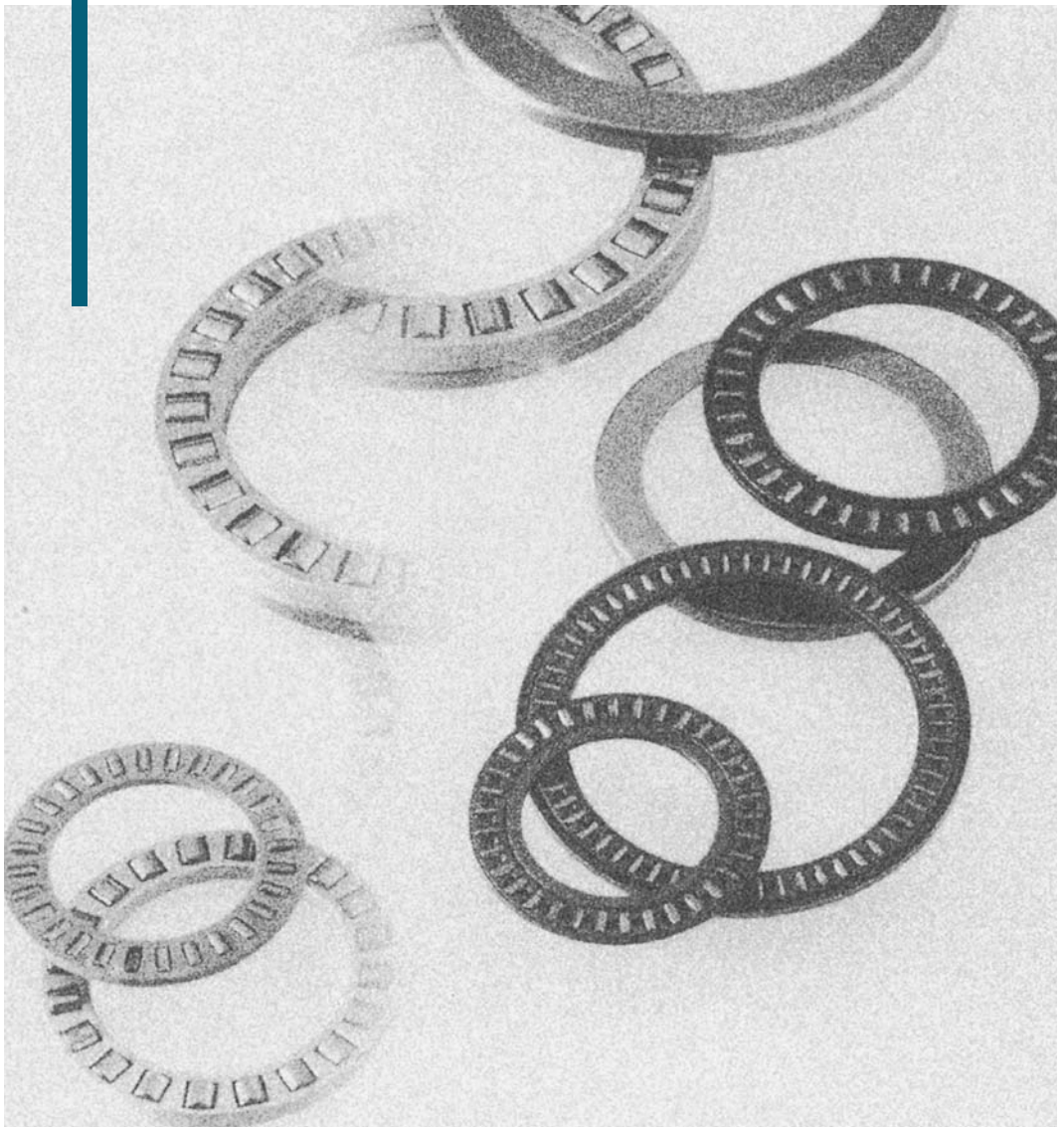


Thrust Roller Bearings



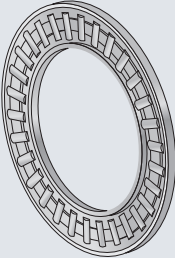
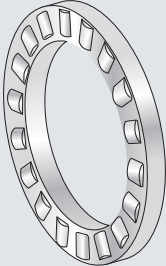
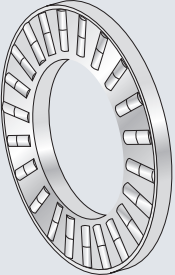
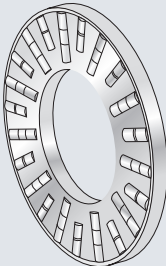
Thrust Roller Bearings

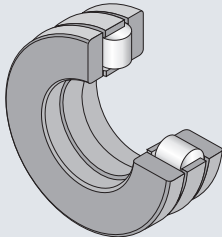
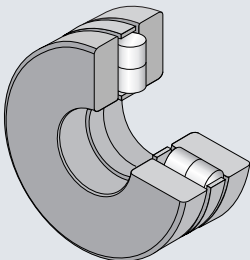
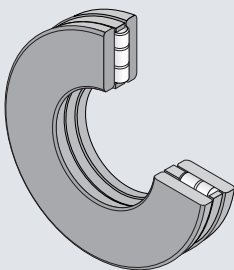
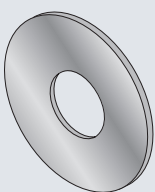
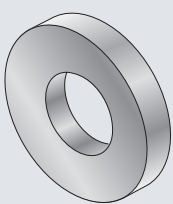
This thrust roller bearing composed of a thrust roller and cage assembly, wherein needle rollers or cylindrical rollers are configured radially in the cage, and a bearing ring of disc form is intended to support one-directional axial load.

In mounting, it is possible to use a shaft or a housing as the direct raceway surface without using the bearing

ring, whereby design of a low height and lightweight compact construction is enabled.

This type of thrust roller bearing results in slipping on raceway surface because theoretically it can't roll perfectly, but in most cases it is practically trouble-free and can rotate at comparatively high speed.

Bearing type	Cage type	Applicable shaft diameter (mm)	Composition of bearing number	Bearing number	Remarks
AXK 	Pressed steel cage	$\phi 10 - \phi 120$	AXK 11 04 ——— Bore diameter code ——— Dimension series code ——— Type code	AXK1104	The type can be used together with the Type AS bearing ring with the lower limit of safety factor S_0 is 3
	High strength brass cage	$\phi 130 - \phi 160$			
K811 K812 	Standard type Polyamide resin cage	Type K811 $\phi 10 - \phi 120$ Type K812 $\phi 30 - \phi 80$	K8 11 10 T2 ——— Suffix ——— Bore diameter code ——— Dimension series code ——— Type code [Suffix] T2: resin cage JW: Pressed steel cage	K81110T2	The suffix T2 means that this bearing uses a polyamide resin cage. Therefore, use this bearing at a temperature 120°C or lower; or at 100°C or lower for continuous operation. Feel free to contact NTN for the detail of the pressed steel cage. Possible to use in combination with GS and WS bearing rings. K811 conforms to the Dimension Series 11 specified in JIS B 1512. K812 conforms to the Dimension Series 12 specified in JIS B 1512.
	Aluminum alloy cage	Type K811 $\phi 130 - \phi 160$ Type K812 $\phi 85 - \phi 140$			
	Pressed steel cage	$\phi 10 - \phi 90$			
K893 	Aluminum alloy cage	$\phi 30 - \phi 110$	K8 93 10 ——— Bore diameter code ——— Dimension series code ——— Type code	K89310	K893 conforms to the Dimension Series 93 specified in JIS B 1512.
K874 	Aluminum alloy cage	$\phi 40 - \phi 90$	K8 74 10 ——— Bore diameter code ——— Dimension series code ——— Type code	K87410	K893 conforms to the Dimension Series 93 specified in JIS B 1512.

Bearing type		Applicable shaft diameter (mm)	Composition of bearing number	Bearing number	Remarks
<p>811 812</p> 		$\phi 10 - \phi 160$	<p>8 11 10 T2</p> <ul style="list-style-type: none"> 8: Type code 11: Dimension series code 10: Bore diameter code T2: Suffix <p>[Suffix] T2: resin cage J: Punched steel plate cage</p>	81110T2	<p>The suffix T2 means that this bearing uses a polyamide resin cage. Therefore, use this bearing at a temperature 120°C or lower; or at 100°C or lower for continuous operation.</p> <p>WS and GS bearing rings are used in set.</p> <p>811 conforms to the Dimension Series 11 specified in JIS B 1512.</p> <p>812 conforms to the Dimension Series 12 specified in JIS B 1512.</p>
<p>893</p> 		$\phi 30 - \phi 110$	<p>8 93 10</p> <ul style="list-style-type: none"> 8: Type code 93: Dimension series code 10: Bore diameter code 	89310	<p>WS and GS bearing rings are used in set.</p> <p>893 conforms to the Dimension Series 93 specified in JIS B 1512.</p>
<p>874</p> 		$\phi 40 - \phi 90$	<p>8 74 10</p> <ul style="list-style-type: none"> 8: Type code 74: Dimension series code 10: Bore diameter code 	87410	<p>WS and GS bearing rings are used in set.</p> <p>874 conforms to the Dimension Series 74 specified in JIS B 1512.</p>
<p>AS</p>  <p>Pressed steel ring</p>		$\phi 10 - \phi 160$	<p>AS 11 04</p> <ul style="list-style-type: none"> AS: Type code 11: Dimension series code 04: Bore diameter code 	AS1104	<p>Because of its 1mm thick steel plate ring, this thrust bearing needs adequate rigidity and profile accuracy of machine parts adjacent to the bearing.</p> <p>As an individual, on occasion this thrust bearing results in slight camber, but it is flattened when specific thrust load acts thereon, having no problem in practical use.</p> <p>The lower limit of safety factor S_0 is 3.</p>
<p>WS811 WS893 WS812 WS874</p>  <p>Machined type, for inner ring land riding</p>		$\phi 10 - \phi 160$	<p>WS8 11 04</p> <ul style="list-style-type: none"> WS8: Type code 11: Dimension series code 04: Bore diameter code 	WS81104	<p>Higher rigidity and higher running accuracy than AS bearing ring .</p>

Bearing accuracy

The dimensional accuracy, profile accuracy and running accuracy of **Types 811, 812, 893 and 874** thrust cylindrical roller bearings shall be as specified in **Table 4.4** in Sec. 4. “**Bearing accuracy**” (page A-28).

The thrust roller and cage assembly **Types AXK, K881, K812, K893 and K874** are machined to the following dimensional tolerances: E11 (or E12 for bearing marked with T2) for bore diameter (D_{e1}); and c12 for outside diameter (D_c) on **Type AXK**, and a13 for **Types K811, K81, K893 and K874**.

Raceway surface requirements:

Where the plane portion of a shaft/a housing is used as the direct raceway surface of thrust roller and cage assembly, the raceway surface must meet the requirements specified as a guideline in **Table 1**.

Table 1 Raceway surface requirements (recommended)

Characteristics	Specified requirements
Perpendicularity (Max)	IT5 (IT4)
Surface roughness	0.2a
Surface hardness	HRC58~64
Effective case depth	Refer to Formula (8.1) on page A-40.

Reference : The parenthesized value shall be applied for high running accuracy.

Cage guiding

To be able to center a running thrust roller and cage assembly (Type **AXK, K811, K812, K893** or **K874**), it is necessary to guide it on its bore (shaft side) or outside surface (housing side).

In general, the bore-side guide of low relative speed against the cage is mostly used. It should be used particularly for high speed running. The dimensional tolerances for shaft and housing, when the cage is guided thereby, shall be h8 for shaft diameter (bore guide) and H9 for housing bore diameter (outer surface guide) respectively, which of the guide surface shall be fine-finished by grinding.

Bearing fit in bearing ring

Table 2 shows the tolerances for fitting of the thrust bearing rings (**AS, WS** and **GS**) on shaft or in housing.

Table 2 Bearing ring fit in shaft and housing (recommended)

Bearing ring		Shaft	Housing
Type AS	Locking to shaft	h10	Clearance to housing
	Locking to housing	Clearance to shaft	H11
Type WS (inner ring)		h6	—
Type GS (outer ring)		—	H7
Type ZS (central ring)	Locking to shaft	h6	—
	Locking to housing	—	H7

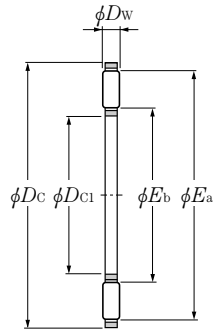
Mounting related dimensions

The mounting dimensions for bearing ring **Types WS, GS** and **ZS** relative to a shaft or housing are listed in the relevant dimension table.

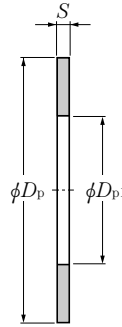
The fitting surface of **AS** bearing ring must be flat and have the rigidity sufficient to support thrust load throughout its entire surface.

The bearing ring has to be installed in correct orientation so that its raceway surface is seated onto the rolling elements. (As shown in the diagram in the relevant dimension table, the narrower chamfering on the bearing ring marks the raceway surface.)

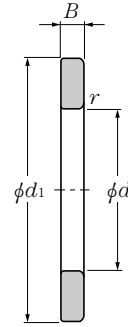
Type AXK11
 Type AS11
 Type WS811
 Type GS811



Type AXK
 (Thrust needle roller
 and cage assy)



AS bearing ring
 (washer)

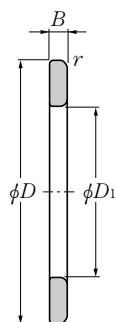


WS bearing ring
 (Inner ring)

D_{c1} 10~140mm

Boundary dimensions											Basic load ratings				
D_{c1} E11	D_c c12	D_w $^0_{-0.01}$	D_p e13	D_{p1} E12	S ²⁾ $^{0.05}$	mm					r_s min ¹⁾	dynamic N	static N	dynamic kgf	static kgf
						d	d_1 $^{-0.2}_{-0.5}$	D	D_1 $^{+0.5}_{+0.2}$	B					
10	24	2	24	10	1	10	24	24	10	2.75 $^0_{-0.060}$	0.3	9 150	25 300	935	2 580
12	26	2	26	12	1	12	26	26	12	2.75 $^0_{-0.060}$	0.3	9 850	28 900	1 010	2 940
15	28	2	28	15	1	15	28	28	16	2.75 $^0_{-0.060}$	0.3	11 300	36 000	1 150	3 700
17	30	2	30	17	1	17	30	30	18	2.75 $^0_{-0.060}$	0.3	11 900	39 500	1 220	4 050
20	35	2	35	20	1	20	35	35	21	2.75 $^0_{-0.060}$	0.3	13 200	46 500	1 340	4 750
25	42	2	42	25	1	25	42	42	26	3 $^0_{-0.060}$	0.6	14 600	58 000	1 490	5 900
30	47	2	47	30	1	30	47	47	32	3 $^0_{-0.060}$	0.6	16 300	69 500	1 660	7 100
35	52	2	52	35	1	35	52	52	37	3.5 $^0_{-0.075}$	0.6	17 800	81 500	1 820	8 300
40	60	3	60	40	1	40	60	60	42	3.5 $^0_{-0.075}$	0.6	27 400	110 000	2 790	11 300
45	65	3	65	45	1	45	65	65	47	4 $^0_{-0.075}$	0.6	29 800	128 000	3 050	13 100
50	70	3	70	50	1	50	70	70	52	4 $^0_{-0.075}$	0.6	31 500	143 000	3 250	14 500
55	78	3	78	55	1	55	78	78	57	5 $^0_{-0.075}$	0.6	38 000	186 000	3 850	19 000
60	85	3	85	60	1	60	85	85	62	4.75 $^0_{-0.075}$	1	44 500	234 000	4 550	23 900
65	90	3	90	65	1	65	90	90	67	5.25 $^0_{-0.075}$	1	46 500	254 000	4 750	25 900
70	95	4	95	70	1	70	95	95	72	5.25 $^0_{-0.075}$	1	53 500	253 000	5 500	25 800
75	100	4	100	75	1	75	100	100	77	5.75 $^0_{-0.075}$	1	55 000	266 000	5 650	27 100
80	105	4	105	80	1	80	105	105	82	5.75 $^0_{-0.075}$	1	56 500	279 000	5 750	28 400
85	110	4	110	85	1	85	110	110	87	5.75 $^0_{-0.075}$	1	57 500	291 000	5 850	29 700
90	120	4	120	90	1	90	120	120	92	6.5 $^0_{-0.090}$	1	70 500	390 000	7 200	39 500
100	135	4	135	100	1	100	135	135	102	7 $^0_{-0.090}$	1	90 000	550 000	9 200	56 500
110	145	4	145	110	1	110	145	145	112	7 $^0_{-0.090}$	1	93 500	590 000	9 550	60 500
120	155	4	155	120	1	120	155	155	122	7 $^0_{-0.090}$	1	99 000	650 000	10 100	66 500
130	170	5	170	130	1	130	170	170	132	9 $^0_{-0.090}$	1	140 000	900 000	14 300	92 000
140	180	5	180	140	1	140	178	180	142	9.5 $^0_{-0.090}$	1	145 000	960 000	14 800	97 500

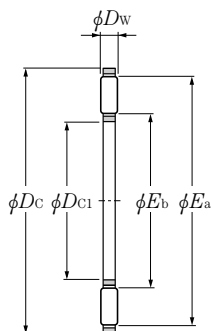
Note 1) Allowable minimum chamfer dimension r_s .
 2) Subject to measured thrust load of 20kg or more.



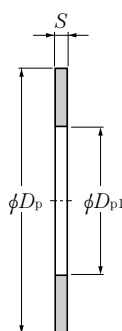
**GS bearing ring
(Outer ring)**

Limiting speeds		Bearing numbers				Reference dimensions		Mass		
grease	oil	thrust needle roller and cage assembly	washer	inner ring	outer ring	mm		AXK11	AS11	WS811 GS811
						E_b	E_a			
3 500	14 000	AXK1100	AS1100	WS81100	GS81100	12.3	21.7	0.0028	0.003	0.008
3 300	13 000	AXK1101	AS1101	WS81101	GS81101	14.3	23.7	0.003	0.0033	0.009
2 800	11 000	AXK1102	AS1102	WS81102	GS81102	17.2	26.5	0.0035	0.0035	0.01
2 500	10 000	AXK1103	AS1103	WS81103	GS81103	19.2	28.5	0.004	0.0038	0.011
2 100	8 500	AXK1104	AS1104	WS81104	GS81104	21.3	31.3	0.005	0.0051	0.014
1 800	7 000	AXK1105	AS1105	WS81105	GS81105	29.5	39.4	0.007	0.007	0.021
1 500	6 000	AXK1106	AS1106	WS81106	GS81106	34.5	44.4	0.008	0.008	0.025
1 400	5 500	AXK1107	AS1107	WS81107	GS81107	39.5	49.4	0.01	0.0091	0.033
1 200	4 700	AXK1108	AS1108	WS81108	GS81108	44.2	56.2	0.0185	0.0123	0.044
1 100	4 300	AXK1109	AS1109	WS81109	GS81109	50.5	62.4	0.0205	0.0136	0.055
1 000	3 900	AXK1110	AS1110	WS81110	GS81110	55.5	67.4	0.0235	0.0148	0.06
900	3 500	AXK1111	AS1111	WS81111	GS81111	61.0	74.9	0.0308	0.0189	0.095
800	3 200	AXK1112	AS1112	WS81112	GS81112	66.0	81.9	0.0390	0.0223	0.101
750	3 000	AXK1113	AS1113	WS81113	GS81113	71.0	86.9	0.04	0.0239	0.125
750	2 900	AXK1114	AS1114	WS81114	GS81114	75.5	91.4	0.06	0.0254	0.134
700	2 700	AXK1115	AS1115	WS81115	GS81115	80.5	96.4	0.061	0.027	0.155
650	2 600	AXK1116	AS1116	WS81116	GS81116	84.4	100.3	0.063	0.0284	0.163
600	2 400	AXK1117	AS1117	WS81117	GS81117	90.5	106.4	0.0668	0.0301	0.175
600	2 300	AXK1118	AS1118	WS81118	GS81118	96.5	116.4	0.086	0.0388	0.25
500	2 000	AXK1120	AS1120	WS81120	GS81120	107.5	131.4	0.112	0.0505	0.35
480	1 900	AXK1122	AS1122	WS81122	GS81122	115.5	139.4	0.122	0.0549	0.385
430	1 700	AXK1124	AS1124	WS81124	GS81124	125.5	149.4	0.131	0.0592	0.415
400	1 600	AXK1126	AS1126	WS81126	GS81126	136.0	164.0	0.205	0.074	0.663
380	1 500	AXK1128	AS1128	WS81128	GS81128	146.0	174.0	0.219	0.079	0.749

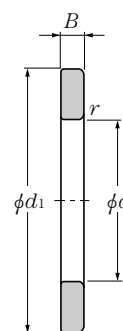
Type AXK11
Type AS11
Type WS811
Type GS811



Type AXK
(Thrust needle roller and cage assy)



AS bearing ring
(washer)

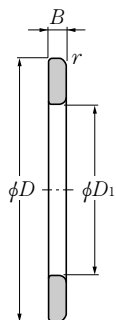


WS bearing ring
(Inner ring)

D_{c1} 150~160mm

Boundary dimensions											Basic load ratings					
mm											dynamic	static	dynamic	static		
D_{c1}	D_c	D_w	D_p	D_{p1}	S ²⁾	d	d_1	D	D_1	B	$r_{s \min}$ ¹⁾	N	N	kgf	kgf	
E11	c12	$\begin{smallmatrix} 0 \\ -0.01 \end{smallmatrix}$	e13	E12	0.05		$\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$		$\begin{smallmatrix} +0.5 \\ +0.2 \end{smallmatrix}$			C_a	C_{oa}	C_a	C_{oa}	
150	190	5	190	150	1	150	188	190	152	9.5	$\begin{smallmatrix} 0 \\ -0.090 \end{smallmatrix}$	1	149 000	1 020 000	15 200	104 000
160	200	5	200	160	1	160	198	200	162	9.5	$\begin{smallmatrix} 0 \\ -0.090 \end{smallmatrix}$	1	154 000	1 070 000	15 700	110 000

Note 1) Allowable minimum chamfer dimension r .
 2) Subject to measured thrust load of 20kg or more.



**GS bearing ring
(Outer ring)**

Limiting speeds		Bearing numbers				Reference dimensions		Mass		
grease	oil	thrust needle roller and cage assembly	washer	inner ring	outer ring	mm		kg (approx.)		
						E_b	E_a	AXK11	AS11	WS811 GS811
350	1 400	AXK1130	AS1130	WS81130	GS81130	156.0	184.2	0.232	0.084	0.796
330	1 300	AXK1132	AS1132	WS81132	GS81132	166.0	194.2	0.246	0.089	0.842