Dismounting of rolling bearings
Mechanical dismounting

Dismounting of rolling bearings

Dismounting methods

In order to prevent damage during the dismounting of bearings, various dismounting methods are used depending on the bearing size and type of application that facilitate the reuse of components. In general, a distinction is made in the dismounting of bearings between mechanical, thermal and hydraulic methods. Before dismounting is actually carried out, the mounting drawings and any instructions for mounting and dismounting must be carefully checked. In case of doubt, the Schaeffler expert team is available to provide advice and assistance.

Mechanical dismounting

In the mechanical method, special extractors are normally used. It must be ensured above all that the extraction tool is positioned on the ring that has the tighter fit, otherwise the rolling elements will press into the raceways of the bearing, *Figure 1*. Furthermore, there is a risk of fracture in the case of thin-walled outer rings.
In the case of non-separable bearings with a sliding seat on the shaft or housing, this adjacent component should if possible be removed before dismounting of the bearing. The force that must be used in pressing the ring off is normally considerably greater than the force used in pressing the ring on, since the ring becomes fixed in place over the course of time. Dismounting can be difficult even in the case of rings with a loose fit if fretting corrosion has formed after long periods of operation.

The following must therefore be observed:

- Avoid direct blows on the bearing rings.
- Do not direct dismounting forces through the rolling elements.

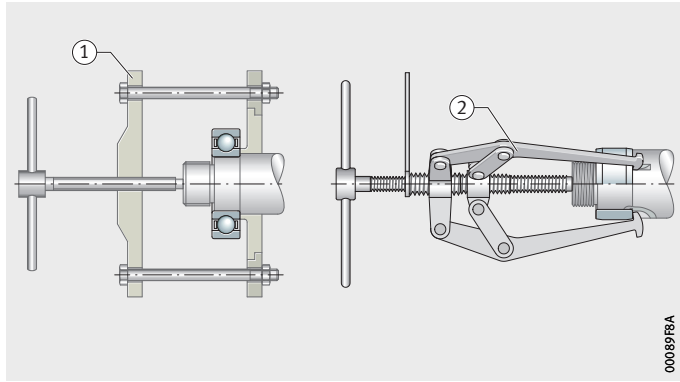
Figure 1
Dismounting
by means of extraction device

If it is not possible to avoid carrying out extraction via the rolling elements, a collar made from unhardened steel is placed around the outer ring (its thickness should be greater than $^1/_4$ of the height of the bearing cross-section). This applies in particular to rolling bearings with a small cross-sectional height and small contact angle, such as tapered and spherical roller bearings.
However, the bearings cannot be subsequently reused.

The rings of separable bearings can be dismounted individually.

Dismounting of cylindrical seats

The extraction of small bearings is normally carried out using mechanical extraction devices, *Figure 2*, or hydraulic presses, *Figure 3*, that are in contact either with the ring with a tight fit itself or with the contact parts, such as those on the labyrinth ring. These are available with a mechanical spindle and hydraulic cylinder if higher forces are required.



① Extraction device with tie rods and split ring
② Extraction device with three adjustable arms and extraction slot in inner ring

Figure 2
Extraction device for rolling bearings

A press can also be used to assist in dismounting. It must be ensured in this case that the bearing is abutted on its inner ring in order to avoid damage. In the pressing operation, the shaft is withdrawn from the bearing.

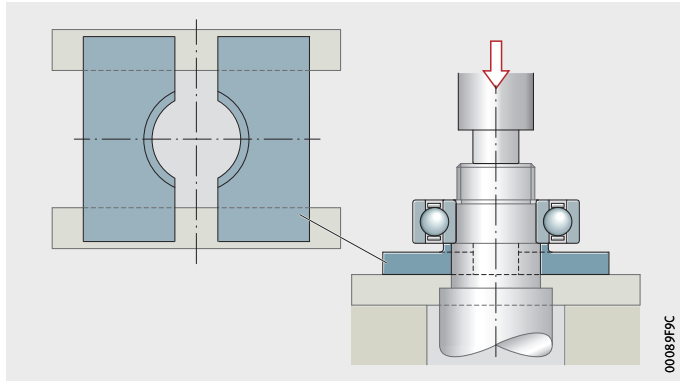


Figure 3
Dismounting using a press

Dismounting is made much easier if the design includes extraction slots so that the extraction tool can be applied directly to the bearing ring with a tight fit. A further alternative to dismounting of bearings is the use of extraction screws.

Special extractors

If the rolling bearing cannot be gripped from outside, special extraction collets are used. The special extractor consists of a base device and a collet that is screwed onto the upper section of the base device, *Figure 4*. The collet is closed using the left hand thread of the union nut and clamped against the inner ring with a conical clamping ring. A threaded spindle generates the extraction force. The finger-shaped extensions of the collet engage between the rolling elements on the raceway edge of the inner ring, behind the rollers or by wedging behind the chamfer of the bearing ring.

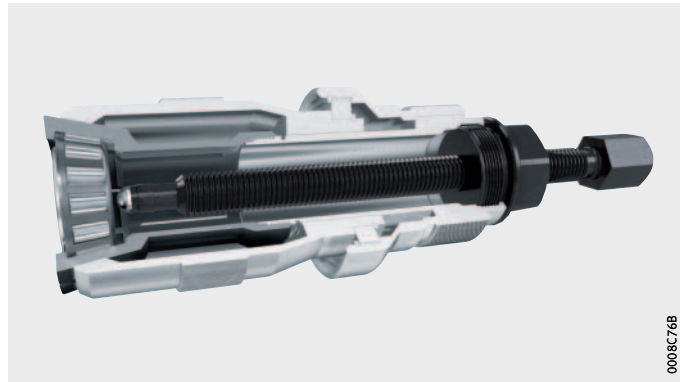


Figure 4
Special extractor

Larger collets do not include the base device. In this case, the collet is tensioned by means of a locking collar and the bearing is removed from the shaft by means of a hydraulic cylinder, *Figure 5*.

Figure 5
Large extraction collet

Internal extractors

If the shaft has already been dismounted, the bearing can also be removed from the housing by means of an internal extractor. The gripping segments of the extractor are spread when the threaded spindle is tightened. The lip of the jaws is pressed against the back of the bearing inner ring bore. With the aid of a countersupport or an impact extractor, the bearing is then withdrawn using the internal extractor. As a result, it is not generally possible to reuse the bearing.

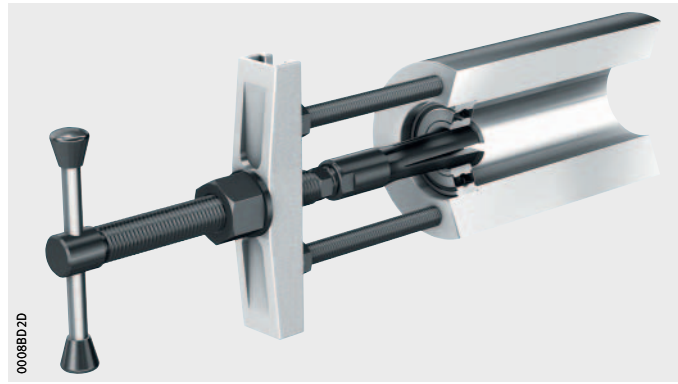


Figure 6
Internal extractor

Hydraulic pressure tool

For the loosening of tightly fitted parts, hydraulic pressure tools can also be used in conjunction with mechanical extractors, *Figure 7*. They are placed between the shaft end and extractor spindle. The spindle diameter of the extractor must not be less than the stated minimum value. The maximum torque must be observed.

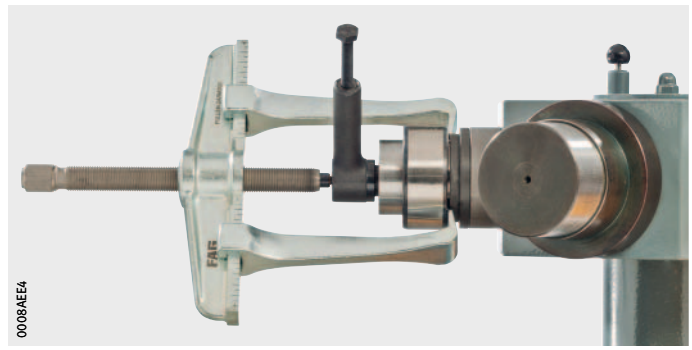


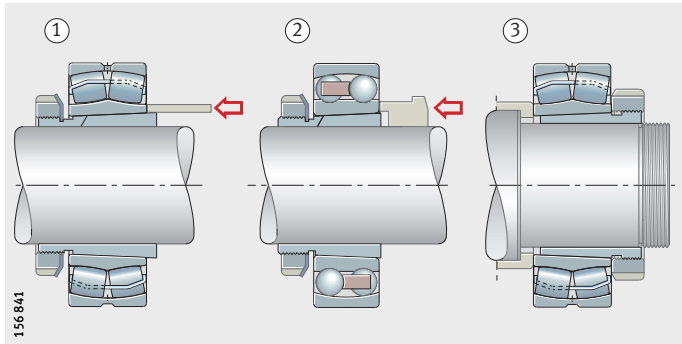
Figure 7
Two-arm extractor
with hydraulic pressure tool

Dismounting of rolling bearings

Dismounting of tapered seats

If bearings are mounted directly on a tapered shaft seat or on an adapter sleeve, the locking action of the shaft or adapter sleeve nut must be loosened first. The nut must then be unscrewed by at least the amount of the drive-up distance. The inner ring is then driven off the sleeve or shaft, for example using a metal drift or impact block, *Figure 8* ①, ②. An impact block avoids the risk of slipping.

Bearings located using withdrawal sleeves are dismounted using a withdrawal nut, *Figure 8* ③.



① Metal drift
② Impact block
③ Withdrawal nut

Figure 8
Dismounting of bearings

The dismounting of large bearings located using a withdrawal sleeve requires considerable force. In this case, locknuts with additional pressure screws can be used, *Figure 8*. A disc must be inserted between the inner ring and the pressure screws in order to prevent damage to the bearing.

Further information

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