



Main Spindle Bearings

11. Angular Contact Ball Bearings for Axial Loads CONTENTS

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11. Angular Contact Ball Bearings for Axial Loads

11.1 Types and features

NTN provides a range of thrust bearings for the main spindles. This includes 5629 and 5620 types for high axial rigidity (contact angle 60°) and ULTAGE series HTA U (A) types high speed duplex angular contact ball bearings for axial loads with optimized

internal design (contact angle 40°, 30°). These bearings are used in conjunction with NN30, NN49, or NNU49 type double-row cylindrical roller bearings (matched bearings must have the same bore and outside diameter).

Table 11.1 Types of angular contact ball bearings for axial loads

	Double-direction thrust type 5629 and 5620	ULTAGE series duplex type HTA0U (A) DB, HTA9U (A) DB
Cross section		
Contact angle	60°	40°, 30°
Cage type	High strength machined brass	Machined phenol resin, polyamide resin, high strength machined brass
Features	These bearings can withstand axial loads in both directions. Due to a larger contact angle, rigidity in axial directions is enhanced. The structure of these bearings is not suitable for grease-lubricated vertical shaft applications.	These duplex angular contact ball bearings have similar designs as the double-direction angular contact thrust ball bearings, but differ in terms on their inner ring widths (see the diagrams below). Since their contact angles are lower at 40° and 30°, the series boast high speed capability. However, their axial rigidity is less than double-direction angular contact thrust ball bearings with 60° contact angle.
Interchangeability	<p>A double-direction angular contact thrust ball bearing can be readily interchanged with a duplex angular contact ball bearing simply by replacing spacer C with spacer D; the dimensions of the shaft and housing remain unchanged.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Double-direction angular contact thrust ball bearing</p> </div> <div style="font-size: 2em;">→</div> <div style="text-align: center;"> <p>Duplex angular contact ball bearing for axial loads</p> </div> </div> <p style="text-align: center;">Dimension $A = \text{Dimension } 2B$</p>	

11.2 Standard cage types

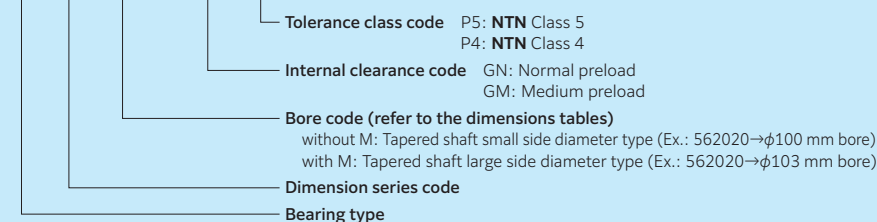
Table 11.2 Standard cage of angular contact ball bearing for axial loads

Bearing types	Machined phenol resin cage	High strength machined brass cage
5629 5620	—	562920 to 562964 562005 to 562064
HTA9U (A) HTA0U (A)	HTA920U to HTA938U ¹⁾ HTA010U to HTA038U	HTA940U to HTA964U HTA040U to HTA064U

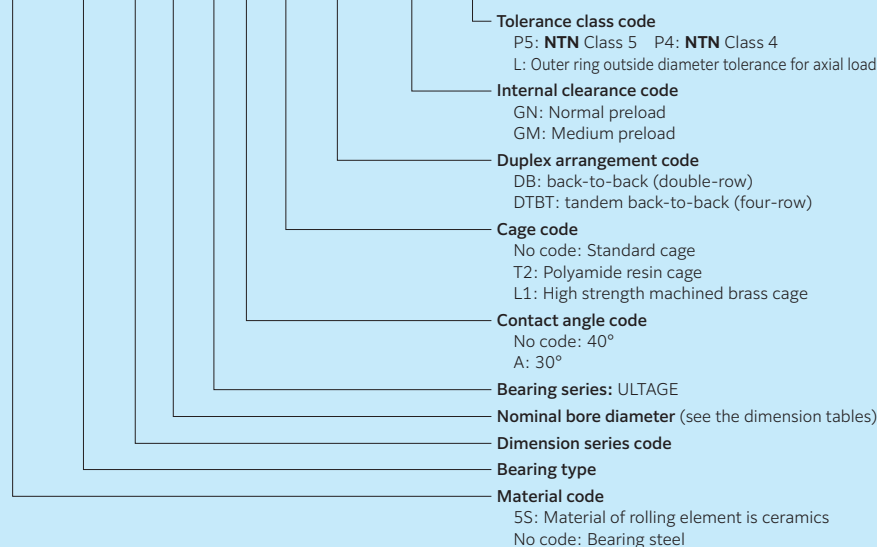
1) Some varieties use polyamide resin cages, so please contact **NTN** Engineering.
Notes: Cage types may be subjected to change without notice. For details, contact **NTN** Engineering.

11.3 Bearing designations

562 0 20M / GN P4



5S- HTA 0 20 U A T2 DB / GN P4L



11.4 Accuracy of double-direction angular contact thrust ball bearings

Table 11.3 Inner rings

Unit: μm

Nominal bore diameter		Deviation of mean bore diameter in a single plane				Perpendicularity of inner ring face with respect to the bore		Axial runout		Width variation		Deviation of the bearing height	
d		Δ_{dmp}				S_d		S_{ia}		V_{Bs}		Δ_{Ts}	
over	incl.	Class 5		Class 4 ¹⁾		Class 5	Class 4	Class 5	Class 4	Class 5	Class 4	Class 5	Class 4
		high	low	high	low	max	max	max	max	max	max	high	low
18	30	0	-6	0	-5	8	4	5	3	5	2.5	0	-300
30	50	0	-8	0	-6	8	4	5	3	5	3	0	-400
50	80	0	-9	0	-7	8	5	6	5	6	4	0	-500
80	120	0	-10	0	-8	9	5	6	5	7	4	0	-600
120	180	0	-13	0	-10	10	6	8	6	8	5	0	-700
180	250	0	-15	0	-12	11	7	8	6	10	6	0	-800
250	315	0	-18	0	-15	13	8	10	8	13	7	0	-900
315	400	0	-23	0	-18	15	9	13	10	15	9	0	-1000

1) The dimensional difference Δ_{ds} of the measured bore diameter applied to Class 4 is the same as the tolerance of dimensional difference Δ_{dmp} of the mean bore diameter within a plane. The applied to diameter series 0.

Table 11.4 Outer rings

Unit: μm

Nominal outside diameter		Deviation of mean outside diameter in a single plane		Perpendicularity of outer ring outside surface with respect to the face		Axial runout		Width variation	
D		Δ_{Dmp}		S_D		S_{ea}		V_{Cs}	
over	incl.	Class 5	Class 4 ²⁾	Class 5	Class 4	Class 5	Class 4	Class 5	Class 4
		high	low	max	max	max	max	max	max
30	50	-30	-40	8	4	Depends on tolerance of S_{ia} in relation to d of the same bearing	5	2.5	
50	80	-40	-50	8	4		6	3	
80	120	-50	-60	9	5		8	4	
120	150	-60	-75	10	5		8	5	
150	180	-60	-75	10	5	8	5		
180	250	-75	-90	11	7	10	7		
250	315	-90	-105	13	8	11	7		
315	400	-110	-125	13	10	13	8		
400	500	-120	-140	15	13	15	10		

2) The dimensional difference Δ_{Ds} of the measured outside diameter applied to Class 4 is the same as the tolerance of dimensional difference Δ_{Dmp} of the mean outside diameter within a plane. The applied to diameter series 0. Note: This standard is the **NTN** standard.

11.5 Accuracy of duplex angular contact ball bearings for axial loads

Table 11.5 Inner rings

Unit: μm

Nominal bore diameter		Deviation of mean bore diameter in a single plane				Variation of bore diameter in a single plane				Variation of mean bore diameter		Perpendicularity of inner ring face with respect to the bore		Axial runout			
d		Δ_{dmp}				V_{dsp}				V_{dmp}		S_d		S_{ia}			
over	incl.	Class 5		Class 4 ¹⁾		Diameter series 9		Diameter series 0		Class 5	Class 4	Class 5	Class 4	Class 5	Class 4	Class 5L	Class 4L
		high	low	high	low	max	max	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		
30	50	0	-8	0	-6	8	6	6	5	4	3	8	4	5	3		
50	80	0	-9	0	-7	9	7	7	5	5	3.5	8	5	6	5		
80	120	0	-10	0	-8	10	8	8	6	5	4	9	5	6	5		
120	150	0	-13	0	-10	13	10	10	8	7	5	10	6	8	6		
150	180	0	-13	0	-10	13	10	10	8	7	5	10	6	8	6		
180	250	0	-15	0	-12	15	12	12	9	8	6	11	7	8	6		
250	315	0	-18	0	-14	18	14	14	11	9	8	13	8	10	8		
315	400	0	-23	0	-16	23	17	18	12	12	9	15	10	13	10		

Unit: μm

1) The dimensional difference Δ_{ds} of the measured bore diameter applied to Class 4 is the same as the tolerance of dimensional difference Δ_{dmp} of the mean bore diameter within a plane. The applied to diameter series 0.

Overall width variation of assembled bearing		Width variation		Nominal bore diameter	
Δ_{Bs}		V_{Bs}		d	
Class 5	Class 4	Class 5	Class 4	over	incl.
high	low	max	max		
0	-240	5	2.5	18	30
0	-240	5	3	30	50
0	-300	6	4	50	80
0	-400	7	4	80	120
0	-500	8	5	120	150
0	-500	8	5	150	180
0	-600	10	6	180	250
0	-700	13	8	250	315
0	-800	15	10	315	400

Table 11.6 Outer rings

Unit: μm

Nominal outside diameter		Deviation of mean outside diameter in a single plane				Axial runout		Overall width variation of assembled bearing		Width variation		
D		Δ_{Dmp}				S_{ea}		Δ_{Cs}		V_{Cs}		
over	incl.	Class 5L	Class 4L	Class 5		Class 5	Class 4 ²⁾	Class 5	Class 4	Class 5	Class 4	
		high	low	high	low	high	low	max	max	max	max	
30	50	-25	-36	0	-7	0	-6	8	5	Depends on tolerance of Δ_{Bs} in relation to d of the same bearing	5	2.5
50	80	-30	-43	0	-9	0	-7	10	5		6	3
80	120	-36	-51	0	-10	0	-8	11	6		8	4
120	150	-43	-61	0	-11	0	-9	13	7		8	5
150	180	-43	-61	0	-13	0	-10	14	8	8	5	
180	250	-50	-70	0	-15	0	-11	15	10	10	7	
250	315	-56	-79	0	-18	0	-13	18	10	11	7	
315	400	-62	-87	0	-20	0	-15	20	13	13	8	
400	500	-68	-95	0	-23	-	-	23	15	15	10	

2) The dimensional difference Δ_{Ds} of the measured outside diameter applied to Class 4 is the same as the tolerance of dimensional difference Δ_{Dmp} of the mean outside diameter within a plane. The applied to diameter series 0. Note: This standard is the **NTN** standard.

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11.6 Standard preload

The initial internal clearance or initial preload must be selected with consideration of the lubricating method, maximum speed, and required axial rigidity. Although usage with normal preload (GN) within the allowable speed range is possible for both grease

lubrication and air-oil lubrication, ask **NTN Engineering** to recommend the appropriate preload if axial rigidity is required and you want to inhibit temperature rise of the main spindle. The standard preloads are summarized in **Table 11.7**.

Table 11.7 Standard preload

Unit: N {kgf}

Bore number	5629		5620		HTA9UDB		HTA9UADB		HTA0UDB		HTA0UADB		Bore number
	Normal GN	Medium GM	Normal GN	Medium GM	Normal GN	Medium GM	Normal GN	Medium GM	Normal GN	Medium GM	Normal GN	Medium GM	
05			294 {30}	685 {70}									05
06													06
07			490 {50}	785 {80}									07
08													08
09													09
10											294 {30}	590 {60}	10
11			980 {100}	1 670 {170}					685 {70}	1 270 {130}	490 {50}	885 {90}	11
12													12
13													13
14													14
15									980 {100}	1 570 {160}	590 {60}	1 470 {150}	15
16			1 470 {150}	2 450 {250}						1 960 {200}			16
17													17
18											885 {90}	1 960 {200}	18
19									1 470 {150}	2 450 {250}			19
20													20
21	1 470 {150}	2 450 {250}			980 {100}	1 670 {170}	685 {70}	1 270 {130}					21
22									1 960 {200}	3 450 {350}	980 {100}	2 450 {250}	22
24			1 960 {200}	3 250 {330}			885 {90}	1 770 {180}					24
26					1 270 {130}	2 450 {250}	980 {100}	1 960 {200}					26
28	1 960 {200}	2 940 {300}							2 940 {300}	5 400 {550}	1 470 {150}	3 450 {350}	28
30													30
32					1 960 {200}	3 450 {350}	1 270 {130}	2 450 {250}					32
34									3 900 {400}	7 350 {750}	2 450 {250}	4 900 {500}	34
36													36
38	2 450 {250}	3 900 {400}	2 450 {250}	3 900 {400}	3 450 {350}	5 900 {600}	1 770 {180}	3 450 {350}	4 900 {500}	9 300 {950}			38
40											3 450 {350}	6 850 {700}	40
44	2 940 {300}	4 400 {450}			3 900 {400}	6 850 {700}			6 850 {700}	12 700 {1 300}	3 900 {400}	7 850 {800}	44
48			2 940 {300}	4 400 {450}									48
52					4 900 {500}	8 850 {900}			8 850 {900}	15 700 {1 600}			52
56	3 900 {400}	5 900 {600}											56
60			3 900 {400}	5 900 {600}	5 900 {600}	11 800 {1 200}			10 800 {1 100}	17 700 {1 800}	5 900 {600}	11 800 {1 200}	60
64	4 900 {500}	7 350 {750}											64

11.7 Fits of angular contact ball bearings for axial loads

Fits given in **Table 11.8** are recommended for angular contact ball bearings for axial loads. To maintain high accuracy, provision of interference between the shaft and the bore of inner ring is essential. The fit of the housing and bearing should be same as that for cylindrical roller bearings, since an angular contact ball bearing is normally used together with a cylindrical roller bearing.

■ Checking concentricity of outside diameter of outer ring after bearing

Controlling concentricity of outer ring assembly is necessary for reduction of axial runout of the main spindle. Measure and control the concentricity of outer ring shown in **Fig. 11.1** and "6. Handling of Bearings, 6.2 Mounting" in the Technical Data section.

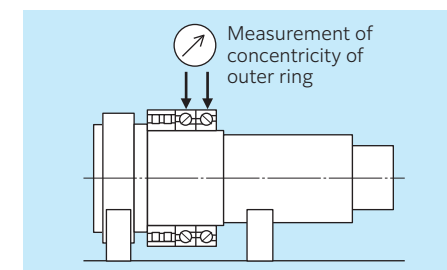


Fig. 11.1 Concentricity

Table 11.8 Shaft fits

Unit: μm

Nominal bore diameter d (mm)	Fits of inner ring to shaft	
	over	incl.
2.5	10	0-2T
10	18	0-2T
18	30	0-2.5T
30	50	0-3T
50	80	0-3.5T
80	120	0-4T
120	180	0-5T
180	250	0-6T

Note 1: Target the median value.

2: For high speed applications where d_{m1} value exceeds 0.75×10^6 , the fit should be increased. For such an arrangement, consult **NTN Engineering**.

T: Tight (Interference) fit

11.8 Recommended lubrication specifications

Angular contact ball bearings for axial loads are usually used with grease lubrication or air-oil lubrication. Recommended specifications of the lubrication methods are described below.

■ Grease lubrication

● Recommended brand of grease

Refer to "7. Lubrication of Bearings, 7.1 Grease lubrication" in the Technical Data section.

● Recommended grease filling amount

$d_{m,n}$ value $\leq 0.65 \times 10^6$

15 % of the capacity shown in the dimensions tables

$d_{m,n}$ value $> 0.65 \times 10^6$

12 % of the capacity shown in the dimensions tables

● Recommended grease filling method

Refer to "6. Handling of Bearings, 6.1 Cleaning and filling with grease" in the Technical Data section.

Notes: High-strength machined brass cages are used for 5629/5620 types. Thus, if they are used for grease-lubricated vertical shafts, the cage on one side may hang onto the rolling elements, possibly causing seizure. Use of the HTA U type with resin cages or oil lubrication (including feeding of lubricating oil) is recommended.

■ Air-oil lubrication

● Recommended location of nozzle

Refer to "7. Lubrication of Bearings 7.2 Recommended location of nozzle for air-oil lubrication" in the Technical Data section.

● Recommended specifications of nozzle

Nozzle bore diameter : From 1 to 1.5 mm
Number of nozzles: One nozzle for each bearing, depth of nozzle bore should be four to six times of nozzle bore diameter.

● Recommended specifications of air-oil

Oil type: Spindle oil
Viscosity grade: ISO VG from 10 to 32 (32 is preferable)

Table 11.9 Air and oil amount

Bearing types	$d_{m,n}$ value ($\times 10^6$) Over Incl.	Oil amount per shot mL	Lubrication intervals min	Oil consumption mL/h	Recommended air consumption NL/min ¹⁾
HTA9U (A)	— 1.0	0.03	8	0.23	20 to 40
HTA0U (A)	1.0 1.25		5	0.36	
SS-HTA0U (A)					

1) NL/min (Normal liter/minute) ... NL means the volume of air at 0 °C and 1 atmosphere.

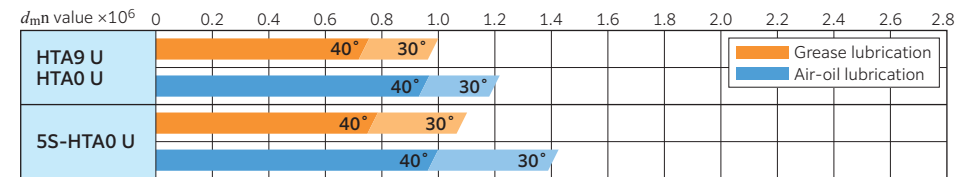
11.9 ULTAGE Angular contact ball bearings for axial loads HTA U type

The HTA U type is an angular contact ball bearing for axial loads. It maintains rigidity and load bearing capacity, and features improved high speed performance.

■ Features

1. Optimized internal design to minimize the temperature rise especially at high speed range.
2. Improved polyamide resin cage pocket design where the ball contacts to have improved lubrication performance under grease or air-oil lubrication.

■ Permissible speed range



Notes) Permissible speed of each bearing ($d_{m,n}$ value) varies depending on the specifications of the machine for which the bearing is used (motor drive system, cooling system, and construction around the bearing). Consider the optimal choice referring to the above guideline, and then, contact NTN Engineering for technical assistance.

■ Data/Axial rigidity

Minimizes drops in axial rigidity while supporting faster speeds (see Fig. 11.3).

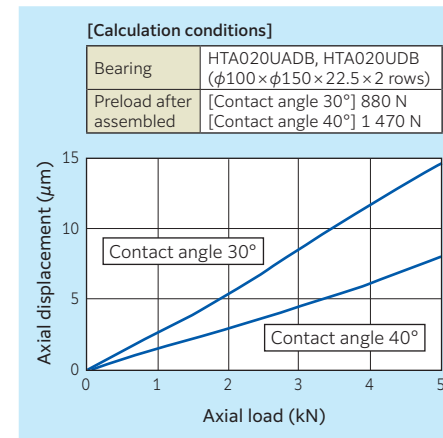


Fig. 11.3 Axial rigidity diagram

■ Bearings specification

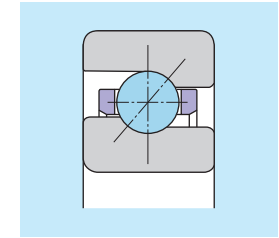


Fig. 11.2 HTA U type

■ Data/Allowable axial load

A contact angle of 30° has a larger allowable axial load, compared to a contact angle of 40° (see Fig. 11.4).

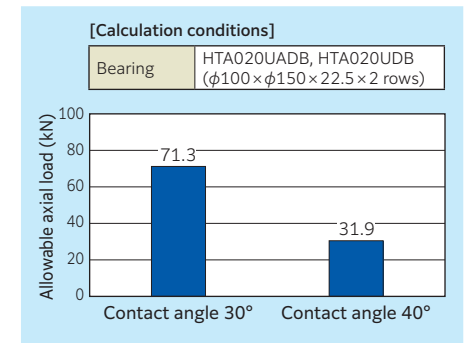


Fig. 11.4 Comparison of allowable axial load

Data/Operation test

d_{mn} value of 1.0×10^6 under grease lubrication and 1.25×10^6 under air-oil lubrication are realized by the optimized internal design (Both specification: steel ball, contact angle 30°) (see Fig. 11.5, Fig. 11.6).

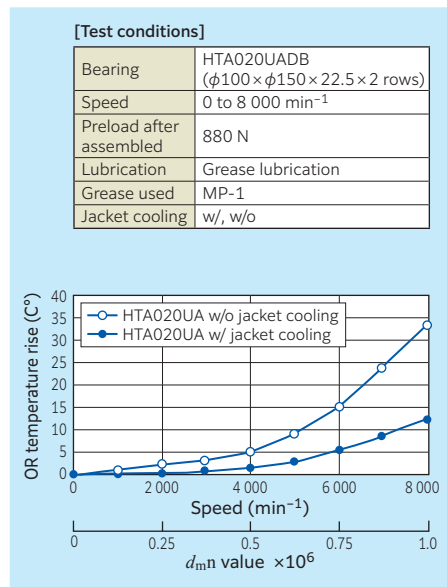


Fig. 11.5 Operation test results (contact angle 30° , grease lubrication)

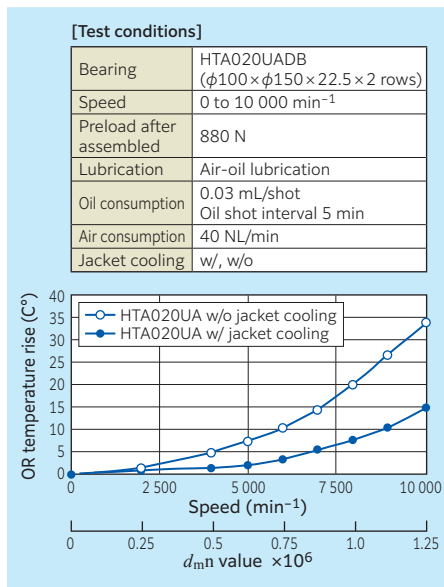


Fig. 11.6 Operation test results (contact angle 30° , air-oil lubrication)

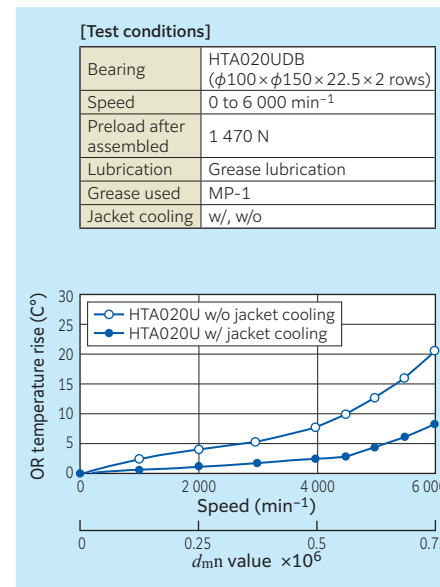


Fig. 11.7 Operation test results (contact angle 40° , grease lubrication)

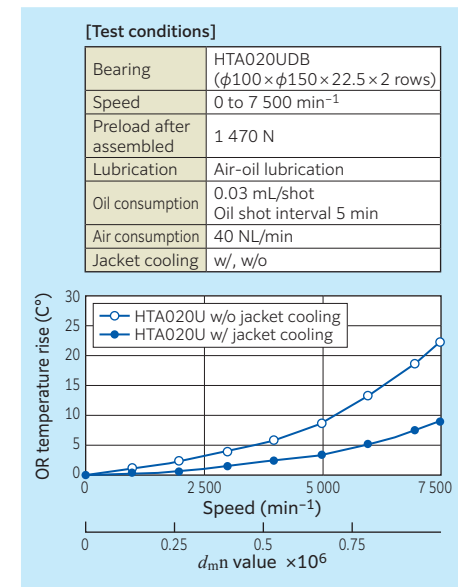


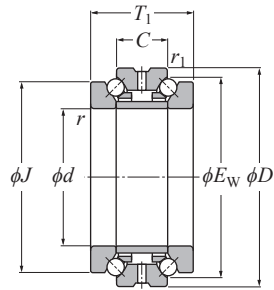
Fig. 11.8 Operation test results (contact angle 40° , air-oil lubrication)

Angular Contact Ball Bearings for Axial Loads

Dimension Tables

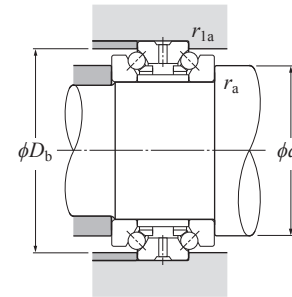


Double-direction angular contact thrust ball bearings 5629 type



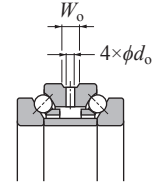
Angular Contact Ball Bearings for Axial Loads

Dimension Tables



Dynamic equivalent axial load
 $P_a = F_a$

Static equivalent axial load
 $P_{0a} = F_a$



Contact angle 60° d 100–320 mm

Part number		Boundary dimensions								Basic load ratings				Allowable speed		Mass (approx.)		Reference dimensions		Abutment and fillet dimensions				Part number	
small size	large size	small size	large size	D		T ₁	C	r _{s min} ¹⁾	r _{1s min} ¹⁾	C _a	C _{0a}	C _a	C _{0a}	grease lubrication	oil lubrication	small size	large size	J	E _w ²⁾	d _a min	D _b max	r _{as} max	r _{1as} max	small size	large size
562920	562920M	100	104	140	48	24	24	1.1	0.6	58.0	179	5 900	18 200	3 200	4 200	2.04	1.8	126	129	114	134.5	1	0.6	562920	562920M
562921	562921M	105	109	145	48	24	24	1.1	0.6	59.5	188	6 050	19 200	3 000	4 100	2.12	1.87	131	134	119	139.5	1	0.6	562921	562921M
562922	562922M	110	114	150	48	24	24	1.1	0.6	59.5	193	6 100	19 700	2 900	3 900	2.21	1.95	136	139	124	144.5	1	0.6	562922	562922M
562924	562924M	120	124	165	54	27	27	1.1	0.6	72.0	242	7 350	24 700	2 600	3 500	3.06	2.75	150	154.5	138	159.5	1	0.6	562924	562924M
562926	562926M	130	134	180	60	30	30	1.5	1	83.0	284	8 450	28 900	2 400	3 200	4.11	3.7	163	168	150	173.5	1.5	1	562926	562926M
562928	562928M	140	144	190	60	30	30	1.5	1	84.0	297	8 600	30 500	2 300	3 100	4.38	3.94	173	178	160	183.5	1.5	1	562928	562928M
562930	562930M	150	155	210	72	36	36	2	1	118	410	12 100	41 500	2 100	2 800	6.88	6.2	190	196.5	174	202	2	1	562930	562930M
562932	562932M	160	165	220	72	36	36	2	1	121	430	12 300	44 000	2 000	2 600	7.26	6.53	200	206.5	184	212	2	1	562932	562932M
562934	562934M	170	175	230	72	36	36	2	1	123	450	12 500	46 000	1 900	2 500	7.64	6.88	210	216.5	194	222	2	1	562934	562934M
562936	562936M	180	186	250	84	42	42	2	1	173	605	17 600	62 000	1 700	2 300	11.2	10	227	234	207	242	2	1	562936	562936M
562938	562938M	190	196	260	84	42	42	2	1	174	625	17 700	63 500	1 700	2 200	11.7	10.5	237	244	217	252	2	1	562938	562938M
562940	562940M	200	207	280	96	48	48	2.1	1.1	205	735	20 900	75 000	1 600	2 100	16.3	14.7	252	261	231	270	2	1	562940	562940M
562944	562944M	220	227	300	96	48	48	2.1	1.1	211	795	21 500	81 000	1 400	1 900	17.7	16	272	281	251	290	2	1	562944	562944M
562948	562948M	240	247	320	96	48	48	2.1	1.1	217	850	22 100	87 000	1 300	1 800	19	17	292	301	271	310	2	1	562948	562948M
562952	562952M	260	269	360	120	60	60	2.1	1.1	289	1 130	29 400	116 000	1 200	1 600	32.9	29.6	328	336	299	350	2	1	562952	562952M
562956	562956M	280	289	380	120	60	60	2.1	1.1	293	1 190	29 900	121 000	1 100	1 500	35	31.5	348	356	319	370	2	1	562956	562956M
562960	562960M	300	310	420	144	72	72	3	1.1	375	1 510	38 000	154 000	1 000	1 400	55	49.5	384	391	349	410	2.5	1	562960	562960M
562964	562964M	320	330	440	144	72	72	3	1.1	380	1 580	38 500	161 000	1 000	1 300	58.1	52.3	404	411	369	430	2.5	1	562964	562964M

Dimensions of oil hole and oil groove unit: mm

Nominal outside diameter D		Oil groove width W _o	Oil hole diameter d _o
over	incl.		
140	190	8	4
190	260	12	6
260	320	14	6
320	380	16	8
380	440	22	12

1) Minimum allowable value for corner radius dimension r or r₁.
2) Maximum circumscribed circle diameter of balls.

Main Spindle Bearings

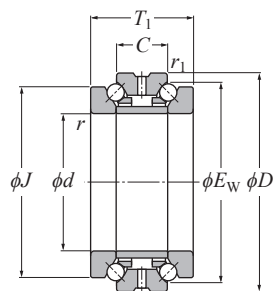
Main Spindle Bearings

Angular Contact Ball Bearings for Axial Loads

Dimension Tables

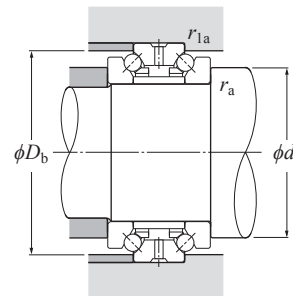


Double-direction angular contact thrust ball bearings 5620 type



Angular Contact Ball Bearings for Axial Loads

Dimension Tables

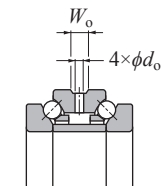


Dynamic equivalent axial load

$P_a = F_a$

Static equivalent axial load

$P_{0a} = F_a$



Contact angle 60° *d* 25–320 mm

Part number		Boundary dimensions										Basic load ratings				Allowable speed		Mass (approx.)		Reference dimensions		Abutment and fillet dimensions				Part number	
		<i>d</i>		mm		dynamic		static		dynamic		static		min ⁻¹		kg		mm		mm							
small size	large size	small size	large size	<i>D</i>	<i>T</i> ₁	<i>C</i>	<i>r</i> _{s min} ¹⁾	<i>r</i> _{s min} ¹⁾	<i>C</i> _a	<i>C</i> _{0a}	<i>C</i> _a	<i>C</i> _{0a}	grease lubrication	oil lubrication	small size	large size	<i>J</i>	<i>E</i> _w ²⁾	<i>d</i> _{a min}	<i>D</i> _{b max}	<i>r</i> _{as max}	<i>r</i> _{1as max}	small size	large size			
562005	562005M	25	27	47	28	14	0.6	0.3	14.6	28.3	1 490	2 890	10 400	14 000	0.197	0.177	40	41.3	33	44	0.6	0.3	562005	562005M			
562006	562006M	30	32	55	32	16	1	0.6	15.5	32.5	1 580	3 350	8 700	11 700	0.301	0.28	47	48.5	40	50.5	1	0.6	562006	562006M			
562007	562007M	35	37	62	34	17	1	0.6	21.8	48.5	2 230	4 950	7 700	10 300	0.394	0.35	53	55	45.5	57.5	1	0.6	562007	562007M			
562008	562008M	40	42	68	36	18	1	0.6	26.4	58.5	2 690	5 950	7 000	9 400	0.482	0.44	58.5	61	50	63.5	1	0.6	562008	562008M			
562009	562009M	45	47	75	38	19	1	0.6	28.8	69.0	2 930	7 000	6 200	8 300	0.605	0.54	65	67.5	56.5	70.5	1	0.6	562009	562009M			
562010	562010M	50	52	80	38	19	1	0.6	29.6	74.0	3 000	7 550	5 700	7 700	0.638	0.59	70	72.5	61.5	75.5	1	0.6	562010	562010M			
562011	562011M	55	57	90	44	22	1.1	0.6	41.0	99.0	4 200	10 100	5 200	7 000	0.988	0.9	78	81	67.5	84	1	0.6	562011	562011M			
562012	562012M	60	62	95	44	22	1.1	0.6	41.5	103	4 250	10 500	4 900	6 500	1.06	0.96	83	86.1	72.5	89	1	0.6	562012	562012M			
562013	562013M	65	67	100	44	22	1.1	0.6	43.0	111	4 400	11 300	4 600	6 100	1.08	1	88	91	77.5	94	1	0.6	562013	562013M			
562014	562014M	70	73	110	48	24	1.1	0.6	52.5	140	5 350	14 300	4 200	5 600	1.53	1.4	97	100	85	104	1	0.6	562014	562014M			
562015	562015M	75	78	115	48	24	1.1	0.6	54.5	150	5 550	15 300	3 900	5 300	1.61	1.5	102	105	90	109	1	0.6	562015	562015M			
562016	562016M	80	83	125	54	27	1.1	0.6	63.5	178	6 500	18 200	3 700	4 900	2.2	2	110	113	96.5	119	1	0.6	562016	562016M			
562017	562017M	85	88	130	54	27	1.1	0.6	64.5	184	6 550	18 800	3 500	4 700	2.31	2.1	115	118	102	124	1	0.6	562017	562017M			
562018	562018M	90	93	140	60	30	1.5	1	74.5	216	7 600	22 000	3 300	4 400	3.05	2.7	123	127	109	133.5	1.5	1	562018	562018M			
562019	562019M	95	98	145	60	30	1.5	1	75.0	223	7 650	22 700	3 100	4 200	3.18	2.9	128	132	114	138.5	1.5	1	562019	562019M			
562020	562020M	100	103	150	60	30	1.5	1	76.0	229	7 750	23 400	3 000	4 000	3.32	3	133	137	119	143.5	1.5	1	562020	562020M			
562021	562021M	105	109	160	66	33	2	1	87.0	266	8 900	27 100	2 800	3 800	4.19	3.7	142	146	127	152	2	1	562021	562021M			
562022	562022M	110	114	170	72	36	2	1	106	315	10 800	32 500	2 700	3 600	5.35	4.9	150	155	133	162	2	1	562022	562022M			
562024	562024M	120	124	180	72	36	2	1	109	335	11 100	34 500	2 500	3 300	5.73	5.2	160	165	143	172	2	1	562024	562024M			
562026	562026M	130	135	200	84	42	2	1	154	460	15 700	47 000	2 300	3 100	8.58	7.6	177	182	155	192	2	1	562026	562026M			
562028	562028M	140	144	210	84	42	2	1	159	495	16 200	50 500	2 200	2 900	9.1	8.1	187	192	165	202	2	1	562028	562028M			
562030	562030M	150	155	225	90	45	2.1	1.1	163	525	16 600	53 500	2 000	2 700	11.2	10	200	206	178	215	2	1	562030	562030M			
562032	562032M	160	165	240	96	48	2.1	1.1	191	620	19 500	63 000	1 900	2 500	13.6	11.9	212	219	189	230	2	1	562032	562032M			
562034	562034M	170	175	260	108	54	2.1	1.1	224	735	22 900	75 000	1 800	2 400	18.5	16.5	230	236	203	250	2	1	562034	562034M			
562036	562036M	180	186	280	120	60	2.1	1.1	259	865	26 400	88 000	1 600	2 200	24.7	21.8	248	255	219	270	2	1	562036	562036M			
562038	562038M	190	196	290	120	60	2.1	1.1	262	890	26 700	91 000	1 600	2 100	25.5	23	258	265	229	280	2	1	562038	562038M			
562040	562040M	200	207	310	132	66	2.1	1.1	300	1 030	30 500	105 000	1 500	2 000	32.7	29.7	274	282	243	300	2	1	562040	562040M			
562044	562044M	220	227	340	144	72	3	1.1	370	1 270	37 500	129 000	1 300	1 800	42.8	38.5	304	310	267	330	2.5	1	562044	562044M			
562048	562048M	240	247	360	144	72	3	1.1	380	1 350	39 000	138 000	1 300	1 700	45.8	41.2	322	330	287	350	2.5	1	562048	562048M			
562052	562052M	260	269	400	164	82	4	1.5	450	1 710	46 000	174 000	1 100	1 500	67	60.3	354	364	315	388	3	1.5	562052	562052M			
562056	562056M	280	289	420	164	82	4	1.5	465	1 810	47 000	185 000	1 100	1 500	71.1	64	374	384	335	408	3	1.5	562056	562056M			
562060	562060M	300	310	460	190	95	4	1.5	530	2 170	54 000	222 000	1 000	1 300	102	91.8	406	418	364	448	3	1.5	562060	562060M			
562064	562064M	320	330	480	190	95	4	1.5	530	2 240	54 500	228 000	1 000	1 300	108	97.2	426	438	384	468	3	1.5	562964	562964M			

1) Minimum allowable value for corner radius dimension *r* or *r*₁.
2) Maximum circumscribed circle diameter of balls.

Dimensions of oil hole and oil groove unit: mm

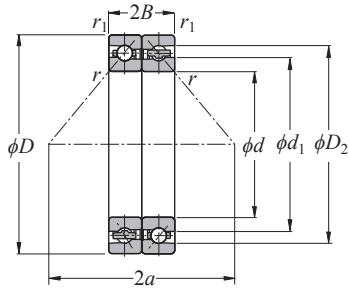
Nominal outside diameter <i>D</i>	Oil groove width <i>W</i> ₀	Oil hole diameter <i>d</i> _o
50	4.5	2
80	6	3
150	8	4
210	12	6
260	14	6
320	16	8
480	22	12

Angular Contact Ball Bearings for Axial Loads

Dimension Tables

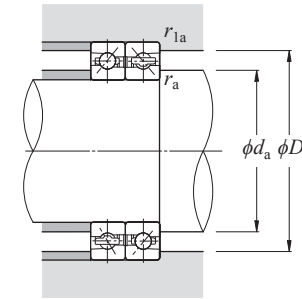


ULTAGE Angular contact ball bearings for axial loads (steel ball spec.)
HTA9UA type



Angular Contact Ball Bearings for Axial Loads

Dimension Tables



Dynamic equivalent axial load
 $P_a = F_a$

Static equivalent axial load
 $P_{0a} = F_a$

Contact angle 30° d 100–320 mm

Part number	Boundary dimensions					Basic load ratings				Allowable axial load		Allowable speed		Load center mm	Internal free space cm ³ Two row (approx.)	Mass kg Two row (approx.)	Reference dimensions		Abutment and fillet dimensions				Part number	
	mm					dynamic kN	static	dynamic	static	kN	kgf	min ⁻¹	mm				mm	mm	mm	mm	mm	mm		mm
	d	D	$2B$	$r_s \text{ min}^{-1}$	$r_{1s} \text{ min}^{-1}$	C_a	C_{0a}	C_a	C_{0a}	(static)	(static)	grease lubrication	oil lubrication				$2a$	d_1	D_2	$d_a \text{ min}$	$D_b \text{ max}$	$r_{as} \text{ max}$		$r_{1as} \text{ max}$
HTA920UADB	100	140	36	1.1	0.6	44.0	109	4 500	11 100	66.0	6 750	8 300	10 400	87.6	24	0.81	115.3	129.1	110	134	1	0.6	HTA920UADB	
HTA921UADB	105	145	36	1.1	0.6	45.5	115	4 650	11 700	70.0	7 150	8 000	10 000	90.5	24	0.85	120.3	134.1	115	139	1	0.6	HTA921UADB	
HTA922UADB	110	150	36	1.1	0.6	46.0	118	4 650	12 000	72.0	7 350	7 700	9 600	93.4	26	0.88	125.3	139.1	120	144	1	0.6	HTA922UADB	
HTA924UADB	120	165	40.5	1.1	0.6	53.5	140	5 450	14 300	87.5	8 900	7 000	8 800	102.9	36	1.23	137.4	152.4	130	159	1	0.6	HTA924UADB	
HTA926UADB	130	180	45	1.5	1	64.0	173	6 500	17 600	103	10 500	6 500	8 100	112.4	50	1.65	149.4	165.8	142	172.5	1.5	1	HTA926UADB	
HTA928UADB	140	190	45	1.5	1	64.0	177	6 500	18 000	106	10 800	6 100	7 600	118.1	53	1.75	159.4	175.8	152	182.5	1.5	1	HTA928UADB	
HTA930UADB	150	210	54	2	1	89.5	243	9 100	24 800	143	14 600	5 600	6 900	131.4	85	2.74	173.1	193.3	164	202.5	2	1	HTA930UADB	
HTA932UADB	160	220	54	2	1	91.5	256	9 300	26 100	151	15 400	5 300	6 600	137.1	90	2.89	183.1	203.3	174	212.5	2	1	HTA932UADB	
HTA934UADB	170	230	54	2	1	93.0	268	9 500	27 300	159	16 200	5 000	6 300	142.9	94	3.05	193.1	213.2	184	222.5	2	1	HTA934UADB	
HTA936UADB	180	250	63	2	1	140	400	14 300	41 000	239	24 400	4 700	5 800	156.2	138	4.78	206.4	231.5	194	242.5	2	1	HTA936UADB	
HTA938UADB	190	260	63	2	1	143	420	14 600	43 000	252	25 700	4 400	5 600	162.0	144	5.00	216.4	241.5	204	252.5	2	1	HTA938UADB	
HTA940UADB	200	280	72	2.1	1.1	169	500	17 200	51 000	305	31 000	4 200	5 200	175.2	197	7.00	230.6	258.2	217	270	2	1	HTA940UADB	
HTA944UADB	220	300	72	2.1	1.1	173	535	17 700	54 500	330	33 500	3 800	4 800	186.7	213	7.60	250.6	277.9	237	290	2	1	HTA944UADB	
HTA948UADB	240	320	72	2.1	1.1	178	570	18 100	58 000	350	35 500	3 600	4 500	198.3	229	8.15	270.6	297.9	257	310	2	1	HTA948UADB	
HTA952UADB	260	360	90	2.1	1.1	234	745	23 800	76 000	460	47 000	3 200	4 000	224.7	378	14.3	298.9	331.6	277	350	2	1	HTA952UADB	
HTA956UADB	280	380	90	2.1	1.1	241	795	24 500	81 000	490	50 000	3 000	3 800	236.3	403	15.2	318.9	351.4	297	370	2	1	HTA956UADB	
HTA960UADB	300	420	108	3	1.1	305	1 020	31 500	104 000	610	62 000	2 800	3 500	262.7	675	23.5	347.1	385.2	320	410	2.5	1	HTA960UADB	
HTA964UADB	320	440	108	3	1.1	310	1 060	32 000	108 000	635	65 000	2 600	3 300	274.2	715	24.8	367.1	405.0	340	430	2.5	1	HTA964UADB	

1) Minimum allowable value for corner radius dimension r or r_1 .

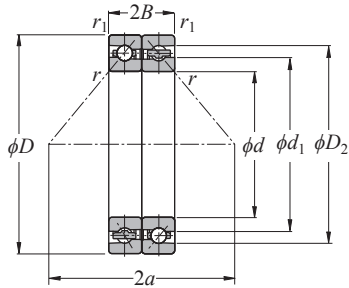
Main Spindle Bearings

Main Spindle Bearings

Angular Contact Ball Bearings for Axial Loads

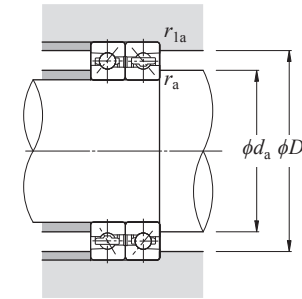
ULTAGE Angular contact ball bearings for axial loads (steel ball spec.)
HTA9U type

Dimension Tables



Angular Contact Ball Bearings for Axial Loads

Dimension Tables



Dynamic equivalent axial load
 $P_a = F_a$

Static equivalent axial load
 $P_{0a} = F_a$

Contact angle 40° d 100–320 mm

Part number	Boundary dimensions					Basic load ratings				Allowable axial load		Allowable speed		Load center mm $2a$	Internal free space cm ³ Two row (approx.)	Mass kg Two row (approx.)	Reference dimensions		Abutment and fillet dimensions				Part number		
	mm					dynamic	static	dynamic	static	kN	kgf	grease	oil				mm	mm	mm	mm	mm	mm		mm	mm
	d	D	$2B$	$r_s \text{ min}^{-1}$	$r_{1s} \text{ min}^{-1}$	C_a	C_{0a}	C_a	C_{0a}	(kN)	(kgf)	lubrication	lubrication				d_1	D_2	$d_a \text{ min}$	$D_b \text{ max}$	$r_{as} \text{ max}$	$r_{1as} \text{ max}$			
HTA920UDB	100	140	36	1.1	0.6	52.5	121	5 350	12 300	29.3	2 990	6 300	7 900	119.1	24	0.81	115.3	129.0	110	134	1	0.6	HTA920UDB		
HTA921UDB	105	145	36	1.1	0.6	53.5	128	5 500	13 000	31.0	3 150	6 000	7 600	123.3	24	0.85	120.3	134.0	115	139	1	0.6	HTA921UDB		
HTA922UDB	110	150	36	1.1	0.6	54.0	131	5 500	13 400	32.0	3 250	5 800	7 300	127.5	26	0.88	125.3	139.0	120	144	1	0.6	HTA922UDB		
HTA924UDB	120	165	40.5	1.1	0.6	63.0	156	6 450	15 900	39.0	4 000	5 300	6 700	140.3	36	1.23	137.4	152.3	130	159	1	0.6	HTA924UDB		
HTA926UDB	130	180	45	1.5	1	75.5	193	7 700	19 600	44.5	4 550	4 800	6 100	153.1	50	1.65	149.4	165.7	142	172.5	1.5	1	HTA926UDB		
HTA928UDB	140	190	45	1.5	1	75.5	197	7 700	20 100	46.0	4 700	4 500	5 800	161.5	53	1.75	159.4	175.7	152	182.5	1.5	1	HTA928UDB		
HTA930UDB	150	210	54	2	1	106	270	10 800	27 600	62.5	6 350	4 200	5 300	178.7	85	2.74	173.1	193.2	164	202.5	2	1	HTA930UDB		
HTA932UDB	160	220	54	2	1	108	284	11 000	29 000	65.5	6 700	3 900	5 000	187.1	90	2.89	183.1	203.2	174	212.5	2	1	HTA932UDB		
HTA934UDB	170	230	54	2	1	110	298	11 200	30 500	69.0	7 050	3 800	4 800	195.5	94	3.05	193.1	213.3	184	222.5	2	1	HTA934UDB		
HTA936UDB	180	250	63	2	1	166	445	16 900	45 500	104	10 600	3 500	4 400	212.7	138	4.78	206.4	231.5	194	242.5	2	1	HTA936UDB		
HTA938UDB	190	260	63	2	1	170	470	17 300	48 000	110	11 200	3 300	4 200	221.1	144	5.00	216.4	241.6	204	252.5	2	1	HTA938UDB		
HTA940UDB	200	280	72	2.1	1.1	200	555	20 400	56 500	134	13 700	3 100	4 000	238.3	197	7.00	230.6	258.2	217	270	2	1	HTA940UDB		
HTA944UDB	220	300	72	2.1	1.1	205	595	20 900	60 500	145	14 800	2 900	3 700	255.1	213	7.60	250.6	278.2	237	290	2	1	HTA944UDB		
HTA948UDB	240	320	72	2.1	1.1	210	635	21 500	64 500	155	15 800	2 700	3 400	271.8	229	8.15	270.6	298.0	257	310	2	1	HTA948UDB		
HTA952UDB	260	360	90	2.1	1.1	276	830	28 200	84 500	203	20 700	2 400	3 100	306.2	378	14.3	298.9	331.6	277	350	2	1	HTA952UDB		
HTA956UDB	280	380	90	2.1	1.1	284	885	29 000	90 500	218	22 200	2 300	2 900	323.0	403	15.2	318.9	351.6	297	370	2	1	HTA956UDB		
HTA960UDB	300	420	108	3	1.1	365	1 130	37 000	115 000	266	27 100	2 100	2 600	357.3	675	23.5	347.1	385.0	320	410	2.5	1	HTA960UDB		
HTA964UDB	320	440	108	3	1.1	370	1 180	37 500	120 000	279	28 400	2 000	2 500	374.1	715	24.8	367.1	405.2	340	430	2.5	1	HTA964UDB		

1) Minimum allowable value for corner radius dimension r or r_1 .

Main Spindle Bearings

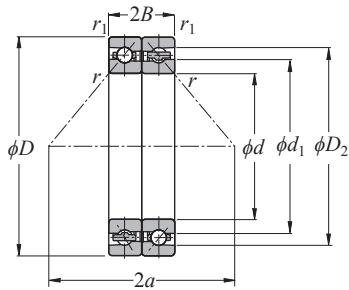
Main Spindle Bearings

Angular Contact Ball Bearings for Axial Loads

Dimension Tables

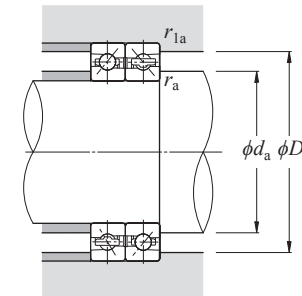


ULTAGE Angular contact ball bearings for axial loads (steel ball spec.)
HTA0UA type



Angular Contact Ball Bearings for Axial Loads

Dimension Tables



Dynamic equivalent axial load
 $P_a = F_a$

Static equivalent axial load
 $P_{0a} = F_a$

Contact angle 30° d 50–320 mm

Part number	Boundary dimensions					Basic load ratings				Allowable axial load		Allowable speed		Load center mm	Internal free space cm ³	Mass kg	Reference dimensions		Abutment and fillet dimensions				Part number	
	mm					dynamic	static	dynamic	static	kN	kgf	min ⁻¹	mm				mm	mm	mm	mm	mm	mm		mm
	d	D	$2B$	$r_s \text{ min}^{-1}$	$r_{1s} \text{ min}^{-1}$	C_a	C_{0a}	C_a	C_{0a}	(static)	grease lubrication	oil lubrication	$2a$				d_1	D_2	$d_a \text{ min}$	$D_b \text{ max}$	$r_{as} \text{ max}$	$r_{1as} \text{ max}$		
HTA010UADB	50	80	28.5	1	0.6	27.5	48.5	2 810	4 950	23.2	2 370	15 400	19 200	52.1	9	0.24	60.7	73.2	57.5	74.0	1	0.6	HTA010UADB	
HTA011UADB	55	90	33	1.1	0.6	29.8	57.5	3 050	5 850	27.7	2 820	13 800	17 200	58.6	13	0.39	68.2	80.8	65.0	84.0	1	0.6	HTA011UADB	
HTA012UADB	60	95	33	1.1	0.6	31.0	63.0	3 200	6 400	30.5	3 100	12 900	16 100	61.5	13	0.41	73.2	85.8	70.0	89.0	1	0.6	HTA012UADB	
HTA013UADB	65	100	33	1.1	0.6	31.5	65.0	3 250	6 650	32.0	3 250	12 100	15 200	64.4	14	0.44	78.2	90.8	75.0	94.0	1	0.6	HTA013UADB	
HTA014UADB	70	110	36	1.1	0.6	38.5	82.0	3 950	8 350	40.0	4 100	11 100	13 900	70.3	18	0.61	85.3	99.1	80.0	104	1	0.6	HTA014UADB	
HTA015UADB	75	115	36	1.1	0.6	41.0	91.5	4 200	9 300	45.5	4 650	10 500	13 200	73.2	19	0.65	90.3	104.1	85.0	109	1	0.6	HTA015UADB	
HTA016UADB	80	125	40.5	1.1	0.6	47.0	105	4 800	10 700	52.0	5 300	9 800	12 200	79.8	26	0.88	97.4	112.5	90.0	119	1	0.6	HTA016UADB	
HTA017UADB	85	130	40.5	1.1	0.6	48.0	108	4 850	11 100	54.5	5 550	9 300	11 600	82.7	28	0.93	102.4	117.5	95.0	124	1	0.6	HTA017UADB	
HTA018UADB	90	140	45	1.5	1	55.5	127	5 650	13 000	63.5	6 500	8 700	10 900	89.3	38	1.22	109.4	125.9	102	132.5	1.5	1	HTA018UADB	
HTA019UADB	95	145	45	1.5	1	56.0	131	5 700	13 400	66.0	6 750	8 300	10 400	92.1	39	1.27	114.4	130.9	107	137.5	1.5	1	HTA019UADB	
HTA020UADB	100	150	45	1.5	1	58.0	140	5 900	14 300	71.0	7 250	8 000	10 000	95.1	39	1.34	119.5	135.9	112	142.5	1.5	1	HTA020UADB	
HTA021UADB	105	160	49.5	2	1	66.5	163	6 800	16 600	82.5	8 400	7 500	9 400	101.6	49	1.74	126.5	144.3	119	152.5	2	1	HTA021UADB	
HTA022UADB	110	170	54	2	1	82.5	200	8 400	20 400	100	10 200	7 100	8 900	108.3	66	2.14	133.1	153.4	124	162.5	2	1	HTA022UADB	
HTA024UADB	120	180	54	2	1	83.0	206	8 450	21 000	104	10 600	6 700	8 300	114.1	67	2.32	143.3	163.5	134	172.5	2	1	HTA024UADB	
HTA026UADB	130	200	63	2	1	119	293	12 200	29 900	144	14 700	6 100	7 600	127.3	108	3.39	156.4	181.7	144	192.5	2	1	HTA026UADB	
HTA028UADB	140	210	63	2	1	123	315	12 600	32 000	156	15 900	5 700	7 100	133.1	114	3.60	166.4	191.7	154	202.5	2	1	HTA028UADB	
HTA030UADB	150	225	67.5	2.1	1.1	127	330	12 900	34 000	169	17 200	5 300	6 700	142.6	141	4.46	178.9	204.3	167	215	2	1	HTA030UADB	
HTA032UADB	160	240	72	2.1	1.1	148	390	15 100	40 000	196	20 000	5 000	6 300	152.1	168	5.40	190.6	218.5	177	230	2	1	HTA032UADB	
HTA034UADB	170	260	81	2.1	1.1	170	450	17 400	46 000	226	23 000	4 700	5 800	165.3	238	7.20	204.7	235.3	187	250	2	1	HTA034UADB	
HTA036UADB	180	280	90	2.1	1.1	197	530	20 100	54 000	265	27 000	4 300	5 400	178.5	285	10.6	218.9	251.7	197	270	2	1	HTA036UADB	
HTA038UADB	190	290	91	2.1	1.1	200	545	20 400	55 500	275	28 000	4 200	5 200	184.3	300	11.0	228.9	261.7	207	280	2	1	HTA038UADB	
HTA040UADB	200	310	99	2.1	1.1	224	610	22 800	62 500	310	31 500	3 900	4 900	197.5	436	13.8	243.0	278.5	217	300	2	1	HTA040UADB	
HTA044UADB	220	340	108	3	1.1	281	775	28 600	79 000	385	39 500	3 600	4 500	216.6	550	18.1	266.3	306.9	240	330	2.5	1	HTA044UADB	
HTA048UADB	240	360	108	3	1.1	289	825	29 500	84 000	415	42 500	3 300	4 200	228.1	650	18.9	286.3	326.8	260	350	2.5	1	HTA048UADB	
HTA052UADB	260	400	123	4	1.5	345	1 040	35 000	106 000	520	53 500	3 000	3 800	253.0	850	28.4	314.6	360.3	283	388	3	1.5	HTA052UADB	
HTA056UADB	280	420	123	4	1.5	350	1 110	36 000	113 000	565	57 500	2 900	3 600	264.6	900	30.2	334.6	380.3	303	408	3	1.5	HTA056UADB	
HTA060UADB	300	460	142.5	4	1.5	400	1 330	41 000	135 000	670	68 500	2 600	3 300	291.8	1 265	43.6	362.9	414.0	323	448	3	1.5	HTA060UADB	
HTA064UADB	320	480	142.5	4	1.5	405	1 360	41 500	139 000	700	71 500	2 500	3 100	303.3	1 340	45.8	382.9	433.9	343	468	3	1.5	HTA064UADB	

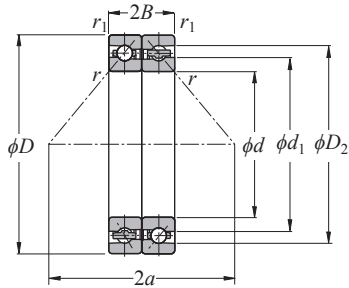
1) Minimum allowable value for corner radius dimension r or r_1 .

Main Spindle Bearings

Main Spindle Bearings

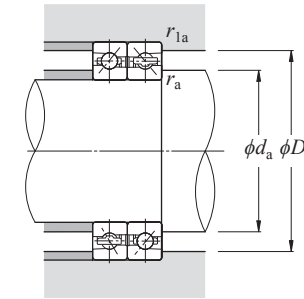
Angular Contact Ball Bearings for Axial Loads

ULTAGE Angular contact ball bearings for axial loads (steel ball spec.)
HTAOU type



Contact angle 40° d 50–320 mm

Part number	Boundary dimensions					Basic load ratings				Allowable axial load		Allowable speed		Load center mm	Internal free space cm ³ Two row (approx.)	Mass kg Two row (approx.)	Reference dimensions		Abutment and fillet dimensions				Part number
	mm					dynamic kN	static kN	dynamic kgf	static kgf	min ⁻¹		mm					mm						
	d	D	$2B$	$r_s \text{ min}^{-1}$	$r_{1s} \text{ min}^{-1}$	C_a	C_{0a}	C_a	C_{0a}	grease	oil	$2a$	d_1				D_2	d_a min	D_b max	r_{as} max	r_{1as} max		
HTA010UDB	50	80	28.5	1	0.6	33.0	55.5	3 350	5 650	11 500	14 600	69.2	9	0.24	60.7	73.1	57.5	74.0	1	0.6	HTA010UDB		
HTA011UDB	55	90	33	1.1	0.6	35.5	64.0	3 600	6 500	10 300	13 100	77.7	13	0.39	68.2	80.7	65.0	84.0	1	0.6	HTA011UDB		
HTA012UDB	60	95	33	1.1	0.6	37.0	69.5	3 800	7 100	9 700	12 300	81.9	13	0.41	73.2	85.7	70.0	89.0	1	0.6	HTA012UDB		
HTA013UDB	65	100	33	1.1	0.6	37.5	72.0	3 850	7 350	9 100	11 500	86.1	14	0.44	78.2	90.7	75.0	94.0	1	0.6	HTA013UDB		
HTA014UDB	70	110	36	1.1	0.6	46.0	91.0	4 700	9 300	8 300	10 600	94.0	18	0.61	85.3	99.0	80.0	104	1	0.6	HTA014UDB		
HTA015UDB	75	115	36	1.1	0.6	49.0	101	5 000	10 300	7 900	10 000	98.2	19	0.65	90.3	104.0	85.0	109	1	0.6	HTA015UDB		
HTA016UDB	80	125	40.5	1.1	0.6	56.0	117	5 700	11 900	7 300	9 300	106.7	26	0.88	97.4	112.4	90.0	119	1	0.6	HTA016UDB		
HTA017UDB	85	130	40.5	1.1	0.6	56.5	120	5 800	12 300	7 000	8 800	110.9	28	0.93	102.4	117.4	95.0	124	1	0.6	HTA017UDB		
HTA018UDB	90	140	45	1.5	1	65.5	141	6 700	14 400	6 500	8 300	119.5	38	1.22	109.4	125.8	102	132.5	1.5	1	HTA018UDB		
HTA019UDB	95	145	45	1.5	1	66.5	146	6 800	14 900	6 300	7 900	123.7	39	1.27	114.4	130.8	107	137.5	1.5	1	HTA019UDB		
HTA020UDB	100	150	45	1.5	1	68.5	156	7 000	15 900	6 000	7 600	128.0	39	1.34	119.5	135.9	112	142.5	1.5	1	HTA020UDB		
HTA021UDB	105	160	49.5	2	1	79.0	181	8 050	18 400	5 700	7 200	136.5	49	1.74	126.5	144.2	119	152.5	2	1	HTA021UDB		
HTA022UDB	110	170	54	2	1	98.0	222	10 000	22 700	5 400	6 800	145.1	66	2.14	133.1	153.3	124	162.5	2	1	HTA022UDB		
HTA024UDB	120	180	54	2	1	98.5	228	10 000	23 300	5 000	6 300	153.6	67	2.32	143.3	163.4	134	172.5	2	1	HTA024UDB		
HTA026UDB	130	200	63	2	1	142	325	14 400	33 000	4 500	5 800	170.8	108	3.39	156.4	181.6	144	192.5	2	1	HTA026UDB		
HTA028UDB	140	210	63	2	1	146	345	14 900	35 500	4 300	5 400	179.2	114	3.60	166.4	191.6	154	202.5	2	1	HTA028UDB		
HTA030UDB	150	225	67.5	2.1	1.1	150	370	15 300	37 500	4 000	5 200	191.9	141	4.46	178.9	204.2	167	215	2	1	HTA030UDB		
HTA032UDB	160	240	72	2.1	1.1	176	435	17 900	44 000	3 800	4 800	204.7	168	5.40	190.6	218.4	177	230	2	1	HTA032UDB		
HTA034UDB	170	260	81	2.1	1.1	202	500	20 600	51 000	3 500	4 400	221.9	238	7.20	204.7	235.2	187	250	2	1	HTA034UDB		
HTA036UDB	180	280	90	2.1	1.1	234	585	23 900	60 000	3 300	4 100	239.1	285	10.6	218.9	251.6	197	270	2	1	HTA036UDB		
HTA038UDB	190	290	91	2.1	1.1	237	605	24 100	61 500	3 100	4 000	247.4	300	11.0	228.9	261.6	207	280	2	1	HTA038UDB		
HTA040UDB	200	310	99	2.1	1.1	265	680	27 100	69 000	2 900	3 700	264.6	436	13.8	243.0	278.4	217	300	2	1	HTA040UDB		
HTA044UDB	220	340	108	3	1.1	335	860	34 000	87 500	2 700	3 400	290.3	550	18.1	266.3	306.7	240	330	2.5	1	HTA044UDB		
HTA048UDB	240	360	108	3	1.1	345	915	35 000	93 000	2 500	3 200	307.0	650	18.9	286.3	326.6	260	350	2.5	1	HTA048UDB		
HTA052UDB	260	400	123	4	1.5	405	1 160	41 500	118 000	2 300	2 900	339.9	850	28.4	314.6	360.1	283	388	3	1.5	HTA052UDB		
HTA056UDB	280	420	123	4	1.5	420	1 230	42 500	125 000	2 100	2 700	356.7	900	30.2	334.6	380.1	303	408	3	1.5	HTA056UDB		
HTA060UDB	300	460	142.5	4	1.5	475	1 470	48 500	150 000	2 000	2 500	391.7	1 265	43.6	362.9	413.7	323	448	3	1.5	HTA060UDB		
HTA064UDB	320	480	142.5	4	1.5	480	1 520	49 000	155 000	1 900	2 400	408.5	1 340	45.8	382.9	433.7	343	468	3	1.5	HTA064UDB		



Dynamic equivalent axial load
 $P_a = F_a$

Static equivalent axial load
 $P_{0a} = F_a$

1) Minimum allowable value for corner radius dimension r or r_1 .

Main Spindle Bearings

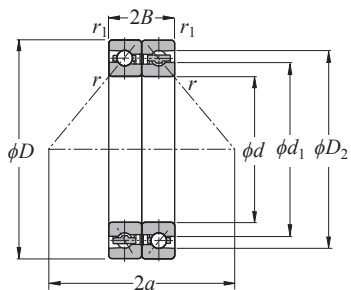
Main Spindle Bearings

Angular Contact Ball Bearings for Axial Loads

ULTAGE Angular contact ball bearings for axial loads (ceramic ball spec.)
5S-HTA0UA type

Dimension Tables

NTN

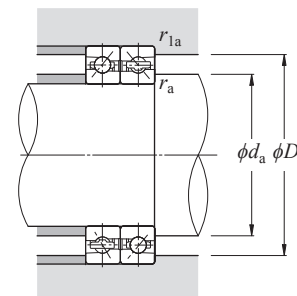


Angular Contact Ball Bearings for Axial Loads

Dynamic equivalent axial load $P_a = F_a$
Static equivalent axial load $P_{0a} = F_a$

Dimension Tables

NTN



Contact angle 30° d 50–130 mm

Part number	Boundary dimensions					Basic load ratings				Allowable axial load		Allowable speed		Load center mm $2a$	Internal free space cm ³ Two row (approx.)	Mass kg Two row (approx.)	Reference dimensions		Abutment and fillet dimensions				Part number
	mm					dynamic	static	dynamic	static	kN	kgf	grease lubrication	oil lubrication				mm	mm	d_a	D_b	r_{as}	r_{1as}	
	d	D	$2B$	$r_s \text{ min}^{-1}$	$r_{1s} \text{ min}^{-1}$	C_a	C_{0a}	C_a	C_{0a}	(kN)	(kgf)	min ⁻¹	min ⁻¹				d_1	D_2	min	max	max	max	
5S-HTA010UADB	50	80	28.5	1	0.6	27.5	33.5	2 810	3 400	15.7	1 600	17 300	22 200	52.1	9	0.22	60.7	73.2	57.5	74.0	1	0.6	5S-HTA010UADB
5S-HTA011UADB	55	90	33	1.1	0.6	29.8	39.5	3 050	4 050	18.6	1 900	15 500	19 900	58.6	13	0.36	68.2	80.8	65.0	84.0	1	0.6	5S-HTA011UADB
5S-HTA012UADB	60	95	33	1.1	0.6	31.0	43.5	3 200	4 450	20.5	2 090	14 500	18 600	61.5	13	0.39	73.2	85.8	70.0	89.0	1	0.6	5S-HTA012UADB
5S-HTA013UADB	65	100	33	1.1	0.6	31.5	45.0	3 250	4 600	21.6	2 200	13 600	17 500	64.4	14	0.41	78.2	90.8	75.0	94.0	1	0.6	5S-HTA013UADB
5S-HTA014UADB	70	110	36	1.1	0.6	38.5	57.0	3 950	5 800	27.2	2 770	12 500	16 000	70.3	18	0.57	85.3	99.1	80.0	104	1	0.6	5S-HTA014UADB
5S-HTA015UADB	75	115	36	1.1	0.6	41.0	63.5	4 200	6 450	30.5	3 150	11 800	15 200	73.2	19	0.60	90.3	104.1	85.0	109	1	0.6	5S-HTA015UADB
5S-HTA016UADB	80	125	40.5	1.1	0.6	47.0	73.0	4 800	7 400	35.0	3 600	11 000	14 100	79.8	26	0.83	97.4	112.5	90.0	119	1	0.6	5S-HTA016UADB
5S-HTA017UADB	85	130	40.5	1.1	0.6	48.0	75.0	4 850	7 650	36.5	3 750	10 500	13 400	82.7	28	0.87	102.4	117.5	95.0	124	1	0.6	5S-HTA017UADB
5S-HTA018UADB	90	140	45	1.5	1	55.5	88.5	5 650	9 000	43.0	4 400	9 800	12 500	89.3	38	1.15	109.4	125.9	102	132.5	1.5	1	5S-HTA018UADB
5S-HTA019UADB	95	145	45	1.5	1	56.0	91.0	5 700	9 300	44.5	4 550	9 400	12 000	92.1	39	1.20	114.4	130.9	107	137.5	1.5	1	5S-HTA019UADB
5S-HTA020UADB	100	150	45	1.5	1	58.0	97.0	5 900	9 900	48.0	4 900	9 000	11 500	95.1	39	1.26	119.5	135.9	112	142.5	1.5	1	5S-HTA020UADB
5S-HTA021UADB	105	160	49.5	2	1	66.5	113	6 800	11 500	55.5	5 650	8 500	10 900	101.6	49	1.64	126.5	144.3	119	152.5	2	1	5S-HTA021UADB
5S-HTA022UADB	110	170	54	2	1	82.5	139	8 400	14 100	67.0	6 850	8 000	10 300	108.3	66	2.00	133.1	153.4	124	162.5	2	1	5S-HTA022UADB
5S-HTA024UADB	120	180	54	2	1	83.0	143	8 450	14 500	70.0	7 150	7 500	9 600	114.1	67	2.17	143.3	163.5	134	172.5	2	1	5S-HTA024UADB
5S-HTA026UADB	130	200	63	2	1	119	203	12 200	20 700	97.0	9 900	6 800	8 700	127.3	108	3.13	156.4	181.7	144	192.5	2	1	5S-HTA026UADB

1) Minimum allowable value for corner radius dimension r or r_1 .

Main Spindle Bearings

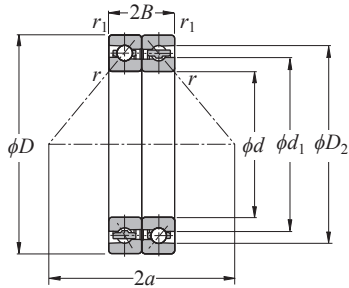
Main Spindle Bearings

Angular Contact Ball Bearings for Axial Loads

Dimension Tables

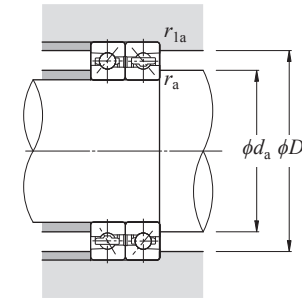


ULTAGE Angular contact ball bearings for axial loads (ceramic ball spec.)
5S-HTA0U type



Angular Contact Ball Bearings for Axial Loads

Dimension Tables



Dynamic equivalent axial load
 $P_a = F_a$

Static equivalent axial load
 $P_{0a} = F_a$

Contact angle 40° d 50–130 mm

Part number	Boundary dimensions					Basic load ratings				Allowable axial load		Allowable speed		Load center mm 2a	Internal free space cm ³ Two row (approx.)	Mass kg Two row (approx.)	Reference dimensions		Abutment and fillet dimensions				Part number		
	mm					dynamic	static	dynamic	static	kN	kgf	grease	oil				mm	mm	mm	mm	mm	mm		mm	mm
	d	D	2B	$r_s \text{ min}^{-1}$	$r_{1s} \text{ min}^{-1}$	C_a	C_{0a}	C_a	C_{0a}	(kN)	(kgf)	lubrication	lubrication				d_1	D_2	$d_a \text{ min}$	$D_b \text{ max}$	$r_{as} \text{ max}$	$r_{1as} \text{ max}$			
5S-HTA010UDB	50	80	28.5	1	0.6	33.0	38.5	3 350	3 900	14.6	1 490	12 200	15 400	69.2	9	0.22	60.7	73.1	57.5	74.0	1	0.6	5S-HTA010UDB		
5S-HTA011UDB	55	90	33	1.1	0.6	35.5	44.5	3 600	4 500	17.1	1 740	10 900	13 800	77.7	13	0.36	68.2	80.7	65.0	84.0	1	0.6	5S-HTA011UDB		
5S-HTA012UDB	60	95	33	1.1	0.6	37.0	48.0	3 800	4 900	18.7	1 910	10 200	12 900	81.9	13	0.39	73.2	85.7	70.0	89.0	1	0.6	5S-HTA012UDB		
5S-HTA013UDB	65	100	33	1.1	0.6	37.5	50.0	3 850	5 100	19.6	2 000	9 600	12 100	86.1	14	0.41	78.2	90.7	75.0	94.0	1	0.6	5S-HTA013UDB		
5S-HTA014UDB	70	110	36	1.1	0.6	46.0	63.0	4 700	6 450	25.6	2 610	8 800	11 100	94.0	18	0.57	85.3	99.0	80.0	104	1	0.6	5S-HTA014UDB		
5S-HTA015UDB	75	115	36	1.1	0.6	49.0	70.5	5 000	7 150	28.7	2 930	8 300	10 500	98.2	19	0.60	90.3	104.0	85.0	109	1	0.6	5S-HTA015UDB		
5S-HTA016UDB	80	125	40.5	1.1	0.6	56.0	81.0	5 700	8 250	34.0	3 450	7 700	9 800	106.7	26	0.83	97.4	112.4	90.0	119	1	0.6	5S-HTA016UDB		
5S-HTA017UDB	85	130	40.5	1.1	0.6	56.5	83.5	5 800	8 500	35.0	3 600	7 300	9 300	110.9	28	0.87	102.4	117.4	95.0	124	1	0.6	5S-HTA017UDB		
5S-HTA018UDB	90	140	45	1.5	1	65.5	98.0	6 700	10 000	38.0	3 900	6 900	8 700	119.5	38	1.15	109.4	125.8	102	132.5	1.5	1	5S-HTA018UDB		
5S-HTA019UDB	95	145	45	1.5	1	66.5	101	6 800	10 300	39.5	4 050	6 600	8 300	123.7	39	1.20	114.4	130.8	107	137.5	1.5	1	5S-HTA019UDB		
5S-HTA020UDB	100	150	45	1.5	1	68.5	108	7 000	11 000	42.5	4 300	6 300	8 000	128.0	39	1.26	119.5	135.9	112	142.5	1.5	1	5S-HTA020UDB		
5S-HTA021UDB	105	160	49.5	2	1	79.0	125	8 050	12 800	50.5	5 150	6 000	7 500	136.5	49	1.64	126.5	144.2	119	152.5	2	1	5S-HTA021UDB		
5S-HTA022UDB	110	170	54	2	1	98.0	154	10 000	15 700	59.5	6 100	5 600	7 100	145.1	66	2.00	133.1	153.3	124	162.5	2	1	5S-HTA022UDB		
5S-HTA024UDB	120	180	54	2	1	98.5	158	10 000	16 100	61.5	6 300	5 300	6 700	153.6	67	2.17	143.3	163.4	134	172.5	2	1	5S-HTA024UDB		
5S-HTA026UDB	130	200	63	2	1	142	225	14 400	23 000	88.0	9 000	4 800	6 100	170.8	108	3.13	156.4	181.6	144	192.5	2	1	5S-HTA026UDB		

1) Minimum allowable value for corner radius dimension r or r_1 .

Main Spindle Bearings

Main Spindle Bearings