

FAG Mechanical 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. Larger bearings are usually dismantled using the hydraulic method or induction heating devices.

In this TI the fields of application and the operation of the FAG mechanical extractors are described. Apart from two-, three- and four-arm extractors and a hydraulic pressure tool, special extractors are described.



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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. gear-wheels, 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

Order designation	Span	Depth	Weight ≈ kg
Two-arm extractor	mm	mm	
ABZIEHER54.100	80	100	0.75
ABZIEHER54.200	120	125	0.9
ABZIEHER54.300	160	150	2.3
ABZIEHER54.400	200	175	2.5
ABZIEHER54.500	250	200	3.45
ABZIEHER54.600	350	250	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 dismounting 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

Order designation	Span	Depth	Weight ≈ kg
Two-arm extractor	mm	mm	
ABZIEHER47.100	45	65	0.55
ABZIEHER47.200	90	100	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
- Big extractors (spans 390 and 640 mm) can be equipped with a hydraulic spindle

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

Order designation Three-arm extractor	Span mm	Depth mm	Weight ≈ kg
ABZIEHER52.085	85	65	0.36
ABZIEHER52.130	130	105	2.4
ABZIEHER52.230	230	150	5.4
ABZIEHER52.295	295	235	6.2
ABZIEHER52.390	390	270	12.3
ABZIEHER52.640	640	300	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.

The availability of hydraulically assisted larger extractors will be indicated on inquiry.



Programme

Order designation	Span	Depth	Weight
Three-arm extractor	mm	mm	≈ kg
ABZIEHER53.130	130	105	1.9
ABZIEHER53.230	230	150	4
ABZIEHER53.295	295	235	5.1
ABZIEHER53.390	390	270	10
ABZIEHER53.640	640	300	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

Order designation Hydraulic pressure tool	Axial force kN	Stroke mm	Section height mm	Spindle diameter min. mm	Torque max. N m	Weight ≈ 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

Order designation Ball bearing extractor set	Depth mm	with claws nos.	Wrench with T-shaped handle	Weight ≈ kg
ABZIEHER56.020.SET	65	01, 02, 03	SW14	2.1
ABZIEHER56.120.SET	90	1, 2, 3, 4, 5	SW22	3.45
ABZIEHER56.220.SET	150	7, 11, 16, 17, 23	SW22	4.15

Mechanical Extractors

Ball Bearing Extractor 56

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

Extractor set	Extractor	Bearing no.	Claw no.	Bearing no.	Claw no.	Bearing no.	Claw no.	Bearing no.	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

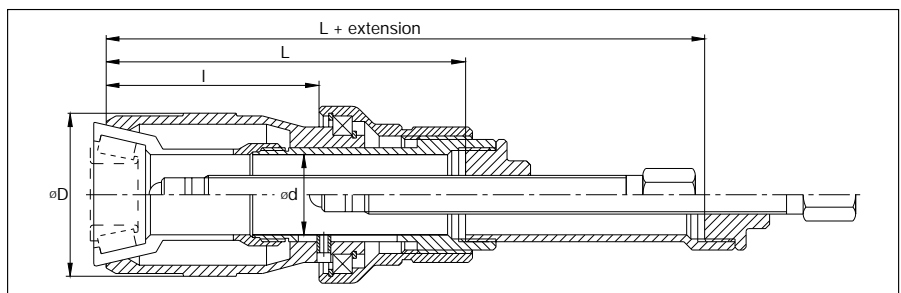
- For radial bearings (deep groove ball bearings, angular contact ball bearings, cylindrical roller bearings, tapered roller bearings and spherical roller bearings).
Since the number of rolling elements is not standardized, the same bearing size from different manufacturers may require different collets. 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.

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.

The availability of hydraulically assisted larger extractors will be indicated on inquiry.



Programme

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

Mechanical Extractors

Special Bearing Extractor 64

Collets for Special Bearing Extractor 64

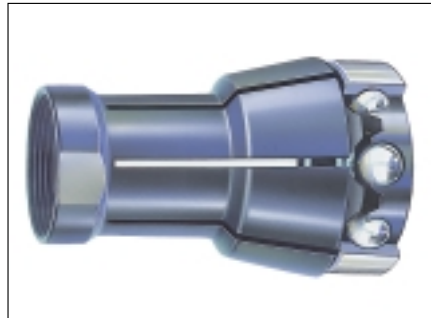
The gripping profile of the collets must be adapted to the geometry of the bearing to be extracted. The extraction principle depends on bearing design and mounting situation.

Extraction principle A:

for deep groove ball bearings, angular contact 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

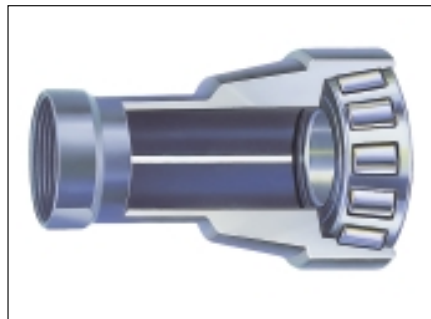


Extraction principle B:

for tapered roller bearings (mounted in X-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



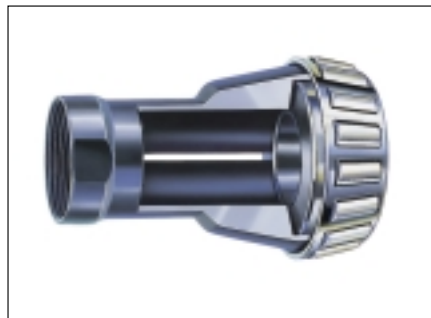
Extraction principle C:

for tapered roller bearings (mounted in O-arrangement)

The collet engages behind the inner ring's large lip.

Code of the collets:

ABZIEHER64C. + bearing code



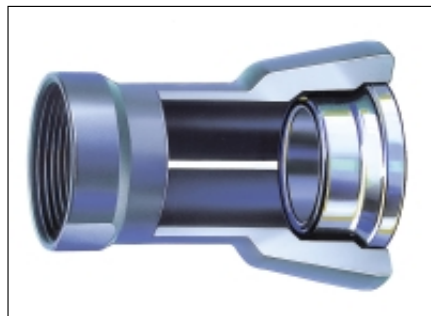
Extraction principle D:

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



Selection of basic unit and collet

The basic unit is always selected such that the bearing bore is smaller than the diameter d of the unit.

Examples of order designations for special bearing extractors, complete:

a) for deep groove ball bearings 6000 (Principle A):

ABZIEHER64.400A.6000

(Basic unit ABZIEHER64.400 + collet ABZIEHER64A.6000)

b) for tapered roller bearings 30203A (Principle B):

ABZIEHER64.400B.30203A

(Basic unit ABZIEHER64.400 + collet ABZIEHER64B.30203A)

c) for deep groove ball bearings 6007 (Principle A):

ABZIEHER64.500A.6007

(Basic unit ABZIEHER64.500 + collet ABZIEHER64A.6007)

d) for self-aligning ball bearings 2312 (Principle A):

ABZIEHER64.600A.2312

(Basic unit ABZIEHER64.600 + collet ABZIEHER64A.2312)

e) for cylindrical roller bearings NU315 (Principle D):

ABZIEHER64.700D.NU315

(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)



Order designation

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

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.



Order designation Extractor with separating device	Order designation Extractor	Span mm	Depth mm	Weight ≈ kg	Order designation Separating device	Span mm	Weight ≈ kg
ABZIEHER49.100.060	ABZIEHER49.100	45 - 130	150	0.97	ABZIEHER49.060	60	0.57
ABZIEHER49.100.075	ABZIEHER49.100	45 - 130	150	0.97	ABZIEHER49.075	75	0.7
ABZIEHER49.200.115	ABZIEHER49.200	85 - 210	200	3.35	ABZIEHER49.115	115	1.75
ABZIEHER49.300.150	ABZIEHER49.300	100 - 300	300	6.2	ABZIEHER49.150	150	4
ABZIEHER49.400.210	ABZIEHER49.400	150 - 360	300	8.81	ABZIEHER49.210	210	10

Mechanical Extractors

Impact-Type Extractor 59

Impact-Type Extractor 59

- For extracting sleeves or rings with a connection thread M10 or M14x1,5: The impact-type extractor is screwed to internal extractor 62 if no counter-support can be used.

Depending on the size of the internal extractor, one of two impact-type extractor sizes is recommended:

59.062 up to bore diameters of 39 mm,
59.362 up to bore diameters of 69 mm.

Operation of impact-type extractor and pin extractor

Extraction is effected by moving the impact weight on the slide bar. The size of the extractor used is determined by the application in hand.



Order designation Impact-type extractor	Impact distance mm	Impact mass kg	Weight ≈ kg
ABZIEHER59.062	90	0.9	1.2
ABZIEHER59.362	300	0.9	1.4

Pin extractor 59

- For extracting parts with an internal thread, such as tapered or straight pins from M4 to M12. The delivery scope includes M4, M5, M6, M8, M10 and

M12 bolts (30 mm thread length) as well as 5 seating rings.

Available pin extractor designs:
59.090 and 59.300.



Order designation Pin extractor	Impact distance mm	Impact mass kg	Weight ≈ kg
ABZIEHER59.090	90	0.9	1.18
ABZIEHER59.300	300	0.9	1.38

Notes

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