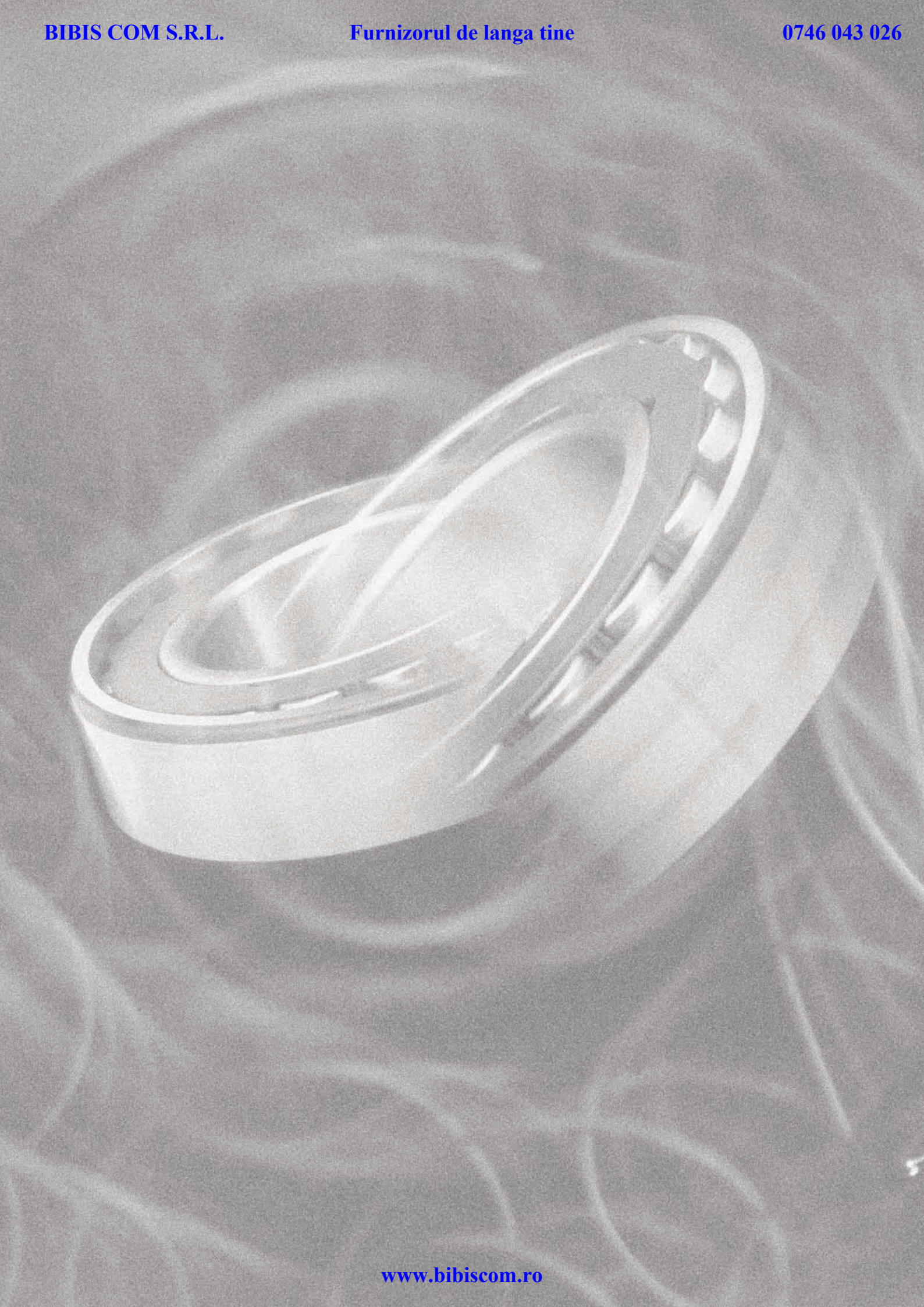


Spherical Roller Bearings

1. Types, construction and characteristics

Spherical roller bearing consists of an outer ring having a continuous spherical raceway within which operates two rows of barrel-shaped rollers guided by an inner ring with two raceways. (Refer to **Fig. 1**) This bearing has self-aligning properties, and therefore is suited for use where misalignment between the inner and outer rings occurs from housing installation error or shaft bending.

Spherical roller bearings have a large capacity for radial loads, axial loads in either direction, and complex loads.

They are also suited for applications where vibration and shock loads are encountered. However, if used under a large axial load, the load on the rollers of the row that is not subject to the axial load becomes small, and the resulting skidding on the rollers may cause insufficient lubricating condition. If the ratio of axial load to radial load exceeds the factor e of the dimension table ($F_a/F_r \leqq 2e$), consult **NTN** Engineering.

In addition to bearings with cylindrical bore, those with tapered bore are also available. Bearings with tapered bore are specified by the suffix "K" to the end of the bearing part number. The standard taper ratio is 1:12 for bearings with a "K" suffix, but for bearings in series 240 and 241 the suffix "K30" indicates the taper ratio for a bearing is1:30. Most tapered bore bearings incorporate the use of adapters and withdrawal sleeves for shaft mounting.

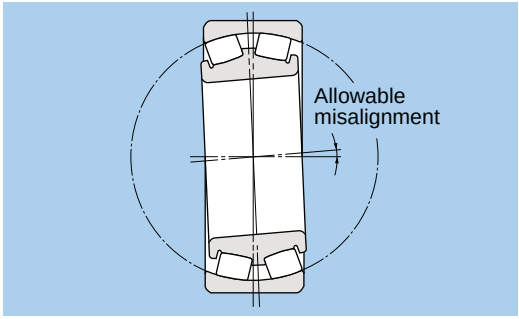
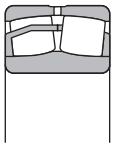
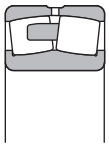
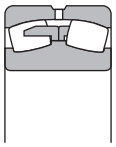
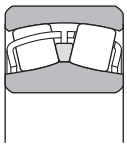
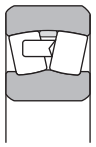


Fig. 1

Table 1 Types of spherical roller bearings

Type	ULTAGE		B type	C type	213 type
	EA type	EM type			
Design					
Bearing series	Series other than 213 with outer diameter of 420 mm or smaller		Other than ULTAGE series	Series 213 with bore dia. of 50 mm or smaller	Series 213 with bore dia. of 55 mm or larger
Rollers	Symmetrical		Asymmetricalころ	Symmetrical	Asymmetrical
cage type	Pressed steel cage	Machined cage	Machined cage	Pressed steel cage	Machined cage

"ULTAGE®" (a name created from the combination of **"ultimate,"** signifying refinement,and **"stage,"** signifying **NTN**'s intention that this series of products be employed in diverse applications) is the general name for **NTN**'s new generation of bearings that are noted for their industry-leading performance.

2. Oil hole and groove for outer ring

ULTAGE and type B are provided with oil holes and oil groove.

Types 213 and C do not have. However, if required, they can be made based on your request. Contact **NTN** Engineering with the bearing numbers and supplementary suffix codes "D1" (refer to page A-29).

If a pin to prevent outer ring rotation is required, contact **NTN** Engineering.

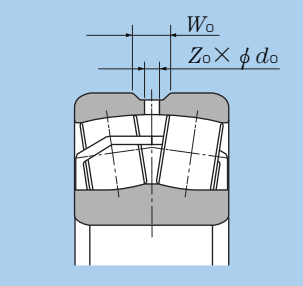


Table 4 Oil inlet number

Nominal bearing outer diameter mm		Number of oil hole	
		D1	W33 (European spec)
or larger	smaller	Z_O	Z_O
–	320	4	3
320	1 010	8	3
1 010	–	12	–

For oil groove width W_O and diameter of oil hole d_O, see dimension table.

3. Allowable misalignment

Spherical roller bearings have the same self-aligning properties as other self-aligning bearings. The allowable misalignment angle varies according to dimension series and load conditions, but the allowable misalignment angles are listed below:

Normal load (loads equivalent to 0.09 C_r): .....0.009rad (0.5°)
Light load: .....0.035rad (2°)

4. Adapters and withdrawal sleeves

Adapters are used for installation of bearings with tapered bore on cylindrical shafts. Withdrawal sleeves are also used to install and disassemble bearings with tapered bore onto and off of cylindrical shafts. In disassembling the bearing from the shaft, the nut is turned down against the side face of the inner ring utilizing the bolt provided on the withdrawal sleeve, and then the sleeve is drawn away from the bearing's bore. (Precision and dimensions of adapter and withdrawal sleeve are defined in JIS B 1552 and JIS B 1556).

For bearings with a bore diameter of 200 mm or more, high pressure oil (hydraulic) type adapters and withdrawal sleeves can be made to make installation and disassembly easier. As shown in **Fig. 2** construction is designed to reduce friction by injecting high pressure oil between the surfaces of the adapter sleeve and bearing inner bore by means of a pressure fitting.

If the oil supply inlet is attached in the nut side of the adapter, the supplementary suffix "HF" is added to the bearing number; if the oil supply inlet is attached on the opposite side, the suffix "HB" is added to the bearing number. For adapter sleeves, the supplementary suffix "H" is added to the bearing's number for both cases.

The hydraulic sleeve nut is equipped with holes for bolts used for mounting and dismounting and holes for hydraulic piping. The suffix SP or SPB is added to the bearing number of the nut.

For information on the hydraulic adapters and withdrawal sleeves, refer to the NTN catalog.

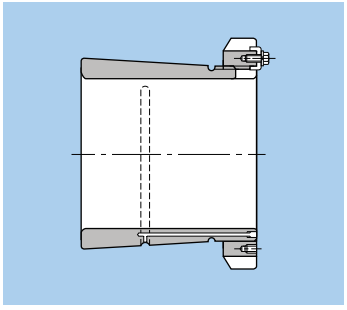
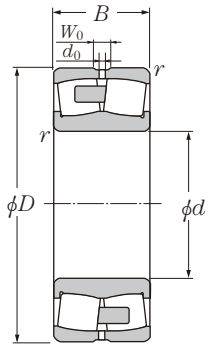
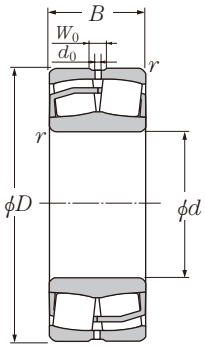


Fig. 2

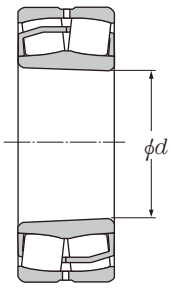
Spherical Roller Bearings



Cylindrical bore
(EM type)



Tapered bore
(EA type)



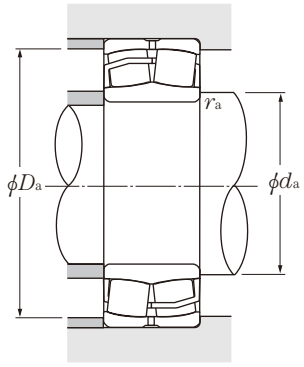
Tapered bore

d 25 ~ 60mm

Boundary dimensions mm				Basic load ratings dynamic kN		Basic load ratings static kgf		Limiting speeds[1] min^{-1}		Bearing numbers[4]	
d	D	B	$r_{s\,min}$[3]	C_r	C_{or}	C_r	C_{or}	grease	oil	cylindrical bore	tapered[2] bore
25	52	18	1	57.3	46.1	5 840	4 700	10 400	13 000	※**22205EAD1**	※**22205EAKD1**
	52	18	1	57.3	46.1	5 840	4 700	10 400	13 000	※**22205EMD1**	※**22205EMKD1**
30	62	20	1	75.7	64.5	7 720	6 580	8 800	11 000	※**22206EAD1**	※**22206EAKD1**
	62	20	1	75.7	64.5	7 720	6 580	8 800	11 000	※**22206EMD1**	※**22206EMKD1**
35	72	23	1.1	100	92	10 200	9 380	7 500	9 400	※**22207EAD1**	※**22207EAKD1**
	72	23	1.1	100	92	10 200	9 380	7 500	9 400	※**22207EMD1**	※**22207EMKD1**
40	80	23	1.1	116	105	11 800	10 700	6 800	8 500	※**22208EAD1**	※**22208EAKD1**
	80	23	1.1	110	98	11 200	10 000	6 800	8 500	※**22208EMD1**	※**22208EMKD1**
	90	23	1.5	88	90	8 950	9 150	4 900	6 400	**21308C**	**21308CK**
	90	33	1.5	169	152	17 200	15 500	5 400	6 600	※**22308EAD1**	※**22308EAKD1**
	90	33	1.5	169	152	17 200	15 500	5 400	6 600	※**22308EMD1**	※**22308EMKD1**
45	85	23	1.1	121	113	12 300	11 500	6 100	7 700	※**22209EAD1**	※**22209EAKD1**
	85	23	1.1	116	106	11 800	10 800	6 100	7 700	※**22209EMD1**	※**22209EMKD1**
	100	25	1.5	102	106	10 400	10 800	4 400	5 700	**21309C**	**21309CK**
	100	36	1.5	206	187	21 000	19 100	4 600	5 700	※**22309EAD1**	※**22309EAKD1**
	100	36	1.5	206	187	21 000	19 100	4 600	5 700	※**22309EMD1**	※**22309EMKD1**
50	90	23	1.1	130	124	13 300	12 600	5 700	7 200	※**22210EAD1**	※**22210EAKD1**
	90	23	1.1	125	117	12 700	11 900	5 700	7 200	※**22210EMD1**	※**22210EMKD1**
	110	27	2	118	127	12 000	12 900	4 000	5 200	**21310C**	**21310CK**
	110	40	2	250	232	25 400	23 700	4 300	5 300	※**22310EAD1**	※**22310EAKD1**
	110	40	2	250	232	25 400	23 700	4 300	5 300	※**22310EMD1**	※**22310EMKD1**
55	100	25	1.5	155	148	15 800	15 100	5 300	6 700	※**22211EAD1**	※**22211EAKD1**
	100	25	1.5	148	140	15 100	14 300	5 300	6 700	※**22211EMD1**	※**22211EMKD1**
	120	29	2	145	163	14 800	16 600	3 700	4 800	**21311**	**21311K**
	120	43	2	296	274	30 200	28 000	3 900	4 800	※**22311EAD1**	※**22311EAKD1**
	120	43	2	296	274	30 200	28 000	3 900	4 800	※**22311EMD1**	※**22311EMKD1**
60	110	28	1.5	187	181	19 100	18 400	4 800	6 000	※**22212EAD1**	※**22212EAKD1**
	110	28	1.5	179	171	18 300	17 400	4 800	6 000	※**22212EMD1**	※**22212EMKD1**
	130	31	2.1	167	191	17 100	19 500	3 400	4 400	**21312**	**21312K**
	130	46	2.1	340	319	34 700	32 600	3 600	4 600	※**22312EAD1**	※**22312EAKD1**
	130	46	2.1	340	319	34 700	32 600	3 600	4 600	※**22312EMD1**	※**22312EMKD1**

1) Bearing part numbers with ※ are **ULTAGE Series** and have outer ring oil holes and oil groove as standard.
2) "**K**" indicates bearings have tapered bore with a taper ratio of 1: 12. 3) Smallest allowable dimension for chamfer dimension r.

Spherical Roller Bearings



Equivalent radial load

dynamic

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

static

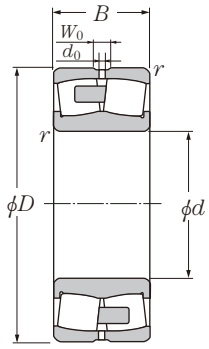
$P_{or} = F_r + Y_o F_a$

For values of e, Y_2 and Y_o see the table below.

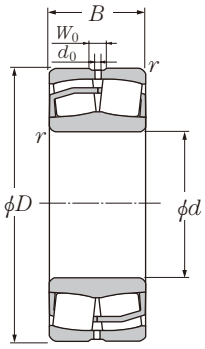
Abutment and fillet dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
W_0	d_0	d_a min	D_a max	r_{as} max	e	Y_1	Y_2	Y_o	cylindrical bore	tapered bore
3	1.5	30	46	1	0.34	2	2.98	1.96	0.173	0.169
3	1.5	30	46	1	0.34	2	2.98	1.96	0.174	0.171
4	2	36	56	1	0.31	2.15	3.2	2.1	0.278	0.272
4	2	36	56	1	0.31	2.15	3.2	2.1	0.281	0.275
5	2	42	65	1.1	0.31	2.21	3.29	2.16	0.438	0.43
5	2	42	65	1.1	0.31	2.21	3.29	2.16	0.442	0.433
5	2.5	47	73	1.1	0.27	2.47	3.67	2.41	0.528	0.518
5	2.5	47	73	1.1	0.27	2.47	3.67	2.41	0.529	0.519
6	3	48.5	81.5	1.5	0.26	2.55	3.8	2.5	0.705	0.694
6	3	49	81	1.5	0.36	1.87	2.79	1.83	1.02	1
6	3	49	81	1.5	0.36	1.87	2.79	1.83	1.03	1.01
6	2.5	52	78	1.1	0.26	2.64	3.93	2.58	0.572	0.561
6	2.5	52	78	1.1	0.26	2.64	3.93	2.58	0.577	0.566
6	3	53.5	91.5	1.5	0.26	2.6	3.87	2.54	0.927	0.912
6	3	54	91	1.5	0.36	1.9	2.83	1.86	1.37	1.34
6	3	54	91	1.5	0.36	1.9	2.83	1.86	1.38	1.35
6	2.5	57	83	1.1	0.24	2.84	4.23	2.78	0.614	0.602
6	2.5	57	83	1.1	0.24	2.84	4.23	2.78	0.616	0.604
6	3	60	100	2	0.26	2.64	3.93	2.58	1.21	1.19
7	3.5	61	99	2	0.36	1.87	2.79	1.83	1.82	1.79
7	3.5	61	99	2	0.36	1.87	2.79	1.83	1.84	1.8
6	3	64	91	1.5	0.23	2.95	4.4	2.89	0.83	0.814
6	3	64	91	1.5	0.23	2.95	4.4	2.89	0.827	0.811
6	3	65	110	2	0.25	2.69	4	2.63	1.71	1.69
8	3.5	66	109	2	0.36	1.87	2.79	1.83	2.31	2.26
8	3.5	66	109	2	0.36	1.87	2.79	1.83	2.34	2.29
7	3	69	101	1.5	0.24	2.84	4.23	2.78	1.14	1.12
7	3	69	101	1.5	0.24	2.84	4.23	2.78	1.15	1.13
7	4	72	118	2	0.25	2.69	4	2.63	2.1	2.07
9	4	72	118	2.1	0.35	1.95	2.9	1.91	2.86	2.8
9	4	72	118	2.1	0.35	1.95	2.9	1.91	2.91	2.85

Note: For the bearings other than **ULTAGE Series**, outer rings with oil inlets and oil grooves can also be made based on your request. In this case, supplementary suffix "**D1**" is added after a bearing number. Example: **22312EMD1**

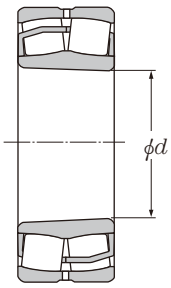
Spherical Roller Bearings



Cylindrical bore
(EM type)



Tapered bore
(EA type)



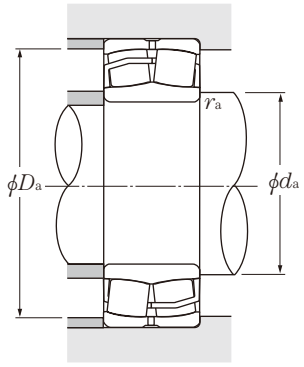
Tapered bore

d 65 ~ 95mm

Boundary dimensions mm				Basic load ratings dynamic kN	static kN	dynamic kgf	static kgf	Limiting speeds[1] min^{-1}		Bearing numbers[4] cylindrical bore	Bearing numbers[4] tapered[2] bore
d	D	B	$r_{s\,min}$[3]	C_r	C_{or}	C_r	C_{or}	grease	oil		
65	120	31	1.5	226	224	23 100	22 900	4 400	5 500	※22213EAD1	※22213EAKD1
	120	31	1.5	217	212	22 100	21 600	4 400	5 500	※22213EMD1	※22213EMKD1
	140	33	2.1	194	228	19 800	23 200	3 100	4 000	21313	21313K
	140	48	2.1	369	343	37 600	35 000	3 300	4 100	※22313EAD1	※22313EAKD1
	140	48	2.1	369	343	37 600	35 000	3 300	4 100	※22313EMD1	※22313EMKD1
70	125	31	1.5	235	240	24 000	24 400	4 100	5 200	※22214EAD1	※22214EAKD1
	125	31	1.5	235	240	24 000	24 400	4 100	5 200	※22214EMD1	※22214EMKD1
	150	35	2.1	220	262	22 400	26 800	2 900	3 800	21314	21314K
	150	51	2.1	420	396	42 800	40 400	3 000	3 800	※22314EAD1	※22314EAKD1
	150	51	2.1	420	396	42 800	40 400	3 000	3 800	※22314EMD1	※22314EMKD1
75	130	31	1.5	244	249	24 800	25 400	4 000	5 000	※22215EAD1	※22215EAKD1
	130	31	1.5	244	249	24 800	25 400	4 000	5 000	※22215EMD1	※22215EMKD1
	160	37	2.1	239	287	24 300	29 300	2 700	3 500	21315	21315K
	160	55	2.1	491	467	50 100	47 600	2 900	3 600	※22315EAD1	※22315EAKD1
	160	55	2.1	491	467	50 100	47 600	2 900	3 600	※22315EMD1	※22315EMKD1
80	140	33	2	278	287	28 400	29 300	3 700	4 600	※22216EAD1	※22216EAKD1
	140	33	2	267	272	27 300	27 700	3 700	4 600	※22216EMD1	※22216EMKD1
	170	39	2.1	260	315	26 500	32 000	2 500	3 300	21316	21316K
	170	58	2.1	541	522	55 200	53 200	2 700	3 400	※22316EAD1	※22316EAKD1
	170	58	2.1	541	522	55 200	53 200	2 700	3 400	※22316EMD1	※22316EMKD1
85	150	36	2	324	330	33 000	33 600	3 400	4 300	※22217EAD1	※22217EAKD1
	150	36	2	324	330	33 000	33 600	3 400	4 300	※22217EMD1	※22217EMKD1
	180	41	3	289	355	29 500	36 000	2 400	3 100	21317	21317K
	180	60	3	599	604	61 100	61 600	2 600	3 200	※22317EAD1	※22317EAKD1
	180	60	3	599	604	61 100	61 600	2 600	3 200	※22317EMD1	※22317EMKD1
90	160	40	2	384	398	39 200	40 600	3 200	4 000	※22218EAD1	※22218EAKD1
	160	40	2	384	398	39 200	40 600	3 200	4 000	※22218EMD1	※22218EMKD1
	160	52.4	2	467	513	47 700	52 300	2 600	3 200	※23218EMD1	※23218EMKD1
	190	43	3	320	400	32 500	40 500	2 300	3 000	21318	21318K
	190	64	3	668	652	68 100	66 400	2 500	3 000	※22318EAD1	※22318EAKD1
	190	64	3	668	652	68 100	66 400	2 500	3 000	※22318EMD1	※22318EMKD1
95	170	43	2.1	416	417	42 400	42 600	3 000	3 800	※22219EAD1	※22219EAKD1
	170	43	2.1	416	417	42 400	42 600	3 000	3 800	※22219EMD1	※22219EMKD1

1) Bearing part numbers with ※ are **ULTAGE Series** and have outer ring oil holes and oil groove as standard.
2) "**K**" indicates bearings have tapered bore with a taper ratio of 1: 12. 3) Smallest allowable dimension for chamfer dimension r.

Spherical Roller Bearings



Equivalent radial load

dynamic

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

static

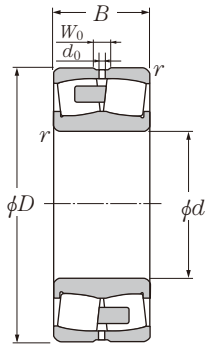
$P_{or} = F_r + Y_o F_a$

For values of e, Y_2 and Y_o see the table below.

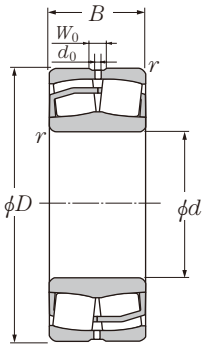
Abutment and fillet dimensions (mm)					Constant	Axial load factors			Mass (approx.) (kg)	
W_0	d_0	d_a min	D_a max	r_{as} max	e	Y_1	Y_2	Y_o	cylindrical bore	tapered bore
8	3.5	74	111	1.5	0.24	2.79	4.15	2.73	1.52	1.49
8	3.5	74	111	1.5	0.24	2.79	4.15	2.73	1.53	1.5
7	4	77	128	2	0.25	2.69	4	2.63	2.55	2.51
9	4	77	128	2.1	0.33	2.06	3.06	2.01	3.48	3.41
9	4	77	128	2.1	0.33	2.06	3.06	2.01	3.5	3.43
7	3.5	79	116	1.5	0.22	3.01	4.48	2.94	1.61	1.58
7	3.5	79	116	1.5	0.22	3.01	4.48	2.94	1.64	1.6
7	4	82	138	2	0.25	2.69	4	2.63	3.18	3.14
10	5	82	138	2.1	0.34	2	2.98	1.96	4.25	4.16
10	5	82	138	2.1	0.34	2	2.98	1.96	4.31	4.22
7	3.5	84	121	1.5	0.22	3.14	4.67	3.07	1.67	1.64
7	3.5	84	121	1.5	0.22	3.14	4.67	3.07	1.71	1.67
7	4	87	148	2	0.24	2.84	4.23	2.78	3.81	3.76
10	5	87	148	2.1	0.34	2	2.98	1.96	5.18	5.07
10	5	87	148	2.1	0.34	2	2.98	1.96	5.27	5.16
8	3.5	91	129	2	0.22	3.14	4.67	3.07	2.09	2.05
8	3.5	91	129	2	0.22	3.14	4.67	3.07	2.11	2.07
7	4	92	158	2	0.23	2.95	4.4	2.89	4.53	4.47
10	5	92	158	2.1	0.34	2	2.98	1.96	6.12	5.99
10	5	92	158	2.1	0.34	2	2.98	1.96	6.28	6.15
8	3.5	96	139	2	0.22	3.07	4.57	3	2.59	2.54
8	3.5	96	139	2	0.22	3.07	4.57	3	2.67	2.62
7	4	99	166	2.5	0.25	2.69	4	2.63	5.35	5.28
11	5	99	166	3	0.32	2.09	3.11	2.04	7.18	7.04
11	5	99	166	3	0.32	2.09	3.11	2.04	7.29	7.15
10	4.5	101	149	2	0.23	2.9	4.31	2.83	3.34	3.27
10	4.5	101	149	2	0.23	2.9	4.31	2.83	3.43	3.37
9	4	101	149	2	0.3	2.25	3.34	2.2	4.43	4.31
7	4	104	176	2.5	0.24	2.84	4.23	2.78	6.3	6.21
12	5	104	176	3	0.33	2.06	3.06	2.01	8.42	8.25
12	5	104	176	3	0.33	2.06	3.06	2.01	8.53	8.35
10	4.5	107	158	2.1	0.23	2.95	4.4	2.89	3.98	3.9
10	4.5	107	158	2.1	0.23	2.95	4.4	2.89	4.06	3.98

Note: For the bearings other than **ULTAGE Series**, outer rings with oil inlets and oil grooves can also be made based on your request. In this case, supplementary suffix "**D1**" is added after a bearing number. Example: **22219EMD1**

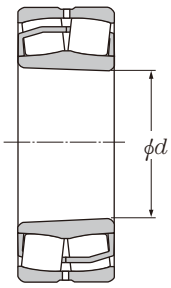
Spherical Roller Bearings



Cylindrical bore
(EM type)



Tapered bore
(EA type)



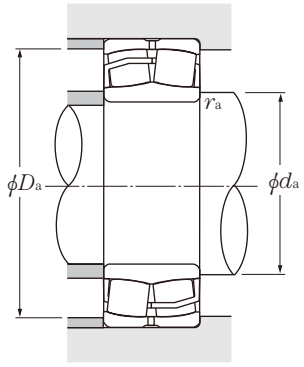
Tapered bore

d 95 ~ 130mm

Boundary dimensions mm				Basic load ratings dynamic kN		Basic load ratings static kgf		Limiting speeds[1] min^{-1}		Bearing numbers[4] cylindrical bore	Bearing numbers[4] tapered[2] bore
d	D	B	$r_{s\,min}$[3]	C_r	C_{or}	C_r	C_{or}	grease	oil		
95	200	45	3	335	420	34 000	43 000	2 100	2 700	21319	21319K
	200	67	3	732	751	74 600	76 500	2 300	2 800	※22319EAD1	※22319EAKD1
	200	67	3	732	751	74 600	76 500	2 300	2 800	※22319EMD1	※22319EMKD1
100	165	52	2	464	563	47 300	57 400	2 400	3 000	※23120EAD1	※23120EAKD1
	165	52	2	480	590	49 000	60 100	2 400	3 000	※23120EMD1	※23120EMKD1
	180	46	2.1	472	495	48 100	50 500	2 800	3 600	※22220EAD1	※22220EAKD1
	180	46	2.1	472	495	48 100	50 500	2 800	3 600	※22220EMD1	※22220EMKD1
	180	60.3	2.1	586	661	59 800	67 400	2 300	2 900	※23220EMD1	※23220EMKD1
	215	47	3	370	465	37 500	47 500	2 000	2 600	21320	21320K
	215	73	3	827	844	84 300	86 100	2 100	2 600	※22320EAD1	※22320EAKD1
	215	73	3	827	844	84 300	86 100	2 100	2 600	※22320EMD1	※22320EMKD1
110	170	45	2	417	517	42 500	52 700	2 600	3 300	※23022EAD1	※23022EAKD1
	170	45	2	417	517	42 500	52 700	2 600	3 300	※23022EMD1	※23022EMKD1
	180	56	2	547	669	55 800	68 200	2 200	2 800	※23122EAD1	※23122EAKD1
	180	56	2	547	669	55 800	68 200	2 200	2 800	※23122EMD1	※23122EMKD1
	180	69	2	622	769	63 400	78 400	2 200	2 700	※24122EMD1	※24122EMK30D1
	200	53	2.1	602	643	61 400	65 600	2 600	3 300	※22222EAD1	※22222EAKD1
	200	53	2.1	602	643	61 400	65 600	2 600	3 300	※22222EMD1	※22222EMKD1
	200	69.8	2.1	752	869	76 700	88 600	2 100	2 600	※23222EMD1	※23222EMKD1
	240	50	3	495	615	50 500	62 500	1 800	2 300	21322	21322K
	240	80	3	975	972	99 500	99 100	2 000	2 400	※22322EAD1	※22322EAKD1
	240	80	3	975	972	99 500	99 100	2 000	2 400	※22322EMD1	※22322EMKD1
120	180	46	2	446	577	45 500	58 900	2 400	3 100	※23024EAD1	※23024EAKD1
	180	46	2	446	577	45 500	58 900	2 400	3 100	※23024EMD1	※23024EMKD1
	180	60	2	526	726	53 700	74 100	2 100	2 600	※24024EMD1	※24024EMK30D1
	200	62	2	663	820	67 600	83 600	2 000	2 500	※23124EAD1	※23124EAKD1
	200	62	2	663	820	67 600	83 600	2 000	2 500	※23124EMD1	※23124EMKD1
	200	80	2	756	991	77 100	101 000	1 900	2 500	※24124EMD1	※24124EMK30D1
	215	58	2.1	688	753	70 100	76 800	2 400	3 000	※22224EAD1	※22224EAKD1
	215	58	2.1	688	753	70 100	76 800	2 400	3 000	※22224EMD1	※22224EMKD1
	215	76	2.1	857	998	87 300	102 000	1 900	2 400	※23224EMD1	※23224EMKD1
	260	86	3	1 170	1 280	119 000	131 000	1 800	2 200	※22324EAD1	※22324EAKD1
	260	86	3	1 170	1 280	119 000	131 000	1 800	2 200	※22324EMD1	※22324EMKD1
130	200	52	2	565	721	57 600	73 500	2 200	2 900	※23026EAD1	※23026EAKD1
	200	52	2	565	721	57 600	73 500	2 200	2 900	※23026EMD1	※23026EMKD1

1) Bearing part numbers with ※ are **ULTAGE Series** and have outer ring oil holes and oil groove as standard.
2) Bearings appended with "**K**" have a tapered bore ratio of 1:12; bearings appended with "**K30**" have a tapered bore ratio of 1:30.
3) Smallest allowable dimension for chamfer dimension r

Spherical Roller Bearings



Equivalent radial load
dynamic

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

static

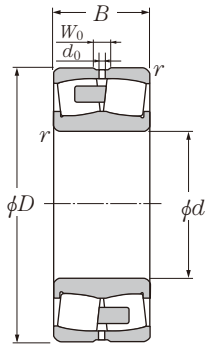
$P_{or} = F_r + Y_o F_a$

For values of e, Y_2 and Y_o see the table below.

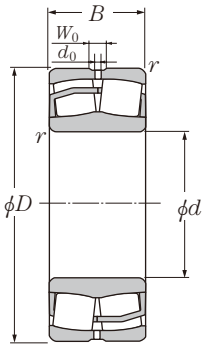
Abutment and fillet dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
W_0	d_0	d_a min	D_a max	r_{as} max	e	Y_1	Y_2	Y_o	cylindrical bore	tapered bore
7	4	109	186	2.5	0.22	3.01	4.48	2.94	7.1	7
12	6	109	186	3	0.32	2.09	3.11	2.04	9.91	9.71
12	6	109	186	3	0.32	2.09	3.11	2.04	10.0	9.82
8	4	111	154	2	0.28	2.39	3.56	2.34	4.37	4.24
8	4	111	154	2	0.28	2.39	3.56	2.34	4.45	4.32
11	5	112	168	2.1	0.24	2.84	4.23	2.78	4.9	4.8
11	5	112	168	2.1	0.24	2.84	4.23	2.78	5.02	4.93
9	4.5	112	168	2.1	0.31	2.18	3.24	2.13	6.51	6.33
9	5	114	201	2.5	0.22	3.01	4.48	2.94	8.89	8.78
13	6	114	201	3	0.34	1.98	2.94	1.93	12.6	12.3
13	6	114	201	3	0.34	1.98	2.94	1.93	12.9	12.7
8	3.5	119	161	2	0.23	2.95	4.4	2.89	3.66	3.55
8	3.5	119	161	2	0.23	2.95	4.4	2.89	3.66	3.55
9	4	121	169	2	0.28	2.43	3.61	2.37	5.66	5.49
9	4	121	169	2	0.28	2.43	3.61	2.37	5.53	5.36
8	4	121	169	2	0.36	1.9	2.83	1.86	6.75	6.65
12	6	122	188	2.1	0.25	2.69	4	2.63	7.1	6.95
12	6	122	188	2.1	0.25	2.69	4	2.63	7.3	7.15
11	5	122	188	2.1	0.32	2.12	3.15	2.07	9.41	9.14
9	5	124	226	2.5	0.21	3.2	4.77	3.13	11.2	11.1
16	7	124	226	3	0.32	2.09	3.11	2.04	17	16.6
16	7	124	226	3	0.32	2.09	3.11	2.04	17.4	17.1
8	3.5	129	171	2	0.22	3.14	4.67	3.07	4.02	3.9
8	3.5	129	171	2	0.22	3.14	4.67	3.07	4.02	3.9
8	3.5	129	171	2	0.29	2.32	3.45	2.26	5.28	5.21
10	3.5	131	189	2	0.28	2.43	3.61	2.37	7.72	7.49
10	3.5	131	189	2	0.28	2.43	3.61	2.37	7.77	7.54
10	4.5	131	189	2	0.37	1.84	2.74	1.8	10	9.87
12	6	132	203	2.1	0.25	2.74	4.08	2.68	8.88	8.68
12	6	132	203	2.1	0.25	2.74	4.08	2.68	9.01	8.82
11	5	132	203	2.1	0.32	2.09	3.11	2.04	11.7	11.3
18	8	134	246	3	0.32	2.09	3.11	2.04	22.3	21.9
18	8	134	246	3	0.32	2.09	3.11	2.04	22.7	22.2
9	4	139	191	2	0.22	3.01	4.48	2.94	5.88	5.71
9	4	139	191	2	0.22	3.01	4.48	2.94	5.9	5.73

Note: For the bearings other than **ULTAGE Series**, outer rings with oil inlets and oil grooves can also be made based on your request.
In this case, supplementary suffix "**D1**" is added after a bearing number. Example: **23026EMD1**

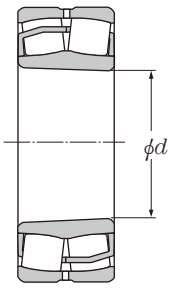
Spherical Roller Bearings



Cylindrical bore (EM type)



Tapered bore (EA type)



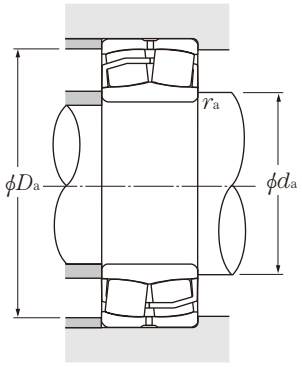
Tapered bore

d 130 ~ 160mm

Boundary dimensions mm				Basic load ratings dynamic kN		dynamic kgf	static	Limiting speeds[1] min^{-1}		Bearing numbers[4] cylindrical bore	tapered[2] bore
d	D	B	$r_{s\,min}$[3]	C_r	C_{or}	C_r	C_{or}	grease	oil		
130	200	69	2	682	936	69 600	95 400	1 900	2 400	※24026EMD1	※24026EMK30D1
	210	64	2	710	906	72 400	92 400	1 900	2 400	※23126EAD1	※23126EAKD1
	210	64	2	710	906	72 400	92 400	1 900	2 400	※23126EMD1	※23126EMKD1
	210	80	2	803	1 080	81 900	110 000	1 800	2 400	※24126EMD1	※24126EMK30D1
	230	64	3	808	898	82 400	91 600	2 200	2 800	※22226EAD1	※22226EAKD1
	230	64	3	808	898	82 400	91 600	2 200	2 800	※22226EMD1	※22226EMKD1
	230	80	3	958	1 130	97 700	115 000	1 700	2 300	※23226EMD1	※23226EMKD1
	280	93	4	1 330	1 400	135 000	143 000	1 600	2 000	※22326EAD1	※22326EAKD1
	280	93	4	1 330	1 400	135 000	143 000	1 600	2 000	※22326EMD1	※22326EMKD1
140	210	53	2	597	783	60 900	79 800	2 100	2 700	※23028EAD1	※23028EAKD1
	210	53	2	597	783	60 900	79 800	2 100	2 700	※23028EMD1	※23028EMKD1
	210	69	2	709	990	72 300	101 000	1 800	2 200	※24028EMD1	※24028EMK30D1
	225	68	2.1	802	1 030	81 800	105 000	1 800	2 200	※23128EAD1	※23128EAKD1
	225	68	2.1	802	1 030	81 800	105 000	1 800	2 200	※23128EMD1	※23128EMKD1
	225	85	2.1	951	1 280	97 000	130 000	1 700	2 200	※24128EMD1	※24128EMK30D1
	250	68	3	912	1 010	93 000	103 000	2 000	2 500	※22228EAD1	※22228EAKD1
	250	68	3	912	1 010	93 000	103 000	2 000	2 500	※22228EMD1	※22228EMKD1
	250	88	3	1 140	1 370	116 000	139 000	1 600	2 100	※23228EMD1	※23228EMKD1
	300	102	4	1 540	1 720	157 000	175 000	1 500	1 900	※22328EAD1	※22328EAKD1
	300	102	4	1 540	1 720	157 000	175 000	1 500	1 900	※22328EMD1	※22328EMKD1
150	225	56	2.1	660	893	67 300	91 100	2 000	2 500	※23030EAD1	※23030EAKD1
	225	56	2.1	660	893	67 300	91 100	2 000	2 500	※23030EMD1	※23030EMKD1
	225	75	2.1	789	1 140	80 400	116000	1 700	2 100	※24030EMD1	※24030EMK30D1
	250	80	2.1	1 060	1 350	108 000	138 000	1 600	2 000	※23130EAD1	※23130EAKD1
	250	80	2.1	1 060	1 350	108 000	138 000	1 600	2 000	※23130EMD1	※23130EMKD1
	250	100	2.1	1180	1 590	121 000	162 000	1 600	2 000	※24130EMD1	※24130EMK30D1
	270	73	3	1080	1 220	110 000	124 000	1 800	2 300	※22230EAD1	※22230EAKD1
	270	73	3	1080	1 220	110 000	124 000	1 800	2 300	※22230EMD1	※22230EMKD1
	270	96	3	1340	1 620	137 000	165 000	1 500	1 900	※23230EMD1	※23230EMKD1
	320	108	4	1740	1 890	178 000	193 000	1 400	1 700	※22330EMD1	※22330EMKD1
160	220	45	2	455	683	46 400	69 600	1 900	2 400	※23932EMD1	※23932EMKD1
	240	60	2.1	748	1 000	76 300	102 000	1 800	2 300	※23032EAD1	※23032EAKD1
	240	60	2.1	748	1 000	76 300	102 000	1 800	2 300	※23032EMD1	※23032EMKD1
	240	80	2.1	901	1 290	91 900	132 000	1 600	2 000	※24032EMD1	※24032EMK30D1
	270	86	2.1	1220	1 580	124 000	162 000	1 500	1 900	※23132EAD1	※23132EAKD1
	270	86	2.1	1220	1 580	124 000	162 000	1 500	1 900	※23132EMD1	※23132EMKD1

1) Bearing part numbers with ※ are **ULTAGE Series** and have outer ring oil holes and oil groove as standard.
2) Bearings appended with "**K**" have a tapered bore ratio of 1:12; bearings appended with "**K30**" have a tapered bore ratio of 1:30.
3) Smallest allowable dimension for chamfer dimension r

Spherical Roller Bearings



Equivalent radial load
dynamic

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

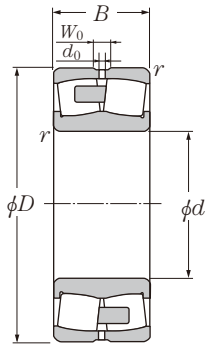
static

$P_{or} = F_r + Y_o F_a$

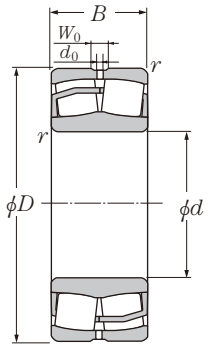
For values of e, Y_2 and Y_o see the table below.

Abutment and fillet dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
W_0	d_0	d_a min	D_a max	r_{as} max	e	Y_1	Y_2	Y_o	cylindrical bore	tapered bore
9	4	139	191	2	0.31	2.2	3.27	2.15	7.82	7.71
10	4.5	141	199	2	0.27	2.51	3.74	2.45	8.45	8.19
10	4.5	141	199	2	0.27	2.51	3.74	2.45	8.51	8.25
10	4.5	141	199	2	0.34	1.96	2.92	1.92	10.7	10.5
13	6	144	216	3	0.25	2.69	4	2.63	11	10.7
13	6	144	216	3	0.25	2.69	4	2.63	11.1	10.9
12	5	144	216	3	0.32	2.12	3.15	2.07	13.8	13.4
19	9	147	263	4	0.33	2.06	3.06	2.01	27.2	26.6
19	9	147	263	4	0.33	2.06	3.06	2.01	28	27.5
9	4	149	201	2	0.22	3.14	4.67	3.07	6.32	6.13
9	4	149	201	2	0.22	3.14	4.67	3.07	6.37	6.18
9	4	149	201	2	0.28	2.37	3.53	2.32	8.27	8.15
11	5	152	213	2.1	0.26	2.55	3.8	2.5	10.3	9.94
11	5	152	213	2.1	0.26	2.55	3.8	2.5	10.3	10
10	4.5	152	213	2.1	0.34	1.98	2.94	1.93	12.9	12.8
14	7	154	236	3	0.25	2.74	4.08	2.68	13.9	13.6
14	7	154	236	3	0.25	2.74	4.08	2.68	14.2	13.9
13	6	154	236	3	0.33	2.06	3.06	2.01	18.2	17.7
19	9	157	283	4	0.33	2.03	3.02	1.98	34.4	33.7
19	9	157	283	4	0.33	2.03	3.02	1.98	35.4	34.7
10	4.5	161	214	2.1	0.21	3.2	4.77	3.13	7.68	7.45
10	4.5	161	214	2.1	0.21	3.2	4.77	3.13	7.73	7.5
10	4.5	161	214	2.1	0.29	2.32	3.45	2.26	10.4	10.3
13	6	162	238	2.1	0.29	2.35	3.5	2.3	15.7	15.2
13	6	162	238	2.1	0.29	2.35	3.5	2.3	15.8	15.3
12	6	162	238	2.1	0.36	1.85	2.76	1.81	19.7	19.4
15	7	164	256	3	0.25	2.74	4.08	2.68	17.6	17.3
15	7	164	256	3	0.25	2.74	4.08	2.68	18	17.7
14	6	164	256	3	0.33	2.03	3.02	1.98	23.6	22.9
20	9	167	303	4	0.34	2	2.98	1.96	42.2	41.3
9	4	169	211	2	0.17	3.9	5.81	3.81	5.09	4.94
11	5	171	229	2.1	0.21	3.2	4.77	3.13	9.32	9.03
11	5	171	229	2.1	0.21	3.2	4.77	3.13	9.37	9.09
10	5	171	229	2.1	0.29	2.32	3.45	2.26	12.6	12.4
14	6	172	258	2.1	0.29	2.35	3.5	2.3	20.1	19.5
14	6	172	258	2.1	0.29	2.35	3.5	2.3	20.2	19.6

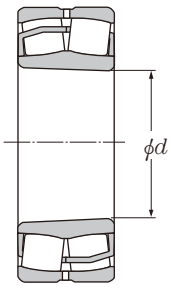
Spherical Roller Bearings



Cylindrical bore (EM type)



Tapered bore (EA type)



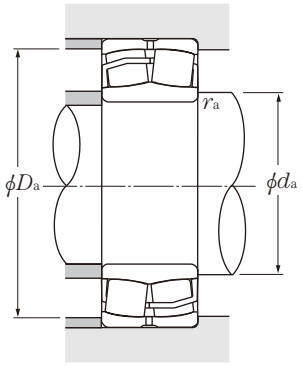
Tapered bore

d 160 ~ 190mm

Boundary dimensions mm				Basic load ratings dynamic kN		Basic load ratings static kgf		Limiting speeds[1] min^{-1}		Bearing numbers[4] cylindrical bore	Bearing numbers[4] tapered[2] bore
d	D	B	$r_{s\,min}$[3]	C_r	C_{or}	C_r	C_{or}	grease	oil		
160	270	109	2.1	1360	1 860	139 000	190 000	1 500	1 800	※24132EMD1	※24132EMK30D1
	290	80	3	1220	1 390	124 000	142 000	1 700	2 100	※22232EAD1	※22232EAKD1
	290	80	3	1220	1 390	124 000	142 000	1 700	2 100	※22232EMD1	※22232EMKD1
	290	104	3	1550	1 890	158 000	193 000	1 400	1 800	※23232EMD1	※23232EMKD1
	340	114	4	1950	2 210	199 000	226 000	1 300	1 600	※22332EMD1	※22332EMKD1
170	230	45	2	468	723	47 700	73 700	1 800	2 300	※23934EMD1	※23934EMKD1
	260	67	2.1	914	1 240	93 200	127 000	1 700	2 200	※23034EAD1	※23034EAKD1
	260	67	2.1	914	1 240	93 200	127 000	1 700	2 200	※23034EMD1	※23034EMKD1
	260	90	2.1	1100	1 600	112 000	163 000	1 500	1 900	※24034EMD1	※24034EMK30D1
	280	88	2.1	1270	1 700	129 000	173 000	1 400	1 800	※23134EAD1	※23134EAKD1
	280	88	2.1	1270	1 700	129 000	173 000	1 400	1 800	※23134EMD1	※23134EMKD1
	280	109	2.1	1410	1 990	144 000	203 000	1 400	1 700	※24134EMD1	※24134EMK30D1
	310	86	4	1400	1 610	143 000	164 000	1 600	2 000	※22234EMD1	※22234EMKD1
	310	110	4	1700	2 070	173 000	211 000	1 300	1 700	※23234EMD1	※23234EMKD1
	360	120	4	2200	2 630	225 000	268 000	1 200	1 500	※22334EMD1	※22334EMKD1
180	250	52	2	573	869	58 400	88 600	1 700	2 100	※23936EMD1	※23936EMKD1
	280	74	2.1	1080	1 450	110 000	148 000	1 600	2 000	※23036EAD1	※23036EAKD1
	280	74	2.1	1080	1 450	110 000	148 000	1 600	2 000	※23036EMD1	※23036EMKD1
	280	100	2.1	1310	1 880	133 000	192 000	1 400	1 800	※24036EMD1	※24036EMK30D1
	300	96	3	1490	1 960	152 000	200 000	1 300	1 700	※23136EAD1	※23136EAKD1
	300	96	3	1490	1 960	152 000	200 000	1 300	1 700	※23136EMD1	※23136EMKD1
	300	118	3	1 660	2 290	169 000	233 000	1 300	1 600	※24136EMD1	※24136EMK30D1
	320	86	4	1 450	1 660	148 000	169 000	1 500	1 900	※22236EMD1	※22236EMKD1
	320	112	4	1 800	2 270	183 000	231 000	1 200	1 600	※23236EMD1	※23236EMKD1
	380	126	4	2 420	2 810	247 000	286 000	1 100	1 400	※22336EMD1	※22336EMKD1
190	260	52	2	603	935	61 500	95 400	1 600	2 000	※23938EMD1	※23938EMKD1
	290	75	2.1	1 140	1 570	116 000	160 000	1 500	1 900	※23038EAD1	※23038EAKD1
	290	75	2.1	1 140	1 570	116 000	160 000	1 500	1 900	※23038EMD1	※23038EMKD1
	290	100	2.1	1 360	2 000	138 000	204 000	1 300	1 700	※24038EMD1	※24038EMK30D1
	320	104	3	1 670	2 250	170 000	230 000	1 200	1 600	※23138EMD1	※23138EMKD1
	320	128	3	1 900	2 700	194 000	275 000	1 200	1 500	※24138EMD1	※24138EMK30D1
	340	92	4	1 620	1 870	165 000	191 000	1 400	1 800	※22238EMD1	※22238EMKD1
	340	120	4	1 990	2 480	203 000	253 000	1 200	1 500	※23238EMD1	※23238EMKD1
	400	132	5	2 600	3 120	265 000	318 000	1 000	1 300	※22338EMD1	※22338EMKD1

1) Bearing part numbers with ※ are **ULTAGE Series** and have outer ring oil holes and oil groove as standard.
2) Bearings appended with "**K**" have a tapered bore ratio of 1:12; bearings appended with "**K30**" have a tapered bore ratio of 1:30.
3) Smallest allowable dimension for chamfer dimension r

Spherical Roller Bearings



Equivalent radial load
dynamic

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

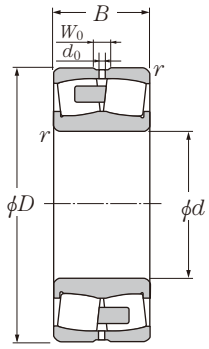
static

$P_{or} = F_r + Y_o F_a$

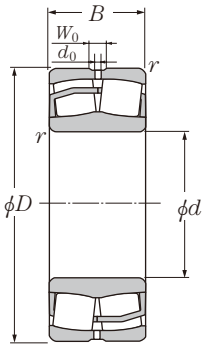
For values of e, Y_2 and Y_o see the table below.

Abutment and fillet dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
W_0	d_0	d_a min	D_a max	r_{as} max	e	Y_1	Y_2	Y_o	cylindrical bore	tapered bore
14	6	172	258	2.1	0.37	1.83	2.72	1.79	25.4	25.1
17	8	174	276	3	0.25	2.69	4	2.63	22.3	21.8
17	8	174	276	3	0.25	2.69	4	2.63	22.9	22.4
15	7	174	276	3	0.33	2.03	3.02	1.98	29.6	28.8
20	10	177	323	4	0.33	2.03	3.02	1.98	50.5	49.5
9	4.5	179	221	2	0.16	4.11	6.12	4.02	5.39	5.23
12	5	181	249	2.1	0.22	3.07	4.57	3	12.7	12.3
12	5	181	249	2.1	0.22	3.07	4.57	3	12.8	12.4
11	5	181	249	2.1	0.3	2.23	3.32	2.18	17.2	16.9
14	6	182	268	2.1	0.28	2.39	3.56	2.34	21.5	20.9
14	6	182	268	2.1	0.28	2.39	3.56	2.34	21.6	20.9
14	6	182	268	2.1	0.35	1.91	2.85	1.87	26.7	26.3
18	8	187	293	4	0.26	2.6	3.87	2.54	28.3	27.7
16	8	187	293	4	0.33	2.03	3.02	1.98	35.8	34.8
20	10	187	343	4	0.32	2.09	3.11	2.04	60.3	59.1
10	5	189	241	2	0.17	3.9	5.81	3.81	7.79	7.56
13	6	191	269	2.1	0.23	2.95	4.4	2.89	16.8	16.3
13	6	191	269	2.1	0.23	2.95	4.4	2.89	16.9	16.4
13	6	191	269	2.1	0.31	2.15	3.2	2.1	22.8	22.4
15	7	194	286	3	0.29	2.32	3.45	2.26	27.2	26.4
15	7	194	286	3	0.29	2.32	3.45	2.26	27.4	26.5
15	7	194	286	3	0.36	1.87	2.79	1.83	33.5	33
18	8	197	303	4	0.25	2.74	4.08	2.68	29.3	28.7
16	8	197	303	4	0.33	2.06	3.06	2.01	38.2	37.1
21	10	197	363	4	0.32	2.09	3.11	2.04	70.2	68.7
10	5	199	251	2	0.17	4.05	6.04	3.96	8.2	7.96
13	6	201	279	2.1	0.22	3.01	4.48	2.94	17.8	17.3
13	6	201	279	2.1	0.22	3.01	4.48	2.94	17.9	17.4
13	6	201	279	2.1	0.3	2.23	3.32	2.18	23.8	23.4
17	8	204	306	3	0.29	2.32	3.45	2.26	34.3	33.2
16	8	204	306	3	0.37	1.84	2.74	1.8	42.1	41.5
20	9	207	323	4	0.25	2.74	4.08	2.68	35.6	34.9
18	8	207	323	4	0.33	2.03	3.02	1.98	46.1	44.7
21	10	210	380	5	0.32	2.12	3.15	2.07	81.5	79.9

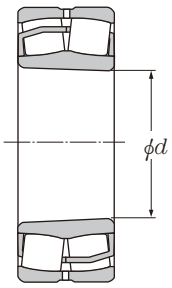
Spherical Roller Bearings



Cylindrical bore
(EM type)



Tapered bore
(EA type)



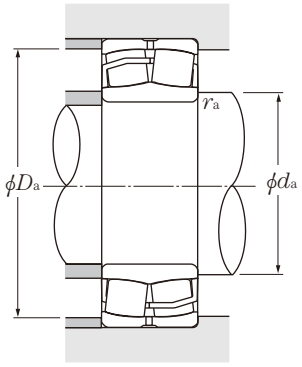
Tapered bore

d 200 ~ 280mm

Boundary dimensions mm				Basic load ratings dynamic kN		Basic load ratings static kgf		Limiting speeds[1] min^{-1}		Bearing numbers[4] cylindrical bore	Bearing numbers[4] tapered[2] bore
d	D	B	$r_{s\,min}$[3]	C_r	C_{or}	C_r	C_{or}	grease	oil		
200	280	60	2.1	766	1 190	78 100	121 000	1 500	1 900	※23940EMD1	※23940EMKD1
	310	82	2.1	1 310	1 790	134 000	182 000	1 400	1 800	※23040EMD1	※23040EMKD1
	310	109	2.1	1 570	2 280	160 000	233 000	1 200	1 600	※24040EMD1	※24040EMK30D1
	340	112	3	1 890	2 510	192 000	256 000	1 100	1 400	※23140EMD1	※23140EMKD1
	340	140	3	2 130	2 930	218 000	299 000	1 100	1 400	※24140EMD1	※24140EMK30D1
	360	98	4	1 810	2 100	184 000	214 000	1 400	1 700	※22240EMD1	※22240EMKD1
	360	128	4	2 250	2 840	230 000	290 000	1 100	1 300	※23240EMD1	※23240EMKD1
	420	138	5	2 830	3 530	289 000	360 000	950	1 200	※22340EMD1	※22340EMKD1
220	300	60	2.1	789	1 260	80 500	128 000	1 400	1 700	※23944EMD1	※23944EMKD1
	340	90	3	1 530	2 110	156 000	215 000	1 300	1 600	※23044EMD1	※23044EMKD1
	340	118	3	1 850	2 720	189 000	278 000	1 100	1 400	※24044EMD1	※24044EMK30D1
	370	120	4	2 190	2 940	223 000	300 000	1 000	1 300	※23144EMD1	※23144EMKD1
	370	150	4	2 540	3 620	259 000	369 000	1 000	1 300	※24144EMD1	※24144EMK30D1
	400	108	4	2 210	2 690	225 000	274 000	1 200	1 500	※22244EMD1	※22244EMKD1
	400	144	4	2 890	3 830	295 000	391 000	1 000	1 200	※23244EMD1	※23244EMKD1
	460	145	5	2 350	3 500	240 000	360 000	770	1 000	22344B	22344BK
240	320	60	2.1	815	1 350	83 100	138 000	1 300	1 600	※23948EMD1	※23948EMKD1
	360	92	3	1 630	2 350	166 000	240 000	1 100	1 400	※23048EMD1	※23048EMKD1
	360	118	3	1 940	2 980	198 000	304 000	1 000	1 300	※24048EMD1	※24048EMK30D1
	400	128	4	2 510	3 500	256 000	357 000	960	1 200	※23148EMD1	※23148EMKD1
	400	160	4	2 910	4 290	297 000	438 000	960	1 200	※24148EMD1	※24148EMK30D1
	440	120	4	1 940	3 100	198 000	315 000	920	1 200	22248B	22248BK
	440	160	4	2 430	4 100	247 000	420 000	720	940	23248B	23248BK
	500	155	5	2 720	4 100	278 000	420 000	720	930	22348B	22348BK
260	360	75	2.1	1 130	1 940	115 000	198 000	1 100	1 400	※23952EMD1	※23952EMKD1
	400	104	4	2 060	2 910	210 000	297 000	1 000	1 300	※23052EMD1	※23052EMKD1
	400	140	4	2 520	3 820	257 000	390 000	960	1 200	※24052EMD1	※24052EMK30D1
	440	144	4	2 140	3 850	219 000	395 000	710	920	23152B	23152BK
	440	180	4	2 510	4 600	256 000	470 000	710	920	24152B	24152BK30
	480	130	5	2 230	3 600	228 000	365 000	850	1 100	22252B	22252BK
	480	174	5	2 760	4 700	281 000	480 000	660	860	23252B	23252BK
	540	165	6	3 100	4 750	320 000	485 000	650	850	22352B	22352BK
280	380	75	2.1	1 180	2 050	120 000	209 000	1 000	1 300	※23956EMD1	※23956EMKD1
	420	106	4	2 170	3 150	221 000	321 000	960	1 200	※23056EMD1	※23056EMKD1

1) Bearing part numbers with ※ are **ULTAGE Series** and have outer ring oil holes and oil groove as standard.
2) Bearings appended with "**K**" have a tapered bore ratio of 1:12; bearings appended with "**K30**" have a tapered bore ratio of 1:30.
3) Smallest allowable dimension for chamfer dimension r

Spherical Roller Bearings



Equivalent radial load

dynamic

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

static

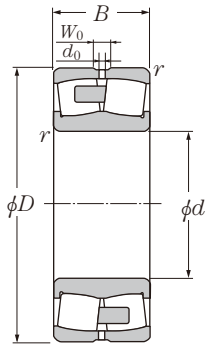
$P_{or} = F_r + Y_o F_a$

For values of e, Y_2 and Y_o see the table below.

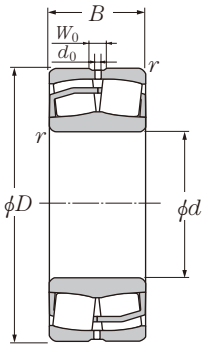
Abutment and fillet dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
W_0	d_0	d_a min	D_a max	r_{as} max	e	Y_1	Y_2	Y_o	cylindrical bore	tapered bore
12	6	211	269	2.1	0.18	3.76	5.59	3.67	12	11.6
15	7	211	299	2.1	0.23	2.95	4.4	2.89	22.8	22.1
14	7	211	299	2.1	0.31	2.18	3.24	2.13	30.2	29.7
18	8	214	326	3	0.3	2.25	3.34	2.2	41.9	40.6
17	8	214	326	3	0.39	1.74	2.59	1.7	51.5	50.7
20	10	217	343	4	0.25	2.74	4.08	2.68	42.7	41.8
19	9	217	343	4	0.34	1.98	2.94	1.93	55.2	53.6
21	10	220	400	5	0.31	2.15	3.2	2.1	94.6	92.7
12	6	231	289	2.1	0.17	4.05	6.04	3.96	12.5	12.1
15	7	233	327	3	0.23	2.95	4.4	2.89	29.9	29.1
15	7	233	327	3	0.31	2.2	3.27	2.15	39.2	38.6
19	9	237	353	4	0.3	2.28	3.39	2.23	52.3	50.7
19	9	237	353	4	0.38	1.78	2.65	1.74	65.2	64.3
21	11	237	383	4	0.25	2.74	4.08	2.68	59.6	58.4
20	10	237	383	4	0.34	2	2.98	1.96	79.4	77.1
20	12	242	438	4	0.33	2.06	3.07	2.02	117	115
12	6	251	309	2.1	0.15	4.4	6.56	4.31	13.5	13.1
16	8	253	347	3	0.22	3.07	4.57	3	32	31.7
16	8	253	347	3	0.28	2.37	3.53	2.32	42.2	41.6
20	9	257	383	4	0.29	2.32	3.45	2.26	65.1	63.1
19	9	257	383	4	0.37	1.82	2.7	1.78	81	79.8
16	10	258	422	3	0.28	2.43	3.62	2.38	81.7	80
20	12	258	422	3	0.37	1.83	2.72	1.79	108	105
20	12	262	478	4	0.32	2.1	3.13	2.06	148	145
14	7	271	349	2.1	0.17	3.9	5.81	3.81	23.9	23.1
18	8	275	385	4	0.23	2.95	4.4	2.89	47.8	46.3
18	8	275	385	4	0.31	2.16	3.22	2.12	63.6	62.6
20	12	278	422	3	0.33	2.06	3.06	2.01	91.4	88.6
27	16	278	422	3	0.41	1.63	2.43	1.6	114	112
20	12	282	458	4	0.28	2.45	3.64	2.39	106	104
27	16	282	458	4	0.37	1.83	2.72	1.79	141	137
27	16	288	512	5	0.32	2.13	3.17	2.08	183	179
14	7	291	369	2.1	016	4.16	6.2	4.07	25.2	24.4
18	8	295	405	4	0.22	3.07	4.57	3	51.3	49.7

Remarks: The bearings other than the **ULTAGE Series** with outer diameter D dimension of 320 mm or more are also provided with outer ring oil inlets and oil grooves.

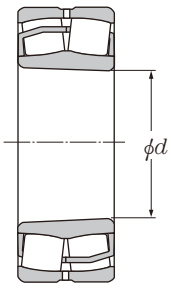
Spherical Roller Bearings



Cylindrical bore
(EM type)



Tapered bore
(EA type)



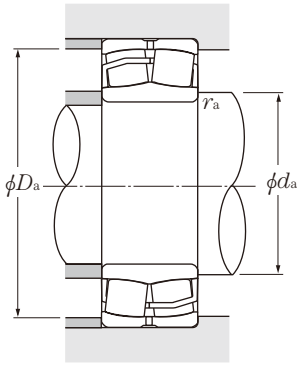
Tapered bore

d 280 ~ 360mm

Boundary dimensions mm				Basic load ratings dynamic kN		Basic load ratings static kgf		Limiting speeds[1] min^{-1}		Bearing numbers[4] cylindrical bore	Bearing numbers[4] tapered[2] bore
d	D	B	$r_{s\,min}$[3]	C_r	C_{or}	C_r	C_{or}	grease	oil		
280	420	140	4	2 620	4 060	267 000	414 000	880	1 100	※24056EMD1	※24056EMK30D1
	460	146	5	2 300	4 250	234 000	435 000	650	850	23156B	23156BK
	460	180	5	2 730	5 200	278 000	530 000	650	850	24156B	24156BK30
	500	130	5	2 310	3 800	236 000	390 000	770	1 000	22256B	22256BK
	500	176	5	2 930	5 150	298 000	525 000	610	790	23256B	23256BK
	580	175	6	3 500	5 350	360 000	545 000	600	780	22356B	22356BK
300	420	90	3	1 110	2 320	113 000	237 000	770	1 000	23960	23960K
	460	118	4	1 890	3 550	193 000	365 000	720	940	23060B	23060BK
	460	160	4	2 450	4 950	250 000	505 000	650	840	24060B	24060BK30
	500	160	5	2 750	5 000	280 000	510 000	600	780	23160B	23160BK
	500	200	5	3 300	6 400	340 000	650 000	600	780	24160B	24160BK30
	540	140	5	2 670	4 350	272 000	440 000	720	930	22260B	22260BK
	540	192	5	3 450	6 000	355 000	615 000	560	730	23260B	23260BK
	620	185	7.5	3 600	5 400	365 000	550 000	550	720	22360B	22360BK
320	440	90	3	1 140	2 460	116 000	251 000	720	930	23964	23964K
	480	121	4	1 960	3 850	200 000	395 000	680	880	23064B	23064BK
	480	160	4	2 510	5 200	255 000	530 000	600	780	24064B	24064BK30
	540	176	5	3 100	5 800	320 000	590 000	560	730	23164B	23164BK
	540	218	5	3 850	7 300	390 000	745 000	560	730	24164B	24164BK30
	580	150	5	3 100	5 050	315 000	515 000	660	860	22264B	22264BK
	580	208	5	4 000	7 050	410 000	720 000	520	680	23264B	23264BK
340	460	90	3	1 220	2 650	124 000	270 000	650	870	23968	23968K
	520	133	5	2 310	4 550	235 000	465 000	630	820	23068B	23068BK
	520	180	5	3 000	6 200	305 000	630 000	550	720	24068B	24068BK30
	580	190	5	3 600	6 600	365 000	670 000	520	680	23168B	23168BK
	580	243	5	4 600	8 950	470 000	910 000	520	680	24168B	24168BK30
	620	224	6	4 450	8 000	455 000	815 000	490	630	23268B	23268BK
360	480	90	3	1 320	2 930	135 000	298 000	630	820	23972	23972K
	540	134	5	2 370	4 700	242 000	480 000	590	770	23072B	23072BK
	540	180	5	3 100	6 600	320 000	675 000	520	680	24072B	24072BK30
	600	192	5	3 750	7 050	385 000	715 000	490	630	23172B	23172BK
	600	243	5	4 600	9 150	470 000	935 000	490	630	24172B	24172BK30
	650	232	6	4 850	8 700	495 000	885 000	450	590	23272B	23272BK

1) Bearing part numbers with ※ are **ULTAGE Series** and have outer ring oil holes and oil groove as standard.
2) Bearings appended with "**K**" have a tapered bore ratio of 1:12; bearings appended with "**K30**" have a tapered bore ratio of 1:30.
3) Smallest allowable dimension for chamfer dimension r

Spherical Roller Bearings



Equivalent radial load
dynamic
$P_r = XF_r + YF_a$

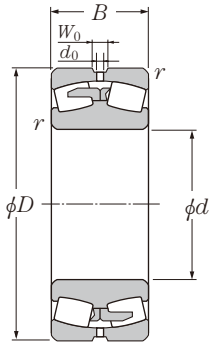
$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

static
$P_{or} = F_r + Y_o F_a$
For values of e, Y_2 and Y_o see the table below.

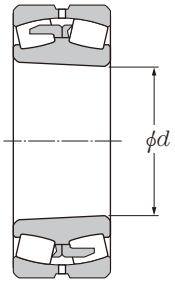
Abutment and fillet dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
W_0	d_0	d_a min	D_a max	r_{as} max	e	Y_1	Y_2	Y_o	cylindrical bore	tapered bore
18	8	295	405	4	0.29	2.3	3.42	2.25	67.3	66.3
20	12	302	438	4	0.32	2.13	3.17	2.08	97.7	94.6
27	16	302	438	4	0.39	1.73	2.58	1.69	120	118
20	12	302	478	4	0.26	2.57	3.83	2.51	112	110
27	16	302	478	4	0.36	1.9	2.83	1.86	150	145
27	16	308	552	5	0.31	2.16	3.22	2.12	224	220
14	8	314	406	2.5	0.2	3.34	4.98	3.27	40	38.7
16	10	318	442	3	0.25	2.66	3.96	2.6	72.4	70.2
20	12	318	442	3	0.34	1.96	2.93	1.92	98	96.4
20	12	322	478	4	0.32	2.11	3.15	2.07	131	127
27	16	322	478	4	0.4	1.69	2.51	1.65	161	159
20	12	322	518	4	0.26	2.57	3.83	2.51	141	138
27	16	322	518	4	0.36	1.88	2.79	1.83	193	187
27	16	336	584	6	0.32	2.13	3.17	2.08	270	265
14	8	334	426	2.5	0.19	3.5	5.21	3.42	43	41.7
20	12	338	462	3	0.25	2.73	4.06	2.67	78.2	75.5
20	12	338	462	3	0.33	2.07	3.08	2.02	103	101
27	16	342	518	4	0.33	2.07	3.08	2.02	167	162
33	20	342	518	4	0.4	1.67	2.48	1.63	207	204
20	12	342	558	4	0.26	2.57	3.83	2.51	172	168
33	20	342	558	4	0.36	1.86	2.77	1.82	243	236
14	8	354	446	2.5	0.17	3.92	5.84	3.83	44.7	43.3
20	12	362	498	4	0.25	2.68	3.99	2.62	104	100
27	16	362	498	4	0.34	1.98	2.95	1.94	140	138
27	16	362	558	4	0.33	2.06	3.06	2.01	210	204
33	20	362	558	4	0.42	1.61	2.39	1.57	269	265
33	20	368	592	5	0.37	1.84	2.75	1.8	300	291
14	8	374	466	2.5	0.17	3.99	5.93	3.9	47.2	45.7
20	12	382	518	4	0.24	2.78	4.14	2.72	110	106
27	16	382	518	4	0.33	2.07	3.08	2.02	147	145
27	16	382	578	4	0.32	2.11	3.15	2.07	222	215
33	20	382	578	4	0.4	1.67	2.48	1.63	281	277
33	20	388	622	5	0.36	1.87	2.78	1.83	339	329

Remarks: The bearings other than the **ULTAGE Series** with outer diameter D dimension of 320 mm or more are also provided with outer ring oil inlets and oil grooves.

Spherical Roller Bearings



Cylindrical bore



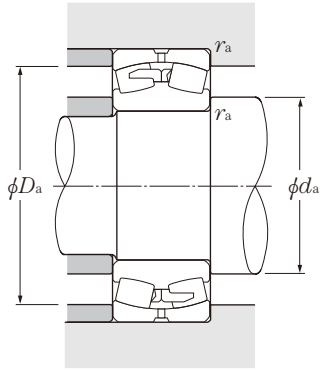
Tapered bore

d 380 ~ 480mm

Boundary dimensions mm				Basic load ratings dynamic kN		dynamic kgf	static	Limiting speeds min^{-1}		Bearing numbers	
d	D	B	$r_{s\,min}$ [2]	C_r	C_{or}	C_r	C_{or}	grease	oil	cylindrical bore	tapered [1] bore
380	520	106	4	1 560	3 550	159 000	360 000	590	770	**23976**	**23976K**
	560	135	5	2 510	5 150	256 000	525 000	550	720	**23076B**	**23076BK**
	560	180	5	3 250	7 100	330 000	725 000	490	640	**24076B**	**24076BK30**
	620	194	5	3 900	7 500	400 000	765 000	450	590	**23176B**	**23176BK**
	620	243	5	4 800	9 650	490 000	985 000	450	590	**24176B**	**24176BK30**
	680	240	6	5 200	9 650	530 000	985 000	430	550	**23276B**	**23276BK**
400	540	106	4	1 580	3 650	161 000	370 000	550	720	**23980**	**23980K**
	600	148	5	2 980	6 050	305 000	615 000	520	680	**23080B**	**23080BK**
	600	200	5	3 850	8 400	390 000	855 000	460	600	**24080B**	**24080BK30**
	650	200	6	4 200	8 050	425 000	820 000	430	560	**23180B**	**23180BK**
	650	250	6	5 100	10 300	520 000	1 060 000	430	560	**24180B**	**24180BK30**
	720	256	6	5 850	10 600	595 000	1 080 000	400	520	**23280B**	**23280BK**
420	560	106	4	1 630	3 850	166 000	390 000	530	690	**23984**	**23984K**
	620	150	5	3 100	6 400	315 000	650 000	490	640	**23084B**	**23084BK**
	620	200	5	3 850	8 450	395 000	865 000	440	570	**24084B**	**24084BK30**
	700	224	6	5 200	9 950	530 000	1 020 000	410	530	**23184B**	**23184BK**
	700	280	6	6 150	12 200	625 000	1 240 000	410	530	**24184B**	**24184BK30**
	760	272	7.5	65 850	12 000	665 000	1 230 000	380	490	**23284B**	**23284BK**
440	600	118	4	2 030	4 700	207 000	480 000	500	650	**23988**	**23988K**
	650	157	6	3 300	6 850	335 000	695 000	470	610	**23088B**	**23088BK**
	650	212	6	4 300	9 450	440 000	960 000	420	540	**24088B**	**24088BK30**
	720	226	6	5 200	10 100	530 000	1 030 000	390	500	**23188B**	**23188BK**
	720	280	6	6 450	13 100	660 000	1 330 000	390	500	**24188B**	**24188BK30**
	790	280	7.5	6 900	12 800	705 000	1 310 000	360	470	**23288B**	**23288BK**
460	620	118	4	2 100	4 950	214 000	505 000	480	620	**23992**	**23992K**
	680	163	6	3 600	7 450	365 000	760 000	450	580	**23092B**	**23092BK**
	680	218	6	4 600	10 200	470 000	1 040 000	390	510	**24092B**	**24092BK30**
	760	240	7.5	5 700	11 400	585 000	1 160 000	360	470	**23192B**	**23192BK**
	760	300	7.5	7100	14 500	725 000	1 480 000	360	470	**24192B**	**24192BK30**
	830	296	7.5	7 750	14 500	790 000	1 470 000	340	440	**23292B**	**23292BK**
480	650	128	5	2 330	5 500	238 000	565 000	450	590	**23996**	**23996K**
	700	165	6	3 650	7 700	370 000	785 000	420	550	**23096B**	**23096BK**
	700	218	6	4 650	10 500	475 000	1 070 000	380	490	**24096B**	**24096BK30**

1) Bearings appended with "**K**" have a tapered bore ratio of 1:12; bearings appended with "**K30**" have a tapered bore ratio of 1:30.
2) Smallest allowable dimension for chamfer dimension r.

Spherical Roller Bearings



Equivalent radial load

dynamic

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

static

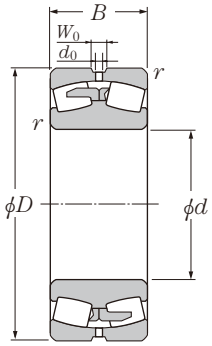
$P_{or} = F_r + Y_o F_a$

For values of e, Y_2 and Y_o see the table below.

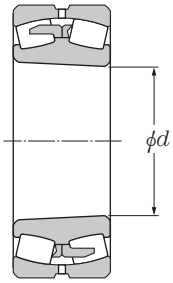
Abutment and fillet dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
W_0	d_0	d_a min	D_a max	r_{as} max	e	Y_1	Y_2	Y_o	cylindrical bore	tapered bore
16	10	398	502	3	0.19	3.54	5.27	3.46	69.9	67.7
20	12	402	538	4	0.24	2.87	4.27	2.8	115	111
27	16	402	538	4	0.3	2.23	3.32	2.18	153	150
27	16	402	598	4	0.31	2.16	3.22	2.12	235	228
33	20	402	598	4	0.39	1.73	2.58	1.69	292	287
33	20	408	652	5	0.36	1.89	2.82	1.85	380	369
16	10	418	522	3	0.18	3.71	5.52	3.63	73	70.7
20	12	422	578	4	0.24	2.8	4.16	2.73	149	144
27	16	422	578	4	0.32	2.09	3.11	2.04	202	200
27	16	428	622	5	0.31	2.21	3.29	2.16	264	256
33	20	428	622	5	0.38	1.77	2.63	1.73	329	324
33	20	428	692	5	0.37	1.81	2.69	1.77	457	443
16	10	438	542	3	0.17	3.95	5.88	3.86	76.2	73.8
20	12	442	598	4	0.24	2.85	4.24	2.79	157	152
27	16	442	598	4	0.32	2.13	3.17	2.08	210	207
33	20	448	672	5	0.32	2.11	3.15	2.07	354	343
33	20	448	672	5	0.4	1.69	2.51	1.65	440	433
33	20	456	724	6	0.36	1.86	2.77	1.82	544	528
16	10	458	582	3	0.18	3.66	5.46	3.58	101	98
20	12	468	622	5	0.24	2.85	4.24	2.79	181	175
33	20	468	622	5	0.32	2.11	3.15	2.07	245	241
33	20	468	692	5	0.31	2.15	3.21	2.11	370	358
33	20	468	692	5	0.39	1.75	2.61	1.71	456	449
33	20	476	754	6	0.36	1.88	2.8	1.84	600	582
16	10	478	602	3	0.17	3.95	5.88	3.86	107	104
27	16	488	652	5	0.23	2.88	4.29	2.82	206	200
33	20	488	652	5	0.31	2.15	3.21	2.11	276	272
33	20	496	724	6	0.31	2.14	3.19	2.1	443	429
33	20	496	724	6	0.39	1.71	2.55	1.67	550	541
33	20	496	794	6	0.36	1.87	2.78	1.83	704	683
20	12	502	628	4	0.18	3.85	5.73	3.76	123	119
27	16	508	672	5	0.23	2.94	4.38	2.88	217	209
33	20	508	672	5	0.3	2.22	3.3	2.17	285	280

Remarks: Outer ring oil holes/oil grooves are provided as standard.

Spherical Roller Bearings



Cylindrical bore



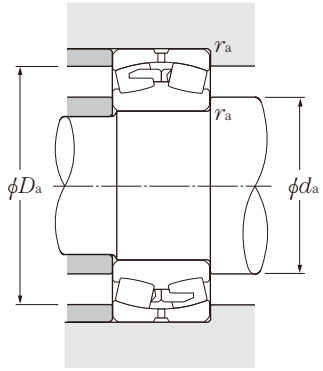
Tapered bore

d 440 ~ 630mm

Boundary dimensions mm				Basic load ratings dynamic kN		Basic load ratings static kgf		Limiting speeds min^{-1}		Bearing numbers	
d	D	B	$r_{s\,min}$ [2]	C_r	C_{or}	C_r	C_{or}	grease	oil	cylindrical bore	tapered [1] bore
480	790	248	7.5	6 200	12 300	635 000	1 260 000	350	450	**23196B**	**23196BK**
	790	308	7.5	7 450	15 300	760 000	1 560 000	350	450	**24196B**	**24196BK30**
	870	310	7.5	8 300	15 500	345 000	1 580 000	320	420	**23296B**	**23296BK**
500	670	128	5	2 370	5 600	242 000	570 000	430	560	**239/500**	**239/500K**
	720	167	6	3 850	8 300	390 000	845 000	410	530	**230/500B**	**230/500BK**
	720	218	6	4 750	10 900	485 000	1 110 000	350	460	**240/500B**	**240/500BK30**
	830	264	7.5	6 950	13 700	705 000	1 400 000	330	430	**231/500B**	**231/500BK**
	830	325	7.5	8 050	16 700	825 000	1 720 000	330	430	**241/500B**	**241/500BK30**
	920	336	7.5	9 400	17 800	960 000	1 820 000	310	400	**232/500B**	**232/500BK**
530	710	136	5	2 640	6 450	269 000	655 000	400	520	**239/530**	**239/530K**
	780	185	6	4 400	9 350	445 000	955 000	380	490	**230/530B**	**230/530BK**
	780	250	6	5 600	12 700	570 000	1 290 000	330	430	**240/530B**	**240/530BK30**
	870	272	7.5	7 000	14 200	715 000	1 450 000	310	400	**231/530B**	**231/530BK**
	870	335	7.5	8 300	17 400	850 000	1 770 000	310	400	**241/530B**	**241/530BK30**
	980	355	9.5	10 400	19 800	1 060 000	2 020 000	280	370	**232/530B**	**232/530BK**
560	750	140	5	2 830	6 700	288 000	680 000	380	490	**239/560**	**239/560K**
	820	195	6	4 800	10 500	490 000	1 070 000	350	450	**230/560B**	**230/560BK**
	820	258	6	6 100	14 100	620 000	1 440 000	310	400	**240/560B**	**240/560BK30**
	920	280	7.5	7 650	15 500	780 000	1 580 000	280	370	**231/560B**	**231/560BK**
	920	355	7.5	9 950	20 800	1 010 000	2 120 000	280	370	**241/560B**	**241/560BK30**
	1 030	365	9.5	11 100	21 100	1 130 000	2 150 000	260	340	**232/560B**	**232/560BK**
600	800	150	5	3 150	7 800	325 000	795 000	350	450	**239/600**	**239/600K**
	870	200	6	5 250	12 000	535 000	1 220 000	310	420	**230/600B**	**230/600BK**
	870	272	6	6 450	15 600	655 000	1 590 000	280	370	**240/600B**	**240/600BK30**
	980	300	7.5	9 000	18 400	920 000	1 880 000	260	340	**231/600B**	**231/600BK**
	980	375	7.5	10 700	23 200	1 090 000	2 360 000	260	340	**241/600B**	**241/600BK30**
	1 090	388	9.5	12 200	23 700	1 240 000	2 420 000	250	320	**232/600B**	**232/600BK**
630	850	165	6	3 700	9 250	375 000	945 000	320	420	**239/630**	**239/630K**
	920	212	7.5	5 900	13 000	600 000	1 330 000	310	400	**230/630B**	**230/630BK**
	920	290	7.5	7 550	17 900	770 000	1 830 000	270	350	**240/630B**	**240/630BK30**
	1 030	315	7.5	9 600	19 900	975 000	2 030 000	250	320	**231/630B**	**231/630BK**
	1 030	400	7.5	11 600	25 000	1 180 000	2 550 000	250	320	**241/630B**	**241/630BK30**
	1 150	412	12	13 700	26 800	1 400 000	2 740 000	230	300	**232/630B**	**232/630BK**

1) Bearings appended with "**K**" have a tapered bore ratio of 1:12; bearings appended with "**K30**" have a tapered bore ratio of 1:30.
2) Smallest allowable dimension for chamfer dimension r.

Spherical Roller Bearings



Equivalent radial load

dynamic

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

static

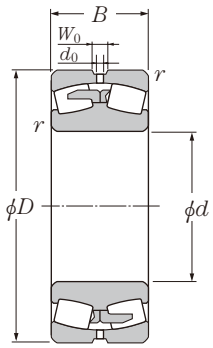
$P_{or} = F_r + Y_o F_a$

For values of e, Y_2 and Y_o see the table below.

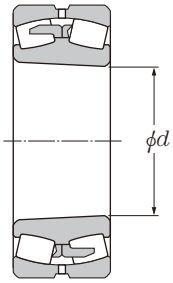
Abutment and fillet dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
W_0	d_0	d_a min	D_a max	r_{as} max	e	Y_1	Y_2	Y_o	cylindrical bore	tapered bore
33	20	516	754	6	0.31	2.15	3.21	2.11	492	477
33	20	516	754	6	0.39	1.74	2.59	1.7	608	600
33	20	516	834	6	0.36	1.87	2.78	1.83	814	790
20	12	522	648	4	0.17	4.02	5.98	3.93	131	127
27	16	528	692	5	0.23	2.98	4.44	2.92	226	218
33	20	528	692	5	0.3	2.28	3.4	2.23	295	290
33	20	536	794	6	0.32	2.12	3.16	2.08	584	566
42	25	536	794	6	0.39	1.72	2.57	1.69	716	705
42	25	536	884	6	0.39	1.74	2.59	1.7	1 000	971
20	12	552	688	4	0.17	3.95	5.88	3.86	157	152
27	16	558	752	5	0.22	3.03	4.52	2.97	306	295
33	20	558	752	5	0.3	2.24	3.33	2.19	413	406
33	20	566	834	6	0.3	2.22	3.3	2.17	653	633
42	25	566	834	6	0.38	1.79	2.67	1.75	800	788
42	25	574	936	8	0.39	1.74	2.59	1.7	1 200	1 170
20	12	582	728	4	0.16	4.1	6.1	4.01	182	176
27	16	588	792	5	0.22	3.03	4.51	2.96	353	340
33	20	588	792	5	0.3	2.29	3.4	2.24	467	459
33	20	596	884	6	0.3	2.27	3.38	2.22	752	729
42	25	596	884	6	0.39	1.75	2.61	1.71	948	934
42	25	604	986	8	0.36	1.88	2.8	1.84	1360	1 320
20	12	622	778	4	0.18	3.85	5.73	3.76	218	211
27	16	628	842	5	0.21	3.17	4.72	3.1	400	386
33	20	628	842	5	0.29	2.33	3.47	2.28	544	535
33	20	636	944	6	0.3	2.22	3.3	2.17	908	880
42	25	636	944	6	0.37	1.81	2.7	1.77	1 130	1 110
42	25	644	1 046	8	0.36	1.86	2.77	1.82	1 540	1 490
27	16	658	822	5	0.18	3.66	5.46	3.58	277	268
33	20	666	884	6	0.22	3.14	4.67	3.07	481	464
33	20	666	884	6	0.3	2.28	3.4	2.23	657	646
33	20	666	994	6	0.3	2.27	3.38	2.22	1 050	1 020
42	25	666	994	6	0.38	1.78	2.66	1.74	1 330	1 310
42	25	684	1 096	10	0.36	1.87	2.78	1.83	1 900	1 840

Remarks: Outer ring oil holes/oil grooves are provided as standard.

Spherical Roller Bearings



Cylindrical bore



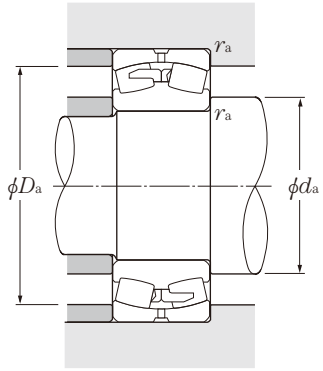
Tapered bore

d 670 ~ 950mm

Boundary dimensions mm				Basic load ratings dynamic kN	static kN	dynamic kgf	static kgf	Limiting speeds min^{-1}		Bearing numbers	
d	D	B	$r_{s\,min}$ [2]	C_r	C_{or}	C_r	C_{or}	grease	oil	cylindrical bore	tapered [1] bore
670	900	170	6	4 100	10 300	420 000	1 050 000	300	390	239/670	239/670K
	980	230	7.5	6 550	14 600	665 000	1 490 000	280	360	230/670B	230/670BK
	980	308	7.5	8 650	20 600	885 000	2 100 000	250	320	240/670B	240/670BK30
	1 090	336	7.5	11 000	22 800	1 120 000	2 330 000	230	300	231/670B	231/670BK
	1 090	412	7.5	12 700	28 000	1 300 000	2 850 000	230	300	241/670B	241/670BK30
	1 220	438	12	16 100	32 000	1 640 000	3 250 000	220	280	232/670B	232/670BK
710	950	180	6	4 450	11 500	450 000	1 170 000	280	370	239/710	239/710K
	1 030	236	7.5	7 200	16 200	730 000	1 650 000	260	340	230/710B	230/710BK
	1 030	315	7.5	9 300	22 500	945 000	2 300 000	230	300	240/710B	240/710BK30
	1 150	345	9.5	11 600	24 900	1 190 000	2 540 000	220	280	231/710B	231/710BK
	1 150	438	9.5	14 500	32 000	1 470 000	3 250 000	220	280	241/710B	241/710BK30
	1 280	450	12	16 300	32 500	1 660 000	3 300 000	200	260	232/710B	232/710BK
750	1 000	185	6	5 000	13 000	510 000	1 330 000	260	340	239/750	239/750K
	1 090	250	7.5	8 150	18 300	835 000	1 860 000	250	320	230/750B	230/750BK
	1 090	335	7.5	10 100	24 600	1 030 000	2 500 000	220	280	240/750B	240/750BK30
	1 220	365	9.5	12 800	27 200	1 310 000	2 780 000	200	260	231/750B	231/750BK
	1 360	475	15	18 200	36 500	1 860 000	3 750 000	180	240	232/750B	232/750BK
800	1 060	195	6	5 400	13 700	550 000	1 400 000	240	310	239/800	239/800K
	1 150	258	7.5	8 400	19 500	860 000	1 990 000	220	290	230/800B	230/800BK
	1 150	345	7.5	11 200	27 800	1 140 000	2 840 000	200	260	240/800B	240/800BK30
	1 280	375	9.5	14 400	31 000	1 460 000	3 150 000	180	240	231/800B	231/800BK
850	1 120	200	6	5 850	15 100	595 000	1 540 000	220	290	239/850	239/850K
	1 220	272	7.5	9 750	22 700	995 000	2 310 000	210	270	230/850B	230/850BK
	1 220	365	7.5	12 500	31 500	1 270 000	3 200 000	180	240	240/850B	240/850BK30
	1 360	400	12	15 500	34 000	1 580 000	3 500 000	170	220	231/850B	231/850BK
900	1 180	206	6	6 650	17 300	675 000	1 770 000	210	270	239/900	239/900K
	1 280	280	7.5	10 300	24 700	1 050 000	2 520 000	190	250	230/900B	230/900BK
	1 280	375	7.5	13 200	33 500	1 350 000	3 450 000	170	220	240/900B	240/900BK30
	1 420	412	12	16 800	38 000	1 720 000	3 850 000	150	200	231/900B	231/900BK
950	1 250	224	7.5	7 750	20 500	790 000	2 090 000	190	250	239/950	239/950K
	1 360	300	7.5	11 500	28 400	1 180 000	2 900 000	180	230	230/950B	230/950BK
	1 360	412	7.5	15 500	40 000	1 580 000	4 100 000	160	210	240/950B	240/950BK30

1) Bearings appended with "**K**" have a tapered bore ratio of 1:12; bearings appended with "**K30**" have a tapered bore ratio of 1:30.
2) Smallest allowable dimension for chamfer dimension r.

Spherical Roller Bearings



Equivalent radial load

dynamic

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

static

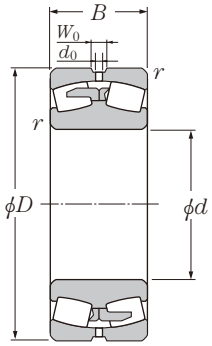
$P_{or} = F_r + Y_o F_a$

For values of e, Y_2 and Y_o see the table below.

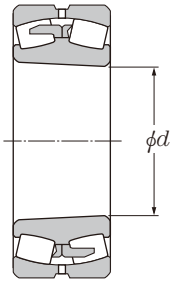
Abutment and fillet dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
		d_a	D_a	r_{as}					cylindrical	tapered
W_0	d_0	min	max	max	e	Y_1	Y_2	Y_o	bore	bore
27	16	698	872	5	0.18	3.76	5.59	3.67	317	307
33	20	706	944	6	0.22	3.07	4.57	3	594	573
33	20	706	944	6	0.29	2.29	3.41	2.24	794	781
42	25	706	1 054	6	0.3	2.22	3.3	2.17	1 250	1 210
42	25	706	1 054	6	0.37	1.83	2.73	1.79	1 530	1 510
42	25	724	1166	10	0.36	1.89	2.81	1.85	2 270	2 200
27	16	738	922	5	0.18	3.85	5.73	3.76	375	363
33	20	746	994	6	0.22	3.02	4.5	2.96	663	640
33	20	746	994	6	0.29	2.36	3.51	2.31	884	870
42	25	754	1 106	8	0.29	2.32	3.45	2.27	1 420	1 380
42	25	754	1 106	8	0.37	1.83	2.72	1.79	1 800	1 770
42	25	764	1 226	10	0.35	1.91	2.84	1.87	2 540	2 470
27	16	778	972	5	0.17	3.9	5.81	3.81	412	399
33	20	786	1 054	6	0.21	3.2	4.76	3.13	790	763
42	25	786	1 054	6	0.29	2.35	3.49	2.29	1 060	1 040
42	25	794	1 176	8	0.29	2.32	3.45	2.27	1 700	1 650
42	25	814	1 296	12	0.35	1.92	2.86	1.88	3 050	2 960
27	16	828	1 032	5	0.17	4.05	6.04	3.96	487	471
33	20	836	1 114	6	0.21	3.15	4.69	3.08	890	859
42	25	836	1 114	6	0.28	2.41	3.59	2.36	1 190	1 170
42	25	844	1 236	8	0.29	2.32	3.45	2.27	1 890	1 830
27	16	878	1 092	5	0.16	4.25	6.32	4.15	550	532
33	20	886	1 184	6	0.2	3.32	4.95	3.25	1 050	1 010
42	25	886	1 184	6	0.28	2.42	3.61	2.37	1 410	1 390
42	25	904	1 306	10	0.28	2.37	3.54	2.32	2 270	2 200
33	20	928	1 152	5	0.16	4.32	6.44	4.23	623	603
33	20	936	1 244	6	0.2	3.32	4.95	3.25	1 170	1 130
42	25	936	1 244	6	0.27	2.48	3.7	2.43	1 570	1 540
42	25	954	1 366	10	0.28	2.42	3.6	2.36	2 500	2 420
33	20	986	1 214	6	0.16	4.2	6.26	4.11	774	749
33	20	986	1 324	6	0.21	3.26	4.85	3.18	1 430	1 380
42	25	986	1 324	6	0.28	2.39	3.56	2.34	1 970	1 940

Remarks: Outer ring oil holes/oil grooves are provided as standard.

Spherical Roller Bearings



Cylindrical bore



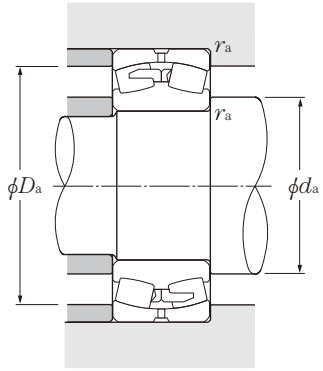
Tapered bore

d 1000 ~ 1400mm

Boundary dimensions mm				Basic load ratings dynamic kN		static kN		Limiting speeds min^{-1}		Bearing numbers	
d	D	B	$r_{s\,min}$ [2]	C_r	C_{or}	C_r	C_{or}	grease	oil	cylindrical bore	tapered [1] bore
1000	1 320	236	7.5	8 600	22 700	875 000	2 310 000	180	230	**239/1000**	**239/1000K**
	1 420	308	7.5	12 400	30 000	1 260 000	3 050 000	170	220	**230/1000B**	**230/1000BK**
	1 420	412	7.5	16 000	42 000	1 640 000	4 250 000	150	190	**240/1000B**	**240/1000BK30**
1060	1 400	250	7.5	9 300	24 700	950 000	2 520 000	160	210	**239/1060**	**239/1060K**
	1 500	325	9.5	13 600	33 500	1 390 000	3 400 000	150	200	**230/1060B**	**230/1060BK**
	1 500	438	9.5	17 800	47 000	1 810 000	4 800 000	140	180	**240/1060B**	**240/1060BK30**
1120	1 460	250	7.5	9 850	26 700	1 000 000	2 720 000	150	200	**239/1120**	**239/1120K**
	1 580	345	9.5	15 600	39 000	1 590 000	4 000 000	150	190	**230/1120B**	**230/1120BK**
	1 580	462	9.5	19 500	52 500	1 990 000	5 350 000	120	160	**240/1120B**	**240/1120BK30**
1180	1 540	272	7.5	11 000	29 800	1 120 000	3 050 000	140	180	**239/1180**	**239/1180K**
1250	1 630	280	7.5	12 100	33 500	1 230 000	3 400 000	120	160	**239/1250**	**239/1250K**
1320	1 720	300	7.5	13 600	38 000	1 390 000	3 900 000	120	150	**239/1320**	**239/1320K**
1400	1 820	315	9.5	15 100	43 000	1 540 000	4 400 000	100	130	**239/1400**	**239/1400K**

1) Bearings appended with "**K**" have a tapered bore ratio of 1:12; bearings appended with "**K30**" have a tapered bore ratio of 1:30.
2) Smallest allowable dimension for chamfer dimension r.

Spherical Roller Bearings



Equivalent radial load

dynamic

$P_r = XF_r + YF_a$

$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

static

$P_{or} = F_r + Y_o F_a$

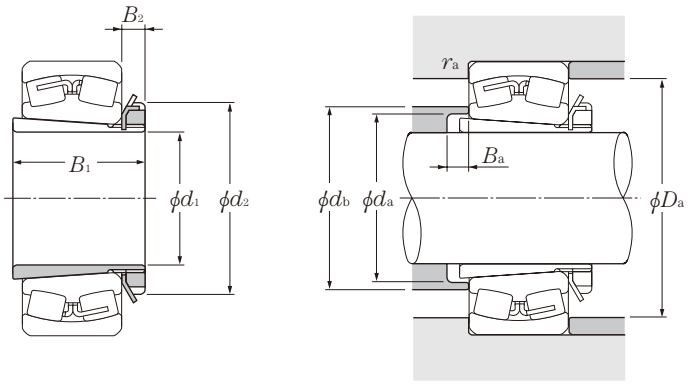
For values of e, Y_2 and Y_o see the table below.

Abutment and fillet dimensions mm					Constant	Axial load factors			Mass (approx.) kg	
		d_a	D_a	r_{as}					cylindrical	tapered
W_0	d_0	min	max	max	e	Y_1	Y_2	Y_o	bore	bore
33	20	1 036	1 284	6	0.16	4.21	6.26	4.11	916	887
33	20	1 036	1 384	6	0.2	3.37	5.02	3.29	1 580	1 520
42	25	1 036	1 384	6	0.27	2.51	3.73	2.45	2 110	2 080
33	20	1 096	1 364	6	0.16	4.2	6.26	4.11	1 090	1 060
42	25	1 104	1 456	8	0.2	3.36	5	3.28	1 850	1 790
42	25	1 104	1 456	8	0.27	2.49	3.71	2.44	2 450	2 140
33	20	1 156	1 424	6	0.15	4.42	6.58	4.32	1 140	1 100
42	25	1 164	1 536	8	0.21	3.19	4.75	3.12	2 160	2 090
42	25	1 164	1 536	8	0.27	2.5	3.72	2.44	2 890	2 840
33	20	1 216	1 504	6	0.15	4.4	6.56	4.31	1 390	1 340
33	20	1 286	1 594	6	0.15	4.42	6.58	4.32	1 600	1 550
33	20	1 356	1 684	6	0.16	4.34	6.46	4.24	1 900	1 840
33	20	1 444	1 776	8	0.15	4.39	6.54	4.29	2 230	2 160

Remarks: Outer ring oil holes/oil grooves are provided as standard.

Adapter

(For spherical roller bearings)



d_1 35 ~ 70mm

Boundary dimensions mm				Bearing numbers	Abutment and fillet dimensions mm						Mass[1] kg
d_1	B_1	d_2	B_2		d_a min	d_b max	B_a min	D_a min	D_a max	r_{as} max	(approx.)
35	36	58	10	LH-22208CK;**H 308X**	44	50	5	—	73	1	0.189
	36	58	10	21308CK;**H 308X**	44	54	5	—	81.5	1.5	0.189
	46	58	10	22308CK;**H2308X**	45	52	5	—	81.5	1.5	0.224
40	39	65	11	LH-22209CK;**H 309X**	49	57	8	—	78	1	0.248
	39	65	11	21309CK;**H 309X**	49	61	5	—	91.5	1.5	0.248
	50	65	11	22309CK;**H2309X**	50	58	5	—	91.5	1.5	0.28
45	42	70	12	LH-22210CK;**H 310X**	54	63	10	—	83	1	0.303
	42	70	12	21310CK;**H 310X**	54	67	5	—	100	2	0.303
	55	70	12	22310CK;**H2310X**	56	65	5	—	100	2	0.362
50	45	75	12	LH-22211EK;**H 311X**	60	67	11	89.5	91.5	1.5	0.345
	45	75	12	LH-22211BK;**H 311X**	60	67	11	—	91.5	1.5	0.345
	45	75	12	21311K ;**H 311X**	60	73	6	—	110	2	0.345
	59	75	12	22311BK;**H2311X**	61	71	6	—	110	2	0.42
55	47	80	13	LH-22212EK;**H 312X**	65	72	9	98	101.5	1.5	0.394
	47	80	13	LH-22212BK;**H 312X**	65	72	9	—	101.5	1.5	0.394
	47	80	13	21312K ;**H312X**	65	79	5	—	118	2	0.394
	62	80	13	22312BK;**H2312X**	66	77	5	—	118	2	0.481
60	50	85	14	LH-22213EK;**H 313X**	70	78.5	8	107	111.5	1.5	0.458
	50	85	14	LH-22213BK;**H 313X**	70	78.5	9	—	111.5	1.5	0.458
	50	85	14	21313K ;**H 313X**	70	85	5	—	128	2	0.458
	65	85	14	22313BK;**H2313X**	72	84	5	—	128	2	0.557
65	55	98	15	LH-22215EK;**H 315X**	80	89	12	117.5	121.5	1.5	0.831
	55	98	15	LH-22215BK;**H 315X**	80	89	12	—	121.5	1.5	0.831
	55	98	15	21315K ;**H315X**	80	97	5	—	148	2	0.831
	73	98	15	22315BK;**H2315X**	82	96	5	—	148	2	1.05
70	59	105	17	LH-22216EK;**H 316X**	86	94.5	12	125.5	130	2	1.03
	59	105	17	LH-22216BK;**H 316X**	86	94.5	12	—	130	2	1.03
	59	105	17	21316K ;**H316X**	86	103	5	—	158	2	1.03
	78	105	17	22316BK;**H2316X**	87	103	5	—	158	2	1.28

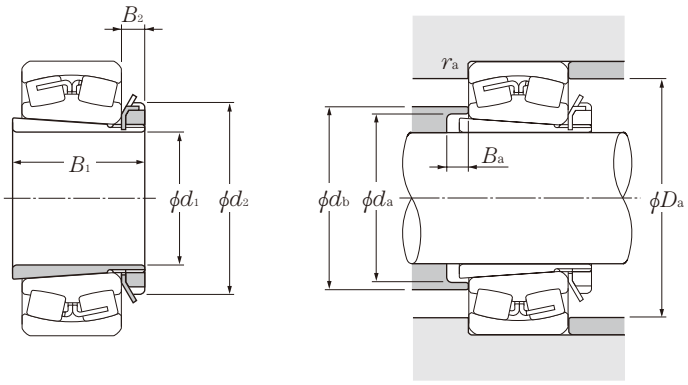
1) Indicates adapter mass.

Note: 1. Please refer to page **B-222 to B-225** for bearing dimensions, rated loads, and mass.
2. Please refer to page **C-2 to C-10** and **C-12 to C-14** for adapter locknut and washer dimensions.
3. Adapter numbers with the suffix "**X**" signify narrow slit type adapters, and use washers with straight inner tabs.

Adapter

NTN

(For spherical roller bearings)



d_1 75 ~ 115mm

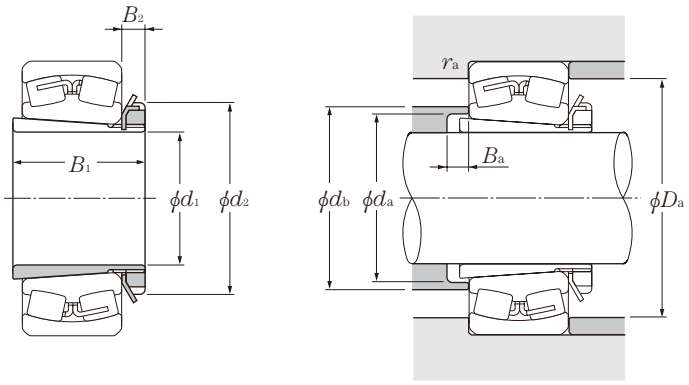
Boundary dimensions mm				Bearing numbers	Abutment and fillet dimensions mm						Mass[1] kg
d_1	B_1	d_2	B_2		d_a min	d_b max	B_a min	D_a min	D_a max	r_{as} max	(approx.)
75	63	110	18	LH-22217EK;**H 317X**	91	100.5	12	135	140	2	1.18
	63	110	18	LH-22217BK;**H 317X**	91	100.5	12	—	140	2	1.18
	63	110	18	21317K ;**H 317X**	91	110	6	—	166	2.5	1.18
	82	110	18	22317BK;**H2317X**	94	110	6	—	166	2.5	1.45
80	65	120	18	LH-22218EK;**H 318X**	96	107.5	10	144	150	2	1.37
	65	120	18	LH-22218BK;**H 318X**	96	107.5	10	—	150	2	1.37
	86	120	18	23218BK;**H2318X**	99	110	18	—	150	2	1.69
	65	120	18	21318K ;**H 318X**	96	116	6	—	176	2.5	1.37
	86	120	18	22318BK;**H2318X**	99	117	6	—	176	2.5	1.69
85	68	125	19	22219BK;**H 319X**	102	117	9	—	158	2	1.56
	68	125	19	21319K ;**H 319X**	102	123	7	—	186	2.5	1.56
	90	125	19	22319BK;**H2319X**	105	123	7	—	186	2.5	1.92
90	71	130	20	22220BK;**H 320X**	107	123	8	—	168	2	1.69
	97	130	20	23220BK;**H2320X**	110	122	19	—	168	2	2.15
	71	130	20	21320K ;**H 320X**	107	130	7	—	201	2.5	1.69
	97	130	20	22320BK;**H2320X**	110	129	7	—	201	2.5	2.15
100	81	145	21	23122BK;**H3122X**	117	127	7	—	170	2	2.25
	77	145	21	22222BK;**H 322X**	117	137	6	—	188	2	2.18
	105	145	21	23222BK;**H2322X**	121	135	17	—	188	2	2.74
	77	145	21	21322K ;**H 322X**	117	142	9	—	226	2.5	2.18
	105	145	21	22322BK;**H2322X**	121	142	7	—	226	2.5	2.74
110	72	145	22	23024BK;**H3024X**	127	136	7	—	170	2	1.93
	88	155	22	23124BK;**H3124X**	128	140	7	—	190	2	2.64
	88	155	22	22224BK;**H3124X**	128	150	11	—	203	2	2.64
	112	155	22	23224BK;**H2324X**	131	147	17	—	203	2	3.19
	112	155	22	22324BK;**H2324X**	131	154	7	—	246	2.5	3.19
115	80	155	23	23026BK;**H3026**	137	147	8	—	190	2	2.85
	92	165	23	23126BK;**H3126**	138	152	8	—	200	2	3.66
	92	165	23	22226BK;**H3126**	138	161	8	—	216	2.5	3.66
	121	165	23	23226BK;**H2326**	142	160	21	—	216	2.5	4.6

1) Indicates adapter mass.

Note: 1. Please refer to page **B-224 to B-227** for bearing dimensions, rated loads, and mass.
2. Please refer to page **C-2 to C-10** and **C-12 to C-14** for adapter locknut and washer dimensions.
3. Adapter numbers with the suffix "**X**" signify narrow slit type adapters, and use washers with straight inner tabs.

Adapter

(For spherical roller bearings)



d_1 115～170mm

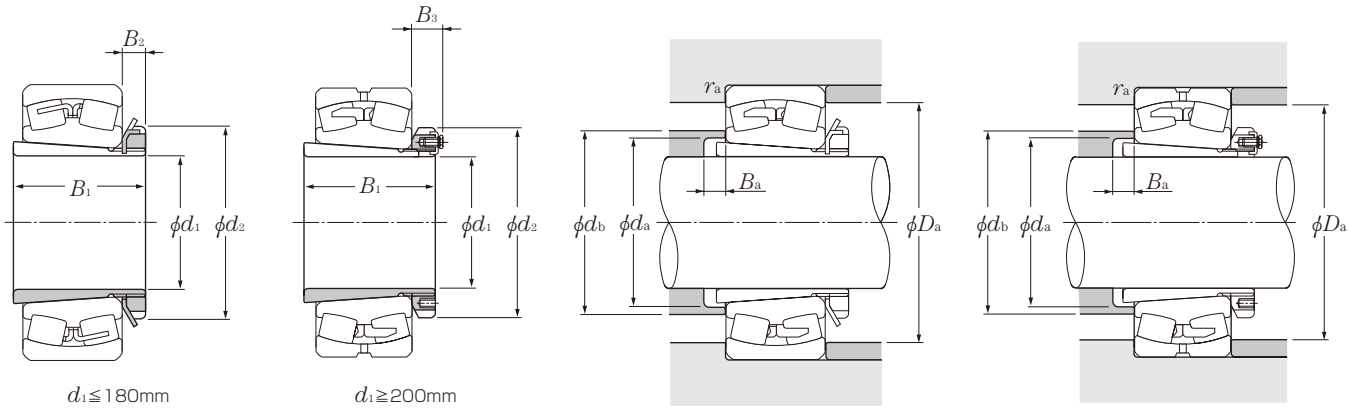
Boundary dimensions mm				Bearing numbers	Abutment and fillet dimensions mm					Mass[1] kg
d_1	B_1	d_2	B_2		d_a min	d_b max	B_a min	D_a max	r_{as} max	(approx.)
115	121	165	23	22326BK;**H2326**	142	167	8	262	3	4.6
125	82	165	24	23028BK;**H3028**	147	158	8	200	2	3.16
	97	180	24	23128BK;**H3128**	149	165	8	213	2	4.34
	97	180	24	22228BK;**H3128**	149	173	8	236	2.5	4.34
	131	180	24	23228BK;**H2328**	152	172	22	236	2.5	5.55
	131	180	24	22328BK;**H2328**	152	179	8	282	3	5.55
135	87	180	26	23030BK;**H3030**	158	170	8	213	2	3.89
	111	195	26	23130BK;**H3130**	160	178	8	238	2	5.52
	111	195	26	22230BK;**H3130**	160	188	15	256	2.5	5.52
	139	195	26	23230BK;**H2330**	163	185	20	256	2.5	6.63
	139	195	26	22330BK;**H2330**	163	192	8	302	3	6.63
140	93	190	28	23032BK;**H3032**	168z	181	8	228	2	5.21
	119	210	28	23132BK;**H3132**	170	190	8	258	2	7.67
	119	210	28	22232BK;**H3132**	170	200	14	276	2.5	7.67
	147	210	28	23232BK;**H2332**	174	198	18	276	2.5	9.14
	147	210	28	22332BK;**H2332**	174	205	8	322	3	9.14
150	101	200	29	23034BK;**H3034**	179	193	8	248	2	5.99
	122	220	29	23134BK;**H3134**	180	202	8	268	2	8.38
	122	220	29	22234BK;**H3134**	180	212	10	292	3	8.38
	154	220	29	23234BK;**H2334**	185	218	18	292	3	10.2
	154	220	29	22334BK;**H2334**	185	218	8	342	3	10.2
160	109	210	30	23036BK;**H3036**	189	204	8	268	2	6.83
	131	230	30	23136BK;**H3136**	191	215	8	286	2.5	9.5
	131	230	30	22236BK;**H3136**	191	225	18	302	3	9.5
	161	230	30	23236BK;**H2336**	195	223	22	302	3	11.3
	161	230	30	22336BK;**H2336**	195	230	8	362	3	11.3
170	112	220	31	23038BK;**H3038**	199	215	9	278	2	7.45
	141	240	31	23138BK;**H3138**	202	228	9	306	2.5	10.8
	141	240	31	22238BK;**H3138**	202	238	21	322	3	10.8
	169	240	31	23238BK;**H2338**	206	236	21	322	3	12.6
	169	240	31	22338BK;**H2338**	206	243	9	378	4	12.6

1) Indicates adapter mass.

Note: 1. Please refer to page **B-226 to B-229** for bearing dimensions, rated loads, and mass.
2. Please refer to page **C-2 to C-10** and **C-12 to C-14** for adapter locknut and washer dimensions.

Adapter

(For spherical roller bearings)



$d_1 \leqq 180$mm $d_1 \geqq 200$mm

d_1 180 ~ 300mm

Boundary dimensions mm					Bearing numbers	Abutment and fillet dimensions mm					Mass[1] kg
d_1	B_1	d_2	B_2	B_3		d_a min	d_b max	B_a min	D_a max	r_{as} max	(approx.)
180	120	240	32	—	23040BK;**H3040**	210	227	10	298	2	9.19
	150	250	32	—	23140BK;**H3140**	212	240	10	326	2.5	12.1
	150	250	32	—	22240BK;**H3140**	212	250	24	342	3	12.1
	176	250	32	—	23240BK;**H2340**	216	248	20	342	3	13.9
	176	250	32	—	22340BK;**H2340**	216	255	10	398	4	13.9
200	126	260	—	41	23044BK;**H3044**	231	250	12	326	2.5	10.2
	158	280	—	44	23144BK;**H3144**	233	264	10	352	3	14.7
	158	280	—	44	22244BK;**H3144**	233	274	22	382	3	14.7
	183	280	—	44	23244BK;**H2344**	236	271	11	382	3	16.7
	183	280	—	44	22344BK;**H2344**	236	278	10	438	4	16.7
220	133	290	—	46	23048BK;**H3048**	251	272	11	346	2.5	13.2
	169	300	—	46	23148BK;**H3148**	254	288	11	382	3	17.3
	169	300	—	46	22248BK;**H3148**	254	298	19	422	3	17.3
	196	300	—	46	23248BK;**H2348**	257	295	6	422	3	19.7
	196	300	—	46	22348BK;**H2348**	257	302	11	478	4	19.7
240	145	310	—	46	23052BK;**H3052**	272	295	13	382	3	15.1
	187	330	—	49	23152BK;**H3152**	276	313	11	422	3	22
	187	330	—	49	22252BK;**H3152**	276	323	25	458	4	22
	208	330	—	49	23252BK;**H2352**	278	319	2	458	4	24.2
	208	330	—	49	22352BK;**H2352**	278	326	11	512	5	24.2
260	152	330	—	50	23056BK;**H3056**	292	317	12	402	3	17.7
	192	350	—	51	23156BK;**H3156**	296	336	12	438	4	24.5
	192	350	—	51	22256BK;**H3156**	296	346	28	478	4	24.5
	221	350	—	51	23256BK;**H2356**	299	343	11	478	4	27.8
	221	350	—	51	22356BK;**H2356**	299	350	12	552	5	27.8
280	168	360	—	54	23060BK;**H3060**	313	340	12	442	3	22.8
	208	380	—	53	23160BK;**H3160**	317	361	12	478	4	30.2
	208	380	—	53	22260BK;**H3160**	317	371	32	518	4	30.2
	240	380	—	53	23260BK;**H3260**	321	368	12	518	4	34.1
300	171	380	—	55	23064BK;**H3064**	334	363	13	462	3	24.6
	226	400	—	56	23164BK;**H3164**	339	384	13	518	4	34.9
	226	400	—	56	22264BK;**H3164**	339	394	39	558	4	34.9

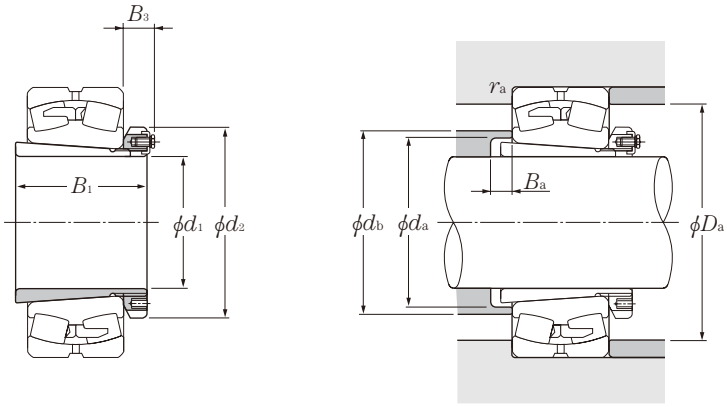
1) Indicates adapter mass.

Note: 1. Please refer to page **B-228 to B-233** for bearing dimensions, rated loads, and mass.
2. Please refer to page **C-2 to C-10** and **C-12 to C-14** for adapter locknut and washer dimensions.

Adapter

NTN

(For spherical roller bearings)



d_1 300～470mm

Boundary dimensions mm				Bearing numbers	Abutment and fillet dimensions mm					Mass[1] kg
d_1	B_1	d_2	B_3		d_a min	d_b max	B_a min	D_a max	r_{as} max	(approx.)
300	258	400	56	23264BK;**H3264**	343	393	13	558	4	39.3
320	187	400	58	23068BK;**H3068**	355	386	14	498	4	28.7
	254	440	72	23168BK;**H3168**	360	409	14	558	4	49.5
	288	440	72	23268BK;**H3268**	364	421	14	592	5	54.6
340	188	420	58	23072BK;**H3072**	375	408	14	518	4	30.5
	259	460	75	23172BK;**H3172**	380	432	14	578	4	54.2
	299	460	75	23272BK;**H3272**	385	442	14	622	5	60.2
360	193	450	62	23076BK;**H3076**	396	431	15	538	4	35.8
	264	490	77	23176BK;**H3176**	401	456	15	598	4	61.7
	310	490	77	23276BK;**H3276**	405	465	15	652	5	69.6
380	210	470	66	23080BK;**H3080**	417	454	15	578	4	41.3
	272	520	82	23180BK;**H3180**	421	479	15	622	5	70.6
	328	520	82	23280BK;**H3280**	427	488	15	692	5	81
400	212	490	66	23084BK;**H3084**	437	476	16	598	4	43.7
	304	540	90	23184BK;**H3184**	443	504	16	672	5	84.2
	352	540	90	23284BK;**H3284**	448	515	16	724	6	94
410	228	520	77	23088BK;**H3088**	458	499	17	622	5	65.2
	307	560	90	23188BK;**H3188**	464	527	17	692	5	104
	361	560	90	23288BK;**H3288**	469	539	17	754	6	118
430	234	540	77	23092BK;**H3092**	478	521	17	652	5	69.5
	326	580	95	23192BK;**H3192**	485	551	17	724	6	116
	382	580	95	23292BK;**H3292**	491	563	17	794	6	132
450	237	560	77	23096BK;**H3096**	499	544	18	672	5	73.3
	335	620	95	23196BK;**H3196**	505	575	18	754	6	133
	397	620	95	23296BK;**H3296**	512	590	18	834	6	152
470	247	580	85	230/500BK;**H30/500**	519	566	18	692	5	81.8
	356	630	100	231/500BK;**H31/500**	527	600	18	794	6	143
	428	630	100	232/500BK;**H32/500**	534	618	18	884	6	166

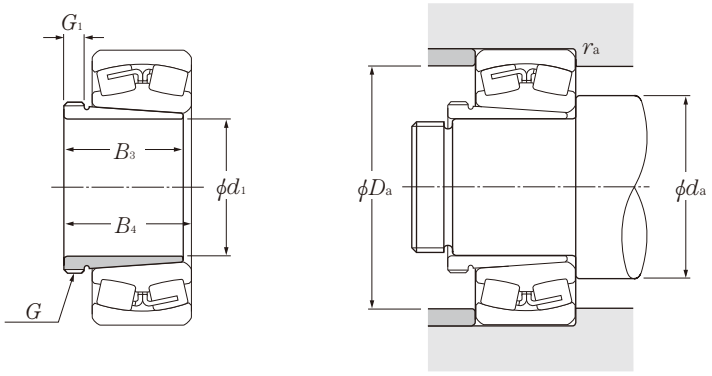
1) Indicates adapter mass.

Note: 1. Please refer to page **B-228 to B-237** for bearing dimensions, rated loads, and mass.
2. Please refer to page **C-2 to C-10** and **C-12 to C-14** for adapter locknut and washer dimensions.

Withdrawal Sleeves

NTN

(For spherical roller bearings)



d_1 35 ~ 70mm

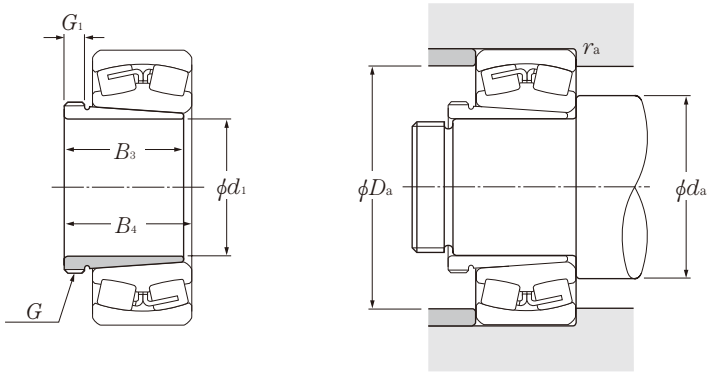
Boundary dimensions mm					Bearing numbers	Abutment and fillet dimensions mm					Mass[3] kg	Appro-priate nut no.[4]
d_1	thread[1] G	B_3	G_1	B_4[2]		min	d_a max	min	D_a max	r_{as} max	(approx.)	
35	M45×1.5	29	6	32	LH-22208CK ;**AH 308**	47	—	—	73	1	0.09	AN09
	M45×1.5	29	6	32	21308CK ;**AH 308**	48.5	—	—	81.5	1.5	0.09	AN09
	M45×1.5	40	7	43	22308CK ;**AH 2308**	48.5	—	—	81.5	1.5	0.128	AN09
40	M50×1.5	31	6	34	LH-22209CK ;**AH 309**	52	—	—	78	1	0.109	AN10
	M50×1.5	31	6	34	21309CK ;**AH 309**	53.5	—	—	91.5	1.5	0.109	AN10
	M50×1.5	44	7	47	22309CK ;**AH 2309**	53.5	—	—	91.5	1.5	0.164	AN10
45	M55×2	35	7	38	LH-22210CK ;**AHX 310**	57	—	—	83	1	0.137	AN11
	M55×2	35	7	38	21310CK ;**AHX 310**	60	—	—	100	2	0.137	AN11
	M55×2	50	9	53	22310CK ;**AHX 2310**	60	—	—	100	2	0.209	AN11
50	M60×2	37	7	40	LH-22211EK;**AHX 311**	63.5	67	89.5	91.5	1.5	0.161	AN12
	M60×2	37	7	40	LH-22211BK;**AHX 311**	63.5	—	—	91.5	1.5	0.161	AN12
	M60×2	37	7	40	21311K ;**AHX 311**	65	—	—	110	2	0.161	AN12
	M60×2	54	10	57	22311BK;**AHX 2311**	65	—	—	110	2	0.253	AN12
55	M65×2	40	8	43	LH-22212EK ;**AHX 312**	68.5	72	98	101.5	1.5	0.189	AN13
	M65×2	40	8	43	LH-22212BK ;**AHX 312**	68.5	—	—	101.5	1.5	0.189	AN13
	M65×2	40	8	43	21312K ;**AHX 312**	72	—	—	118	2	0.189	AN13
	M65×2	58	11	61	22312BK ;**AHX 2312**	72	—	—	118	2	0.297	AN13
60	M75×2	42	8	45	LH-22213EK ;**AH 313**	73.5	78.5	107	111.5	1.5	0.253	AN15
	M75×2	42	8	45	LH-22213BK ;**AH 313**	73.5	—	—	111.5	1.5	0.253	AN15
	M75×2	42	8	45	21313K ;**AH 313**	77	—	—	128	2	0.253	AN15
	M75×2	61	12	64	22313BK;**AH 2313**	77	—	—	128	2	0.395	AN15
65	M80×2	43	8	47	LH-22214EK ;**AH 314**	78.5	83.5	112.5	116.5	1.5	0.28	AN16
	M80×2	43	8	47	LH-22214BK ;**AH 314**	78.5	—	—	116.5	1.5	0.28	AN16
	M80×2	43	8	47	21314K ;**AH 314**	82	—	—	138	2	0.28	AN16
	M80×2	64	12	68	22314BK;**AHX 2314**	82	—	—	138	2	0.466	AN16
70	M85×2	45	8	49	LH-22215EK ;**AH 315**	83.5	89	117.5	121.5	1.5	0.313	AN17
	M85×2	45	8	49	LH-22215BK ;**AH 315**	83.5	—	—	121.5	1.5	0.313	AN17
	M85×2	45	8	49	21315K ;**AH 315**	87	—	—	148	2	0.313	AN17
	M85×2	68	12	72	22315BK ;**AHX 2315**	87	—	—	148	2	0.534	AN17

1) Standard thread shapes and dimensions are as per **JIS B0207** (metric thread).
2) Indicates reference dimensions before attachment of withdrawal sleeve.
3) Indicates withdrawal sleeve mass.
4) Indicates number of nut to be used at time of disassembly. See pages **C-2 to C-10** for nut dimensions.
Note: 1. Please refer to page **B-222, B-225** for bearing dimensions, rated loads, and mass.

Withdrawal Sleeves

NTN

(For spherical roller bearings)



d_1 75 ~ 115mm

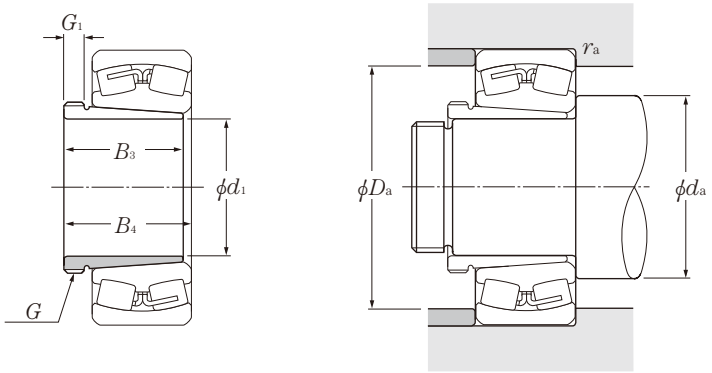
Boundary dimensions mm					Bearing numbers	Abutment and fillet dimensions mm					Mass[3] kg	Appro-priate nut no.[4]
d_1	thread[1] G	B_3	G_1	B_4[2]		d_a min	d_a max	D_a min	D_a max	r_{as} max	(approx.)	
75	M90×2	48	8	52	LH-22216EK;**AH 316**	90	94.5	125.5	130	2	0.365	AN18
	M90×2	48	8	52	LH-22216BK;**AH 316**	90	—	—	130	2	0.365	AN18
	M90×2	48	8	52	21316K ;**AH 316**	92	—	—	158	2	0.365	AN18
	M90×2	71	12	75	22316BK;**AHX 2316**	92	—	—	158	2	0.597	AN18
80	M95×2	52	9	56	LH-22217EK;**AHX 317**	95	100.5	135	140	2	0.429	AN19
	M95×2	52	9	56	LH-22217BK;**AHX 317**	95	—	—	140	2	0.429	AN19
	M95×2	52	9	56	21317K ;**AHX 317**	99	—	—	166	2.5	0.429	AN19
	M95×2	74	13	78	22317BK;**AHX 2317**	99	—	—	166	2.5	0.67	AN19
85	M100×2	53	9	57	LH-22218EK;**AHX 318**	100	107.5	144	150	2	0.461	AN20
	M100×2	53	9	57	LH-22218BK;**AHX 318**	100	—	—	150	2	0.461	AN20
	M100×2	63	10	67	23218BK;**AHX 3218**	100	—	—	150	2	0.576	AN20
	M100×2	53	9	57	21318K ;**AHX 318**	104	—	—	176	2.5	0.461	AN20
	M100×2	79	14	83	22318BK;**AHX 2318**	104	—	—	176	2.5	0.779	AN20
90	M105×2	57	10	61	22219BK;**AHX 319**	107	—	—	158	2	0.532	AN21
	M105×2	57	10	61	21319K ;**AHX 319**	109	—	—	186	2.5	0.532	AN21
	M105×2	85	16	89	22319BK;**AHX 2319**	109	—	—	186	2.5	0.886	AN21
95	M110×2	59	10	63	22220BK;**AHX 320**	112	—	—	168	2	0.582	AN22
	M110×2	73	11	77	23220BK;**AHX 3220**	112	—	—	168	2	0.767	AN22
	M110×2	59	10	63	21320K ;**AHX 320**	114	—	—	201	2.5	0.582	AN22
	M110×2	90	16	94	22320BK;**AHX 2320**	114	—	—	201	2.5	0.998	AN22
105	M120×2	68	11	72	23122BK ;**AHX 3122**	120	—	—	170	2	0.76	AN24
	M115×2	82	13	91	24122BK30 ;**AH 24122**	120	—	—	170	2	0.73	AN23
	M120×2	68	11	72	22222BK ;**AHX 3122**	122	—	—	188	2	0.76	AN24
	M125×2	82	11	86	23222BK ;**AHX 3222**	122	—	—	188	2	1.04	AN25
	M120×2	63	12	67	21322K ;**AHX 322**	124	—	—	226	2.5	0.663	AN24
	M125×2	98	16	102	22322BK ;**AHX 2322**	124	—	—	226	2.5	1.35	AN25
115	M130×2	60	13	64	23024BK ;**AHX 3024**	130	—	—	170	2	0.75	AN26
	M125×2	73	13	82	24024BK30 ;**AH 24024**	130	—	—	170	2	0.65	AN25
	M125×2	73	13	82	24024CK30 ;**AH 24024**	130	—	—	170	2	0.65	AN25
	M130×2	75	12	79	23124BK ;**AHX 3124**	130	—	—	190	2	0.95	AN26

1) Standard thread shapes and dimensions are as per **JIS B0207** (metric thread).
2) Indicates reference dimensions before attachment of withdrawal sleeve.
3) Indicates withdrawal sleeve mass.
4) Indicates number of nut to be used at time of disassembly. See pages **C-2 to C-10** for nut dimensions.
Note: 1. Please refer to page **B-224, B-227** for bearing dimensions, rated loads, and mass.

Withdrawal Sleeves

NTN

(For spherical roller bearings)



d_1 115 ~ 150mm

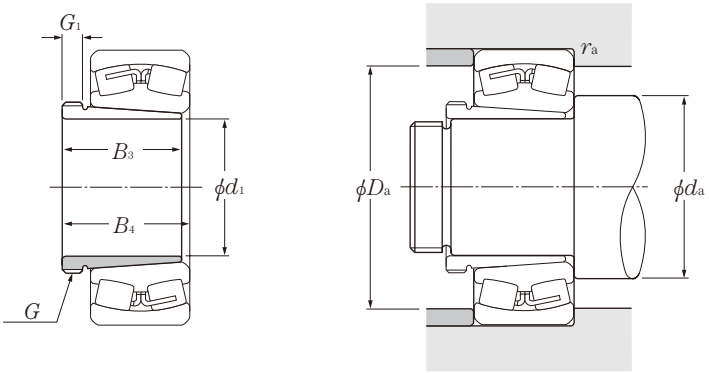
Boundary dimensions mm					Bearing numbers	Abutment and fillet dimensions mm			Mass[3] kg	Appro-priate nut no.[4]
d_1	thread[1] G	B_3	G_1	B_4[2]		d_a min	D_a max	r_{as} max	(approx.)	
115	M130×2	93	13	102	24124BK30 ; **AH 24124**	130	190	2	1	AN26
	M130×2	75	12	79	22224BK ; **AHX 3124**	132	203	2	0.95	AN26
	M135×2	90	13	94	23224BK ; **AHX 3224**	132	203	2	1.3	AN27
	M135×2	105	17	109	22324BK ; **AHX 2324**	134	246	2.5	1.6	AN27
125	M140×2	67	14	71	23026BK ; **AHX 3026**	140	190	2	0.93	AN28
	M135×2	83	14	93	24026BK30 ; **AH 24026**	140	190	2	0.84	AN27
	M135×2	83	14	93	24026CK30 ; **AH 24026**	140	190	2	0.84	AN27
	M140×2	78	12	82	23126BK ; **AHX 3126**	140	200	2	1.08	AN28
	M140×2	94	14	104	24126BK30 ; **AH 24126**	140	200	2	1.11	AN28
	M140×2	78	12	82	22226BK ; **AHX 3126**	144	216	2.5	1.08	AN28
	M145×2	98	15	102	23226BK ; **AHX 3226**	144	216	2.5	1.58	AN29
	M145×2	115	19	119	22326BK ; **AHX 2326**	148	262	3	1.97	AN29
135	M150×2	68	14	73	23028BK ; **AHX 3028**	150	200	2	1.01	AN30
	M145×2	83	14	93	24028BK30 ; **AH 24028**	150	200	2	0.91	AN29
	M145×2	83	14	93	24028CK30 ; **AH 24028**	150	200	2	0.91	AN29
	M150×2	83	14	88	23128BK ; **AHX 3128**	152	213	2	1.28	AN30
	M150×2	99	14	109	24128BK30 ; **AH 24128**	152	213	2	1.25	AN30
	M150×2	83	14	88	22228BK ; **AHX 3128**	154	236	2.5	1.28	AN30
	M155×3	104	15	109	23228BK ; **AHX 3228**	154	236	2.5	1.84	AN31
	M155×3	125	20	130	22328BK ; **AHX 2328**	158	282	3	2.33	AN31
145	M160×3	72	15	77	23030BK ; **AHX 3030**	162	213	2	1.15	AN32
	M155×3	90	15	101	24030BK30 ; **AH 24030**	162	213	2	1.04	AN31
	M155×3	90	15	101	24030CK30 ; **AH 24030**	162	213	2	1.04	AN31
	M165×3	96	15	101	23130BK ; **AHX 3130**	162	238	2	1.79	AN33
	M160×3	115	15	126	24130BK30 ; **AH 24130**	162	238	2	1.56	AN32
	M165×3	96	15	101	22230BK ; **AHX 3130**	164	256	2.5	1.79	AN33
	M165×3	114	17	119	23230BK ; **AHX 3230**	164	256	2.5	2.22	AN33
	M165×3	135	24	140	22330BK ; **AHX 2330**	168	302	3	2.82	AN33
150	M170×3	77	16	82	23032BK ; **AH 3032**	172	228	2	2.06	AN34
	M170×3	95	15	106	24032BK30 ; **AH 24032**	172	228	2	2.33	AN34
	M170×3	95	15	106	24032CK30 ; **AH 24032**	172	228	2	2.33	AN34
	M180×3	103	16	108	23132BK ; **AH 3132**	172	258	2	3.21	AN36

1) Standard thread shapes and dimensions are as per **JIS B0207** (metric thread).
2) Indicates reference dimensions before attachment of withdrawal sleeve.
3) ndicates withdrawal sleeve mass.
4) Indicates number of nut to be used at time of disassembly. See pages **C-2 to C-10** for nut dimensions.
Note: 1. Please refer to page **B-226, B-229** for bearing dimensions, rated loads, and mass.

Withdrawal Sleeves

NTN

(For spherical roller bearings)



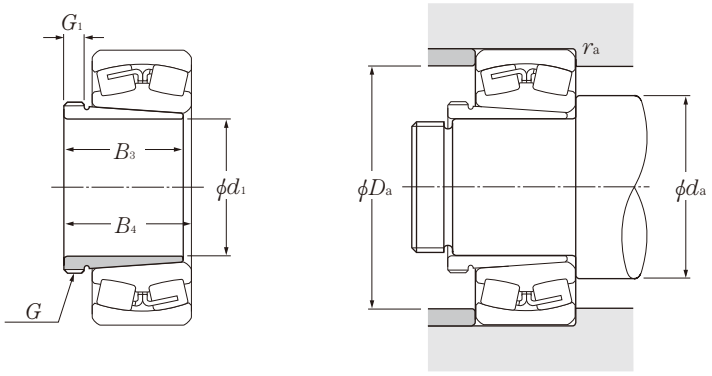
d_1 150 ~ 190mm

d_1	Boundary dimensions mm thread[1] G	B_3	G_1	B_4[2]	Bearing numbers	Abutment and fillet dimensions mm d_a min	D_a max	r_{as} max	Mass[3] kg (approx.)	Appro-priate nut no.[4]
150	M170×3	124	15	135	24132BK30 ;**AH 24132**	172	258	2	3	AN34
	M180×3	103	16	108	22232BK ;**AH 3132**	174	276	2.5	3.21	AN36
	M180×3	124	20	130	23232BK ;**AH 3232**	174	276	2.5	4.08	AN36
	M180×3	140	24	146	22332BK ;**AH 2332**	178	322	3	4.72	AN36
160	M180×3	85	17	90	23034BK ;**AH 3034**	182	248	2	2.43	AN36
	M180×3	106	16	117	24034BK30 ;**AH 24034**	182	248	2	2.8	AN36
	M180×3	106	16	117	24034CK30 ;**AH 24034**	182	248	2	2.8	AN36
	M190×3	104	16	109	23134BK ;**AH 3134**	182	268	2	3.4	AN38
	M180×3	125	16	136	24134BK30 ;**AH 24134**	182	268	2	3.21	AN36
	M190×3	104	16	109	22234BK ;**AH 3134**	188	292	3	3.4	AN38
	M190×3	134	24	140	23234BK ;**AH 3234**	188	292	3	4.8	AN38
	M190×3	146	24	152	22334BK ;**AH 2334**	188	342	3	5.25	AN38
170	M190×3	92	17	98	23036BK ;**AH 3036**	192	268	2	2.81	AN38
	M190×3	116	16	127	24036BK30 ;**AH 24036**	192	268	2	3.1	AN38
	M190×3	116	16	127	24036CK30 ;**AH 24036**	192	268	2	3.1	AN38
	M200×3	116	19	122	23136BK ;**AH 3136**	194	286	2.5	4.22	AN40
	M190×3	134	16	145	24136BK30 ;**AH 24136**	194	286	2.5	3.68	AN38
	M200×3	105	17	110	22236BK ;**AH 2236**	198	302	3	3.73	AN40
	M200×3	140	24	146	23236BK ;**AH 3236**	198	302	3	5.32	AN40
	M200×3	154	26	160	22336BK ;**AH 2336**	198	362	3	5.83	AN40
180	Tr205×4	96	18	102	23038BK ;**AH 3038**	202	278	2	3.32	HNL41
	M200×3	118	18	131	24038BK30 ;**AH 24038**	202	278	2	3.5	AN40
	M200×3	118	18	131	24038CK30 ;**AH 24038**	202	278	2	3.5	AN40
	Tr210×4	125	20	131	23138BK ;**AH 3138**	204	306	2.5	4.89	HN42
	M200×3	146	18	159	24138BK30 ;**AH 24138**	204	306	2.5	4.28	AN40
	Tr210×4	112	18	117	22238BK ;**AH 2238**	208	322	3	4.25	HN42
	Tr210×4	145	25	152	23238BK ;**AH 3238**	208	322	3	5.9	HN42
	Tr210×4	160	26	167	22338BK ;**AH 2338**	212	378	4	6.63	HN42
190	Tr215×4	102	19	108	23040BK ;**AH 3040**	212	298	2	3.8	HNL43
	Tr210×4	127	18	140	24040BK30 ;**AH 24040**	212	298	2	3.93	HN42
	Tr220×4	134	21	140	23140BK ;**AH 3140**	214	326	2.5	5.49	HN44
	Tr210×4	158	18	171	24140BK30 ;**AH 24140**	214	326	2.5	5.1	HN42

1) Standard thread shapes and dimensions are as per **JIS B0207** (metric thread).
2) Indicates reference dimensions before attachment of withdrawal sleeve.
3) Indicates withdrawal sleeve mass.
4) Indicates number of nut to be used at time of disassembly. See pages **C-2 to C-10** for nut dimensions.
Note: 1. Please refer to page **B-228, B-231** for bearing dimensions, rated loads, and mass.

Withdrawal Sleeves

(For spherical roller bearings)



d_1 190 ~ 260mm

d_1	Boundary dimensions mm thread[1] G	B_3	G_1	B_4[2]	Bearing numbers	Abutment and fillet dimensions mm d_a min	D_a max	r_{as} max	Mass[3] kg (approx.)	Appro-priate nut no.[4]
190	Tr220×4	118	19	123	22240BK ;**AH 2240**	218	342	3	4.68	HN44
	Tr220×4	153	25	160	23240BK ;**AH 3240**	218	342	3	6.68	HN44
	Tr220×4	170	30	177	22340BK ;**AH 2340**	222	398	4	7.54	HN44
200	Tr235×4	111	20	117	23044BK ;**AH 3044**	234	326	2.5	7.4	HNL47
	Tr230×4	138	20	152	24044BK30 ;**AH 24044H**	234	326	2.5	8.25	HN46
	Tr240×4	145	23	151	23144BK ;**AH 3144**	238	352	3	10.4	HN48
	Tr230×4	170	20	184	24144BK30 ;**AH 24144H**	238	352	3	10.2	HN46
	Tr240×4	130	20	136	22244BK ;**AH 2244**	238	382	3	9.1	HN48
	Tr240×4	181	30	189	23244BK ;**AH 2344**	238	382	3	13.5	HN48
	Tr240×4	181	30	189	22344BK ;**AH 2344**	242	438	4	13.5	HN48
220	Tr260×4	116	21	123	23048BK ;**AH 3048**	254	346	2.5	8.75	HNL52
	Tr250×4	138	20	153	24048BK30 ;**AH 24048H**	254	346	2.5	8.98	HN50
	Tr260×4	154	25	161	23148BK ;**AH 3148**	258	382	3	12	HN52
	Tr260×4	180	20	195	24148BK30 ;**AH 24148H**	258	382	3	12.5	HN52
	Tr260×4	144	21	150	22248BK ;**AH 2248**	258	422	3	11.1	HN52
	Tr260×4	189	30	197	23248BK ;**AH 2348**	258	422	3	15.5	HN52
	Tr260×4	189	30	197	22348BK ;**AH 2348**	262	478	4	15.5	HN52
240	Tr280×4	128	23	135	23052BK ;**AH 3052**	278	382	3	10.7	HNL56
	Tr270×4	162	22	178	24052BK30 ;**AH 24052**	278	382	3	11.8	HN54
	Tr290×4	172	26	179	23152BK ;**AH 3152**	278	422	3	16.2	HN58
	Tr280×4	202	22	218	24152BK30 ;**AH 24152H**	278	422	3	15.4	HN56
	Tr290×4	155	23	161	22252BK ;**AH 2252**	282	458	4	14	HN58
	Tr290×4	205	30	213	23252BK ;**AH 2352**	282	458	4	19.6	HN58
	Tr290×4	205	30	213	22352BK ;**AH 2352**	288	512	5	19.6	HN58
260	Tr300×4	131	24	139	23056BK ;**AH 3056**	298	402	3	12	HNL60
	Tr290×4	162	22	179	24056BK30 ;**AH 24056H**	298	402	3	12.8	HN58
	Tr310×5	175	28	183	23156BK ;**AH 3156**	302	438	4	17.5	HN62
	Tr300×4	202	22	219	24156BK30 ;**AH 24156H**	302	438	4	16.3	HN60
	Tr310×5	155	24	163	22256BK ;**AH 2256**	302	478	4	15.2	HN62
	Tr310×5	212	30	220	23256BK ;**AH 2356**	302	478	4	21.6	HN62
	Tr310×5	212	30	220	22356BK ;**AH 2356**	308	552	5	21.6	HN62

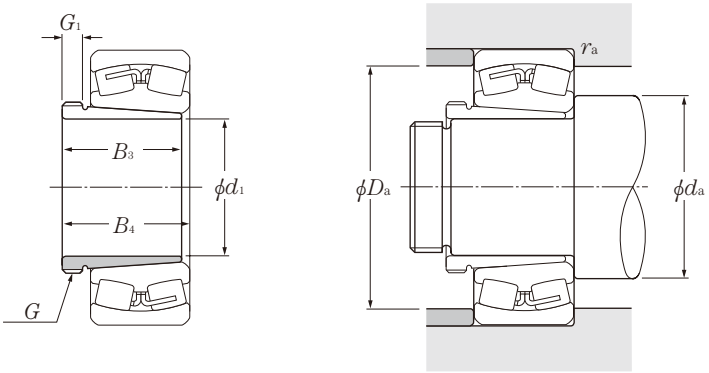
1) Standard thread shapes and dimensions are as per **JIS B0207** (metric thread).
2) Indicates reference dimensions before attachment of withdrawal sleeve.
3) Indicates withdrawal sleeve mass.
4) Indicates number of nut to be used at time of disassembly. See pages **C-2 to C-10** for nut dimensions.

Note: 1. Please refer to page **B-230, B-233** for bearing dimensions, rated loads, and mass.
2. Withdrawal sleeve numbers appended with the suffix "**H**" signify high pressure oil (hydraulic) design. (See page **B-213**)

Withdrawal Sleeves

NTN

(For spherical roller bearings)



d_1 280 ~ 400mm

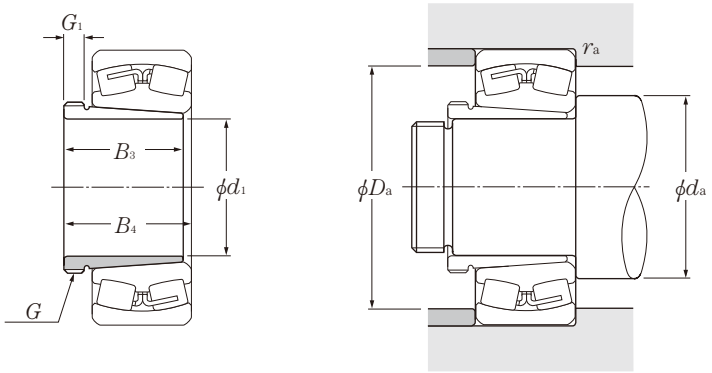
d_1	Boundary dimensions mm thread[1] G	B_3	G_1	B_4[2]	Bearing numbers	Abutment and fillet dimensions mm d_a min	D_a max	r_{as} max	Mass[3] kg (approx.)	Appro-priate nut no.[4]
280	Tr320×5	145	26	153	23060BK ;**AH 3060**	318	442	3	14.4	HNL64
	Tr310×5	184	24	202	24060BK30 ;**AH 24060H**	318	442	3	15.5	HN62
	Tr330×5	192	30	200	23160BK ;**AH 3160**	322	478	4	20.8	HN66
	Tr320×5	224	24	242	24160BK30 ;**AH 24160H**	322	478	4	19.5	HN64
	Tr330×5	170	26	178	22260B ;**AH 2260**	322	518	4	18.1	HN66
	Tr330×5	228	34	236	23260BK ;**AH 3260**	322	518	4	26	HN66
300	Tr345×5	149	27	157	23064BK ;**AH 3064**	338	462	3	16	HNL69
	Tr330×5	184	24	202	24064BK30 ;**AH 24064H**	338	462	3	16.6	HN66
	Tr350×5	209	31	217	23164BK ;**AH 3164**	342	518	4	24.5	HN70
	Tr340×5	242	24	260	24164BK30 ;**AH 24164H**	342	518	4	21.4	HN68
	Tr350×5	180	27	190	22264BK ;**AH 2264**	342	558	4	20.2	HN70
	Tr350×5	246	36	254	23264BK ;**AH 3264**	342	558	4	30.6	HN70
320	Tr365×5	162	28	171	23068BK ;**AH 3068**	362	498	4	19.5	HN73
	Tr360×5	206	26	225	24068BK30 ;**AH 24068H**	362	498	4	21.7	HNL72
	Tr370×5	225	33	234	23168BK ;**AH 3168**	362	558	4	29	HN74
	Tr360×5	269	26	288	24168BK30 ;**AH 24168H**	362	558	4	27.1	HN72
340	Tr385×5	167	30	176	23072BK ;**AH 3072**	382	518	4	21	HNL77
	Tr380×5	206	26	226	24072BK30 ;**AH 24072H**	382	518	4	22.7	HNL76
	Tr400×5	229	35	238	23172BK ;**AH 3172**	382	578	4	33	HN80
	Tr380×5	269	26	289	24172BK30 ;**AH 24172H**	382	578	4	29.6	HN76
360	Tr410×5	170	31	180	23076BK ;**AH 3076**	402	538	4	23.2	HNL82
	Tr400×5	208	28	228	24076BK30 ;**AH 24076H**	402	538	4	23.7	HNL80
	Tr420×5	232	36	242	23176BK ;**AH 3176**	402	598	4	35.7	HN84
	Tr400×5	271	28	291	24176BK30 ;**AH 24176H**	402	598	4	31.3	HN80
380	Tr430×5	183	33	193	23080BK ;**AH 3080**	422	578	4	27.3	HNL86
	Tr420×5	228	28	248	24080BK30 ;**AH 24080H**	422	578	4	27.1	HNL84
	Tr440×5	240	38	250	23180BK ;**AH 3180**	428	622	5	39.5	HN88
	Tr420×5	278	28	298	24180BK30 ;**AH 24180H**	428	622	5	34.4	HN84
400	Tr450×5	186	34	196	23084BK ;**AH 3084**	442	598	4	29	HNL90
	Tr440×5	230	30	252	24084BK30 ;**AH 24084H**	442	598	4	29	HNL88

1) Standard thread shapes and dimensions are as per **JIS B0207** (metric thread).
2) Indicates reference dimensions before attachment of withdrawal sleeve.
3) Indicates withdrawal sleeve mass.
4) Indicates number of nut to be used at time of disassembly. See pages **C-2 to C-10** for nut dimensions.
Note: 1. Please refer to page **B-232, B-235** for bearing dimensions, rated loads, and mass.
2. Withdrawal sleeve numbers appended with the suffix "**H**" signify high pressure oil (hydraulic) design. (See page **B-221**)

Withdrawal Sleeves

NTN

(For spherical roller bearings)



d_1 400 ~ 480mm

Boundary dimensions mm					Bearing numbers	Abutment and fillet dimensions mm			Mass[3] kg	Appro-priate nut no.[4]
d_1	thread[1] G	B_3	G_1	B_4[2]		d_a min	D_a max	r_{as} max	(approx.)	
400	Tr460×5	266	40	276	23184BK ; **AH 3184**	448	672	5	46.5	HN92
	Tr440×5	310	30	332	24184BK30 ; **AH 24184H**	448	672	5	40.3	HN88
420	Tr470×5	194	35	205	23088BK ; **AHX 3088**	468	622	5	32	HNL94
	Tr460×5	242	30	264	24088BK30 ; **AH 24088H**	468	622	5	31.9	HNL92
	Tr480×5	270	42	281	23188BK ; **AHX 3188**	468	692	5	49.8	HN96
440	Tr460×5	310	30	332	24188BK30 ; **AH 24188H**	468	692	5	42.3	HN92
	Tr490×5	202	37	213	23092BK ; **AHX 3092**	488	652	5	35.2	HNL98
	Tr480×5	250	32	273	24092BK30 ; **AH 24092H**	488	652	5	34.7	HNL96
	Tr510×6	285	43	296	23192BK ; **AHX 3192**	496	724	6	57.9	HN102
	Tr480×5	332	32	355	24192BK30 ; **AH 24192H**	496	724	6	47.6	HN96
460	Tr520×6	205	38	217	23096BK ; **AHX 3096**	508	672	5	39.2	HNL104
	Tr500×5	250	32	273	24096BK30 ; **AH 24096H**	508	672	5	36.6	HNL100
	Tr530×6	295	45	307	23196BK ; **AHX 3196**	516	754	6	63.1	HN106
	Tr500×5	340	32	363	24196BK30 ; **AH 24196H**	516	754	6	52.6	HN100
480	Tr540×6	209	40	221	230/500BK ; **AHX 30/500**	528	692	5	42.5	HNL108
	Tr530×6	253	35	276	240/500BK30 ; **AH 240/500H**	528	692	5	43.9	HNL106
	Tr550×6	313	47	325	231/500BK ; **AHX 31/500**	536	794	6	70.9	HN110
	Tr530×6	360	35	383	241/500BK30 ; **AH 241/500H**	536	794	6	59	HN106

1) Standard thread shapes and dimensions are as per **JIS B0207** (metric thread).
2) Indicates reference dimensions before attachment of withdrawal sleeve.
3) Indicates withdrawal sleeve mass.
4) Indicates number of nut to be used at time of disassembly. See pages **C-2 to C-10** for nut dimensions.
Note: 1. Please refer to page **B-234, B-237** for bearing dimensions, rated loads, and mass.
2. Withdrawal sleeve numbers appended with the suffix "**H**" signify high pressure oil (hydraulic) design. (See page **B-213**)