12.13 BEARING HOUSINGS AND ACCESSORIES

- CLAMP-TYPE BEARINGS AND HUBS
- BEARING HOUSINGS FOR STANDARD BEARINGS
- ROLLING BEARING ACCESSORIES

CLAMP-TYPE BEARINGS AND HUBS

Clamp-type bearings are single row ball bearings with seals on both sides. The outer ring has a spherical surface, which allows tilting of the surfaces in housings with the same spherical modification. This makes it possible to compensate for any misalignment. The inner bearing ring is wider than the outer ring and is attached to the shaft:

- using an eccentric clamping ring, structurally designed under the marking UA,
- by screws, structurally designed under the marking UC.

Bearings are pre-packed with grease and maintenance-free for the lifetime of the bearing. The housing design also permits re-lubrication via a lubricating nipple. Bearings are suitable for loading short shafts and for loadings with low thermal expansion, which compensate axial clearance in bearings or flexibility of the structure, on which the bearings are fastened.

The hub material is made of cast iron or steel plating and can be divided from a structural viewpoint into upright housings – marked SG, SE or flanged – marked FG, FM, FB, and FE. The hub has a round bore that contains the bearings; together, they form a unit, which provides an efficient solution with a simple loading design. They are used primarily in agricultural machinery, transportation equipment, food machinery, and similar equipment.

Clamp-type bearing design

Clamp-type bearings are available in several versions, which are designed to meet various technical requirements. All clamp-type bearings have outer rings with a spherical surface and are equipped with seals that provide optimum protection against entry of contaminants, particularly in dirty operating environments.

UA design

The UA clamp-type bearing has an extended inner ring on both sides. The design is similar to the UC design, but it differs in its shaft fastening method. The inner bearing ring is attached to the shaft by an eccentric clamping ring, which is additionally secured to the shaft by screws. The UA design enables quick, efficient, and easy installation of bearings onto the shaft. Clamp-type bearings in this design are suitable for single direction rotation applications.

UC design

The UA clamp-type bearing has an extended inner ring on both sides, which enables the use of more effective packing. These bearing loadings have a larger internal space, which serves as a grease reservoir. This provides for extended service intervals and supports their use in demanding conditions. The inner ring is fastened onto the shaft using two screws, just like the US series. UC version bearings can be re-lubricated via lubricating nozzles on the outer ring.

UE design

Clamp-type UE bearings have an extended inner ring on one side and are fastened to the shaft by an eccentric clamping ring. These bearings are suitable in applications that have the same direction of rotation. Bearings in this version cannot be re-lubricated.

UD design

UD clamp-type bearings have identical inner ring and outer ring widths.

US version

US clamp-type bearings have an extended inner ring on one side. These bearings are suitable even for standard applications with alternating directions of rotation. Bearings in this version cannot be re-lubricated. The inner ring is fastened to the shaft by two screws that are set at 120° to each other. This locking method provides quick, efficient, and easy installation of the bearing onto the shaft.

Main dimensions

The main dimensions of clamp-type bearings meet standard ISO 2264, standard ISO 3228 for bearing housings, and standard ISO 3145 for eccentric clamping rings.

Labelling

Labelling of clamp-type bearings, respective clamping elements, and complete units is provided in the tables of the publication.

Cage

Bearings have unlabelled cages made from pressed steel plating. Bearings, in special cases, can be supplied with a different cage designs. Please consult the distributor for the availability of bearings with different cages.

Precision

Clamp-type bearings are standardly produced at a normal degree of precision P0. Higher degrees of precision P6 and P5 are available upon request. The distributor must be consulted.

Bearings have a uniform bore diameter tolerance of H6. This tolerance ensures the shaft tolerance, during machining, lies within the field h for each sliding loading. Tolerances of h8 to h11 are generally sufficient for the production of shafts. Higher loads and speeds require of higher tolerances – h6, h7.

Radial clearance

Commonly manufactured clamp-type bearings have a normal radial clearance, which is not marked and its size and span are identical to single row ball bearings of identical dimensions. Any delivery of bearings with different radial clearances must be negotiated in advance with the supplier.

Rotation limiting speed

This parameter is largely dependent on the shaft fitting and the shaft diameter tolerance. The specified relationship is provided in the appropriate tables.

Minimal load

Bearings require a minimal load under all operating conditions. The minimal load of clamp-type bearings is 1 % of the dynamic load capacity of the bearing.

BEARING HOUSINGS FOR STANDARD BEARINGS

ZKL bearing housings are designated for the standard product line of inclined double row ball bearings and spherical roller bearings. ZKL bearing housings provide ideal bearing loadings for the lifetime of the bearing and decrease the maintenance costs. ZKL bearing housings are suitable for both oil and grease lubrication. We can find applications of ZKL bearing housings for standard bearings, in particular, in various machines, equipment, and facilities.

Bearing housing material

Bearing housings are standardly produced from grey cast iron; in special cases, bearing housings can also be made from ductile iron or cast steel. ZKL Technical and Consultation Services can be consulted for advice on the selection of the most suitable material.

All external bearing housing surfaces, which are not machined, are treated with a universal coating that protects the bearing housing against corrosion. Functional machined surfaces are treated with an anti-corrosion coating, which can easily be removed during installation.

Bearing loadings

Bearing housings are exclusively manufactured for free axial loadings, when the bearing does not transfer axial loads and enables axial sliding of the bearing in the bearing housing. This loading is suitable for compensating for the thermal expansion of shafts. In the case of axial guided loadings, the same bearing housing is used together with axial guide rings. If the bearing is to carry bilateral axial loads, then axial guide rings must be used on both sides.

Seals

Bearing housings may be sealed depending on the operating conditions and method of lubrication of the contact seal, non-contact seal, or combination of non-contact and contact seal. Seals should be selected in consultation with Technical and Consultation Services, who determine the optimal solution for bearing housing seals under the given operating conditions.

Upright bearing housings

Split and non-split upright bearing housings are designated exclusively for inclined double row ball bearings and double row spherical roller bearings. The upper section of the split housing is centred during installation using centring pins, which ensure proper seating of both housing sections. The upper sections of housings must not be confused. Upright bearing housings are standardly equipped with two or four bores for bolts.

Flanged bearing housings

Flanged housings are also designated for self-aligning double row ball bearings and double row spherical roller bearings. They are produced in two versions, depending on the size. The smaller and less burdened housings have a triangular shape with three bolt bores. The larger and more burdened have a square shape with four bolt bores. Flanged bearing housings are designed for grease lubrication and are most often sealed using felt sealing rings.

ROLLING BEARING ACCESSORIES

Accessories include machine components that serve to fasten roller bearings to a shaft or into a hole of the element.

Adapter sleeves

Adapter sleeves are used for fastening double row self aligning ball bearings and double row spherical roller bearings with tapered hole (K) onto cylindrical shafts. Adapter sleeves are made of steel with a tensile strength of 400 to 600 MPa. The main dimensions of adapter sleeves are specified in the tables provided and they meet standard ISO 2982-1.

Labelling of adapter sleeves, together with nuts and locking elements is specified in the tables provided. Information on matching sleeves with individual bearings with a tapered bore is specified in the relevant section, dedicated to double row self-aligning bearings and double row spherical roller bearings. Connection dimensions for bearings with adapter sleeves are provided in table 12.13.1.

Table 12.13.1

Nominal diameter		Type of adapter sleeve															
		H2		H3			H23			H30		H31			H32		
		Dimensional group of bearings															
		02		22		03	32		23	30		31		22	32		
d	d_0	d_b min	a_a min	d_b min	a_a min		d_b min	a_a min		d_b min	a_a min	d_b min	a_a min		d_b min	a_a min	
mm																	
20	17	23	5	23	5	8	24	-	5	-	-	-	-	-	-	-	
25	20	28	5	28	5	6	30	-	5	-	-	-	-	-	-	-	
30	25	33	5	33	5	6	35	-	5	-	-	-	-	-	-	-	
35	30	38	5	39	5	8	40	-	5	-	-	-	-	-	-	-	
40	35	43	5	44	5	5	45	-	5	-	-	-	-	-	-	-	
45	40	48	5	50	8	5	50	-	5	-	-	-	-	-	-	-	
50	45	53	5	55	10	5	56	-	5	-	-	-	-	-	-	-	
55	50	60	6	60	19	6	61	-	6	-	-	-	-	-	-	-	
60	55	64	5	65	8	5	66	-	5	-	-	-	-	-	-	-	
65	60	70	5	70	8	5	72	-	5	-	-	-	-	-	-	-	
70	60	75	5	75	10	5	76	-	5	-	-	-	-	-	-	-	
75	65	80	5	80	12	5	82	-	5	-	-	-	-	-	-	-	
80	70	85	5	85	12	5	88	-	5	-	-	-	-	-	-	-	
85	75	90	6	91	12	6	94	-	6	-	-	-	-	-	-	-	
90	80	95	6	96	10	6	100	18	6	-	-	-	-	-	-	-	
100	90	106	7	108	8	7	110	19	7	-	-	-	-	-	-	-	
110	100	116	7	118	6	9	121	17	7	-	-	117	7	-	-	-	
120	110	-	-	-	-	-	131	17	7	127	7	128	7	11	-	-	
130	115	-	-	-	-	-	142	21	8	137	8	138	8	8	-	-	
140	125	-	-	-	-	-	152	22	8	147	8	149	8	8	-	-	
150	135	-	-	-	-	-	163	20	8	158	8	160	8	15	-	-	
160	140	-	-	-	-	-	174	18	8	168	8	170	8	14	-	-	
170	150	-	-	-	-	-	185	18	8	179	8	180	8	10	-	-	
180	160	-	-	-	-	-	195	22	8	189	8	191	8	18	-	-	
190	170	-	-	-	-	-	206	21	9	199	9	202	9	21	-	-	
200	180	-	-	-	-	-	216	20	10	210	10	212	10	24	-	-	
220	200	-	-	-	-	-	236	11	10	231	12	233	10	22	-	-	
240	220						257	6	11	251	11	254	11	19			
260	240						278	2	11	171	13	276	11	25			
280	260						299	11	12	292	12	296	12	28			
300	280									313	12	318	12	32	321	12	
320	300									334	13	338	13	39	343	13	
340	320									355	14	360	14	-	-	-	
360	340									375	14	380	14	-	-	-	

Connection dimensions $d_{a\,min}$, $D_{a\,max}$ and $r_{a\,max}$ are specified in dimension tables of double row self-aligning ball bearings and double row spherical roller bearings

Withdrawal sleeves

Withdrawal sleeves are used for fastening double row spherical roller bearings with a tapered bore (K) onto cylindrical shafts. Sleeves are made of steel with a tensile strength of 400 to 600 MPa.

Main dimensions of withdrawal sleeves meet standard ISO 2982-2.

Designations of withdrawal sleeves and respective withdrawal nuts, which must be ordered separately, are listed in the tables provided.

Information on assignments of withdrawal sleeves to individual double row spherical roller bearings with a tapered bore are listed in the respective sections, dedicated to such bearings. Connecting dimensions for bearings with withdrawal sleeves ($d_{a\ min}$, $D_{a\ max}$, $r_{a\ max}$) are identical to bearings without withdrawal sleeves and are listed in the respective tables of the publication.

Adapter and withdrawal sleeves ring nuts

Adapter and withdrawal sleeve nuts are used for fastening internal bearing rings onto adapter sleeves or directly onto the journal. Withdrawal nuts are used for removing double row spherical roller bearings with a tapered bore that are fastened by means of a withdrawal sleeve. Rings nuts are made of steel with a minimal tensile strength of 410 MPa.

The main dimensions of adapter and withdrawal nuts are specified in the tables provided and they meet standard ISO 2982-2.

Adapter nuts are made in standard design (type KM) and specific design (type KMA) and are listed in the table section of the publication. Proceed according to table 12.13.2 when determining the front axial runout.

Table 12.13.2

Designation of nut size		Limit axial runout values of functional face	
over	up to	KM	KMA
		mm	
	10	0,04	0,025
10	20	0,05	0,03
20	25	0,05	0,03
25	30	0,06	0,04
30	40	0,06	0,05

Lock washers

The washers are used for fastening adapter ring nuts. They are made from steel with a minimal tensile strength of 274 MPa. The main dimensions of washers are specified in the tables provided and they meet standard ISO 2982.

Snap rings for bearings with a groove on the outer ring

Snap rings are used for simple axial fastening of bearings with groove on outer race (N) in hubs. Snap rings are made of spring steel. Main dimensions of snap rings meet standard ISO 464.

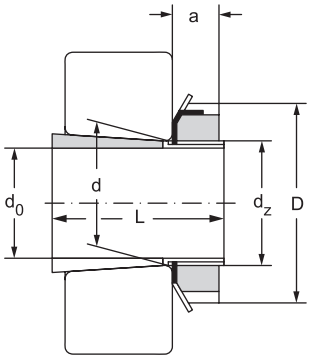
Snap rings are labelled with a number the expresses the outer bearing diameter D and a number that expresses the minimal width of the snap ring f, e.g. ring 52/1.02.

Trade labels are also used in practise to designate the type of ring R and the outer bearing diameter in mm, e.g. R52.

The tables list snap rings for N-style single row ball bearings, types 60, 62, 63, and 64.

Snap rings are, in rare circumstances, also used for bearings of different design groups. Their delivery must be negotiated with the supplier in advance. Snap rings are supplied individually.

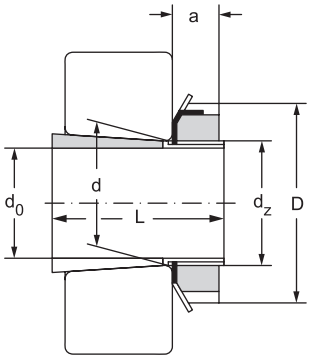
Adapter sleeves d = 20 to 150 mm



12.13.1

Main dimensions					
d_0	d	d_z	D	L	a
mm					
20	25	M25x1,5	38	26	8
	25	M25x1,5	38	29	8
	25	M25x1,5	38	35	8
25	30	M30x1,5	45	27	8
	30	M30x1,5	45	31	8
	30	M30x1,5	45	38	8
30	35	M35x1,5	52	29	9
	35	M35x1,5	52	35	9
	35	M35x1,5	52	43	9
35	40	M40x1,5	58	31	10
	40	M40x1,5	58	36	10
	40	M40x1,5	58	46	10
40	45	M45x1,5	65	33	11
	45	M45x1,5	65	39	11
	45	M45x1,5	65	50	11
45	50	M50x1,5	70	35	12
	50	M50x1,5	70	42	12
	50	M50x1,5	70	55	12
50	55	M55x2	75	37	12
	55	M55x2	75	45	12
	55	M55x2	75	59	12
55	60	M60x2	80	38	13
	60	M60x2	80	47	13
	60	M60x2	80	62	13
60	65	M65x2	85	40	14
	65	M65x2	85	50	14
	65	M65x2	85	65	14
65	75	M75x2	98	43	15
	75	M75x2	98	55	15
	75	M75x2	98	73	15

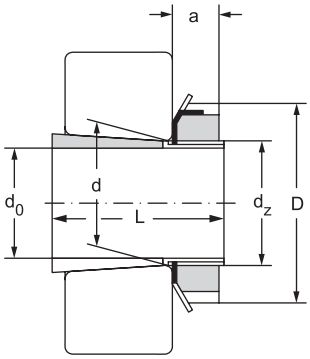
Sleeve designation incl. nut and locking	Appropriate components		Weight
	nut	locking	
			kg
H205	KM5	MB5	0,07
H305	KM5	MB5	0,075
H2305	KM5	MB5	0,087
H206	KM6	MB6	0,099
H306	KM6	MB6	0,109
H2306	KM6	MB6	0,126
H207	KM7	MB7	0,125
H307	KM7	MB7	0,142
H2307	KM7	MB7	0,165
H208	KM8	MB8	0,174
H308	KM8	MB8	0,189
H2308	KM8	MB8	0,224
H209	KM9	MB9	0,227
H309	KM9	MB9	0,248
H2309	KM9	MB9	0,28
H210	KM10	MB10	0,274
H310	KM10	MB10	0,303
H2310	KM10	MB10	0,362
H211	KM11	MB11	0,308
H311	KM11	MB11	0,345
H2311	KM11	MB11	0,42
H212	KM12	MB12	0,346
H312	KM12	MB12	0,394
H2312	KM12	MB12	0,481
H213	KM13	MB13	0,401
H313	KM13	MB13	0,458
H2313	KM13	MB13	0,557
H215	KM15	MB15	0,707
H315	KM15	MB15	0,831
H2315	KM15	MB15	1,05



12.13.1

Main dimensions					
d_0	d	d_z	D	L	a
mm					
70	80	M80x2	105	46	17
	80	M80x2	105	59	17
	80	M80x2	105	78	17
75	85	M85x2	110	50	18
	85	M85x2	110	63	18
	85	M85x2	110	82	18
80	90	M90x2	120	62	18
	90	M90x2	120	65	18
	90	M90x2	120	86	18
85	95	M95x2	125	55	19
	95	M95x2	125	68	19
	95	M95x2	125	90	19
90	100	M100x2	130	58	20
	100	M100x2	130	71	20
	100	M100x2	130	97	20
100	110	M110x2	145	81	21
	110	M110x2	145	63	21
	110	M110x2	145	77	21
	110	M110x2	145	105	21
110	120	M120x2	145	72	22
	120	M120x2	155	88	22
	120	M120x2	155	112	22
115	130	M130x2	155	80	23
	130	M130x2	165	92	23
	130	M130x2	165	121	23
125	140	M140x2	165	82	24
	140	M140x2	180	97	24
	140	M140x2	180	131	24
135	150	M150x2	180	87	26
	150	M150x2	195	111	26
	150	M150x2	195	139	26

Sleeve designation incl. nut and locking	Appropriate components		Weight
	nut	locking	
			kg
H216	KM16	MB16	0,882
H316	KM16	MB16	1,03
H2316	KM16	MB16	1,28
H217	KM17	MB17	1,02
H317	KM17	MB17	1,18
H2317	KM17	MB17	1,45
H218	KM18	MB18	1,19
H318	KM18	MB18	1,37
H2318	KM18	MB18	1,69
H219	KM19	MB19	1,37
H319	KM19	MB19	1,56
H2319	KM19	MB19	1,92
H220	KM20	MB20	1,49
H320	KM20	MB20	1,69
H2320	KM20	MB20	2,15
H3122	KM22	MB22	2,25
H222	KM22	MB22	1,93
H322	KM22	MB22	2,18
H2322	KM22	MB22	2,74
H3024	KML24	MBL24	1,93
H3124	KM24	MB24	2,64
H2324	KM24	MB24	3,19
H3026	KML26	MBL26	2,85
H3126	KM26	MB26	3,66
H2326	KM26	MB26	4,6
H3028	KML28	MBL28	3,16
H3128	KM28	MB28	4,34
H2328	KM28	MB28	5,55
H3030	KML30	MBL30	3,89
H3130	KM30	MB30	5,52
H2330	KM30	MB30	6,63



12.13.1

Main dimensions					
d_0	d	d_z	D	L	a
mm					
140	160	M160x3	190	93	28
	160	M160x3	210	119	28
	160	M160x3	210	147	28
150	170	M170x3	200	101	29
	170	M170x3	220	122	29
	170	M170x3	220	154	29
160	180	M180x3	210	109	30
	180	M180x3	230	131	30
	180	M180x3	230	161	30
170	190	M190x3	220	112	31
	190	M190x3	240	141	31
	190	M190x3	240	169	31
180	200	M200x3	240	120	32
	200	M200x3	250	150	32
	200	M200x3	250	176	32

Sleeve designation incl. nut and locking	Appropriate components		Weight
	nut	locking	
			kg
H3032	KML32	MBL32	5,21
H3132	KM32	MB32	7,67
H2332	KM32	MB32	9,14
H3034	KML34	MBL34	5,99
H3134	KM34	MB34	8,36
H2334	KM34	MB34	10,2
H3036	KML36	MBL36	6,83
H3136	KM36	MB36	9,5
H2336	KM36	MB36	11,3
H3038	KML38	MBL38	7,45
H3138	KM38	MB38	10,8
H2338	KM38	MB38	12,6
H3040	KML40	MBL40	9,19
H3140	KM40	MB40	12,1
H2340	KM40	MB40	13,9