Table of contents

Application recommendation

If a shaft coupling is needed for a servo drive, three different backlash-free coupling types are available: ROTEX® GS, TOOLFLEX® and RADEX®-NC . Dependent on the required torsional stiffness of the complete system you choose the best coupling for your individual application.

ROTEX® GS Backlash-free, flexible jaw-type coupling

- axially plug-in ability
- high power density
- adjustment of damping through different elastomer hardness of the spiders

Shaft encoders, miniature drives	compact design, easy assembly/disassembly, electric insulation
Ball screws, synchronous belt drives	high power density, adapted torsional stiffness, damping vibrations, for thread drives with pitch < 40 (otherwise an inspection by KTR is necessary)
Low backlash/backlash-free gears	high power density, easy blind assembly/disassembly, fail-safe, suitable for average to high gear ratios i≥ 7, temperature range 80 °C at the maximum
Main spindle drives	high power density, good concentric running properties of the clamping ring hubs, damping vibrations with interrupted cutting, higher accuracy of the ROTEX® GS-P design for HSC machining

TOOLFLEX® Backlash-free, torsionally stiff metal bellow-type coupling

- non-positive bellow-hub connection
- frictionally engaged clamping hubs

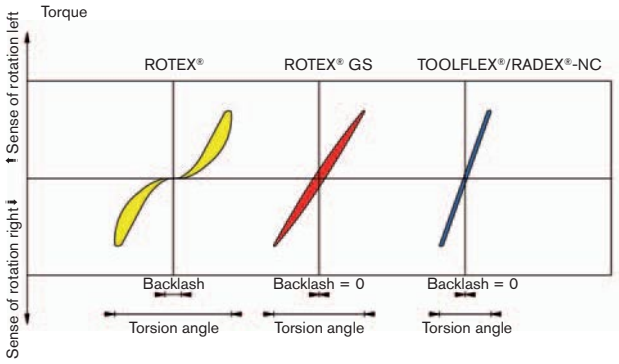
Shaft encoders, miniature drives	compact flexible coupling with low radial restoring forces
Ball screws, synchronous belt drives	suitable if higher torsional stiffness is required, e. g. high pitch with threaded spindle drives s ≥ 40, constant torsional stiffness with high temperatures
Low backlash/backlash-free gears	suitable if higher torsional stiffness is required, e. g. gear ratios i < 7, constant torsional stiffness with high temperatures
Main spindle drives	high torsional stiffness, for main spindle drives subject to critical resonances

RADEX®-NC Backlash-free, torsionally rigid servo laminae coupling

- compact design
- higher torsional stiffness
- frictionally engaged clamping hubs

Shaft encoders, miniature drives	double-cardanic design to compensate for bigger displacements
Ball screws, synchronous belt drives	suitable if higher torsional stiffness is required, e. g. high pitch with threaded spindle drives s ≥ 40, constant torsional stiffness with high temperatures
Low backlash/backlash-free gears	suitable if higher torsional stiffness is required, e. g. gear ratios i < 7 , constant torsional stiffness with high temperatures
Main spindle drives	high torsional stiffness, for main spindle drives subject to critical resonances, for high torques type RADEX®-N is available: T_{KN} up to 280.000 Nm

The diagram alongside this text clarifies the influence of the ROTEX®, ROTEX® GS, RADEX®-NC and the TOOLFLEX® couplings regarding backlash and torsion angle.
Due to the high stiffness of the RADEX®-NC and the 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 is not possible.

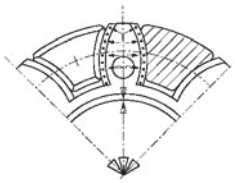


Technical description

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

ROTEX® GS (straight tooth, backlash-free)
The straight toothing of the spider mounted under prestress results in a smaller surface pressure and consequently higher stiffness of the coupling system. The 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.

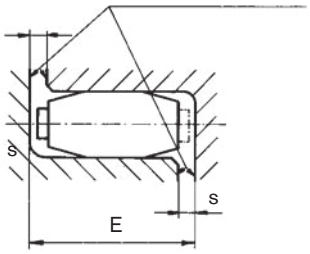
Limitation by concave cams in case of too high speeds/centrifugal forces and prestress of elastomer parts



Support to the axis of rotation

The hub claws and the nylon teeth are chamfered to allow for a "blind assembly". 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. The plug-in force varies depending on the Shore hardness and prestress of the spider (see comments in the mounting instructions KTR-N 45510).

Electric isolation due to gap dimension "s"



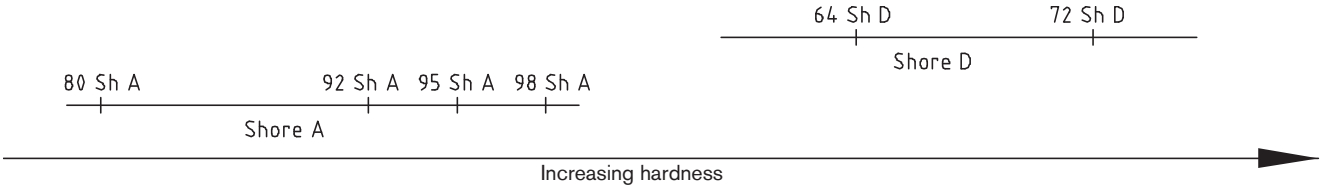
By observing the gap dimension "s" the electrical isolation is ensured, as well as a high service life of the coupling. This fact is gaining more and more importance, due to the increasing precision of shaft encoders and the existing demand for electro-magnetic compatibility.

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 four spiders with different kinds of Shore hardness it is easily possible to adjust the **ROTEX® GS** regarding the torsional stiffness and the vibration behaviour to the individual conditions of an application.

Spider

Description of spider hardness [Shore]	Identification Colour	Material	Permissible temperature range [° C]		Available for coupling size	Typical applications
			Permanent temperature	Max. temperature short-term		
80 Sh A-GS	blue	Polyurethane	- 50 to + 80	- 60 to + 120	size 5 to 24	– drives of electric measuring systems
92 Sh A-GS	yellow	Polyurethane	- 40 to + 90	- 50 to + 120	size 5 to 55	– drives of electric measuring and control systems – main spindle drives
95/98 Sh A-GS	red	Polyurethane	- 30 to + 90	- 40 to + 120	size 5 to 75	– positioning drives – main spindle drives – high load
64 Sh D-H-GS	green	Hytrel	- 50 to + 120	- 60 to + 150	size 7 to 38	– planetary gears / backlash-free gears – heighten torsional stiffness / high ambient temperature
64 Sh D-GS	green	Polyurethane	- 20 to + 110	- 30 to + 120	size 42 to 75	– heighten load – heighten torsional stiffness
72 Sh D-H-GS	grey	Hytrel	- 50 to + 120	- 60 to + 150	size 24 to 38	– very high torsional stiffness – very high load
72 Sh D-GS	grey	Polyurethane	- 20 to + 110	- 30 to + 120	size 42 to 65	– very high torsional stiffness – very high load

Degree of hardness

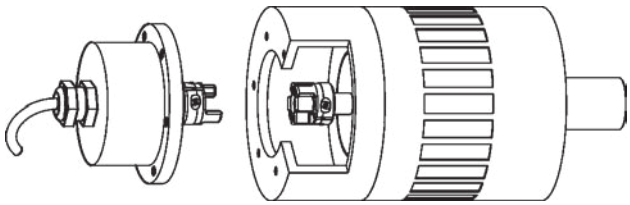


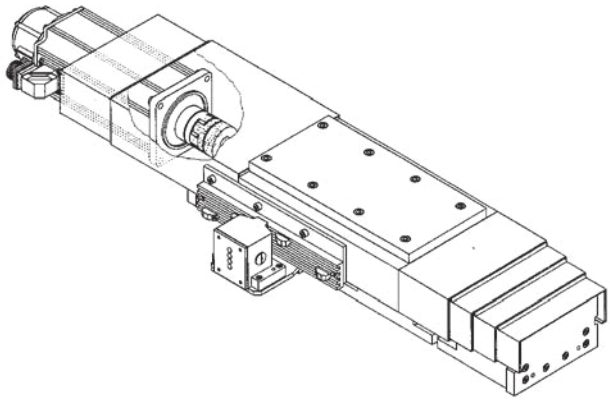
Application recommendation

Measurement and control systems

For measurement and control systems a high torsional stiffness of the coupling is required in order to obtain positioning repeatability. The torques that arise are relatively small so that backlash-free, torsionally stiff power transmission is achieved by the elastomer prestress.

In order to minimize the restoring forces we would recommend the spider 80 Sh A GS for such applications.





Servo and positioning drives

ROTEX® GS as an alternative to torsionally rigid couplings

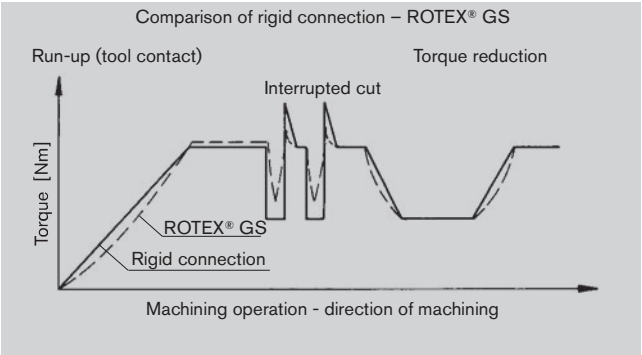
Torsionally rigid shaft-to-shaft connections do not only transmit the torque backlash-free and non-rigid, but also torque peaks and vibrations. For driving systems with critical vibrations, the benefit of high stiffness for torque transmission soon becomes a serious disadvantage. For applications on which torsionally rigid shaft-to-shaft connections may cause a problematic torque transmission, the optimum alternative is ROTEX® GS.

Backlash-free, damping vibrations, yet sufficiently torsionally rigid so that even highly dynamic servo drives must not suffer from lower precision with the right sizing of the coupling.

Main spindle drives

With the high torques in the field of machine tools, e. g. direct spindle drives, initial small twisting (under prestress) and damping dependent on the elastomer hardness is achieved. Peak tensions and shock loads are reduced or the resonance range is shifted to non-critical speed ranges, respectively.

For peripheral speeds up to 50 m/s (referred to the outside diameter of the coupling) we would recommend to use our ROTEX® GS clamping ring hub. For peripheral speeds exceeding 50 m/s, ROTEX® GS...P should be used. We have on hand experiences from industrial applications for peripheral speeds up to 80 m/s.



Explosion protection use

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 so that there is a minimum safetyfactor of s = 2 between the peak torque (including all operating parameters) and the nominal torque and frictional torque of engagement of the coupling.

Spider from polyurethane	92 Shore A	95/98 Shore A	64 Shore D
Relative Damping ψ [-]	0,80	0,80	0,75
Resonance factor V_R [-]	7,90	7,90	8,50

Technical data

Size	Spider Shore-GS	Shore range	Max. speed [rpm] for hub design 2.0 / 2.1 2.5 / 2.6	Max. speed [rpm] for hub design 1.0 1.1	Max. speed [rpm] for hub design 6.0 light [2]	Max. speed [rpm] for hub design 6.0 P [2]	Torque [Nm] T_{KN}	Torque [Nm] $T_{K\,max}$	Static torsion spring stiffness [1] [Nm/rad]	Dynamic torsion spring stiffness [1] [Nm/rad]	Radial stiffness C_r [N/mm]	Weight [kg] Each hub [5]	Weight [kg] Spider	Mass moment of inertia J [kgm²] Each hub [5]	Mass moment of inertia J [kgm²] Spider
5	70	A	38000	47700			0,2	0,3	1,78	5	43	1 x 10^{-3}	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	34100			0,7	1,4	8,6	26	114	3 x 10^{-3}	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				
9	80	A	19000	23800			1,8	3,6	17,2	52	125	8 x 10^{-3}	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	19100			3,0	6,0	84,3	252	274	17 x 10^{-3}	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				
14	80	A	12700	15900	32000	47700	4,0	8,0	60,2	180	153	23 x 10^{-3}	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				
19	80	A	9550	11900	24000	35800	4,9	9,8	618	1065	582	86 x 10^{-3}	7 x 10^{-3}	19,5 x 10^{-6}	1,35 x 10^{-6}
	92	A					10,0	20,0	1090	1815	1120				
	98	A					17,0	34,0	1512	2540	2010				
	64	D					21,0	42,0	2560	3810	2930				
24	92	A	6950	8650	17000	26000	35	70	2280	4010	1480	197 x 10^{-3}	18 x 10^{-3}	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	7350	15000	22000	95	190	4080	6745	1780	312 x 10^{-3}	29 x 10^{-3}	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	5950	12000	17900	190	380	6525	11050	2350	611 x 10^{-3}	49 x 10^{-3}	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	265	530	10870	15680	2430	2422 x 10^{-3}	74,5 x 10^{-3}	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	310	620	12968	18400	2580	3314 x 10^{-3}	96 x 10^{-3}	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	410	820	15482	21375	2980	5026 x 10^{-3}	125 x 10^{-3}	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	14883				
NEW 65	95	A	2800	3500	5650 [4]	11000	940	1880	48520	71660	6418	6754 x 10^{-3}	185 x 10^{-3}	15143 x 10^{-6}	437 x 10^{-6}
	64	D					1175	2350	118510	189189	8870				
	72 [3]	D					1527	3054	160000	310000	11826				
75	95	A	2350	2950	4750 [4]	8950	1920	3840	79150	150450	8650	10498 x 10^{-3}	342 x 10^{-3}	32750 x 10^{-6}	1179 x 10^{-6}
	64	D					2400	4800	182320	316377	11923				

[1] Static and dynamic torsional stiffness with 0,5 x T_{KN}
[2] Higher speeds on request
[3] With the use of the 72 Sh D spider we would recommend to use hubs from steel
[4] Clamping ring hubs 6.0 from steel
[5] Hubs with average bore type 1.0

The size of the coupling has to be such that the permissible coupling load is not exceeded in any operating condition (see coupling selection on page 141).
The torques T_{KN}/T_{Kmax} mentioned refer to the spider. The shaft-hub-connection has to be investigated by the customer.

1. Definitions and factors for coupling selection

Prestress: The flexible prestress varies depending on the coupling size, the spiders/spider material and the production tolerances. As a result there is the axial plug-in force varying from low as sliding seat or with a torsionally soft spider to heavy with a high amount of prestress or torsionally rigid spider.

T_{KN} Rated torque of coupling [Nm] – Torque which can be transmitted continuously over the entire permissible speed range, taking into account the operating factors (S_t, S_d). –

T_{Kmax} Maximum torque of coupling [Nm] – Torque which can be transmitted during the full service life of the coupling as dynamic load ≥ 10^5 or as alternating load $5 \cdot 10^4$, taking into account the operating factors (S_t, S_d, S_A). –

T_R Friction torque [Nm] – Torque which can be transmitted by the frictionally engaged shaft-hub-connection. –

T_{AN} Constantly occurring driving torque as per the data indicated by the engine manufacturer

T_{AS} Maximum driving torque [Nm] as per the data indicated by the engine manufacturer – Peak torque in case of shock by the driving A. C. motor, for example during acceleration or breakdown torque of the A. C. motor. –

T_S Peak torque [Nm] – Peak torque on the coupling, calculated from max. driving torque T_{AS}, rotational inertia coefficient m_A or m_L and opertaing factor S_A. –

S_t Temperature factor – Factor considering the lower loading capacity or larger deformation of an elastomer part under load particularly in case of increased temperatures. In case of temperatures exceeding 80 °C we would recommend to use the RADEX®-NC (see page 166). –

S_d Torsional stiffness factor – Factor considering the different demands on the torsional stiffness and fatigue strength of the coupling dependent on the application. In case of using the spider 64 Sh D-GS and reversing drive S_d has to selected in case of couplings made of aluminium. For positioning drives with increased demand on torsional stiffness (e. g. gearbox with low transmission) we would recommend the use of the TOOLFLEX® or RADEX®-NC (see page 157 and 166). –

S_A Operating factor – Factor considering the occurring shocks or starts each minute, depending on the –

$m_{A(L)}$ Rotational inertia coefficient of driving side (load side) – Factor taking into account the distribution of masses in case of drive and load side shocks and vibration excitation. –

Coupling selection

2. Factors

Temperature factor S_t				
	-30 °C +30 °C	+40 °C	+60 °C	+80 °C
S_t	1,0	1,2	1,4	1,8

See note on page 136.

Torsional stiffness factorr S_d		
Main spindle drive of machine tool	Positioning drive (x - y axis)	Shaft encoders Angle encoders
2 — 5*	3 — 8*	10 →

See note on page 140.
*When using the 64 Sh D-GS spider at least factor 4
With the use of the spider 72 Sh D-GS with a minimum factor 4 and steel hubs.

Operating factor S_A		
main spindle drive	positioning drive*	S_A
light shock loads	≤ 60	1,0
average shock loads	≥60 ≤300	1,4
heavy shock loads	≥300	1,8

*Starts/minute

3. Calculation formula

The size of the coupling must be selected so that the following conditions are met.

$$T_{KN} \geq T_N \cdot S_t \cdot S_d$$ and $$T_{KN} \geq T_S \cdot S_t \cdot S_d$$

For the factors please see the tables at the top.

Peak torque

Shock on driving side
$T_S = T_{AS} \times m_A \times S_A$

Shock on load side
$T_S = T_{LS} \times m_L \times S_L$

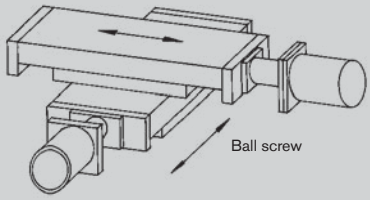
$$m_A = \frac{J_L}{J_A + J_L} \qquad m_L = \frac{J_A}{J_A + J_L}$$

J_A = Moment of inertia of driving side
J_L = Moment of inertia of load side

4. Example of calculation (positioning drive)

Given: Details of driving side
Servo motor
Rated torque T_{AN} = 43 Nm
Max. drive torque T_{AS} = 144 Nm
Moment of inertia J_{Mot} = 108 ▪ 10^{-4} kgm²
Driving shaft d = 32 k6 without keyway

Details of driven side
Ball spindle J_{SP} = 38 ▪ 10^{-4} kgm²
Screw pitch s = 10 mm
Driven shaft d = 30 k6 ohne Nut
Mass of slide and work piece m_{Schl} = 1030 kg



Ambient temperature t = 40 °C ⇒ S_t = 1,4
60 starts/minute required ⇒ S_A = 1,0

required:
high torsional stiffness ⇒ Sd = 4

Preliminary consideration:
ROTEX® GS clamping ring hub - axial plug-in jaw coupling backlash-free under prestress with frictionally engaged shaft-hub-connection.

● Moment of inertia of slide and work piece reduced to driving axis.

$$J_{Schl} = m_{Schl} \left(\frac{s}{2 \cdot \pi} \right)^2 [kgm^2] \qquad J_{Schl} = 1030\ kg \left(\frac{0{,}01\ m}{2 \cdot \pi} \right)^2 = 26 \cdot 10^{-4}\ kgm^2$$

Coupling selection

● Selection according to rated torque (pre-selection)

$$T_{KN} \geq T_{AN} \cdot S_t \cdot S_d \qquad T_{KN} \geq 43\ Nm \cdot 1{,}2 \cdot 4 \qquad T_{KN} \geq 206{,}4\ Nm$$

● Coupling selection: ROTEX® GS 38 - 98 Sh A-GS - clamping hub design T_{KN} 325 Nm

● Review of max. deiving torque

$$T_{KN} \geq T_S \cdot S_t \cdot S_d$$

$$T_S = T_{AS} \cdot m_A \cdot S_A$$

$$m_A = \frac{J_L}{J_A + J_L} = \frac{73{,}8 \cdot 10^{-4}}{(117{,}6 + 73{,}8) \cdot 10^{-4}} = 0{,}385$$

$J_L = (J_{Sp} + J_{Schl} + {}^1/_2 J_K) = (38 + 26 + 9{,}6) \cdot 10^{-4}\ kgm^2 = 73{,}8 \cdot 10^{-4}\ kgm^2$
$J_A = J_{Mot} + {}^1/_2 J_K = (108 + 9{,}6) \cdot 10^{-4}\ kgm^2 = 117{,}6 \cdot 10^{-4}\ kgm^2$

$T_S = 144\ Nm \cdot 0{,}385 \cdot 1{,}0 = 55{,}44\ Nm$
$T_{KN} \geq 55{,}44\ Nm \cdot 1{,}2 \cdot 4$

ROTEX® GS 38 98 Sh A-GS T_{KN} = 325 Nm
$T_{KN} \geq 266{,}11\ Nm$

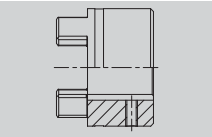
● Check of torque transmission of clamping ring hub for shaft diameter Ø 30

$T_R > T_{AS}$ Figures for T_R see table on catalogue page 146.
Transmittable torque T_R Ø 30 H7/k6 = 452 Nm > 144 Nm ✓

Hub designs

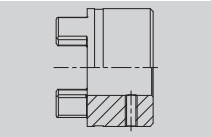
Due to the numerous applications of ROTEX® GS for many different mounting situations, this coupling system is available with various hub designs. These designs mainly differ in that they offer either positive or frictionally engaged (backlash-free) connections, but mounting situations like, for example, hollow shaft tacho, shaft encoder installation or similar applications are covered, too.

Design 1.0 with keyway and fixing screw



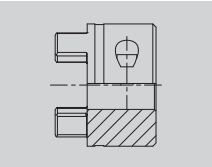
Positive power transmission; permissible torque depends on the permissible surface pressure. Not suitable for backlash-free power transmission for heavily reversing operation.

Design 1.1 without keyway, with setscrew



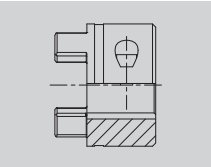
Non-positive torque transmission, suitable for backlash-free transmission of very small torques. (Only for ATEX category 3)

Design 2.0 clamping hub, single slotted, without keyway



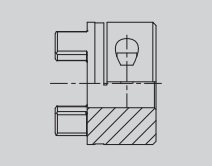
Frictionally engaged, backlash-free shaft-hub-connection. Transmittable torques depend on the bore diameter. Design 2.0 up to size 14 as standard. (Only for ATEX category 3)

Design 2.1 clamping hub, single slotted, with keyway



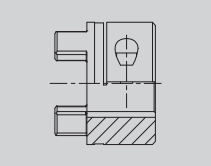
Positive power transmission with additional frictional tightness. The frictional tightness avoids or reduces reversal backlash. Surface pressure of the keyway connection is reduced. Design 2.1 up to size 14 as standard.

Design 2.5 clamping hub, double slotted, without keyway



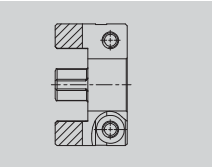
Frictionally engaged, backlash-free shaft-hub-connection. Transmittable torques depend on the bore diameter. Design 2.5 from size 19 as standard. (Only for ATEX category 3)

Design 2.6 clamping hub, double slotted, with keyway



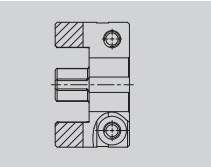
Positive power transmission with additional frictional tightness. The frictional tightness prevents or reduces reversal backlash. Surface pressure of the keyway connection is reduced. Design 2.6 from size 19 as standard.

Type 2.8 short clamping hub with axial slots without feather key



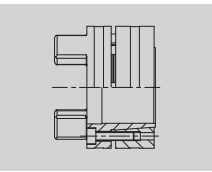
Frictionally engaged, backlash-free shaft-hub-connection, good properties of concentric running due to symmetrical arrangement and cams without slots. Design 2.8 up to size 24 as standard. (Only for ATEX category 3)

Type 2.9 short clamping hub with axial slots with feather key



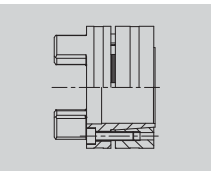
Positive-locking power transmission in addition frictionally engaged. Smooth power transmission due to cams without slots. The surface pressure of the feather key combination is reduced. Type 2.9 from size 24 as standard.

Design 6.0 clamping ring hub



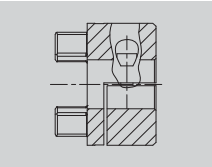
Integrated frictionally engaged shaft-hub-connection for transmission of higher torques. Screw fitting on elastomer side. For details about torques and dimensions see page 146/147. Suitable for high speeds.

Design 6.0 P precision clamping ring hub



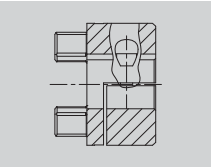
Design equal to 6.0, but highly accurate machining with slight modifications of design, see page 148.

Design 7.5 shell clamping hub without feather keyway for double-cardanic connections



Frictionally engaged, backlash-free shaft-hub connection for the radial assembly of the coupling. Transmittable torques dependent on bore diameter. Torque indicated on page 152.

Design 7.6 shell clamping hub with feather keyway for double-cardanic connections



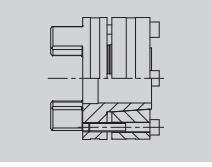
Positive shaft-hub connection with additional frictional engagement for the radial assembly of the coupling. The frictional engagement avoids or reduces the reverse backlash. The surface pressure of the feather key connection is reduced.

Design 7.8 shell clamping hub without feather keyway for single-cardanic connection

Design 7.9 shell clamping hub with feather keyway for single-cardanic connection

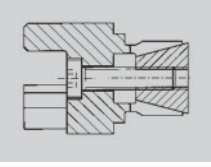
Special designs on request of customers

Design 6.5 clamping ring hub

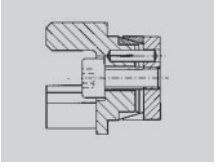


Design equal to 6.0, but clamping screws on the outside. For example for radial disassembly of the intermediate tube (special design).

Special hub designs for hollow shaft drives



Expansion hub



ROTEX® GS hub with CLAMPEX® KTR 150

Stock programme

Finish bore [mm] according to ISO fit H7 / feather keyway with thread according to DIN 6885 sheet 1 - JS9																																
Size	Hub design	un-/pilot bored	∅2	∅3	∅4	∅5	∅6	∅6,35	∅7	∅8	∅9	∅9,5	∅10	∅11	∅12	∅14	∅15	∅16	∅18	∅19	∅20	∅22	∅24	∅25	∅28	∅30	∅32	∅35	∅38	∅40	∅42
	1.1	●			●	●	●		●																							
7	2.0	●		●	●	●	●	●	●																							
	2.0C	●																														
	1.0	●					●		●	●	●		●																			
	1.1	●			●	●	●		●	●			●																			
9	2.0	●		●	●	●	●	●	●	●	●	●	●	●																		
	2.1	●					●			●	●		●																			
	2.0C	●																														
	1.0	●													●																	
	1.1	●																														
12	2.0	●			●	●	●	●		●	●		●	●	●																	
	2.1	●											●		●																	
	2.0C	●																														
	1.0	●					●			●	●		●	●	●	●	●	●														
	1.1	●					●			●			●	●	●	●																
	2.0	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●														
14	2.1	●								●	●		●	●	●	●	●	●														
	2.0C	●								●	●		●	●																		
	6.0 light									●			●	●	●	●																
	6.0 P															●																
	1.0	●											●	●	●	●	●	●	●	●	●	●	●									
	2.5	●				■				●		●	●	●	●	●	●	●	●	●	●	●	●									
	2.6	●								●			●	●	●	●	●	●	●	●	●		●									
19	2.0C	●									●		●	●		●	●	●	●	●	●		●									
	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 design	∅28	∅30	∅32	∅35	∅38	∅40	∅42	∅45	∅48	∅50	∅55	∅60	∅65	∅70	∅80
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										●	●	●	●	●	●

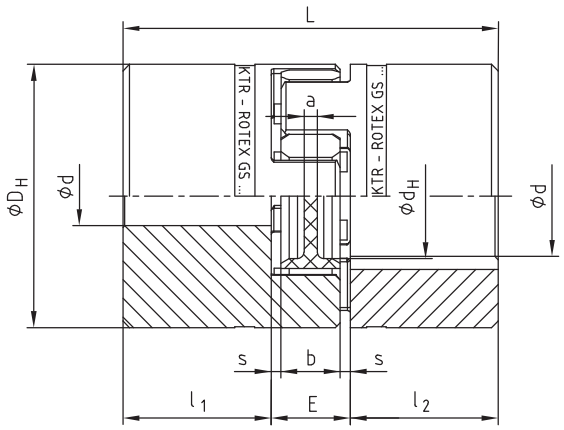
■ = Pilot bored clamping hubs ● = Standard bore

Unbored hubs up to size 65 available from stock.

Further dimensions on request

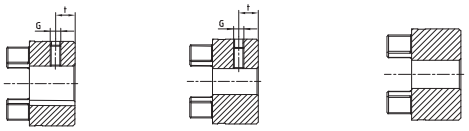
Miniature couplings

- Backlash-free shaft connections for measurement drive swith small torques
- Small dimensions - low flywheel mass
- Maintenance-free, easy to check visually
- Different elastomer hardness of spiders
- Finish bore acc. to ISO fit H7 (apart from clamping hub), keyway, from Ø 6 mm acc. to DIN 6885 sheet 1 - JS9
- Ex Approved according to EC Standard 94/9/EC (without feather key according to category 3)



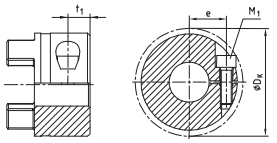
Hub designs: (see page 142)

Design 1.0 | Design 1.1 | Design 1.2



with keyway and setscrew | without keyway with setscrew | without keyway without setscrew

Setscrew to DIN EN ISO 4029



Clamping hub with capscrew DIN EN ISO 4762 (ROTEX® 5 DIN 84)

Design 2.0 Clamping hub without keyway, (only category 3), torques depending on bore diameter

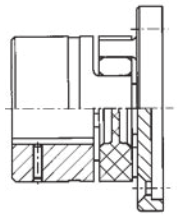
Design 2.1 Clamping hub with keyway

Size	Finish bore				Dimensions [mm]								Setscrew		Clamping screw				
		Hub design																	
	d_{min}	1.0 d_{max}	1.1, 1.2 d_{max}	2.0, 2.1 d_{max}	D_H	d_H	L	l_1; l_2	E	b	s	a	G	t	M_1	t_1	e	$ØD_K$	T_A [Nm]
ROTEX® GS Aluminium (Al-H)																			
5	2	—	6	5	10	—	15	5	5	4	0,5	4,0	M2	2,5	M1,2	2,5	3,5	11,4	—
7	3	7	7	7	14	—	22	7	8	6	1,0	6,0	M3	3,5	M2	3,5	5,0	16,5	0,37
9	4	10	11	11	20	7,2	30	10	10	8	1,0	1,5	M4	5,0	M2,5	5,0	7,5	23,4	0,76
12	4	12	12	12	25	8,5	34	11	12	10	1,0	3,5	M4	5,0	M3	5,0	9,0	27,5	1,34
14	5	16	16	16	30	10,5	35	11	13	10	1,5	2,0	M4	5,0	M3	5,0	11,5	32,2	1,34

Bores and the corresponding transmittable torques of the clamping hub design 2.0 [Nm]														
Size	∅2	∅3	∅4	∅5	∅6	∅7	∅8	∅9	∅10	∅11	∅12	∅14	∅15	∅16
5	*	*	*	*										
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

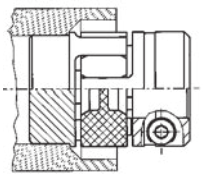
* Use of DIN 84 screw, tightening torque T_A not defined (slotted screw)

Other designs

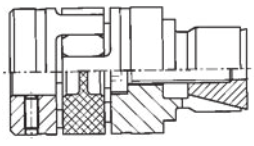


ROTEX® GS-CF

ROTEX® GS for hollow shaft connections



ROTEX® GS with interference fit hub



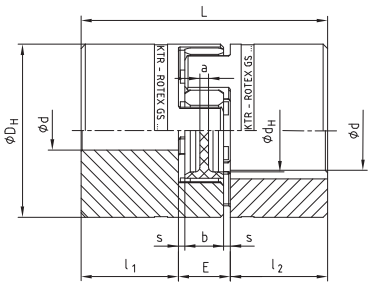
ROTEX® GS with expansion hub

Order form:

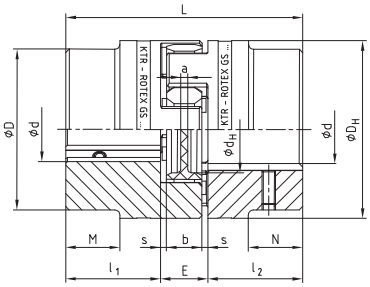
ROTEX® GS 14	80 Sh A-GS	-d10	1.0 – Ø 12		2.0 – Ø 10	
Coupling size	Spider hardness	**Optional:** Bore diameter in spider	Hub design	Finish bore	Hub design	Finish bore

Standard types

- Backlash-free shaft connection under prestress for spindle drives, elevating platforms, machine tool drives, etc.
- Small dimensions - low flywheel mass
- Maintenance-free, easy to check visually
- Finish bore acc. to ISO fit H7 (apart from clamping hub), keyway, from Ø 6 mm acc. to DIN 6885 sheet 1 - JS9
- Ex Approved according to EC Standard 94/9/EC (without feather key according to category 3)

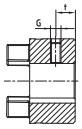


ROTEX® GS 5 - 38

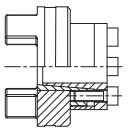


ROTEX® GS 42 - 75

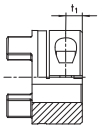
Hub designs: (see page 142)



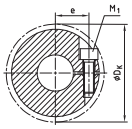
Design
1.0 with keyway and thread
1.1 without keyway, with thread



Design 4.2 with CLAMPEX® KTR 250



Design from size 19 as standard
2.5 double slot, without key-way (only for category 3)
2.6 double slot with keyway



Design 2.5
Torque depending on bore diameter

Size	un-bored	Finish bores				Dimensions [mm]										Setscrew		Clamping screw				
		$d_{min.}$	1.0, 1.1 $d_{max.}$	2.5 $d_{max.}$	2.6 [1] $d_{max.}$	D	D_H	d_H	L	l_1, l_2	M, N	E	b	s	a	G	t	M_1	t_1	e	$\varnothing D_K$	T_A [Nm]
ROTEX® GS Aluminium (Al-H)																						
19	●	6	24	24	24	–	40	18	66	25	–	16	12	2,0	3,0	M5	10	M6	11,0	14,5	46	10,5
24	●	8	28	28	28	–	55	27	78	30	–	18	14	2,0	3,0	M5	10	M6	10,5	20,0	57,5	10,5
28	●	10	38	38	38	–	65	30	90	35	–	20	15	2,5	4,0	M8	15	M8	11,5	25,0	73	25
38	●	12	45	45	45	–	80	38	114	45	–	24	18	3,0	4,0	M8	15	M8	15,5	30,0	83,5	25
ROTEX® GS Steel																						
42	●	14	55	50	45	85	95	46	126	50	28	26	20	3,0	4,0	M8	20	M10	18	32,0	93,5	69
48	●	15	62	55	55	95	105	51	140	56	32	28	21	3,5	4,0	M8	20	M12	21	36,0	105	120
55	●	20	74	68	68	110	120	60	160	65	37	30	22	4,0	4,5	M10	20	M12	26	42,5	119,5	120
65	●	22	80	70	70	115	135	68	185	75	47	35	26	4,5	4,5	M10	20	M12	33	45,0	124	120
75	●	30	95	80	80	135	160	80	210	85	53	40	30	5,0	5,0	M10	25	M16	36	51,0	147,5	295

Bores and the corresponding transmittable torques of the clamping hub design 2.5 [Nm]

Size	∅8	∅10	∅11	∅14	∅15	∅16	∅18	∅19	∅20	∅22	∅24	∅25	∅28	∅30	∅32	∅35	∅38	∅40	∅42	∅45	∅48	∅50	∅55	∅60	∅65	∅70	∅75	∅80
19	25	27	27	29	30	31	32	32	34	30 [2]	32 [2]																	
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

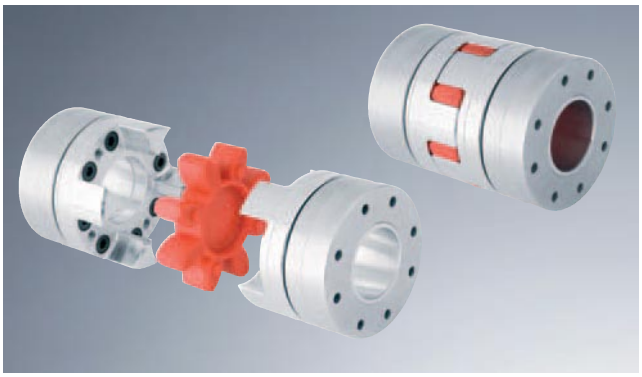
[1] from ∅65 keyway opposite to the clamping screw

[2] clamping hub single slotted 2 x clamping screw M4 and dimension e=15

Order form:

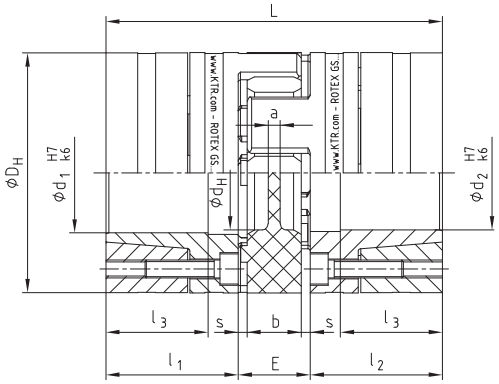
ROTEX® GS 24	98 Sh A-GS	d20	2.5 – Ø 24		1.0 – Ø 20	
Coupling size	Spider hardness	**Optional:** Bore diameter in spider	Hub design	Finish bore	Hub design	Finish bore

Clamping ring hubs light



- Backlash-free shaft coupling with integrated clamping system
- As an example, use on feed/main spindles, drives on machine tools, handling units, etc.
- Low weight and low mass moment of inertia due to a design fully made from aluminium
- Easy assembly due to internal clamping screws and block assembly
- High friction torques
- High smoothness of running, application up to a peripheral speed of 50 m/s
- Approved according to EC Standard 94/9/EC

Tack thread M_1 between clamping screws



Size	Torque [Nm] 1)				Dimensions [mm]									Clamping screws				Weight per hub with max. bore [kg]	Mass moment of inertia per hub with max. bore [kgm²]
	92 Sh A		98 Sh A																
	T_{KN}	T_{Kmax}	T_{KN}	T_{Kmax}	D_H 2)	d_H	L	l_1; l_2	l_3	E	b	s	a	M	numberz	T_A[Nm]	M_1		
Hub material – Aluminium (Al-H) Clamping ring material – Aluminium (Al-H)																			
14	7,5	15	12,5	25	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	10	20	17	34	40	18	66	25	18	16	12	2,0	3,0	M4	6	3	M4	0,077	0,19 x 10^{-4}
24	35	70	60	120	55	27	78	30	22	18	14	2,0	3,0	M5	4	6	M5	0,162	0,78 x 10^{-4}
28	95	190	160	320	65	30	90	35	27	20	15	2,5	4,0	M5	8	6	M5	0,240	1,70 x 10^{-4}
38	190	380	325	650	80	38	114	45	35	24	18	3,0	4,0	M6	8	10	M6	0,490	5,17 x 10^{-4}
42	265	530	450	900	95	46	126	50	35	26	20	3,0	4,0	M8	4	25	M8	0,772	11,17 x 10^{-4}
48	310	620	525	1050	105	51	140	56	41	28	21	3,5	4,0	M10	4	49	M10	1,066	18,81 x 10^{-4}

1) Please note coupling selection on pages 141/142 · 2) $ØD_H$ + 2 mm with high speeds for expansion of spider

Bore d_1/d_2 and the corresponding transmittable friction torques T_R of clamping ring hub in [Nm] 1)																					
Size	Ø6	Ø10	Ø11	Ø14	Ø15	Ø16	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø48	Ø50	Ø55
14	5,4	7,5	11,3	24,7																	
19		17	20	41	49	36	56	64													
24				47	57	67	98	110	127	139	175										
28							121	133	201	219	248	285	253	307	329						
38								203	304	331	394	452	453	543	550	609	669	629	706		
42											444	508	535	638	692	763	754	858	964	976	
48												572	638	762	842	929	943	1074	1208	1136	1336

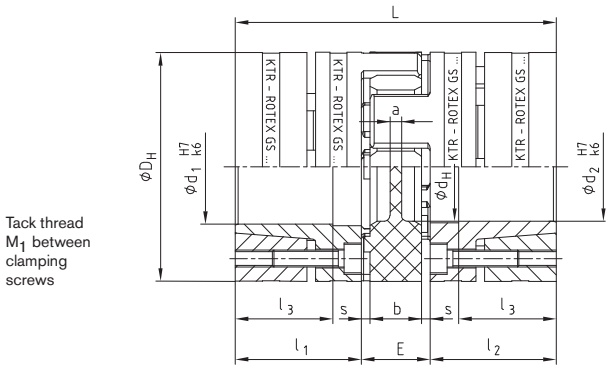
The transmittable torques of the clamping connection consider the max. clearance with shaft fit k6 / bore H7. With bigger clearance the torque is reduced.
As shaft material – steel or spheroïdal iron with a yield point of approx. 250 N/mm² or more can be used. For the stiffness calculation of the shaft/hollow shaft see KTR standard 45510 at our homepage www.ktr.com.

Order form:

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

Clamping ring hubs steel

- Backlash-free shaft coupling with integrated clamping system
- As an example, use on gearboxes and other drives with high torque shocks
- High smoothness of running, application up to a peripheral speed of 40 m/s
- For high friction torques (consider the selection in case of explosion protection use)
- Easy to assemble due to internal clamping screws
- Finish bore up to Ø 50 mm according to ISO fit H7, from Ø 55 mm according to ISO fit G7
- Ex Approved according to EC Standard 94/9/EC



Tack thread M_1 between clamping screws

Size	Torques [Nm] 1)				Dimensions [mm]									Clamping screws				Weight per hub with max. bore [kg]	Mass moment of inertia per hub with max. bore [kgm²]
	98 Sh A		64 Sh D																
	T_{KN}	T_{Kmax}	T_{KN}	T_{Kmax}	D_H 3)	d_H	L	l_1; l_2	l_3	E	b	s	a	M	number z	T_A [Nm]	M_1		
Hub and clamping ring material – Steel (St-H)																			
19	17	34	21	42	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	120	75	150	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	320	200	400	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	650	405	810	80	38	114	45	35	24	18	3,0	4,0	M6	8	14	M6	1,225	12,9 x 10^{-4}
42	450	900	560	1120	95	46	126	50	35	26	20	3,0	4,0	M8	4	35	M8	2,30	31,7 x 10^{-4}
48	525	1050	655	1310	105	51	140	56	41	28	21	3,5	4,0	M10	4	69	M10	3,08	52,0 x 10^{-4}
55	685	1370	825	1650	120	60	160	65	45	30	22	4,0	4,5	M10	4	69	M10	4,67	103,0 x 10^{-4}
65	940 2)	1880 2)	1175	2350	135	68	185	75	55	35	26	4,5	4,5	M12	4	120	M12	6,70	191,0 x 10^{-4}
75	1920 2)	3840 2)	2400	4800	160	80	210	85	63	40	30	5,0	5,0	M12	5	120	M12	9,90	396,8 x 10^{-4}

1) Please note coupling selection on pages 141/142 2) Figures for 95 Sh A - GS 3) $ØD_H$ + 2 mm with high speeds for expansion of spider

Bores d_1/d_2 and the corresponding transmittable friction torques T_R of clamping ring hub in [Nm] 1)																							
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
19	27	32	69	84	57	94	110																	
24			70	87	56	97	114	116	133	192														
28				108	131	207	148	253	285	315	382	330	433	503										
38							208	353	395	439	531	463	603	593	689	793	776							
42									358	398	483	416	547	536	625	571	704	851	865					
48											616	704	899	896	1030	962	1160	1379	1222	1543				
55													863	856	991	918	1119	1110	1247	1277	1672	1605	2008	
65															1446	1355	1637	1635	1827	1887	2429	2368	2930	
75																1710	2053	2059	2294	2384	3040	2983	3664	4293

The transmittable torques of the clamping connection consider the max. clearance with shaft fit k6 / bore H7, from Ø55 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 www.ktr.com.

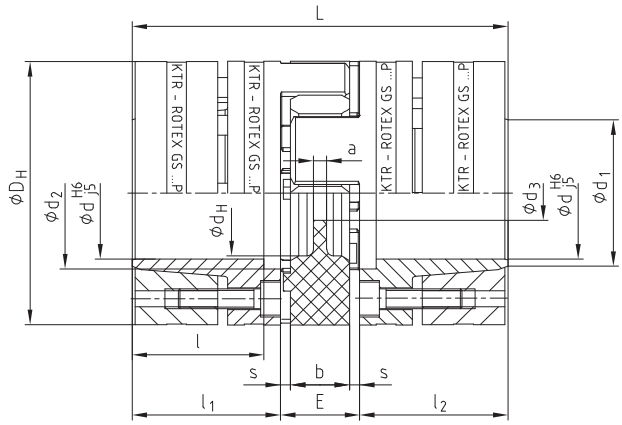
Order form:

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

Type P according to DIN 69002

- Backlash-free, highly accurate shaft coupling with integrated clamping system
- Developed specifically for stub spindles on multiple spindle heads according to DIN 69002
- Application on main spindle drives with high speeds, peripheral speeds of 75 m/s and more (please consult with KTR Engineering Department)
- For high friction torques (consider the selection in case of explosion protection use)
- Easy to assemble to due internal clamping screws
- Ex Approved according to EC Standard 94/9/EC

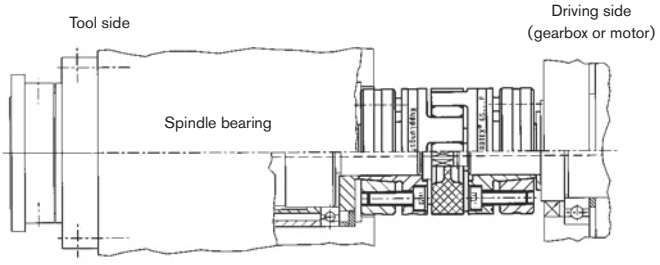
Tack thread M_1 between clamping screws



Hub material – Steel					Clamping ring material – Steel															
Size	Torque [Nm] 2)				Dimensions [mm]													Transmittable torque of clamping ring hub Ø d [Nm] 1)	Tightening torque of clamping screws T_A [Nm]	Weight per hub with bore Ø d norm [kg]	Mass moment of inertia with bore Ø d norm [kgm²]
	98 Sh A-GS		64 Sh A-GS																	
	T_{KN}	T_{Kmax}	T_{KN}	T_{Kmax}	d 1)	D_H 3)	d_H	L	l_1;l_2	l	E	b	s	a	d_1	d_2	d_3			
14 P	12,5	25	16	32	14*	32	10,5	50	18,5	15,5	13	10	1,5	2	17	17	8,5	25	1,89	0,08	0,011x10^{-3}
19 P 37,5	14	28	17	34	16*	37,5	18	66	25	21	16	12	2	3	20	19	9,5	60	3,05	0,16	0,037x10^{-3}
19 P	17	34	21	42	19*	40	18	66	25	21	16	12	2	3	23	22	9,5	71	3,05	0,19	0,046x10^{-3}
24 P 50	43	86	54	108	24*	50	27	78	30	25	18	14	2	3	28	29	12,5	108	4,9	0,331	0,136x10^{-3}
24 P	60	120	75	150	25*	55	27	78	30	25	18	14	2	3	30	30	12,5	170	8,5	0,44	0,201x10^{-3}
28 P	160	320	200	400	35*	65	30	90	35	30	20	15	2,5	4	40	40	14,5	506	8,5	0,64	0,438x10^{-3}
38 P	325	650	405	810	40	80	38	114	45	40	24	18	3	4	46	46	16,5	821	14	1,32	1,325x10^{-3}
42 P	450	900	560	1120	42	95	46	126	50	45	26	20	3	4	52	55	18,5	709	35	2,23	3,003x10^{-3}
48 P	525	1050	655	1310	45	105	51	140	56	50	28	21	3,5	4	52	60	20,5	1340	69	3,09	5,043x10^{-3}
55 P	685	1370	825	1650	50	120	60	160	65	58	30	22	4	4,5	55	72	22,5	1510	69	4,74	10,02x10^{-3}

1) * Standard spindle shaft diameter · 2) Please note coupling selection on pages 141/142 · 3) Ø D_H + 2 mm with higher speed for expansion of spider
For the stiffness calculation of the shaft/hollow shaft see KTR standard 45510 at our homepage www.ktr.com.

Selection for stub spindles						
Spindle drive	ROTEX® GS P Size	Dimensions				
		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



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

Order form:

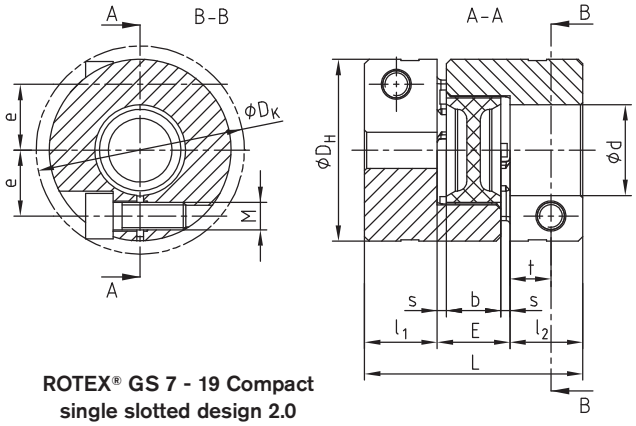
ROTEX® GS 24	P	98 Sh A-GS	6.0 - ∅25		6.0 - ∅25	
Coupling size	Type	Spider hardness	Hub design	Finish bore	Hub design	Finish bore

Compact

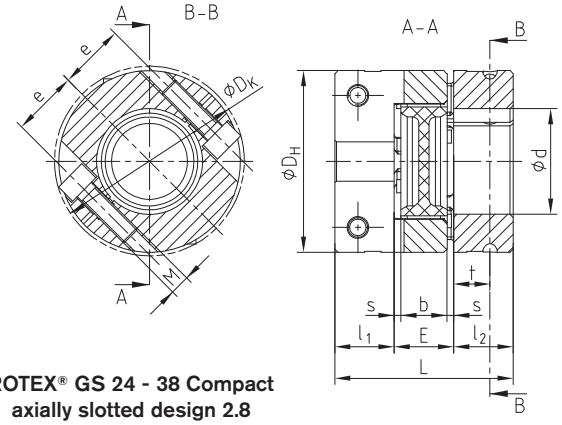
- Up to 1/3 shorter
- High performance

Design with axial slot, patent pending
- Good concentric running properties
- Uniform power transmission due to cams without slots
- Improved balancing quality

- Finish bore from Ø 6 mm also available with feather key acc. To DIN 6885 sheet 1 – JS9
- Ex Approved according to EC Standard 94/9/EC (without feather key according to category 3)



ROTEX® GS 7 - 19 Compact single slotted design 2.0



ROTEX® GS 24 - 38 Compact axially slotted design 2.8

ROTEX® GS Compact Hub material - Aluminium (Al-H)															
Size	Torque [Nm]			Dimensions [mm]											T_A [Nm]
	92Sh A	98Sh A	64Sh D	$d_{max.}$	D_H	D_K	L	l_1, l_2	E	b	s	t	e	M	
7	1,2	2,0	2,4	7	14	16,6	18	5	8	6	1	2,5	5,0	M2	0,37
9	3,0	5,0	6	9	20	21,3	24	7	10	8	1	3,5	6,7	M2,5	0,76
12	5,0	9,0	12	12	25	26,2	26	7	12	10	1	3,5	8,3	M3	1,34
14	7,5	12,5	16	16 [1]	30	30,5	32	9,5	13	10	1,5	4,5	9,6	M4	2,9
19	10	17	21	24 [1]	40	45,0	50	17	16	12	2	9	14,0	M6	10
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

Bores and the corresponding transmittable torques of clamping hub design 2.0/2.8																											
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
7	0,8	0,9	1,0	1,0	1,1																					
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																
14			7,1	7,4	7,7	8,0	8,2	8,5	8,8	9,1	5,8[1]	5,9[1]	6,1[1]													
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[1]									
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

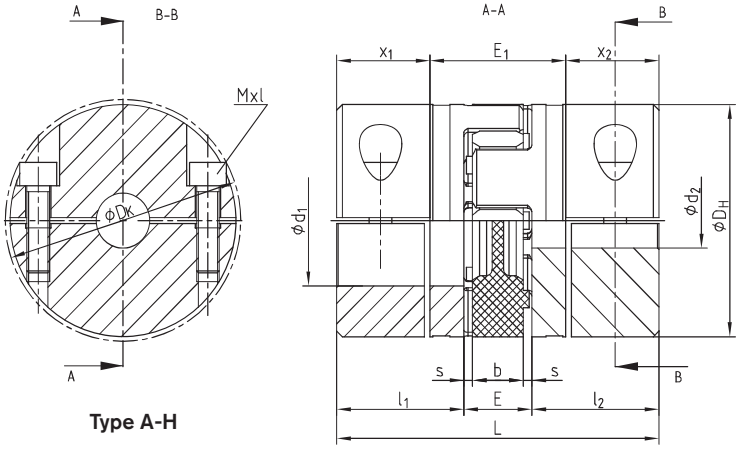
[1] Size 14 with screw M3 (T_A=1,34 Nm) and dimension e=10.4, size 19 with screw M5 (T_A= 6 Nm) and dimension e=15.5

Order form:

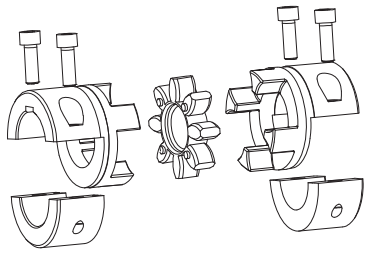
ROTEX® GS 38	Compact	98 Sh A-GS	d28	2.8 - Ø28		2.8 - Ø45	
Coupling size	Type	Spider hardness	**Optional:** Bore diameter in spider	Hub design	Finish bore	Hub design	Finish bore

Drop-out center design coupling type A-H

- Backlash-free shaft connection under prestress
- Maintenance-free, easy to check visually
- Different elastomer hardness of spiders
- Assembly/disassembly by means of 4 screws only
- Exchange of spider with no need to shift the driving and driven side
- Finish bore according to ISO fit H7, keyway, from Ø 6 mm according to DIN 6885 sheet 1 - JS9
- Ⓔx Approved according to EC Standard 94/9/EC (type 7.8 shell clamping hub without feather key according to category 3)



Type A-H



Please note:
The feather keys are offset to each other by approx. 5°!
Hub material: Al-H
Hub design 7.8 shell clamping hub without keyway
Hub design 7.9 shell clamping hubs with keyway

ROTEX® GS Type A-H

Size	Finish bore Ød$_{max.}$ [mm]	Dimensions [mm]									Cyl. screw DIN EN ISO 4762	
		L	l_1; l_2	E	b	s	D_H	D_K	x_1/x_2	E_1	MxI	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	Shore-range	Max. speed [rpm]	Torque [Nm] T_{KN}	Torque [Nm] $T_{K\,max}$	Static torsion spring stiffness [1] [Nm/rad]	Weight of each hub with max. bore diame-tet [kg]	Mass moment of inertia of each hub with max. bore diameter [kgm²]
19	80	A	9550	4,9	9,8	618	77 x 10^{-3}	19,6 x 10^{-6}
	92	A		10,0	20,0	1090		
	98	A		17,0	34,0	1512		
	64	D		21,0	42,0	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] static stiffness with 0,5 x T_{KN}

Bores and the corresponding transmittable torques of the Shell clamping hubwithout feather keyway [mm] design 7.8

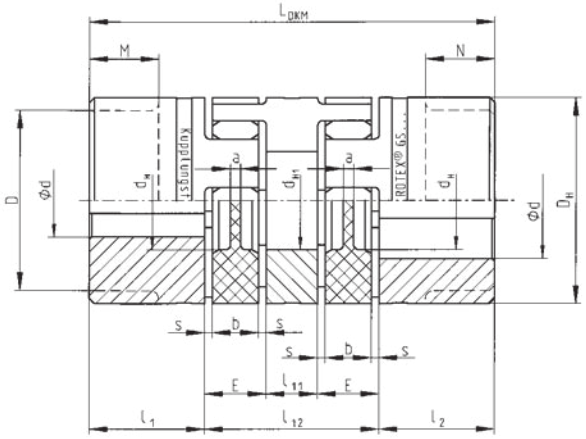
Size	∅8	∅10	∅11	∅14	∅15	∅16	∅18	∅19	∅20	∅22	∅24	∅25	∅28	∅30	∅32	∅35	∅38	∅40	∅42	∅45	∅46	∅48	∅50
19	17	21	23	30	32	34	38	40	42														
24		21	23	30	32	34	38	40	42	47	51	53	59										
28				54	58	62	70	74	78	86	93	97	109	117	124	136	148						
38							70	74	78	86	93	97	109	117	124	136	148	156	163	175			
42										136	149	155	174	186	198	217	235	248	260	279	285	297	310

Order form:

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

Typ DKM (double cardanic)

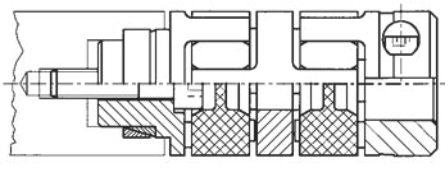
- Backlash-free, double cardanic shaft connection
- Double cardanic design allowing for absorption of larger radial displacements
- Axial plug-in ability - easy blind assembly
- Maintenance-free
- Simple to check visually
- Finish bore according to ISO fit H7 (apart from clamping hub), keyway, from Ø 6 mm according to DIN 6885 sheet 1 - JS9
- Ⓔx Approved according to EC Standard 94/9/EC



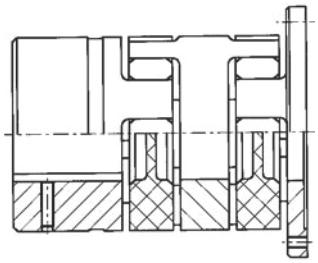
Size	Hub material – Aluminium (Al-H) Spacer material – Aluminium (Al-H) Dimenssions [mm]													
	$d_{max.}$ [1]	D	D_H	d_H	d_{H1}	$l_1; l_2$	M; N	l_{11}	l_{12}	L_{DKM}	E	b	s	a
5	5	—	10	—	—	5	—	3	13	23	5	4	0,5	4,0
7	7	—	14	—	—	7	—	4	20	34	8	6	1,0	6,0
9	11	—	20	7,2	—	10	—	5	25	45	10	8	1,0	1,5
12	12	—	25	8,5	—	11	—	6	30	52	12	10	1,0	3,5
14	16	—	30	10,5	—	11	—	8	34	56	13	10	1,5	2,0
19	24	—	40	18,0	18	25	—	10	42	92	16	12	2,0	3,0
24	28	—	55	27,0	27	30	—	16	52	112	18	14	2,0	3,0
28	38	—	65	30,0	30	35	—	18	58	128	20	15	2,5	4,0
38	45	—	80	38,0	38	45	—	20	68	158	24	18	3,0	4,0
	Hub material – Steel Spacer material – Aluminium (Al-H)													
42	55	85	95	46	46	50	28	22	74	174	26	20	3,0	4,0
48	62	95	105	51	51	56	32	24	80	192	28	21	3,5	4,0
55	74	110	120	60	60	65	37	28	88	218	30	22	4,0	4,5

[1] depend on hub design

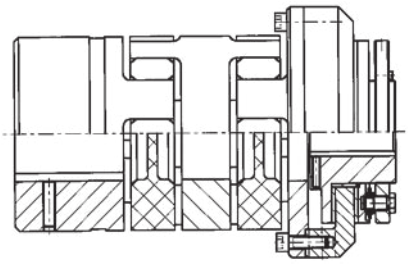
Other designs:



ROTEX® GS - DKM as hollow shaft design



ROTEX® GS - CF - DKM



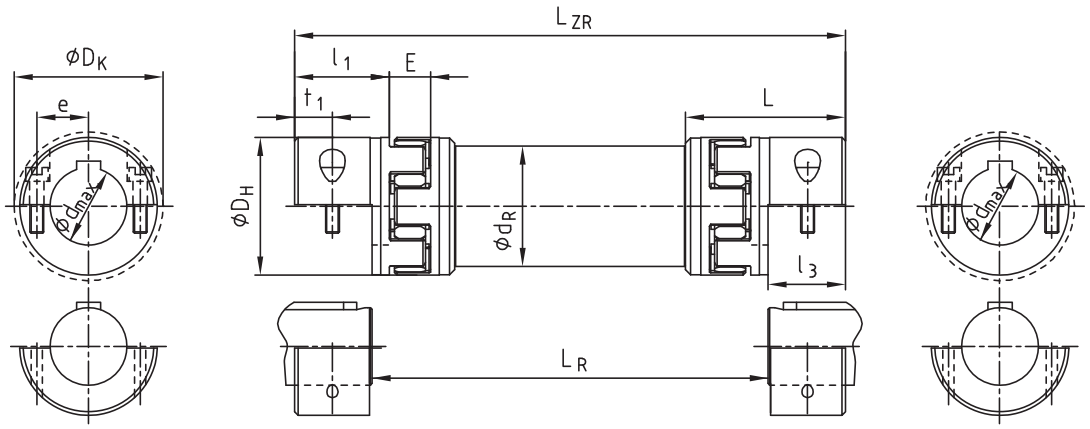
ROTEX® GS - DKM in combination with torque limiter KTR-RU

Order form:

ROTEX®GS 24	DKM	92 Sh A-GS	d25	1.0 - ∅38		2.5 - ∅25	
Coupling size	Type	Spider hard-ness	**Optional:** Bore diameter in spider	Hub design	Finish bore	Hub design	Finish bore

Intermediate shaft coupling

- Use with lifting machines, in handling units, robotic palletisers etc.
- Easy, radial coupling assembly because of split coupling hub
- Exchange of spiders without displacing the drive and driven side
- Lengths are possible up to 4 m without intermediate bearing dependent on speed and size
- Positive and frictionally engaged torque transmission
- Low mass moment of inertia due to use of aluminium
- Can be combined with other hub forms (clamping or clamping ring hubs, page 142)
- Finish bore according to ISO fit H7,keyway according to DIN 6885 sheet 1 - JS9



ROTEX® GS type ZR3

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 [Nm]	
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	113	3456	157	3500	50	57,5	10,5	20	M6	10	
28	14	38	65	35	67,0	25,0	20	131	3950	181	4000	60	73	11,5	25	M8	25	
38	18	45	80	45	83,5	33,0	24	163	3934	229	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	17,0	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 with a spider 98 Sh-A-GS

Size	Coupling torques [Nm]		Mass moment of inertia [10^{-3} kgm²]			stat. torsion spring stiffness [Nm²/rad]	Size	Coupling torques [Nm]		Mass moment of inertia [10^{-3} kgm²]			stat. torsion spring stiffness [Nm²/rad]
	T_{KN}	$T_{K\,max.}$	Hub [1]	ZR-hub	Pipe/meter	ZW C_2 [2]		T_{KN}	$T_{K\,max.}$	Nabe [1]	ZR-Nabe	Rohr/Meter	ZW C_2 [2]
19	17	34	0,02002	0,01304	0,329	3243,6	38	325	650	0,50385	0,2572	2,972	29290,4
24	60	120	0,07625	0,04481	0,673	6631,8	42	450	900	1,12166	0,5523	4,560	44929,7
28	160	320	0,17629	0,10950	1,199	11814,1	48	525	1050	1,87044	1,1834	9,251	91158,2

Bores and the corresponding transmittable friction torques of split hub without keyway [mm] type 7.5

Size	∅8	∅10	∅11	∅14	∅15	∅16	∅18	∅19	∅20	∅22	∅24	∅25	∅28	∅30	∅32	∅35	∅38	∅40	∅42	∅45	∅46	∅48	∅50	∅55
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

[1] At $d_{max.}$

[2] Torsional spring stiffness with an intermediate pipe of a length of 1 m, L_{Pipe} being = L_{ZR} - 2 . L

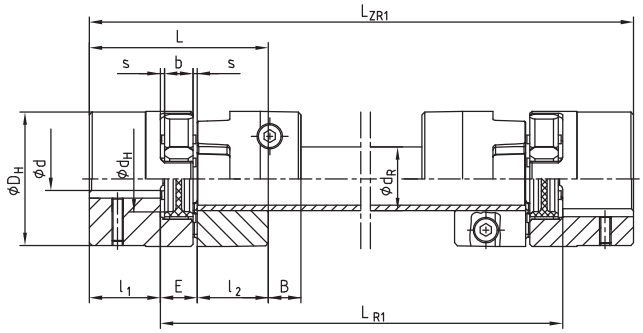
For enquiries and orders please mention the shaft distance dimension L_R along with the maximum speed to review the critical speed.

Order form:

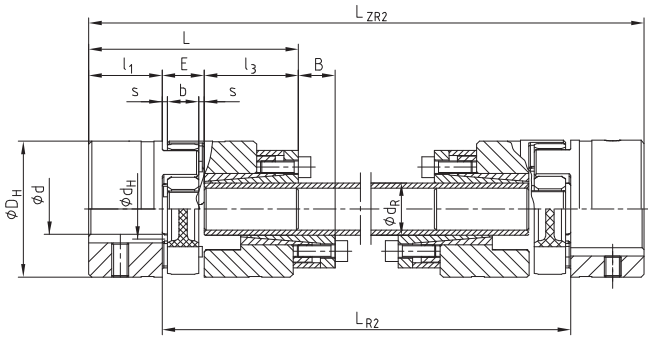
ROTEX® GS 24	ZR3	1200 mm	98 Sh A-GS	7.5 - ∅24		7.5 - ∅24	
Coupling size	Type	Shaft distance dimension (L_R)	Spider hardnes	Hub design	Finish bore	Hub design	Finish bore

Intermediate shaft coupling

- Backlash-free intermediate shaft coupling
- Application, for example, on lifting spindle elements, parallel linear systems, overhead gantry robots, handling machines
- For connection of larger shaft distances and a maximum speed of 1500 rpm
- Spacer part to be disassembled radially
- Design ZR1 for torques up to the maximum friction torque of clamping hub, design ZR2 for higher torques
- Finish bore according to ISO fit H7 (apart from clamping hub), keyway, from Ø 6 mm according to DIN 6885 sheet 1 - JS9



Type ZR1



Type ZR2

ROTEX® GS Type ZR1

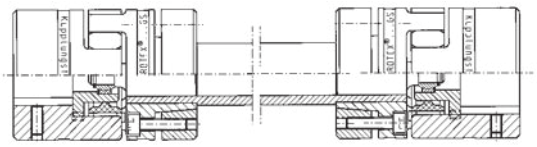
Size	Finish bore	Dimensions [mm]												Cap screw DIN EN ISO 4762 – 8.8	Tightening torque	Friction torque
	$d_{max.}$ [1]	D_H	$l_1; l_2$	L	E	b	s	B	L_{R1}	L_{R1} min.	L_{ZR1}	d_R [2]		Mxl		
14 ZR1	16	30	11	35	13	10	1,5	11,5	please mention for inquiries and orders	71	L_{R1}+22	14x2,5		M3x12	1,34	6,1
19 ZR1	24	40	25	66	16	12	2,0	14,0		110	L_{R1}+50	20x3,0		M6x16	10,5	34
24 ZR1	28	55	30	78	18	14	2,0	16,0		128	L_{R1}+60	25x2,5		M6x20	10,5	45
28 ZR1	38	65	35	90	20	15	2,5	17,5		145	L_{R1}+70	35x4,0		M8x25	25	105
38 ZR1	45	80	45	114	24	18	3,0	21,0		180	L_{R1}+90	40x4,0		M8x30	25	123

ROTEX® GS Type ZR2

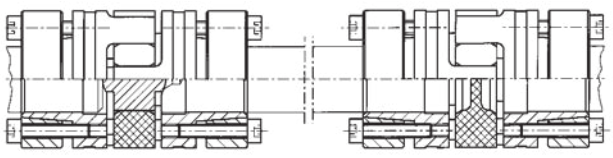
Size	Finish bore	Dimensions [mm]												Precision tube [mm]	Precision tube $\frac{Nm^2}{rad}$	Clamping set size	Clamping screws DIN EN ISO 4762–12.9 μtot. = 0,14	Tightening torque T_A [Nm]
	max. d	D_H	$l_1; l_2$	l_3	L	E	b	s	B	LR_2	L_{R2} min	L_{ZR2}		d_R	C_2 [3]		Mxl	
14 ZR2	16	30	11	26	50	13	10	1,5	11,5	please mention for inquiries and orders	109	L_{R2}+22		10x2,0	68,36	10x16	M4x10	5,2
19 ZR2	24	40	25	26	67	16	12	2,0	14,0		120	L_{R2}+50		12x2,0	130	12x18	M4x10	5,2
24 ZR2	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	38	65	35	45	100	20	15	2,5	17,5		177	L_{R2}+70		25x2,5	1811	25x34	M6x18	17,0
38 ZR2	45	80	45	45	114	24	18	3,0	21,0		192	L_{R2}+90		32x3,5	5167	32x43	M6x18	17,0
42 ZR2	55	95	50	52	128	26	20	3,0	23,0		214	L_{R2}+100		40x4,0	11870	40x53	M6x18	17,0
48 ZR2	62	105	56	70	154	28	21	3,5	24,5		261	L_{R2}+112		45x4,0	17486	45x59	M8x22	41,0
55 ZR2	74	120	65	80	175	30	22	4,0	26,0		288	L_{R2}+130		55x4,0	33543	55x71	M8x22	41,0
65 ZR2	80	135	75	80	185	35	26	4,5	30,5		387	L_{R2}+150		60x4,0	44362	60x77	M8x22	41,0

[1] For inquiries and orders please mention the shaft distance dimension L_{R1}/L_{R2} along with the maximum speed to review the critical whirling speed.
[2] Has to be remachined, if necessary
[3] Torsional spring stiffness with an intermediate pipe of a length of 1 m

Other designs:



ROTEX® ZRG with bearing for higher speeds



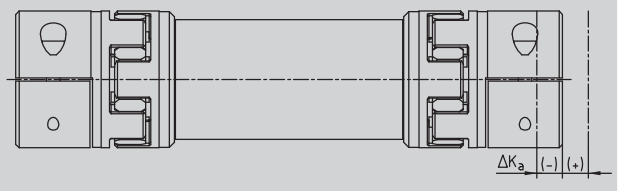
ROTEX® GS ZR for vertical assembly

Order form:

ROTEX® GS 24	ZR1	1000 mm	98 Sh A-GS	1.0 - ∅24		2.5 - ∅24	
Coupling size	Type	Shaft distance dimension (L_R)	Spider hardnes	Hub design	Finish bore	Hub design	Finish bore

Displacements and technical data

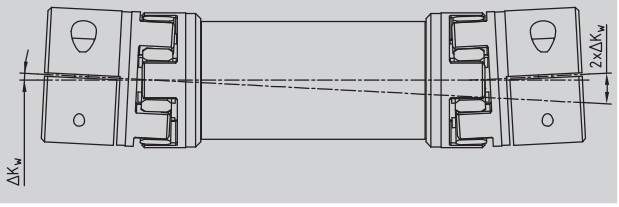
Axial displacements



Radial displacements

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

Angular displacements



Displacements intermediate shaft coupling

ROTEX® GS Size with 98Sh A-GS	Axial ΔK_a [mm]	Radial ΔK_r [1] [mm]	Angular α [degree]
14	+1,0 / -1,0	15,16	0,9°
19	+1,2 / -1,0	14,67	0,9°
24	+1,4 / -1,0	14,48	0,9°
28	+1,5 / -1,4	14,30	0,9°
38	+1,8 / -1,4	13,92	0,9°
42	+2,0 / -2,0	13,73	0,9°
48	+2,1 / -2,0	13,51	0,9°
55	+2,2 / -2,0	13,19	0,9°
65	+2,6 / -2,0	12,80	0,9°

[1] Radial displacements based on coupling length L_{ZR} = 1000 mm

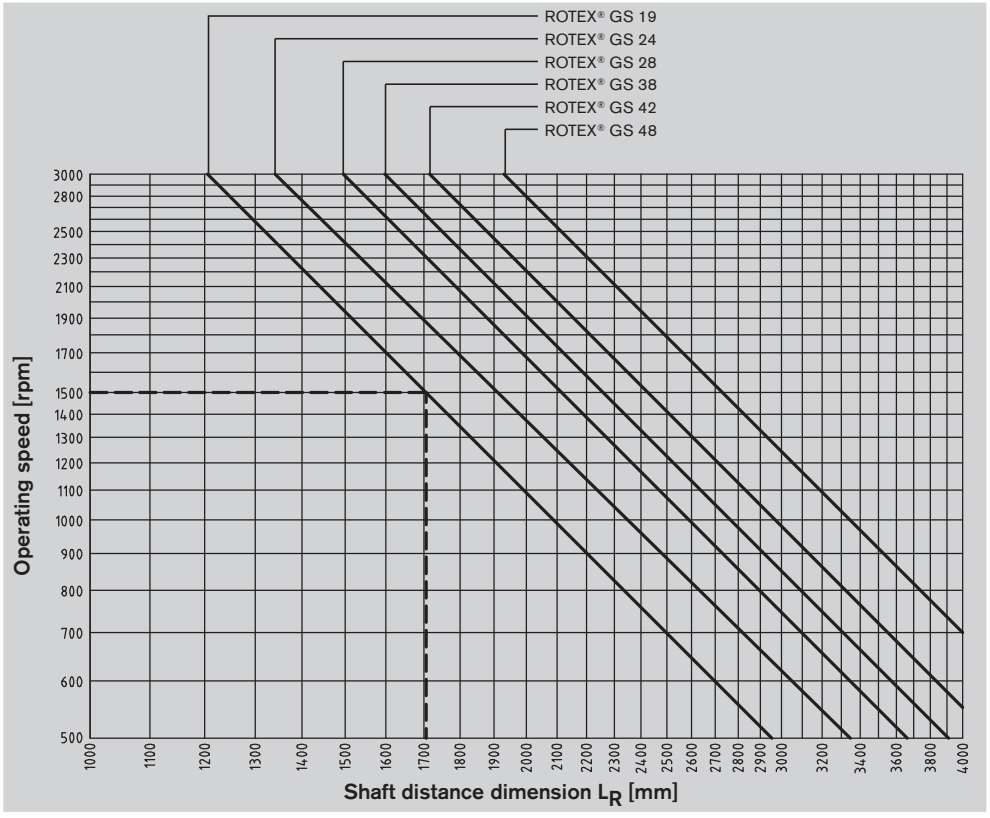
Calculation of total torsion spring stiffness:

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

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

C_1 = torsion spring stiffness for spider page 140
C_2 = from table page 152/153

Chart of critical speeds for design ZR3

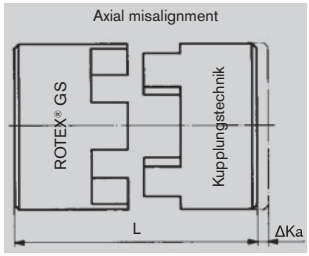


Example:

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

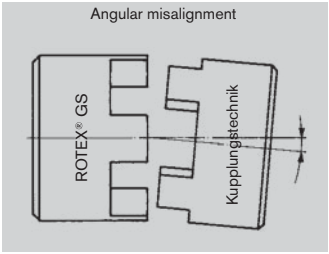
Displacements

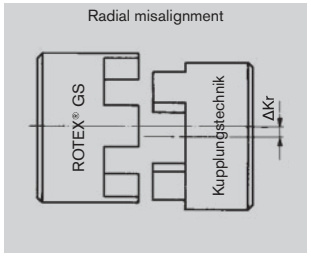
Due to its design the ROTEX® GS is able to absorb axial, angular and radial misalignment, without causing any wear or premature failure of the coupling. As the spider is only stressed under pressure it is ensured that the coupling will remain backlash-free even after a longer operation period.



As an example, axial misalignment 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 misalignment and to keep the reaction forces low.

In case of pure angular misalignment 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 misalignment 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 misalignment 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, taking into account the coupling load up to the rated torque T_{KN} of the coupling and with an ambient temperature of + 30 °C. The displacement figures may, in each case, merely be used individually - if they occur simultaneously they may only be used proportionately. 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.

Displacements

Size	Spider GS	Displacements standard [mm] Axial ΔKa[1)]	[mm] Radial ΔKr	[degree] Angular α	Displacements DKM [mm] Axial ΔKa[1)]	[mm] Radial ΔKr	[degree] Angular α
	70 ShA		0,14	1,2°		0,17	1,2°
5	80 ShA	+0,4	0,12	1,1°	+0,4	0,15	1,1°
	92 ShA	-0,2	0,06	1,0°	-0,4	0,14	1,0°
	98 ShA		0,04	0,9°		0,13	0,9°
	80 ShA		0,15	1,1°		0,23	1,1°
7	92 ShA	+0,6	0,10	1,0°	+0,6	0,21	1,0°
	98 ShA	-0,3	0,06	0,9°	-0,6	0,19	0,9°
	64 ShD		0,04	0,8°		0,17	0,8°
	80 ShA		0,19	1,1°		0,29	1,1°
9	92 ShA	+0,8	0,13	1,0°	+0,8	0,26	1,0°
	98 ShA	-0,4	0,08	0,9°	-0,8	0,24	0,9°
	64 ShD		0,05	0,8°		0,21	0,8°
	80 ShA		0,20	1,1°		0,35	1,1°
12	92 ShA	+0,9	0,14	1,0°	+0,9	0,32	1,0°
	98 ShA	-0,4	0,08	0,9°	-0,9	0,29	0,9°
	64 ShD		0,05	0,8°		0,25	0,8°
	80 ShA		0,21	1,1°		0,40	1,1°
14	92 ShA	+1,0	0,15	1,0°	+1,0	0,37	1,0°
	98 ShA	-0,5	0,09	0,9°	-1,0	0,33	0,9°
	64 ShD		0,06	0,8°		0,29	0,8°
	80 ShA		0,15	1,1°		0,49	1,1°
19	92 ShA	+1,2	0,10	1,0°	+1,2	0,45	1,0°
	98 ShA	-0,5	0,06	0,9°	-1,0	0,41	0,9°
	64 ShD		0,04	0,8°		0,36	0,8°
	92 ShA		0,14	1,0°		0,59	1,0°
24	98 ShA	+1,4	0,10	0,9°	+1,4	0,53	0,9°
	64 ShD	-0,5	0,07	0,8°	-1,0	0,47	0,8°
	72 ShD		0,04	0,7°		0,42	0,7°
	92 ShA		0,15	1,0°		0,66	1,0°
28	98 ShA	+1,5	0,11	0,9°	+1,5	0,60	0,9°
	64 ShD	-0,7	0,08	0,8°	-1,4	0,53	0,8°
	72 ShD		0,05	0,7°		0,46	0,7°
	92 ShA		0,17	1,0°		0,77	1,0°
38	98 ShA	+1,8	0,12	0,9°	+1,8	0,69	0,9°
	64 ShD	-0,7	0,09	0,8°	-1,4	0,61	0,8°
	72 ShD		0,06	0,7°		0,54	0,7°
	92 ShA		0,19	1,0°		0,84	1,0°
42	98 ShA	+2,0	0,14	0,9°	+2,0	0,75	0,9°
	64 ShD	-1,0	0,10	0,8°	-2,0	0,67	0,8°
	72 ShD		0,07	0,7°		0,59	0,7°
	92 ShA		0,23	1,0°		0,91	1,0°
48	98 ShA	+2,1	0,16	0,9°	+2,1	0,82	0,9°
	64 ShD	-1,0	0,11	0,8°	-2,0	0,73	0,8°
	72 ShD		0,08	0,7°		0,64	0,7°
	92 ShA		0,24	1,0°		1,01	1,0°
55	98 ShA	+2,2	0,17	0,9°	+2,2	0,91	0,9°
	64 ShD	-1,0	0,12	0,8°	-2,0	0,81	0,8°
	72 ShD		0,09	0,7°		0,71	0,7°
	95ShA		0,18	0,9°			
65	64 ShD	+2,6 -1,0	0,13	0,8°	—	—	—
	72 ShD		0,10	0,7°			
75	95 ShA	+3,0	0,21	0,9°	—	—	—
	64 ShD	-1,5	0,15	0,8°			

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

Shaft misalignment ROTEX® GS type DKM

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