

FAG



FAG Mechanical Extractors

Technical Information

A Member of the
Schaeffler Group

FAG Mechanical Extractors

Application · Programme

Application of extractors

Small rolling bearings with bore diameters of up to about 100 mm which have an interference fit on the shaft or in the housing are usually dismantled by means of mechanical extractors. The bearings can be dismantled without getting damaged if the device is applied at the tightly fitted bearing ring.

With FAG mechanical extractors,

the extraction force is usually applied by means of threaded spindles. Hydraulic pressure tools make the job easier in some cases.

Lager bearings are dismantled using hydraulic extractors (see Publ. No. WL 80 344), the hydraulic method or induction heating devices.

In this TI the fields of application and the operation of the FAG mechanical extractors are described.

Programme

The programme of the FAG mechanical extractors comprises:

Two-Arm Extractor 54	3
Two-Arm Bearing Extractor 47	4
Three-Arm Extractor 52	5
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Mechanical Extractors

Two-Arm Extractor 54

Two-Arm Extractor 54

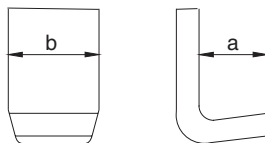
Application

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

Operation

Depending on bearing size and mounting conditions, the extractor with the suitable dimensions is selected. The extraction arms are adjusted on the cross arm until they have the right span. When the spindle is screwed in, a self-locking mechanism prevents the arms from slipping off.

Rolling bearing rings that are extracted correctly remain undamaged. Complete bearings where the extraction force is transmitted through the rolling elements usually become unserviceable.



Programme Two-Arm Extractor 54

Order designation Two-arm extractor	Span	Depth	Dimensions		Spindle thread	Extraction force kN	Mass ≈ kg
	mm	mm	a mm	b mm			
ABZIEHER54.100	80	100	14 + 1	18 + 1	M14x1.5	40	0.75
ABZIEHER54.200	120	125	14 + 1	18 + 1	M14x1.5	40	0.9
ABZIEHER54.300	160	150	18 + 1	26 + 2	M20x2	60	2.3
ABZIEHER54.400	200	175	18 + 1	26 + 2	M20x2	60	2.5
ABZIEHER54.500	250	200	20 + 1	28 + 2	M22x2	85	3.45
ABZIEHER54.600	350	250	20 + 1	28 + 2	M22x2	85	4.4
ABZIEHER54.SET *)							15.5

*) consists of a holder (W x D x H) 215 x 235 x 475 mm, complete with the 6 extractors listed above

Mechanical Extractors

Two-Arm Bearing Extractor 47

Two-Arm Bearing Extractor 47

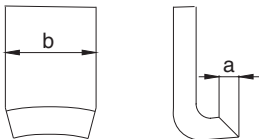
Application

- 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

Depending on bearing size and mounting conditions, the extractor with the suitable dimensions is selected. By means of the tightening shackle the ring to be extracted can be wedged loose by means of the specially shaped arms. The wedging and centering on the shaft are important for dismantling bearings without damage.

Rolling bearing rings that are extracted correctly do not get damaged. Complete bearings where the extraction force is transmitted through the rolling elements usually become unserviceable.



Programme Two-Arm Extractor 47							
Order designation	Span	Depth	Dimensions		Spindle thread	Extraction force	Mass
Two-arm extractor	mm	mm	a	b		kN	≈ kg
			mm				
ABZIEHER47.100	45	65	2.5	12 + 1	M10	10	0.55
ABZIEHER47.200	90	100	2.5	14 + 1	M14x1.5	40	1.45

Mechanical Extractors

Three-Arm Extractor 52

Three-Arm Extractor 52

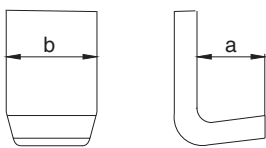
Application

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

Operation

Depending on bearing size and mounting conditions, the extractor with the suitable dimensions is selected. The span can be adjusted by shifting the lever system on the cylinder. During the extraction process the lever system causes self-locking of the arms and ensures a good grip.

Rolling bearing rings that are extracted correctly remain undamaged. Complete bearings where the extraction force is transmitted through the rolling elements usually become unserviceable.



Programme Three-Arm Extractor 52

Order designation Three-arm extractor	Span mm	Depth mm	Dimensions a mm b mm		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	M14x1.5	40	2.4
ABZIEHER52.230	230	150	19 + 1	22 + 1	M22x2	100	5.4
ABZIEHER52.295	295	235	19 + 1	22 + 1	M22x2	100	6.2
ABZIEHER52.390	390	270	20 + 2	30 + 2	M30x2	150	12.3
ABZIEHER52.640	640	300	22 + 2	34 + 2	M30x2	150	15.8

Mechanical Extractors

Three-Arm Extractor 53

Three-Arm Extractor 53

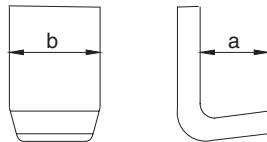
Application

- For extracting complete rolling bearings or tightly fitted inner rings as well as similar parts
- Good radial and axial accessibility of the bearing location, possibly slots, required

Operation

Depending on bearing size and mounting conditions, the extractor with the suitable dimensions is selected. The span can be adjusted by turning the knurled disk above the upper star. The two stars move on the cylinder symmetrically to each other so that the entire spread range can be covered with just a few rotations. The arms are locked during the extraction process so that they cannot be opened accidentally.

Rolling bearing rings that are extracted correctly do not get damaged. Complete bearings where the extraction force is transmitted through the rolling elements usually become unserviceable.



Programme Three-Arm Extractor 53							
Order designation	Span	Depth	Dimensions		Spindle thread	Extraction force	Mass
Three-arm extractor	mm	mm	a	b		kN	≈ kg
			mm				
ABZIEHER53.130	130	105	14 + 1	15 + 1	M14x1.5	45	1.9
ABZIEHER53.230	230	150	19 + 1	22 + 1	M22x2	100	4
ABZIEHER53.295	295	235	19 + 1	22 + 1	M22x2	100	5.1
ABZIEHER53.390	390	270	20 + 2	30 + 2	M30x2	150	10
ABZIEHER53.640	640	300	22 + 2	34 + 2	M30x2	150	13.8

Mechanical Extractors

Hydraulic Pressure Tool 44

Hydraulic Pressure Tool 44

Application

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

Operation

The hydraulic pressure tool generates an axial force of 80 or 150 kN, respectively, thus making the job considerably easier. The spindle thread of the mechanical extractor is not unduly stressed as the main extraction force acts on static thread flanks.

The pressure tool 44.150 features a hydraulic resetting mechanism, i.e. when the thrust bolt is reversed the hydraulic system automatically returns to its normal position. The hydraulic pressure tool is applied between shaft end and extractor spindle. Then the spindle is applied. The hydraulic system is actuated by screwing in the thrust bolt. The axial force generated will loosen the part. The part can then be extracted in the usual manner with the mechanical spindle.

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



Programme Hydraulic Pressure Tool 44						
Order designation Hydraulic pressure tool	Axial force kN	Stroke mm	Section height mm	Spindle diameter min. mm	Torque max. Nm	Mass ≈ kg
ABZIEHER44.080	80	7	35	M22	25	0.6
ABZIEHER44.150	150	10	85	M30	50	1.74

Mechanical Extractors

Ball Bearing Extractor 56

Ball Bearing Extractor 56

Application

- For extracting complete radial ball bearings
- For ball bearings with a tightly fitted outer ring
- For bearings that are radially not accessible
- As the extraction hooks are applied at the outer ring and the threaded spindle is applied at the shaft, the extraction force is transmitted via the rolling elements, rendering the bearing un-serviceable.

Operation

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



Programme Ball Bearing Extractor 56					
Order designation Ball bearing extractor set	Depth mm	with claws nos.	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	M20x2	3.45
ABZIEHER56.220.SET	150	7, 11, 16, 17, 23	SW22	M20x2	4.15

Mechanical Extractors

Ball Bearing Extractor 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				

Mechanical Extractors

Special Bearing Extractor 64

Special Bearing Extractor 64

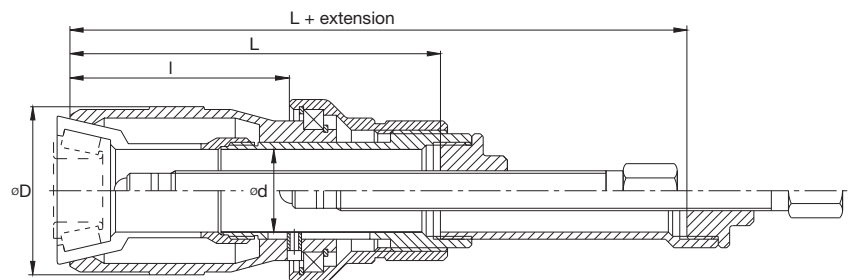
Application

- For radial bearings (deep groove ball bearings, angular contact ball bearings, cylindrical roller bearings, tapered roller bearings and spherical roller bearings). Since the number of rolling elements is not standardized, the same bearing size from different manufacturers may require different collets. So when ordering an extractor the bearing manufacturer should always be indicated.
- Bearings with a tightly fitted inner or outer ring
- For applications where the inner ring is adjacent to a shaft shoulder without extraction slots; also applications where the bearing to be extracted from the shaft is still inside a housing.
- If handled correctly, the bearings can be extracted without getting damaged.
- Max. shaft diameter 75 mm

Operation

The special extractor consists of a basic unit and a collet which is screwed onto the upper part of the basic unit. The collet is closed via the left-hand thread of the coupling nut and clamped against the inner ring by means of a tapered clamping ring. A threaded spindle generates the extraction force.

The finger-shaped extensions of the collet engage between the rolling elements at the inner ring raceway edge, behind the rollers or behind the chamfer of the bearing ring, wedging it loose. The extraction principle must be observed when selecting the suitable collet for a specific bearing, see page 11.



Programme Special Bearing Extractor 64

Order designation Basic unit to special extractor	Dimensions				Spindle thread	Mass ≈ kg
	d mm	D	l	L		
ABZIEHER64.400	30.5	60	78	135	M14x1.5	1.25
ABZIEHER64.500	46	75	80	150	M20x2	2.5
ABZIEHER64.600	66	100	92	170	M22x2	3.8
ABZIEHER64.700	77	126	120	205	M30x2	7.8

The basic unit is always selected such that the diameter d is larger than the bearing bore, e.g. ABZIEHER64.700 (d = 77 mm) for bearing 6015 with 75 mm bore.

Mechanical Extractors

Special Bearing Extractor 64

Collets for Special Bearing Extractor 64

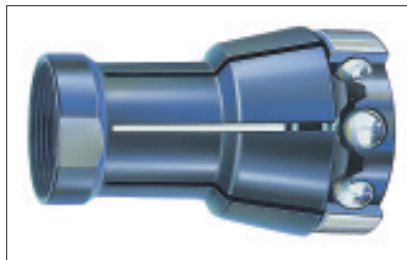
The gripping profile of the collets must be adapted to the geometry of the bearing to be extracted. The extraction principle depends on bearing design and mounting situation. Two collets are used for tapered roller bearings in X and O arrangement.

Extraction principle A:

for deep groove ball bearings, four point 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 bearing's O.D. is larger than that of the basic unit.

Code of the collets:

ABZIEHER64A. + bearing code
(Example: **ABZIEHER64A.6000**)



Selection of basic unit and collet

The basic unit is always selected such that the diameter d is larger than the bearing bore. Examples of order designations for special bearing extractors, plus collets:

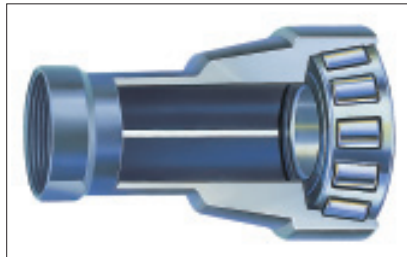
- a) for deep groove ball bearings 6000 (Principle A):
Basic unit **ABZIEHER64.400** +
collet **ABZIEHER64A.6000**

Extraction principle B:

for tapered roller bearings (mounted in X and O arrangement)
The collet reaches over the rollers, irrespective of their number. Bearings of certain dimensions that are located deep on the shaft can also be extracted.

Code of the collets:

ABZIEHER64B. + bearing code
(Example: **ABZIEHER64B.30203A**)



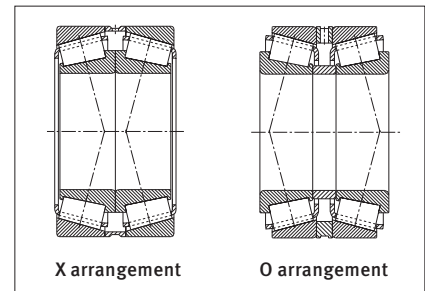
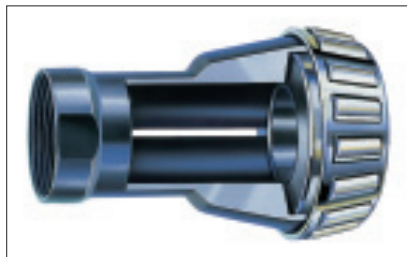
- b) for tapered roller bearing pair 30203A in X arrangement:
Basic unit **ABZIEHER64.400** +
collet **ABZIEHER64B.30203A**
collet **ABZIEHER64C.30203A**

Extraction principle C:

for tapered roller bearings (mounted in X and O arrangement)
The collet engages behind the inner ring's large lip.

Code of the collets:

ABZIEHER64C. + bearing code
(Example: **ABZIEHER64C.30203A**)



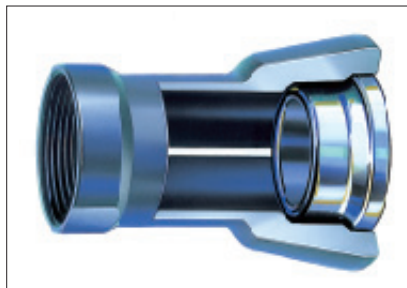
For tapered roller bearings in O arrangement the same collets are used in inverse sequence.

Extraction principle D:

for the inner rings of cylindrical roller bearings and four point bearings, and for the outer rings of deep groove ball bearings and spherical roller bearings. Engaging behind the chamfer of the bearing ring and wedging the bearing loose.

Code of the collets:

ABZIEHER64D. + bearing code
(Example: **ABZIEHER64D.NU315**)



- c) for cylindrical roller bearings NU315 (Principle D):
Basic unit **ABZIEHER64.700** +
collet **ABZIEHER64.700D.NU315**

Mechanical Extractors

Internal Extractor 62 and Countersupport

Internal Extractor 62

Application

- For deep groove ball bearings and angular contact ball bearings. Internal extractors are available in various sizes for bearing bores of up to ca. 70 mm.
- For bearings with a tightly fitted outer ring.
- The inner ring bore must be easily accessible.
- As the extraction force is transmitted via the rolling elements, the bearing may get damaged.

Operation

The gripping segments spread when the threaded spindle is tightened, and the lip of the jaws is pressed behind the bore of the bearing's inner ring. The bearing is extracted by means of the threaded spindle.

Internal extractors are suitable for small diameter ranges only.

Order designations for sets:

ABZIEHER62.SET

(two countersupports and nine internal extractors)

ABZIEHER62.SET.100

(countersupport ABZIEHER62.100 + 6 internal extractors)

ABZIEHER62.SET.200

(countersupport ABZIEHER62.200 + 3 internal extractors)



Programme Internal Extractor 62 and Countersupport							
Order designation	Countersupport	Internal extractor	for bore diameters		Depth mm	Spindle thread	Mass ≈ kg
Internal extractor with countersupport			from mm	to mm			
ABZIEHER62.100.005	ABZIEHER62.100	ABZIEHER62.005	5	6.5	35	M10	0.09
ABZIEHER62.100.007	ABZIEHER62.100	ABZIEHER62.007	7	9.5	35	M10	0.09
ABZIEHER62.100.010	ABZIEHER62.100	ABZIEHER62.010	10	13.5	35	M10	0.1
ABZIEHER62.100.014	ABZIEHER62.100	ABZIEHER62.014	14	19.5	45	M10	0.13
ABZIEHER62.100.020	ABZIEHER62.100	ABZIEHER62.020	20	29.5	50	M10	0.18
ABZIEHER62.100.030	ABZIEHER62.100	ABZIEHER62.030	30	39.5	90	M10	0.25
ABZIEHER62.200.040	ABZIEHER62.200	ABZIEHER62.040	40	49.5	95	M14x1.5	0.48
ABZIEHER62.200.050	ABZIEHER62.200	ABZIEHER62.050	50	59.5	95	M14x1.5	0.56
ABZIEHER62.200.060	ABZIEHER62.200	ABZIEHER62.060	60	69.5	95	M14x1.5	0.62

Mechanical Extractors

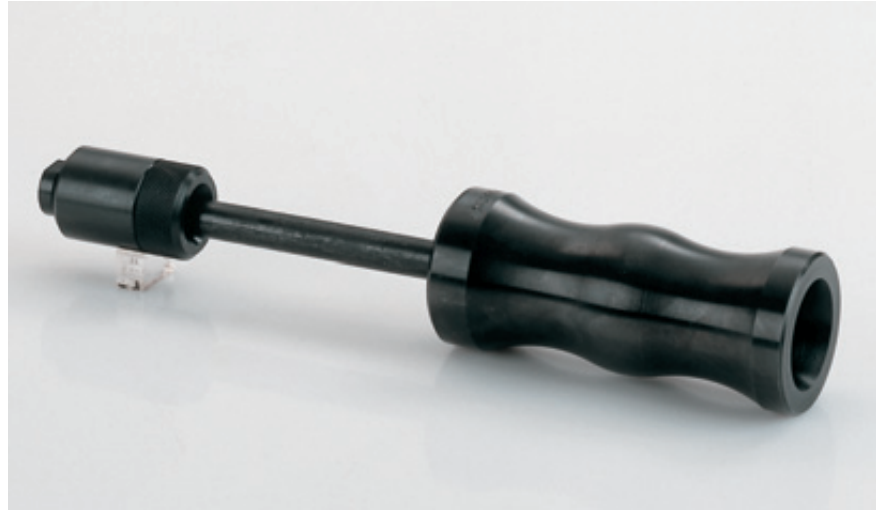
Impact-Type Extractor 62

Impact-Type Extractor 62

- For extracting sleeves or rings. The impact-type extractor is screwed to internal extractor 62 (connection thread M10 or M14x1,5). The extractor is applied if no countersupport can be used.

Operation

Extraction is effected by moving the impact mass on the slide bar.



Programme Impact-type Extractor 62			
Order designation Impact-type extractor	Impact distance mm	Impact mass kg	Mass ≈ kg
ABZIEHER62.300	300	0.9	1.4

Mechanical Extractors

Extractor 49 and Separating Device

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
- Especially for applications where the inner ring is adjacent to a shaft shoulder without extraction slots. The bearing location must be radially accessible without problems.
- If handled correctly, inner rings and complete rolling bearings are extracted without getting damaged

Operation

The two wedge-shaped halves of the separating device are inserted between shaft shoulder and inner ring by alternately tightening the nuts. The separating device is bolted to the extractor by means of two tie rods that are fastened on the extractor's cross arm. The bearing or inner ring is extracted



by screwing in the spindle. For parts that are located very deep on

a shaft tie rod extensions can be supplied.

Programme Extractor 49 and Separating Device								
Order designation Extractor with separating device	Order designation Extractor	Span mm	Depth mm	Spindle thread	Mass ≈ kg	Order designation Separating device	Span mm	Mass ≈ kg
ABZIEHER49.100.060	ABZIEHER49.100	45-130	150	M14x1.5	0.97	ABZIEHER49.060	60	0.57
ABZIEHER49.100.075	ABZIEHER49.100	45-130	150	M14x1.5	0.97	ABZIEHER49.075	75	0.7
ABZIEHER49.200.115	ABZIEHER49.200	85-210	200	M20x2	3.35	ABZIEHER49.115	115	1.75
ABZIEHER49.300.150	ABZIEHER49.300	100-300	300	M20x2	6.2	ABZIEHER49.150	150	4
ABZIEHER49.400.210	ABZIEHER49.400	150-360	300	M30x2	8.81	ABZIEHER49.210	210	10

Notes

Notes

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