RELIABLE | COMPACT | ROBUST

R+W®
A POPPE + POTTHOFF COMPANY

INDUSTRIAL DRIVE COUPLINGS

FOR THE MOST DEMANDING POWER TRANSMISSION APPLICATIONS.

WHO WE ARE.

ABOVE ALL R+W IS:
THE PERFECT COUPLING.

When R+W Antriebselemente GmbH was first established in 1990 in Klingenberg, Germany, there were three people on board. The head office is still there, but we are now more than 170 people, with subsidiaries in the USA, China, Italy, Singapore, France and Slovakia, and are partnered with over 60 well established distributors in more than 40 countries throughout the world. Many developments have lead to this success, but most importantly it was brought about by our endless search for the best possible coupling solutions as well as the high esteem in which we hold all of our customers.

WE PROVIDE INSPIRED SOLUTIONS BACKED BY SOUND PLANNING AND DESIGN.

R+W stands for expertise in the development of solutions for precise torque transmission. The focus of our development is on innovative coupling systems for all sectors of precision drive technology. As a leading manufacturer of precision couplings and line shafts, we strive to maintain a permanent status of technology leadership in our field. Our central claim: R+W couplings ensure precision for process reliability and efficiency, and to that end we seek perfection.

Optimized for technology and business, our product portfolio includes:

- **Metallic couplings**
- **Elastic couplings**
- **Ball-detent safety couplings**
- **Drive shafts**
- **Industrial Drive couplings**
- **Development of customized solutions with collaboration from start to finish, including:**
  - Consultation
  - Conception
  - Engineering analysis
  - Prototyping
  - Manufacturing

DRIVE

D - DYNAMIC

Our staff is trained to always be ready and willing to provide a quick reaction to customer inquiries. Our product, the core of which is based on handling high performance, dynamic applications, is increasingly available for fast delivery.

R - RELIABLE

Many of our products are designed for infinite life with zero maintenance required. With thorough engineering processes in place, and an ISO 9001:2008 certified production facility, we continue to deliver high quality coupling products with a high level of reliability.

I - INNOVATIVE

Our business was founded on developing unique and innovative solutions to common coupling problems. Our staff in turn is constantly developing its work flows to streamline delivery and simplify the process for our customers.

V - VERSATILE

With products successfully applied and deployed in over 125 industry segments, chances are very good that we have an expert on our versatile staff that is familiar with your application requirements.

E - EXPANDING

With double digit annual growth the norm, our company is ever expanding, adding new product offerings and opening new service centers throughout the world all the time.

MORE R+W COUPLINGS

Aside from the products detailed in this catalog, we also offer high quality shaft couplings and torque limiters for servo motion control and other small to mid-size precision applications.

More information on these can be found in our **PRECISION COUPLINGS catalog.**

SIZING AND SELECTION

According to
DIN 740 part 2

SAFETY COUPLINGS

ST

SYMBOLS

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 (min^{-1})
α = Angular acceleration $\frac{rad}{s^2}$
t = Acceleration time (s)
ω = Angular velocity (rad/s)
J_L = Moment of inertia of load (kgm^2)
J_A = Moment of inertia of drive (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)
η = Spindle efficiency
d_0 = Pitch diameter (mm)
F_V = Feed force (N)
C_T = Torsional stiffness of coupling (Nm/rad)
$J_{Masch.}$ = Total load inertia (kgm^2)
(e.g. shaft + sprocket + chain + roller + 1/2 of coupling)
$J_{Mot.}$ = Total driving inertia (kgm^2)
(e.g. motor shaft + 1/2 of coupling)
f_e = Resonant frequency of the two mass system (Hz)

Shock or 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

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

or

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

ACCORDING TO ACCELERATION (START-UP WITH NO LOAD)

$$T_{AR} \geqq \alpha \cdot J_L \geqq \frac{J_L}{J_A + J_L} \cdot T_{As} \cdot S_A \,(Nm)$$

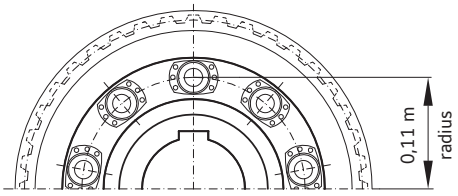
$$\alpha = \frac{\omega}{n} = \frac{\pi \cdot n}{t \cdot 30}$$

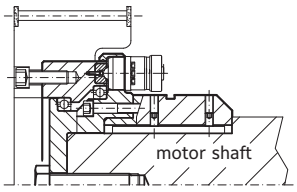
ACCORDING TO ACCELERATION (START-UP WITH LOAD)

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

ACCORDING TO THE NUMBER OF SAFETY ELEMENTS

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





ACCORDING TO LINEAR FEED FORCE

Screw drive

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

Rack and pinion drive

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

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.

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

SAFETY COUPLINGS

ST

ELASTIC JAW COUPLING DESIGN ST2

Size	ST2 / 10	ST2 / 25	ST2 / 60	ST2 / 160
T_{KN} Rated Torque (Nm)	10,000	15,000	40,000	80,000
T_{Kmax} Maximum Torque (Nm)	22,000	33,000	88,000	176,000
Torsional Stiffness (10^3 Nm/rad)	145	230	580	1000
Relative Damping	1	1	1	1

LOAD FACTORS BY MACHINE TYPE

EXCAVATORS
S bucket chain excavators
S traveling gear (caterpillar)
M traveling gear (rails)
M suction pumps
S bucket wheels
M slewing gears

CONSTRUCTION MACHINERY
M concrete mixers
M road construction machinery

CHEMICAL INDUSTRY
M mixers
G agitators (light fluids)
M dryer drums
G centrifuges

FEEDERS AND CONVEYORS
S belt conveyors
G belt conveyors (bulk materials)
M belt bucket conveyors
M screw conveyors
M circular conveyors
M hoists

BLOWERS AND FANS[1]
G blowers (axial/radial) P:n ≤ 0.007
M blowers (axial/radial) P:n ≤ 0.007
S blowers (axial/radial) P:n > 0.007
G cooling tower fans P:n ≤ 0.007
M cooling tower fans P:n ≤ 0.007
S cooling tower fans P:n > 0.007

GENERATORS AND TRANSFORMERS
S generators

RUBBER MACHINERY
S extruders
S calendars
M mixers
S rolling millse

WOOD PROCESSING MACHINERY
G woodworking machines

CRANES
S traveling gears
S hoisting gears
M slewing gears

PLASTICS MACHINERY
M mixers
M shredders

METALWORKING MACHINERY
M sheet metal bending machines
S plate straightening machines
S presses
M shears
S punch presses
M machine tools, main drives

FOOD PROCESSING MACHINERY
G filling machines
M kneading machines
M cane crushers
M cane cutters
S cane mills
M sugar beet cutters
M sugar beet washers

PAPER MACHINERY
S wood cutters
S calendars
S wet presses
S suction presses
S suction rollers
S drying cylinders

PUMPS
S piston pumps
G centrifugal pumps (light fluids)
S reciprocating pumps

STONE AND CLAY MACHINES
S breakers
S rotary kilns
S hammer mills
S brick presses

TEXTILE MACHINERY
M tanning vats
M willows
M looms

COMPRESSORS
S reciprocating compressors
M centrifugal compressors

METAL ROLLING MILLS
M plate tilters
S ingot handling machinery
M winding machines (strip and wire)
S descaling machines
S cold rolling mills
M chain transfers
M cross transfers
M roller straighteners
S tube welding machines
S continuous casting plants
M roller adjustment drives

LAUNDRY MACHINES
M tumblers
M washing machines

WASTEWATER TREATMENT PLANTS
M aerators
G screw pumps

[1]) P = power of drive in kW
n = speed of drive in rpm

DESIGN FACTORS

Shock or Load Factor S_A

Drive type	Load characteristics of driven machine		
	G	M	S
electric motors, turbines, hydraulic motors	1.25	1.6	2.0
internal combustion engines ≥4 cylinder degree of uniformity ≥1:100	1.5	2.2	2.5

G = smooth uniform load | M = moderate load | S = heavy shock load

Temperature Factor S_υ

Ambient Temperature	-40 C° +30 C°	+40 C°	+60 C°	+80 C°	> +80 C°
S_υ	1.0	1.1	1.4	1.8	on request

Start Factor S_Z

Starts per Hour	30	60	120	240	>240
S_Z	1.0	1.1	1.2	1.3	on request

ACCORDING TO TORQUE

1. Calculate the drive torque T_{AN}.

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

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

$$T_{KN} \geq T_{AN} \cdot S_A \cdot S_\upsilon \cdot S_Z$$

Example:
Coupling between an electric motor (P=450kW and n=980 rpm) and a gearbox driving a conveyor.

$$T_{AN} = 9{,}550 \cdot \frac{450\ kW}{980\ min.^{-1}} = 4{,}385.2\ Nm$$

smooth uniform load
= G : S_A = 1.25
ambient temperature
40˚C : S_υ = 1.1
starts
30/h : S_Z = 1.0

$$T_{KN} \geq T_{AN} \cdot S_A \cdot S_\upsilon \cdot S_Z$$
$$T_{KN} \geq 4{,}385.2\ Nm \cdot 1.25 \cdot 1.1 \cdot 1.0 = 6{,}029.7\ Nm$$

Selected coupling: ST2 / 10 with elastomer coupling T_{KN} = 6,030 Nm

SAFETY COUPLINGS

ST

GEAR COUPLING DESIGN ST4

Size		ST4 / 10	ST4 / 25	ST4 / 60	ST4 / 160
T_{KN} Rated Torque	(Nm)	16,000	22,000	62,000	174,000
T_{Kmax} Maximum Torque	(Nm)	32,000	44,000	124,000	348,000
Volume of Grease	(dm^3)	0.52	0.8	1.51	3.29
n Ref (max speed)	($min.^{-1}$)	6,050	5,150	3,600	3,050

*only allowable at reduced torque and misalignment levels (see table on page 13)

ACCORDING TO TORQUE

1. Calculate the drive torque. T_{AN}.

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

2. Base the coupling rated torque T_{KN} on the drive torque T_{AN} multiplied by the application factor. (see page 17 for shock or load factors S_A).

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

Example:
Coupling between an electric motor (P=1000kW and n=980 rpm) and a gearbox driving a screw conveyor (S_A = 1.6).

$$T_{AN} = 9{,}550 \cdot \frac{100 \text{ kW}}{980 \text{ min.}^{-1}} = 9{,}744 \text{ Nm}$$

$$T_{KN} \geq T_{AN} \cdot S_A$$
$$T_{KN} \geq 9{,}744 \text{ Nm} \cdot 1.6 = 15{,}591 \text{ Nm}$$

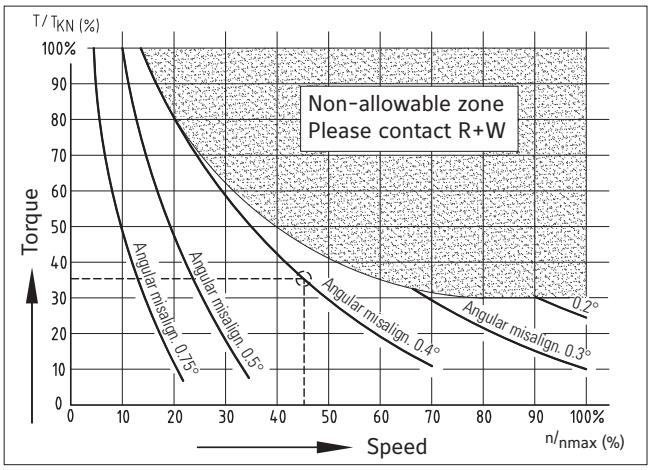
Selected coupling: ST4 / 10 with gear coupling T_{KN} = 16,000 Nm

RATINGS CHART

Maximum torque, speed and misalignment are related and can not exist at the same time.

Evaluation of T/T_{KN} and n / n_{max}

▶ Compare plotted values for combined limits



Example: Coupling ST4 / 10

T = 5,600 Nm

$$T/_{TKN} = \frac{5{,}600}{16{,}000} \cdot 100 = 35\%$$

n = 2,700 min.$^{-1}$
Angular misalignment: 0.4°

$$n/_{n_{max}} = \frac{2{,}700}{6{,}050} \cdot 100 = 45\%$$

▶ Coupling is within operable range – ST4 / 10 can be used.

ST

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.

ST

TORSIONALLY STIFF **SAFETY COUPLINGS**
SIZES FROM **2 –165 KNm**

MODEL | FEATURES

ST1

with simple keyway mounting
for indirect drives
from 2 - 165 KNm

- compact, simple design
- precise overload protection
- torsionally stiff
- integral bearing for overhung load support

Page 40

STN

with conical clamping ring
for indirect drives
from 2 - 165 KNm

- high shaft clamping pressure
- compact, simple design
- precise overload protection
- torsionally stiff
- integral bearing for overhung load support

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ST2

with simple keyway mounting
and elastic coupling
from 2 - 165 KNm

- vibration damping
- compensation for misalignment
- precise overload protection
- elastomer segments resistant to oil and dirt
- press fit design

Page 42

ST4

with simple keyway mounting
and crowned gear coupling
from 2 - 165 KNm

- high power density
- compensation for misalignment
- precise overload protection
- low reaction loads on shaft bearings
- torsionally stiff

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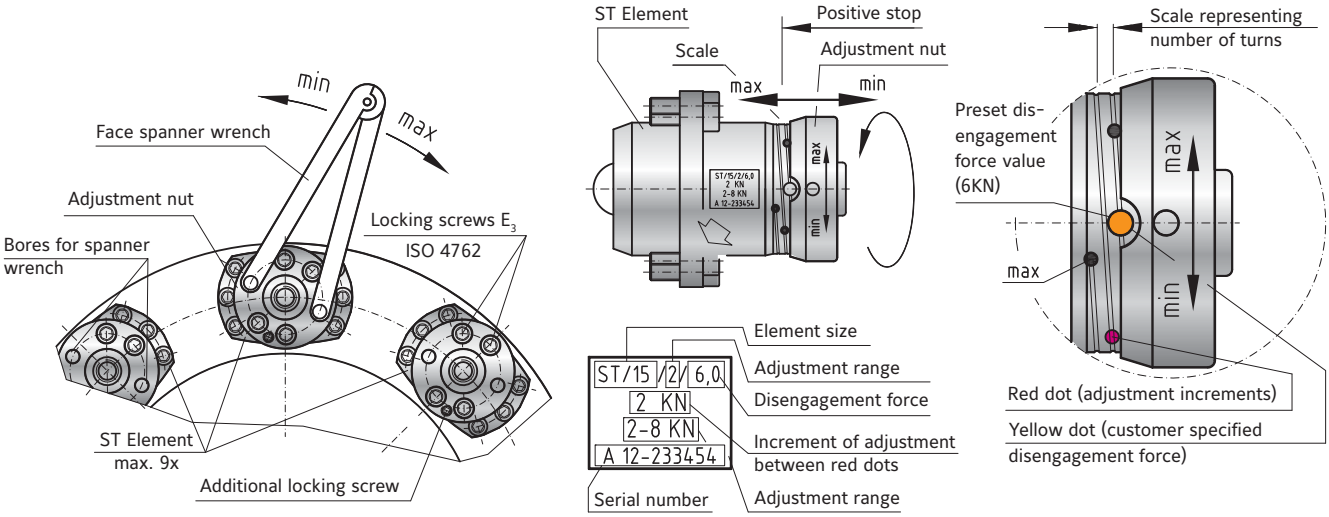
GENERAL INFORMATION
SAFETY COUPLINGS

ST1 | STN | ST2 | ST4

TORQUE ADJUSTMENT



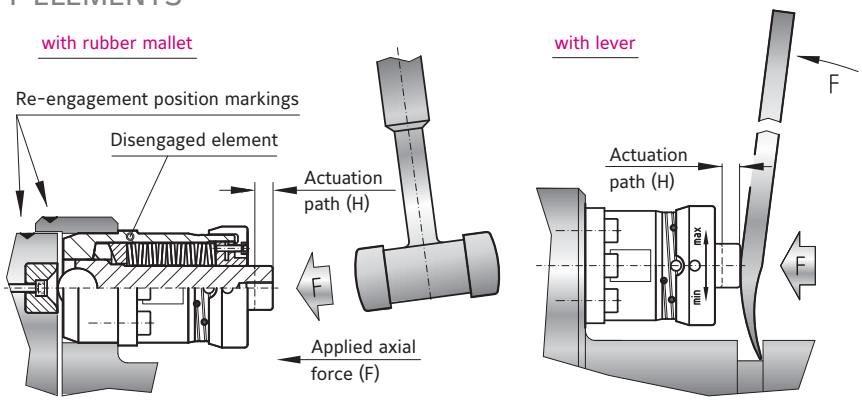
After loosening (approx. 1 rotation) the locking screws (E_3), the adjustment nut can be turned to adjust the disengagement setting. Incremental values are marked on the adjustment scale. After adjustment, the torque setting is secured by tightening the locking screws (E_3).

▶ **Note**

All safety elements must be set to the same value.

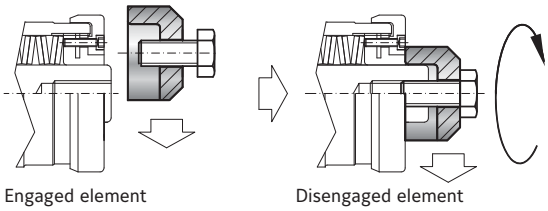
RE-ENGAGEMENT OF THE SAFETY ELEMENTS

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 13).



RELIABLE TORQUE OVERLOAD PROTECTION

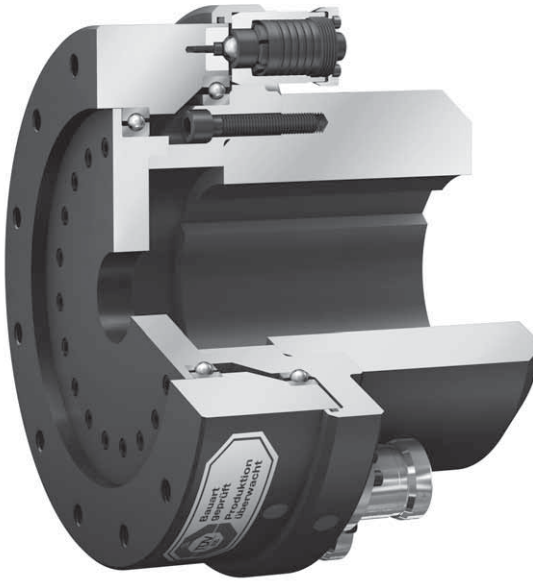
ST series safety couplings are designed to decouple machine drives in the event of torque overload, preventing damage and downtime.

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.

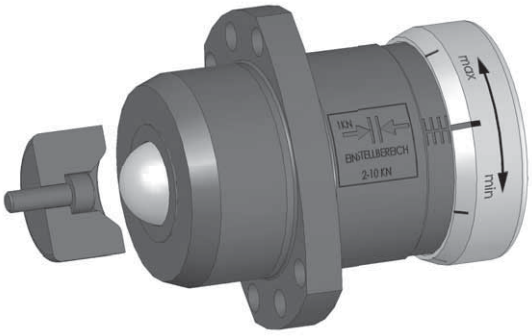
They will not re-engage automatically. After the overload condition has passed, an axial force must be applied in order to re-engage the safety elements into the detents of the output plate.

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.



OPTION: HYDRAULIC ACTUATED RE-ENGAGEMENT

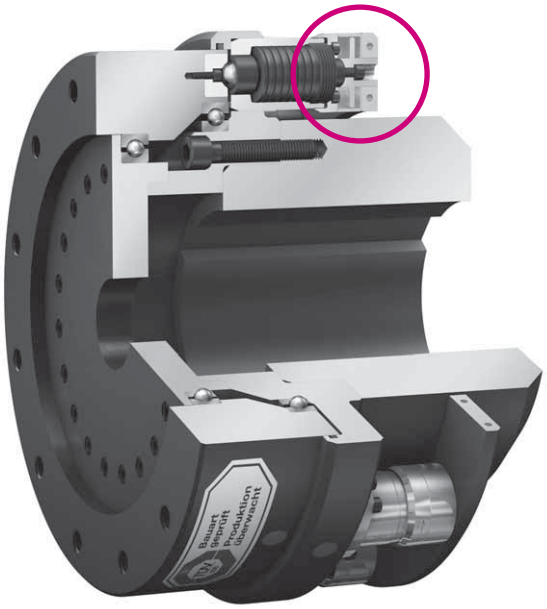
With a new combination of hydraulic and mechanical components, the special SH version is available for automatic re-engagement.

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

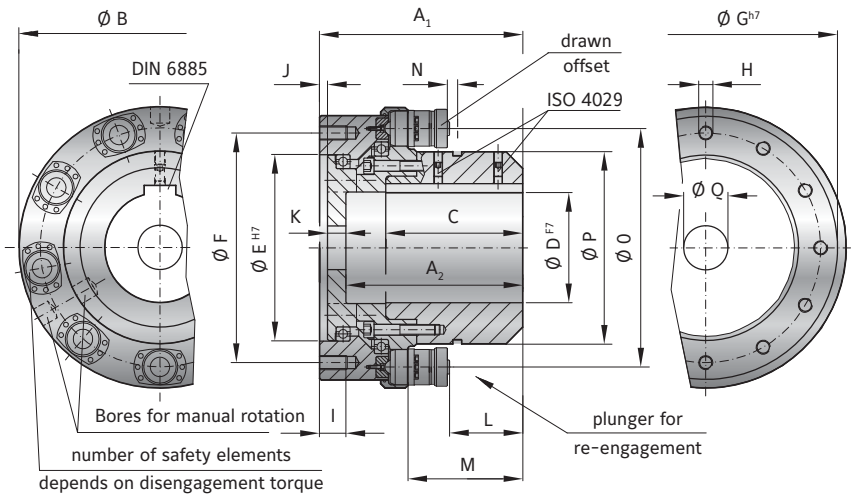
ABOUT

MATERIAL

Hardened steel (nitrocarburized surface)

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			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} kgm²)			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)

All data subject to change without notice.

STN

WITH CONICAL CLAMPING RING

2 - 165 KNm

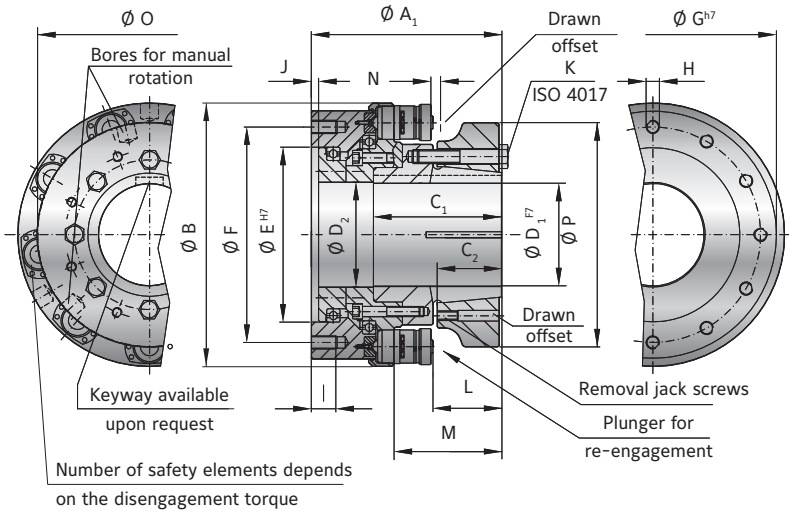
ABOUT

MATERIAL

Hardened steel (nitrocarburized surface)

DESIGN

- Drive side: coupling hub with conical clamping ring 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 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} kgm²)		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	25	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. STN / 025 / 5-16 / 12 / 117.48 / 25 / XX)

ST2

WITH SIMPLE KEYWAY MOUNTING

2 – 165 KNm

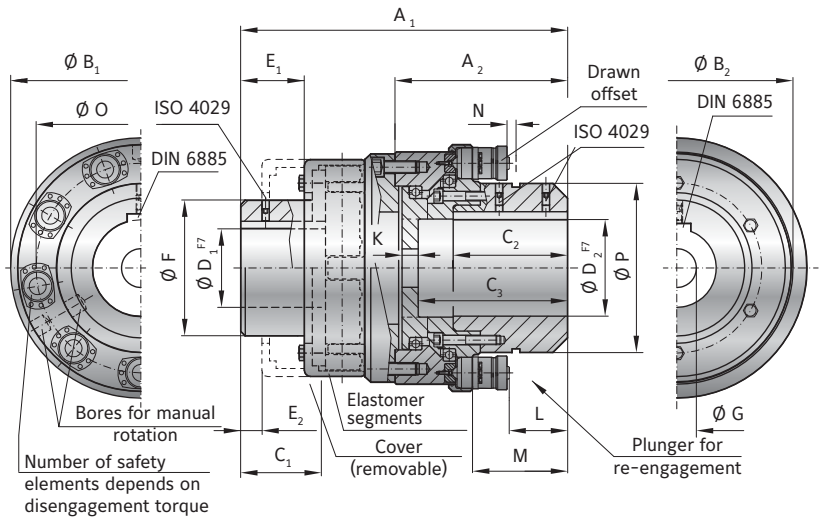
ABOUT

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} kgm²)			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.

All data subject to change without notice.

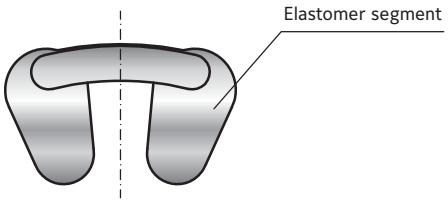
THE ELASTOMER SEGMENT

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.

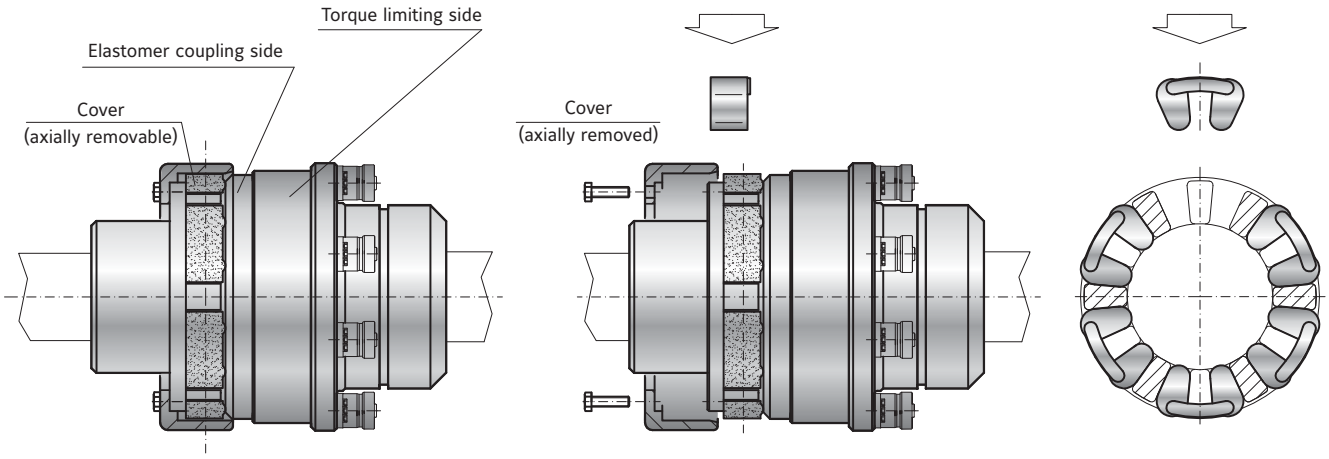
Type	Relative damping (ψ)	Temperature range constant	peak	Material	Shore hardness	Features
A (Standard)	1.0	-40°C to +80°C	+90°C	Natural and synthetic rubber	75-80 Shore A	Very high wear resistance
B	1.0	-40°C to +100°C	+120°C	Synthetic rubber	73-78 Shore A	Resistant to many oils and fuels
C	1.0	-70°C 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	●						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. ST2 / 025 / 10-25 / 15 / 127 / 117.48 / XX)

ST4

WITH SIMPLE KEYWAY MOUNTING

2 - 165 KNm

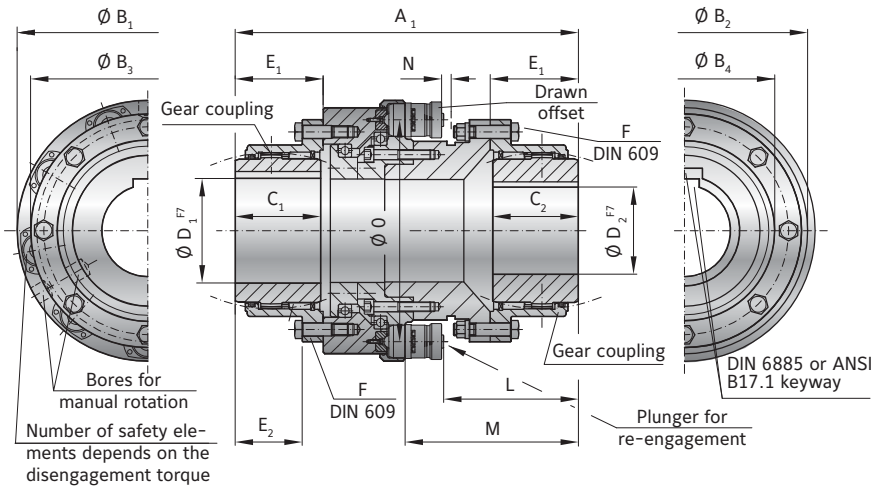
ABOUT

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} kgm²)		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		

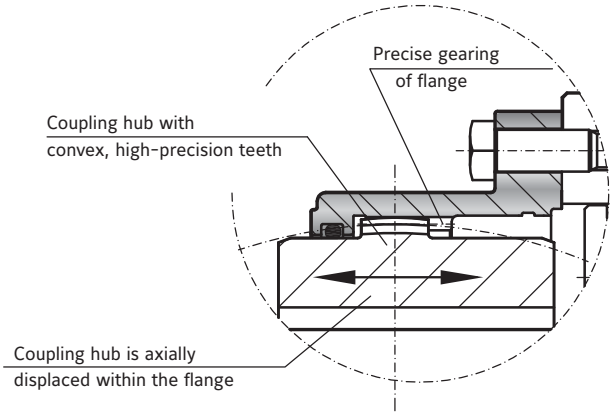
* larger bore diameters upon request.

All data subject to change without notice.

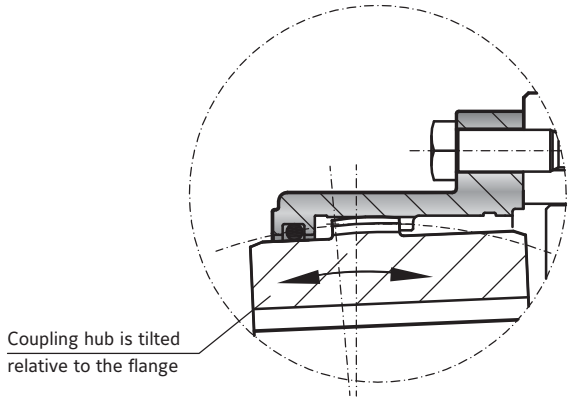
FUNCTION OF THE GEAR COUPLING

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



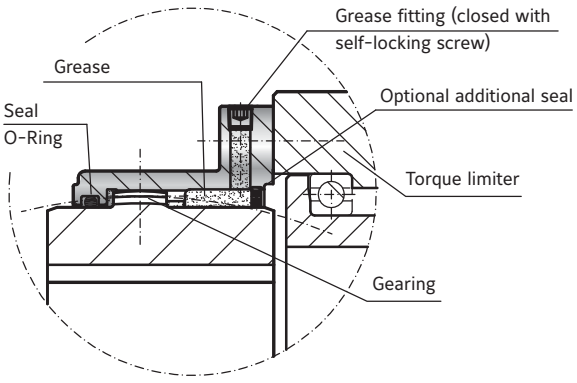
MAINTENANCE AND LUBRICATION

▶ **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)							

ATEX

FOR USE IN HAZARDOUS AREAS

FOR USE IN HAZARDOUS AREAS
INDUSTRIAL DRIVE COUPLINGS

MARKING EXAMPLE

Based on the ATEX markings the product can be certified for suitability under certain conditions.

	II	2G	c	IIA T6	X
	II	2D	c	85°C	X
	Equipment group	Category	Protection type	Explosion group / temperature class / maximum surface temperature	Additional features

Equipment group	Approval type
I	approved for underground operation
II	approved for all other applications

Category	Approved for zone	Zone description
1G	0	Area in which an explosive atmosphere consisting of a mixture of air and flammable gases, vapors, or mists, is present continuously, frequently, or for long periods of time.
2G	1	Area in which the potential exists for an explosive mixture of air and flammable gases, vapors, or mists to occur.
3G	2	Area in which the potential for an explosive mixture of air and flammable gases, vapors, or mists to occur is unlikely and only for a brief duration.
1D	20	Area with the same conditions as zone 0, with powder or dust.
2D	21	Area with the same conditions as zone 1, with powder or dust.
3D	22	Area with the same conditions as zone 2, with powder or dust.

Protection type	Definition
c	Design safety level: ignition hazard is avoided by the product design.

Example classification by occurring gases, mists and vapors according to temperature class and explosion group

Explosion group / temperature class / maximum surface temperature	IIA	IIB (includes IIA)	IIC (includes IIA + IIB)
T1 / 450°C	acetone, ammonia, methane...	natural gas	hydrogen
T2 / 300°C	ethyl alcohol, butane, cyclohexane...	ethylene, ethylene oxide	ethyne (acetylene)
T3 / 200°C	gasoline, diesel fuel, fuel oil...	ethylene glycol, hydrogen sulfide	
T4 / 135°C	acetaldehyde	ethyl ether	
T5 / 100°C			
T6 / 85°C			carbon disulphide

Additional labeling	Definition
X	Special operating conditions
U	Product is only a component in a machine. Conformity therefore shall only be declared after installation.

All data subject to change without notice.

GENERAL INFORMATION

The use of devices and components in explosive areas is governed by the European directives 94/9/EC (for manufacturers) and 1992/92/EC (for operators). The presented products are non-electrical equipment of category 2.

According to Directive 94/9/EC, delivery of an ATEX coupling requires the inclusion of special installation and operating instructions along with the EC declaration of conformity issued by the manufacturer. All necessary values for installation, operation and removal are included.

All models of BX, LP, EK, and ST are available with ATEX certification on request. The BZ coupling is not intended for use in hazardous areas.

R+W Couplings are ATEX approved for use in general industry (Group II). Operation in hazardous zones 1 and 2 (Category 2G) and 21 and 22 (category 2D) are allowed. For the device group I, as well as for zones 0 and 20 the couplings are not registered.

Product specific information about ATEX certified couplings, such as temperature class, are available on request.

All statements made about ATEX conforming products are based on our present knowledge and experience. R+W reserves the right to change technical specifications.

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R + W ANTRIEBSELEMENTE GMBH

Alexander-Wiegand-Strasse 8
D - 63911 Klingenberg/Germany
Phone +49 9372 986 40
Fax +49 9372 986 420
info@rw-kupplungen.de
www.rw-kupplungen.de

R+W AMERICA

1120 Tower Lane
Bensenville, IL 60106
USA
Phone +1 630 521 9911
Fax +1 630 521 0366
info@rw-america.com
www.rw-america.com

R+W MACHINERY (SHANGHAI) CO., LTD

Dept. J, 4 Floor, No 207, Tai Gu Road
PRC Waigaoquiao Free Trade Zone
(Postcode 200131)
Shanghai China
Phone +86 21 586 829 86
Fax +86 21 586 829 95
info@rw-china.com
www.rw-china.com

R+W ITALIA S.R.I.

Via Pisa, 134
I - 20099 Sesto San Giovanni (MI)
Phone +39 02 262 641 63
Fax +39 02 243 085 64
info@rw-italia.it
www.rw-italia.it

R+W FRANCE OFFICE

713, route de Tréconnas
F - 01250 Ceyzeriat France
Phone +33 4 74 42 98 37
Fax +33 4 74 45 01 14
info@rw-france.fr
www.rw-france.fr

R+W SINGAPORE OFFICE

55 Market Street #10-00
Singapore 048941
Phone +65 3158 4434
Fax +65 6521 3001
info@rw-singapore.com.sg
www.rw-singapore.com.sg

R+W ANTRIEBSELEMENTE GMBH

ALEXANDER-WIEGAND-STRASSE 8
D-63911 KLINGENBERG
WWW.RW-KUPPLUNGEN.DE

PHONE: +49 9372 9864-0
FAX: +49 9372 9864-20
INFO@RW-KUPPLUNGEN.DE

A POPPE + POTTHOFF COMPANY

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