



Single direction thrust ball bearings



Double direction angular contact thrust ball bearings



High speed / axial load duplex angular contact thrust ball bearings



Spherical roller thrust bearings

These bearings are designed primarily to support axial loads at contact angles between 30° and 90°. Just as with radial bearings, these bearings differ according to the type of rolling element they use: there are thrust ball bearings that use balls and thrust roller bearings that use rollers.

The configuration and characteristics of each type of bearing are given.

With thrust bearings, it is necessary to supply an axial preload in order to prevent slipping movement between the bearing's rolling elements and raceways. For more detailed information on this point, please refer to the material concerning bearing preload on page A-62.

1. Single direction thrust ball bearings

As shown in **Diagram 1**, the steel balls of single direction thrust ball bearings are arranged between a pair of shaft housing washers (bearing shaft washer and housing shaft washer), and the normal contact angle is 90°. Axial loads can

be supported in only one direction, radial loads can not be accommodated, therefore these bearings are unsuitable for high speed operation.

Table 1 lists the standard cage types for single direction thrust ball bearings.

2. Angular contact thrust ball bearings

Angular contact thrust ball bearings are high precision bearings which are widely used to handle axial loads from machine tool main shafts. These bearings come in a number of varieties including double direction angular contact thrust ball bearings (series 5629 and 5620), and high speed / axial load duplex angular contact thrust ball bearings (HTA series).

These bearings have the same bore diameter and outer diameter as double row cylindrical roller bearings (series NN30, NN49, and NNU49) and can be arranged for use together. **Table 2** shows the construction and characteristics of these various bearings.

Table 1 Standard cage types for single direction thrust ball bearings

Bearing series	511	512	513	514
Molded resin cage	51100 ~ 51107	51200 ~ 51207	-	-
Pressed cage	51108 ~ 51152	51208 ~ 51224	51305 ~ 51320	51405 ~ 51415
Machined cage	51156 ~ 511/530	51226 ~ 51260	51322 ~ 51340	51416 ~ 51420

Note: Due to their material properties, molded resin cages can not be used in applications where temperatures exceed 120°C.

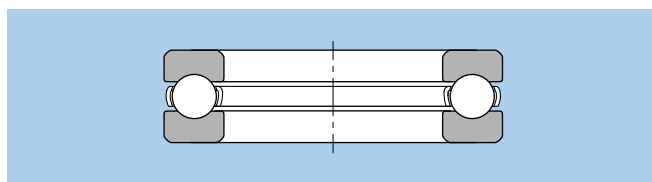


Diagram 1. Single direction thrust ball bearing (with pressed cage)



Table 2 Angular contact thrust ball bearing construction and characteristics

Bearing no.	Double direction angular contact thrust bearing	High speed / axial load duplex angular contact thrust ball bearing
Bearing series	Series 5629, 5620	HTA, DB series
Bearing construction		
Initial contact angle	60°	40°, 30°
Standard cage type	Machined cage	Molded resin cage, Machined cage
Characteristics	<ul style="list-style-type: none"> • 5629 is used in combination with NN (NNU) 49 and 5620 with NN30. • High axial direction rigidity; can support axial loads in either direction • Unsuitable for vertical shafts • Oil inlet and oil groove dimensions listed in dimension charts 	<ul style="list-style-type: none"> • HTA9, DB can be arranged and used with NN (NNU) 49; HTA0, DB can be arranged and used with NN30 • Bearing outer diameter dimension same as double direction angular contact thrust ball bearings minus tolerances (suffix code: L); can only support axial loads • Axial rigidity is less than that of high-speed duplex angular contact ball bearings (for axial loads). • Allowable axial load should be regulated to approx. 1/6 of the rated basic static load
Bearing accuracy	See Table 6.9 on p. A-41	See Table 3
Standard preload	See Table 5	
Interchangeability	<p>Double direction angular contact thrust ball bearing Series 5629 Series 5620</p>	<p>High speed / axial load duplex angular contact thrust ball bearing HTA9DB series HTA0DB series</p> <p>Because dimension $A = \text{dimension } 2B$, it is necessary to change the washer dimension.</p>

For more details about these bearings, please refer to the **NTN** machine tool precision bearing catalog.

Table 3 Standard cages for duplex angular contact ball bearings for high-speed axial loads

Bearing series	HTA 9	HTA 0
Formed resin cage	-	HTA 010 ~ HTA 032
Machined cage	HTA 920 ~ HTA 964	HTA 005 ~ HTA 009 HTA 034 ~ HTA 064

Table 4 Tolerance of high speed / axial load duplex angular contact thrust ball bearings

Table 4.1 Inner rings

Units μm

Nominal bore dia. d mm over up to/incl.	Dimensional tolerance of mean bore diameter within plane Δ_{dmp}				Bore diameter variation V_{dp}				Dimensional tolerance of mean inside diameter within plane V_{dmp}		Side runout with bore S_d		Axial runout S_a		Tolerance of combination width Δ_{fs}		Width variation V_{fs}			
	Class 5		Class 4		Diameter series 9		Diameter series 0		Class 5		Class 4		Class 5		Class 4		Class 5		Class 4	
	High	Low	High	Low	Class 5	Class 4	Class 5	Class 4	Class 5	Class 4	Class 5	Class 4	Class 5	Class 4	Class 5	Class 4	Class 5	Class 4	Class 5	Class 4
	Max		Max		Max		Max		Max		Max		Max		Max		Max		Max	
18 30	0	-6	0	-5	6	5	5	4	3	2.5	8	4	5	3	0	-240	5	2.5		
30 50	0	-8	0	-6	8	6	6	5	4	3	8	4	5	3	0	-240	5	3		
50 80	0	-9	0	-7	9	7	7	5	5	3.5	8	5	6	5	0	-300	6	4		
80 120	0	-10	0	-8	10	8	8	6	5	4	9	5	6	5	0	-400	7	4		
120 150	0	-13	0	-10	13	10	10	8	7	5	10	6	8	6	0	-500	8	5		
150 180	0	-13	0	-10	13	10	10	8	7	5	10	6	8	6	0	-500	8	5		
180 250	0	-15	0	-12	15	12	12	9	8	6	11	7	8	6	0	-600	10	6		
250 315	0	-18	0	-14	18	14	14	11	9	8	13	8	10	8	0	-700	13	8		
315 400	0	-23	0	-16	23	17	18	12	12	9	15	10	13	10	0	-800	15	10		

① The allowable deviation of single bore diameter deviation Δ_{fs} is identical to the allowable deviation of the single plane mean bore diameter deviation.

Table 4.2 Outer ring

Units μm

Nominal outside dia. D mm over up to/incl.	Dimensional tolerance of mean bore diameter Δ_{Dmp} within plane and outer diameter tolerance Δ_{Ds}		Axial runout S_{ea}		Width variation V_{cs}	
	Class 5	Class 4	Class 5	Class 4	Class 5	Class 4
	High	Low	Max		Max	
30 50	-25	-36	8	5	5	2.5
50 80	-30	-43	10	5	6	3
80 120	-36	-51	11	6	8	4
120 150	-43	-61	13	7	8	5
150 180	-43	-61	14	8	8	5
180 250	-50	-70	15	10	10	7
250 315	-56	-79	18	10	11	7
315 400	-62	-87	20	13	13	8
400 500	-68	-95	23	15	15	10

Note: 1. These standards are NTN standards.
2. Bearing which use these accuracies should be appended with the accuracies code L.
(Example: HTA 020 DB / GNP 4L)



Table 4 Standard preload

Units N { kgf }

Bore dia. no	5629		5620		HTA9DB		HTA0DB		HTA0ADB	
	Normal preload GN	Medium preload GM	Normal preload GN	Medium preload GM	Normal preload GN	Medium preload GM	Normal preload GN	Medium preload GM	Normal preload GN	Medium preload GM
05			294{ 30 }	685{ 70 }			390	685	147	294
06							{ 40 }	{ 70 }	{ 15 }	{ 30 }
07			490	785					294	590
08			{ 50 }	{ 80 }					{ 30 }	{ 60 }
09							685	1,270		
10							{ 70 }	{ 130 }		
11			980	1,670					490	885
12			{ 100 }	{ 170 }					{ 50 }	{ 90 }
13										
14										
15							980	1,570	590	1,470
16			1,470	2,450			{ 100 }	{ 160 }	{ 60 }	{ 150 }
17			{ 150 }	{ 250 }				1,960		
18								{ 200 }		
19							1,470	2,450	885	1,960
20							{ 150 }	{ 250 }	{ 90 }	{ 200 }
21	1,470	2,450			980	1,670				
22	{ 150 }	{ 250 }			{ 100 }	{ 170 }			980	2,450
24							1,960	3,450	{ 100 }	{ 250 }
26			1,960	3,250	1,270	2,450	{ 200 }	{ 350 }		
28			{ 200 }	{ 330 }	{ 130 }	{ 250 }			2,940	5,400
30	1,960	2,940					{ 300 }	{ 550 }	{ 150 }	{ 350 }
32	{ 200 }	{ 300 }			1,960	3,450				
34					{ 200 }	{ 350 }	3,900	7,350	2,450	4,900
36							{ 400 }	{ 750 }	{ 250 }	{ 500 }
38	2,450	3,900	2,450	3,900	3,450	5,900	4,900	9,300		
40	{ 250 }	{ 400 }	{ 250 }	{ 400 }	{ 350 }	{ 600 }	{ 500 }	{ 950 }	3,450	6,850
44					3,900	6,850			{ 350 }	{ 700 }
48	2,940	4,400			{ 400 }	{ 700 }	6,850	12,700		
52	{ 300 }	{ 450 }	2,940	4,400			{ 700 }	{ 1,300 }	3,900	7,850
56			{ 300 }	{ 450 }	4,900	8,850			{ 400 }	{ 800 }
60	3,900	5,900			{ 500 }	{ 900 }	8,850	15,700		
64	{ 400 }	{ 600 }					{ 900 }	{ 1,600 }	5,900	11,800
			3,900	5,900	5,900	11,800	10,800	17,700	{ 600 }	{ 1,200 }
	4,900{ 500 }	7,350{ 750 }	{ 400 }	{ 600 }	{ 600 }	{ 1,200 }	{ 1,100 }	{ 1,800 }		

3. Spherical roller thrust bearings

Just like spherical roller bearings, the center of the spherical surface for spherical roller thrust bearings is the point where the raceway surface of the housing raceway disc meets the center axis of the bearing. Since spherical roller thrust bearings incorporate barrel-shaped rollers as rolling elements, they also have self-aligning properties. (See **Diagram 2**)

Under normal load conditions, the allowable misalignment is 1° to 2°, although this will vary depending upon the bearing's dimension series.

These bearings use machined copper alloy cages and a guide sleeve is attached to the inner ring to guide the cage. The axial load capacity of these bearings is high, and a certain amount of radial load can also be accommodated when the ring is in an axially loaded state. However, it is necessary to operate these bearings where the load condition meet $F_r/F_a \leq 0.55$.

These bearings have some spots where lubricant cannot enter such as the gap between the cage and guide sleeve. It is necessary to use oil lubrication even in low speed operation.

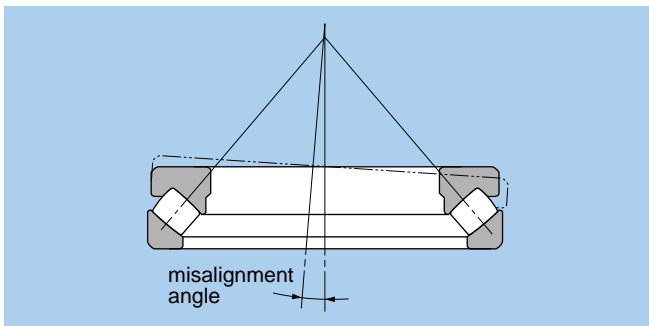


Diagram 2. Spherical roller thrust bearings

4. Cylindrical roller thrust bearings

Thrust bearings incorporating cylindrical rollers are available in single row, double row, triple row, and four row varieties. (See **Diagram 3**) NTN Engineering offers the 811, 812 and 893 series of standard series bearings that conform to dimension series 11, 12 and 93 prescribed in JIS, as well as other special dimensions.

Cylindrical roller thrust bearings are able to receive axial loads only, and have high axial rigidity which makes them well suited for heavy axial loads. Needle roller bearing information for series 811, 812, and 893 is also listed in the dimension tables.

Furthermore, bearings with dimensions not listed in the dimension tables are also manufactured. Contact NTN Engineering for more information.

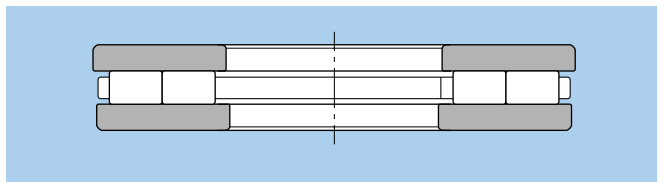


Diagram 3. Double row cylindrical roller thrust bearings

5. Tapered roller thrust bearings

Although not listed in the dimension tables, tapered roller bearings like those in **Diagram 4** are also manufactured. Contact NTN Engineering for more detailed information.

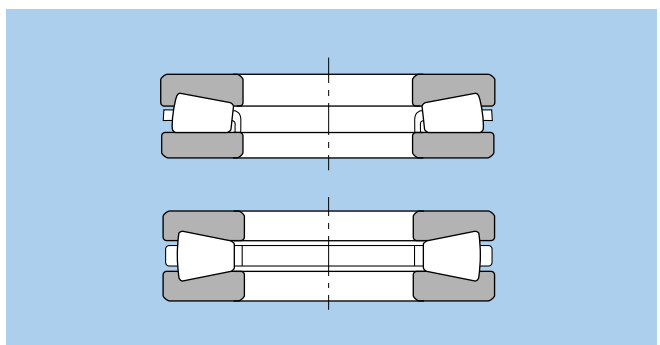
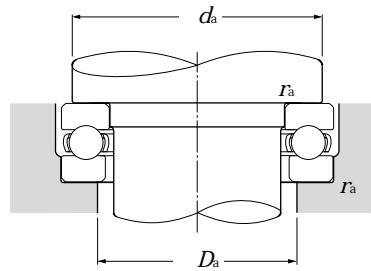
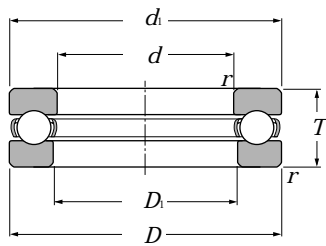


Diagram 4. Tapered roller thrust bearings



Single Direction Thrust Ball Bearings



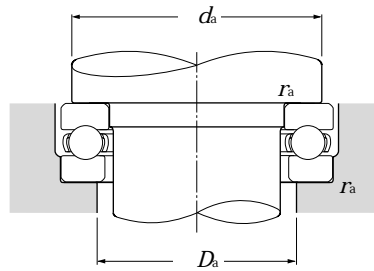
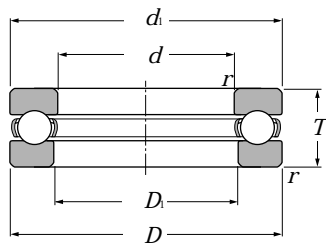
Equivalent bearing load
dynamic
 $P_a = F_a$
static
 $P_{0a} = F_a$

d 10 ~ 50mm

	Boundary dimensions			Basic load ratings				Limiting speeds		Bearing numbers	Dimensions		Abutment and fillet dimensions			Mass kg (approx.)
	mm			dynamic kN	static kN	dynamic kgf	static kgf	grease	oil		mm		mm	mm	mm	
<i>d</i>	<i>D</i>	<i>T</i>	<i>r</i> _{s min} ¹⁾	<i>C</i> _a	<i>C</i> _{0a}	<i>C</i> _a	<i>C</i> _{0a}				<i>d</i> _{s max} ²⁾	<i>D</i> _{s min} ³⁾	<i>d</i> _a min	<i>D</i> _a max	<i>r</i> _{as} max	
10	24	9	0.3	10.0	14.0	1 020	1 420	6 700	9 500	51100	24	11	18	16	0.3	0.021
	26	11	0.6	12.7	17.1	1 290	1 740	5 800	8 300	51200	26	12	20	16	0.6	0.03
12	26	9	0.3	10.3	15.4	1 050	1 570	6 400	9 200	51101	26	13	20	18	0.3	0.023
	28	11	0.6	13.2	19.0	1 340	1 940	5 600	8 000	51201	28	14	22	18	0.6	0.034
15	28	9	0.3	10.5	16.8	1 070	1 710	6 200	8 800	51102	28	16	23	20	0.3	0.024
	32	12	0.6	16.6	24.8	1 690	2 530	5 000	7 100	51202	32	17	25	22	0.6	0.046
17	30	9	0.3	10.8	18.2	1 100	1 850	6 000	8 500	51103	30	18	25	22	0.3	0.026
	35	12	0.6	17.2	27.3	1 750	2 780	4 800	6 800	51203	35	19	28	24	0.6	0.054
20	35	10	0.3	14.2	24.7	1 450	2 520	5 200	7 500	51104	35	21	29	26	0.3	0.04
	40	14	0.6	22.3	37.5	2 270	3 850	4 100	5 900	51204	40	22	32	28	0.6	0.081
25	42	11	0.6	19.6	37.0	1 990	3 800	4 600	6 500	51105	42	26	35	32	0.6	0.06
	47	15	0.6	27.8	50.5	2 830	5 150	3 700	5 300	51205	47	27	38	34	0.6	0.111
	52	18	1	35.5	61.5	3 650	6 250	3 200	4 600	51305	52	27	41	36	1	0.176
	60	24	1	55.5	89.5	5 650	9 100	2 600	3 700	51405	60	27	46	39	1	0.33
30	47	11	0.6	20.4	42.0	2 080	4 300	4 300	6 200	51106	47	32	40	37	0.6	0.069
	52	16	0.6	29.3	58.0	2 990	5 950	3 400	4 900	51206	52	32	43	39	0.6	0.139
	60	21	1	43.0	78.5	4 350	8 000	2 800	3 900	51306	60	32	48	42	1	0.269
	70	28	1	72.5	126	7 400	12 800	2 200	3 200	51406	70	32	54	46	1	0.516
35	52	12	0.6	20.4	44.5	2 080	4 550	3 900	5 600	51107	52	37	45	42	0.6	0.085
	62	18	1	39.0	78.0	4 000	7 950	2 900	4 200	51207	62	37	51	46	1	0.215
	68	24	1	55.5	105	5 650	10 700	2 400	3 500	51307	68	37	55	48	1	0.383
	80	32	1.1	87.0	155	8 850	15 800	1 900	2 800	51407	80	37	62	53	1	0.759
40	60	13	0.6	26.9	63.0	2 740	6 400	3 500	5 000	51108	60	42	52	48	0.6	0.125
	68	19	1	47.0	98.5	4 800	10 000	2 700	3 900	51208	68	42	57	51	1	0.276
	78	26	1	69.0	135	7 050	13 700	2 200	3 100	51308	78	42	63	55	1	0.548
	90	36	1.1	112	205	11 500	20 900	1 700	2 500	51408	90	42	70	60	1	1.08
45	65	14	0.6	27.9	69.0	2 840	7 050	3 200	4 600	51109	65	47	57	53	0.6	0.148
	73	20	1	48.0	105	4 850	10 700	2 600	3 700	51209	73	47	62	56	1	0.317
	85	28	1	80.0	163	8 150	16 700	2 000	2 900	51309	85	47	69	61	1	0.684
	100	39	1.1	130	242	13 200	24 700	1 600	2 200	51409	100	47	78	67	1	1.43
50	70	14	0.6	28.8	75.5	2 930	7 700	3 100	4 500	51110	70	52	62	58	0.6	0.161
	78	22	1	48.5	111	4 950	11 400	2 400	3 400	51210	78	52	67	61	1	0.378

1) Smallest allowable dimension for chamfer dimension *r*. 2) Maximum allowable dimension for shaft washer outer dimension *d*.
 3) Smallest allowable dimension for housing washer inner dimension *D*.

Single Direction Thrust Ball Bearings



Equivalent bearing load

dynamic

$$P_a = F_a$$

static

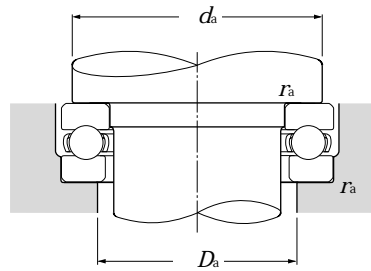
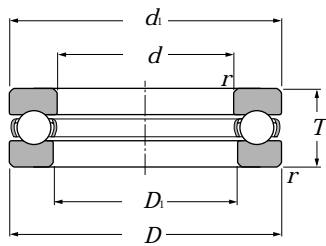
$$P_{0a} = F_a$$

d 50 ~ 90 mm

	Boundary dimensions			Basic load ratings				Limiting speeds		Bearing numbers	Dimensions		Abutment and fillet dimensions			Mass kg (approx.)
	mm			dynamic kN		static kgf		min ⁻¹			mm		mm			
<i>d</i>	<i>D</i>	<i>T</i>	<i>r</i> _{1s min¹}	<i>C_a</i>	<i>C_{0a}</i>	<i>C_a</i>	<i>C_{0a}</i>	grease	oil	<i>d</i> _{1s max²}	<i>D</i> _{1s min³}	<i>d_a</i> min	<i>D_a</i> max	<i>r_{as}</i> max		
50	95	31	1.1	96.5	202	9 850	20 600	1 800	2 600	51310 51410A	95	52	77	68	1	0.951
	110	43	1.5	148	283	15 100	28 800	1 400	2 000		110	52	86	74	1.5	1.9
55	78	16	0.6	35.0	93.0	3 550	9 500	2 800	4 000	51111 51211 51311 51411	78	57	69	64	0.6	0.226
	90	25	1	69.5	159	7 100	16 200	2 100	3 000		90	57	76	69	1	0.608
	105	35	1.1	119	246	12 200	25 100	1 600	2 300		105	57	85	75	1	1.29
	120	48	1.5	178	360	18 200	36 500	1 300	1 800		120	57	94	81	1.5	2.52
60	85	17	1	41.5	113	4 200	11 500	2 600	3 700	51112 51212 51312 51412	85	62	75	70	1	0.296
	95	26	1	73.5	179	7 500	18 200	2 000	2 800		95	62	81	74	1	0.676
	110	35	1.1	123	267	12 600	27 200	1 600	2 300		110	62	90	80	1	1.37
	130	51	1.5	214	435	21 800	44 500	1 200	1 700		130	62	102	88	1.5	3.12
65	90	18	1	41.5	117	4 250	12 000	2 400	3 500	51113 51213 51313 51413	90	67	80	75	1	0.338
	100	27	1	75.0	189	7 650	19 200	1 900	2 700		100	67	86	79	1	0.767
	115	36	1.1	128	287	13 000	29 300	1 500	2 200		115	67	95	85	1	1.51
	140	56	2	232	495	23 600	50 500	1 100	1 600		140	68	110	95	2	3.96
70	95	18	1	43.0	127	4 400	12 900	2 400	3 400	51114 51214 51314 51414	95	72	85	80	1	0.356
	105	27	1	76.0	199	7 750	20 200	1 800	2 600		105	72	91	84	1	0.793
	125	40	1.1	148	340	15 100	34 500	1 400	2 000		125	72	103	92	1	2.01
	150	60	2	250	555	25 500	56 500	1 000	1 500		150	73	118	102	2	4.86
75	100	19	1	44.5	136	4 550	13 900	2 200	3 200	51115 51215 51315 51415	100	77	90	85	1	0.399
	110	27	1	77.5	209	7 900	21 300	1 800	2 600		110	77	96	89	1	0.874
	135	44	1.5	171	395	17 400	40 500	1 300	1 800		135	77	111	99	1.5	2.61
	160	65	2	269	615	27 400	63 000	940	1 400		160	78	125	110	2	5.97
80	105	19	1	44.5	141	4 550	14 400	2 200	3 100	51116 51216 51316 51416	105	82	95	90	1	0.422
	115	28	1	78.5	218	8 000	22 300	1 700	2 400		115	82	101	94	1	0.916
	140	44	1.5	176	425	18 000	43 000	1 200	1 800		140	82	116	104	1.5	2.72
	170	68	2.1	270	620	27 500	63 500	890	1 300		170	83	133	117	2	7.77
85	110	19	1	46.0	150	4 700	15 300	2 100	3 000	51117 51217 51317 * 51417	110	87	100	95	1	0.444
	125	31	1	95.5	264	9 700	26 900	1 600	2 200		125	88	109	101	1	1.25
	150	49	1.5	201	490	20 500	50 000	1 100	1 600		150	88	124	111	1.5	3.52
	180	72	2.1	288	685	29 400	70 000	840	1 200		177	88	141	124	2	9.17
90	120	22	1	59.5	190	6 100	19 400	1 900	2 700	51118 51218 51318 * 51418	120	92	108	102	1	0.687
	135	35	1.1	117	325	11 900	33 000	1 400	2 000		135	93	117	108	1	1.7
	155	50	1.5	198	490	20 200	50 000	1 100	1 600		155	93	129	116	1.5	3.74
	190	77	2.1	305	750	31 500	76 500	790	1 100		187	93	149	131	2	11

1) Smallest allowable dimension for chamfer dimension *r*. 2) Maximum allowable dimension for shaft washer outer dimension *d_a*. 3) Smallest allowable dimension for housing washer inner dimension *D_a*. Note: Bearing numbers marked "*" signify bearings where the bearing shaft washer outer diameter is smaller than the housing shaft washer outer diameter. Therefore when using these bearings, it is possible to use the housing bore as is, without providing a ground undercut on the outer diameter section of the bearing shaft washer as shown in the drawing.

Single Direction Thrust Ball Bearings



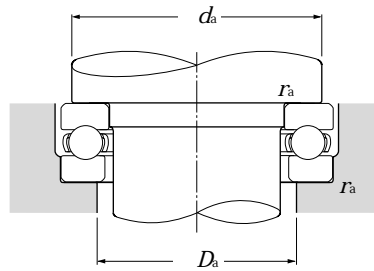
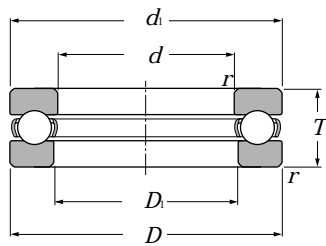
Equivalent bearing load
dynamic
 $P_a = F_a$
static
 $P_{0a} = F_a$

d 100 ~ 200mm

	Boundary dimensions			Basic load ratings				Limiting speeds		Bearing numbers	Dimensions		Abutment and fillet dimensions			Mass kg (approx.)
	mm			dynamic kN	static kN	dynamic kgf	static kgf	grease	oil		mm		mm	mm	mm	
	<i>d</i>	<i>D</i>	<i>T</i>	$r_{s \min}^{1)}$	C_a	C_{0a}	C_a	C_{0a}			$d_{is \max}^{2)}$	$D_{is \min}^{3)}$	d_a min	D_a max	r_{as} max	
100	135	25	1	85.0	268	8 700	27 300	1 700	2 400	51120	135	102	121	114	1	0.987
	150	38	1.1	147	410	14 900	42 000	1 300	1 800	51220	150	103	130	120	1	2.29
	170	55	1.5	237	595	24 100	60 500	990	1 400	51320	170	103	142	128	1.5	4.88
	210	85	3	370	970	37 500	99 000	710	1 000	* 51420	205	103	165	145	2.5	14.7
110	145	25	1	87.0	288	8 900	29 400	1 600	2 300	51122	145	112	131	124	1	1.07
	160	38	1.1	153	450	15 600	46 000	1 200	1 800	51222	160	113	140	130	1	2.46
	190	63	2	267	705	27 300	72 000	870	1 200	* 51322	187	113	158	142	2	7.67
120	155	25	1	89.0	310	9 100	31 500	1 500	2 200	51124	155	122	141	134	1	1.11
	170	39	1.1	154	470	15 700	48 000	1 200	1 700	51224	170	123	150	140	1	2.71
	210	70	2.1	296	805	30 000	82 500	780	1 100	* 51324	205	123	173	157	2	10.8
130	170	30	1	104	350	10 600	36 000	1 300	1 900	51126	170	132	154	146	1	1.73
	190	45	1.5	191	565	19 400	57 500	1 000	1 500	* 51226	187	133	166	154	1.5	4.22
	225	75	2.1	330	960	33 500	97 500	720	1 000	* 51326	220	134	186	169	2	12.7
140	180	31	1	107	375	10 900	38 500	1 300	1 800	* 51128	178	142	164	156	1	1.9
	200	46	1.5	193	595	19 700	60 500	980	1 400	* 51228	197	143	176	164	1.5	4.77
	240	80	2.1	350	1 050	35 500	107 000	670	960	* 51328	235	144	199	181	2	15.3
150	190	31	1	109	400	11 100	41 000	1 200	1 800	* 51130	188	152	174	166	1	2
	215	50	1.5	220	685	22 400	70 000	900	1 300	* 51230	212	153	189	176	1.5	5.87
	250	80	2.1	360	1 130	37 000	115 000	660	940	* 51330	245	154	209	191	2	16.1
160	200	31	1	112	425	11 400	43 500	1 200	1 700	* 51132	198	162	184	176	1	2.1
	225	51	1.5	223	720	22 800	73 000	870	1 200	* 51232	222	163	199	186	1.5	6.32
	270	87	3	450	1 470	45 500	150 000	600	860	* 51332	265	164	225	205	2.5	20.7
170	215	34	1.1	134	510	13 700	52 000	1 100	1 600	* 51134	213	172	197	188	1	2.77
	240	55	1.5	261	835	26 600	85 000	810	1 200	* 51234	237	173	212	198	1.5	7.81
	280	87	3	465	1 570	47 000	160 000	590	840	* 51334	275	174	235	215	2.5	21.6
180	225	34	1.1	135	525	13 700	54 000	1 100	1 500	* 51136	222	183	207	198	1	2.92
	250	56	1.5	266	875	27 100	89 000	780	1 100	* 51236	247	183	222	208	1.5	8.34
	300	95	3	490	1 700	50 000	174 000	540	780	* 51336	295	184	251	229	2.5	27.5
190	240	37	1.1	170	655	17 400	67 000	980	1 400	* 51138	237	193	220	210	1	3.75
	270	62	2	310	1 060	31 500	108 000	710	1 000	* 51238	267	194	238	222	2	11.3
	320	105	4	545	1 950	55 500	199 000	500	710	* 51338	315	195	266	244	3	35
200	250	37	1.1	172	675	17 500	69 000	960	1 400	* 51140	247	203	230	220	1	3.92

1) Smallest allowable dimension for chamfer dimension *r*. 2) Maximum allowable dimension for shaft washer outer dimension *d_a*. 3) Smallest allowable dimension for housing washer inner dimension *D_i*. Note: Bearing numbers marked "*" signify bearings where the bearing shaft washer outer diameter is smaller than the housing shaft washer outer diameter. Therefore when using these bearings, it is possible to use the housing bore as is, without providing a ground undercut on the outer diameter section of the bearing shaft washer as shown in the drawing.

Single Direction Thrust Ball Bearings



Equivalent bearing load

dynamic

$$P_a = F_a$$

static

$$P_{0a} = F_a$$

d 200 ~ 530mm

	Boundary dimensions			Basic load ratings				Limiting speeds		Bearing numbers	Dimensions		Abutment and fillet dimensions			Mass kg (approx.)
	mm			dynamic kN	static kN	dynamic kgf	static kgf	min ⁻¹			mm		mm	mm	mm	
<i>d</i>	<i>D</i>	<i>T</i>	<i>r</i> _{s min¹⁾}	<i>C_a</i>	<i>C_{0a}</i>	<i>C_a</i>	<i>C_{0a}</i>	grease	oil		<i>d</i> _{1s max²⁾}	<i>D</i> _{1s min³⁾}	<i>d_a</i> min	<i>D_a</i> max	<i>r_{as}</i> max	
200	280	62	2	315	1 110	32 000	113 000	700	990	* 51240	277	204	248	232	2	11.8
	340	110	4	595	2 220	61 000	227 000	470	670	* 51340	335	205	282	258	3	41.8
220	270	37	1.1	177	740	18 100	75 500	920	1 300	* 51144	267	223	250	240	1	4.27
	300	63	2	325	1 210	33 000	123 000	660	950	* 51244	297	224	268	252	2	13
240	300	45	1.5	228	935	23 200	95 000	780	1 100	* 51148	297	243	276	264	1.5	6.87
	340	78	2.1	415	1 650	42 500	168 000	550	790	* 51248	335	244	299	281	2	22.4
260	320	45	1.5	232	990	23 600	101 000	750	1 100	* 51152	317	263	296	284	1.5	7.38
	360	79	2.1	440	1 810	45 000	184 000	530	760	* 51252	355	264	319	301	2	24.2
280	350	53	1.5	305	1 270	31 000	130 000	650	940	* 51156	347	283	322	308	1.5	11.8
	380	80	2.1	460	1 970	47 000	201 000	510	730	* 51256	375	284	339	321	2	26.1
300	380	62	2	355	1 560	36 000	159 000	580	820	* 51160	376	304	348	332	2	17.2
	420	95	3	590	2 680	60 000	273 000	440	630	* 51260	415	304	371	349	2.5	40.6
320	400	63	2	365	1 660	37 000	169 000	550	790	* 51164	396	324	368	352	2	18.4
340	420	64	2	375	1 760	38 000	179 000	530	760	* 51168	416	344	388	372	2	19.7
360	440	65	2	380	1 860	39 000	190 000	510	730	* 51172	436	364	408	392	2	21.1
380	460	65	2	380	1 910	39 000	195 000	500	710	* 51176	456	384	428	412	2	22.3
400	480	65	2	390	2 010	40 000	205 000	480	690	* 51180	476	404	448	432	2	23.3
420	500	65	2	395	2 110	40 500	215 000	470	670	* 51184	495	424	468	452	2	24.4
440	540	80	2.1	515	2 850	52 500	291 000	400	580	* 51188	535	444	499	481	2	40
460	560	80	2.1	525	3 000	53 500	305 000	390	560	* 51192	555	464	519	501	2	41.6
480	580	80	2.1	525	3 100	54 000	315 000	380	550	* 51196	575	484	539	521	2	43.3
500	600	80	2.1	575	3 400	58 500	345 000	370	540	511/500	595	504	559	541	2	45
530	640	85	3	645	4 000	66 000	405 000	350	500	511/530	635	534	595	575	2.5	55.8

1) Smallest allowable dimension for chamfer dimension *r*. 2) Maximum allowable dimension for shaft washer outer dimension *d₁*. 3) Smallest allowable dimension for housing washer inner dimension *D₁*. Note: Bearing numbers marked " * " signify bearings where the bearing shaft washer outer diameter is smaller than the housing shaft washer outer diameter. Therefore when using these bearings, it is possible to use the housing bore as is, without providing a ground undercut on the outer diameter section of the bearing shaft washer as shown in the drawing.