

# 18. BEARING SLEEVES

ADAPTER AND WITHDRAWAL SLEEVES

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SLEEVES

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## TABLES:

18.	BEARING SLEEVE
18.1.	Withdrawal sleeves
18.2.	Adapter sleeves
18.3.	Lock nuts – type KM
18.4.	Lock nuts – type HM
18.5.	Lock nuts – type KMT
18.6.	Lock nuts – type KMTA
18.7.	Lock washers – type MB
18.8.	Lock washers – type MS

## INTRODUCTION:

## 18. Bearing sleeves, lock nuts and lock washers

## 18.1. Adapter sleeves and withdrawal sleeves

## 18.1.1. Dimension series

Series	Type of sleeve	Taper	Lock nut	Lock washer	Appropriate bearing series – with tapered bore (K)
H2..	adapter sleeve	1:12	KM..,HM..	MB..	12..*, 202..
H3..	adapter sleeve	1:12	KM..,HM..	MB..	22.., 222..*, 13.., 203.., 213..
H23..	adapter sleeve	1:12	KM..,HM..	MB..	232..*, 23.., 223..
H39..	adapter sleeve	1:12	HM.., HM39..	MS39..	239..
H30..	adapter sleeve	1:12	HM.., HM30..	MS30..	12..*, 230..
H31..	adapter sleeve	1:12	HM.., HM31..	MS31..	222..*, 231..
H32..	adapter sleeve	1:12	HM31..	MS32..	232..*
AH2..	withdrawal sleeve	1:12	KM.., HMV..**	-	12..*, 202..
AH22..	withdrawal sleeve	1:12	KM.., HMV..**	-	22..*, 222..*
AH3..	withdrawal sleeve	1:12	KM.., HMV..**	-	22..*, 222..*, 13.., 203.., 213..*
AH23..	withdrawal sleeve	1:12	KM.., HMV..**	-	232..*, 23..*, 223..
AH39..	withdrawal sleeve	1:12	KM.., HMV..**	-	239..
AH30..	withdrawal sleeve	1:12	KM.., HMV..**	-	12..*, 230..
AH31..	withdrawal sleeve	1:12	KM.., HMV..**	-	222..*, 231..
AH32..	withdrawal sleeve	1:12	KM.., HMV..**	-	232..*
AH240..	withdrawal sleeve	1:30	KM.., HMV..**	-	240..
AH241..	withdrawal sleeve	1:30	KM.., HMV..**	-	241..

\*) Bearing series marked like this are mounted on various sleeves, depending on size.

\*\*) Demounting nuts (regular and hydraulic) are not delivered in set with the sleeve.

\*\*\*) H-symbol behind the sleeve number means the make that is suitable for hydraulic assembly.

## Notes

## regarding adapter sleeves

- between 12-series.. and 1222 K-series, the sleeve of H2-series, above the sleeve of H30-series is used
- between 222-series.. and 22222 K-series, the sleeve of H3-series, above the sleeve of H31-series is used.



Fig.61 Withdrawal sleeve

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- between 232-series.. and 23256 K-series, the sleeve of H23-series, above the sleeve of H32-series is used

## regarding withdrawal sleeves

- between 12-series and 1222 K-series, the sleeve of AH2-series, above the sleeve of H30-series is used
- 22-series, the sleeve of AH22-series interchangeably with AH3-series sleeve is used
- 222-series, the sleeve of AH22-series interchangeably with AH3-series sleeve is used up to 22222 K-series, and above the sleeve of AH31-series is used
- from 232-series to 23240K-series the AH232-series sleeve is used, then up to 23256 K-series the AH23-series sleeve is used, and then again the AH32-series sleeve is used

## 18.1.2. Structure and features

Bearing sleeves are the elements that are commonly used with rolling bearings. Generally every bearing can be mounted on the shaft by means of a sleeve, but in practice it applies mostly to self-aligning ball bearings or spherical roller bearings, more rarely to deep-groove ball bearings.



Fig.62 Adapter sleeve

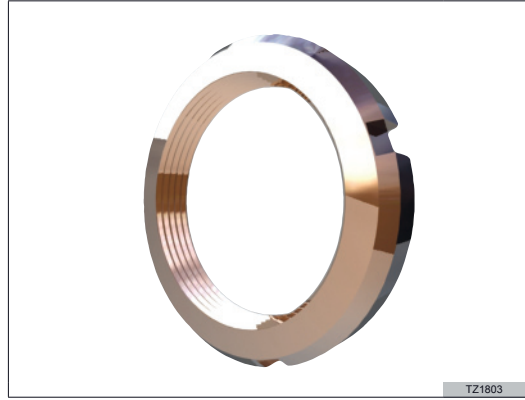


Fig.63 Lock nut – type KM

For many reasons it is recommended to use bearing sleeves. You can find below some of them:

- facilitated housing
- decisively quicker and more comfortable mounting procedure (specialist equipment is not necessary)
- decisively quicker and more comfortable dismounting procedure (specialist equipment is not necessary)
- lower requirements regarding the shaft processing (the shaft need not to be grinded – lower cost)
- safety – the sleeve protects the shaft against damage
- lower operations costs – (mounting and dismounting cost, possible damage of shaft)

The mounting procedure by means of a sleeve is possible owing to tapered bores made in bearings (K behind the symbol), whereas standard taper of the cone is 1:12. Only 240- and 241-series sleeves for spherical roller bearings of the same series are made with the taper of 1:30. There are two types of sleeves: **adapter (H) sleeves** and **withdrawal (AH) sleeves**. Adapter sleeves are more popular because they enable housing of bearings both on flat and on outstanding shafts. Their mounting and dismounting is easier than in case of withdrawal sleeves and, moreover, they do not require additional fixing on the shaft. Adapter sleeves consist of three elements: the actual sleeve, toothed washer **MB..** (for large sleeves lock washer of **MS-type**) and lock nut of **KM** or **HM-type**. Withdrawal sleeves require no additional equipment and mounting nuts are not delivered together with sleeves but only to separate order.

**18.2. Lock nuts and lock washers**

**18.2.1. Dimension series**

**18.2.2. Basic features**

Bearing nuts (lock nuts) are for fixing the bearing on the shaft or on the adapter sleeve (a nut and a washer are delivered together with a sleeve), as well as for mounting and

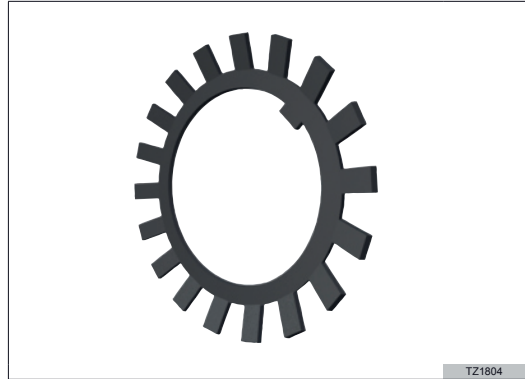


Fig.64 Lock washer – type MB

dismounting bearings on withdrawal sleeves or on tapered shaft mandrels. Lock nuts have four or eight cuts, arranged symmetrically on their circumference where the catch of the appropriate hook spanner is put. On the whole, smaller lock nuts (till the 40KM/KML size) have a metric thread and bigger (from the 41-size on) a trapezoid thread. Washer types depend directly on these sizes. Within the above mentioned ranges one uses toothed lock washers of MB-type and MBL-type for small lock nuts and shaped washers of MS-type for bigger lock nuts. Shaped washers fit into groove on the shaft and fix lock nuts in position. Washers are fastened to lock nuts with hexagonal bolts.

**18.3. Independent lock nuts of KMT- and KMTA-type**

**18.3.1. Dimension series**

- **KMT..**
- **KMTA..**

**18.3.2. Structure and features**

Lock nuts of KMT- and KMTA-type allow to easily and precisely fix bearings or other interacting elements axially on

Lock nut type	Thread	Washer	Type	Notes
KM..	metric	MB..	toothed	standard version differs slightly from the L-version in size
KML..	metric	MBL..	toothed	
HM..	metric*	MB..	toothed	
HML..	metric*	MBL..	toothed	*) rare series rather HM.., T..,HM...T version
HM..T	trapezoid*	MB..	toothed	*) washers are not adapted for all types of lock nuts
HML..T	trapezoid*	MBL..	toothed	
HM30..	trapezoid	MS30..	shaped	other type of washers – shaped washer with thread and hexagonal bolt
HM31..	trapezoid	MS31..	shaped	

the shaft. They are used, above all, to fix precise bearings, matching their size. Key construction feature of KMT and KMTA lock nuts are three brass blocking pins evenly distributed on their circumference. They are held down to the shaft thread through grub screws preventing the lock nut from turning, thus making mounting as well as the whole construction easier, because no additional toothed or shaped washers are needed. Blocking bolts and grub screws are arranged obliquely to the shaft at the same angle as flanks of thread. Surfaces of blocking pins' ends are processed in the same step of the technological process as nut thread so they take on the thread's shape. Safeying of a nut consists only in friction between safety pins and the shaft's thread, as well as in the static friction between flanks of the thread. Owing to this the blocking pins are not exposed to axial load acting on the nut, and after safeying of the nut flanks of the thread are not axially relieved and the nut is not subject to deformation. Equally significant feature of KMT and

KMTA lock nuts is their adjustability. Three blocking pins, evenly distributed on the circumference allow to fix the nut exactly at right angle during safeying procedure or to compensate inaccuracies and deviations of other construction elements fixed on the shaft. KMT-type lock nuts are made with grooves, whereas small-sized nuts have two chamfers on the opposite sides to apply a spanner. These nuts are meant for applications where simple housing of bearings, reliable protection and high precision are required. Despite the fact that KMTA-nuts differ from KMT-nuts in outside shape and also partially in the thread (different pitch of thread), they have similar features. They have smooth projection surfaces and are designed for compact housings in the first place. Because projection surface is cylindrical, the nut can be also used as part of the slotted seal. Holes on the circumference and on the face makes nut housing easier. KMT and KMTA nuts are made of heavy-duty electro-galvanized steel. Safety pins are made of cold drawing brass.