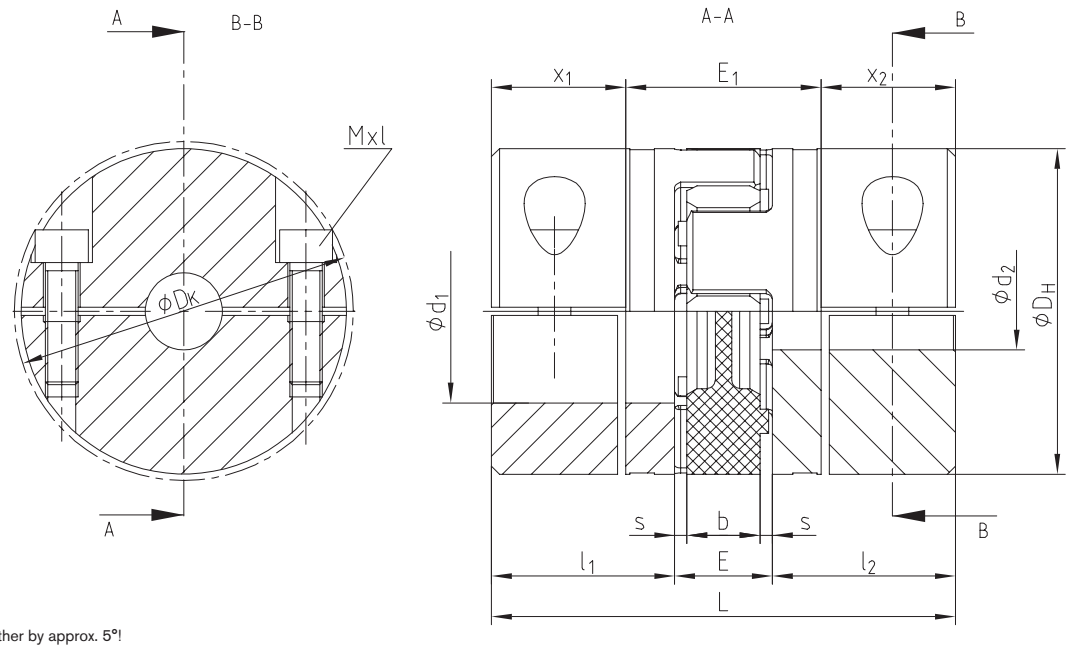
1) Other spiders/selection see page 18 et seqq.
2) Static torsion spring stiffness with 0.5 x T_{KN}
To make sure that the coupling can be assembled/disassembled radially, please observe the insertion dimension x_1/x_2 of the shafts.

Review of shaft-hub-connection: Friction torques for hub type 7.8																							
Size	Ø8	Ø10	Ø11	Ø14	Ø15	Ø16	Ø18	Ø19	Ø20	Ø22	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø46	Ø48	Ø50
19	17	21	23	30	32	34	38	40	42														
24		21	23	30	32	34	38	40	42	47	51	53	59										
28				54	58	62	70	74	78	86	93	97	109	117	124	136	148						
38							70	74	78	86	93	97	109	117	124	136	148	156	163	175			
42										136	149	155	174	186	198	217	235	248	260	279	285	297	310

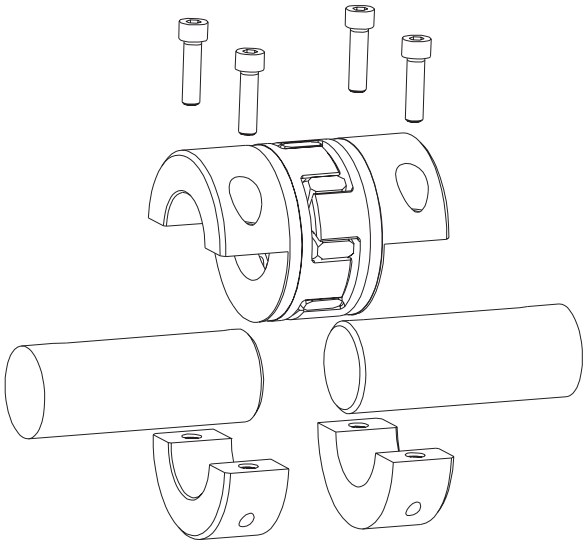
Ordering example:

ROTEX® GS 38	A-H	98 Sh-A-GS	7.8 – Ø 38		7.9 – Ø 30	
Coupling size	Type	Spider hardness	Hub type	Finish bore	Hub type	Finish bore

Type A-H

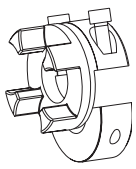


Please note:
The feather keys are offset to each other by approx. 5°!
Hub material: Al-H



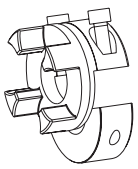
Hub types

Type 7.8



Clamping hub type H without feather keyway for single-cardanic connection

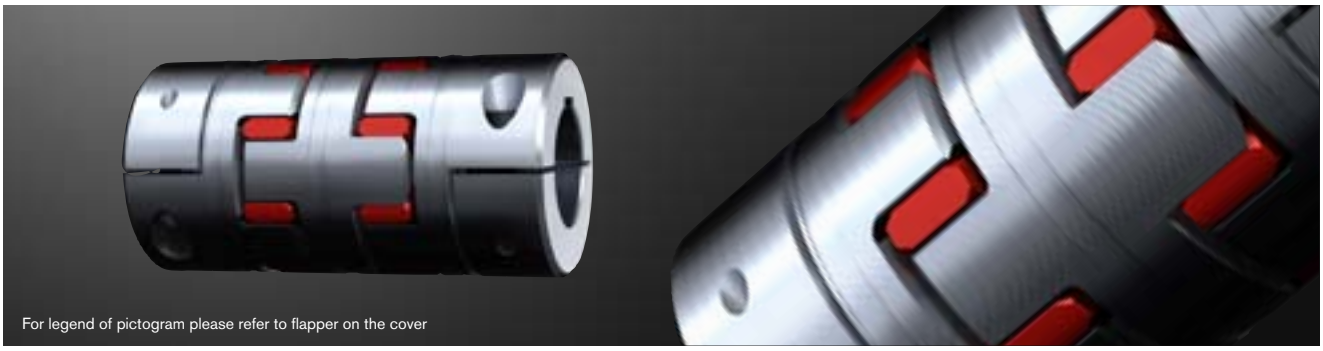
Type 7.9

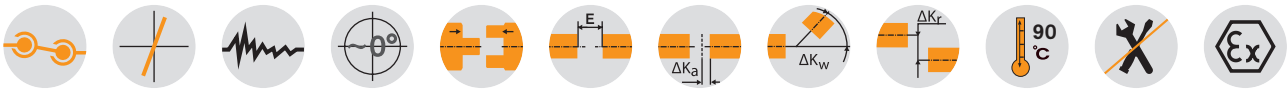


Clamping hub type H with feather keyway for singe-cardanic connection

ROTEX® GS DKM
Backlash-free jaw couplings

Double-cardanic jaw coupling





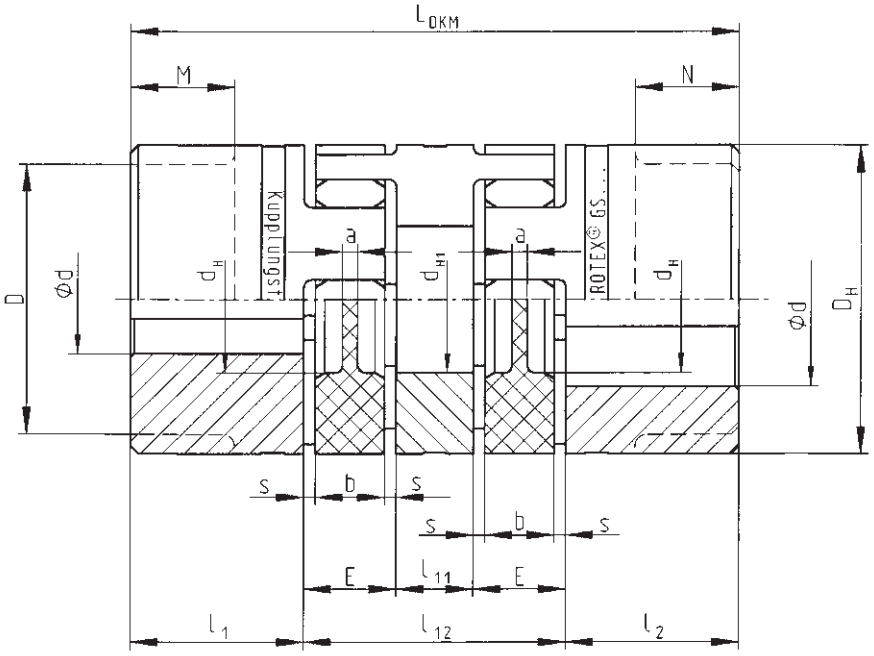
ROTEX® GS DKM Spacer material aluminium/hub material depends on hub design

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
19	21,0	26,0	24	—	40	18,0	18	25	—	10	42	92	16	12	2,0	3,0
24	60	75	28	—	55	27,0	27	30	—	16	52	112	18	14	2,0	3,0
28	160	200	38	—	65	30,0	30	35	—	18	58	128	20	15	2,5	4,0
38	325	405	45	—	80	38,0	38	45	—	20	68	158	24	18	3,0	4,0
42	450	560	55	85	95	46	46	50	28	22	74	174	26	20	3,0	4,0
48	525	655	62	95	105	51	51	56	32	24	80	192	28	21	3,5	4,0
55	685	825	74	110	120	60	60	65	37	28	88	218	30	22	4,0	4,5

[1] Other spiders/selection see page 18 et seqq.
[2] Depending on hub type. Hub types can be freely selected, for summary see page 124

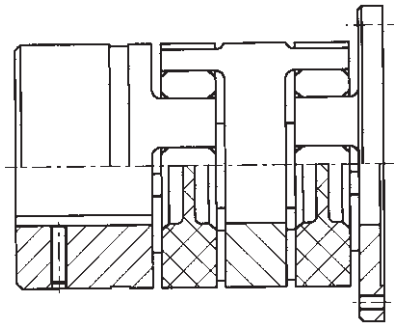
Ordering example:

ROTEX® GS 24	DKM	98 Sh-A-GS	d25	1.0 - Ø38		2.5 - Ø25	
Coupling size	Type	Spider hardness	Optional: Bore in spider	Hub type	Finish bore	Hub type	Finish bore

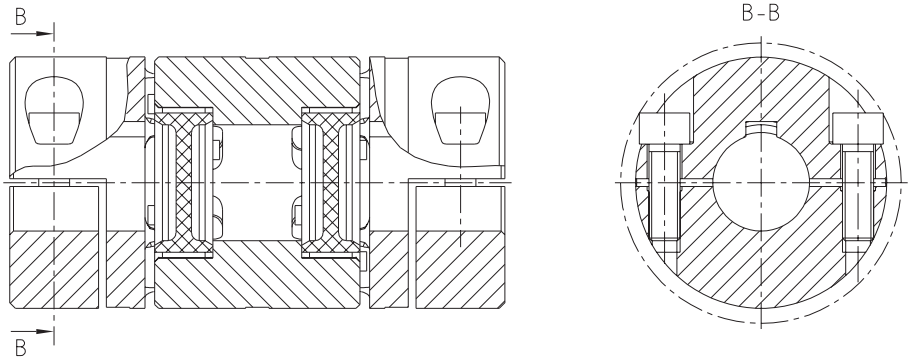


Other types:

ROTEX® GS - CF - DKM

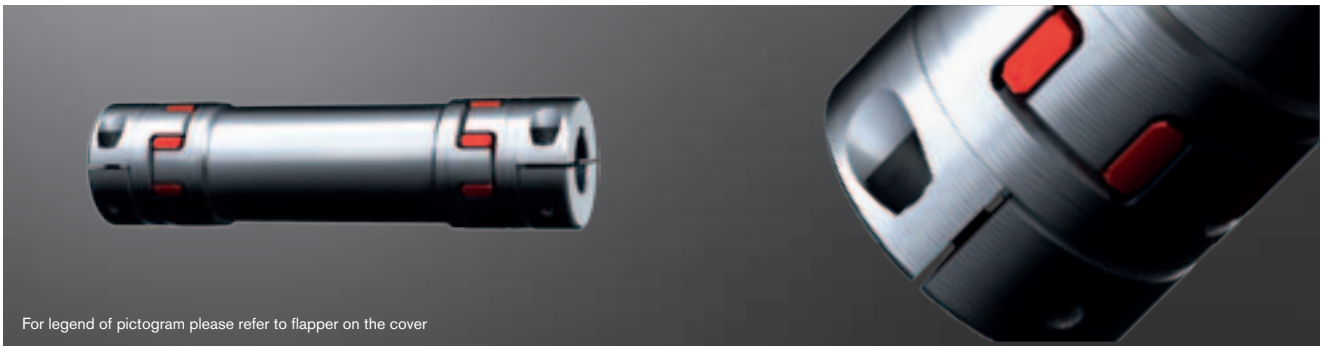


ROTEX® GS DKM with clamping hubs DH type 7.5/7.6



ROTEX® GS ZR3
Backlash-free intermediate shaft couplings

Intermediate shaft coupling with aluminium pipe bonded





ROTEX® GS type ZR3 hub material aluminium/intermediate pipe material aluminium

Size	Dimensions [mm]																
	Minimum and maximum finish bore		General												Cyl. screw DIN EN ISO 4762	
								L_R		$L_{ZR} = L_R + 2 \cdot l_3$						
	$d_{min.}$	$d_{max.}$	D_H	l_1	L	l_3	E	min.	max.	min.	max.	d_R	D_K	t_1	e	8.8	T_A [Nm]
14	5	16	30	18,5	36,0	14,5	13	72	2971	101	3000	28	32,5	7,5	11,5	M3	1,34
19	8	20	40	25	49,0	17,5	16	98	2965	133	3000	40	46	8,0	14,5	M6	10
24	10	28	55	30	59,0	22,0	18	121	3456	165	3500	50	57,5	10,5	20	M6	10
28	14	38	65	35	67,0	25,0	20	137	3950	187	4000	60	73	11,5	25	M8	25
38	18	45	80	45	83,5	33,0	24	169	3934	235	4000	70	83,5	15,5	30	M8	25
42	22	50	95	50	93,0	36,5	26	180	3927	253	4000	80	93,5	18,0	32	M10	49
48	22	55	105	56	100,0	39,5	28	202	3921	281	4000	100	105	18,5	36	M12	86

Technical data of type ZR3

Size	Spider torque T_{KN} [Nm] [1]		Moment of inertia [10^{-3} kgm^2]			Stat. torsion spring stiffness [Nm2/rad]
	98 Sh-A	64 Sh-D	Hub [2]	ZR hub	Pipe/meter	ZW C_2 [3]
14	12,5	16,0	0,00406	0,00238	0,088	858
19	21,0	26,0	0,02002	0,01304	0,329	3243,6
24	60,0	75,0	0,07625	0,04481	0,673	6631,8
28	160	200	0,17629	0,10950	1,199	11814,1
38	325	405	0,50385	0,2572	2,972	29290,4
42	450	560	1,12166	0,5523	4,560	44929,7
48	525	655	1,87044	1,1834	9,251	91158,2

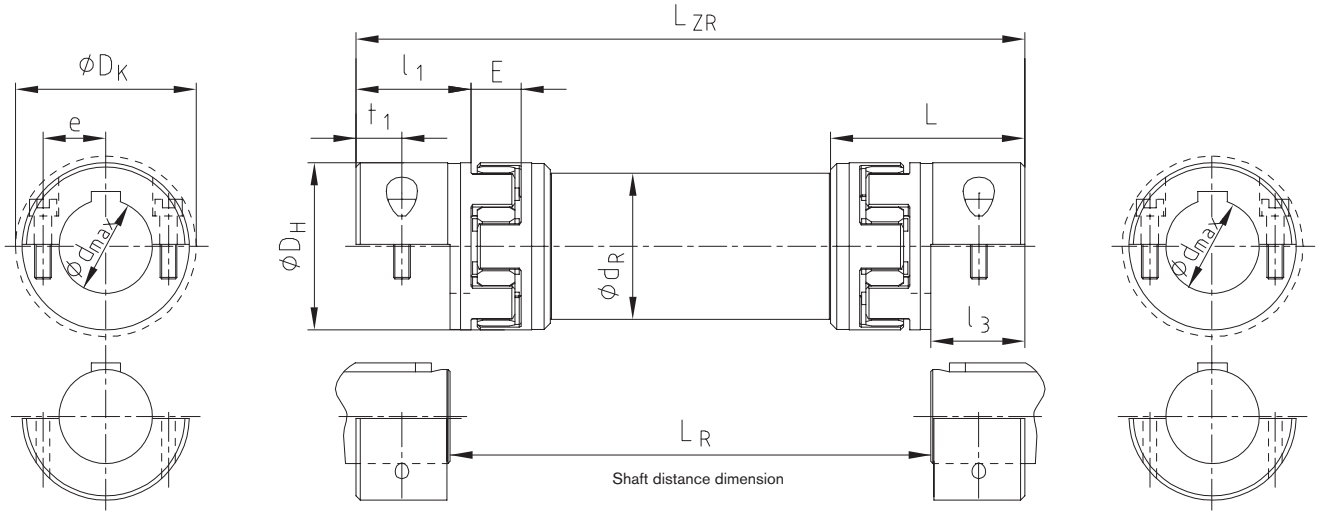
[1] Other spiders/selection see page 18 et seqq.
[2] With $d_{max.}$
[3] Torsion spring stiffness with a length of 1 m of intermediate pipe with $L_{Rohr} = L_{ZR} - 2 \cdot L$
For enquiries and orders please specify the shaft distance dimension LR along with the maximum speed to review the critical bending speed.
The intermediate pipe could be combined with other hub designs, but in that case it can no longer be radially disassembled. Please mention the shaft distance dimension required in your order.
With vertical application a support washer has to be used (please mention in your order).
Insertion dimension of shaft l_3, to make sure that the coupling can be assembled/disassembled radially.

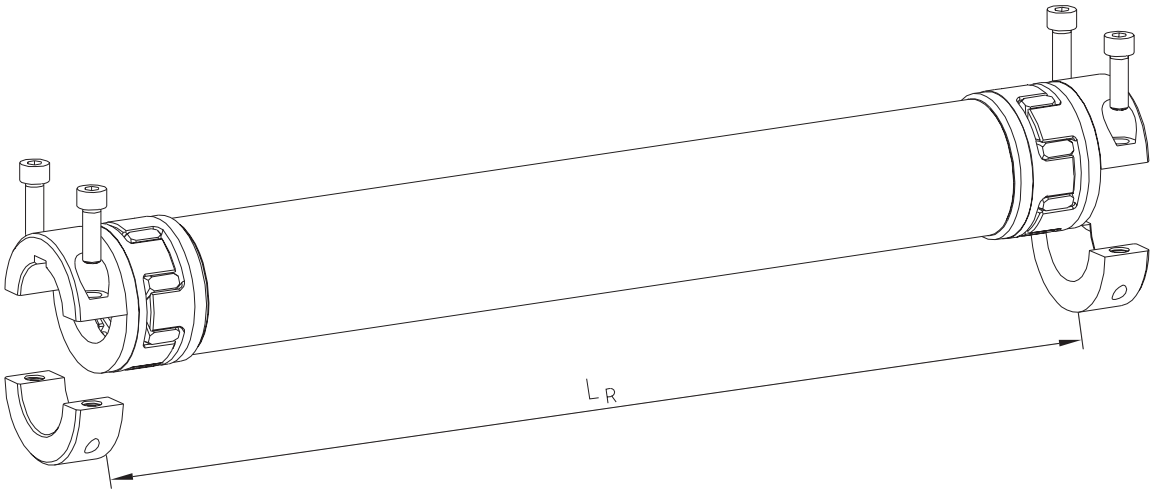
Review of shaft-hub-connection: Friction torques for hub type 7.5

Size	Ø5	Ø6	Ø8	Ø10	Ø11	Ø14	Ø15	Ø16	Ø18	Ø19	Ø20	Ø22	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø46	Ø48	Ø50	Ø55
14	2,6	3,1	4,2	5,2	5,7	7,3	7,8	8,3																		
19			17	21	23	30	32	34	38	40	42															
24				21	23	30	32	34	38	40	42	47	51	53	59											
28						54	58	62	70	74	78	86	93	97	109	117	124	136	148							
38									70	74	78	86	93	97	109	117	124	136	148	156	163	175				
42												136	149	155	174	186	198	217	235	248	260	279	285	297	310	
48												199	217	226	253	271	290	317	344	362	380	407	416	434	452	498

Ordering example:

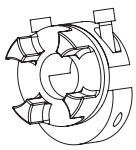
ROTEX® GS 24	ZR3	1200 mm	98 Sh A-GS	7.5 - Ø24		7.5 - Ø24	
Coupling size	Type	Shaft distance dimension (LR)	Spider hardness	Hub type	Finish bore	Hub type	Finish bore





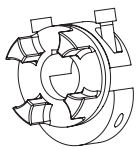
Hub types

Type 7.5



Clamping hub type DH without feather keyway for double-cardanic connections

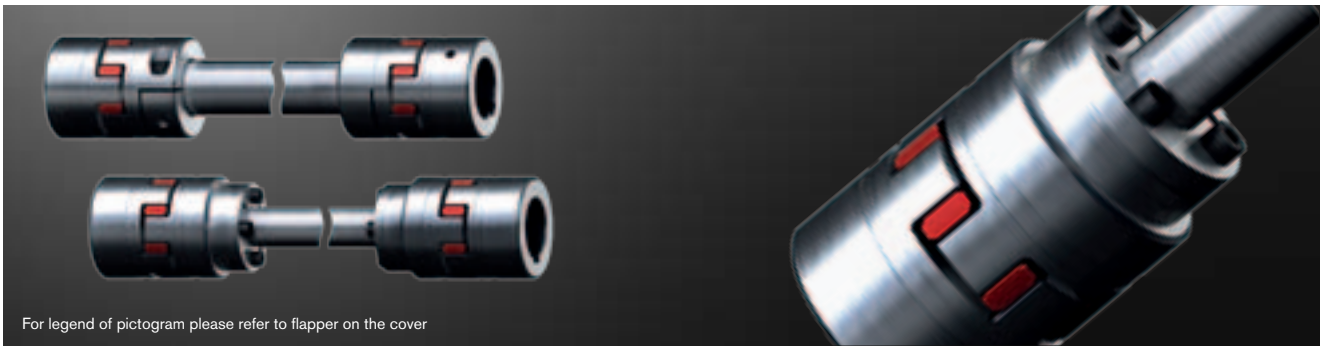
Type 7.6

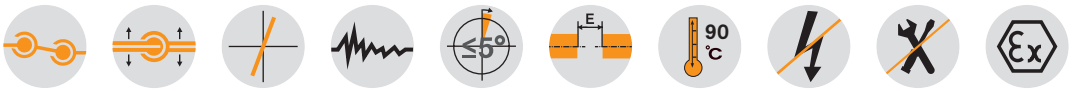


Clamping hub type DH with feather keyway for double-cardanic connections

ROTEX® GS ZR1 und ZR2
Backlash-free intermediate shaft couplings

Intermediate shaft couplings with steel pipe/steel shaft





ROTEX® GS Type ZR1

Size	Spider torque T_{KN} [Nm] [1]		Maximum finish bore	Dimensions [mm]											Cyl. screw DIN EN ISO 4762 – 8.8	Tightening torque T_A [Nm]	Friction torque TR [Nm]
	98 Sh-A	64 Sh-D	d [2]	D_H	l_1; l_2	L	E	b	s	B	L_{R1}	Minimum dimension for L_{R1}	L_{ZR1}	d_R [3]	Mxl		
14 ZR1	12,5	16,0	16	30	11	35	13	10	1,5	11,5	Pease mention with inquiries and orders	71	L_{R1}+22	14x2,5	M3x12	1,34	6,1
19 ZR1	21,0	26,0	24	40	25	66	16	12	2,0	14,0		110	L_{R1}+50	20x3,0	M6x16	10,5	34
24 ZR1	60	75	28	55	30	78	18	14	2,0	16,0		128	L_{R1}+60	25x2,5	M6x20	10,5	45
28 ZR1	160	200	38	65	35	90	20	15	2,5	17,5		145	L_{R1}+70	35x4,0	M8x25	25	105
38 ZR1	325	405	45	80	45	114	24	18	3,0	21,0		180	L_{R1}+90	40x4,0	M8x30	25	123

ROTEX® GS Type ZR2

Size	Spider torque T_{KN} [Nm] [1]		Maximum finish bore	Dimensions [mm]										Precision tube [mm]	Precision tube [Nm²/rad]	Clamping set size KTR 250	Clamping screws DIN EN ISO 4762–12.9	Tightening torque TA [Nm]
	98 Sh-A	64 Sh-D	d [2]	D_H	l_1; l_2	l_3	L	E	b	s	B	L_{R2}	Minimum dimension for L_{R2}	L_{ZR2}	d_R	C_2 [4]	dxD	Mxl	
14 ZR2	12,5	16,0	16	30	11	26	50	13	10	1,5	11,5	Pease mention with inquiries and orders	109	L_{R2}+22	10x2,0	68,36	10x16	M4x10	5,2
19 ZR2	21,0	26,0	24	40	25	26	67	16	12	2,0	14,0		120	L_{R2}+50	12x2,0	130	12x18	M4x10	5,2
24 ZR2	60	75	28	55	30	38	86	18	14	2,0	16,0		156	L_{R2}+60	20x3,0	954,9	20x28	M6x18	17,0
28 ZR2	160	200	38	65	35	45	100	20	15	2,5	17,5		177	L_{R2}+70	25x2,5	1811	25x34	M6x18	17,0
38 ZR2	325	405	45	80	45	45	114	24	18	3,0	21,0		192	L_{R2}+90	32x3,5	5167	32x43	M6x18	17,0
42 ZR2	450	560	55	95	50	52	128	26	20	3,0	23,0		214	L_{R2}+100	40x4,0	11870	40x53	M6x18	17,0
48 ZR2	525	655	62	105	56	70	154	28	21	3,5	24,5		261	L_{R2}+112	45x4,0	17486	45x59	M8x22	41,0
55 ZR2	685	825	74	120	65	80	175	30	22	4,0	26,0		288	L_{R2}+130	55x4,0	33543	55x71	M8x22	41,0
65 ZR2	940	1175	80	135	75	80	185	35	26	4,5	30,5		387	L_{R2}+150	60x4,0	44362	60x77	M8x22	41,0

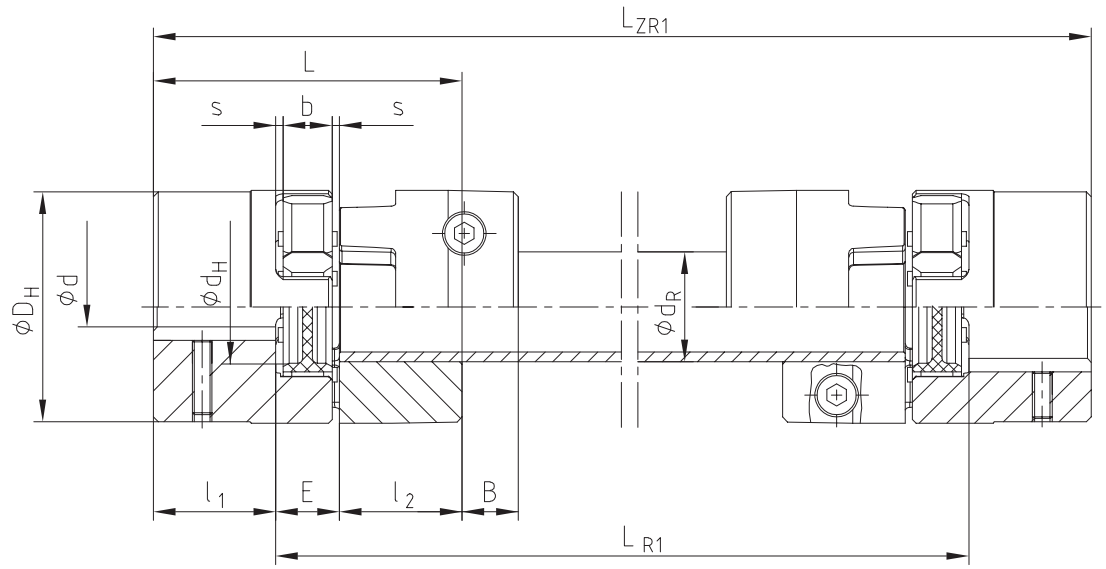
[1] Other spiders/selection see page 18 et seqq.
[2] Depending on hub type. Hub types can be freely selected, for summary see page 124
[3] Has to be remachined, if necessary
[4] Torsion spring stiffness with a length of 1 m of intermediate pipe
For inquiries and orders please specify the shaft distance dimension LR1/LR2 along with the maximum speed to review the critical bending speed.
With vertical application a support washer has to be used (please mention in your order).

Ordering example:

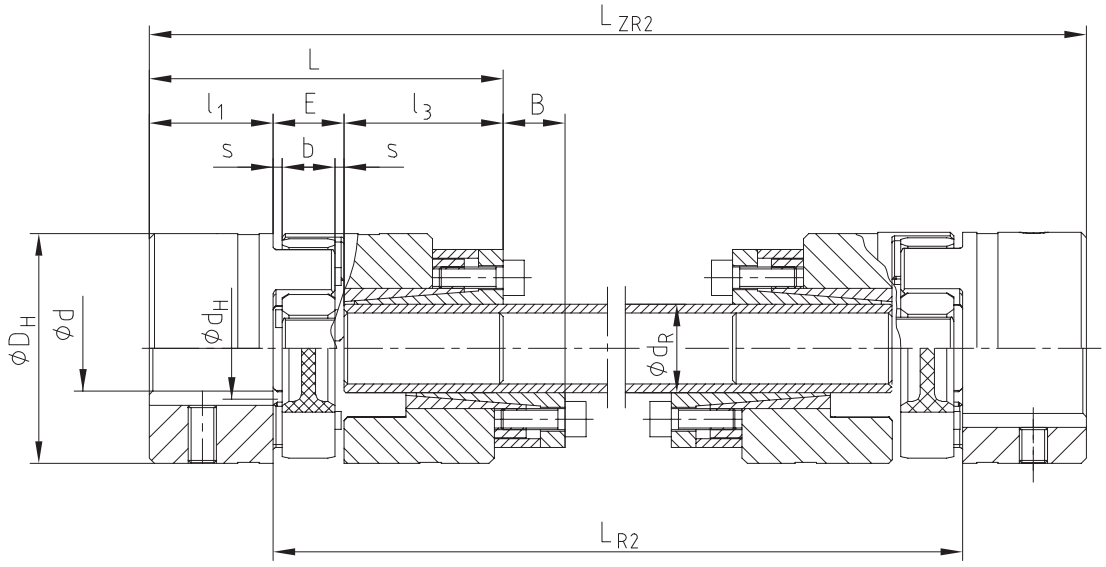
ROTEX® GS 24	ZR1	1000 mm	98 Sh-A-GS	1.0 - Ø24		2.5 - Ø24	
Coupling size	Type	Shaft distance dimension (LR)	Spider hardness	Hub type	Finish bore	Hub type	Finish bore

Type ZR1

– Double- and single-cardanic types



Type ZR2

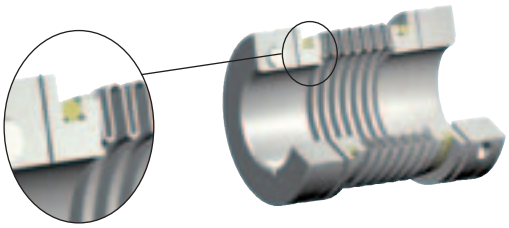


TOOLFLEX®
Metal bellow-type couplings

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.

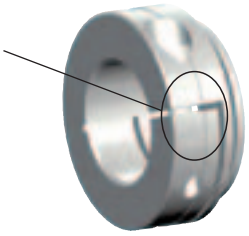




Subject to its well-proven joint procedure a non-positive, backlash-free connection of the aluminium hubs with the multilayer bellows made from stainless steel is generated. The flanged insert connection for sizes 16 to 45 ensures a torque transmission by every single bellow layer. Since TOOLFLEX®is 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.
For higher friction torques type KN with taper hubs can be used.

clamping hub with two slots



Types



Type with thread for setscrews



Type with clamping hubs



Type KN



Type PI



Type CF

Summary

Size	Type	Bellow-hub-connection	Thread for setscrews (hub type 1.0/1.1)			Clamping hubs (hub type 2.5/2.6)			KN			PI			CF		
			Torque of bellow T_{KN} [Nm]	Torque of bellow T_K max. [Nm]	Max. speed [rpm]	Torque of bellow T_{KN} [Nm]	Torque of bellow T_K max. [Nm]	Max. speed [rpm]	Torque of bellow T_{KN} [Nm]	Torque of bellow T_K max. [Nm]	Max. speed [rpm]	Torque of bellow T_{KN} [Nm]	Torque of bellow T_K max. [Nm]	Max. speed [rpm]	Torque of bellow T_{KN} [Nm]	Torque of bellow T_K max. [Nm]	Max. speed [rpm]
5	S	**Bonded** Maximum ambient temperature 100°C	0,1	0,15	47700												
	M																
7	S		1	1,5	31800	1	1,5	31800									
	M																
9	S		1,5	2,25	23800	1,5	2,25	23800									
	M																
12	S		2	3	19000	2	3	19100									
	M																
16	S	**Flanged** Maximum ambient temperature 200°C	5	7,5	14900	5	7,5	14900									
	M																
20	S		15	22,5	11900	15	22,5	11950				15	22,5	11950			
	M																
30	S					35	52,5	8700	35	52,5	15280	35	52,5	8700	35	52,5	8700
	M																
38	S					65	97,5	7350	65	97,5	12600	65	97,5	7350	65	97,5	7350
	M																
42	S					95	142,5	6820	95	142,5	11580	95	142,5	6820	95	142,5	6820
	M																
45	S					150	225	5750	150	225	9300	150	225	5750	150	225	5750
	M																
55	S	**Welded** Maximum ambient temperature 200°C				340	510	4800	340	510	7870	340	510	4800			
	M																
65	S					600	900	3850									
	M																

Hub types

Due to the numerous applications of TOOLFLEX® for many different applications and mounting situations, this coupling system is available with various hub designs and two different lengths of bellows. A combination of the components forms a type.
TOOLFLEX® is supplied as a complete unit; a supply of individual components is not possible.



Type 1.0
with feather keyway and setscrew

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



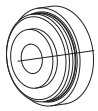
Type 1.1 without keyway, with setscrew

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



Type 1.3 with spline bore

Positive locking power transmission. Spline on request of customers (e. g. sfor shaft with flattening)



Type 1.2 without feather keyway, without thread for setscrews

For low torques Suitable for bonding or pressing onto the shaft.



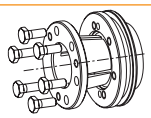
Type 2.5 Clamping hub double slot, without feather keyway

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



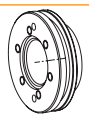
Type 2.6 Clamping hub double slot, with feather keyway

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.



Type 6.5 Taper hub KN

Integrated frictionally engaged shaft-hub-connection for the transmission of higher torques in the area of the shaft-hub-connection.



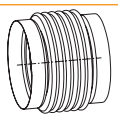
Flange

Flange to connect to customer's component. Special dimensions on request.



Bellow type S

Bellow with 4 layers made of stainless steell; compact design with high torsion spring stiffness.



Bellow type M

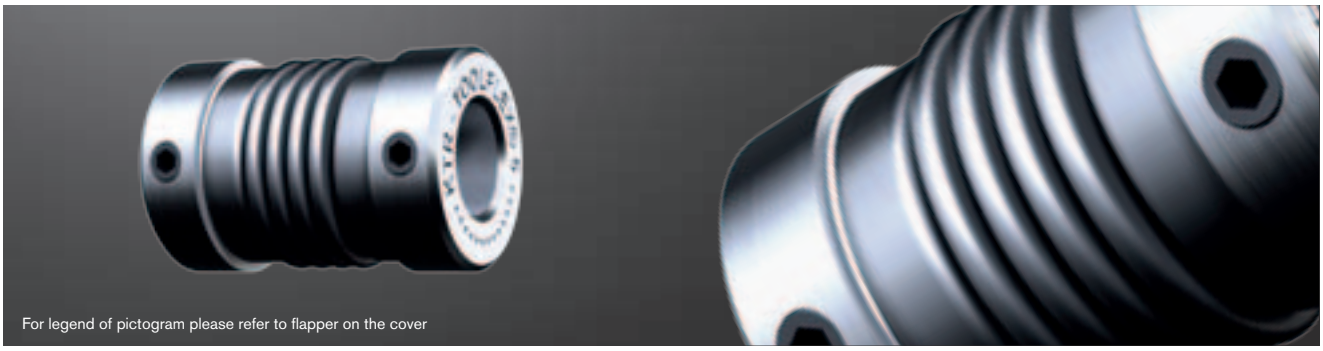
Bellow with 4 layers made of stainless steel; realizing large shaft distance dimensions and displacements

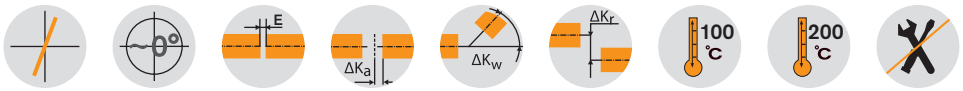
Special designs on request of customers

Special bellows

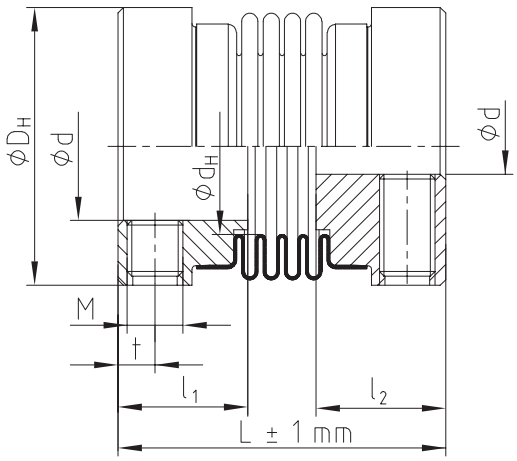
Bellows with 1, 2 or 3 layers available on request.

Type S: Hubs with threads for setscrews





TOOLFLEX® S type 1.1



TOOLFLEX® S with thread for setscrews (type 1.1) Hub material aluminium/bellow material stainless steel

Size	Bellow-hub-connection	Torque of bellow T_{KN} [1] [Nm]	Max. speed n [rpm]	Dimensions [mm]									Perm. displacements			Torsion spring stiffness C_T [Nm/rad]	Weight [3] [kg]
				Finish bore		General				Set screw							
				min. d	max. d	D_H	d_H	L	l_1; l_2	M	t	Number [2] z	Axial [mm]	Radial [mm]	Angular [degrees]		
5		0,1	47700	2	5	10	6	15	6	M2	1,8	1	±0,30	0,10	0,7	97	0,0027
7	[4]	1,0	31800	3	8	15	9	18	7	M3	2,0	1	±0,30	0,10	0,7	390	0,005
9		1,5	23800	3	10	20	12	21	8	M3	2,2	2	±0,35	0,15	1,0	750	0,010
12		2,0	19000	4	14	25	16	27,5	11	M4	2,8	2	±0,40	0,15	1,0	1270	0,017
16	[5]	5,0	14900	5	18	32	20	37	13	M5	4	2	±0,30	0,15	1,0	4500	0,046
20		15	11900	6	25	40	27	42	15	M5	5	2	±0,40	0,15	1,0	9600	0,076

[1] For selection see page 18 et seqq.
[2] Quantity each hub; from size 9: 2x120° offset
[3] Details referring to the overall coupling with max. bore
[4] Bonded
[5] Flanged

Hub designs

Type 1.0



Hub with feather keyway and setscrew

Type 1.1



Hub without feather keyway, with setscrew

Type 1.3



Hub with spline bore

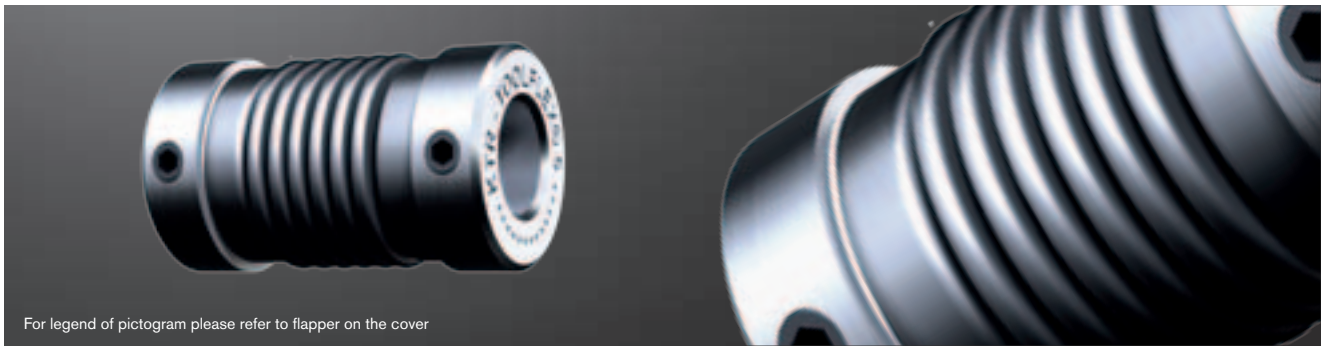
Type 1.2

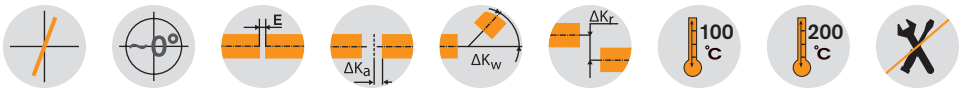


Hub without feather keyway, without setscrew

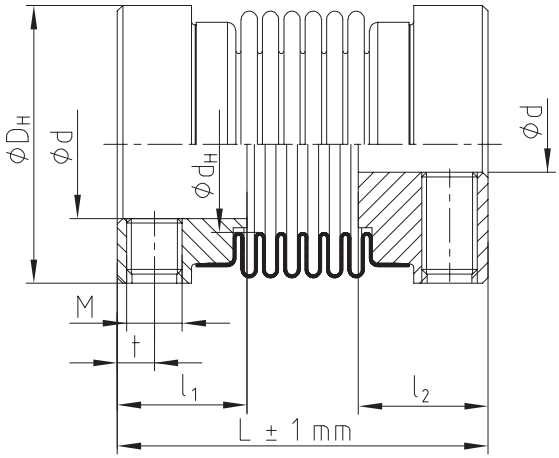
Ordering example:	TOOLFLEX® 7 S	1.1 - Ø4		1.1 - Ø6	
	Size and type of coupling	Hub type	Finish bore	Hub type	Finish bore

Type M: Hubs with threads for setscrews





TOOLFLEX® M type 1.1



TOOLFLEX® M with thread for setscrews (type 1.1) Hub material aluminium/bellow material stainless steel

Size	Bellow-hub-connection	Torque of bellow T_{KN} [1] [Nm]	Max. speed n [rpm]	Dimensions [mm]									Perm. displacements			Torsion spring stiffness C_T [Nm/rad]	Weight [3] [kg]
				Finish bore		General				Set screw							
				min. d	max. d	D_H	d_H	L	l_1; l_2	M	t	Number [2] z	Axial [mm]	Radial [mm]	Angular [degrees]		
5		0,1	47700	2	5	10	6	17	6	M2	1,8	1	±0,40	0,15	1,0	75	0,003
7	[4]	1,0	31800	3	8	15	9	20	7	M3	2,0	1	±0,40	0,15	1,0	300	0,006
9		1,5	23800	3	10	20	12	24	8	M3	2,2	2	±0,50	0,20	1,5	580	0,011
12		2,0	19000	4	14	25	16	31	11	M4	2,8	2	±0,60	0,20	1,5	980	0,019
16	[5]	5,0	14900	5	18	32	20	41	13	M5	4	2	±0,50	0,20	1,5	3050	0,049
20		15	11900	6	25	40	27	49	15	M5	5	2	±0,60	0,20	1,5	6600	0,082

[1] For selection see page 18 et seqq.
[2] Quantity each hub; from size 9: 2x120° offset
[3] Details referring to the overall coupling with max. bore
[4] Bonded
[5] Flanged

Hub designs

Type 1.0



Hub with feather keyway and setscrew

Type 1.1



Hub without feather keyway, with setscrew

Type 1.3



Hub with spline bore

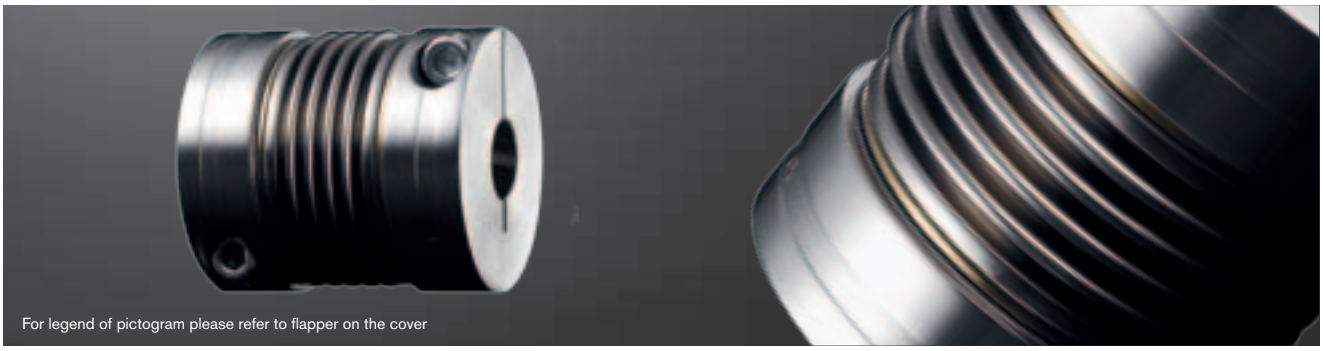
Type 1.2

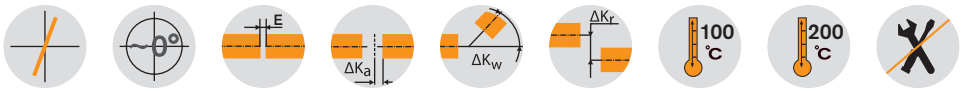


Hub without feather keyway, without setscrew

Ordering example:	TOOLFLEX® 7 M	1.1 - Ø4		1.1 - Ø6	
	Size and type of coupling	Hub type	Finish bore	Hub type	Finish bore

Type S: With clamping hubs





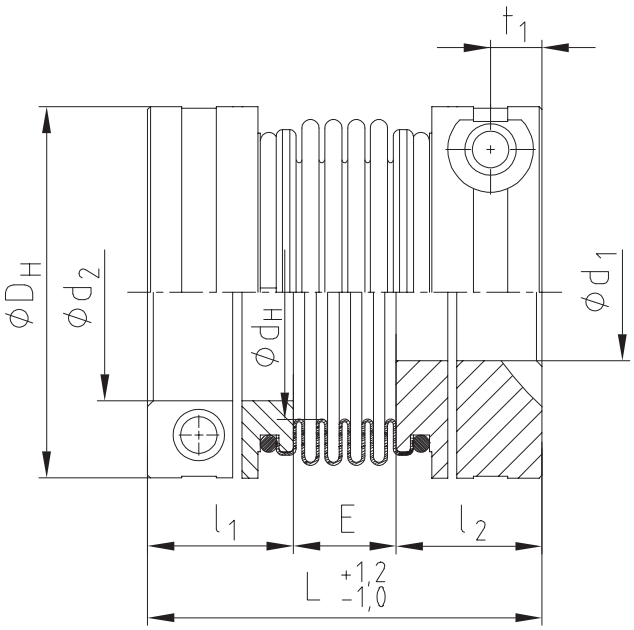
TOOLFLEX® Type S with clamping hubs Hub material aluminium (size 55/65 steel/bellow material stainless steel												
Size	Dimensions [mm]											
	Min./max. finish bore		General					Clamping screws DIN EN ISO 4762				
	min. d	max. d	L	l_1; l_2	E	D_H	d_H	M_1	D_3	t_1	e_1	T_A [Nm]
7	3	7	24	9	6	15	9	M2	16,5	3,2	5	0,37
9	3	9	29	11	7	20	12	M2,5	21,5	3,5	7,1	0,76
12	4	12	34,5	13	8,5	25	16	M3	26,5	4	8,5	1,34
16	5	16	45	17,0	11	32	20	M4	35,0	5	12,0	2,9
20	8	20	55	21,5	12	40	27	M5	43,5	6	14,5	6
30	10	30	63	23,0	17	55	33	M6	58,0	7	19	10
38	12	38	69	25,5	18	65	42	M8	72,6	9	25	25
42	14	42	84	30,0	24	70	46	M8	76,1	9	27	25
45	14	45	86,5	32,0	22,5	83	58	M10	89,0	11	30	49
55 [4]	20	55	111	40,0	31	100	73	M12	106,0	14	37	120
65 [4]	30	65	126	45,0	36	125	95	M14	127,2	15	45	185

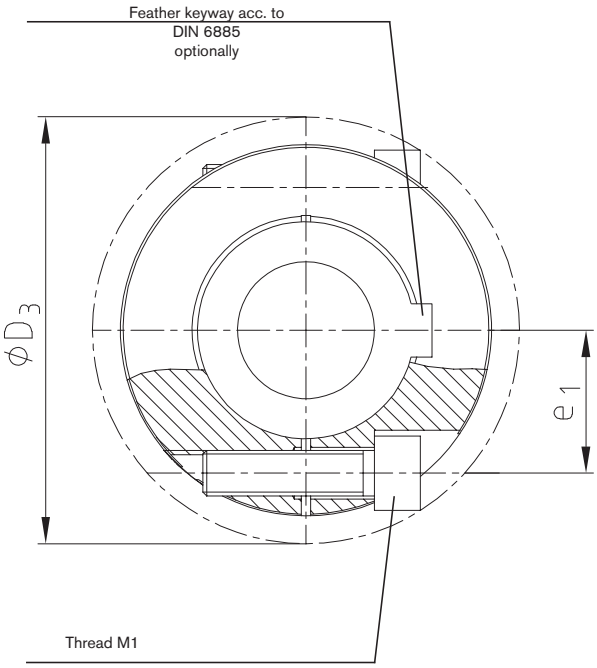
Technical data											
Size	Bellow-hub connection	Torque of bellow T_{KN} [1] [Nm]	Max. speed n [rpm]	Moment of inertia [2] [x10^{-6}kgm^2]	Torsion spring stiffness C_T [Nm/rad]	Axial spring stiffness [N/mm]	Radial spring stiffness [N/mm]	Perm. displacements			Weight [2] [kg]
								Axial [mm]	Radial [mm]	Angular [degrees]	
7	Bonded	1	31800	0,26	390	—	—	±0,3	0,10	0,7	0,007
9	Bonded	1,5	23800	0,97	750	—	—	±0,35	0,15	1,0	0,014
12	Bonded	2	19100	2,6	1270	—	—	±0,4	0,15	1,0	0,025
16	Flanged	5	14900	9	4500	43	138	±0,3	0,15	1,0	0,06
20	Flanged	15	11950	30	9600	63	189	±0,4	0,15	1,0	0,12
30	Flanged	35	8700	114	17800	97	233	±0,5	0,20	1,5	0,24
38	Flanged	65	7350	245	37400	108	318	±0,6	0,20	1,5	0,35
42	Flanged	95	6820	396	54700	120	499	±0,6	0,20	1,5	0,49
45	Flanged	150	5750	931	95800	132	738	±0,9	0,25	1,5	0,82
55 [3]	Flanged	340	4800	4996	144100	160	894	±1,0	0,25	1,5	3,2
65 [3]	Flanged	600	3850	13318	322740	212	1365	±1,0	0,30	1,5	5,5

[1] For selection see page 18 et seqq.
[2] Details referring to the overall coupling with max. bore
[3] Hub made of steel welded to bellow

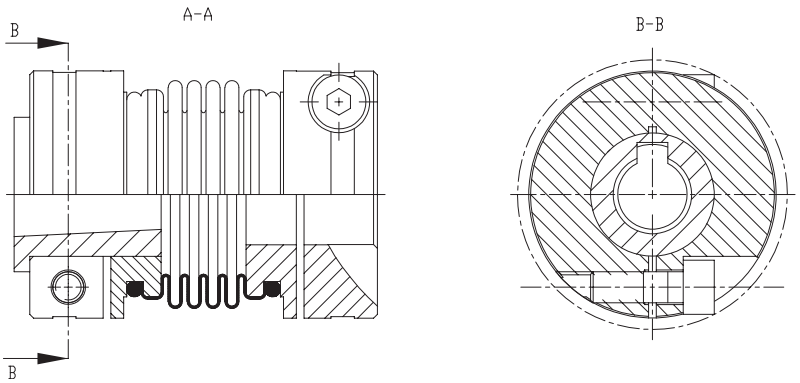
Review of shaft-hub-connection: Friction torques for hub type 2.5																														
Size	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	Ø9	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16	Ø18	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø50	Ø55	Ø60	Ø65
7	0,84	0,91	0,97	1,04	1,10																									
9	1,87	1,98	2,09	2,20	2,31	2,41	2,52																							
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																	
20						17,6	18,1	18,6	19,1	19,5	20,5	21,0	21,4	22,4	22,9	23,3														
30									33,1	33,8	35,1	35,8	36,5	37,8	38,5	39,2	41,9	42,5	44,6	45,9										
38											79,2	80,4	81,7	84,2	85,4	86,6	91,6	92,8	96,5	99,0	102	105	109							
42											84,2	85,4	86,6	89,1	90,3	91,6	96,5	97,8	102	104	106	110	114	116	119					
45																157	165	167	173	177	181	187	193	197	200	206				
55 [4]																	397	401	413	421	429	442	454	462	470	482	502	523		
65 [4]																				720	732	750	768	780	792	810	840	870	900	930

Ordering-example:	TOOLFLEX® 30 S	2.5	Ø25	2.5	Ø30
	Size and type of coupling	Hub type	Finish bore	Hub type	Finish bore





Other types:
Type for FANUC motors



Hub types

Type 2.5



Clamping hub, double slotted, without feather keyway

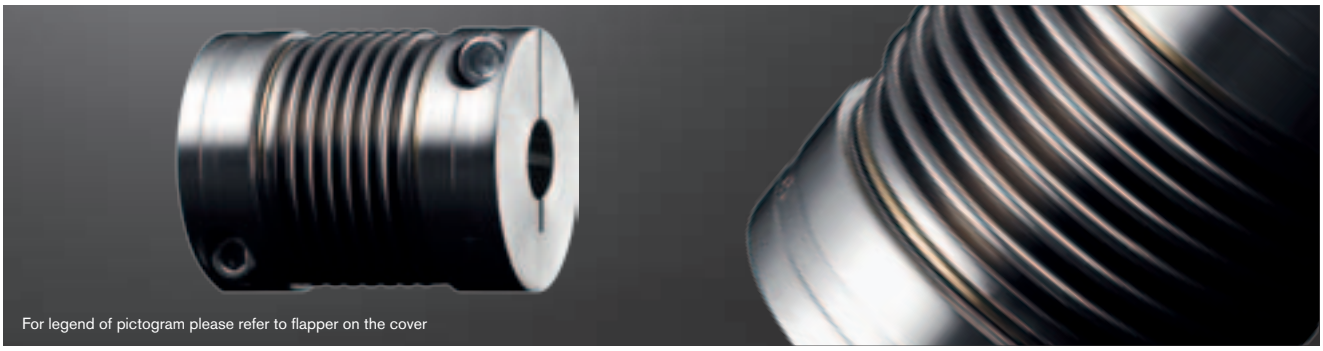
Type 2.6

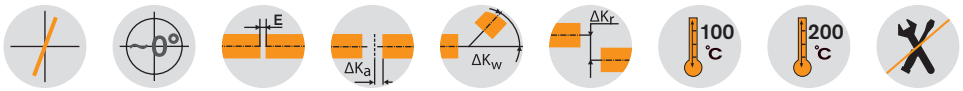


Clamping hub, single slotted, with feather keyway

TOOLFLEX® M
Metal bellow-type couplings

Type M: With clamping hubs





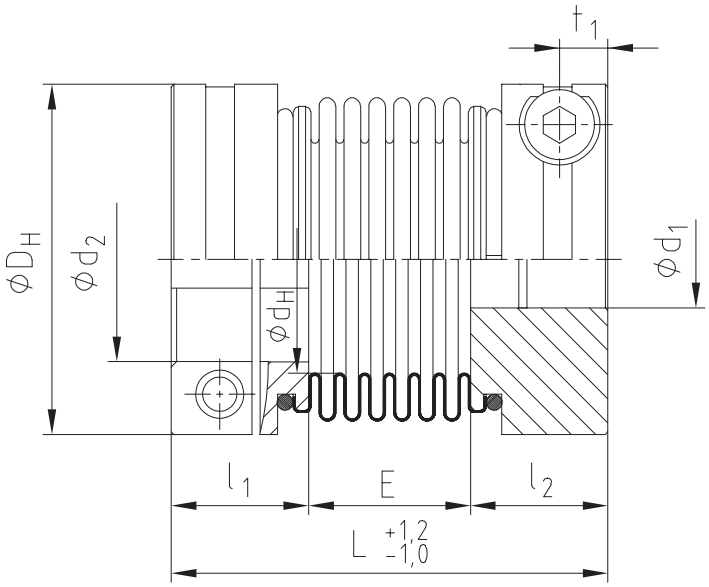
TOOLFLEX® Type M with clamping hubs Hub material aluminium (size 55/65 steel/bellow material stainless steel												
Size	Dimensions [mm]											
	Min./max. finish bore		General					Clamping screws DIN EN ISO 4762				
	min. d	max. d	L	l_1; l_2	E	D_H	d_H	M_1	D_3	t_1	e_1	T_A [Nm]
7	3	7	26	9	8	15	9	M2	16,5	3,2	5	0,37
9	3	9	32	11	10	20	12	M2,5	21,5	3,5	7,1	0,76
12	4	12	38	13	12	25	16	M3	26,5	4	8,5	1,34
16	5	16	49	17,0	15	32	20	M4	35,0	5	12	2,9
20	8	20	62	21,5	19	40	27	M5	43,5	6	14,5	6
30	10	30	72	23,0	26	55	33	M6	58,0	7	19	10
38	12	38	81	25,5	30	65	42	M8	72,6	9	25	25
42	14	42	95	30,0	35	70	46	M8	76,1	9	27	25
45	14	45	103	32,0	39	83	58	M10	89,0	11	30	49
55 [4]	20	55	125	40,0	45	100	73	M12	106,0	14	37	120
65 [4]	30	65	142	45,0	52	125	95	M14	127,2	15	45	185

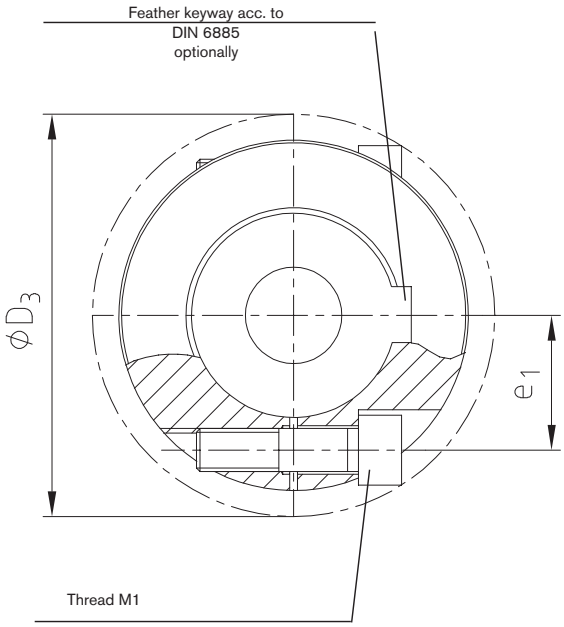
Technical data											
Size	Bellow-hub-connection	Torque of bellow T_{KN} [Nm] [1]	Max. speed n [rpm]	Moment of inertia [2] [x10^{-6}kgm^2]	Torsion spring stiffness C_T [Nm/rad]	Axial spring stiffness [N/mm]	Radial spring stiffness [N/mm]	Perm. displacements			Weight [2] [kg]
								Axial [mm]	Radial [mm]	Angular [degrees]	
7	Bonded	1	31800	0,3	300	—	—	±0,4	0,15	1,0	0,008
9		1,5	23800	1,0	580	—	—	±0,5	0,20	1,5	0,015
12		2	19100	2,7	980	—	—	±0,6	0,20	1,5	0,03
16	Flanged	5	14900	10	3050	29	92	±0,5	0,20	1,5	0,06
20		15	11950	32	6600	42	126	±0,6	0,20	1,5	0,14
30		35	8700	123	14800	65	155	±0,8	0,25	2,0	0,31
38		65	7350	262	24900	72	212	±0,8	0,25	2,0	0,45
42		95	6820	427	36500	80	333	±0,8	0,25	2,0	0,52
45		150	5750	1020	64000	88	492	±1,0	0,30	2,0	1,13
55 [3]		340	4800	5118	96100	107	598	±1,0	0,30	2,0	3,3
65 [3]		600	3850	13727	226550	135	910	±2,0	0,35	2,0	5,6

[1] For selection see page18 ff.
[2] Details referring to the overall coupling with max. bore
[3] Hub made of steel welded to bellow

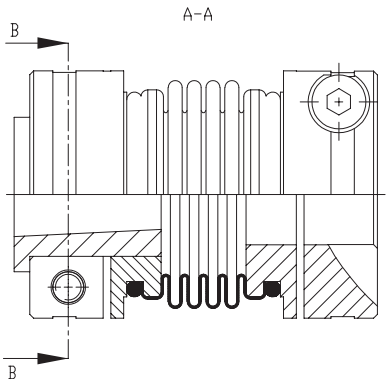
Review of shaft-hub-connection: Friction torques for hub type 2.5																														
Size	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	Ø9	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16	Ø18	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø50	Ø55	Ø60	Ø65
7	0,84	0,91	0,97	1,04	1,10																									
9	1,87	1,98	2,09	2,20	2,31	2,41	2,52																							
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																	
20						17,6	18,1	18,6	19,1	19,5	20,5	21,0	21,4	22,4	22,9	23,3														
30									33,1	33,8	35,1	35,8	36,5	37,8	38,5	39,2	41,9	42,5	44,6	45,9										
38											79,2	80,4	81,7	84,2	85,4	86,6	91,6	92,8	96,5	99,0	102	105	109							
42											84,2	85,4	86,6	89,1	90,3	91,6	96,5	97,8	102	104	106	110	114	116	119					
45																157	165	167	173	177	181	187	193	197	200	206				
55 [4]																	397	401	413	421	429	442	454	462	470	482	502	523		
65 [4]																				720	732	750	768	780	792	810	840	870	900	930

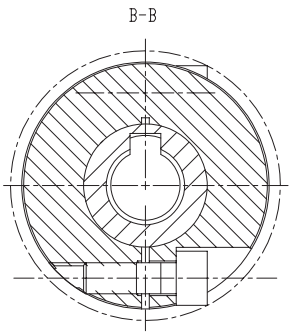
Ordering-example:	TOOLFLEX® 30 M	2.5	Ø25	2.5	Ø30
	Size and type of coupling	Hub type	Finish bore	Hub type	Finish bore





Other types:
Type for FANUC motors





Hub types

Type 2.5



Clamping hub, double slotted, without feather keyway

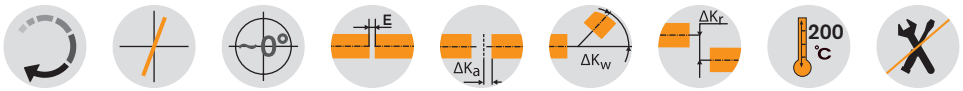
Type 2.6



Clamping hub, single slotted, with feather keyway

Taper hubs for high friction torques





TOOLFLEX® Type S-KN Hub material steel/bellow stainless steel

Size	Torque of bellow TKN [1] [Nm]	Max. speed n [rpm]	Dimensions [mm]															Weight [5] [kg]
			Finish bore		L	$L_{total.}$	l_1; l_2	D_H	D_1	D_2	Clamping screws			Pull-off threads				
			min. d	max.d	4 [2]	4 [2]					M	T_A [Nm]	Number z	M_1	Number z	T_{A1} [4][Nm]		
30	35	15280	12	22	48	63	22	50	43	47	M4	2,9	12	M4	6	1,2		0,4
38	65	12600	12	28	56	75	26	60,5	52	56	M5	6	12	M5	6	1,4		0,7
42	95	11580	14	35	64	82	29	66	60	63	M5	6	12	M5	6	1,4		0,8
45	150	9300	15	40	74,5	99	34	82	68	77	M6	14	12	M6	6	3		1,5
55 [3]	340	7870	15	56	95,5	120	40	97	95	95	M8	35	12	M8	6	6		2,5

[1] For selection see page 18 et seqq.
[2] [1] Type S = 4 layers
[3] Hub made of steel welded to bellow
[4] [5] After assembly of the clamping screws (M) tighten the tack thread (M1) to the torque T_{A1} indicated.
[5] Details referring to the overall coupling with max. bore

TOOLFLEX® Type M-KN Hub material steel/bellow stainless steel

Size	Torque of bellow TKN [1] [Nm]	Max. speed n [rpm]	Abmessungen [mm]															Weight [5] [kg]
			Finish bore		L	L_{total}	l_1; l_2	D_H	D_1	D_2	Clamping screws			Pull-off threads				
			min. d	max.d	6 layers [2]	6 layers [2]					M	T_A [Nm]	Number z	M_1	Number z	T_{A1} [5][Nm]		
30	35	15280	12	22	57	63	22	50	43	47	M4	2,9	12	M4	6	1,2		0,4
38	65	12600	12	28	68	75	26	60,5	52	56	M5	6	12	M5	6	1,4		0,7
42	95	11580	14	35	75	82	29	66	60	63	M5	6	12	M5	6	1,4		0,8
45	150	9300	15	40	91	99	34	82	68	77	M6	14	12	M6	6	3		1,5
55 [4]	340	7870	15	56	109	120	40	97	95	95	M8	35	12	M8	6	6		2,5

[1] For selection see page 18 et seqq.
[2] Type M = 6 layers
[3] Hub made of steel welded to bellow
[4] [5] After assembly of the clamping screws (M) tighten the tack thread (M1) to the torque T_{A1} indicated.
[5] Details referring to the overall coupling with max. bore

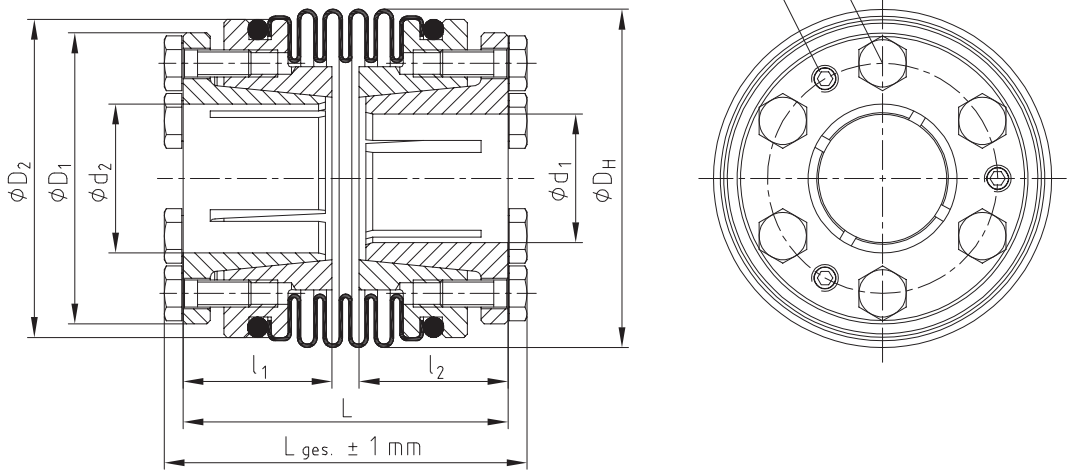
Review of shaft-hub-connection: Friction torques for hub type 6.5

Size	Ø14	Ø15	Ø16	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø48	Ø50	Ø55
30	50	58	66	71	79													
38		81	92	130	103	149	161	202										
42				105	117	168	131	164	189	215	257							
45					230	332	230	288	331	376	451	531	589					
55 [4]							483	606	696	792	585	690	764	843	967	1101	1194	1445

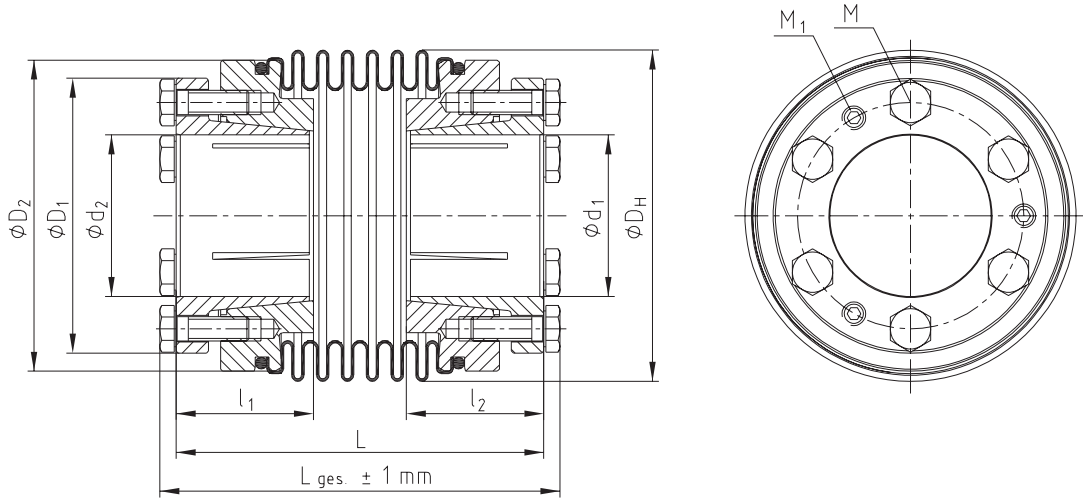
Ordering-example:

TOOLFLEX® 38 S-KN	Ø15	Ø22
Size and type of coupling	Finish bore	Finish bore

TOOLFLEX® S-KN

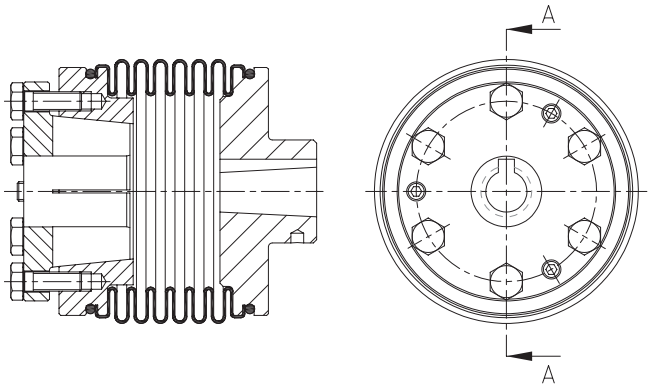


TOOLFLEX® M-KN



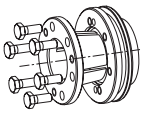
Other types:

TOOLFLEX® KN for FANUC motors



Hub types

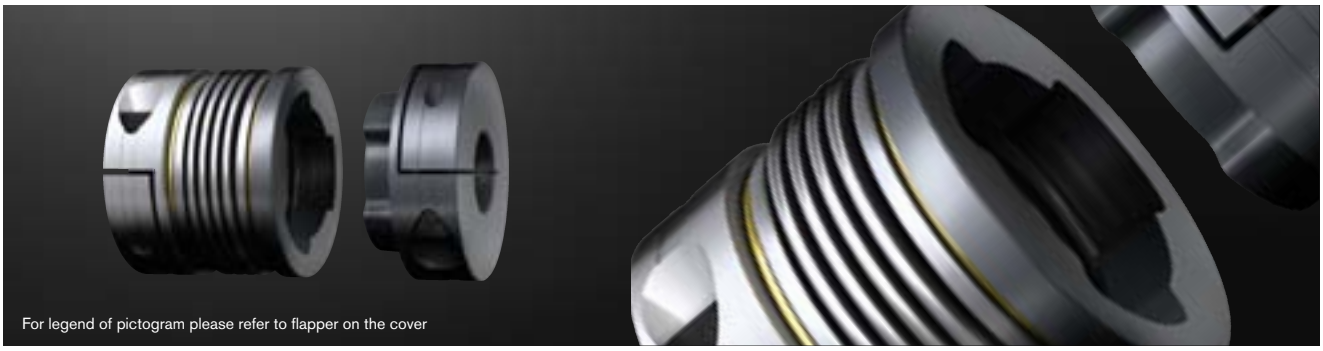
Type 6.5

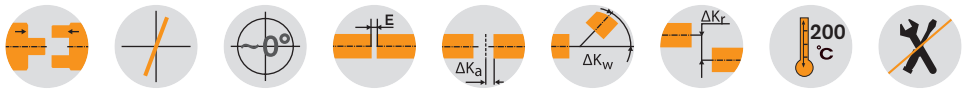


Taper hub KN

TOOLFLEX® PI
Metal bellow-type couplings

Axial plug-in





TOOLFLEX® Type S-PI Hub material aluminium/bellow stainless steel

Size	Type	Dimensions [mm]													
		General									Clamping screw				
		min. $d_1;d_2$	max. d_1	max.d_2	L [1]	l_1	l_2	E	D_H	H	$M_1;M_2$	D_3	e	$t_1;t_2$	T_A [Nm]
20	S	8	20	20	67,0	21,5	33,5	19,0	40	0,5 - 1	M5	43,5	14,5	6	6
30	S	10	30	28	73,5	23,0	33,5	26,0	55	0,5 - 1	M6	58,0	19,0	7	10
38	S	12	38	32	87,5	25,5	44,0	30,0	65	0,5 - 1,5	M8	72,6	25,0	9	25
42	S	14	42	35	93,0	30	39,0	35,0	70	0,5 - 1,5	M8	76,1	25,0	9	25
45	S	14	45	42	96,0	32,0	41,5	39,0	83	0,5 - 1,5	M10	89,0	30,0	11	49
NEW 55	S	20	55	55	130,0	40	58,5	31	100	0,5 - 1,5	M12	106,0	37	14	120

Technical data of TOOLFLEX® S-PI

Size	Type	Torque of bellow T_{KN} [Nm] [2]	Max. speed n [rpm]	Moment of inertia [4] [$x10^{-6}kgm^2$]	Torsion spring stiffness C_T [Nm/rad]	Axial spring stiffness [N/mm]	Radial spring stiffness [N/mm]	Perm. displacements		Weight [4] [kg]
								Radial [mm]	Angular [degrees]	
20	S	15	11950	37	6600	63	189	0,15	1,0	0,15
30	S	35	8700	140	11500	97	233	0,20	1,5	0,29
38	S	65	7350	329	21500	108	318	0,20	1,5	0,50
42	S	95	6820	396	31500	120	499	0,20	1,5	0,49
45	S	150	5750	1031	55000	132	738	0,25	1,5	0,93
NEW 55	S	340	4800	6150	144100	160	894	0,25	1,5	3,80

TOOLFLEX® Type M-PI Hub material aluminium/bellow stainless steel

Size	Type	Dimensions [mm]													
		General									Clamping screw				
		min. $d_1;d_2$	max. d_1	max.d_2	L [1]	l_1	l_2	E	D_H	H	$M_1;M_2$	D_3	e	$t_1;t_2$	T_A [Nm]
20	M	8	20	20	74,0	21,5	33,5	19,0	40	0,5 - 1	M5	43,5	14,5	6	6
30	M	10	30	28	82,5	23,0	33,5	26,0	55	0,5 - 1	M6	58,0	19,0	7	10
38	M	12	38	32	99,5	25,5	44,0	30,0	65	0,5 - 1,5	M8	72,6	25,0	9	25
42	M	14	42	35	104,0	30	39,0	35,0	70	0,5 - 1,5	M8	76,1	25,0	9	25
45	M	14	45	42	112,5	32,0	41,5	39,0	83	0,5 - 1,5	M10	89,0	30,0	11	49
NEW 55	M	20	55	55	143,5	40	58,5	45	100	0,5 - 1,5	M12	106,0	37	14	120

Technical data of TOOLFLEX® M-PI

Size	Type	Torque of bellow T_{KN} [Nm] [2]	Max. speed n [rpm]	Moment of inertia [4] [$x10^{-6}kgm^2$]	Torsion spring stiffness C_T [Nm/rad]	Axial spring stiffness [N/mm]	Radial spring stiffness [N/mm]	Perm. displacements		Weight [3] [kg]
								Radial [mm]	Angular [degrees]	
20	M	15	11950	38	4900	42	126	0,20	1,5	0,16
30	M	35	8700	145	10200	65	155	0,25	2,0	0,31
38	M	65	7350	346	15100	72	212	0,25	2,0	0,52
42	M	95	6820	427	22000	80	333	0,25	2,0	0,52
45	M	150	5750	1127	41000	88	492	0,30	2,0	1,00
NEW 55	M	340	4800	6270	96100	107	598	0,30	2,0	3,90

[1] When being plugged in
[2] For selection see page 18 et seqq.
[3] Figures refer to the complete coupling with max. bores

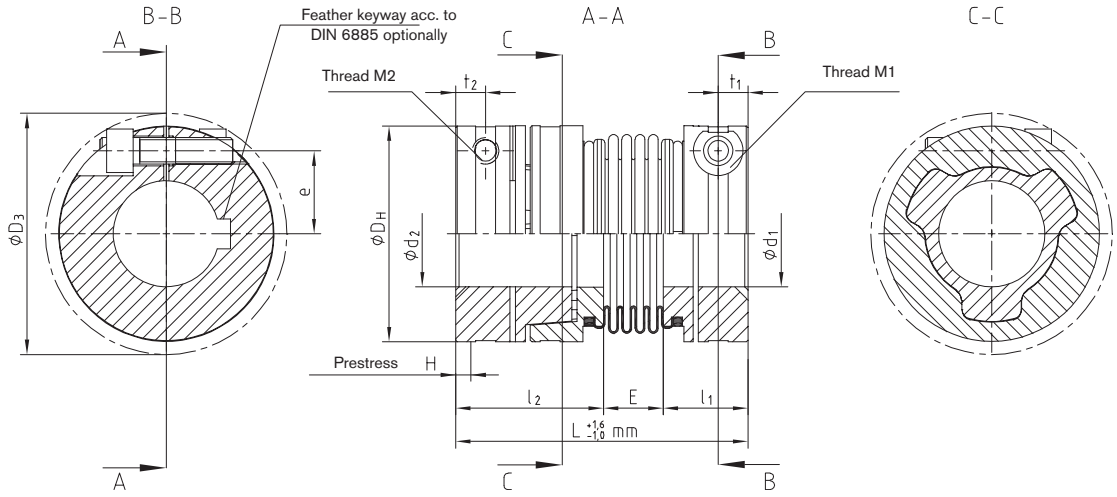
Review of shaft-hub-connection: Friction torques for hub type 2.5 for Ød1/Ød2

Size	Ø8	Ø9	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16	Ø18	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42
20	17,6	18,1	18,6	19,1	19,5	20,5	21,0	21,4	22,4	22,9	23,3									
30				33,1	33,8	35,1	35,8	36,5	37,8	38,5	39,2	41,9	42,5	44,6	45,9					
38						79,2	80,4	81,7	84,2	85,4	86,6	91,6	92,8	96,5	99,0	102				
42						79,2	80,4	81,7	84,2	85,4	86,6	91,6	92,8	96,5	99,0	102	105			
45											157	165	167	173	177	181	187	193	197	200
NEW 55												397	401	413	421	429	442	454	462	470

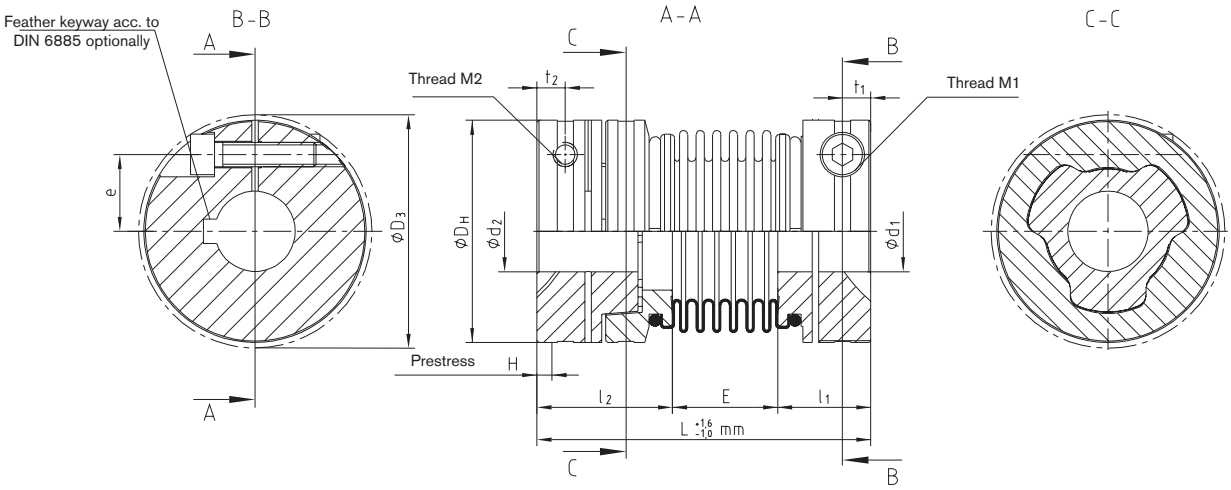
Ordering example:

TOOLFLEX® 30 S-PI	d_1 - Ø22	d_2 - Ø18
Size and type of coupling	Finish bore	Finish bore

TOOLFLEX® S-PI

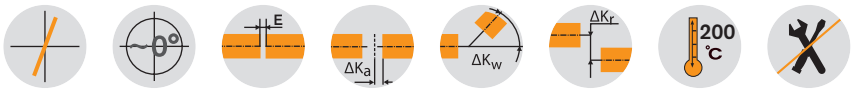


TOOLFLEX® M-PI



Flange programme





TOOLFLEX® Type S-CF Hub material aluminium (size 55 steel)/bellow stainless steel

Size	Finish bore		Dimensions [mm]									Clamping screw					Flange	
	min. d_1	max. d_1	D_H	D_B	D_F	d_2 H7	l_3	l_1	l_2	E	L	D_K	e_1	t_1	M	T_A	D_T	M_1
30	10	20	55	50	47	25	1,5	16	23,0	17,0	56,0	58,0	19	7	M6	10	30	M4
						29											34	
38	12	38	65	60,5	55,75	29	1,5	18	25,5	18,0	61,5	72,6	25	9	M8	25	35	M5
						36											42	
42	14	42	70	66	62,95	36	1,5	21	30,0	24,0	75,0	76,1	27	9	M8	25	42	M5
						43											49	
45	14	45	83	82	77	38	1,5	23	32,0	22,5	77,5	89,0	30	11	M10	49	45	M6
						49											56	
55 [2]	20	55	100	97	95	51	1,5	28	40,0	31,0	99,0	106,0	37	14	M12	120	60	M8
						68											78	

Technical data

Size	Type	Torque of bellow T_{KN} [Nm] [1]	Speed n [rpm]	Torsion spring stiffness C_T [Nm/rad]	Axial spring stiffness [N/mm]	Radial spring stiffness [N/mm]	Perm. displacements		
							Axial [mm]	Radial [mm]	Angular [degrees]
30	S	35	8700	14800	97	233	±0,5	0,20	1,5
38	S	65	7350	24900	108	318	±0,6	0,20	1,5
42	S	95	6820	36500	120	499	±0,6	0,20	1,5
45	S	150	5750	64000	132	738	±0,9	0,25	1,5
55 [2]	S	340	4800	96100	160	894	±1,0	0,25	1,5

TOOLFLEX® Type M-CF Hub material aluminium (size 55 steel)/bellow stainless steel

Size	Finish bore		Dimensions [mm]									Clamping screw					Flange	
	min. d_1	max. d_1	D_H	D_B	D_F	d_2 H7	l_3	l_1	l_2	E	L	D_K	e_1	t_1	M	T_A	D_T	M_1
30	10	20	55	50	47	25	1,5	16	23,0	26,0	65,0	58,0	19	7	M6	10	30	M4
						29											34	
38	12	38	65	60,5	55,75	29	1,5	18	25,5	30,0	73,5	72,6	25	9	M8	25	35	M5
						36											42	
42	14	42	70	66	62,95	36	1,5	21	30,0	35,0	86,0	76,1	27	9	M8	25	42	M5
						43											49	
45	14	45	83	82	77	38	1,5	23	32,0	39,0	94,0	89,0	30	11	M10	49	45	M6
						49											56	
55 [2]	20	55	100	97	95	51	1,5	28	40,0	45,0	113,0	106,0	37	14	M12	120	60	M8
						68											78	

Technical data

Size	Type	Torque of bellow T_{KN} [Nm] [1]	Speed n [rpm]	Torsion spring stiffness C_T [Nm/rad]	Axial spring stiffness [N/mm]	Radial spring stiffness [N/mm]	Perm. displacements		
							Axial [mm]	Radial [mm]	Angular [degrees]
30	M	35	8700	14800	65	155	±0,8	0,25	2,0
38	M	65	7350	24900	72	212	±0,8	0,25	2,0
42	M	95	6820	36500	80	333	±0,8	0,25	2,0
45	M	150	5750	64000	88	492	±1,0	0,30	2,0
55 [2]	M	340	4800	96100	107	598	±1,0	0,30	2,0

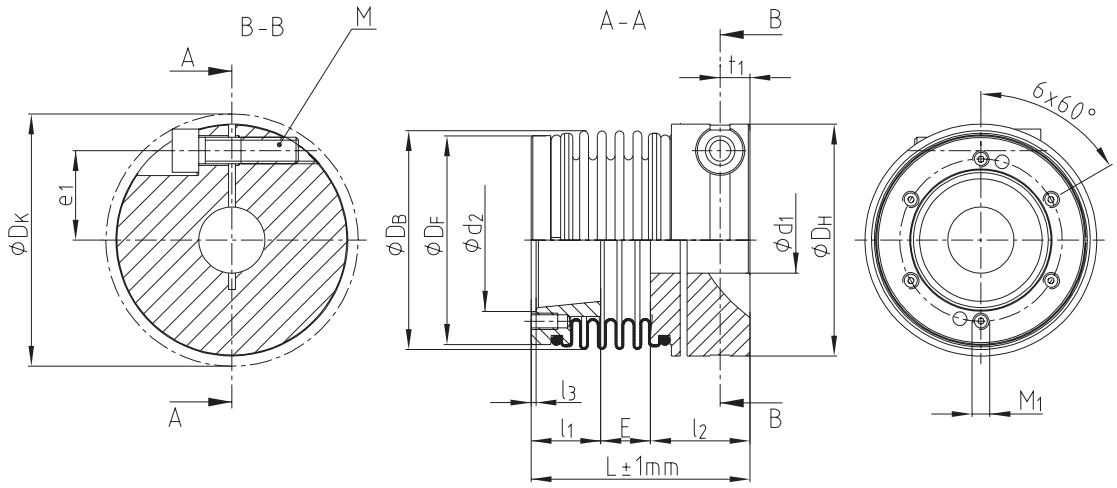
[1] For selection see page 18 et seqq.
[2] Hub made of steel welded to bellow

Review of shaft-hub-connection: Friction torques for hub type 2.5

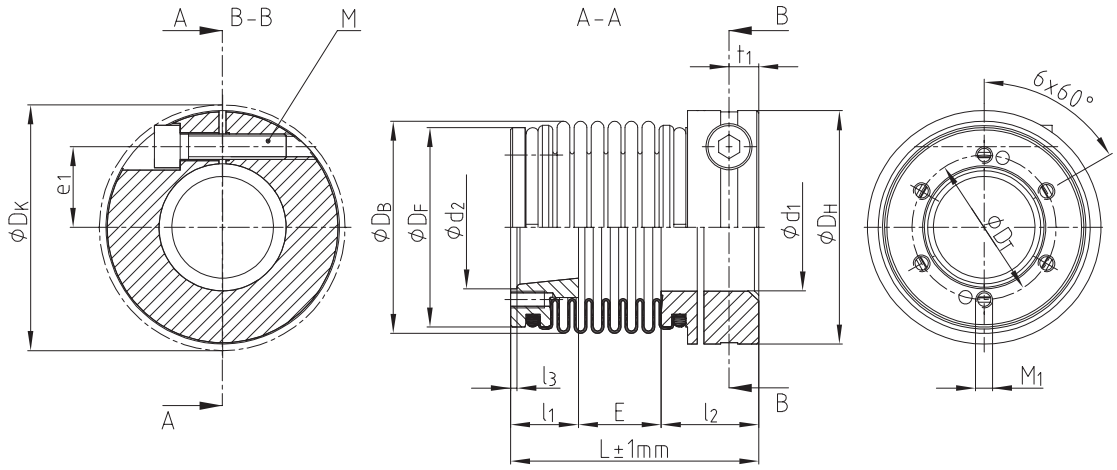
Size	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16	Ø18	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø50	Ø55
30		33,1	33,8	35,1	35,8	36,5	37,8	38,5	39,2	41,9	42,5	44,6	45,9								
38							84,2	85,4	86,6	91,6	92,8	96,5	99,0	102	105	109					
42				84,2	85,4	86,6	89,1	90,3	91,6	96,5	97,8	102	104	106	110	114	116	119			
45									157	165	167	173	177	181	187	193	197	200	206		
55 [4]										397	401	413	421	429	442	454	462	470	482	502	523

Ordering-example:	TOOLFLEX® 38 M-CF	Ø15	Ø29 - Ø35 - 6xM5
	Size and type of coupling	Finish bore	Dimensions of flange (d2 - DT - M1)

TOOLFLEX® S-CF



TOOLFLEX® M-CF



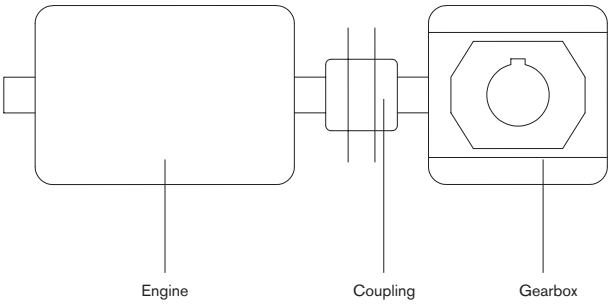
RADEX®-NC
Servo lamina couplings

Technical description

RADEX®-NC is a line specifically developed for servo technology. In this coupling a set 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 designed as 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 smaller 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.



Use in explosive applications

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.
Selection:
If used in hazardous areas the clamping ring hubs (clamping hubs without feather keyway only for use in category 3 (with feather keyway for cat. 2) must be selected such that there is a minimum safety factor of s = 2 between the peak torque (including all operating parameters) and the nominal torque and frictional torque of engagement of the coupling.

Hub types



Type 2.5 Clamping hub double slot, without feather keyway

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

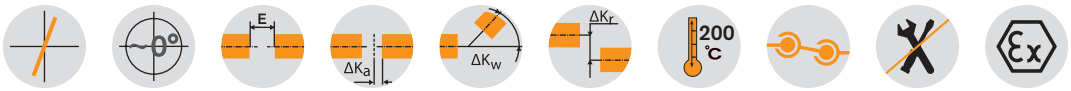


Type 2.6 Clamping hub double slot, with feather keyway

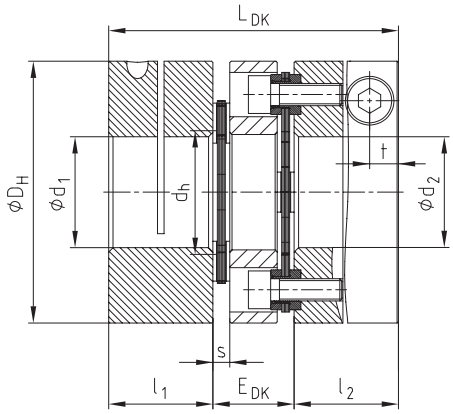
Positive locking power transmission with additional frictionally engaged condition. The frictionally engaged condition prevents or reduces reverse backlash, respectively. Surface pressure of the keyway connection is reduced.

Double- and single-cardanic types

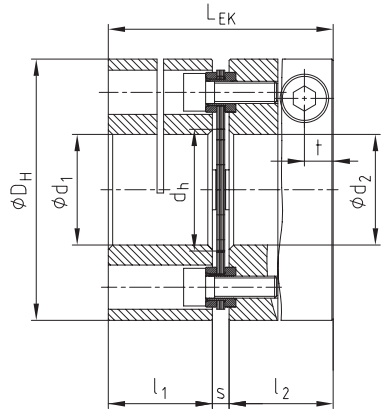




Type DK



Type EK



RADEX®-NC Types DK and EK Hub and spacer material aluminium (size 42 steel)/laminas stainless steel

Size	Dimensions [mm]									Clamping screw		Mass moments 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
15	20	47	21	55	13	45	19,5	3	6,8	M6	10	0,000065	0,000053
20	25	59	24	67	19	52	24	4	6,5	M6	10	0,000199	0,000154
25	35	70	32	88	24	69	30	5	9,0	M8	25	0,000508	0,000393
35	42	84	35	98	28	77	38	7	10,5	M10	49	0,001153	0,000911
42	55	104	40	116	36	91	48	11	10,5	M10	69	0,007458	0,006153

Technical data

Size	T_{KN} [1] [Nm]	$T_{K\,max}$ [1] [Nm]	Max. speed [rpm]	Torsion spring 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
15	20	40	16000	12000	6000	0,16	1,0	1	—	0,5	1
20	30	60	12000	30000	15000	0,25	1,2	1	—	0,6	1
25	60	120	10000	60000	30000	0,30	1,6	1	—	0,8	1
35	100	200	9000	72000	36000	0,40	2,0	1	—	1,0	1
42	300	600	7000	240000	120000	0,50	2,8	1	—	1,4	1

[1] See page 18 et seqq.

Review of shaft-hub-connection: Friction torques for hub type 2.5

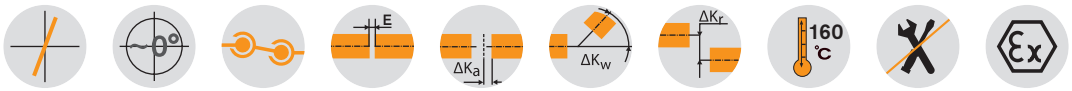
Size	Pilot bored	Ø3	Ø5	Ø8	Ø10	Ø12	Ø14	Ø15	Ø16	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø45	Ø50	Ø55
5	2,5	2,2	2,3	2,4	2,5																	
10	4,5		8	9	10	10	11	11														
15	5,5				28	30	31	32	32	34	35											
20	7,5					36	37	38	39	40	41	44	45									
25	9,5							82	83	87	88	93	94	98	100	103	106					
35	11,5									155	157	165	167	173	177	181	187	193	197			
42	15,0											285	287	296	301	307	315	323	329	343	357	370

Ordering-example:

RADEX®-NC 20	DK	2.5	Ø20	2.5	Ø25
Coupling size	Type	Hub type	Finish bore	Hub type	Finish bore

Double-cardanic for measuring drives





COUNTEX® Hub material aluminium/spacer PEEK														
Size	Torque [Nm]		Dimensions [mm]						Displacements			Torsion spring stiffness C_T [Nm/rad]	Radial stiffness CR [N/mm]	Axial restoring force CA [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

General description

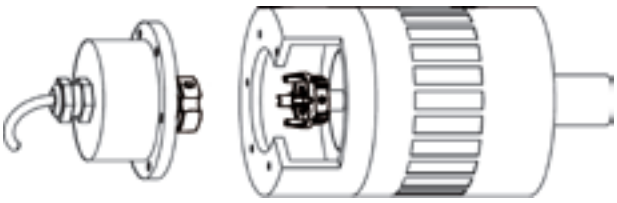
COUNTEX® is a three-part, backlash-free and torsionally stiff coupling specifically developed for the demands in measuring and control technology.

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.

Applications

The measuring and control technology demands for a high torsion spring stiffness of the coupling in order to realize reproduceable positioning. At the same time the coupling has to compensate for displacements without the large forces causing stresses for the adjacent filigree components.

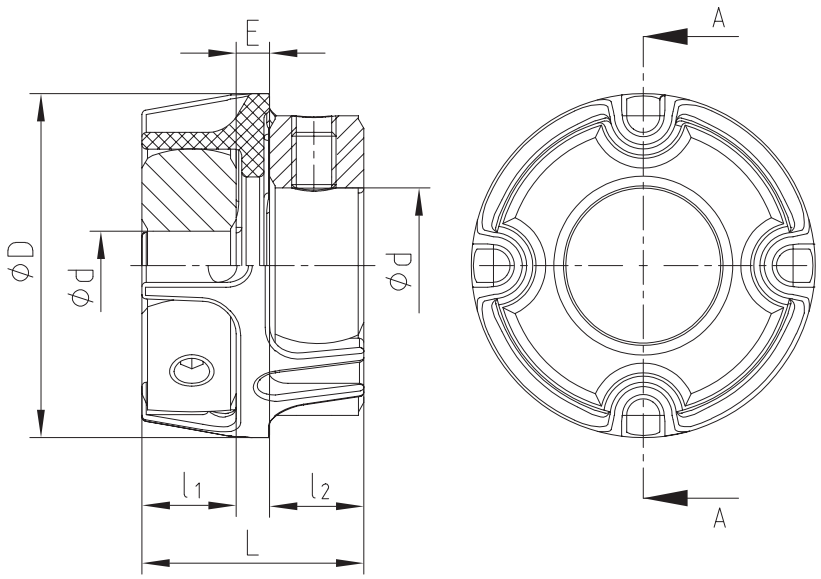
With its spacer made of highly temperature-resistant nylon our COUNTEX® ensures an almost constant torsion spring stiffness even with high temperatures. The double-cardanic principle of COUNTEX® reduces the restoring forces to a minimum. Nevertheless it has very compact dimensions which make it excellently suitable for tight mounting spaces.

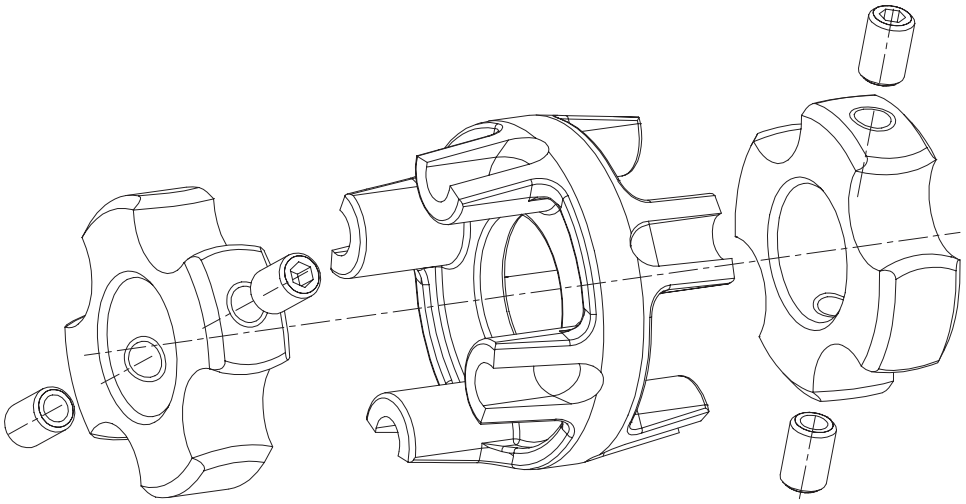


Use in explosive applications

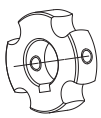
COUNTEX® couplings are suitable for positioning transmission in drives used in explosive areas. The couplings are certified and confirmed according to EC standard 94/9/EC (ATEX 95) as units of category 2G/2D and thus suitable for the use in hazardous areas of zone 1, 2, 21 and 22. Please read through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

Ordering-example:	COUNTEX® 14	1.1	Ø6,35	1.1	Ø10
	Coupling size	Hub type	Finish bore Ød1	Hub type	Finish bore Ød2



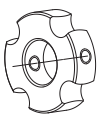


Hub types



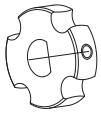
Type 1.0 with keyway and set screw

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



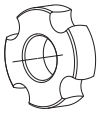
Type 1.1
without keyway, with setscrew

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



Type 1.3
with spline bore

Positive locking power transmission. Spline on request of customers (e. g. sfor shaft with flattening)



Type 1.2 Hub
without feather keyway without setscrew

For low torques. Suitable for bonding or pressing onto the shaft.