Safety Couplings I Adjusting the Disengagement Torque

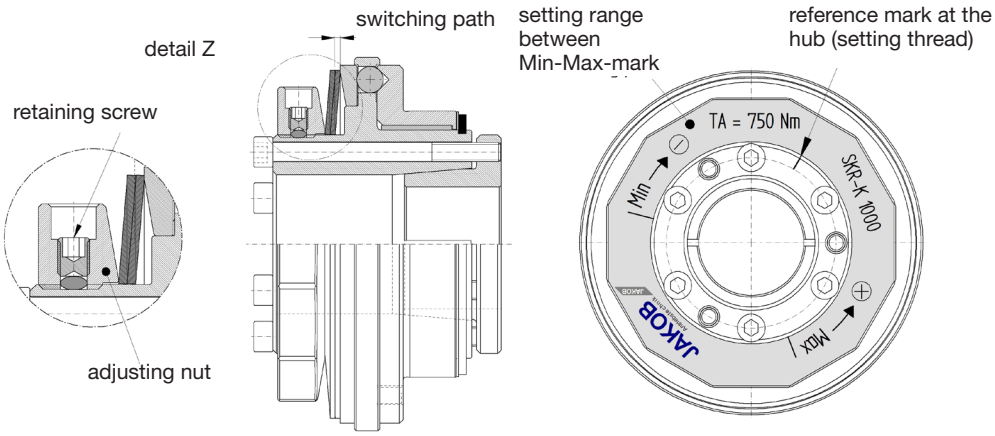
The disengagement torque is generally steplessly adjustable between about 40% and 100% of the nominal clutch torque. If no setting is specified by the customer, the maximum torque (nominal torque) is set. The set, static disengagement torque can easily be readjusted by turning the adjusting nut or the adjusting ring on the machine using a hook wrench. For this purpose, the setting rings of all series are provided with a user-friendly label and the set release torque as well as a marking for the minimum and maximum release torque (Tmin, Tmax) are engraved. Additional scaling is possible on request. Higher disengaging torques greater than Tmax are generally possible, but this results in greater wear on the locking mechanism.

Caution:

Due to the degressive spring characteristics, turning back (counter-clockwise) the adjusting nut means an increase, or a turning in clockwise direction means a reduction of the disengagement torque (see direction arrow at clamping nut)!

Reihe SKW/SKR/SKY

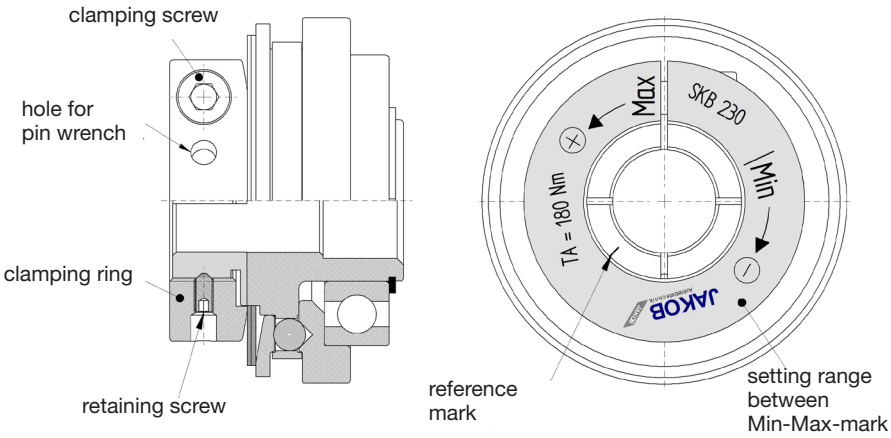
Einstellvorgang für das Ausrückmoment:



Setting procedure for the release torque:
Completely loosen the locking screws (see Detail Z). Turn the adjusting nut in the minus or plus direction with a hook wrench! Observe the reference mark and min-max mark. After the adjustment, secure the adjustment ring by screwing in the locking screws. Factory setting of the release torque, see ring engraving.

Series SKB

Setting of disengagement torque:



Setting procedure for the release torque:
Loosen the locking screw. When installed, the clamping screw of the clamping ring hub must also be loosened. Then turn the clamping ring in the minus or plus direction - note the reference line and the MIN and MAX markings. The drive shaft should be locked here. Finally, tighten the clamping screw with the specified TS value and screw in the locking screw. Factory setting of TA see ring engraving.

Technical Information - Definitions / Details:

Nominal torque of the coupling: T_N - [Nm]
The nominal torque of the coupling defines the max. load of the prolonged alternating-stress strength. If in normal operation, T_N is not exceeded, an infinite number of operation cycles can be carried out (see d „durability“).

Moment of inertia: J_K - [10^{-3}kgm^2]
The values for the moment of inertia are defined for medium hub-bores in the given diameter range Dmin/Dmax. Conversion: [kgcm^2] = [10^{-4}kgm^2]

Torsional stiffness: C_{TK} - [Nm/arc min]
The values for the specific torsional stiffness of all couplings are converted from the existing values [103 Nm/rad] to “Newton meter per angular minute”. This enables the constructor to determine the torsion angle failure quite easily (see b below) under consideration of the operating torque. 60 angular minutes (resp. arc minutes) correspond to one angular degree. This defines the conversion factor 1 rad = 57,3° = 3438 arcmin.

Conversion: [103Nm/rad = 0,291 Nm/arcmin] resp. [1Nm/arcmin = 3438 Nm/rad=3,44 kNm/rad]
Example: Size KM 170: 17,5 Nm/arcmin= 60 kNm/rad

Max. misalignment of shafts: [mm]
The maximum misalignment of shafts is the largest allowed misalignment between drive and output shaft, which results from the calculation of the prolonged alternating-stress strength for compensating elements. If the allowed misalignment values are not exceeded, an infinite number of load alternations can be carried out. In exceptional cases (e.g. during fixing) particularly at reduced numbers of load alternations, the misalignment values may be considerably higher (please contact for further consultation).

- **axial misalignment:** usually without problems (expansion due to temperature)
- **angular misalignment:** usually without problems - allowed max. value: 1 to 2 degrees
- **lateral or parallel misalignment:** If the admissible values are considerably exceeded, permanent distortion at the bellows and higher wear of the elastomer spider can occur. Special care must be taken during fitting!

Spring stiffness - axial / lateral: [N/mm]
Restoring forces of metal bellows or elastomer spiders, caused by shaft misalignments.

Dimensioning of the coupling

a) according to torque:

Usually, the size of the coupling is chosen according to the required torque. For exact determination of the necessary drive torque, difficult calculations are neccessary. If the size of the motor is fixed, the necessary nominal torque of the coupling T_{KN} can be calculated as follows:

$$T_N > 1{,}25 \cdot T_A \text{ max} \cdot i$$

T_A max = peak torque of the motor
i = transmission / reduction of the toothed belt drive or the spur-toothed wheel

b) according to torsional stiffness:

For applications with very precise requirements (position control, transmitter), transfer errors due to high elastic deformation can be an important criterion for selection of the coupling. The torsional angle “αT” is calculated as follows:

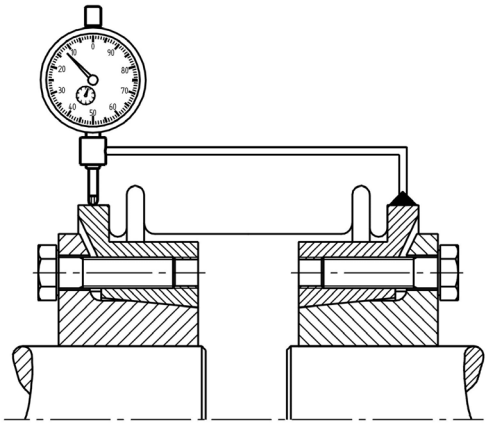
$$\alpha T = \frac{T_A}{C_{TK}}$$

[arc minutes] with T_A= drive torque [Nm] C_{TK}= torsional stiffness of the coupling [Nm/arcmin]

Very seldomly, metal bellows couplings may have resonance sounds (e.g. a whistling or a humming), when coupling types with a higher torsional stiffness or vibration reducing elastomer couplings are recommended.

Alignment of shafts:

Axial and angle misalignment are usually without problems and also simple to measure. To obtain the lateral misalignment, it is recommended to proceed as follows: Fit a dial gauge with an appropriate holding device on one shaft end or on one hub of the coupling and bring the feeler onto the second shaft end or onto the second coupling half (sketch). Now the shafts are turned with the dial gauge and the deflection is read. One half of the total deflection is the lateral misalignment. The admissible value for the shaft misalignments must be taken from the technical data sheets of the appropriate series.



Shaft-hub connection

The couplings are generally supplied with finished bores, in exceptional cases they are also supplied prebored. The seat shaft / hub is to be selected as a transitional seat (example: hub bore diameter 28 G6 - shaft diameter 28 k6). Prior to mounting, the finished bore shaft end conical sleeve should be oiled to prevent fretting corrosion. The coupling is then ready for assembly between the two shafts. An existing keyway in the shaft will not affect the frictional connection.

a) lateral clamping hub

Admissible seat clearance shaft hub: **min. 0,01mm / max. 0,04mm**. Very simple fitting by tightening only one laterally arranged clamping screw (DIN 912). The value for the relevant tightening torques can be found in the data sheets. One hole in the housing is sufficient to tighten the clamping screw (see EASY-clamp sytem). The exception is the KG-HS series with two clamping screws arranged in mirror symmetry.

b) conical hub / conical ring hub

Admissible seat clearance shaft-hub: **max. 0,02 mm.** Assembly of the conical bush or of the conical clamping ring with several, concentrically arranged mounting screws (as a rule 6x DIN 933). One side of the coupling is fit onto the shaft end by evenly tightening the screws crosswise (to prevent uneven draw-on). The drive or output is now turned by a few revolutions, so that the shaft pinion turns in the second hub and the hub can move on the shaft for axial release. Now the six screws of the second hub are also evenly tightened.

c) split-hub

Admissible seat clearance shaft-hub: **min. 0,01mm / max. 0,04mm**. Two lateral clamping screws (DIN 912) are arranged oppositely. The hubs or couplings are split and consist of two loose halves. One of the split-hubs can be put onto the aligned shaft. Tighten clamping screws evenly, alternating between both sides (note specified tightening torques). A larger opening must be provided in the housing for easy installation.

d) disassembly

After releasing the six retaining screws, the hubs are released with three push-off threads each. In axially tight space conditions, it is advisable to screw in and secure the push-off-screws before fitting. For disassembly an opening in the housing should be provided. Disassembly of lateral clamping hub: see EASY-clamp System page 7!

e) special notes

- As the metal bellows consist of thin stainless steel sheeting, special care during fitting and disassembly is necessary. Damages to the bellows can render the coupling useless
- **hub bores which are smaller than "Dmin"** are possible, but an optimal transfer of the nominal torque cannot be guaranteed in this case
- at smaller shaft diameters, the conical hub (larger section thickness) is slotted additionally
- you will find further type specific technical details and characteristics in the data sheets