



# SIZES FROM 0.1 - 2,800 Nm BACKLASH FREE SAFETY COUPLINGS

## GENERAL INFORMATION ABOUT R+W SAFETY COUPLINGS:



### SERVICE LIFE

As long as the technical limits are not exceeded these couplings are wear and maintenance free.

### FIT CLEARANCE

Overall shaft / hub clearance of 0.01 - 0.05 mm

### SPECIAL SOLUTIONS

Various materials, tolerances, dimensions and performance ratings available for custom applications on request.

### ATEX (Optional)

For use in hazardous zones 1/21 and 2/22, these safety couplings have been authorized under directive 94/9/EG and are available with certification.

**SK****SL****ES**

## BACKLASH FREE SAFETY COUPLINGS

### SIZES FROM 0.1 - 2,800 Nm

MODEL

FEATURES

**SK1**

**with conical clamping bushing (or clamping hub in smaller sizes) for indirect drives from 0.1 - 2,800 Nm**

- ▶ integral bearing to support sprockets, gears, and other drive elements
- ▶ compact simple design
- ▶ adjustable torque settings

Pages 90-91

**SKN**

**with clamping hub for indirect drives from 5 - 1,800 Nm**

- ▶ integral bearing to support sprockets, gears, and other drive elements
- ▶ compact simple design
- ▶ adjustable torque settings

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**SKP**

**with keyway mounting for indirect drives from 0.1 - 2,800 Nm**

- ▶ integral bearing to support sprockets, gears, and other drive elements
- ▶ compact simple design
- ▶ adjustable torque settings

Pages 94-95

**SLN**

**with clamping hub for indirect drives from 10 - 700 Nm**

- ▶ integral bearing to support sprockets, gears, and other drive elements
- ▶ adjustable torque settings
- ▶ ultra compact, low inertia version

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**SLP**

**with keyway mounting for indirect drives from 10 - 700 Nm**

- ▶ integral bearing to support sprockets, gears, and other drive elements
- ▶ adjustable torque settings
- ▶ ultra compact, low inertia version

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## MODEL

## FEATURES

SK2



**with clamping hubs and bellows coupling for direct drives from 0.1 - 1,800 Nm**

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- ▶ easy to mount
- ▶ compensation for shaft misalignment
- ▶ adjustable torque settings

SL2



**with clamping hubs and bellows coupling for direct drives from 10 - 400 Nm**

Page 99

- ▶ easy to mount
- ▶ compensation for shaft misalignment
- ▶ adjustable torque settings
- ▶ ultra compact, low inertia version

SK3



**with conical clamping bushings and bellows coupling for direct drives from 5 - 2,800 Nm**

Page 100

- ▶ high clamping pressure
- ▶ compensation for shaft misalignment
- ▶ adjustable torque settings

SK5



**with clamping hubs, bellows coupling, and blind mate system for direct drives from 0.1 - 850 Nm**

Page 101

- ▶ very easy to mount and dismount
- ▶ electrically and thermally isolating
- ▶ adjustable torque settings

**SK****SL****ES**

## BACKLASH FREE SAFETY COUPLINGS

### SIZES FROM 0.1 - 2,800 Nm

MODEL

FEATURES

**ES2**

**with clamping hubs and elastomer coupling for direct drives from 1 - 1,800 Nm**

Page 102

- ▶ easy to mount
- ▶ vibration damping
- ▶ compensation for shaft misalignment
- ▶ adjustable torque settings

**SLE**

**with clamping hubs and elastomer coupling for direct drives from 10 - 700 Nm**

Page 103

- ▶ easy to mount
- ▶ vibration damping
- ▶ compensation for shaft misalignment
- ▶ adjustable torque settings
- ▶ ultra compact, low inertia version

**ESL**

**with keyway mounting and elastomer coupling for direct drives from 1 - 150 Nm**

Pages 104-105

- ▶ low cost design
- ▶ vibration damping
- ▶ wear resistant ratcheting ball design

**ACCESSORIES**

**Accessories for safety couplings**

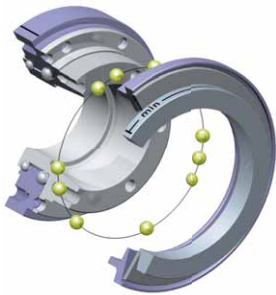
Pages 107-111

# GENERAL INFORMATION

## SAFETY COUPLINGS

### AVAILABLE FUNCTION SYSTEMS

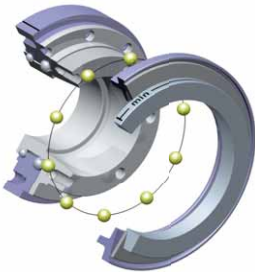
#### SAFETY COUPLINGS



#### SINGLE POSITION

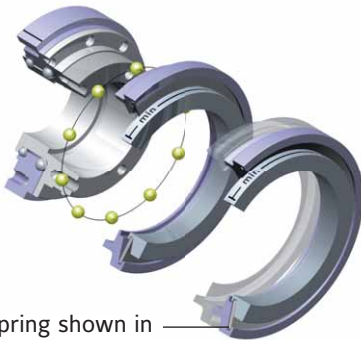
##### Standard Version

- ▶ after the overload condition has been removed the clutch will automatically re-engage precisely at its original orientation
- ▶ maintains synchronous shaft positioning
- ▶ switch plate moves at disengagement to signal overload
- ▶ patented preload for zero backlash; suitable for high precision drives



#### MULTI-POSITION

- ▶ after the overload condition has been removed the clutch will automatically re-engage at one of multiple angular intervals
- ▶ immediate availability of the machine after overload disengagement
- ▶ switch plate moves at disengagement to signal overload
- ▶ standard re-engagement interval is 60 degrees
- ▶ optional re-engagement intervals of 30, 45, 90, 120 degrees
- ▶ patented preload for zero backlash; suitable for high precision drives

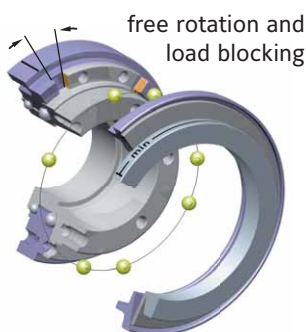


#### FULL DISENGAGEMENT

- ▶ spring snaps over center, eliminating residual force on the ball-detent system
- ▶ complete separation at overload, allowing shafts to spin freely until they are stopped
- ▶ switch plate moves at disengagement to signal overload
- ▶ coupling requires manual re-engagement at multiple available intervals (60 degrees standard; alternate engagement intervals on request)
- ▶ well suited to higher speed applications

**Note:** Coupling can be disengaged manually. Contact R+W for details.

spring shown in disengaged state



#### LOAD HOLDING / LOAD BLOCKING

- ▶ overload detection device
- ▶ only limited free rotation after overload disengagement, beyond which the clutch is fully blocked
- ▶ re-engages automatically when reversed back into original disengagement position
- ▶ switch plate moves at disengagement to signal overload
- ▶ useful in lift systems and other applications where the load must be supported after a brief torque release

# GENERAL INFORMATION

## SAFETY COUPLINGS

SINGLE POSITION  
MULTI-POSITION  
LOAD HOLDING

**Note: Automatic re-engagement only occurs at low speed.**

### GENERAL INFORMATION

R+W safety couplings operate as spring loaded ball-detent clutches. They protect drive components (e.g. motors, transmissions, and spindles) from damage caused by machine crashes and other forms of overload.

- ▶ The torque is transmitted by hardened balls (4) loaded into conical detents (5).
- ▶ The balls are loaded into the detents by the spring disc system (2) across the switch plate (3).
- ▶ The disengagement torque is continuously adjustable via the torque adjustment nut (1).
- ▶ At overload the balls exit their detents, moving the switch plate (3) and disc spring system (2) back away from the detents, separating the input from the output of the safety coupling.
- ▶ The movement of the switch plate (3) can be detected by a proximity switch (6) to signal the drive to shut down.

### FUNCTION OF THE BALL-DETENT SYSTEM

SK

SL

ES2

### SINGLE POSITION / MULTI-POSITION

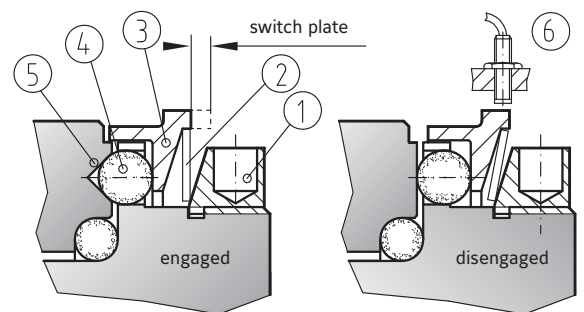
In these designs the disc spring system continues to apply a light residual pressure when in its disengaged state. This pressure is sufficient to cause automatic re-engagement after the torque has been reduced to a level below the torque setting of the safety coupling.

SK

ES2

### LOAD HOLDING / LOAD BLOCKING

The input and output of the safety coupling are only allowed limited free rotation after disengagement. This free rotation is sufficient to allow the switch plate to move and the overload condition to be signaled (see page 85).



- ① Torque adjustment nut
- ② Disc spring system
- ③ Switch plate
- ④ Drive ball
- ⑤ Conical detent
- ⑥ Proximity switch

# GENERAL INFORMATION

## SAFETY COUPLINGS

### FULL DISENGAGEMENT

**Only attempt re-engagement when the machine is stopped.**

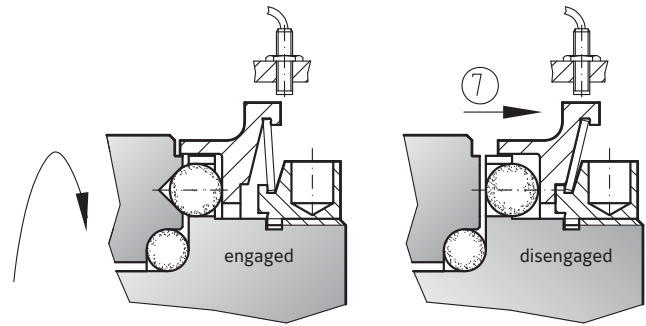
### FUNCTION OF THE BALL-DETENT SYSTEM

**SK ES2**

### FULL DISENGAGEMENT

In the full disengagement version the spring system (7) snaps over center, eliminating residual force on the ball-detent system. This causes a complete separation at overload, allowing shafts to spin freely until they are stopped.

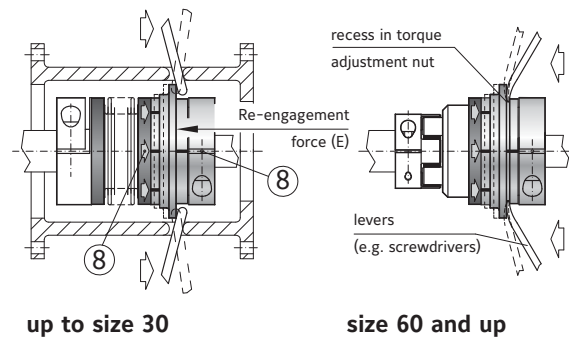
- Re-engagement must be performed manually (see figure at right).



### BALL-DETENT CLUTCHES ARE THE SAME DESIGN IN THE SK AND ES2 SIZES

The R+W full disengagement safety coupling can be re-engaged at any of 6 intervals by pressing the spring system back into its locked position. The re-engagement intervals are indicated by reference markings (8) on the coupling.

From size 60 and up a recess is included in the torque adjustment nut, allowing for 2 levers to be used in a self contained fashion, as shown in the figure on the right.



# GENERAL INFORMATION

## SAFETY COUPLINGS

### BEHAVIOR AND CHARACTERISTICS

#### SPRING SYSTEM

R+W safety couplings work exclusively with a disc spring system with a special characteristic. Prior to the torque adjustment nut coming into contact with the disc springs and applying pressure (1) no torque transmission is possible. Once the spring is loaded, the active range of the spring system had been reached, with the spring rate declining as further compression takes place, both prior to, and during disengagement (2). Once completely depressed, the spring system is rigid (3).

As the safety coupling is in the process of disengaging, the spring force continues to decline. This advantage guarantees the shortest possible disengagement times (1-2 msec), very low wear while running disengaged, and very low residual friction in general (2-5%).

#### IMPORANT!

The minimum and maximum torque values of the R+W safety couplings are at the limits of the active range of the disc spring system. Therefore it is critical not to exit the manufacturer specified torque adjustment range.

#### ROTATIONAL SPEED

The rotational speed at disengagement significantly influences the service life of the coupling. At lower speeds the coupling can handle many thousands of disengagements with no degradation to performance. Please contact R+W for details if applying the safety coupling to a high speed shaft.

#### WEAR

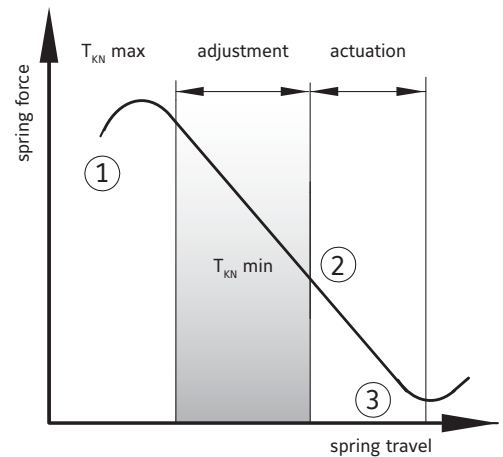
In its engaged state the safety coupling is completely wear free. Service life can be extended significantly by taking measures to stop shaft rotation quickly after disengagement.

#### MAINTENANCE

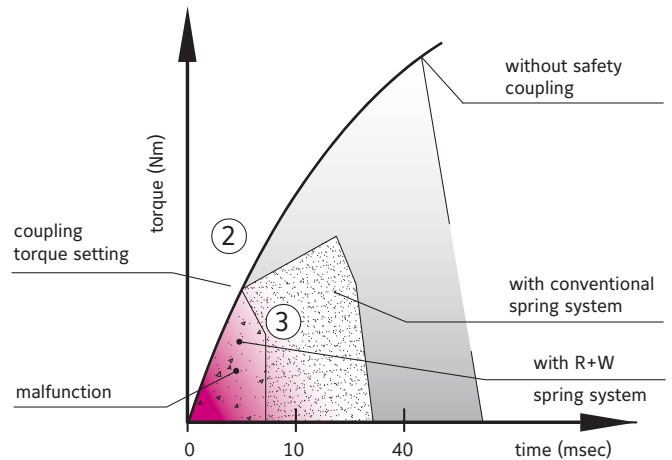
The R+W safety couplings are maintenance free and lubricated for life.

#### SPRING CHARACTERISTIC

special design



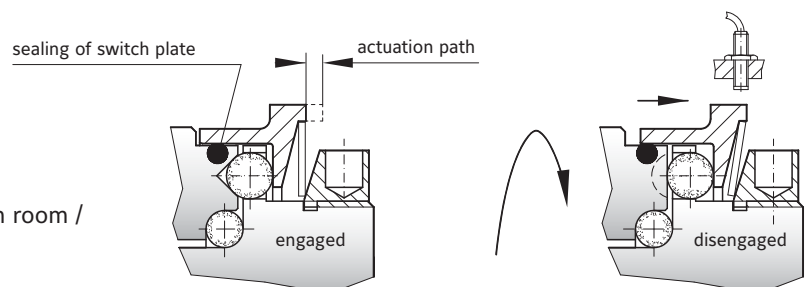
#### DISENGAGEMENT



#### SAFETY COUPLING WITH SEAL (OPTIONAL)

##### Benefits of sealing:

- ▶ Protection from harmful contaminants
- ▶ No leakage of grease
- ▶ Recommended for harsh environments or clean room / sanitary application requirements





# GENERAL INFORMATION

## SAFETY COUPLINGS

### RADIAL LOADS

### SAFETY COUPLINGS

SK1

SKN

SKP

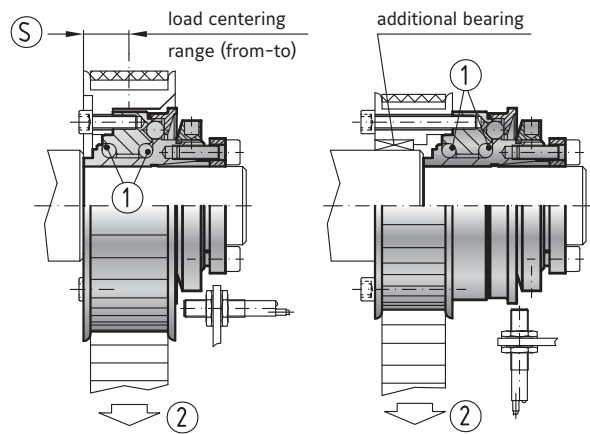
SLN

SLP

The models shown above have an integral bearing (1) to support the drive attachment (e.g. timing belt or chain sprocket, gear, or hand wheel). The maximum radial load (2) is listed in the table below.

If the center of the overhung load is located within dimension range (S) no additional bearing support is necessary. For offset mounting additional bearings can be used to support the load. This is useful in cases where the attached component is too small to fit over the coupling output flange or has a large width.

Depending on the installation space, ball, roller or needle bearings can all be used.



SIZE SK1/SKN/SKP	1.5	2	4.5	10	15	30	60	150	200	300	500	800	1500	2500
Max. radial load (N)	25	50	100	250	700	900	1100	1500	1700	2200	2800	4000	5000	7000
(S) from-to (mm)	3-6	5-8	5-11	6-14	7-17	10-24	10-24	12-24	12-26	12-28	16-38	16-42	20-50	28-60

SIZE SLN/SLP	30	60	150	300
Max. radial load (N)	800	1000	1200	1600
(S) from-to (mm)	4-14	5-18	6-20	6-23