

Installation and Operating Instructions for R+W Torque Limiting Couplings: Series SL



Please carefully and completely read the following installation, operation and maintenance procedures for the R+W torque limiters. Failure to comply with these procedures may result in poor performance and/or failure of the torque limiter.



Installation of the torque limiters should be performed by a qualified technician.

Transport

R+W torque limiters are delivered ready for installation. After incoming inspection, the coupling should be stored in its original packaging until ready for installation. A copy of this installation and operating manual should be kept with the coupling.

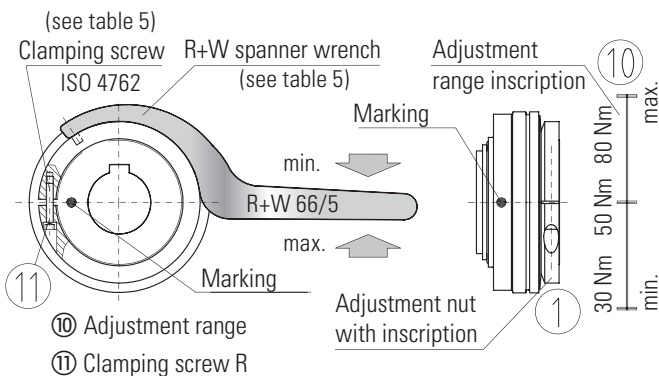
General function of the torque limiter

- Torque is transmitted through hardened ball bearings (4) arranged around the coupling's circumference and loaded into conical detents (5).
- The ball bearings are loaded into the detents by an actuation ring (3) which, in turn, is held in place by disc springs (2).
- The disengagement torque is continuously adjustable through rotation of the adjustment nut (1).
- In the event of an overload, the actuation ring (3) moves toward the disc springs (2) which are pushed over center by the force from the balls (4) exiting their detents. This completely separates the driving and driven sides of the coupling.
- As a consequence of the actuation ring's (3) axial movement, the mechanical limit switch or proximity sensor (6) is activated, signaling the drive to be shut down.

In its disengaged state, this design forces the disc springs into a shape where the residual force drops off to a very small value. The residual force of the springs is insufficient to re-engage the coupling.

Coupling re-engagement can only occur at a slow rotational speed.

Disengagement torque setting



R+W torque limiters are preset and marked with the desired disengagement torque setting at the factory. The min. and max. of the torque adjustment range (10) are also marked on the adjustment nut (1). The disengagement torque is continuously adjustable within the preset range (10) by turning the adjustment nut, increasing or decreasing the tension on the disc springs (2).

Safety alert

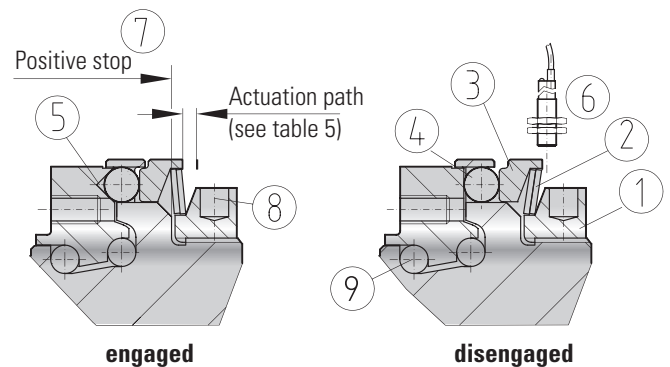


Rotating couplings can be very dangerous. Proper guarding should be in place at all times and is the responsibility of the machine builder, user, or operator. Do not approach or touch a coupling while it is rotating. Make sure the machine is „locked out“ and be accidentally started during installation or maintenance of the coupling.

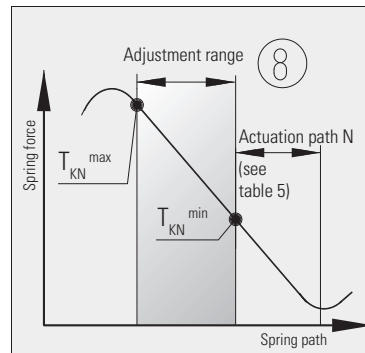
Manufacturer's declaration

According to EG guidelines for machinery 2006/42/EG, Appendix IIB
As per machinery guidelines (MR), shaft couplings are not considered machines, but rather components for installation in a machine. Their putting into operation is subject to the fulfillment of all requirements of machinery regulations by or after integration into the final product.

Single / Multi-Position Automatic Re-engagement



- | | | |
|----------------------|--------------------|---------------------------|
| ① Adjustment nut | ④ Detent balls | ⑦ Positive stop |
| ② Belleville springs | ⑤ Conical detent | ② Bore for spanner wrench |
| ③ Actuation ring | ⑥ Proximity sensor | ⑨ Integral ball bearings |



Caution: R+W torque limiters have disc springs with a special characteristic. The torque adjustment range lies within a specific range of positions for the disc spring, outside of which the torque limiter can not function. It is important to always stay within the min.-max. of the specified torque adjustment range.

Caution! The torque limiter should not be adjusted outside of the preset torque adjustment range. After loosening the clamping screw (11) (max. 1/2 turn), the adjustment nut can be rotated with an appropriate tool (e.g. R+W spanner wrench). After adjustment, tighten the clamping screw. The torque limiter can now be used.

Mounting preparation

All mounting surfaces including shafts, bores, keys, and keyways must be clean and free of burrs, nicks, or dents. Inspect shaft diameters, coupling bore diameters, and dimensions and tolerances of keys and keyways prior to installation. All R+W coupling bores are machined to ISO tolerance H7. The overall clearance between shaft and hub should be between 0.01 and 0.04 mm. A light coating of machine oil is recommended to ease the mounting process and will not affect the clamping force of the hub.



Caution!

Oils and greases containing molybdenum disulphide or other high pressure additives should not be used.

Mounting instructions SLN / SLP

The models SLN / SLP have integral bearings (1) for support of the attached component (e.g. timing belt pulley, sprocket, etc.).

The max. radial load capacity (2) must not be exceeded. See table below.

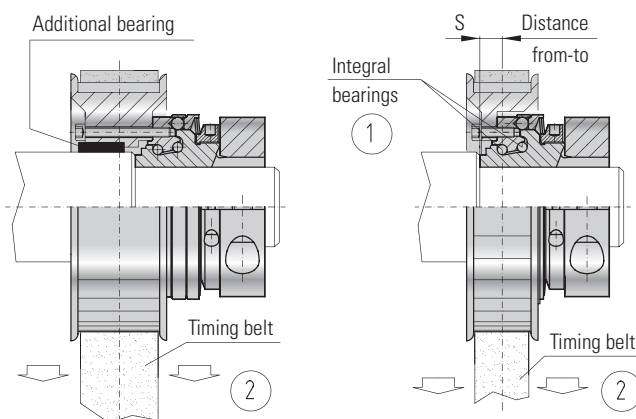
When dimension (S) is maintained, the load is centered between the two bearing races. In this case, an additional bearing is not required. An offset mounting configuration requires additional bearing support. This is recommended when the diameter is small or the attached component is very wide.

Depending on the application, ball bearings, needle bearings or plain bearings can be used.

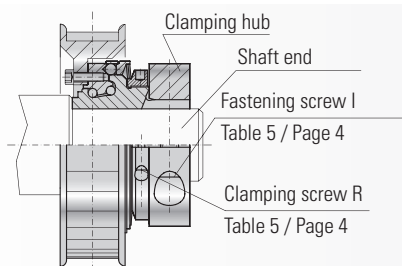
Series	30	60	150	300
Radial load capacity (max.) (2)(N)	1800	2300	3000	4500
Distance (S) from - to (mm)	4-14	5-18	6-20	6-23

(1 N = 0.2248 lbs)

SLN (with clamping hub) SLP (with keyway connection)



SLN



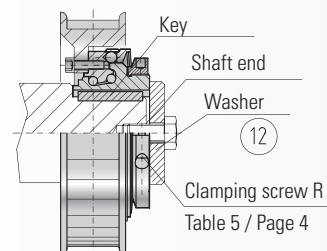
Mounting:

Slide the complete coupling onto the shaft and place it in the correct axial position. Tighten the fastening screw to its specified torque value according to the information in table 5 (page 4).

Dismounting:

To remove the R+W torque limiter, simply loosen the clamping screw and slide the coupling off the shaft.

SLP



Mounting:

Using the appropriate tools, slide the complete coupling onto the shaft end. The final position must be secured axially, e.g. with a washer (12).

Dismounting:

Remove the axial fastening mechanism and slide the coupling off the shaft with the appropriate tools.

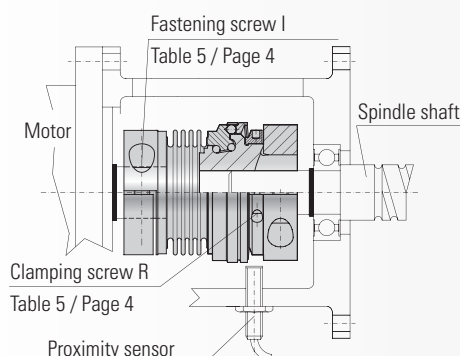
Function of metal bellows



R+W metal bellows couplings are flexible shaft couplings.

The highly flexible, torsionally rigid stainless steel bellows provides backlash free transmission of torque. The metal bellows compensates for lateral, axial and angular misalignment, with very low restoring forces.

Mounting instructions SL2 (with integral bellows coupling)



Mounting:

Slide the torque limiter end onto the spindle shaft. When the correct axial position has been reached, tighten the fastening screw with a torque wrench to the torque specified in table 5 (page 4). Slide the coupling end onto the motor shaft and at the correct axial position, with no axial force on the bellows, tighten the fastening screw on the second clamping hub as described above.

Dismounting:

To remove the R+W torque limiter, simply loosen the clamping screws and slide the coupling off the shaft.

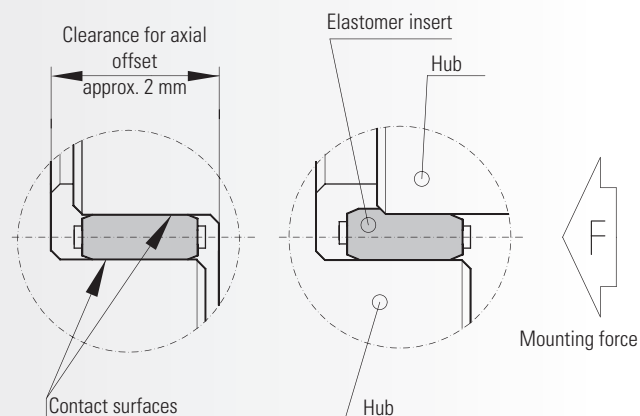
Function of elastomer insert

The elastomer insert is the compensating element in an SLE coupling. It transmits torque without backlash and damps shock and vibration. The SLE coupling's elastomer insert determines the hysteresis characteristics of the entire rotational axis, and is available in two different designs.

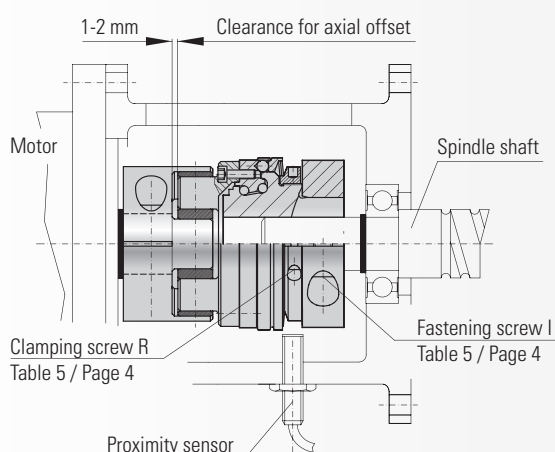
When the coupling hubs are pushed together during installation, axial force is required to overcome the elastomer insert's preload tension. The amount of force required can be reduced by cleaning the elastomer insert and then applying a coat of light oil to its contact surfaces.

Type / Shore Hardness	Color	Material	Temperature range	Properties
A / 98 Sh A	red	TPU	-30°C - +100°C	high damping
B / 64 Sh D	green	TPU	-30°C - +120°C	high torsional stiffness

Table 2



Installation Instructions SLE (with elastomer insert)



Mounting:

Slide the torque limiter onto the spindle shaft. When the correct axial position has been reached, tighten the fastening screw, with a torque wrench, to the torque specified in table 5 (page 4). Insert the motor shaft, and at the correct axial position, tighten the fastening screw as described above.

Dismounting:

To remove the R+W torque limiter, simply loosen the clamping screws and slide the coupling off the shaft.

Maximum shaft misalignment



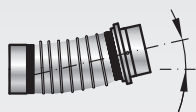
Caution! Precise alignment of the R+W torque limiters greatly increases their service life.

Maximum misalignment values can be found in tables 3 and 4.

Reducing or eliminating lateral misalignment lessens the radial loading of adjacent bearings, increasing the performance of the drive train. For high speed drive systems, precise alignment with a dial indicator is recommended.

Maximum misalignment with bellows coupling

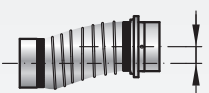
Angular misalignment



Axial misalignment



Lateral misalignment

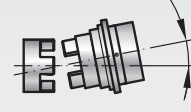


Series	30	60	150	300
Lateral misalignment	0.2	0.2	0.2	0.25
Angular misalignment	$\pm 1^\circ$			
Axial misalignment	$\pm 2 \text{ mm}$			

Table 3

Maximum misalignment with elastomer coupling

Angular misalignment



Axial misalignment



Lateral misalignment



Series	30		60		150		300	
Type (Elastomer insert)	A	B	A	B	A	B	A	B
Lateral misalignment	0.12	0.1	0.15	0.12	0.18	0.14	0.2	0.18
Angular misalignment	± 1°							
Axial misalignment	± 2 mm							

Table 4

Tightening torque values / Actuation path distance

Series			30	60	150	300
Screw ISO 4762 Fastening screw	I	(Nm)	M6/15Nm	M8/15Nm	M10/75Nm	M12/130Nm
Actuation path	N	(mm)	1.3	1.5	1.8	2
Clamping screw ISO 4762 Adjustment nut	R	(Nm)	M3/2Nm	M3/2Nm	M2/2Nm	M4/4.5Nm
R+W spanner wrench for torque adjustment. Order No.:			55/4	66/5	82/5	100/6

Table 5

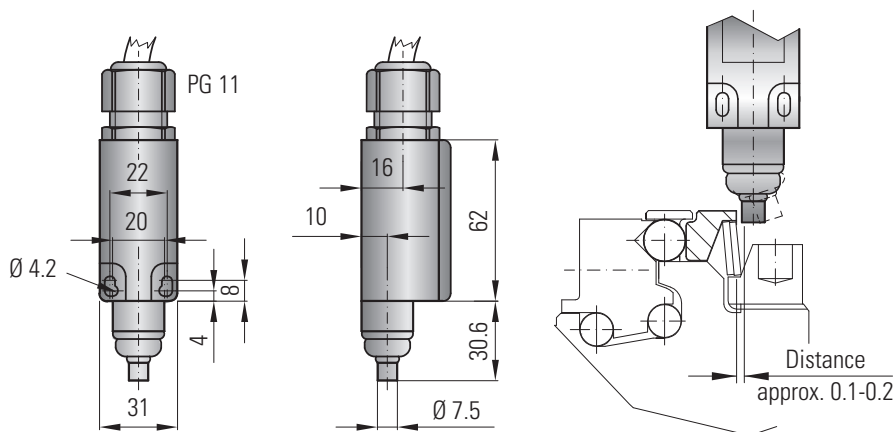


Caution!

It is imperative to follow the tightening torque specifications in order to ensure proper performance of the torque limiter.

Mechanical limit switch

Order No.: 618.6740.644



Caution:

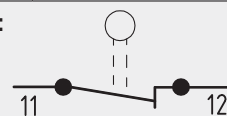
After installation, it is necessary to fully test the functionality of the mechanical limit switch.

The plunger should be placed as close as possible to the actuation ring of the torque limiter (approx. 0.1 - 0.2 mm).

Technical Data

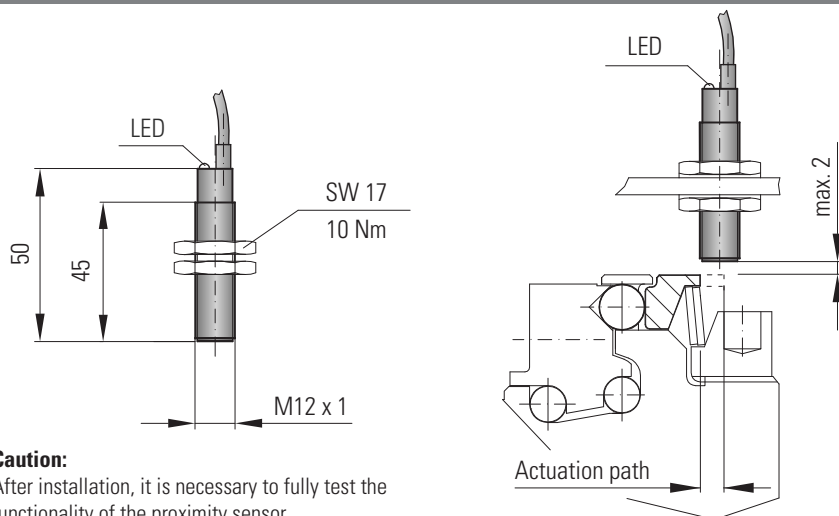
Max. voltage:	500 V AC
Max. constant current:	10 A
Protective system:	IP 65
Contact system:	Open (forced separating)
Temperature range:	- 30 - +80 °C
Actuation:	Plunger (metal)

Switch diagram:



Proximity sensor

Order No.: 619.4711.650



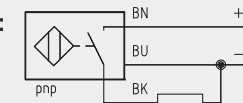
Caution:

After installation, it is necessary to fully test the functionality of the proximity sensor.

Technical Data

Voltage range:	10 to 30 V DC
Max. output current:	200 mA
Max. frequency:	≤ 3 KHz
Temperature range:	-25°C to +70°C
Protective system:	IP 67
Switch type:	PNP, NO
Max. detection gap:	max. 2 mm

Switch diagram:



Additional information

Wear:

No wear occurs while the coupling is engaged. In the event of an overload, the drive must be shut down immediately through the use of a mechanical limit switch or proximity sensor.

Rotational speed:

The service life of the torque limiters depends on the rotational speed at which the torque limiter disengages, as well as the frequency and duration of disengagement events.

Maintenance:

Since the torque limiters are not subject to wear while engaged, there is no required maintenance. The positive locking connections are backlash free and the unit is lubricated for life.

Selection:

Torque limiters are typically selected based on the required disengagement torque value. This value must be greater than the required torque for normal acceleration and deceleration of the machine.

The torque limiter's disengagement torque is typically determined by the data from the drive, motor, and/or gearbox.