

## RUFLEX®

Torque limiter

## SYNTEX®

Backlash-free overload system

## SYNTEX®-NC **NEW**

Backlash-free overload system

## KTR-SI Compact

Backlash-free overload system

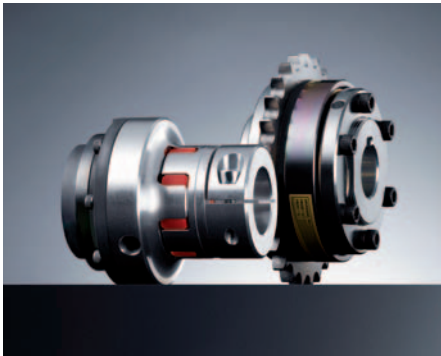
## KTR-SI

Safety system

Made for Motion



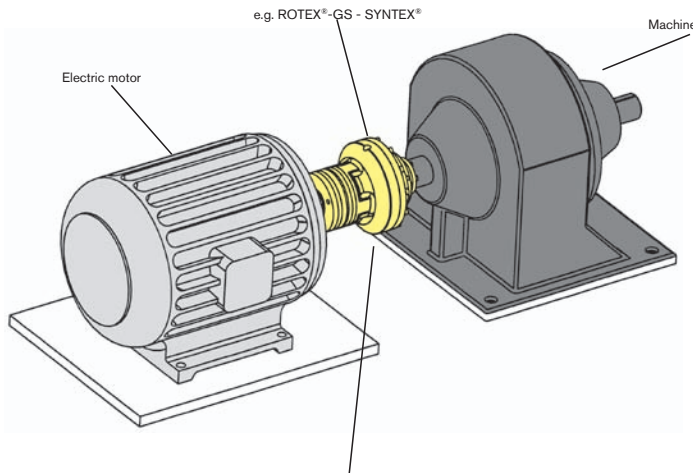
## Table of contents



<b>RUFLEX®</b>	
<b>Torque limiter</b>	245
Overload protection for direct and indirect drives	247
Types and applications	248
Information for selection of torque limiters	250
Assembly and operation	251
Standard RUFLEX®	253
RUFLEX® with sprocket	254
RUFLEX® max.	255
RUFLEX® with torsionally flexible ROTEX®	256
RUFLEX® with torsionally rigid BoWex®	257
<b>SYNTEX®</b>	
<b>Backlash-free Overload System</b>	
A good idea - The punched disk spring	258
Operating principle	259
Standard SYNTEX® flange coupling	260
Standard SYNTEX® with integrated sprocket	261
Standard SYNTEX® with belt drive	262
SYNTEX® with shaft coupling ROTEX® GS	263
Cost-effective version	264
Backlash-free, torsionally rigid overload system	265
<b>NEW</b> SYNTEX®-NC	266
<b>NEW</b> SYNTEX®-NC with ROTEX® GS or TOOLFLEX®	267
<b>KTR-SI Compact</b>	
<b>Backlash-free overload system</b>	
Backlash-free, torsionally rigid overload system	268
Type FT, FT-4.5	269
Type FT with ROTEX® GS	270
With torsionally stiff TOOLFLEX® KN	271
<b>KTR-SI</b>	
<b>Overload system</b>	
We provide safety	272
Variable applications by modular system	273
Idle rotation coupling (load-separating)	274
Type FT, KT and LT	275
With torsionally flexible ROTEX®	276

## Overload protection for direct and indirect drives

### Direct drives



Torque limiter as shaft-to-shaft connection, for example:

- ball spindles
- axle drives
- between motor and gearbox

RUFLEX® - Torque limiter with ROTEX®



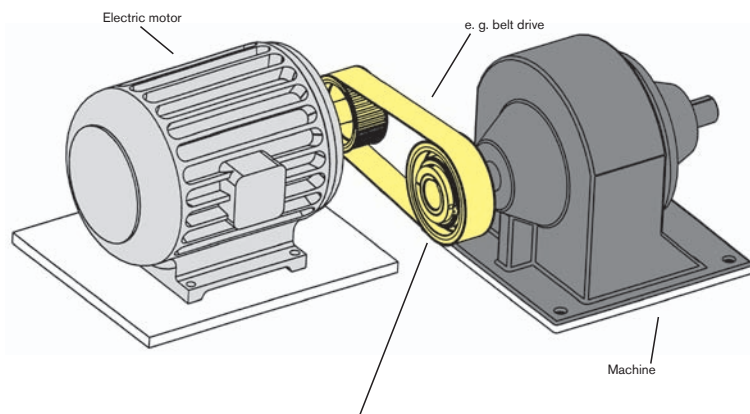
SYNTEX® - Overload system with ROTEX® GS



KTR-SI - Overload system with ROTEX®



### Indirect drives



Torque limiter as shaft-to-flange connection, for example:

- sprockets
- belt drives
- crank gears

RUFLEX® - Torque limiter with sprocket










SYNTEX® - Overload system with sprocket



KTR-SI - Overload system with flange connection



## Types and applications

Type	Characteristics	Applications
 <p><b>RUFLEX® standard</b></p>	<ul style="list-style-type: none"> <li>- Torque limiter with high power density due to high-quality materials</li> <li>- Overload protection up to 6800 Nm</li> <li>- High capacity of wear for a long service life</li> <li>- Surfaces zinc-coated and passivated</li> <li>- See page 253</li> </ul>	<ul style="list-style-type: none"> <li>- Conveyors</li> <li>- Packaging machines</li> <li>- Textile machines</li> <li>- Gear motors</li> </ul>
 <p><b>RUFLEX® with sprocket</b></p>	<ul style="list-style-type: none"> <li>- Torque limiter with sprocket</li> <li>- Components ready for assembly</li> <li>- Customer's torque is set</li> <li>- Available from stock with standard sprockets</li> <li>- Other sprockets available according to customer's requests</li> <li>- See page 254</li> </ul>	<ul style="list-style-type: none"> <li>- Conveyors</li> <li>- Automation systems</li> <li>- Actuators</li> </ul>
 <p><b>RUFLEX® max.</b></p>	<ul style="list-style-type: none"> <li>- Torque limiter in a lengthened design for assemblies with wide driving components (e. g. double or triple sprockets)</li> <li>- Detailed adjustment to customer's mounting dimensions possible</li> <li>- Also available as assembly with sprocket</li> <li>- See page 255</li> </ul>	<ul style="list-style-type: none"> <li>- Multiple sprocket drives</li> <li>- Multiple groove V-belt pulleys</li> <li>- Conveyors</li> <li>- Packaging machines</li> </ul>
 <p><b>RUFLEX® with ROTEX®</b></p>	<ul style="list-style-type: none"> <li>- Torque limiter for shaft-to-shaft connection</li> <li>- Torsionally flexible torque limiter able to compensate for misalignment</li> <li>- Axial plug-in</li> <li>- Different elastomers available each adjusted to the application</li> <li>- See page 256</li> </ul>	<ul style="list-style-type: none"> <li>- Gear motors</li> <li>- Axle drives</li> <li>- High-quality pumps</li> <li>- Printing machines</li> </ul>
 <p><b>RUFLEX® with BoWex®</b></p>	<ul style="list-style-type: none"> <li>- Torque limiter as a torsionally stiff, double-cardanic shaft-to-shaft connection</li> <li>- Low-cost shaft-to-shaft connection</li> <li>- Axial plug-in</li> <li>- Compensating for high misalignment due to double-cardanic design</li> <li>- See page 257</li> </ul>	<ul style="list-style-type: none"> <li>- Simple applications</li> <li>- Low speeds</li> <li>- High misalignment</li> </ul>
 <p><b>SYNTEX® Standard</b></p>	<ul style="list-style-type: none"> <li>- Safety clutch up to 400 Nm</li> <li>- Backlash-free, torsionally stiff</li> <li>- Available as a synchronous and ratchet design</li> <li>- For mounting of customer's components</li> <li>- See page 260</li> </ul>	<ul style="list-style-type: none"> <li>- Packaging machines</li> <li>- Machine tools</li> <li>- X-Y-Z axle drives</li> <li>- Linear drives</li> </ul>
 <p><b>SYNTEX® with sprocket</b></p>	<ul style="list-style-type: none"> <li>- Safety clutch with integrated sprocket</li> <li>- Customer's torque is set</li> <li>- Reduction of components and costs</li> <li>- Standard sprockets available from stock</li> <li>- Alternatively available with belt pulley instead of sprocket</li> <li>- See page 261 and 262</li> </ul>	<ul style="list-style-type: none"> <li>- Conveyors for packaging machines</li> <li>- Textile machines</li> <li>- With belt pulley for linear drives</li> </ul>

## Types and applications

### Types

### Characteristics

### Applications



SYNTEX® with ROTEX® GS

- Safety clutch as a shaft-to-shaft connection
- Combination with backlash-free ROTEX® GS
- Torsionally flexible, able to compensate for misalignment
- Axial plug-in
- Various elastomers available
- See page 263

- Axle drives on machine tools
- Gear motors
- Woodworking machinery
- Linear drives



SYNTEX®-NC

- Safety clutch up to 280 Nm
- Backlash-free, torsionally stiff
- Low mass moment of inertia
- Light-weight design
- Available as a synchronous and ratchet design
- Easy assembly
- Compact design
- See page 266

- Machine tools
- Packaging machines
- Linear drives

**NEW**



SYNTEX®-NC with ROTEX® GS

- Safety clutch as a shaft-to-shaft connection
- Combination with the backlash-free ROTEX® GS
- Torsionally flexible, able to compensate for misalignment
- Axial plug-in
- See page 267

- Machine tools
- Packaging machines
- Linear drives
- Servo drives

**NEW**



KTR-SI Compact

- Safety clutch up to 3100 Nm
- Backlash-free, torsionally stiff
- Available as a synchronous and ratchet design
- Rugged design
- See page 268

- Packaging machines
- Special purpose machinery
- Conveyors



KTR SI Compact with ROTEX® GS

- Safety clutch as a shaft-to-shaft connection
- Combination with the backlash-free ROTEX® GS
- Torsionally flexible, able to compensate for misalignment
- Axial plug-in
- See page 270

- Packaging machines
- Special purpose machinery
- Conveyors



KTR-SI standard

- Safety clutch up to 8200 Nm
- Available in a ratchet, synchronous and fail-safe design
- New: Also available in a free-rotating design (no residual torque)
- See page 272 and 274

- Rugged applications, e. g. crushers
- In combination with coupling or belt pulleys, sprockets, etc.



KTR-SI with ROTEX®

- Safety clutch as a shaft-to-shaft connection
- Torsionally flexible, able to compensate for misalignment
- Axial plug-in
- Various elastomers available
- See page 276

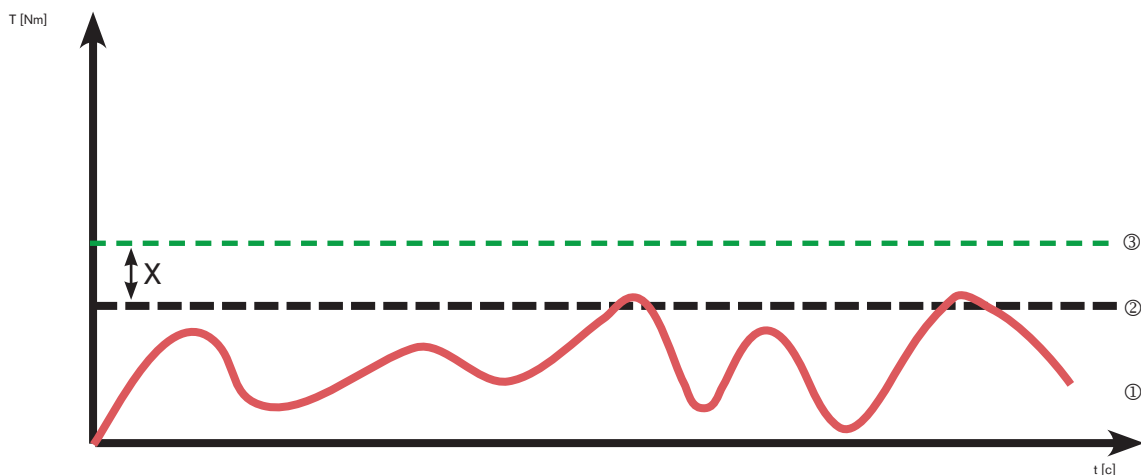
- Axle drive as a shaft-to-shaft connection
- Motor-gearbox-combinations
- Bottling machines
- Extruders (as a free-rotating coupling)

## Information for selection of torque limiters

- For accurate dimensioning of torque limiters latest simulation and calculation programmes are available. Therefore let us know many data of your drive. The more accurate these data are, the more accurate are the results of calculation. Make use of this possibility and discuss with us the application in advance.
- Please note: Big masses on the driving or driven end can mean long slow-down times in case of torques limiters entered in function. This may cause increased wear on the coupling. Therefore in case of high speeds we recommend to use a free-rotating (load-separating) safety clutch (KTR-SI idle rotation coupling). If required, please consult with KTR's engineering department.
- Besides it is important for the failure-free operation to define the switching torque definitely above the max. operating torque of the unit. Therefore we recommend to set the coupling at least 30 % above the max. operating torque (also refer the diagram below)
- For all torque limiters an electrical disconnection of the drive should be provided. Long slipping or ratching times may destroy the coupling. We kindly assist you when selecting sensors, end switches or speed controls.

### Important factors for the selection of torque limiters:

A smooth operation is only guaranteed if the overload torque set exceeds the maximum operating torque of the machine (see diagram below).



- ① Torque curve of the machine
  - ② Maximum operating torque of the machine
  - ③ Torque of the coupling set
- X Safety margin between ② and ③ (should be at least 30 % of the maximum operating torque of the machine).

## Assembly and operation

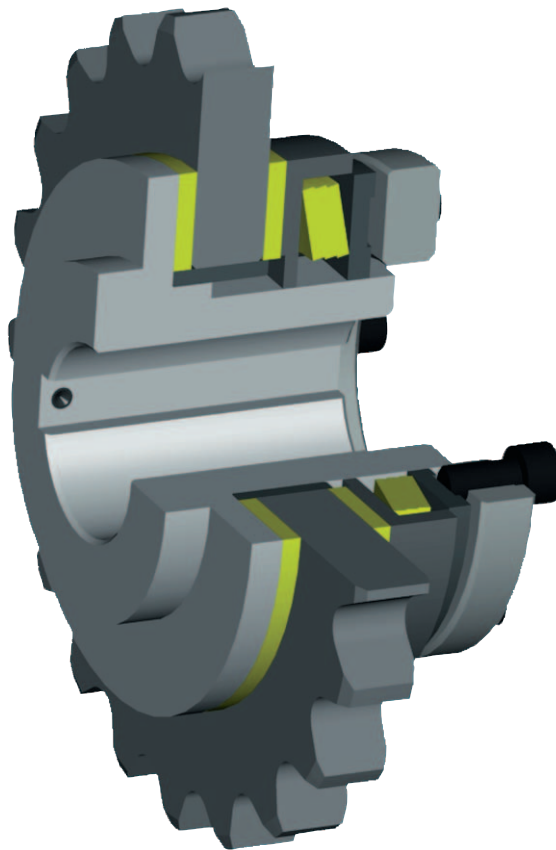
RUFLEX® standard




RUFLEX® with sprocket



RUFLEX® with ROTEX®



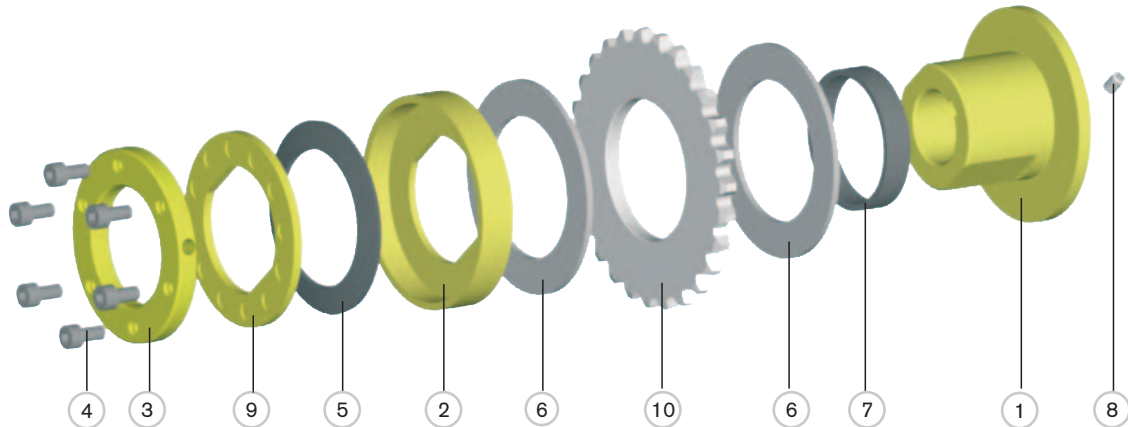
- Overload protection up to 6800 Nm (standard)
- Available with sprocket assembled
- Asbestos-free and rust-resistant friction lining for dry running  (ATEX possible on request)
- High wear capacity, long service life
- High-quality slide bush with dry-film lubricant
- Torque setting while in place

- Securing of the nut by locking in 12 different positions
- Easy assembly and torque setting
- Coupling components from steel, high safety reserves
- Corrosion protection by zinc-coated and passivated surfaces
- Rust-resistant and acid-proof design on request
- High power density due to high-quality disk springs and friction linings

The RUFLEX® modular system is able to provide a solution for your drive, too. The combination with the well-approved KTR couplings and the integration of customer-specific drive components (e. g. sprockets) provides for an overload protection adapted to every application in an optimum way. Various layers of disk springs and high-quality friction linings ensure a high power density even for only a small mounting space.

## Assembly and operation

RUFLEX® consists of the following components:



List of components:

- |                         |                                    |
|-------------------------|------------------------------------|
| ① Hub                   | ⑥ Friction lining                  |
| ② Thrust washer         | ⑦ Slide bush                       |
| ③ Setting nut           | ⑧ Set screw                        |
| ④ Torque setting screws | ⑨ Locking washer                   |
| ⑤ Disk spring           | ⑩ Drive component (e. g. sprocket) |

Layers of disk springs:



- 1 TF
- Small specific load on the friction linings
  - For small to average torques
  - Long service life of friction linings



- 1 TFD
- Small specific load on the friction linings
  - Torques as with design 1TF
  - Only small decrease of the torque even during a longer period of friction
  - Precision torque adjustment due to a double spring excursion



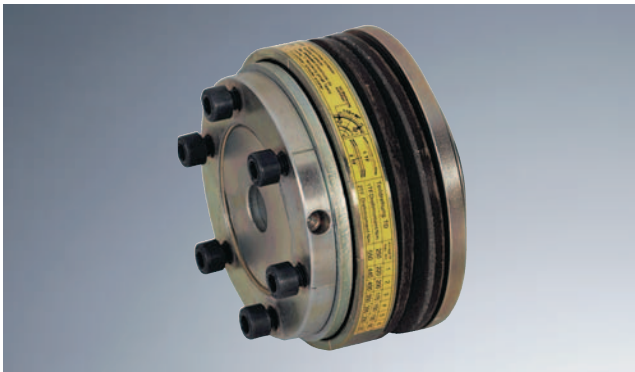
- 2 TF
- Average specific load on the friction linings
  - Average wear and decrease of torque with longer slipping periods
  - Double torque due to double layer of the disk springs



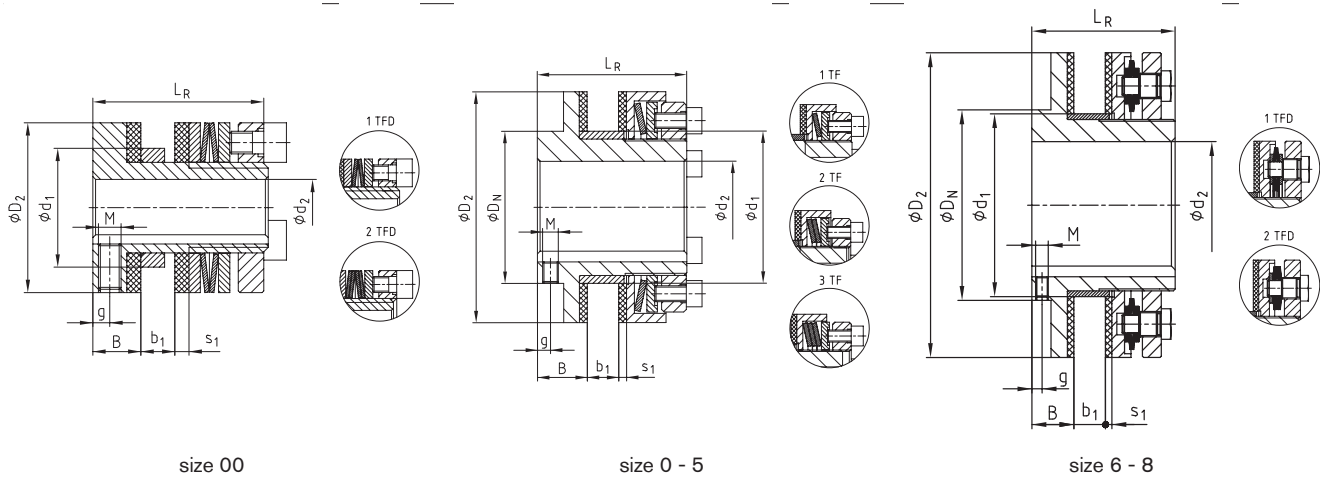
- 3 TF
- High specific load on the friction linings
  - High wear and decrease of torque with longer slipping periods
  - Suitable only in special cases for designs with only limited dimensions



Standard RUFLEX®



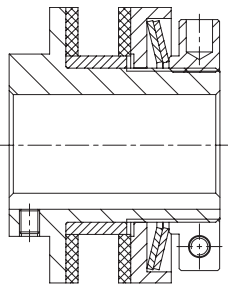
- Torque limiter for a torque range up to 6800 Nm
- Standard RUFLEX® zinc-coated and passivated
- Torque setting possible while in place
- Asbestos-free and rust-resistant friction linings
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9
- Securing of the setting nut by locking in 12 different positions
- All components are made of high-quality steel



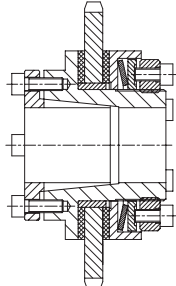
Technical data

Size	Max. speed [rpm]	Torques [Nm]			Dimension [mm]											
					Bore d <sub>2</sub>		D <sub>2</sub>	D <sub>N</sub>	d <sub>1</sub> <sup>2)</sup>	B	Driving component b <sub>1</sub>		S <sub>1</sub>	L <sub>R</sub>	Set screw	
		Pilot bore	max.	min.	max.	g					M					
00	10000	0,5-3	1-5	–	–	10	30	30	21	8,5	2	6	2,5	31	3	M4
0	8500	2-10	4-20	–	–	20 <sup>1)</sup>	45	45	35	8,5	2	6	2,5	33	3	M4
01	6600	5-35	10-70	–	–	22	58	40	40	16	3	8	3	45	4	M5
1	5600	20-75	40-150	130-200	–	25	68	45	44	17	3	10	3	52	5	M5
2	4300	25-140	50-280	250-400	–	35	88	58	58	19	4	12	3	57	5	M6
3	3300	50-300	100-600	550-800	–	45	115	75	72	21	5	15	4	68	5	M6
4	2700	90-600	180-1200	1100-1600	–	55	140	90	85	23	6	18	4	78	5	M8
5	2200	400-800	800-1600	1400-2100	–	65	170	102	98	29	8	20	5	92	8	M8
6	1900	300-1200	600-2400	–	38	80	200	120	116	31	8	23	5	102	8	M8
7	1600	600-2200	1200-4400	–	45	100	240	150	144	33	8	25	5	113	8	M10
8	1300	900-3400	1800-6800	–	58	120	285	180	170	35	8	25	5	115	8	M10

<sup>1)</sup> Finish bore exceeding Ø19, keyway to 6885 sheet 3  
<sup>2)</sup> Bore tolerance (driving component): F8 with size 00-4, H8 with size 5-8  
<sup>3)</sup> To use only for designs with limited dimensions



– with clamping setting nut  
 – for radial torque setting



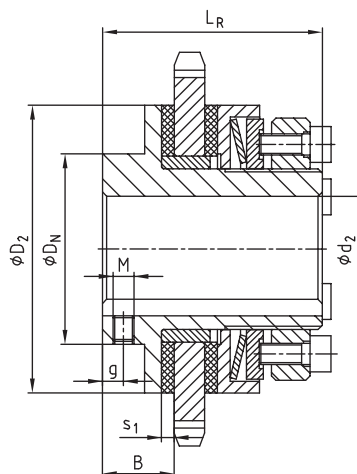
– with taper bush (hub design 4.5)  
 – frictionally engaged shaft-hub-connection

Ordering example:	RUFLEX®	1	2TF	Ø20
	Type	Size	Disk spring layer	Finish bore d <sub>2</sub>

RUFLEX® with sprocket



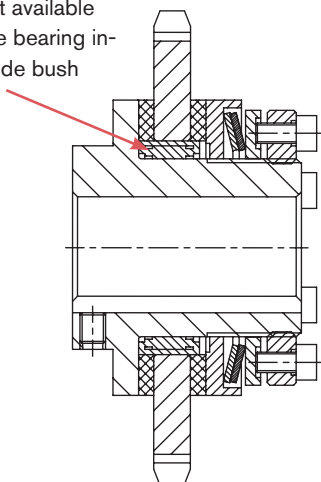
- RUFLEX® torque limiter with sprocket mounted
- Available from stock with standard sprocket (see table below)
- Other sprockets on request
- Complete unit with torque pre-set
- On request also available from stainless material
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9



Technical data														
Size	Max. speed [rpm]	Torques [Nm]			Dimensions [mm]									
		1TF	2TF	3TF <sup>1)</sup>	Bore d <sub>2</sub>		D <sub>2</sub>	D <sub>N</sub>	B	s <sub>1</sub>	L <sub>R</sub>	g	M	Standard sprocket
01	6600	5-35	10-70	–	–	22	58	40	16	3	45	4	M5	06B-1 ( <sup>3</sup> / <sub>8</sub> x <sup>7</sup> / <sub>32</sub> ) z = 23
1	5600	20-75	40-150	130-200	–	25	68	45	17	3	52	6	M5	08B-1 ( <sup>1</sup> / <sub>2</sub> x <sup>5</sup> / <sub>16</sub> ) z = 22
2	4300	25-140	50-280	250-400	–	35	88	58	19	3	57	6	M6	08B-1 ( <sup>1</sup> / <sub>2</sub> x <sup>5</sup> / <sub>16</sub> ) z = 27
3	3300	50-300	100-600	550-800	–	45	115	75	21	4	68	6	M6	12B-1 ( <sup>3</sup> / <sub>4</sub> x <sup>7</sup> / <sub>16</sub> ) z = 22

<sup>1)</sup> To use only for designs with limited dimensions

– On request available with needle bearing instead of slide bush



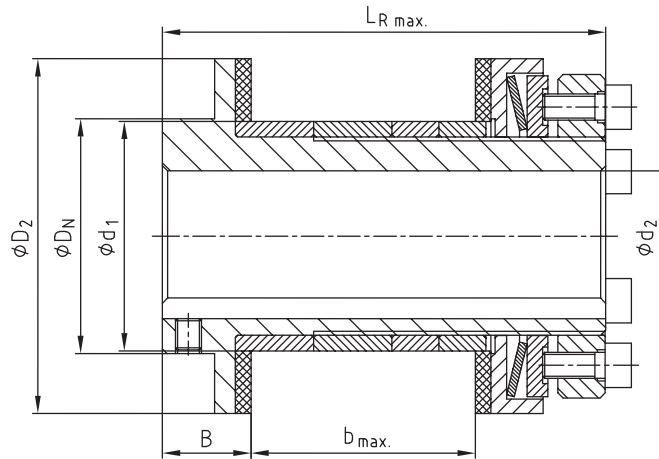
- available with needle bearing
- for high radial load on the sprocket
- for high torques or long slipping periods

Ordering example:	RUFLEX®	1	2TF	08B-1 ( <sup>1</sup> / <sub>2</sub> x <sup>5</sup> / <sub>16</sub> ), z=29	Ø20	100 Nm
	Type	Size	Disk spring layer	Sprocket	Finish bore d <sub>2</sub>	Torque set

RUFLEX® max.



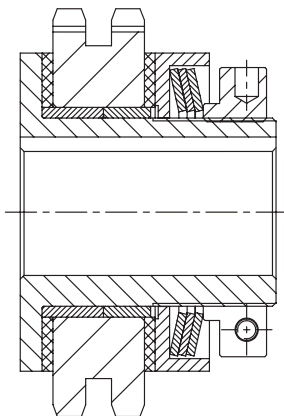
- RUFLEX® for assemblies with wide driving components
- E. g. double and triple sprockets
- Detailed adjustment to the customer's dimensions possible
- Also available as a complete unit with sprocket
- Other sizes of RUFLEX® max. on request
- Please mention the width of driving component „b“ in your order
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9



Technical data												
Size	Max. speed [rpm]	Torques [Nm]			Dimensions [mm]							
		1TF	2TF	3TF <sup>2)</sup>	Bore $d_2$		$D_2$	$D_N$	B	$b_{\text{max.}}$	$d_1$ <sup>1)</sup>	$L_R \text{ max.}$
01	6600	5-35	10-70	–	–	22	58	40	16	33	40	70
1	5600	20-75	40-150	130-200	–	25	68	45	17	43	44	85
2	4300	25-140	50-280	250-400	–	35	88	58	19	54	58	100
3	3300	50-300	100-600	550-800	–	45	115	75	21	62	72	115
4	2700	90-600	180-1200	1100-1600	–	55	140	90	23	91,5	85	154

<sup>1)</sup> Bore tolerance (drive component): F8  
<sup>2)</sup> To use only for designs with limited dimensions

- RUFLEX® max. with sprocket mounted
- available as a complete unit with torque pre-set

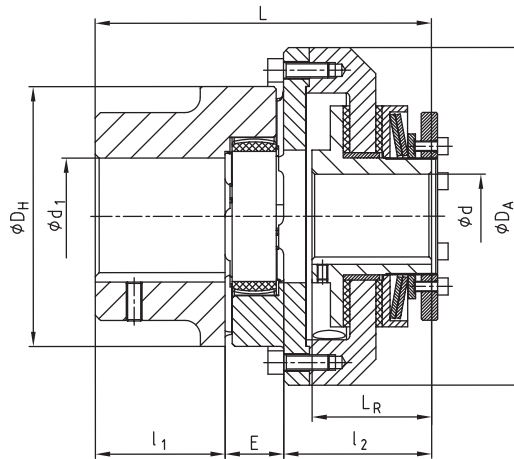


Ordering example:	RUFLEX® max.	1	2TF	35	Ø20
	Type	Size	Disk spring layer	Width of driving components „b“	Finish bore $d_2$

RUFLEX® with torsionally flexible ROTEX®



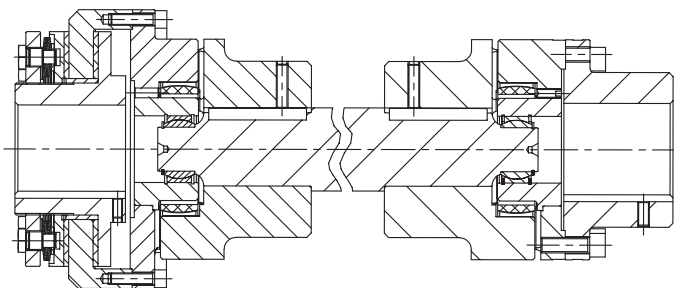
- RUFLEX® with ROTEX® as shaft-to-shaft-connection
- Torsionally flexible torque limiter
- Axial plug-in
- Able to compensate for misalignment
- Various kinds of elastomer hardness available
- Torque can be set while in place
- Easy assembly
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9



Technical data																
RUFLEX® size	ROTEX® size	RUFLEX® torques [Nm]			ROTEX® torques [Nm]		Dimensions [mm]									
					95/98 Shore-A		Bore d									
		1TF	2TF	3TF 2)	T <sub>KN</sub>	T <sub>Kmax</sub>	Pilot bore	max.	d1	L	D <sub>A</sub>	L <sub>R</sub>	E	l <sub>1</sub>	l <sub>2</sub>	D <sub>H</sub>
00	14	0,5-3	1-5	-	12,5	25	-	10	16	59	44	31	13	11	35	30
0	19	2-10	4-20	-	17	34	-	20 <sup>1)</sup>	25	78	63	33	16	25	37	40
01	24	5-35	10-70	-	60	120	-	22	35	98	80	45	18	30	50	55
1	28	20-75	40-150	130-200	160	320	-	25	40	113	98	52	20	35	58	65
2	38	25-140	50-280	250-400	325	650	-	35	48	133	120	57	24	45	64	80
3	48	50-300	100-600	550-800	525	1050	-	45	62	166	162	68	28	56	82	105
4	75	90-600	180-1200	1100-1600	1465	2930	-	55	95	205	185	78	40	85	80	160
5	90	400-800	800-1600	1400-2100	3600	7200	-	65	110	259	260	92	45	100	114	200
6	100	300-1200	600-2400	-	4950	9900	38	80	115	290	285	102	50	110	130	225
7	110	600-2200	1200-4400	-	6000	12000	45	100	125	317	330	113	55	120	142	255
8	140	900-3400	1800-6800	-	11000	22000	58	120	160	372	410	115	65	155	152	320

<sup>1)</sup> Finish bore exceeding Ø 19, keyway to DIN 6885 sheet 3

<sup>2)</sup> To use only for designs with limited dimensions



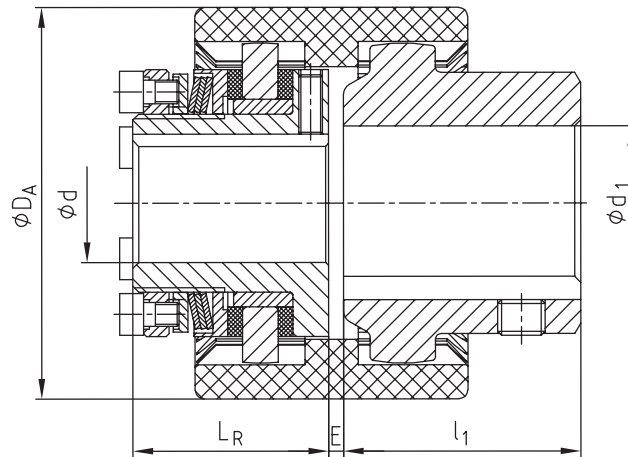
- RUFLEX® as intermediate shaft coupling
- for large shaft distance dimensions
- available in combination with ROTEX® or RADEX-N® steel lamina couplings

Ordering example:	RUFLEX®	1	2TF	Ø20	ROTEX®	28	98 Sh-A	Ø25	100 Nm
	Type	Size	Disk spring layer	RUFLEX® bore	Type	Size	Spider	ROTEX®-bore	Torque set

RUFLEX® with torsionally rigid BoWex®



- RUFLEX® with BoWex® as shaft-to-shaft-connection
- Torsionally rigid safety clutch
- Axial plug-in
- Double-cardanic, able to compensate for misalignment
- For simple drives (low speeds, etc.)
- Easy assembly
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9

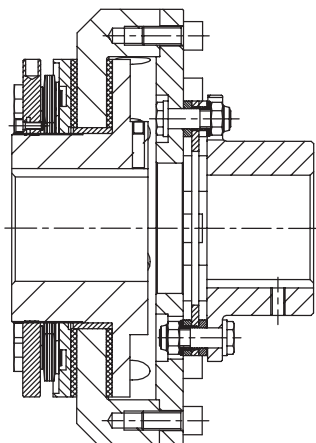


Technical data

RUFLEX® size	BoWex® size	RUFLEX® torques [Nm]			BoWex® torques [Nm]		Dimensions [mm]							
		1TF	2TF	3TF <sup>2)</sup>	TKN	TK max.	Bore d		Bore d <sub>1</sub> max.	D <sub>A</sub>	L <sub>R</sub>	E	l <sub>1</sub>	
Pilot bore	max.													
00	19	0,5-3	1-5	–	16	32	–	10	19	48	31	2,5	25,0	
0	28	2-10	4-20	–	45	90	–	20 <sup>1)</sup>	28	66	33	2,5	40,0	
01	38	5-35	10-70	–	80	160	–	22	38	83	45	1,0	35,5	
1	48	20-75	40-150	130-200	140	280	–	25	48	95	52	1,0	45,5	
2	65	25-140	50-280	250-400	380	760	–	35	65	132	57	1,0	64,0	

<sup>1)</sup> Finish bores exceeding Ø 19 mm, keyway to DIN 6885 sheet 3

<sup>2)</sup> To use only for designs with limited dimensions



- RUFLEX® with torsionally rigid, backlash-free RADEX®-N steel lamina coupling
- suitable for high operating temperatures (up to 280 °C)
- with variable spacers adapted to different shaft distance dimensions

Ordering example:

RUFLEX®	1	1TF	Ø20	BoWex®	48	Ø25	50 Nm
Type	Size	Disk spring layer	RUFLEX® bore	Coupling type	Size	BoWex®-bore	Torque set

**A good idea - The punched disk spring**

SYNTEX® - Safety clutch with mounting flange



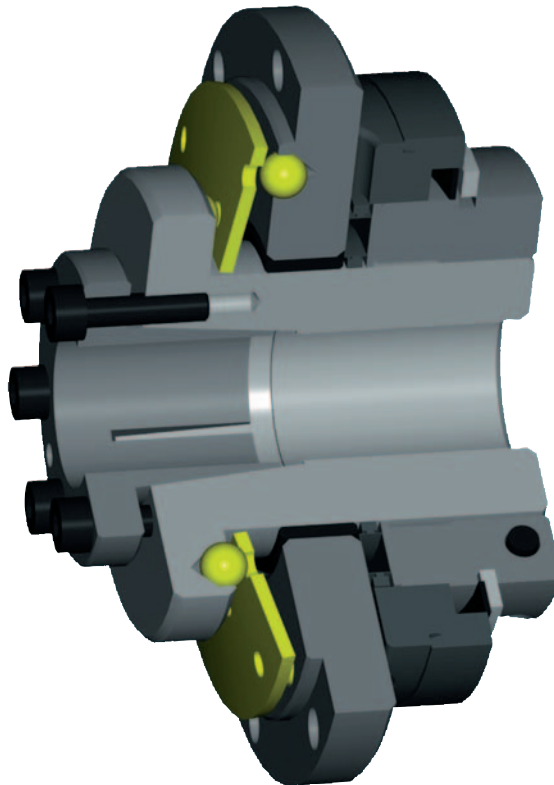
SYNTEX® - Safety clutch with sprocket



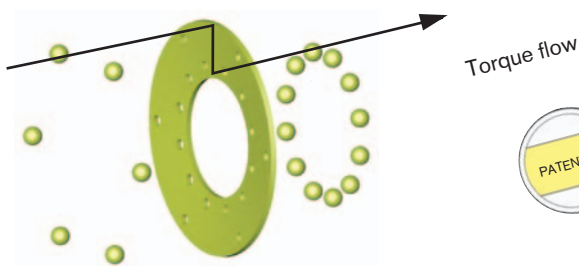
SYNTEX® - Safety clutch with ROTEX® GS



- Backlash-free, torsionally stiff overload protection, suitable for reversing drives
- Disconnection of the drive in case of overload
- Reduction of torque peaks
- High repeating accuracy even after a long operation period
- Easy integration of customer components
- Compact design, low mass moment of inertia
- Variable due to modular system
- Special disk springs for special applications



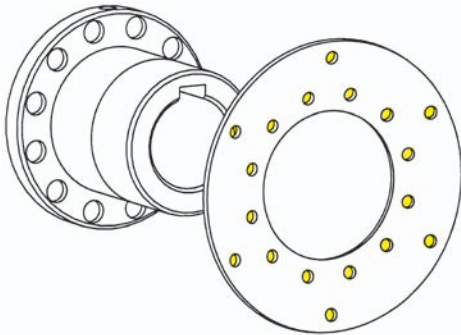
- Low-cost protection even for simple applications
- Easy assembly and torque setting
- Maintenance-free
- Insensitive to oil and grease
- Long service life due to low internal loads
- Backlash-free shaft-hub-connections
- Any or synchronous re-engagement
- Automatically operative



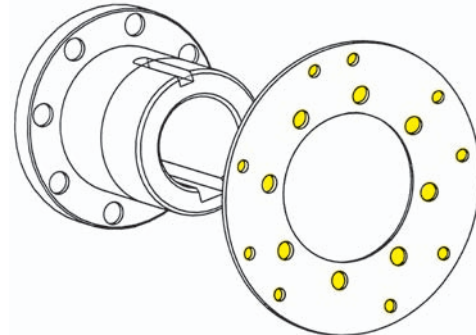
SYNTEX® is an overload system with positive operation. The punched disk spring is a component serving for torque transmission (registered patent).

**Operating principle**

Ratchet design DK



Synchronous design SK



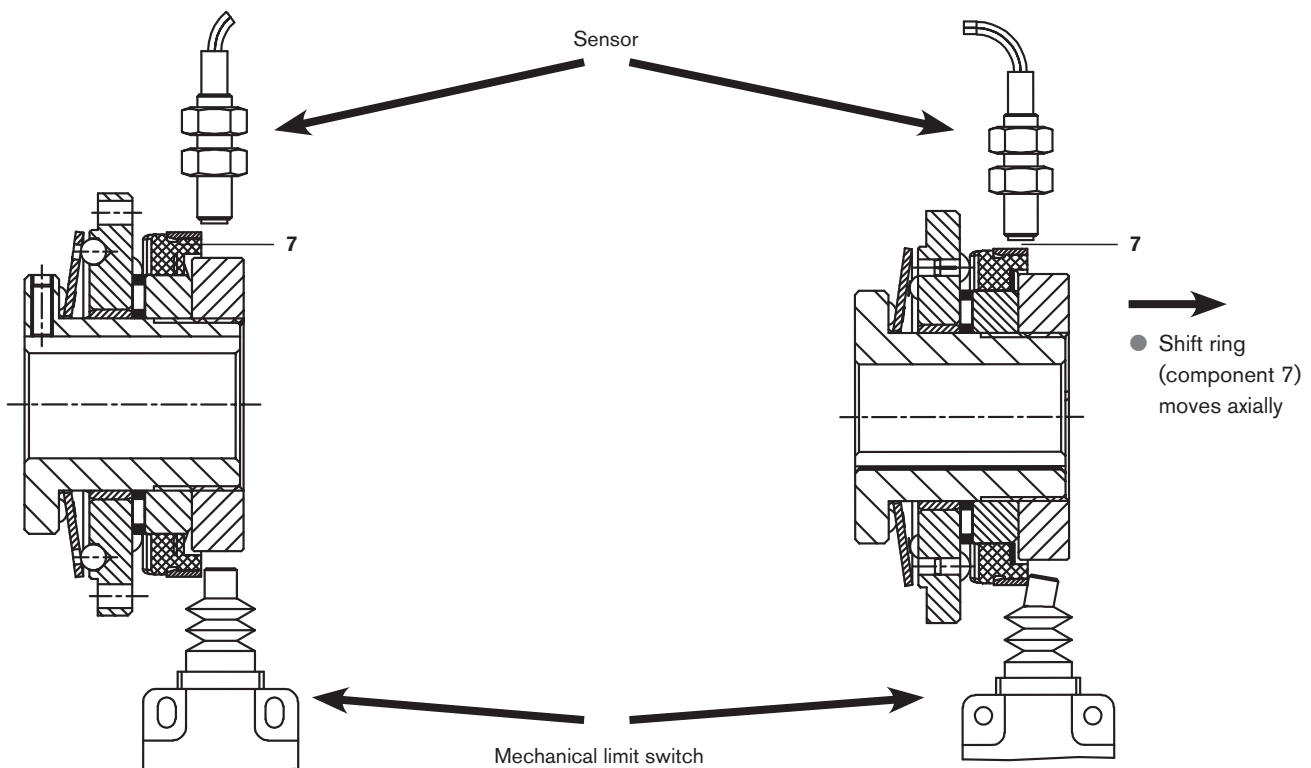
If the torque set is exceeded, a relative movement is generated between the driving and driven side. The transmittable torque is decreased to a minimum.

The balls leave the indentations of the disk springs. After eliminating the overload, the balls engage automatically with the next following ball indentation of the disk springs.

If the torque set is exceeded, a relative movement is generated between the driving and driven side. The transmittable torque is decreased to a minimum.

The balls leave the indentations of the disk springs. 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 reengagement, for example 180°, are also possible).

**Signal by limit switch or sensor in case of overload**



**Normal operation:**

No signal by sensor or mechanical limit switch

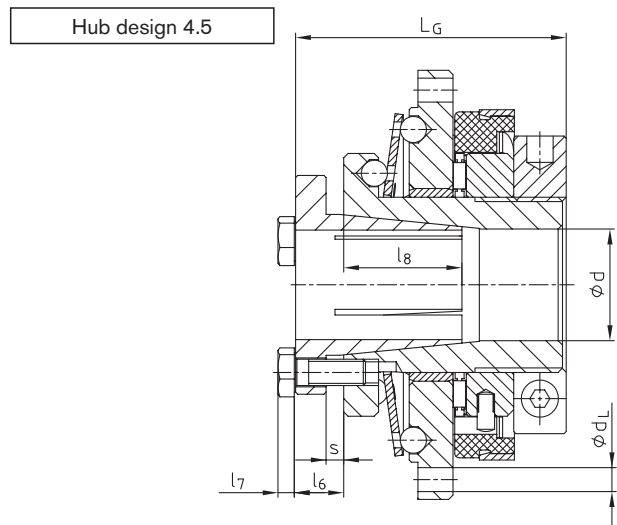
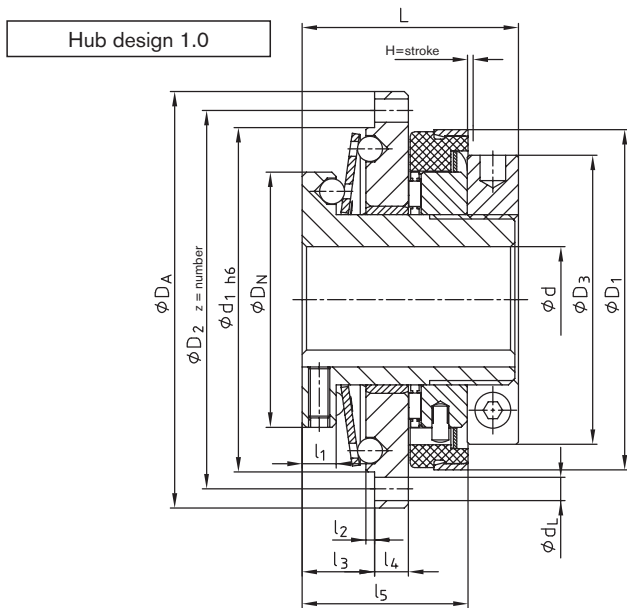
**In case of overload:**

The axial movement of the shift ring activates the sensor or mechanical limit switch, respectively. The resulting signal may be used for control operation (e. g. motor stop).

**SYNTEX® standard flange coupling**



- Standard SYNTEX® overload system up to 400 Nm
- Flange design
- Easy mounting of customers' components
- Available both as a ratchet and synchronous design
- Torque setting possible while in place
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9
- Also available with a frictionally engaged shaft-hub-connection (hub design 4.5)



Technical data																						
Size	Torques [Nm]				Max. speed [rpm]	Dimensions [mm]																
	Ratchet design DK		Synchronous design SK			Bore d																
	DK <sub>1</sub>	DK <sub>2</sub>	SK <sub>1</sub>	SK <sub>2</sub>		Pilot bore	max.	D <sub>A</sub>	D <sub>2</sub>	d <sub>1</sub>	D <sub>N</sub>	D <sub>3</sub>	D <sub>1</sub>	d <sub>L</sub>	L	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	l <sub>5</sub>	z	H=stroke
20	6-20	15-30	10-20	20-65	1500	-	20	80	71	65	48	54	61,5	4,5	45	8	2	16	6	35	8	2
25	20-60	45-90	25-65	40-100	1500	-	25	98	89	81	60	68	80	5,5	50	8	2	17	8	39	8	2
35	25-80	75-150	30-100	70-180	1000	-	35	120	110	102	75	78	91	5,5	60	10	2	21	10	42	12	2
50	60-180	175-300	80-280	160-400	1000	-	50	162	152	142	105	108	121	6,6	70	12	2	25	13	56	12	2

Technical data – Hub design 4.5								
Size	Dimensions [mm]						Clamping screw	Tightening torque T <sub>A</sub> [Nm]
	d <sub>max.</sub>	l <sub>6</sub>	l <sub>7</sub>	l <sub>8</sub>	L <sub>G</sub>	s		
20	20	9	3,5	23	54	3	4 x M5	8,5
25	25	11	4,0	28	61	4	4 x M6	14
35	35	10	4,0	31	70	4	4 x M6	14
50	50	12	4,0	37	82	6	4 x M6	14

Bores (fitting tolerance H7/h6) and the corresponding friction torques T <sub>R</sub> [Nm]																						
Size	Ø12	Ø14	Ø15	Ø16	Ø17	Ø18	Ø19	Ø20	Ø22	Ø23	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø48	Ø50
20	45	62	71	81	92	103	115	127														
25		72	83	95	107	120	133	148	179	196	213	231										
35									127	139	152	165	207	237	270	323						
50																238	281	311	343	394	448	486

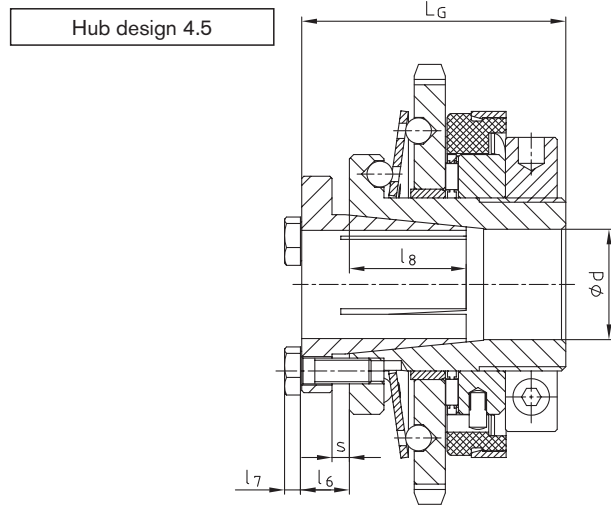
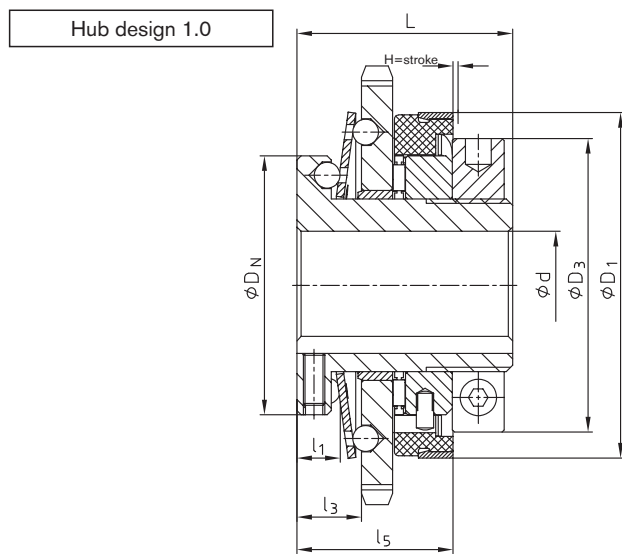
Ordering example:	SYNTEX®	25	DK1	Ø20	1.0	45 Nm
	Type	Size	Design	Bore	Hub design	Torque set



**Standard SYNTEX® with integrated sprocket**



- Standard SYNTEX® with integrated sprocket
- Available ready to be installed with the torque set
- Reduction of components by integration of components
- Available both as a ratchet and synchronous design
- Torque setting possible while in place
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9
- Also available with a frictionally engaged shaft-hub-connection (hub design 4.5)



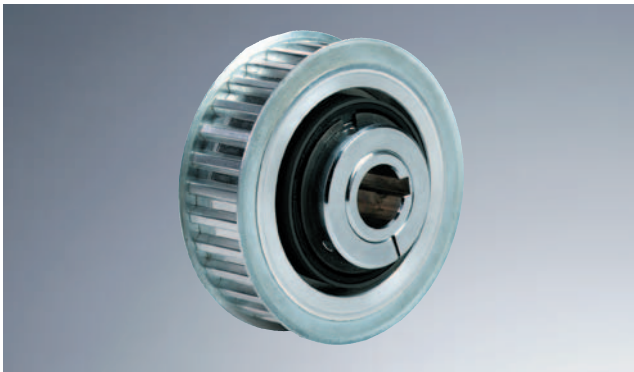
Technical data																	
Size	Torque [Nm]				max. speed [RPM]	Dimensions [mm]											
	Ratchet design DK		Synchronous design SK			Bore d		Standard sprocket	DN	D3	D1	L	l1	l3	l5	H=stroke	
	DK1	DK2	SK1	SK2		Pilot bore	max.										
20	6-20	15-30	10-20	20-65	1500	-	20	06 B-1 (1/8 x 7/32) z = 25	48	54	61,5	45	8	14	33	2	
25	20-60	45-90	25-65	40-100	1500	-	25	08 B-1 (1/2 x 5/16) z = 24	60	68	80	50	8	15	37	2	
35	25-80	75-150	30-100	70-180	1000	-	35	08 B-1 (1/2 x 5/16) z = 29	75	78	91	60	10	19	41	2	
50	60-180	175-300	80-280	160-400	1000	-	50	12 B-1 (3/4 x 7/16) z = 27	105	108	121	70	12	23	52	2	

Technical data – Hub design 4.5									
Size	Dimensions [mm]							Clamping screws	Tightening torque TA [Nm]
	dmax.	l6	l7	l8	LG	s			
20	20	9	3,5	23	54	3	4 x M5	8,5	
25	25	11	4,0	28	61	4	4 x M6	14	
35	35	10	4,0	31	70	4	4 x M6	14	
50	50	12	4,0	37	82	6	4 x M6	14	

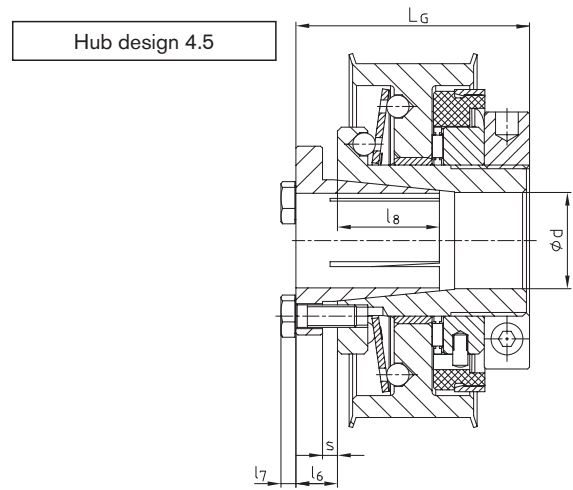
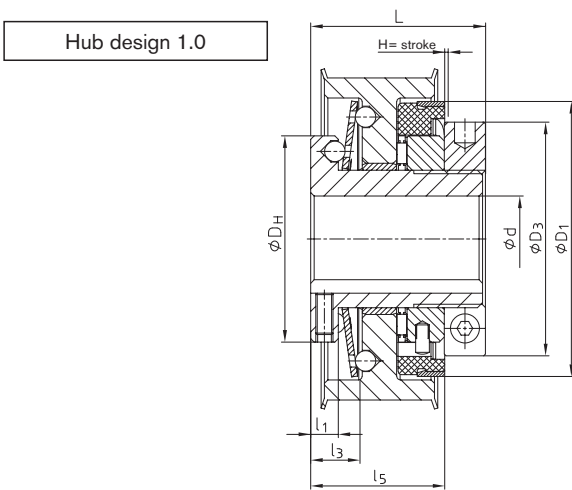
Bores (fitting tolerance H7/h6) and the corresponding friction torques TR [Nm]																						
Size	Ø12	Ø14	Ø15	Ø16	Ø17	Ø18	Ø19	Ø20	Ø22	Ø23	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø48	Ø50
20	45	62	71	81	92	103	115	127														
25		72	83	95	107	120	133	148	179	196	213	231										
35									127	139	152	165	207	237	270	323						
50																238	281	311	343	394	448	486

Ordering example:	SYNTEX®	25	DK1	Ø20	1.0	08 B-1 (1/2 x 5/16), z=29	45 Nm
	Type	Size	Design	Bore	Hub design	Sprocket	Torque set

**Standard SYNTEX® with belt drive**



- Standard SYNTEX® with integrated belt drive
- Available ready to be installed with the torque set
- Reduction of components by integration of components
- Available both as a ratchet and synchronous design
- Torque setting possible while in place
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9
- Also available with a frictionally engaged shaft-hub-connection (hub design 4.5)



Technical data																	
Size	Torques [Nm]				Max. speed [rpm]	Dimensions [mm]											
	Ratchet design DK		Synchronous design SK			Bore d		Belt drive		$D_N$	$D_3$	$D_1$	L	$l_1$	$l_3$	$l_5$	H=stroke
	DK1	DK2	SK1	SK2		Pilot bore	max.	T10 <sup>1)</sup>	AT10 <sup>1)</sup>								
20	6-20	15-30	10-20	20-65	1500	-	20	T10, z=24	AT10, z=24	48	54	61,5	45	8	14	35	2
25	20-60	45-90	25-65	40-100	1500	-	25	T10, z=30	AT10, z=30	60	68	80	50	8	15	39	2
35	25-80	75-150	30-100	70-180	1000	-	35	T10, z=36	AT10, z=36	75	78	91	60	10	19	42	2
50	60-180	175-300	80-280	160-400	1000	-	50	T10, z=48	AT10, z=48	105	108	121	70	12	23	56	2

Technical data – Hub design 4.5								
Size	Dimensions [mm]						Clamping screws	Tightening torque $T_A$ [Nm]
	$d_{max.}$	$l_6$	$l_7$	$l_8$	$L_G$	s		
20	20	9	3,5	23	54	3	4 x M5	8,5
25	25	11	4,0	28	61	4	4 x M6	14
35	35	10	4,0	31	70	4	4 x M6	14
50	50	12	4,0	37	82	6	4 x M6	14

Bores (fitting tolerance H7/h6) and the corresponding friction torques $T_R$ [Nm]																						
Size	$\phi 12$	$\phi 14$	$\phi 15$	$\phi 16$	$\phi 17$	$\phi 18$	$\phi 19$	$\phi 20$	$\phi 22$	$\phi 23$	$\phi 24$	$\phi 25$	$\phi 28$	$\phi 30$	$\phi 32$	$\phi 35$	$\phi 38$	$\phi 40$	$\phi 42$	$\phi 45$	$\phi 48$	$\phi 50$
20	45	62	71	81	92	103	115	127														
25		72	83	95	107	120	133	148	179	196	213	231										
35									127	139	152	165	207	237	270	323						
50															238	281	311	343	394	448	486	

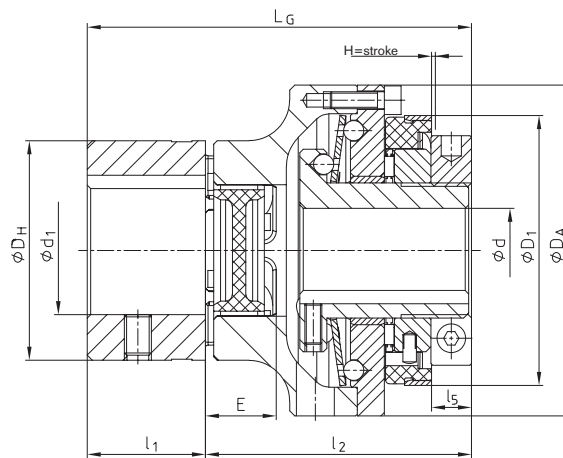
<sup>1)</sup> z = minimum number of teeth requested  
weitere Größen auf Anfrage

Ordering example:	SYNTEX®	25	DK1	$\phi 20$	1.0	AT10, z=24	30	45 Nm
	Type	Size	Design	Bore	Hub design	Belt drive	Width of synchronous belt	Torque set

**SYNTEX® with shaft coupling ROTEX® GS**



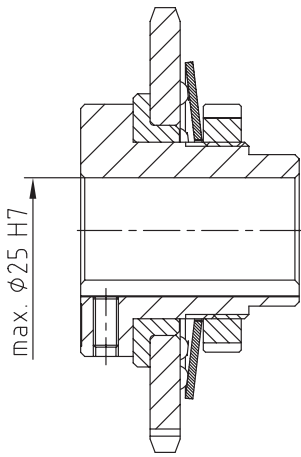
- Backlash-free, torsionally stiff safety clutch
- Axial plug-in
- Low mass moments of inertia by using aluminium components
- Available both as a ratchet or synchronous design
- Torque setting possible while in place
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9
- Also available with a frictionally engaged shaft-hub-connection (hub design 4.5)



		Technical data																		
SYNTEX® size	ROTEX® GS size	Torques [Nm]								Max. speed [rpm]	Dimensions [mm]									
		Ratchet design DK		Synchronous design SK		ROTEX® GS 98 Sh A-GS		Max. bore			D <sub>A</sub>	D <sub>H</sub>	l <sub>1</sub>	E	l <sub>2</sub>	l <sub>5</sub>	L	L <sub>G</sub>	D <sub>1</sub>	H=stroke
		DK1	DK2	SK1	SK2	T <sub>KN</sub>	T <sub>Kmax.</sub>	d	d <sub>1</sub>											
20	24	6-20	15-30	10-20	20-65	60	120	1500	20	28	80	55	30	18	70	10	45	100	61,5	2
25	28	20-60	45-90	25-65	40-100	160	320	1500	25	38	98	65	35	20	78	11	50	113	80	2
35	38	25-80	75-150	30-100	70-180	325	650	1000	35	45	120	80	45	24	91	13	60	136	91	2
50	48	60-180	175-300	80-280	160-400	525	1050	1000	50	62	162	105	56	28	111	14	70	167	121	2

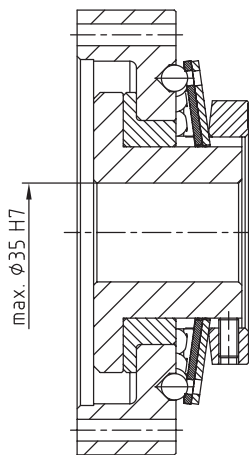
Ordering example:	SYNTEX®	25	DK1	Ø20	1.0	ROTEX® GS	28	98 ShA-GS	1.0	Ø25	50 Nm
	Type	Size	Design	Bore	Hub design	Coupling type	Size	Spider	Hub design	ROTEX® GS bore	Torque set

**Cost-optimised version**

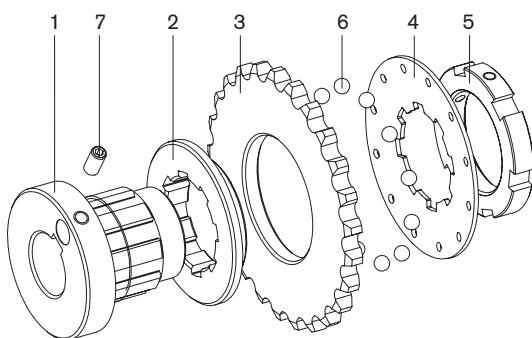


- Low-cost version with high power density
- Ideal for higher quantities e. g. for conveyor belt drives
- Use of optimised manufacturing processes, e. g. sintering
- Please order our detailed literature

- Spec. SYNTEX® 25 with integrated sprocket
- Performance range with 1 disk spring up to 80 Nm, in case of 2 disk springs up to 160 Nm
- Use of different sprockets possible
- Ideal for „simple“ drives like e. g. in the conveyor technology



- Spec. SYNTEX® 35 with integrated flange
- Performance range with 1 disk spring up to 200 Nm, in case of 2 disk springs up to 400 Nm
- Adjustment of the flange to ambient components possible



**Components:**

1. Hub with external spline to support the disk spring (torque transmission)
2. Plain bearing sleeve to support the axial and radial forces
3. Sprocket with cylinder bores to support the balls
4. Disk spring with internal spline and bores for balls (torque transmission and axial prestress, KTR patent)
5. Keyway nut for torque setting
6. Ratchet balls for torque transmission
7. Set screw for axial fixing onto the shaft

**Backlash-free, torsionally stiff safety clutch**

- Backlash-free torque transmission
- Light-weight design
- Declining spring characteristic
- Overload protection up to 265 Nm
- Low mass moment of inertia
- Large bore diameters
- Short reaction times
- High power density



- Clamping ring design easy to assemble
- As a ratchet (DK) and synchronous design (SK)
- Backlash-free shaft-hub-connection
- In combination with the backlash-free ROTEX®-GS or backlash-free, torsionally rigid TOOLFLEX®
- Direct assembly of tooth belt pulley, as an example, possible (integrated deep groove ball bearing)

SYNTEX®-NC is a backlash-free safety clutch with a low weight and mass moment of inertia. Large bore diameters and a clamping ring design easy to install are further characteristics of the extremely compact safety clutch. The design is based on a backlash-free, positive locking ball-ratchet-principle allowing for a high repeating accuracy and short reaction times over the entire service life. Main applications are latest machine tools, control and positioning technology as well as packaging machines and special purpose machinery.

**Ratchet design DK**

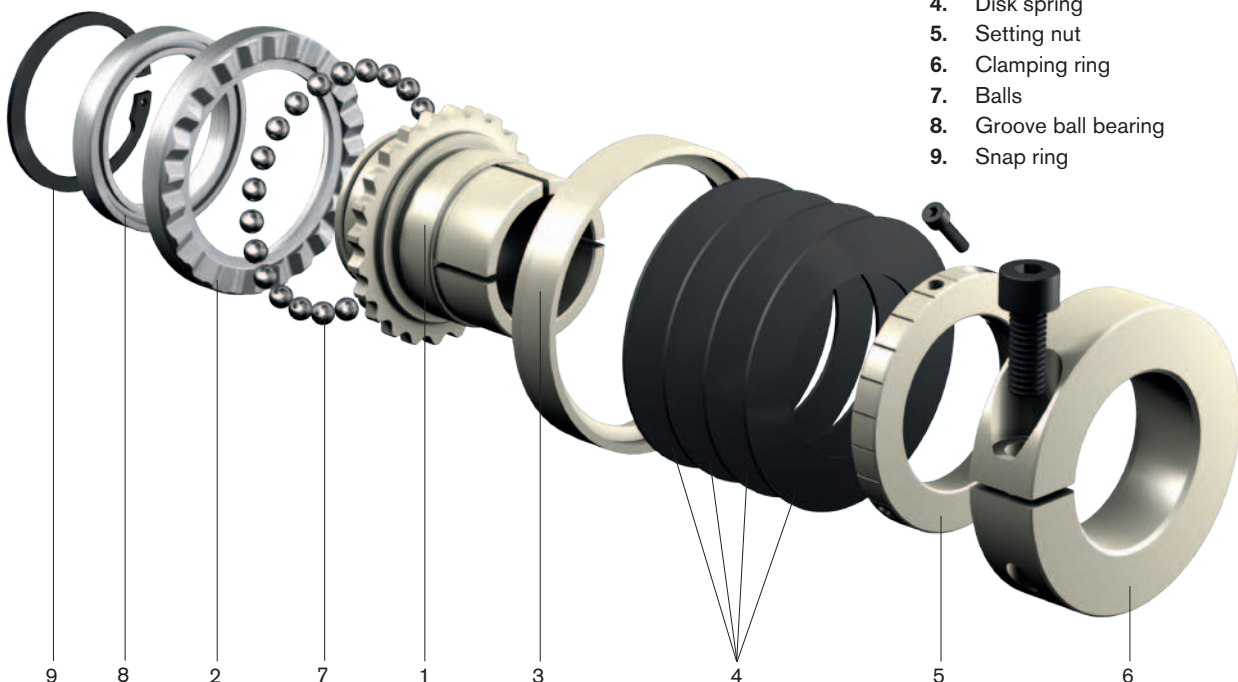
Optional ratcheting in case of overload. After eliminating the overload, the balls engage automatically with the next following ball indentation of the disk springs

**Synchronous design SK**

Synchronous ratcheting in case of 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, e. g. 180°, are also possible

**Spare part list:**

1. Hub with keyway to DIN (type 1.0) or with clamping ring (type 6.1)
2. Flange ring
3. Shifting ring
4. Disk spring
5. Setting nut
6. Clamping ring
7. Balls
8. Groove ball bearing
9. Snap ring

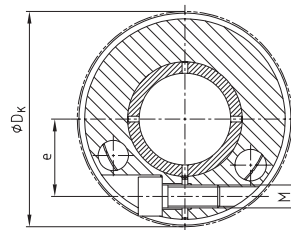
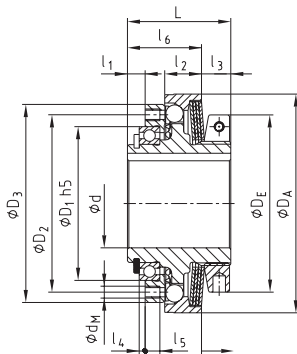


### SYNTEX®-NC

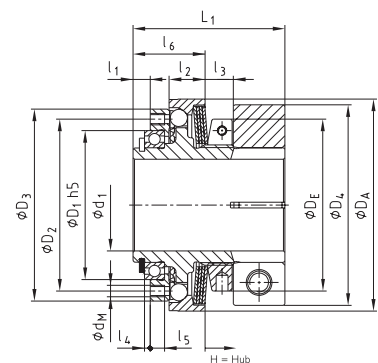


- Overload system up to 265 Nm
- Backlash-free, torsionally stiff
- Low mass moment of inertia
- Available as a synchronous (SK) and ratchet design (DK)
- Easy assembly
- Compact design
- Finish bore acc. to ISO fit H7, feather keyway acc. to DIN 6885 sheet 1 – JS9
- See page 265

Hub design 1.0 keyway acc. to DIN 6885



Clamping ring design 6.1



#### Technical data

Size	Speed [rpm]	Torques [Nm]			Dimensions [mm]														
		T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	d <sub>max.</sub>	D <sub>1</sub> h <sub>5</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>A</sub>	D <sub>E</sub>	z x d <sub>M</sub>	L	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	l <sub>5</sub>	l <sub>6</sub>	H-stroke
25	3000	9 - 15	20 - 35	40 - 65	22 <sup>1)</sup>	42	48	56	61	50	8xM4	33	5,5	11,5	9,1	2	5	23,9	1,2
32	3000	25 - 38	50 - 75	100 - 150	30 <sup>1)</sup>	52	60	67	74	60	8xM4	35	6	12,5	9,9	2	5	25,1	1,5
42	2500	30 - 65	60 - 135	120 - 265	38 <sup>1)</sup>	65	75	83	90	72	8xM5	43	7	16	11,2	2	6	31,8	1,5

#### Dimensions with clamping ring type 6.1

Size	Bore d <sub>1</sub>		Dimensions [mm]								Weight <sup>2)</sup> [kg]	Mass moment of inertia <sup>2)</sup> J <sub>Ges</sub> [kgm <sup>2</sup> ]
	pilot bored	max.	D <sub>4</sub>	D <sub>K</sub>	L <sub>1</sub>	e	M	T <sub>A</sub> [Nm]				
25	9,5	25	55	-	45	21	M6	14	0,282	0,00014		
32	13,5	32	70	-	53	27	M8	34	0,471	0,00035		
42	18,5	42	86	91,2	63	33	M10	67	0,815	0,00095		

#### Transmittable friction torques TR [Nm] of clamping ring hub 6.1 (without feather keyway)

Size	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16	Ø18	Ø19	Ø20	Ø22	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø36	Ø38	Ø40	Ø42
25	34	41	48	63	71	79	55	61	67	79	92	98								
32					87	95	118	130	143	169	132	143	174	197	220					
42									170	203	238	257	314	354	301	353	371	407	444	482

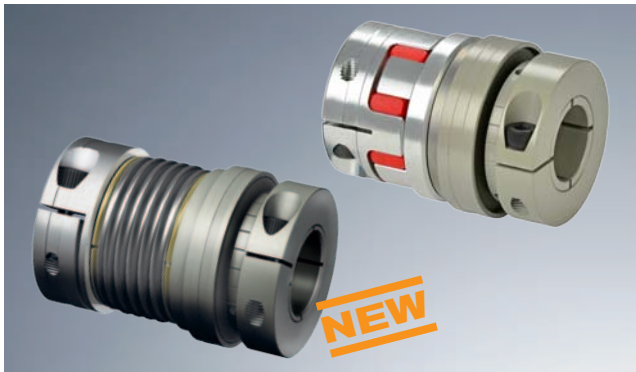
<sup>1)</sup> Max. bore, feather keyway to DIN 6885 sheet 3

<sup>2)</sup> With max. bore

#### Ordering example:

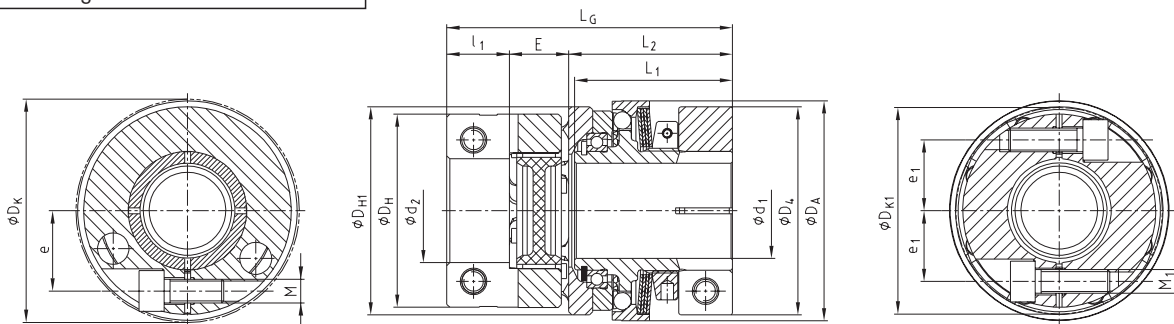
SYNTEX®-NC	32	SK	T3	Ø25	6.1	120
Type	Size	Type [DK/SK]	Disk springs	Bore	Hub design	Torque set

### SYNTEX®-NC with ROTEX® GS or TOOLFLEX®



- Safety clutch as a shaft-to-shaft connection
  - In combination with a backlash-free ROTEX® GS
  - Torsionally flexible, able to compensate for misalignment
  - Axial plug-in
  - See page 265
- 
- In combination with a backlash-free, torsionally stiff TOOLFLEX®
  - Maintenance-free
  - In combination with a backlash-free, frictionally engaged shaft-hub-connection on driving and driven side

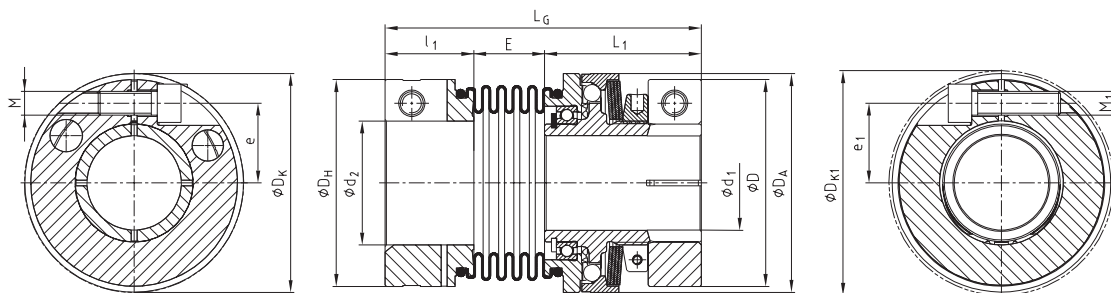
Design with ROTEX® GS



SYNTEX®-NC with ROTEX® GS

Size	Speed [rpm]	Torques [Nm]			ROTEX® GS size	Max. bore		Dimensions [mm]															
		T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>		d <sub>1</sub>	d <sub>2</sub>	D <sub>A</sub>	D <sub>H</sub>	D <sub>H1</sub>	D <sub>K</sub>	D <sub>K1</sub>	L <sub>G</sub>	L <sub>1</sub>	L <sub>2</sub>	l <sub>1</sub>	E	e	e <sub>1</sub>	M	T <sub>A</sub> [Nm]	M <sub>1</sub>	T <sub>A1</sub> [Nm]
25	3000	9 - 15	20 - 35	40 - 65	24	25	32	61	55	58	-	57,5	83,5	45	47,5	18	18	21	20	M6	14	M6	10
32	3000	20 - 38	50 - 75	100 - 150	28	32	35	74	65	70	-	69	96	53	55	21	20	27	23,8	M8	34	M8	25
42	2500	30 - 65	60 - 135	120 - 265	38	42	45	90	80	88	91,2	86	116	63	66	26	24	33	30,5	M10	67	M10	49

Design with TOOLFLEX®



SYNTEX®-NC with TOOLFLEX®

Size	Speed [rpm]	Torque [Nm]			TOOLFLEX® size	Max. bore		Dimensions [mm]														
		T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>		d <sub>1</sub>	d <sub>2</sub>	D <sub>A</sub>	D <sub>H</sub>	D	D <sub>K</sub>	D <sub>K1</sub>	L <sub>G</sub>	L <sub>1</sub>	l <sub>1</sub>	E	e	e <sub>1</sub>	M	T <sub>A</sub> [Nm]	M <sub>1</sub>	T <sub>A1</sub> [Nm]
25	3000	9 - 15	20 - 35	40 - 65	38	25	38	61	65	55	-	72,6	88	45	25,5	18	21	25	M6	14	M8	25
32	3000	20 - 38	50 - 75	100 - 150	42	32	42	74	70	70	-	76,1	107	53	30	24	27	27	M8	34	M8	25
42	2500	30 - 65	60 - 135	120 - 265	45	42	45	90	83	86	91,2	89	114	63	32	22,5	33	30	M10	67	M10	49

**Ordering example:**

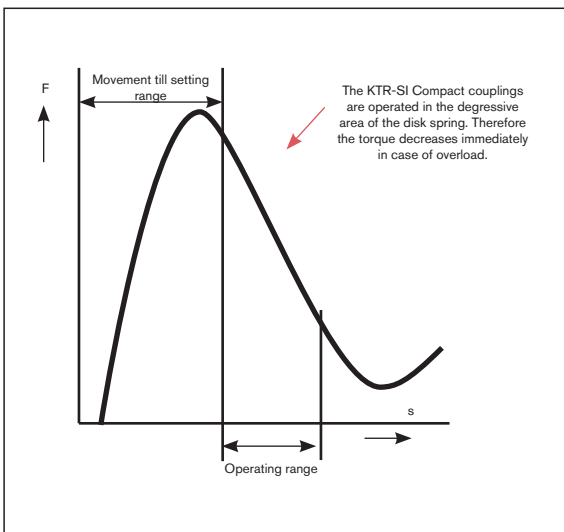
SYNTEX®-NC 32	SK	T3	Ø25	6.1	28	2.8	Ø20	120
Type/size	Type	Disk springs	SYNTEX®-NC-bore	Hub design	ROTEX® GS-size	Hub design	ROTEX® GS-bore	Torque set

### Backlash-free, torsionally stiff overload system

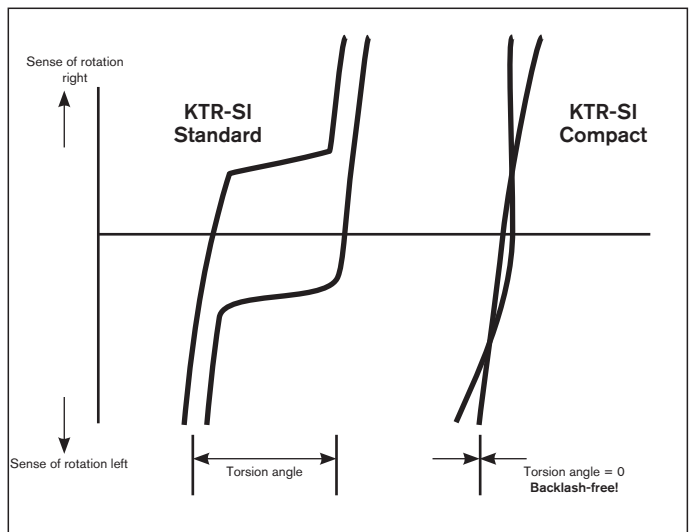


- Backlash-free overload system with declining spring characteristic
- Rugged design
- Accurate disengagement with high repeating accuracy
- Accurate backlash-free torque transmission, even in case of wear
- Easy torque setting by torque scale on the coupling
- Ball-bearing connection flange
- Hardened ratchet surfaces for a long service life
- Backlash-free shaft-hub-connection due to taper sleeve
- Can be used with proven ROTEX® GS as shaft-to-shaft connection

Spring characteristic



What does backlash-free mean?



Backlash-free ball-ratchet principle also with reversion of torsional direction

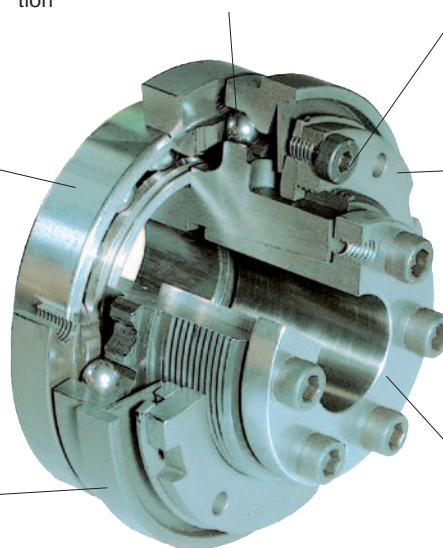
Positive protection of the setting nut against accidental adjustment

Ball-bearing flange ring for accurate concentricity and axial run-out

Setting nut with fine-pitch thread for easy and accurate torque setting

Shifting ring with setting scale for exact torque adjustment

Backlash-free shaft-hub-connection due to taper sleeve

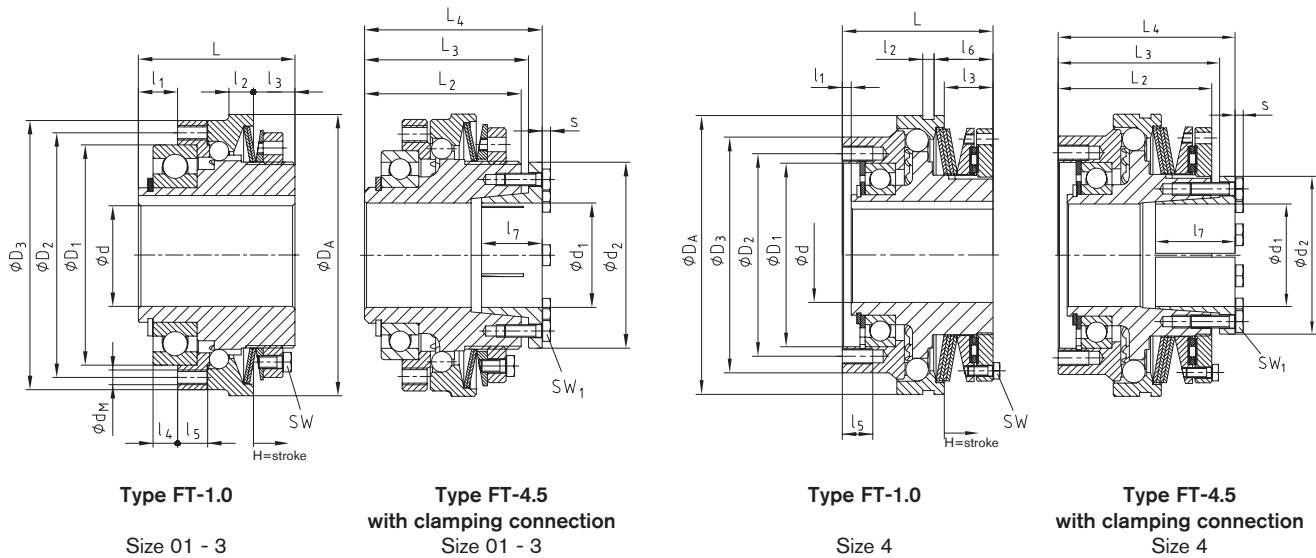




## Type FT, FT-4.5 and FT



- Torque up to 3100 Nm
- Rugged design
- Maximum shaft diameter up to 80 mm
- Drive and driven-sided with backlash-free, frictionally engaged shaft-hub-connection
- Synchronous **(SK)** and ratchet design**(DK)**
- Finish bore acc. to ISO fit H7, feather keyway to DIN 6885 sheet 1 - JS9



Technical data																			
Size	Speed [rpm]	Torques [Nm]			Dimensions [mm]														
		T1	T2	T3	d	D <sub>1</sub> <sup>HS</sup>	D <sub>2</sub>	D <sub>3</sub>	D <sub>A</sub>	d <sub>M</sub>	L	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	l <sub>5</sub>	l <sub>6</sub>	SW	H=stroke
01	4000	3-14	6-28	13-56	8-20	47	56	65	70	8xM4	40	8	7	12	5	7,5	-	7	1,2
0	3000	9-35	18-70	40-140	10-30 <sup>1)</sup>	62	71	80	85	8xM5	48	11	8	14	7	8,0	-	7	1,5
1	2500	19-65	38-130	78-260	14-35 <sup>1)</sup>	75	85	95	100	8xM6	59	14	9	16	9	10,5	-	8	1,8
2	2000	35-110	80-220	160-440	18-45 <sup>1)</sup>	90	100	110	115	8xM6	64	16	10	17	10	12	-	10	2,0
3	1200	80-185	160-370	320-740	24-50	100	116	130	135	8xM8	75	18	12	21	10	12	-	10	2,2
4	400	230-730	460-1590	960-3100	40-75	145 <sup>HS7</sup>	160	186	220	6xM12	119	7	9	38,5	-	24	46,5	13	3,5

Dimensions with taper sleeve type 4.5 [mm]									
Size	Max. finish bore	Dimensions [mm]							
	d <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	l <sub>7</sub>	d <sub>2</sub>	s	SW <sub>1</sub>	T <sub>A</sub> [Nm]
01	10-20	40	42	47	26	40,5	2,8	7	3
	19-25					42,0			
0	19-30	46	49	56	31	57	4,0	10	10
1	19-30	57	60	67	31	40	3,5	8	5,9
	32-40					57			
2	32-50	63	68,5	73	29	73,5	4,0	10	10
3	32-50	75	78,5	85	29	73,5	4,0	10	10
	55-60					89			
4	60-80	119	126	138	62	123	7	16	35

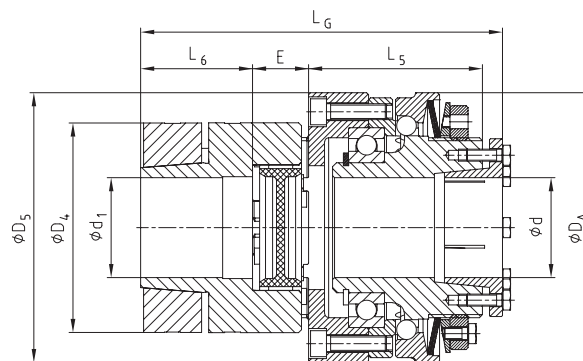
<sup>1)</sup> max. finish bore, keyway to DIN 6885 sheet 3

Ordering example	KTR-SI Compact	2	DK	T2	Ø40	4.5	150 Nm
	Type	Size	Type [DK/SK]	Disk springs	Bore	Hub design	Torque set

## Type FT with ROTEX® GS



- Torque up to 3100 Nm
- Maximum shaft diameter up to 80 mm
- Backlash-free and vibration-reducing in combination with ROTEX® GS
- Drive and driven-sided with backlash-free, frictionally engaged shaft-hub-connection
- Synchronous and ratchet design
- Also available in combination with the torsionally stiff RADEX®-N or RADEX®-NC
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9



**Type FT with ROTEX® GS**  
as shaft-to-shaft connection

Technical data														
Size	Speed [rpm]	Torques [Nm]			ROTEX® GS size	Max. finish bore		Dimensions [mm]						
		T1	T2	T3		d	d1	D4	D5	L <sub>G</sub>	L <sub>5</sub>	L <sub>6</sub>	D <sub>A</sub>	E
01	4000	3-14	6-28	13-56	24	25	28	55	70	102	47	30	70	18
0	3000	9-35	18-70	40-140	28	30	38	65	85	119,5	54,5	35	85	20
1	2500	19-65	38-130	78-260	38	40	45	80	100	146	67	45	100	24
2	2000	35-110	80-220	160-440	42	50	55	95	115	159	73	50	115	26
3	1200	80-185	160-370	320-740	48	60	62	105	135	182	87	56	135	28
4	400	230-730	460-1590	960-3100	75	80	80	160	186	302,5	139,5	85	220	40

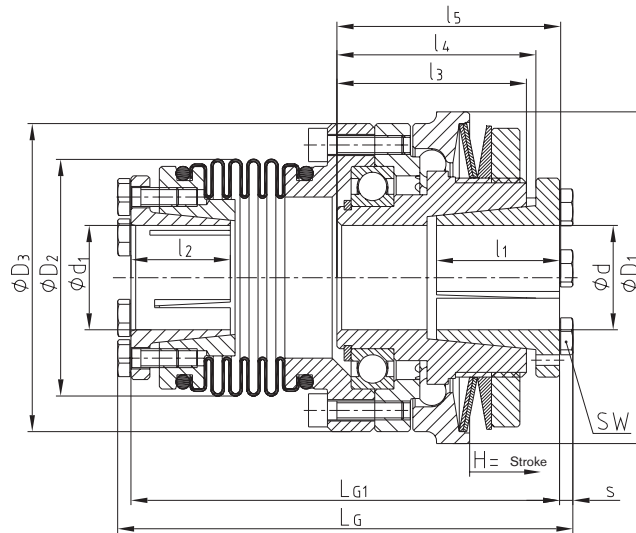
<b>Ordering example:</b>	KTR-SI Compact 1	DK	T2	4.5 / Ø25	ROTEX® GS 38	6.0 / Ø25	150 Nm
	Type/size	Type [DK/SK]	Disk spring	KTR-SI hub design/bore	Type/size of coupling	ROTEX® GS hub design/bore	Torque set

# KTR-SI Compact Backlash-free overload system

## With a torsionally stiff TOOLFLEX® S-KN



- Max. shaft diameter up to 56 mm
- Non-positive bellow-hub connection
- Maintenance-free
- Good properties of concentric running with high speeds
- Optionally available as design M (6 bellows) or design S (4 bellows, short version)



KTR-SI Compact with TOOLFLEX® S-KN

Technical data										
KTR-SI Compact size	TOOLFLEX® S-KN <sup>1)</sup> size	Max. speed [rpm]	TOOLFLEX® S-KN torque [Nm]	KTR-SI Compact torque [Nm]		Dimensions [mm]				
				T1	T2	max. d	max d <sub>1</sub>	D <sub>1</sub>	L <sub>G</sub> <sup>2)</sup>	L <sub>G1</sub> <sup>2)</sup>
01	30	4000	35	3-14	6-28	25	22	70	96	90,5
0	38	3000	65	9-35	18-70	30	28	85	109	102,0
1	45	2500	150	19-65	38-130	40	40	100	145	137,5
2	55	2000	340	35-110	80-220	50	56	115	170	159,5

Dimensions											
KTR-SI Compact size	TOOLFLEX® S-KN <sup>1)</sup> size	Dimensions [mm]									
		D <sub>2</sub>	D <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	l <sub>5</sub>	s	SW <sub>1</sub>	H
01	30	50,0	65	26	22	40	42,0	47	2,8	7	1,2
0	38	60,5	80	31	26	46	49,0	56	4,0	7	1,5
1	45	82,0	95	40	34	57	60,0	67	4,0	8	1,8
2	55	97,0	110	29	40	63	68,5	73	3,5	10	2,0

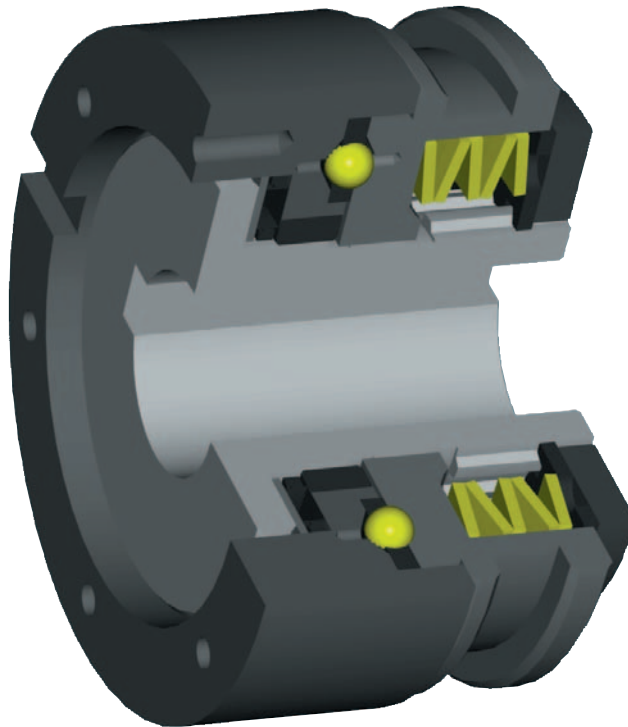
<sup>1)</sup> Optionally available with clamping hub

<sup>2)</sup> Depending on the type of TOOLFLEX®, M (6 bellows) or S (4 bellows)

Ordering example:	KTR-SI Compact	1	S-KN 45	DK	T2	d Ø40	d <sub>1</sub> Ø40	100 Nm
	Type	KTR-SI Compact size	TOOLFLEX® S-KN size	Type [DK/SK]	Disk springs	Bore KTR-SI Compact	Bore TOOLFLEX S-KN	Torque set

**We provide safety**

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

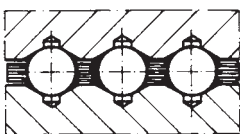


- Different designs also suitable for your application
- Easy assembly and torque setting
- Maintenance-free
- Insensitive to oil and grease
- High service life due to high-quality materials
- Backlash-free shaft-hub-connections

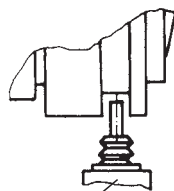
In case of overload the ratchet parts (balls or rollers) leave their indentations, and a relative motion between the driving and driven side is produced. In this way damages due to overload are avoided. The shift ring (3) makes an axial motion to the shifting way „S“ and activates the limit switch or proximity initiator. The signal can be used for control functions or for disconnection of the drive. For the restart we would recommend to electrically bypass the limit switch or proximity initiator for a short time.

**No signal in case of normal operation**

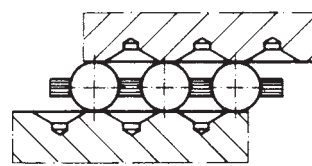
**Signal in case of overload**



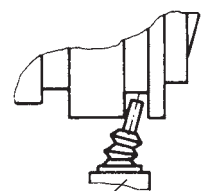
Engaged



Limit switch

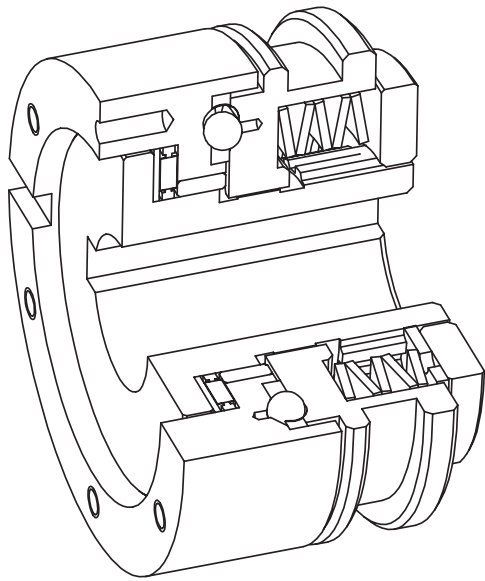


Disengaged



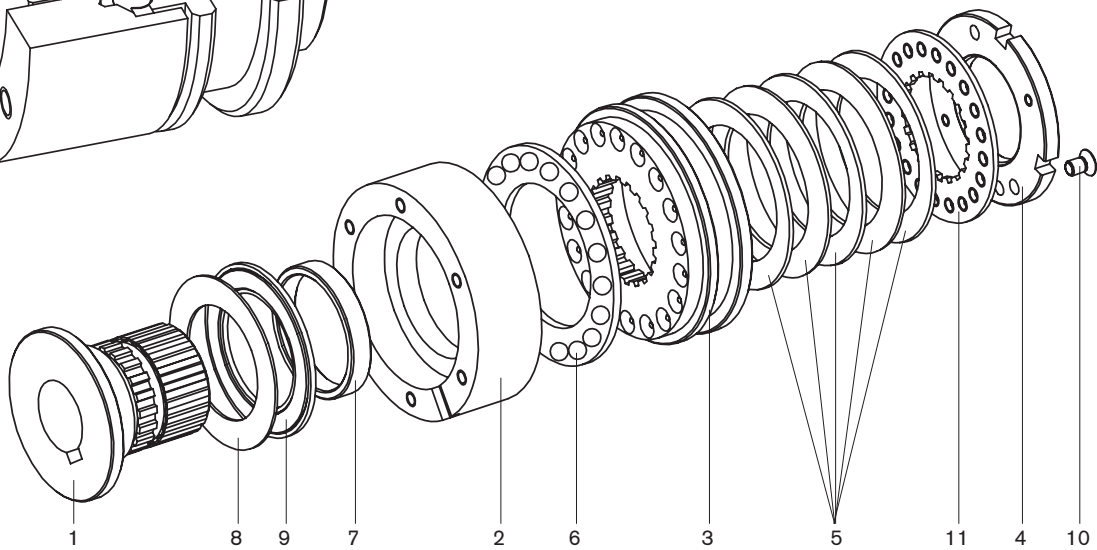
Limit switch

**Variable applications by modular system**



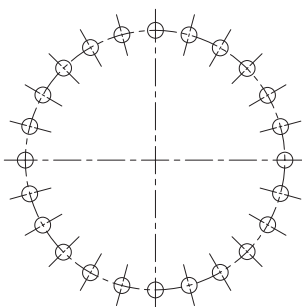
**List of components:**

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. Securing disk



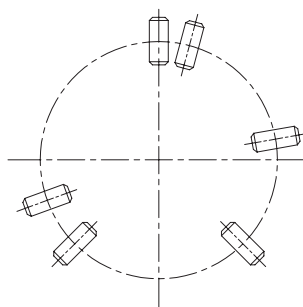
**Three operating principles with the same mounting space**

**Ratchet design DK**



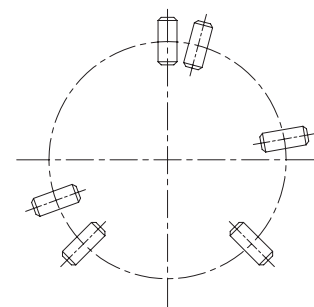
Any engagement after an overload.  
After eliminating the overload, the balls engage automatically with the next following ball indentation of the disk springs.

**Synchronous design SR**



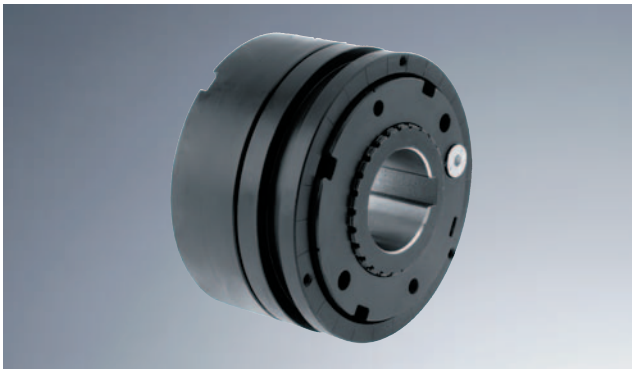
Synchronous engagement after an overload.  
After eliminating the overload, the balls re-engage automatically with the disk springs after a rotation of 360°. Driving and driven side are always placed in the same position to each other. Other degrees of re-engagement, for example 180°, are also possible.

**Fail-safe design SGR**

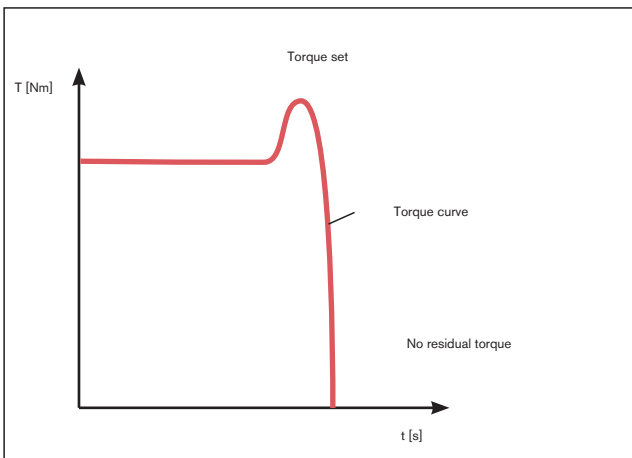


The fail-safe design is a pure torque measurement without any ratchet operation.  
In case of overload a signal is generated by the limit switch, producing a mechanical separation of driving and driven side = ratcheting is not possible.

**Idle rotation coupling (load-separating)**

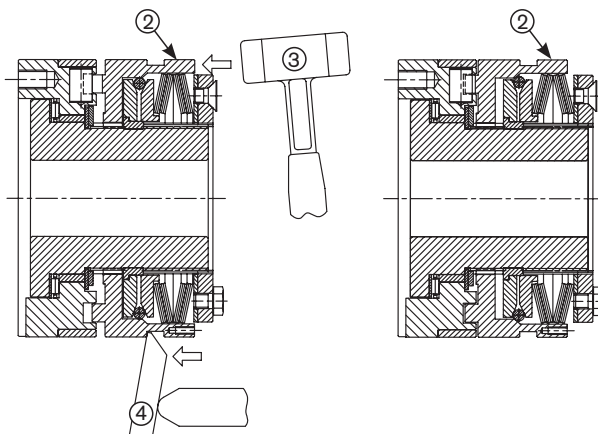


- Idle-rotation safety clutch for a torque up to 1800 Nm
- Max. speed up to 5000 rpm (see table)
- Driving and driven side are permanently separated
- Manual re-engagement
- Optional overload recognition by limit switch or sensor
- Combination with ROTEX® coupling as shaft-to-shaft connection
- Easy assembly and torque setting



Operating principle of the 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 having removed the overload, the coupling reengages.
- The re-engagement is effected manually or via a device.



Re-engagement of the idle rotation coupling:

Re-engagement of the free-rotating coupling is effected by axial pressure on the shifting ring (2). Dependent on the existing media, accessibility etc., the re-engagement can be effected in different ways:

- by several beats with a plastic hammer (3) axially on the shifting ring (see on the left)
- by mounting levers (4)
- by a pneumatic or hydraulic engagement device (automated process of engagement)

Size	Torques [Nm]		
	T1	T2	T3
1	12-25	25-50	50-100
2	25-50	50-100	100-200
3	50-100	100-200	200-450
4	100-200	200-400	400-800
5	170-450	350-900	600-1800

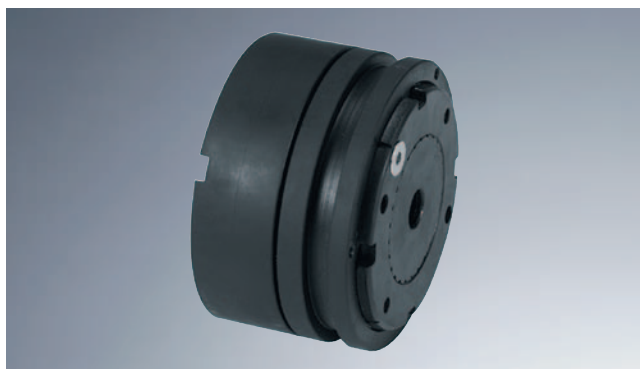
Size	Max. speeds [rpm]
	n <sub>max.</sub>
1	5000
2	4000
3	3500
4	3000
5	2300

Dimensions like KTR-SI design DK, SR and SGR (see following pages)

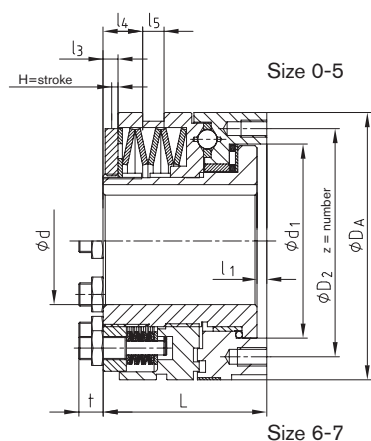
Ordering example:

KTR-SI	2	FR	FT	T2	Ø20	40 Nm
Type	Size	Design	Design	Disk springs	Bore	Torque set

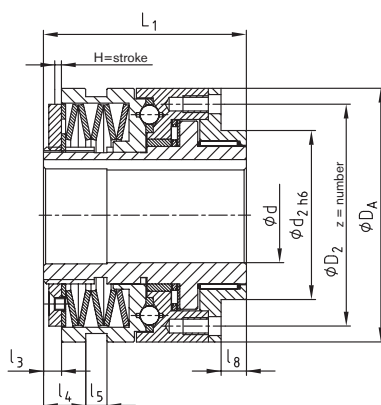
## Type FT, KT and LT



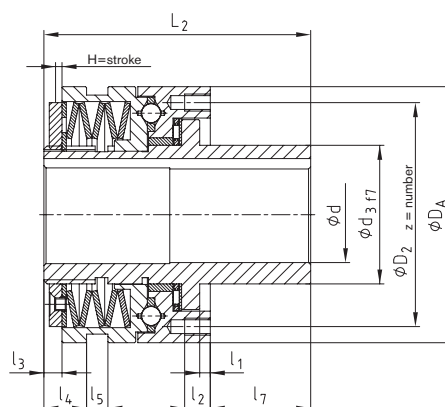
- Standard KTR-SI safety clutch up to 8200 Nm
- Available ready for assembly with the torque set
- For direct mounting of customers' components
- Available as a ratchet, synchronous and fail-safe design
- Torque setting possible while in place
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9
- Surface protection by phosphating



Type FT



Type KT



Type LT

### Technical data - Torques, weights

Size	Torques [Nm]								Weight with max. bore [kg]
	Disk spring layers type DK				Disk spring layers type SR and SGR				
	T1	T2	T3	T4	T1	T2	T3	T4	
0	2,5-5	5-20	-	20-40	5-10	10-40	-	-	0,41
1	6-12	12-25	25-55	55-100	12-25	25-50	50-100	-	1,30
2	12-25	25-50	50-120	120-200	25-50	50-100	100-200	-	2,27
3	25-50	50-100	100-250	200-450	50-100	100-200	200-450	-	3,88
4	50-100	100-200	200-500	500-1000	100-200	200-400	400-800	800-2000	8,34
5	85-250	230-600	300-1000	600-2000	170-450	350-900	600-1800	1200-3400	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		H=stroke																			
	Pilot bore	max.	DK														SR		SGR	FR		
			d <sub>1</sub>	D <sub>2</sub>	D <sub>A</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	l <sub>5</sub>	l <sub>7</sub>	l <sub>8</sub>	L	L <sub>1</sub>	L <sub>2</sub>	z	DK	SR	SGR	FR
0	7	20	41,0	48	55	38	28	4,0	6,5	3,0	7,5	9	27,5	8	38,5	51,0	66,0	6xM5	1,4	1,2	0,6	1,6
1	10	25	60,0	70	82	50	38	4,0	8,0	6,0	11,5	9	33,0	10	52,0	70,0	85,0	6xM5	2,3	1,8	0,8	2,3
2	14	35	78,0	89	100	60	52	5,0	10,0	5,0	12,0	9	39,0	12	61,0	78,0	100,0	6xM6	2,4	2,0	1,1	3,0
3	18	45	90,5	105	120	80	65	5,0	12,0	8,5	21,0	10	47,0	12	78,0	96,0	125,0	6xM8	2,7	2,2	1,2	3,5
4	24	55	105,0	125	146	100	78	6,5	15,0	11,0	27,0	9	52,5	16	100,0	124,5	152,5	6xM10 <sup>1)</sup>	3,7	2,5	1,2	3,8
5	30	65	120,5	155	176	120	90	6,5	17,0	12,0	33,0	9	57,5	18	113,5	140,0	171,0	6xM12 <sup>1)</sup>	4,6	3,0	1,6	4,5
6 <sup>2)</sup>	40	80	136,0	160	200	130	108	7,0	20,0	14,0	39,0	9	64,0	20	119,0	150,0	183,0	6xM12 <sup>2)</sup>	5,0	3,5	2,5	-
7 <sup>2)</sup>	50	100	168,0	200	240	160	135	8,0	25,0	15,0	46,0	9	72,0	25	141,0	175,0	213,0	6xM16 <sup>1)</sup>	5,5	4,0	2,7	-

<sup>1)</sup> Type T4 SR and SRG: tightening torques according to 12,9

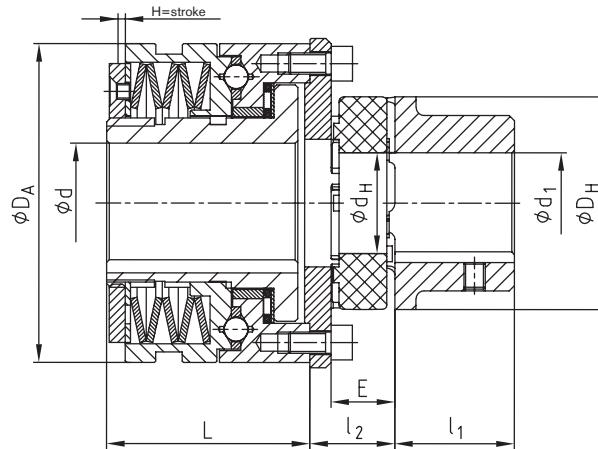
<sup>2)</sup> Size 6: dimension t= 15 mm, Size 7: dimension t= 21 mm

Ordering example:	KTR-SI	2	DK	FT	T2	Ø20	40 Nm
	Type	Size	Design	Design	Disk springs	Bore	Torque set

## With torsionally flexible ROTEX®



- KTR-SI safety clutch as a shaft-to-shaft connection
- Axial plug-in
- Able to compensate for misalignment
- Available as a ratchet, synchronous and fail-safe design
- Torque setting possible while in place
- Various kinds of elastomer hardness available
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9



### Technical data

KTR-SI size	ROTEX® size	Torque [Nm] <sup>1)</sup>		ROTEX® size	Torque [Nm] <sup>1)</sup>		KTR-SI disk spring layer type DK Torque [Nm]				Torque [Nm] KTR-SI disk spring layer type SR and SGR			
		T <sub>KN</sub>	T <sub>Kmax</sub>		T <sub>KN</sub>	T <sub>Kmax</sub>	T1	T2	T3	T4	T1	T2	T3	T4
0	19	17	34	28	160	320	2,5-5	5-20	–	20-40	5-10	10-40	–	–
1	24	60	120	38	325	650	6-12	12-25	25-55	55-100	12-25	25-50	50-100	–
2	28	160	320	48	525	1050	12-25	25-50	50-120	120-200	25-50	50-100	100-200	–
3	38	325	650	55	685	1370	25-50	50-100	100-250	200-450	50-100	100-200	200-450	–
4	48	525	1050	75	1920	3840	50-100	100-200	200-500	500-1000	100-200	200-400	400-800	800-2000
5	55	685	1370	90	3600	7200	85-250	230-600	300-1000	600-2000	170-450	350-900	600-1800	1200-3400
6	100	4950	9900	100	4950	9900	180-480	360-960	720-1950	1600-3300	300-750	600-1500	1200-3000	2900-5800
7	110	7200	14400	110	7200	14400	250-520	500-1050	1000-2100	2000-3600	550-1100	1100-2200	2200-4400	3000-8200

### Dimensions

KTR-SI size	ROTEX® size	Max. Bore		Dimensions [mm]							H=stroke [mm]	
		d	d <sub>1</sub>	D <sub>A</sub>	D <sub>H</sub>	d <sub>H</sub>	E	l <sub>1</sub>	l <sub>2</sub>	L	Design	
											DK	SR
0	19	20	24	55	40	18	16	25	22	38,5	1,4	1,2
	28		38		65	30	20	35	28,5			
1	24	25	28	82	55	27	18	30	24	52	2,3	1,8
	38		45		80	38	24	45	32,5			
2	28	35	38	100	65	30	20	35	28	61	2,4	2,0
	48		60		105	51	28	56	38			
3	38	45	45	120	80	38	24	45	32	78	2,7	2,2
	55		70		120	60	30	65	43			
4	48	55	60	146	105	51	28	56	38	100	3,7	2,5
	75		95		160	80	40	85	56,5			
5	55	65	70	176	120	60	30	65	44	113,5	4,6	3,0
	90		110		200	100	45	100	62			
6	100	80	115	200	225	113	50	110	72	119	5,0	3,5
	110		100		240	255	127	55	120			

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

Ordering example	KTR-SI 2	28	DK	T2	Ø25	Ø20	40 Nm
	Type/size	ROTEX® size	Design	Disk springs	ROTEX® bore	KTR-SI bore	Torque set