FAG

# FAG tools for mechanical mounting and dismounting of rolling bearings

## Technical Product Information

SCHAEFFLER GROUP
INDUSTRIAL

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# Mechanical mounting and dismounting of rolling bearings

## Mechanical mounting and dismounting of rolling bearings

### Cylindrical bearing seats

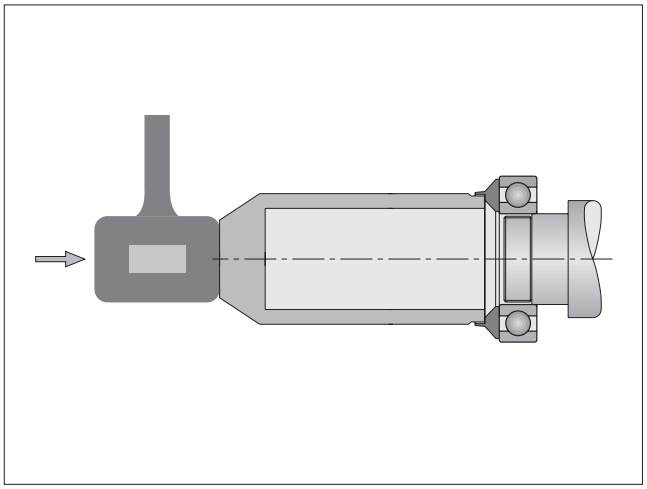
Smaller bearings can be driven cold onto the shaft or into the housing for normal tight fits.
To prevent bearing damage, the fitting forces must always be applied to the tightly fitted ring.

FAG **mounting tool sets** allow cost-effective and safe **mounting** of rolling bearings with bore diameters of 10 to 50 mm or outside diameters of 16 to 110 mm. They can also be used to easily mount sleeves, intermediate rings, seals and similar parts.
Tightly fitted inner rings can be driven onto the shaft or outer ring into the housing bore by hitting the mounting sleeve with the hammer. This prevents the mounting forces being transmitted through the rolling elements and raceways, which can lead to damage. The carefully matched FAG precision parts ensure that the forces are uniformly transmitted to the side faces of the bearing rings.

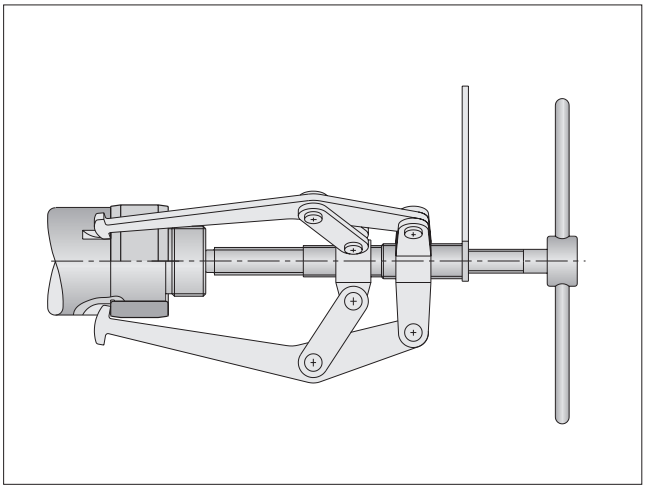
Great care is also required during **dismounting**. The extraction tool must always be applied to the ring to be removed.

Mechanical FAG **extractors** can be used to dismount small rolling bearings up to approx. 100 mm bore diameter that are located with a tight fit on a shaft or in a housing. The extraction force is normally applied by means of a threaded spindle.

A hydraulic spindle facilitates work with hydraulic FAG extractors for larger rolling bearings. Extraction forces of up to 400 kN (40 tonnes) can be generated in this case.



Appropriate mounting sleeves such as those included in the FAG mounting tool sets can be used to drive on small bearings using light hammer blows.



An extractor with adjustable arms grips under a tightly fitted inner ring. Extraction slots make dismounting easier.

# Mechanical mounting and dismounting of rolling bearings

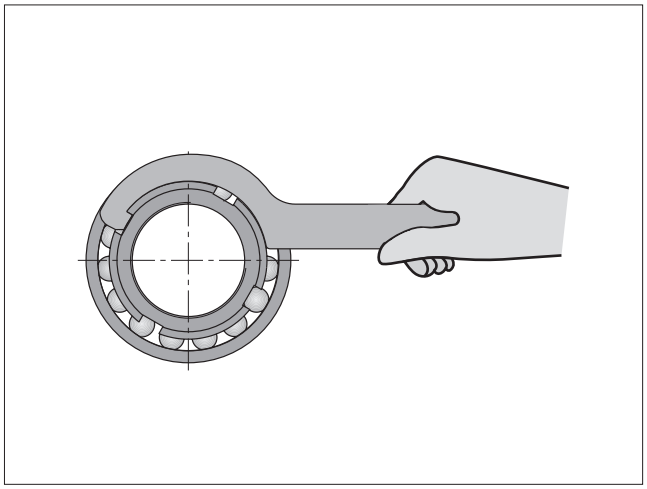
**Tapered bearing seats**

The inner ring of a bearing with tapered bore is always mounted with a tight fit. The bearing can be seated directly on a tapered shaft or be fixed to a cylindrical shaft using an adapter or extraction sleeve. When the inner ring is pushed on, it is expanded and the radial internal clearance is reduced. The reduction in radial internal clearance is therefore valid as a measure of the seating of the inner ring. To prevent bearing damage, the inner ring must not be pushed on too far.

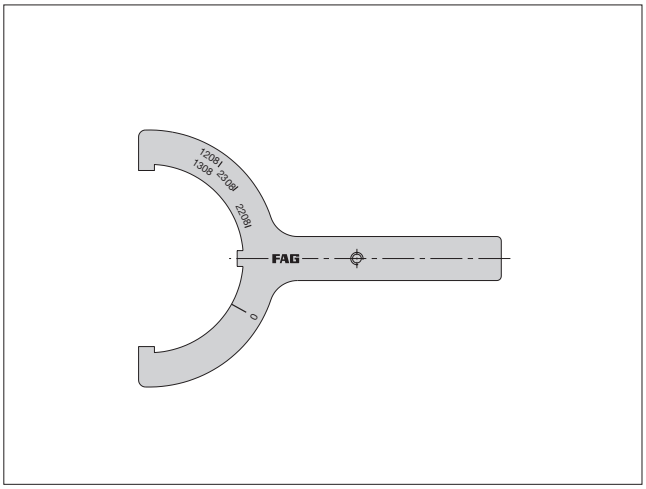
For guide values for the reduction in radial internal clearance, see FAG publication WL 80 100 “Mounting of rolling bearings”. Feeler gauges for measuring the radial internal clearance are described in FAG publication WL 80 250 “FAG Equipment and Services for the Mounting and Maintenance of Rolling Bearings”. Another method for measuring the correct internal clearance is measurement of the axial displacement.

Locknuts can be easily tightened and loosened on shafts, adapter sleeves and extraction sleeves using **socket wrenches**.
FAG **hook wrenches** can be used to tighten and loosen locknuts (precision locknuts) on shafts, adapter sleeves or extraction sleeves.
If no torque value is specified, jointed hook wrenches, jointed pin wrenches and jointed face wrenches can be used for locknuts and precision locknuts.
**Double hook wrenches** are engraved with the torsion angles for the appropriate self-aligning ball bearings. The displacement and reduction in radial internal clearance can therefore be precisely set. Both kits and sets contain suitable torque wrenches.

The FAG computer program **MOUNTING MANAGER** is a user-friendly aid for ensuring the correct mounting of bearings with tapered bore. It shows suitable mounting methods, calculates the data required for mounting in relation to reduction in radial internal clearance and displacement and generates a list of the accessories and tools required. A more detailed description of the computer program can be found in TPI WL 80-57 “FAG hydraulic nuts”.



An FAG hook wrench is used to tighten shaft nuts, adapter sleeve nuts and extraction nuts simply and securely.




The FAG double hook wrench is engraved with the torsion angles for the appropriate self-aligning ball bearings.

# FAG tools for mounting of rolling bearings

Mounting tool set FITTING.TOOL.ALU.SET10-50 for cylindrical bearing seats

## FAG mounting tool set FITTING.TOOL.ALU.SET10-50

The FITTING.TOOL.ALU.SET10-50 supports cost-effective assembly for many standardised rolling bearings (bore diameter of 10 to 50 mm) and for other parts. The low mass of the components makes this mounting tool set very easy to handle.

### Features

The tool set contains 33 different mounting rings and 3 mounting sleeves as well as a hammer.
The mounting rings are made from impact-resistant plastic.
This prevents metal/metal contact as well as damage to or premature wear of the bearing seatings.
The mounting sleeves are made from aluminium. The head of the recoilless hammer (1 kg mass) produces no sparks. Each mounting sleeve can be pushed over the shaft end as far as 220 mm.
The combination of mounting ring and mounting sleeve required for the application in question can be found in the table inside the lid of the case, see also page 5.
The parts are driven on by hitting the mounting sleeve using the supplied hammer.
The components of the tool set are housed in a practical case.
Case dimensions:
440×350×95 mm

Scope of delivery

33 mounting rings
3 mounting sleeves
1 hammer
1 case

Mass of complete tool set: 4,5 kg

Ordering designation for tool set:
**FITTING.TOOL.ALU.SET10-50**

**Ordering examples for replacement parts**
(available by agreement):

**FITTING.TOOL.ALU.SLEEVE-A**
(mounting sleeve A)

**FITTING.TOOL.ALU.SLEEVE-B**
(mounting sleeve B)

**FITTING.TOOL.ALU.SLEEVE-C**
(mounting sleeve C)

**FITTING.TOOL.ALU.RING10/26**
(mounting ring bore 10 mm, outside diameter 26 mm)

**FITTING.TOOL.ALU.RING50/110**
(mounting ring bore 50 mm, outside diameter 110 mm)

**FITTING.TOOL.ALU.HAMMER**
(hammer, recoilless)

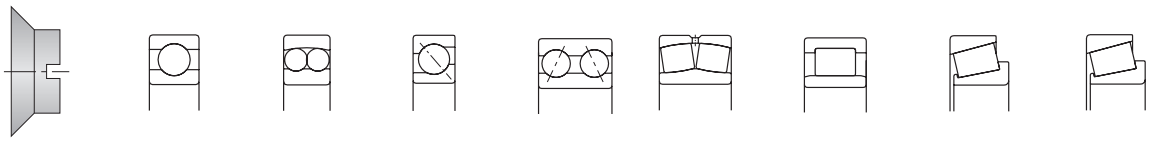
**FITTING.TOOL.ALU.SUITCASE10-50**
(case for tool set)

FITTING.TOOL.ALU.SET10-50

# FAG tools for mounting of rolling bearings

FITTING.TOOL.ALU.SET10-50 · Selection table

## FITTING.TOOL.ALU.SET10-50



| Mounting sleeve | Mounting ring No. | Series 60, 62 63, 64 | Series 12, 22 13, 23 | Series 72B 73B | Series 32 33 | Series 213, 222 223 | Series NU/NJ/N 2, 3, 4 | Series 302, 303 322 | Series 313 323 |
|---|---|---|---|---|---|---|---|---|---|
| | 10–26 | 6000 | | | | | | | |
| | 10–30 | 6200 | 1200 | | 3200 | | | | |
| | | | 2200 | | | | | | |
| | 10–35 | 6300 | 1300 | | | | | | |
| | 12–28 | 6001 | | | | | | | |
| | 12–32 | 6201 | 1201 | | 3201 | | | | |
| | | | 2201 | | | | | | |
| | 12–37 | 6301 | 1301 | | | | | | |
| | | | 2301 | | | | | | |
| A | 15–32 | 6002 | | | | | | | |
| | 15–35 | 6202 | 1202 | 7202B | 3202 | | | | |
| | | | 2202 | | | | | | |
| | 15–42 | 6302 | 1302 | | 3302 | | | 30302 | |
| | | | 2302 | | | | | | |
| | 17–35 | 6003 | | | | | | | |
| | 17–40 | 6203 | 1203 | 7203B | 3203 | | | 30203 | |
| | | | 2203 | | | | | | |
| | 17–47 | 6303 | 1303 | 7303B | 3303 | | | 30303 | |
| | | | 2303 | | | | | | |
| | 20–42 | 6004 | | | | | | | |
| | 20–47 | 6204 | 1204 | 7204B | 3204 | | 204 | | |
| | | | 2204 | | | | | | |
| | 20–52 | 6304 | 1304 | 7304B | 3304 | 21304 | 304 | 30304 | 32304 |
| | | 6403 | 2304 | | | | | | |
| | 25–47 | 6005 | | | | | | | |
| | 25–52 | 6205 | 1205 | 7205B | 3205 | 22205 | 205 | 30205 | |
| B | | | 2205 | | | | | | |
| | 25–62 | 6305 | 1305 | 7305B | 3305 | 21305 | 305 | 30305 | 31305 |
| | | 6404 | 2305 | | | | | | 32305 |
| | 30–55 | 6006 | | | | | | | |
| | 30–62 | 6206 | 1206 | 7206B | 3206 | 22206 | 206 | 30206 | |
| | | | 2206 | | | | | 32206 | |
| | 30–72 | 6306 | 1306 | 7306B | 3306 | 21306 | 306 | 30306 | 31306 |
| | | 6405 | 2306 | | | | 405 | | 32306 |
| | 35–62 | 6007 | | | | | | | |
| | 35–72 | 6207 | 1207 | 7207B | 3207 | 22207 | 207 | 30207 | |
| | | | 2207 | | | | | 32207 | |
| | 35–80 | 6307 | 1307 | 7307B | 3307 | 21307 | 307 | 30307 | 31307 |
| | | 6406 | 2307 | | | | 406 | | 32307 |
| | 40–68 | 6008 | | | | | | | |
| | 40–80 | 6208 | 1208 | 7208B | 3208 | 22208 | 208 | 30208 | |
| | | | 2208 | | | | | 32208 | |
| | 40–90 | 6308 | 1308 | 7308B | 3308 | 21308 | 308 | 30308 | 31308 |
| C | | 6407 | 2308 | | | 22308 | 407 | | 32308 |
| | 45–75 | 6009 | | | | | | | |
| | 45–85 | 6209 | 1209 | 7209B | 3209 | 22209 | 209 | 30209 | |
| | | | 2209 | | | | | 32209 | |
| | 45–100 | 6309 | 1309 | 7309B | 3309 | 21309 | 309 | 30309 | 31309 |
| | | 6408 | 2309 | | | 22309 | 408 | | 32309 |
| | 50–80 | 6010 | | | | | | | |
| | 50–90 | 6210 | 1210 | 7210B | 3210 | 22210 | 210 | 30210 | |
| | | | 2210 | | | | | 32210 | |
| | 50–110 | 6310 | 1310 | 7310B | 3310 | 21310 | 310 | 30310 | 31310 |
| | | 6409 | 2310 | | | 22310 | 409 | | 32310 |

**If only bearing outer rings have to be installed, for example when the shaft is dismounted, the mounting rings no. 50-90, no. 45-100 and no. 50-110 are used according to the following table.**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 50–90 | 6011 | | | | | | | |
| | | 6012 | | | | | | | |
| | 45–100 | 6013 | 1211 | 7211B | 3211 | 22211 | 211 | | |
| | | 6211 | 2211 | | | | | | |
| C | 50–110 | 6014 | 1212 | 7212B | 3212 | 22212 | 212 | | |
| | | 6015 | 1213 | 7213B | 3213 | 22213 | 213 | | |
| | | 6212 | 2212 | 7311B | 3311 | 21311 | 311 | | |
| | | 6213 | 2213 | | | 22311 | 410 | | |
| | | 6311 | 1311 | | | | | | |
| | | 6410 | 2311 | | | | | | |

# FAG tools for mounting of rolling bearings

Mounting tool set FITTING.TOOL.STEEL.SET10-50 for cylindrical bearing seats

## FAG mounting tool set FITTING.TOOL.STEEL.SET 10-50

The mounting tool set FITTING.TOOL.STEEL.SET10-50 (former FAG designation EINBAU.SET.ST) is designed for maximum stressing and a long life. The tools can also be used for pressing in or out on workshop power presses. Rolling bearings with a 10 to 50 mm bore diameter can be fitted using the tool set.

### Features

The tool set contains 33 different hardened mounting rings and 5 mounting sleeves made from tool steel. The nylon head of the recoilless hammer (0.7 kg mass) produces no sparks. Each mounting sleeve can be pushed over the shaft end as far as 220 mm.
The combination of mounting ring and mounting sleeve required for the application in question can be found in the table inside the lid of the case, see also page 7. Integrated O rings allow parts to be joined together securely. The parts are driven on by hitting the mounting sleeve with the supplied hammer.
The components of the tool set are housed in a practical metal case.
Case dimensions:
370×320×70 mm

Scope of delivery

33 mounting rings
5 mounting sleeves
1 hammer
1 metal case

Mass of complete tool set: 21 kg

Ordering designation for tool set:
**FITTING.TOOL.STEEL.SET10-50**

**Ordering examples for replacement parts**
(available by agreement):

**FITTING.TOOL.STEEL.SLEEVE-B**
(mounting sleeve B)

**FITTING.TOOL.STEEL.SLEEVE-C**
(mounting sleeve C)

**FITTING.TOOL.STEEL.SLEEVE-E**
(mounting sleeve E)

**FITTING.TOOL.STEEL.RING10/26**
(mounting ring bore 10 mm, outside diameter 26 mm)

**FITTING.TOOL.STEEL.RING50/110**
(mounting ring bore 50 mm, outside diameter 110 mm)

**FITTING.TOOL.STEEL.HAMMER**
(hammer, recoilless)

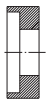
**FITTING.TOOL.STEEL.SUITCASE10-50**
(case for tool set)

FITTING.TOOL.STEEL.SET10-50

# FAG tools for mounting of rolling bearings

FITTING.TOOL.STEEL.SET10-50 · Selection table

## FITTING.TOOL.STEEL.SET10-50










| Mounting sleeve | Mounting ring No. | | Series 60, 62 63, 64 | Series 12, 22 13, 23 | Series 72B 73B | Series 32 33 | Series 213, 222 223 | Series NU/NJ/N 2, 3, 4 | Series 302, 303 322 | Series 313 323 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 (10/26 mm) | 6000 | | | | | | | |
| | | 2 (10/30 mm) | 6200 | 1200 | | 3200 | | | | |
| | | | | 2200 | | | | | | |
| | | 3 (10/35 mm) | 6300 | 1300 | | | | | | |
| A | | 4 (12/28 mm) | 6001 | | | | | | | |
| | | 5 (12/32 mm) | 6201 | 1201 | | 3201 | | | | |
| | | | | 2201 | | | | | | |
| | | 6 (12/37 mm) | 6301 | 1301 | | | | | | |
| | | | | 2301 | | | | | | |
| | | 7 (15/32 mm) | 6002 | | | | | | | |
| | | 8 (15/35 mm) | 6202 | 1202 | 7202B | 3202 | | | | |
| | | | | 2202 | | | | | | |
| | | 9 (15/42 mm) | 6302 | 1302 | | 3302 | | | 30302 | |
| B | | | | 2302 | | | | | | |
| | | 10 (17/35 mm) | 6003 | | | | | | | |
| | | 11 (17/40 mm) | 6203 | 1203 | 7203B | 3203 | | | 30203 | |
| | | | | 2203 | | | | | | |
| | | 12 (17/47 mm) | 6303 | 1303 | 7303B | 3303 | | | 30303 | |
| | | | | 2303 | | | | | | |
| | | 13 (20/42 mm) | 6004 | | | | | | | |
| | | 14 (20/47 mm) | 6204 | 1204 | 7204B | 3204 | | 204 | | |
| | | | | 2204 | | | | | | |
| | | 15 (20/52 mm) | 6304 | 1304 | 7304B | 3304 | 21304 | 304 | 30304 | 32304 |
| | | | 6403 | 2304 | | | | | | |
| C | 16 (25/47 mm) | | 6005 | | | | | | | |
| | 17 (25/52 mm) | | 6205 | 1205 | 7205B | 3205 | 22205 | 205 | 30205 | |
| | | | | 2205 | | | | | | |
| | 18 (25/62 mm) | | 6305 | 1305 | 7305B | 3305 | 21305 | 305 | 30305 | 31305 |
| | | | 6404 | 2305 | | | | | | 32305 |
| | | 19 (30/55 mm) | 6006 | | | | | | | |
| | | 20 (30/62 mm) | 6206 | 1206 | 7206B | 3206 | 22206 | 206 | 30206 | |
| | | | | 2206 | | | | | 32206 | |
| | | 21 (30/72 mm) | 6306 | 1306 | 7306B | 3306 | 21306 | 306 | 30306 | 31306 |
| D | | | 6405 | 2306 | | | | 405 | | 32306 |
| | 22 (35/62 mm) | | 6007 | | | | | | | |
| | 23 (35/72 mm) | | 6207 | 1207 | 7207B | 3207 | 22207 | 207 | 30207 | |
| | | | | 2207 | | | | | 32207 | |
| | 24 (35/80 mm) | | 6307 | 1307 | 7307B | 3307 | 21307 | 307 | 30307 | 31307 |
| | | | 6406 | 2307 | | | | 406 | | 32307 |
| | | 25 (40/68 mm) | 6008 | | | | | | | |
| | | 26 (40/80 mm) | 6208 | 1208 | 7208B | 3208 | 22208 | 208 | 30208 | |
| | | 27 (40/90 mm) | 6308 | 1308 | 7308B | 3308 | 21308 | 308 | 30308 | |
| | | | 6407 | 2308 | | | 22308 | 407 | | |
| | 28 (45/75 mm) | | 6009 | | | | | | | |
| | 29 (45/85 mm) | | 6209 | 1209 | 7209B | 3209 | 22209 | 209 | 30209 | |
| | | | | 2209 | | | | | 32209 | |
| E | 30 (45/100 mm) | | 6309 | 1309 | 7309B | 3309 | 21309 | 309 | 30309 | 31309 |
| | | | 6408 | 2309 | | | 22309 | 408 | | 32309 |
| | 31 (50/80 mm) | | 6010 | | | | | | | |
| | 32 (50/90 mm) | | 6210 | 1210 | 7210B | 3210 | 22210 | 210 | 30210 | |
| | | | | 2210 | | | | | 32210 | |
| | 33 (50/110 mm) | | 6310 | 1310 | 7310B | 3310 | 21310 | 310 | 30310 | 31310 |
| | | | 6409 | 2310 | | | 22310 | 409 | | 32310 |

**If only bearing outer rings have to be installed, for example when the shaft is dismounted, the mounting rings no. 32 (50/90 mm), no. 30 (45/100 mm) and no. 33 (50/110 mm) are used according to the following table.**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 32 (50/90 mm) | | 6011 | | | | | | | |
| | | | 6012 | | | | | | | |
| | 30 (45/100 mm) | | 6013 | 1211 | 7211B | 3211 | 22211 | 211 | | |
| | | | 6211 | 2211 | | | | | | |
| E | 33 (50/110 mm) | | 6014 | 1212 | 7212B | 3212 | 22212 | 212 | | |
| | | | 6015 | 1213 | 7213B | 3213 | 22213 | 213 | | |
| | | | 6212 | 2212 | 7311B | 3311 | 21311 | 311 | | |
| | | | 6213 | 2213 | | | 22311 | 410 | | |
| | | | 6311 | 1311 | | | | | | |
| | | | 6410 | 2311 | | | | | | |

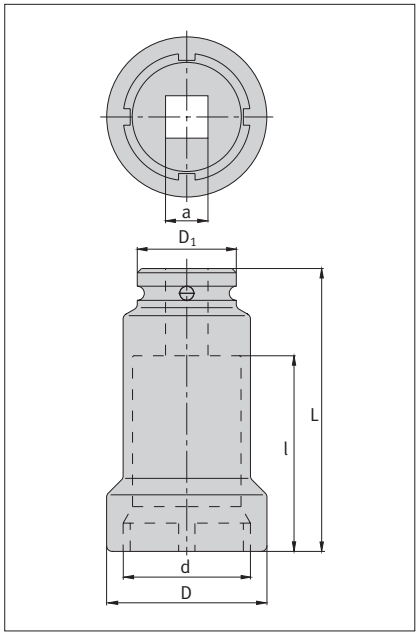
# FAG tools for mounting and dismounting of rolling bearings

Socket wrenches for tapered bearing seats

## FAG socket wrenches LOCKNUT.SOCKET...

Locknuts KM0 to KM20 can be easily tightened and loosened on shafts, adapter sleeves or extraction sleeves using socket wrenches LOCKNUT.SOCKET...
They require less space on the circumference of the nut than hook wrenches and allow the use of ratchets and torque wrenches.
For increased reliability, socket wrenches should be secured using a locking pin and rubber washer. FAG socket wrenches therefore have a hole for the locking pin and a groove for the rubber washer.

The locking pin and rubber washer are included in the scope of delivery.




### Technical data

| Socket wrenches<br>Ordering designation | Dimensions<br>d<br>mm | D | $D_1$ | L | l | Square a<br>inch | Mass ≈<br>kg | Suitable for nut<br>FAG |
|---|---|---|---|---|---|---|---|---|
| **LOCKNUT.SOCKET.KM0** | 18,1 | 22 | 22 | 57 | 44 | 3/8 | 0,1 | KM0 |
| **LOCKNUT.SOCKET.KM1** | 22,2 | 28 | 22 | 57 | 44 | 3/8 | 0,1 | KM1 |
| **LOCKNUT.SOCKET.KM2** | 25,2 | 33 | 30 | 82 | 60 | 1/2 | 0,2 | KM2 |
| **LOCKNUT.SOCKET.KM3** | 28,2 | 36 | 30 | 82 | 60 | 1/2 | 0,24 | KM3 |
| **LOCKNUT.SOCKET.KM4** | 32,2 | 38 | 30 | 82 | 56 | 1/2 | 0,28 | KM4 |
| **LOCKNUT.SOCKET.KM5** | 38,2 | 46 | 30 | 82 | 56 | 1/2 | 0,38 | KM5 |
| **LOCKNUT.SOCKET.KM6** | 45,2 | 53 | 30 | 82 | 56 | 1/2 | 0,42 | KM6 |
| **LOCKNUT.SOCKET.KM7** | 52,2 | 60 | 30 | 82 | 56 | 1/2 | 0,45 | KM7 |
| **LOCKNUT.SOCKET.KM8** | 58,3 | 68 | 30 | 82 | 56 | 1/2 | 0,61 | KM8 |
| **LOCKNUT.SOCKET.KM9** | 65,4 | 73,5 | 44 | 90 | 62 | 3/4 | 0,8 | KM9 |
| **LOCKNUT.SOCKET.KM10** | 70,4 | 78,5 | 44 | 90 | 62 | 3/4 | 0,85 | KM10 |
| **LOCKNUT.SOCKET.KM11** | 75,4 | 83,5 | 44 | 90 | 62 | 3/4 | 0,9 | KM11 |
| **LOCKNUT.SOCKET.KM12** | 80,4 | 88,5 | 44 | 90 | 60 | 3/4 | 1 | KM12 |
| **LOCKNUT.SOCKET.KM13** | 85,4 | 94 | 44 | 90 | 60 | 3/4 | 1,1 | KM13 |
| **LOCKNUT.SOCKET.KM14** | 92,5 | 103 | 76 | 110 | 74 | 1 | 2,2 | KM14 |
| **LOCKNUT.SOCKET.KM15** | 98,5 | 109 | 76 | 110 | 74 | 1 | 2,3 | KM15 |
| **LOCKNUT.SOCKET.KM16** | 105,6 | 116 | 76 | 110 | 74 | 1 | 2,45 | KM16 |
| **LOCKNUT.SOCKET.KM17** | 110,6 | 121 | 76 | 110 | 72 | 1 | 2,6 | KM17 |
| **LOCKNUT.SOCKET.KM18** | 120,6 | 131 | 76 | 110 | 72 | 1 | 2,9 | KM18 |
| **LOCKNUT.SOCKET.KM19** | 125,6 | 137 | 76 | 110 | 72 | 1 | 3,05 | KM19 |
| **LOCKNUT.SOCKET.KM20** | 130,6 | 143 | 76 | 110 | 70 | 1 | 3,3 | KM20 |

Other sizes by agreement.

# FAG tools for mounting and dismounting of rolling bearings

Hook wrenches for tapered bearing seats

## FAG hook wrenches LOCKNUT.HOOK...

Hook wrenches of series LOCKNUT.HOOK... (former FAG designation HN../..) can be used to tighten and loosen locknuts from KM0 on shafts, adapter sleeves and extraction sleeves.

Hook wrenches can be used to mount rolling bearings on tapered shaft seats, adapter sleeves or extraction sleeves. Extraction sleeves can also be dismounted using hook wrenches together with the extraction nuts. The table below contains dimensions, masses and allocation of the hook wrenches to the respective locknuts.

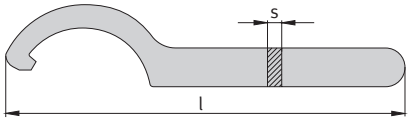
Ordering example for FAG socket wrench, suitable for threaded nuts KM18, KM19 and KM20:

**LOCKNUT.HOOK.KM18-20**
(former designation: HN120/130)

### Technical data

| Hook wrenches<br>Ordering designation | Dimensions<br>l<br>mm | <br>s | Mass<br>≈<br>kg | Suitable for locknuts<br>FAG |
|---|---|---|---|---|
| **LOCKNUT.HOOK.KM0-1** | 110 | 3 | 0,025 | KM0, KM1 |
| **LOCKNUT.HOOK.KM2-3** | 136 | 4 | 0,045 | KM2, KM3 |
| **LOCKNUT.HOOK.KM4** | 136 | 4 | 0,05 | KM4 |
| **LOCKNUT.HOOK.KM5** | 170 | 5 | 0,09 | KM5 |
| **LOCKNUT.HOOK.KM6** | 206 | 6 | 0,155 | KM6 |
| **LOCKNUT.HOOK.KM7** | 206 | 6 | 0,16 | KM7 |
| **LOCKNUT.HOOK.KM8-9** | 242 | 7 | 0,255 | KM8, KM9 |
| **LOCKNUT.HOOK.KM10-11** | 242 | 7 | 0,255 | KM10, KM11 |
| **LOCKNUT.HOOK.KM12-14** | 280 | 8 | 0,41 | KM12, KM13, KM14 |
| **LOCKNUT.HOOK.KM15-16** | 280 | 8 | 0,385 | KM15, KM16 |
| **LOCKNUT.HOOK.KM17** | 335 | 10 | 0,745 | KM17 |
| **LOCKNUT.HOOK.KM18-20** | 335 | 10 | 0,72 | KM18, KM19, KM20 |
| **LOCKNUT.HOOK.KM21-23** | 385 | 10 | 1 | KM21, KM22, KM23 |
| **LOCKNUT.HOOK.KM24-27** | 385 | 10 | 1,16 | KM24, KM25, KM26, KM27 |
| **LOCKNUT.HOOK.KM28-30** | 470 | 10 | 1,58 | KM28, KM29, KM30 |
| **LOCKNUT.HOOK.KM31-34** | 470 | 10 | 1,58 | KM31, KM32, KM33, KM34 |
| **LOCKNUT.HOOK.KM36-40** | 560 | 10 | 2,25 | KM36, KM38, KM40 |

Other sizes by agreement.



# FAG tools for mounting and dismounting of rolling bearings

Jointed hook wrenches for tapered bearing seats

## FAG jointed hook wrenches LOCKNUT.FLEXI-HOOK...

FAG jointed hook wrenches of series LOCKNUT.FLEXI-HOOK... can be used to tighten and loosen locknuts KM.. as well as precision locknuts LNPG..., ZM... and ZMA... on shafts, adapter sleeves and extraction sleeves if no torque value is specified.

The joint allows one hook wrench of series LOCKNUT.FLEXI-HOOK... to be used for mounting or dismounting locknuts of various sizes.

Ordering example for FAG jointed hook wrench, suitable for locknuts KM14 to KM24:
**LOCKNUT.FLEXI-HOOK.KM14-24**

### Technical data

| Jointed hook wrenches | Dimensions | | Mass | Suitable for nut | | | |
|---|---|---|---|---|---|---|---|
| | Length | Thickness | ≈ | | Precision locknut (FAG) | Precision locknut (INA) | |
| Ordering designation | mm | | kg | | | | |
| **LOCKNUT.FLEXI-HOOK.KM1-4** | 135 | 4 | 0,05 | KM1 | | ZM12 | |
| | | | | KM2 | | ZM15 | |
| | | | | KM3 | LNPG017 | ZM17 | |
| | | | | KM4 | LNPG020 | ZM20 | ZMA15/33 |
| **LOCKNUT.FLEXI-HOOK.KM5-8** | 175 | 5 | 0,1 | KM5 | LNPG025 | ZM25 | ZMA20/38; ZMA20/52 |
| | | | | KM6 | LNPG030 | ZM30 | ZMA25/45; ZMA25/58 |
| | | | | KM7 | LNPG035 | ZM35 | ZMA30/52 |
| | | | | KM8 | LNPG040 | ZM40 | ZMA35/58 |
| **LOCKNUT.FLEXI-HOOK.KM9-13** | 250 | 7 | 0,28 | KM9 | LNPG045 | ZM45 | ZMA30/65 |
| | | | | KM10 | LNPG050 | ZM50 | ZMA35/70 |
| | | | | KM11 | LNPG055 | ZM55 | ZMA40/62; ZMA40/75 |
| | | | | KM12 | LNPG060 | ZM60 | ZMA45/68; ZMA45/85 |
| | | | | KM13 | LNPG065 | ZM65 | ZMA50/75 |
| **LOCKNUT.FLEXI-HOOK.KM14-24** | 290 | 8 | 0,46 | KM14 | LNPG070 | ZM70 | ZMA50/92 |
| | | | | KM15 | LNPG075 | ZM75 | ZMA55/98 |
| | | | | KM16 | LNPG080 | ZM80 | ZMA60/98 |
| | | | | KM17 | LNPG085 | ZM85 | ZMA65/105 |
| | | | | KM18 | LNPG090 | ZM90 | ZMA70/110 |
| | | | | KM19 | LNPG095 | | ZMA75/125 |
| | | | | KM20 | LNPG100 | ZM100 | ZMA80/120 |
| | | | | KM21 | | ZM105 | ZMA90/130; ZMA90/155 |
| | | | | KM22 | LNPG110 | ZM110 | ZMA100/140 |
| | | | | KM23 | | ZM115 | |
| | | | | KM24 | LNPG120 | ZM120 | |
| **LOCKNUT.FLEXI-HOOK.KM24-36** | 420 | 8 | 1 | KM24 | LNPG120 | ZM120 | ZMA90/155 |
| | | | | KM25 | | ZM125 | |
| | | | | KM26 | LNPG130 | ZM130 | |
| | | | | KM27 | | | |
| | | | | KM28 | LNPG140 | ZM140 | |
| | | | | KM29 | | | |
| | | | | KM30 | LNPG150 | ZM150 | |
| | | | | KM31 | | | |
| | | | | KM32 | LNPG160 | | |
| | | | | KM33 | | | |
| | | | | KM34 | LNPG170 | | |
| | | | | KM36 | LNPG180 | | |

# FAG tools for mounting and dismounting of rolling bearings

Jointed pin wrenches for tapered bearing seats

## FAG jointed pin wrenches LOCKNUT.FLEXI-PIN...

FAG jointed pin wrenches of series LOCKNUT.FLEXI-PIN... can be used to tighten and loosen precision locknuts AM15 to AM90 on shafts if no torque value is specified. FAG jointed pin wrenches can be used to mount small bearings on tapered shaft seats.

Tightening is achieved by means of axially arranged holes.

Ordering example for FAG jointed pin wrench, suitable for locknuts AM35 to AM60:
**LOCKNUT.FLEXI-PIN.AM35-60**

**Technical data**

| Jointed pin wrenches<br>Ordering designation | Dimensions<br>Length<br>mm | Pin diameter | Mass<br>≈<br>kg | Suitable for precision locknut (INA) |
|---|---|---|---|---|
| **LOCKNUT.FLEXI-PIN.AM15-17** | 135 | 4 | 0,05 | AM15 |
| | | | | AM17 |
| **LOCKNUT.FLEXI-PIN.AM20** | 175 | 4 | 0,1 | AM20 |
| **LOCKNUT.FLEXI-PIN.AM25-35/58** | 175 | 5 | 0,1 | AM25 |
| | | | | AM30 |
| | | | | AM35/58 |
| **LOCKNUT.FLEXI-PIN.AM35-60** | 250 | 6 | 0,28 | AM35 |
| | | | | AM40 |
| | | | | AM45 |
| | | | | AM50 |
| | | | | AM60 |
| **LOCKNUT.FLEXI-PIN.AM70-90** | 290 | 8 | 0,46 | AM70 |
| | | | | AM90 |

# FAG tools for mounting and dismounting of rolling bearings

Jointed face wrenches for tapered bearing seats

## FAG jointed face wrenches LOCKNUT.FACE-PIN...

FAG jointed face wrenches of series LOCKNUT.FACE-PIN... can be used to tighten and loosen precision locknuts LNP017 to LNP170 on shafts if no torque value is specified.
FAG jointed face wrenches can be used to mount small bearings on tapered shaft seats.

Tightening is achieved by means of axially arranged holes.

Ordering example for FAG jointed face wrench, suitable for precision locknuts LNP017 to LPN025:
**LOCKNUT.FACE-PIN.LNP17-25**

### Technical data

| Jointed face wrenches | Dimensions | | Mass | Suitable for precision locknut |
|---|---|---|---|---|
| | Length | Pin diameter | ≈ | |
| Ordering designation | mm | | kg | |
| **LOCKNUT.FACE-PIN.LNP17-25** | 150 | 4 | 0,09 | LNP017 |
| | | | | LNP020 |
| | | | | LNP025 |
| **LOCKNUT.FACE-PIN.LNP35-40** | 220 | 5 | 0,245 | LNP035 |
| | | | | LNP040 |
| **LOCKNUT.FACE-PIN.LNP45-65** | 220 | 6 | 0,245 | LNP045 |
| | | | | LNP050 |
| | | | | LNP055 |
| | | | | LNP060 |
| | | | | LNP065 |
| **LOCKNUT.FACE-PIN.LNP70-75** | 320 | 7 | 0,67 | LNP070 |
| | | | | LNP075 |
| **LOCKNUT.FACE-PIN.LNP80-100** | 320 | 8 | 0,67 | LNP080 |
| | | | | LNP085 |
| | | | | LNP090 |
| | | | | LNP095 |
| | | | | LNP100 |
| **LOCKNUT.FACE-PIN.LNP110-130** | 450 | 8 | 1,75 | LNP110 |
| | | | | LNP120 |
| | | | | LNP130 |
| **LOCKNUT.FACE-PIN.LNP140-170** | 450 | 10 | 1,75 | LNP140 |
| | | | | LNP150 |
| | | | | LNP160 |
| | | | | LNP170 |

# FAG tools for mounting and dismounting of rolling bearings

Double hook wrenches for tapered bearing seats

## FAG double hook wrenches for tapered bearing seats

FAG double hook wrenches are intended for the mounting of self-aligning ball bearings with a tapered bore. They are available as kits, sets or individual wrenches (for a description see below).

### FAG double hook wrench kits LOCKNUT.DOUBLEHOOK...KIT

FAG double hook wrench kits comprise a case containing **one** double hook wrench, one torque wrench and a user manual.
The torque wrench allows a precisely defined tightening torque to be achieved at the start of the mounting operation.

Double hook wrench kits, e.g. LOCKNUT.DOUBLEHOOK.KM5.KIT and LOCKNUT.DOUBLEHOOK.KM13.KIT (FAG ordering designations)

### FAG double hook wrench sets LOCKNUT.DOUBLEHOOK...SET

FAG offers two different double hook wrench sets. The smaller set contains four double hook wrenches, while the larger set contains five. The other items in the case are the same as in the kits.

Double hook wrench sets LOCKNUT.DOUBLEHOOK.KM5-8.SET and LOCKNUT.DOUBLEHOOK.KM9-13.SET (FAG ordering designations)

### FAG double hook wrenches LOCKNUT.DOUBLEHOOK...

Individual double hook wrenches are also available, see table on page 14 below. Each double hook wrench is engraved with the torsion angles for the self-aligning ball bearings to be mounted using that particular wrench, so that the sliding distance and reduction in radial internal clearance can be precisely set.

Double hook wrenches, e.g. LOCKNUT.DOUBLEHOOK.KM5 and LOCKNUT.DOUBLEHOOK.KM13 (FAG ordering designations)

# FAG tools for mounting and dismounting of rolling bearings

Double hook wrenches for tapered bearing seats

## Double hook wrenches

| Double hook wrench kits | Suitable for self-aligning ball bearings | | | | Adapter sleeve nut | Mass Kit ≈ |
|---|---|---|---|---|---|---|
| **Ordering designation** | | | | | **FAG** | **kg** |
| **LOCKNUT.DOUBLEHOOK.KM5.KIT** | 1205 | 2205 | 1305 | 2305 | KM5 | 1,35 |
| **LOCKNUT.DOUBLEHOOK.KM6.KIT** | 1206 | 2206 | 1306 | 2306 | KM6 | 1,35 |
| **LOCKNUT.DOUBLEHOOK.KM7.KIT** | 1207 | 2207 | 1307 | 2307 | KM7 | 1,35 |
| **LOCKNUT.DOUBLEHOOK.KM8.KIT** | 1208 | 2208 | 1308 | 2308 | KM8 | 1,4 |
| Contents of a kit: | 1 double hook wrench (left-hand column below),<br>torque wrench with adjusting wrench (same as small set),<br>case (350×220×65 mm),<br>user manual | | | | | |
| **LOCKNUT.DOUBLEHOOK.KM9.KIT** | 1209 | 2209 | 1309 | 2309 | KM9 | 3,8 |
| **LOCKNUT.DOUBLEHOOK.KM10.KIT** | 1210 | 2210 | 1310 | 2310 | KM10 | 3,8 |
| **LOCKNUT.DOUBLEHOOK.KM11.KIT** | 1211 | 2211 | 1311 | 2311 | KM11 | 3,85 |
| **LOCKNUT.DOUBLEHOOK.KM12.KIT** | 1212 | 2212 | 1312 | | KM12 | 3,85 |
| **LOCKNUT.DOUBLEHOOK.KM13.KIT** | 1213 | 2213 | | | KM13 | 4 |
| Contents of a kit: | 1 double hook wrench (right-hand column below),<br>torque wrench with adjusting wrench, extension piece (same as large set),<br>case (450×330×100 mm),<br>user manual | | | | | |

**Double hook wrench sets**

**Ordering designation:**

**LOCKNUT.DOUBLEHOOK.KM5-8.SET** (previously 173556)
Scope of delivery: 4 double hook wrenches (left-hand column below),
torque wrench with adjusting wrench **LOCKNUT.DOUBLEHOOK.WRENCH35NM**,
case (350×220×65 mm),
user manual,
mass of complete set 1,5 kg

**LOCKNUT.DOUBLEHOOK.KM9-13.SET** (previously 173557)
Scope of delivery: 5 double hook wrenches (right-hand column below),
torque wrench with adjusting wrench **LOCKNUT.DOUBLEHOOK.WRENCH100NM**,
extension piece **LOCKNUT.DOUBLEHOOK.LEVER**,
case (450×330×100 mm),
user manual,
mass of complete set 4,2 kg

**Double hook wrenches**

| Individual wrenches included in the small set | Individual wrenches included in the large set |
|---|---|
| **Ordering designation** (previous designation) | |
| **LOCKNUT.DOUBLEHOOK.KM5** (DHN5) | **LOCKNUT.DOUBLEHOOK.KM9** (DHN9) |
| **LOCKNUT.DOUBLEHOOK.KM6** (DHN6) | **LOCKNUT.DOUBLEHOOK.KM10** (DHN10) |
| **LOCKNUT.DOUBLEHOOK.KM7** (DHN7) | **LOCKNUT.DOUBLEHOOK.KM11** (DHN11) |
| **LOCKNUT.DOUBLEHOOK.KM8** (DHN8) | **LOCKNUT.DOUBLEHOOK.KM12** (DHN12) |
| | **LOCKNUT.DOUBLEHOOK.KM13** (DHN13) |

The following are available as **replacement parts**:
individual double hook wrenches (list of ordering designations above),
torque wrenches **LOCKNUT.DOUBLEHOOK.WRENCH35NM** and **LOCKNUT.DOUBLEHOOK.WRENCH100NM**,
extension piece **LOCKNUT.DOUBLEHOOK.LEVER** for large set.

# FAG tools for dismounting of rolling bearings

Mechanical two-arm extractors 54 for small bearings

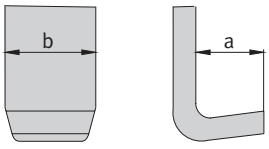
## FAG two-arm extractor 54

### Application

- For extracting complete rolling bearings of all types or tightly fitted inner rings as well as other parts, e.g. gears, that are gripped from inside or outside
- Good radial and axial accessibility of the bearing location and slots required

### Operation and handling

An extractor with suitable dimensions is selected in accordance with the bearing size and the mounting conditions. The extraction arms are adjusted on the cross arm until they have the correct span.
A self-locking device prevents the arms from slipping off when the spindle is screwed in.
Rolling bearing rings that are removed in accordance with the specifications remain undamaged.
If the extraction forces are directed through the rolling elements during extraction of complete bearings, the bearings are generally rendered unusable.

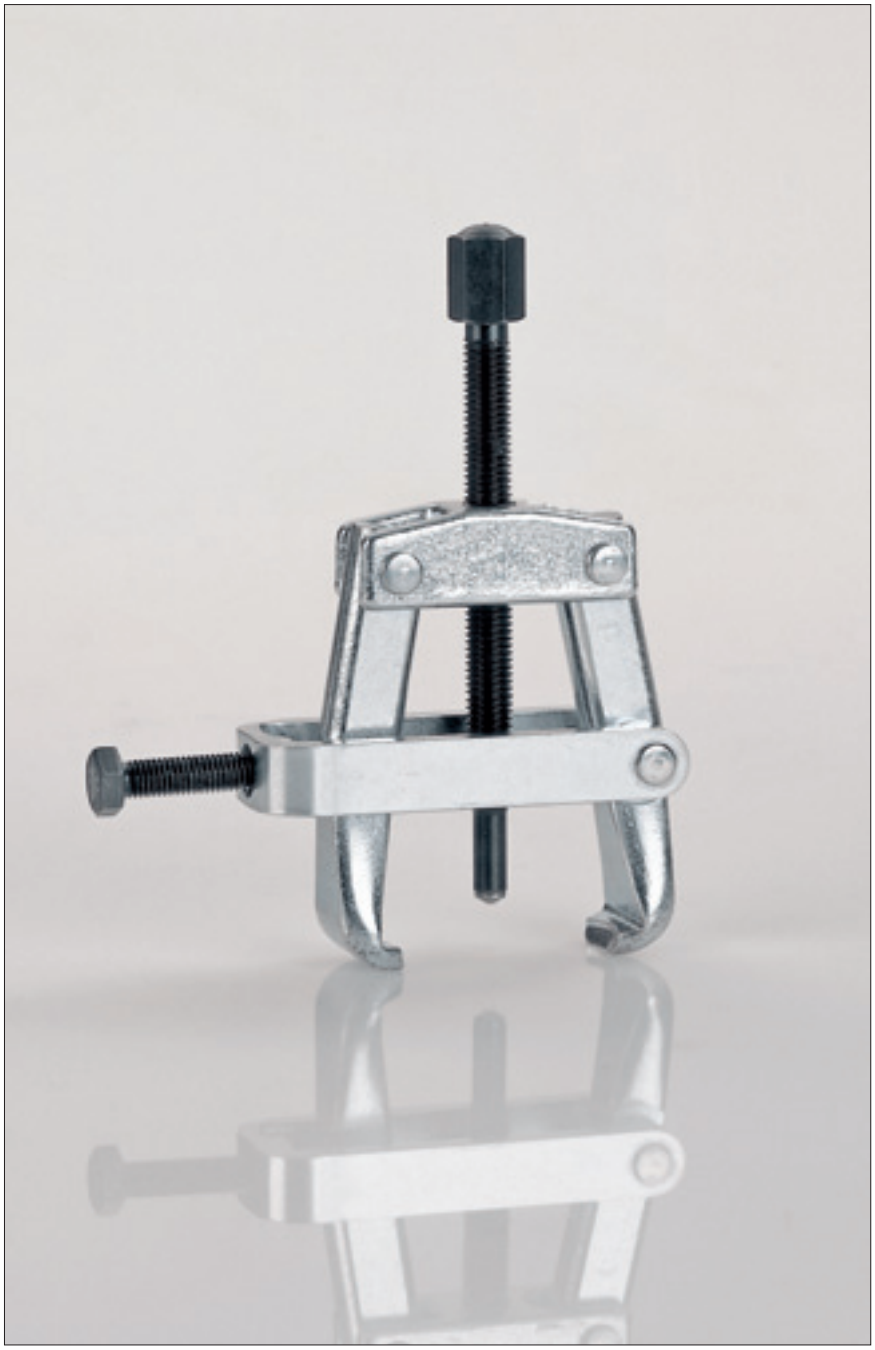




**Product range – Two-arm extractor 54**

| Ordering designation Two-arm extractors | Span mm | Depth mm | Dimensions a mm | b | Spindle thread | Extraction force kN | Mass ≈ kg |
|---|---|---|---|---|---|---|---|
| **ABZIEHER54.SET**, comprising a stand (B×T×H) 215×235×475 mm, complete with the following 6 extractors | | | | | | | 15,5 |
| **ABZIEHER54.100** | 80 | 100 | 14 + 1 | 18 + 1 | M14×1,5 | 40 | 0,75 |
| **ABZIEHER54.200** | 120 | 125 | 14 + 1 | 18 + 1 | M14×1,5 | 40 | 0,9 |
| **ABZIEHER54.300** | 160 | 150 | 18 + 1 | 26 + 2 | M20×2 | 60 | 2,3 |
| **ABZIEHER54.400** | 200 | 175 | 18 + 1 | 26 + 2 | M20×2 | 60 | 2,5 |
| **ABZIEHER54.500** | 250 | 200 | 20 + 1 | 28 + 2 | M22×2 | 85 | 3,45 |
| **ABZIEHER54.600** | 350 | 250 | 20 + 1 | 28 + 2 | M22×2 | 85 | 4,4 |

# FAG tools for dismounting of rolling bearings

Mechanical two-arm extractors 47 for small bearings



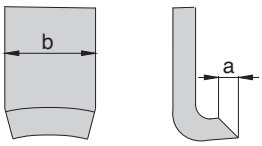
## FAG two-arm bearing extractor 47

### Application

- For extracting complete rolling bearings or tightly fitted inner rings
- Bearing rings may be fitted against a surface, i.e. slots are not required

### Operation and handling

An extractor with suitable dimensions is selected in accordance with the bearing size and the mounting conditions. By means of the tightening shackle the ring to be extracted can be wedged loose using the specially shaped arms. Wedging and centring on the shaft are important for extraction without damage.
Rolling bearing rings that are removed in accordance with the specifications remain undamaged. If the extraction forces are directed through the rolling elements during extraction of complete bearings, the bearings are generally rendered unusable.




**Product range – Two-arm bearing extractor 47**

| Ordering designation Two-arm bearing extractor | Span | Depth | Dimensions | | Spindle thread | Extraction force | Mass ≈ |
|---|---|---|---|---|---|---|---|
| | | | a | b | | | |
| | mm | mm | mm | | | kN | kg |
| **ABZIEHER47.100** | 45 | 65 | 2,5 | 12 + 1 | M10 | 10 | 0,55 |
| **ABZIEHER47.200** | 90 | 100 | 2,5 | 14 + 1 | M14×1,5 | 40 | 1,45 |

# FAG tools for dismounting of rolling bearings

Mechanical three-arm extractors 52 for small bearings

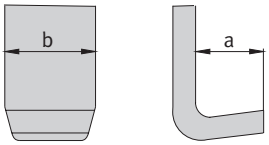
## FAG three-arm extractor 52

### Application

- For extracting complete rolling bearings or tightly fitted inner rings
- Good radial and axial accessibility of the bearing location and slots required

### Operation and handling

An extractor with suitable dimensions is selected in accordance with the bearing size and the mounting conditions. The span is adjusted by shifting the lever system on the cylinder. The lever system causes self-locking of the arms, thereby ensuring good grip during the extraction process.
Rolling bearing rings that are removed in accordance with the specifications remain undamaged. If the extraction forces are directed through the rolling elements during extraction of complete bearings, the bearings are generally rendered unusable.





**Product range – Three-arm extractor 52**

| Ordering designation Three-arm extractor | Span mm | Depth mm | Dimensions a mm | b | Spindle thread | Extraction force kN | Mass ≈ kg |
|---|---|---|---|---|---|---|---|
| **ABZIEHER52.085** | 85 | 65 | 5 + 1 | 6,5 + 1 | M10 | 10 | 0,36 |
| **ABZIEHER52.130** | 130 | 105 | 14 + 1 | 15 + 1 | M14×1,5 | 40 | 2,4 |
| **ABZIEHER52.230** | 230 | 150 | 19 + 1 | 22 + 1 | M22×2 | 100 | 5,4 |
| **ABZIEHER52.295** | 295 | 235 | 19 + 1 | 22 + 1 | M22×2 | 100 | 6,2 |
| **ABZIEHER52.390** | 390 | 270 | 20 + 2 | 30 + 2 | M30×2 | 150 | 12,3 |
| **ABZIEHER52.640** | 640 | 300 | 22 + 2 | 34 + 2 | M30×2 | 150 | 15,8 |

# FAG tools for dismounting of rolling bearings

Hydraulic pressure tool 44 for small bearings

## Hydraulic FAG pressure tool 44

### Application

The pressure tool is normally used to loosen tightly fitted parts in conjunction with mechanical extractors.

### Operation and handling

The hydraulic pressure tool generates an axial force of 80 or 150 kN, thus bringing about a significant reduction in the effort required. The spindle thread of the mechanical extraction tool is not unduly stressed as the main extraction force acts on static thread flanks.

The pressure tool 44.150 features a hydraulic return mechanism, i.e. when the pressure screw is reversed, the hydraulic system automatically returns to the initial position.

The hydraulic pressure tool is applied between the shaft end and extractor spindle. The spindle is then applied. The hydraulic system is actuated by screwing in the pressure screw. The axial force that this generates loosens the part. It can then be extracted in the normal manner with the mechanical spindle.

For safety reasons, the minimum spindle diameter and the maximum torque (see table) must be observed.

**Product range – Hydraulic pressure tool 44**

| Ordering designation Hydraulic pressure tool | Axial force | Stroke | Section height | Spindle diameter min. | Torque max. | Mass ≈ |
|---|---|---|---|---|---|---|
| | kN | mm | mm | mm | Nm | kg |
| **ABZIEHER44.080** | 80 | 7 | 35 | M22 | 25 | 0,6 |
| **ABZIEHER44.150** | 150 | 10 | 85 | M30 | 50 | 1,74 |

# FAG tools for dismounting of rolling bearings

Mechanical internal extractors 62 for small bearings

## FAG internal extractor 62

### Application

- For deep groove ball bearings and angular contact ball bearings. The internal extractor set comprises nine extractors and can be used on bearings with a bore of 5 mm up to approx. 70 mm.
- For tightly fitted outer rings.
- The inner ring bore must be easily accessible.
- Since the extraction force is directed through the rolling elements, the possibility of bearing damage cannot be excluded.

### Operation and handling

The gripping segments spread when the threaded spindle is tightened. The lip of the jaws is behind under the bore of the bearing inner ring. The bearing is extracted using the threaded spindle and the internal extractor with the aid of the countersupport.


Ordering designation: **ABZIEHER62.SET** (nine internal extractors with two countersupports in a rigid metal case). The 9 internal extractors with countersupport can also be ordered individually.

**Product range – Internal extractor set 62 with countersupports**

| Ordering designation 9 internal extractors with 2 countersupports (set complete in case) | Internal extractor with countersupport | For inside diameter from mm | to | Depth mm | Spindle thread | Mass ≈ kg |
|---|---|---|---|---|---|---|
| **ABZIEHER62.SET** | **ABZIEHER62.100.005** | 5 | 6,5 | 35 | M10 | 0,09 |
| | **ABZIEHER62.100.007** | 7 | 9,5 | 35 | M10 | 0,09 |
| | **ABZIEHER62.100.010** | 10 | 13,5 | 35 | M10 | 0,1 |
| | **ABZIEHER62.100.014** | 14 | 19,5 | 45 | M10 | 0,13 |
| | **ABZIEHER62.100.020** | 20 | 29,5 | 50 | M10 | 0,18 |
| | **ABZIEHER62.100.030** | 30 | 39,5 | 90 | M10 | 0,25 |
| | **ABZIEHER62.200.040** | 40 | 49,5 | 95 | M14×1,5 | 0,48 |
| | **ABZIEHER62.200.050** | 50 | 59,5 | 95 | M14×1,5 | 0,56 |
| | **ABZIEHER62.200.060** | 60 | 69,5 | 95 | M14×1,5 | 0,62 |

# FAG tools for dismounting of rolling bearings

Mechanical internal extractor PULLER.INTERNAL.SET10-100

## FAG internal extractor PULLER.INTERNAL.SET10-100

### Application

- For standard deep groove ball bearings. The set, comprising 6 sets of extraction legs and 2 threaded spindles can be used on bores from 10 to 100 mm.
- For tightly fitted outer rings.
- No dismounting of shaft.

### Operation

Three extraction legs grip under the outer ring shoulder of the deep groove ball bearing. The suitable combination of extraction legs and threaded spindle for the bearing size can be found in the selection table.

Ordering designation:
**PULLER.INTERNAL.SET10-100**
(6 sets of extraction legs and 2 threaded spindles in a practical case, case dimensions: 315×250×70 mm, total mass: 3,2 kg)

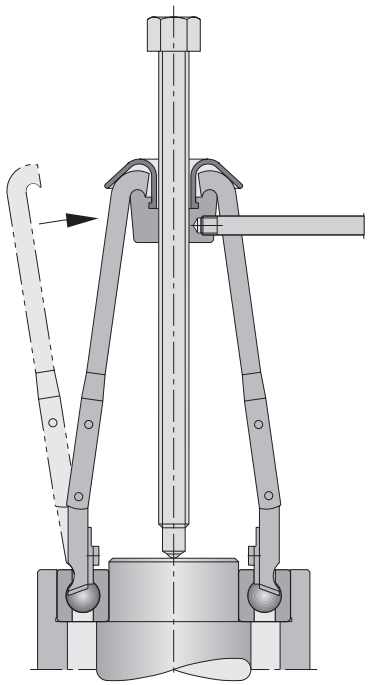
The individual parts can be ordered separately, see page 21 below.

# FAG tools for dismounting of rolling bearings

Mechanical internal extractor PULLER.INTERNAL.SET10-100

## Selection table for extraction legs and spindles for internal extractor PULLER.INTERNAL.SET10-100

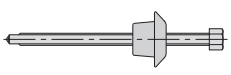
| Deep groove ball bearings series | | | | Extraction leg | Spindle |
|---|---|---|---|---|---|
| 60 | 62 | 63 | 64 | | |
| 6000 | 6200 | | | | |
| 6001 | | | | A1 | |
| 6002 | | | | | |
| 6003 | | | | | |
| 6004 | 6201 | | | | |
| 6005 | 6202 | | | A2 | M12 |
| 6006 | 6203 | | | | |
| 6007 | 6204 | 6300 | | | |
| 6008 | 6205 | 6301 | | A3 | |
| 6009 | | 6302 | | | |
| 6010 | | | | | |
| 6011 | 6206 | 6303 | | | |
| 6012 | | 6304 | | A4 | |
| 6013 | | | | | |
| 6014 | 6207 | 6305 | 6403 | | |
| 6015 | 6208 | 6306 | | | |
| 6016 | 6209 | 6307 | | A5 | |
| 6017 | 6210 | | | | |
| | 6211 | | | | M16 |
| 6018 | 6212 | 6308 | 6404 | | |
| 6019 | 6213 | 6309 | 6405 | | |
| 6020 | 6214 | 6310 | 6406 | | |
| | 6215 | 6311 | 6407 | A6 | |
| | 6216 | 6312 | 6408 | | |
| | 6217 | 6313 | 6409 | | |
| | | | 6410 | | |



## Replacement parts

| Ordering designation | Description |
|---|---|
| **PULLER.INTERNAL.3ARM-A1** | Three extraction legs, size A1, 140 mm long |
| **PULLER.INTERNAL.3ARM-A2** | Three extraction legs, size A2, 140 mm long |
| **PULLER.INTERNAL.3ARM-A3** | Three extraction legs, size A3, 140 mm long |
| **PULLER.INTERNAL.3ARM-A4** | Three extraction legs, size A4, 170 mm long |
| **PULLER.INTERNAL.3ARM-A5** | Three extraction legs, size A5, 170 mm long |
| **PULLER.INTERNAL.3ARM-A6** | Three extraction legs, size A6, 170 mm long |

| | |
|---|---|
| **PULLER.INTERNAL.SPINDLE-M12** | Spindle with nut, thread M12 |
| **PULLER.INTERNAL.SPINDLE-M16** | Spindle with nut, thread M16 |



# FAG tools for dismounting of rolling bearings

Mechanical ball bearing extractors 56

## FAG ball bearing extractor 56


### Application

- For extracting complete deep groove ball bearings
- For tightly fitted outer rings
- For bearings without radial access
- Given the fact that the extraction hooks are applied at the outer ring and the threaded spindle is applied at the shaft, the extraction force is forced through the rolling elements, which can render the bearing unusable.

### Operation and handling

The claws of the device grasp the raceway edge of the outer ring between the balls and are supported by the inner ring. The bearing is extracted using a threaded spindle. One of three extractor sizes and one of 13 sets of claws is selected in accordance with the bearing size, see table on page 9.
The number of arms required and their arrangement in the index plate depends on the number of balls in the bearing.
Complete extractor sets consist of one extractor and three or five sets of claws as well as a wrench with a T-shaped handle in the box, see table below.

**Product range – Ball bearing extractor 56**

| Ordering designation Ball bearing extractor set | Depth mm | With claws no. | Wrench with T-shaped handle | Spindle thread | Mass ≈ kg |
|---|---|---|---|---|---|
| **ABZIEHER56.020.SET** | 65 | 01, 02, 03 | SW14 | M10 | 2,1 |
| **ABZIEHER56.120.SET** | 90 | 1, 2, 3, 4, 5 | SW22 | M20×2 | 3,45 |
| **ABZIEHER56.220.SET** | 150 | 7, 11, 16, 17, 23 | SW22 | M20×2 | 4,15 |

# FAG tools for dismounting of rolling bearings

Mechanical ball bearing extractors 56

**Allocation of extractor sets, extractors and claws to standard rolling bearings**

| Extractor set | Extractor | Bearing | Claw no. | Bearing | Claw no. | Bearing | Claw no. | Bearing | Claw no. |
|---|---|---|---|---|---|---|---|---|---|
| **ABZIEHER56.020.SET** | **ABZIEHER56.000** | 6004 | 01 | 6200 | 02 | 6300 | 01 | | |
| | | 6005 | 02 | 6201 | 02 | 6301 | 03 | | |
| | | 6006 | 01 | 6202 | 01 | 6302 | 03 | | |
| | | | | 6203 | 03 | | | | |
| | | | | 6204 | 03 | | | | |
| | | | | 6205 | 03 | | | | |
| **ABZIEHER56.120.SET** | **ABZIEHER56.100** | 6007 | 1 | 6206 | 2 | 6303 | 2 | 6403 | 4 |
| | | 6008 | 1 | 6207 | 3 | 6304 | 2 | 6404 | 5 |
| | | 6009 | 1 | 6208 | 3 | 6305 | 3 | 6405 | 5 |
| | | 6010 | 1 | 6209 | 4 | 6306 | 4 | | |
| | | 6011 | 2 | 6210 | 4 | 6307 | 4 | | |
| | | 6012 | 2 | 6211 | 4 | 6308 | 5 | | |
| | | 6013 | 2 | 6212 | 5 | | | | |
| | | 6014 | 3 | | | | | | |
| | | 6015 | 3 | | | | | | |
| | | 6016 | 4 | | | | | | |
| | | 6017 | 4 | | | | | | |
| | | 6018 | 5 | | | | | | |
| | | 6019 | 5 | | | | | | |
| | | 6020 | 5 | | | | | | |
| **ABZIEHER56.220.SET** | **ABZIEHER56.200** | 6021 | 16 | 6213 | 16 | 6309 | 16 | 6406 | 16 |
| | | | | 6214 | 16 | 6310 | 16 | 6408 | 7 |
| | | | | 6215 | 16 | 6311 | 11 | 6409 | 17 |
| | | | | 6216 | 16 | 6312 | 17 | 6410 | 17 |
| | | | | 6217 | 7 | 6313 | 17 | 6412 | 23 |
| | | | | 6218 | 17 | 6314 | 17 | | |
| | | | | 6219 | 17 | 6315 | 23 | | |
| | | | | | | 6316 | 23 | | |
| | | | | | | 6317 | 23 | | |
| | | | | | | 6318 | 23 | | |
| | | | | | | 6319 | 23 | | |

# FAG tools for dismounting of rolling bearings

Mechanical special bearing extractors 64 for small bearings

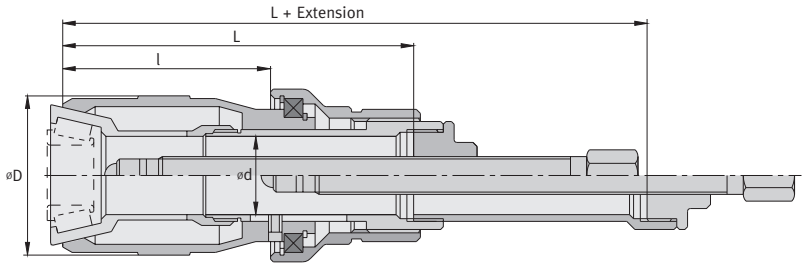
## FAG special bearing extractor 64

### Application

- For radial bearings (deep groove ball bearings and self-aligning ball bearings as well as cylindrical roller, tapered roller and spherical roller bearings). Since the number of rolling elements is not standardised, different grippers may be required for the same bearing sizes from different manufacturers. The bearing manufacturer must be specified when ordering.
- For tight fit of inner ring or outer ring
- For cases in which the inner ring is adjacent to a shaft shoulder without extraction slots; also where the bearing to be extracted from the shaft is still inside a housing.
- Extraction without damage is possible with proper handling.
- Max. shaft diameter 75 mm

### Operation and handling

The special extractor consists of a basic unit and a gripper, which is screwed onto the upper section of the basic unit. The gripper 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 gripper engage between the rolling elements on the raceway edge of the inner ring, behind the rollers or behind the chamfer of the bearing ring, wedging it loose. The extraction principle must be observed when selecting the suitable gripper for the respective bearing, see page 25.




**Product range – Special bearing extractor 64**

| Ordering designation Basic unit for special extractor | Dimensions d mm | D | l | L | Spindle thread | Mass ≈ kg |
|---|---|---|---|---|---|---|
| **ABZIEHER64.400** | 30,5 | 60 | 78 | 135 | M14×1,5 | 1,25 |
| **ABZIEHER64.500** | 46 | 75 | 80 | 150 | M20×2 | 2,5 |
| **ABZIEHER64.600** | 66 | 100 | 92 | 170 | M22×2 | 3,8 |
| **ABZIEHER64.700** | 77 | 126 | 120 | 205 | M30×2 | 7,8 |

The basic unit is chosen so that the dimension d is greater than the bearing bore, for example ABZIEHER64.700 (d = 77 mm) for rolling bearing 6015 with 75 mm bore.

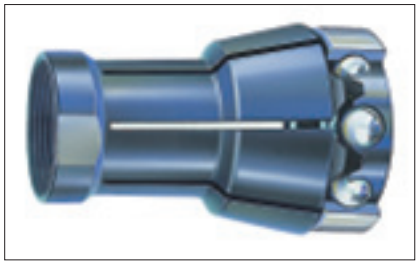
# FAG tools for dismounting of rolling bearings

Mechanical special bearing extractors 64 for small bearings

## Grippers for special bearing extractors 64

The gripping profile of the grippers must be adapted to the geometry of the bearing to be extracted. The extraction principle depends on the bearing design and the mounting position. Two grippers are required for tapered roller bearings in X and O arrangements.

**Extraction principle A:**
For deep groove ball bearings, four point contact bearings, self-aligning ball bearings
The bearing is grasped at the inner ring. Bearings that are located deep in a housing can also be grasped if the outside diameter of the bearing is greater than that of the basic unit.



Ordering designation for grippers: ABZIEHER64A.+ bearing designation (Example: **ABZIEHER64A.6000**)

**Selection of basic unit and gripper**
The basic unit is always chosen so that the dimension d is greater than the bearing bore.
Ordering examples for special bearing extractors plus gripper:
a) For deep groove ball bearings 6000 according to principle A: Basic unit **ABZIEHER64.400** + gripper **ABZIEHER64A.6000**

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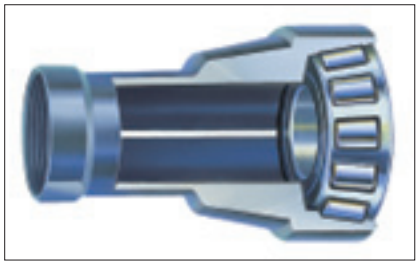
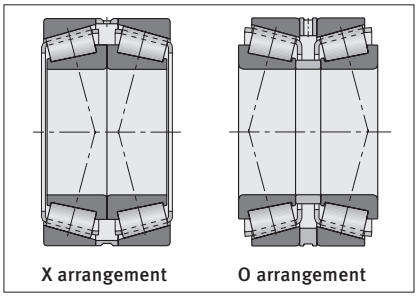
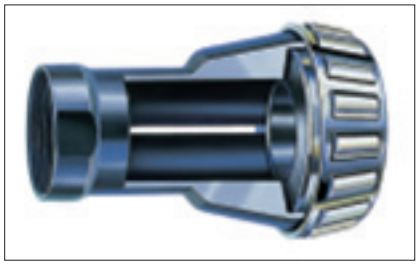
**Extraction principle B:**
For tapered roller bearings (mounted in X or O arrangement)
The gripper reaches over the rollers, irrespective of their number.
With certain bearing dimensions, bearings that are located deep on the shaft can also be extracted.
Ordering designation for grippers: ABZIEHER64B.+ bearing designation (Example: **ABZIEHER64B.30203A**)



b) For tapered roller bearing pair 30203A in X arrangement: Basic unit **ABZIEHER64.400** + gripper **ABZIEHER64B.30203A** + gripper **ABZIEHER64C.30203A**



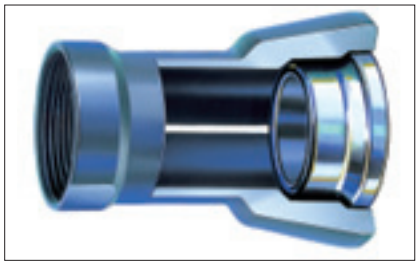

**Extraction principle C:**
For tapered roller bearings (fitted in X or O arrangement)
The gripper engages behind the large lip of the inner ring.
Ordering designation for grippers: ABZIEHER64C.+ bearing designation (Example: **ABZIEHER64C.30203A**)



The same grippers are used in reverse for an O arrangement of the tapered roller bearings.

---

**Extraction principle D:**
For cylindrical roller bearing, four point contact bearing inner ring and for deep groove ball bearing, wedged loose via the chamfer of the bearing ring
Ordering designation for grippers: ABZIEHER64D.+ bearing designation (Example: **ABZIEHER64D.NU315**)



c) For cylindrical roller bearings NU315 according to principle D: Basic unit **ABZIEHER64.700** + gripper **ABZIEHER64D.NU315**

# FAG tools for dismounting of rolling bearings

Mechanical extractor 49 for small bearings


## FAG extractor 49

### Application

- For all rolling bearing types. For extracting complete rolling bearings or tightly fitted inner rings.
  The extractor and the separating device are available in various sizes with openings of up to 210 mm.
- Principally for cases in which the inner ring is adjacent to a shoulder on the shaft without extraction slots. Good radial access to the bearing location is required.
- Extraction of inner rings and complete rolling bearings without damage is possible with proper handling.

### Operation and handling

The two wedge-shaped halves of the separating device are inserted between the shaft shoulder and inner ring by alternately tightening the nuts. The separating device is bolted onto the extractor using two tie rods, which are fastened on the cross arm of the extractor. The bearing or the inner ring are removed by screwing in the spindle. A tie rod extension is available for parts that are seated very deeply on a shaft.

**Product range – Extractor 49 and separating device**

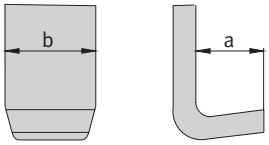
| Ordering designation Extractor with separating device | Span | Depth | Spindle thread | Mass ≈ |
|---|---|---|---|---|
| | mm | mm | mm | kg |
| **ABZIEHER49.100.060** | 60 | 150 | M14×1,5 | 1,54 |
| **ABZIEHER49.100.075** | 75 | 150 | M14×1,5 | 1,67 |
| **ABZIEHER49.200.115** | 115 | 200 | M20×2 | 5,1 |
| **ABZIEHER49.300.150** | 150 | 300 | M20×2 | 10,2 |
| **ABZIEHER49.400.210** | 210 | 300 | M30×2 | 18,8 |

# FAG tools for dismounting of rolling bearings

Hydraulic standard extractor with integral hand pump

## Hydraulic FAG standard extractor with integral hand pump

Hydraulic FAG standard extractors with integral hand pump are available for extraction forces of 40, 60 and 80 kN. They allow rolling bearings, gears, bushes and other components to be dismounted effortlessly. They are easy to handle and safe. The compact, light units are housed with a safety grid in a rigid case.
PULLER.HYD40 is supplied with a normal arm length. PULLER.HYD60 and PULLER.HYD80 are also available with extended arms (suffix XL).
In addition to the complete devices, we also supply the arms as replacement parts and accessories.
Ordering example for normal length arm as accessory for PULLER.HYD60XL / replacement part for PULLER.HYD60:
**PULLER.HYD60.JAW**
Ordering example for extended arm as
accessory for PULLER.HYD80 / replacement part for PULLER.HYD80XL:
**PULLER.HYD80.LONGJAW**




**Product range – Standard extractor SPIDER with integral hand pump**

| Ordering designation | Extraction force | Span | Depth | Stroke | Dimensions | | Mass |
|---|---|---|---|---|---|---|---|
| | | | | | a | b | ≈ |
| | kN | mm | mm | mm | mm | | kg |
| **PULLER.HYD40** | 40 | 150 | 152 | 55 | 11 | 22 | 4,5 |
| **PULLER.HYD60** | 60 | 200 | 152 | 82 | 11 | 22 | 4,9 |
| PULLER.HYD60XL | 60 | 200 | 190 | 82 | 11 | 22 | 5,2 |
| **PULLER.HYD80** | 80 | 250 | 190 | 82 | 11 | 25 | 6,6 |
| PULLER.HYD80XL | 80 | 250 | 229 | 82 | 14 | 25 | 7 |

# FAG tools for dismounting of rolling bearings

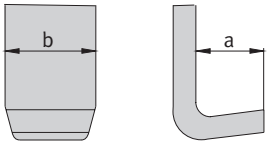
Extra strong hydraulic extractor with integral hand pump

## Extra strong hydraulic FAG extractor with integral hand pump

Extra strong hydraulic FAG extractors with integral hand pump are available for high extraction forces of up to 300 kN. They allow rolling bearings, gears, bushes and other components to be dismounted effortlessly. They are easy to handle and safe. The compact units are housed in a rigid metal case. Extractors SPIDER 100 to 300 are also available with extended arms (suffix XL).


Ordering example for normal length arm as accessory for PULLER.HYD100XL / replacement part for PULLER.HYD100:
**PULLER.HYD100.JAW**

Ordering example for extended arm as accessory for PULLER.HYD200 / replacement part for PULLER.HYD200XL:
**PULLER.HYD200.LONGJAW**




**Product range – Extra strong extractor SPIDER with integral hand pump**

| Ordering designation | Extraction force kN | Span mm | Depth mm | Stroke mm | Dimensions a mm | Dimensions b | Mass ≈ kg |
|---|---|---|---|---|---|---|---|
| **PULLER.HYD100** | 100 | 280 | 182 | 82 | 11 | 22 | 5,6 |
| PULLER.HYD100XL | 100 | 280 | 220 | 82 | 11 | 25 | 6,5 |
| **PULLER.HYD120** | 120 | 305 | 220 | 82 | 11 | 25 | 7,6 |
| PULLER.HYD120XL | 120 | 305 | 259 | 82 | 14 | 29 | 8,5 |
| **PULLER.HYD200** | 200 | 356 | 259 | 82 | 14 | 29 | 10 |
| PULLER.HYD200XL | 200 | 356 | 300 | 82 | 30 | 33 | 11,5 |
| **PULLER.HYD250** | 250 | 406 | 300 | 110 | 30 | 33 | 20 |
| PULLER.HYD250XL | 250 | 406 | 375 | 110 | 27 | 38 | 22 |
| **PULLER.HYD300** | 300 | 540 | 375 | 110 | 27 | 38 | 25 |
| PULLER.HYD300XL | 300 | 800 | 405 | 110 | 30 | 28 | 45 |

# FAG tools for dismounting of rolling bearings

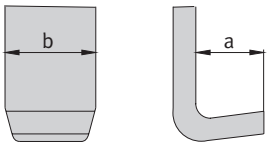
Extra strong hydraulic extractors with separate hand pump

## Extra strong hydraulic FAG extractors with separate hand pump

For extra strong hydraulic FAG extractors for maximum extraction forces of 175 and 400 kN, the oil pressure is applied with a separate hand pump. They allow rolling bearings, gears, bushes and other components to be dismounted effortlessly, even in restricted spaces. The extractors are easy and safe to use. They are housed with the pumps in a rigid metal case. The two hydraulic extractors are available with a normal arm length and with extended arms on request (suffix XL).

Ordering example for normal length arm as
accessory for PULLER.HYD175XL / replacement part for PULLER.HYD175:
**PULLER.HYD175.JAW**

Ordering example for extended arm as
accessory for PULLER.HYD400 / replacement part for PULLER.HYD400XL:
**PULLER.HYD400.LONGJAW**


**Product range – Extra strong extractor SPIDER with separate hand pump**

| Ordering designation | Extraction force | Span | Depth | Stroke | Dimensions | | Mass |
|---|---|---|---|---|---|---|---|
| | | | | | a | b | ≈ |
| | kN | mm | mm | mm | mm | | kg |
| **PULLER.HYD175** | 175 | 356 | 229 | 82 | 14 | 29 | 15,6 |
| PULLER.HYD175XL | 175 | 356 | 300 | 82 | 30 | 33 | 17 |
| **PULLER.HYD400** | 400 | 800 | 405 | 250 | 30 | 28 | 45 |
| PULLER.HYD400XL | 400 | 1 200 | 635 | 250 | 30 | 28 | 49 |

# FAG tools for dismounting of rolling bearings

Three-section extraction plates for extractors

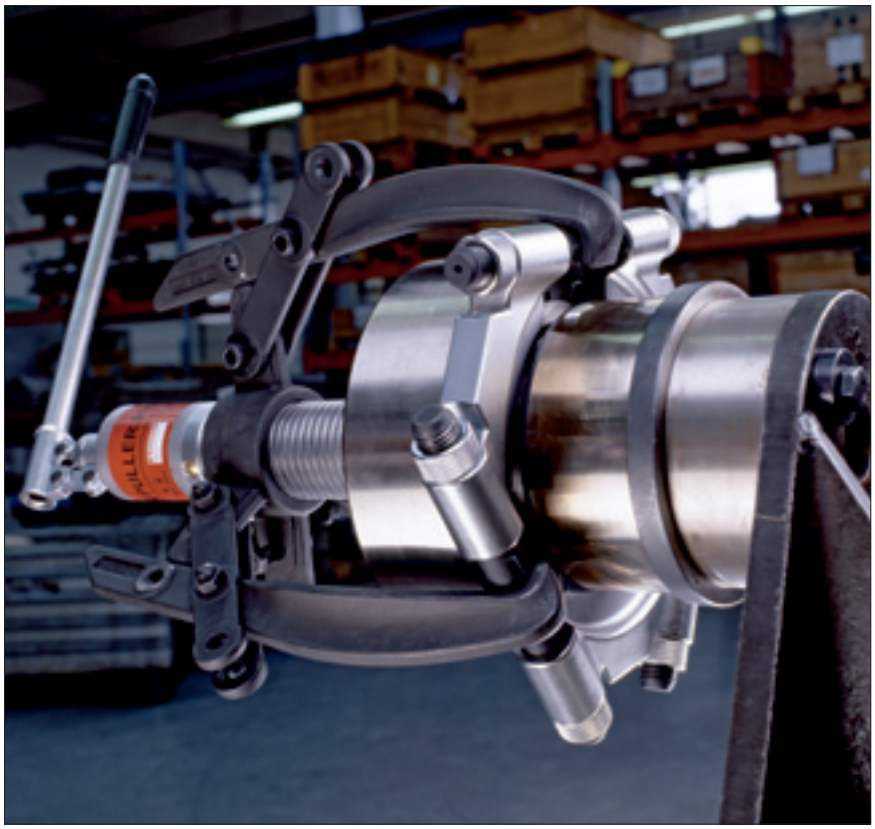
## Three-section FAG extraction plates

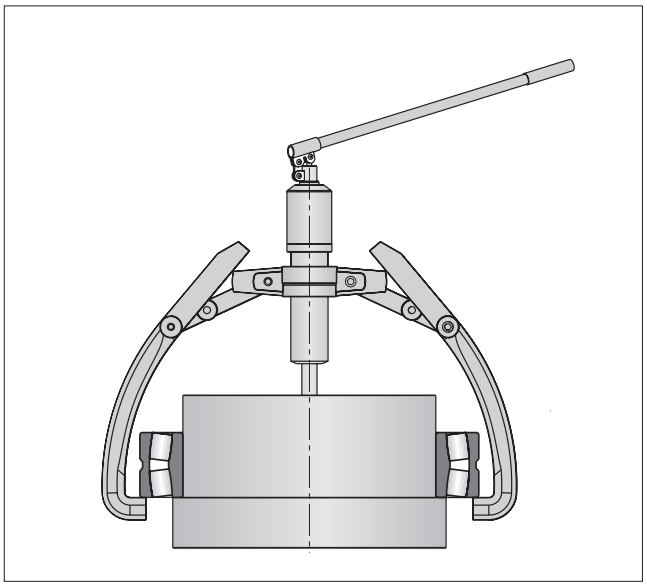
### Application

- For extraction of complete bearings or tightly fitted inner rings
- Principally for cases in which the inner ring is adjacent to a shoulder on the shaft without extraction slots. Good radial access to the bearing location is required.
- Extraction of inner rings and complete rolling bearings without damage is possible with proper handling.

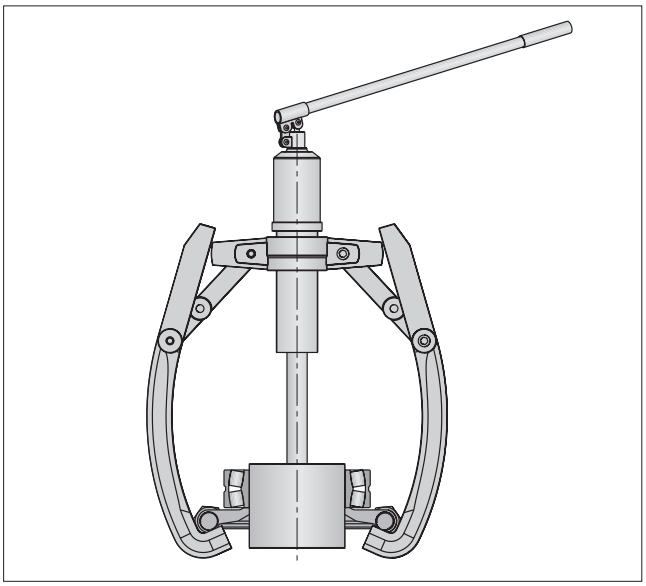
### Operation

The three extraction plates are pushed due to alternating screwing in of the nuts between the shaft shoulder and inner ring.
The separating device is screwed onto the extraction plates using three tie rods.





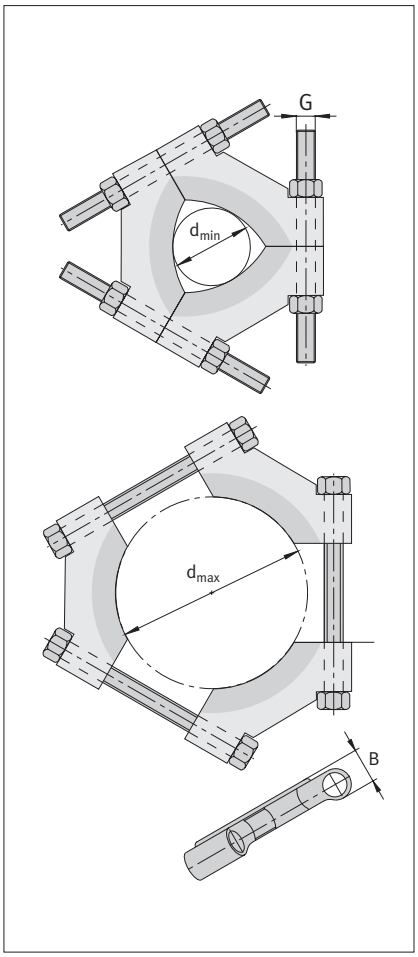
If the extraction forces are directed through the rolling elements, the rolling elements and raceways could be damaged.



Use of a three-section extraction plate prevents damage because the forces act on the tightly fitted inner rings.

# FAG tools for dismounting of rolling bearings

Three-section extraction plates for extractors




**Product range – Three-section extraction plates**

| Ordering designation Extraction plate | Dimensions $d_{min}$ mm | $d_{max}$ | B | Thread G | Mass ≈ kg | Suitable for hydraulic extractor | mechanical extractor |
|---|---|---|---|---|---|---|---|
| **PULLER.TRISECTION50** | 12 | 50 | 17 | M10×1,25 | 0,5 | – | 52,085/52,130 |
| **PULLER.TRISECTION100** | 26 | 100 | 28 | M16×2 | 2,6 | 40/60/80/100 | 52,230 |
| **PULLER.TRISECTION160** | 50 | 160 | 33,5 | M22×2,5 | 5,8 | 80/100/120/175/200 | 52,295 |
| **PULLER.TRISECTION260** | 90 | 260 | 46,5 | M32×2,5 | 18,4 | 175/200/250/300 | 52,390 |
| **PULLER.TRISECTION380** | 140 | 380 | 65 | M44×2,5 | 50,3 | 250/300/400 | 52,640 |

# Other FAG publications

| | |
|---|---|
| CD - MM 1.0 | FAG Mounting Manager |
| CD Medias 4.x | Electronic INA/FAG rolling bearing catalogue |
| CD - WLS | Rolling bearing learning system |
| | |
| Publ. WL 80 100 | Mounting of rolling bearings |
| Publ. WL 80 102 | Hydraulic method for mounting and dismounting of rolling bearings |
| Publ. WL 80 123 | All about rolling bearings – The FAG training offer on the theory and practice of rolling bearings |
| Publ. WL 80 250 | FAG equipment and services for the mounting and maintenance of rolling bearings |
| Publ. WL 82 102 | Rolling bearing damage |
| | |
| TI WL 00-11 | FAG videos on bearing arrangement technology |
| TI WL 80-14 | Mounting and dismounting of spherical roller bearings with tapered bore |
| TI WL 80-38 | Mounting of self-aligning ball bearings using adapter sleeves |
| TI WL 80-50 | FAG pressure generation devices |
| TI WL 80-53 | Rolling bearing mounting cabinet and mounting sets – Basic course for vocational training |
| TPI WL 80-54 | FAG heating devices for mounting of rolling bearings |
| TPI WL 80-55 | FAG alignment tools |
| TPI WL 80-57 | FAG hydraulic nuts |
| TPI WL 80-58 | FAG tools for heat assisted dismounting |

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