



SIZES FROM 2,000 - 165,000 Nm SAFETY COUPLINGS

GENERAL INFORMATION ABOUT R+W SAFETY COUPLINGS:



SERVICE LIFE

When properly installed and handled these couplings are completely wear and maintenance free.

FIT CLEARANCE

Overall shaft / hub clearance of 0.02 - 0.07 mm

TEMPERATURE RANGE

-30 to +120° C

SPECIAL SOLUTIONS

Automatic re-engagement, special materials, special flanges, bore profiles, etc. are available on request.

ATEX (Optional)

For use in hazardous areas available upon request.

DISENGAGEMENT BEHAVIOR

Full disengagement / manual reset is standard.



TORSIONALLY STIFF SAFETY COUPLINGS

SIZES FROM 2 –165 KNm

MODEL

FEATURES

ST1		<p>with simple keyway mounting for indirect drives from 2 - 165 KNm</p> <ul style="list-style-type: none">▶ compact, simple design▶ precise overload protection▶ torsionally stiff▶ integral bearing for overhung load support	Page 40
STN		<p>with conical clamping ring for indirect drives from 2 - 165 KNm</p> <ul style="list-style-type: none">▶ high shaft clamping pressure▶ compact, simple design▶ precise overload protection▶ torsionally stiff▶ integral bearing for overhung load support	Page 41
ST2		<p>with simple keyway mounting and elastic coupling from 2 - 165 KNm</p> <ul style="list-style-type: none">▶ vibration damping▶ compensation for misalignment▶ precise overload protection▶ elastomer segments resistant to oil and dirt▶ press fit design	Page 42
ST4		<p>with simple keyway mounting and crowned gear coupling from 2 - 165 KNm</p> <ul style="list-style-type: none">▶ high power density▶ compensation for misalignment▶ precise overload protection▶ low reaction loads on shaft bearings▶ torsionally stiff	Page 44

GENERAL INFORMATION

SAFETY COUPLINGS

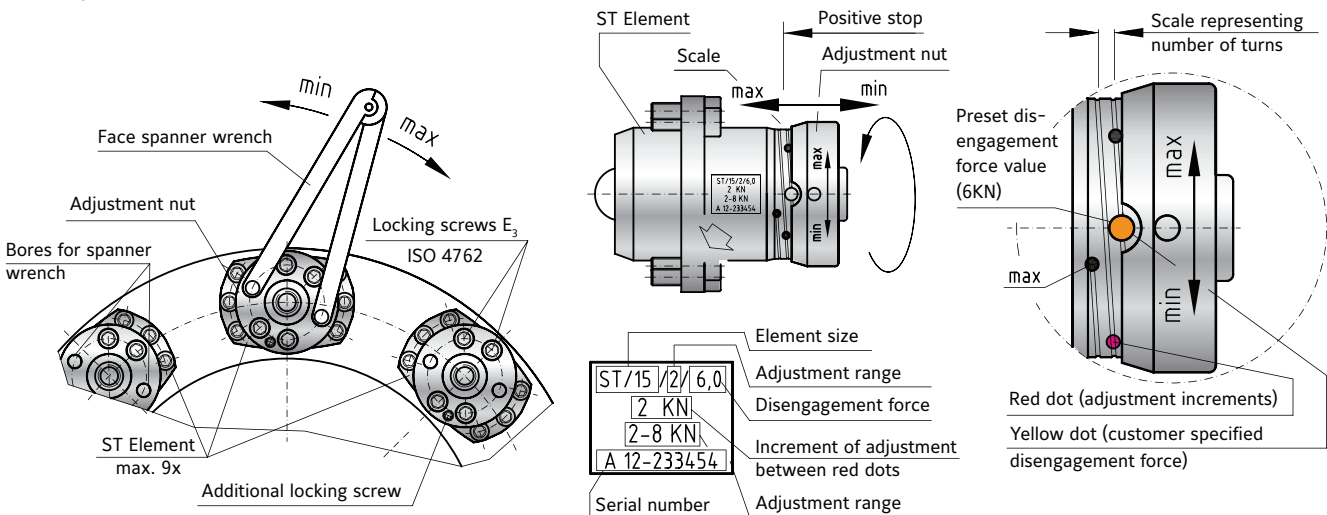
ST1

STN

ST2

ST4

TORQUE ADJUSTMENT



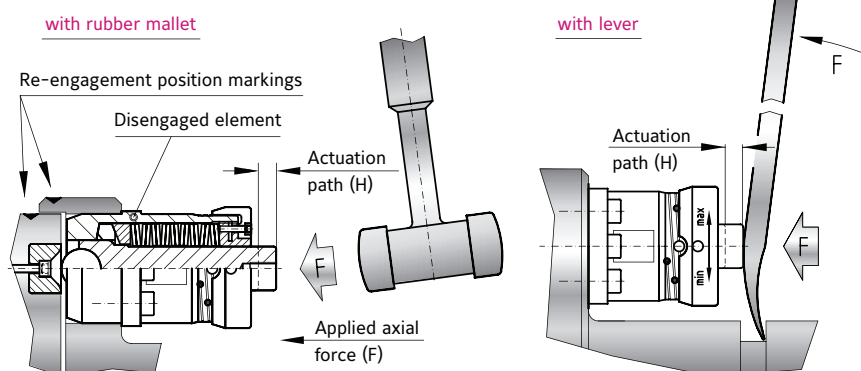
After loosening (approx. 1 rotation) the locking screws (E_3), the adjustment nut can be turned to adjust the disengagement setting. Incremental values are marked on the adjustment scale. After adjustment, the torque setting is secured by tightening the locking screws (E_3).

► **Note**

All safety elements must be set to the same value.

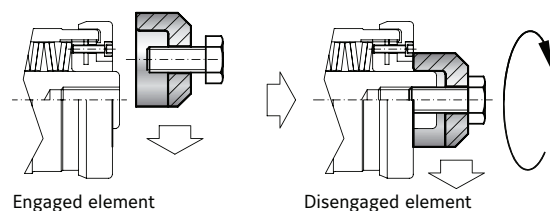
RE-ENGAGEMENT OF THE SAFETY ELEMENTS

After the overload has been cleared, the drive or driven side must be rotated until the re-engagement position markings are lined up. The elements can only be re-engaged in this position. The element is re-engaged through applying an axial force to the plunger. Re-engagement is audible. Once this is complete, the torque limiter is ready for operation.



MANUAL DISENGAGEMENT OF ELEMENTS

Prior to machine start-up, the individual elements can be manually disengaged. A manual disengagement tool is available from R+W (see page 50).



SAFETY COUPLINGS
ST

GENERAL INFORMATION

SAFETY COUPLINGS

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.

This is normally accomplished without any special tools, simply requiring a mallet or pry bar.



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

The force setting is clearly marked on an adjusting scale.



GENERAL INFORMATION

SAFETY COUPLINGS

OPTION: HYDRAULIC ACTUATED RE-ENGAGEMENT

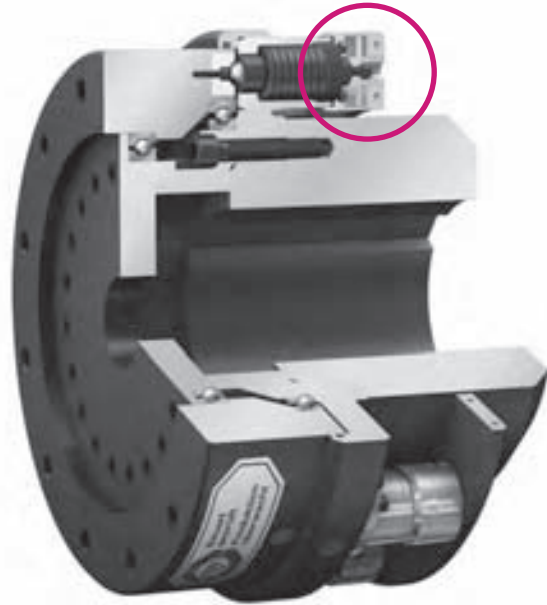
With a new combination of hydraulic and mechanical components, the special SH version is available for automatic re-engagement.

The SH system is available to be incorporated into all of the standard ST series safety couplings, from 2,000 - 165,000 Nm.

After an overload the coupling can be slowly rotated in reverse to cause the safety elements to automatically engage upon reaching the next set of detent receptacles.

This reduces downtime in heavy equipment by allowing for remote re-engagement of the safety coupling.

Incorporation of the SH system into any standard ST model has no impact on the overall space envelope requirements.



ST1

WITH SIMPLE KEYWAY MOUNTING

2 - 165 KNm



ABOUT

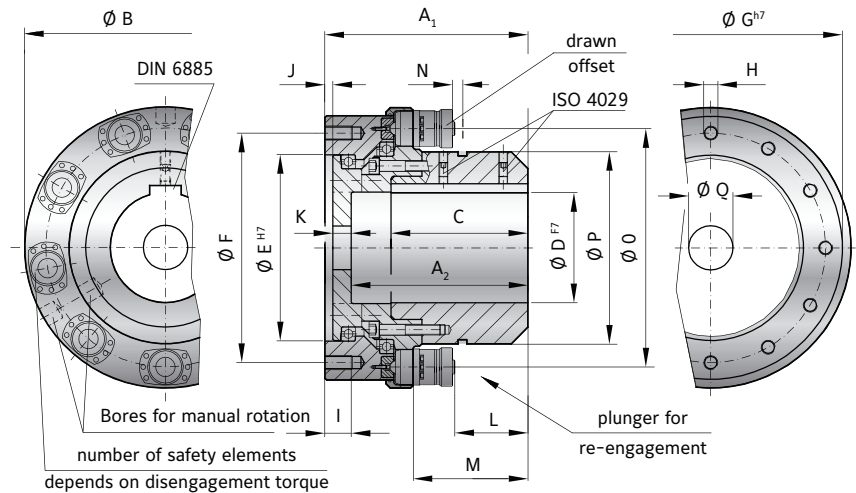
MATERIAL
Hardened steel (nitrocarburized surface)

► Driven side: output flange with 12x fastening threads and integral bearings

DESIGN

► Drive side: coupling hub with keyway connection (spline profile on request)

► Safety elements: evenly spaced around the circumference; externally adjustable



MODEL ST1

SIZE		10			25			60			160		
Adjustment range available from - to (KNm)		2-6	4-12	6-18	3-8	5-16	10-25	11-20	22-40	35-60	25-55	50-110	80-165
		3 x ST 15	6 x ST 15	9 x ST 15	3 x ST 15	6 x ST 15	9 x ST 15	3 x ST 30	6 x ST 30	9 x ST 30	3 x ST 70	6 x ST 70	9 x ST 70
Overall length (mm)	A ₁	183			230			320			410		
Bore depth (mm)	A ₂	158			200			275			360		
Flange outside diameter (mm)	B	270			318			459			648		
Fit length (mm)	C	120			155			220			290		
Bore diameter possible Ø to Ø F7 (mm)	D	40-110			60-140			80-200			100-290		
Flange centering diameter H7 (mm)	E	170			210			300			450		
Bolt circle diameter ±0.3 (mm)	F	220			260			360			570		
Outside diameter h7 (mm)	G	259			298			418			618		
Fastening threads	H	12 x M16			12 x M16			12 x M20			12 x M24		
Thread depth (mm)	I	25			30			35			40		
Fit length (mm)	J	6			8			8			10		
Wall thickness (mm)	K	17			20			30			38		
Distance (mm)	L	45			83			96			136		
Distance (mm)	M	95			130			165			225		
Actuation path (mm)	N	4			4			7,5			10		
Mounting diameter - elements (mm)	O	220			270			376			532		
Hub outside diameter (mm)	P	170			218			295			418		
Bore for fastening screw (mm)	Q	max. Ø 110			max. Ø 140			max. Ø 200			max. Ø 290		
Moment of inertia (approx.) D max. (10 ⁻³ kgm ²)		370			780			4600			24600		
Speed max. (rpm)		4200			3800			2500			2000		
Allowable max. radial force standard* (KN)		40			60			100			200		
Approx. weight at D max. (kg)		40			63			179			463		

* larger radial loads possible with special bearings

ORDERING EXAMPLE	ST1	025	5-16	12	117.48	25.4	XX
Model	●						Special designation only (e.g. custom output flange)
Size		●					
Adjustment range (KNm)			●				
Disengagement torque (KNm)				●			
Bore diameter D F7					●		
Bore for fastening screw in shaft end (Q)						●	
For custom features place an XX at the end of the part number and describe the special requirements (e.g. ST1 / 025 / 5-16 / 12 / 117.48 / 25.4 / XX)							



ABOUT

MATERIAL

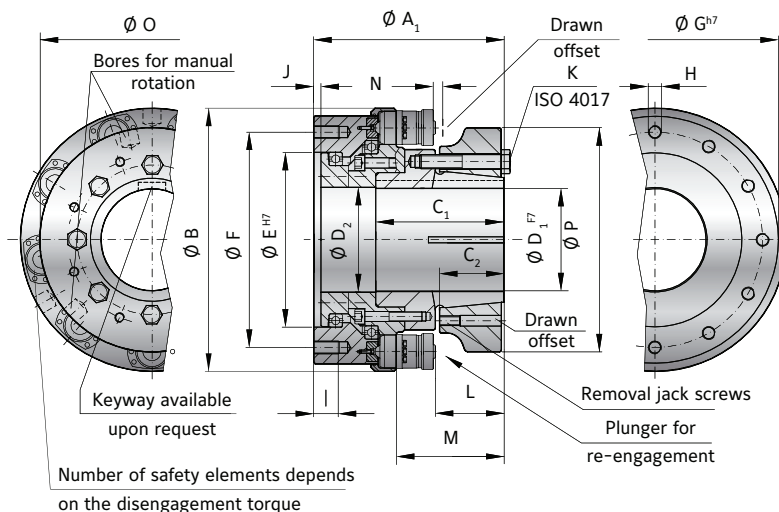
Hardened steel (nitrocarburized surface)

► Driven side: output flange with 12x fastening threads and integral bearings

DESIGN

► Drive side: coupling hub with conical clamping ring connection (spline profile on request)

► Safety elements: evenly spaced around the circumference; externally adjustable



MODEL STN

SIZE		10			25			60			160		
Adjustment range available from - to (KNm)		2-6	4-12	6-18	3-8	5-16	10-25	11-20	22-40	35-60	25-55	50-110	80-165
		3 x ST 15	6 x ST 15	9 x ST 15	3 x ST 15	6 x ST 15	9 x ST 15	3 x ST 30	6 x ST 30	9 x ST 30	3 x ST 70	6 x ST 70	9 x ST 70
Overall length (mm)	A ₁	210			227			318			425		
Flange outside diameter (mm)	B	270			318			459			648		
Fit length / keyway length (mm)	C ₁	147			152			218			305		
Effective clamping length (mm)	C ₂	62			67			93			125		
Bore diameter possible Ø to Ø F7 (mm)	D ₁	65 - 110			70 - 150			80 - 200			140 - 290		
Bore diameter max. Ø F7 with keyway (mm)	D ₁	100			140			180			270		
Inside diameter (mm)	D ₂	110,2			140,2			200,2			290,2		
Flange centering diameter H7 (mm)	E	170			210			300			450		
Bolt circle diameter ±0.3 (mm)	F	220			260			360			570		
Outside diameter h7 (mm)	G	259			298			418			618		
Fastening threads	H	12 x M16			12 x M16			12 x M20			12 x M24		
Thread depth (mm)	I	25			30			35			40		
Fit length (mm)	J	6			8			8			10		
Tightening screw ISO 4017	K	8 x M16			9 x M16			8 x M20			8 x M24		
Tightening torque (Nm)		180			180			570			710		
Distance (mm)	L	72			80			94			151		
Distance (mm)	M	122			127			163			240		
Actuation path (mm)	N	4			4			7,5			10		
Mounting diameter - elements (mm)	O	220			270			376			532		
Hub outside diameter (mm)	P	218			278			378			535		
Moment of inertia (approx.) D max. (10 ⁻³ kgm ²)		446			789			5700			30700		
Speed max. (rpm)		4200			3800			2500			2000		
Allowable max. radial force standard* (kN)		40			60			100			200		
Approx. weight at D max. (kg)		50			65			200			550		

* larger radial loads possible with special bearings

ORDERING EXAMPLE	STN	025	5-16	12	117.48	XX
Model	●					
Size		●				
Adjustment range (KNm)			●			
Disengagement torque (KNm)				●		
Bore diameter D F7					●	
For custom features place an XX at the end of the part number and describe the special requirements (e.g. STN / 025 / 5-16 / 12 / 117.48 / XX)						

ST2

WITH SIMPLE KEYWAY MOUNTING

2 - 165 KNm



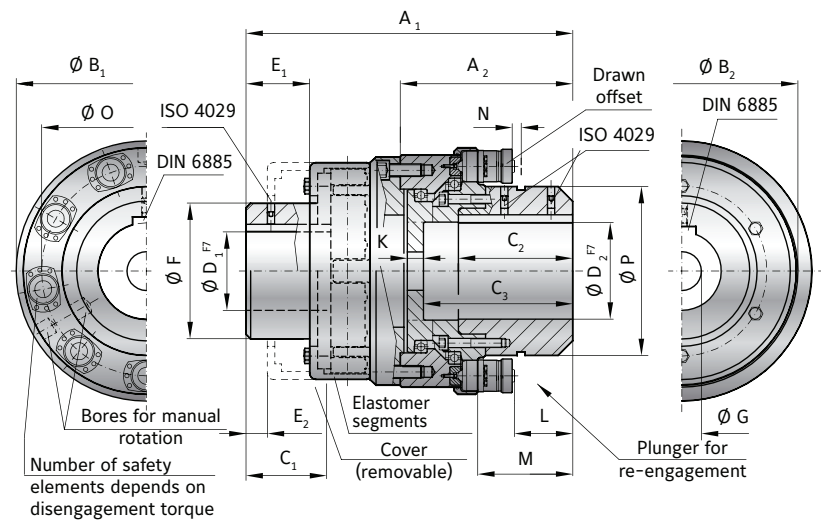
ABOUT

MATERIAL

- ▶ **Safety coupling portion:** hardened steel (nitrocarburized surface)
- ▶ **Elastomer segments:** precision molded, wear resistant rubber compound (75-80 Shore A)
- ▶ **Elastomer coupling:** hubs made from coated high strength cast steel

DESIGN

With keyway connection (spline profile on request). Elastomer segments compensate for misalignment and absorb vibration. Safety elements evenly spaced around the circumference. Field adjustable within the specified range.



MODEL ST2

SIZE		10			25			60			160		
Adjustment range available from - to (KNm)		2-6	4-12	6-18	3-8	5-16	10-25	11-20	22-40	35-60	25-55	50-110	80-165
		3 x ST 15	6 x ST 15	9 x ST 15	3 x ST 15	6 x ST 15	9 x ST 15	3 x ST 30	6 x ST 30	9 x ST 30	3 x ST 70	6 x ST 70	9 x ST 70
Overall length ±2 (mm)	A ₁	360			437			580			730		
Length of torque limiting portion (mm)	A ₂	183			230			320			410		
Flange outside diameter (ST portion) (mm)	B ₁	270			318			459			648		
Flange outside diameter (elastomer portion) (mm)	B ₂	290			330			432			553		
Fit length/keyway length D1 (mm)	C ₁	97			116			160			230		
Fit length/keyway length D2 (mm)	C ₂	120			155			220			290		
Bore depth (torque limiting portion) (mm)	C ₃	158			200			275			360		
Bore diameter (elastomer portion) Ø - Ø F7 (mm)	D ₁	40-105*			60-130*			80-160*			100-200*		
Bore diameter (torque limiting portion) Ø - Ø F7 (mm)	D ₂	40-110*			60-140*			80-200*			100-290*		
Length to cover (mm)	E ₁	70			87			112			152		
Length to (cover removed) (mm)	E ₂	22			26			40			65		
Hub diameter (mm)	F	160			200			255			300		
Bore for fastening screw (mm)	G	max. 110			max. 140			max. 200			max. 290		
Distance (mm)	L	45			83			96			136		
Distance (mm)	M	95			130			165			225		
Actuation path (mm)	N	4			4			7.5			10		
Mounting diameter - elements (mm)	O	220			270			376			532		
Hub outside diameter (mm)	P	170			218			295			418		
Moment of inertia (approx.) D max. (10 ⁻³ kgm ²)		854			1850			8960			36858		
Speed max. (rpm)		2700			2300			1800			1500		
Approx. weight at D max. (kg)		80			115			287			729		
Axial (mm)		1.5			1.5			2			2.5		
Lateral (mm)		0.4			0.5			0.6			0.7		
Angular (Grad)		1			1			1			1		
Dynamic torsional stiffness at T _{KN} (Standard A Insert) (10 ³ Nm/rad)		145			230			580			1000		

* larger bore diameters upon request.

THE ELASTOMER SEGMENT

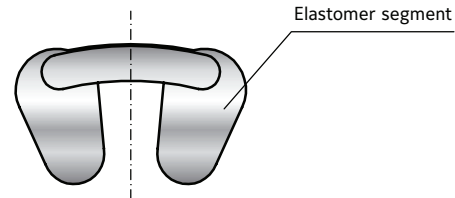
The compensating elements of the ST2 safety couplings are the elastomer segments. They transmit torque while damping vibration and compensating for lateral, axial

and angular misalignment. Three different versions are available with version A being supplied unless otherwise specified.

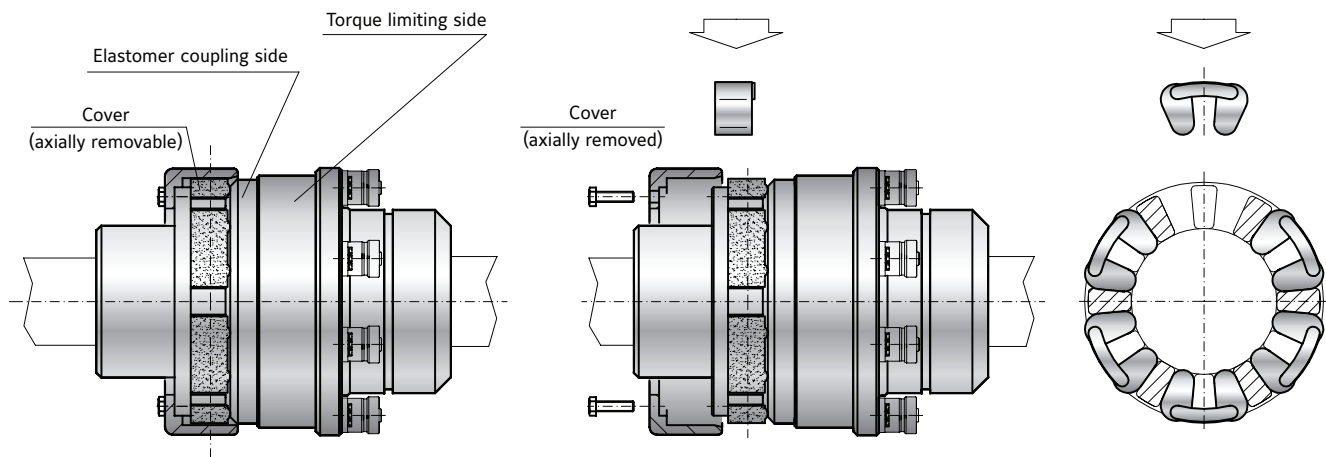
Type	Relative damping (ψ)	Temperature range constant peak	Material	Shore hardness	Features
A (Standard)	1.0	-40°C to +80°C +90°C	Natural and synthetic rubber	75-80 Shore A	Very high wear resistance
B	1.0	-40°C to +100°C +120°C	Synthetic rubber	73-78 Shore A	Resistant to many oils and fuels
C	1.0	-70°C to +120°C +140°C	Silicone rubber	70-75 Shore A	High temperature range

► Note

Elastomer segments can be easily changed after installation. Every coupling utilizes 6x elastomer segments. The elastomer segments do not need to be installed prior to coupling mounting.



CHANGING THE ELASTOMER SEGMENTS



For easier handling, the coupling will be shipped unassembled.

ORDERING EXAMPLE	ST2	025	10-25	15	127	117.48	XX
Model	●						
Size		●					
Adjustment range (KNm)			●				
Disengagement torque (KNm)				●			
Bore \varnothing D1 F7					●		
Bore \varnothing D2 F7						●	
For custom features place an XX at the end of the part number and describe the special requirements (e.g. ST2 / 025 / 10-25 / 15 / 127 / 117.48 / XX)							

Special designation only (e.g. custom output flange)

ST4

WITH SIMPLE KEYWAY MOUNTING

2 - 165 KNm



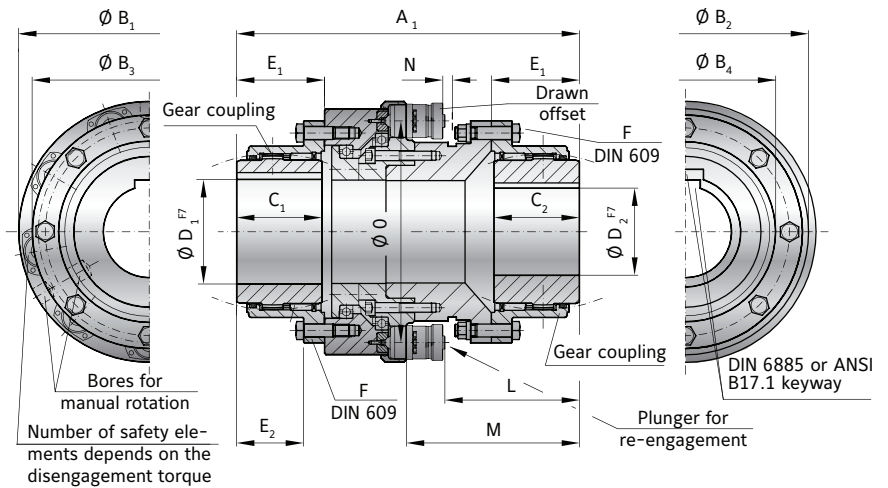
ABOUT

MATERIAL

- **Safety coupling portion:** hardened steel (nitrocarburized surface)
- **Gear coupling portion:** wear resistant high strength alloy steel (nitrocarburized surface)

DESIGN

With keyway connection (spline profile on request). Gear coupling for misalignment compensation. Safety elements evenly spaced around the circumference. Field adjustable within the specified range.



MODEL ST4

SIZE		10			25			60			160		
Adjustment range available from - to (KNm)		2-6	4-12	6-18	3-8	5-16	10-25	11-20	22-40	35-60	25-55	50-110	80-165
		3 x ST 15	6 x ST 15	9 x ST 15	3 x ST 15	6 x ST 15	9 x ST 15	3 x ST 30	6 x ST 30	9 x ST 30	3 x ST 70	6 x ST 70	9 x ST 70
Overall length (mm)	A ₁	377			430			615			850		
Flange outside diameter (ST portion) (mm)	B ₁	270			318			459			648		
Mounting flange outside diameter (ST portion) (mm)	B ₂	259			298			418			618		
Flange outside diameter (gear coupling) (mm)	B ₃	234			274			380			506		
Hub diameter (gear coupling) (mm)	B ₄	181			209			307			426		
Fit length/keyway length (mm)	C _{1/2}	90			105			150			220		
Bore diameter Ø bis Ø F7 (mm)	D _{1/2}	40-112*			55-132*			90-198*			150-275*		
Length (mm)	E ₁	92.5			108			154			225		
Length (mm)	E ₂	70			79			116			196		
Screw DIN 609 12.9 (mm)	F	8 x M16			8 x M20			10 x M20			16 x M24		
Tightening torque (mm)		280			650			650			1100		
Distance (mm)	L	146			172			237			320		
Distance (mm)	M	196			222			306			412		
Actuation path (mm)	N	4			4			7.5			10		
Mounting diameter - elements (mm)	O	220			270			376			532		
Moment of inertia (approx.) D max. (10 ⁻³ kgm ²)		545			1298			7547			39742		
Speed max. (rpm)		2700			2300			1800			1500		
Approx. weight at D max. (kg)		69			115			325			870		
Axial (mm)		4			5			6			8		
Lateral (mm)		6			7			8			10		
Angular (Degrees)		1.2			1.2			1.2			1.2		

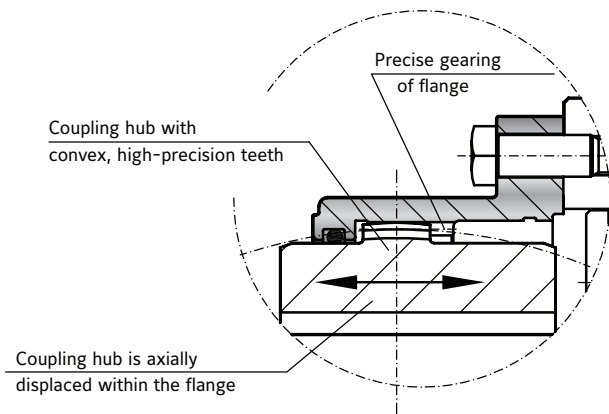
* larger bore diameters upon request.

FUNCTION OF THE GEAR COUPLING

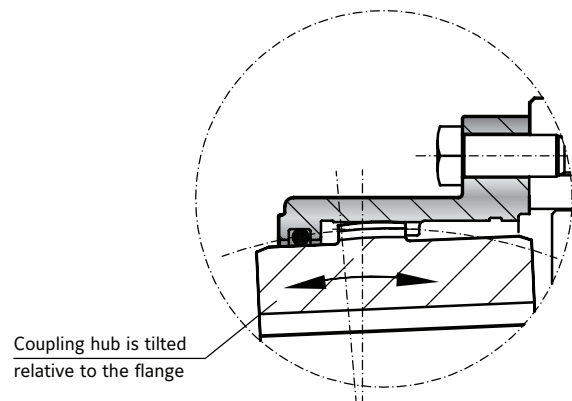
The high precision gearing of the coupling compensates for lateral, angular, and axial misalignment. The gearing transmits torque with minimal backlash and a high degree

of torsional rigidity. The precise geometry of the gearing ensures the performance of the coupling.

Axial misalignment



Angular and lateral misalignment



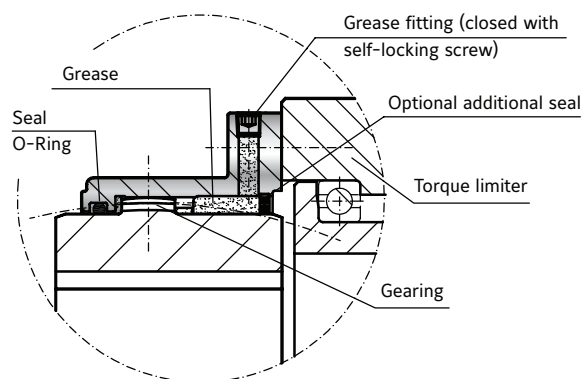
MAINTENANCE AND LUBRICATION

► **Note:** Lubrication of the gearing is very important to the service life of the coupling. An additional seal (optional) ensures the lubrication of the gearing over a long period of time.

Use only high performance grease

RECOMMENDED LUBRICANTS

Normal speed		High speed	
Castrol	Impervia MDX	Caltex	Coupling Grease
Esso	Fibrax 370	Klüber	Klüberplex GE 11-680
Klüber	Klüberplex GE 11-680	Mobil	Mobilgrease XTC
Mobil	Mobilux EPO	Shell	Albida GC1
Shell	Alvania grease EP R-O or ER 1	Texaco	Coupling Grease
Total	Specis EPG		



For easier handling, the coupling will be shipped unassembled.

ORDERING EXAMPLE	ST4	025	10-25	15	100	120	XX
Model	●						Special designation only (e.g. custom output flange)
Size		●					
Adjustment range (KNm)			●				
Disengagement torque (KNm)				●			
Bore Ø D1 F7					●		
Bore Ø D2 F7						●	
For custom features place an XX at the end of the part number and describe the special requirements (e.g. ST4 / 025 / 10-25 / 15 / 100 / 120 / XX)							



SAFETY COUPLING ACCESSORIES



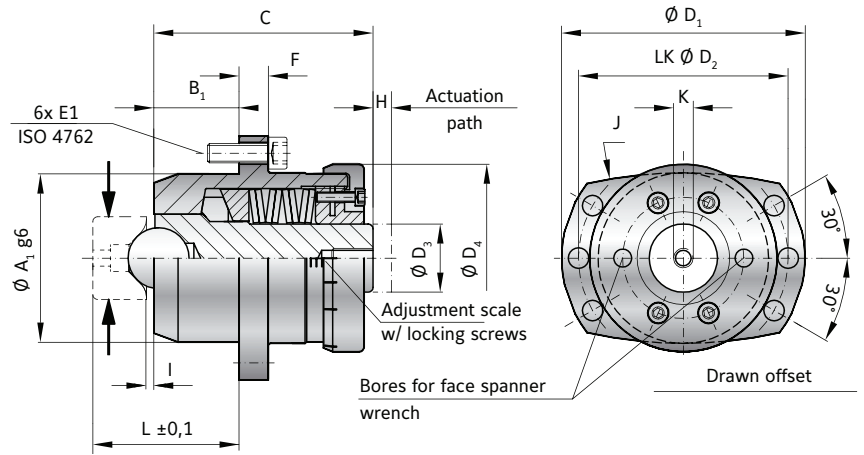
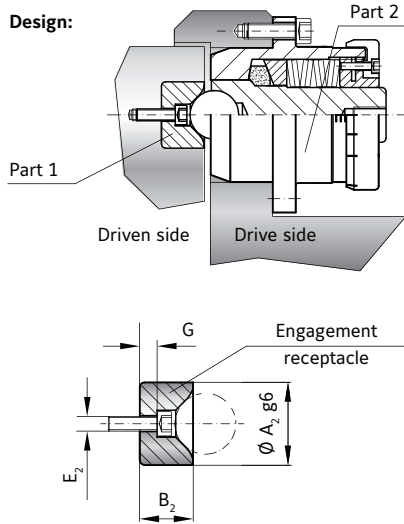
ABOUT

MATERIAL
Hardened steel (nitrocarburized surface)

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.

FIT TOLERANCE
For insertion of the safety elements H7 precision holes should be used for all centered components.

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		15	30	70
Tangential force (KN) Adjustment range available from - to (ranges)	1	1-4	5-10	8-20
	2	2-8	10-20	15-40
	3	6-20	20-35	30-70
Centering diameter of safety element g6 (mm)	A ₁	40	70	90
Centering diameter engagement receptacle g6 (mm)	A ₂	24	34	44
Centering length of safety element (mm)	B ₁	20	35	45
Centering length engagement receptacle (mm)	B ₂	14	22	30
Overall length (mm)	C	70	103	135
Outside diameter (mm)	D ₁	59	100	129
Bolt circle diameter (mm)	D ₂	50	86	110
Diameter plunger (mm)	D ₃	16	28	35
Diameter adjustment nut (mm)	D ₄	44	75	92
Screw / Tightening torque ISO 4762 (mm)	E ₁	6 x M5 x 16 / 10 Nm	6 x M8 x 25 / 40 Nm	6 x M12 x 35 / 120 Nm
Screw / Tightening torque ISO 4762 (mm)	E ₂	M4 x 14 4.5 Nm	M6 x 20 15.5 Nm	M8 x 25 38 Nm
Flange thickness (mm)	F	7	12	16
Distance (mm)	G	5	8	10
Actuation path (mm)	H	4	7.5	10
Distance (mm)	I	2	3	4
Radius (mm)	J	110	200	250
Inner thread (mm)	K	M8 x 15	M10 x 25	M16 x 30
Distance ± 0,1 (mm)	L	36	60	79
Weight (kg)		0.65	2.7	6

axial spring force = tangential force/1.4

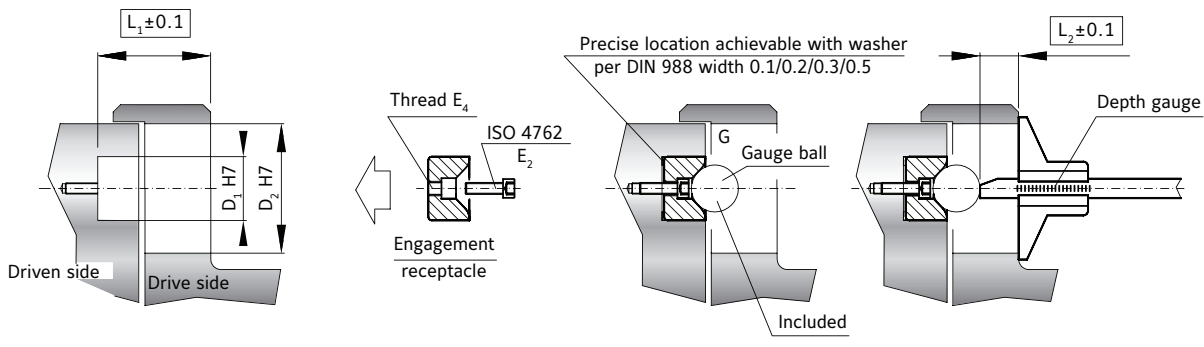
MAINTENANCE

The ST elements are lubricated and sealed for life. Routine maintenance is not required. While the safety elements have an extreme service life, they should be periodically checked to ensure proper functionality.

MOUNTING INSTRUCTIONS ST

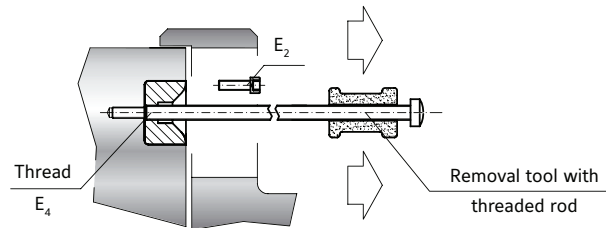
MOUNTING ENGAGEMENT RECEPTACLE

Note: Measurements L1 and L2 must be checked prior to installing the safety elements.



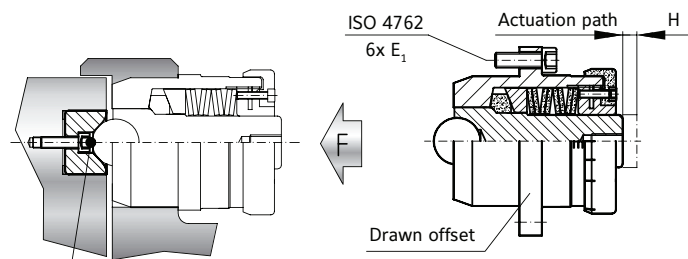
DISMOUNTING OF ENGAGEMENT RECEPTACLE

After loosening the mounting screw E2, the engagement receptacle can be dismantled with a removal tool.



MOUNTING OF SAFETY ELEMENT

SIZE	15	30	70
Screws E ₁	6 x M5 x 16 (12.9)	6 x M8 x 25 (12.9)	6 x M12 x 35 (12.9)
Tightening torque	10 Nm	40 Nm	120 Nm
Screws E ₂	1 x M4 x 12	1 x M6 x 20	1 x M8 x 25
Tightening torque	4.5 Nm	15.5 Nm	38 Nm
Screws E ₃	4 x M4 x 14	4 x M4 x 16	4 x M5 x 20
Tightening torque	4.5 Nm	4.5 Nm	10 Nm
Thread E ₄	M5	M8	M10
Actuation path H	4 mm	7.5 mm	10 mm
Restoring force F	max. 2 KN	max. 4 KN	max. 6 KN
Fit length L ₁ ± 0,1	36	60	79
Depth measurement L ₂ ± 0,1	10	20.5	29
Gauge ball Ø G	16	25	30



Note: Prior to mounting the safety element, the ball seat must be lubricated (e.g. Klüber Isoflex Topas NB 52).

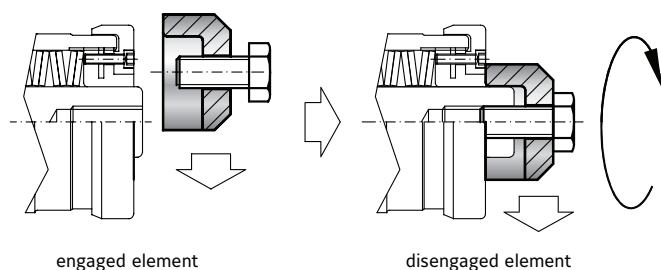
ORDERING EXAMPLE	ST	30	2	12	XX
Model	●				
Size		●			
Adjustment range 1/2/3			●		
Tangential force (KN)				●	
For custom features place an XX at the end of the part number and describe the special requirements (e.g. ST / 30 / 2 / 12 / XX)					

ST ACCESSORIES

SAFETY COUPLINGS

ENGAGEMENT AND DISENGAGEMENT

ST1 STN ST2 ST4

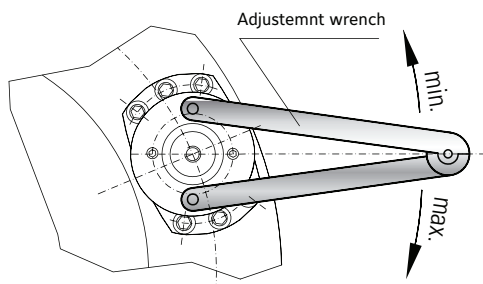


ORDER NUMBER

SIZE	ENGAGEMENT / DISENGAGEMENT TOOL
15	Order number AV/0015
30	Order number AV/0030
70	Order number AV/0070

ADJUSTMENT WRENCH

ST1 STN ST2 ST4

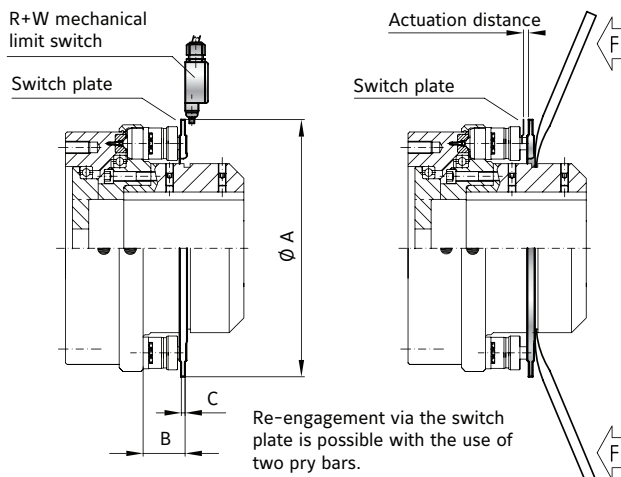


ORDER NUMBER

SIZE	ADJUSTMENT WRENCH
15	Order number SLS/0015
30	Order number SLS/0030
70	Order number SLS/0070

SWITCH PLATE

ST



SIZE		10	25	60	160
Outside diameter	A	278	328	on request	on request
Distance	B	57	57	on request	on request
Thickness	C	4.5	4.5	on request	on request