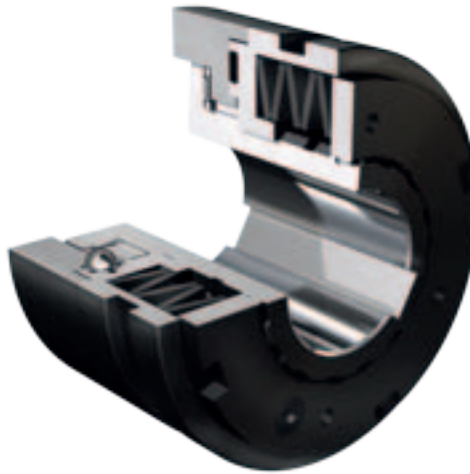


KTR-SI

Overload systems

Structure and operation

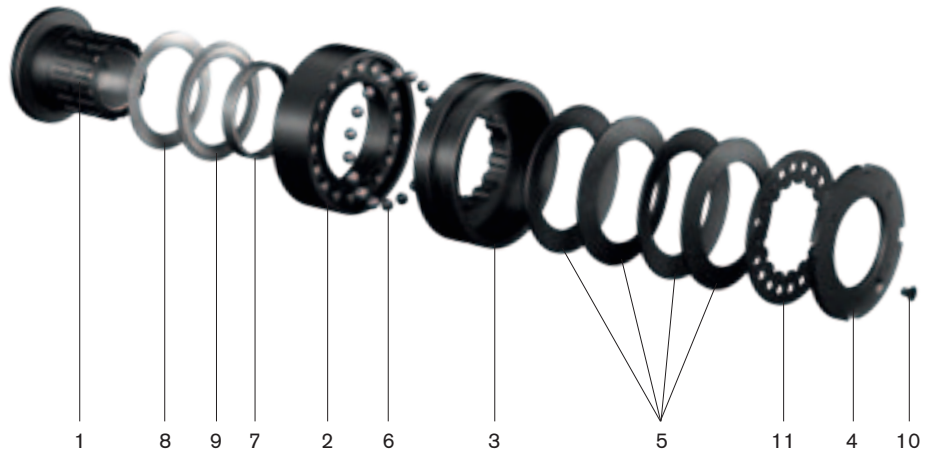
- Overload protection up to 8200 Nm
- Available as a ratchet, synchronous and fail-safe design with the same dimensions
- Reduction of torque peaks
- High repeating accuracy, even after a long operating period
- Disconnection of the drive with overload by retrieving limit switch
- Automatically operative



- Different types also suitable for your application
- Easy assembly and torque setting
- Maintenance-free
- Insensitive to oil and grease
- High service life due to high-quality materials

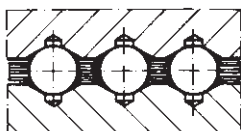
In case of overload the ratchet components (balls or rollers) leave their indentations, and a relative motion between the driving and driven side is generated. Damages caused by overload are reliably prevented in this way. The shift ring (3) makes an axial motion to the shifting way „H “ activating the limit switch or proximity initiator. The signal can be used for controlling or disconnecting the drive. For restarting we would recommend to bypass the limit switch or proximity switch electrically for a short time.

Component	Description
1	Hub
2	Flange ring
3	Shift ring
4	Setting nut
5	Disk spring
6	Ball retainer
7	Slide bush
8	Axial disk
9	Axial needle bearing
10	Setscrew
11	Locking washer

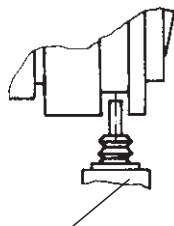


No signal with normal operation

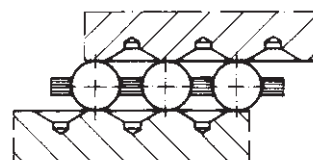
Signal with overload



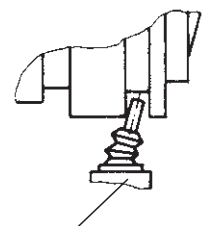
Engaged



Limit switch



Disengaged



Limit switch

KTR-SI FRE

Idle rotating overload system

Structure and operation

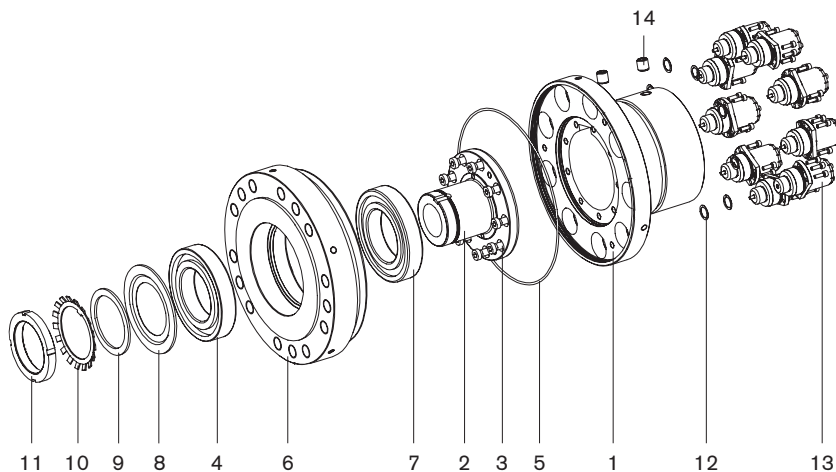
- Idle rotating overload system (load separating)
- High repeating accuracy
- Flange type to connect toothed belt pulleys or sprockets



- Combination with ROTEX®, GEARex® or RADEX®-N as a shaft-to-shaft connection
- The intelligent further development of shear pin couplings and hydraulic clamping sets
- Setting range up to 60,000 Nm (higher torques possible on request)

The core of the overload system is formed by the idle rotation elements. In case of overload they uncouple the driving and driven side while protecting the drive train from damages. After eliminating the overload, the rotation segments are manually re-engaged so that the drive is released again. In order to set the coupling to the requested release torque, a defined prestress is generated on the disk springs in each idle rotation element via the setting nut. The number of elements varies depending on the release torque demanded. If requested, the coupling can be preset by the manufacturer. It is also possible to adapt the coupling while in place.

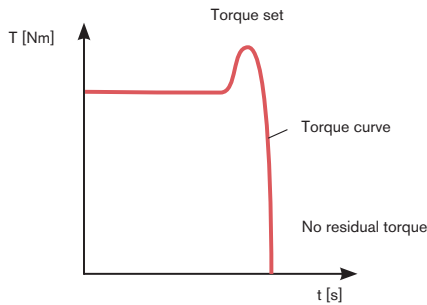
Component	Description
1	Hub
2	Bearing flange
3	Cylinder screw
4	Groove ball bearing
5	O-ring
6	KTR-SI FRE connection flange
7	Angular ball bearing
8	NILOS ring
9	Supporting washer
10	Locking plate
11	Groove nut
12	Adjusting washer
13	Idle rotation element
14	Setscrew



KTR-SI/KTR-SI FRE Overload systems

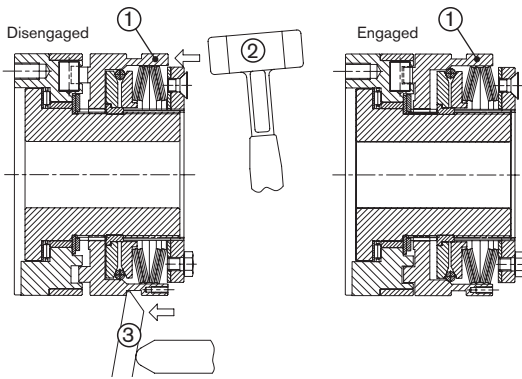
Operating principles

1. Idle rotation type FR/ FRE

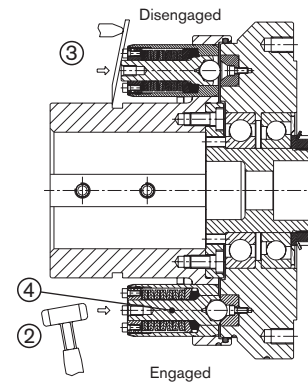


Operating principle of KTR-SI idle-rotation couplings:
When achieving the torque set, the coupling rotates. Subject to the idle rotation mechanism driving and driven side remain separated. The resulting flywheel mass may run out in idle state. After eliminating the overload, the coupling can be re-engaged. The re-engagement is effected manually or via a device.

Re-engagement of FR



Re-engagement of FRE



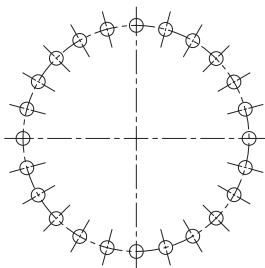
Re-engagement of the idle rotation coupling:

Re-engagement is effected via axial pressure on the shift ring (1). Dependent on the existing resources, accessibility etc., the re-engagement can be effected in different ways: By several blows of a plastic hammer (2) axially on the shift ring (see above), by assembly levers (3) or by a pneumatic or hydraulic engagement device (automated process of engagement).

Re-engagement of idle rotation elements

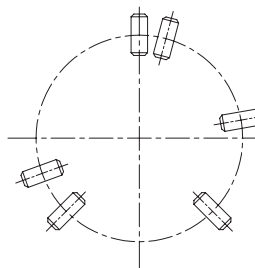
After eliminating the overload, driving and driven side are aligned to each other. By means of a plastic hammer (2) or a tyre lever (3) the idle rotation elements (4) are manually re-engaged. Re-engagement can be heard loudly. The overload coupling is ready for use again.

2. Ratchet design DK



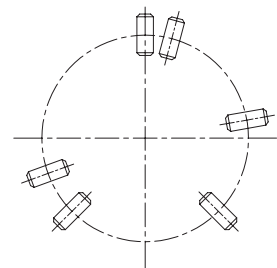
Any engagement after an overload. After eliminating the overload, the balls engage automatically with the next following ball indentation.

3. Synchronous design SR



Synchronous engagement after an overload. After eliminating the overload, the balls re-engage automatically with the disk springs after a rotation of 360°. Driving and driven side are always placed in the same position to each other. Other degrees of re-engagement, for example 180°, are also possible.

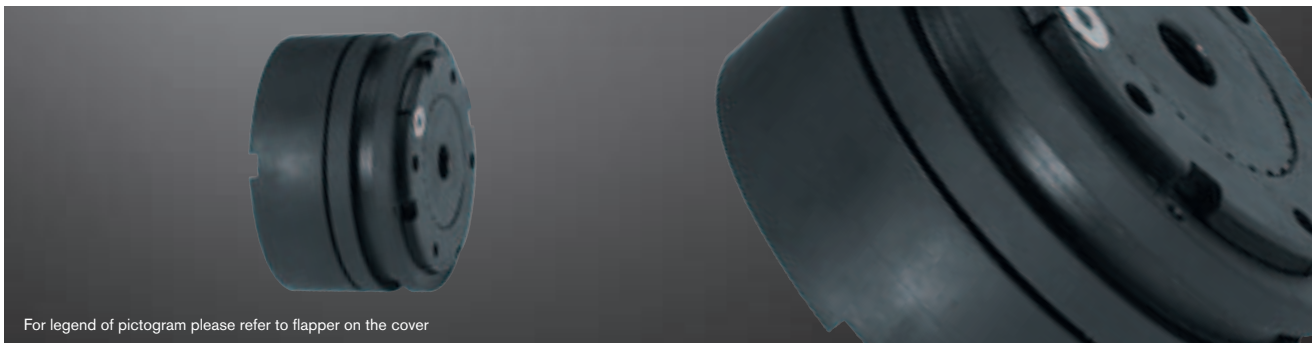
4. Fail-safe design SGR



The fail-safe design is a pure torque measurement without any ratchet operation. In case of overload a signal is generated by the limit switch, producing a mechanical separation of driving and driven side = ratching is not possible.

KTR-SI Overload systems

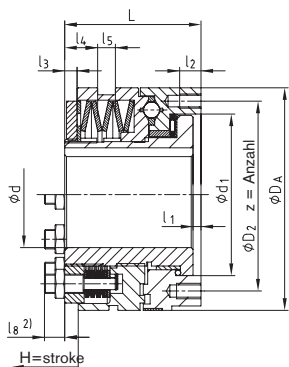
Flange type



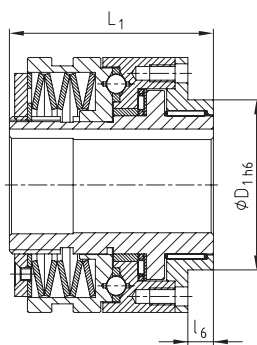
For legend of pictogram please refer to flapper on the cover



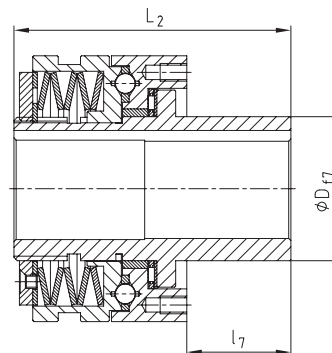
Type FT



Type KT



Type LT



Technical data

Size	Torques [Nm]												Weight with max. bore [kg]
	Type DK				Type SR and SGR				Type FR				
	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	nmax. [RPM] ³⁾	
0	2,5-5	5-20	-	20-40	5-10	10-40	-	-	5-10	10-20	20-40	6000	0,41
1	6-12	12-25	25-55	55-100	12-25	25-50	50-100	-	12-25	25-50	50-100	5000	1,30
2	12-25	25-50	50-120	120-200	25-50	50-100	100-200	-	25-50	50-100	100-200	4000	2,27
3	25-50	50-100	100-250	200-450	50-100	100-200	200-450	-	50-100	100-200	200-450	3500	3,88
4	50-100	100-200	200-500	500-1000	100-200	200-400	400-800	800-2000	100-200	200-400	400-800	3000	8,34
5	85-250	230-600	300-1000	600-2000	170-450	350-900	600-1800	1200-3400	170-450	350-900	600-1800	2300	13,51
6	180-480	360-960	720-1950	1600-3300	300-750	600-1500	1200-3000	2900-5800	-	-	-	-	21
7	250-520	500-1050	1000-2100	2000-3600	550-1100	1100-2200	2200-4400	3000-8200	-	-	-	-	37

Dimensions [mm]

Size	Bore d		d ₁	D	D ₁	D ₂	D _A	l ₁	l ₂	l ₃	l ₄	l ₅	l ₆	l ₇	L	L ₁	L ₂	z	H=stroke			
	pilot b.	max.																	DK	SR	SGR	FR
0	7	20	41,0	28	38	48	55	4,0	6,5	3,0	7,5	9	8	27,5	38,5	51,0	66,0	6xM5	1,4	1,2	0,6	1,6
1	10	25	60,0	38	50	70	82	4,0	8,0	6,0	11,5	9	10	33,0	52,0	70,0	85,0	6xM5	2,3	1,8	0,8	2,3
2	14	35	78,0	52	60	89	100	5,0	10,0	5,0	12,0	9	12	39,0	61,0	78,0	100,0	6xM6	2,4	2,0	1,1	3,0
3	18	45	90,5	65	80	105	120	5,0	12,0	8,5	21,0	10	12	47,0	78,0	96,0	125,0	6xM8	2,7	2,2	1,2	3,5
4	24	55	105,0	78	100	125	146	6,5	15,0	11,0	27,0	9	16	52,5	100,0	124,5	152,5	6xM10 ¹⁾	3,7	2,5	1,2	3,8
5	30	65	120,5	90	120	155	176	6,5	17,0	12,0	33,0	9	18	57,5	113,5	140,0	171,0	6xM12 ¹⁾	4,6	3,0	1,6	4,5
6 ²⁾	40	80	136,0	108	130	160	200	7,0	20,0	14,0	39,0	9	20	64,0	119,0	150,0	183,0	6xM12 ¹⁾	5,0	3,5	2,5	-
7 ²⁾	50	100	168,0	135	160	200	240	8,0	25,0	15,0	46,0	9	25	72,0	141,0	175,0	213,0	6xM16 ¹⁾	5,5	4,0	2,7	-

¹⁾ Type T4 SR and SRG: tightening torques according to 12.9
²⁾ Size 6: dimension l₈ = 15 mm, size 7: dimension l₈ = 21 mm
³⁾ See comments on page 226

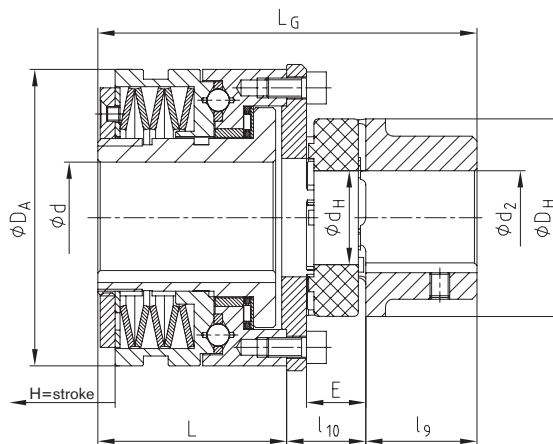
Ordering example:	KTR-SI 2	FR	FT	T2	d Ø20	40 Nm
	Type / size	Type [DK/SR/SGR]	Type	Disk spring layer	Bore	Torque set

KTR-SI Overload systems

With torsionally flexible ROTEX®



For legend of pictogram please refer to flapper on the cover



Technical data

KTR-SI size	Torque [Nm] of type DK				Torque [Nm] of type SR and SGR				Torque [Nm] of type FR		
	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3
0	2,5-5	5-20	-	20-40	5-10	10-40	-	-	5-10	10-20	20-40
1	6-12	12-25	25-55	55-100	12-25	25-50	50-100	-	12-25	25-50	50-100
2	12-25	25-50	50-120	120-200	25-50	50-100	100-200	-	25-50	50-100	100-200
3	25-50	50-100	100-250	200-450	50-100	100-200	200-450	-	50-100	100-200	200-450
4	50-100	100-200	200-500	500-1000	100-200	200-400	400-800	800-2000	100-200	200-400	400-800
5	85-250	230-600	300-1000	600-2000	170-450	350-900	600-1800	1200-3400	170-450	350-900	600-1800
6	180-480	360-960	720-1950	1600-3300	300-750	600-1500	1200-3000	2900-5800	-	-	-
7	250-520	500-1050	1000-2100	2000-3600	550-1100	1100-2200	2200-4400	3000-8200	-	-	-

Technical data – Dimensions

KTR-SI size	ROTEX® size	Torque of ROTEX [Nm] 1)		Max. bore [mm]	Dimensions [mm]									H=stroke [mm]			
		98 Sh-A			d	d ₂	d _H	D _H	D _A	l ₉	l ₁₀	E	L	L _G	Type		
		T _{KN}	T _{Kmax}												DK	SR	FR
0	19	17	34	20	24	18	40	55	25	22	16	38,5	85,5	1,4	1,2	1,6	
	28	160	320		38	30	65		35	28,5	20						102
1	24	60	120	25	28	27	55	82	30	24	18	52	106	2,3	1,8	2,3	
	38	325	650		45	38	80		45	32,5	24						129,5
2	28	160	320	35	38	30	65	100	35	28	20	61	124	2,4	2,0	3,0	
	48	525	1050		60	51	105		56	38	28						155
3	38	325	650	45	45	38	80	120	45	32	24	78	155	2,7	2,2	3,5	
	55	685	1370		70	60	120		65	43	30						186
4	48	525	1050	55	60	51	105	146	56	38	28	100	194	3,7	2,5	3,8	
	75	1920	3840		95	80	160		85	56,5	40						241,5
5	55	685	1370	65	70	60	120	176	65	44	30	113,5	222,5	4,6	3,0	4,5	
	90	3600	7200		110	100	200		100	62	45						275,5
6	100	4950	9900	80	115	113	225	200	110	72	50	119	301	5,0	3,5	-	
7	110	7200	14400	100	125	127	255	240	120	78	55	141	339	5,5	4,0	-	

1) The ROTEX® coupling can each be selected based on the torque of the machine (see coupling selection for ROTEX®). Torques of 98Sh-A spider

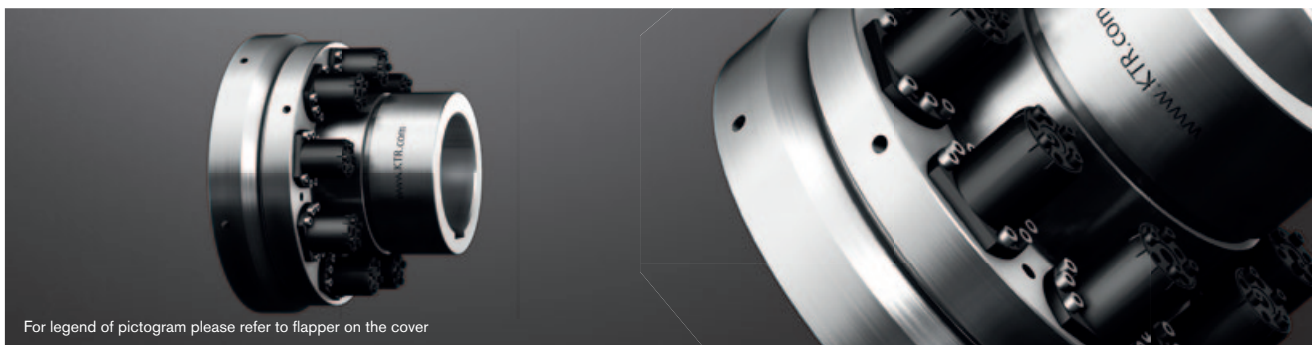
Ordering example:

KTR-SI 2	DK	T2	d Ø20	ROTEX® 28	d ₂ Ø25	40 Nm
Type/size	Type	Disk spring layer	KTR-SI bore	Type/size	ROTEX® bore	Torque set

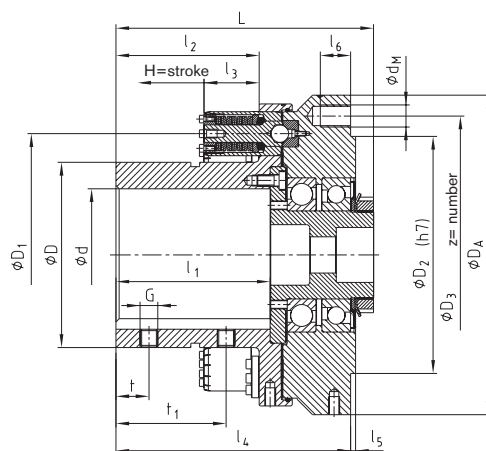
KTR-SI FRE

Idle rotating overload system

Flange type



For legend of pictogram please refer to flapper on the cover



Torques [Nm]

Size	Type of element	3 idle rotation elements		6 idle rotation elements		9 idle rotation elements	
		min.	max.	min.	max.	min.	max.
9	1T2	1000	4000	2000	8000	-	-
	1T3	2000	5500	4000	11000	-	-
12	1T2	1300	5000	2600	10000	3900	15000
	1T3	2400	6700	4800	13400	7200	20100
15	1T2	1700	6000	3400	12000	5100	18000
	1T3	3000	8200	6000	16400	9000	24600
20	2T2	5000	15000	10000	30000	15000	45000
	2T3	10000	20000	20000	40000	30000	60000

Technical data – Dimensions

Size ¹⁾	Bore max.	Dimensions [mm]																			Perm. max. bearing forces [kN] ²⁾		Speed ³⁾ [RPM]	Weight with max. bore [kg]
		d	D	D ₁	D ₂	D ₃	D _A	l ₁	l ₂	l ₃	l ₄	l ₅	l ₆	G	t	t ₁	L	d _M	z	Pitch	H=stroke	Radial force		
9	90	135	185	200	225	260	120	110	50	188	2,5	17,5	12	25	75	203,5	12	12	12x30°	5,3	14	10	3300	36
12	120	173	225	215	252	290	140	128	50	215	4,5	27,5	16	30	100	236	20	15	20x18°	5,3	20	14	2300	54
15	150	215	270	245	282	324	170	160	50	247	4,5	27,5	20	40	120	269	20	15	20x18°	5,3	24	16	2050	76
20	200	285	370	330	375	460	220	200	78	322	5	33,0	20	50	150	344	24	18	24x15°	9	40	32	1550	194

¹⁾ Other sizes available on request

²⁾ Bigger forces can be accepted with a stronger bearing

³⁾ Higher speeds possible on request, see comments on page 226

Ordering example:

KTR-SI FRE 12	1T3	9	d Ø85	12000 Nm
Type / size	Type of element	Number of idle rotation elements	KTR-SI FRE bore	Torque set

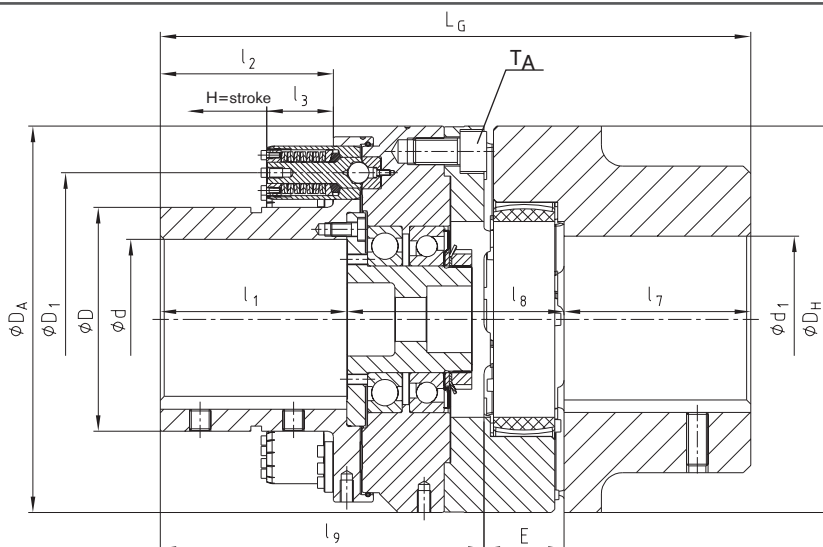
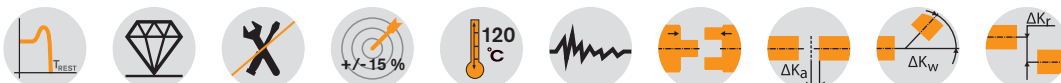
KTR-SI FRE

Idle rotating overload system

With torsionally flexible ROTEX®



For legend of pictogram please refer to flapper on the cover



Torques [Nm]							
Size	Type of element	3 idle rotation elements		6 idle rotation elements		9 idle rotation elements	
		min.	max.	min.	max.	min.	max.
9	1T2	1000	4000	2000	8000	-	-
	1T3	2000	5500	4000	11000	-	-
12	1T2	1300	5000	2600	10000	3900	15000
	1T3	2400	6700	4800	13400	7200	20100
15	1T2	1700	6000	3400	12000	5100	18000
	1T3	3000	8200	6000	16400	9000	24600
20	2T2	5000	15000	10000	30000	15000	45000
	2T3	10000	20000	20000	40000	30000	60000

Technical data – Dimensions																						
Size ¹⁾	ROTEX®			Max. bore		Dimensions [mm]														TA [Nm]	Speed ²⁾ [RPM]	Weight with max. bore [kg]
	Size	Torque [Nm] 64 Sh-D		d	d1	D	D1	DH	DA	l1	l2	l3	l7	l8	l9	E	LG	H=stroke				
		TKN	TKmax																			
9	90	4500	9000	90	110	135	185	200	260	120	110	50	100	133	208	45	353	5,3	117	3300	57	
12	125	12500	25000	120	125	173	225	290	290	146	130	50	140	165	245	60	445	5,3	560	2300	108	
15	140	16000	32000	150	160	215	270	320	324	170	160	50	155	176	281	65	501	5,3	560	2050	142	
20	180	35000	70000	200	200	285	370	420	460	220	200	78	195	227	362	85	642	9	970	1550	331	

¹⁾ Other sizes available on request

²⁾ Higher speeds possible on request, see comments on page 226

Ordering example:	KTR-SI FRE 12	1T3	9	d Ø85	ROTEX® 125	d1 Ø85	12000 Nm
	Type/size	Type of element	Number of idle rotation elements	KTR-SI FRE bore	Type/size	ROTEX® bore	Torque set

KTR-SI

Idle rotating overload systems

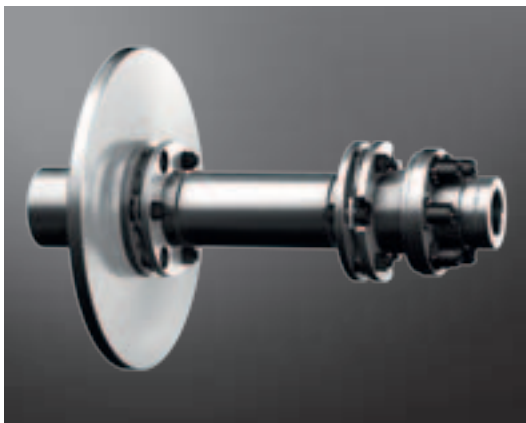
Special types



KTR-SI FRE with GEARex® and integrated brake disk



KTR-SI FRE with REVOLEX® and limitation of axial backlash



KTR-SI FRE with RADEX®-N and integrated brake disk



KTR-SI FRE with sprocket

RUFLEX®

KTR-SI

SYNTEX®

SYNTEX®-NC

KTR-SI Compact