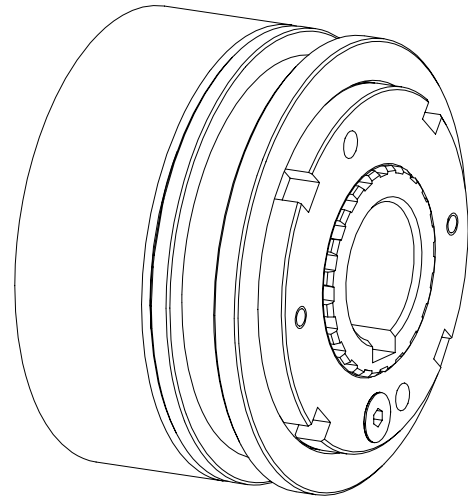
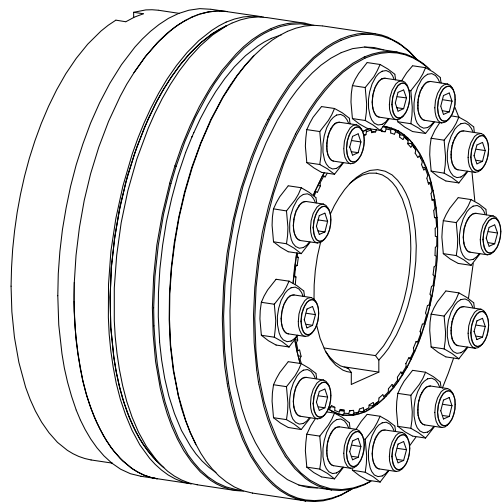




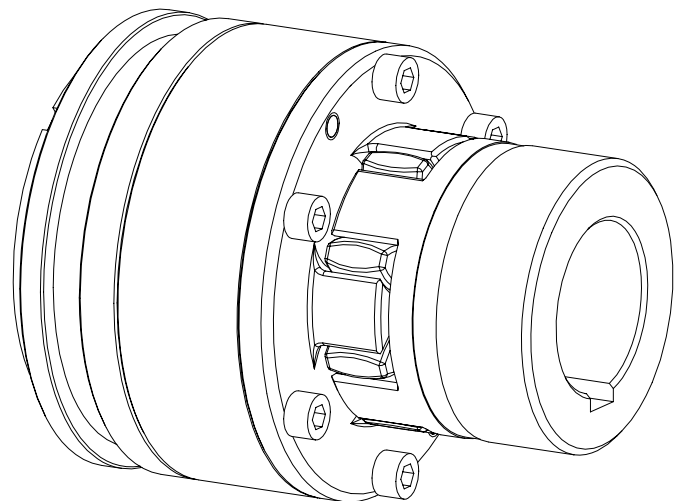
KTR-SI **design DK** **(ratchet design)**



KTR-SI size 0 to 5



KTR-SI size 6 to 7



KTR-SI with torsionally flexible ROTEX® coupling

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The **KTR-SI** is a torque limiting overload system with positive locking. It protects the following components against destruction. Type DK (ratchet design) re-engages in case of overload every 15° into the following sinking.

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1 Technical Data

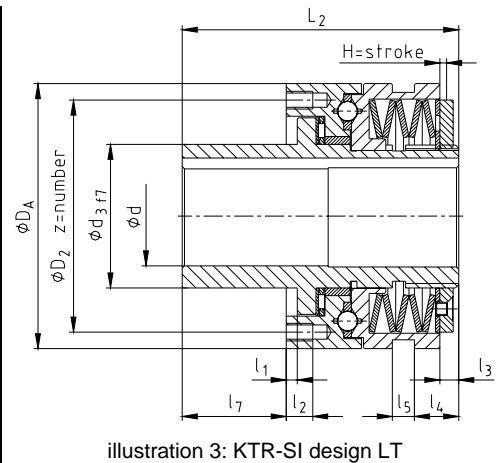
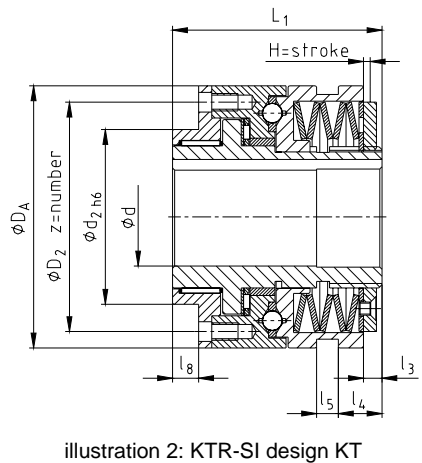
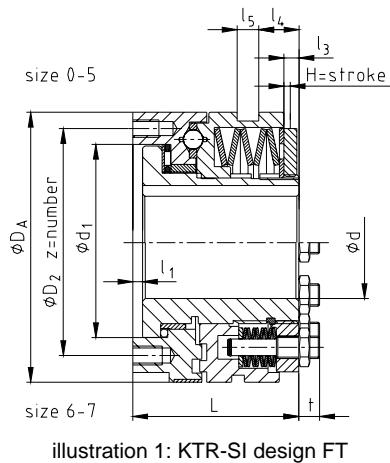


Table 1: Dimension

KTR-SI size	dimensions [mm]									
	bore d		d ₁	D ₂	D _A	d ₂	d ₃	l ₁	l ₂	l ₃
	pilot bore	max.								
0	7	20	41,0	48	55	38	28	4,0	6,5	3,0
1	10	25	60,0	70	82	50	38	4,0	8,0	6,0
2	14	35	78,0	89	100	60	52	5,0	10,0	5,0
3	18	45	90,5	105	120	80	65	5,0	12,0	8,5
4	24	55	105,0	125	146	100	78	6,5	15,0	11,0
5	30	65	120,5	155	176	120	90	6,5	17,0	12,0
6	40	80	136,0	160	200	130	108	7,0	20,0	14,0
7	50	100	168,0	200	240	160	135	8,0	25,0	15,0

KTR-SI size	dimensions [mm]								
	l ₄	l ₅	l ₇	l ₈	L	L ₁	L ₂	z	H=stroke
0	7,5	9	27,5	8	38,5	51,0	66,0	6 x M5	1,4
1	11,5	9	33,0	10	52,0	70,0	85,0	6 x M5	2,3
2	12,0	9	39,0	12	61,0	78,0	100,0	6 x M6	2,4
3	21,0	10	47,0	12	78,0	96,0	125,0	6 x M8	2,7
4	27,0	9	52,5	16	100,0	124,5	152,5	6 x M10	3,7
5	33,0	9	57,5	18	113,5	140,0	171,0	6 x M12	4,6
6 ¹⁾	39,0	9	64,0	20	119,0	150,0	183,0	6 x M12	5,0
7 ¹⁾	46,0	9	72,0	25	141,0	175,0	213,0	6 x M16	5,5

1) size 6: dimension t = 15 mm; size 7: dimension t = 21 mm

Table 2: Torques and weight

KTR-SI size	torques [Nm] with disk spring layers				weight with max. bore [kg]
	T1	T2	T3	T4	
0	2,5-5	5-20	-	20-40	0,41
1	6-12	12-25	25-55	55-100	1,30
2	12-25	25-50	50-120	120-200	2,27
3	25-50	50-100	100-250	200-450	3,88
4	50-100	100-200	200-500	500-1000	8,34
5	85-250	230-600	300-1000	600-2000	13,51
6	180-480	360-960	720-1950	1600-3300	21
7	250-520	500-1050	1000-2100	2000-3600	37



1 Technical Data

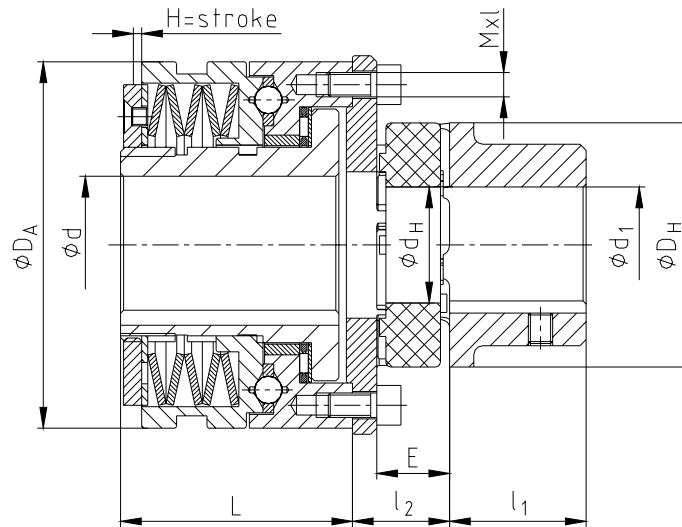


illustration 4: KTR-SI with torsionally flexible ROTEX® coupling

Table 3: Dimensions

KTR-SI size	ROTEX® size	dimensions [mm]										cap screws DIN EN ISO 4762 – 12.9	
		max. bore		D _A	D _H	d _H	E	l ₁	l ₂	L	H=stroke	M x l	T _A [Nm]
		d _{max.}	d ₁										
0	19	20	24	55	40	18	16	25	22,0	38,5	1,4	M5 x 10	8,1
	28		38		65	30	20	35	28,5				
1	24	25	28	82	55	27	18	30	24,0	52,0	2,3	M5 x 12	8,1
	38		45		80	38	24	45	32,5				
2	28	35	38	100	65	30	20	35	28,0	61,0	2,4	M6 x 16	14
	48		60		105	51	28	56	38,0				
3	38	45	45	120	80	38	24	45	32,0	78,0	2,7	M8 x 18	34
	55		70		120	60	30	65	43,0				
4	48	55	60	146	105	51	28	56	38,0	100,0	3,7	M10 x 20	67
	75		95		160	80	40	85	56,5				
5	55	65	70	176	120	60	30	65	44,0	113,5	4,6	M12 x 30	115
	90		110		200	100	45	100	62,0				
6	100	80	115	200	225	113	50	110	72,0	119,0	5,0	M12 x 30	115
7	110	100	125	240	255	127	55	120	78,0	141,0	5,5	M16 x 35	290

For torques see table 2: With sizes 5 to 7 higher torques can be transmitted due to an additional feather key in the flange connection KTR-SI – ROTEX®.



2 Hints

2.1 Coupling Selection



CAUTION!

To review the coupling selection please consult with KTR Kupplungstechnik GmbH.

2.2 General Hints

Please read through these mounting instructions carefully before you set the coupling into operation. Please pay special attention to the safety instructions! The mounting instructions are part of your product. Please keep them carefully and close to the coupling. The copyright for these mounting instructions remains with **KTR Kupplungstechnik GmbH**.

2.3 Safety and Advice Hints



DANGER!

Danger of injury to persons



CAUTION!

Damages on the machine possible



ATTENTION!

Pointing to important items

2.4 General Hints to Danger



DANGER!

With assembly, operation and maintenance of the coupling it has to be made sure that the entire drive train is secured against unintentional engagement. You can be seriously hurt by rotating parts. Please make absolutely sure to read through and observe the following safety instruction.

- All operations on and with the coupling have to be performed taking into account "safety first".
- Please make sure to disengage the drive unit and the power packs in service before you perform your work.
- Secure the drive unit against unintentional engagement, e. g. by providing hints at the place of engagement or removing the fuse for current supply.
- Do not touch the operation area of the coupling as long as it is in operation.
- Please secure the coupling against unintentional touch. Please arrange for the corresponding protection devices and caps.

2.5 Proper Use

You may only assemble, operate and maintain the coupling if you

- have carefully read through the mounting instructions and understood them
- had technical training
- are authorized to do so by your company

The coupling may only be used in accordance with the technical data (see table 1 to 3). Unauthorized modifications on the coupling design are not admissible. We do not take any warranty for resulting damages. To further develop the product we reserve the right for technical modifications. The KTR-SI described in here corresponds to the technical status at the time of printing of these mounting instructions.

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2 Hints

2.6 Hint Regarding the Finish Bore



DANGER!

The maximum permissible bore diameters d (see table 1 and 3 in chapter 1 - Technical Data) must not be exceeded. If these figures are disregarded, the coupling may tear. Rotating particles may cause serious danger.

- If the bore of the hub is machined by the customer, the coupling needs to be disassembled (see chapter 4.6).
- The concentricity or true running (see illustration 5) needs to be adhered to. Please make absolutely sure to observe the figures for d_{max} .
- Please align the hubs carefully when machining the finish bore.

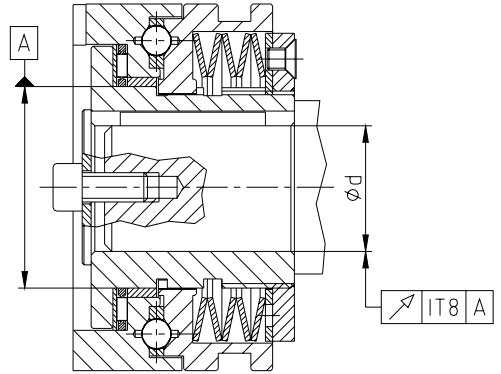


illustration 5: concentric running and axial running



CAUTION!

The buyer is responsible of all subsequently made machinings to unbored or pilot bored and to finish machined coupling parts. KTR does not assume any warranty claims resulting from insufficient refinish.

Table 4: Recommended combinations of fit acc. to DIN 748/1

bore [mm]		Shaft tolerance	Bore tolerance
above	to		
	50	k6	H7
50		m6	(KTR-Standard)

If a feather key is intended to be used in the hub, it should correspond to the tolerance ISO JS9 (KTR-Standard) with normal operating conditions or ISO P9 with heavy operating conditions (frequently alternating torsional direction, shock loads, etc.). (Applies only in combination with a ROTEX® coupling): Preferably the keyway should be positioned between the cams. For the axial fastening by set screws the tapping should be positioned on the keyway with the exception of AI-D which should be positioned opposite to the keyway.)

The transmissible torque of the shaft/hub connection must be checked by the buyer, and he is responsible for the same.

3 Storage

The coupling hubs are supplied in preserved condition and can be stored at a dry and roofed place for 6 - 9 months.



CAUTION!

Humid storage rooms are not suitable.

Please make sure that there is no condensation. The best relative air humidity is less than 65%.



4 Assembly

The coupling is supplied in assembled condition.

4.1 Components of the Couplings

Components KTR-SI size 0 to 5

Component	Quantity	Designation
1	1	hub
2	1	flange ring (DK-design)
3	1	shifting ring (DK-design)
4	1	ball bearing cage
5	1	circlip
6	1	slide bush
7	1	netting nut
8	s. table 5	disk spring (set)
9	1	axial needle bearing ¹⁾
10	1	axial disk
11	1	securing screw

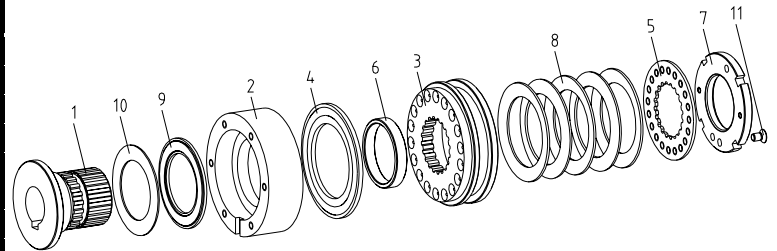


illustration 6: KTR-SI size 0 to 5

1) at size 0: bearing balls (1 set)

Components KTR-SI size 6 to 7

Component	Quantity	Designation
1	1	hub
2	1	flange ring (DK-design)
3	1	shifting ring (DK-design)
6	1	slide bush
7	1	setting nut
9	1	bearing balls (set)
12	s. table 6	setting screws
13	1	securing nut
14	6	setscrew DIN EN ISO 4029
15	1	additional ring

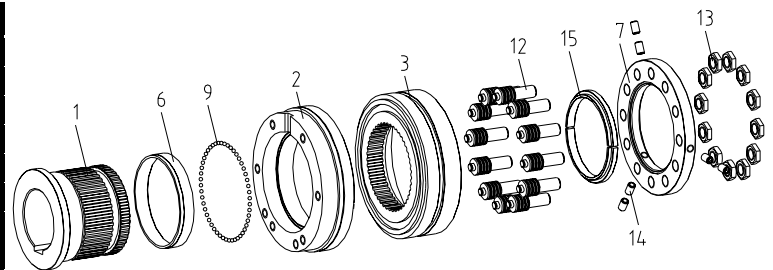


illustration 7: KTR-SI size 6 to 7

Components KTR-SI with torsionally flexible ROTEX® coupling

Component	Quantity	Designation
1	1	KTR-SI (complete coupling)
2	1	ROTEX®-SI-flange ¹⁾
3	1	ROTEX®-spider
4	1	ROTEX®-hub
5	6	cap screws DIN EN ISO 4762 – 12.9
6	1	setscrew DIN EN ISO 4029

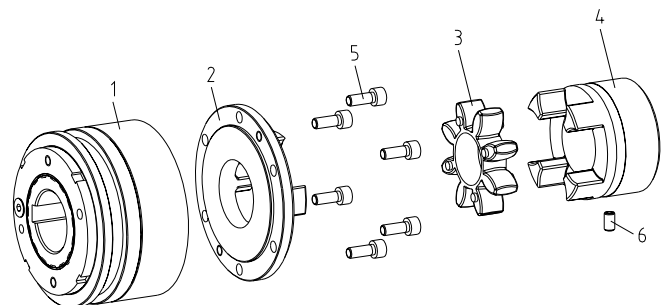


illustration 8: KTR-SI with torsionally flexible ROTEX® coupling

1) from ROTEX® size 75 with additional feather key on the front side



4 Assembly

4.2 Layers of disk spring

Disk spring layer with KTR-SI size 0 to 5

Table 5: Disk springs

layers of disk springs	type				
	T1	T2	T3	T4	
KTR-SI size	0 to 5	0 to 5	1 to 5	0	1 to 5
projection					
description	6x1S	5x1M	5x1L	4x1L	3x2L

Arrangement of setting screw with KTR-SI size 6 to 7

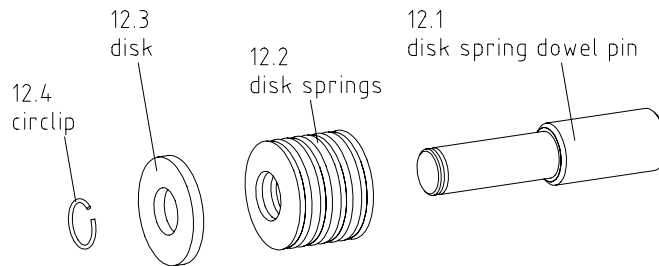


illustration 9: Arrangement of setting screw

Table 6: Disk springs

layers of disk springs	type							
	T1		T2		T3		T4	
KTR-SI size	6	7	6	7	6	7	6	7
projection								
description	13x1M	17x1S	13x1M	17x1S	13x1M	17x1S	11x1L	15x1M
number of components 12.1, 12.3, 12.4, 13	3		6		12		12	



4 Assembly

4.3 General mounting instructions



ATTENTION!

We recommend to inspect bores, shaft, keyway and feather key for dimensional accuracy before assembly.

Light heating of the KTR-SI coupling or ROTEX® hub (approx. 80 °C) allows for an easier mounting on the shafts.



DANGER!

Touching the heated coupling or hub, respectively, may cause burns. Please wear safety gloves.

- Please make sure the perfect technical condition of the **KTR-SI** overloaded system.
- Please only use original KTR components (no outside supplied parts).

4.4 Assembly of the KTR-SI-Coupling

- Assemble the KTR-SI coupling (component 1) on the shaft of the driving or driven side.
- Please provide for an end plate to axially secure the KTR-SI coupling (see illustration 5 in chapter 2.6).

4.5 Assembly of KTR-SI with torsionally flexible ROTEX® coupling

- Mount the KTR-SI coupling (component 1) or ROTEX® hub (component 4) on the shafts of the driving or driven side.
- Provide for an end plate for the axial locking of the KTR-SI coupling (see illustration 5 in chapter 2.6).
- Screw the ROTEX®-SI flange (component 2) to the KTR-SI coupling hand-tight for the time being.
- Tighten the screws crosswise by a suitable torque key to the tightening torques T_A mentioned in table 3.
- Insert the ROTEX® spider (component 3) in the cam area of the ROTEX® hub.
- Shift the power packs in axial direction until the distance dimension E has been reached (see illustration 11).
- If the power packs are firmly assembled, the distance dimension E has to be set by shifting the hubs axially on the shafts.
- Lock the hubs by tightening the set screws DIN EN ISO 4029 via a cup point (for tightening torques T_A see KTR-N 40210).

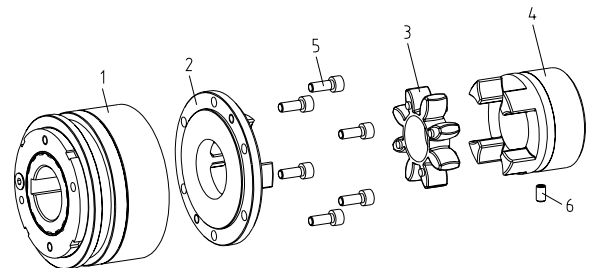


illustration 10: KTR-SI with a torsionally flexible ROTEX® coupling

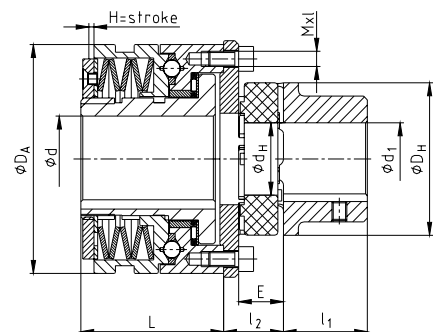


illustration 11: assembly of coupling



CAUTION!

Please make sure with the assembly that the distance dimension E (see table 3) is adhered to in order to assure that the coupling components do not get in contact during the operation.

If this instruction is not observed, the coupling may be damaged.



ATTENTION!

Please consider our assembly instructions KTR-N 40210 additionally when using the ROTEX® coupling.

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4 Assembly

4.6 Disassembly of the coupling / replacement of spare parts

Only valid for size 0 to 5:

- Disassemble the locking screw (component 11) and setting nut (component 7).
- Remove the locking disk (component 5) from the hub.
- Remove the disk springs (component 8) and the shifting ring (component 3).

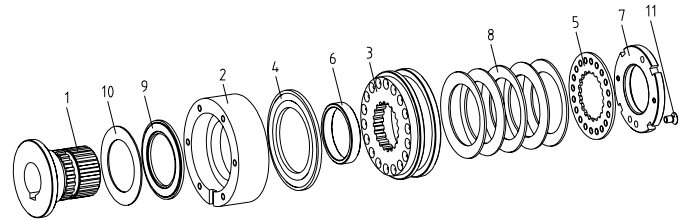


illustration 12: KTR-SI size 0 to 5



ATTENTION!

Please note the disk spring layer for the assembly.

Only valid for size 6 to 7:

- Unscrew the locking nuts (component 13).
- Remove the set screws (component 14) and afterwards disassemble the setting nut (component 7).

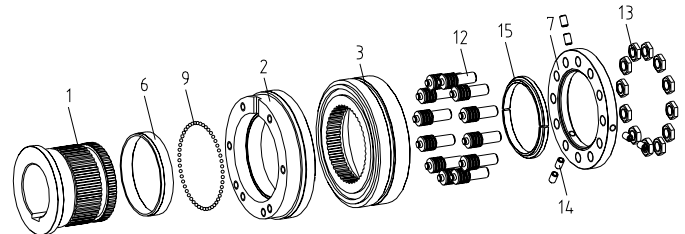


illustration 13: KTR-SI size 6 to 7

Continuation of disassembly with all sizes:

- Remove the shifting ring (component 3) and flange ring (component 2) from the hub (component 1).
- Remove the slide bush (component 6) and the axial needle bearing or ball bearings, respectively (component 9).



CAUTION!

For sizes 0, 6 and 7 bearing balls are mounted between hub (component 1) and flange ring (component 2) instead of the needle bearing (see illustration 6 and 7).

4.7 Assembly of the coupling

The assembly is done in reverse order with the disassembly (see chapter 4.6). For that purpose please note the exploded drawings illustration 12 and 13. Factory-provided components may have to be re-lubricated.



ATTENTION!

Greasing by usual greases has to be done.



CAUTION!

Please note the disk spring layer for the assembly as per chapter 4.2.

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4 Assembly

4.8 Adjustment of torque – KTR-SI size 0 to 5

Dependent of the used arrangement in layers of the disk spring the desired torque can be fixed by adjusting the screw setting nut in the sphere of the torque:

- Fix the hub (component 1) against twisting.
- Unscrew the locking screw (component 11).
- Screw the setting nut (component 7) manually to the disk springs (component 8) against a stop (zero point → backlash-free prestress of disk spring).
- Choose any reference point of the setting nut (component 1) versus a scale mark of the shifting ring (component 3).
- Insert the face spanner into the respective bores of the setting nut (see illustration 14).
- The exact torque is adjusted by turning the setting nut (component 1) clockwise.



ATTENTION!
For torque setting please note the setting diagrammes of the respective sizes (see diagramme 1 to 6 in chapter 4.10).

- Having set the torque the setting nut (component 1) is secured against loosening by means of the locking screw (component 11).

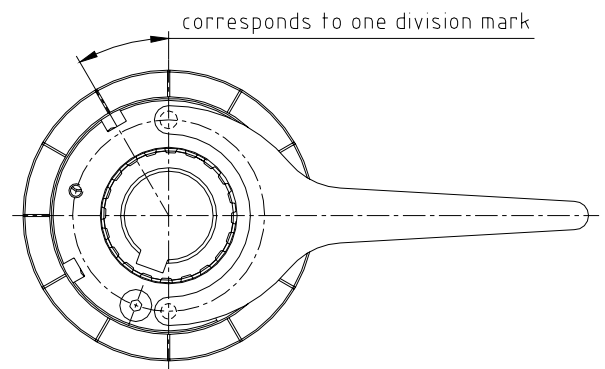


illustration 14: adjustment of torque – KTR-SI size 0 to 5

If **KTR-SI** has been set to the requested torque following these operating/assembly instructions, the level of the ratchet torque can be considered as a reference value only. For more accurate setting the ratchet torque should be investigated by means of a suitable measuring system. In order to achieve the optimum accuracy, the ratchet torque needs to be reviewed after the initial ratchets and reset, if necessary.



4 Assembly

4.9 Adjustment of torque – KTR-SI size 6 to 7

Dependent of the used arrangement in layers of the disk spring the desired torque can be fixed by adjusting the screw setting nut in the sphere of the torque:



ATTENTION!

KTR supplies the coupling in pre-assembled condition as a standard. Continue with item 2 torque setting.

If a new assembly has been performed or the buyer has made modifications subsequently, please go on with item 1 preparation of torque setting.

1. Preparation of torque setting

- Fix the hub (component 1) against twisting.
- Unscrew the locking nuts (component 13).
- Turn the setting screws (component 12) manually counter-clockwise against a stop (contact between internal disk springs and setting nut).
- Remove each the first one out of the three set screws arranged twice (component 14) and afterwards unscrew the second set screw.
- Turn the setting nut (component 7) manually against a stop.
- Afterwards turn back the setting nuts counter-clockwise until the balance of the three set screws is flush with three out of the total of six keyways of the hub.
- Turn in the three set screws (component 14) in order to lock the setting nut by positive fit on the hub. Afterwards counter the set screws each by the second set screw.

2. Adjustment of torque

- Screw the setting screws (component 12) manually with only little effort to the disk springs (component 8) against a stop (→ backlash-free contact between disk springs and pressure ring).
- Tighten the setting screws (component 12) stepwise evenly in several revolutions (max. 360°) clockwise to the requested torque (6/6 corresponds to one complete revolution). The torque can be set by means of a hexagon socket wrench (component 16).



ATTENTION!

For torque setting the setting diagrammes of each size need to be observed (see diagramme 7 to 8 in chapter 4.10).

- Having set the torque the setting screws (component 12) are secured against loosening by locking nuts (component 13) (see illustration 15).

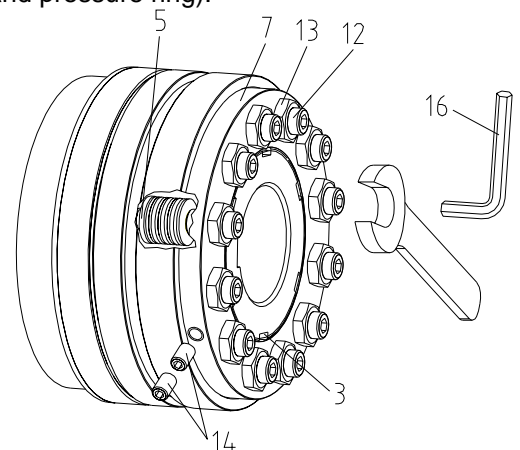


illustration 15: adjustment of torque – KTR-SI size 6 to 7

If **KTR-SI** has been set to the requested torque following these operating/assembly instructions, the level of ratchet torque can only be considered as a reference value. For more accurate setting the ratchet torque should be investigated by means of a suitable measuring system. In order to achieve the optimum accuracy, the ratchet torque needs to be reviewed after the initial ratchets and reset, if necessary.

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4 Assembly

4.10 Setting diagramme

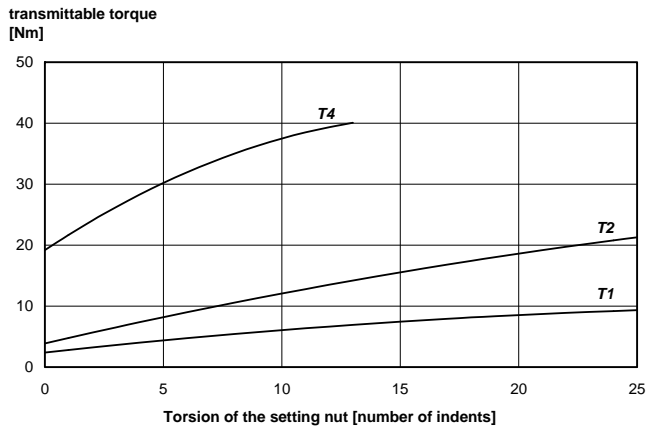


diagram 1: KTR-SI 0

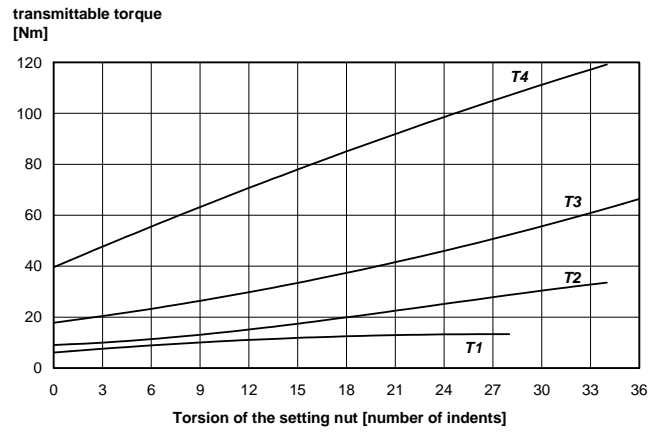


diagram 2: KTR-SI 1

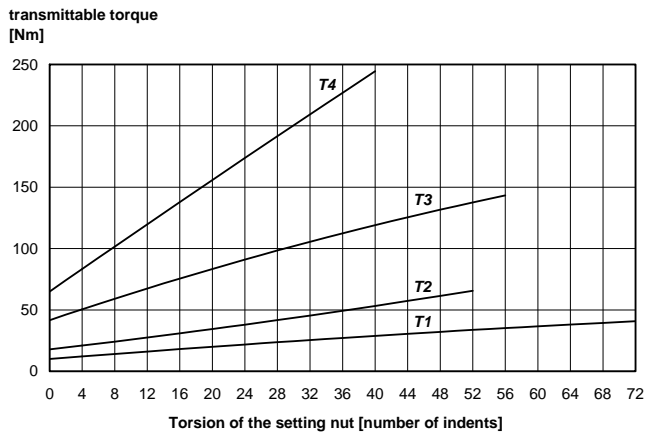


diagram 3: KTR-SI 2

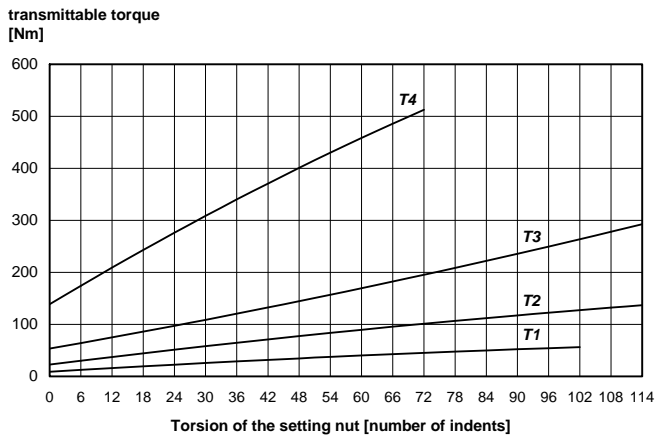


diagram 4: KTR-SI 3

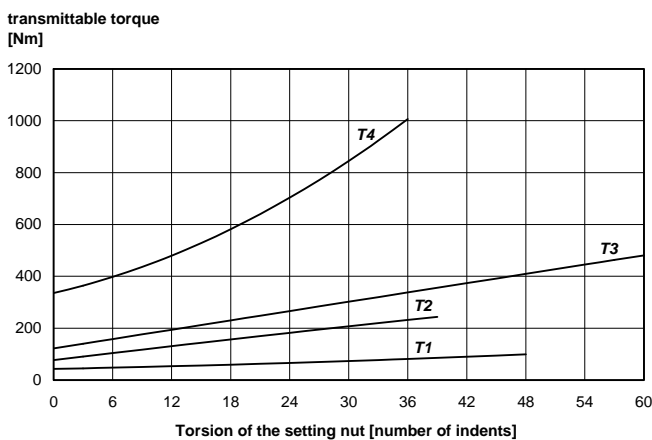


diagram 5: KTR-SI 4

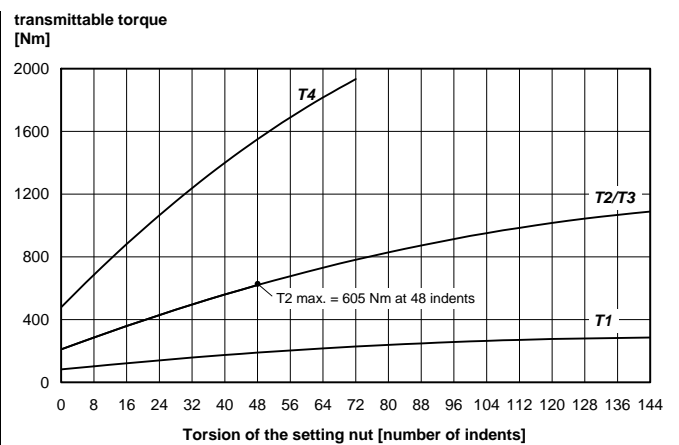
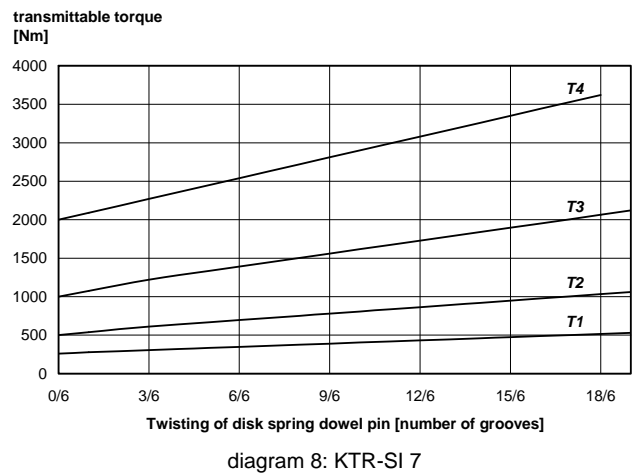
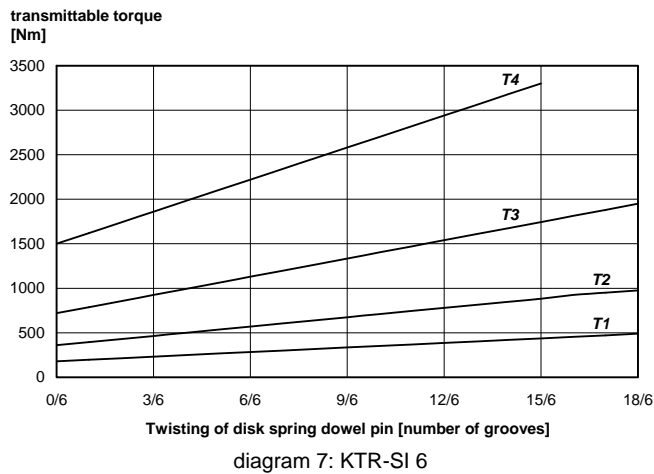


diagram 6: KTR-SI 5



4 Assembly

4.10 Setting diagrammes



4.11 Advices for the use of drive components

With the use of drive components, e. g. sprockets, belt pulleys or gear wheels radial forces have to be expected during the operation. For the FT design the customer should provide for a separate bearing of the drive component. The non-positive connection of the drive components with the overload hub is done by screwing by using usual standard screws of property class 10.9.

For the designs KT and LT the drive components are mounted to the coupling hub and screwed to the flange ring. The resulting radial force on the drive element should be in the level of the bearing in order to avoid twisting of the drive elements and consequently the flange ring.

- If torsional vibrations of the overall drive have to be expected, we would recommend to lock the screw by means of a suitable screw locking.
- Do not give any axial pressure on the coupling. The drive element needs a corresponding bearing.
- For higher torque shocks an extra feather key can be used for additional positive locking power transmission.



4 Assembly

4.12 Assembly of the limit switch

The limit switch should be assembled in the keyway of the shifting ring (see illustration 16). The positions and dimensions of the keyway are shown in table 7.

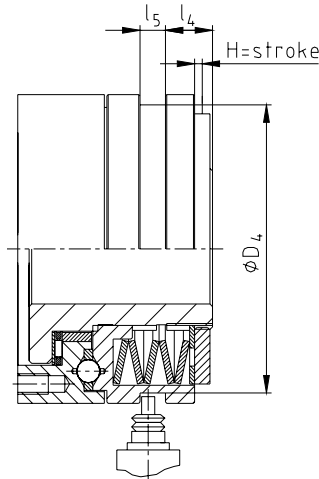


illustration 16: mechanical limit switch

Table 7: position of the limit switch

KTR-SI size	dimensions [mm]			
	l_4	l_5	$\text{Ø}D_4$	H=stroke
0	7,5	9	50,0	1,4
1	11,5	9	72,5	2,3
2	12,0	9	90,5	2,4
3	21,0	10	112	2,7
4	27,0	9	140	3,7
5	33,0	9	170	4,6
6	39,0	9	190	5,0
7	46,0	9	230	5,5

Operation

Due to the axial stroke of the shifting ring produced by overload a mechanical limit switch or inductive sensor may be activated. In this way a control signal is produced which can be analysed for shifting off the drive.

Assembly

The sensor has to be mounted in a solid device in order to ensure a smooth operation. The sensor should be protected against dirt and potential mechanical disorders.

Adjustment

When the overload coupling slips, the shifting ring makes an axial thrust (see table 7). The sensor or limit switch, respectively, has to be mounted within this shifting range. In order to adapt the mechanical limit switch and the shifting process to the machine, the limit switch has to be adjusted accordingly. For that purpose the shifting process can be regulated after opening the cover plate on the tappet.



CAUTION!

We recommend to use a limit switch!

Please make absolutely sure to inspect the operation of the limit switch before dispatch of the machine. Please also observe the operating instructions for the sensor or limit switch, respectively. The axial stroke of the shifting ring must not be blocked by other components. As soon as the limit switch or sensor is activated (overload: activating the overload coupling) the drive should be stopped immediately.

For higher speeds corresponding brake devices may be necessary.



4 Assembly

4.13 Waste disposal

For the sake of environmental protection we would ask you to dispose of the products in accordance with the current legal specifications or guidelines, respectively at the end of their service life.

- **Metal**

Any metal components need to be cleaned and delivered to scrap metal.

4.14 Spares Inventory, Customer Service Addresses

A basic requirement to guarantee the operational readiness of the coupling is a stock of the most important spare parts on site.

Contact addresses of the KTR partners for spare parts and orders can be obtained from the KTR homepage under www.ktr.com.



CAUTION!

KTR does not take any liability or warranty for the use of spare parts and accessories which have not been supplied by KTR and the resulting damages.

5 Maintenance

The **KTR-SI** overload hub is finish bored and provided with grease filling. With normal drive conditions this grease filling is sufficient during the overall service life. In case of extreme drive conditions or heavy dirt, respectively, the KTR-SI has to be regularly inspected for its operation. If KTR-SI is ordered in a pilot-bored design, the customer has to disassemble it in order to place a finish bore.



CAUTION!

During the subsequent assembly it needs to be lubricated by usual grease.

Schutzvermerk ISO 16016 beachten.	Gezeichnet: 13.10.11 Kb/Koh	Ersatz für: KTR-N 46110
	Geprüft: 02.02.12 Kb	Ersetzt durch: