

THE COUPLING.



# INDUSTRIAL COUPLINGS

# Sizing and selection



Proper sizing of couplings is crucial to ensuring smooth and efficient power transmission. This involves taking the specific requirements and operating conditions of the application into account. Various factors such as torque, speed, temperature and shock loads must be considered when selecting the correct coupling type and size.

**According to DIN 740 part 2**

# Legend guide book industrial couplings

$T_{AR}$	=	Disengagement torque of the coupling (Nm)
K	=	Service factor
$T_{max}$	=	Maximum torque of the drive system (Nm)
$T_{AN}$	=	Rated torque of the motor (Nm)
$P_{Drive}$	=	Drive power (kW)
n	=	Drive speed ( $\text{min}^{-1}$ )
$\alpha$	=	Angular acceleration ( $\text{rad/s}^2$ )
t	=	Acceleration time (s)
$\omega$	=	Angular velocity (rad/s)
$J_L$	=	Moment of inertia of load ( $\text{kgm}^2$ )
$J_A$	=	Moment of inertia of drive ( $\text{kgm}^2$ )
$T_{AS}$	=	Peak motor torque (Nm)
S	=	Number of safety elements
F	=	Tangential force (kN)
r	=	Radius to element (m)
s	=	Spindle pitch (mm)
$F_V$	=	Feed force (N)
$\eta$	=	Spindle efficiency
$d_0$	=	Pitch diameter (mm)
$C_T$	=	Torsional stiffness of coupling (Nm/rad)
$J_{Masch}$	=	Total load inertia ( $\text{kgm}^2$ ) (e.g. shaft + sprocket + chain + roller + 1/2 of coupling)
$J_{Mot.}$	=	Total driving inertia ( $\text{kgm}^2$ ) (e.g. motor shaft + 1/2 of coupling)
$f_e$	=	Resonant frequency of the two mass system (Hz)
$f_{er}$	=	Excitation frequency of the drive (Hz)
$T_{KN}$	=	Rated torque of coupling (Nm)
$T_{AS}$	=	Peak torque (Nm) e.g. maximum acceleration peak torque or maximum braking torque from the load
$\varphi$	=	Angle of twist (degree)
$S_A$	=	Load factor
N	=	Length to flexure (mm)

## Sizing and selection

# Formulas

### Shock / load factor $S_A$

uniform load	non-uniform load	heavy shock load
1	2	3

For many crushing and shredding applications load factors are commonly  $S_A = 2-3$

### According to disengagement torque

Safety couplings are normally selected according to the required disengagement torque, which must be greater than the maximum torque required for start-up and operation.

Disengagement torque values are often determined from the drive data and are typically a multiple of the nominal torque at the operating drive speed (TAN). In addition to a start-up torque (Tmax.), the following values are used as further safety factors, depending on the load conditions:

- K = 1.3 uniform harmonious load
- K = 1.5 non-uniform load
- K = 1.8 heavy shock load

$$T_{AR} \geq K \cdot T_{max} \text{ (Nm)}$$

or

$$T_{AN} \geq 9,550 \cdot \frac{P_{Drive}}{n} \text{ (Nm)}$$

### According to torque

1. Calculate the drive torque  $T_{AN}$ .
2. Base the coupling rated torque  $T_{KN}$  on the drive torque  $T_{AN}$  multiplied by the application factors.

$$T_{AN} \geq 9,550 \cdot \frac{P_{Drive}}{n} \text{ (Nm)}$$

$$T_{KN} \geq T_{AN} \cdot S_A \cdot S_u \cdot S_z$$

Couplings are normally sized for the highest torque to be regularly transmitted. The peak torque of the application should not exceed the rated torque of the coupling. The following calculation provides an approximation of the minimum required coupling size, and allows for the maximum rated speed and misalignment to exist in the application.

$$T_{KN} \geq 1.5 \cdot T_{AS} \text{ (Nm)}$$

## Formulas

According to acceleration  
(Start-up with no load)

$$T_{AR} \geq \alpha \cdot J_L \geq \frac{J_L}{J_A + J_L} \cdot T_{AS} \cdot S_A \text{ (Nm)}$$

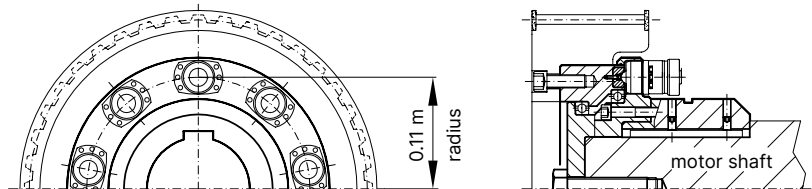
$$\alpha = \frac{\omega}{n} = \frac{\pi \cdot n}{t \cdot 30}$$

According to acceleration  
(Start-up with load)

$$T_{AR} \geq \alpha \cdot J_L + T_{AN} \geq \left[ \frac{J_L}{J_A + J_L} \cdot (T_{AS} - T_{AN}) + T_{AN} \right] \cdot S_A \text{ (Nm)}$$

According to the number  
of safety elements

$$T_{AR} = S \cdot F \cdot r$$



According to linear feed force

Screw drive

$$T_{AN} = \frac{s \cdot F_v}{2,000 \cdot \pi \cdot \eta} \text{ (Nm)}$$

Rack and pinion drive

$$T_{AN} = \frac{d_0 \cdot F_v}{2,000} \text{ (Nm)}$$

## Sizing and selection

# Formulas

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### According to resonant frequency

The torsional natural frequency of the coupling must be significantly higher or lower than that of the equipment. For the mechanical substitution model the two mass system applies.

$$f_e = \frac{1}{2 \cdot \pi} \sqrt{C_T \cdot \frac{J_{Masch} + J_{Mot}}{J_{Masch} \cdot J_{Mot}}} \quad (\text{Hz})$$

### According to acceleration torque

A more detailed calculation takes acceleration and the driving and driven moments of inertia into account. A strong inertia ratio diminishes the effect of the load factor in the sizing calculation.

$$T_{KN} \geq T_{AS} \cdot S_A \cdot \frac{J_L}{J_A + J_L} \quad (\text{Nm})$$

### According to torsional deflection

To calculate transmission error as a result of torsional stress:

$$\varphi = \frac{180}{\pi} \cdot \frac{T_{AS}}{C_T} \quad (\text{degree})$$

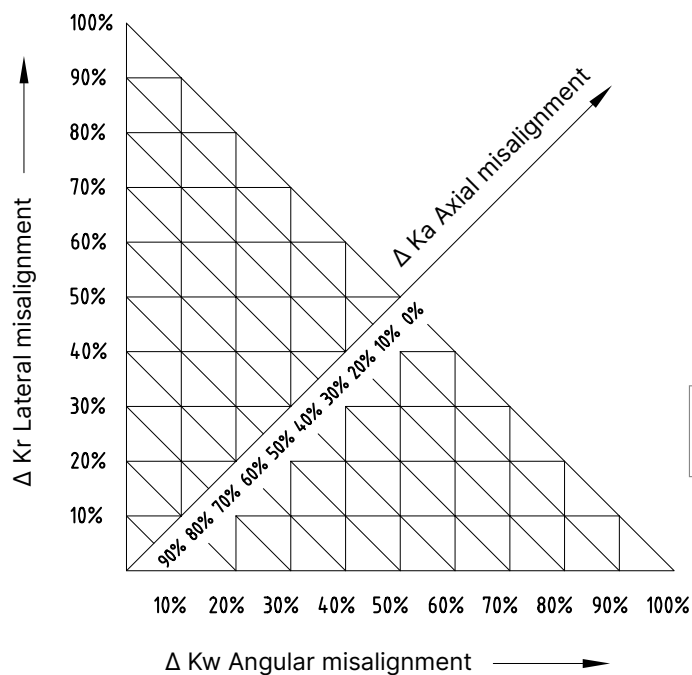
## Sizing and selection

# Design disc pack couplings

Taking into account the friction drive principle of the R+W disc coupling design, torque is transferred without micro-movements or backlash.



## Misalignment compensation



$$\Delta K_{total} = \Delta K_r + \Delta K_w + \Delta K_a \leq 100\%$$

The maximum total misalignment of the disc coupling should not exceed 100% of the combined percentages of the maximum axial, angular and lateral values as shown in the product data tables.

### Example: pump skid

axial misalignment: 20%  
lateral misalignment: 40%  
angular misalignment: 40%

$$\Delta K_{total} = 20\% + 40\% + 40\% \leq 100\%$$

➔ coupling is fatigue resistant







ST

# TORQSET® safety couplings

## 200 – 40,000,000 Nm

### Areas of application

- + Timber processing machinery
- + Bulk material handling systems
- + Tunnel boring machinery
- + Industrial shredders
- + Rotary test stands
- + Extruder drives
- + Wastewater scraper drives
- + Wherever potential for torque overload exists

### Temperature range

-15°C to +80°C

### Fit clearance

Overall shaft / hub clearance of 0.02 - 0.07 mm

### Special solutions

Automatic re-engagement

### ATEX (Optional)

Available on request

### Disengagement behavior

Full disengagement / manual reset is standard

Ordering Example	STR	10	4-10	20	100	XX
Model	•					Special designation only (e.g. special bore diameter tolerances, balancing, etc.). Contact R+W for more information
Size		•				
Adjustment range			•			
Disengagement torque				•		
Bore D1					•	

For custom features place an XX at the end of the part number and describe the special requirements (e.g. STR / 10 / 4-10 / 20 / 100 / XX)

# Safety couplings

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### Reliable torque overload protection

ST series safety couplings are designed to decouple machine drives in the event of torque overload, preventing damage and downtime.

A series of ball bearings are spring loaded into detents on an otherwise freely spinning output plate. In the case of the ST series, these ball bearings are mounted onto plungers which are individually loaded in order to generate high clutching forces while maintaining a relatively small profile.

The transmittable torque is determined by the number and force setting of the safety elements and

their distance from the center of the rotational axis. In the event of an overload, the force applied by the detents causes the plungers to overcome the spring loading and retract into the housings, resulting in a complete separation of the driving and driven hubs.

They will not re-engage automatically. After the overload condition has passed, an axial force must be applied in order to re-engage the safety elements into the detents of the output plate.

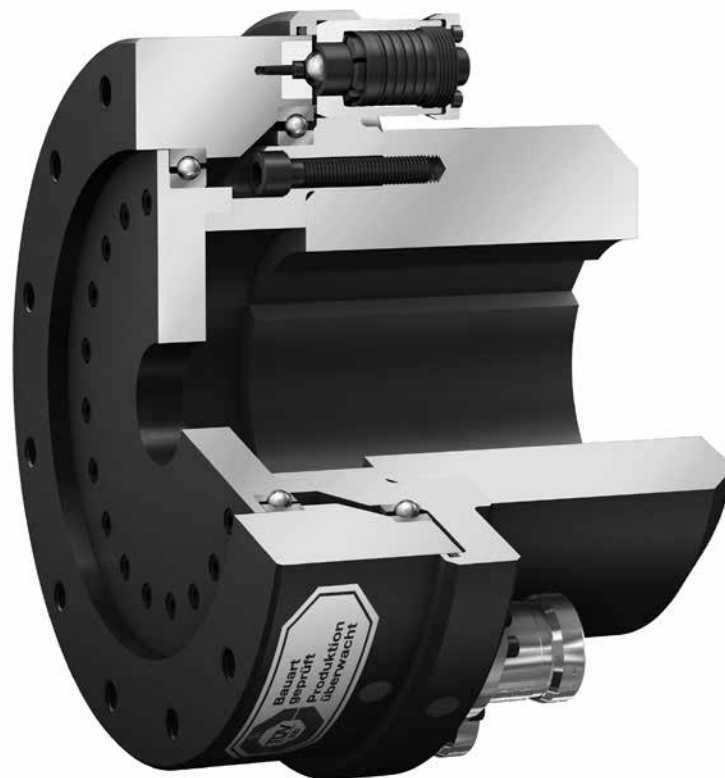


Image: The ST1 safety coupling with integral bearings and hardened races to absorb axial and lateral forces. The ST1 is the basic model of the ST series.

# Safety couplings

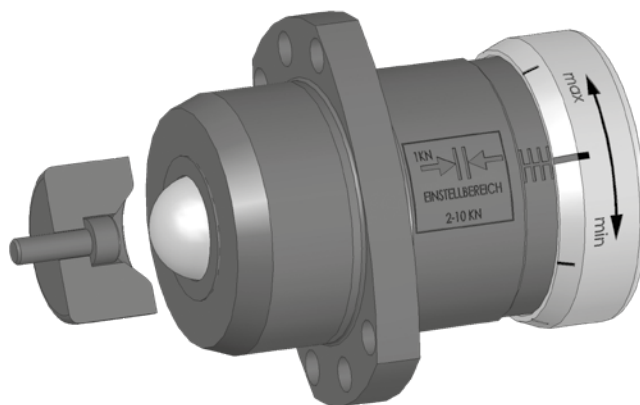
### Serie ST1R - ST5

All coupling variants are designed with a reinforced bearing adapted to the application. This serves to enable high speeds and absorb axial and transverse

loads. Depending on the application and external loading, they are normally angular contact or tapered roller bearings.

### Safety element









The safety elements consist of two components: the detent receptacle and the adjustable plunger mechanism.






ST

# TORQSET® Safety couplings

## 200 – 40,000,000 Nm

Model	Features	Page
 	<p><b>With simple keyway mounting for indirect drives</b> 200 – 25,000 Nm</p> <ul style="list-style-type: none"><li>• Compact, simple design</li><li>• Precise overload protection</li><li>• Torsionally stiff</li><li>• Integral bearing for overhung load support</li></ul>	22-23
 	<p><b>With keyway mounting special robust version</b> 200 – 250,000 Nm</p> <ul style="list-style-type: none"><li>• Compact, simple design</li><li>• Precise overload protection</li><li>• Torsionally stiff</li><li>• With heavy duty bearing for overhung load support</li></ul>	24-25
 	<p><b>With conical clamping ring for indirect drives</b> 200 – 165,000 Nm</p> <ul style="list-style-type: none"><li>• High shaft clamping pressure</li><li>• Compact, simple design</li><li>• Precise overload protection</li><li>• Torsionally stiff</li><li>• With heavy duty bearing for timing belt pulley or sprocket</li></ul>	26-27
 	<p><b>With flange mounting both sides</b> 200 – 45,000 Nm</p> <ul style="list-style-type: none"><li>• Compact design with customer specified interface for torque transducers and other mounting flanges</li><li>• Precise overload protection</li><li>• Torsionally stiff</li><li>• With special bearing for high speeds</li></ul>	28



Model	Features	Page
<b>STE</b>	 <p><b>With keyway mounting and elastomer coupling</b> 200 – 14,000 Nm</p> <ul style="list-style-type: none"> <li>• Vibration damping</li> <li>• Precise overload protection</li> <li>• Wear resistant</li> <li>• Press fit design</li> <li>• With reinforced bearing suitable for extrusion machinery</li> </ul>	29
<b>ST4</b>	 <p><b>With simple keyway mounting and crowned gear coupling</b> 200 – 250,000 Nm</p> <ul style="list-style-type: none"> <li>• High power density</li> <li>• Compensation for misalignment</li> <li>• Precise overload protection</li> <li>• Low reaction loads on shaft bearings</li> <li>• Extremely wear resistant</li> <li>• With reinforced bearing</li> </ul>	30-31
<b>ST5</b>	 <p><b>With simple keyway mounting and highly flexible coupling</b> 200 – 19.000 Nm</p> <ul style="list-style-type: none"> <li>• High damping</li> <li>• Compensation for misalignment</li> <li>• Precise torque limitation</li> <li>• Wear resistant</li> <li>• Low backlash</li> <li>• With reinforced bearing</li> </ul>	32-33
<b>ACCESSORIES</b>	<b>Accessories for Safety Couplings</b>	34-38
<b>ST</b>	<b>Options / Special Solutions</b>	39

# ST1

## With simple keyway mounting

200 – 25,000 Nm



### Features

- Compact, simple design
- Precise overload protection
- Torsionally stiff
- Integral bearing for overhung load support

### Material

Hardened steel (nitrocarburized surface)

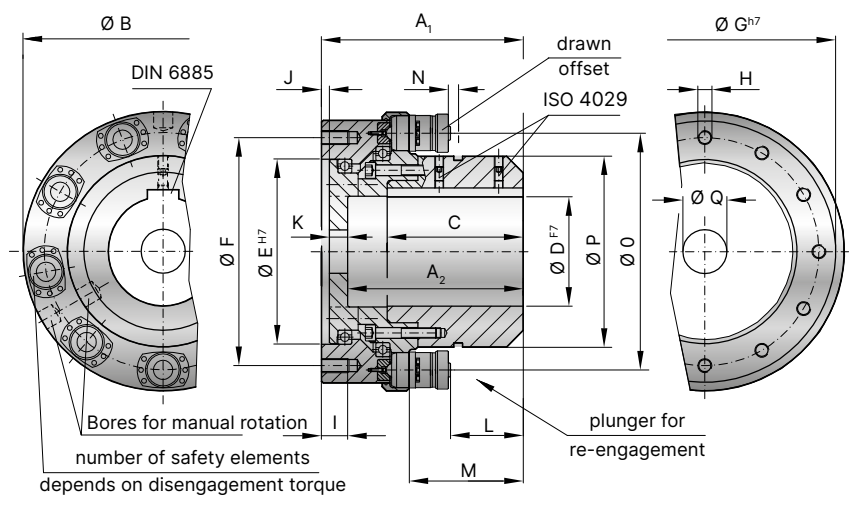
### Design

- **Drive side:** coupling hub with keyway connection (spline profile on request)
- **Driven side:** output flange with 12x fastening threads and integral bearings
- **Safety elements:** evenly spaced around the circumference; externally adjustable

## Model ST1 | Size 2-5

Size		2			5		
Adjustment range available from - to (KNm)		0.2-0.5	0.5-1.0	1.0-1.5	0.7-2	1.2-4	3.2-5
		3×ST10	6×ST10	6×ST10	3×ST15	6×ST15	6×ST15
Overall length (mm)	A <sub>1</sub>		120			150	
Bore depth (mm)	A <sub>2</sub>		100			124	
Outside diameter (mm)	B		198			220	
Fit length (mm)	C		100			121	
Bore diameter possible Ø to Ø F7 (mm)	D		30-75			40-90	
Flange centering diameter H7 (mm)	E		132			145	
Bolt circle diameter ±0,3 (mm)	F		162			170	
Flange outside diameter h7 (mm)	G		192			209	
Fastening threads	H		12xM10			12xM12	
Thread depth (mm)	I		15			20	
Fit length (mm)	J		3.5			4	
Wall thickness (mm)	K		15			21	
Distance (mm)	L		10.5			16.5	
Distance (mm)	M		51.5			66.5	
Actuation path (mm)	N		3.5			4.5	
Mounting diameter - elements (mm)	O		154			171	
Hub outside diameter (mm)	P		104			120	
Bore for fastening screw (mm)	Q		max. Ø 75			max. Ø 90	
Moment of inertia (approx.) D max. + max. sgmnt (10 <sup>-3</sup> kgm <sup>2</sup> )			77			151	
Speed max. (1/min.)			7,000			6,000	
Allowable max. radial force standard* (KN)			5			10	
Approx. weight at D max. + max. sgmnt (kg)			15			24	

\* larger radial loads possible with special bearings



## Model ST1 | Size 10-25

Size		10			25			
Adjustment range available from - to	(KNm)		2-5	4-10	6-14	6-12	9-18	15-25
			3×ST15	6×ST15	9×ST15	6×ST15	9×ST15	12×ST15
Overall length	(mm)	A <sub>1</sub>		183			230	
Bore depth	(mm)	A <sub>2</sub>		158			200	
Outside diameter	(mm)	B		270			318	
Fit length	(mm)	C		120			155	
Bore diameter possible Ø to Ø F7	(mm)	D		40-110			60-140	
Flange centering diameter H7 (mm)		E		170			210	
Bolt circle diameter ±0,3	(mm)	F		220			260	
Flange outside diameter h7	(mm)	G		259			298	
Fastening threads		H		12xM16			12xM16	
Thread depth	(mm)	I		25			30	
Fit length	(mm)	J		6			8	
Wall thickness	(mm)	K		17			20	
Distance	(mm)	L		45			80	
Distance	(mm)	M		95			130	
Actuation path	(mm)	N		4			4	
Mounting diameter - elements (mm)		O		220			270	
Hub outside diameter	(mm)	P		170			218	
Bore for fastening screw	(mm)	Q		max. Ø 110			max. Ø 140	
Moment of inertia (approx.) D max. + max. sgmnt (10 <sup>-3</sup> kgm <sup>2</sup> )				370			780	
Speed max.	(1/min.)			4,200			3,800	
Allowable max. radial force standard*	(KN)			20			30	
Approx. weight at D max. + max. sgmnt	(kg)			40			63	

\* larger radial loads possible with special bearings



# ST1 R

## With simple keyway mounting, robust

200 – 250,000 Nm



### Feataures

- Compact, simple design
- Precise overload protection
- Torsionally stiff
- With heavy duty bearing for overhung

### Material

- Hardened steel (nitrocarburized surface).
- Corrosion resistant surface treatments

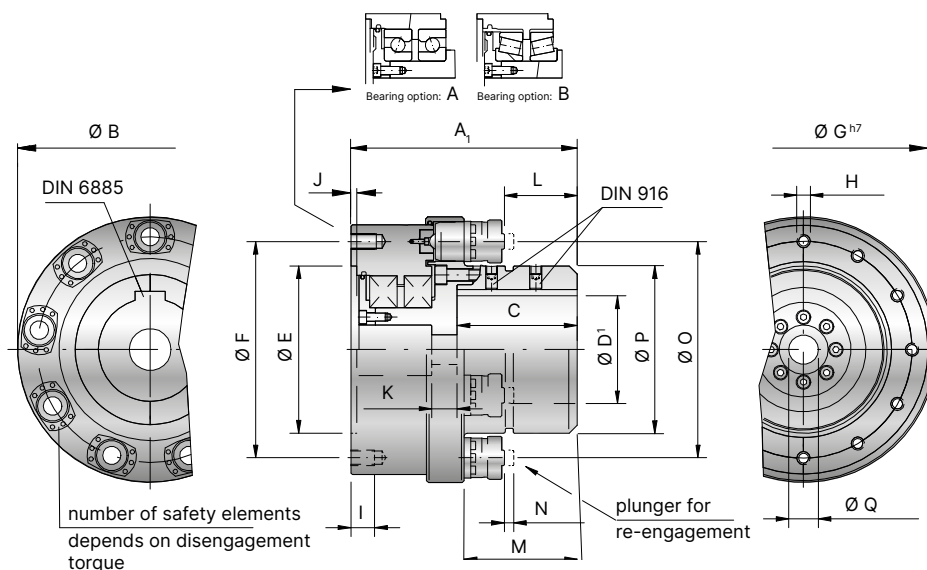
### Design

- **Drive side:** coupling hub with keyway connection
- **Driven side:** Output flange with attachment threads and reinforced bearings.
- **Safety elements:** The ST safety segments are evenly distributed around the circumference of the coupling. They ensure the safe disconnection of the driveline in the event of overload, and can be adjusted within a fixed range.

## Model ST1R | Size 2–40

Size	2				5			10			25			40		
	0.2-0.5	0.5-1.0	1.0-1.5	1.5-3.5	0.7-2	1.2-4	3.2-5	2-5	4-10	6-14	6-12	9-18	15-25	12-21	22-32	32-45
Adjustment range available from - to (KNm)	3x ST11	6x ST11	6x ST11	6x ST11	3x ST16	6x ST16	6x ST16	3x ST16	6x ST16	9x ST16	6x ST16	9x ST16	12x ST16	6x ST31	6x ST31	9x ST31
Overall length (mm)	A <sub>i</sub>	170			190			230			264			335		
Outside diameter (mm)	B	198			220			270			318			428		
Fit length Bore depth (mm)	C	85 / 95			100 / 111			122			150			191		
Bore diameter possible Ø to Ø F7 (mm)	D	30-80			40-90			40-110			60-140			90-170		
Flange centering diameter H7 (mm)	E	132			145			170			210			270		
Bolt circle diameter ±0.2 (mm)	F	162			170			220			260			330		
Flange outside diameter h7 (mm)	G	192			209			259			298			380		
Fastening threads	H	12xM10			12xM12			12xM16			12xM16			12xM20		
Thread depth (mm)	I	18			22			28			30			36		
Fit length (mm)	J	4.5			3.5			6			8			6		
Wall thickness (mm)	K	16			24			32			32			48		
Distance (mm)	L	50			56			74			97			111.5		
Distance (mm)	M	81			97			115			138			171		
Actuation path (mm)	N	3.5			4.5			4.5			4.5			7.5		
Mounting diameter - elements (mm)	O	154			171			220			270			350		
Hub outside diameter (mm)	P	112			122			170			218			265		
Bore for fastening screw (mm)	Q	17			25			26			32			38		
Moment of inertia (approx.) D max. + max. sgmnt (10 <sup>-3</sup> kgm <sup>2</sup> )		103			168			484			1,028			4,107		
Speed max. (1/min.)		8,500			6,300			5,000			4,000			3,600		
Allowable max. radial force standard* (KN)		10			20			40			60			80		
Approx. weight at D max. + max. sgmnt (kg)		21			28			55			86			196		

\* larger radial loads possible with special bearings



## Model ST1R | Size 60 - 250

Size		60			100			160			250	
Adjustment range available from - to (KNm)		11-18	22-36	30-55	24-50	45-90	80-110	25-55	50-110	80-165	100-170	160-250
		3×ST31	6×ST31	9×ST31	3×ST71	6×ST71	9×ST71	3×ST71	6×ST71	9×ST71	8×ST71	12×ST71
Overall length (mm)	A <sub>1</sub>	380			470			490			600	
Outside diameter (mm)	B	459			592			648			740	
Fit length Bore depth (mm)	C	220			275			282			361	
Bore diameter possible Ø to Ø F7 (mm)	D	90-200			100-250			130-290			200-340	
Flange centering diameter H7 (mm)	E	300			390			450			508	
Bolt circle diameter ±0.2 (mm)	F	360			464			570			600	
Flange outside diameter h7 (mm)	G	418			530			618			680	
Fastening threads	H	12xM20			12xM24			12xM24			12xM36	
Thread depth (mm)	I	36			40			44			60	
Fit length (mm)	J	9			10			11			12	
Wall thickness (mm)	K	53.5			67			67			78	
Distance (mm)	L	143			179			189			273	
Distance (mm)	M	202.5			255			265			349	
Actuation path (mm)	N	7.5			10			10			10	
Mounting diameter - elements (mm)	O	376			490			532			630	
Hub outside diameter (mm)	P	295			380			420			508	
Bore for fastening screw (mm)	Q	44			44			52			52	
Moment of inertia (approx.) D max. + max. sgmnt (10 <sup>-3</sup> kgm <sup>2</sup> )		5,925			20,000			31,830			61,300	
Speed max. (1/min.)		3,200			2,200			2,000			1,800	
Allowable max. radial force standard* (KN)		100			130			200			240	
Approx. weight at D max. + max. sgmnt (kg)		244			502			636			978	

\* larger radial loads possible with special bearings

**STN**

## With conical clamping bushing

200 – 5,000 Nm



2,000 – 165,000 Nm



### Features

- High shaft clamping pressure
- Compact, simple design
- Precise overload protection
- Torsionally stiff
- With heavy duty bearing for timing belt or chain sprocket

### Material

- Hardened steel (nitrocarburized surface).
- Corrosion resistant surface treatments

### Design

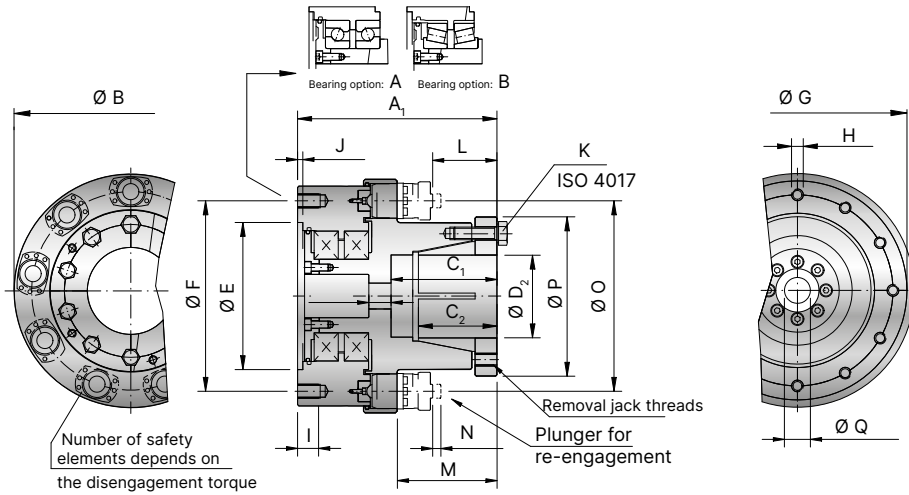
- **Drive side:** hub with slotted conical bushing
- **Output side:** mounting flange with integral bearing.  
Connection via pilot and bolt circle.
- **Safety elements:** The ST safety segments are evenly distributed around the circumference of the coupling. They ensure the safe disconnection of the driveline in the event of overload, and can be adjusted within a fixed range.

## Model STN | Size 2-5

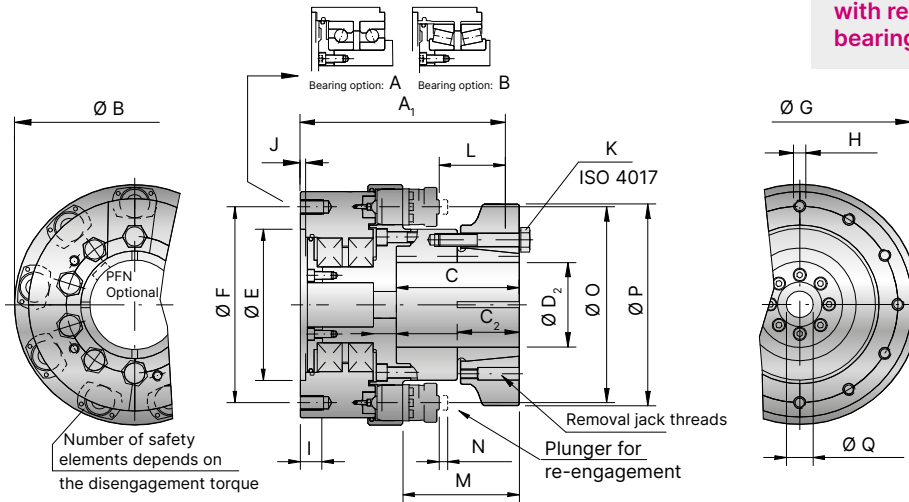
Size	2				5		
	0.2-0.5	0.5-1.0	1.0-1.5	1.5-3.5	0.7-2	1.2-4	3.2-5
Adjustment range available from - to	3×ST10	6×ST10	6×ST10	6×ST11	3×ST16	6×ST16	6×ST16
Overall length (mm)	A <sub>1</sub>	170				190	
Flange outside diameter (mm)	B	198				220	
Fit length / keyway length (mm)	C <sub>1</sub>	85				111	
Effective clamping length (mm)	C <sub>2</sub>	33				39	
Bore diameter possible Ø to Ø F7 (mm)	D <sub>2</sub>	35-75				40-96	
Flange centering diameter H7 (mm)	E	132				145	
Bolt circle diameter ±0,3 (mm)	F	162				170	
Outside diameter h7 (mm)	G	192				209	
Fastening threads	H	12×M10				12×M12	
Thread depth (mm)	I	18				22	
Fit length (mm)	J	3.5				3.5	
Tightening screw ISO 4017	K	M10				M12	
Tightening torque (Nm)		59				100	
Distance (mm)	L	50				56	
Distance (mm)	M	81				97	
Actuation path (mm)	N	3.5				4.5	
Mounting diameter - elements (mm)	O	154				171	
Hub outside diameter (mm)	P	135				180	
Moment of inertia (approx.) D max. + max. sgmnt (10 <sup>-3</sup> kgm <sup>2</sup> )		103				168	
Speed max. (rpm)		8,500				6,300	
Allowable max. radial force standard* (KN)		10				20	
Approx. weight at D max. + max. sgmnt (kg)		21				28	

\* larger radial loads possible with special bearings

**Size**  
200 – 5,000 Nm



**Size**  
2,000 – 165,000 Nm



with reinforced bearing

SAFETY COUPLINGS  
ST

## Model STN | Size 10-160

Size	10			25			40			60			100			160			
	2-5 3x ST16	4-10 6x ST16	6-14 9x ST16	6-12 6x ST16	9-18 9x ST16	15-25 12x ST16	12-21 6x ST31	22-32 6x ST31	32-45 9x ST31	11-18 3x ST31	22-36 6x ST31	30-55 9x ST31	24-50 3x ST71	45-90 6x ST71	80-110 9x ST71	25-55 3x ST71	50-110 6x ST71	80-165 9x ST71	
Adjustment range available from - to																			
Overall length (mm)	A <sub>1</sub>	240			270			330			380			470			500		
Flange outside diameter (mm)	B	270			318			428			459			592			648		
Fit length / keyway length (mm)	C <sub>1</sub>	132			156			186			220			275			292		
Effective clamping length (mm)	C <sub>2</sub>	67			70			82.5			97			100			133		
Bore diameter possible Ø to Ø F7 (mm)	D <sub>1</sub>	65-110			70-150			90-170			80-200			200-250			200-290		
Flange centering diameter H7 (mm)	E	170			210			270			300			390			450		
Bolt circle diameter ±0,3 (mm)	F	220			260			330			360			464			570		
Outside diameter h7 (mm)	G	259			298			380			418			530			618		
Fastening threads	H	12xM16			12xM16			12xM20			12xM20			12xM24			12xM24		
Thread depth (mm)	I	28			30			36			36			40			44		
Fit length (mm)	J	6			8			6			9			10			11		
Tightening screw ISO 4017	K	M16			M16			M16			M20			M24			M24		
Tightening torque (Nm)	K	180			180			300			570			680			680		
Distance (mm)	L	84			103			106.5			143			179			199		
Distance (mm)	M	125			144			166			202.5			255			275		
Actuation path (mm)	N	4.5			4.5			7.5			7.5			10			10		
Mounting diameter - elements (mm)	O	220			270			350			376			490			532		
Hub outside diameter (mm)	P	218			218			322			380			470			538		
Moment of inertia (approx.) D max. + max. sgmnt (10 <sup>-3</sup> kgm <sup>2</sup> )		440			780			3,570			4,600			XXX			XXX		
Speed max. (rpm)		5,000			4,000			3,600			3,200			2,200			2,000		
Allowable max. radial force standard* (kN)		40			60			80			100			130			200		
Approx. weight at D max. + max. sgmnt (kg)		50			63			166			179			XXX			XXX		

\* larger radial loads possible with special bearings

**STF**

## With flange mounting

200 – 45,000 Nm



### Features

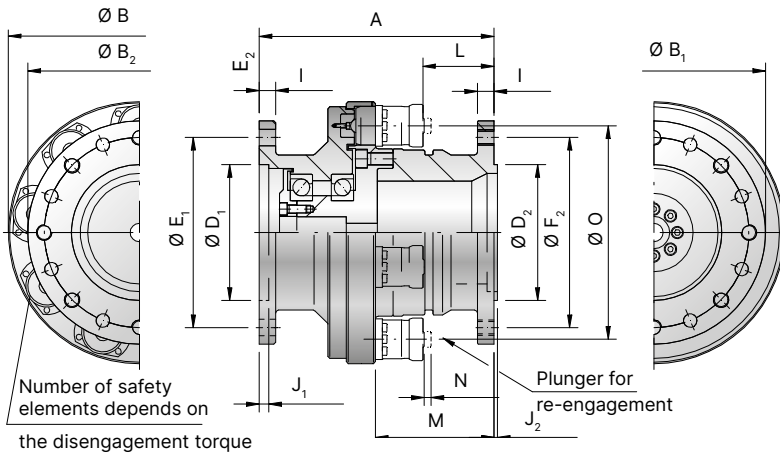
- Compact design with customer specified interface for torque transducers and other mounting flanges
- Precise overload protection
- Torsionally stiff
- With special bearing for high speeds

### Material

- Hardened steel (nitrocarburized surface)
- Corrosion resistant surface treatments

### Design

- **Drive side:** mounting flange with pilot and bolt circle.
- **Output side:** mounting flange with integral bearing. Connection via pilot and bolt circle.
- **Safety elements:** The ST safety segments are evenly distributed around the circumference of the coupling. They ensure the safe disconnection of the driveline in the event of overload, and can be adjusted within a fixed range.



with reinforced bearing

## Model STF | Size 2-40

Higher torque on request

Size	2			5			10			25			40			
	0.2-0.5	0.5-1.0	1.0-1.5	1.5-3.5	0.7-2	1.2-4	3.2-5	2-5	4-10	6-14	6-12	9-18	15-25	12-21	22-32	32-45
Adjustment range available from to (KNm)	3×ST10	6×ST10	6×ST10	6×ST10	3×ST15	6×ST15	6×ST15	3×ST15	6×ST15	9×ST15	6×ST15	9×ST15	12×ST15	6×ST30	6×ST30	9×ST30
Overall length (mm)	A	190			230			250			280			360		
Flange outside diameter (mm)	B	198			220			270			318			428		
Flange outside diameter (mm)	B <sub>1</sub>	170			188			230			268			340		
Flange outside diameter (mm)	B <sub>2</sub>	170			188			230			306			390		
Flange centering diameter H7 (mm)	D <sub>1</sub>	90			110			140			174			210		
Flange centering diameter H7 (mm)	D <sub>2</sub>	90			110			140			200			210		
Hole circle diameter (mm)	E <sub>1</sub>	130			155.5			196			220			304		
Through hole diameter (mm)	F <sub>1</sub>	8x Ø13			8x Ø15			8x Ø17			12x Ø19			16x Ø22		
Bolt circle diameter (mm)	F <sub>2</sub>	130			155.5			196			270			350		
Thread size (mm)	F <sub>2</sub>	8x M12			8x M14			8x M16			12x M18			16x M20		
Flange thickness (mm)	l	14			17.5			20			22			25		
Fit length (mm)	J <sub>1</sub>	3			4			5			5			6		
Fit length (mm)	J <sub>2</sub>	2.5			3			3.5			4			4		
Distance (mm)	L	45			63.5			75			83.5			105.5		
Distance (mm)	M	83			113.5			125			124.5			165		
Actuation path (mm)	N	3.5			4.5			4.5			4.5			7.5		
Mounting diameter - elements (mm)	O	154			171			220			270			350		
Moment of inertia (approx.) D max. + max. sgmnt (10 <sup>-3</sup> kgm <sup>2</sup> )	J.kst	83			150			380			830			3,300		
Speed max. (rpm)		9,000			7,500			6,300			5,000			3,600		
Allowable max. radial force standard* (KN)		7			12			17			22			30		
Approx. weight at D max. + max. sgmnt (kg)	m.kst	20			30.4			50.3			73			180		

\* larger radial loads possible with special bearings

# STE

200 – 14,000 Nm



### Features

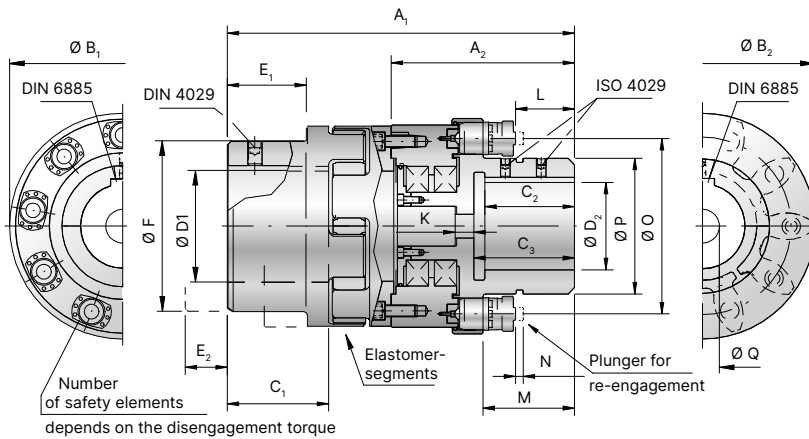
- Vibration damping
- Precise overload protection
- Wear resistant
- Press fit design
- With reinforced bearing suitable for extrusion machinery

### Material

- High-quality, hardened steel.
- Corrosion resistant surface treatments

### Design

- **Drive side:** hub with keyway connection
- **Output side:** flexible coupling and hub with simple keyway connection.
- **Safety elements:** The ST safety segments are evenly distributed around the circumference of the coupling. They ensure the safe disconnection of the driveline in the event of overload, and can be adjusted within a fixed range.



with integrated bearing  
 Optionally available with fully split hubs

## Model STE | Size 2-10

Size	2			5			10			
	Adjustment range available from to (KNm)	0.2-0.5	0.5-1.0	1.0-1.5	0.7-2	1.2-4	3.2-5	2-5	4-10	6-14
Elastomer coupling size		3×ST11	6×ST11	6×ST11	3×ST16	6×ST16	6×ST16	3×ST16	6×ST16	9×ST16
Elastomer insert type		A / B			A / B			A / B		
Overall length ±2 (mm)	$A_1$	312			373			460		
Length of torque limiting portion (mm)	$A_2$	170			190			230		
Flange outside diameter (ST portion) (mm)	$B_1$	198			220			270		
Flange outside diameter (elastomer portion) (mm)	$B_2$	160			225			290		
Fit length/keyway length D1 (mm)	$C_1$	88			113			142		
Fit length/keyway length D2 (mm)	$C_2$	85			100			122		
Bore depth (torque limiting portion) (mm)	$C_3$	95			111			122		
Bore diameter (elastomer portion) $\varnothing - \varnothing F7$ (mm)	$D_1$	30-95			40-130			50-170		
Bore diameter (torque limiting portion) $\varnothing - \varnothing F7$ (mm)	$D_2$	30-80			40-90			40-110		
Length (mm)	$E_1$	69			89			110		
Length (mm)	$E_2$	36			47			57		
Hub diameter (mm)	F	154			190			240		
Wall thickness (mm)	K	16			24			32		
Distance (mm)	L	50			56			74		
Distance (mm)	M	81			97			115		
Actuation path (mm)	N	3.5			4.5			4.5		
Mounting diameter - elements (mm)	O	154			171			220		
Hub outside diameter (mm)	P	112			122			170		
Bore for fastening screw (mm)	Q	max. $\varnothing 17$			max. $\varnothing 25$			max. $\varnothing 26$		
Moment of inertia (approx.) D max. + max. sgmnt ( $10^{-3} \text{kgm}^2$ )		145			337			1,145		
Speed max. (rpm)		8,500			6,300			5,000		
Approx. weight at D max. + max. sgmnt (kg)		35			47			110		
Axial (mm)		± 3			± 4			± 5		
Lateral Elastomer insert type A / B (mm)		0.5 / 0.3			0.5 / 0.3			0.6 / 0.4		
Angular Elastomer insert type A / B (degree)		1.5 / 1.0			1.5 / 1.0			1.5 / 1.0		
Dynamic torsional stiffness at $T_{KN}$ (Elastomer insert type A / B) ( $10^3 \text{ Nm/rad}$ )		175 / 216			337 / 743			1,180 / 1,340		

**ST4**

## With simple keyway mounting and flexible gear coupling

200 – 250,000 Nm



### Features

- High power density
- Compensation for misalignment
- Precise overload protection
- Low reaction loads on shaft bearings
- Extremely wear resistant
- With reinforced bearing

### Material

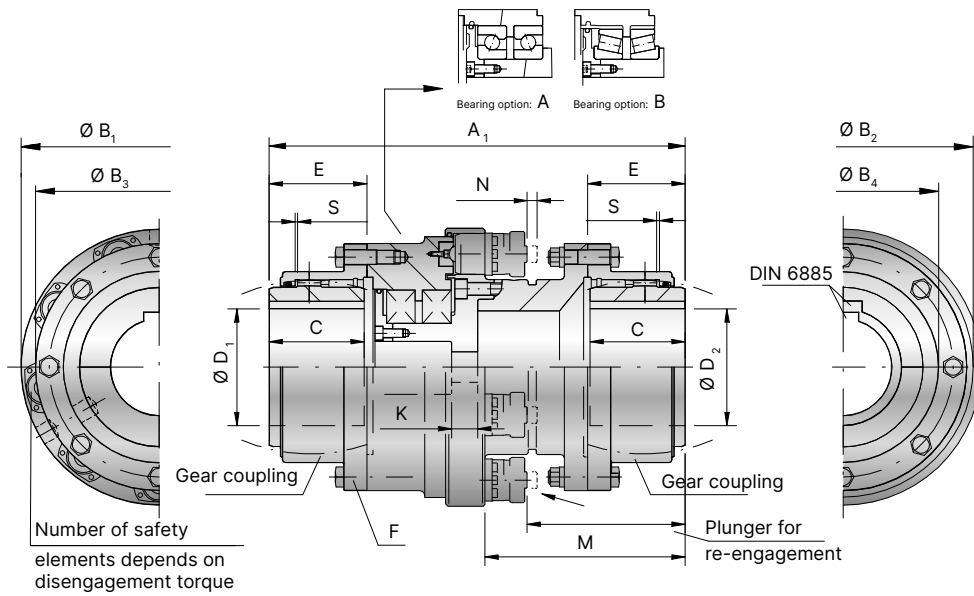
- High-quality, hardened steel.
- Corrosion resistant surface treatments

### Design

- **Drive side:** hub with keyway connection
- **Output side:** flexible gear coupling and hub with simple keyway connection.
- **Safety elements:** The ST safety segments are evenly distributed around the circumference of the coupling. They ensure the safe disconnection of the driveline in the event of overload, and can be adjusted within a fixed range.

## Model ST4 | Size 2–25

Size		2			5			10			25			
Adjustment range available from to	(KNm)		0.2-0.5	0.5-1.0	1.0-1.5	0.7-2	1.2-4	3.2-6	2-5	4-10	6-14	3-6	5-12	9-19
			3×ST10	6×ST10	6×ST10	3×ST15	6×ST15	6 ST15	3×ST15	6×ST15	9×ST15	3×ST15	6× ST15	9×ST15
Overall length	(mm)	A <sub>1</sub>	300			355			410			490		
Flange outside diameter (ST portion)	(mm)	B <sub>1</sub>	198			220			270			318		
Mounting flange outside diameter (ST portion)	(mm)	B <sub>2</sub>	192			209			259			300		
Flange outside diameter (gear coupling)	(mm)	B <sub>3</sub>	168			200			225			265		
Hub diameter (gear coupling)	(mm)	B <sub>4</sub>	130.5			158.4			183.4			211.5		
Fit length/keyway length	(mm)	C <sub>1/2</sub>	62			76			90			105		
Bore diameter Ø to Ø F7	(mm)	D <sub>1/2</sub>	30-78			32-98			42-112			46-132		
Length	(mm)	E	63.5			78.5			92.5			108		
Screw	(mm)	F	6×M8			10×M12			12×M12			12×M16		
Tightening torque	(mm)	F	18			65			65			150		
Distance	(mm)	L	110			138			159.5			202		
Distance	(mm)	M	148			188			209.5			252		
Actuation path	(mm)	N	3.5			4.5			4.5			4.5		
Mounting diameter - elements	(mm)	O	154			171			220			270		
Moment of inertia (approx.) D max. + max. sgmnt	(10 <sup>-3</sup> kgm <sup>2</sup> )		108			244			529			1,117		
Speed max.	(1/min.)		4,000			3,900			3,700			3,550		
Approx. weight at D max. + max. sgmnt	(kg)		25			45			65			100		
Axial	(mm)		1.5			2.5			2.5			3		
Angular	(degree)		2×0.35°			2×0.35°			2×0.35°			2×0.35°		



## Model ST4 | Size 40–250

Size		40			60			100			160			250	
Adjustment range available from to	(KNm)	12-21	22-32	32-45	11-18	22-36	30-55	24-50	45-90	80-110	25-55	50-110	80-165	100-170	160-250
		6×ST30	6×ST30	9×ST30	3×ST30	6×ST30	9×ST30	3×ST70	6×ST70	9×ST70	3×ST70	6×ST70	9×ST70	8×ST71	12×ST71
Overall length	(mm)	A <sub>1</sub>	600			660			780			860			891
Flange outside diameter (ST portion)	(mm)	B <sub>1</sub>	428			459			592			648			740
Mounting flange outside diameter (ST portion)	(mm)	B <sub>2</sub>	399			418			560			618			724
Flange outside diameter (gear coupling)	(mm)	B <sub>3</sub>	330			370			438			525			639
Hub diameter (gear coupling)	(mm)	B <sub>4</sub>	275.5			307			367			423			505
Fit length/keyway length	(mm)	C <sub>1/2</sub>	135			150			190			220			220
Bore diameter Ø to Ø F7	(mm)	D <sub>1/2</sub>	60-174			70-190			110-233			120-280			200-280
Length	(mm)	E	139			154			194			225			296
Screw DIN 609 12.9	(mm)	F	14×M16			14×M18			14×M22			16×M24			22×M24
Tightening torque	(mm)		150			220			400			520			520
Distance	(mm)	L	238			275			318			360			458
Distance	(mm)	M	306			343			408			450			534
Actuation path	(mm)	N	8			8			10			10			10
Mounting diameter - elements	(mm)	O	350			376			490			532			630
Moment of inertia (approx.) D max. + max. sgmnt (10 <sup>-3</sup> kgm <sup>2</sup> )			4,363			6,650			20,611			33,820			84,926
Speed max.	(1/min.)		2,750			2,420			1,950			1,730			950
Approx. weight at D max. + max. sgmnt	(kg)		225			293			570			718			1,110
Axial	(mm)		4			4			4			5			6
Angular	(degree)		2×0.35°			2×0.35°			2×0.35°			2×0.35°			2×0.35°



# ST5

## With keyway connection and flexible coupling

200 – 19,000 Nm



### Features

- Highly elastic damping
- Compensation of misalignments
- Precise torque limitation
- Puncture-proof
- Low backlash

### Material

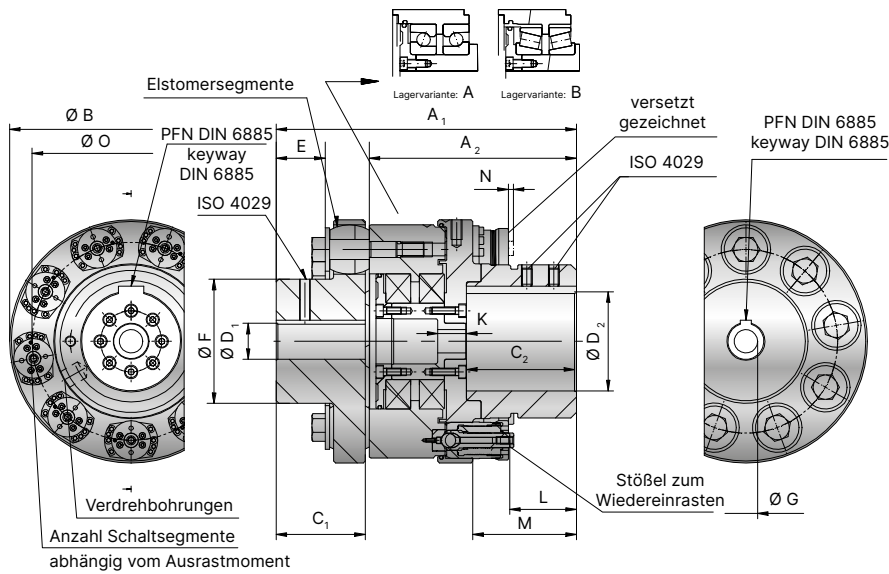
- High-quality, hardened steel.
- Rust protection due to oxidized surfaces.

### Design

- **Drive side:** hub with keyway connection
- **Output side:** flexible pin and bushing coupling and hub with simple keyway connection.
- **Safety elements:** The ST safety segments are evenly distributed around the circumference of the coupling. They ensure the safe disconnection of the driveline in the event of overload, and can be adjusted within a fixed range.

## Model ST5 | Size 2-5

Size			2			5		
Adjustment range available from - to	(KNm)		0.2-0.5	0.5-1.0	1.0 -1.5	0.7-2	1.2-4	3.2-5
			3×ST11	6×ST11	6×ST11	3×ST16	6×ST16	6×ST16
Overall length	(mm)	A <sub>1</sub>		245			273	
Length of torque limiting portion	(mm)	A <sub>2</sub>		170			190	
Diameter safety coupling	(mm)	B		198			220	
Fit length / keyway length elastomer portion	(mm)	C <sub>1</sub>		72			80	
Fit length / keyway length limiting portion	(mm)	C <sub>2</sub>		85			100	
Bore diameter elastomer portion	(mm)	D <sub>1</sub>		30-80			40-100	
Bore diameter torque limiting portion	(mm)	D <sub>2</sub>		30-80			40-90	
Hub diameter	(mm)	F		116			138	
Bore for fastening screw	(mm)	G		max. Ø 21			max. Ø 25	
Distance	(mm)	L		50			56	
Distance	(mm)	M		81			97	
Actuation path	(mm)	N		3			4.5	
Mounting diameter - elements	(mm)	O		154			171	
Moment of inertia (approx.) D max. + max. sgmnt	(10 <sup>-3</sup> kgm <sup>2</sup> )			133			216	
Speed max.	(1/min.)			8,500			6,300	
Approx. weight at D max. + max. sgmnt	(kg)			33			39	
Axial	(mm)			1.3			1.3	
Lateral	(mm)			0.56			0.56	
Angular	(degree)			0.18			0.16	
Dynamic torsional stiffness T <sub>KN</sub> (Standard A)	(10 <sup>3</sup> Nm/rad)			130			200	



## Model ST5 | Size 10–25

Higher torque on request

Size		10			25			
Adjustment range available from - to	(KNm)		2-5	4-10	6-14	3-6	5-12	9-19
			3×ST16	6×ST16	9×ST16	3×ST16	6×ST16	9×ST16
Overall length	(mm)	A <sub>1</sub>	334			385		
Length of torque limiting portion	(mm)	A <sub>2</sub>	230			264		
Diameter safety coupling	(mm)	B	270			318		
Fit length / keyway length elastomer portion	(mm)	C <sub>1</sub>	99			116		
Fit length / keyway length limiting portion	(mm)	C <sub>2</sub>	122			150		
Bore diameter elastomer portion	(mm)	D <sub>1</sub>	40-105			60-130		
Bore diameter torque limiting portion	(mm)	D <sub>2</sub>	40-110			60-140		
Hub diameter	(mm)	F	138			186		
Bore for fastening screw	(mm)	G	max. Ø 26			max. Ø 32		
Distance	(mm)	L	74			97		
Distance	(mm)	M	115			138		
Actuation path	(mm)	N	4.5			4.5		
Mounting diameter - elements	(mm)	O	220			270		
Moment of inertia (approx.) D max. + max. sgmnt	(10 <sup>-3</sup> kgm <sup>2</sup> )		622			1,300		
Speed max.	(1/min.)		5,000			4,000		
Approx. weight at D max. + max. sgmnt	(kg)		76			114		
Axial	(mm)		2.25			2.25		
Lateral	(mm)		0.91			0.91		
Angular	(degree)		0.21			0.18		
Dynamic torsional stiffness T <sub>KN</sub> (Standard A)	(10 <sup>3</sup> Nm/rad)		350			740		

ST

# Accessories TORQSET® Safety element



### Material

Hardened steel (nitrocarburized surface)  
Corrosion resistant surface treatments

### Design

Two part assembly for installation into prefabricated coupling components.

Part 1: detent receptacle

Part 2: self-contained, spring loaded plunger module. The spring force setting is adjustable in the field, with the settings clearly marked on an adjustment scale.

### Re-engagement

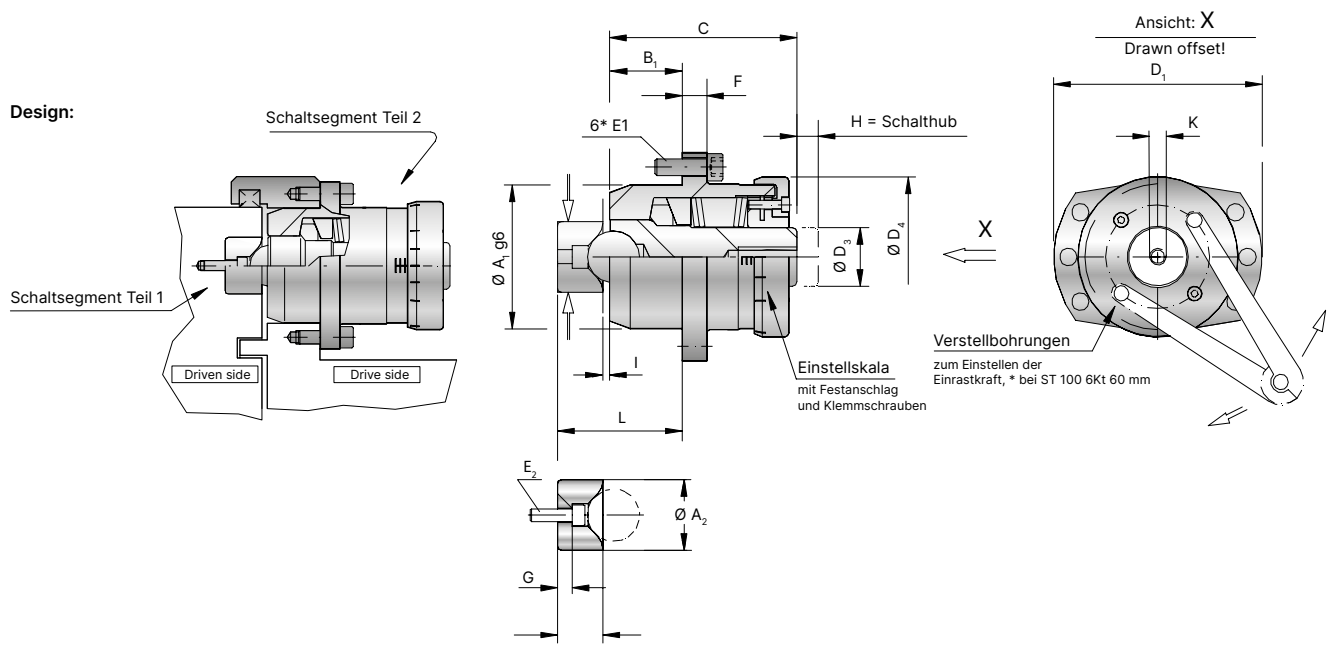
When properly located over the detent receptacle the safety element can be re-engaged through the application of pressure to the back side of the plunger core.

## Model ST | Size 10 – 30

Size			10	15	30
Tangential force (KN) Adjustment range available from - to	(ranges)	1	0.8-2.2	1-4	5-10
		2	2.0-3.3	2-8	10-20
		3	3.2-8	6-15	20-32
Centering diameter of safety element g6	(mm)	A <sub>1</sub>	28	40	70
Centering diameter engagement receptacle g6	(mm)	A <sub>2</sub>	18	24	34
Centering length of safety element	(mm)	B <sub>1</sub>	15	20	35
Centering length engagement receptacle	(mm)	B <sub>2</sub>	13.5	14	22
Overall length	(mm)	C	56	70	103
Outside diameter	(mm)	D <sub>1</sub>	45	59	100
Bolt circle diameter	(mm)	D <sub>2</sub>	37.5	50	86
Diameter plunger	(mm)	D <sub>3</sub>	8	16	28
Diameter adjustment nut	(mm)	D <sub>4</sub>	32	44	75
Screw / Tightening torque ISO 4762	(mm)	E <sub>1</sub>	6 x M4 x 12 / 4.5 Nm	6 x M5 x 16 / 10 Nm	6 x M8 x 25 / 40 Nm
Screw / Tightening torque ISO 4762	(mm)	E <sub>2</sub>	M3 x 20 4.5 Nm	M4 x 14 4.5 Nm	M6 x 20 15.5 Nm
Flange thickness	(mm)	F	5	7	12
Distance	(mm)	G	6.5	5	8
Actuation path	(mm)	H	3	4	7.5
Distance	(mm)	I	1.5	2	3
Radius	(mm)	J	100	110	200
Inner thread	(mm)	K	M5 x 10	M8 x 15	M10 x 25
Distance ± 0,1	(mm)	L	30	36	60
Weight	(kg)		0.26	0.65	2.7

axial spring force ≈ tangential force/1.4

Design:



## Model ST | Size 70-100

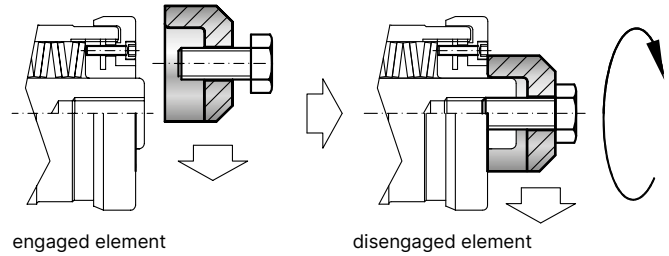
Size			70	100
Tangential force (KN) Adjustment range available from - to	(ranges)	1	8-20	
		2	15-40	52-88
		3	30-70	70-120
Centering diameter of safety element g6	(mm)	A <sub>1</sub>	90	120
Centering diameter engagement receptacle g6	(mm)	A <sub>2</sub>	44	60
Centering length of safety element	(mm)	B <sub>1</sub>	45	80.5
Centering length engagement receptacle	(mm)	B <sub>2</sub>	30	40.5
Overall length	(mm)	C	135	240
Outside diameter	(mm)	D <sub>1</sub>	129	160
Bolt circle diameter	(mm)	D <sub>2</sub>	110	
Diameter plunger	(mm)	D <sub>3</sub>	35	
Diameter adjustment nut	(mm)	D <sub>4</sub>	92	98
Screw / Tightening torque ISO 4762	(mm)	E <sub>1</sub>	6 x M12 x 35 / 120 Nm	6 x M12 x 40 (12.9) 120 Nm
Screw / Tightening torque ISO 4762	(mm)	E <sub>2</sub>	M8 x 25 38 Nm	M10 x 25 38 Nm
Flange thickness	(mm)	F	16	18
Distance	(mm)	G	10	
Actuation path	(mm)	H	10	12.5
Distance	(mm)	I	4	5
Radius	(mm)	J	250	315
Inner thread	(mm)	K	M16 x 30	SW 36
Distance ± 0,1	(mm)	L	79	79
Weight	(kg)		6	14.8

# Accessories TORQSET® Safety element

## Engagement and disengagement

Order number

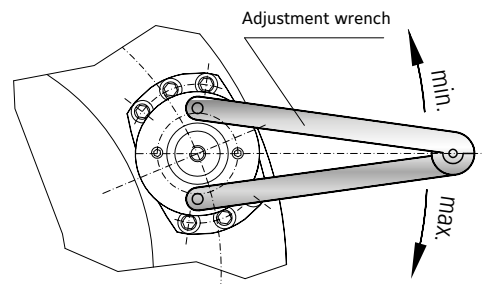
Size	Engagement/ disengagement tool
10	Order number AV / 0010
15	Order number AV / 0015
30	Order number AV / 0030
70	Order number AV / 0070
100	on request



## Adjustment wrench

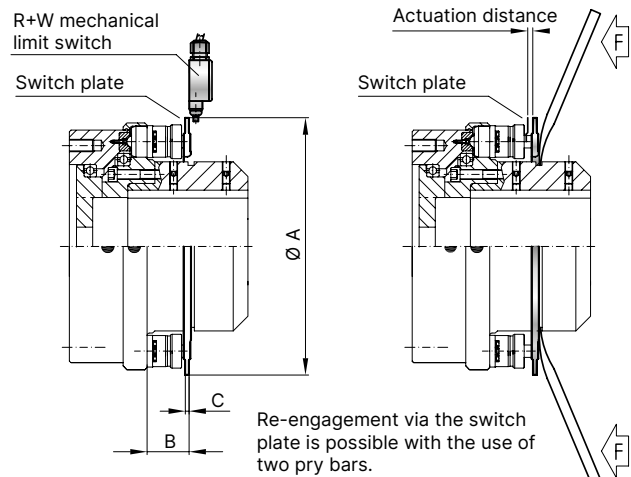
Order number

Size	Adjustment wrench
10	Order number SLS / 0010
15	Order number SLS / 0015
30	Order number SLS / 0030
70	Order number SLS / 0070
100	on request



## Switch plate

Switch plates are available on request for all models and sizes. Contact R+W for more information.



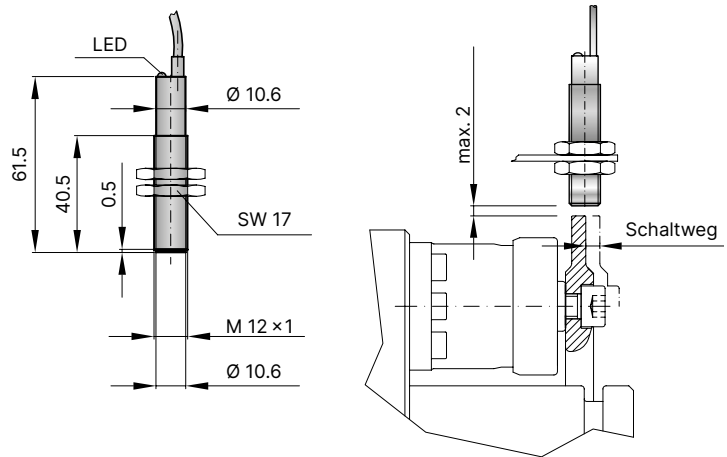
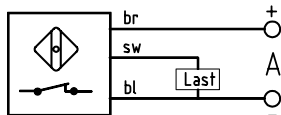
# Accessories TORQSET® Safety element

## Proximity switch

Order number 650.2703.001

Technical data	ST
Voltage	10 to 30 V DC
Max. output current	200 mA
Max. switch frequency	800 KHz
Temperature range	-25° to +70° C
Protective system	IP 67
Switch type	normally open
Max. detection gap	max. 2 mm

### Switch diagram ST

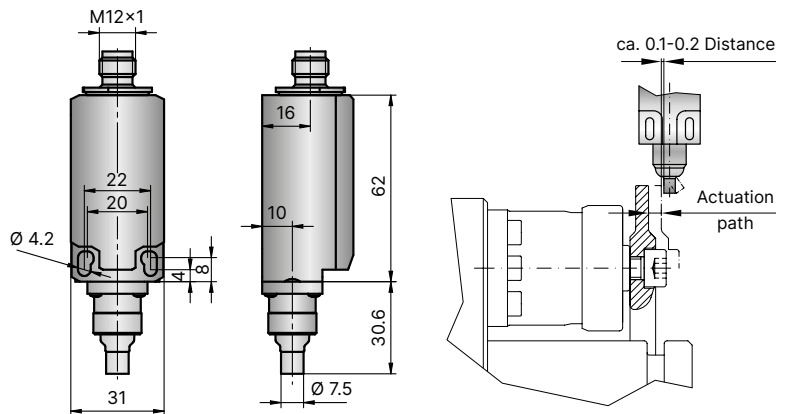
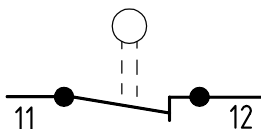


## Mechanical limit switch

Order number 618.3000.313

Technical data	ST
Max. voltage	250 V AC
Protective system	IP 67
Contact system	2 Opener (forced separating)
Temperature range	-30° to +80° C
Actuation	Plunger (metal)

### Switch diagram ST



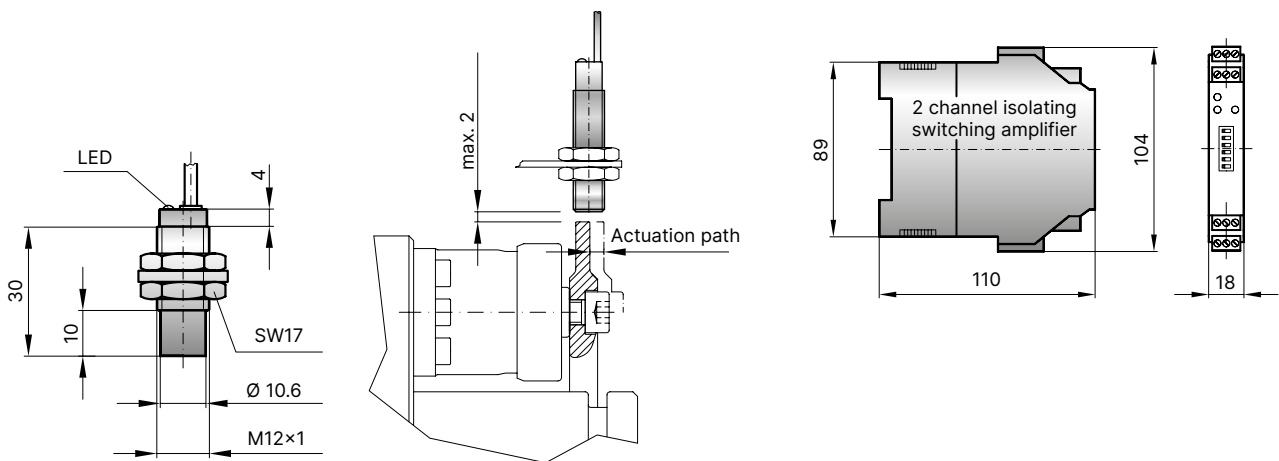
The switch plunger (pictured above and right) should be located as close to the actuation ring / limit switch plate as possible (approximately 0.1-0.2mm).

ST

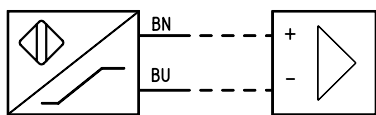
# Accessories TORQSET® Safety element

## ATEX limit switch

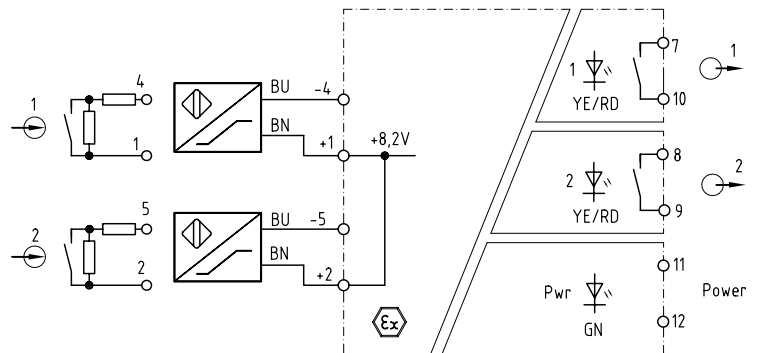
Order number EEX. 1624.004



## Switch diagram



Technical data on request.





### With torsionally stiff flexible bellows coupling

- With clamping hubs, keyway connection or flange connection
- Compensates for misalignment
- With metal bellows made of highly elastic stainless steel



### For high speed applications

- Integral ball-plunger system
- Extremely compact with a low moment of inertia
- Balanced for high speed



**BUREAU  
VERITAS**

### Bureau Veritas certified

- For inland and offshore applications
- Customized solutions
- Rugged and special design for direct use in ship powertrains