

KOYO



Spherical roller bearings

Spherical roller bearings feature a large load rating capacity and self-aligning capability.

This type of bearing is suitable for low-or medium-speed applications which involve heavy or impact loading.

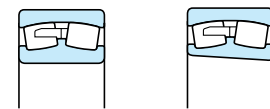
- These bearings are divided into R, RR, RH, RHR and RHA types, which differ in internal structure. (refer to Table 1.)
- Each type can be produced with a cylindrical bore or tapered bore.

Bearing with a tapered bore can be fit and removed easily using an adapter assembly or withdrawal sleeve. The rate of taper is equivalent among all bearing series.

240 and 241 series ...1 : 30 (supplementary code "K30")

Others ...1 : 12 (supplementary code "K")

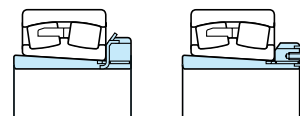
Spherical roller bearings



Cylindrical bore Tapered bore

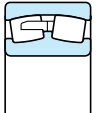
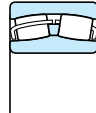
Bore diameter 25 – 300 mm

Adapter assemblies



Bore diameter 20 – 280 mm

Table 1 Spherical roller bearings : types and structures

Structure	 R, RR type*	 RH, RHR type	 RHA type
Roller	Convex asymmetrical roller	Convex symmetrical roller	Convex symmetrical roller
Cage	Copper alloy prong type machined cage *(excl. 240 and 241 series)	Pressed steel cage	Copper alloy integral type machined cage
Inner ring (with or without rib)	With center rib	Without center rib (guide ring)	Without center rib (guide ring)
	With ribs on both sides (to prevent rollers from falling) *(excl. 240 and 241 series)	Without ribs on both sides	With ribs on both sides (to prevent rollers from falling)
Characteristics	Superior to RH and RHA types in high-speed performance.	The load rating capacity is larger than that of R type. (There are some exceptional cases due to different interior specifications.)	

* Some 240 or 241 series R type bearings have a pressed cage. Some of them are provided with an inner ring which does not have ribs.

■ Spherical roller bearings for shaker screens



- These bearings consist of convex asymmetric rollers and a prong type, copper alloy, outer ring guided, machined cage. This cage possesses optimum characteristics for use with shaker screens.
- The bearings most commonly used with shaker screens are 223 series spherical roller bearings. They are identified by the supplementary code "ROVSW502." The outer ring outside diameter tolerance of these bearings is held to a small allowable variation.

Spherical roller bearings

■ Bearings with lubrication holes and a lubrication groove

- Outer rings can be provided with lubrication holes, a lubrication groove and an anti-rotation pin hole. (Specifications are given in Table 4.)
- Inner rings can also be provided with lubrication holes and a lubrication groove.

Table 2 Supplementary codes for identification of bearings with lubrication holes, lubrication groove and anti-rotation pin hole (outer ring)

Supplementary code		Number of lubrication holes	Hole layout
With lubrication holes and lubrication groove	With lubrication holes, lubrication groove and anti-rotation pin hole		
W33	W3N	3	3 equally spaced positions ¹⁾
W33A	W3NA	4	4 equally spaced positions
—	W3NB	5	6 equally spaced positions ²⁾
W33C	W3NC	6	6 equally spaced positions
—	W3ND	7	8 equally spaced positions ²⁾
W33T	—	8	8 equally spaced positions

Notes 1) 4 or 6 holes are provided in smaller size bearings. Consult Koyo.
2) One hole is used for the anti-rotation pin.

Table 3 Supplementary codes for identification of bearings with lubrication holes and / or lubrication groove

Supplementary code	Inner ring		Outer ring	
	Number of lubrication holes	Lubrication groove	Number of lubrication holes	Lubrication groove
W513	3	—	3	○
W518	3	—	3	—
W26	3	—	—	—

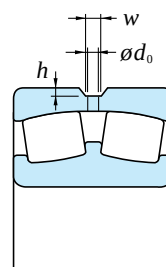


Table 4 Lubrication hole and lubrication groove dimensions

Unit mm

Bore diameter number	Nominal bore diameter d	239			230			240			231			241			222			232			213			223		
		d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h
20	100	—	—	—	3.5	5	1	—	—	—	4	6	1.2	—	—	—	5	7	1.5	6	8	1.5	4	6	1.5	6	8	1.5
22	110	—	—	—	5	7	1.2	—	—	—	4	6	1.2	4	6	1.2	5	7	1.5	6	8	1.5	4	6	1.5	8	10	2
24	120	—	—	—	5	7	1.2	4	6	1.2	4	6	1.2	4	6	1.2	5	7	1.5	8	10	2	4	6	1.5	10	12	2.5
26	130	—	—	—	5	7	1.2	4	6	1.2	4	6	1.5	4	6	1.5	6	8	1.5	8	10	2	—	—	—	12	14	3
28	140	—	—	—	5	7	1.2	5	7	1.2	6	8	1.5	6	8	1.5	8	10	2	8	10	2	—	—	—	12	14	3
30	150	5	7	1.2	6	8	1.5	6	8	1.5	8	10	2	8	10	2	10	12	2.5	8	10	2	—	—	—	12	14	3
32	160	5	7	1.2	6	8	1.5	6	8	1.5	10	12	2.5	10	12	2	10	12	2.5	10	12	2.5	—	—	—	12	14	3
34	170	5	7	1.2	8	10	2	8	10	2	10	12	2.5	10	12	2	12	14	3	10	12	2.5	—	—	—	12	14	3
36	180	5	7	1.2	10	12	2.5	10	12	2.5	10	12	2.5	10	12	2	12	14	3	10	12	2.5	—	—	—	14	16.5	4
38	190	5	7	1.2	10	12	2.5	—	—	—	10	12	2.5	10	12	2	12	14	3	12	14	3	—	—	—	14	16.5	4
40	200	6	8	1.5	10	12	2.5	10	12	2.5	12	14	3	12	14	3	12	14	3	12	14	3	—	—	—	14	16.5	4
44	220	6	8	1.5	10	12	2.5	10	12	2.5	12	14	3	12	14	3	12	14	3	12	14	3	—	—	—	14	16.5	4
48	240	6	8	1.5	10	12	2.5	10	12	2.5	12	14	3	12	14	3	14	16.5	4	14	16.5	4	—	—	—	14	16.5	4
52	260	10	12	2.5	12	14	3	12	14	3	12	14	3	12	14	3	14	16.5	4	14	16.5	4	—	—	—	14	16.5	4
56	280	10	12	2.5	12	14	3	12	14	3	12	14	3	12	14	3	14	16.5	4	14	16.5	4	—	—	—	14	16.5	4
60	300	10	12	2.5	12	14	3	12	14	3	12	14	3	12	14	3	14	16.5	4	14	16.5	4	—	—	—	14	16.5	4
64	320	10	12	2.5	12	14	3	12	14	3	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	—	—	—	14	16.5	4
68	340	12	14	3	14	16.5	4	14	16.5	3	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	—	—	—	14	16.5	4
72	360	12	14	3	14	16.5	4	14	16.5	3	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	—	—	—	14	16.5	4
76	380	12	14	3	14	16.5	4	14	16.5	3	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	—	—	—	14	16.5	4
80	400	12	14	3	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	—	—	—	14	16.5	4
84	420	12	14	3	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	—	—	—	14	16.5	4
88	440	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	—	—	—	14	16.5	4
92	460	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	—	—	—	14	16.5	4	—	—	—	14	16.5	4
96	480	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	—	—	—	14	16.5	4	—	—	—	14	16.5	4
/500	500	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	5	—	—	—	14	16.5	4	—	—	—	—	—	—

Boundary dimensions	As specified in JIS B 1512.
Tolerances	As specified in JIS B 1514, class 0.
Radial internal clearance	As specified in JIS B 1520. (refer to Table 2-8 on pp. A 18, 19.)
Standard cages	Refer to Table 5.
Allowable aligning angle	Refer to Table 5. (varies depending on bearing series.)
Equivalent radial load	Dynamic equivalent radial load $\left[\text{when } \frac{F_a}{F_r} \leq e \right] P_r = F_r + Y_1 F_a$ $\left[\text{when } \frac{F_a}{F_r} > e \right] P_r = 0.67 F_r + Y_2 F_a$ Static equivalent radial load $P_{0r} = F_r + Y_0 F_a$

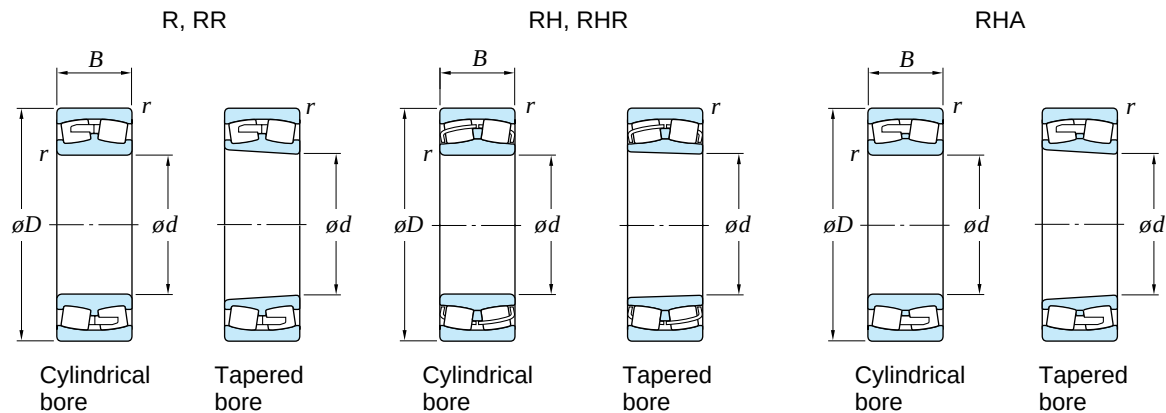
Remark) If the ratio of axial load to radial load exceeds the value e given in the specification table ($F_a / F_r > e$), slippage occurs between rollers in rows that are not axial-loaded and the raceway. This may cause smearing, especially when the bearing is large. Consult Koyo on the use of bearings under such conditions.

Table 5 Application of standard cages and allowable aligning angle

Bearing series	Standard cages		Allowable aligning angle
	Pressed cage	Machined cage	
239 R	—	23930R – 239/500R	0.026 rad (1.5°)
230 R	—	23038R – 230/500R	0.026 rad (1.5°)
RH RHA	23022RH – 23036RH —	— 23038RHA – 23096RHA	
240 R	—	24038R – 240/500R	0.035 rad (2°)
RH RHA	24024RH – 24036RH —	— 24038RHA – 24096RHA	
231 R	—	23136R – 231/500R	0.026 rad (1.5°)
RH RHA	23122RH – 23134RH —	— 23136RHA – 23196RHA	
241 R	—	24136R – 241/500R	0.044 rad (2.5°)
RH RHA	24122RH – 24134RH —	— 24136RHA – 24196RHA	
222 R(RR) RH(RHR) RHA	— 22205RHR – 22230RH —	22232RR – 22272R — 22232RHA – 22260RHA	0.026 rad (1.5°)
232 R	—	23232R – 232/500R	0.044 rad (2.5°)
RH RHA	23218RH – 23230RH —	— 23232RHA – 23296RHA	
213 R	—	21328R – 21322R	0.017 rad (1°)
RH	21311RH – 21322RH —	—	
223 R(RR) RH(RHR) RHA	— 22308RHR – 22326RH —	22328R – 22360R — 22328RHA – 22356RHA	0.035 rad (2°)

Spherical roller bearings

d 25 – 80 mm



Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min ⁻¹)		Bearing No.		(Refer.) Mass (kg)	
d	D	B	r _{min.}	C _r	C _{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	Cylindrical bore	Tapered bore
25	52	18	1	45.4	48.1	7 000	9 300	22205RHR	22205RHRK	0.220	0.215
30	62	20	1	61.2	65.9	5 900	7 900	22206RHR	22206RHRK	0.360	0.350
	72	19	1.1	59.3	62.7	5 200	7 000	21306RH	21306RHK	0.380	0.370
35	72	23	1.1	80.3	88.7	5 000	6 700	22207RHR	22207RHRK	0.550	0.540
	80	21	1.5	69.6	75.3	4 500	6 000	21307RH	21307RHK	0.510	0.500
40	80	23	1.1	90.9	102	4 500	6 000	22208RHR	22208RHRK	0.660	0.650
	90	23	1.5	85.7	95.5	4 100	5 500	21308RH	21308RHK	0.710	0.700
	90	33	1.5	136	152	4 100	5 500	22308RHR	22308RHRK	1.25	1.23
45	85	23	1.1	95.6	110	4 200	5 600	22209RHR	22209RHRK	0.720	0.710
	100	25	1.5	108	124	3 600	4 900	21309RH	21309RHK	0.950	0.940
	100	36	1.5	166	183	3 700	4 900	22309RHR	22309RHRK	1.62	1.59
50	90	23	1.1	103	122	3 900	5 200	22210RHR	22210RHRK	0.780	0.770
	110	27	2	128	151	3 300	4 400	21310RH	21310RHK	1.20	1.18
	110	40	2	204	237	3 300	4 500	22310RHR	22310RHRK	2.21	2.18
55	100	25	1.5	124	144	3 400	4 600	22211RHR	22211RHRK	1.05	1.04
	120	29	2	144	165	3 000	4 100	21311RH	21311RHK	1.60	1.58
	120	43	2	236	264	3 000	4 000	22311RHR	22311RHRK	2.72	2.67
60	110	28	1.5	153	181	3 100	4 200	22212RHR	22212RHRK	1.45	1.43
	130	31	2.1	168	193	2 800	3 700	21312RH	21312RHK	1.95	1.92
	130	46	2.1	283	334	2 800	3 700	22312RHR	22312RHRK	3.43	3.37
65	120	31	1.5	178	211	2 900	3 800	22213RHR	22213RHRK	1.84	1.81
	140	33	2.1	194	232	2 600	3 400	21313RH	21313RHK	2.45	2.41
	140	48	2.1	305	360	2 600	3 400	22313RHR	22313RHRK	4.15	4.07
70	125	31	1.5	187	222	2 700	3 600	22214RHR	22214RHRK	1.94	1.91
	150	35	2.1	215	260	2 400	3 200	21314RH	21314RHK	3.00	2.95
	150	51	2.1	348	413	2 400	3 200	22314RHR	22314RHRK	5.01	4.92
75	130	31	1.5	193	236	2 600	3 400	22215RHR	22215RHRK	2.05	2.01
	160	37	2.1	246	298	2 200	3 000	21315RH	21315RHK	3.55	3.50
	160	55	2.1	393	473	2 200	3 000	22315RHR	22315RHRK	6.13	6.02
80	140	33	2	217	271	2 400	3 200	22216RHR	22216RHRK	2.61	2.57
	170	39	2.1	275	339	2 100	2 800	21316RH	21316RHK	4.20	4.14
	170	58	2.1	431	521	2 100	2 800	22316RHR	22316RHRK	7.18	7.04

Remark) Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

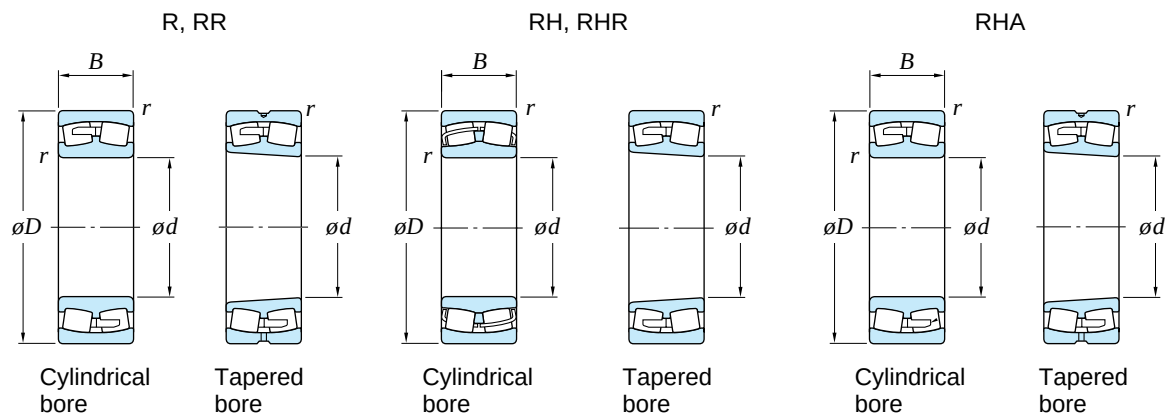
d 85 – (150) mm

Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min ⁻¹)		Bearing No.		(Refer.) Mass (kg)	
<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> _{min.}	<i>C_r</i>	<i>C</i> _{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	Cylindrical bore	Tapered bore
85	150	36	2	258	324	2 200	3 000	22217RHR	22217RHRK	3.23	3.16
	180	41	3	300	372	2 000	2 600	21317RH	21317RHK	5.00	4.93
	180	60	3	481	586	2 000	2 600	22317RHR	22317RHRK	8.41	8.26
90	160	40	2	298	381	2 100	2 800	22218RHR	22218RHRK	4.01	3.94
	160	52.4	2	336	482	2 100	2 800	23218RH	23218RHK	4.60	4.47
	190	43	3	330	416	1 900	2 500	21318RH	21318RHK	5.80	5.71
	190	64	3	538	662	1 900	2 500	22318RHR	22318RHRK	9.87	9.68
	190	64	3	538	662	1 900	2 500	22318RHR	22318RHRK	9.87	9.68
95	170	43	2.1	334	422	2 000	2 600	22219RHR	22219RHRK	4.90	4.80
	200	45	3	362	461	1 800	2 300	21319RH	21319RHK	7.15	7.05
	200	67	3	586	726	1 800	2 300	22319RHR	22319RHRK	11.6	11.38
100	150	37	1.5	208	332	2 100	2 800	23020RH	—	2.80	—
	180	46	2.1	377	481	1 900	2 500	22220RHR	22220RHRK	5.82	5.72
	180	60.3	2.1	425	629	1 900	2 500	23220RH	23220RHK	6.70	6.51
	215	47	3	416	524	1 600	2 200	21320RH	21320RHK	8.80	8.68
	215	73	3	700	877	1 600	2 200	22320RHR	22320RHRK	14.7	14.4
110	170	45	2	300	486	1 900	2 500	23022RH	23022RHK	4.50	4.38
	180	56	2	385	605	1 800	2 400	23122RH	23122RHK	5.55	5.37
	180	69	2	469	778	1 800	2 400	24122RH	24122RHK30	6.53	6.44
	200	53	2.1	491	642	1 700	2 200	22222RHR	22222RHRK	8.37	8.22
	200	69.8	2.1	537	792	1 700	2 200	23222RH	23222RHK	9.70	9.40
120	240	50	3	484	616	1 400	1 900	21322RH	21322RHK	12.0	11.8
	240	80	3	828	1 040	1 400	1 900	22322RHR	22322RHRK	20.2	19.8
	180	46	2	314	524	1 700	2 300	23024RH	23024RHK	4.90	4.77
	180	60	2	397	709	1 700	2 300	24024RH	24024RHK30	5.04	4.96
	200	62	2	454	714	1 600	2 200	23124RH	23124RHK	7.80	7.56
130	200	80	2	605	1 020	1 600	2 200	24124RH	24124RHK30	9.64	9.54
	215	58	2.1	565	764	1 500	2 000	22224RHR	22224RHRK	10.6	10.4
	215	76	2.1	616	956	1 500	2 100	23224RH	23224RHK	12.0	11.6
	260	86	3	896	1 130	1 300	1 800	22324RHR	22324RHRK	24.1	23.6
	260	86	3	896	1 130	1 300	1 800	22324RHR	22324RHRK	24.1	23.6
140	200	52	2	404	674	1 600	2 100	23026RH	23026RHK	7.30	7.12
	200	69	2	512	914	1 600	2 100	24026RH	24026RHK30	7.43	7.33
	210	64	2	494	799	1 500	2 000	23126RH	23126RHK	8.55	8.27
	210	80	2	620	1 080	1 500	2 000	24126RH	24126RHK30	10.3	10.1
	230	64	3	658	914	1 400	1 900	22226RHR	22226RHRK	13.3	13.0
150	230	80	3	702	1 090	1 400	1 900	23226RH	23226RHK	14.0	13.5
	280	93	4	1 040	1 340	1 200	1 600	22326RHR	22326RHRK	30.3	29.7
	210	53	2	422	723	1 500	2 000	23028RH	23028RHK	7.80	7.60
	210	69	2	524	957	1 500	2 000	24028RH	24028RHK30	7.88	7.74
	225	68	2.1	565	940	1 400	1 900	23128RH	23128RHK	10.5	10.2
150	225	85	2.1	702	1 220	1 400	1 900	24128RH	24128RHK30	12.3	12.1
	250	68	3	759	1 030	1 300	1 700	22228RHR	22228RHRK	16.4	16.1
	250	88	3	811	1 290	1 300	1 700	23228RH	23228RHK	18.5	17.9
	300	102	4	1 100	1 410	1 300	1 700	22328R	22328RK	36.2	35.5
	300	102	4	1 170	1 570	1 100	1 500	22328RH	22328RHK	35.7	34.9
150	210	45	2	334	622	1 600	2 100	23930R	23930RK	4.97	4.81

Remark) Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

Spherical roller bearings

d (150) – (180) mm



Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min ⁻¹)		Bearing No.		(Refer.) Mass (kg)	
d	D	B	r _{min.}	C _r	C _{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	Cylindrical bore	Tapered bore
150	225	56	2.1	461	797	1 400	1 800	23030RH	23030RHK	9.50	9.26
	225	75	2.1	593	1 100	1 400	1 800	24030RH	24030RHK30	9.81	9.64
	250	80	2.1	717	1 230	1 300	1 700	23130RH	23130RHK	16.0	15.5
	250	100	2.1	915	1 590	1 300	1 700	24130RH	24130RHK30	18.4	18.1
	270	73	3	865	1 200	1 200	1 600	22230RHR	22230RHRK	20.6	20.2
	270	96	3	959	1 540	1 200	1 600	23230RH	23230RHK	24.0	23.3
	320	108	4	1 230	1 600	1 200	1 500	22330R	22330RK	43.6	42.7
	320	108	4	1 290	1 740	1 200	1 500	22330RHA	22330RHAK	40.3	39.4
	220	45	2	341	649	1 500	2 000	23932R	23932RK	5.25	5.08
	240	60	2.1	531	924	1 300	1 700	23032RH	23032RHK	11.3	11.0
160	240	80	2.1	679	1 270	1 300	1 700	24032RH	24032RHK30	12.0	11.8
	270	86	2.1	848	1 430	1 200	1 600	23132RH	23132RHK	20.5	19.9
	270	109	2.1	1 070	1 890	1 200	1 600	24132RH	24132RHK30	24.0	23.7
	290	80	3	885	1 270	1 200	1 600	22232R	22232RK	23.4	22.9
	290	80	3	897	1 320	1 200	1 600	22232RHA	22232RHAK	21.9	21.4
	290	104	3	1 030	1 650	1 200	1 600	23232R	23232RK	31.0	30.1
	290	104	3	1 100	1 780	1 200	1 600	23232RHA	23232RHAK	29.4	28.5
	340	114	4	1 380	1 790	1 100	1 400	22332R	22332RK	51.9	51.0
	340	114	4	1 420	1 940	1 100	1 400	22332RHA	22332RHAK	48.0	47.1
170	230	45	2	353	691	1 400	1 900	23934R	23934RK	5.53	5.35
	260	67	2.1	632	1 090	1 200	1 600	23034RH	23034RHK	15.9	15.5
	260	90	2.1	828	1 540	1 200	1 600	24034RH	24034RHK30	16.3	16.0
	280	88	2.1	916	1 550	1 100	1 500	23134RH	23134RHK	21.5	20.8
	280	109	2.1	1 090	1 940	1 100	1 500	24134RH	24134RHK30	25.4	25.0
	310	86	4	952	1 390	1 100	1 500	22234R	22234RK	29.0	28.4
	310	86	4	1 010	1 490	1 100	1 500	22234RHA	22234RHAK	27.1	26.5
	310	110	4	1 150	1 870	1 100	1 500	23234R	23234RK	37.5	36.5
	310	110	4	1 210	1 940	1 100	1 500	23234RHA	23234RHAK	35.6	34.6
	360	120	4	1 460	1 920	1 000	1 300	22334R	22334RK	62.0	60.8
180	360	120	4	1 590	2 200	1 000	1 300	22334RHA	22334RHAK	57.3	56.1
	250	52	2	479	939	1 300	1 700	23936R	23936RK	8.00	7.80
	280	74	2.1	768	1 330	1 100	1 400	23036RH	23036RHK	20.2	19.7
	280	100	2.1	984	1 830	1 100	1 400	24036RH	24036RHK30	21.4	21.0

Remark) Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

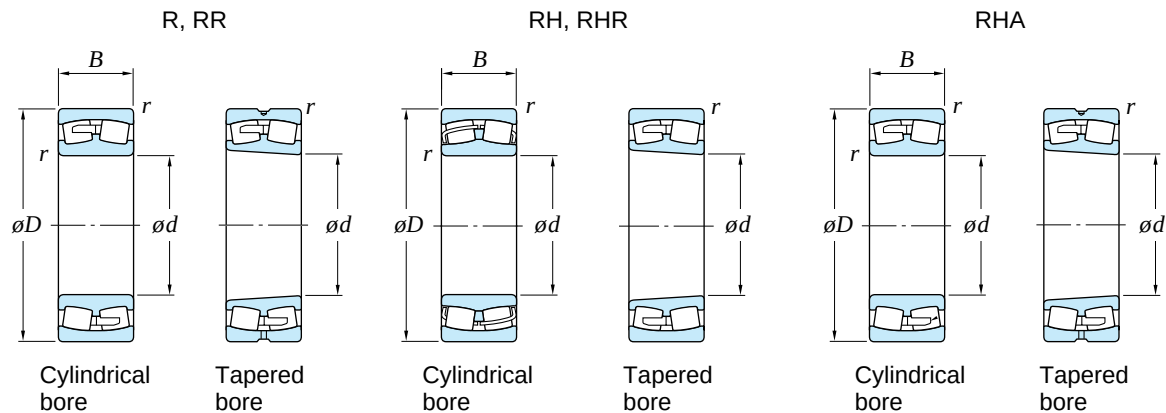
d (180) – (220) mm

Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min ⁻¹)		Bearing No.		(Refer.) Mass (kg)	
<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> _{min.}	<i>C_r</i>	<i>C</i> _{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	Cylindrical bore	Tapered bore
180	300	96	3	1 000	1 800	1 100	1 500	23136R	23136RK	28.4	27.5
	300	96	3	1 060	1 790	1 100	1 500	23136RHA	23136RHAK	26.5	25.6
	300	118	3	1 160	2 010	1 000	1 400	24136R	24136RK30	33.3	32.7
	300	118	3	1 250	2 240	1 100	1 500	24136RHA	24136RHAK30	31.8	31.2
	320	86	4	978	1 450	1 100	1 400	22236R	22236RK	30.5	29.8
	320	86	4	1 060	1 610	1 100	1 400	22236RHA	22236RHAK	28.5	27.8
	320	112	4	1 190	1 980	1 100	1 400	23236R	23236RK	39.8	38.6
	320	112	4	1 320	2 170	1 100	1 400	23236RHA	23236RHAK	37.7	36.5
	380	126	4	1 740	2 360	920	1 200	22336R	22336RK	71.4	69.9
	380	126	4	1 740	2 410	930	1 200	22336RHA	22336RHAK	66.0	64.5
	260	52	2	486	969	1 200	1 600	23938R	23938RK	8.40	8.10
	290	75	2.1	736	1 370	1 100	1 500	23038R	23038RK	18.8	18.2
190	290	75	2.1	789	1 430	1 100	1 500	23038RHA	23038RHAK	17.2	16.6
	290	100	2.1	906	1 640	1 000	1 400	24038R	24038RK30	24.0	23.6
	290	100	2.1	1 010	1 920	1 100	1 500	24038RHA	24038RHAK30	22.4	22.0
	320	104	3	1 090	2 000	1 000	1 400	23138R	23138RK	35.5	34.4
	320	104	3	1 210	2 080	1 000	1 400	23138RHA	23138RHAK	33.2	32.1
	320	128	3	1 340	2 320	950	1 300	24138R	24138RK30	42.0	41.4
	320	128	3	1 460	2 630	1 000	1 400	24138RHA	24138RHAK30	40.1	39.5
	340	92	4	1 110	1 730	1 000	1 300	22238R	22238RK	37.4	36.6
	340	92	4	1 150	1 770	1 000	1 300	22238RHA	22238RHAK	34.9	34.1
	340	120	4	1 410	2 210	1 000	1 300	23238R	23238RK	47.4	46.0
	340	120	4	1 490	2 470	990	1 300	23238RHA	23238RHAK	44.9	43.5
	400	132	5	1 900	2 610	880	1 200	22338R	22338RK	84.1	82.4
200	400	132	5	1 940	2 810	870	1 200	22338RHA	22338RHAK	77.7	76.0
	280	60	2.1	601	1 190	1 100	1 500	23940R	23940RK	12.0	11.6
	310	82	2.1	890	1 670	1 000	1 400	23040R	23040RK	24.1	23.4
	310	82	2.1	940	1 680	1 100	1 400	23040RHA	23040RHAK	22.0	21.3
	310	109	2.1	1 030	1 900	950	1 300	24040R	24040RK30	30.5	30.0
	310	109	2.1	1 180	2 230	1 100	1 400	24040RHA	24040RHAK30	28.5	28.0
	340	112	3	1 240	2 250	980	1 300	23140R	23140RK	43.7	42.4
	340	112	3	1 380	2 340	970	1 300	23140RHA	23140RHAK	40.8	39.5
	340	140	3	1 450	2 490	890	1 200	24140R	24140RK30	51.9	51.1
	340	140	3	1 660	2 970	990	1 300	24140RHA	24140RHAK30	49.5	48.7
	360	98	4	1 230	1 930	930	1 200	22240R	22240RK	45.0	44.0
	360	98	4	1 310	2 030	940	1 300	22240RHA	22240RHAK	42.0	41.0
220	360	128	4	1 550	2 610	940	1 300	23240R	23240RK	58.1	56.4
	360	128	4	1 660	2 780	930	1 200	23240RHA	23240RHAK	55.1	53.4
	420	138	5	2 010	2 750	830	1 100	22340R	22340RK	95.4	93.5
	420	138	5	2 060	2 920	820	1 100	22340RHA	22340RHAK	88.1	86.2
	300	60	2.1	634	1 300	1 000	1 400	23944R	23944RK	13.0	12.6
	340	90	3	984	1 890	940	1 300	23044R	23044RK	31.5	30.6
	340	90	3	1 090	1 950	940	1 200	23044RHA	23044RHAK	28.8	27.9
	340	118	3	1 240	2 300	850	1 100	24044R	24044RK30	39.6	39.0
	340	118	3	1 380	2 630	950	1 300	24044RHA	24044RHAK30	37.0	36.4
	370	120	4	1 440	2 700	880	1 200	23144R	23144RK	54.8	53.2
	370	120	4	1 590	2 790	870	1 200	23144RHA	23144RHAK	51.2	49.6
	370	150	4	1 680	2 900	800	1 100	24144R	24144RK30	65.0	64.0

Remark) Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

Spherical roller bearings

d (220) – (260) mm



Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min ⁻¹)		Bearing No.		(Refer.) Mass (kg)	
d	D	B	r _{min.}	C _r	C _{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	Cylindrical bore	Tapered bore
220	370	150	4	1 920	3 550	880	1 200	24144RHA	24144RHAK30	62.0	61.0
	400	108	4	1 560	2 400	820	1 100	22244R	22244RK	63.0	61.7
	400	108	4	1 590	2 440	820	1 100	22244RHA	22244RHAK	58.8	57.5
	400	144	4	1 880	3 200	830	1 100	23244R	23244RK	81.6	79.2
	400	144	4	2 020	3 350	810	1 100	23244RHA	23244RHAK	77.4	75.0
	460	145	5	2 380	3 380	720	960	22344R	22344RK	124	122
	460	145	5	2 370	3 470	730	970	22344RHA	22344RHAK	115	113
	320	60	2.1	651	1 380	940	1 300	23948R	23948RK	14.0	13.5
	360	92	3	1 100	2 170	860	1 100	23048R	23048RK	34.9	33.8
	360	92	3	1 170	2 180	860	1 100	23048RHA	23048RHAK	31.9	30.9
240	360	118	3	1 310	2 530	780	1 000	24048R	24048RK30	42.4	41.8
	360	118	3	1 430	2 840	870	1 200	24048RHA	24048RHAK30	39.6	39.0
	400	128	4	1 630	3 080	790	1 100	23148R	23148RK	67.6	65.6
	400	128	4	1 810	3 200	790	1 000	23148RHA	23148RHAK	63.1	61.1
	400	160	4	1 970	3 500	720	960	24148R	24148RK30	80.3	79.0
	400	160	4	2 200	4 130	800	1 100	24148RHA	24148RHAK30	76.6	75.3
	440	120	4	1 920	2 940	730	970	22248R	22248RK	85.0	83.2
	440	120	4	1 920	2 990	730	970	22248RHA	22248RHAK	79.4	77.6
	440	160	4	2 340	3 990	730	970	23248R	23248RK	110	107
	440	160	4	2 460	4 130	730	970	23248RHA	23248RHAK	104	101
	500	155	5	2 610	4 020	650	870	22348R	22348RK	157	154
	500	155	5	2 720	3 990	650	870	22348RHA	22348RHAK	145	142
	360	75	2.1	914	1 880	820	1 100	23952R	23952RK	24.0	23.3
	400	104	4	1 330	2 570	760	1 000	23052R	23052RK	50.7	49.3
	400	104	4	1 470	2 720	760	1 000	23052RHA	23052RHAK	46.3	44.9
	400	140	4	1 690	3 240	690	920	24052R	24052RK30	64.6	63.7
260	400	140	4	1 860	3 670	770	1 000	24052RHA	24052RHAK30	60.3	59.4
	440	144	4	2 100	3 860	710	940	23152R	23152RK	93.6	90.8
	440	144	4	2 220	4 000	700	930	23152RHA	23152RHAK	87.4	84.6
	440	180	4	2 360	4 170	640	860	24152R	24152RK30	111	110
	440	180	4	2 650	4 950	720	950	24152RHA	24152RHAK30	106	105
	480	130	5	2 240	3 460	650	870	22252R	22252RK	110	108
	480	130	5	2 230	3 430	650	870	22252RHA	22252RHAK	103	101
	480	174	5	2 750	4 640	640	860	23252R	23252RK	144	140

Remark) Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

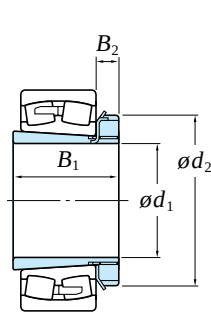
d (260) – 300 mm

Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min ⁻¹)		Bearing No.		(Refer.) Mass (kg)	
d	D	B	$r_{min.}$	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	Cylindrical bore	Tapered bore
260	480	174	5	2 870	4 900	650	860	23252RHA	23252RHAK	137	133
	540	165	6	2 830	4 380	590	780	22352R	22352RK	196	192
	540	165	6	3 120	4 620	580	780	22352RHA	22352RHAK	181	177
280	380	75	2.1	928	1 960	760	1 000	23956R	23956RK	26.0	25.2
	420	106	4	1 430	2 860	710	950	23056R	23056RK	54.5	52.9
	420	106	4	1 550	2 950	700	940	23056RHA	23056RHAK	49.8	48.2
	420	140	4	1 740	3 420	640	850	24056R	24056RK30	68.5	67.4
	420	140	4	1 960	4 000	710	950	24056RHA	24056RHAK30	64.0	62.9
	460	146	5	2 140	4 280	660	880	23156R	23156RK	100	96.9
	460	146	5	2 340	4 290	650	870	23156RHA	23156RHAK	93.4	90.3
	460	180	5	2 440	4 440	600	790	24156R	24156RK30	118	116
	460	180	5	2 740	5 240	660	880	24156RHA	24156RHAK30	113	112
	500	130	5	2 100	3 380	610	810	22256R	22256RK	114	112
	500	130	5	2 320	3 670	610	810	22256RHA	22256RHAK	106	104
	500	176	5	2 690	4 910	610	820	23256R	23256RK	153	149
	500	176	5	3 010	5 300	600	800	23256RHA	23256RHAK	145	141
	580	175	6	3 150	4 910	530	710	22356R	22356RK	229	225
	580	175	6	3 510	5 260	530	700	22356RHA	22356RHAK	212	208
	420	90	3	1 280	2 610	680	910	23960R	23960RK	40.0	38.8
	460	118	4	1 750	3 480	630	840	23060R	23060RK	75.8	73.7
	460	118	4	1 940	3 700	630	840	23060RHA	23060RHAK	68.9	66.8
300	460	160	4	2 240	4 370	570	760	24060R	24060RK30	97.1	95.5
	460	160	4	2 420	4 910	640	850	24060RHA	24060RHAK30	90.7	89.1
	500	160	5	2 490	4 850	590	790	23160R	23160RK	132	128
	500	160	5	2 730	4 970	580	780	23160RHA	23160RHAK	123	119
	500	200	5	2 990	5 520	530	710	24160R	24160RK30	157	155
	500	200	5	3 320	6 420	590	790	24160RHA	24160RHAK30	150	148
	540	140	5	2 690	4 330	550	740	22260R	22260RK	145	142
	540	140	5	2 650	4 360	550	740	22260RHA	22260RHAK	135	132
	540	192	5	3 430	5 910	540	720	23260R	23260RK	197	192
	540	192	5	3 530	6 280	540	720	23260RHA	23260RHAK	187	182
	620	185	7.5	3 910	5 430	470	630	22360R	22360RK	289	284

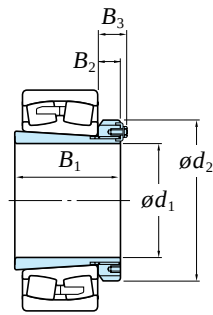
Remark) Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

Adapter assemblies for spherical roller bearings

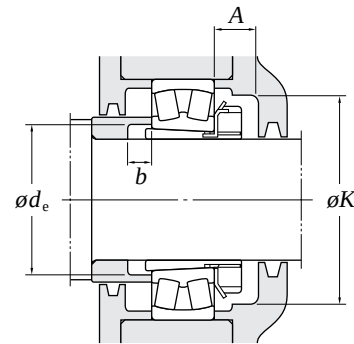
d_1 20 – (80) mm



$d_1 \leq 180$ mm



$d_1 \geq 200$ mm



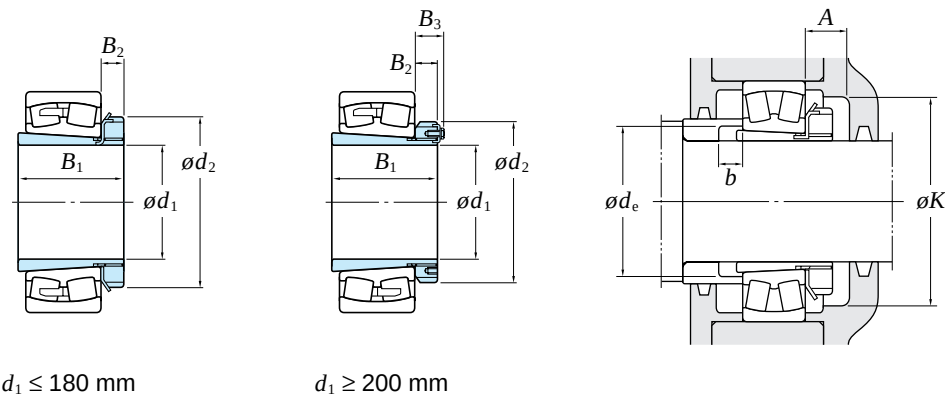
Boundary dimensions (mm)					Brg. bore (mm) d	Designations Bearing + adapter ass'y	Mounting dimensions (mm)				Mass Brg. + adapter ass'y (kg)	(Refer.)	
d_1	B_1	d_2	B_2	B_3			A min.	K min.	d_e min.	b min.		Adapter sleeve No.	Locknut No.
20	29	38	8	—	25	22205RHRK + H305X	15	45	29	5	0.290	A305X	AN05
25	31	45	8	—	30	22206RHRK + H306X	15	50	34	5	0.459	A306X	AN06
	31	45	8	—	30	21306RHK + H306X	15	50	34	6	0.479	A306X	AN06
30	35	52	9	—	35	22207RHRK + H307X	17	58	39	5	0.682	A307X	AN07
	35	52	9	—	35	21307RHK + H307X	17	58	39	7	0.642	A307X	AN07
35	36	58	10	—	40	22208RHRK + H308X	17	65	44	5	0.839	A308X	AN08
	36	58	10	—	40	21308RHK + H308X	17	65	44	5	0.888	A308X	AN08
	46	58	10	—	40	22308RHRK + H2308X	17	65	45	5	1.46	A2308X	AN08
40	39	65	11	—	45	22209RHRK + H309X	17	72	49	8	0.958	A309X	AN09
	39	65	11	—	45	21309RHK + H309X	17	72	49	5	1.19	A309X	AN09
	50	65	11	—	45	22309RHRK + H2309X	17	72	50	5	1.87	A2309X	AN09
45	42	70	12	—	50	22210RHRK + H310X	19	76	54	10	1.07	A310X	AN10
	42	70	12	—	50	21310RHK + H310X	19	76	54	5	1.48	A310X	AN10
	55	70	12	—	50	22310RHRK + H2310X	19	76	56	5	2.54	A2310X	AN10
50	45	75	12	—	55	22211RHRK + H311X	19	85	60	11	1.39	A311X	AN11
	45	75	12	—	55	21311RHK + H311X	19	85	60	6	1.93	A311X	AN11
	59	75	12	—	55	22311RHRK + H2311X	19	85	61	6	3.09	A2311X	AN11
55	47	80	13	—	60	22212RHRK + H312X	20	90	65	9	1.82	A312X	AN12
	47	80	13	—	60	21312RHK + H312X	20	90	65	5	2.31	A312X	AN12
	62	80	13	—	60	22312RHRK + H2312X	20	90	66	5	3.82	A2312X	AN12
60	50	85	14	—	65	22213RHRK + H313X	21	96	70	8	2.27	A313X	AN13
	50	85	14	—	65	21313RHK + H313X	21	96	70	5	2.87	A313X	AN13
	65	85	14	—	65	22313RHRK + H2313X	21	96	72	5	4.63	A2313X	AN13
65	55	98	15	—	75	22215RHRK + H315X	23	110	80	12	2.84	A315X	AN15
	55	98	15	—	75	21315RHK + H315X	23	110	80	5	4.33	A315X	AN15
	73	98	15	—	75	22315RHRK + H2315X	23	110	82	5	7.07	A2315X	AN15
70	59	105	17	—	80	22216RHRK + H316X	25	120	86	12	3.60	A316X	AN16
	59	105	17	—	80	21316RHK + H316X	25	120	86	5	5.17	A316X	AN16
	78	105	17	—	80	22316RHRK + H2316X	25	120	87	5	8.32	A2316X	AN16
75	63	110	18	—	85	22217RHRK + H317X	27	128	91	12	4.34	A317X	AN17
	63	110	18	—	85	21317RHK + H317X	27	128	91	6	6.11	A317X	AN17
	82	110	18	—	85	22317RHRK + H2317X	27	128	94	6	9.71	A2317X	AN17
80	65	120	18	—	90	22218RHRK + H318X	28	139	96	10	5.31	A318X	AN18

d_1 (80) – (150) mm

Boundary dimensions (mm)					Brg. bore (mm) d	Designations Bearing + adapter ass'y	Mounting dimensions (mm)				Mass Brg. + adapter ass'y (kg)	(Refer.)	
d_1	B_1	d_2	B_2	B_3			A min.	K min.	d_e min.	b min.		Adapter sleeve No.	Locknut No.
80	86	120	18	–	90	23218RHK + H2318X	28	139	99	18	6.16	A2318X	AN18
	65	120	18	–	90	21318RHK + H318X	28	139	96	6	7.08	A318X	AN18
	86	120	18	–	90	22318RHRK + H2318X	28	139	99	6	11.37	A2318X	AN18
85	68	125	19	–	95	22219RHRK + H319X	29	145	102	9	6.36	A319X	AN19
	68	125	19	–	95	21319RHK + H319X	29	145	102	7	8.61	A319X	AN19
	90	125	19	–	95	22319RHRK + H2319X	29	145	105	7	13.3	A2319X	AN19
90	71	130	20	–	100	22220RHRK + H320X	30	150	107	8	7.41	A320X	AN20
	97	130	20	–	100	23220RHK + H2320X	30	150	110	19	8.66	A2320X	AN20
	71	130	20	–	100	21320RHK + H320X	30	150	107	7	10.4	A320X	AN20
	97	130	20	–	100	22320RHRK + H2320X	30	150	110	7	16.6	A2320X	AN20
100	81	145	21	–	110	23122RHK + H3122X	32	170	117	7	7.62	A3122X	AN22
	77	145	21	–	110	22222RHRK + H322X	32	170	117	6	10.4	A322X	AN22
	105	145	21	–	110	23222RHK + H2322X	32	170	121	17	12.1	A2322X	AN22
	77	145	21	–	110	21322RHK + H322X	32	170	117	9	14.0	A322X	AN22
	105	145	21	–	110	22322RHRK + H2322X	32	170	121	7	22.5	A2322X	AN22
110	72	145	22	–	120	23024RHK + H3024	33	180	127	7	6.70	A3024	ANL24
	88	155	22	–	120	23124RHK + H3124	33	180	128	7	10.2	A3124	AN24
	88	155	22	–	120	22224RHRK + H3124	33	180	128	11	13.0	A3124	AN24
	112	155	22	–	120	23224RHK + H2324	33	180	131	17	14.8	A2324	AN24
	112	155	22	–	120	22324RHRK + H2324	33	180	131	7	26.8	A2324	AN24
115	80	155	23	–	130	23026RHK + H3026	34	190	137	8	9.97	A3026	ANL26
	92	165	23	–	130	23126RHK + H3126	34	190	138	8	11.9	A3126	AN26
	92	165	23	–	130	22226RHRK + H3126	34	190	138	8	16.7	A3126	AN26
	121	165	23	–	130	23226RHK + H2326	34	190	142	21	18.1	A2326	AN26
	121	165	23	–	130	22326RHRK + H2326	34	190	142	8	34.3	A2326	AN26
125	82	165	24	–	140	23028RHK + H3028	36	205	147	8	10.76	A3028	ANL28
	97	180	24	–	140	23128RHK + H3128	36	205	149	8	14.5	A3128	AN28
	97	180	24	–	140	22228RHRK + H3128	36	205	149	8	20.4	A3128	AN28
	131	180	24	–	140	23228RHK + H2328	36	205	152	22	23.5	A2328	AN28
	131	180	24	–	140	22328RK + H2328	36	205	152	8	41.1	A2328	AN28
135	87	180	26	–	150	23030RHK + H3030	37	220	158	8	13.15	A3030	ANL30
	111	195	26	–	150	23130RHK + H3130	37	220	160	8	21.0	A3130	AN30
	111	195	26	–	150	22230RHRK + H3130	37	220	160	15	25.7	A3130	AN30
	139	195	26	–	150	23230RHK + H2330	37	220	163	20	29.9	A2330	AN30
	139	195	26	–	150	22330RK + H2330	37	220	163	8	49.3	A2330	AN30
140	93	190	28	–	160	23032RHK + H3032	39	230	168	8	16.2	A3032	ANL32
	119	210	28	–	160	23132RHK + H3132	39	230	170	8	27.6	A3132	AN32
	119	210	28	–	160	22232RK + H3132	39	230	170	14	30.5	A3132	AN32
	119	210	28	–	160	22232RHAK + H3132	39	230	170	14	29.1	A3132	AN32
	147	210	28	–	160	23232RK + H2332	39	230	174	18	39.2	A2332	AN32
150	122	220	29	–	170	23034RHK + H3034	40	250	179	8	21.5	A3034	ANL34
	122	220	29	–	170	23134RHK + H3134	40	250	180	8	29.2	A3134	AN34
	122	220	29	–	170	22234RK + H3134	40	250	180	10	36.8	A3134	AN34
	147	210	28	–	160	22332RK + H2332	39	230	174	8	60.1	A2332	AN32
	147	210	28	–	160	22332RHAK + H2332	39	230	174	8	56.2	A2332	AN32

Adapter assemblies for spherical roller bearings

d_1 (150) – 180 mm



Boundary dimensions (mm)					Brg. bore (mm) d	Designations Bearing + adapter ass'y	Mounting dimensions (mm)				Mass Brg. + adapter ass'y (kg)	(Refer.)	
d_1	B_1	d_2	B_2	B_3			A min.	K min.	d_e min.	b min.		Adapter sleeve No.	Locknut No.
150	122	220	29	–	170	22234RHAK + H3134	40	250	180	10	34.9	A3134	AN34
	154	220	29	–	170	23234RK + H2334	40	250	185	18	46.7	A2334	AN34
	154	220	29	–	170	23234RHAK + H2334	40	250	185	18	44.8	A2334	AN34
	154	220	29	–	170	22334RK + H2334	40	250	185	8	71.0	A2334	AN34
	154	220	29	–	170	22334RHAK + H2334	40	250	185	8	66.3	A2334	AN34
	154	220	29	–	170	22334RHAK + H2334	40	250	185	8	66.3	A2334	AN34
160	109	210	30	–	180	23036RHK + H3036	41	260	189	8	26.5	A3036	ANL36
	131	230	30	–	180	23136RK + H3136	41	260	191	8	37.0	A3136	AN36
	131	230	30	–	180	23136RHAK + H3136	41	260	191	8	35.1	A3136	AN36
	131	230	30	–	180	22236RK + H3136	41	260	191	18	39.3	A3136	AN36
	131	230	30	–	180	22236RHAK + H3136	41	260	191	18	37.3	A3136	AN36
	161	230	30	–	180	23236RK + H2336	41	260	195	22	49.9	A2336	AN36
	161	230	30	–	180	23236RHAK + H2336	41	260	195	22	47.8	A2336	AN36
	161	230	30	–	180	22336RK + H2336	41	260	195	8	81.2	A2336	AN36
	161	230	30	–	180	22336RHAK + H2336	41	260	195	8	75.8	A2336	AN36
	161	230	30	–	180	22336RHAK + H2336	41	260	195	8	75.8	A2336	AN36
	161	230	30	–	180	22336RHAK + H2336	41	260	195	8	75.8	A2336	AN36
	161	230	30	–	180	22336RHAK + H2336	41	260	195	8	75.8	A2336	AN36
170	112	220	31	–	190	23038RK + H3038	43	270	199	9	25.7	A3038	ANL38
	112	220	31	–	190	23038RHAK + H3038	43	270	199	9	24.1	A3038	ANL38
	141	240	31	–	190	23138RK + H3138	43	270	202	9	45.2	A3138	AN38
	141	240	31	–	190	23138RHAK + H3138	43	270	202	9	42.9	A3138	AN38
	141	240	31	–	190	22238RK + H3138	43	270	202	21	47.4	A3138	AN38
	141	240	31	–	190	22238RHAK + H3138	43	270	202	21	44.9	A3138	AN38
	169	240	31	–	190	23238RK + H2338	43	270	206	21	58.6	A2338	AN38
	169	240	31	–	190	23238RHAK + H2338	43	270	206	21	56.1	A2338	AN38
	169	240	31	–	190	22338RK + H2338	43	270	206	9	95.0	A2338	AN38
	169	240	31	–	190	22338RHAK + H2338	43	270	206	9	88.6	A2338	AN38
	169	240	31	–	190	22338RHAK + H2338	43	270	206	9	88.6	A2338	AN38
	169	240	31	–	190	22338RHAK + H2338	43	270	206	9	88.6	A2338	AN38
180	120	240	32	–	200	23040RK + H3040	46	280	210	10	32.6	A3040	ANL40
	120	240	32	–	200	23040RHAK + H3040	46	280	210	10	30.5	A3040	ANL40
	150	250	32	–	200	23140RK + H3140	46	280	212	10	54.5	A3140	AN40
	150	250	32	–	200	23140RHAK + H3140	46	280	212	10	51.6	A3140	AN40
	150	250	32	–	200	22240RK + H3140	46	280	212	24	56.1	A3140	AN40
	150	250	32	–	200	22240RHAK + H3140	46	280	212	24	53.1	A3140	AN40
	176	250	32	–	200	23240RK + H2340	46	280	216	20	70.3	A2340	AN40
	176	250	32	–	200	23240RHAK + H2340	46	280	216	20	67.3	A2340	AN40
	176	250	32	–	200	22340RK + H2340	46	280	216	10	107	A2340	AN40
	176	250	32	–	200	22340RHAK + H2340	46	280	216	10	100	A2340	AN40
	176	250	32	–	200	22340RHAK + H2340	46	280	216	10	100	A2340	AN40
	176	250	32	–	200	22340RHAK + H2340	46	280	216	10	100	A2340	AN40

d_1 200 – 280 mm

Boundary dimensions (mm)					Brg. bore (mm) d	Designations Bearing + adapter ass'y	Mounting dimensions (mm)				Mass Brg. + adapter ass'y (kg)	(Refer.)	
d_1	B_1	d_2	B_2	B_3			A min.	K min.	d_e min.	b min.		Adapter sleeve No.	Locknut No.
200	128	260	30	41	220	23044RK + H3044	—	—	231	12	40.9	A3044	ANL44
	128	260	30	41	220	23044RHAK + H3044	—	—	231	12	38.2	A3044	ANL44
	158	280	32	44	220	23144RK + H3144	—	—	233	10	67.9	A3144	AN44
	158	280	32	44	220	23144RHAK + H3144	—	—	233	10	64.3	A3144	AN44
	158	280	32	44	220	22244RK + H3144	—	—	233	22	76.4	A3144	AN44
	158	280	32	44	220	22244RHAK + H3144	—	—	233	22	72.2	A3144	AN44
	183	280	32	44	220	23244RK + H2344	—	—	236	11	95.9	A2344	AN44
	183	280	32	44	220	23244RHAK + H2344	—	—	236	11	91.7	A2344	AN44
	183	280	32	44	220	22344RK + H2344	—	—	236	10	139	A2344	AN44
	183	280	32	44	220	22344RHAK + H2344	—	—	236	10	130	A2344	AN44
	133	290	34	46	240	23048RK + H3048	—	—	251	11	47.0	A3048	ANL48
	133	290	34	46	240	23048RHAK + H3048	—	—	251	11	44.1	A3048	ANL48
	169	300	34	46	240	23148RK + H3148	—	—	254	11	82.9	A3148	AN48
	169	300	34	46	240	23148RHAK + H3148	—	—	254	11	78.4	A3148	AN48
	169	300	34	46	240	22248RK + H3148	—	—	254	19	101	A3148	AN48
220	169	300	34	46	240	22248RHAK + H3148	—	—	254	19	94.9	A3148	AN48
	196	300	34	46	240	23248RK + H2348	—	—	257	6	127	A2348	AN48
	196	300	34	46	240	23248RHAK + H2348	—	—	257	6	121	A2348	AN48
	196	300	34	46	240	22348RK + H2348	—	—	257	11	174	A2348	AN48
	196	300	34	46	240	22348RHAK + H2348	—	—	257	11	162	A2348	AN48
	147	310	34	46	260	23052RK + H3052	—	—	272	13	64.6	A3052	ANL52
	147	310	34	46	260	23052RHAK + H3052	—	—	272	13	60.2	A3052	ANL52
	187	330	36	49	260	23152RK + H3152	—	—	276	11	113	A3152	AN52
	187	330	36	49	260	23152RHAK + H3152	—	—	276	11	107	A3152	AN52
	187	330	36	49	260	22252RK + H3152	—	—	276	25	130	A3152	AN52
	187	330	36	49	260	22252RHAK + H3152	—	—	276	25	123	A3152	AN52
	208	330	36	49	260	23252RK + H2352	—	—	278	2	164	A2352	AN52
	208	330	36	49	260	23252RHAK + H2352	—	—	278	2	157	A2352	AN52
	208	330	36	49	260	22352RK + H2352	—	—	278	11	216	A2352	AN52
	208	330	36	49	260	22352RHAK + H2352	—	—	278	11	201	A2352	AN52
240	152	330	38	50	280	23056RK + H3056	—	—	292	12	70.6	A3056	ANL56
	152	330	38	50	280	23056RHAK + H3056	—	—	292	12	65.9	A3056	ANL56
	192	350	38	51	280	23156RK + H3156	—	—	296	12	121	A3156	AN56
	192	350	38	51	280	23156RHAK + H3156	—	—	296	12	115	A3156	AN56
	192	350	38	51	280	22256RK + H3156	—	—	296	28	137	A3156	AN56
	192	350	38	51	280	22256RHAK + H3156	—	—	296	28	129	A3156	AN56
	221	350	38	51	280	23256RK + H2356	—	—	299	11	177	A2356	AN56
	221	350	38	51	280	23256RHAK + H2356	—	—	299	11	169	A2356	AN56
	221	350	38	51	280	22356RK + H2356	—	—	299	12	253	A2356	AN56
	221	350	38	51	280	22356RHAK + H2356	—	—	299	12	236	A2356	AN56
	168	360	42	54	300	23060RK + H3060	—	—	313	12	96.5	A3060	ANL60
	168	360	42	54	300	23060RHAK + H3060	—	—	313	12	89.6	A3060	ANL60
	208	380	40	53	300	23160RK + H3160	—	—	317	12	158	A3160	AN60
	208	380	40	53	300	23160RHAK + H3160	—	—	317	12	149	A3160	AN60
	208	380	40	53	300	22260RK + H3160	—	—	317	32	172	A3160	AN60
	208	380	40	53	300	22260RHAK + H3160	—	—	317	32	162	A3160	AN60
280	240	380	40	53	300	23260RK + H3260	—	—	321	12	226	A3260	AN60
	240	380	40	53	300	23260RHAK + H3260	—	—	321	12	216	A3260	AN60