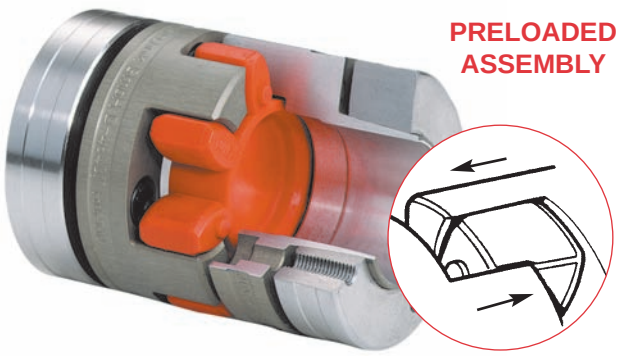
ROTEX® GS
Zero Backlash Coupling

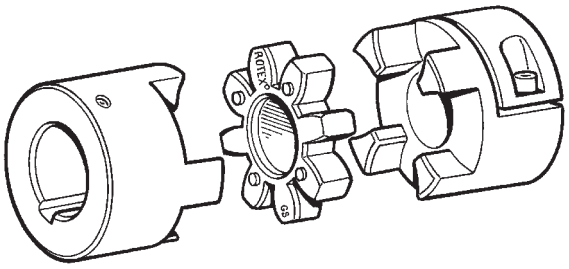
Catalog Contents

ROTEX® GS Coupling Features

Technical Description

The **ROTEX® GS** is a shaft to shaft jaw coupling assembled under preload to provide zero backlash torque transmission. The preload is accomplished by compressing the spider between the jaws of the hubs during assembly. The elastomer spider provides vibrational damping which helps avoid resonance problems. The compact design offers low mass moment of inertia and is well balanced, making it perfect for high speed applications.





ROTEX® GS Coupling with different clamping style hubs
1.0 - Set screw and keyway
2.5 - Double slit cross clamp w/o keyway

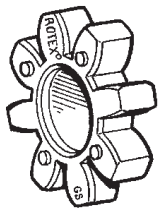
ROTEX® GS Hubs

- Precision machined from aluminum barstock (sizes 5-38) and steel barstock (sizes 42-75)
- Tightly toleranced jaws ensure consistent preload and zero backlash torque transmission
- Inch bore sizes machined to AGMA 9002-A86 class 1 fit
  Inch key sizes machined to ANSI B17.1
- Metric bore sizes machined to ISO H7 fit
  Metric key sizes machined to DIN 6885 JS9
- Eight standard clamping styles (see page 49)
- Fifteen sizes with inch and metric bores up to 3.74"

ROTEX® GS Spiders

Spiders are made from high quality urethane and hytrel® materials. Up to four different material hardnesses are available per size allowing the stiffness of the coupling to be tuned to the drive system

- Elastomeric connection provides electrical isolation from driver to driven sides
- Center web provides stiffness and prevents deformation during shock loads and high speed operation
- Special spider materials available on request

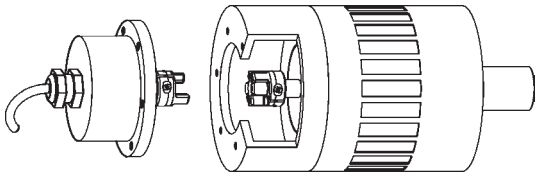


ROTEX® GS Spider

Spider Durometer	Spider Color / Material	Admissible Temp. (F)		Available Sizes
		Continuous	Intermittent	
80 Sh. A	Blue/ Urethane	-55 to +175	-75 to +245	5 - 24
92 Sh. A	Yellow / Urethane	-40 to +195	-55 to +245	5 - 55
98 Sh. A (1)	Red / Urethane	-20 to +195	-40 to +245	5 - 75
64 Sh. D-H	Dark Green / Hytrel®	-55 to +245	-75 to +300	7 - 38
64 Sh. D	Light Green / Urethane	-5 to +230	-20 to +245	42 - 55

(1) For sizes 65 and up the durometer is 95 Sh A (red).

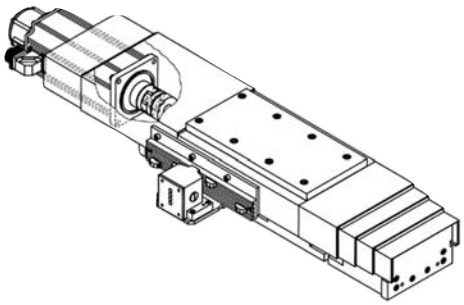
ROTEX® GS Typical Applications



Encoders, Tachometers, Resolvers...

The smaller sizes of the **ROTEX® GS** couplings are ideal for precision feedback devices.

- *Low mass moment of inertia*
- *Three piece design allows simple blind assembly*
- *Elastomer provides electrical isolation*

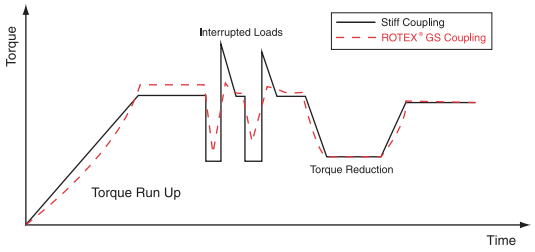


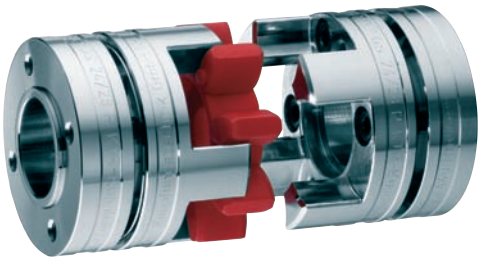
Servo Positioning Drives...

The **ROTEX® GS** couplings provide zero backlash torque transmission in even the most demanding positioning applications.

- *Elastomer damping can eliminate vibration problems*
- *Torsional stiffness of the coupling can be optimized by using a different elastomer hardness*
- *Long life due to the high quality spider and large jaw contact surface*

Damping Characteristics of the **ROTEX® GS**





Main Spindle Drives...

The **ROTEX® GS** and **ROTEX® GS-P** couplings are perfectly suited for milling, drilling and grinding spindles.

- *Precision machining provides a well balanced coupling ideal for high speed spindles*
- *Elastomer dampens shock loads during interrupted cuts and torque reductions (see chart above)*

Coupling Selection

1. Selection Formula

Rated Torque [lb in]: $T_N = 63000 \times \text{Power [HP]} / \text{Speed [RPM]}$ Peak Torque [lb in]: $T_S = T_{AS} \times m_A \times S_A$

The coupling size selected must meet two conditions: $T_{KN} \geq T_N \times S_t \times S_d$ and $T_{Kmax} \geq T_S \times S_t \times S_d$

2. Selection Data - Ball Screw Drive Example

Driver Side Data - Servo Motor
Rated Torque (T_N) = 380 lb in
Peak Torque (T_{AS}) = 1274 lb in
Mass Moment of Inertia (J_{mot}) = 956×10^{-4} lb in sec^2
Shaft Diameter (d_m) = 1.25 in

Driven Side Data - Ball Screw
Shaft Diameter (d_b) = 1.375 in
Mass Moment of Inertia (J_b) = 566×10^{-4} lb in sec^2

Additional System Data
Temperature at 104° F., light shock loads, high torsional stiffness required

3. Safety Factors

Select temperature, torsional stiffness and shock load factors

$S_t = 1.2$ $S_d = 4$ $S_A = 1.0$

Temperature Factor (S_t)

Temperature (F)	-22°/ 86°	104°	140°	176°
S_t	1.0	1.2	1.4	1.8

Shock Load Factor (S_A)

	S_A
Light Shock Loads	1.0
Medium Shock Loads	1.4
Heavy Shock Loads	1.8

Torsional Stiffness Factor (S_d)

Machine Tool Main Drives	S_d	Positioning Drives	S_d	Encoder Drives	S_d
Grinding Spindles	2-3	Ball Screws	3-5	1000 Count	20
Drilling Spindles	2-3	Belt Drives	2-3	3600 Count	60
Milling Spindles	2-4	Rack & Pinion	2-4	15000 Count	150

4. Coupling Selection (example)

Select according to the Rated Torque (T_N): $T_{KN} \geq T_N \times S_t \times S_d \geq 380 \times 1.2 \times 4 \geq$ *1824 lb in*

The **ROTEX® GS** 38 (98 Sh A) 6.0 design can be selected for this example (T_{KN} = 2876 lb in)

Calculate the peak torque of the system, however first find the values for J_L and J_A;

$J_L = (J_b + J_c/2)$ = (566 + 84.96) x 10^{-4} lb in sec^2 = *651 x 10^{-4} lb in sec^2*

$J_A = (J_{mot} + J_c/2)$ = (956 +84.96) x 10^{-4} lb in sec^2 = *1041 x 10^{-4} lb in sec^2*

Calculate the value of m_A: $m_A = J_L / (J_A + J_L)$ = (651 / (1041 + 651)) x 10^{-4} = *0.385*

Calculate the peak torque of the system T_S: $T_S = T_{AS} \times m_A \times S_A$ = 1274 lb in x 0.385 x 1.0 = *490 lb in*

Compare coupling maximum torque to the peak torque of the system. From the technical data table on page four, the maximum torque of the **ROTEX® GS** 38-6.0 (98 Sh A) is 5752 lb in:

$T_{Kmax} \geq T_S \times S_t \times S_d$: 5752 lb in ≥ 490 lb in x 1.2 x 4 : *5752 lb in ≥ 2352 lb in*

Finally, using table on page 8, compare the transmittable torque of clamping ring hub 1.25 in = 2330 lb in, to maximum driving torque:

$T_R > T_{AS}$: *2330 lb in > 1274 lb in*

A **ROTEX® GS** 38 (98 Sh A - 6.0 design) is suitable for this application.

Coupling Ratings

Coupling Size	Spider Durometer	Maximum Speed [rpm] for Clamping Styles				Nominal Torque T_{KN}		Maximum Torque T_{Kmax}		Static Torsional Stiffness		Dynamic [2] Torsional Stiffness		Radial Stiffness	
		2.0 / 2.1 2.5 / 2.6	1.0 / 1.1 [1]	6.0 [1]	6.0 P [1]	[lb in]	[Nm]	[lb in]	[Nm]	[lb in/rad]	[Nm/rad]	[lb in/rad]	[Nm/rad]	[lb/in]	[N/mm]
5	70 Sh A	38000	47700	---	----	1.8	0.20	2.7	0.3	15.8	1.80	44.3	5	246	43
	80 Sh A					2.7	0.30	5.3	0.6	27.9	3.20	88.5	10	469	82
	92 Sh A					4.4	0.50	8.9	1.0	45.7	5.20	141.6	16	880	154
	98 Sh A					8.0	0.90	15.0	1.7	73.5	8.3	221.3	25	1692	296
7	80 Sh A	27000	34100	---	----	6.2	0.7	12.4	1.4	76.1	8.6	230	26	652	114
	92 Sh A					10.6	1.2	21.2	2.4	126.6	14.3	380	43	1252	219
	98 Sh A					17.7	2.0	35.4	4.0	202.7	22.9	610	69	2406	421
	64 Sh D					21.2	2.4	42.5	4.8	303.6	34.3	911	103	3600	630
9	80 Sh A	19000	23800	---	----	15.9	1.8	31.9	3.6	152.2	17.2	460	52	714	125
	92 Sh A					26.6	3.0	53.1	6.0	278.8	31.5	840	95	1497	262
	98 Sh A					44.3	5.0	88.5	10.0	456.7	51.6	1371	155	2960	518
	64 Sh D					53.1	6.0	106.2	12.0	660.2	74.6	1982	224	4223	739
12	80 Sh A	15200	19100	---	----	26.6	3.0	53.1	6.0	746	84.3	2230	252	1565	274
	92 Sh A					44.3	5.0	88.5	10.0	1419	160.4	4265	482	2685	470
	98 Sh A					79.7	9.0	159.3	18.0	2130	240.7	6354	718	4834	846
	64 Sh D					106.2	12.0	212.4	24.0	2900	327.9	8690	982	6845	1198
14	80 Sh A	12700	15900	25400	31800	35.4	4.0	70.8	8.0	532.8	60.2	1593	180	874	153
	92 Sh A					66.4	7.5	132.8	15.0	1014	114.6	3044	344	1920	336
	98 Sh A					110.6	12.5	221.3	25.0	1521	171.9	4540	513	3738	604
	64 Sh D					141.6	16.0	283.2	32.0	2072	234.2	6212	702	4892	856
19	80 Sh A	9550	11900	19000	23800	43.4	4.9	86.7	9.8	3042	343.8	9115	1030	3326	582
	92 Sh A					88.5	10.0	177.0	20.0	5071	573.0	15222	1720	6401	1120
	98 Sh A					150.5	17.0	300.9	34.0	7606	859.5	22833	2580	11487	2010
	64 Sh D					185.9	21.0	371.7	42.0	10976	1240	32922	3720	16745	2930
24	92 Sh A	6950	8650	13800	17300	309.8	35	619.5	70	12673	1432	38019	4296	8458	1480
	98 Sh A					531.0	60	1062	120	18257	2063	54772	6189	14630	2560
	64 Sh D					663.8	75	1327	150	26355	2978	79065	8934	21123	3696
28	92 Sh A	5850	7350	11700	14700	840.8	95	1681	190	20284	2292	60852	6876	10173	1780
	98 Sh A					1416	160	2832	320	30426	3438	91278	10314	18288	3200
	64 Sh D					1770	200	3540	400	38497	4350	115492	13050	24849	4348
38	92 Sh A	4750	5950	9550	11900	1681	190	3363	380	40568	4584	121705	13752	13430	2350
	98 Sh A					2876	325	5752	650	63366	7160	190151	21486	25146	4400
	64 Sh D					3584	405	7168	810	93279	10540	279837	31620	36999	6474
42	92 Sh A	4000	5000	8050	10000	2345	265	4690	530	55755	6300	128236	14490	13887	2430
	98 Sh A					3982	450	7965	900	169920	19200	424800	48000	31833	5570
	64 Sh D					4956	560	9912	1120	244083	27580	610207	68950	41548	7270
48	92 Sh A	3600	4550	7200	9100	2743	310	5487	620	69472	7850	159786	18055	14745	2580
	98 Sh A					4646	525	9292	1050	197974	22370	494936	55925	33890	5930
	64 Sh D					5796	655	11593	1310	320370	36200	800925	90500	47286	8274
55	92 Sh A	3150	3950	6350	7950	3628	410	7257	820	84075	9500	193372	21850	17031	2980
	98 Sh A					6062	685	12124	1370	210630	23800	526575	59500	38210	6686
	64 Sh D					7301	825	14602	1650	366921	41460	917302	103650	52852	9248
65	95 Sh A	2800	3500	5650	7050	8319	940	16638	1880	338070	38200	845175	95500	36679	6418
	64 Sh D					10399	1175	20798	2350	585870	66200	1464875	165500	50692	8870
75	95 Sh A	2350	2950	4750	5950	16992	1920	33984	3840	557815	63030	1393875	157500	49435	8650
	64 Sh D					21240	2400	42480	42480	957836	108230	2416714	273075	68140	11923

1) Higher speeds can be achieved with dynamic balancing. Please consult KTR Corporation for more information.
2) Dynamic torsional stiffness at 0.5 x T_{KN}

Table of Terms

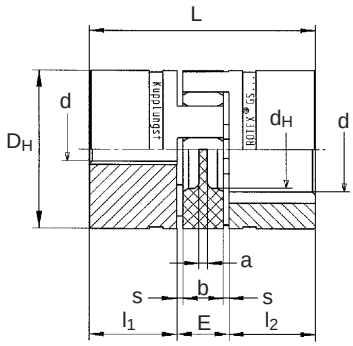
T_N	System Rated Torque	T_{AS}	Maximum Driving Torque (i.e. start up)
T_S	System Peak Torque	T_{KN}	Coupling Nominal Torque
T_{Kmax}	Coupling Maximum Torque	S_t	Temperature Service Factor
S_d	Torsional Stiffness Service Factor	S_A	Shock Load Service Factor
J_A	Drive Side Mass Moment of Inertia	J_L	Driven Side Mass Moment of Inertia
J_C	Coupling Mass Moment of Inertia	m_A	Drive Side Mass Moment of Inertia Factor
T_R	Transmittable Torque for Keyless Clamping Styles (2.0 / 2.5 / 6.0 / 6.0 P)		

ROTEX® GS Zero Backlash

For advanced drive technology KTR

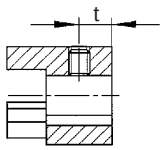
For Low to Medium Torque Applications

- Zero Backlash shaft coupling for measurement and positioning drives
- Three piece - single element coupling design
- Axial plug-in design allows simple blind-assembly
- Compact design - low mass moment of inertia
- Inch bore sizes machined to AGMA 9002-A86 class 1 fit
  Inch key sizes machined to ANSI B17.1
- Metric bore sizes machined to ISO H7 fit
  Metric key sizes machined to DIN 6885 JS9

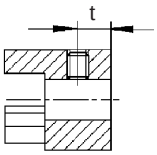


ROTEX® GS 5-19
Aluminum Hubs

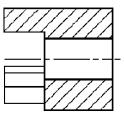
Clamping Styles (see page 49):
1.0 with keyway and set screw
1.1 without keyway, with set screw
1.2 without keyway and set screw
2.0 cross clamp (single slit) without keyway
2.1 cross clamp (single slit) with keyway



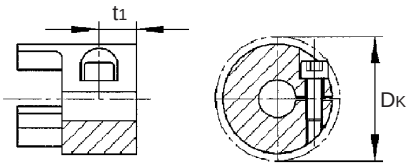
Style 1.0



Style 1.1



Style 1.2



Style 2.0/2.1

Size	Dimensions [in]								Clamping Style 1.0 ; 1.1 ; 1.2		Clamping Style 2.0 ; 2.1				Coupling 1)	
	D_H	L	l_1;l_2	E	b	s	a	d_H	Size	t [in]	Bolt Size	t_1 [in]	ø D_K [in]	Tightening Torque [lb in]	Weight [lb] (x 10 $^{-3}$)	Mass Moment of Inertia [lb in sec^2] (x 10 $^{-6}$)
5	0.39	0.59	0.20	0.20	0.16	0.02	0.16	—	M2	0.10	M1.2	0.10	0.45	—	4.9	0.30
7	0.55	0.87	0.28	0.31	0.24	0.04	0.24	—	M3	0.14	M2.0	0.14	0.65	3.3	14.8	1.63
9	0.79	1.18	0.39	0.39	0.31	0.04	0.06	0.28	M4	0.20	M2.5	0.20	0.92	6.7	43.7	9.37
12	0.98	1.34	0.43	0.47	0.39	0.04	0.14	0.33	M4	0.20	M3	0.20	1.08	11.9	66.8	24.24
14	1.18	1.38	0.43	0.51	0.39	0.06	0.08	0.41	M4	0.20	M3	0.20	1.27	11.9	98.3	53.60
19	1.57	2.60	0.98	0.63	0.47	0.08	0.12	0.71	M5	0.39	M6	0.47	1.81	93	306.4	374.27

1) The weight and mass moment of inertia shown are for couplings with maximum bore without keyway.

Size	Maximum Bores [in] for Clamping Style			Clamping Style 2.0 Transmittable Torque [lb in] 2) Hub Bore d [in]										
	1.0	1.1 ; 1.2	2.0 ; 2.1	0.125	0.1875	0.250	0.3125	0.375	0.4375	0.500	0.5625	0.625	0.6875	0.750
5	-	0.20	0.20	**	**	**	**	**	**	**	**	**	**	**
7	0.28	0.28	0.28	7.52	8.43	9.33								
9	0.38	0.38	0.38		19.00	20.50	22.10	23.60						
12	0.47	0.47	0.47		33.40	35.70	38.00	40.40	42.70					
14	0.59	0.63	0.63		40.70	43.10	45.40	47.70	50.00	52.40	54.70	57.00		
19	0.94	0.84	0.81			211.00	221.00	230.00	240.00	249.00	259.00	268.00	278.00	287.00

2) Please verify that the peak torque of the application does not exceed the transmittable torque for the selected coupling size and bore.

****Call KTR**

***See pages 50 and 51 for ROTEX® GS part numbers**

ROTEX® GS Zero Backlash

For Medium to High Torque Applications

- Zero Backlash shaft coupling for measurement and positioning drives
- Three piece - single element coupling design
- Axial plug-in design allows simple blind-assembly
- Compact design - low mass moment of inertia
- Inch bore sizes machined to AGMA 9002-A86 class 1 fit
  Inch key sizes machined to ANSI B17.1
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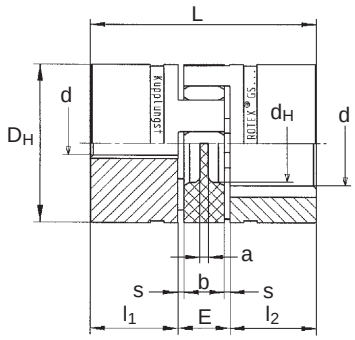
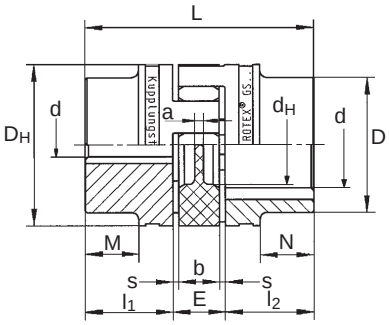
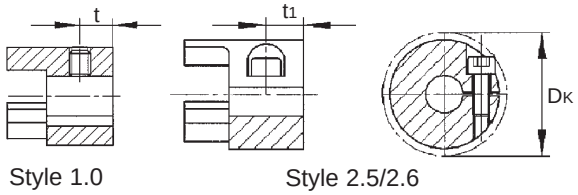


ROTEX® GS 24-38
Aluminum Hubs



ROTEX® GS 42-75
Steel Hubs

Clamping Styles (see page 49):
1.0 with keyway and set screw
2.5 cross clamp (double slit) without keyway
2.6 cross clamp (double slit) with keyway



Style 1.0 Style 2.5/2.6

Size	Dimensions [in]										Clamping Style 1.0 ; 1.1 ; 1.2		Clamping Style (2.5 ; 2.6)					Coupling[1]	
	D	D_H	L	l_1;l_2	M;N	E	b	s	a	d_H	Set Screw Size	t [in]	Bolt Size	t_1 [in]	e [in]	Ø D_K [in]	Tightening Torque [lb in]	Weight [lb]	Mass Moment of Inertia [lb in sec^2]
24	—	2.17	3.07	1.18	—	0.71	0.55	0.08	0.12	1.06	M5	0.39	M6	0.41	0.79	2.24	93	0.622	0.0009
28	—	2.56	3.54	1.38	—	0.79	0.59	0.10	0.16	1.18	M6	0.59	M8	0.45	0.98	2.87	221	1.179	0.0037
38	—	3.15	4.49	1.77	—	0.94	0.71	0.12	0.16	1.50	M8	0.59	M8	0.61	1.18	3.27	221	2.114	0.0075
42	3.35	3.74	4.96	1.97	1.10	1.02	0.79	0.12	0.16	1.81	M8	0.79	M10	0.71	1.26	3.70	611	8.331	0.0406
48	3.74	4.13	5.51	2.20	1.26	1.10	0.83	0.14	0.16	2.01	M8	0.79	M12	0.83	1.42	4.13	1,062	11.327	0.0688
55	4.33	4.72	6.30	2.56	1.46	1.18	0.87	0.16	0.18	2.36	M10	0.79	M12	1.02	1.67	4.72	1,062	17.009	0.1353
65	4.53	5.31	7.28	2.95	1.85	1.38	1.02	0.18	0.18	2.68	M10	0.79	M12	1.30	1.77	4.88	1,062	20.305	0.2168
75	5.31	6.30	8.27	3.35	2.09	1.57	1.18	0.20	0.20	3.15	M10	0.39	M16	1.42	2.00	5.47	2,611	32.408	0.4779

1) The weight and mass moment of inertia shown are for couplings with maximum bore without keyway.

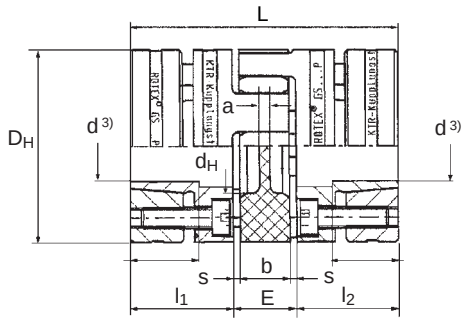
Size	Maximum Bores [in] for Clamping Style			Clamping Style 2.5 Transmittable Torque [lb in] [2]																						
				Hub Bore d [in]																						
	1.0	2.5	2.6	0.375	0.500	0.625	0.750	0.875	1.000	1.125	1.250	1.375	1.500	1.625	1.750	1.875	2.000	2.125	2.250	2.375	2.500	2.625	2.750	2.875	3.125
24	1.125	1.125	1.125	296	315	334	353	372	391																	
28	1.500	1.500	1.375		687	721	756	791	826	861	895	930	965													
38	1.750	1.750	1.688		796	831	866	901	935	970	1005	1040	1074	1109	1144											
42	2.156	1.813	1.688				2034	2112	2190	2267	2345	2423	2501	2578	2656											
48	2.438	2.063	2.063						3491	3605	3719	3832	3946	4060	4174	4288	4401									
55	2.875	2.500	2.500							4071	4185	4298	4412	4526	4640	4754	4867	4981	5095	5209	5323					
65	3.125	2.750	2.750									4478	4591	4705	4819	4933	5047	5160	5274	5388	5502	5616	5729			
75	3.750	3.125	3.125											9700	9915	10130	10345	10560	10775	10990	11205	11420	11635	11850	12280	

2) Please verify that the peak torque of the application does not exceed the transmittable torque for the selected coupling size and bore.
Contact KTR for availability of larger bores.

*See pages 50 and 51 for ROTEX® GS part numbers

Clamping Ring Hub - Style 6.0

- Zero Backlash shaft coupling for spindle, elevator and machine tools drives with medium-high torque
- Smooth running - no imbalance due to keyways or slotted clamping elements
- **Frictional shaft to hub connections** for high torque
- Compact design - low mass moment of inertia



3) Transmittable torques are based on shaft tolerances of

0 to -0.0005 in. for shafts up to 1.5 in. in diameter
0 to -0.0010 in. for shafts larger than 1.5 in. diameter

Looser tolerances will decrease the transmittable torque

Coupling size	Bores [in] d		Dimensions [in]									Clamping Bolts			Weight per coupling w/ max. bore [lb]	Mass Moment of Inertia per cplg. [lb in sec²] (x 10 -4)
	min	max	D_H 1)	L	$l_1;l_2$	l_3	E	b	s	a	d_H	Size 2)	Qty. per Hub	Tightening Torque [lb in]		
Hub material - aluminum Clamping ring material - steel																
14	0.197	0.551	1.18	1.97	0.73	0.53	0.51	0.39	0.06	0.08	0.41	M3	4	11.86	0.223	1.279
19	0.394	0.787	1.57	2.60	0.98	0.71	0.63	0.47	0.08	0.12	0.71	M4	6	25.55	0.543	5.619
24	0.394	1.102	2.17	3.07	1.18	0.87	0.71	0.55	0.08	0.12	1.06	M5	4	53.1	1.271	24.559
28	0.591	1.496	2.56	3.54	1.38	1.06	0.79	0.59	0.10	0.16	1.18	M5	8	53.1	2.043	56.861
38	0.591	1.811	3.15	4.49	1.77	1.38	0.94	0.71	0.12	0.16	1.50	M6	8	88.5	4.287	173.867
Hub and clamping ring material - steel																
42	0.787	2.008	3.74	4.96	1.97	1.38	1.02	0.79	0.12	0.16	1.81	M8	4	309	10.293	569.940
48	0.984	2.165	4.13	5.51	2.20	1.61	1.10	0.83	0.14	0.16	2.01	M10	4	610	13.767	938.100
55	1.181	2.756	4.72	6.30	2.56	1.77	1.18	0.87	0.16	0.18	2.36	M10	4	610	20.801	1849.650
65	1.496	2.756	5.31	7.28	2.95	2.17	1.38	1.02	0.18	0.18	2.68	M12	4	1062	29.942	3424.950
75	1.654	3.150	6.30	8.27	3.35	2.48	1.57	1.18	0.20	0.20	3.15	M12	4	1062	44.308	7200.360

1) At high speeds diameter D_H increases 0.08 for expansion of spider.
2) Jack threads of the same size are located between the clamping bolts for easy disassembly

Size	Clamping Ring Hub 6.0 Transmittable Torque [lb in] 4)																							
	Hub bore d_1 ; d_2 [in]																							
	0.2500	0.3125	0.3750	0.4375	0.5000	0.6250	0.7500	0.8750	1.0000	1.1250	1.2500	1.3750	1.5000	1.6250	1.7500	1.8750	2.0000	2.1250	2.2500	2.3750	2.5000	2.6250	2.7500	3.1250
14	41	71	65	86	127																			
19			280	335	417	499	668																	
24			283	340	432	513	702	738	970															
28						1180	1530	1680	2090	2330	2540	3350	3150											
38						1700	2180	2420	2980	3280	3530	4150	4090	4810	4950									
42								2000	2929	3083	3066	4175	3255	4670	4331	5849	6183							
48									4630	5950	5930	7440	6610	8470	8330	10320	8950	11000						
55											5320	6900	5750	7740	7450	7250	8690	7910	10004	12460	10080	12310	14790	
65													9140	11760	11610	11560	13470	12710	15520	18690	15970	18910	22160	
75															15230	15380	17620	16990	20260	23930	21140	24560	28330	32760

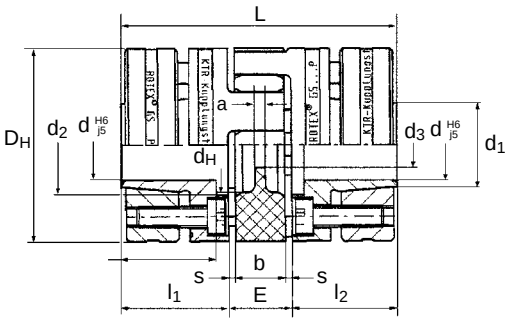
4) Please verify that the peak torque of the application does not exceed the transmittable torque for the selected coupling size and bore.
Note - Steel or Nodular Iron shafts with min. yield of 36000 PSI are recommended. Hollow shafts require KTR Engineering approval.
(See KTR assembly instructions @ www.ktrcorp.com)

*See pages 49 and 50 for ROTEX® GS part numbers

Metric Clamping Ring Hub - Style 6.0 P (DIN 69002)

- Zero Backlash shaft coupling for multiple head **spindle drives** in machine tools
- Smooth running - no imbalance due to keyways or slotted clamping elements
- Standard 6.0 P design can operate at v=50 m/s (higher speeds available upon request)
- **Frictional shaft to hub connections** for high torque

DIN Spindle Size	ROTEX ® GS P Size	Dimensions [mm]				
		d	D_H	$l_1;l_2$	L	E
25 x 20	14 P	14	32	18.5	50	13
32k x 25	19 P37.5	16	37.5	25	66	16
32g x 30	19 P	19	40	25	66	16
40 x 35	24 P50	24	50	30	78	18
50 x 45	24 P	25	55	30	78	18
63 x 55	28 P	35	65	35	90	20



Coupling size	Dimensions [mm]												
	d	D_H 2)	d_H	L	$l_1;l_2$	l	E	b	s	a	d_1	d_2	d_3
14P	14 1)	32	10.5	50	18.5	15.5	13	10	1.5	2	17	17	8.5
19/24P 37.5	16 1)	37.5	18	66	25	21	16	12	2	3	20	19	9.5
19/24P	19 1)	40	18	66	25	21	16	12	2	3	23	22	9.5
24/28P 50	24 1)	50	27	78	30	25	18	14	2	3	28	29	12.5
24/28P	25 1)	55	27	78	30	25	18	14	2	3	30	30	12.5
28/38P	35 1)	65	30	90	35	30	20	15	2.5	4	40	40	14.5
38/45P	40	80	38	114	45	40	24	18	3	4	46	46	16.5
42/55P	42	95	46	126	50	45	26	20	3	4	52	55	18.5
48/60P	45	105	51	140	56	50	28	21	3.5	4	52	60	20.5
55/70P	50	120	60	160	65	58	30	22	4	4.5	55	72	22.5

1) Only available in standard DIN spindle shaft diameters.

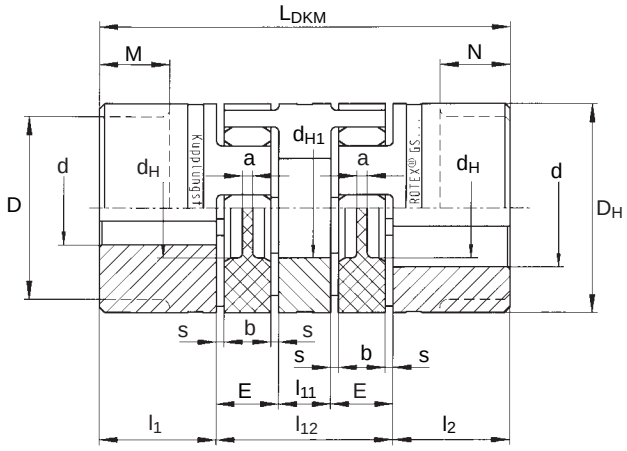
2) At high speeds diameter D_H increases by 2mm for expansion of spider.

Coupling Size	Torques [Nm]				Transmitable torque of the hub at dia. d [Nm] 3)	Tightening torque of the clamping screws T_A [Nm]	Weight per coupling at bore diameter d [kg]	Mass moment of inertia J at bore dia. d norm [kg m^2]
	98 Sh A-GS		64 Sh D-GS					
	T_{KN} Nominal	T_{Kmax} Maximum	T_{KN} Nominal	T_{Kmax} Maximum				
14 P	12.5	25	16	32	25	1.89	0.16	0.022 x 10^{-3}
19/24 P 37.5	14	28	17	34	60	3.05	0.32	0.075 x 10^{-3}
19/24 P	17	34	21	42	71	3.05	0.38	0.093 x 10^{-3}
24/28 P 50	43	86	54	108	108	4.90	0.66	0.279 x 10^{-3}
24/28 P	60	120	75	150	170	8.50	0.88	0.409 x 10^{-3}
28/38 P	160	320	200	400	506	8.50	1.28	0.892 x 10^{-3}
38/45 P	325	650	405	810	821	14.00	2.64	2.694 x 10^{-3}
42/55 P	450	900	560	1120	709	35.00	4.46	6.106 x 10^{-3}
48/60 P	525	1050	655	1310	1340	69.00	6.18	10.286 x 10^{-3}
55/70 P	625	1250	825	1650	1510	69.00	9.48	20.340 x 10^{-3}

3) Transmittable torque is based on a H6/j5 tolerance. If a looser tolerance is used the transmittable torque will decrease.
Note - Steel or Nodular Iron shafts with min. yield of 36000 PSI are recommended. Hollow shafts require KTR Engineering approval.
(See KTR assembly instructions at www.ktrcorp.com)

Style DKM

- Zero Backlash shaft coupling with **double flexing elements** for shaft to shaft connection
- DKM insert allows the coupling to compensate for more parallel misalignment (see page 47)
- Axial plug-in design allows for blind assembly
- Inch bore sizes machined to AGMA 9002-A86 class 1 fit
  Inch key sizes machined to ANSI B17.1
- Metric bore sizes machined to ISO H7 fit
  Metric key sizes machined to DIN 6885 JS9
- See page 49 for hub clamping styles

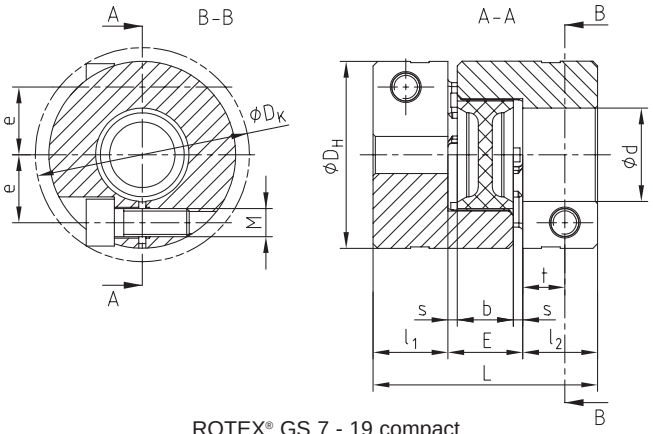


Dimensions [in]

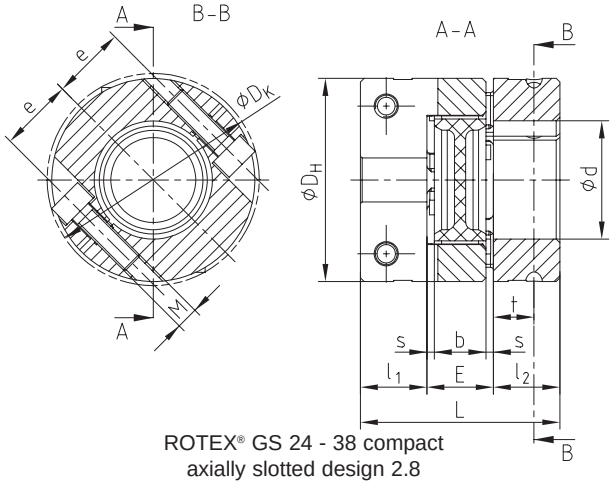
Size	Bore Sizes	D	DH	dH	dH1	l1;l2	M;N	l11	l12	E	b	s	a	LDKM
		Hub Material - Aluminum					DKM Insert Material - Aluminum							
5		—	0.39	—	—	0.20	—	0.12	0.51	0.20	0.16	0.02	0.16	0.91
7		—	0.55	—	—	0.28	—	0.16	0.79	0.31	0.24	0.04	0.24	1.34
9		—	0.79	0.28	—	0.39	—	0.20	0.98	0.39	0.31	0.04	0.06	1.77
12		—	0.98	0.33	—	0.43	—	0.24	1.18	0.47	0.39	0.04	0.14	2.05
14		—	1.18	0.41	—	0.43	—	0.31	1.34	0.51	0.39	0.06	0.08	2.20
19		—	1.57	0.71	0.71	0.98	—	0.39	1.65	0.63	0.47	0.08	0.12	3.62
24		—	2.17	1.06	1.06	1.18	—	0.63	2.05	0.71	0.55	0.08	0.12	4.41
28		—	2.56	1.18	1.18	1.38	—	0.71	2.28	0.79	0.59	0.10	0.16	5.04
38		—	3.15	1.50	1.50	1.77	—	0.79	2.68	0.94	0.71	0.12	0.16	6.22
	For these dimensions, please see pg. 38 & 39	Hub Material - Steel					DKM Insert Material - Aluminum							
42		3.35	3.74	1.81	1.81	1.97	1.10	0.87	2.91	1.02	0.79	0.12	0.16	6.85
48		3.74	4.13	2.01	2.01	2.20	1.26	0.94	3.15	1.10	0.83	0.14	0.16	7.56
55		4.33	4.72	2.36	2.36	2.56	1.46	1.10	3.46	1.18	0.87	0.16	0.18	8.58

Compact design

- Up to 1/3 shorter than standard GS couplings
- Axial Cross-Clamp design (patent pending)
- Designed for Ball Screw and Servo applications
- Static Balanced for High-speeds
- Compact design for tight areas



ROTEX® GS 7 - 19 compact single slotted [1] design 2.0



ROTEX® GS 24 - 38 compact axially slotted design 2.8

Size	Torque [lbin]			Dimensions [in]												T_A
	92Sh A	98Sh A	64Sh D	$d_{max.}$	D_H	D_K	L	l_1, l_2	E	b	s	t	e	M	[lbin]
7	10.6	17.7	21.2	0.28	0.55	0.65	0.71	0.20	0.31	0.24	0.04	0.10	5.0	M2	3.3
9	26.6	44.3	53.1	0.35	0.79	0.84	0.94	0.28	0.39	0.31	0.04	0.14	6.7	M2.5	6.7
12	44.3	79.7	106	0.47	0.98	1.03	1.02	0.28	0.47	0.39	0.04	0.14	8.3	M3	11.9
14	66	111	142	0.63	1.18	1.20	1.26	0.37	0.51	0.39	0.06	0.18	9.6	M4	25.7
19	89	150	186	0.94	1.57	1.77	1.97	0.67	0.63	0.47	0.08	0.35	14.0	M6	88.5
24	310	531	664	1.26	2.17	2.26	2.13	0.71	0.71	0.55	0.08	0.43	20.0	M6	88.5
28	841	1416	1770	1.38	2.56	2.72	2.44	0.83	0.79	0.59	0.10	0.47	23.8	M8	221
38	1682	2876	3584	1.77	3.15	3.39	2.99	1.02	0.94	0.71	0.10	0.63	30.5	M10	4347

Size	Bores and the corresponding transmittable torques of clamping hub design 2.0/2.8															
	0.125	0.1875	0.25	0.3125	0.375	0.500	0.625	0.750	0.875	1.000	1.125	1.250	1.375	1.500	1.625	1.750
7	7.965	8.850	9.735													
9		17.70	18.59	20.36												
12		30.98	33.63	36.29	38.06											
14			66.38	69.92	74.34	82.31	51.33									
19			205.3	215.1	223.9	243.4	262.0	281.4	300.0							
24					148.7	198.2	248.7	298.2	347.8	397.4	446.9	496.5				
28						363.7	454.9	546.0	637.2	728.4	819.5	910.7	1001			
38							723.0	867.3	1012	1157	1301	1445	1590	1735	1879	2024

1) ROTEX® GS compact size 7 to 19 axially slotted on request

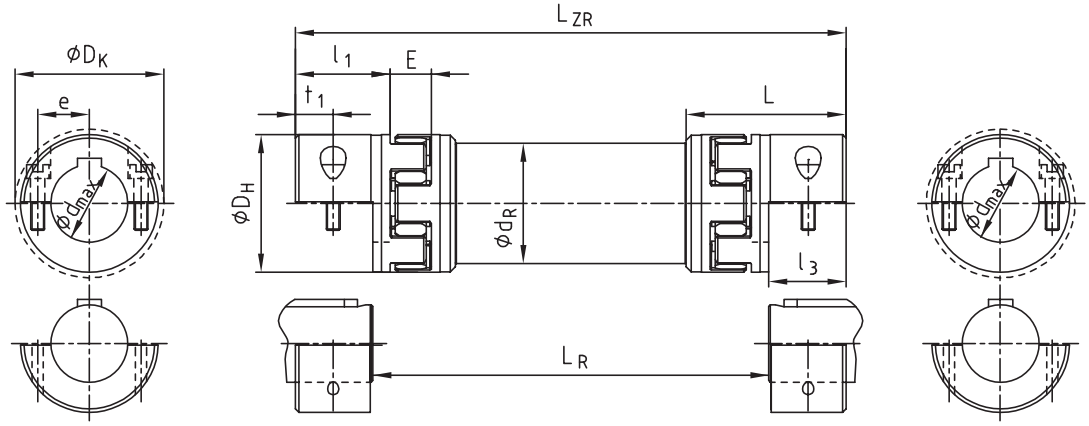
2) Size 14 with screw M3, size 19 with screw M5

Order form:

ROTEX® GS 38	Compact	98 Sh A-GS	Design 2.8	Ø 28	Design 2.8	Ø 45
Coupling size	Design	Spider	Hub design	Finish bore	Hub design	Finish bore

Intermediate Shaft Couplings with Aluminium Tube • Design ZR3

- Motion Control Coupling with Custom Intermediate shaft
- Designed for Large shaft Gaps
- Excellent for Gantrys, Robotics, Packaging Machines, Synchronous lift units, Etc.
- Easy Radial assembly without moving youor Drive or Driven component
- Split A-H style hubs
- Aluminum tube spacer with Low Mass Moment of Inertia
- Various bore and key combinations Inch, Metric or both
- Keyless connections available with standard **ROTEX® GS** hubs
- Easy spider replacement
- Standard spacers up to 13 feet without bearing support (consult KTR for speed and size restrictions)



Size	Dimensions [mm]																	
	Finish bore		General														Capscrew DIN EN ISO 4762	
								L_R		L_{ZR}								
	$d_{min.}$	$d_{max.}$	D_H	l_1	L	l_3	E	min.	max.	min.	max.	d_R	D_K	t_1	e	8.8	T_A [lbin]
19	0.31	0.79	1.57	0.98	1.93	0.69	0.63	3.86	117	5.24	118	1.57	1.85	0.31	0.57	M 6	89
24	0.39	1.10	2.17	1.18	2.32	0.87	0.71	4.45	136	6.18	138	1.97	2.24	0.41	0.79	M 6	89
28	0.55	1.50	2.56	1.38	2.64	0.98	0.79	5.16	156	7.13	157	2.36	2.87	0.45	0.98	M 8	221
38	0.71	1.77	3.15	1.77	3.29	1.30	0.94	6.42	155	9.02	157	2.76	3.31	0.61	1.18	M 8	221
42	0.87	1.97	3.74	1.97	3.66	1.44	1.02	7.09	155	9.96	157	3.15	3.70	0.71	1.26	M10	434
48	0.87	2.17	4.13	2.20	4.06	1.56	1.10	7.95	154	11.06	157	3.94	4.13	0.73	1.42	M12	761

Size 98 Sh A-GS	Coupling torques [lbin] 1)		Mass moment of inertia [lbins²]			stat. torsion spring stiffness	ROTEX® GS Size 98 Sh A-GS	Coupling torques [lbin] 1)		Mass moment of inertia [lbins²]			stat. torsion spring stiffness
	T_{KN}	$T_{K\,max.}$	GTS-hub 2) J_1	ZR-hub J_2	Pipe/ meter J_3	ZW 3) C_2 [lbft²/rad]		T_{KN}	$T_{K\,max.}$	GTS-hub 2) J_1	ZR-hub J_2	Pipe/ meter J_3	ZW 3) C_2 [lbft²/rad]
19	89	177	0.00018	0.00012	0.00291	7852	**38**	1682	3363	0.00446	0.00228	0.02630	70902
24	310	620	0.00067	0.00040	0.00596	16053	**42**	2345	4691	0.00993	0.00489	0.04036	108759
28	841	1682	0.00156	0.00097	0.01061	28598	**48**	2744	5487	0.01655	0.01047	0.08187	220661

ROTEX® GS Size	Bores and the corresponding transmittable friction torques of split hub without keyway [in]															
	0.250	0.375	0.500	0.625	0.750	0.875	1.000	1.125	1.250	1.375	1.500	1.625	1.750	1.875	2.000	2.125
19	119.5	178.8	238.1	298.2	357.5											
24		178.8	238.1	298.2	357.5	416.8	477.0									
28			437.2	546.0	655.8	764.6	873.5	983.2	1092	1202	1311					
38			437.2	546.0	655.8	764.6	873.5	983.2	1092	1202	1311	1420	1529			
42					1041	1214	1388	1561	1735	1908	2082	2255	2428	2602		
48							2023	2276	2529	2782	3035	3288	3541	3794	4046	4299

1) Transmissible torque acc. to 92 Sh-A GS. The coupling is normally supplied with 98 Sh-A GS.
2) At $d_{max.}$ 3) intermediate shaft at L = 39.4 in with $L_{Rohr} = L_{ZR} - 2 \cdot L$
For inquiries and orders please mention the shaft distance dimension L_R along with the maximum speed to review the critical speed.

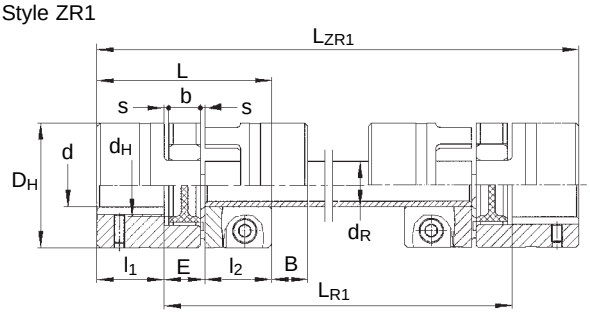
Order form:

ROTEX® GS 24	ZR3	1200 mm	98 Sh A-GS	7.5 – Ø 24 mm		7.5 – Ø 24 mm	
Coupling size	Type	Shaft distance dimension [L_R]	Spider hardness	Hub design without keyway	Finish bore	Hub design without keyway	Finish bore

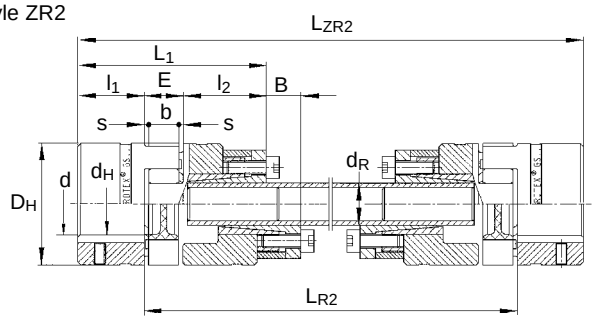
Style ZR1 / ZR2

- Zero Backlash shaft coupling with double flexing elements for shaft to shaft connection
- Used for applications with **extended shaft gaps**
- Z_{R1} and Z_{R2} couplings can operate at speeds up to 1500 rpm
- Design ZR2 utilizes CLAMPEX® 250 for higher transmittable torque without keyways

Style ZR1



Style ZR2



Note: Please provide shaft gap (LR1;LR2) and maximum speed prior to obtaining pricing.

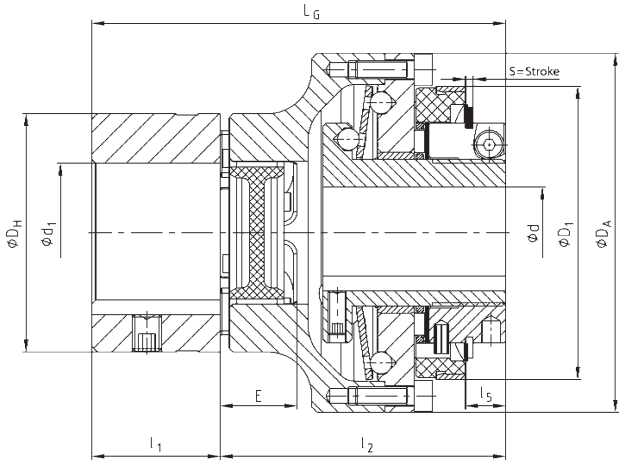
Size	Bore Sizes	Dimensions [in] for ZR1 Style											Cross Clamp Bolt		
		DH	l1;l2	L	E	b	s	B	LR1	LR1 min.	LZR1	dR [mm]	Size x Length	Torque Ratings [lb in] Tight-ening	Trans-mittable
14	For these dimensions, please see pg. 38 & 39	1.18	0.43	1.38	0.51	0.39	0.06	0.45	Please speficy at time of ordering	2.56	LR1+0.87	*9/16x#14*	M3x12	11.86	53.99
19		1.57	0.98	2.60	0.63	0.47	0.08	0.55		3.23	LR1+1.97	*13/16x1/8*	M6x16	92.93	300.90
24		2.17	1.18	3.07	0.71	0.55	0.08	0.63		3.78	LR1+2.36	*1x#13*	M6x20	92.93	398.25
28		2.56	1.38	3.54	0.79	0.59	0.10	0.69		4.37	LR1+2.76	*1-3/8x5/32*	M8x25	221.25	929.25
38		3.15	1.77	4.49	0.94	0.71	0.12	0.83		4.96	LR1+3.54	*1-5/8x5/32*	M8x30	221.25	1088.55

Size	Bore Sizes	Dimensions [in] for ZR2 Style												Torsional Stiffness of Tube [lb ft / rad x ft]	CLAMPEX® KTR 250
		DH	l1	l3	L1	E	b	s	B	LR2	LR2 min.	LZR2	dR [mm]		
14	For these dimensions please see pg. 38 & 39	1.18	0.43	1.02	1.97	0.51	0.39	0.06	0.45	Please speficy at time of ordering	4.29	LR2+0.87	*10x2.0*	165	Please review tightening and transmitable torques in the CLAMPEX® section of this catalogue
19		1.57	0.98	1.02	2.64	0.63	0.47	0.08	0.55		4.72	LR2+1.97	*12x2.0*	315	
24		2.17	1.18	1.50	3.39	0.71	0.55	0.08	0.63		6.14	LR2+2.36	*20x3.0*	2311	
28		2.56	1.38	1.77	3.94	0.79	0.59	0.10	0.69		6.97	LR2+2.76	*25x2.5*	4384	
38		3.15	1.77	1.77	4.49	0.94	0.71	0.12	0.83		7.56	LR2+3.54	*32x3.5*	12507	
42		3.74	1.97	2.05	5.04	1.02	0.79	0.12	0.91		8.43	LR23.94	*40x4.0*	28733	
48		4.13	2.20	2.76	6.06	1.10	0.83	0.14	0.96		10.28	LR24.41	*45x4.0*	42327	
55		4.72	2.56	3.15	6.89	1.18	0.87	0.16	1.02		11.34	LR25.12	*55x4.0*	81196	
65		5.31	2.95	3.15	7.28	1.38	1.02	0.18	1.20		15.24	LR25.91	*60x4.0*	107384	

ROTEX® GS Zero Backlash

with SYNTEX® Torque Limiter

- **Zero Backlash** torque transmission
- Simple torque adjustment even after installation
- Compact design with low mass moment of inertia
- Standard and synchronous designs
- Allows shaft misalignments
- Provides vibration damping



SYNTEX® Sizes	ROTEX® GS Sizes	Coupling Torque [lb in]								Dimensions [in]											
		SYNTEX® Standard 1) Style		SYNTEX® Synchronous 2) Style		ROTEX® GS 92 Sh A		ROTEX® GS 98 Sh A		Max. bore		D_A	D_1	D_H	E	L	L_G	l_1	l_2	l_5	S
		DK1	DK2	SK1	SK2	Nom	Max	Nom	Max	d_1	d										
20	24	53-177	132-266	89-310	177-575	310	620	531	1062	See pages 36 & 37 for max. bores of standard Rotex GS hubs	0.750	3.15	2.40	2.17	0.70	1.77	3.94	1.18	2.05	0.39	0.08
25	28	177-531	398-796	221-575	354-885	840	1680	1416	2832		1.000	3.85	3.07	2.56	0.79	1.97	4.45	1.38	2.28	0.43	0.08
35	38	221-708	664-1328	266-885	620-1593	1680	3360	2876	5753		1.375	4.72	3.54	2.76	0.94	2.36	5.35	1.77	2.64	0.51	0.08
50	48	531-1593	1549-2655	443-2478	1416-3540	2740	5480	4646	9293		1.875	6.38	4.72	3.86	1.10	2.76	6.57	2.20	3.27	0.55	0.08

1) Standard design reengages every 30 degrees.

2) Synchronous design reengages every 360 degrees.

Other Styles

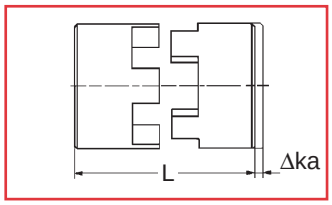
SYNTEX® flange style with integrated sprocket.

SYNTEX® flange style with integrated HTD pulley.

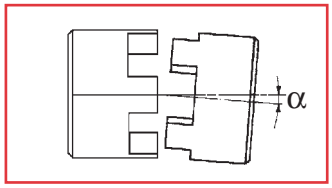
Coupling Alignment

The design of the **ROTEX® GS** coupling allows it to compensate for axial, angular, as well as parallel misalignment without causing wear on the coupling or shortening its life. Since the components are pre-loaded, the coupling will remain backlash free even after extended operation.

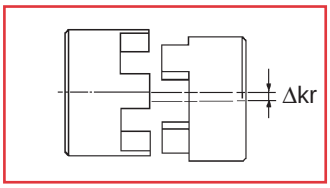
In order to assemble the **ROTEX® GS,** ensuring long lasting performance, please review the permissible misalignment values. The values shown in the table are maximum values for couplings experiencing only one type of misalignment. For applications with both angular and parallel misalignments, the values shown in the table must be reduced. All permissible maximum misalignments given on this page take into account the following:
1) An ambient temperature of 86° F (30° C)
2) Operating speeds of 1500 rpm



Axial Misalignment is often caused by different tolerances of mating components during assembly or length changes of the shafts due to fluctuations in temperature. Since the shaft bearings can normally only tolerate light loading in the axial direction, the coupling will absorb the axial misalignment while transmitting only low reaction forces.



In the case of pure **Angular Misalignment**, the imaginary center lines of the shafts cross. This type of misalignment can be compensated within the permitted range without any danger of large restoring forces.



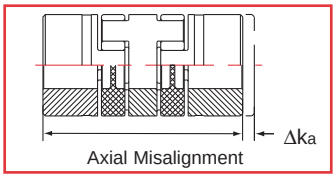
Parallel Misalignment results from the offset of the two shafts. This can be caused by varying pilot tolerances or difficulties during assembly. This type of misalignment causes the largest restoring forces and the largest loads of the mating parts.

Size	Spider Durometer	Misalignment for Standard Design [in] Axial Δ K_a 1)	Misalignment for Standard Design [in] Parallel Δ K_r	Misalignment for Standard Design [degree] Angular α	Misalignment for DKM Design [in] Axial Δ K_a 1)	Misalignment for DKM Design [in] Parallel Δ K_r	Misalignment for DKM Design [degree] Angular α_1
5	70	+0.015 -0.008	0.005	1.2	+0.030 -0.016	0.007	2.4
	80		0.005	1.1		0.006	2.2
	92		0.002	1.0		0.005	2.0
	98		0.001	0.9		0.005	1.8
7	80	+0.024 -0.012	0.006	1.1	+0.048 -0.024	0.009	2.2
	92		0.004	1.0		0.008	2.0
	98		0.002	0.9		0.007	1.8
	64		0.001	0.8		0.007	1.6
9	80	+0.031 -0.016	0.007	1.1	+0.062 -0.032	0.011	2.2
	92		0.005	1.0		0.010	2.0
	98		0.003	0.9		0.009	1.8
	64		0.002	0.8		0.008	1.6
12	80	+0.035 -0.016	0.007	1.1	+0.070 -0.032	0.013	2.2
	92		0.005	1.0		0.012	2.0
	98		0.003	0.9		0.011	1.8
	64		0.002	0.8		0.010	1.6
14	80	+0.039 -0.019	0.008	1.1	+0.078 -0.038	0.016	2.2
	92		0.006	1.0		0.014	2.0
	98		0.003	0.9		0.013	1.8
	64		0.002	0.8		0.011	1.6
19	80	+0.047 -0.019	0.006	1.1	+0.094 -0.038	0.019	2.2
	92		0.004	1.0		0.018	2.0
	98		0.002	0.9		0.016	1.8
	64		0.001	0.8		0.014	1.6
24	92	+0.055 -0.019	0.005	1.0	+0.110 -0.038	0.023	2.0
	98		0.004	0.9		0.020	1.8
	64		0.003	0.8		0.018	1.6
28	92	+0.059 -0.027	0.006	1.0	+0.118 -0.054	0.022	2.0
	98		0.004	0.9		0.024	1.8
	64		0.003	0.8		0.021	1.6
38	92	+0.070 -0.027	0.007	1.0	+0.140 -0.054	0.030	2.0
	98		0.005	0.9		0.027	1.8
	64		0.003	0.8		0.024	1.6
42	92	+0.078 -0.039	0.007	1.0	+0.156 -0.078	0.033	2.0
	98		0.005	0.9		0.029	1.8
	64		0.004	0.8		0.026	1.6
48	92	+0.082 -0.039	0.009	1.0	+0.164 -0.078	0.036	2.0
	98		0.006	0.9		0.032	1.8
	64		0.004	0.8		0.029	1.6
55	92	+0.086 -0.039	0.009	1.0	+0.172 -0.078	0.040	2.0
	98		0.007	0.9		0.036	1.8
	64		0.005	0.8		0.032	1.6
65	95	+0.102 -0.039	0.007	0.9	---	---	---
75	95	+0.118 -0.059	0.008	0.9	---	---	---

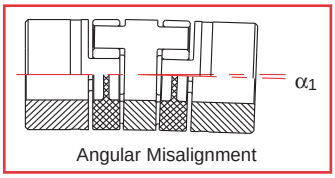
1) The expected axial misalignment should be added to the overall length (L) of the coupling during assembly. For dimensions please review pages 38 through 46.

Misalignment for the ROTEX® GS-DKM

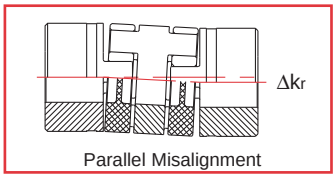
In case of larger misalignments (especially large parallel misalignments) the **ROTEX® GS-DKM** coupling should be considered to avoid excessive restoring forces by the coupling. The double flexing element design allows higher axial, angular and parallel misalignments. Please review the table above for maximum permissible misalignments.



Axial Misalignment



Angular Misalignment



Parallel Misalignment

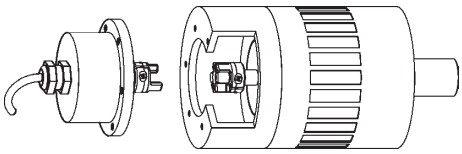
Coupling Assembly

The three piece design of the **ROTEX® GS** coupling allows the hubs to be installed on each individual shaft and then plugged axially, thus providing the following features:

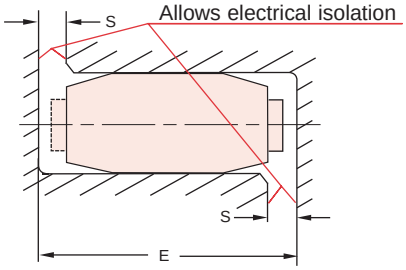
- No tightening of clamping bolts inside the housing
- No inspection holes required in the housing

These design features provide the following benefits:

- Reduced assembly time
- Reduced manufacturing costs



ROTEX® GS Coupling Blind Assembly Feature



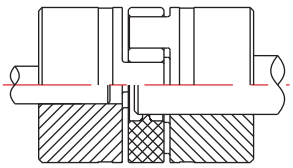
Since the **ROTEX® GS** coupling is assembled under preload, a small axial force is required during assembly. This force is dependent on the size of the coupling and the hardness of the spider. This axial force could be reduced by applying a light coat of thin oil, such as Castrol 4 in 1 to the **ROTEX® GS** spider.

Standoff Dimension "E"

In order to ensure a long life for the **ROTEX® GS** spider, it is important that it is not assembled under axial compression. To ensure that this is not a problem, the coupling must be assembled with the proper "E" dimension. The "E" dimension given in this catalogue (varies for each size) should be viewed as the minimum value. If axial misalignment is anticipated, the coupling should be assembled with a sightly larger standoff between hubs ("E" + axial misalignment).

Small Shaft Gaps

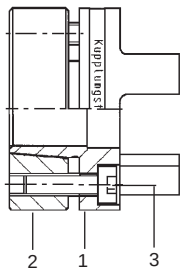
If the shaft gap is smaller then the "E" dimension it may be possible to protrude one of the shafts into the spider. A hole with the same diameter of the shaft can be machined through the spider web, however the shaft must be smaller than the d_H diameter. If a key is present it will need to be shortened before the shaft can be inserted through the spider.



Shaft protruding into **ROTEX® GS** spider

Clamping Ring Hub 6.0 Assembly/Disassembly

ROTEX® GS Clamping Ring Hub 6.0



1- Clamping Hub
2- Clamping Ring
3- Clamping Bolt

The steel components of the clamping ring 6.0 hubs are lightly coated with a thin oil (for example Castrol 4 in 1). If the coupling is being reassembled, all steel surfaces and the threads should be lightly coated with oil.

Caution: Do not use lubricants containing Molybdenum Disulphide.

Assembly

- Clean and oil the shaft
- Position the hubs on the shaft
- Lightly tighten the clamping bolts
- Using a torque wrench, tighten the clamping bolts in a crosswise pattern until the tightening torque shown on page 38 is reached.

Disassembly

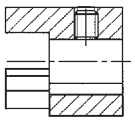
- Loosen all clamping bolts slightly
- Remove clamping bolts next to the jack threads
- Insert these bolts in the jack threads
- Tighten the clamping bolts in the jack threads in a crosswise pattern until the clamping ring loosens

Assembly instructions for all **ROTEX® GS** couplings are available, please visit our web site www.ktrcorp.com or call KTR Corporation @ 219-872-9100.

Hub Clamping Styles

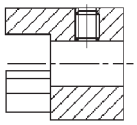
The **ROTEX® GS** coupling has many different uses, so KTR has developed several clamping styles to suit each type of application. The primary difference between hub clamping styles is whether they utilize a keyway to transmit torque or use a friction connection. KTR also offers many custom clamping arrangements for specific applications such as hollow shaft tachometer and encoders.

Style 1.0 with keyway and set screw



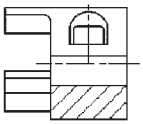
Positive hub to shaft connection. Transmittable torque is dependent on surface pressure on the keyway only. This design is not zero backlash.

Style 1.1 without keyway, with set screw



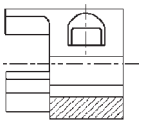
Frictional hub to shaft connection. Useful for zero backlash torque transmission with extremely low torque.

Style 2.0 with cross clamp (single slit) without keyway



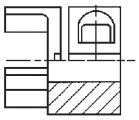
Frictional hub to shaft connection. Useful for zero backlash transmission with low torque. Transmittable torque is dependent on bore diameter (see page 38).

Style 2.1 with cross clamp (single slit) with keyway



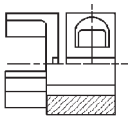
Positive hub to shaft with additional frictional connection. The frictional connection prevents or reduces backlash and surface pressure at keyway is reduced. Sizes 5 through 19.

Style 2.5 with cross clamp (double slit) without keyway



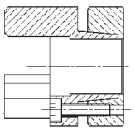
Frictional hub to shaft connection. Useful for zero backlash transmission with low torque. Transmittable torque is dependent on bore diameter (see page 39).

Style 2.6 with cross clamp (double slit) with keyway



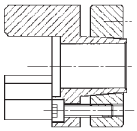
Positive hub to shaft with additional frictional connection. The frictional connection prevents or reduces backlash and surface pressure at keyway is reduced. Sizes 24 and above.

Style 6.0 clamping ring hub



Integrated frictional hub to shaft connection for high torque transmission. The clamping bolts are tightened from the elastomer side (inside) of the hub. Transmittable torque is dependent on bore diameter (see page 40).

Style 6.0 P clamping ring hub



Same concept as 6.0 design, however this design was intended for extremely high speed drives and multiple head spindles. See page 41 for additional details.

*See pages 50 and 51 for ROTEX® GS part numbers

Ordering Procedure

To order the **ROTEX® GS** coupling please follow the procedure below, fill out the form and fax it to (219) 872-9150.

1) Enter coupling size, hub and spider material
2) Enter shaft size, keyway size and clamping style (please review clamping styles above)

Coupling	Spider	First Hub			Second Hub		
Size	Material	Bore	Keyway	Clamping	Bore	Keyway	Clamping
28 GS	98	0.875"	0.1875"	1.0	1.125"	0.250"	2.1

5 through 75

Standard Spider Materials
80 - 80 Shore A Urethane
92 - 92 Shore A Urethane
98 - 98 Shore A Urethane
64 - 64 Shore D-H Hytrel (sizes 7-38)
64 - 64 Shore D Urethane (sizes 42-75)

Standard Clamping Styles
1.0 - with keyway & set screw
1.1 - w/o keyway, with set screw
1.2 - w/o keyway, w/o set screw
2.0 - cross clamp, single slit w/o keyway
2.1 - cross clamp, single slit with keyway
2.5 - cross clamp, double slit w/o keyway
2.6 - cross clamp, double slit with keyway
6.0 - clamping ring w/o keyway

ROTEX® GS Part Number

	Size	007	009	012	014		019		024		028		038	042	048	055	065
Spider	80 SA Blue	1000003	1000003	1000003	1000003		1000003		1000003		1000003		1000003	-	-	-	-
	92 SA Yellow	1000001	1000001	1000001	1000001		1000001		1000001		1000001		1000001	1000001	1000001	1000001	-
	98 SA Red	1000002	1000002	1000002	1000002		1000002		1000002		1000002		1000002	1000002	1000002	1000002	1000070
	64 SD-H Hytrel	1000025	1000025	1000025	1000025		1000025		1000025		1000025		1000025	1000005	1000005	1000005	1000005
Hub	Clamping Design	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.5	2.6	2.5	2.6	2.6	2.6	2.6	2.6	2.6
	Bore [in]	Stock Sizes Highlighted															
	1/8	7150370															
	3/16	7150470	7150470	7150470	7150470												
	1/4	7150670	7150670	7150670	7150670		7150670										
	5/16	OMB	7150770	7150770	7150770		7150770										
	3/8		7150970	7150970	7150970		7150970		7150970								
	7/16			7151170	7151170		7151170		7151170								
	1/2				7151270	7151269	7151270	7151269	7151270	7151269	7151270	7151269	7151269				
	9/16				7151470	7151469	7151470	7151469	7151470	7151469	7151470	7151469	7151469				
	5/8				7151570	7151569	7151570	7151569	7151570	7151669	7151570	7151569	7151569				
	11/16						7151770	7151769	7151770	7151769	7151770	7151769	7151769				
	3/4						7151970	7151969	7151970	7151969	7151970	7151969	7151969	5051969			
	13/16								7152070	7152069	7152070	7152069	7152069	5052069			
	7/8								7152270	7152269	7152270	7152269	7152269	5052269			
	15/16								7152370	7152369	7152370	7152369	7152369	5052369			
	1								7152570	7152569	7152570	7152569	7152569	5052569	5052569		
	1 1/8										7152870	7152869	7152869	5052869	5052869	5052869	
	1 1/4										7153170	7153169	7153169	5053169	5053169	5053169	
	1 3/8										7153470	7153469	7153469	5053469	5053469	5053469	5053469
	1 1/2										7153870	7153869	7153869	5053869	5053869	5053869	5053869
	1 5/8												7154169	5054169	5054169	5054169	5054169
	1 3/4												7154469	5054469	5054469	5054469	5054469
	1 7/8														5054769	5054769	5054769
	2														5055069	5055069	5055069
	2 1/8															5055369	5055369
	2 1/4															5055769	5055769
	2 3/8															5056069	5056069
	2 1/2															5056369	5056369
	2 5/8																5056669
	2 3/4																5056969
	2 7/8																
	3 1/8																

	Size	014	019	024	028	038	042	048	055	065
Hub	Clamping Design	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
	Bore [in]	For Inch Sizes, Call KTR For Availability								
	1/4	0150681								
	5/16	0150781								
	3/8	0150981	0150981	0150981						
	7/16	0151181	0151181	0151181						
	1/2	0151281	0151281	0151281						
	5/8		0151581	0151581	0151581	0151581				
	3/4		0151981	0151981	0151981	0151981				
	7/8			0152281	0152281	0152281	5052281			
	1			0152581	0152581	0152581	5052581	5052581		
	1 1/8				0152881	0152881	5052881	5052881		
	1 1/4				0153181	0153181	5053181	5053181	5053181	
	1 3/8				0153481	0153481	5053481	5053481	5053481	
	1 1/2				0153881	0153881	5053881	5053881	5053881	5053881
	1 5/8					0154181	5054181	5054181	5054181	5054181
	1 3/4					0154481	5054481	5054481	5054481	5054481
	1 7/8						5054781	5054781	5054781	5054781
	2						5055081	5055081	5055081	5055081
	2 1/8							5055381	5055381	5055381
	2 1/4								5055781	5055781
	2 3/8								5056081	5056081
	2 1/2								5056381	5056381
	2 5/8								5056681	5056681
	2 3/4								5056981	5056981

For ordering, select the product code, size, bore or Spider number above.

Product Code: **ROTEX® GS: BA55**

Product Code	Size	Part Number
BA55	**019**	**7150770**

ROTEX® GS Part Number Selection

	Size	007	009	012	014		019		024		028		038	042	048	055	065
Spider	80 SA Blue	1000003	1000003	1000003	1000003		1000003		1000003		1000003		1000003	-	-	-	-
	92 SA Yellow	1000001	1000001	1000001	1000001		1000001		1000001		1000001		1000001	1000001	1000001	1000001	-
	98 SA Red	1000002	1000002	1000002	1000002		1000002		1000002		1000002		1000002	1000002	1000002	1000002	1000070
	64 SD-H Hytrel	1000025	1000025	1000025	1000025		1000025		1000025		1000025		1000025	1000005	1000005	1000005	1000005
Hub	Clamping Design	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.5	2.6	2.5	2.6	2.6	2.6	2.6	2.6	2.6
	Bore [mm]	Stock Sizes Highlighted Below															
	3	7150350															
	4	7150450	7150450	7150450													
	5	7150550	7150550	7150550	7150550	7150549											
	6	7150650	7150650	7150650	7150650	7150649	7150650	7150649									
	7	7150750	7150750	7150750	7150750	7150749	7150750	7150749									
	8		7150850	7150850	7150850	7150849	7150850	7150849	7150850	7150849							
	9		7150950	7150950	7150950	7150949	7150950	7150949	7150950	7150949							
	10		7151050	7151050	7151050	7151049	7151050	7151049	7151050	7151049	7151050	7151049					
	11			7151150	7151150	7151149	7151150	7151149	7151150	7151149	7151150	7151149					
	12			7151250	7151250	7151249	7151250	7151249	7151250	7151249	7151250	7151249	7151249				
	14				7151450	7151449	7151450	7151449	7151450	7151449	7151450	7151449	7151449	5051449			
	15				7151550	7151549	7151550	7151549	7151550	7151549	7151550	7151549	7151549	5051549	5051549		
	16				7151650	7151649	7151650	7151649	7151650	7151649	7151650	7151649	7151649	5051649	5051649		
	18						7151850	7151849	7151850	7151849	7151850	7151849	7151849	5051849	5051849		
	19						7151950	7151949	7151950	7151949	7151950	7151949	7151949	5051949	5051949		
	20						7152050	7152049	7152050	7152049	7152050	7152049	7152049	5052049	5052049	5052049	
	22								7152250	7152249	7152250	7152249	7152249	5052249	5052249	5052249	5052249
	24								7152450	7152449	7152449	7152450	7152449	5052449	5052449	5052449	5052449
	25								7152550	7152549	7152549	7152550	7152549	5052549	5052549	5052549	5052549
	28								7152850	7152849	7152849	7152850	7152849	5052849	5052849	5052849	5052849
	30										7153049	7153049	7153049	5053049	5053049	5053049	5053049
	32										7153249	7153249	7153249	5053249	5053249	5053249	5053249
	35										7153549	7153549	7153549	5053549	5053549	5053549	5053549
	38										7153849	7153849	7153849	5053849	5053849	5053849	5053849
	40												7154049	5054049	5054049	5054049	5054049
	42												7154249	5054249	5054249	5054249	5054249
	45												7154549	5054549	5054549	5054549	5054549
	48													5054849	5054849	5054849	5054849
	50													5055049	5055049	5055049	5055049
	55														5055549	5055549	5055549
	60															5056049	5056049
	65															5056549	5056549
	68															5056849	5056849
	70																5057049

	Size	014	019	024	028	038	042	048	055	065
Hub	Clamping Design	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
	Bore [mm]	Stock Sizes Highlighted Below								
	6	0150680								
	10	0151080	0151080							
	11	0151180	0151180	0151180						
	14	0151480	0151480	0151480						
	15		0151580	0151580						
	16		0151680	0151680	0151680	0151680				
	18		0151880	0151880	0151880	0151880				
	19		0151980	0151980	0151980	0151980				
	20		0152080	0152080	0152080	0152080	5052080			
	22			0152280	0152280	0152280	5052280			
	24			0152480	0152480	0152480	5052480			
	25			0152580	0152580	0152580	5052580			
	28			0152880	0152880	0152880	5052880	5052880		
	30				0153080	0153080	5053080	5053080		
	32				0153280	0153280	5053280	5053280	5053280	
	35				0153580	0153580	5053580	5053580	5053580	
	38				0153880	0153880	5053880	5053880	5053880	5053880
	40					0154080	5054080	5054080	5054080	5054080
	42					0154280	5054280	5054280	5054280	5054280
	45					0154580	5054580	5054580	5054580	5054580
	48					0154880	5054880	5054880	5054880	5054880
	50					0155080	5055080	5055080	5055080	5055080
	55							5055580	5055580	5055580
	60								5056080	5056080

For ordering, select the product code, size, bore or Spider number above.

Product Code: **ROTEX® GS: BA55**

Product Code	Size	Part Number
BA55	**019**	**7150749**

Quality Approval

Development

Partnership

Research

Service

www.ktrcorp.com

TOOLFLEX®

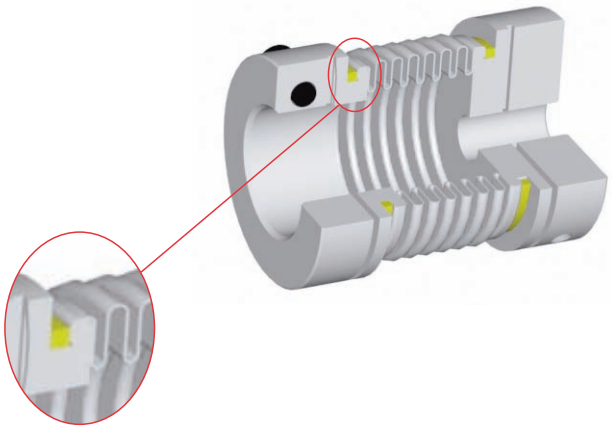
Zero-Backlash Metal Bellows Couplings

Catalog Contents **Page**

Zero-Backlash, torsionally Stiff and Maintenance-Free

TOOLFLEX® is a zero-backlash torsionally stiff "Bellows style" coupling for applications where extreme stiffness is required. It permits excellent compensation for all types of misalignment (axial, radial and angular) in addition to fast, easy assembly.

Examples of applications:
Machine tools, linear actuators (high-pitch ball screws), indexing tables and low reduction planetary gearboxes perform well with the KTR TOOLFLEX®.



Brass Ring Bellows Connection:

- Brass rings secure the stainless steel bellow to the aluminum hubs creating a non-slip zero-backlash connection
- Insures uniform torque transmission from the bellow to the hub in any direction
- Resistant to fatigue and failure in all styles of operating conditions including temperatures up to 280°C (536°F)

Cross-Clamped Hubs

- Double-Slit Cross-Clamped hubs reduce deformation of the bellow during tightening
- Easy access clamping bolt allow for fast assembly
- Custom bore tolerance allows quick positioning on shafts

Double-Slit Cross-Clamped Hub

Zero-Backlash, torsionally Stiff and Maintenance-Free

Normally the TOOLFLEX® is selected according to nominal torque (T_{KN}) shown in the technical specifications list, just like most couplings. In any case the nominal torque (T_{KN}) should never exceed the maximum torque of the application. This is critical when using servo motors because acceleration torques can easily exceed the nominal torque (T_{KN}) of the coupling significantly.

$$T_{AS}\ [Nm] = 9550 \cdot \frac{P_{max}}{n}$$

$$T_{KN}\ [Nm] \geq T_{AS/LS} \cdot f$$

P_{max} = max. motor performance [kW]
n = motor speed [min^{-1}]
T_{AS} = peak torque of the motor [Nm]
T_{LS} = peak torque of load side [Nm]
f = safety factor

f = 1.5 with uniform loading, f = 2 with moderate shock load, f = 2.5 - 4 with high shock load

For drives in machine tools (servo motors) min. f values of 1.5 - 2 must be used.

When selecting servo motors, the calculations should be made with the torque values of the motor suppliers and not with P_{max}. When dimensioning the coupling, please use the respective data of the manufacturer considering the servo controller to be used.

Accelerating torque (drive side / load side)

$$T_{KN} > T_S$$

$$T_S = T_{AS} \cdot m_A \cdot k \qquad T_S = T_{LS} \cdot m_L \cdot k$$

$$m_A = \frac{J_L}{J_A + J_L} \qquad m_L = \frac{J_A}{J_A + J_L}$$

T_S = accelerating torque (drive or driven side)
m_A = drive-side shock
m_L = driven-side shock
J_A = moment of inertia of the drive side
J_L = moment of inertia of the drive side

Torsional Stiffness

Transmission error of the metal bellow due to torsional strain

$$\varphi = \frac{180 \cdot T_{AS}}{\pi \cdot C_T}$$

φ = torsion angle [degrees]
C_T = torsion stiffness of the coupling [Nm/rad]

Natural Frequency

The natural frequency of the coupling must be above or below the frequency of the unit. Valid for the mechanical spare model of the 2-mass-system:

$$\omega_K = \frac{1}{2 \cdot \pi} \sqrt{C_T \cdot \frac{J_L + J_A}{J_L \cdot J_A}}\ [Hz]$$

ω_K = frequency of the 2-mass-system [s^{-1}]
ω_e = exciting frequency of the drive [s^{-1}]

Valid in practice: $\omega_K \geq 2 \cdot \omega_e$

Note:

When operating torque of the application exceeds nominal (T_{KN}), only limited alternating loads can be tolerated. When this occurs, deformation and fatigue fracture of the bellow can occur.

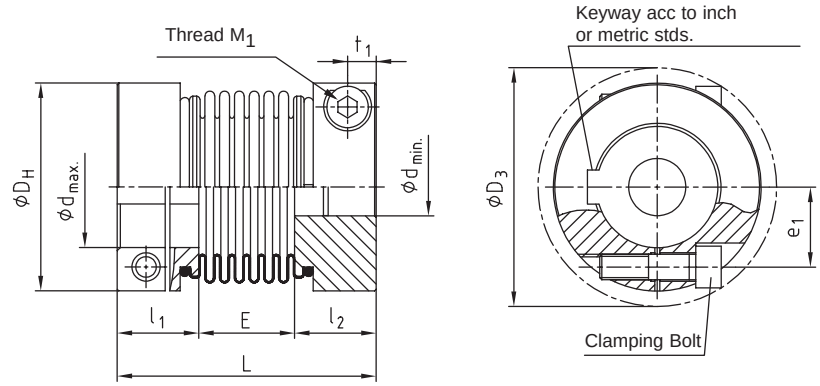
TOOLFLEX® Zero-Backlash Bellows Couplings

For advanced drive technology KTR®

Style M

Zero-Backlash, torsionally Stiff and Maintenance-Free

- Zero-backlash / Torsionally-stiff
- High-strength brass ring bellow connection
- Frictional or Keyed Double-slit Cross-Clamping Hubs
- Maintenance Free
- Temperatures up to 280°C (536°F)
- Corrosion Resistant Stainless Steel Bellow and Aluminum Hubs
- Perfect for servo applications



TOOLFLEX® Size	Dimensions [mm]										
	Finish Bore		General				Clamping Bolts				
	$d_{min.}$	$d_{max.}$	L	l_1; l_2	E	D_H	M_1	D_3	t_1	e_1	Tightning Torque [Nm]
16	5	16	46	17.0	16	30	M3	32.2	4	11.5	1.9
20	8	20	62	21.5	19	40	M5	43.5	6	14.5	8.5
30	10	30	72	23.0	26	55	M6	57.7	7	19	14
38	14	38	81	25.5	30	65	M8	74.3	9	25	35
45	14	45	103	32.0	39	83	M10	88.9	11	30	49

TOOLFLEX® Size	Torque Rating [Nm] T_{KN}	Dimensions [mm]								
		Moment of inertia [10-6kgm2]	Torsional stiffness [Nm/rad]	Axial spring stiffness [N/mm]	Radial spring stiffness [N/mm]	Permissible misalignment			Masse [10-3kg]	Tightning Torque [Nm]
						Axial [mm]	Radial [mm]	Angular [degrees]		
16	5	7	3050	26.0	92	±0.3	0.09	1.5	61	1.9
20	15	31	6640	27.5	126	±0.4	0.10	1.5	144	8.5
30	35	117	14760	36.0	155	±0.5	0.10	2.0	306	14
38	65	254	24920	36.2	212	±0.6	0.15	2.0	448	35
45	150	1011	64000	88.0	492	±0.9	0.25	2.0	1125	49

TOOLFLEX®	Bore range and respective torque values of frictional connection of the clamping hub [Nm]																							
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
16	4.3	4.5	4.6	4.8	5.0	5.1	5.3	5.5	5.6	5.8	6.1	6.3	6.5												
20						17.6	18.1	18.6	19	19.5	20.5	21	21.4	22.4	22.9	23.3									
30									33	34	35	36	36.4	38	38.5	39	42	42,5	44,5	46					
38														84	85	87	92	93	97	99	101	105	109		
45																157	165	167	173	177	181	187	193	197	200

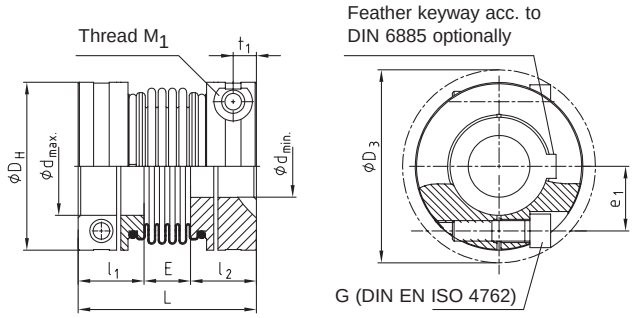
Inch Bores Available

Note:
The nominal torque (T_{KN}) of the coupling selected must exceed the maximum operating torque of the application (acceleration or peak torque). When operating torque of the application exceeds nominal (T_{KN}), only limited alternating loads can be tolerated. When this occurs, deformation and fatigue fracture of the bellow can occur.

Style S

Zero-Backlash, torsionally Stiff and Maintenance-Free

- Compact Short Design
- Zero-backlash / Torsionally-stiff
- High-strength brass ring bellow connection
- Frictional or Keyed Double-slit Cross-Clamping Hubs
- Maintenance Free
- Temperatures up to 280°C (536°F)
- Corrosion Resistant Stainless Steel Bellow and Aluminum Hubs
- Perfect for servo applications



TOOLFLEX® Size	Dimensions [mm]										
	Finish bore		General				Clamping screws				
	$d_{min.}$	$d_{max.}$	L	l_1; l_2	E	D_H	M_1	D_3	t_1	e_1	T_A [Nm]
16	3	16	45	17,0	11	32	M4	35,0	5	12,0	2,5
20	8	20	55	21,5	12	40	M5	43,5	6	14,5	6
30	11	30	63	23,0	17	55	M6	58,0	7	19	10
38	18	38	69	25,5	18	65	M8	72,6	9	25	25
45	22	45	86,5	32,0	22,5	83	M10	89,0	11	30	49

TOOLFLEX® Size	Torque [Nm] T_{KN}	Speed [min^{-1}] n 1)	Technical data							
			Moment of inertia 2) [$x10^{-6}kgm^2$]	Torsional stiffness [Nm/rad]	Axial spring stiffness [N/mm]	Radial spring stiffness [N/mm]	Perm. displacements			Mass 2) [$x10^{-3}kg$]
							Axial [mm]	Radial [mm]	Angular [degrees]	
16	5	14920	10	4500	43	138	±0,3	0,07	1,0	61
20	15	11940	30	9600	63	189	±0,4	0,08	1,0	121
30	35	8680	114	17800	97	233	±0,5	0,10	1,5	243
38	65	7345	243	37400	108	318	±0,6	0,12	1,5	351
45	150	5750	933	95800	132	738	±0,9	0,18	1,5	824

1) With v= 25 m/s

2) Figures refer to the complete coupling with max. bores

Inch Bores Available

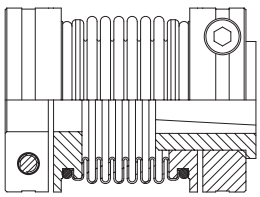
Info:

Torques of frictional engagement of the clamping hub shown under Style M (page 78)

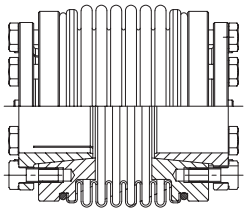
Other designs:

For further information, see **www.ktrcorp.com**

Style for FANUC-Motors



Style KN



Order form:

TOOLFLEX® S 30	d_1 - Ø25	d_2 - Ø30
Coupling size	Finish bore Component 1	Finish bore Component 2

TOOLFLEX® Metal bellows-type couplings

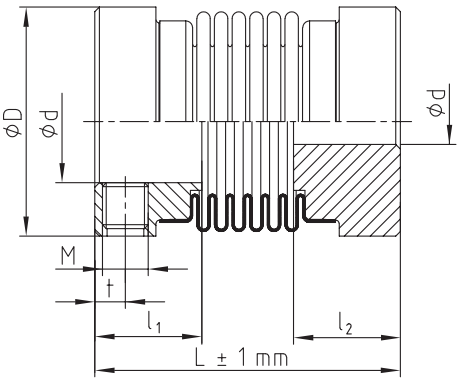
For advanced drive technology KTR

NEW

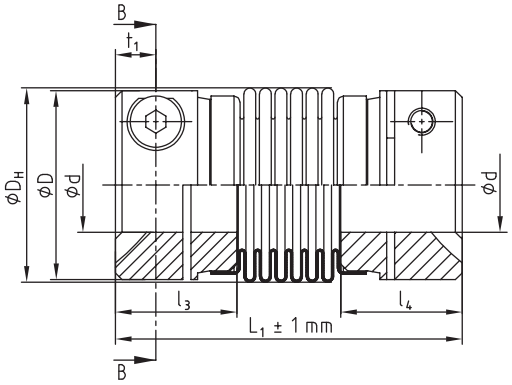
Miniature couplings

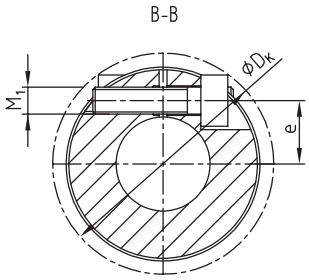
Zero-Backlash, torsionally Stiff and Maintenance-Free

- For motion control applications
- Zero-backlash, torsionally stiff
- Maintenance-free
- Low mass moment of inertia
- Easy assembly with clamping or set screw hubs
- Temperature range - 22° F to + 212° F
- Inch and metric bores available



TOOLFLEX® Type 1.1





TOOLFLEX® Type 2.5

TOOLFLEX®		Technical data of type with fixing screw (type 1.1)													
		Torque	Dimensions [mm]								Perm. displacements			Torsional stiffness	Weight 4)
			Finish bore		General			Fixing screw							
Size	Design1/2)	T_{KN} [Nm]	$d_{min.}$	$d_{max.}$	D_H	L	l_1; l_2	M	t	number3) z	Axial [mm]	Radial [mm]	Angular [degrees]	[Nm/rad]	[kg]
5	M	0,1	2	5	10	15 1)	6	M2	1,8	1	0,30	0,10	0,7	97	0,0027
	S					17 2)					0,40	0,15	1,0	75	0,003
7	M	1,0	3	8	15	18 1)	7	M3	2,0	1	0,30	0,10	0,7	390	0,005
	S					20 2)					0,40	0,15	1,0	300	0,006
9	M	1,5	4	10	20	21 1)	8	M3	2,5	2	0,35	0,15	1,0	750	0,010
	S					24 2)					0,50	0,20	1,5	580	0,011
12	M	2,0	5	14	25	27,5 1)	11	M4	2,5	2	0,40	0,15	1,0	1270	0,017
	S					31 2)					0,60	0,20	1,5	980	0,019

Circumferential speed v_{max}= 25 m/s

TOOLFLEX®		Technical data of type with clamping screw (type. 2.5)														
		Torque	Dimensions [mm]										Perm. displacements			Torsional stiffness	Weight 4)
			Finish bore		General			Clamping screw									
Size	Design1/2)	T_{KN} [Nm]	$d_{min.}$	$d_{max.}$	D_H	L_1	l_3; l_4	M_1	t_1	e	D_K	T_A [Nm]	Axial [mm]	Radial [mm]	Angular [degrees]	[Nm/rad]	[kg]
7	M	1,0	3	7	15	24 1)	9	M2	3,2	5,0	16,5	0,37	0,3	0,1	0,7	390	0,007
	S					26 2)							0,4	0,15	1,0	300	0,008
9	M	1,5	3	9	20	30 1)	11	M2,5	3,5	7,1	21,5	0,76	0,35	0,15	1,0	750	0,014
	S					33 2)							0,5	0,2	1,5	580	0,015
12	M	2,0	4	12	25	34,5 1)	13	M3	4,0	8,5	26,5	1,34	0,4	0,15	1,0	1270	0,025
	S					38 2)							0,6	0,2	1,5	980	0,027

1) Design S = 4 shafts 2) Design M = 6 shafts 3) Quantity each hub, from size 9: 2x120° offset
4) Figures refer to the complete coupling with max. bores
Circumferential speed v_{max}= 20 m/s

Note:
The coupling must be selected in a way that the nominal torque exceeds the maximum torque to be transmitted (accelerating or peak torque). In case of values exceeding T_{KN} (collision, trouble) only limited alternating load figures are possible. In this torque range there can be permanent deformation of the bellow and fatigue fractures can occur.

Order form:

TOOLFLEX® 7 M	2.5	d - Ø4	2.5	d - Ø6
Coupling size	Hub design	Finish bore component 1	Hub design	Finish bore component 2

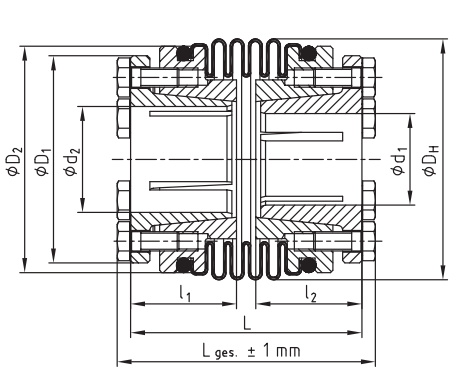
TOOLFLEX® Metal bellows-type couplings

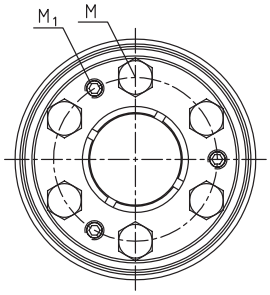
Type KN

Zero-Backlash, torsionally Stiff and Maintenance-Free

NEW

- Zero-backlash-free, torsionally stiff
- Rigid bellow-hub connection
- High-torque capacity keyless connection
- Maintenance-free
- Designed for high-speed applications





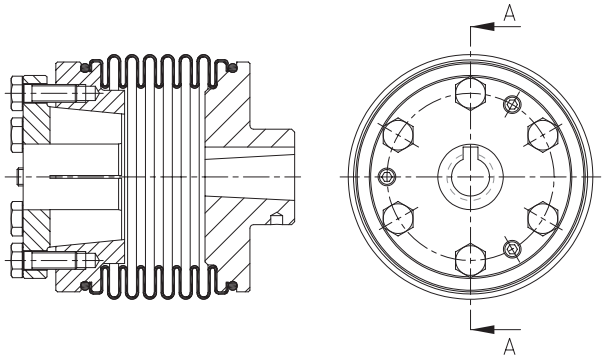
TOOLFLEX® S-KN

TOOLFLEX® Size	Torque T_{KN} [Nm]	Dimensions [mm]																
		Finish bore		L		$L_{ges.}$		l_1; l_2	D_H	D_1	D_2	Clamping screw			Pull-off threads		
		$d_{min.}$	$d_{max.}$	4 shafts 1)	6 shafts 2)	4 shafts 1)	6 shafts 2)					M	T_A [Nm]	Number z	M_1	Number z	T_{A1} 4) [Nm]
30	35	12	22	48	57	54	63	22	50	43	47	M4	2,9	12	M4	6	1,2
38	65	12	28	56	68	63	75	26	60,5	52	56	M5	6	12	M5	6	1,4
45	150	15	40	74,5	91	82,5	99	34	82	68	77	M6	14	12	M6	6	3
55 3)	340	15	56	95,5	109	106	120	40	97	95	95	M8	35	12	M8	6	6

TOOLFLEX® Size	Bore range d and the corresponding transmittable torques T_R of frictional engagement of the clamping hub [Nm]																			
	Ø12	Ø14	Ø15	Ø16	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø48	Ø50	Ø55	Ø56
30	37	50	58	66	[illegible]	[illegible]														
38	52	[illegible]	81	92	130	103	149	161	202											
45		113	130	147	208	230	332	230	288	331	[illegible]	451	531	589						
55 3)			[illegible]	198	[illegible]	309	445	483	606	696	[illegible]	585	690	[illegible]	843	967	1101	1194	1445	1498

1) Design S = 4 shafts 2) Design M = 6 shafts 3) Hubs from steel welded with bellow
4) After assembly of the clamping screws (M) tighten the pull-off thread (M_1) to the torque T_{A1} indicated.

Other designs: TOOLFLEX® KN for FANUC engines



Order form:

TOOLFLEX® 38 S-KN	d_1 - Ø15	d_2 - Ø22
Coupling size	Finish bore component 1	Finish bore component 2

The **NEW** **RADEX®-NC** steel disk **servo-motor couplings** were designed specifically for the motion control technology, which requires not only zero-backlash torque transmission, but high torsional stiffness.

Application Examples

Indexing table, planetary or worm gears with low transmission for highly precise positioning, ball screws with large diameters and/or low ratio pitch.

High Temperature Resistance

The all steel style can be used in temperatures up to **535° F**.

Backlash Free

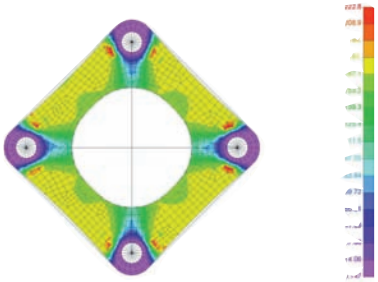
Special shoulder bolts along with a **strong frictional connection** between the disk pack bushing and hub flanges allow the coupling to transmit torque with zero-backlash.

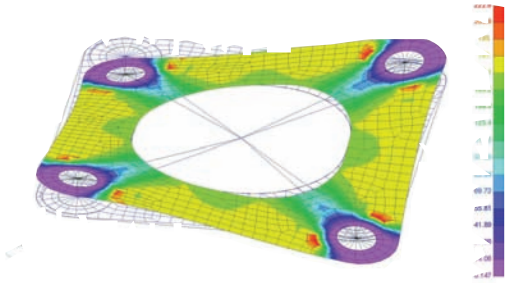
Maintenance Free

The **stainless steel** disk packs require no lubrication allowing the coupling to be completely maintenance free

Finite Element Analysis (F.E.A.)

Through FEA, we have been able to analyze and re-design the **RADEX®-NC** thin layered disk packets to reduce high stress points and optimize performance.





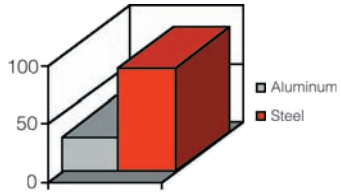
Misalignment Capabilities

The thin layered disk packets of the **RADEX®-NC** compensate axial, angular and parallel misalignment producing **low restoring forces**, therefore increasing the lifetime of adjacent support bearings.

Aluminum Hubs and Spacers

The **RADEX®-NC** hubs and spacers are **precisely machined** from high quality aluminum bar stock. As a result there are **low mass moments of inertia**, which is highly beneficial for the dynamic characteristics of the entire drive system.

Comparison of Mass Moment of Inertia



Cross clamped **RADEX®-NC** hub

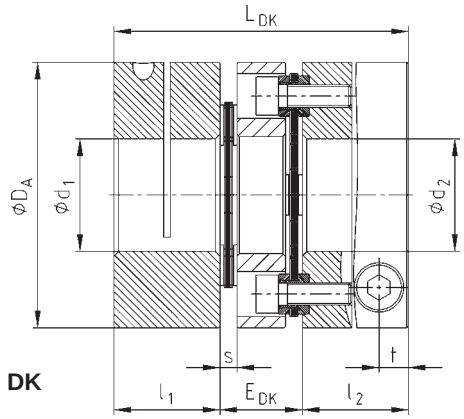
Frictionally Engaged Cross Clamped Hubs

All **RADEX®-NC** hubs are manufactured with a cross clamped style hub for **frictionally engaged** torque transmission. This design satisfies the need of **continuous reversing** applications for the motion control industry.

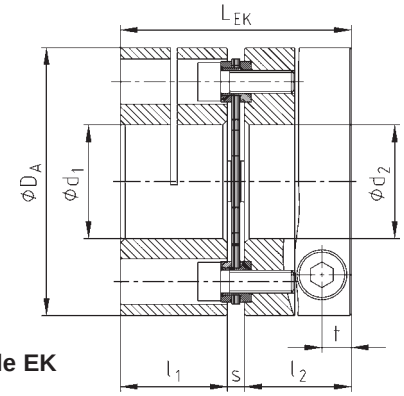
RADEX®-NC

Servo Motor Couplings

- **Zero-Backlash** torque transmission for precision drives
- High torsional stiffness
- Zero-Backlash cross clamped hubs
- Low mass moment of inertia
- High speed capability
- Operating temperatures up to 535˚ F



Style DK



Style EK

Size	Technical Data				Misalignment Style DK			Misalignment Style EK		
	T_{KN} [lb in]	T_{Kmax} [lb in]	Max. Speed [rpm]	Torsional Stiffness 1) [lb in / rad]	Parallel [in]	Axial [in]	Angular [degree]	Parallel [in]	Axial [in]	Angular [degree]
10	66	132	20000	49560	0.005	0.031	1	-	0.016	1
15	177	354	16000	106200	0.006	0.039	1	-	0.020	1
20	265	531	12000	265500	0.010	0.047	1	-	0.024	1
25	531	1062	10000	531000	0.012	0.063	1	-	0.031	1
35	885	1770	9000	637200	0.016	0.079	1	-	0.039	1

1) EK design

Size	Dimensions [in]								Cross Bolt		Mass Moment of Inertia	
	Max. d_1; d_2	D_A	l_1; l_2	L_{DK}	E_{DK}	L_{EK}	s	t	Size	Torque [lb in]	DK [lb in s²]	EK [lb in s²]
10	0.563	1.38	0.63	1.73	0.47	1.38	0.12	0.20	M4	26	0.0001239	0.0000885
15	0.750	1.85	0.83	2.17	0.51	1.77	0.12	0.27	M6	88	0.0004779	0.0003540
20	1.000	2.32	0.94	2.68	0.79	2.09	0.20	0.26	M6	88	0.0016815	0.0013275
25	1.500	2.76	1.26	3.46	0.94	2.72	0.20	0.35	M8	221	0.0040710	0.0030975
35	1.563	3.31	1.38	3.86	1.10	3.03	0.28	0.41	M10	433	0.0088500	0.0070800

Inch Bore Available

1. Drives without periodic torsional vibrations:
For example, centrifugal pumps, fans, screw compressors, etc. The coupling selection requires that the nominal torque T_{KN} and the maximum torque T_{Kmax} are checked.

1.1 Loading due to nominal torque:
The nominal torque of the coupling T_{KN} must be larger than or equal to the nominal torque of the system T_N multiplied by the operating service factor S_B.

$$T_{KN} \geq T_N \times S_B$$

1.1 Loading due to spike loads:
The maximum torque T_{Kmax} of the coupling must be larger than or equal to the sum of the peak torque T_S and the nominal torque T_N of the system. This is valid when a shock load is superimposed on the nominal torque of the system (for example motor starting).
For drives with AC motors and large mass moment of inertia on the load side, KTR recommends a calculation of the start up torque with our simulation program. Consult KTR for this free service.

$$T_{Kmax} \geq (T_N + T_S)$$

2. Drives with periodic torsional vibrations:
For example, piston compressors, combustion engines, piston pumps, generators, etc. For these types of applications, a torsional vibration analysis is required. Please consult KTR.

2.1 Loading due to nominal torque:
The nominal torque of the coupling T_{KN} must be larger than or equal to the nominal torque of the system T_N multiplied by the operating service factor S_B.

$$T_{KN} \geq T_N \times S_B$$

2.2 Passing through resonance:
The peak torque T_{SR} experienced while passing through resonance cannot exceed the maximum torque of the coupling T_{Kmax}.

$$T_{Kmax} \geq T_{SR}$$

2.3 Loading due to alternating torque:
The alternating torque of the coupling T_{KW} cannot be exceeded by the alternating torque of the system T_W.

$$T_{KW} \geq T_W$$

Table of Terms:

Term	Abbreviation	Definition
Nominal coupling torque	T_{KN}	Torque that can be transmitted continuously throughout the entire coupling speed range
Maximum coupling torque	T_{Kmax}	Torque to be transmitted $1x10^5$ occurences of peak load or $0.5x10^4$ occurences of alternating load during the entire life of the coupling
Alternating coupling torque	T_{KW}	The maximum amplitude of an alternating torque with a frequency of 10 Hz and a base load of T_{KN}.

Operating Service Factors:

Application	S_B	Application	S_B	Application	S_B
Agitators	1 - 2	Generators	1	Packaging Machinery	1
Centrifugal Pumps	1.5	Rotary Screw Compressors	1.5	Fans / Blowers / Centrifuges	1.5
Woodworking Machinery	1.5	Calenders	2	Machine Tools	2
Mixers / Extruders	2	Construction Machinery	2	Conveyor Belts	2
Elevators	2	Textile Machinery	2	Turbo Compressors	2
Crushers	2.5	Grinders	2.5	Piston Compressors	2.5
Piston Pumps	2.5	Rolling Mills	2.5	Presses	2.5

Order form for RADEX®-NC:

Coupling			First Hub		Second Hub	
Qty.	Size	Style	Shaft	Keyway	Shaft	Keyway
5	25	DK	1.125"	0.250"	1.125"	0.250"

10 through 35

Style DK / EK