KSM

2014

HEAVY DUTY

- Taper Roller Bearings
- Spherical Roller Bearings
- Plummer Block Housings
- Bearing Units
- Super Bearing Units

- Ball Bearings
- Needle Roller Bearings
- Track Roller Bearings
- Linear Bearings
- Adapter Sleeves

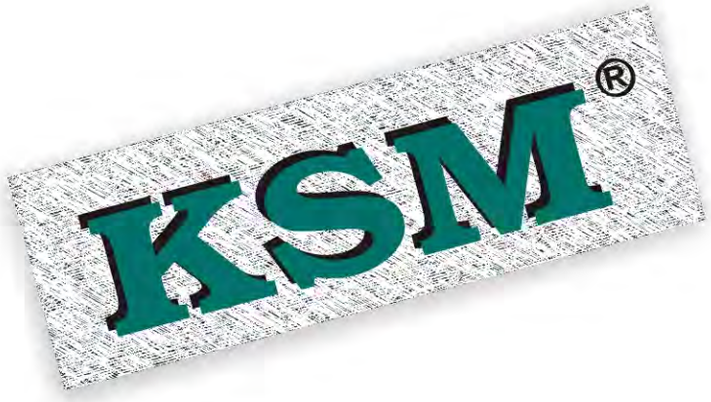
軸　受

Sakai City, Osaka, Japan.

Http://www.minamiguchi-bearings.com

In January 1958 Our Company
MINAMIGUCHI BEARING MFG.CO.,LTD.
In Osaka Japan, established by HIROMU MINAMIGUCHI.

Afterwards its production activities has been developed, enlarged and ball bearings commenced to be produced. It has always been our motto "HIGHER QUALITY & LOWER COST" as it is at present, through working hard constantly so as to enable us contribute to the industrial worked as well as to meet with the patronage of our customers.



BEARINGS & BEARING UNITS

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General index

		Pages for refer
		Total 56 pages
General technical information		
T1	Technical information of bearings	T 014 - T 049
	Technical supplement of bearings	Refer to below technical supplement
T2	Technical information of plummer block housings	T 368 - T 373
T3	Technical information of bearing units	T 388 - T 403
Technical supplement		
	Needle roller and cage assemblies	T 098
	Drawn cup needle roller bearings	T 110 & T 111
	One-way clutches	T 120
	Machined-ring needle roller bearings	T 124 & T 125
	Machined-ring needle roller bearings, separable	T 156
	Thrust needle roller bearings	T 168 & T 169
	Complex bearings	T 176 & T 177
	Roller followers	T 188 - T 190
	Cam followers	T 202 & T 203
	Components	T 218
	Seals	T 234 & T 235
	Track roller bearings	T 242 - T 250
	Linear ball bearings	T 260 - T 265

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General index

Pages for refer

Total 298 pages

Product information

P1	Ball bearings	P 052- P 094
P2	Needle roller bearings	P 099 - P 238
P3	Track roller bearings	P 251 - P 256
P4	Linear ball bearings	P 266 - P 278
P5	Adapter sleeves	P 281 - P 292
P6	Taper roller bearings	P 294 - P 305
P7	Spherical roller bearings	P 308 - P 363
P8	Plummer block housings	P 374 - P 383
P9	Bearing units	P 404 - P 434
	Super bearing units	P 436 - P 445

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General ball bearings

		Pages for refer
		P 052 - P 072
	Ball bearings	
	60.. ZZ, 60.. DDU & 60.. VV series	P 052
	62.. ZZ, 62.. DDU & 62.. VV series	P 053
	60.. ZZ, 60.. 2RS, 62.. ZZ & 62.. 2RS series (Non-standard)	P 054
	63.. ZZ, 63.. DDU & 63.. VV series	P 055
	622.. 2RS series	P 056
	623.. 2RS series	P 057
	630.. 2RS series	P 058
	68.., 68.. ZZ & 68.. 2RS series	P 059 & P 060
	69.., 69.. ZZ & 69.. 2RS series	P 061 & P 062
	16.. 2RS	P 063 & P 064
	R.., R.. ZZ & R.. 2RS series	P 065 & P 066
	RLS.., RLS.. ZZ & RLS.. 2RS series	P 067 & P 068
	RMS.., RMS.. ZZ & RMS.. 2RS series	P 069 & P 070
	Self-aligning ball bearings	
	12.. E, 12.. & 12.. K series	P 071
	13.. E, 13.. & 13.. K series	P 072

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General ball bearings		Pages for refer
		P 073 - P 094
	22.. E, 22.., 22.. K & 22.. 2RS series	P 073 & P 074
	23.. E, 23.., 23.. K & 23.. 2RS series	P 075 & P 076
Double-row angular contact ball bearings		
	30.. B TVH, 30.. B ZZ TVH & 30.. B 2RSR TVH series	P 077 & P 078
	52.. , 52.. ZZ & 52.. 2RS series	P 079 & P 080
	53.. , 53.. ZZ & 53.. 2RS series	P 081 & P 082
Thrust ball bearings		
	511.. series	P 083
	512.. series	P 084
Stainless steel (SUS 440 C) ball bearings		
	SS 60.., SS 60.. ZZ & SS 60.. 2RS series	P 085
	SS 62.., SS 62.. ZZ & SS 62.. 2RS series	P 086
	SS 63.., SS 63.. ZZ & SS 63.. 2RS series	P 087
	SS 68.., SS 68.. ZZ & SS 68.. 2RS series	P 088
	SS 69.., SS 69.. ZZ & SS 69.. 2RS series	P 089
	SS 16.. 2RS series	P 090 & P 091
	SS 160 series	P 092
	SS R.., SS R.. ZZ & SS R.. 2RS series	P 093 & P 094

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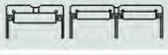
Needle roller bearings

		Pages for refer
		P 099 - P 174
	Needle roller and cage assemblies	
	K series	P 099 - P 108
	Drawn cup needle roller bearings	
	HK & BK series	P 112 - P 115
	HK.. RS & HK.. 2RS series	P 116 & P 117
	BK.. RS series	P 116 & P 117
	One-way clutches	
	HF series	P 121
	HFL series	P 122
	Machined-ring needle roller bearings	
	NA 48, NA 49, NA 59 & NA 69 ZW series	P 126 - P 135
	NA 49.. RSR, RNA 49.. RSR, NA 49.. 2RSR & RNA 49.. 2RSR series	P 136 & P 137
	RNA 48, RNA 49, RNA 59 & RNA 69 ZW series	P 138 - P 147
	NK series	P 148 - P 151
	NKI series	P 152 - P 154
	Machined-ring needle roller bearings, separable	
	RNAO series	P 158 - P 161
	NAO series	P 162 - P 165
	Thrust needle roller bearings	
	AXK 11, AS, WS & GS series	P 170 & P 171
	LS series	P 172
	K 811 & K 812 series	P 173 & P 174

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Needle roller bearings

		Pages for refer
		P 178 - P 238
	Complex bearings	
	NKX & NKX.. Z series	P 178 & P 179
	NKXR & NKXR.. Z series	P 180 & P 181
	NKIA 59 series	P 182 & P 183
	NKIB 59 series	P 184 & P 185
	Roller followers	
	NATR & NATR.. PP series	P 192 & P 193
	NATV & NATV.. PP series	P 194 & P 195
	NUTR series	P 196 & P 197
	NA 22.. 2RSR & RNA 22.. 2RSR series	P 198 & P 199
	PWTR.. 2RS series	P 200
	Cam followers	
	KR series	P 204 & P 205
	KRV series	P 206 & P 207
	NUKR series	P 208 & P 209
	NUKRE series	P 210 & P 211
	PWKR.. 2RS series	P 212 & P 213
	PWKRE.. 2RS series	P 214 & P 215
	Components	
	IR series	P 219 - P 231
	Seals	
	G & SD series	P 236 - P 238

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Track roller bearings

Technical supplement refer to pages (T 242 - T 250).

		Pages for refer
		P 251 - P 256
	LR 2 series	P 251
	LR 50 series	P 252
	LR 52 series	P 253
	LR 53 series	P 254
	LR 60 series	P 255
	LFR.. ZZ & LFR.. 2RS series	P 256

Linear ball bearings

Technical supplement refer to pages (T 260 - T 265).

		Pages for refer
		P266 - P 278
	LME.. AS series	P 266 & P 267
	LME.. UUAJ AS series	P 268 & P 269
	LME.. UUOP AS series	P 270 & P 271
	LMEF series	P 272 & P 273
	LMEK series	P 274 & P 275
	LMES series	P 276
	LMES.. OP series	P 277
	KH series, open types & PP	P 278

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Adapter sleeves

		Pages for refer
		P 280 - P 291
	H 2 series	280
	H 3 series	281
	H 23 series	282
	H 31 series	283
	HE 2 series	284
	HE 3 series	285
	HE 23 series	286
	HE 31 series	287
	AN series	289
	AW series	291

Taper roller bearings

		Pages for refer
		P 294 - P 305
	302.. A series	P 294 & P 295
	303.. A series	P 296 & P 297
	320.. X series	P 298 & P 299
	322.. A series	P 300 & P 301
	323.. A series	P 302 & P 303
	332.. series	P 304 & P 305

KSM®

Spherical roller bearings		Pages for refer
		P 308 - P 363
	213.. CC, 213.. CA & 213.. MB series	P 308 - P 317
	222.. CC, 222.. CA & 222.. MB series	P 318 - P 329
	223.. CC, 223.. CA & 223.. MB series	P 330 - P 337
	230.. CC, 230.. CA & 230.. MB series	P 338 - P 341
	231.. CC, 231.. CA & 231.. MB series	P 342 - P 345
	232.. CC, 232.. CA & 232.. MB series	P 346 - P 349
	240.. CC, 240.. CA & 240.. MB series	P 350 - P 353
	241.. CC, 241.. CA & 241.. MB series	P 354 - P 357
Spherical roller thrust bearings		
	292.. series	P 358 & P 359
	293.. series	P 360 & P 361
	294.. series	P 362 & P 363

Plummer block housings Technical information refer to pages (T 368 - T 373).		Pages for refer
		P 374 - P 383
	SNU 500-600 series	P 374 - P 377
	SN 500 series	P 378 & P 379
	SN 600 series	P 380 & P 381
	SN 200 series	P 382 & P 383

Bearing units

Technical information refer to pages (T 388 - T 403).

		Pages for refer
	Pillow blocks type	P 404 - P 419
	UCAK 200 series	P 404
	UCP 200 series	P 405 & P 406
	UKP 200 series	P 407
	UCPA 200 series	P 408
	UKPA 200 series	P 409
	UCPH 200 series	P 410
	Two bolts flanged units type	
	UCFL 200 series	P 411 & P 412
	UKFL 200 series	P 413
	UCFT 200 series	P 414
	UKFT 200 series	P 415
	Three bolts flanged units type	
	UCFB 200 series	P 416
	Four bolts flanged units type	
	UCF 200 series	P 417 & P 418
	UKF 200 series	P 419

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Bearing units

Technical information refer to pages (T 388 - T 403).

		Pages for refer
	Special flanged units type	P 420 - P 434
	UCFA 200 series	P 420
	Flanged cartridge units type	
	UCFC 200 series	P 421 & P 422
	UKFC 200 series	P 423
	Take up units type	
	UCT 200 series	P 424 & P 425
	Hanger units type	
	UCHA 200 series	P 426
	Insert ball bearings	
	UC 200 series	P 427 & P 428
	UK 200 series	P 429
	SA 200 series	P 430
	SB 200 series	P 431
	CSA 200 series	P 432
	CSB 200 series	P 433
	SER 200 series	P 434

Super bearing units		Pages for refer P 436 - P 445
	UCP 200 series	P 436
	UCF 200 series	P 437
	UCFL 200 series	P 438
	UCFC 200 series	P 439
	UCT 200 series	P 440
	UCUP 200 series	P 441
	UC 200 series	P 442
	AEL 200 series	P 443
	AS 200 series	P 444
	UK 200 series	P 445

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Technical information for bearings		Pages for refer
		T 015 - T 050
1	Bearing materials	T 015
2	External bearing sealing devices	T 016
3	Bearing tolerances	T 016 - T 025
4	Bearing fits	T 025 - T 034
5	Bearing internal clearance	T 035 - T 038
6	Lubrication	T 038 - T 040
7	Load rating and life	T 041 - T 046
8	Bearing handling	T 046 - T 049
9	Allowable speed	T 049 & T 050

1. Bearing materials

1.1 Raceway and rolling element materials

1.1.1 High/mid carbon alloy steel

In general, steel varieties which can be hardened not just on the surface but also deep hardened by the so-called " through hardening method" are used for the raceways and rolling elements of bearings. Foremostmong these is high carbon chromium bearing steel, which is widely used.

1.1.2 Mid-carbon chromium steel

Mid-carbon chromium steel in corporating silicone and manganese, which gives it hardening properties comparable to high carbon chromium steel.

1.1.3 Stainless steel

In general, all **KSM** bearings choose material of SUS 440 C

1.2 Cages

Material of bearing cage must have the strength to withstand rotations vibrations and shock loads. These materials must also have a low friction coefficient, in light weight, and be able to withstand bearing operation temperatures.

For small and medium sized bearings, pressed cages of cold or hot rolled steel with a low carbon content of approx. 0.1% are used. However, depending on the application, austenitic stainless steel is also used when bearings are made by stainless steel.

Machined cages are generally used for large bearings. Carbon steel for machine structures or high-strength cast brass is frequently used for the cages, but other materials such as aluminum alloy are also used.

Tables 1A and 1B provide the chemical composition for these representative cages materials.

Materials of polymide cages that can be injection molded are also widely used for cages. Polyamide resin reinforced with glass fibers is generally used. Cages made of high-polymer materials are lightweight and corrosion resistant. They also have superior damping and characteristics and lubrication performance. Heat resistant polyimide resins now enable the production of cages that perform well in applications ranging between -40° C -120° C. However, they are not recommended for use at temperatures exceeding 120°C.

Table 1A Chemical composition of steel plate for pressed cages and carbon steel for machined cages.

	Standard	Symbol	Chemical composition(%)						
			C	Si	Mn	P	S	Ni	Cr
Pressed retainers	JIS G 4305	SUS440 C	Max. 0.08	Max. 1.00	Max. 2.00	Max. 0.045	Max. 0.030	8.00~10.50	18.00~20.00

Table 1B Chemical composition of high-strength cast brass for machined cages

Standard	Symbol	Chemical composition(%)							Impurities	
		Cu	Zn	Mn	Fe	Al	Sn	Ni	Pb	Si
JIS H 5120	CAC301	55.0~60.0	33.0~42.0	0.1~1.5	0.5~1.5	0.5~1.5	Max. 1.0	Max. 1.0	Max. 0.4	Max. 0.1

2. External bearing sealing devices

External seals have two main functions: to prevent lubricating oil from leaking out, soas to prevent dust, water, and others contaminants from entering into the bearing. When selecting a seal, the following factors need to be taken into consideration: the type of lubricant (oil or grease), seal, peripheral speed, shaft fitting errors, space limitations, seal friction, resultant heat increase, and cost.

Sealing devices for rolling bearings fall into two main classifications:
Non-contact seals and contact seals.

2.1 Non-contact seals:
Non-contact seals utilize a small clearance between the shaft and the housing cover. Therefore friction is negligible, in order to make them suitable for high speed application, also to improve sealing capability, clearance spaces are often filled with lubricant.

2.2 Contact seals:
Contact seals accomplish their sealing action through the contact pressure of a resistant the seals (the lips are often made by synthetic rubber) the sealing surface. Contact seals are generally far superior to non-contact seals in sealing efficiency, although their friction torque and temperature rise coefficients are higher . Furthermore, because the portion of a contact seal rotates while in contact with the shaft, the allowable seal, peripheral speed, varies depending on seal type.

3. Tolerances

3.1 Standard of tolerances for ball and roller bearings
Ball bearing "tolerances"or dimensional accuracy and running accuracy, are regulated by ISO and JIS standards (rolling bearing tolerances). For dimensional accuracy, these standards prescribe the tolerances necessary when installing bearings on shafts or in housings.Running accuracy is defined as the allowable limits for bearing runout during operation.

Table 3A Comparison of tolerance classifications of national standards

Standard		Tolerance class				
Japanese industrial standard (JIS)	JIS	Class 0	Class 6	Class 5	Class 4	Class 2
International organization for standardization (ISO)	ISO	Normal class Class 6X	Class 6	Class 5	Class 4	Class 2
Deutsches institute fur normung(ISO)	DIN	P0	P6	P5	P4	P2
American national standards institute (ANSI)	ANSI/ABMA	ABEC-1	ABEC-3	ABEC-5	ABEC-7	ABEC-9

Table 3B Bearings types and applicable tolerance

Bearing type		Applicable standard	Applicable tolerance class				Applicable table
Ball bearing		JIS B 1514 (ISO 492) (**KSM** standard)	class 0	class 6	class 5	class 4	Table 3C
Angular contact ball bearings			class 0	class 6	class 5	class 4	Table 3C
Self-aligning ball bearings			class 0	—	—	—	Table 3C
Thrust ball bearings			class 0	class 6	class 5	class 4	Table 3E
Needle roller bearing			class change	class 6	class 5	class 4	Table 3D
Complex bearing	Radial bearing		class 0	class 6	class 5	—	Table 3D
	Thrust bearing		**KSM** class 0	**KSM** class 6	**KSM** class 5	**KSM** class 4	Table 3E
Needle roller bearing with double-direction thrustf roller bearing	Radial bearing		—	—	class 5	class 4	Table 3D
	Thrust bearing		—	—	**KSM** class 5	**KSM** class 4	Table 3E
Thrust roller bearings			**KSM** class 0	**KSM** class 6	**KSM** class 5	**KSM** class 4	Table 3E
Roller follower/cam follower			class 0	—	—	—	Table 3D
Taper roller bearing			**KSM** class 0 class 6X	**KSM** class 6	**KSM** class 5	**KSM** class 4	Table 3F
Spherical roller bearing							Table 3C
Spherical thrust roller bearings							Table 3G

Table 3C Tolerances for radial bll bearings

Inner rings

Nominal bore diameter d mm		Single plane mean bore diameter deviation Δ_{dmp}										Single radial plane bore diameter variation V_{dp}									
												diameter series 9					maxdiameter series 0,1				
		class 0		class 6		class 5		class 4 ❶		class 2 ❶		class 0	class 6	class 5	class 4	class 2	class 0	class 6	class 5	class 4	class 2
												max.					max.				
over	incl.	high	low	high	low	high	low	high	low	high	low										
10	18	0	-8	0	-7	0	-5	0	-4	0	-2.5	10	9	5	4	2.5	8	7	4	3	2.5
18	30	0	-10	0	-8	0	-6	0	-5	0	-2.5	13	10	6	5	2.5	10	8	5	4	2.5
30	50	0	-12	0	-10	0	-8	0	-6	0	-2.5	15	13	8	6	2.5	12	10	6	5	2.5
50	80	0	-15	0	-12	0	-9	0	-7	0	-4.0	19	15	9	7	4.0	19	15	7	5	4.0
80	120	0	-20	0	-15	0	-10	0	-8	0	-5.0	25	19	10	8	5.0	25	19	8	6	5.0
120	150	0	-25	0	-18	0	-13	0	-10	0	-7.0	31	23	13	10	7.0	31	23	10	8	7.0
150	180	0	-25	0	-18	0	-13	0	-10	0	-7.0	31	23	13	10	7.0	31	23	10	8	7.0

Nominal bore diameter d mm		Single radial plane bore diameter variation V_{dp} maxdiameter series 2,3,4					Mean single plane bore diameter variation V_{dmp}					Inner ring radial runout K_{ia}					Face runout with bore S_d		
		class 0	class 6	class 5	class 4	class 2	class 0	class 6	class 5	class 4	class 2	class 0	class 6	class 5	class 4	class 2	class 5	class 4	class 2
				max.					max.					max.				max.	
over	incl.																		
10	18	6	5	4	3	2.5	6	5	3	2.0	1.5	10	7	4	2.5	1.5	7	3	1.5
18	30	8	6	5	4	2.5	8	6	3	2.5	1.5	13	8	4	3.0	2.5	8	4	1.5
30	50	9	8	6	5	2.5	9	8	4	3.0	1.5	15	10	5	4.0	2.5	8	4	1.5
50	80	11	9	7	5	4.0	11	9	5	3.5	2.0	20	10	5	4.0	2.5	8	5	1.5
80	120	15	11	8	6	5.0	15	11	5	4.0	2.5	25	13	6	5.0	2.5	9	5	2.5
120	150	19	14	10	8	7.0	19	14	7	5.0	3.5	30	18	8	6.0	2.5	10	6	2.5
120	150	19	14	10	8	7.0	19	14	7	5.0	3.5	30	18	8	6.0	5.0	10	6	4.0

(Unit : μm)

Nominal bore diameter d mm over	incl.	Inner ring axial runout (with side) Sia❷ class 5	class 4	class 2	Inner ring width deviation △Bs normal class 0,6 high	low	class 5,4 high	low	class 2 high	low	modified❸ class 0,6 high	low	class 5,4 high	low	Inner ring width varietion VBs class 0	class 6	class 5 max.	class 4	class 2
10	18	7	3	1.5	0	-120	0	- 80	0	- 80	0	- 250	0	- 250	20	20	5	2.5	1.5
18	30	8	4	2.5	0	-120	0	-120	0	-120	0	-250	0	-250	20	20	5	2.5	1.5
30	50	8	4	2.5	0	-120	0	-120	0	-120	0	-380	0	-250	20	20	5	3.0	1.5
50	80	8	5	2.5	0	-150	0	-150	0	-150	0	-380	0	-250	25	25	6	4.0	1.5
80	120	9	5	2.5	0	-200	0	-200	0	-200	0	-380	0	-380	25	25	7	4.0	2.5
120	150	10	7	2.5	0	-250	0	-250	0	-250	0	-500	0	-380	30	30	8	5.0	2.5
120	150	10	7	5.0	0	-250	0	-250	0	-250	0	-500	0	-380	30	30	8	5.0	4.0

Note: ❶ The dimensional difference △ds of bore diameter to applied for class 4 and 2 is the same as the tolerance of dimentional difference △dmp of average bore diameter. How ever, the dimensional difference is applied to diameter series 0, 1, 2, 3 and 4 against Class 4, and to all the diameter series against Class 2.

❷ To be applied for deep groove ball bearing and angular contact ball bearings.

❸ To be applied for individual raceway rings manufactured for combined bearing use.

Outer rings

Nominal Outside diameter D mm over	incl.	Single plane mean outside diameter deviation △Dmp class 0 high	low	class 6 high	low	class 5 high	low	class 4❹ high	low	class 2❹ high	low	Single radial plane outside diameter variation VDp diameter series 9 class 0	class 6	class 5 max.	class 4	class 2	maxdiameter series 0.1 class 0	class 6	class 5 max.	class 4	class 2
6	18	0	-8	0	-7	0	-5	0	-4	0	-2.5	10	9	5	4	2.5	8	7	4	3	2.5
18	30	0	-9	0	-8	0	-6	0	-5	0	-4.0	12	10	6	5	4.0	9	8	5	4	4.0
30	50	0	-11	0	-9	0	-7	0	-6	0	-4.0	14	11	7	6	4.0	11	9	5	5	4.0
50	80	0	-13	0	-11	0	-9	0	-7	0	-4.0	16	14	9	7	4.0	13	11	7	5	4.0
80	120	0	-15	0	-13	0	-10	0	-8	0	-5.0	19	16	10	8	5.0	19	16	8	6	5.0
120	150	0	-18	0	-15	0	-11	0	-9	0	-5.0	23	19	11	9	5.0	23	19	8	7	5.0
150	180	0	-25	0	-18	0	-13	0	-10	0	-7.0	31	23	13	10	7.0	31	23	10	8	7.0
180	250	0	-30	0	-20	0	-15	0	-11	0	-8.0	38	25	15	11	8.0	38	25	11	8	8.0
250	315	0	-35	0	-25	0	-18	0	-13	0	-8.0	44	31	18	13	8.0	44	31	14	10	8.0

Nominal Outside diameter D mm over	incl.	Vdp max diameter series 2.3.4 class 0	class 6	class 5 max.	class 4	class 2	diameter variation Vdp❻ capped bearings diameter series 2,3,4 class 0 max.	0,1,2,3,4 class 6	Mean single plane outside diameter variation Vdmp class 0	class 6	class 5 max.	class 4	class 2
6	18	6	5	4	3	2.5	10	9	6	5	3	2.0	1.5
18	30	7	6	5	4	4.0	12	10	7	6	3	2.5	2.0
30	50	8	7	5	5	4.0	16	13	8	7	4	3.0	2.0
50	80	10	8	7	5	4.0	20	16	10	8	5	3.5	2.0
80	120	11	10	8	6	5.0	26	20	11	10	5	4.0	2.5
120	150	14	11	8	7	5.0	30	25	14	11	6	5.0	2.5
150	180	19	14	10	8	7.0	38	30	19	14	7	5.0	3.5
180	250	23	15	11	8	8.0	—	—	23	15	8	6.0	4.0
250	315	26	19	14	10	8.0	—	—	26	19	9	7.0	4.0

(Unit : μm)

Nominal Outside diameter D mm over	incl.	Outer ring radial runout Kea class 0	class 6	class 5 max.	class 4	class 2	Outside surface inclination SD class 5	class 4 max.	class 2	Outside ring axial runout Sea❼ class 5	class 4 max.	class 2	Outer ring width deviation ΔCs all type	Outer ring width variation Vcs class 0,6	class 5	class 4 max.	class 2
6	18	15	8	5	3	1.5	8	4	1.5	8	5	1.5	Identical to ΔBs of inner ring of same bearing	Identical to ΔBs and Vbs of inner ring of same bearing	5	2.5	1.5
18	30	15	9	6	4	2.5	8	4	1.5	8	5	2.5			5	2.5	1.5
30	50	20	10	7	5	2.5	8	4	1.5	8	5	2.5			5	2.5	1.5
50	80	25	13	8	5	4.0	8	4	1.5	10	5	4.0			6	3.0	1.5
80	120	35	18	10	6	5.0	9	5	2.5	11	6	5.0			8	4.0	2.5
120	150	40	20	11	7	5.0	10	5	2.5	13	7	5.0			8	5.0	2.5
150	180	45	23	13	8	5.0	10	5	2.5	14	8	5.0			8	5.0	2.5
180	250	50	25	15	10	7.0	11	7	4.0	15	10	7.0			10	7.0	4.0
250	315	60	30	18	11	7.0	13	8	5.0	18	10	7.0			11	7.0	5.0

Note: ❺ The dimensional difference △Ds of outer diameter to be applied for classes 4 and 2 is the same as the tolerance of dimensional difference △Dmp of average outer diameter. However, the dimensional difference is applied to diameter series 0,1.2.3 and 4 against Class 4, and also to all the diameter series against Cfass 2.

❻ To be applied in case snap rings are not installed on the bearings.

❼ To be applied for Deep Groove Ball Bearings and Angular Contact Ball Bearings.

Table 3D Tolerance for needle roller bearings

Inner rings

Nominal bore diameter d mm		Single plane mean bore diameter deviation $\triangle d_{mp}$								Single radial plane bore diameter variation V_{dp}				Mean single plane bore diameter variation V_{dmp}				Inner ring radial runout K_{ia}			
		class 0		class 6		class 5		class 4 ❶		class 0	class 6	class 5	class 4	class 0	class 6	class 5	class 4	class 0	class 6	class 5	class 4
over	incl.	high	low	high	low	high	low	high	low	max.				max.				max.			
2.5 ❷	10	0	-8	0	-7	0	-5	0	-4	10	9	5	4	6	5	3	2.0	10	6	4	2.5
10	18	0	-8	0	-7	0	-5	0	-4	10	9	5	4	6	5	3	2.0	10	7	4	2.5
18	30	0	-10	0	-8	0	-6	0	-5	13	10	6	5	8	6	3	2.5	13	8	4	3.0
30	50	0	-12	0	-10	0	-8	0	-6	15	13	8	6	9	8	4	3.0	15	10	5	4.0
50	80	0	-15	0	-12	0	-9	0	-7	19	15	9	7	11	9	5	3.5	20	10	5	4.0
80	120	0	-20	0	-15	0	-10	0	-8	25	19	10	8	15	11	5	4.0	25	13	6	5.0
120	150	0	-25	0	-18	0	-13	0	-10	31	23	13	10	19	14	7	5.0	30	18	8	6.0
150	180	0	-25	0	-18	0	-13	0	-10	31	23	13	10	19	14	7	5.0	30	18	8	6.0
180	250	0	-30	0	-22	0	-15	0	-12	38	28	15	12	23	17	8	6.0	40	20	10	8.0
250	315	0	-35	0	-25	0	-18	—	—	44	31	18	—	26	19	9	—	50	25	13	—
315	400	0	-40	0	-30	0	-23	—	—	50	38	23	—	30	23	12	—	60	30	15	—
400	500	0	-45	0	-35	—	—	—	—	56	44	—	—	34	26	—	—	65	35	—	—

Note: ❶ The dimensional difference $\triangle d_s$ of the bore diameter to be applied for class 4 is the same as the tolerance of dimensional difference $\triangle d_{mp}$ of the average bore diameter

❷ Nominal bore diameter of bearings of 2.5 mm is included in this dimensional division.

(Unit: μm)

Nominal bore diameter d mm		Face runout with bore S_d			Inner ring axial runout (with side) S_{ia} ❸			Inner ring width deviation $\triangle B_s$				Inner ring width variation V_{Bs}			
		class 0	class 6	class 5	class 0	class 6	class 5	class 0,6		class 5,4		class 0	class 6	class 5	class 4
over	incl.	max.			max.			high	low	high	low	max.			
2.5 ❷	10	7	3	1.5	7	3	1.5	0	-120	0	-40	15	15	5	2.5
10	18	7	3	1.5	7	3	1.5	0	-120	0	-80	20	20	5	2.5
18	30	8	4	1.5	8	4	2.5	0	-120	0	-120	20	20	5	2.5
30	50	8	4	1.5	8	4	2.5	0	-120	0	-120	20	20	5	3.0
50	80	8	5	1.5	8	5	2.5	0	-150	0	-150	25	25	6	4.0
80	120	9	5	2.5	9	5	2.5	0	-200	0	-200	25	25	7	4.0
120	150	10	6	2.5	10	7	2.5	0	-250	0	-250	30	30	8	5.0
150	180	10	6	4.0	10	7	5.0	0	-250	0	-250	30	30	8	5.0
180	250	11	7	5.0	13	8	5.0	0	-300	0	-300	30	30	10	6.0
250	315	13	—	—	15	—	—	0	-350	0	-350	35	35	13	—
315	400	15	—	—	20	—	—	0	-400	0	-400	40	40	15	—
400	500	—		—	—	—	—	0	-450	—	—	50	45	—	—

Note: ❸ To be applied for deep groove ball bearing.

Symbols: $\triangle d_{mp}$: dveiation of the mean bore diameter from the nominal ($\triangle dmp = dmp - d$).

V_{dp}: bore diameter variation; difference between the largest and smallest single bore diameters in one plane.

V_{dmp}: mean bore diameter variation; difference between the largest and smallest mean bore diameters of one ring or washer.

K_{ia}: radial runout of assembled bearing inner ring and assembled bearing outer ring, respectively.

S_d: side face runout with reference to bore (of inner ring).

S_{ia}: side face runout of assembled bearing inner ring and assembled bearing outer ring, respectively.

$\triangle B_s$: deviation of single inner ring width or single outer ring width from the nominal ($\triangle Bs = Bs - B$ etc.)

V_{bs}: ring width variation; difference between the largest and smallest single widths of inner ring and of outer ring, respectively.

Outer rings

Nominal outside diameter D mm		Single plane mean outside diameter deviation ΔDmp								Single radial plane outside diameter variation VDp				Mean single plane outside diameter variation VDmp				Outer ring radial runout Kea			
		class 0		class 6		class 5		class 4 ❹		class 0	class 6	class 5	class 4	class 0	class 6	class 5	class 4	class 0	class 6	class 5	class 4
over	incl.	high	low	high	low	high	low	high	low	max.				max.				max.			
6 ❺	18	0	-8	0	-7	0	-5	0	-4	10	9	5	4	6	5	3	2.0	15	8	5	3
18	30	0	-9	0	-8	0	-6	0	-5	12	10	6	5	7	6	3	2.5	15	9	6	4
30	50	0	-11	0	-9	0	-7	0	-6	14	11	7	6	8	7	4	3.0	20	10	7	5
50	80	0	-13	0	-11	0	-9	0	-7	16	14	9	7	10	8	5	3.5	25	13	8	5
80	120	0	-15	0	-13	0	-10	0	-8	19	16	10	8	11	10	5	4.0	35	18	10	6
120	150	0	-18	0	-15	0	-11	0	-9	23	19	11	9	14	11	6	5.0	40	20	11	7
150	180	0	-25	0	-18	0	-13	0	-10	31	23	13	10	19	14	7	5.0	45	23	13	8
180	250	0	-30	0	-20	0	-15	0	-11	38	25	15	11	23	15	8	6.0	50	25	15	10
250	315	0	-35	0	-25	0	-18	0	-13	44	31	18	13	26	19	9	7.0	60	30	18	11
315	400	0	-40	0	-28	0	-20	0	-15	50	35	20	15	30	21	10	8.0	70	35	20	13
400	500	0	-45	0	-33	0	-23	—	—	56	41	23	—	34	25	12	—	80	40	23	—
500	630	0	-50	0	-38	0	-28	—	—	63	48	28	—	38	29	14	—	100	50	25	—

Note: ❹ The dimensional difference $\triangle Ds$ of the outer diameter to be applied for class 4 is the same as the tolerance of dimensional difference $\triangle Dmp$ of the average outer diameter.
❺ Nominal outer diameter of bearings of 6 mm is included in this dimensional division.

(Unit: μm)

Nominal outside diameter D mm		Outside surface inclination Sd		Outside ring axial runout Sia ❻		Outer ring width deviation ΔCs	Outer ring width variation VCs		
		class 5	class 4	class 5	class 4		class 0,6	class 5	class 4
over	incl.	max.		max.		all type	max.		
6 ❺	18	8	4	8	5	Identical to ΔBs of inner ring of same bearing	Identical to ΔBs and Vbs of inner ring of same bearing	5	2.5
18	30	8	4	8	5			5	2.5
30	50	8	4	8	5			5	2.5
50	80	8	4	10	5			6	3.0
80	120	9	5	11	6			8	4.0
120	150	10	5	13	7			8	5.0
150	180	10	5	14	8			8	5.0
180	250	11	7	15	10			10	7.0
250	315	13	8	18	10			11	7.0
315	400	13	10	20	13			13	8.0
400	500	15	—	23	—			15	—
500	630	18	—	25	—			18	—

Note: ❻ To be applied for deep groove ball bearings.

Symbols: $\triangle Dmp$: deviation of the mean outside diameter from the nominal ($\triangle Dmp = Dmp - D$).
VDp: outside diameter variation; difference between the largest and smallest single outside diameters in one plane.
$Vdmp$: mean bore diameter variation; difference between the largest and smallest mean bore diameters of one ring or washer.
Kea: radial runout of assembled bearing inner ring and assembled bearing outer ring, respectively.
Sd: side face runout with reference to bore (of inner ring).
Sia: side face runout of assembled bearing inner ring and assembled bearing outer ring, respectively.
$\triangle Cs$: deviation of single inner ring width or single outer ring width from the nominal ($\triangle Bs = Bs - B$ etc.)
Vcs: ring width variation; difference between the largest and smallest single widths of inner ring and of outer ring, respectively.

Table 3E Tolerances of thrust ball bearings & thrust roller bearings

Inner rings (Unit: μm)

Nominal outer diameter d mm		Single plane mean bore diameter deviation △dmp				Single radial plane bore diameter variation Vdp		Thrust bearing shaft washer raceway (or center washer raceway) thickness variation St			
		class 0,6,5		class 4		class 0,6,5	class 4	class 0	class 6	class 5	class 4
over	incl.	high	low	high	low	max.		max.			
—	18	0	-8	0	-7	6	5	10	5	3	2
18	30	0	-10	0	-8	8	6	10	5	3	2
30	50	0	-12	0	-10	9	8	10	6	3	2
50	80	0	-15	0	-12	11	9	10	7	4	3
80	120	0	-20	0	-15	15	11	15	8	4	3
120	180	0	-25	0	-18	19	14	15	9	5	4
180	250	0	-30	0	-22	23	17	20	10	5	4
250	315	0	-35	0	-25	26	19	25	13	7	5
315	400	0	-40	0	-30	30	23	30	15	7	5
400	500	0	-45	0	-35	34	26	30	18	9	6
500	630	0	-50	0	-40	38	30	35	21	11	7

Outer rings (Unit: μm)

Nominal outside diameter D mm		Single plane mean outside diameter deviation △Dmp				Single radial plane outside diameter variation VDp		Thrust bearing housing washer raceway thickness variation Se			
		class 0,6,5		class 4		class 0,6,5	class 4	class 0	class 6	class 5	class 4
over	incl.	high	low	high	low	max.		max.			
10	18	0	-11	0	-7	8	5				
18	30	0	-13	0	-8	10	6				
30	50	0	-16	0	-9	12	7				
50	80	0	-19	0	-11	14	8				
80	120	0	-22	0	-13	17	10	According to the tolerance of Si against "d" or "d2" of the same bearings			
120	180	0	-25	0	-15	19	11				
180	250	0	-30	0	-20	23	15				
250	315	0	-35	0	-25	26	19				
315	400	0	-40	0	-28	30	21				
400	500	0	-45	0	-33	34	25				
500	630	0	-50	0	-38	38	29				
630	800	0	-75	0	-45	55	34				

Symbols: △*dmp*: deviation of the mean bore diameter from the nominal (△dmp = dmp - d).
Vdp: bore diameter variation; difference between the largest and smallest single bore diameters in one plane.
Si: thickness variation, measured from middle of raceway to back (seating) face of shaft washer and of housing washer, respectively (axial runout).
△*Dmp*: deviation of the mean outside diameter from the nominal (△Dmp=Dmp - D).
Vdp: outside diameter variation; difference between the largest and smallest single outside diameters in one plane.
Se: thickness variation, measured from middle of raceway to back (seating) face of shaft washer and of housing washer, respectively (axial runout).

Table 3F Tolerance of taper roller bearings
Inner rings

Nominal outer diameter *d* mm		Single plane mean bore diameter deviation $\triangle dmp$						Single radial plane bore diameter variation Vdp				Mean single plane bore diameter variation $Vdmp$				Inner ring radial runout Kia			
		class 0 class 6X		class 5 class 6		class 4 ❶		class 0 class 6X	class 6	class 5	class 4	class 0 class 6X	class 6	class 5	class 4	class 0 class 6X	class 6	class 5	class 4
over	incl.	high	low	high	low	high	low	max.				max.				max.			
10	18	0	-12	0	-7	0	-5	12	7	5	4	9	5	5	4	15	7	5	3
18	30	0	-12	0	-8	0	-6	12	8	6	5	9	6	5	4	18	8	5	3
30	50	0	-12	0	-10	0	-8	12	10	8	6	9	8	5	5	20	10	6	4
50	80	0	-15	0	-12	0	-9	15	12	9	7	11	9	6	5	25	10	7	4
80	120	0	-20	0	-15	0	-10	20	15	11	8	15	11	8	5	30	13	8	5
120	180	0	-25	0	-18	0	-13	25	18	14	10	19	14	9	7	35	18	11	6

Note: ❶ The dimensional difference $\triangle ds$ of the bore diameter to be applied for class 4 is the same as the tolerance of dimensional difference $\triangle dmp$ of the average bore diameter.

(Unit: μm)

Nominal outer diameter *d* mm		Face runout with bore *Sd*		Inner ring axial runout (with side) *Sia*	Inner ring width deviation $\triangle Bs$						Single-row bearing width deviation $\triangle Ts$					
		class 5	class 4	class 4	class 0 class 6		class 6X		class 5 class 4		class 0 class 6		class 6X		class 5 class 4	
over	incl.	max.		max.	high	low	high	low	high	low	high	low	high	low	high	low
10	18	7	3	3	0	-120	0	-50	0	-200	+200	0	+100	0	+200	-200
18	30	8	4	4	0	-120	0	-50	0	-200	+200	0	+100	0	+200	-200
30	50	8	4	4	0	-120	0	-50	0	-240	+200	0	+100	0	+200	-200
50	80	8	5	4	0	-150	0	-50	0	-300	+200	0	+100	0	+200	-200
80	120	9	5	5	0	-200	0	-50	0	-400	+200	-200	+100	0	+200	-200
120	180	10	6	7	0	-250	0	-50	0	-500	+350	-250	+150	0	+350	-250

Outer rings

Nominal outer diameter D mm		Single plane mean bore diameter deviation $\triangle Dmp$						Single radial plane bore diameter variation V_{Dp}				Mean single plane bore diameter variation V_{Dmp}				Inner ring radial runout Kea			
		class 0 class 6X		class 5 class 6		class 4 ❶		class 0 class 6X	class 6	class 5	class 4	class 0 class 6X	class 6	class 5	class 4	class 0 class 6X	class 6	class 5	class 4
over	incl.	high	low	high	low	high	low	max.				max.				max.			
18	30	0	-12	0	-8	0	-6	12	8	6	5	9	6	5	4	18	9	6	4
30	50	0	-14	0	-9	0	-7	14	9	7	5	11	7	5	5	20	10	7	5
50	80	0	-16	0	-11	0	-9	16	11	8	7	12	8	6	5	25	13	8	5
80	120	0	-18	0	-13	0	-10	18	13	10	8	14	10	7	5	35	18	10	6
120	150	0	-20	0	-15	0	-11	20	15	11	8	15	11	8	6	40	20	11	7
150	180	0	-25	0	-18	0	-13	25	18	14	10	19	14	9	7	45	23	13	8

Note: ❷ The dimensional difference $\triangle ds$ of the outside diameter to be applied for class 4 is the same as the tolerance of dimensional difference $\triangle Dmp$ of the average outside diameter.

(Unit: μm)

Nominal outer diameter D mm		Outside surface inclination S_D ❸		Outside ring axial runout Sea	Outer ring width deviation $\triangle Cs$ ❹			
		class 5	class 4	class 4	class 0, class 6 class 5, class 4		class 6X	
over	incl.	max.		max.	high	low	high	low
18	30	8	4	5	Depends on tolerance of $\triangle Bs$ in relation to d of same bearing		0	-100
30	50	8	4	5			0	-100
50	80	8	4	5			0	-100
80	120	9	5	6			0	-100
120	150	10	5	7			0	-100
150	180	10	5	8			0	-100

Note: ❸ Does not apply to bearings with flange.

❹ Applied to bearing where d is greater than 10 mm but is less than or equal to 400 mm.

Table 3G Tolerance of spherical thrust roller bearings

Inner rings

Nominal outer diameter d mm		Single plane mean bore diameter deviation $\triangle dmp$		Single radial plane bore diameter variation Vdp	Face runout with bore Sd	Height deviation of single direction thrust bearings $\triangle Ts$	
over	incl.	high	low	max.	max.	high	low
50	80	0	-15	11	25	+150	-150
80	120	0	-20	15	25	+200	-200
120	180	0	-25	19	30	+250	-250
180	250	0	-30	23	30	+300	-300
250	315	0	-35	26	35	+350	-350

Outer rings

Nominal outer diameter D mm		Single plane mean outside diameter deviation $\triangle dmp$	
over	incl.	high	low
120	180	0	-25
180	250	0	-30
250	315	0	-35
315	400	0	-40
400	500	0	-45
500	630	0	-50

3.2 Chamfer measurements and tolerance or allowable values of tapered bore

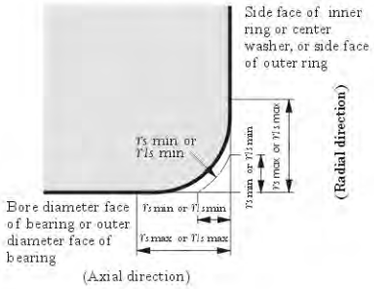


Table 3H Allowable critical-value of taper roller bearing chamfer (Unit: μm)

rs min ❶ or r1s min	Nominal bore diameter of bearing "d" or nominal outside diameter "D" ❷ over	incl.	rs max or r1s max Radial direction	Axial direction
0.3	-	40	0.7	1.4
	40	-	0.9	1.6
0.6	-	40	1.1	1.7
	40	-	1.3	2.0
1.0	-	50	1.6	2.5
	50	-	1.9	3.0
1.5	-	120	2.3	3.0
	120	250	2.8	3.5
	250	-	3.5	4.0
2.0	-	120	2.8	4.0
	120	250	3.5	4.5
	250	-	4.0	5.0
2.5	-	120	3.5	5.0
	120	250	4.0	5.5
	250	-	4.5	6.0
3.0	-	120	4.0	5.5
	120	250	4.5	6.5
	250	400	5.0	7.0
	400	-	5.5	7.5
4.0	-	120	5.0	7.0
	120	250	5.5	7.5
	250	400	6.0	8.0
	400	-	6.5	8.5
5.0	-	180	6.5	8.0
	180	-	7.5	9.0
6.0	-	180	7.5	10.0
	180	-	9.0	11.0

4. Bearing fits

4.1 Interference

For rolling bearings, inner and outer rings are fixed on the shaft or in the housing so that relative movement does not occur between fitted surfaces during operation or under load. This relative movement (referred to as "creep") between the fitted surfaces of the bearing and the shaft or housing can occur in a radial direction, an axial direction, or in the direction of rotation. To help prevent this creeping movement, bearing rings and the shaft or housing are installed with one of three interference fits, a "tight fit" (also called shrink fit), "transition fit," or "loose fit" (also called clearance fit), and the degree of interference between their fitted surfaces varies.

The most effective way to fix the fitted surfaces between a bearing's raceway and shaft or housing are to apply a "tight fit." The advantage of this tight fit for thin walled bearings is that it provides uniform load support over the entire ring circumference without any loss of load carrying capacity. However, with a tight fit, ease of installation and disassembly is lost; and when using a non-separable bearing as the floating-side bearing, axial displacement is not possible. For this reason, a tight fit cannot be recommended in all cases.

4.2 The necessity of a proper fit

In some cases, improper fit may lead to damage and shorten bearing life, therefore it is necessary to make a careful analysis in selecting a proper fit. Some of the negative conditions caused by improper fit are listed below.

- Raceway cracking, early peeling and displacement of raceway.
- Raceway and shaft or housing abrasion caused by creeping and fretting corrosion.
- Seizing caused by loss of internal clearances.
- Increased noise and lower rotational accuracy due to raceway groove deformation.

4.3 Fit selection

Selection of a proper fit is depend upon thorough analysis of bearing operating conditions, including consideration of:

- Material shaft and housing , wall thickness, surface finished accuracy, etc.
- Machinery operating conditions (nature and magnitude of load, rotational speed, temperature, etc.)

4.3.1 "Tight fit," "transition fit," or "loose fit"

For raceways under rotating loads, a tight fit is necessary. (Refer to Table 4A & 4B) "Raceways under rotating loads" refer to raceways receiving loads rotating relative to their radial direction. For raceways under static loads, on the other hand, a loose fit is sufficient. (Example) Rotating inner ring load the direction of the radial load on the inner ring is rotating relatively.

For non-separable bearings, such as ball bearings, it is generally recommended that either the inner ring or outer ring be given a loose fit.

Table 4A Radial load for ball bearings

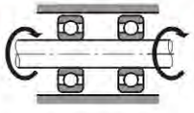
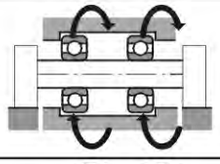
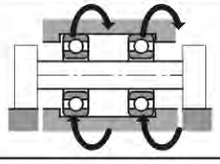
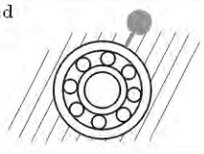
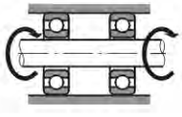
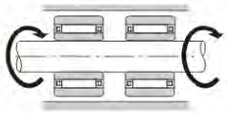
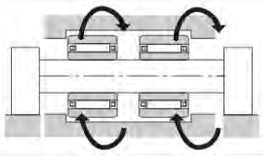
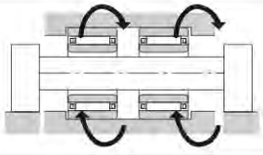
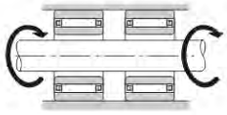
Illustration	Bearing rotation		Ring load	Fit
Static load		Inner ring: Rotating Outer ring: Stationary	Rotating inner ring load	Inner ring: Tight fit
Imbalanced load		Inner ring: Stationary Outer ring: Rotating	Static outer ring load	Outer ring: Loose fit
Static load		Inner ring: Stationary Outer ring: Rotating	Static inner ring load	Inner ring: Loose fit
Imbalanced load 		Inner ring: Rotating Outer ring: Stationary	Rotating outer ring load	Outer ring: Tight fit

Table 4B Radial load for roller bearings

Illustration	Bearing rotation	Ring load	Fit
Static load	 Inner ring: Rotating Outer ring: Stationary	Rotating inner ring load	Inner ring: Tight fit
Imbalanced load	 Inner ring: Stationary Outer ring: Rotating	Static outer ring load	Outer ring: Loose fit
Static load	 Inner ring: Stationary Outer ring: Rotating	Static inner ring load	Inner ring: Loose fit
Imbalanced load	 Inner ring: Rotating Outer ring: Stationary	Rotating outer ring load	Outer ring: Tight fit

4.3.2 Recommended Fits

The system of limits and fits define the tolerances of the outside diameter of the shaft or the bore diameter of a housing (the shaft or housing to which a metric bearing is installed). Bearing fit is governed by the selection of tolerances for the shaft outside diameter and housing bore diameter. Fig. 4A summarizes the interrelations between shaft outside diameter and bearing bore diameter, and between housing bore diameter and shaft outside diameter. Table 4C & 4D provides the recommended fits for common radial needle roller bearings (machined ring needle roller bearings with inner ring), relative to dimensions and loading conditions. Table 4E & 4F is a table of the numerical value of fits.

4.3.3 Interference minimum and maximum values

The following points should be considered when it is necessary to calculate the interference for an application:

- In calculating the minimum required amount of interference keep in mind that:
  1) interference is reduced by radial loads.
  2) interference is reduced by differences between bearing temperature and ambient temperature.
  3) interference is reduced by variation of fitted surfaces.
- Maximum interference should be no more than 1:1000 of the shaft diameter or outer diameter. Required interference calculations are shown below.

4.3.3.1 Fitted surface variation and required interference

Interference between fitted surfaces is reduced by roughness and other slight variations of these surfaces which are flattened in the fitting process. The degree of reduced interference depends upon the finish treatment of these surfaces, but in general it is necessary to assume the following interference reductions.

For ground shafts: 1.0 ~ 2.5 μm
For lathed shafts : 5.0 ~ 7.0 μm

4.3.3.2 Maximum interference

When bearing rings are installed with an interference fit, tension or compress on stress may occur along their raceways. If interference is too great, this may cause damage to the rings and reduce bearing life. For these reasons, maximum interference should not exceed the previously mentioned ratio of 1 : 1000 of the shaft or outside diameter.

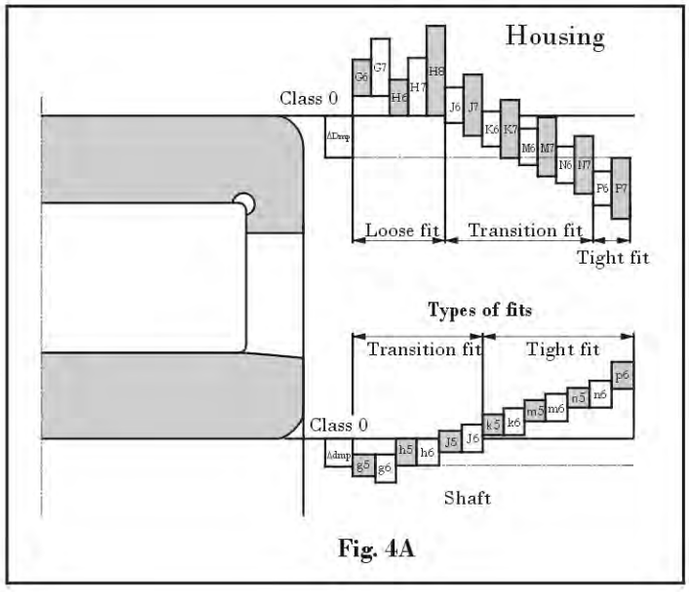


Fig. 4A

Table 4C General standards for needle roller bearings fits
Shaft fits

Nature of load	Fit	Load condition, magnitude	Shaft diameter mm over	incl	Tolerance class	Remarks
Indeterminate direction load Rotating inner ring load	Tight fit/ Transition fit	Light load ❶		~ 50	js6	When greater accuracy is required m5 may be substituted for m6.
			50 ~	100	k6	
			100 ~	200	m6	
		Normal load ❶		~ 50	k5	
			50 ~	100	m5	
			100 ~	150	m6	
			150 ~	200	n6	
			200 ~		p6	
		Heavy load ❶ or shock load		~ 150	n6	When greater accuracy is required m5 may be substituted for m6.
			150 ~		p6 r6	
Static inner ring load	Transition fit	Inner ring axial displacement possible	All shaft diameters		g6	When greater accuracy is required use g5. For large bearings, f6 may be used.
		Inner ring axial displacement unnecessary			h6	When greater accuracy is required use h5.
Centric axial load only	Transition fit	All loads	All shaft diameters		js6	General; depending on the fit, shaft and inner rings are not fixed.

❶ Standards for light loads, normal loads, and heavy loads.
Light loads : equivalent radial load $\leqslant 0.06\ Cr$
Normal loads: $0.06\ Cr <$ equivalent radial load $\leqslant 0.12\ Cr$
Heavy loads : $0.12\ Cr <$ equivalent radial load

Note: All values and fits listed in the above tables are for solid steel shafts.

Housing fits (Housing of the drawn cup needle roller bearings)

Nature of load	Housing	Fit	Load condition, magnitude	Tolerance class	Outer ring axial displacement❷	Remarks
Rotating outer ring load or static outer ring load	Solid housing or split housing	Loose fit	All loads	J7	Displacement possible	G7 also acceptable for large type bearings as well as outer rings and housings with large temperature differences
			Light❶ to normal load	H7	Displacement possible	—
	Solid housing	Transition or loose fit	High rotation accuracy required with light to normal loads	K6	Displacement not possible(in principle)	Applies primarily to roller bearings
Direction indeterminate load		Tight to transition fit	Light to normal load	J7	Displacement possible	When greater accuracy is required substitute j6 for J7 and K6 for K7.
			Normal to heavy load	K7	Displacement not possible(in principle)	
			Heavy shock load	M7	Displacement not possible	—
Inner ring static load or outer ring rotating load		Tight fit	Light or variable load	M7	Displacement not possible	—
			Normal to heavy load	N7	Displacement not possible	—
			Heavy load (thin wall housing)or heavy shock load	P7	Displacement not possible	—
Centered axial load only - Loose fit		Loose fit	—	Select a tolerance class that will provide clearance between outer ring and housing.		—

❶ Standards for light loads, normal loads, and heavy loads.
Light loads : equivalent radial load $\leqslant 0{,}06\ Cr$
Normal loads: $0{,}06\ Cr <$ equivalent radial load $\leqslant 0{,}12\ Cr$
Heavy loads : $0{,}12\ Cr <$ equivalent radial load

❷ Indicates whether or not outer ring axial displacement is possible with non-separable type bearings.

Note 1 : All values and fits listed in the above tables are for cast iron or steel housings.
2 : In cases where only a centered axial load acts on the bearing, select a tolerance class that will provide clearance in the axial direction for the outer ring.

Table 4D General standard for taper roller bearings and spherical roller bearings fits
Shaft fits

Nature of load	Fit	Load condition, magnitude	Shaft diameter mm over	incl	Tolerance class	Remarks
Indeterminate direction load Rotating inner ring load	Tight fit/ Transition fit	Light load ❶		~ 40	js6	When greater accuracy is required m5 may be substituted to m6.
			40 ~	140	k6	
			140 ~	200	m6	
		Normal load ❶		~ 40	k5	
			40 ~	100	m5	
			100 ~	140	m6	
			140 ~	200	n6	
			200 ~	400	p6	
		Heavy load ❶ or shock load	50 ~	140	n6	When greater accuracy is required m5 may be substituted to m6.
			140 ~	200	p6	
			200 ~		r6	
Static inner ring load	Transition fit	Inner ring axial displacement possible	All shaft diameters		g6	When greater accuracy is required use g5. For larger bearings, f6 may be used.
		Inner ring axial displacement unnecessary			h6	When greater accuracy is required use h5.
Centric axial load only	Transition fit	All loads	All shaft diameters		h9/IT5	In general, it depends on the fit, shaft and inner rings are not fixed.

❶ Standards for light loads, normal loads, and heavy loads.
Light loads : equivalent radial load ≤ 0.06 Cr
Normal loads: 0.06 Cr < equivalent radial load ≤ 0.12 Cr
Heavy loads : 0.12 Cr < equivalent radial load

Note: All values and fits listed in the above tables are for solid steel shafts.

Housing fits (Housing of the drawn cup taper roller bearings and spherical roller bearings)

Housing	Solid housing or split housing		Split housing
Load condition, magnitude	Static outer load	All loads	H7
		with large temperature different	G7
	Direction indeterminate load	Light to normal load	JS7
Tolerance class		Normal to heavy load	K7
		Heavy shock load	M7
	Outer ring Rotating load	Light or variable load	M7
		Normal to heavy load	N7
		Heavy load (thin wall housing) or heavy shock load	P7

Note: All values add fits listed in the above table is for cast iron or steel housings.
Select more tighten tolerance class for light weight alloy housings.

Table 4E Numeric value table of fitting for radial bearing of class 0 (Needle roller bearings)

Fitting against shaft

Nominal bore diameter of bearing d mm		Single plane mean bore diameter deviation $\triangle d_{mp}$		g5	g6	h5	h6	j5	js5	j6
				bearing shaft	bearing shaft	bearing shaft	bearing shaft	bearing shaft	bearing shaft	bearing shaft
over	incl.	high	low							
3	6	0	-8	4T ~ 9L	4T ~ 12L	8T ~ 5L	8T ~ 8L	11T ~ 2L	10.5T ~ 2.5L	14T ~ 2L
6	10	0	-8	3T ~ 11L	3T ~ 14L	8T ~ 6L	8T ~ 9L	12T ~ 2L	11T ~ 3L	15T ~ 2L
10	18	0	-8	2T ~ 14L	2T ~ 17L	8T ~ 8L	8T ~ 11L	13T ~ 3L	12T ~ 4L	16T ~ 3L
18	30	0	-10	3T ~ 16L	3T ~ 20L	10T ~ 9L	10T ~ 13L	15T ~ 4L	14.5T ~ 4.5L	19T ~ 4L
30	50	0	-12	3T ~ 20L	3T ~ 25L	12T ~ 11L	12T ~ 16L	18T ~ 5L	17.5T ~ 5.5L	23T ~ 5L
50	80	0	-15	5T ~ 23L	5T ~ 29L	15T ~ 13L	15T ~ 19L	21T ~ 7L	21.5T ~ 6.5L	27T ~ 7L
80	120	0	-20	8T ~ 27L	8T ~ 34L	20T ~ 15L	20T ~ 22L	26T ~ 9L	27.5T ~ 7.5L	33T ~ 9L
120	140									
140	160	0	-25	11T ~ 32L	11T ~ 39L	25T ~ 18L	25T ~ 25L	32T ~ 11L	34T ~ 9L	39T ~ 11L
160	180									
180	200									
200	225	0	-30	15T ~ 35L	15T ~ 44L	30T ~ 20L	30T ~ 29L	37T ~ 13L	40T ~ 10L	46T ~ 13L
225	250									
250	280	0	-35	18T ~ 40L	18T ~ 49L	35T ~ 23L	35T ~ 32L	42T ~ 16L	46.5T ~ 11.5L	51T ~ 16L
280	315									
315	355	0	-40	22T ~ 43L	22T ~ 54L	40T ~ 25L	40T ~ 36L	47T ~ 18L	52.5T ~ 12.5L	58T ~ 18L
355	400									
400	450	0	-45	25T ~ 47L	25T ~ 60L	45T ~ 27L	45T ~ 40L	52T ~ 20L	58.5T ~ 13.5L	65T ~ 20L
450	500									

Fitting against housing

Nominal outside diameter of bearing d mm		Single plane mean outside diameter deviation $\triangle D_{mp}$		G7	H6	H7	J6	J7	Js7	K6
				housing bearing	housing bearing	housing bearing	housing bearing	housing bearing	housing bearing	housing bearing
over	incl.	high	low							
6	10	0	-8	5L ~ 28L	0 ~ 17L	0 ~ 23L	4T ~ 13L	7T ~ 16L	7.5T ~ 15.5L	7T ~ 10L
10	18	0	-8	6L ~ 32L	0 ~ 19L	0 ~ 26L	5T ~ 14L	8T ~ 18L	9T ~ 17L	9T ~ 10L
18	30	0	-9	7L ~ 37L	0 ~ 22L	0 ~ 30L	5T ~ 17L	9T ~ 21L	10.5T ~ 19.5L	11T ~ 11L
30	50	0	-11	9L ~ 45L	0 ~ 27L	0 ~ 36L	6T ~ 21L	11T ~ 25L	12.5T ~ 23.5L	13T ~ 14L
50	80	0	-13	10L ~ 53L	0 ~ 32L	0 ~ 43L	6T ~ 26L	12T ~ 31L	15T ~ 28L	15T ~ 17L
80	120	0	-15	12L ~ 62L	0 ~ 37L	0 ~ 50L	6T ~ 31L	13T ~ 37L	17.5T ~ 32.5L	18T ~ 19L
120	150	0	-18	14L ~ 72L	0 ~ 43L	0 ~ 58L	7T ~ 36L	14T ~ 44L	20T ~ 38L	21T ~ 22L
150	180	0	-25	14L ~ 79L	0 ~ 50L	0 ~ 65L	7T ~ 43L	14T ~ 51L	20T ~ 45L	21T ~ 29L
180	250	0	-30	15L ~ 91L	0 ~ 59L	0 ~ 76L	7T ~ 52L	16T ~ 60L	23T ~ 53L	24T ~ 35L
250	315	0	-35	17L ~ 104L	0 ~ 67L	0 ~ 87L	7T ~ 60L	16T ~ 71L	26T ~ 61L	27T ~ 40L
315	400	0	-40	18L ~ 115L	0 ~ 76L	0 ~ 97L	7T ~ 69L	18T ~ 79L	28.5T ~ 68.5L	29T ~ 47L
400	500	0	-45	20L ~ 128L	0 ~ 85L	0 ~ 108L	7T ~ 78L	20T ~ 88L	31.5T ~ 76.5L	32T ~ 53L

Note: T = tight, L = loose

T1

(Unit: μm)

js6 bearing	k5 bearing	k6 bearing	m5 bearing	m6 bearing	n6 bearing	p6 bearing	r6 bearing	Nominal bore diameter of bearing d mm over	incl
12T ~ 4L	14T ~ 1T	17T ~ 1T	17T ~ 4T	20T ~ 4T	24T ~ 8T	28T ~ 12T		3	6
12,5T ~ 4,5L	15T ~ 1T	18T ~ 1T	20T ~ 6T	23T ~ 6T	27T ~ 10T	32T ~ 15T		6	10
13,5T ~ 5,5L	17T ~ 1T	20T ~ 1T	23T ~ 7T	26T ~ 7T	31T ~ 12T	37T ~ 18T		10	18
16,5T ~ 6,5L	21T ~ 2T	25T ~ 2T	27T ~ 8T	31T ~ 8T	38T ~ 15T	45T ~ 22T		18	30
20T ~ 8L	25T ~ 2T	30T ~ 2T	32T ~ 9T	37T ~ 9T	45T ~ 17T	54T ~ 26T		30	50
24,5T ~ 9,5L	30T ~ 2T	36T ~ 2T	39T ~ 11T	45T ~ 11T	54T ~ 20T	66T ~ 32T		50	80
31T ~ 11L	38T ~ 3T	45T ~ 2T	48T ~ 13T	55T ~ 13T	65T ~ 23T	79T ~ 37T		80	120
							113T ~ 63T	120	140
37,5T ~ 12,5L	46T ~ 3T	53T ~ 3T	58T ~ 15T	65T ~ 15T	77T ~ 27T	93T ~ 43T	115T ~ 65T	140	160
							118T ~ 68T	160	180
							136T ~ 77T	180	200
44,5T ~ 14,5L	54T ~ 4T	63T ~ 4T	67T ~ 17T	76T ~ 17T	90T ~ 31T	109T ~ 50T	139T ~ 80T	200	225
							143T ~ 84T	225	250
51T ~ 16L	62T ~ 4T	71T ~ 4T	78T ~ 20T	87T ~ 20T	101T ~ 34T	123T ~ 56T	161T ~ 94T	250	280
							165T ~ 98T	280	315
58T ~ 18L	69T ~ 4T	80T ~ 4T	86T ~ 21T	97T ~ 21T	113T ~ 37T	138T ~ 62T	184T ~ 108T	315	355
							190T ~ 114T	355	400
65T ~ 20L	77T ~ 5T	90T ~ 4T	95T ~ 23T	108T ~ 23T	125T ~ 40T	153T ~ 68T	211T ~ 126T	400	450
							217T ~ 132T	450	500

(Unit: μm)

K7 housing bearing	M7 housing bearing	N7 housing bearing	P7 housing bearing	Nominal outside diameter of bearing d mm over	incl
10T ~ 13L	15T ~ 8L	19T ~ 4L	24T ~ 1L	6	10
12T ~ 14L	18T ~ 8L	23T ~ 3L	29T ~ 3L	10	18
15T ~ 15L	21T ~ 9L	28T ~ 2L	35T ~ 5L	18	30
18T ~ 18L	25T ~ 11L	33T ~ 3L	42T ~ 6L	30	50
21T ~ 22L	30T ~ 13L	39T ~ 4L	52T ~ 8L	50	80
25T ~ 25L	35T ~ 15L	45T ~ 5L	59T ~ 9L	80	120
28T ~ 30L	40T ~ 18L	52T ~ 6L	68T ~ 10L	120	150
28T ~ 37L	40T ~ 25L	52T ~ 13L	68T ~ 3L	150	180
33T ~ 43L	46T ~ 30L	60T ~ 16L	79T ~ 3L	180	250
36T ~ 51L	52T ~ 35L	66T ~ 21L	88T ~ 1L	250	315
40T ~ 57L	57T ~ 40L	73T ~ 24L	98T ~ 1L	315	400
45T ~ 63L	63T ~ 45L	80T ~ 28L	108T ~ 0	400	500

Table 4F Numeric value table of fitting for radial bearing of class 0 (Taper roller bearings and spherical roller bearings)
Fitting against shaft

Nominal bore diameter of bearing d mm		Single plane mean bore diameter deviation $\triangle dmp$		g5 bearing shaft	g6 bearing shaft	h5 bearing shaft	H6 bearing shaft	j5 bearing shaft	js5 bearing shaft	j6 bearing shaft
over	incl.	high	low							
10	18	0	-8	2T ~ 14L	2T ~ 17L	8T ~ 8L	8T ~ 11L	13T ~ 3L	12T ~ 4L	16T ~ 3L
18	30	0	-10	3T ~ 16L	3T ~ 20L	10T ~ 9L	10T ~ 13L	15T ~ 4L	14.5T ~ 4.5L	19T ~ 4L
30	50	0	-12	3T ~ 20L	3T ~ 25L	12T ~ 11L	12T ~ 16L	18T ~ 5L	17.5T ~ 5.5L	23T ~ 5L
50	80	0	-15	5T ~ 23L	5T ~ 29L	15T ~ 13L	15T ~ 19L	21T ~ 7L	21.5T ~ 6.5L	27T ~ 7L
80	120	0	-20	8T ~ 27L	8T ~ 34L	20T ~ 15L	20T ~ 22L	26T ~ 9L	27.5T ~ 7.5L	33T ~ 9L
120	140	0	-25	11T ~ 32L	11T ~ 39L	25T ~ 18L	25T ~ 25L	32T ~ 11L	34T ~ 9L	39T ~ 11L
140	160									
160	180									
180	200	0	-30	15T ~ 35L	15T ~ 44L	30T ~ 20L	30T ~ 29L	37T ~ 13L	40T ~ 10L	46T ~ 13L
200	225									
225	250									
250	280	0	-35	18T ~ 40L	18T ~ 49L	35T ~ 23L	35T ~ 32L	42T ~ 16L	46.5T ~ 11.5L	51T ~ 16L
280	315									

Fitting against housing

Nominal outside diameter of bearing D mm		Single plane mean outside diameter deviation $\triangle Dmp$		G7 housing bearing	H6 housing bearing	H7 housing bearing	J6 housing bearing	J7 housing bearing	Js7 housing bearing	K6 housing bearing
over	Incl.	high	low							
10	18	0	-8	6L ~ 32L	0 ~ 19L	0 ~ 26L	5T ~ 14L	8T ~ 18L	9T ~ 17L	9T ~ 10L
18	30	0	-9	7L ~ 37L	0 ~ 22L	0 ~ 30L	5T ~ 17L	9T ~ 21L	10.5T ~ 19.5L	11T ~ 11L
30	50	0	-11	9L ~ 45L	0 ~ 27L	0 ~ 36L	6T ~ 21L	11T ~ 25L	12.5T ~ 23.5L	13T ~ 14L
50	80	0	-13	10L ~ 53L	0 ~ 32L	0 ~ 43L	6T ~ 26L	12T ~ 31L	15T ~ 28L	15T ~ 17L
80	120	0	-15	12L ~ 62L	0 ~ 37L	0 ~ 50L	6T ~ 31L	13T ~ 37L	17.5T ~ 32.5L	18T ~ 19L
120	150	0	-18	14L ~ 72L	0 ~ 43L	0 ~ 58L	7T ~ 36L	14T ~ 44L	20T ~ 38L	21T ~ 22L
150	180	0	-25	14L ~ 79L	0 ~ 50L	0 ~ 65L	7T ~ 43L	14T ~ 51L	20T ~ 45L	21T ~ 29L
180	250	0	-30	15L ~ 91L	0 ~ 59L	0 ~ 76L	7T ~ 52L	16T ~ 60L	23T ~ 53L	24T ~ 35L
250	315	0	-35	17L ~ 104L	0 ~ 67L	0 ~ 87L	7T ~ 60L	16T ~ 71L	26T ~ 61L	27T ~ 40L

Note: T = tight, L = loose

(Unit: μm)

js6 bearing shaft	k5 bearing shaft	k6 bearing shaft	m5 bearing shaft	m6 bearing shaft	n6 bearing shaft	p6 bearing shaft	r6 bearing shaft
13.5T ~ 5.5L	17T ~ 1T	20T ~ 1T	23T ~ 7T	26T ~ 7T	31T ~ 12T	37T ~ 18T	—
16.5T ~ 6.5L	21T ~ 2T	25T ~ 2T	27T ~ 8T	31T ~ 8T	38T ~ 15T	45T ~ 22T	—
20T ~ 8L	25T ~ 2T	30T ~ 2T	32T ~ 9T	37T ~ 9T	45T ~ 17T	54T ~ 26T	—
24.5T ~ 9.5L	30T ~ 2T	36T ~ 2T	39T ~ 11T	45T ~ 11T	54T ~ 20T	66T ~ 32T	—
31T ~11L	38T ~ 3T	45T ~ 2T	48T ~ 13T	55T ~ 13T	65T ~ 23T	79T ~ 37T	—
37.5T ~ 12.5L	46T ~ 3T	53T ~ 3T	58T ~ 15T	65T ~ 15T	77T ~ 27T	93T ~ 43T	113T ~ 63T 115T ~ 65T 118T ~ 68T
44.5T ~ 14.5L	54T ~ 4T	63T ~ 4T	67T ~ 17T	76T ~ 17T	90T ~ 31T	109T ~ 50T	136T ~ 77T 139T ~ 80T 143T ~ 84T
51T ~ 16L	62T ~ 4T	71T ~ 4T	78T ~ 20T	87T ~ 20T	101T ~ 34T	123T ~ 56T	161T ~ 94T 165T ~ 98T

(Unit: μm)

K7 housing bearing	M7 housing bearing	N7 housing bearing	P7 housing bearing
12T ~ 14L	18T ~ 8L	23T ~ 3L	29T ~ 3L
15T ~ 15L	21T ~ 9L	28T ~ 2L	35T ~ 5L
18T ~ 18L	25T ~ 11L	33T ~ 3L	42T ~ 6L
21T ~ 22L	30T ~ 13L	39T ~ 4L	52T ~ 8L
25T ~ 25L	35T ~ 15L	45T ~ 5L	59T ~ 9L
28T ~ 30L	40T ~ 18L	52T ~ 6L	68T ~ 10L
28T ~ 37L	40T ~ 25L	52T ~ 13L	68T ~ 3L
33T ~ 43L	46T ~ 30L	60T ~ 16L	79T ~ 3L
36T ~ 51L	52T ~ 35L	66T ~ 21L	88T ~ 1L

5. Bearing internal clearance

Bearing internal clearance (initial clearance) is the amount of internal clearance a bearing has before being installed on a shaft or in a housing. The internal clearance values for **KSM** bearing classes are shown in tables 5A to 5G.

Table 5A Radial internal clearance for ball bearings (Unit : μm)

Nominal bore diameter d (mm)		C2		CN		C3		C4		C5	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
6	10	0	7	2	13	8	23	14	29	20	37
10	18	0	9	3	18	11	25	18	33	25	45
18	24	0	10	5	20	13	28	20	36	28	48
24	30	1	11	5	20	13	28	23	41	30	53
30	40	1	11	6	20	15	33	28	46	40	64
40	50	1	11	6	23	18	36	30	51	45	73
50	65	1	15	8	28	23	43	38	61	55	90
65	80	1	15	10	30	25	51	46	71	65	105
80	100	1	18	12	36	30	58	53	84	75	120
100	120	2	20	15	41	36	66	61	97	90	140

Table 5B Radial internal clearance for self-aligning ball bearings (Unit : μm)

Nominal bore diameter d (mm)		Bearing with cylindrical bore								Bearing with tapered bore							
		C2		Normal		C3		C4		C2		Normal		C3		C4	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
6	10	2	9	6	17	12	25	19	33	—	—	—	—	—	—	—	—
10	14	2	10	6	19	13	26	21	35	—	—	—	—	—	—	—	—
14	18	3	12	8	21	15	28	23	37	—	—	—	—	—	—	—	—
18	24	4	14	10	23	17	30	25	39	7	17	13	26	20	33	28	42
24	30	5	16	11	24	19	35	29	46	9	20	15	28	23	39	33	50
30	40	6	18	13	29	23	40	34	53	12	24	19	35	29	46	40	59
40	50	6	19	14	31	25	44	37	57	14	27	22	39	33	52	45	65
50	65	7	21	16	36	30	50	45	69	18	32	27	47	41	61	56	80
65	80	8	24	18	40	35	60	54	83	23	39	35	57	50	75	69	98

Table 5C Radial internal clearance for double row angular contact ball bearings

(Unit : μm)

Nominal bore diameter d (mm)		C2		Normal		C3		C4	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
-	10	6	12	8	15	15	22	22	30
10	18	6	12	8	15	15	24	30	40
18	30	6	12	10	20	20	32	40	55
30	50	8	14	14	25	25	40	55	75
50	80	11	17	17	32	32	50	75	95
80	100	13	22	22	40	40	60	95	120

Table 5D Radial internal clearance of bearings for electric motor

(Unit : μm)

Nominal bore diameter d (mm)		Radial internal clearance CM Deep groove ball bearings	
over	incl.	min.	max.
10 (incl.)	18	4	11
18	24	5	12
24	30	5	12
30	40	9	17
40	50	9	17
50	65	12	22
65	80	12	22

Table 5E Radial internal clearance for needle roller bearings

(Unit: μm)

Nominal bore diameter d (mm)		C2		Normal		C3		C4	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
-	10	0	30	10	40	25	55	35	65
10	18	0	30	10	40	25	55	35	65
18	24	0	30	10	40	25	55	35	65
24	30	0	30	10	45	30	65	40	70
30	40	0	35	15	50	35	70	45	80
40	50	5	40	20	55	40	75	55	90
50	65	5	45	20	65	45	90	65	105
65	80	5	55	25	75	55	105	75	125
80	100	10	60	30	80	65	115	90	140
100	120	10	65	35	90	80	135	105	160
120	140	10	75	40	105	90	155	115	I 80
140	160	15	80	50	115	100	165	130	195
160	180	20	85	60	125	110	175	150	215
180	200	25	95	65	135	125	195	165	235
200	225	30	105	75	150	140	215	180	255
225	250	40	115	90	165	155	230	205	280
250	280	45	125	100	180	175	255	230	310
280	315	50	135	110	195	195	280	255	340
315	355	55	145	125	215	215	305	280	370
355	400	65	160	140	235	245	340	320	415
400	450	70	190	155	275	270	390	355	465

Table 5F Radial internal clearance for taper roller bearings

(Unit: μm)

Nominal bore diameter d (mm)		C2		CN		C3		C4		C5	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
10	24	0	25	20	45	35	60	50	75	65	90
24	30	0	25	20	45	35	60	50	75	70	95
30	40	5	30	25	50	45	70	60	85	80	105
40	50	5	35	30	60	50	80	70	100	95	125
50	65	10	40	40	70	60	90	80	110	110	140
65	80	10	45	40	75	65	100	90	125	130	165
80	100	15	50	50	85	75	110	105	140	155	190
100	120	15	55	50	90	85	125	125	165	180	220
120	140	15	60	60	105	100	145	145	190	200	245
140	160	20	70	70	120	115	165	165	215	225	275
160	180	25	75	75	125	120	170	170	220	250	300
180	200	35	90	90	145	140	195	195	250	275	330

Table 5G Radial internal clearance for spherical roller bearings

(Unit: μm)

Nominal bore diameter d (mm)		Bearing with cylindrical bore										Bearing with tapered bore									
		C2		CN		C3		C4		C5		C2		CN		C3		C4		C5	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
18	24	10	20	20	35	35	45	45	60	60	75	15	25	25	35	35	45	45	60	60	75
24	30	15	25	25	40	40	55	55	75	75	95	20	30	30	40	40	55	55	75	75	95
30	40	15	30	30	45	45	60	60	80	80	100	25	35	35	50	50	65	65	85	85	105
40	50	20	35	35	55	55	75	75	100	100	125	30	45	45	60	60	80	80	100	100	130
50	65	20	40	40	65	65	90	90	120	120	150	40	55	55	75	75	95	95	120	120	160
65	80	30	50	50	80	80	110	110	145	145	180	50	70	70	95	95	120	120	150	150	200
80	100	35	60	60	100	100	135	135	180	180	225	55	80	80	110	110	140	140	180	180	230
100	120	40	75	75	120	120	160	160	210	210	260	65	100	100	135	135	170	170	220	220	280
120	140	50	95	95	145	145	190	190	240	240	300	80	120	120	160	160	200	200	260	260	330
140	160	60	110	110	170	170	220	220	280	280	350	90	130	130	180	180	230	230	300	300	380

6. Lubrication

6.1 Lubrication of rolling bearings

The purpose of bearing lubrication is to prevent direct metallic contact between the various rolling and sliding elements. This is accomplished through the formation of a thin oil (or grease) film on the contact surfaces. However, for rolling bearings, lubrication has the following advantages:

(1) Friction and wear reduction
(2) Friction heat dissipation
(3) Prolonged bearing life
(4) Prevention of rust
(5) Protection against harmful elements

In order to achieve the above effects, the most effective lubrication method for the operating conditions must be selected. Also, a good quality, reliable lubricant must be selected. In addition, an effectively designed sealing system that prevents the intrusion of damaging elements (Dust, water, etc.) Into the bearing interior, removes dust and other impurities from the lubricant, and prevents the lubricant from leaking to the outside, is also a requirement. Almost all rolling bearings use either grease or oil lubrication methods, but in some special applications, a solid lubricant such as molybdenum disulfide or graphite may be used.

6.2 Lubrication methods and characteristics

The lubrication methods come in two general methods: grease or oil, each with their own characteristics. These characteristics are shown in table 6A.

Table 6A Comparison of grease lubrication and oil lubrication characteristics

Method / Concern	Grease lubrication	Oil lubrication
Handling	Very good	Fair
Reliability	Good	Very good
Cooling effect	Poor	Good (circulation necessary)
Seal's structure	Good	Fair
Power loss	Good	Good
Environment contamination	Good	Fair
High speed rotation	Poor	Good

6.3 Grease lubrication

Grease type lubricants are relatively easy to handle and require only the simplest sealing devices. For these reasons, grease is the most widely used lubricant for rolling bearings.

6.3.1 Types and characteristics of grease

Lubricating grease are composed of either a mineral oil base or a synthetic oil base. To this base a thickener and other additives are added. The properties of all greases are mainly determined by the kind of base oil used and by the combination of thickening agent and various additives.

Standard greases and their characteristics are listed in Table 6B as performance characteristics of even the same type of grease will vary widely from brand to brand, it is best to check the manufacturers' data when selecting a grease.

Also, greases of different brands should not be mixed because of the different additives they contain.

However, if different greases must be mixed, at least greases with the same base oil and thickening agent should be selected. But even when greases of the same base oil and thickening agent are mixed, the quality of U grease may still change due to the difference in additives. For this reason, changes in consistency and other qualities should be checked before being applied.

Table 6B Grease varieties and characteristics

Grease name	Lithium grease			Sodium grease (Fiber grease)	Calcium compound base grease
Thickener	Li soap			Na soap	Ca+Na soap Ca+Li soap
Base oil	Mineral oil	Diester oil	Silicone oil	Mineral oil	Mineral oil
Dropping point	170 °C ~ 190 °C	170 °C ~ 190 °C	200 °C ~ 250 °C	150 °C ~ 180 °C	150 °C ~ 180 °C
Operating temperature range °C	-30 °C ~ +130 °C	-50 °C ~ +130 °C	-50 °C ~ +160 °C	-20 °C ~ +130 °C	-20 °C ~ +120 °C
Mechanical stability	Excellent	Good	Good	Excellent ~ Good	Excellent ~ Good
Pressure resistance	Good	Good	Poor	Good	Excellent ~ Good
Water resistance	Good	Good	Good	Good ~ Poor	Good ~ Poor
Applications	Widest range of applications.	Excellent low temperature and wear characteristics.	Suitable for high and low temperature.	Some emulsification when water is introduced.	Excellent pressure resistance and mechanical stability.
	Grease used in all types of rolling bearings.	Suitable for small sized and miniature bearings.	Unsuitable for heavy load applications due to low oil film strength.	Excellent characteristics at relatively high temperatures.	Suitable for bearings receiving shock loads.

Grease name	Aluminum grease	Non-soap base grease Thickener	
Thickener	Al soap	Bentone, silica gel, urea, carbon black, fluorine compounds, etc.	
Base oil	Mineral oil	Mineral oil	Synthetic oil
Dropping point	70 °C ~ 90 °C	250 °C or above	250 °C or above
Operating temperature range °C	-10 °C ~ +80 °C	-10 °C ~ +130 °C	-50 °C ~ +200 °C
Mechanical stability	Good ~ Poor	Good	Good
Pressure resistance	Good	Good	Good
Water resistance	Good	Good	Good
Applications	Excellent viscosity characteristics. Suitable for bearings subject to vibrations.	Can be used in a wide range of low to high temperatures. Shows excellent heat resistance, cold resistance, chemical resistance, and other characteristics when matched with a suitable base oil and thickener. Grease used in all types of rolling bearings.	

Note: The figures given for operating temperature range are standard characteristic values, and are not guaranteed.

6.3.2 Amount of grease

The amount of grease used in any given situation will depend on many factors relating to the size and shaped the housing, space limitations, bearing's rotating speed and type of grease used.

As a general rule, housings and bearings should be only filled from 50% to 80% of their capacities.

Where speeds are high and temperature rises need to be kept to a minimum, a reduced amount of grease should be used. Excessive amounts of grease cause temperature rise which in turn causes the grease to soften and may allow leakage. With excessive grease fills oxidation and deterioration may cause lubricating efficiency to be lowered.

Moreover, the standard bearing space can be found by below formula (6.1)

$V = K \cdot W$ ..... **Formula (6.1)**

where,
V : **Quantity of bearing space open type (approx.)** Cm^3
K : **Bearing space factor (Table 6C)**
W : **Mass of bearing kg (See bearing tables)**

Table 6C Bearings space ratio K

Bearing type	Retainer type	K
Needle roller bearings	Pressed or Machined retainer	35

7. Load rating and life

7.1 Bearing life

Even in bearings operating under normal conditions, the surfaces of the raceway and rolling elements are constantly being subjected to repeated compressive stresses which causes flaking of these surfaces to occur. This flaking is due to material fatigue and will eventually cause the bearings to fail. The effective life of a bearing is usually defined in terms of the total number of revolutions a bearing can undergo before flaking of either the raceway surface or the rolling element surfaces occurs.

Other causes of bearing failure are often attributed to problems such as seizing, abrasions, cracking, chipping, gnawing, rust, etc. However, these so called "causes" of bearing failure are usually themselves caused by improper installation, insufficient or improper lubrication, faulty sealing or inaccurate bearing selection. Since the above mentioned "causes" of bearing failure can be avoided by taking the proper precautions, and are not simply caused by material fatigue, they are considered separately from the flaking aspect.

7.2 Basic rating life and basic dynamic load rating

A group of seemingly identical bearings when subjected to identical load and operating conditions will exhibit a wide diversity in their durability.

This " life " disparity can be accounted for by the difference in the fatigue of the bearing material itself. This disparity is considered statistically when calculating bearing life, and the basic rating life is defined as follows.

The basic rating life is based on a 90% statistical model which is expressed as the total number of revolutions 90% of the bearings in an identical group of bearings subjected to identical operating conditions will attain or surpass before flaking due to material fatigue occurs. For bearings operating at fixed constant speeds, the basic rating life (90% reliability) is expressed in the total number of hours of operation.

The basic dynamic load rating is an expression of the load capacity of a bearing based on a constant load which the bearing can sustain for one million revolutions (the basic life rating). For radial bearings this rating applies to pure radial loads, and for thrust bearings it refers to pure axial loads. The basic dynamic load ratings given in the bearing tables of this catalogue are for bearings constructed of **KSM** standard bearing materials, using standard manufacturing techniques. Please consult **KSM** engineering for basic load ratings of bearings constructed of special materials or using special manufacturing techniques.

The relationship between the basic rating life, the basic dynamic load rating and the bearing load is given in formula (7.1).

$$L_{10} = \left(\frac{C}{P}\right)^{P} \cdots\cdots\cdots\cdots (7.1)$$

where,

$P = 3$ ····· For ball bearings

L_{10} : Basic rating life 106 revolutions

C : Basic dynamic rating load, n

(Cr: radial bearings)

P : Equivalent dynamic load, n

(Pr: radial bearings)

The basic rating life can also be expressed in terms of hours of operation (revolution), and is calculated as shown in formula (7.2).

$$L_{10h} = 500 f_h^{\,p} \quad \text{.....(7.2)}$$

$$f_h = f_n \frac{C}{P} \quad \text{.....(7.3)}$$

$$f_n = \left(\frac{33.3}{n}\right)^{1/p} \quad \text{.....(7.4)}$$

where,
L_{10} : Basic rating life, h
f_h : Life factor
f_n : Speed factor
n : Rotational speed, r/min

Formula (7.2) can also be expressed as shown in formula (7.5).

$$L_{10h} = \frac{10^6}{60n} \left(\frac{C}{P}\right)^P \quad \text{.....(7.5)}$$

The relationship between rotational speed n and speed factor f_n as well as the relation between the basic rating life L_{10h} and the life factor f_h is shown in Fig. 7A. When several bearings are incorporated in machines or equipment as complete units, all the bearings in the unit are considered as a whole when computing bearing life (see formula 7.6). The total bearing life of the unit is a life rating based on the viable lifetime of the unit before even one of the bearings fails due to rolling contact fatigue.

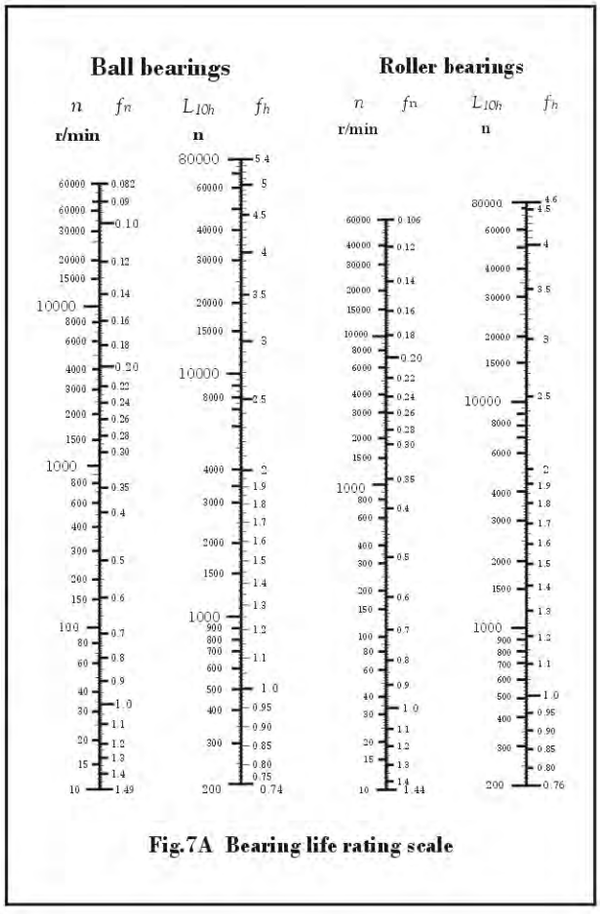


Fig.7A Bearing life rating scale

$$L = \frac{1}{\left(\frac{1}{L_1^{\,e}} + \frac{1}{L_2^{\,e}} + \ldots \frac{1}{L_n^{\,e}}\right)^{1/e}} \quad \text{.....(7.6)}$$

where,
e = 10/9.....For ball bearings
L = Total basic rating life or entire unit, h
$L_1, L_2 \ldots L_n$: Basic rating life or individual bearings, 1, 2,...n, h

When the load conditions vary at regular intervals, the life can be given by formula (7.7).

$$L_m = (\Sigma\ \phi_j / L_j)^{-1} \quad \text{.....(7.7)}$$

where,
ϕj : Frequency of individual load conditions
$L j$: Life under individual conditions

7.3 Machine applications and requisite life

When selecting a bearing, it is essential that the requisite life of the bearing be established in relation to the operating conditions. The requisite life of the bearing is usually determined by the type of machine in which the bearing will be used, and duration of service and operational reliability requirements. When determining bearing size, the fatigue life of the bearing is an important factor; however, besides bearing life, the strength and rigidity of the shaft and housing must also be taken into consideration.

7.4 Adjusted life rating factor

The basic bearing life rating (90% reliability factor) can be calculated through the formulas mentioned earlier in Section 7.2. However, in some applications a bearing life factor of over 90% reliability may be required. To meet these requirements, bearing life can be lengthened by the use of specially improved bearing materials or special construction techniques. Moreover, according to elastohydrodynamic lubrication theory, it is clear that the bearing operating conditions (lubrication, temperature, speed, etc.) all exert an effect on bearing life. All these adjustment factors are taken into consideration when calculating bearing life, the adjusted bearing life can be determined.

$$Lna = a1 \cdot a2 \cdot a3 \cdot (C/P)^P \quad \text{.....(7.8)}$$

where,

Lna : Adjusted life rating in millions of revolutions (10^6)(adjusted for reliability, material and operating conditions)

$a1$: Reliability adjustment factor

$a2$: Material adjustment factor

$a3$: Operating condition adjustment factor

7.4.1 Life adjustment factor for reliability a_1

The values for the reliability adjustment factor ai (for a reliability factor higher than 90%) can be found in Table 7A.

Table 7A Reliability adjustment factor values a_1

Reliability %	L_n	Reliability factor a_1
90	L_{10}	1.00
95	L_5	0.62
96	L_4	0.53
97	L_3	0.44
98	L_2	0.33
99	L_1	0.21

7.4.2 Life adjustment factor for material a_2

The life of a bearing is affected by the material type and quality as well as the manufacturing process. In this regard, the life is adjusted by the use of an a_2 factor.

The basic dynamic load ratings listed in the catalogue are based on **KSM**'s standard material and process, therefore, the adjustment factor a_2 =1. When special materials or processes are used the adjustment factor can be larger than 1.

KSM bearings can generally be used up to 120 °C. If bearings are operated at a higher temperature, the bearing must be specially heat treated (stabilized) so that inadmissible dimensional change does not occur due to changes in the microstructure. This special heat treatment might cause the reduction of bearing life because of a hardness change.

7.4.3 Life adjustment factor a_3 for operating conditions

The operating conditions life adjustment factor a_3 is used to adjust for such conditions as lubrication, operating temperature, and other operation factors which have an effect on bearing life.

Generally speaking, when lubricating conditions are satisfactory, the a_3 factor has a value of one; and when lubricating conditions are exceptionally favorable, and all other operating conditions are normal, as can have a value greater than one.

However, when lubricating conditions are particularly unfavorable and the oil film formation on the contact surfaces of the raceway and rolling elements is insufficient, the value of a_3 becomes less than one. This Insufficient oil film formation can be caused, for example, by the lubricating oil viscosity being too low for the operating temperature (below13 mm^2/s for ball bearings or by exceptionally low rotational speed (nr/min x dpmm less than 10,000). For bearings used under special operating conditions, please consult **KSM** engineering.

As the operating temperature of the bearing increases, the hardness of the bearing material decreases. Thus, the bearing life correspondingly decreases. The operating temperature adjustment values are shown in Fig. 7B.

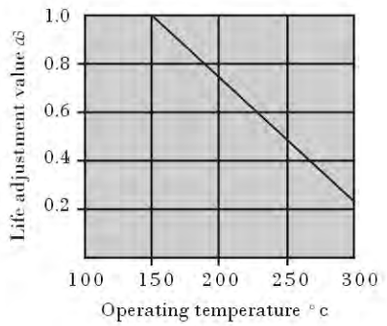


Fig. 7B Life adjustment value for operating temperature

7.5 Life of roller bearings with oscillating motion

The life of a radial bearing with oscillating motion can be calculated formula (7.8).

$L_{osc} = \Omega L_{Rot}$ ..... Formula (7.8)

where,

L_{osc} : life for oscillating bearing

L_{Rot} : rating life at assumed number of rotations same as oscillation cycles

Ω : oscillation factor (Fig.6.3 indicates the relationship between half oscillation angle β and Ω).

Fig. 7C is valid only when the amplitude exceeds a certain degree (critical angle 2 βc). The critical angle is determined by the internal design of the bearing, in particular by the number of rolling elements in one row. Critical angle values are given in Table 7B. When the magnitude of the oscillation is less than the critical angle, the life may be shorter than that calculated to be the value in Fig. 7C it is safer to calculate life with the factor Ω corresponding to the critical angle. For the critical angle of an individual bearing, please consult **KSM** Engineering. Where the amplitude of the oscillation 2 β is small, it is difficult for a complete lubricant film to form on the contact surfaces of the rings and rolling elements, and fretting corrosion may occur. Therefore it is necessary to exercise extreme care in the selection of bearing type, lubrication and lubricant.

Table 7B Critical angle

Number of rolling elements	Half critical angle βc
10	10°
25	4°
40	2.6°

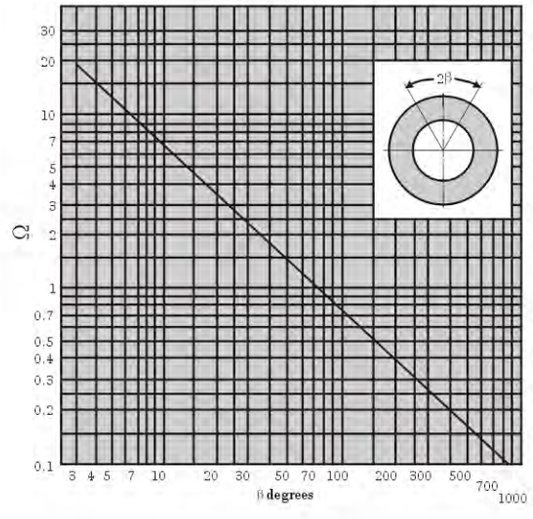


Fig. 7C Relationship between half angle β and factor Ω

7.6 Life of roller bearings with linear motion

With a linear motion bearing such as a linear ball bearing or linear flat roller bearing, the relation among the axial travel distance, bearing load, and load rating is expressed by formulas (7.9).

When the rolling elements are rollers:

$L = 100 \times \left(\frac{C_r}{P_r}\right)^{\frac{10}{3}}$ .....(7.9)

where,

L : Load rating km

C_r : Basic dynamic load rating [kgf]

P_r : Bearing load [kgf]

If the cycle and travel distance within a particular travel motion remain constant, the rating life of the bearing can be determined by formulas (7.10) .

$$L_h = \frac{50 \times 10^3}{10 \cdot S} \left(\frac{C_r}{P_r}\right)^{\frac{10}{3}} \quad \text{..... Formula (7.10)}$$

Where,

L_h : Travel life, *h*

S : Travel distance per minute, m/min.

$S = 2 \cdot L \cdot N$

L : Stroke length, *m*

n : Stroke cycle, N {kgf}

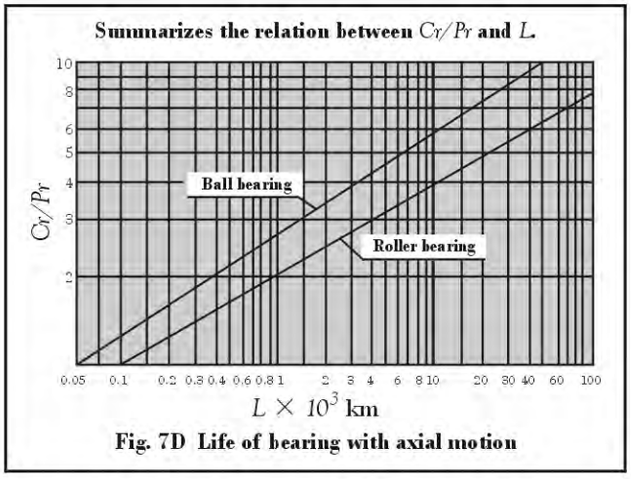


Fig. 7D Life of bearing with axial motion

7.7 Basic static load rating

When stationary rolling bearings are subjected to static loads, they suffer from partial permanent deformation of the contact surfaces at the contact point between the rolling elements and the raceway. The amount of deformity increases as the load increases, and if this increase in load exceeds certain limits ,the subsequent smooth operation of the bearings is impaired.

It has been found through experience that a permanent deformity of 0.0001 times the diameter of the rolling element, occurring at the most heavily stressed contact point between the raceway and the rolling elements, can be tolerated without any impairment in running efficiency.

The basic rating static load refers to a fixed static load limit at which a specified amount of permanent deformation occurs. It applies to pure radial loads for radial bearings and to pure axial loads for thrust bearings. The maximum applied load values for contact stress occurring at the rolling element and raceway contact points are given below.

For ball bearings (except self-aligning ball bearings)	4,200 Mpa
For self-aligning ball bearings	4,600 Mpa
For roller bearings	4,000 Mpa

7.8 Allowable static equivalent load

Generally the static equivalent load which can be permitted is limited by the basic static load rating. However, depending on requirements regarding friction and smooth operation, these limits may be greater or lesser than the basic static rating load in the following formula (7.11) and Table 7C the safety factor So can be determined considering the maximum static equivalent load.

$So = Co/Po$ ..... (7.11)

where,

So : Safety factor

Co : Basic static rating load, N (radial bearings: Cor)

$Po\,max$: Maximum static equivalent load, N (radial: $Por\,max$)

T1

Table 7C Minimum safety factor values *So*

Operating conditions	Ball bearings	Roller bearings
High rotational accuracy demand	2	3.0
Normal rotating accuracy demand (Universal application)	1	1.5
Slight rotational accuracy deterioration permitted (Low speed, heavy loading, etc.)	0.5	1.0

Note 1 : For spherical thrust roller bearings, min. *So* value=4.
2: For drawn-cup needle roller bearings, min. *So* value=3.
3 : When vibration and/or shock loads are present, a load factor based on the shock load needs to be included in the *Po* max value.

8. Bearing handling

Bearings are precision parts and, in order to preserve their accuracy and reliability, care must be exercised in their handling. In particular, bearing cleanliness must be maintained, sharp impacts avoided, and rust prevented.

8.1 Bearing storage

Most rolling bearings are coated with a rust preventative before being packed and shipped, and they should be stored at room temperature with a relative humidity of less than 60%.

8.2 Installation

When bearings are being installed on shafts or in housings, the bearing rings should never be struck directly with a hammer or a drift, as shown in Fig. 8A, because damage to the bearing may result. Any force applied to the bearing should always be evenly distributed over the entire bearing ring face.

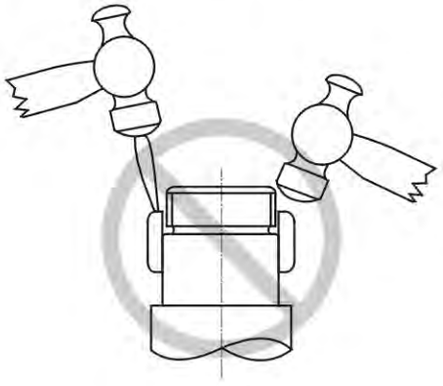


Fig. 8A

8.2.1 Installation preparations

Bearings should be fitted in a clean, dry work area. Specially for small and miniature bearings, a "clean room" should be provided as any contamination particles in the bearing will greatly affect bearing efficiency. Before installation, all fitting tools, shafts, housings, and related parts should be cleaned and any burrs or cutting chips removed if necessary. Shaft and housing fitting surfaces should also be checked for roughness, dimensional and design accuracy, and to ensure that they are within allowable tolerance limits. Bearings should not be unwrapped until just prior to installation. Normally, bearings to be used with grease lubricant can be installed as is, without removing the rust preventative. However, for bearings which will use oil lubricant, or in cases where mixing the grease and rust preventative would result in loss of lubrication efficiency, the rust preventative should be removed by washing with benzene or petroleum solvent and dried before installation. Bearings should also be washed and dried before installation if the package has been damaged or there are other chances that the bearings have been contaminated. Double shielded bearings and sealed bearings, one way clutches should never be washed.

8.2.2 Installing cylindrical bore bearings

Bearings with relatively small interference fits can be press fit at room temperature by using a sleeve against the inner ring face as shown in Fig. 8B. Usually, bearings are installed by striking the sleeve with a hammer; however, when installing a large number of bearings, a mechanical or hydraulic press should be used.

When installing non-separable bearings on a shaft and in a housing simultaneously, a pad which distributesth fitting pressure evenly over the inner and outer rings is used as shown in Fig. 8C. When fitting bearings which have a large inner ring interference fit, or when fitting bearings on shafts that have a large diameter, a considerable amount of force is required to install the bearing at room temperature. Installation can be facilitated by heating and expanding the inner ring beforehand. The required relative temperature difference between the inner ring and the fitting surface depends on the amount of interference and the shaft fitting surface diameter. Fig. 8D shows the relation between the bearing inner bore diameter temperature differential and the amount of thermal expansion. In any event, bearings should never be heated above 120° C.

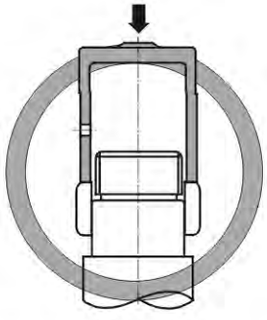


Fig. 8B Fitting sleeve pressure against inner ring

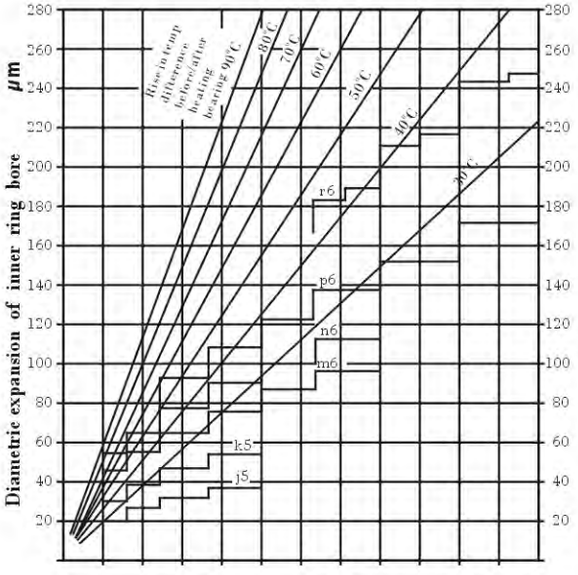


Fig. 8C Temperature differential required for shrinkage fit of inner ring

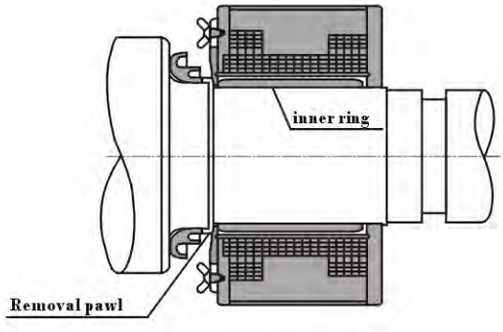


Fig. 8D Removal of inner ring using an induction heater

The most commonly used method of heating bearings is to immerse them in hot oil. However, this method should not be used for pre lubricated shielded and sealed bearings. To avoid overheating parts of the bearings they should never be brought into direct contact with the heat source, but instead should be suspended inside the heating tank or placed on a wire grid. If bearings are dry-heated with a heating cabinet or hot plate, they can be mounted without drying. An induction heater can be used to quickly heat bearings in a dry state (always demagnetize). When heated bearings are installed on shafts, the inner rings must be held against the shaft abutment until the bearing has been cooled in order to prevent gaps from occurring between the ring and the abutment face.

8.2.3 Installation of outer ring

Even for tight interference fits, the outer rings of small type bearings can be installed by driving them into housings at room temperature. For large type bearings, the housing can be heated before installing the bearing, or the bearing's outer ring can be cooled with dry ice, etc. Before installing. If dry ice or other cooling agent is used, atmospheric moisture will condense on bearing surfaces, and therefore appropriate rust preventative measures are necessary.

8.3 Post installation running test

To in sure that the bearing has been properly in stalled, a running test is performed after installation is completed. The shaft or housing is first rotated by hand and if no problems are observed a low speed, no load power test is performed. If no abnormalities are observed, the load and speed are gradually increased to operating conditions.During the test if any unusual noise, vibration , or temperature rise is observed the test should be stopped and the equipment examined. If necessary, the bearing should be disassembled for inspection. To check bearing running noise, the sound can be amplified and the type of noise ascertained with a listening instrument placed against the housing. A clear, smooth and continuous running sound is normal A high, metallic or irregular sound indicates some error in function. Vibration can be accurately checked with a vibration measuring instrument, and the amplitude and frequency characteristics measured against a fixed standard. Usually the bearing temperature can be estimated from the housing surface temperature, However, if the bearing outer ring is accessible through oil inlets, etc., the temperature can e moreaccurately measured. Under normal conditions, bearing temperature rises with rotation time and then reaches a stable operating temperature after a certain period of time. If the temperature does not level off and continues to rise, or if there is a sudden temperature rise, or if the temperature is unusually high, the bearing should be inspected.

8.4 Bearing disassembly

Bearings are often removed as part of periodic inspection procedures or during the replacement of other parts. However, the shaft and housing are almost always reinstalled, and in more than a few cases the bearings themselves are reused. These bearings, shafts, housings, and other related parts must be designed to prevent damage during disassembly procedures, and the proper disassembly tools must be employed. When removing inner and outer rings which have been installed with interference fits, the dismounting force should be applied to that ring only and not applied to other parts of the bearing, as this may cause internal damage to the bearing's raceway or rolling elements.

8.4.1 Disassembly of bearings with cylindrical bores

For small type bearings, the pullers shown in Fig. 8E or the press method shown in Fig. 8F can be used for disassembly. When used properly, these methods can improve disassembly efficiency and prevent damage to bearings. To facilitate disassembly procedures, attention should be given to planning the designs of shafts and housings, such as providing extraction grooves on the shaft and housing for puller claws as shown Figs. 8G and 8H. Threaded bolt holes should also be provided in housings to facilitate the pressing out of outer rings as shown in Fig. 8I.

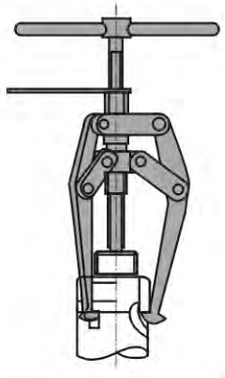


Fig. 8E Puller disassembly

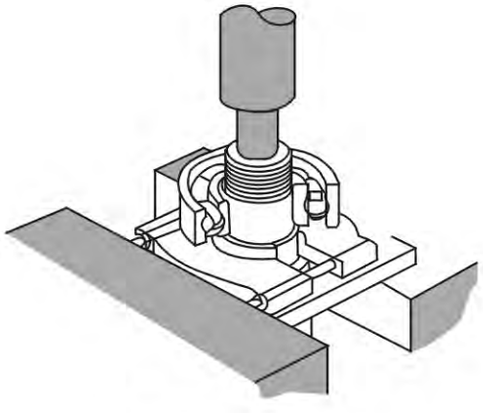


Fig. 8F press disassembly

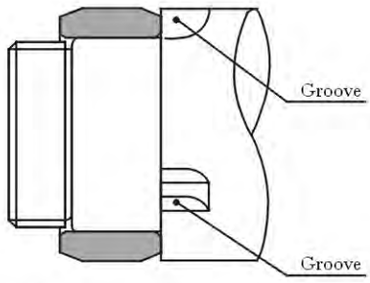


Fig. 8G Extracting grooves

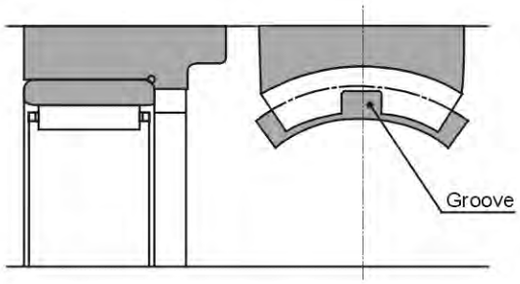


Fig. 8H Extraction groove for outer ring disassembly

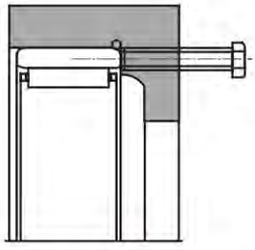


Fig. 8I Outer ring disassembly bolt

9. Allowable speed

As bearing speed increases, the temperature of the bearing also increases due to friction heat generated in the bearing interior. If the temperature continues to rise and exceeds certain limits, the efficiency of the lubricant start to fail down drastically, and the bearing can no longer continue to operate in a stable manner. Therefore, the maximum speed at which it is possible for the bearing to continuously operate without the generation of excessive heat beyond specified limits, is called the allowable speed (r/min). The allowable speed of a bearing depends on the type of bearing, bearing dimensions, type of cage, load, lubricating conditions, and cooling conditions.

The allowable speeds listed in the bearing tables for grease and oil lubrication are for standard **KSM** bearings under normal operating conditions, correctly installed, using the suitable lubricants with adequate supply and proper maintenance. Moreover, these values are based on normal load conditions ($P \leqslant 0.09C$, $Fa/Fr \leqslant 0.3$). For ball bearings with contact seals (LLU type), the allowable speed is determined by the peripheral lip speed of the seal.
For bearings to be used under heavier than normal load conditions, the allowable speed values listed in the bearing tables must be multiplied by an adjustment factor. The adjustment factors f_L and f_c are given in Figs. 9A and 9B.

Also, when radial bearings are mounted on vertical shafts, lubricant retentions and cage guidance are not favorable compared to horizontal shaft mounting.

Therefore, the allowable speed should be reduced to approximately 80% of the listed speed.

It is possible to operate precision bearings with high speed specification cages at speeds higher than those listed in the bearing tables , if special precautions are taken. These precautions should include the use of forced oil circulation methods such as oil jet or oil mist lubrication.

Under such high speed operating conditions, when special care is taken ,the standard allowable speeds given in the bearing tables can be adjusted upward. The maximum speed adjustment values, /B, by which the bearing table speeds can be multiplied, are shown in Table 9A. However, for any application requiring speeds in excess of the standard allowable speed, please consult **KSM** Engineering.

Fig. 9A Value of adjustment factor F_L depends on bearing load

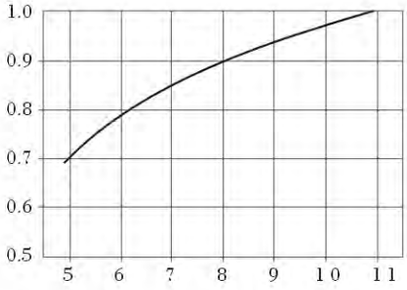


Fig. 9B Value of adjustment factor F_C depends on combined load

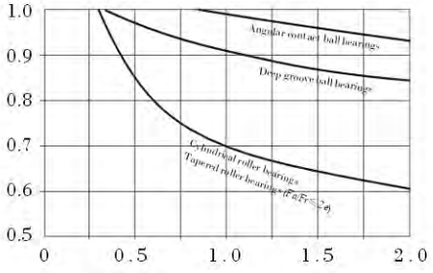


Table 9A Adjustment factor, f_B, for allowable number of revolutions

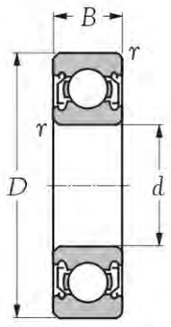
Type of bearing	Adjustment factor f_B
Deep groove ball bearings	3.0
Angular contact ball bearings	2.0
Track rollers bearings	2.0

P1

KSM®

BALL BEARINGS

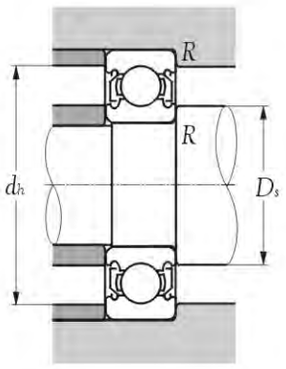
Ball bearings
series 60..



Shielded type
(ZZ)

Non-contact sealed type
(VV)

Contact Sealed type
(DDU)



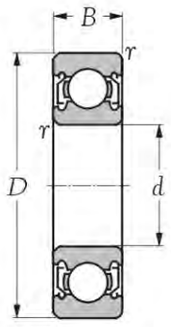
Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers	Abutment and fillet dimensions mm				Mass kg.
d	D	B	$r_{s\,min}$[1]	C_r	C_{or}				$D_{s\,min}$	$D_{s\,max}$	$d_{h\,max}$	R_{max}	(approx.)
10	26	8	0.3	4550	1960	29000	34000	**6000 ZZ**	12.5	13.5	23.5	0.3	0.019
10	26	8	0.3	4550	1960	21000	-	**6000 DDU**	12.5	13.5	23.5	0.3	0.019
12	28	8	0.3	5100	2390	26000	30000	**6001 ZZ**	14.5	16.0	25.5	0.3	0.021
12	28	8	0.3	5100	2390	18000	-	**6001 DDU**	14.5	16.0	25.5	0.3	0.021
15	32	9	0.3	5600	2840	22000	26000	**6002 ZZ**	17.5	19.0	29.5	0.3	0.030
15	32	9	0.3	5600	2840	15000	-	**6002 DDU**	17.5	19.0	29.5	0.3	0.030
17	35	10	0.3	6800	3350	20000	24000	**6003 ZZ**	19.5	21.0	32.5	0.3	0.039
17	35	10	0.3	6800	3350	14000	-	**6003 DDU**	19.5	21.0	32.5	0.3	0.039
20	42	12	0.6	9400	5050	18000	21000	**6004 ZZ**	25.0	26.0	37.0	0.6	0.069
20	42	12	0.6	9400	5050	11000	-	**6004 DDU**	25.0	26.0	37.0	0.6	0.069
25	47	12	0.6	10100	5850	15000	18000	**6005 ZZ**	30.0	30.5	42.0	0.6	0.080
25	47	12	0.6	10100	5850	15000	18000	**6005 VV**	30.0	30.5	42.0	0.6	0.080
30	55	13	1.0	13200	8300	13000	15000	**6006 ZZ**	36.0	37.0	49.0	1.0	0.116
30	55	13	1.0	13200	8300	13000	15000	**6006 VV**	36.0	37.0	49.0	1.0	0.116
35	62	14	1.0	16000	10300	12000	14000	**6007 ZZ**	41.0	42.0	56.0	1.0	0.155
35	62	14	1.0	16000	10300	12000	14000	**6007 VV**	41.0	42.0	56.0	1.0	0.155
40	68	15	1.0	16800	11500	10000	12000	**6008 ZZ**	46.0	47.0	62.0	1.0	0.190
40	68	15	1.0	16800	11500	10000	12000	**6008 VV**	46.0	47.0	62.0	1.0	0.190
45	75	16	1.0	21000	15100	9200	11000	**6009 ZZ**	51.0	52.5	69.0	1.0	0.237
45	75	16	1.0	21000	15100	9200	11000	**6009 VV**	51.0	52.5	69.0	1.0	0.237
50	80	16	1.0	21800	16600	8400	9800	**6010 ZZ**	56.0	57.5	74.0	1.0	0.261
50	80	16	1.0	21800	16600	8400	9800	**6010 VV**	56.0	57.5	74.0	1.0	0.261

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Multemp SRL

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

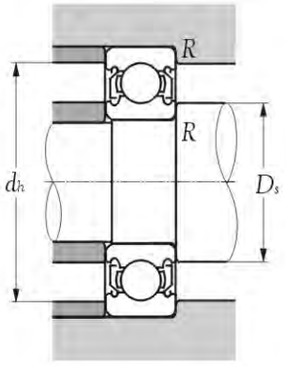
Ball bearings
series 62..



Shielded type
(ZZ)

Non-contact sealed type
(VV)

Contact Sealed type
(DDU)



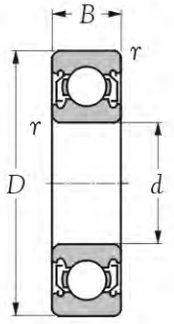
Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers	Abutment and fillet dimensions mm				Mass kg.
d	D	B	$r_{s\,min}$[1]	C_r	C_{or}				$D_{s\,min}$	$D_{s\,max}$	$d_{h\,max}$	R_{max}	(approx.)
10	30	9	0.6	5100	2390	25000	30000	**6200 ZZ**	15	16.0	25	0.6	0.032
10	30	9	0.6	5100	2390	18000	-	**6200 DDU**	15	16.0	25	0.6	0.032
12	32	10	0.6	6100	2750	22000	26000	**6201 ZZ**	17	17.5	27	0.6	0.037
12	32	10	0.6	6100	2750	16000	-	**6201 DDU**	17	17.5	27	0.6	0.037
15	35	11	0.6	7750	3600	19000	23000	**6202 ZZ**	20	20.5	30	0.6	0.045
15	35	11	0.6	7750	3600	15000	-	**6202 DDU**	20	20.5	30	0.6	0.045
17	40	12	0.6	9600	4600	18000	21000	**6203 ZZ**	22	23.0	35	0.6	0.066
17	40	12	0.6	9600	4600	12000	-	**6203 DDU**	22	23.0	35	0.6	0.066
20	47	14	1.0	12800	6650	16000	18000	**6204 ZZ**	26	28.0	41	1.0	0.106
20	47	14	1.0	12800	6650	10000	-	**6204 DDU**	26	28.0	41	1.0	0.106
25	52	15	1.0	14000	7850	13000	15000	**6205 ZZ**	31	32.0	46	1.0	0.128
25	52	15	1.0	14000	7850	13000	15000	**6205 VV**	31	32.0	46	1.0	0.128
30	62	16	1.0	19500	11300	11000	13000	**6206 ZZ**	36	39.0	56	1.0	0.199
30	62	16	1.0	19500	11300	11000	13000	**6206 VV**	36	39.0	56	1.0	0.199
35	72	17	1.1	25700	15300	9800	11000	**6207 ZZ**	42	45.0	65	1.0	0.288
35	72	17	1.1	25700	15300	9800	11000	**6207 VV**	42	45.0	65	1.0	0.288
40	80	18	1.1	29100	17800	8700	10000	**6208 ZZ**	47	51.0	73	1.0	0.366
40	80	18	1.1	29100	17800	8700	10000	**6208 VV**	47	51.0	73	1.0	0.366
45	85	19	1.1	32500	20400	7800	9200	**6209 ZZ**	52	55.5	78	1.0	0.398
45	85	19	1.1	32500	20400	7800	9200	**6209 VV**	52	55.5	78	1.0	0.398
50	90	20	1.1	35000	23200	7100	8300	**6210 ZZ**	57	60.0	83	1.0	0.454
50	90	20	1.1	35000	23200	7100	8300	**6210 VV**	57	60.0	83	1.0	0.454

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Multemp SRL

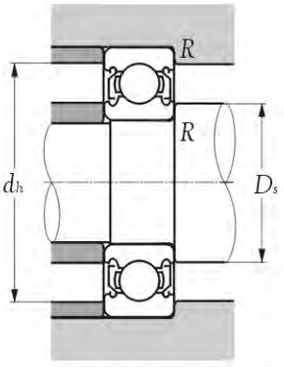
If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Ball bearings
series 60..ZZ, 60..2RS, 62..ZZ & 62..2RS (Non-standard)



Shielded type
(ZZ)

Sealed type
(2RS)



Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers		Abutment and fillet dimensions mm				Mass kg.
d	D	B	r	Cr	Cor					Ds min	Ds max	dh max	R max	(approx.)
12.448	28	8	0.3	5100	2390	26000	30000	6001-31/64" ZZ	6001-31/64" 2RS	14.5	16	25.5	0.3	0.021
12.700	28	8	0.3	5100	2390	26000	30000	6001-1/2" ZZ	6001-1/2" 2RS	14.5	16	25.5	0.3	0.021
16.000	32	9	0.3	5600	2840	22000	26000	6002-16mm ZZ	6002-16mm 2RS	17.5	19	29.5	0.3	0.030
22.000	42	12	0.6	9400	5050	18000	21000	6004-22mm ZZ	6004-22mm 2RS	25.0	26	37.0	0.6	0.069
8.000	32	10	0.6	6100	2750	22000	26000	6201-8mm ZZ	6201-8mm 2RS	17	17.5	27	0.6	0.037
13.000	32	10	0.6	6100	2750	22000	26000	6201-13mm ZZ	6201-13mm 2RS	17	17.5	27	0.6	0.037
12.700	32	10	0.6	6100	2750	22000	26000	6201-1/2" ZZ	6201-1/2" 2RS	17	17.5	27	0.6	0.037
14.000	35	11	0.6	7750	3600	19000	23000	6202-14mm ZZ	6202-14mm 2RS	20	20.5	30	0.6	0.045
16.000	35	11	0.6	7750	3600	19000	23000	6202-16mm ZZ	6202-16mm 2RS	20	20.5	30	0.6	0.045
15.875	35	11	0.6	7750	3600	19000	23000	6202-5/8" ZZ	6202-5/8" 2RS	20	20.5	30	0.6	0.045
12.700	35	11	0.6	7750	3600	19000	23000	6202-1/2" ZZ	6202-1/2" 2RS	20	20.5	30	0.6	0.045
12.000	40	12	0.6	9600	4600	18000	21000	6203-12mm ZZ	6203-12mm 2RS	22	23.0	35	0.6	0.066
14.000	40	12	0.6	9600	4600	18000	21000	6203-14mm ZZ	6203-14mm 2RS	22	23.0	35	0.6	0.066
15.000	40	12	0.6	9600	4600	18000	21000	6203-15mm ZZ	6203-15mm 2RS	22	23.0	35	0.6	0.066
16.000	40	12	0.6	9600	4600	18000	21000	6203-16mm ZZ	6203-16mm 2RS	22	23.0	35	0.6	0.066
12.700	40	12	0.6	9600	4600	18000	21000	6203-1/2" ZZ	6203-1/2" 2RS	22	23.0	35	0.6	0.066
15.875	40	12	0.6	9600	4600	18000	21000	6203-5/8" ZZ	6203-5/8" 2RS	22	23.0	35	0.6	0.066
19.050	40	12	0.6	9600	4600	18000	21000	6203-3/4" ZZ	6203-3/4" 2RS	22	23.0	35	0.6	0.066
19.050	47	14	1.0	12800	6650	16000	18000	6204-3/4" ZZ	6204-3/4" 2RS	26	28.0	41	1.0	0.106
22.225	47	14	1.0	12800	6650	16000	18000	6204-7/8" ZZ	6204-7/8" 2RS	26	28.0	41	1.0	0.106
25.400	52	15	1.0	14000	7850	13000	15000	6205-1" ZZ	6205-1" 2RS	31	32.0	46	1.0	0.128

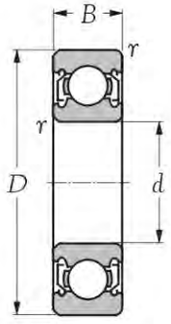
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

KSM®

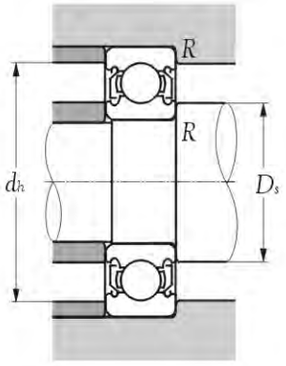
Ball bearings
series 63..



Shielded type
(ZZ)

Non-contact sealed type
(VV)

Contact Sealed type
(DDU)



Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers	Abutment and fillet dimensions mm				Mass kg(s).
d	D	B	$r_{s\ min}$[1]	C_r	C_{or}				D_s min	D_s max	d_h max	R max	(approx.)
10	35	11	0.6	8200	3500	23000	27000	**6300 ZZ**	15.0	17.0	30.0	0.6	0.053
10	35	11	0.6	8200	3500	16000	-	**6300 DDU**	15.0	17.0	30.0	0.6	0.053
12	37	12	1.0	9700	4200	20000	24000	**6301 ZZ**	18.0	18.5	31.0	1.0	0.060
12	37	12	1.0	9700	4200	15000	-	**6301 DDU**	18.0	18.5	31.0	1.0	0.060
15	42	13	1.0	11400	5450	17000	21000	**6302 ZZ**	21.0	23.0	36.0	1.0	0.082
15	42	13	1.0	11400	5450	12000	-	**6302 DDU**	21.0	23.0	36.0	1.0	0.082
17	47	14	1.0	13500	6550	16000	19000	**6303 ZZ**	23.0	25.0	41.0	1.0	0.115
17	47	14	1.0	13500	6550	16000	19000	**6303 VV**	23.0	25.0	41.0	1.0	0.115
20	52	15	1.1	15900	7900	14000	17000	**6304 ZZ**	27.0	28.5	45.0	1.0	0.144
20	52	15	1.1	15900	7900	14000	17000	**6304 VV**	27.0	28.5	45.0	1.0	0.144
25	62	17	1.1	21200	10900	12000	14000	**6305 ZZ**	32.0	35.0	55.0	1.0	0.232
25	62	17	1.1	21200	10900	12000	14000	**6305 VV**	32.0	35.0	55.0	1.0	0.232
30	72	19	1.1	26700	15000	10000	12000	**6306 ZZ**	37.0	43.0	65.0	1.0	0.360
30	72	19	1.1	26700	15000	10000	12000	**6306 VV**	37.0	43.0	65.0	1.0	0.360
35	80	21	1.5	33500	19100	8800	10000	**6307 ZZ**	43.5	47.0	71.5	1.5	0.457
35	80	21	1.5	33500	19100	8800	10000	**6307 VV**	43.5	47.0	71.5	1.5	0.457
40	90	23	1.5	40500	24000	7800	9200	**6308 ZZ**	48.5	54.0	81.5	1.5	0.630
40	90	23	1.5	40500	24000	7800	9200	**6308 VV**	48.5	54.0	81.5	1.5	0.630
45	100	25	1.5	53000	32000	7000	8200	**6309 ZZ**	53.5	61.5	91.5	1.5	0.814
45	100	25	1.5	53000	32000	7000	8200	**6309 VV**	53.5	61.5	91.5	1.5	0.814
50	110	27	2.0	62000	38500	6400	7500	**6310 ZZ**	60.0	68.5	100.0	2.0	1.070
50	110	27	2.0	62000	38500	6400	7500	**6310 VV**	60.0	68.5	100.0	2.0	1.070

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Multemp SRL

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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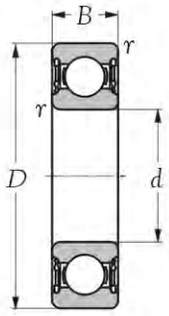
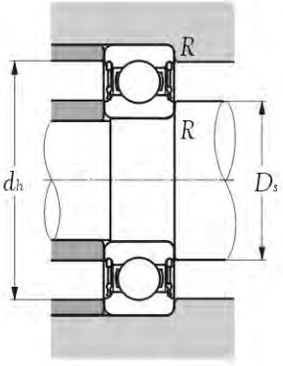
P1

Ball bearings
series 622..2RS



Sealed type
(2RS)



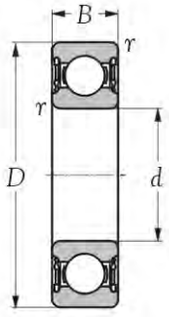
Boundary dimensions mm				Basic load ratings dynamic static N		Speed rating grease rpm	Bearing numbers	Abutment and fillet dimensions mm				Mass kg.
d	D	B	rs min1)	C0	C0r			Ds min	Ds max	dh max	R max	(approx.)
10	30	14	0.6	5070	2360	17000	**62200 2RS**	14.0	14.5	26.0	0.6	0.040
12	32	14	0.6	6890	3100	15000	**62201 2RS**	16.0	16.0	28.0	0.6	0.045
15	35	14	0.6	7800	3750	13000	**62202 2RS**	19.0	19.0	31.0	0.6	0.054
17	40	16	0.6	9560	4750	12000	**62203 2RS**	21.0	21.0	36.0	0.6	0.083
20	47	18	1.0	12700	6550	10000	**62204 2RS**	25.0	25.5	42.0	1.0	0.130
25	52	18	1.0	14000	7800	8500	**62205 2RS**	30.0	31.0	47.0	1.0	0.150
30	62	20	1.0	19500	11200	7500	**62206 2RS**	35.0	37.0	57.0	1.0	0.240
35	72	23	1.1	25500	15300	6300	**62207 2RS**	41.5	43.5	65.5	1.0	0.370
40	80	23	1.1	30700	19000	5600	**62208 2RS**	46.5	49.5	73.5	1.0	0.440
45	85	23	1.1	33200	21600	5000	**62209 2RS**	51.5	54.0	78.5	1.0	0.480
50	90	23	1.1	35100	23200	4800	**62210 2RS**	56.5	58.0	83.5	1.0	0.520
55	100	25	1.5	43600	29000	4300	**62211 2RS**	63.0	65.0	92.0	1.5	0.700
60	110	28	1.5	47500	32500	4000	**62212 2RS**	68.0	71.0	102.0	1.5	0.970

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

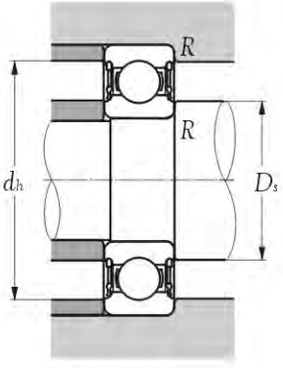
Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Ball bearings
series 623..2RS



Sealed type
(2RS)



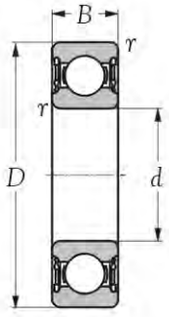
Boundary dimensions mm				Basic load ratings dynamic static N		Speed rating grease rpm	Bearing numbers	Abutment and fillet dimensions mm				Mass kg(s).
d	D	B	rs min 1)	Co	Cor			Ds min	Ds max	dh max	R max	(approx.)
10	35	17	0.6	8060	3400	15000	**62300 2RS**	14.0	15.0	31.0	0.6	0.060
12	37	17	1.0	9750	4150	14000	**62301 2RS**	17.0	17.0	32.0	1.0	0.070
15	42	17	1.0	11400	5400	12000	**62302 2RS**	20.0	20.5	37.0	1.0	0.110
17	47	19	1.0	13500	6550	11000	**62303 2RS**	22.0	23.5	42.0	1.0	0.150
20	52	21	1.1	15900	7800	9500	**62304 2RS**	26.5	27.0	45.5	1.0	0.200
25	62	24	1.1	22500	11600	7500	**62305 2RS**	31.5	33.5	55.5	1.0	0.320
30	72	27	1.1	28100	16000	6300	**62306 2RS**	36.5	41.5	65.5	1.0	0.480
35	80	31	1.5	33200	19000	6000	**62307 2RS**	43.0	44.0	72.0	1.5	0.660
40	90	33	1.5	41000	24000	5000	**62308 2RS**	48.0	50.5	82.0	1.5	0.890
45	100	36	1.5	52700	31500	4500	**62309 2RS**	53.0	56.5	92.0	1.5	1.150
50	110	40	2.0	61800	38000	4300	**62310 2RS**	59.0	63.0	101.0	2.0	1.550

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

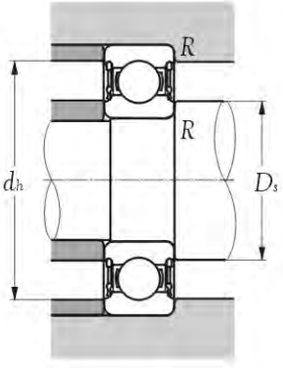
Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Ball bearings
series 630..2RS



Sealed type
(2RS)



Boundary dimensions mm				Basic load ratings dynamic static N		Speed rating grease rpm	Bearing numbers	Abutment and fillet dimensions mm				Mass kg.
d	D	B	rs min 1)	Co	Cor			mm	Ds max	dh max	R max	(approx.)
10	26	12	0.3	4620	1960	19000	**63000 2RS**	12	12.5	24	0.3	0.025
12	28	12	0.3	5070	2360	17000	**63001 2RS**	14	14.5	26	0.3	0.029
15	32	13	0.3	5590	2850	14000	**63002 2RS**	17	18.0	30	0.3	0.039
17	35	14	0.3	6050	3250	13000	**63003 2RS**	19	20.0	33	0.3	0.052
20	42	16	0.6	9360	5000	11000	**63004 2RS**	24	24.5	38	0.6	0.086
25	47	16	0.6	11200	6550	9500	**63005 2RS**	29	29.0	43	0.6	0.100
30	55	19	1.0	13300	8300	8000	**63006 2RS**	35	35.5	50	1.0	0.160
35	62	20	1.0	15900	10200	7000	**63007 2RS**	40	40.5	57	1.0	0.210
40	68	21	1.0	16800	11600	6300	**63008 2RS**	45	46.0	63	1.0	0.260
45	75	23	1.0	20800	14600	5600	**63009 2RS**	50	51.0	70	1.0	0.340
50	80	23	1.0	21600	16000	5000	**63010 2RS**	55	56.0	75	1.0	0.370

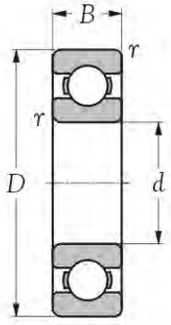
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

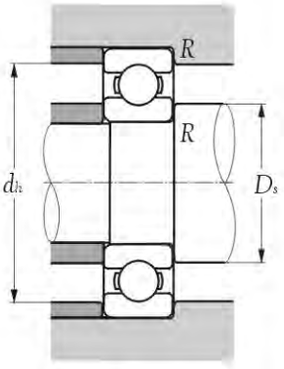
Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

KSM®

Ball bearings
series 68..





Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers	Abutment and fillet dimensions mm				Mass kg.
d	D	B	$r_{s\,min}$[1]	C_r	C_{or}				$D_{s\,min}$	$D_{s\,max}$	$d_{h\,max}$	R_{max}	(approx.)
10	19	5	0.3	1830	925	32000	38000	**6800**	12	17	17	0.3	0.005
12	21	5	0.3	1920	1040	29000	35000	**6801**	14	19	19	0.3	0.006
15	24	5	0.3	2080	1260	26000	31000	**6802**	17	22	22	0.3	0.007
17	26	5	0.3	2810	1720	24000	28000	**6803**	19	24	24	0.3	0.008
20	32	7	0.3	4000	2470	21000	25000	**6804**	22	30	30	0.3	0.019
25	37	7	0.3	4300	2950	18000	21000	**6805**	27	35	35	0.3	0.022
30	42	7	0.3	4700	3650	15000	18000	**6806**	32	40	40	0.3	0.026
35	47	7	0.3	4900	4050	13000	16000	**6807**	37	45	45	0.3	0.029
40	52	7	0.3	5100	4400	12000	14000	**6808**	42	50	50	0.3	0.033
45	58	7	0.3	6400	5650	11000	12000	**6809**	47	56	56	0.3	0.040
50	65	7	0.3	6600	6100	9600	11000	**6810**	52	63	63	0.3	0.052
55	72	9	0.3	8800	8100	8700	10000	**6811**	57	70	70	0.3	0.083
60	78	10	0.3	11500	10600	8000	9400	**6812**	62	76	76	0.3	0.106
65	85	10	0.6	11600	11000	7400	8700	**6813**	69	81	81	0.6	0.128
70	90	10	0.6	12100	11900	6900	8100	**6814**	74	86	86	0.6	0.137
75	95	10	0.6	12500	12900	6400	7600	**6815**	79	91	91	0.6	0.145
80	100	10	0.6	12700	13300	6000	7100	**6816**	84	96	96	0.6	0.154
85	110	13	1.0	18700	19000	5700	6700	**6817**	90	105	105	1.0	0.270
90	115	13	1.0	19000	19700	5400	6300	**6818**	95	110	110	1.0	0.285
95	120	13	1.0	19300	20500	5000	5900	**6819**	100	115	115	1.0	0.300
100	125	13	1.0	19600	21200	4800	5600	**6820**	105	120	120	1.0	0.313
105	130	13	1.0	19800	22000	4600	5400	**6821**	110	125	125	1.0	0.330
110	140	16	1.0	28800	32000	4300	5100	**6822**	115	135	135	1.0	0.515
120	150	16	1.0	28900	33000	4000	4700	**6824**	125	145	145	1.0	0.555

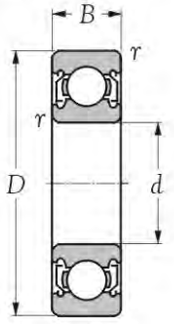
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

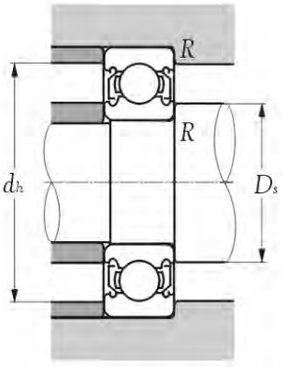
P1

Ball bearings
series 68..ZZ & 68..2RS



Shielded type
(ZZ)

Sealed type
(2RS)



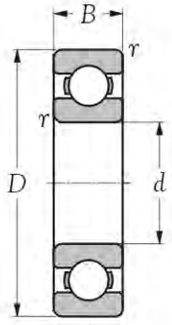
Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds grease rpm	Bearing numbers		Abutment and fillet dimensions mm				Mass kg.
d	D	B	rs min1)	Cr	Cor				Ds min	Ds max	dh max	R max	(approx.)
10	19	5	0.3	1830	925	32000	6800 ZZ	6800 2RS	12	12.5	17	0.3	0.005
12	21	5	0.3	1920	1040	29000	6801 ZZ	6801 2RS	14	14.5	19	0.3	0.006
15	24	5	0.3	2080	1260	26000	6802 ZZ	6802 2RS	17	17.5	22	0.3	0.007
17	26	5	0.3	2810	1720	24000	6803 ZZ	6803 2RS	19	19.5	24	0.3	0.008
20	32	7	0.3	4000	2470	21000	6804 ZZ	6804 2RS	22	23.0	30	0.3	0.019
25	37	7	0.3	4300	2950	18000	6805 ZZ	6805 2RS	27	28.0	35	0.3	0.022
30	42	7	0.3	4700	3650	15000	6806 ZZ	6806 2RS	32	33.0	40	0.3	0.026
35	47	7	0.3	4900	4050	13000	6807 ZZ	6807 2RS	37	38.0	45	0.3	0.029
40	52	7	0.3	5100	4400	12000	6808 ZZ	6808 2RS	42	43.0	50	0.3	0.033
45	58	7	0.3	6400	5650	11000	6809 ZZ	6809 2RS	47	48.0	56	0.3	0.040
50	65	7	0.3	6600	6100	9600	6810 ZZ	6810 2RS	52	54.0	63	0.3	0.052
55	72	9	0.3	8800	8100	8700	6811 ZZ	6811 2RS	57	59.0	70	0.3	0.083
60	78	10	0.3	11500	10600	8000	6812 ZZ	6812 2RS	62	64.5	76	0.3	0.106
65	85	10	0.6	11600	11000	7400	6813 ZZ	6813 2RS	69	70.0	81	0.6	0.128
70	90	10	0.6	12100	11900	6900	6814 ZZ	6814 2RS	74	75.5	86	0.6	0.137
75	95	10	0.6	12500	12900	6400	6815 ZZ	6815 2RS	79	80.0	91	0.6	0.145
80	100	10	0.6	12700	13300	6000	6816 ZZ	6816 2RS	84	85.0	96	0.6	0.154
85	110	13	1.0	18700	19000	5700	6817 ZZ	6817 2RS	90	91.0	105	1.0	0.270
90	115	13	1.0	19000	19700	5400	6818 ZZ	6818 2RS	95	96.0	110	1.0	0.285
95	120	13	1.0	19300	20500	5000	6819 ZZ	6819 2RS	100	101.0	115	1.0	0.300
100	125	13	1.0	19600	21200	4800	6820 ZZ	6820 2RS	105	106.0	120	1.0	0.313

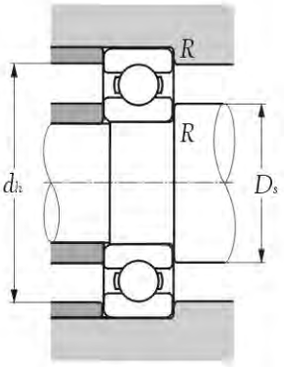
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Ball bearings
series 69..





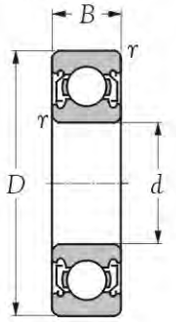
Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers	Abutment and fillet dimensions mm				Mass kg.
d	D	B	rs min1)	Cr	Cor				Ds min	Ds max	dh max	R max	(approx.)
10	22	6	0.3	2700	1270	30000	36000	**6900**	12.0	13.0	20.0	0.3	0.009
12	24	6	0.3	2890	1460	27000	32000	**6901**	14.0	15.0	22.0	0.3	0.011
15	28	7	0.3	4100	2060	24000	28000	**6902**	17.0	18.0	26.0	0.3	0.016
17	30	7	0.3	4650	2580	22000	26000	**6903**	19.0	20.0	28.0	0.3	0.018
20	37	9	0.3	6400	3700	19000	23000	**6904**	22.0	24.0	35.0	0.3	0.036
25	42	9	0.3	7050	4550	16000	19000	**6905**	27.0	29.0	40.0	0.3	0.042
30	47	9	0.3	7250	5000	14000	17000	**6906**	32.0	34.0	45.0	0.3	0.048
35	55	10	0.6	11200	7450	12000	15000	**6907**	39.0	40.0	51.0	0.6	0.074
40	62	12	0.6	14600	10200	11000	13000	**6908**	44.0	45.0	58.0	0.6	0.110
45	68	12	0.6	15100	11200	9800	12000	**6909**	49.0	51.0	64.0	0.6	0.128
50	72	12	0.6	15600	12200	8900	11000	**6910**	54.0	55.5	68.0	0.6	0.132
55	80	13	1.0	16000	13300	8200	9600	**6911**	60.0	61.5	75.0	1.0	0.180
60	85	13	1.0	16400	14300	7600	8900	**6912**	65.0	66.5	80.0	1.0	0.193
65	90	13	1.0	17400	16100	7000	8200	**6913**	70.0	71.5	85.0	1.0	0.206
70	100	16	1.0	23700	21200	6500	7700	**6914**	75.0	77.5	95.0	1.0	0.334
75	105	16	1.0	24400	22600	6100	7200	**6915**	80.0	82.5	100.0	1.0	0.353
80	110	16	1.0	24900	24000	5700	6700	**6916**	85.0	88.0	105.0	1.0	0.373
85	120	18	1.1	32000	29600	5400	6300	**6917**	91.5	94.0	113.5	1.0	0.536
90	125	18	1.1	33000	31500	5100	6000	**6918**	96.5	99.0	118.5	1.0	0.554

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

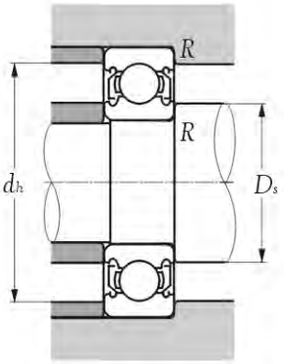
If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Ball bearings
series 69..ZZ & 69..2RS



Shielded type
(ZZ)

Sealed type
(2RS)



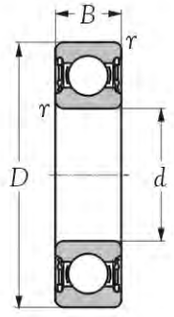
Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds grease rpm	Bearing numbers		Abutment and fillet dimensions mm				Mass kg.
d	D	B	rs min1)	Cr	Cor				Ds min	Ds max	dh max	R max	(approx.)
10	22	6	0.3	2700	1270	30000	6900 ZZ	6900 2RS	12.0	13.0	20.0	0.3	0.009
12	24	6	0.3	2890	1460	27000	6901 ZZ	6901 2RS	14.0	15.0	22.0	0.3	0.011
15	28	7	0.3	4100	2060	24000	6902 ZZ	6902 2RS	17.0	18.0	26.0	0.3	0.016
17	30	7	0.3	4650	2580	22000	6903 ZZ	6903 2RS	19.0	20.0	28.0	0.3	0.018
20	37	9	0.3	6400	3700	19000	6904 ZZ	6904 2RS	22.0	24.0	35.0	0.3	0.036
25	42	9	0.3	7050	4550	16000	6905 ZZ	6905 2RS	27.0	29.0	40.0	0.3	0.042
30	47	9	0.3	7250	5000	14000	6906 ZZ	6906 2RS	32.0	34.0	45.0	0.3	0.048
35	55	10	0.6	11200	7450	12000	6907 ZZ	6907 2RS	39.0	40.0	51.0	0.6	0.074
40	62	12	0.6	14600	10200	11000	6908 ZZ	6908 2RS	44.0	45.0	58.0	0.6	0.110
45	68	12	0.6	15100	11200	9800	6909 ZZ	6909 2RS	49.0	51.0	64.0	0.6	0.128
50	72	12	0.6	15600	12200	8900	6910 ZZ	6910 2RS	54.0	55.5	68.0	0.6	0.132
55	80	13	1.0	16000	13300	8200	6911 ZZ	6911 2RS	60.0	61.5	75.0	1.0	0.180
60	85	13	1.0	16400	14300	7600	6912 ZZ	6912 2RS	65.0	66.5	80.0	1.0	0.193
65	90	13	1.0	17400	16100	7000	6913 ZZ	6913 2RS	70.0	71.5	85.0	1.0	0.206
70	100	16	1.0	23700	21200	6500	6914 ZZ	6914 2RS	75.0	77.5	95.0	1.0	0.334
75	105	16	1.0	24400	22600	6100	6915 ZZ	6915 2RS	80.0	82.5	100.0	1.0	0.353
80	110	16	1.0	24900	24000	5700	6916 ZZ	6916 2RS	85.0	88.0	105.0	1.0	0.373
85	120	18	1.1	32000	29600	5400	6917 ZZ	6917 2RS	91.5	94.0	113.5	1.0	0.536
90	125	18	1.1	33000	31500	5100	6918 ZZ	6918 2RS	96.5	99.0	118.5	1.0	0.554

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Ball bearings
series 16..2RS (Inch sizes)



Sealed type
(2RS)

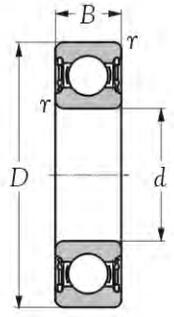
Boundary dimensions mm				Basic load ratings dynamic N	static N	Limiting speeds grease rpm	oil rpm	Bearing numbers	Mass kg.
d	D	B	$r_{s\,min}$ 1)	C_r	C_{or}				(approx.)
4.762	17.462	7.938	0.3	1280	578	28000	43000	1601 2RS	0.004
3/16	11/16	5/16							
6.350	17.462	7.938	0.3	1280	578	28000	43000	1602 2RS	0.006
1/4	11/16	5/16							
7.938	22.225	8.731	0.3	1925	916	22000	36000	1603 2RS	0.010
5/16	7/8	11/32							
9.525	22.225	8.731	0.3	1925	916	22000	36000	1604 2RS	0.009
3/8	7/8	11/32							
7.938	23.019	7.938	0.3	1556	845	18000	33000	1605 2RS	0.017
5/16	29/32	5/16							
9.525	23.019	7.938	0.3	1556	845	18000	33000	1606 2RS	0.022
3/8	29/32	5/16							
11.112	23.019	7.938	0.3	3560	1950	17000	32000	1607 2RS	0.022
7/16	29/32	5/16							
9.525	28.575	9.525	0.6	3920	2250	15000	28000	1614 2RS	0.035
3/8	1-1/8	3/8							
11.112	28.575	9.525	0.6	3920	2250	15000	28000	1615 2RS	0.034
7/16	1-1/8	3/8							
12.700	28.575	9.525	0.6	3920	2250	15000	28000	1616 2RS	0.030
1/2	1-1/8	3/8							
11.112	34.925	11.112	0.6	5900	3500	12000	26000	1620 2RS	0.050
7/16	1-3/8	7/16							
12.700	34.925	11.112	0.6	5900	3500	12000	26000	1621 2RS	0.048
1/2	1-3/8	7/16							

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Ball bearings
series 16..2RS (Inch sizes)



Sealed type
(2RS)

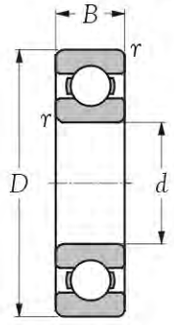
Boundary dimensions mm				Basic load ratings dynamic N	static N	Limiting speeds grease rpm	oil rpm	Bearing numbers	Mass kg. (approx.)
d	D	B	$r_{s\,min}$ 1)	C_r	C_{or}				
14.288	34.925	11.112	0.6	5900	3500	12000	26000	**1622 2RS**	0.046
9/16	1-3/8	7/16							
15.875	34.925	11.112	0.6	5900	3500	12000	26000	**1623 2RS**	0.040
5/8	1-3/8	7/16							
15.875	41.275	12.700	0.6	7250	4450	10000	20000	**1628 2RS**	0.072
5/8	1-5/8	1/2							
19.050	41.275	12.700	0.6	7250	4450	10000	20000	**1630 2RS**	0.065
3/4	1-5/8	1/2							
15.875	44.450	12.700	0.6	7250	4450	9000	16000	**1633 2RS**	0.092
5/8	1-3/4	1/2							
19.050	44.450	12.700	0.6	7250	4450	9000	16000	**1635 2RS**	0.085
3/4	1-3/4	1/2							
19.050	50.800	14.288	1.0	10800	6950	7500	13000	**1638 2RS**	0.120
3/4	2	9/16							
22.225	50.800	14.288	1.0	10800	6950	7500	13000	**1640 2RS**	0.112
7/8	2	9/16							
25.400	50.800	14.288	1.0	10800	6950	7500	13000	**1641 2RS**	0.100
1	2	9/16							
28.575	63.500	15.875	1.0	12800	8400	5500	10000	**1652 2RS**	0.210
1-1/8	2-1/2	5/8							
31.750	63.500	15.875	1.0	12800	8400	5500	10000	**1654 2RS**	0.190
1-1/4	2-1/2	5/8							

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Ball bearings
series R.., R..ZZ & R..2RS (Inch sizes)



Open type

Shielded type
(ZZ)

Sealed type
(2RS)

Boundary dimensions mm inch				Basic load ratings dynamic N	static N	Limiting speeds grease rpm	oil rpm	Bearing numbers open	with shields	with seals	Mass kg. (approx.)
d	D	B	rs min 1)	Cr	Cor						
3.175	9.525	3.967 5/32	0.3	630	218	56000	67000	R 2			0.0012
1/8	3/8	3.967 5/32					-		R 2 ZZ	R 2 2RS	0.0014
3.175	12.700	4.366 11/64	0.3	630	218	56000	6700	R 2 A			0.0010
1/8	1/2	4.366 11/64					-		R 2 A ZZ	R 2 A 2RS	0.0010
4.762	12.700	3.967 5/32	0.3	1310	490	41000	48000	R 3			0.0022
3/16	1/2	4.978 -					-		R 3 ZZ	R 3 2RS	0.0024
4.762	15.875	4.978 0.196	0.3	1310	490	41000	48000	R 3 A			0.0020
3/16	5/8	4.978 0.196					-		R 3 A ZZ	R 3 A 2RS	0.0020
6.350	15.875	4.978 0.196	0.4	1480	615	36000	43000	R 4			0.0040
1/4	5/8	4.978 0.196					-		R 4 ZZ	R 4 2RS	0.0044
6.350	19.050	5.556 7/32	0.4	1480	615	36000	43000	R 4 A			0.0040
1/4	3/4	7.142 0.281					-		R 4 A ZZ	R 4 A 2RS	0.0040
9.525	22.225	5.556 7/32	1.0	3300	1400	31000	37000	R 6			0.0136
2/8	7/8	7.142 0.281					-		R 6 ZZ	R 6 2RS	0.0140
12.700	28.575	6.350 1/4	1.0	3950	2250	26000	31000	R 8			0.0165
1/2	1-1/8	7.938 5/16					-		R 8 ZZ	R 8 2RS	0.0180
15.875	34.925	7.140 9/32	1.0	4600	2800	21000	25000	R 10			0.0340
5/8	1-3/8	8.730 11/32					-		R 10 ZZ	R 10 2RS	0.0370
19.050	41.275	7.938 5/16	1.0	7250	4450	16000	21000	R 12			0.0440
3/4	1-5/8	11.112 7/16					-		R 12 ZZ	R 12 2RS	0.0470
22.225	47.625	9.525 3/8	1.0	7250	4950	12000	16000	R 14			0.0700
7/8	1-7/8	12.700 1/2					-		R 14 ZZ	R 14 2RS	0.0720

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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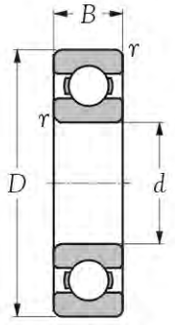
Ball bearings
series R.., R..ZZ & R..2RS (Inch sizes)



Open type

Shielded type
(ZZ)

Sealed type
(2RS)

Boundary dimensions mm inch				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers			Mass kg.
d	D	B	$r_{s\,min}$ 1)	Cr	Cor			open	with shields	with seals	(approx.)
25.400	50.800	9.525 3/8	1.0	8250	5450	11000	15000	R 16			0.0810
2	3	12.700 1/2					-		R 16 ZZ	R 16 2RS	0.0850
25.797	53.975	9.525 3/8	1.0	9600	6260	10000	13000	R 18			0.0860
1-1/64	2-1/8	12.700 1/2					-		R 18 ZZ	R 18 2RS	0.0900
31.750	57.150	9.525 3/8	1.0	10800	7520	9000	11000	R 20			0.0900
1-1/4	2-1/4	12.700 1/2					-		R 20 ZZ	R 20 2RS	0.0950
34.925	63.500	11.112 7/16	1.0	12280	8500	7000	8500	R 22			0.1010
1-3/8	2-1/2	14.288 9/16					-		R 22 ZZ	R 22 2RS	0.1050
38.100	66.675	11.112 7/16	1.0	13150	9450	6000	7500	R 24			0.1360
1-1/2	2-5/8	14.288 9/16					-		R 24 ZZ	R 24 2RS	0.1400

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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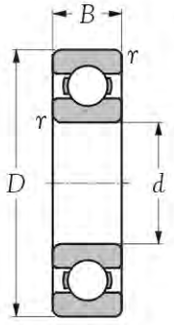
Ball bearings
series RLS.., RLS..ZZ & RLS..2RS (Inch sizes)



Open type

Shielded type
(ZZ)

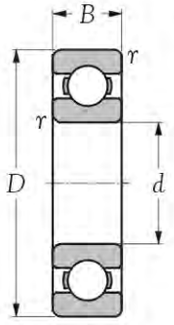
Sealed type
(2RS)

Boundary dimensions mm inch			Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers			Mass kg. (approx.)
d	D	B	Cr	Cor						
12.700	33.338	9.525	5162	3026	21000	28500	RLS 4	RLS 4 ZZ	RLS 4 2RS	0.037
1/2	1-5/16	3/8								
15.875	39.688	11.112	7387	4361	18000	24000	RLS 5	RLS 5 ZZ	RLS 5 2RS	0.059
5/8	1-9/16	7/16								
19.050	47.625	14.288	10547	6542	15500	21000	RLS 6	RLS 6 ZZ	RLS 6 2RS	0.109
3/4	1-7/8	9/16								
22.225	50.800	14.288	10725	6542	14300	19500	RLS 7	RLS 7 ZZ	RLS 7 2RS	0.116
7/8	2	9/16								
25.400	57.150	15.875	13795	8900	12700	17000	RLS 8	RLS 8 ZZ	RLS 8 2RS	0.169
1	2-1/4	5/8								
28.575	63.500	15.875	14997	10013	11700	15500	RLS 9	RLS 9 ZZ	RLS 9 2RS	0.220
1-1/8	2-1/2	5/8								
31.750	69.850	17.463	20470	13929	10600	14400	RLS 10	RLS 10 ZZ	RLS 10 2RS	0.276
1-1/4	2-3/4	11/16								
34.925	76.200	17.463	23051	15842	9800	13200	RLS 11	RLS 11 ZZ	RLS 11 2RS	0.333
1-3/8	3	11/16								
38.100	82.550	19.050	25810	17889	9000	12200	RLS 12	RLS 12 ZZ	RLS 12 2RS	0.418
1-1/2	3-1/4	3/4								
41.275	88.900	19.050	28658	20070	8400	11300	RLS 13	RLS 13 ZZ	RLS 13 2RS	0.481
1-5/8	3-1/2	3/4								
44.450	95.250	20.638	31595	22339	7800	10600	RLS 14	RLS 14 ZZ	RLS 14 2RS	0.594
1-3/4	3-3/4	13/16								
47.625	101.600	20.638	37380	27857	7200	9800	RLS 15	RLS 15 ZZ	RLS 15 2RS	0.708
1-7/8	4	13/16								

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter KSM web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Ball bearings
series RLS.., RLS..ZZ & RLS..2RS (Inch sizes)



Open type

Shielded type
(ZZ)

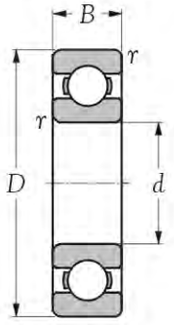
Sealed type
(2RS)

Boundary dimensions mm inch			Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers			Mass kg(s). (approx.)
d	D	B	Cr	Cor						
50.800	101.600	20.638	37558	27857	7200	9800	RLS 16	RLS 16 ZZ	RLS 16 2RS	0.667
2	4	13/16								
57.150	114.300	22.225	44500	32752	6400	8600	RLS 18	RLS 18 ZZ	RLS 18 2RS	0.885
2-1/4	4-1/2	7/8								
63.500	127.000	23.813	48505	36846	5700	7700	RLS 20	RLS 20 ZZ	RLS 20 2RS	1.220
2-1/2	5	15/16								
69.850	133.350	23.813	51620	40940	5300	7200	RLS 22	RLS 22 ZZ	RLS 22 2RS	1.334
2-3/4	5-1/4	15/16								
76.200	146.050	26.988	60075	48505	4800	6500	RLS 24	RLS 24 ZZ	RLS 24 2RS	1.814
3	5-3/4	1-1/16								

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Ball bearings
series RMS.., RMS..ZZ & RMS..2RS (Inch sizes)



Open type

Shielded type
(ZZ)

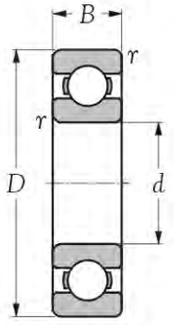
Sealed type
(2RS)

Boundary dimensions mm inch			Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers			Mass kg(s). (approx.)
d	D	B	Cr	Cor						
12.700	41.275	15.875	9034	5607	18500	25000	RMS 4	RMS 4 ZZ	RMS 4 2RS	0.096
1/2	1-5/8	5/8								
15.875	46.038	15.875	9345	5607	16500	22000	RMS 5	RMS 5 ZZ	RMS 5 2RS	0.117
5/8	1-13/16	5/8								
19.050	50.800	17.463	12193	7788	14700	20000	RMS 6	RMS 6 ZZ	RMS 6 2RS	0.156
3/4	2	11/16								
22.225	57.150	17.463	14196	9123	13300	18000	RMS 7	RMS 7 ZZ	RMS 7 2RS	0.197
7/8	2-1/4	11/16								
25.400	63.500	19.050	16332	10547	12200	16500	RMS 8	RMS 8 ZZ	RMS 8 2RS	0.262
1	2-1/2	3/4								
28.575	71.438	20.638	22695	15842	10800	14500	RMS 9	RMS 9 ZZ	RMS 9 2RS	0.347
1-1/8	2-13/16	13/16								
31.750	79.375	22.225	27902	19536	9800	13200	RMS 10	RMS 10 ZZ	RMS 10 2RS	0.476
1-1/4	3-1/8	7/8								
34.925	88.900	22.225	33598	23852	8800	11900	RMS 11	RMS 11 ZZ	RMS 11 2RS	0.608
1-3/8	3-1/2	7/8								
38.100	95.250	23.813	36490	26211	8200	11000	RMS 12	RMS 12 ZZ	RMS 12 2RS	0.753
1-1/2	3-3/4	15/16								
41.275	101.600	23.813	40495	30038	7700	10300	RMS 13	RMS 13 ZZ	RMS 13 2RS	0.857
1-5/8	4	15/16								
44.450	107.950	26.988	43254	31195	7100	9600	RMS 14	RMS 14 ZZ	RMS 14 2RS	1.061
1-3/4	4-1/4	1-1/16								
47.625	114.300	26.988	51175	38715	6600	8900	RMS 15	RMS 15 ZZ	RMS 15 2RS	1.220
1-7/8	4-1/2	1-1/16								

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter KSM web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Ball bearings
series RMS.., RMS..ZZ & RMS..2RS (Inch sizes)



Open type

Shielded type
(ZZ)

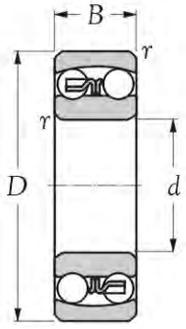
Sealed type
(2RS)

Boundary dimensions mm inch			Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers			Mass kg(s). (approx.)
d	D	B	Cr	Cor						
50.800	114.300	26.988	51175	38715	5900	8000	RMS 16	RMS 16 ZZ	RMS 16 2RS	1.175
2	4-1/2	1-1/16								
57.150	127.000	31.750	62745	48505	4600	6200	RMS 18	RMS 18 ZZ	RMS 18 2RS	1.601
2-1/4	5	1-1/4								
63.500	139.700	31.750	71200	55625	4000	5400	RMS 20	RMS 20 ZZ	RMS 20 2RS	2.041
2-1/2	5-1/2	1-1/4								
69.850	158.750	34.925	87220	71200	3800	5100	RMS 22	RMS 22 ZZ	RMS 22 2RS	2.894
2-3/4	6-1/4	1-3/8								

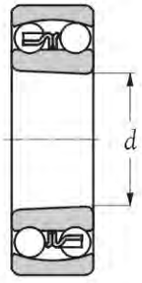
Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Self-aligning ball bearings
series 12..E, 12.. & 12..K



Cylindrical bore



Tapered bore
taper 1:12

Boundary dimensions mm				Basic load ratings dynamic N	static N	Limiting speeds grease rpm	oil rpm	Bearing numbers		Mass kg(s). cylindrical bore (approx.)	tapered bore (approx.)
d	D	B	$r_{s\,min}$	C_r	C_{or}						
10	30	9	0.6	5500	1190	21000	24000	**1200 E**	-	0.033	-
12	32	10	0.6	5600	1270	18000	22000	**1201 E**	-	0.040	-
15	35	11	0.6	7450	1750	16000	19000	**1202 E**	-	0.049	-
17	40	12	0.6	7900	2010	14000	17000	**1203 E**	-	0.072	-
20	47	14	1.0	9900	2610	13000	15000	**1204**	-	0.116	-
25	52	15	1.0	12100	3300	11000	13000	**1205**	**1205 K**	0.138	0.135
30	62	16	1.0	15600	4650	9200	11000	**1206**	**1206 K**	0.217	0.213
35	72	17	1.1	15800	5100	8000	9400	**1207**	**1207 K**	0.317	0.312
40	80	18	1.1	19300	6550	7100	8400	**1208**	**1208 K**	0.414	0.407
45	85	19	1.1	21900	7350	6400	7500	**1209**	**1209 K**	0.457	0.448
50	90	20	1.1	22700	8100	5800	6800	**1210**	**1210 K**	0.515	0.504
55	100	21	1.5	26800	10000	5300	6200	**1211**	**1211 K**	0.692	0.679
60	110	22	1.5	30000	11500	4900	5800	**1212**	**1212 K**	0.879	0.864
65	120	23	1.5	31000	12500	4500	5300	**1213**	**1213 K**	1.130	1.110
70	125	24	1.5	34500	13800	4200	4900	**1214**	-	1.240	-
75	130	25	1.5	39000	15700	3900	4600	**1215**	**1215 K**	1.330	1.310
80	140	26	2.0	40000	17000	3700	4300	**1216**	**1216 K**	1.650	1.620

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: All **KSM** products of 12, 13, 22 and 23 series mainly come with steel cages, exceptional for small dimension sizes come with polyamide 66, suffix "E" stand for.

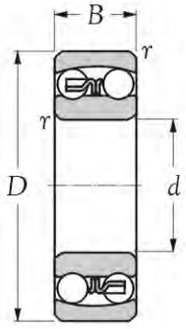
[Precision] - Class 0 (JIS)

[Cages] - Polyamide 66 (E), Steel

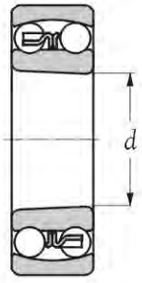
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Self-aligning ball bearings
series 13..E, 13.. & 13..K



Cylindrical bore



Tapered bore
taper 1:12

Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers		Mass kg(s). cylindrical bore tapered bore (approx.)	
d	D	B	$r_{s\,min}$	C_r	C_{or}						
10	35	11	0.6	7250	1620	18000	21000	**1300 E**	-	0.058	-
12	37	12	1.0	9450	2160	16000	18000	**1301 E**	-	0.066	-
15	42	13	1.0	9550	2300	13000	16000	**1302 E**	-	0.092	-
17	47	14	1.0	12500	3200	12000	14000	**1303 E**	-	0.128	-
20	52	15	1.1	12400	3350	11000	13000	**1304**	-	0.160	-
25	62	17	1.1	18000	5000	9100	11000	**1305**	**1305 K**	0.255	0.251
30	72	19	1.1	21300	6300	7700	9100	**1306**	**1306 K**	0.383	0.377
35	80	21	1.5	25100	7850	6800	8000	**1307**	**1307 K**	0.500	0.492
40	90	23	1.5	29600	9700	6000	7000	**1308**	**1308 K**	0.709	0.698
45	100	25	1.5	38000	12700	5400	6300	**1309**	**1309 K**	0.953	0.938
50	110	27	2.0	43500	14100	4900	5800	**1310**	**1310 K**	1.200	1.180
55	120	29	2.0	51500	17900	4500	5200	**1311**	**1311 K**	1.580	1.560
60	130	31	2.1	57000	20800	4100	4800	**1312**	**1312 K**	1.960	1.930

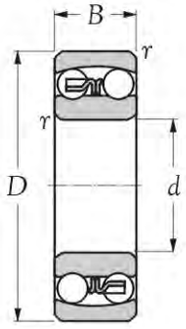
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: All **KSM** products of 12, 13, 22 and 23 series mainly come with steel cages, exceptional for small dimension sizes come with polyamide 66, suffix "E" stand for.

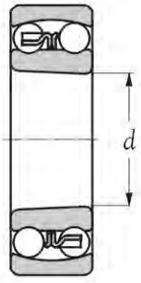
[Precision] - Class 0 (JIS)
[Cages] - Polyamide 66 (E), Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Self-aligning ball bearings
series 22..E, 22.. & 22..K



Cylindrical bore



Tapered bore
taper 1:12

Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers		Mass kg(s). cylindrical bore tapered bore (approx.)	
d	D	B	$r_{s\,min}$	C_r	C_{or}						
10	30	14	0.6	7300	1590	19000	23000	**2200 E**	-	0.047	-
12	32	14	0.6	7600	1730	17000	20000	**2201 E**	-	0.051	-
15	35	14	0.6	7700	1850	15000	18000	**2202**	-	0.060	-
17	40	16	0.6	9800	2410	13000	16000	**2203**	-	0.088	-
20	47	18	1.0	12600	3300	12000	14000	**2204**	-	0.140	-
25	52	18	1.0	12300	3450	10000	12000	**2205**	**2205 K**	0.157	0.153
30	62	20	1.0	15200	4500	8600	10000	**2206**	**2206 K**	0.256	0.250
35	72	23	1.1	21500	6600	7500	8800	**2207**	**2207 K**	0.392	0.382
40	80	23	1.1	22300	7350	6700	7900	**2208**	**2208 K**	0.493	0.482
45	85	23	1.1	23200	8150	6000	7100	**2209**	**2209 K**	0.540	0.528
50	90	23	1.1	23200	8450	5500	6400	**2210**	**2210 K**	0.583	0.569
55	100	25	1.5	26500	9900	5000	5800	**2211**	**2211 K**	0.787	0.769
60	110	28	1.5	34000	12600	4600	5400	**2212**	**2212 K**	1.080	1.060

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: All **KSM** products of 12, 13, 22 and 23 series mainly come with steel cages, exceptional for small dimension sizes come with polyamide 66, suffix "E" stand for.

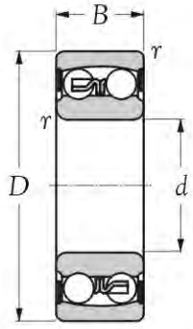
[Precision] - Class 0 (JIS)

[Cages] - Polyamide 66 (E), Steel

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Self-aligning ball bearings
series 22..E 2RS & 22..2RS



Sealed type
(2RS)

Boundary dimensions mm				Basic load ratings dynamic N	static N	Limiting speeds grease rpm	Bearing numbers	Mass kg(s).
d	D	B	$r_{s\,min}$	C_r	C_{or}			(approx.)
10	30	14	0.6	5530	1180	17000	**2200 E 2RS**	0.048
12	32	14	0.6	6240	1430	16000	**2201 E 2RS**	0.053
15	35	14	0.6	7410	1760	14000	**2202 2RS**	0.058
17	40	16	0.6	8840	2200	12000	**2203 2RS**	0.089
20	47	18	1.0	12700	3400	10000	**2204 2RS**	0.140
25	52	18	1.0	14300	4000	9000	**2205 2RS**	0.160
30	62	20	1.0	15600	4650	7500	**2206 2RS**	0.260
35	72	23	1.1	19000	6000	6300	**2207 2RS**	0.410
40	80	23	1.1	19900	6950	5600	**2208 2RS**	0.500
45	85	23	1.1	22900	7800	5300	**2209 2RS**	0.530
50	90	23	1.1	22900	8150	4800	**2210 2RS**	0.570
55	100	25	1.5	27600	10600	4300	**2211 2RS**	0.790
60	110	28	1.5	31200	12200	3800	**2212 2RS**	1.050

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: All **KSM** products of 12, 13, 22 and 23 series mainly come with steel cages, exceptional for small dimension sizes come with polyamide 66, suffix "E" stand for.

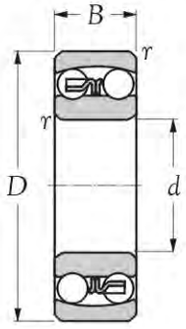
[Precision] - Class 0 (JIS)

[Cages] - Polyamide 66 (E), Steel

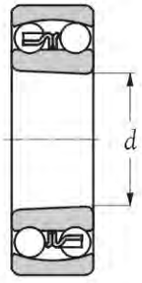
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Self-aligning ball bearings
series 23..E, 23.. & 23..K



Cylindrical bore



Tapered bore
taper 1:12

Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers		Mass kg(s). cylindrical bore tapered bore (approx.)	
d	D	B	$r_{s\,min}$	C_r	C_{or}						
10	35	17	0.6	10100	2150	17000	20000	**2300 E**	-	0.083	-
12	37	17	1.0	11800	2710	15000	17000	**2301 E**	-	0.091	-
15	42	17	1.0	12000	2900	13000	15000	**2302**	-	0.114	-
17	47	19	1.0	14400	3550	11000	14000	**2303**	-	0.156	-
20	52	21	1.1	18100	4700	10000	12000	**2304**	-	0.206	-
25	62	24	1.1	24400	6600	8500	10000	**2305**	**2305 K**	0.334	0.326
30	72	27	1.1	31500	8750	7200	8500	**2306**	**2306 K**	0.496	0.485
35	80	31	1.5	39500	11300	6300	7400	**2307**	**2307 K**	0.671	0.653
40	90	33	1.5	45000	13500	5600	6600	**2308**	**2308 K**	0.918	0.895
45	100	36	1.5	54000	16700	5000	5900	**2309**	**2309 K**	1.230	1.200
50	110	40	2.0	64500	20200	4600	5400	**2310**	**2310 K**	1.630	1.590
55	120	43	2.0	75500	24000	4200	4900	**2311**	**2311 K**	2.100	2.050
60	130	46	2.1	87000	28200	3800	4500	**2312**	**2312 K**	2.590	2.520

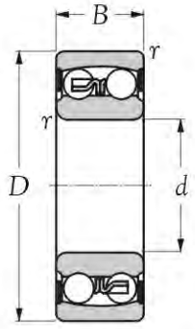
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: All **KSM** products of 12, 13, 22 and 23 series mainly come with steel cages, exceptional for small dimension sizes come with polyamide 66, suffix "E" stand for.

[Precision] - Class 0 (JIS)
[Cages] - Polyamide 66 (E), Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Self-aligning ball bearings
series 23..2RS



Sealed type
(2RS)

Boundary dimensions mm				Basic load ratings dynamic N	static N	Limiting speeds grease rpm	Bearing numbers	Mass kg(s).
d	D	B	$r_{s\,min}$	C_r	C_{or}			(approx.)
15	42	17	1.0	10800	2600	12000	**2302 2RS**	0.110
17	47	19	1.0	12700	3400	11000	**2303 2RS**	0.160
20	52	21	1.1	14300	4000	9500	**2304 2RS**	0.210
25	62	24	1.1	19000	5400	7500	**2305 2RS**	0.340
30	72	27	1.1	22500	6800	6700	**2306 2RS**	0.510
35	80	31	1.5	26500	8500	5600	**2307 2RS**	0.700
40	90	33	1.5	33800	11200	5000	**2308 2RS**	0.960
45	100	36	1.5	39000	13400	4500	**2309 2RS**	1.300
50	110	40	2.0	43600	14000	4000	**2310 2RS**	1.650

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: All **KSM** products of 12, 13, 22 and 23 series mainly come with steel cages, exceptional for small dimension sizes come with polyamide 66, suffix "E" stand for.

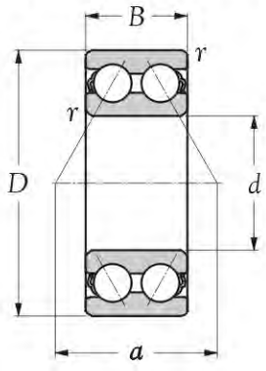
[Precision] - Class 0 (JIS)

[Cages] - Polyamide 66 (E), Steel

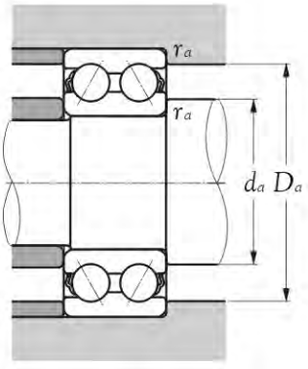
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Double row angular contact ball bearings
series 30 B TVH, Contact angle α = 25°



Open type



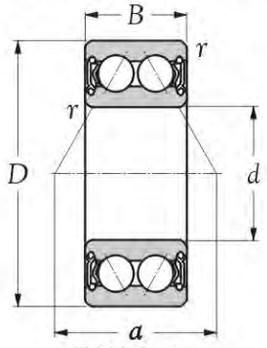
Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speed Reference speed 1/min		Bearing numbers	Abutment and fillet dimensions mm			Load center	Mass kg.
d	D	B	$r_{s\,min}$ 1)	C_r	C_{or}				d_a min	D_a max	r_a max	a	(approx.)
10	26	12	-	5700	3250	23300	21900	**3000 B TVH**	12.0	24.0	0.3	12.3	0.022
12	28	12	-	6200	3750	21900	19300	**3001 B TVH**	14.0	26.0	0.3	13.0	0.025
15	32	13	-	8600	5400	17800	16500	**3002 B TVH**	17.0	30.0	0.3	14.8	0.036
17	35	14	-	9200	6200	16800	15300	**3003 B TVH**	19.0	33.0	0.3	15.5	0.042
20	42	16	-	14500	9600	13500	13200	**3004 B TVH**	23.2	38.8	0.6	19.1	0.080
25	47	16	-	15500	11100	11900	11100	**3005 B TVH**	38.2	43.8	0.6	21.2	0.100
30	55	19	-	20300	15600	10100	10000	**3006 B TVH**	34.6	50.4	1.0	24.8	0.160
35	62	20	-	24500	19400	8700	8800	**3007 B TVH**	39.6	57.4	1.0	27.8	0.200
40	68	21	-	25500	21700	7900	8000	**3008 B TVH**	44.6	63.4	1.0	30.8	0.250

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

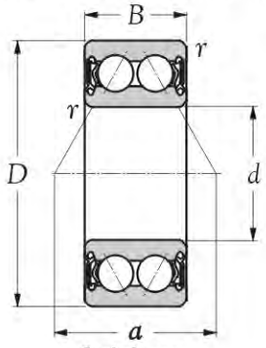
Remark: [Precision] - Class 0 (JIS)
[Cage] - Polyamide 66 (TVH)
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

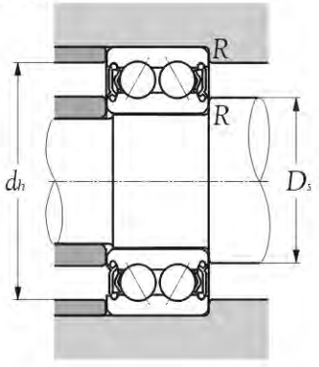
Double-row angular contact ball bearings
series 30 B ZZ TVH & 30 B 2RSR TVH, Contact angle α = 25°



Shielded type
(ZZ)



Sealed type
(2RSR)



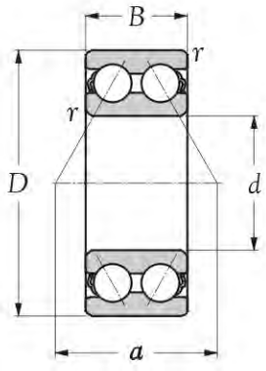
Boundary dimensions mm				Basic load ratings N		Limiting speed	Reference speed	Bearing numbers	Abutment and fillet dimensions mm			Load center	Mass kg.
d	D	B	$r_{s\,min}$ 1)	C_r	C_{or}	1/min			d_a min	D_a max	r_a max	a	(approx.)
10	26	12	-	5700	3250	23300	21900	**3000 B ZZ TVH**	12.0	24.0	0.3	12.3	0.022
10	26	12	-	5700	3250	14000	-	**3000 B 2RSR TVH**	12.0	24.0	0.3		0.022
12	28	12	-	6200	3750	21900	19300	**3001 B ZZ TVH**	14.0	26.0	0.3	13.0	0.025
12	28	12	-	6200	3750	13000	-	**3001 B 2RSR TVH**	14.0	26.0	0.3		0.025
15	32	13	-	8600	5400	17800	16500	**3002 B ZZ TVH**	17.0	30.0	0.3	14.8	0.036
15	32	13	-	8600	5400	12000	-	**3002 B 2RSR TVH**	17.0	30.0	0.3		0.036
17	35	14	-	9200	6200	16800	15300	**3003 B ZZ TVH**	19.0	33.0	0.3	15.5	0.042
17	35	14	-	9200	6200	11000	-	**3003 B 2RSR TVH**	19.0	33.0	0.3		0.042
20	42	16	-	14500	9600	13500	13200	**3004 B ZZ TVH**	23.2	38.8	0.6	19.1	0.080
20	42	16	-	14500	9600	9000	-	**3004 B 2RSR TVH**	23.2	38.8	0.6		0.080
25	47	16	-	15500	11100	11900	11100	**3005 B ZZ TVH**	38.2	43.8	0.6	21.2	0.100
25	47	16	-	15500	11100	8000	-	**3005 B 2RSR TVH**	38.2	43.8	0.6		0.100
30	55	19	-	20300	15600	10100	10000	**3006 B ZZ TVH**	34.6	50.4	1.0	24.8	0.160
30	55	19	-	20300	15600	6700	-	**3006 B 2RSR TVH**	34.6	50.4	1.0		0.160
35	62	20	-	24500	19400	8700	8800	**3007 B ZZ TVH**	39.6	57.4	1.0	27.8	0.200
35	62	20	-	24500	19400	5600	-	**3007 B 2RSR TVH**	39.6	57.4	1.0		0.200
40	68	21	-	25500	21700	7900	8000	**3008 B ZZ TVH**	44.6	63.4	1.0	30.8	0.250
40	68	21	-	25500	21700	5000	-	**3008 B 2RSR TVH**	44.6	63.4	1.0		0.250

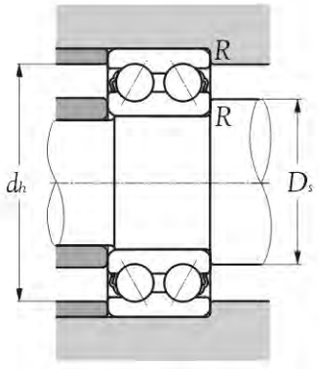
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Polyamide 66 (TVH)
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Double-row angular contact ball bearings
series 52..





Open type

Boundary dimensions mm				Basic load ratings dynamic N	static N	Limiting speeds grease rpm	oil rpm	Bearing numbers	Abutment and fillet dimensions mm			Load center	Mass kg(s).
d	D	B	$r_{s\,min}$ 1)	Cr	Cor				Ds min	dh max	R max	a	(approx.)
10	30	14.3	0.6	6950	3800	16000	22000	**5200**	15.0	25.0	0.6	17.5	0.049
12	32	15.9	0.6	9150	5050	15000	20000	**5201**	17.0	27.0	0.6	19.0	0.057
15	35	15.9	0.6	10000	6050	12000	17000	**5202**	20.0	30.0	0.6	21.0	0.064
17	40	17.5	0.6	12800	7900	10000	15000	**5203**	22.0	35.0	0.6	24.0	0.096
20	47	20.6	1.0	19000	12100	9000	13000	**5204**	26.0	41.0	1.0	28.0	0.153
25	52	20.6	1.0	20600	14300	8000	11000	**5205**	31.0	46.0	1.0	31.5	0.175
30	62	23.8	1.0	28600	20400	7000	9500	**5206**	36.0	56.0	1.0	36.5	0.286
35	72	27.0	1.1	38000	27800	6000	8000	**5207**	42.0	65.0	1.0	42.5	0.436
40	80	30.2	1.1	42500	32500	5600	7500	**5208**	47.0	73.0	1.0	47.5	0.590
45	85	30.2	1.1	48000	37000	5000	6700	**5209**	52.0	78.0	1.0	50.5	0.640
50	90	30.2	1.1	51000	42000	4000	5300	**5210**	57.0	83.0	1.0	54.0	0.689
55	100	33.3	1.5	63000	53000	3600	4900	**5211**	63.5	91.5	1.5	60.5	0.986
60	110	36.5	1.5	71500	58500	3400	4500	**5212**	68.5	101.5	1.5	65.5	1.270
65	120	38.1	1.5	83500	72500	3100	4200	**5213**	73.5	111.5	1.5	71.0	1.570
70	125	39.7	1.5	90500	79500	2900	3900	**5214**	78.5	116.5	1.5	74.5	1.800
75	130	41.3	1.5	90000	80500	2700	3600	**5215**	83.5	121.5	1.5	78.0	1.900
80	140	44.4	2.0	106000	95500	2500	3400	**5216**	90.0	130.0	2.0	83.5	2.390
85	150	49.2	2.0	112000	106000	2400	3200	**5217**	95.0	140.0	2.0	91.0	3.060
90	160	52.4	2.0	140000	129000	2200	3000	**5218**	100.0	150.0	2.0	95.5	3.730
95	170	56.0	2.1	159000	148000	2800	2100	**5219**	107.0	158.0	2.0	111.0	4.860
100	180	60.0	2.1	178000	167000	2700	2000	**5220**	112.0	168.0	2.0	118.0	5.940
110	200	70.0	2.1	212000	212000	2800	2800	**5222**	122.0	188.0	2.0	132.0	8.800

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Remark: All **KSM** products of 52 and 53 series come with Polyamide 66 cages, classified as standard production. Steel cages are classified as non-standard production with suffix "S", i.e. 5204 S, it is subject on request.

[Precision] - Class 0 (JIS)

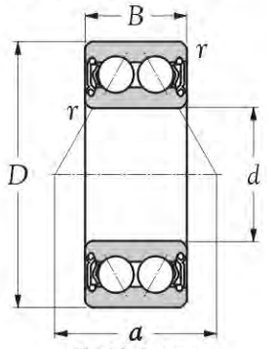
[Cages] - Polyamide 66, steel (S)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

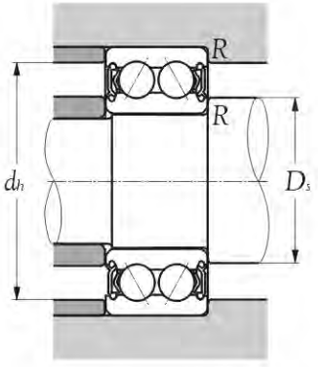
P1

Double-row angular contact ball bearings
series 52..ZZ & 52..2RS



Shielded type
(ZZ)

Sealed type
(2RS)



P1

Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds rpm	Bearing numbers		Abutment and fillet dimensions mm			Load center	Mass kg(s).
d	D	B	rs min1)	Cr	Cor				Ds min	dh max	R max	a	(approx.)
10	30	14.3	0.6	6950	3800	16000	5200 ZZ	5200 2RS	15.0	25.0	0.6	17.5	0.045
12	32	15.9	0.6	9150	5050	15000	5201 ZZ	5201 2RS	17.0	27.0	0.6	19.0	0.050
15	35	15.9	0.6	10000	6050	12000	5202 ZZ	5202 2RS	20.0	30.0	0.6	21.0	0.068
17	40	17.5	0.6	12800	7900	10000	5203 ZZ	5203 2RS	22.0	35.0	0.6	24.0	0.090
20	47	20.6	1.0	19000	12100	9000	5204 ZZ	5204 2RS	26.0	41.0	1.0	28.0	0.140
25	52	20.6	1.0	20600	14300	8000	5205 ZZ	5205 2RS	31.0	46.0	1.0	31.5	0.160
30	62	23.8	1.0	28600	20400	7000	5206 ZZ	5206 2RS	36.0	56.0	1.0	36.5	0.260
35	72	27.0	1.1	38000	27800	6000	5207 ZZ	5207 2RS	42.0	65.0	1.0	42.5	0.400
40	80	30.2	1.1	42500	32500	5600	5208 ZZ	5208 2RS	47.0	73.0	1.0	47.5	0.530
45	85	30.2	1.1	48000	37000	5000	5209 ZZ	5209 2RS	52.0	78.0	1.0	50.5	0.570
50	90	30.2	1.1	51000	42000	5000	5210 ZZ	5210 2RS	57.0	83.0	1.0	54.0	0.670
55	100	33.3	1.5	63000	53000	4000	5211 ZZ	5211 2RS	63.5	91.5	1.5	60.5	0.960
60	110	36.5	1.5	71500	58500	3800	5212 ZZ	5212 2RS	68.5	101.5	1.5	65.5	1.360
65	120	38.1	1.5	83500	72500	3400	5213 ZZ	5213 2RS	73.5	111.5	1.5	71.0	1.660
70	125	39.7	1.5	90500	79500	3200	5214 ZZ	5214 2RS	78.5	116.5	1.5	74.5	1.820
75	130	41.3	1.5	90000	80500	3200	5215 ZZ	5215 2RS	83.5	121.5	1.5	78.0	1.910
80	140	44.4	2.0	106000	95500	2800	5216 ZZ	5216 2RS	90.0	130.0	2.0	83.5	2.480
85	150	49.2	2.0	112000	106000	2600	5217 ZZ	5217 2RS	95.0	140.0	2.0	91.0	3.400
90	160	52.4	2.0	140000	129000	2500	5218 ZZ	5218 2RS	100.0	150.0	2.0	95.5	4.280

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Remark: All **KSM** products of 52 and 53 series come with Polyamide 66 cages, classified as standard production. Steel cages are classified as non-standard production with suffix "S", i.e. 5204 S, it is subject on request.

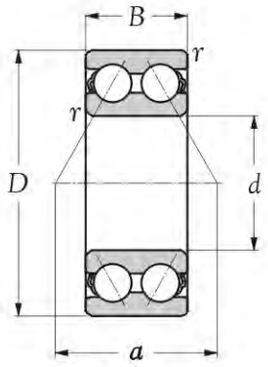
[Precision] - Class 0 (JIS)

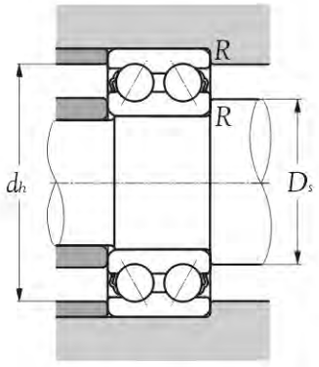
[Cages] - Polyamide 66, steel (S)

[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Double-row angular contact ball bearings
series 53..





Open type

Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers	Abutment and fillet dimensions mm			Load center	Mass kg(s).
d	D	B	rs min1)	Cr	Cor				Ds min	dh max	R max	a	(approx.)
10	35	19.0	1.0	11700	7000	18000	24000	**5300**	16.0	30.0	0.6	20.6	0.050
12	37	19.0	1.0	11700	7000	17000	22000	**5301**	18.0	32.0	0.6	21.3	0.058
15	42	19.0	1.0	17200	10100	9900	13000	**5302**	21.0	36.0	1.0	26.0	0.132
17	47	22.2	1.0	20400	12100	9000	12000	**5303**	23.0	41.0	1.0	28.5	0.181
20	52	22.2	1.1	20600	12700	8000	11000	**5304**	27.0	45.0	1.0	30.5	0.217
25	62	25.4	1.1	30500	20500	6700	8900	**5305**	32.0	55.0	1.0	36.5	0.362
30	72	30.2	1.1	39500	27500	5700	7600	**5306**	37.0	65.0	1.0	43.0	0.553
35	80	34.9	1.5	49500	35000	5000	6600	**5307**	43.5	71.5	1.5	48.5	0.766
40	90	36.5	1.5	60500	44000	4400	5900	**5308**	48.5	81.5	1.5	53.5	1.010
45	100	39.7	1.5	72500	54000	4000	5300	**5309**	53.5	91.5	1.5	60.0	1.340
50	110	44.4	2.0	85500	64500	3600	4800	**5310**	60.0	100.0	2.0	65.5	1.810
55	120	49.2	2.0	106000	82000	3300	4400	**5311**	65.0	110.0	2.0	73.0	2.320
60	130	54.0	2.1	122000	95500	3000	4000	**5312**	72.0	118.0	2.0	79.5	3.050
65	140	58.7	2.1	138000	109000	2800	3700	**5313**	77.0	128.0	2.0	84.5	3.960
70	150	63.5	2.1	155000	125000	2600	3500	**5314**	82.0	138.0	2.0	93.0	4.740
75	160	68.3	2.1	168000	141000	2400	3200	**5315**	87.0	148.0	2.0	98.0	5.650
80	170	68.3	2.1	182000	156000	2400	3400	**5316**	92.0	158.0	2.0	112.0	6.950
85	180	73.0	3.0	195000	176000	2200	3200	**5317**	99.0	166.0	2.5	119.0	8.300
90	190	73.0	3.0	195000	180000	2000	3000	**5318**	104.0	176.0	2.5	125.0	9.250

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Remark: All **KSM** products of 52 and 53 series come with Polyamide 66 cages, classified as standard production. Steel cages are classified as non-standard production with suffix "S", i.e. 5204 S, it is subject on request.

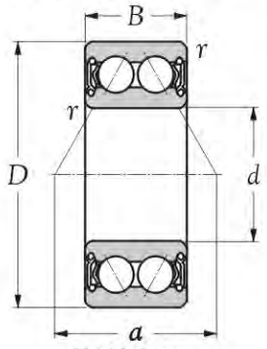
[Precision] - Class 0 (JIS)

[Cages] - Polyamide 66, steel (S)

[Grease] - Nil

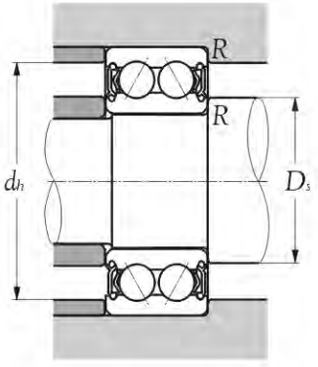
If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Double-row angular contact ball bearings
series 53..ZZ & 53..2RS



Shielded type
(ZZ)

Sealed type
(2RS)



P1

Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds rpm	Bearing numbers		Abutment and fillet dimensions mm			Load center	Mass kg(s).
d	D	B	rs min1)	Cr	Cor				Ds min	dh max	R max	a	(approx.)
10	35	19.0	1.0	11700	7000	18000	5300 ZZ	5300 2RS	16.0	30.0	0.6	20.6	0.050
12	37	19.0	1.0	11700	7000	17000	5301 ZZ	5301 2RS	18.0	32.0	0.6	21.3	0.058
15	42	19.0	1.0	17200	10100	9900	5302 ZZ	5302 2RS	21.0	36.0	1.0	26.0	0.132
17	47	22.2	1.0	20400	12100	9000	5303 ZZ	5303 2RS	23.0	41.0	1.0	28.5	0.181
20	52	22.2	1.1	20600	12700	8500	5304 ZZ	5304 2RS	27.0	45.0	1.0	30.5	0.200
25	62	25.4	1.1	30500	20500	7500	5305 ZZ	5305 2RS	32.0	55.0	1.0	36.5	0.320
30	72	30.2	1.1	39500	27500	6300	5306 ZZ	5306 2RS	37.0	65.0	1.0	43.0	0.480
35	80	34.9	1.5	49500	35000	5000	5307 ZZ	5307 2RS	43.5	71.5	1.5	48.5	0.766
40	90	36.5	1.5	60500	44000	4700	5308 ZZ	5308 2RS	48.5	81.5	1.5	53.5	1.010
45	100	39.7	1.5	72500	54000	4500	5309 ZZ	5309 2RS	53.5	91.5	1.5	60.0	1.150
50	110	44.4	1.1	85500	64500	4500	5310 ZZ	5310 2RS	60.0	100.0	2.0	65.5	0.670
55	120	49.2	1.5	106000	82000	4000	5311 ZZ	5311 2RS	65.0	110.0	2.0	73.0	0.960
60	130	54.0	2.1	122000	95500	2720	5312 ZZ	5312 2RS	72.0	118.0	2.0	79.5	3.250
65	140	58.7	2.1	138000	109000	2560	5313 ZZ	5313 2RS	77.0	128.0	2.0	84.5	4.100
70	150	63.5	2.1	155000	125000	2240	5314 ZZ	5314 2RS	82.0	138.0	2.0	93.0	5.050
75	160	68.3	2.1	168000	141000	2080	5315 ZZ	5315 2RS	87.0	148.0	2.0	98.0	6.150
80	170	68.3	2.1	182000	156000	1920	5316 ZZ	5316 2RS	92.0	158.0	2.0	112.0	6.950
85	180	73.0	3.0	195000	176000	1760	5317 ZZ	5317 2RS	99.0	166.0	2.5	119.0	8.300
90	190	73.0	3.0	195000	180000	1600	5318 ZZ	5318 2RS	104.0	176.0	2.5	125.0	9.250

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Remark: All **KSM** products of 52 and 53 series come with Polyamide 66 cages, classified as standard production. Steel cages are classified as non-standard production with suffix "S", i.e. 5204 S, it is subject on request.

[Precision] - Class 0 (JIS)

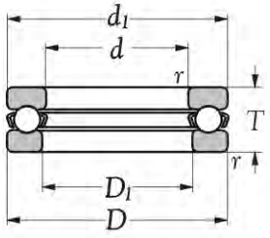
[Cages] - Polyamide 66, steel (S)

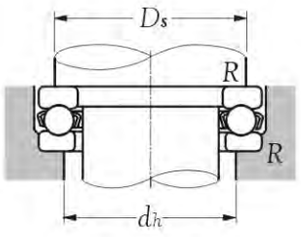
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

KSM®

Thrust ball bearings
series 511..





Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers	Dimensions mm		Abutment and fillet dimensions mm			Mass kg(s).
d	D	T	$r_{s\,min}$[1]	C_a	C_{oa}				$d_{1s\,max}$[2]	$D_{1s\,min}$[3]	D_s mm	d_h max	R max	(approx.)
10	24	9	0.3	10000	14000	6700	9500	**51100**	24	11	18	16	0.3	0.021
12	26	9	0.3	10300	15400	6400	9200	**51101**	26	13	20	18	0.3	0.023
15	28	9	0.3	10500	16800	6200	8800	**51102**	28	16	23	20	0.3	0.024
17	30	9	0.3	10800	18200	6000	8500	**51103**	30	18	25	22	0.3	0.026
20	35	10	0.3	14200	24700	5200	7500	**51104**	35	21	29	26	0.3	0.040
25	42	11	0.6	19600	37000	4600	6500	**51105**	42	26	35	32	0.6	0.060
30	47	11	0.6	20400	42000	4300	6200	**51106**	47	32	40	37	0.6	0.069
35	52	12	0.6	20400	44500	3900	5600	**51107**	52	37	45	42	0.6	0.085
40	60	13	0.6	26900	63000	3500	5000	**51108**	60	42	52	48	0.6	0.125
45	65	14	0.6	27900	69000	3200	4600	**51109**	65	47	57	53	0.6	0.148
50	70	14	0.6	28800	75500	3100	4500	**51110**	70	52	62	58	0.6	0.161
55	78	16	0.6	35000	93000	2800	4000	**51111**	78	57	69	64	0.6	0.226
60	85	17	1.0	41500	113000	2600	3700	**51112**	85	62	75	70	1.0	0.296
65	90	18	1.0	41500	117000	2400	3500	**51113**	90	67	80	75	1.0	0.338
70	95	18	1.0	43000	127000	2400	3400	**51114**	95	72	85	80	1.0	0.356
75	100	19	1.0	44500	136000	2200	3200	**51115**	100	77	90	85	1.0	0.399
80	105	19	1.0	44500	141000	2200	3100	**51116**	105	82	95	90	1.0	0.422
85	110	19	1.0	46000	150000	2100	3000	**51117**	110	87	100	95	1.0	0.444
90	120	22	1.0	59500	190000	1900	2700	**51118**	120	92	108	102	1.0	0.687
100	135	25	1.0	85000	268000	1700	2400	**51120**	135	102	121	114	1.0	0.987
110	145	25	1.0	87000	288000	1600	2300	**51122**	145	112	131	124	1.0	1.070
120	155	25	1.0	89000	310000	1500	2200	**51124**	155	122	141	134	1.0	1.110

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

2) Maximum allowable dimension for shaft washer outer dimension $d1$.

3) Smallest allowable dimension for housing washer inner dimension $D1$.

Remark: [Precision] - Class 0 (JIS)

[Cage] - Steel

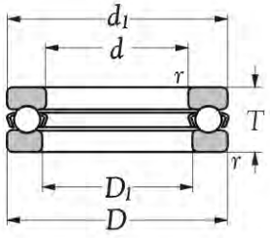
[Grease] - Nil

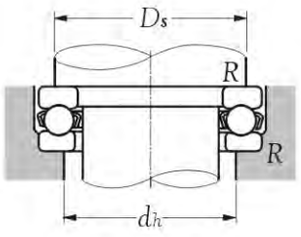
If you require more individual technical information for each of above bearing model, please enter **KSM** web-site: Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P1

KSM®

Thrust ball bearings
series 512..





P1

Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers	Dimensions mm		Abutment and fillet dimensions mm			Mass kg(s).
d	D	T	rs min1)	Ca	Coa				d1s max2)	D1s min3)	Ds mm	dh max	R max	(approx.)
10	26	11	0.6	12700	17100	5800	8300	**51200**	26	12	20	16	0.6	0.030
12	28	11	0.6	13200	19000	5600	8000	**51201**	28	14	22	18	0.6	0.034
15	32	12	0.6	16600	24800	5000	7100	**51202**	32	17	25	22	0.6	0.046
17	35	12	0.6	17200	27300	4800	6800	**51203**	35	19	28	24	0.6	0.054
20	40	14	0.6	22300	37500	4100	5900	**51204**	40	22	32	28	0.6	0.081
25	47	15	0.6	27800	50500	3700	5300	**51205**	47	27	38	34	0.6	0.111
30	52	16	0.6	29300	58000	3400	4900	**51206**	52	32	43	39	0.6	0.139
35	62	18	1.0	39000	78000	2900	4200	**51207**	62	37	51	46	1.0	0.215
40	68	19	1.0	47000	98500	2700	3900	**51208**	68	42	57	51	1.0	0.276
45	73	20	1.0	48000	105000	2600	3700	**51209**	73	47	62	56	1.0	0.317
50	78	22	1.0	48500	111000	2400	3400	**51210**	78	52	67	61	1.0	0.378
55	90	25	1.0	69500	159000	2100	3000	**51211**	90	57	76	69	1.0	0.608
60	95	26	1.0	73500	179000	2000	2800	**51212**	95	62	81	74	1.0	0.676
65	100	27	1.0	75000	189000	1900	2700	**51213**	100	67	86	79	1.0	0.767
70	105	27	1.0	76000	199000	1800	2600	**51214**	105	72	91	84	1.0	0.793
75	110	27	1.0	77500	209000	1800	2600	**51215**	110	77	96	89	1.0	0.874
80	115	28	1.0	78500	218000	1700	2400	**51216**	115	82	101	94	1.0	0.916
85	125	31	1.0	95500	264000	1600	2200	**51217**	125	88	109	101	1.0	1.250
90	135	35	1.1	117000	325000	1400	2000	**51218**	135	93	117	108	1.0	1.700
100	150	38	1.1	147000	410000	1300	1800	**51220**	150	103	130	120	1.0	2.290
110	160	38	1.1	153000	450000	1200	1800	**51222**	160	113	140	130	1.0	2.460
120	170	39	1.1	154000	470000	1200	1700	**51224**	170	123	150	140	1.0	2.710
130	190	45	1.5	191000	565000	1000	1500	**51226**	187	133	166	154	1.5	4.220
140	200	46	1.5	193000	595000	980	1400	**51228**	197	143	176	164	1.5	4.770

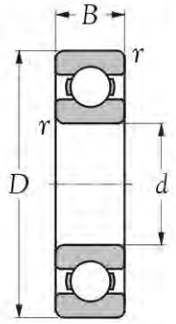
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.
2) Maximum allowable dimension for shaft washer outer dimension *d1*.
3) Smallest allowable dimension for housing washer inner dimension *D1*.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

KSM®

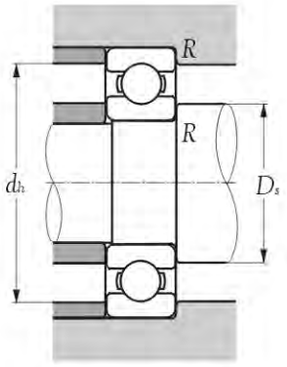
Stainless steel (SUS 440 C) ball bearings
series SS 60.., SS 60.. ZZ & SS 60.. 2RS



Open type

Shielded type
(ZZ)

Sealed type
(2RS)



Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers			Abutment and fillet dimensions mm				Mass kg.
d	*D*	*B*	*r*s min 1)	*Cr*	*Cor*						*Ds* min	*Ds* max	*dh* max	*R* max	(approx.)
7	19	6	0.3	2240	910	39000	33000	SS 607	SS 607 ZZ	SS 607 2RS	9	-	17	0.3	0.008
8	22	7	0.3	3350	1400	36000	31000	SS 608	SS 608 ZZ	SS 608 2RS	10	-	20	0.3	0.012
9	24	7	0.3	3400	1450	33000	29000	SS 609	SS 609 ZZ	SS 609 2RS	11	-	22	0.3	0.014
10	26	8	0.3	4580	1980	28000	20000	SS 6000	SS 6000 ZZ	SS 6000 2RS	12	13.5	24	0.3	0.019
12	28	8	0.3	5100	2380	26000	19000	SS 6001	SS 6001 ZZ	SS 6001 2RS	14	16.0	26	0.3	0.022
15	32	9	0.3	5600	2840	24000	18000	SS 6002	SS 6002 ZZ	SS 6002 2RS	17	19.0	30	0.3	0.031
17	35	10	0.3	6800	3350	22000	17000	SS 6003	SS 6003 ZZ	SS 6003 2RS	19	21.0	33	0.3	0.040
20	42	12	0.6	9400	5050	19000	15000	SS 6004	SS 6004 ZZ	SS 6004 2RS	24	26.0	38	0.6	0.071
25	47	12	0.6	10100	5850	17000	13000	SS 6005	SS 6005 ZZ	SS 6005 2RS	29	30.5	43	0.6	0.084
30	55	13	1.0	13200	8300	14000	10000	SS 6006	SS 6006 ZZ	SS 6006 2RS	35	37.0	50	1.0	0.110
35	62	14	1.0	16000	10300	12000	9000	SS 6007	SS 6007 ZZ	SS 6007 2RS	40	42.0	57	1.0	0.162
40	68	15	1.0	16800	11500	11000	8500	SS 6008	SS 6008 ZZ	SS 6008 2RS	45	47.0	63	1.0	0.199
45	75	16	1.0	21000	15100	10000	8000	SS 6009	SS 6009 ZZ	SS 6009 2RS	50	52.5	70	1.0	0.230
50	80	16	1.0	21800	16600	9000	7000	SS 6010	SS 6010 ZZ	SS 6010 2RS	55	57.5	75	1.0	0.272
55	90	18	1.1	28300	21200	7700	8300	SS 6011	SS 6011 ZZ	SS 6011 2RS	62	64.0	83	1.0	0.388
60	95	18	1.1	29500	23200	7000	8300	SS 6012	SS 6012 ZZ	SS 6012 2RS	67	69.0	88	1.0	0.414
65	100	18	1.1	30500	25200	6500	7700	SS 6013	SS 6013 ZZ	SS 6013 2RS	72	73.0	93	1.0	0.421
70	110	20	1.1	38000	31000	6100	7100	SS 6014	SS 6014 ZZ	SS 6014 2RS	77	80.5	103	1.0	0.604
75	115	20	1.1	39500	33500	5700	6700	SS 6015	SS 6015 ZZ	SS 6015 2RS	82	85.5	108	1.0	0.649

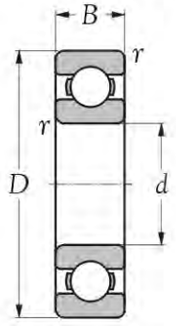
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Stainless steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P1

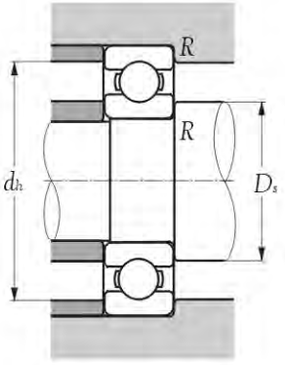
Stainless steel (SUS 440 C) ball bearings
series SS 62.., SS 62.. ZZ & SS 62.. 2RS



Open type

Shielded type
(ZZ)

Sealed type
(2RS)



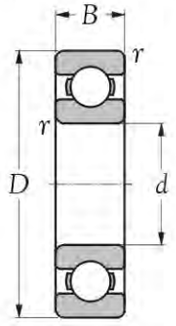
Boundary dimensions mm				Basic load ratings dynamic N	static N	Limiting speeds grease rpm	oil rpm	Bearing numbers			Abutment and fillet dimensions mm				Mass kg.
d	D	B	rs min[1]	Cr	Cor						Ds min	Ds max	dh max	R max	(approx.)
6	19	6	0.3	2340	885	39000	33000	SS 626	SS 626 ZZ	SS 626 2RS	8.0	-	17.0	0.3	0.008
7	22	7	0.3	3350	1400	36000	31000	SS 627	SS 627 ZZ	SS 627 2RS	9.0	-	20.0	0.3	0.014
9	26	8	0.3	4550	1960	31000	27000	SS 629	SS 629 ZZ	SS 629 2RS	11.0	-	24.0	0.3	0.019
10	30	9	0.6	5100	2380	26000	19000	SS 6200	SS 6200 ZZ	SS 6200 2RS	14.0	16.0	26.0	0.6	0.032
12	32	10	0.6	6100	2750	24000	18000	SS 6201	SS 6201 ZZ	SS 6201 2RS	16.0	17.5	28.0	0.6	0.035
15	35	11	0.6	7750	3600	22000	17000	SS 6202	SS 6202 ZZ	SS 6202 2RS	19.0	20.5	31.0	0.6	0.045
17	40	12	0.6	9600	4600	20000	16000	SS 6203	SS 6203 ZZ	SS 6203 2RS	21.0	23.0	36.0	0.6	0.064
20	47	14	1.0	12800	6650	18000	14000	SS 6204	SS 6204 ZZ	SS 6204 2RS	24.0	28.0	42.0	1.0	0.103
25	52	15	1.0	14000	7880	16000	12000	SS 6205	SS 6205 ZZ	SS 6205 2RS	30.0	32.0	47.0	1.0	0.127
30	62	16	1.0	19500	11500	13000	9500	SS 6206	SS 6206 ZZ	SS 6206 2RS	35.0	39.0	57.0	1.0	0.200
35	72	17	1.1	25500	15200	11000	8500	SS 6207	SS 6207 ZZ	SS 6207 2RS	41.5	45.0	65.5	1.0	0.298
40	80	18	1.1	29100	17800	10000	8000	SS 6208	SS 6208 ZZ	SS 6208 2RS	46.5	51.0	73.5	1.0	0.368
45	85	19	1.1	32500	20400	9000	7000	SS 6209	SS 6209 ZZ	SS 6209 2RS	51.5	55.5	78.5	1.0	0.416
50	90	20	1.1	35000	23200	8500	6700	SS 6210	SS 6210 ZZ	SS 6210 2RS	56.5	60.0	83.5	1.0	0.463
55	100	21	1.5	43500	29200	6400	7600	SS 6211	SS 6211 ZZ	SS 6211 2RS	63.0	67.0	92.0	1.5	0.601
60	110	22	1.5	52500	36000	6000	7000	SS 6212	SS 6212 ZZ	SS 6212 2RS	68.0	75.0	102.0	1.5	0.783

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Stainless steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

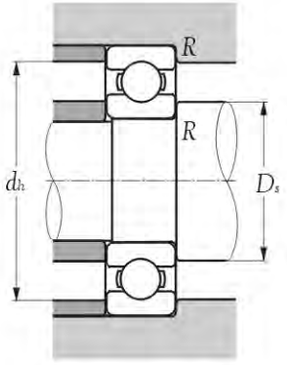
Stainless steel (SUS 440 C) ball bearings
series SS 63.., SS 63.. ZZ & SS 63.. 2RS



Open type

Shielded type
(ZZ)

Sealed type
(2RS)



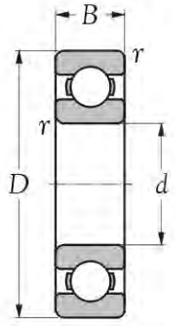
Boundary dimensions mm				Basic load ratings dynamic N	static	Limiting speeds grease rpm	oil	Bearing numbers			Abutment and fillet dimensions mm				Mass kg(s).
d	D	B	$r_{s\,min}$ 1)	C_r	C_{or}						$D_{s\,min}$	$D_{s\,max}$	$d_{h\,max}$	R_{max}	(approx.)
10	35	11	0.6	8200	3500	23000	27000	SS 6300	SS 6300 ZZ	SS 6300 2RS	14.0	17.0	31.0	0.6	0.053
12	37	12	1.0	9700	4200	20000	24000	SS 6301	SS 6301 ZZ	SS 6301 2RS	18.0	18.5	31.0	1.0	0.060
15	42	13	1.0	11400	5450	17000	21000	SS 6302	SS 6302 ZZ	SS 6302 2RS	21.0	23.0	36.0	1.0	0.082
17	47	14	1.0	13500	6550	16000	19000	SS 6303	SS 6303 ZZ	SS 6303 2RS	23.0	25.0	41.0	1.0	0.115
20	52	15	1.0	15900	7900	14000	17000	SS 6304	SS 6304 ZZ	SS 6304 2RS	27.0	28.5	45.0	1.0	0.144
25	62	17	1.0	21200	10900	12000	14000	SS 6305	SS 6305 ZZ	SS 6305 2RS	32.0	35.0	55.0	1.0	0.232
30	72	19	1.0	26700	15000	10000	12000	SS 6306	SS 6306 ZZ	SS 6306 2RS	37.0	43.0	65.0	1.0	0.360
35	80	21	1.5	33500	19100	8800	10000	SS 6307	SS 6307 ZZ	SS 6307 2RS	43.5	47.0	71.5	1.5	0.457
40	90	23	1.5	40500	24000	7800	9200	SS 6308	SS 6308 ZZ	SS 6308 2RS	48.5	54.0	81.5	1.5	0.630
45	100	25	1.5	53000	32000	7000	8200	SS 6309	SS 6309 ZZ	SS 6309 2RS	53.5	61.5	91.5	1.5	0.814
50	110	27	2.0	62000	38500	6400	7500	SS 6310	SS 6310 ZZ	SS 6310 2RS	60.0	68.5	100.0	2.0	1.070

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Stainless steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

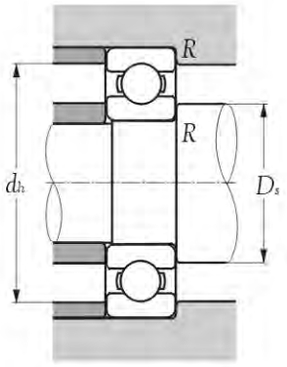
Stainless steel (SUS 440 C) ball bearings
series SS 68.., SS 68.. ZZ & SS 68.. 2RS



Open type

Shielded type
(ZZ)

Sealed type
(2RS)



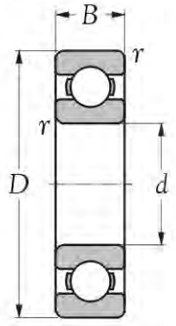
Boundary dimensions mm				Basic load ratings dynamic N	static N	Limiting speeds grease rpm	oil rpm	Bearing numbers			Abutment and fillet dimensions mm				Mass kg.
d	D	B	rs min[1]	Cr	Cor						Ds min	Ds max	dh max	R max	(approx.)
10	19	5	0.3	1830	925	32000	38000	SS 6800	SS 6800 ZZ	SS 6800 2RS	12	12.5	17	0.3	0.005
12	21	5	0.3	1920	1040	29000	35000	SS 6801	SS 6801 ZZ	SS 6801 2RS	14	14.5	19	0.3	0.006
15	24	5	0.3	2080	1260	26000	31000	SS 6802	SS 6802 ZZ	SS 6802 2RS	17	17.5	22	0.3	0.007
17	26	5	0.3	2810	1720	24000	28000	SS 6803	SS 6803 ZZ	SS 6803 2RS	19	19.5	24	0.3	0.008
20	32	7	0.3	4000	2470	21000	25000	SS 6804	SS 6804 ZZ	SS 6804 2RS	22	23.0	30	0.3	0.019
25	37	7	0.3	4300	2950	18000	21000	SS 6805	SS 6805 ZZ	SS 6805 2RS	27	28.0	35	0.3	0.022
30	42	7	0.3	4700	3650	15000	18000	SS 6806	SS 6806 ZZ	SS 6806 2RS	32	33.0	40	0.3	0.026
35	47	7	0.3	4900	4050	13000	16000	SS 6807	SS 6807 ZZ	SS 6807 2RS	37	38.0	45	0.3	0.029
40	52	7	0.3	5100	4400	12000	14000	SS 6808	SS 6808 ZZ	SS 6808 2RS	42	43.0	50	0.3	0.033
45	58	7	0.3	6400	5650	11000	12000	SS 6809	SS 6809 ZZ	SS 6809 2RS	47	48.0	56	0.3	0.040
50	65	7	0.3	6600	6100	9600	11000	SS 6810	SS 6810 ZZ	SS 6810 2RS	52	54.0	63	0.3	0.052
55	72	9	0.3	8800	8100	8700	10000	SS 6811	SS 6811 ZZ	SS 6811 2RS	57	59.0	70	0.3	0.083
60	78	10	0.3	11500	10600	8000	9400	SS 6812	SS 6812 ZZ	SS 6812 2RS	62	64.5	76	0.3	0.106
65	85	10	0.6	11600	11000	7400	8700	SS 6813	SS 6813 ZZ	SS 6813 2RS	69	70.0	81	0.6	0.128
70	90	10	0.6	12100	11900	6900	8100	SS 6814	SS 6814 ZZ	SS 6814 2RS	74	75.5	86	0.6	0.137
75	95	10	0.6	12500	12900	6400	7600	SS 6815	SS 6815 ZZ	SS 6815 2RS	79	80.0	91	0.6	0.145
80	100	10	0.6	12700	13300	6000	7100	SS 6816	SS 6816 ZZ	SS 6816 2RS	84	85.0	96	0.6	0.154

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Stainless steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

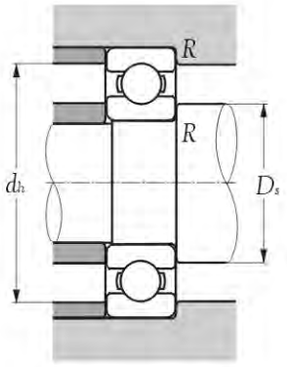
Stainless steel (SUS 440 C) ball bearings
series SS 69.., SS 69.. ZZ & SS 69.. 2RS



Open type

Shielded type
(ZZ)

Sealed type
(2RS)



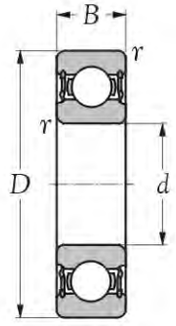
Boundary dimensions mm				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers			Abutment and fillet dimensions mm				Mass kg.
d	D	B	$r_{s\,min}$ [1]	C_r	C_{or}						$D_{s\,min}$	$D_{s\,max}$	$d_{h\,max}$	R_{max}	(approx.)
10	22	6	0.3	2700	1270	30000	36000	SS 6900	SS 6900 ZZ	SS 6900 2RS	12	13.0	20	0.3	0.009
12	24	6	0.3	2890	1460	27000	32000	SS 6901	SS 6901 ZZ	SS 6901 2RS	14	15.0	22	0.3	0.011
15	28	7	0.3	4100	2060	24000	28000	SS 6902	SS 6902 ZZ	SS 6902 2RS	17	18.0	26	0.3	0.016
17	30	7	0.3	4650	2580	22000	26000	SS 6903	SS 6903 ZZ	SS 6903 2RS	19	20.0	28	0.3	0.018
20	37	9	0.3	6400	3700	19000	23000	SS 6904	SS 6904 ZZ	SS 6904 2RS	22	24.0	35	0.3	0.036
25	42	9	0.3	7050	4550	16000	19000	SS 6905	SS 6905 ZZ	SS 6905 2RS	27	29.0	40	0.3	0.042
30	47	9	0.3	7250	5000	14000	17000	SS 6906	SS 6906 ZZ	SS 6906 2RS	32	34.0	45	0.3	0.048
35	55	10	0.3	11200	7450	12000	15000	SS 6907	SS 6907 ZZ	SS 6907 2RS	39	40.0	51	0.6	0.074
40	62	12	0.3	14600	10200	11000	13000	SS 6908	SS 6908 ZZ	SS 6908 2RS	44	45.0	58	0.6	0.11
45	68	12	0.3	15100	11200	9800	12000	SS 6909	SS 6909 ZZ	SS 6909 2RS	49	51.0	64	0.6	0.128
50	72	12	0.3	15600	12200	8900	11000	SS 6910	SS 6910 ZZ	SS 6910 2RS	54	55.5	68	0.6	0.132
55	80	13	0.3	16000	13300	8200	9600	SS 6911	SS 6911 ZZ	SS 6911 2RS	60	61.5	75	1.0	0.180
60	85	13	0.3	16400	14300	7600	8900	SS 6912	SS 6912 ZZ	SS 6912 2RS	65	66.5	80	1.0	0.193
65	90	13	0.6	17400	16100	7000	8200	SS 6913	SS 6913 ZZ	SS 6913 2RS	70	71.5	85	1.0	0.206
70	100	16	0.6	23700	21200	6500	7700	SS 6914	SS 6914 ZZ	SS 6914 2RS	75	77.5	95	1.0	0.334
75	105	16	0.6	24400	22600	6100	7200	SS 6915	SS 6915 ZZ	SS 6915 2RS	80	82.5	100	1.0	0.353
80	110	16	0.6	24900	24000	5700	6700	SS 6916	SS 6916 ZZ	SS 6916 2RS	85	88.0	105	1.0	0.373

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Stainless steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Stainless steel (SUS 440 C) ball bearings
series SS 16.. 2RS



Sealed type
(2RS)

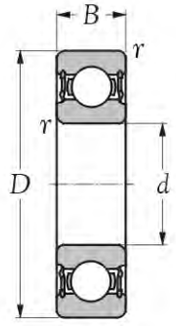
Boundary dimensions mm inch				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers	Mass kg. (approx.)
d	D	B	$r_{s\,min}$[1]	C_r	C_{or}				
4.762	17.462	7.938	0.3	3920	2250	25000	28000	SS 1616 2RS	0.030
3/16	11/16	5/16							
11.112	34.925	11.112	0.6	5900	3500	22000	26000	SS 1620 2RS	0.050
7/16	1-3/8	7/16							
12.700	34.925	11.112	0.6	5900	3500	22000	26000	SS 1621 2RS	0.048
1/2	1-3/8	7/16							
14.288	34.925	11.112	0.6	5900	3500	22000	26000	SS 1622 2RS	0.046
9/16	1-3/8	7/16							
15.875	34.925	11.112	0.6	5900	3500	22000	26000	SS 1623 2RS	0.040
5/8	1-3/8	7/16							
15.875	41.275	12.700	0.6	7250	4450	17000	20000	SS 1628 2RS	0.072
5/8	1-5/8	1/2							
19.050	41.275	12.700	0.6	7250	4450	17000	20000	SS 1630 2RS	0.065
3/4	1-5/8	1/2							
15.875	44.450	12.700	0.6	7250	4450	17000	20000	SS 1633 2RS	0.092
5/8	1-3/4	1/2							
19.050	44.450	12.700	0.6	7250	4450	17000	20000	SS 1635 2RS	0.085
3/4	1-3/4	1/2							
19.050	50.800	14.288	1.0	10800	6950	12000	13000	SS 1638 2RS	0.120
3/4	2	9/16							
22.225	50.800	14.288	1.0	10800	6950	12000	13000	SS 1640 2RS	0.112
7/8	2	9/16							
25.400	50.800	14.288	1.0	10800	6950	12000	13000	SS 1641 2RS	0.100
1	2	9/16							

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Stainless steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Stainless steel (SUS 440 C) ball bearings
series SS 16.. 2RS



Sealed type
(2RS)

Boundary dimensions mm inch				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers	Mass kg. (approx.)
d	D	B	$r_{s\,min}$ 1)	C_r	C_{or}				
28.575	63.500	15.875	1.0	28000	8400	9000	10000	SS 1652 2RS	0.210
1-1/8	2-1/2	5/8							
31.750	63.500	15.875	1.0	28000	8400	9000	10000	SS 1654 2RS	0.190
1-1/4	2-1/2	5/8							

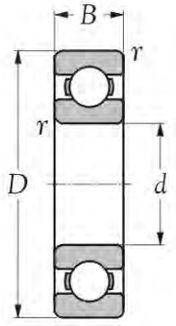
P1

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

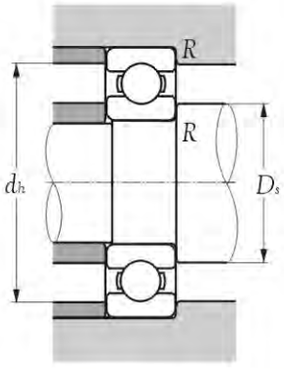
Remark: [Precision] - Class 0 (JIS)
[Cage] - Stainless steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Stainless steel (SUS 440 C) ball bearings
series SS 160..



Open type



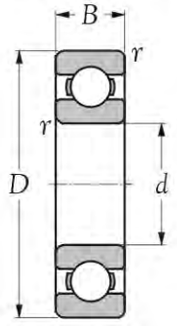
Boundary dimensions mm				Basic load ratings dynamic N	static N	Limiting speeds grease rpm	oil rpm	Bearing numbers	Abutment and fillet dimensions mm			Mass kg.
d	D	B	$r_{s\,min}$ 1)	C_r	C_{or}				$D_{s\,min}$	$d_{h\,max}$	R_{max}	(approx.)
12	28	7	0.3	5100	2390	26000	30000	**SS 16001**	14.5	25.5	0.3	0.019
15	32	8	0.3	5600	2840	22000	26000	**SS 16002**	17.5	29.5	0.3	0.025
17	35	8	0.3	6800	3350	20000	24000	**SS 16003**	19.5	32.5	0.3	0.032
20	42	8	0.3	7900	4500	18000	21000	**SS 16004**	22.5	39.5	0.3	0.051
25	47	8	0.3	8350	5100	15000	18000	**SS 16005**	27.5	44.5	0.3	0.060
30	55	9	0.3	11200	7350	13000	15000	**SS 16006**	32.5	52.5	0.3	0.091
35	62	9	0.3	11700	8200	12000	14000	**SS 16007**	37.5	59.5	0.3	0.110
40	68	9	0.3	12600	9650	10000	12000	**SS 16008**	42.5	65.5	0.3	0.125
45	75	10	0.6	12900	10500	9200	11000	**SS 16009**	50.0	70.0	0.6	0.171
50	80	10	0.6	13200	11300	8400	9800	**SS 16010**	55.0	75.0	0.6	0.180
55	90	11	0.6	18600	15300	7700	9000	**SS 16011**	60.0	85.0	0.6	0.258
60	95	11	0.6	20000	17500	7000	8300	**SS 16012**	65.0	90.0	0.6	0.283
65	100	11	0.6	20500	18700	6500	7700	**SS 16013**	70.0	95.0	0.6	0.307
70	110	13	0.6	24400	22600	6100	7100	**SS 16014**	75.0	105.0	0.6	0.441
75	115	13	0.6	25000	24000	5700	6700	**SS 16015**	80.0	110.0	0.6	0.464

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Stainless steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Stainless steel (SUS 440 C) ball bearings
series SS R.., SS R..ZZ & SS R..2RS



Open type

Shielded type
(ZZ)

Sealed type
(2RS)

Boundary dimensions mm inch				Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Bearing numbers			Mass kg.
d	D	B	$r_{s\,min}$[1]	C_r	C_{or}			open	with shields	with seals	(approx.)
3.175	9.525	3.967 5/32	0.3	630	218	56000	67000	SS R 2			0.001
1/8	3/8	3.967 5/32		630	218	56000	-		SS R 2 ZZ	SS R 2 2RS	0.001
3.175	9.525	3.967 5/32	0.3	630	218	56000	67000	SS R 2 A			0.001
1/8	3/8	3.967 5/32		630	218	56000	-		SS R 2 A ZZ	SS R 2 A 2RS	0.001
4.762	12.7	3.967 5/32	0.3	1310	490	41000	48000	SS R 3			0.002
3/16	1/2	4.978 3/16		1310	490	41000	-		SS R 3 ZZ	SS R 3 2RS	0.002
4.762	12.7	3.967 5/32	0.3	1310	490	41000	48000	SS R 3 A			0.002
3/16	1/2	4.978 3/16		1310	490	41000	-		SS R 3 A ZZ	SS R 3 A 2RS	0.002
6.35	15.875	4.978 3/16	0.4	1480	615	36000	43000	SS R 4			0.004
1/4	5/8	4.978 3/16		1480	615	36000	-		SS R 4 ZZ	SS R 4 2RS	0.004
6.35	15.875	4.978 3/16	0.4	1480	615	36000	43000	SS R 4 A			0.004
1/4	5/8	4.978 3/16		1480	615	36000	-		SS R 4 A ZZ	SS R 4 A 2RS	0.004
9.525	22.225	5.556 7/32	1.0	3300	1400	31000	37000	SS R 6			0.013
3/8	7/8	7.144 9/32		3300	1400	31000	-		SS R 6 ZZ	SS R 6 2RS	0.014
12.7	28.575	6.35 1/4	1.0	3950	2250	26000	31000	SS R 8			0.016
1/2	1-1/8	7.938 5/16		3950	2250	26000	-		SS R 8 ZZ	SS R 8 2RS	0.018
15.875	34.925	7.14 9/32	1.0	4600	2800	21000	25000	SS R 10			0.034
5/8	1-3/8	8.73 11/32		4600	2800	21000	-		SS R 10 ZZ	SS R 10 2RS	0.037
19.05	41.275	7.938 5/16	1.0	7250	4450	16000	21000	SS R 12			0.044
3/4	1-5/8	11.112 7/16		7250	4450	16000	-		SS R 12 ZZ	SS R 12 2RS	0.047
22.225	47.625	9.525 3/8	1.0	7250	4950	12000	16000	SS R 14			0.070
7/8	1-7/8	12.7 1/2		7250	4950	12000	-		SS R 14 ZZ	SS R 14 2RS	0.072

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Stainless steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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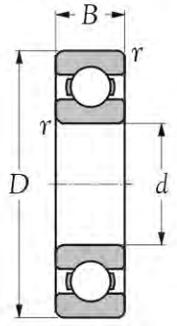
Stainless steel (SUS 440 C) ball bearings
series SS R.., SS R..ZZ & SS R..2RS



Open type

Shielded type
(ZZ)

Sealed type
(2RS)

Boundary dimensions mm inch				Basic load ratings dynamic N	static	Limiting speeds grease rpm	oil	Bearing numbers open	with shields	with seals	Mass kg. (approx.)
d	D	B	$r_{s\,min}$[1]	C_r	C_{or}						
25.4	50.8	9.525 3/8	1.0	8250	5450	11000	15000	SS R 16			0.081
2	3	12.7 1/2		8250	5450	11000	-		SS R 16 ZZ	SS R 16 2RS	0.085
25.797	53.975	9.525 3/8	1.0	9600	6260	10000	13000	SS R 18			0.086
1-1/64	2-1/8	12.7 1/2		9600	6260	10000	-		SS R 18 ZZ	SS R 18 2RS	0.090
31.75	57.15	9.525 3/8	1.0	10800	7520	9000	11000	SS R 20			0.090
1-1/4	2-1/4	12.7 1/2		10800	7520	9000	-		SS R 20 ZZ	SS R 20 2RS	0.095
34.925	63.5	11.112 7/16	1.0	12280	8500	12000	14000	SS R 22			0.106
1-3/8	2-1/2	14.288 9/16		12280	8500	12000	-		SS R 22 ZZ	SS R 22 2RS	0.106
38.1	66.675	11.112 7/16	1.0	16800	11400	10000	12000	SS R 24			0.141
1-1/2	2-5/8	14.288 9/16		16800	11400	1000	-		SS R 24 ZZ	SS R 24 2RS	0.141

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Stainless steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

KSM®

NEEDLE ROLLER BEARINGS

Needle roller and cage assemblies

TECHNICAL SUPPLEMENT

T 098

T1

1. Types and designs

KSM Needle roller and cage assemblies are supplied in single row Fig. A. The single row cages are available in two configurations: machined ring (series K), and molded polyamide reinforced with glass or carbon fiber (series K - TV). The TV cage features a maximum allowable operating temperature of 120° C and maximum allowable continuous operating temperature of 100° C .

Fig. A

2. Bearing numbers

As summarized in Fig. B, the bearing numbers of **KSM** needle roller and cage assemblies comprise a series number , a dimension code (inscribed enveloping circle diameter × roller set outside diameter × cage width), and a suffix.

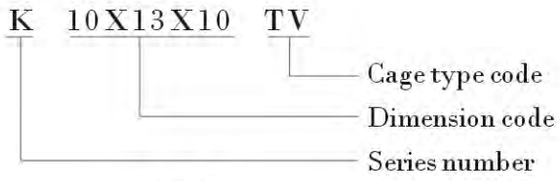


Fig. B

3. Radial clearance

When the shaft and housing are used as the raceway, the radial clearance of the ball and age assembly is governed by the shaft diameter and housing bore dimension. Usually, if the tolerance range of the needle rollers is one of the standard groups, the shaft diameter and housing bore diameter in Table A are used.

Table A Recommended fits

Shaft dia. mm		≥80	81~139	140≥
Radial clearance	Smaller than normal clearance	j5/G6	H5/G6	h5/G6
	Normal clearance	h5/G6	g5/G6	f5/H6
	Greater than normal clearance	g6/G6	f6/G6	f6/G6

4. Shaft and housing requirements

When used as a raceway, a shaft and housing must satisfy the requirements indicated in Table B.

Table B Shaft and housing requirements

Characteristics	Shaft	Housing
Circularity (max.)	IT3	IT4
Cylindricity (max.)	IT3	IT4
Surface roughness (max.)	0.4a	0.4a
Surface roughness (max.)	HRC58~64	

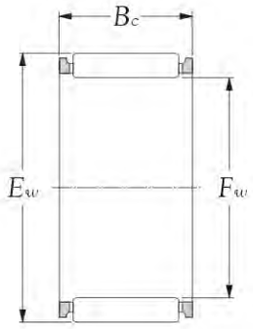
5. Mounting dimensions for bearings

Table C gives the recommended tolerance for the cage guide width b dimension relative to the nominal dimension " B_c ".

Table C Tolerance for guide width

Series classification	Tolerance for b
Metric	$Bc^{+0.2}_{0}$

Needle roller and cage assemblies
series K



Inner bore Fw	Bearing number	Principal dimensions		Basic load ratings				Limiting speeds		Mass
		Ew	Bc	dynamic Cr	static Cor	dynamic Cr	static Cor	grease	oil	kg.
mm		mm		N		kgf		rpm		(approx.)
3	K 3x6x7 TV	6	7 $^{-0.2}_{-0.55}$	1460	970	149	99	33000	50000	0.0004
4	K 4x7x7 TV	7	7 $^{-0.2}_{-0.55}$	1770	1270	180	129	30000	45000	0.0005
5	K 5x8x8 TV	8	8 $^{-0.2}_{-0.55}$	2640	2190	269	224	27000	40000	0.0007
5	K 5x8x10 TV	8	10 $^{-0.2}_{-0.55}$	2720	2250	277	230	27000	40000	0.0009
6	K 6x9x8 TV	9	8 $^{-0.2}_{-0.55}$	2660	2280	272	233	25000	37000	0.0009
6	K 6x9x10 TV	9	10 $^{-0.2}_{-0.55}$	3400	3150	345	320	25000	37000	0.0011
6	K 6x10x13 TV	10	13 $^{-0.2}_{-0.55}$	4400	3700	450	380	25000	37000	0.0019
7	K 7x10x8 TV	10	8 $^{-0.2}_{-0.55}$	2670	2350	272	239	23000	34000	0.0009
7	K 7x10x10 TV	10	10 $^{-0.2}_{-0.55}$	3400	3200	345	330	23000	34000	0.0011
8	K 8x11x8 TV	11	8 $^{-0.2}_{-0.55}$	3150	3000	320	305	21000	32000	0.0011
8	K 8x11x10 TV	11	10 $^{-0.2}_{-0.55}$	4000	4100	410	420	21000	32000	0.0013
8	K 8x11x13 TV	11	13 $^{-0.2}_{-0.55}$	4850	5200	495	535	21000	32000	0.0026
8	K 8x12x10 TV	12	10 $^{-0.2}_{-0.55}$	4650	4150	475	425	21000	32000	0.0020
8	K 8x12x12 TV	12	12 $^{-0.2}_{-0.55}$	5600	5300	570	540	21000	32000	0.0034
8	K 8x12x13 TV	12	13 $^{-0.2}_{-0.55}$	5600	5300	570	540	21000	32000	0.0036
9	K 9x12x10 TV	12	10 $^{-0.2}_{-0.55}$	4550	5000	465	510	20000	30000	0.0015
9	K 9x12x13 TV	12	13 $^{-0.2}_{-0.55}$	5500	6400	560	650	20000	30000	0.0021
10	K 10x13x10 TV	13	10 $^{-0.2}_{-0.55}$	4550	5100	460	520	19000	28000	0.0016
10	K 10x13x13 TV	13	13 $^{-0.2}_{-0.55}$	5450	6450	555	660	19000	28000	0.0031
10	K 10x14x8 TV	14	8 $^{-0.2}_{-0.55}$	4300	3950	435	405	19000	28000	0.0027
10	K 10x14x10 TV	14	10 $^{-0.2}_{-0.55}$	5500	5450	560	555	19000	28000	0.0034
10	K 10x14x13 TV	14	13 $^{-0.2}_{-0.55}$	6600	6900	675	705	19000	28000	0.0044
10	K 10x16x12 TV	16	12 $^{-0.2}_{-0.55}$	7100	5950	720	610	19000	28000	0.0066
11	K 11x14x10 TV	14	10 $^{-0.2}_{-0.55}$	5050	6000	515	615	18000	27000	0.0028
12	K 12x15x9 TV	15	9 $^{-0.2}_{-0.55}$	4450	5250	455	535	17000	26000	0.0027
12	K 12x15x13 TV	15	13 $^{-0.2}_{-0.55}$	6000	7700	615	785	17000	26000	0.0038

Remark: [Precision] - Class 0 (JIS)
[Cages] - Steel, Polyamide 66 (TV)
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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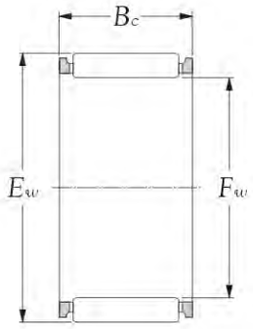
P2

Needle roller and cage assemblies
series K



Inner bore Fw	Bearing number	Principal dimensions		Basic load ratings				Limiting speeds		Mass
		Ew	Bc	dynamic Cr	static Cor	dynamic Cr	static Cor	grease	oil	kg.
mm		mm		N		kgf		rpm		(approx.)
12	K 12x16x8 TV	16	8 $^{-0.2}_{-0.55}$	4850	4900	495	500	17000	26000	0.0034
12	K 12x16x13 TV	16	13 $^{-0.2}_{-0.55}$	7500	8500	765	870	17000	26000	0.0055
12	K 12x17x13 TV	17	13 $^{-0.2}_{-0.55}$	9000	9400	920	960	17000	26000	0.0075
12	K 12x18x12 TV	18	12 $^{-0.2}_{-0.55}$	8650	8000	880	815	17000	26000	0.0084
14	K 14x17x10 TV	17	10 $^{-0.2}_{-0.55}$	5400	7050	550	720	16000	24000	0.0033
14	K 14x18x10 TV	18	10 $^{-0.2}_{-0.55}$	6900	8000	705	815	16000	24000	0.0046
14	K 14x18x11 TV	18	11 $^{-0.2}_{-0.55}$	7600	9050	775	925	16000	24000	0.0053
14	K 14x18x13 TV	18	13 $^{-0.2}_{-0.55}$	8300	10100	845	1030	16000	24000	0.0063
14	K 14x18x17	18	17 $^{-0.2}_{-0.55}$	10900	14400	1120	1470	16000	24000	0.0081
14	K 14x19x13	19	13 $^{-0.2}_{-0.55}$	8950	9650	915	985	16000	24000	0.0080
14	K 14x20x12	20	12 $^{-0.2}_{-0.55}$	9350	9150	955	930	16000	24000	0.0095
14	K 14x20x17	20	17 $^{-0.2}_{-0.55}$	13500	14600	1370	1490	16000	24000	0.0140
15	K 15x18x14	18	14 $^{-0.2}_{-0.55}$	7850	11600	800	1190	15000	23000	0.0060
15	K 15x19x17	19	17 $^{-0.2}_{-0.55}$	10900	14600	1110	1490	15000	23000	0.0090
15	K 15x20x13	20	13 $^{-0.2}_{-0.55}$	10100	11500	1030	1170	15000	23000	0.0088
15	K 15x21x15	21	15 $^{-0.2}_{-0.55}$	11900	12500	1210	1280	15000	23000	0.0130
15	K 15x21x21	21	21 $^{-0.2}_{-0.55}$	16500	19100	1680	1950	15000	23000	0.0170
16	K 16x20x10	20	10 $^{-0.2}_{-0.55}$	7500	9250	765	945	15000	23000	0.0057
16	K 16x20x11	20	11 $^{-0.2}_{-0.55}$	8300	10500	845	1070	15000	23000	0.0061
16	K 16x20x13	20	13 $^{-0.2}_{-0.55}$	9050	11800	925	1200	15000	23000	0.0071
16	K 16x22x12	22	12 $^{-0.2}_{-0.55}$	11700	12500	1190	1280	15000	23000	0.0100
16	K 16x22x17	22	17 $^{-0.2}_{-0.55}$	14400	16400	1470	1670	15000	23000	0.0150
16	K 16x22x20	22	20 $^{-0.2}_{-0.55}$	16000	18800	1640	1920	15000	23000	0.0170
17	K 17x21x15	21	15 $^{-0.2}_{-0.55}$	10400	14400	1060	1460	15000	22000	0.0089
17	K 17x21x17	21	17 $^{-0.2}_{-0.55}$	11800	16900	1210	1720	15000	22000	0.0095
17	K 17x22x20	22	20 $^{-0.2}_{-0.55}$	14700	19200	1500	1960	15000	22000	0.0150

Remark: [Precision] - Class 0 (JIS)
[Cages] - Steel, Polyamide 66 (TV)
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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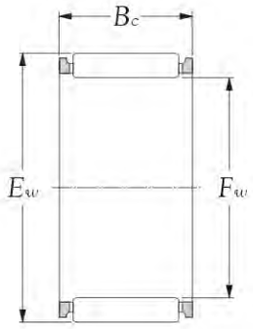
Needle roller and cage assemblies
series K



Inner bore Fw	Bearing number	Principal dimensions Ew	Bc	Basic load ratings dynamic Cr	static Cor	dynamic Cr	static Cor	Limiting speeds grease	oil	Mass kg.
mm		mm		N		kgf		rpm		(approx.)
17	K 17x23x17	23	17 $^{-0.2}_{-0.55}$	14400	16500	1460	1690	15000	22000	0.0160
18	K 18x22x10	22	10 $^{-0.2}_{-0.55}$	7400	9400	755	955	14000	21000	0.0061
18	K 18x22x13	22	13 $^{-0.2}_{-0.55}$	8900	11900	910	1210	14000	21000	0.0077
18	K 18x22x17	22	17 $^{-0.2}_{-0.55}$	11700	17000	1200	1730	14000	21000	0.0110
18	K 18x24x12	24	12 $^{-0.2}_{-0.55}$	12300	13800	1250	1410	14000	21000	0.0120
18	K 18x24x13	24	13 $^{-0.2}_{-0.55}$	11600	12800	1180	1300	14000	21000	0.0130
18	K 18x24x20	24	20 $^{-0.2}_{-0.55}$	17000	20900	1730	2130	14000	21000	0.0190
18	K 18x25x17	25	17 $^{-0.2}_{-0.55}$	18000	20400	1830	2080	14000	21000	0.0190
18	K 18x25x22	25	22 $^{-0.2}_{-0.55}$	22100	26600	2250	2710	14000	21000	0.0240
19	K 19x23x13	23	13 $^{-0.2}_{-0.55}$	9650	13500	985	1370	14000	21000	0.0082
19	K 19x23x17	23	17 $^{-0.2}_{-0.55}$	12700	19200	1300	1960	14000	21000	0.0110
20	K 20x24x11	24	11 $^{-0.2}_{-0.55}$	9500	13400	970	1370	13000	20000	0.0072
20	K 20x26x12	26	12 $^{-0.2}_{-0.55}$	12900	15100	1320	1540	13000	20000	0.0130
20	K 20x28x25	28	25 $^{-0.2}_{-0.55}$	27100	32500	2760	3300	13000	20000	0.0370
21	K 21x25x13	25	13 $^{-0.2}_{-0.55}$	10300	15100	1050	1540	13000	19000	0.0090
21	K 21x25x17	25	17 $^{-0.2}_{-0.55}$	13600	21500	1380	2200	13000	19000	0.0120
22	K 22x26x13	26	13 $^{-0.2}_{-0.55}$	10200	15200	1040	1550	12000	18000	0.0094
22	K 22x27x20	27	20 $^{-0.2}_{-0.55}$	17500	25900	1780	2640	12000	18000	0.0200
22	K 22x28x17	28	17 $^{-0.2}_{-0.55}$	17700	23300	1810	2380	12000	18000	0.0200
22	K 22x30x15 TV	30	15 $^{-0.2}_{-0.55}$	19300	21700	1970	2210	12000	18000	0.0220
23	K 23x28x24	28	24 $^{-0.2}_{-0.55}$	19800	31000	2020	3150	11000	17000	0.0230
24	K 24x28x13	28	13 $^{-0.2}_{-0.55}$	10800	16800	1100	1710	11000	17000	0.0100
24	K 24x28x17	28	17 $^{-0.2}_{-0.55}$	14300	23900	1460	2440	11000	17000	0.0130
24	K 24x29x13	29	13 $^{-0.2}_{-0.55}$	12300	16900	1250	1720	11000	17000	0.0120
24	K 24x30x17	30	17 $^{-0.2}_{-0.55}$	18400	25200	1880	2570	11000	17000	0.0220
25	K 25x29x10	29	10 $^{-0.2}_{-0.55}$	8950	13300	910	1350	11000	16000	0.0083

Remark: [Precision] - Class 0 (JIS)
[Cages] - Steel, Polyamide 66 (TV)
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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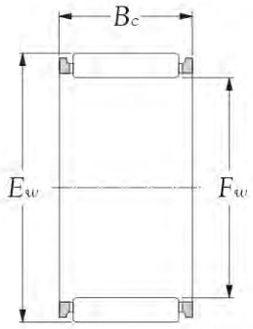
P2

Needle roller and cage assemblies
series K



Inner bore Fw	Bearing number	Principal dimensions		Basic load ratings				Limiting speeds		Mass
		Ew	Bc	dynamic Cr	static Cor	dynamic Cr	static Cor	grease	oil	kg.
mm		mm		N		kgf		rpm		(approx.)
25	K 25x29x13	29	13 $^{-0.2}_{-0.55}$	10800	16900	1100	1720	11000	16000	0.0100
25	K 25x30x13	30	13 $^{-0.2}_{-0.55}$	13200	18800	1350	1920	11000	16000	0.0130
25	K 25x31x13	31	13 $^{-0.2}_{-0.55}$	15200	19900	1550	2030	11000	16000	0.0160
25	K 25x31x14	31	14 $^{-0.2}_{-0.55}$	16500	22100	1680	2250	11000	16000	0.0180
25	K 25x31x17	31	17 $^{-0.2}_{-0.55}$	18300	25300	1870	2580	11000	16000	0.0220
25	K 25x31x21	31	21 $^{-0.2}_{-0.55}$	22500	33000	2290	3350	11000	16000	0.0260
26	K 26x30x13	30	13 $^{-0.2}_{-0.55}$	11800	19200	1200	1960	10000	15000	0.0110
26	K 26x30x17	30	17 $^{-0.2}_{-0.55}$	15500	27400	1580	2790	10000	15000	0.0150
26	K 26x34x22	34	22 $^{-0.2}_{-0.55}$	24200	30000	2470	3050	10000	15000	0.0410
28	K 28x32x17	32	17 $^{-0.2}_{-0.55}$	15300	27500	1560	2810	9500	14000	0.0170
28	K 28x32x21	32	21 $^{-0.2}_{-0.55}$	18700	35500	1910	3650	9500	14000	0.0200
28	K 28x33x13	33	13 $^{-0.2}_{-0.55}$	13900	20900	1420	2130	9500	14000	0.0150
28	K 28x33x27	33	27 $^{-0.2}_{-0.55}$	28300	52000	2890	5300	9500	14000	0.0320
28	K 28x34x14	34	14 $^{-0.2}_{-0.55}$	17500	24800	1790	2530	9500	14000	0.0200
28	K 28x34x17	34	17 $^{-0.2}_{-0.55}$	18100	25800	1850	2630	9500	14000	0.0240
28	K 28x35x16	35	16 $^{-0.2}_{-0.55}$	21200	28400	2160	2900	9500	14000	0.0290
28	K 28x35x18	35	18 $^{-0.2}_{-0.55}$	21500	28900	2190	2950	9500	14000	0.0310
29	K 29x34x27	34	27 $^{-0.2}_{-0.55}$	28100	52000	2870	5300	9500	14000	0.0330
30	K 30x37x16	37	16 $^{-0.2}_{-0.55}$	21900	30500	2230	3100	8500	13000	0.029
30	K 30x37x18	37	18 $^{-0.2}_{-0.55}$	23300	33000	2370	3350	8500	13000	0.034
30	K 30x38x18	38	18 $^{-0.2}_{-0.55}$	25000	33000	2550	3350	8500	13000	0.036
32	K 32x37x13	37	13 $^{-0.2}_{-0.55}$	14500	23000	1480	2350	8500	13000	0.018
32	K 32x38x26	38	26 $^{-0.2}_{-0.55}$	31500	54000	3200	5550	8500	13000	0.041
32	K 32x39x16	39	16 $^{-0.2}_{-0.55}$	22600	32000	2310	3300	8500	13000	0.034
32	K 32x39x18	39	18 $^{-0.2}_{-0.55}$	24000	35000	2450	3550	8500	13000	0.037
35	K 35x40x13	40	13 $^{-0.2}_{-0.55}$	15200	25100	1550	2560	7500	11000	0.019

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

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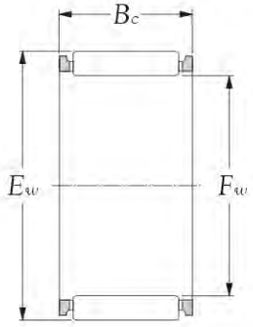
Needle roller and cage assemblies
series K



Inner bore Fw	Bearing number	Principal dimensions Ew	Bc	Basic load ratings dynamic Cr	static Cor	dynamic Cr	static Cor	Limiting speeds grease	oil	Mass kg.
mm		mm		N		kgf		rpm		(approx.)
35	K 35x40x17	40	17 $^{-0.2}_{-0.55}$	20000	36000	2040	3650	7500	11000	0.025
35	K 35x41x14	41	14 $^{-0.2}_{-0.55}$	19400	30500	1980	3100	7500	11000	0.026
35	K 35x41x15	41	15 $^{-0.2}_{-0.55}$	20900	33500	2130	3400	7500	11000	0.027
35	K 35x42x16	42	16 $^{-0.2}_{-0.55}$	24100	36000	2450	3650	7500	11000	0.035
35	K 35x42x18	42	18 $^{-0.2}_{-0.55}$	24700	37000	2510	3750	7500	11000	0.039
35	K 35x42x20	42	20 $^{-0.2}_{-0.55}$	28500	44500	2910	4550	7500	11000	0.041
35	K 35x42x30	42	30 $^{-0.2}_{-0.55}$	39500	68000	4050	6950	7500	11000	0.062
37	K 37x42x13	42	13 $^{-0.2}_{-0.55}$	15900	27100	1620	2770	7500	11000	0.021
37	K 37x44x18	44	18 $^{-0.2}_{-0.55}$	26300	41000	2680	4150	7500	11000	0.042
38	K 38x43x17	43	17 $^{-0.2}_{-0.55}$	20900	38500	2130	3950	7500	11000	0.026
38	K 38x43x27	43	27 $^{-0.2}_{-0.55}$	32000	67500	3300	6900	7500	11000	0.043
38	K 38x46x32	46	32 $^{-0.2}_{-0.55}$	54000	95500	5500	9700	7500	11000	0.073
40	K 40x45x13	45	13 $^{-0.2}_{-0.55}$	16500	29200	1680	2980	6500	10000	0.022
40	K 40x45x17	45	17 $^{-0.2}_{-0.55}$	21800	41500	2220	4250	6500	10000	0.027
40	K 40x45x21	45	21 $^{-0.2}_{-0.55}$	26700	54000	2720	5500	6500	10000	0.037
40	K 40x45x27	45	27 $^{-0.2}_{-0.55}$	33500	72500	3400	7400	6500	10000	0.044
40	K 40x46x17	46	17 $^{-0.2}_{-0.55}$	24600	43000	2500	4350	6500	10000	0.030
40	K 40x47x18	47	18 $^{-0.2}_{-0.55}$	27700	45000	2820	4550	6500	10000	0.045
40	K 40x47x20	47	20 $^{-0.2}_{-0.55}$	31000	51500	3150	5250	6500	10000	0.048
40	K 40x48x20	48	20 $^{-0.2}_{-0.55}$	33000	51000	3350	5200	6500	10000	0.052
40	K 40x48x25	48	25 $^{-0.2}_{-0.55}$	42500	71000	4350	7250	6500	10000	0.065
42	K 42x47x17	47	17 $^{-0.2}_{-0.55}$	22100	43000	2250	4400	6500	9500	0.028
42	K 42x47x27	47	27 $^{-0.2}_{-0.55}$	34000	75500	3450	7700	6500	9500	0.047
42	K 42x48x17	48	17 $^{-0.2}_{-0.55}$	25700	46000	2630	4700	6500	9500	0.036
42	K 42x50x20	50	20 $^{-0.2}_{-0.55}$	34000	53500	3450	5500	6500	9500	0.054
43	K 43x48x17	48	17 $^{-0.2}_{-0.55}$	22000	43000	2240	4400	6500	9500	0.029

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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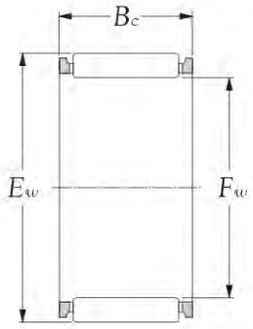
P2

Needle roller and cage assemblies
series K



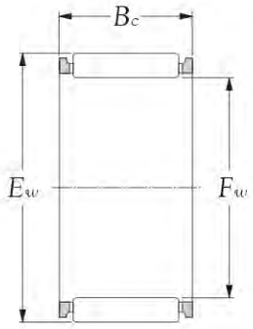
Inner bore Fw	Bearing number	Principal dimensions		Basic load ratings				Limiting speeds		Mass
		Ew	Bc	dynamic Cr	static Cor	dynamic Cr	static Cor	grease	oil	kg.
mm		mm		N		kgf		rpm		(approx.)
43	K 43x48x27	48	27.0 $^{-0.2}_{-0.55}$	34000	75500	3450	7700	6500	9500	0.046
43	K 43x50x18	50	18.0 $^{-0.2}_{-0.55}$	29100	49000	2960	5000	6500	9500	0.049
45	K 45x49x19	49	19.0 $^{-0.2}_{-0.55}$	22100	52000	2260	5300	6000	9000	0.027
45	K 45x50x27	50	27.0 $^{-0.2}_{-0.55}$	34500	78000	3500	7950	6000	9000	0.050
45	K 45x52x18	52	18.0 $^{-0.2}_{-0.55}$	29700	51000	3000	5200	6000	9000	0.051
45	K 45x52x21	52	21.0 $^{-0.2}_{-0.55}$	32000	56500	3300	5750	6000	9000	0.061
45	K 45x53x20	53	20.0 $^{-0.2}_{-0.55}$	36000	59000	3650	6000	6000	9000	0.062
45	K 45x53x25	53	25.0 $^{-0.2}_{-0.55}$	46500	82000	4700	8400	6000	9000	0.077
47	K 47x52x17	52	17.0 $^{-0.2}_{-0.55}$	23200	47500	2360	4850	5500	8500	0.033
47	K 47x52x27	52	27.0 $^{-0.2}_{-0.55}$	35500	83000	3650	8450	5500	8500	0.051
48	K 48x54x19	54	19.0 $^{-0.2}_{-0.55}$	31000	61000	3150	6250	5500	8500	0.044
50	K 50x55x13.5	55	13.5 $^{-0.2}_{-0.55}$	18100	35500	1850	3600	5500	8000	0.023
50	K 50x55x20	55	20.0 $^{-0.2}_{-0.55}$	27900	62000	2850	6300	5500	8000	0.042
50	K 50x55x27	55	27.0 $^{-0.2}_{-0.55}$	37000	88500	3750	9000	5500	8000	0.053
50	K 50x55x30	55	30.0 $^{-0.2}_{-0.55}$	39500	97000	4050	9900	5500	8000	0.059
50	K 50x57x18	57	18.0 $^{-0.2}_{-0.55}$	31500	57000	3200	5800	5500	8000	0.053
50	K 50x58x20	58	20.0 $^{-0.2}_{-0.55}$	38500	67500	3950	6850	5500	8000	0.065
50	K 50x58x25	58	25.0 $^{-0.2}_{-0.55}$	48500	90000	4950	9150	5500	8000	0.081
52	K 52x58x19	58	19.0 $^{-0.2}_{-0.55}$	32000	65500	3250	6650	5000	7500	0.048
55	K 55x60x17	60	17.0 $^{-0.2}_{-0.55}$	25800	58000	2630	5900	5000	7500	0.043
55	K 55x60x20	60	20.0 $^{-0.2}_{-0.55}$	28800	66500	2940	6750	5000	7500	0.045
55	K 55x60x30	60	30.0 $^{-0.2}_{-0.55}$	42000	108000	4300	11000	5000	7500	0.069
55	K 55x61x19	61	19.0 $^{-0.2}_{-0.55}$	33000	69500	3350	7100	5000	7500	0.051
55	K 55x61x20	61	20.0 $^{-0.2}_{-0.55}$	33000	69500	3350	7100	5000	7500	0.054
55	K 55x61x30	61	30.0 $^{-0.2}_{-0.55}$	48000	113000	4900	11500	5000	7500	0.081
55	K 55x62x18	62	18.0 $^{-0.2}_{-0.55}$	33500	63000	3400	6450	5000	7500	0.054

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

Needle roller and cage assemblies
series K



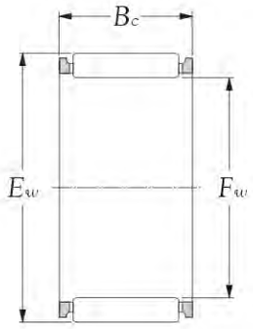
Inner bore Fw	Bearing number	Principal dimensions		Basic load ratings				Limiting speeds		Mass
		Ew	Bc	dynamic Cr	static Cor	dynamic Cr	static Cor	grease	oil	kg.
mm		mm		N		kgf		rpm		(approx.)
55	K 55x63x20	63	20 $^{-0.2}_{-0.55}$	39000	70000	3950	7100	5000	7500	0.073
55	K 55x63x25	63	25 $^{-0.2}_{-0.55}$	50500	97500	5150	9950	5000	7500	0.088
55	K 55x63x32	63	32 $^{-0.2}_{-0.55}$	61000	125000	6200	12700	5000	7500	0.117
58	K 58x64x19	64	19 $^{-0.2}_{-0.55}$	34000	73500	3450	7500	4700	7000	0.052
60	K 60x65x20	65	20 $^{-0.2}_{-0.55}$	29800	71500	3050	7300	4300	6500	0.051
60	K 60x65x30	65	30 $^{-0.2}_{-0.55}$	43500	116000	4450	11800	4300	6500	0.071
60	K 60x66x19	66	19 $^{-0.2}_{-0.55}$	33500	73500	3450	7500	4300	6500	0.053
60	K 60x66x20	66	20 $^{-0.2}_{-0.55}$	33500	73500	3450	7500	4300	6500	0.056
60	K 60x66x30	66	30 $^{-0.2}_{-0.55}$	49000	119000	5000	12200	4300	6500	0.084
60	K 60x68x15	68	15 $^{-0.2}_{-0.55}$	27200	45500	2780	4650	4300	6500	0.058
60	K 60x68x20	68	20 $^{-0.2}_{-0.55}$	40000	75000	4100	7650	4300	6500	0.077
60	K 60x68x23	68	23 $^{-0.2}_{-0.55}$	44500	85000	4500	8700	4300	6500	0.092
60	K 60x68x25	68	25 $^{-0.2}_{-0.55}$	52000	105000	5300	10700	4300	6500	0.097
60	K 60x68x27	68	27 $^{-0.2}_{-0.55}$	52000	105000	5300	10700	4300	6500	0.098
61	K 61x66x20	66	20 $^{-0.2}_{-0.55}$	29700	71500	3050	7300	4300	6500	0.054
61	K 61x66x30	66	30 $^{-0.2}_{-0.55}$	43500	116000	4400	11900	4300	6500	0.073
63	K 63x70x21	70	21 $^{-0.2}_{-0.55}$	44500	95500	4500	9700	4300	6500	0.075
64	K 64x70x16	70	16 $^{-0.2}_{-0.55}$	28400	60500	2900	6150	4300	6500	0.053
65	K 65x70x20	70	20 $^{-0.2}_{-0.55}$	30500	75000	3100	7650	4000	6000	0.055
65	K 65x70x30	70	30 $^{-0.2}_{-0.55}$	45000	124000	4600	12700	4000	6000	0.083
65	K 65x73x23	73	23 $^{-0.2}_{-0.55}$	47000	94000	4800	9600	4000	6000	0.100
65	K 65x73x30	73	30 $^{-0.2}_{-0.55}$	61000	132000	6200	13400	4000	6000	0.126
68	K 68x74x20	74	20 $^{-0.2}_{-0.55}$	36000	83500	3700	8550	4000	6000	0.065
68	K 68x74x30	74	30 $^{-0.2}_{-0.55}$	51500	133000	5250	13500	4000	6000	0.097
68	K 68x75x21	75	21 $^{-0.2}_{-0.55}$	45500	101000	4600	10300	4000	6000	0.077
70	K 70x76x20	76	20 $^{-0.2}_{-0.55}$	36500	86000	3700	8750	3700	5500	0.070

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

Needle roller and cage assemblies
series K



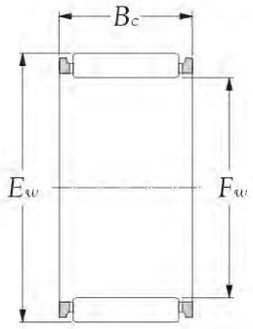
Inner bore Fw	Bearing number	Principal dimensions Ew	Bc	Basic load ratings dynamic Cr	static Cor	dynamic Cr	static Cor	Limiting speeds grease	oil	Mass kg.
mm		mm		N		kgf		rpm		(approx.)
70	K 70x76x30	76	30 $^{-0.2}_{-0.55}$	53000	139000	5400	14200	3700	5500	0.100
70	K 70x77x21	77	21 $^{-0.2}_{-0.55}$	45000	101000	4600	10300	3700	5500	0.080
70	K 70x78x23	78	23 $^{-0.2}_{-0.55}$	49500	103000	5050	10500	3700	5500	0.107
70	K 70x78x30	78	30 $^{-0.2}_{-0.55}$	65500	149000	6700	15200	3700	5500	0.136
72	K 72x79x21	79	21 $^{-0.2}_{-0.55}$	46500	106000	4750	10800	3700	5500	0.085
73	K 73x79x30	79	30 $^{-0.2}_{-0.55}$	54500	146000	5550	14900	3700	5500	0.106
75	K 75x81x30	81	30 $^{-0.2}_{-0.55}$	56000	152000	5700	15500	3700	5500	0.108
75	K 75x82x21	82	21 $^{-0.2}_{-0.55}$	46000	106000	4700	10800	3700	5500	0.088
75	K 75x83x23	83	23 $^{-0.2}_{-0.55}$	50500	109000	5150	11100	3700	5500	0.113
75	K 75x83x30	83	30 $^{-0.2}_{-0.55}$	67500	157000	6850	16100	3700	5500	0.147
80	K 80x86x20	86	20 $^{-0.2}_{-0.55}$	39000	98000	4000	10000	3300	5000	0.077
80	K 80x86x30	86	30 $^{-0.2}_{-0.55}$	57000	159000	5800	16200	3300	5000	0.110
80	K 80x88x23	88	23 $^{-0.2}_{-0.55}$	53000	118000	5400	12100	3300	5000	0.125
80	K 80x88x26	88	26 $^{-0.2}_{-0.55}$	61000	142000	6250	14500	3300	5000	0.131
80	K 80x88x30	88	30 $^{-0.2}_{-0.55}$	69000	66000	7050	17000	3300	5000	0.157
85	K 85x92x30	92	30 $^{-0.2}_{-0.55}$	66000	176000	6750	18000	3100	4700	0.142
85	K 85x93x27	93	27 $^{-0.2}_{-0.55}$	64000	153000	6500	15600	3100	4700	0.145
85	K 85x93x30	93	30 $^{-0.2}_{-0.55}$	71000	175000	7200	17900	3100	4700	0.160
90	K 90x97x20	97	20 $^{-0.2}_{-0.55}$	46000	113000	4700	11500	2900	4400	0.103
90	K 90x97x30	97	30 $^{-0.2}_{-0.55}$	67500	184000	6850	18700	2900	4400	0.151
90	K 90x98x26	98	26 $^{-0.2}_{-0.55}$	64000	157000	6550	16000	2900	4400	0.148
90	K 90x98x27	98	27 $^{-0.2}_{-0.55}$	64000	157000	6550	16000	2900	4400	0.150
90	K 90x98x30	98	30 $^{-0.2}_{-0.55}$	72500	184000	7400	18800	2900	4400	0.172
95	K 95x102x21	102	21 $^{-0.2}_{-0.55}$	48000	122000	4900	12400	2800	4200	0.115
95	K 95x102x31	102	31 $^{-0.2}_{-0.55}$	70500	199000	7200	20300	2800	4200	0.172
95	K 95x103x27	103	27 $^{-0.2}_{-0.55}$	65500	165000	6700	16800	2800	4200	0.159

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

Needle roller and cage assemblies
series K



Inner bore Fw	Bearing number	Principal dimensions Ew	Bc	Basic load ratings dynamic Cr	static Cor	dynamic Cr	static Cor	Limiting speeds grease	oil	Mass kg.
mm		mm		N		kgf		rpm		(approx.)
95	K 95x103x30	103	30 $^{-0.2}_{-0.55}$	74000	193000	7550	19600	2800	4200	0.165
100	K 100x107x21	107	21 $^{-0.3}_{-0.65}$	49000	127000	5000	12900	2700	4000	0.120
100	K 100x107x31	107	31 $^{-0.3}_{-0.65}$	71500	207000	7300	21100	2700	4000	0.173
100	K 100x108x27	108	27 $^{-0.3}_{-0.65}$	61000	153000	6250	15600	2700	4000	0.176
100	K 100x108x30	108	30 $^{-0.3}_{-0.65}$	76000	201000	7700	20500	2700	4000	0.190
105	K 105x112x21	112	21 $^{-0.3}_{-0.65}$	48500	127000	4950	12900	2500	3800	0.130
105	K 105x112x31	112	31 $^{-0.3}_{-0.65}$	71000	207000	7250	21100	2500	3800	0.176
105	K 105x113x30	113	30 $^{-0.3}_{-0.65}$	77500	210000	7900	21400	2500	3800	0.198
110	K 110x117x24	117	24 $^{-0.3}_{-0.65}$	54500	149000	5550	15200	2400	3600	0.145
110	K 110x117x34	117	34 $^{-0.3}_{-0.65}$	77500	235000	7900	24000	2400	3600	0.205
110	K 110x118x30	118	30 $^{-0.3}_{-0.65}$	79000	219000	8050	22300	2400	3600	0.217
115	K 115x123x27	123	27 $^{-0.3}_{-0.65}$	64000	170000	6550	17300	2300	3500	0.200
115	K 115x125x34	125	34 $^{-0.3}_{-0.65}$	95000	241000	9700	24600	2300	3500	0.330
120	K 120x127x24	127	24 $^{-0.3}_{-0.65}$	57500	165000	5850	16800	2200	3300	0.160
120	K 120x127x34	127	34 $^{-0.3}_{-0.65}$	82000	260000	8350	26600	2200	3300	0.235
125	K 125x133x35	133	35 $^{-0.3}_{-0.65}$	87000	260000	8900	26500	2100	3200	0.275
125	K 125x135x34	135	34 $^{-0.3}_{-0.65}$	100000	265000	10200	27000	2100	3200	0.350
130	K 130x137x24	137	24 $^{-0.3}_{-0.65}$	59000	175000	6000	17900	2100	3100	0.170
130	K 130x137x34	137	34 $^{-0.3}_{-0.65}$	84500	277000	8600	28300	2100	3100	0.240
135	K 135x143x35	143	35 $^{-0.3}_{-0.65}$	92500	288000	9450	29400	2000	3000	0.300
135	K 135x150x38	150	38 $^{-0.3}_{-0.65}$	145000	325000	14800	33500	2000	3000	0.590
145	K 145x153x26	153	26 $^{-0.3}_{-0.65}$	72000	214000	7350	21800	1900	2800	0.250
145	K 145x153x28	153	28 $^{-0.3}_{-0.65}$	80500	247000	8200	25200	1900	2800	0.252
145	K 145x153x36	153	36 $^{-0.3}_{-0.65}$	100000	325000	10200	33000	1900	2800	0.335
150	K 150x160x46	160	46 $^{-0.3}_{-0.65}$	149000	470000	15200	48000	1800	2700	0.550
155	K 155x163x26	163	26 $^{-0.3}_{-0.65}$	73500	224000	7500	22800	1700	2600	0.270

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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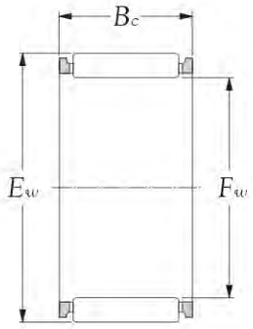
P2

Needle roller and cage assemblies
series K



Inner bore Fw	Bearing number	Principal dimensions		Basic load ratings				Limiting speeds		Mass kg(s).
		Ew	Bc	dynamic Cr	static Cor	dynamic Cr	static Cor	grease	oil	
mm		mm		N		kgf		rpm		(approx.)
155	K 155x163x36	163	36 $^{-0.3}_{-0.65}$	102000	340000	10400	34500	1700	2600	0.355
160	K 160x170x46	170	46 $^{-0.3}_{-0.65}$	155000	505000	15800	51500	1700	2500	0.570
165	K 165x173x26	173	26 $^{-0.3}_{-0.65}$	79000	251000	8050	25600	1600	2400	0.290
165	K 165x173x32	173	32 $^{-0.3}_{-0.65}$	97000	330000	9900	33500	1600	2400	0.340
165	K 165x173x36	173	36 $^{-0.3}_{-0.65}$	109000	380000	11100	39000	1600	2400	0.375
170	K 170x180x46	180	46 $^{-0.3}_{-0.65}$	160000	540000	16400	55000	1600	2400	0.620
175	K 175x183x32	183	32 $^{-0.3}_{-0.65}$	101000	350000	10300	35500	1500	2300	0.360
185	K 185x195x37	195	37 $^{-0.3}_{-0.65}$	131000	425000	13300	43500	1500	2200	0.560
195	K 195x205x37	205	37 $^{-0.3}_{-0.65}$	135000	450000	13800	46000	1400	2100	0.620
210	K 210x220x42	220	42 $^{-0.3}_{-0.65}$	156000	560000	15900	57000	1300	1900	0.740
220	K 220x230x42	230	42 $^{-0.3}_{-0.65}$	161000	590000	16400	60000	1200	1800	0.790
240	K 240x250x42	250	42 $^{-0.3}_{-0.65}$	167000	635000	17000	64500	1100	1700	0.850
265	K 265x280x50	280	50 $^{-0.3}_{-0.65}$	256000	850000	26100	87000	1000	1500	1.810
285	K 285x300x50	300	50 $^{-0.3}_{-0.65}$	268000	930000	27300	94500	950	1400	1.970

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Drawn cup needle roller bearings

TECHNICAL SUPPLEMENT T 110 & T 111

T1

1. Types and designs

KSM drawn cup needle roller bearings can be classified into open-end and closed-end types according to the form of their outer ring. The open-end design is further subcategorized into the series HK (metric standard series). The closed-end design is further classified into series BK (metric standard series). Sealed **KSM** Drawn Cup Needle Roller Bearings (suffix RS or 2RS) having a synthetic rubber seal on one or both ends are pre-filled with lithium soap grease. The allowable operating temperature range with this bearing variant is -25°C to+100°C. Its rollers are shorter than those in an open-ended type of the same dimension, so its load rating is accordingly smaller.

Fig. A Series HK

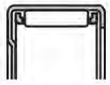


Fig. B Series BK

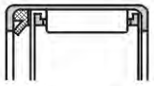


Fig. C Series HK . . RS

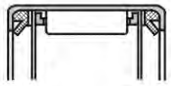


Fig. D Series HK. . 2RS

The cages used for drawn cup needle roller bearings are usually pressed-steel cages. Also, certain small drawn cup needle roller bearings use molded polyamide cages reinforced with glass fiber or carbon fiber .

2. Interpreting bearing numbers

As summarized in Fig. E, the bearing numbers of **KSM** Drawn Cup Needle Roller Bearings comprise a series number, dimension code (inscribed enveloping circle diameter×width dimension), and suffix.

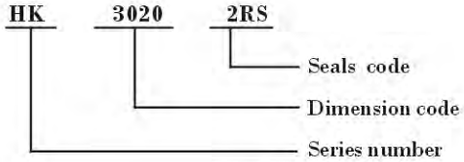


Fig. E

3. Bearing fits

The fit of an **KSM** drawn cup needle roller bearing to a housing is usually a tight fit where the inscribed enveloping circle diameter (*Fw*) of press-fit rollers satisfies ISO tolerance class F8. However, the inscribed enveloping circle diameter (*Fw*) of pressfit rollers varies with the material and rigidity of the housing. Therefore, actual bearing fit (interference) should be measured and determined through trials before the bearing is mounted. If a housing has sufficient rigidity, selecting a fit to housing or shaft from Table A can result in an inscribed enveloping circle diameter (*Fw*) of press-fit rollers close to F8 and a radial clearance close to normal clearance.

Table A Fit to housing and shaft

Series number	Housing		Shaft	
	Steel	Light alloy	Without inner ring	With inner ring
HK, BK	N6 (N7)	R6 (R7)	h5 (h6)	K5 (j6)

4. Housing bore accuracy

Because the outer ring has a thinner wall, the performance of drawn cup needle roller bearings is significantly affected by the surface roughness and the dimensional and form accuracy of the housing bore to which a bearing is press-fit. The housing bore must satisfy the accuracy of Table B.

Table B Recommended fits

Characteristics	Tolerance
Circularity (max.)	IT4 or less
Cylindricithy (max.)	IT4 or less
Surface roughness (max.)	1.6a

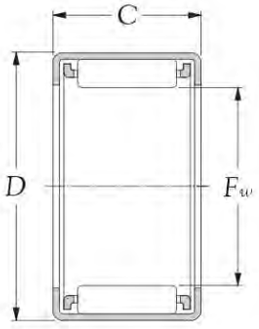
5. Bearing tolerances and measuring methods

The outer ring of a drawn cup needle roller bearing is thin-walled. Therefore, some deformation of the outer ring unavoidably develops during the manufacturing process, particularly during heat treatment. However, when the outer ring is press-fit into a correctly dimensioned housing, the deformation is corrected, restoring the design functions of the outer ring. For this reason, measuring the dimensional accuracy of a drawn cup needle roller bearing before it is press-fit is meaningless. Therefore, its accuracy is evaluated by measuring its inscribed enveloping circle diameter (Fw) after it has been press-fit into a ring gauge of correct dimensions (wall thickness 20 mm or greater). The tolerances of the bore diameter of the ring gauges and the inscribed enveloping circle diameter (Fw) are given in Tables C, which apply to the series HK and BK (standard metric series). When measuring the inscribed enveloping circle diameter (Fw) with a plug gauge, the dimension at GO side must satisfy "Low" tolerance for inscribed enveloping circle diameter, and that at NO GO side must satisfy "Height" tolerance plus 2 μm. These values comply with the relevant ISO standard.

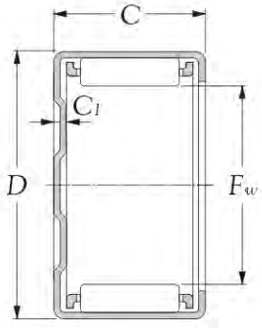
Table C Enveloping circle diameter tolerance (series HK and BK) (Unit: mm)

Enveloping circle dia. Fw	Outside dia. of outer ring D	Ring gauge bore dia.	Enveloping circle dia. tolerance	
			Hight	low
3	6.5	6.4840	3.016	3.006
4	8	7.9840	4.022	4.010
5	9	8.9840	5.022	5.010
6	10	9.9840	6.022	6.010
7	11	10.980	7.028	7.013
8	12	11.980	8.028	8.013
9	13	12.980	9.028	9.013
10	14	13.980	10.028	10.013
12	16	15.980	12.034	12.016
12	18	17.980	12.034	12.016
13	19	18.976	13.034	13.016
14	20	19.976	14.034	14.016
15	21	20.976	15.034	15.016
16	22	21.976	16.034	16.016
17	23	22.976	17.034	17.016
18	24	23.976	18.034	18.016
20	26	25.976	20.041	20.020
22	28	27.976	22.041	22.020
25	32	31.972	25.041	25.020
28	35	34.972	28.041	28.020
30	37	36.972	30.041	30.020
35	42	41.972	35.050	35.025
40	47	46.972	40.050	40.025
45	52	51.967	45.050	45.025
50	58	57.967	50.050	50.025
55	63	62.967	55.060	55.030
60	68	67.967	60.060	60.030

Drawn cup needle roller bearings
series HK.. & BK..



Type HK



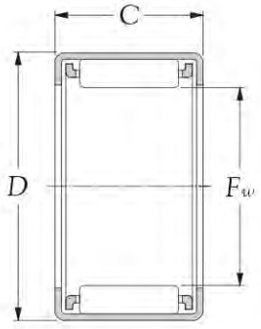
Type BK

Inner bore Fw mm	Bearing number Open end design	Bearing number Closed end design	Principal dimensions D	Principal dimensions C 0-0.2 mm	Principal dimensions C1 max	Basic load ratings dynamic Cr N	Basic load ratings static Cor N	Basic load ratings dynamic Cr kgf	Basic load ratings static Cor kgf	Limiting speeds grease rpm	Limiting speeds oil rpm	Appropriate inner ring (as a reference)	Mass kg. (approx.)
3	HK 0306 TV	-	6.5	6	-	1250	835	128	85	33000	50000	-	0.0006
3	-	BK 0306 TV	6.5	6	0.8	1250	835	128	85	33000	50000	-	0.0007
4	HK 0408	-	8.0	8	-	1770	1270	180	129	30000	45000	-	0.0016
4	-	BK 0408	8.0	8	1.6	1770	1270	180	129	30000	45000	-	0.0018
5	HK 0509	-	9.0	9	-	2640	2190	269	224	27000	40000	-	0.0019
5	-	BK 0509	9.0	9	1.6	2640	2190	269	224	27000	40000	-	0.0021
6	HK 0609	-	10.0	9	-	2660	2280	272	233	25000	37000	-	0.0022
6	-	BK 0609	10.0	9	1.6	2660	2280	272	233	25000	37000	-	0.0024
7	HK 0709	-	11.0	9	-	3400	3250	345	330	23000	34000	-	0.0025
7	-	BK 0709	11.0	9	1.6	3400	3250	345	330	23000	34000	-	0.0027
8	HK 0810	-	12.0	10	-	3850	3950	395	400	20000	30000	IR 5x8x12	0.0032
8	-	BK 0810	12.0	10	1.6	3850	3950	395	400	20000	30000	IR 5x8x12	0.0034
9	HK 0910	-	13.0	10	-	4600	5050	465	515	18000	27000	IR 6x9x12	0.0035
9	-	BK 0910	13.0	10	1.6	4600	5050	465	515	18000	27000	IR 6x9x12	0.0039
9	HK 0912	-	13.0	12	-	5650	6650	575	680	18000	27000	IR 6x9x12	0.0042
9	-	BK 0912	13.0	12	1.6	5650	6650	575	680	18000	27000	IR 6x9x12	0.0045
10	HK 1010	-	14.0	10	-	4500	5100	460	520	16000	24000	IR 7x10x10.5	0.0038
10	-	BK 1010	14.0	10	1.6	4500	5100	460	520	16000	24000	IR 7x10x10.5	0.0042
10	HK 1012	-	14.0	12	-	5900	7250	605	735	16000	24000	IR 7x1x16	0.0045
10	-	BK 1012	14.0	12	1.6	5900	7250	605	735	16000	24000	IR 7x10x16	0.0050
10	HK 1015	-	14.0	15	-	7100	9150	725	935	16000	24000	IR 7x10x16	0.0056
10	-	BK 1015	14.0	15	1.6	7100	9150	725	935	16000	24000	IR 7x10x16	0.0062
12	HK 1210	-	16.0	10	-	5050	6250	515	635	13000	20000	IR 8x12x10.5	0.0046
12	-	BK 1210	16.0	10	1.6	5050	6250	515	635	13000	20000	IR 8x12x10.5	0.0052
12	HK 1212	-	18.0	12	-	6600	7300	675	745	13000	20000	IR 8x12x12.5	0.0091
12	-	BK 1212	18.0	12	2.7	6600	7300	675	745	13000	20000	IR 8x12x12.5	0.0100
13	HK 1312	-	19.0	12	-	7300	8450	745	865	12000	18000	IR10x13x12.5	0.0100
13	-	BK 1312	19.0	12	2.7	7300	8450	745	865	12000	18000	IR10x13x12.5	0.0110

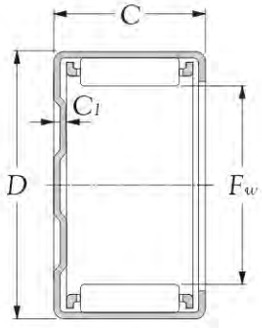
Remark: [Precision] - Class 0 (JIS)
[Cages] - Steel, Polyamide 66 (TV)
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Drawn cup needle roller bearings
series HK.. & BK..



Type HK



Type BK

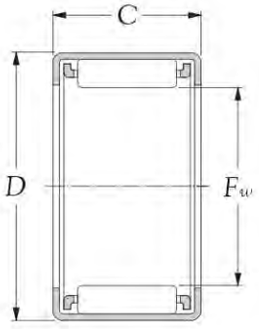
Inner bore Fw mm	Bearing number Open end design	Bearing number Closed end design	Principal dimensions D	Principal dimensions C 0-0.2 mm	Principal dimensions C1 max	Basic load ratings dynamic Cr N	Basic load ratings static Cor N	Basic load ratings dynamic Cr kgf	Basic load ratings static Cor kgf	Limiting speeds grease rpm	Limiting speeds oil rpm	Appropriate inner ring (as a reference)	Mass kg. (approx.)
14	HK 1412	-	20	12	-	7200	8500	735	865	11000	17000	IR 10x14x13	0.011
14	-	BK 1412	20	12	2.7	7200	8500	735	865	11000	17000	IR 10x14x13	0.012
14	HK 1416	-	20	16	-	10700	14000	1090	1430	11000	17000	-	0.015
14	-	BK 1416	20	16	2.7	10700	14000	1090	1430	11000	17000	-	0.016
15	HK 1512	-	21	12	-	7500	9100	765	930	11000	16000	IR 12x15x12.5	0.011
15	-	BK 1512	21	12	2.7	7500	9100	765	930	11000	16000	IR 12x15x12.5	0.013
15	HK 1516	-	21	16	-	10700	14400	1090	1470	11000	16000	IR 12x15x16.5	0.015
15	-	BK 1516	21	16	2.7	10700	14400	1090	1470	11000	16000	IR 12x15x16.5	0.017
16	HK 1612	-	22	12	-	7750	9700	795	990	10000	15000	IR 12x16x13	0.012
16	-	BK 1612	22	12	2.7	7750	9700	795	990	10000	15000	IR 12x16x13	0.014
16	HK 1616	-	22	16	-	11100	15300	1130	1570	10000	15000	IR 12x16x20	0.016
16	-	BK 1616	22	16	2.7	11100	15300	1130	1570	10000	15000	IR 12x16x20	0.018
17	HK 1712	-	23	12	-	8500	11100	865	1130	9500	14000		0.012
17	-	BK 1712	23	12	2.7	8500	11100	865	1130	9500	14000		0.015
18	HK 1812	-	24	12	-	8300	10900	845	1110	8500	13000	IR 15x18x12.5	0.013
18	-	BK 1812	24	12	2.7	8300	10900	845	1110	8500	13000	IR 15x18x12.5	0.015
18	HK 1816	-	24	16	-	11800	17300	1210	1760	8500	13000	IR 15x18x16.5	0.018
18	-	BK 1816	24	16	2.7	11800	17300	1210	1760	8500	13000	IR 15x18x16.5	0.020
20	HK 2012	-	26	12	-	9250	13000	945	1330	8000	12000	IR 15x20x13	0.014
20	-	BK 2012	26	12	2.7	9250	13000	945	1330	8000	12000	IR 15x20x13	0.017
20	HK 2016	-	26	16	-	13000	20100	1320	2050	8000	12000	IR 17x20x16.5	0.019
20	-	BK 2016	26	16	2.7	13000	20100	1320	2050	8000	12000	IR 17x20x16.5	0.022
20	HK 2020	-	26	20	-	16400	27100	1670	2760	8000	12000	IR 17x20x20.5	0.024
20	-	BK 2020	26	20	2.7	16400	27100	1670	2760	8000	12000	IR 17x20x20.5	0.027
22	HK 2212	-	28	12	-	9750	14300	995	1460	7500	11000	IR 17x22x13	0.013
22	-	BK 2212	28	12	2.7	9750	14300	995	1460	7500	11000	IR 17x22x13	0.015
22	HK 2216	-	28	16	-	13600	22100	1390	2250	7500	11000	IR 17x22x18	0.021
22	-	BK 2216	28	16	2.7	13600	22100	1390	2250	7500	11000	IR 17x22x18	0.024

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

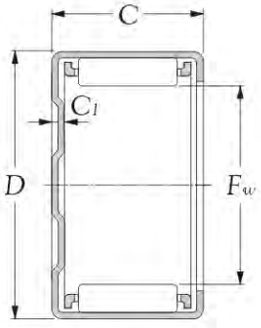
If you require more individual technical information for each of above bearing model, please enter KSM web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

Drawn cup needle roller bearings
series HK.. & BK..



Type HK



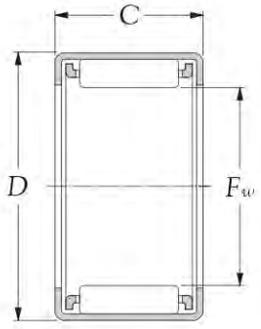
Type BK

Inner bore Fw mm	Bearing number Open end design	Bearing number Closed end design	Principal dimensions D	Principal dimensions C 0-0.2 mm	Principal dimensions C1 max	Basic load ratings dynamic Cr N	Basic load ratings static Cor N	Basic load ratings dynamic Cr kgf	Basic load ratings static Cor kgf	Limiting speeds grease rpm	Limiting speeds oil rpm	Appropriate inner ring (as a reference)	Mass kg. (approx.)
22	HK 2220	-	28	20	-	17200	29800	1760	3050	7500	11000	IR 17x22x20.5	0.026
22	-	BK 2220	28	20	2.7	17200	29800	1760	3050	7500	11000	IR 17x22x20.5	0.030
25	HK 2512	-	32	12	-	11800	16300	1200	1660	6500	9500	IR 20x25x12.5	0.021
25	-	BK 2512	32	12	2.7	11800	16300	1200	1660	6500	9500	IR 20x25x12.5	0.023
25	HK 2516	-	32	16	-	15900	24000	1620	2450	6500	9500	IR 20x25x17	0.027
25	-	BK 2516	32	16	2.7	15900	24000	1620	2450	6500	9500	IR 20x25x17	0.031
25	HK 2520	-	32	20	-	20300	33000	2070	3350	6500	9500	IR 20x25x20.5	0.034
25	-	BK 2520	32	20	2.7	20300	33000	2070	3350	6500	9500	IR 20x25x20.5	0.039
25	HK 2526	-	32	26	-	26400	46000	2690	4700	6500	9500	IR 20x25x26.5	0.045
25	-	BK 2526	32	26	2.7	26400	46000	2690	4700	6500	9500	IR 20x25x26.5	0.049
28	HK 2816	-	35	16	-	17300	27600	1760	2820	5500	8500	IR 22x28x17	0.030
28	-	BK 2816	35	16	2.7	17300	27600	1760	2820	5500	8500	IR 22x28x17	0.034
28	HK 2820	-	35	20	-	21300	36000	2170	3700	5500	8500	IR 22x28x20.5	0.038
28	-	BK 2820	35	20	2.7	21300	36000	2170	3700	5500	8500	IR 22x28x20.5	0.043
30	HK 3012	-	37	12	-	13000	19500	1320	1990	5500	8000	IR 25x30x12.5	0.024
30	-	BK 3012	37	12	2.7	13000	19500	1320	1990	5500	8000	IR 25x30x12.5	0.028
30	HK 3016	-	37	16	-	18100	30000	1850	3050	5500	8000	IR 25x30x17	0.032
30	-	BK 3016	37	16	2.7	18100	30000	1850	3050	5500	8000	IR 25x30x17	0.037
30	HK 3020	-	37	20	-	22300	39500	2280	4000	5500	8000	IR 25x30x20.5	0.040
30	-	BK 3020	37	20	2.7	22300	39500	2280	4000	5500	8000	IR 25x30x20.5	0.047
30	HK 3026	-	37	26	-	29100	55000	2960	5650	5500	8000	IR 25x30x26.5	0.053
30	-	BK 3026	37	26	2.7	29100	55000	2960	5650	5500	8000	IR 25x30x26.5	0.059
35	HK 3512	-	42	12	-	14000	22800	1430	2320	4700	7000	-	0.028
35	-	BK 3512	42	12	2.7	14000	22800	1430	2320	4700	7000	-	0.033
35	HK 3516	-	42	16	-	19700	35000	2000	3600	4700	7000	-	0.037
35	-	BK 3516	42	16	2.7	19700	35000	2000	3600	4700	7000	-	0.044
35	HK 3520	-	42	20	-	24800	47500	2530	4850	4700	7000	-	0.046
35	-	BK 3520	42	20	2.7	24800	47500	2530	4850	4700	7000	-	0.055

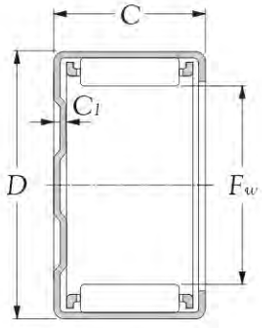
Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Drawn cup needle roller bearings
series HK.. & BK..



Type HK



Type BK

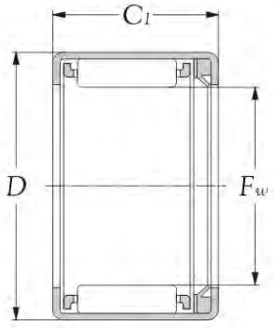
Inner bore Fw	Bearing number		Principal dimensions			Basic load ratings				Limiting speeds		Appropriate inner ring	Mass
						dynamic	static	dynamic	static	grease	oil		kg.
	Open end design	Closed end design	D	C 0-0.2	C1 max	Cr	Cor	Cr	Cor			(as a reference)	(approx.)
mm			mm			N		kgf		rpm			
40	HK 4012	-	47	12	-	15100	26000	1540	2660	4000	6000	IR 35x40x12.5	0.031
40	-	BK 4012	47	12	2.7	15100	26000	1540	2660	4000	6000	IR 35x40x12.5	0.038
40	HK 4016	-	47	16	-	21100	40000	2150	4100	4000	6000	IR 35x40x17	0.041
40	-	BK 4016	47	16	2.7	21100	40000	2150	4100	4000	6000	IR 35x40x17	0.051
40	HK 4020	-	47	20	-	25900	52500	2650	5350	4000	6000	IR 35x40x20.5	0.052
40	-	BK 4020	47	20	2.7	25900	52500	2650	5350	4000	6000	IR 35x40x20.5	0.064
45	HK 4516	-	52	16	-	21600	43000	2210	4400	3700	5500	IR 40x45x17	0.046
45	-	BK 4516	52	16	2.7	21600	43000	2210	4400	3700	5500	IR 40x45x17	0.058
45	HK 4520	-	52	20	-	27600	59000	2810	6000	3700	5500	IR 40x45x20.5	0.058
45	-	BK 4520	52	20	2.7	27600	59000	2810	6000	3700	5500	IR 40x45x20.5	0.072
50	HK 5020	-	58	20	-	31500	63000	3200	6450	3200	4800	IR 40x50x22	0.072
50	-	BK 5020	58	20	2.7	31500	63000	3200	6450	3200	4800	IR 40x50x22	0.087
50	HK 5025	-	58	25	-	38500	82000	3900	8400	3200	4800	IR 45x50x25.5	0.090
50	-	BK 5025	58	25	2.7	38500	82000	3900	8400	3200	4800	IR 45x50x25.5	0.109

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

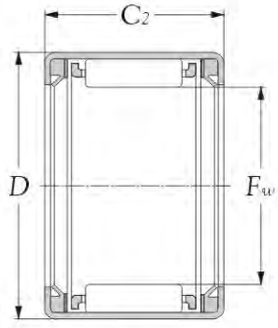
If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

Drawn cup needle roller bearings sealed type
series HK..RS, HK..2RS & BK..RS



Type HK..RS
(Open end, single seal)



Type HK..2RS
(Open end, double seals)

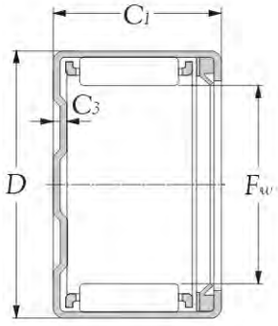
Inner bore Fw	Bearing number			Principal dimensions				Basic load ratings			
								dynamic	static	dynamic	static
mm	open end single seal	open end double seals	closed end single seal	D	C1 $^{0}_{-0.02}$	C2 $^{0}_{-0.02}$	C3 max	Cr	Cor	Cr	Cor
					mm			N		Kgf	
12	HK 1214 RS	HK 1216 2RS	BK 1214 RS	18	14	16	2.7	6600	7300	675	745
14	HK 1414 RS	HK 1416 2RS	BK 1414 RS	20	14	16	2.7	7200	8500	735	865
15	HK 1514 RS	HK 1516 2RS	BK 1514 RS	21	14	16	2.7	7500	9100	765	930
16	HK 1614 RS	HK 1616 2RS	BK 1614 RS	22	14	16	2.7	7750	9700	795	990
18	HK 1814 RS	HK 1816 2RS	BK 1814 RS	24	14	16	2.7	8300	10900	845	1110
20	-	HK 2016 2RS	-	26	-	16	-	9250	13000	945	1330
20	HK 2018 RS	HK 2020 2RS	BK 2018 RS	26	18	20	2.7	13000	20100	1320	2050
22	-	HK 2216 2RS	-	28	-	16	-	9750	14300	995	1460
22	HK 2218 RS	HK 2220 2RS	BK 2218 RS	28	18	20	2.7	13600	22100	1390	2250
25	-	HK 2516 2RS	-	32	-	16	-	11800	16300	1200	1660
25	HK 2518 RS	HK 2520 2RS	BK 2518 RS	32	18	20	2.7	15900	24000	1620	2450
28	-	HK 2820 2RS	-	35	-	20	-	17300	27600	1760	2820
30	-	HK 3016 2RS	BK 3018 RS	37	-	16	-	13000	19500	1320	1990
30	HK 3018 RS	HK 3020 2RS		37	18	20	2.7	18100	30000	1850	3050
35	-	HK 3516 2RS	-	42	-	16	-	14000	22800	1430	2320
35	HK 3518 RS	HK 3520 2RS	BK 3518 RS	42	18	20	2.7	19700	35000	2000	3600
40	-	HK 4016 2RS	-	47	-	16	-	15100	26000	1540	2660
40	HK 4018 RS	HK 4020 2RS	BK 4018 RS	47	18	20	2.7	21100	40000	2150	4100
45	HK 4518 RS	HK 4520 2RS	BK 4518 RS	52	18	20	2.7	21600	43000	2210	4400
50	HK 5022 RS	HK 5024 2RS	BK 5022 RS	58	22	24	2.7	31500	63000	3200	6450

P2

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter KSM web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Drawn cup needle roller bearings sealed type
series HK..RS, HK..2RS & BK..RS



Type BK..RS
(Closed end, single seal)

Limiting speeds grease rpm	Appropriate inner ring (as a reference)		Mass (approx.) kg.		
	single seal	double seals	open end single seal	open end double seals	closed end single seal
10000	IR 9×12×16	-	0.011	0.012	0.012
10000	IR 10×14×16	IR 10×14×20	0.012	0.014	0.014
10000	IR 12×15×16.5	IR 12×15×16.5	0.013	0.014	0.014
10000	IR 12×16×16	IR 12×16×20	0.013	0.015	0.015
9000	IR 15×18×16	IR 15×18×17.5	0.015	0.017	0.017
8000	-	IR 15×20×18	-	0.019	-
8000	IR 17×20×20	IR 17×20×20.5	0.021	0.024	0.024
7500	-	IR 17×22×18	-	0.020	-
7500	IR 17×22×20.5	IR 17×22×23	0.024	0.026	0.027
6500	-	IR 20×25×18D	-	0.027	-
6500	IR 20×25×20	IR 20×25×23	0.031	0.033	0.035
5500	-	IR 22×28×23	-	0.037	-
5500	-	IR 25×30×18D	-	0.027	-
5500	IR 25×30×20	IR 25×30×23	0.037	0.039	0.045
4600	-	-	-	0.036	-
4600	-	-	0.037	0.040	0.047
4000	-	IR 35×40×17	-	0.041	-
4000	IR 35×40×20	-	0.047	0.050	0.062
3600	IR 40×45×20	-	0.054	0.057	0.072
3200	IR 45×50×25	IR 45×50×25.5	0.086	0.089	0.104

KSM® NOTE

One-way clutches

TECHNICAL SUPPLEMENT

T 120

T1

1. Bearing materials

KSM Series HF one-way clutches have an outer ring formed by precision drawing of thin steel plate, and are capable of a clutching function only. In order to carry a radial load and rotate smoothly, a one-way clutch must have bearings on both sides.

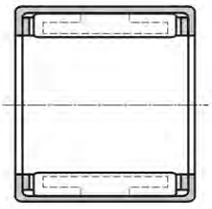


Fig. A Series HF

KSM Engineering.
All of **KSM**'s series HF one-way clutches use a polyamide resin cage that supports a leaf spring. The leaf spring in turn forces the needle rollers to the wedge sectionformed between the outer ring cam way and the shaft.

2. Interpreting clutch numbers

Clutch numbers of **KSM** one-way clutches comprise a series number and dimension code.

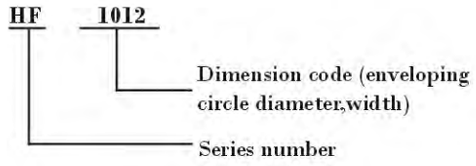


Fig. B

3. Lubrication

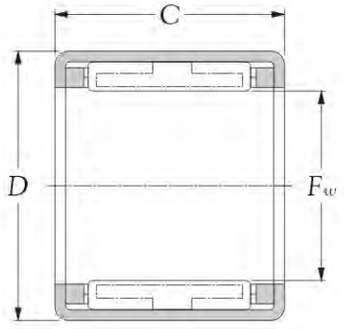
Oil is the best lubrication for **KSM** one-way clutches. However, they are supplied prefilled with adequate grease, as they are often grease-lubricated. Under normal operating conditions, this grease does not need replenish-ment. Note, however, that excessive grease can inhibit reliable clutch operation.

4. Mounting practices

Using a press-fit mandrel is convenient when assembling one-way clutch as illustrated in Fig.A. With series HF besure to press-fit the clutch with its inscription side placed onto the shoulder on the mandrel. With series HFL, it is important to press-fit the clutch by using a special tool that presses the outer ring without pressing the oil retaining bearing. When assembling, be sure not to pry the outer ring or directly hit the outer ring with a hammer. Be sure place the appropriate tool on the face of the outer ring when press-fitting the clutch. When mass-producing clutches with a press, using a mandrel equipped with an O-ring facilitates inserti on of the one-way clutch by keeping it from falling out. Turning the shaft in the direction in which the clutch slips facilitates the assembly. If this can't be done, providing a tapered guide (chamfered) on the shaft end will also facilitate assembly.

Transmission direction (direction of engagement)
The clutch is engaged when the outer ring (housing) is turned relative to the shaft in the direction indicated by the arrow mark.
With the series HF clutch, the mark is on the rib of the outer ring.

One-way clutches
series HF

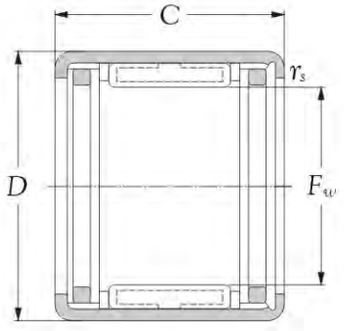


Inner bore F_w mm	Bearing number	Principal dimensions D mm	C mm	Torque capacity N・m Md	kgf・m Md	Part number by radial load needle roller bearing	oil retaining bearing	Mass kg. (approx.)
6	**HF 0612**	10	12	1.76	0.18	HK 0609 T2	B-S 6-22	0.0030
8	**HF 0812**	12	12	3.15	0.32	HK 0810	B-S 8-25	0.0035
10	**HF 1012**	14	12	5.30	0.54	HK 1010	B-S 10-21	0.0040
12	**HF 1216**	18	16	12.20	1.24	HK 1212	B-S 12-32	0.0116
14	**HF 1416**	20	16	17.30	1.76	HK 1412	B-S 14-13	0.0130
16	**HF 1616**	22	16	20.50	2.09	HK 1612	B-S 16-13	0.0140
18	**HF 1816**	24	16	24.10	2.46	HK 1812	B-S 18-8	0.0155
20	**HF 2016**	26	16	28.50	2.91	HK 2012	B-S 20-19	0.0170
25	**HF 2520**	32	20	66.00	6.73	HK 2512	B-S 25-11	0.0309
30	**HF 3020**	37	20	90.00	9.18	HK 3012	B-S 30-19	0.0360
35	**HF 3520**	42	20	121.00	12.30	HK 3512	B-S 35-7	0.0400

Remark: [Precision] - Class 0 (JIS)
[Cage] - Polymid (TV)
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Drawn cup needle clutches
series HFL



Inner bore F_w	Bearing number	Principal dimensions		Basic load ratings		Limiting speeds		Rotation torque
		D	C	dynamic Cr	static Cor	n	nl**	
mm		mm		N		rpm		Nm
4	HFL 0408	8	8	1270	1740	34000	14000	0.34
6	HFL 0615	10	15	1650	2030	23000	13000	1.76
8	HFL 0822	12	22	4050	4150	17000	12000	3.15
10	HFL 1022	14	22	4300	4650	14000	11000	5.30
12	HFL 1226	18	26	6300	6500	11000	8000	12.20
14	HFL 1426	20	26	6300	6500	9500	8000	17.30
16	HFL 1626	22	26	7300	8400	8500	7500	20.50
18	HFL 1826	24	26	8200	10300	7500	7500	24.10
20	HFL 2026	26	26	8300	10400	7000	6500	28.50
25	HFL 2530	32	30	10900	14100	5500	5500	66.00
30	HFL 3030	37	30	12600	17600	4500	4500	90.00
35	HFL 3530	42	30	13000	19300	3900	3900	121.00

Remark: [Precision] - Class 0 (JIS)
[Cage] - Polymid (TV)
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Machined-ring needle roller bearings

TECHNICAL SUPPLEMENT T 124 & T 125

1. Bearing materials

The available **KSM** machined ring needle roller bearings, without an inner ring, include the series NK and RNA (metric series). The dimension series of the series RNA includes the RNA 49, RNA 59, and RNA 69. The bearing series with an inner ring include NKI and NA (metric series) The dimension series of series NA in clude NA 48, NA 49, NA 59, and NA 69. The boundary dimensions (bore diameter, outside diameter, width, and cham fer dimension) for these dimension series are specified in ISO 15. The third and fourth significant numera ls in their bearing numbers represent width number and diameter number, respectively. Particular bearings, whose inscribed enveloping circle diameter is 40 mm or greater, among the RNA 69 (NA 69) bearings have double-row needle rollers, while bearings of other models and dimension series have single-row needle rollers. With bearings whose inscribed enveloping circle diameter (F_w) does not exceed 12 mm, the needle rollers and cage are retained in the outer ring by the side plate: in the case of the inscribed enveloping circle diameter (F_w) exceeding 12 mm, the needle rollers and cage are retained in the outer ring by the rib. The outer rings (other than those of series NK bearings whose inscribed enveloping circle diameter does not exceed 12 mm) have a lubrication hole and oil groove to simplify relubrication of the bearing. The cage used on **KSM** machined ring needle roller bearings is usually a machined or pressed-steel type. However, cages of molded polyamide reinforced with glass fiber or carbon fiber (suffix TV) may be used. The T2 cage features a maximum allowable operating temperature of 120°C and maximum allowable continuous operating temperature of 100°C . Series RNA 49 (NA 49) bearings include a sealed type whose outer ring has a synthetic rubber sea l on one or both ends (suffix RSR, 2RSR). This variant is pre-filled with lithium soap grease and can operate within a temperate range of -25°C to 100°C.

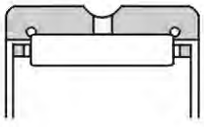


Fig. A Series RNA (NK)

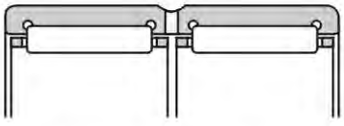


Fig. B Series RNA (double row)

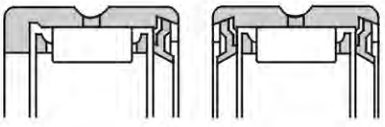


Fig. C Series RNA 49..RSR(2RSR)

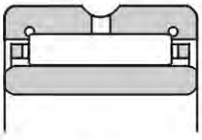


Fig. D Series NA

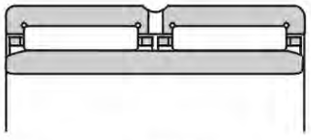


Fig. E Series NA (double row)

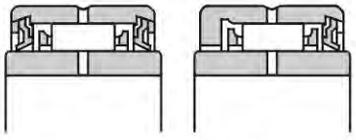


Fig. F Series NA 49..RSR (2RSR)

2. Interpreting bearing numbers

The bearing numbers of **KSM** machined ring needle roller bearings, series RNA and NA, comprise a series number, dimension series code, bore diameter number, and suffix. Bearing numbers of series NK bearings comprise a series number, dimension code (inscribed enveloping circle diameter/width dimension)

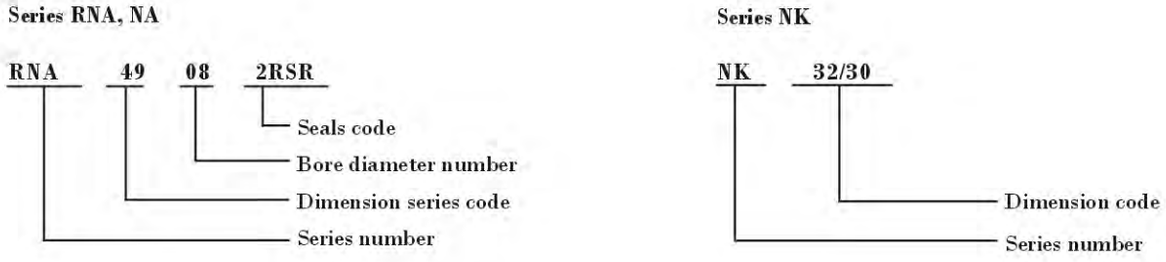


Fig. G

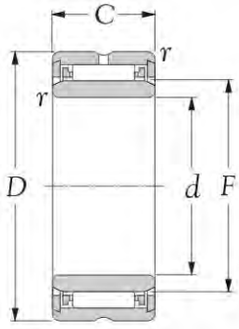
3. Interpreting clearance and bearing fits

The radial clearances of **KSM** machined ring roller bearings with an inner ring are given in "Bearing Internal Clearance". Because the range of non-interchangeable clearance is limited, a bearing delivered adjusted to a non-interchangeable clearance must be mounted as is. The dimensional tolerances (fits) with the shaft and housing bore when installing a bearing with an inner ring vary with the type and magnitude of load, shaft diameter, and housing bore size, and must satisfy the requirements in "Recommended fits". The required form accuracy and surface roughness are specified in "Shaft and housing accuracy". The bearing without an inner ring uses a shaft as a raceway surface. The required tolerances of the shaft diameter (raceway diameter) corresponding with the running clearance are given in Table A below. The dimensional tolerance of the housing bore is K7, which is commonly used. For the form accuracy, roughness, and hardness of the shaft as a raceway surface, refer to Table A "Accuracy of Raceway surface".

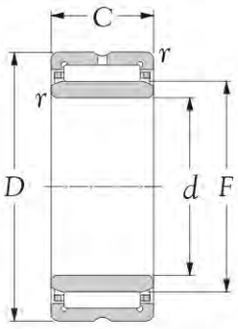
Table A Dimensional tolerances of shaft (raceway diameter)

Enveloping circle dia. *Fw* mm		Tolerance class of shaft		
over	incl.	smaller than normal clearance	normal clearance	greater than normal clearance
-	80	k5	h5	f6
80	160	k5	g5	f6
160	180	k5	g5	e6
180	200	j5	g5	e6
200	250	j5	f6	e6
250	315	h5	f6	e6
315	400	g5	f6	d6

Machined-ring needle roller bearings with inner ring
series NA 49-59-69



Type NA 49 (d≤9 mm)



Type NA 49 (d≥10 mm)
Type NA 59
Type NA 69 (d≤30 mm)

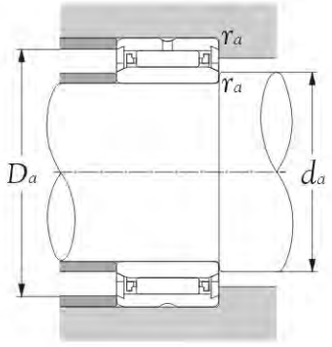
Inner bore d	Bearing number	Principal dimensions					Basic load ratings			
		D	C	r s min[1]	F	s[2]	dynamic Cr	static Cor	dynamic Cr	static Cor
mm		mm					N		kgf	
5	NA 495	13	10	0.15	7	-	2670	2350	272	239
6	NA 496	15	10	0.15	8	-	3150	3000	320	305
7	NA 497	17	10	0.15	9	-	3600	3650	365	375
8	NA 498	19	11	0.15	10	-	4300	3950	435	405
9	NA 499	20	11	0.30	12	-	4850	4900	495	500
10	NA 4900	22	13	0.30	14	0.5	8600	9200	875	935
12	NA 4901	24	13	0.30	16	0.5	9550	10900	975	1110
12	NA 6901	24	22	0.30	16	1.0	15400	20000	1570	2040
15	NA 4902	28	13	0.30	20	0.5	10300	12800	1050	1310
15	NA 5902	28	18	0.30	20	0.5	14100	19100	1440	1950
15	NA 6902	28	23	0.30	20	1.0	17600	25300	1790	2580
17	NA 4903	30	13	0.30	22	0.5	11200	14600	1140	1490
17	NA 5903	30	18	0.30	22	0.5	15200	21700	1550	2210
17	NA 6903	30	23	0.30	22	1.0	18200	27200	1850	2770
20	NA 4904	37	17	0.30	25	0.8	21300	25500	2170	2600
20	NA 5904	37	23	0.30	25	0.8	28400	37000	2900	3750
20	NA 6904	37	30	0.30	25	1.0	36500	50500	3700	5150
22	NA 49/22	39	17	0.30	28	0.8	23200	29300	2360	2990
22	NA 59/22	39	23	0.30	28	0.8	26400	37500	2690	3850
22	NA 69/22	39	30	0.30	28	0.5	40000	58500	4050	6000
25	NA 4905	42	17	0.30	30	0.8	24000	31500	2450	3200
25	NA 5905	42	23	0.30	30	0.8	30500	43000	3150	4350
25	NA 6905	42	30	0.30	30	1.0	41500	63000	4200	6400
28	NA 49/28	45	17	0.30	32	0.8	24800	33500	2530	3400
28	NA 59/28	45	23	0.30	32	0.8	32000	45500	3250	4650
28	NA 69/28	45	30	0.30	32	1.0	43000	67000	4350	6850

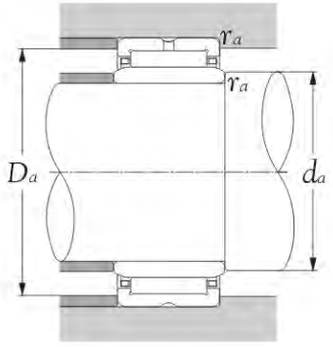
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.
2) These values are the possible axial displacement of the inner ring against outer ring.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

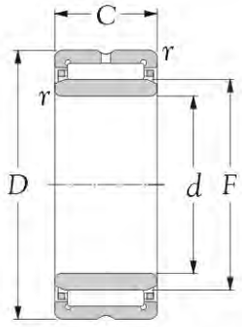
Machined-ring needle roller bearings with inner ring
series NA 49-59-69



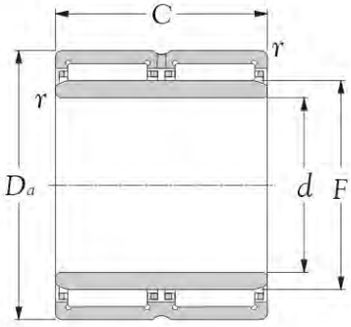


Limiting speeds grease rpm	Limiting speeds oil rpm	Abutment dimensions d_a min	Abutment dimensions D_a max	Abutment dimensions r_{as} max	Mass kg. (approx.)
23000	34000	6.2	8.5	0.15	0.007
21000	32000	8.0	9.5	0.15	0.009
20000	30000	9.0	10.5	0.15	0.010
19000	28000	10.0	12.0	0.15	0.016
17000	26000	11.0	14.0	0.30	0.017
16000	24000	12.0	20.0	0.30	0.024
15000	23000	14.0	22.0	0.30	0.026
15000	23000	14.0	22.0	0.30	0.046
13000	20000	17.0	26.0	0.30	0.036
13000	20000	17.0	26.0	0.30	0.052
13000	20000	17.0	26.0	0.30	0.064
12000	18000	19.0	28.0	0.30	0.056
12000	18000	19.0	28.0	0.30	0.037
12000	18000	19.0	28.0	0.30	0.069
11000	16000	22.0	35.0	0.30	0.074
11000	16000	22.0	35.0	0.30	0.115
11000	16000	22.0	35.0	0.30	0.141
9500	14000	24.0	37.0	0.30	0.080
9500	14000	24.0	37.0	0.30	0.134
9500	14000	24.0	37.0	0.30	0.154
8500	13000	27.0	40.0	0.30	0.088
8500	13000	27.0	40.0	0.30	0.139
8500	13000	27.0	40.0	0.30	0.162
8500	13000	30.0	43.0	0.30	0.098
8500	13000	30.0	43.0	0.30	0.142
8500	13000	30.0	43.0	0.30	0.179

Machined-ring needle roller bearings with inner ring
series NA 49-59-69



Type NA 49 (d≥10 mm)
Type NA 59
Type NA 69 (d≤30 mm)



Type NA 69 ZW (d≥32 mm)

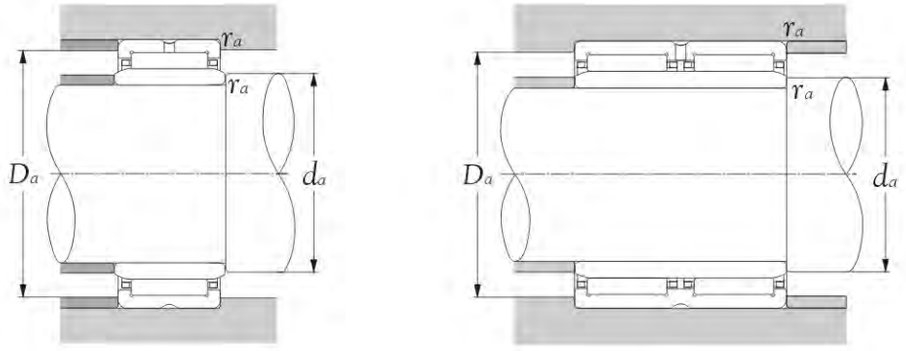
Inner bore d	Bearing number	Principal dimensions					Basic load ratings			
		D	C	r s min 1)	F	s 2)	dynamic Cr	static Cor	dynamic Cr	static Cor
mm		mm					N		kgf	
30	NA 4906	47	17	0.30	35	0.8	25500	35500	2600	3600
30	NA 5906	47	23	0.30	35	0.8	32500	48500	3350	4950
30	NA 6906	47	30	0.30	35	1.0	42500	67500	4300	6900
32	NA 49/32	52	20	0.60	40	0.8	31500	47500	3200	4850
32	NA 59/32	52	27	0.60	40	0.8	38000	61000	3850	6250
32	NA 69/32 ZW	52	36	0.6	40	0.5	47500	82000	4850	4350
35	NA 4907	55	20	0.6	42	0.8	32000	50000	3300	5100
35	NA 5907	55	27	0.6	42	0.8	39000	64500	3950	6550
35	NA 6907 ZW	55	36	0.6	42	0.5	49000	86500	5000	8800
40	NA 4908	62	22	0.6	48	1.0	43500	66500	4450	6800
40	NA 5908	62	30	0.6	48	1.0	53000	92500	5450	9450
40	NA 6908 ZW	62	40	0.6	48	0.5	67000	116000	6850	11800
45	NA 4909	68	22	0.6	52	1.0	46000	73000	4700	7450
45	NA 5909	68	30	0.6	52	1.0	56000	101000	5700	10300
45	NA 6909 ZW	68	40	0.6	52	0.5	70500	127000	7200	13000
50	NA 4910	72	22	0.6	58	1.0	48000	80000	4900	8150
50	NA 5910	72	30	0.6	58	1.0	58000	110000	5950	11200
50	NA 6910 ZW	72	40	0.6	58	0.5	74000	139000	7500	14200
55	NA 4911	80	25	1.0	63	1.5	58500	99500	6000	10100
55	NA 5911	80	34	1.0	63	1.5	76500	140000	7800	14300
55	NA 6911 ZW	80	45	1.0	63	1.5	94000	183000	9600	18600
60	NA 4912	85	25	1.0	68	1.5	61500	108000	6250	11000
60	NA 5912	85	34	1.0	68	1.5	80500	153000	8200	15600
60	NA 6912 ZW	85	45	1.0	68	1.5	95500	191000	9750	19400
65	NA 4913	90	25	1.0	72	1.5	62500	112000	6350	11400
65	NA 5913	90	34	1.0	72	1.5	84000	165000	8600	16800

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.
2) These values are the possible axial displacement of the inner ring against outer ring.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

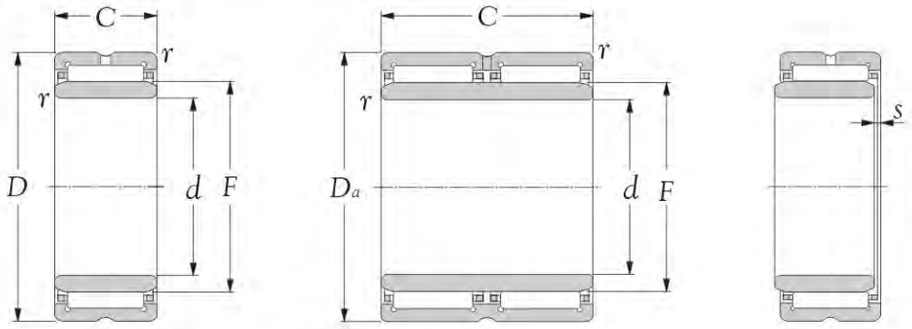
If you require more individual technical information for each of above bearing model, please enter KSM web-site: Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Machined-ring needle roller bearings with inner ring
series NA 49-59-69



Limiting speeds grease rpm	Limiting speeds oil rpm	Abutment dimensions d_a min	Abutment dimensions D_a max	Abutment dimensions r_{as} max	Mass kg. (approx.)
7500	11000	32.0	45.0	0.30	0.101
7500	11000	32.0	45.0	0.30	0.152
7500	11000	32.0	45.0	0.30	0.185
6500	10000	36.0	48.0	0.60	0.157
6500	10000	36.0	48.0	0.60	0.241
6500	10000	36	48	0.6	0.286
6500	9500	39	51	0.6	0.171
6500	9500	39	51	0.6	0.256
6500	9500	39	51	0.6	0.310
5500	8500	44	58	0.6	0.232
5500	8500	44	58	0.6	0.348
5500	8500	44	58	0.6	0.426
5000	7500	49	64	0.6	0.270
5000	7500	49	64	0.6	0.396
5000	7500	49	64	0.6	0.437
4700	7000	54	68	0.6	0.276
4700	7000	54	68	0.6	0.498
4700	7000	54	68	0.6	0.529
4300	6500	60	75	1.0	0.396
4300	6500	60	75	1.0	0.559
4300	6500	60	75	1.0	0.726
4000	6000	65	80	1.0	0.427
4000	6000	65	80	1.0	0.614
4000	6000	65	80	1.0	0.758
3700	5500	70	85	1.0	0.454
3700	5500	70	85	1.0	0.655

Machined-ring needle roller bearings with inner ring
series NA 48-49-59-69



Type NA 48
Type NA 49 (d≥10 mm)
Type NA 59

Type NA 69 ZW (d≥32 mm)

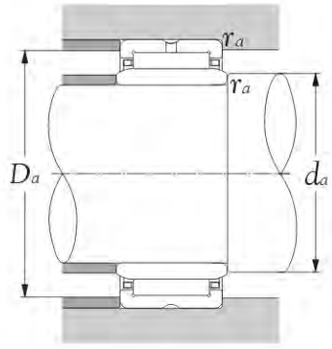
Inner bore d	Bearing number	Principal dimensions					Basic load ratings dynamic Cr	static Cor	dynamic Cr	static Cor
		D	C	r s min 1)	F	s 2)	N		kgf	
mm		mm								
65	NA 6913 ZW	90	45	1.0	72	1.5	97000	198000	9900	20200
70	NA 4914	100	30	1.0	80	1.5	85500	156000	8750	15900
70	NA 5914	100	40	1.0	80	1.5	103000	187000	10500	19100
70	NA 6914 ZW	100	54	1.0	80	1.0	130000	267000	13300	27200
75	NA 4915	105	30	1.0	85	1.5	87000	162000	8900	16500
75	NA 5915	105	40	1.0	85	1.5	109000	205000	11100	20900
75	NA 6915 ZW	105	54	1.0	85	1.0	132000	277000	13500	28300
80	NA 4916	110	30	1.0	90	1.5	90500	174000	9250	17700
80	NA 5916	110	40	1.0	90	1.5	115000	223000	11700	22700
80	NA 6916 ZW	110	54	1.0	90	1.5	137000	298000	14000	30500
85	NA 4917	120	35	1.1	100	1.0	112000	237000	11500	24200
85	NA 5917	120	46	1.1	100	1.5	137000	290000	14000	29600
85	NA 6917 ZW	120	63	1.1	100	1.0	169000	400000	17300	41000
90	NA 4918	125	35	1.1	105	1.0	116000	252000	11900	25700
90	NA 5918	125	46	1.1	105	1.0	143000	310000	14600	32000
90	NA 6918 ZW	125	63	1.1	105	1.0	175000	425000	17900	43500
95	NA 4919	130	35	1.1	110	1.0	118000	260000	12000	26500
95	NA 5919	130	46	1.1	110	1.0	149000	335000	15200	34000
95	NA 6919 ZW	130	63	1.1	110	1.0	177000	440000	18100	45000
100	NA 4920	140	40	1.1	115	2.0	127000	260000	12900	26500
100	NA 5920	140	54	1.1	115	2.0	182000	395000	18600	40500
110	NA 4822	140	30	1.0	120	0.8	93500	210000	9550	21400
110	NA 4922	150	40	1.1	125	2.0	131000	279000	13300	28400
110	NA 5922	150	54	1.1	125	2.0	193000	440000	19700	45000
120	NA 4824	150	30	1.0	130	0.8	99500	233000	10100	23800
120	NA 4924	165	45	1.1	135	2.0	180000	380000	18300	38500

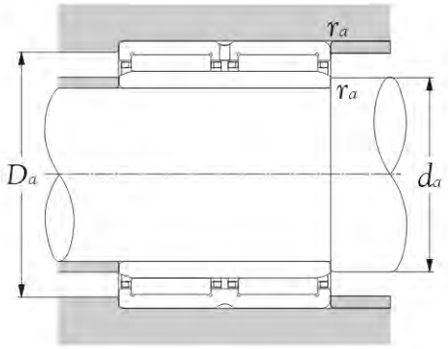
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.
2) These values are the possible axial displacement of the inner ring against outer ring.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site: Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

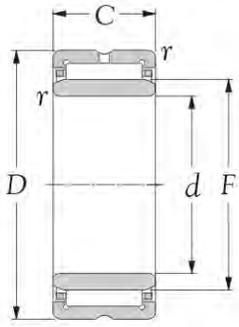
Machined-ring needle roller bearings with inner ring
series NA 48-49-59-69

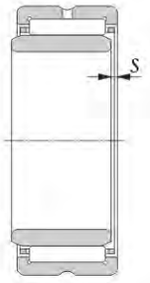




Limiting speeds grease	oil	Abutment dimensions			Mass
rpm		d_a min	D_a max	r_{as} max	kg(s). (approx.)
3700	5500	70.0	85.0	1.0	0.779
3300	5000	75.0	95.0	1.0	0.727
3300	5000	75.0	95.0	1.0	1.060
3300	5000	75.0	95.0	1.0	1.340
3100	4700	80.0	100.0	1.0	0.776
3100	4700	80.0	100.0	1.0	1.130
3100	4700	80.0	100.0	1.0	1.450
2900	4400	85.0	105.0	1.0	0.820
2900	4400	85.0	105.0	1.0	1.150
2900	4400	85.0	105.0	1.0	1.530
2700	4000	91.5	113.5	1.0	1.240
2700	4000	91.5	113.5	1.0	1.760
2700	4000	91.5	113.5	1.0	2.250
2500	3800	96.5	118.5	1.0	1.310
2500	3800	96.5	118.5	1.0	1.840
2500	3800	96.5	118.5	1.0	2.440
2400	3600	101.5	123.5	1.0	1.360
2400	3600	101.5	123.5	1.0	1.980
2400	3600	101.5	123.5	1.0	2.630
2300	3500	106.5	133.5	1.0	1.930
2300	3500	106.5	133.5	1.0	2.850
2200	3300	115.0	135.0	1.0	1.110
2100	3200	116.5	143.5	1.0	2.080
2100	3200	116.5	143.5	1.0	2.980
2100	3100	125.0	145.0	1.0	1.170
2000	3000	126.5	158.5	1.0	2.840

Machined-ring needle roller bearings with inner ring series NA 48-49





Type NA 48

Type NA 49 (d≥10 mm)

Type NA 59

Inner bore d	Bearing number	Principal dimensions					Basic load ratings			
		D	C	r s min 1)	F	s 2)	dynamic Cr	static Cor	dynamic Cr	static Cor
mm		mm					N		kgf	
120	NA 5924	165	60	1.1	135	2.0	245000	525000	25000	53500
130	NA 4826	165	35	1.1	145	1.0	118000	305000	12100	31000
130	NA 4926	180	50	1.5	150	1.5	202000	455000	20600	46500
130	NA 5926	180	67	1.5	150	1.5	294000	685000	30000	70000
140	NA 4828	175	35	1.1	155	1.0	121000	315000	12300	32500
140	NA 4928	190	50	1.5	160	1.5	209000	485000	21300	49500
140	NA 5928	190	67	1.5	160	1.5	310000	755000	31500	77000
150	NA 4830	190	40	1.1	165	1.5	152000	390000	15500	40000
150	NA 4930	210	60	2.0	170	1.5	261000	610000	26600	62500
160	NA 4832	200	40	1.1	175	1.5	160000	425000	16300	43500
160	NA 4932	220	60	2.0	180	1.5	270000	650000	27600	66500
170	NA 4834	215	45	1.1	185	1.5	185000	495000	18800	50500
170	NA 4934	230	60	2.0	190	1.5	279000	690000	28500	70500
180	NA 4836	225	45	1.1	195	1.5	195000	540000	19800	55000
180	NA 4936	250	69	2.0	205	1.5	375000	890000	38500	90500
190	NA 4838	240	50	1.5	210	1.5	227000	680000	23200	69000
190	NA 4938	260	69	2.0	215	1.5	390000	945000	40000	96500
200	NA 4840	250	50	1.5	220	1.5	231000	705000	23600	71500
200	NA 4940	280	80	2.1	225	1.5	505000	1180000	51500	120000
220	NA 4844	270	50	1.5	240	1.5	244000	780000	24900	79500
220	NA 4944	300	80	2.1	245	1.5	525000	1270000	53500	129000
240	NA 4848	300	60	2.0	265	2.0	360000	1080000	37000	110000
240	NA 4948	320	80	2.1	265	2.0	540000	1350000	55000	138000
260	NA 4852	320	60	2.0	285	2.0	375000	1160000	38000	119000
260	NA 4952	360	100	2.1	290	2.0	805000	1900000	82000	193000
280	NA 4856	350	69	2.0	305	2.5	455000	1300000	46500	133000

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

2) These values are the possible axial displacement of the inner ring against outer ring.

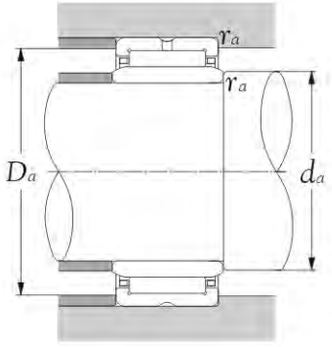
Remark: [Precision] - Class 0 (JIS)

[Cage] - Steel

[Grease] - Nil

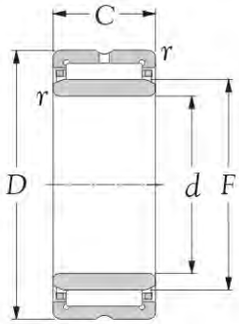
If you require more individual technical information for each of above bearing model, please enter **KSM** web-site: Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

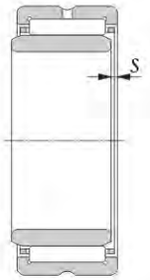
Machined-ring needle roller bearings with inner ring
series NA 48-49-59-69



Limiting speeds grease rpm	Limiting speeds oil rpm	Abutment dimensions d_a min	Abutment dimensions D_a max	Abutment dimensions r_{as} max	Mass kgs. (approx.)
2000	3000	126.5	158.5	1.0	3.92
1900	2800	136.5	158.5	1.0	1.60
1800	2700	138.0	172.0	1.5	3.90
1800	2700	138.0	172.0	1.5	5.60
1700	2600	146.5	168.5	1.0	1.82
1700	2500	148.0	182.0	1.5	4.05
1700	2500	148.0	182.0	1.5	6.18
1600	2400	156.5	183.5	1.0	2.72
1600	2400	159.0	201.0	2.0	5.33
1500	2300	166.5	193.5	1.0	2.90
1500	2200	169.0	211.0	2.0	5.60
1500	2200	176.5	208.5	1.0	3.99
1400	2100	179.0	221.0	2.0	5.87
1400	2100	186.5	218.5	1.0	4.19
1300	2000	189.0	241.0	2.0	8.58
1300	1900	198.0	232.0	1.5	5.62
1300	1900	199.0	251.0	2.0	8.68
1200	1800	208.0	242.0	1.5	5.84
1200	1800	211.0	269.0	2.0	12.20
1100	1700	228.0	262.0	1.5	6.37
1100	1600	231.0	289.0	2.0	13.50
1000	1500	249.0	291.0	2.0	10.00
1000	1500	251.0	309.0	2.0	14.70
950	1400	269.0	311.0	2.0	10.80
950	1400	271.0	349.0	2.0	25.90
850	1300	289.0	341.0	2.0	15.50

Machined-ring needle roller bearings with inner ring
series NA 48-49





Type NA 48

Type NA 49 (d≥10 mm)

Inner bore d	Bearing number	Principal dimensions					Basic load ratings			
		D	C	r s min 1)	F	s 2)	dynamic Cr	static Cor	dynamic Cr	static Cor
mm		mm					N		kgf	
280	NA 4956	380	100	2.1	310	2.5	835000	2030000	85000	207000
300	NA 4860	380	80	2.1	330	2.0	625000	1770000	64000	180000
300	NA 4960	420	118	3.0	340	2.0	1080000	2640000	110000	269000
320	NA 4864	400	80	2.1	350	2.0	640000	1850000	65500	189000
320	NA 4964	440	118	3.0	360	2.0	1120000	2820000	114000	288000
340	NA 4868	420	80	2.1	370	2.0	655000	1940000	66500	197000
340	NA 4968	460	118	3.0	380	2.0	1160000	3000000	118000	305000
360	NA 4872	440	80	2.1	390	2.0	665000	2020000	68000	206000
360	NA 4972	480	118	3.0	400	2.0	1200000	3200000	122000	325000
380	NA 4876	480	100	2.1	415	2.0	1000000	2840000	102000	289000
380	NA 4976	520	140	4.0	430	2.0	1400000	3750000	143000	385000
400	NA 4980	540	140	4.0	450	2.5	1450000	4000000	148000	410000
420	NA 4984	560	140	4.0	470	2.5	1500000	4250000	153000	430000
440	NA 4988	600	160	4.0	490	2.5	1750000	4600000	179000	470000

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

2) These values are the possible axial displacement of the inner ring against outer ring.

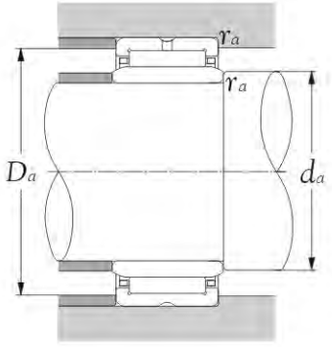
Remark: [Precision] - Class 0 (JIS)

[Cage] - Steel

[Grease] - Nil

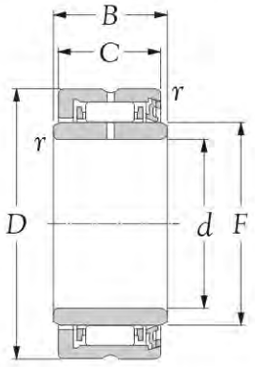
If you require more individual technical information for each of above bearing model, please enter **KSM** web-site: Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Machined-ring needle roller bearings with inner ring
series NA 48-49-59-69

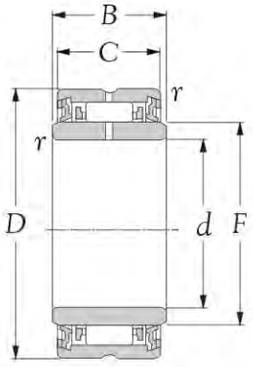


Limiting speeds grease rpm	Limiting speeds oil rpm	Abutment dimensions d_a min	Abutment dimensions D_a max	Abutment dimensions r_{as} max	Mass kgs. (approx.)
850	1300	291	369	2.0	27.50
800	1200	311	369	2.0	22.00
800	1200	313	407	2.5	42.50
750	1100	331	389	2.0	23.20
750	1100	333	427	2.5	45.20
750	1100	351	409	2.0	24.10
750	1100	353	447	2.5	47.30
650	1000	371	429	2.0	25.70
650	1000	373	467	2.5	49.00
650	950	391	469	2.0	44.50
650	950	396	504	3.0	73.60
600	900	416	524	3.0	76.60
550	850	436	544	3.0	89.80
550	800	456	584	3.0	123.00

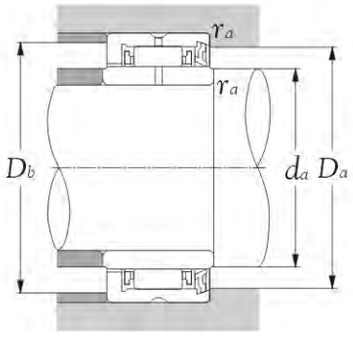
Machined-ring needle roller bearings with inner ring sealed type
series NA 49..RSR & 2RSR



Type NA 49..RSR
(With single seal)



Type NA 49..2RSR
(With double seals)



Inner bore d	Bearing number		Principal dimensions					Basic load ratings				Limiting speeds	Abutment dimensions				Mass
								dynamic	static	dynamic	static						
			D	B	C	F	rs min[1]	Cr	Cor	Cr	Cor		da	Da	Db	ra	kg.
mm			mm					N		kgf		rpm	max	max	max	max	(approx.)
10	NA 4900 RSR	NA 4900 2RSR	22	14	13	14	0.3	7200	8500	735	865	10000	12	16	20	0.3	0.025
12	NA 4901 RSR	NA 4901 2RSR	24	14	13	16	0.3	7750	9700	795	990	10000	14	18	22	0.3	0.028
15	NA 4902 RSR	NA 4902 2RSR	28	14	13	20	0.3	8300	11200	845	1150	10000	17	22	26	0.3	0.036
17	NA 4903 RSR	NA 4903 2RSR	30	14	13	22	0.3	8500	11900	865	1220	9000	19	24	28	0.3	0.039
20	NA 4904 RSR	NA 4904 2RSR	37	18	17	25	0.3	15200	19900	1550	2030	8000	22	28	35	0.3	0.080
25	NA 4905 RSR	NA 4905 2RSR	42	18	17	30	0.3	16000	22600	1640	2300	6500	27	33	40	0.3	0.093
30	NA 4906 RSR	NA 4906 2RSR	47	18	17	35	0.3	18000	27400	1830	2800	5500	32	38	45	0.3	0.107
35	NA 4907 RSR	NA 4907 2RSR	55	21	20	42	0.6	22700	39500	2320	4000	4800	39	45	51	0.6	0.175
40	NA 4908 RSR	NA 4908 2RSR	62	23	22	48	0.6	27800	53500	2830	5450	4200	44	51	58	0.6	0.252
45	NA 4909 RSR	NA 4909 2RSR	68	23	22	52	0.6	28600	57000	2920	5800	3800	49	55	64	0.6	0.290
50	NA 4910 RSR	NA 4910 2RSR	72	23	22	58	0.6	30500	64000	3100	6500	3400	54	61	68	0.6	0.295

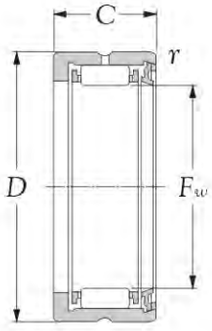
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

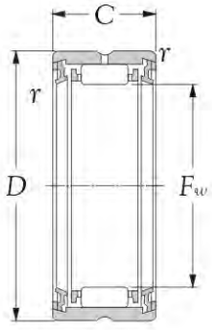
If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

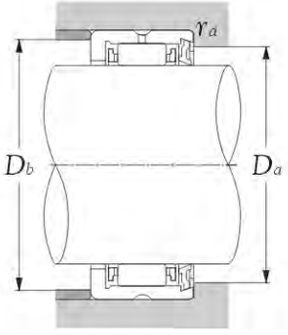
Machined-ring needle roller bearings with inner ring sealed type
series RNA 49..RSR & 2RSR



Type RNA 49..RSR
(With single seal)



Type RNA 49..2RSR
(With double seals)



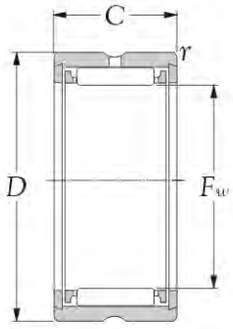
Inner bore F_w mm	Bearing number		Principal dimensions D	C	r_s min[1]	Basic load ratings dynamic C_r	static C_{or}	dynamic C_r	static C_{or}	Limiting speeds	Abutment dimensions D_a max.	D_b max.	r_{as} max.	Mass kg.
			mm			N		kgf		rpm				(approx.)
14 $^{+0.027}_{+0.016}$	RNA 4900 RSR	RNA 4900 2RSR	22	13	0.3	7200	8500	735	865	10000	16	20	0.3	0.016
16 $^{+0.027}_{+0.016}$	RNA 4901 RSR	RNA 4901 2RSR	24	13	0.3	7750	9700	795	990	10000	18	22	0.3	0.018
20 $^{+0.033}_{+0.020}$	RNA 4902 RSR	RNA 4902 2RSR	28	13	0.3	8300	11200	845	1150	10000	22	26	0.3	0.022
22 $^{+0.033}_{+0.020}$	RNA 4903 RSR	RNA 4903 2RSR	30	13	0.3	8500	11900	865	1220	9000	24	28	0.3	0.022
25 $^{+0.033}_{+0.020}$	RNA 4904 RSR	RNA 4904 2RSR	37	17	0.3	15200	19900	1550	2030	8000	28	35	0.3	0.055
30 $^{+0.033}_{+0.020}$	RNA 4905 RSR	RNA 4905 2RSR	42	17	0.3	16000	22600	1640	2300	6500	33	40	0.3	0.063
35 $^{+0.041}_{+0.025}$	RNA 4906 RSR	RNA 4906 2RSR	47	17	0.3	18000	27400	1830	2800	5500	38	45	0.3	0.072
42 $^{+0.041}_{+0.025}$	RNA 4907 RSR	RNA 4907 2RSR	55	20	0.6	22700	39500	2320	4000	4800	45	51	0.6	0.113
48 $^{+0.041}_{+0.025}$	RNA 4908 RSR	RNA 4908 2RSR	62	22	0.6	27800	53500	2830	5450	4200	51	58	0.6	0.154
52 $^{+0.049}_{+0.030}$	RNA 4909 RSR	RNA 4909 2RSR	68	22	0.6	28600	57000	2920	5800	3800	55	64	0.6	0.157
58 $^{+0.049}_{+0.030}$	RNA 4910 RSR	RNA 4910 2RSR	72	22	0.6	30500	64000	3100	6500	3400	61	68	0.6	0.160

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

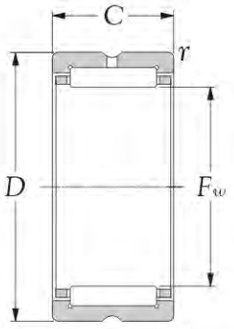
Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Machined-ring needle roller bearings without inner ring
series RNA 49-59-69



Type RNA 49 (Fw≤12 mm)



Type RNA 49 (Fw≥14 mm)
Type RNA 59
Type RNA 69 (Fw≤35 mm)

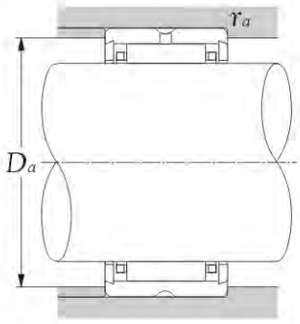
Inner bore F_w	Bearing number	Principal dimensions			Basic load ratings			
		D	C	r_s min[1]	dynamic C_r	static C_{or}	dynamic C_r	static C_{or}
mm		mm			N		kgf	
7 $^{+0.022}_{+0.013}$	RNA 495	13	10	0.15	2670	2350	272	239
8 $^{+0.022}_{+0.013}$	RNA 496	15	10	0.15	3150	3000	320	305
9 $^{+0.022}_{+0.013}$	RNA 497	17	10	0.15	3600	3650	365	375
10 $^{+0.022}_{+0.013}$	RNA 498	19	11	0.15	4300	3950	435	405
12 $^{+0.027}_{+0.016}$	RNA 499	20	11	0.30	4850	4900	495	500
14 $^{+0.027}_{+0.016}$	RNA 4900	22	13	0.30	8600	9200	875	935
16 $^{+0.027}_{+0.016}$	RNA 4901	24	13	0.30	9550	10900	975	1110
16 $^{+0.027}_{+0.016}$	RNA 6901	24	22	0.30	15400	20000	1570	2040
20 $^{+0.033}_{+0.020}$	RNA 4902	28	13	0.30	10300	12800	1050	1310
20 $^{+0.033}_{+0.020}$	RNA 5902	28	18	0.30	14100	19100	1440	1950
20 $^{+0.033}_{+0.020}$	RNA 6902	28	23	0.30	17600	25300	1790	2580
22 $^{+0.033}_{+0.020}$	RNA 4903	30	13	0.30	11200	14600	1140	1490
22 $^{+0.033}_{+0.020}$	RNA 5903	30	18	0.30	15200	21700	1550	2210
22 $^{+0.033}_{+0.020}$	RNA 6903	30	23	0.30	18200	27200	1850	2770
25 $^{+0.033}_{+0.020}$	RNA 4904	37	17	0.30	21300	25500	2170	2600
25 $^{+0.033}_{+0.020}$	RNA 5904	37	23	0.30	28400	37000	2900	3750
25 $^{+0.033}_{+0.020}$	RNA 6904	37	30	0.30	36500	50500	3700	5150
28 $^{+0.033}_{+0.020}$	RNA 49/22	39	17	0.30	23200	29300	2360	2990
28 $^{+0.033}_{+0.020}$	RNA 59/22	39	23	0.30	26400	37500	2690	3850
28 $^{+0.033}_{+0.020}$	RNA 69/22	39	30	0.30	40000	58500	4050	6000
30 $^{+0.033}_{+0.020}$	RNA 4905	42	17	0.30	24000	31500	2450	3200
30 $^{+0.033}_{+0.020}$	RNA 5905	42	23	0.30	30500	43000	3150	4350
30 $^{+0.033}_{+0.020}$	RNA 6905	42	30	0.30	41500	63000	4200	6400
32 $^{+0.041}_{+0.025}$	RNA 49/28	45	17	0.30	24800	33500	2530	3400
32 $^{+0.041}_{+0.025}$	RNA 59/28	45	23	0.30	32000	45500	3250	4650
32 $^{+0.041}_{+0.025}$	RNA 69/28	45	30	0.30	43000	67000	4350	6850

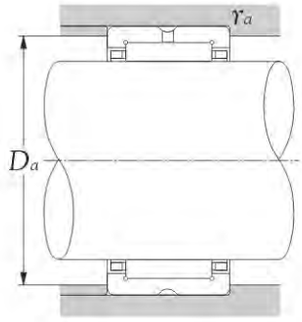
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

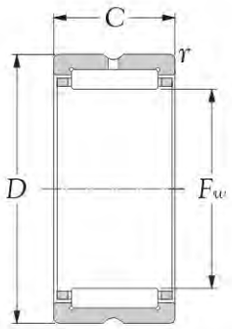
Machined-ring needle roller bearings without inner ring
series RNA 49-59-69



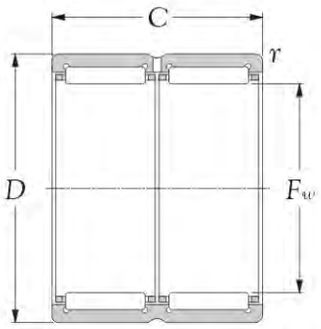


Limiting speeds grease rpm	oil rpm	Abutment dimensions D_a max	r_{as} max	Mass kg. (approx.)
23000	34000	8.5	0.15	0.0055
21000	32000	9.5	0.15	0.0073
20000	30000	10.5	0.15	0.0095
19000	28000	12.0	0.15	0.0130
17000	26000	14.0	0.30	0.0130
16000	24000	20.0	0.30	0.0170
15000	23000	22.0	0.30	0.0170
15000	23000	22.0	0.30	0.0310
13000	20000	26.0	0.30	0.0220
13000	20000	26.0	0.30	0.0330
13000	20000	26.0	0.30	0.0400
12000	18000	28.0	0.30	0.0220
12000	18000	28.0	0.30	0.0350
12000	18000	28.0	0.30	0.0420
11000	16000	35.0	0.30	0.0520
11000	16000	35.0	0.30	0.0840
11000	16000	35.0	0.30	0.1000
9500	14000	37.0	0.30	0.0500
9500	14000	37.0	0.30	0.0920
9500	14000	37.0	0.30	0.1000
8500	13000	40.0	0.30	0.0610
8500	13000	40.0	0.30	0.1010
8500	13000	40.0	0.30	0.1120
8500	13000	43.0	0.30	0.0730
8500	13000	43.0	0.30	0.1080
8500	13000	43.0	0.30	0.1350

Machined-ring needle roller bearings without inner ring
series RNA 49-59-69



Type RNA 49 (Fw≥14 mm)
Type RNA 59



Type RNA 69 ZW (Fw≥40 mm)

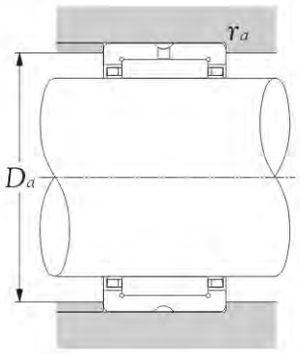
Inner bore F_w	Bearing number	Principal dimensions			Basic load ratings			
		D	C	r_s min[1]	dynamic C_r	static C_{or}	dynamic C_r	static C_{or}
mm		mm			N		kgf	
35 $^{+0.041}_{+0.025}$	RNA 4906	47	17	0.3	25500	35500	2600	3600
35 $^{+0.041}_{+0.025}$	RNA 5906	47	23	0.3	32500	48500	3350	4950
35 $^{+0.041}_{+0.025}$	RNA 6906	47	30	0.3	42500	67500	4300	6900
40 $^{+0.041}_{+0.025}$	RNA 49/32	52	20	0.6	31500	47500	3200	4850
40 $^{+0.041}_{+0.025}$	RNA 59/32	52	27	0.6	38000	61000	3850	6250
40 $^{+0.041}_{+0.025}$	RNA 69/32 ZW	52	36	0.6	47500	82000	4850	8350
42 $^{+0.041}_{+0.025}$	RNA 4907	55	20	0.6	32000	50000	3300	5100
42 $^{+0.041}_{+0.025}$	RNA 5907	55	27	0.6	39000	64500	3950	6550
42 $^{+0.041}_{+0.025}$	RNA 6907 ZW	55	36	0.6	49000	86500	5000	8800
48 $^{+0.041}_{+0.025}$	RNA 4908	62	22	0.6	43500	66500	4450	6800
48 $^{+0.041}_{+0.025}$	RNA 5908	62	30	0.6	53000	92500	5450	9450
48 $^{+0.041}_{+0.025}$	RNA 6908 ZW	62	40	0.6	67000	116000	6850	11800
52 $^{+0.049}_{+0.030}$	RNA 4909	68	22	0.6	46000	73000	4700	7450
52 $^{+0.049}_{+0.030}$	RNA 5909	68	30	0.6	56000	101000	5700	10300
52 $^{+0.049}_{+0.030}$	RNA 6909	68	40	0.6	70500	127000	7200	13000
58 $^{+0.049}_{+0.030}$	RNA 4910	72	22	0.6	48000	80000	4900	8150
58 $^{+0.049}_{+0.030}$	RNA 5910	72	30	0.6	58000	110000	5950	11200
58 $^{+0.049}_{+0.030}$	RNA 6910 ZW	72	40	0.6	74000	139000	7500	14200
63 $^{+0.049}_{+0.030}$	RNA 4911	80	25	1.0	58500	99500	6000	10100
63 $^{+0.049}_{+0.030}$	RNA 5911	80	34	1.0	76500	140000	7800	14300
63 $^{+0.049}_{+0.030}$	RNA 6911 ZW	80	45	1.0	94000	183000	9600	18600
68 $^{+0.049}_{+0.030}$	RNA 4912	85	25	1.0	61500	108000	6250	11000
68 $^{+0.049}_{+0.030}$	RNA 5912	85	34	1.0	80500	153000	8200	15600
68 $^{+0.049}_{+0.030}$	RNA 6912 ZW	85	45	1.0	95500	191000	9750	19400
72 $^{+0.049}_{+0.030}$	RNA 4913	90	25	1.0	62500	112000	6350	11400
72 $^{+0.049}_{+0.030}$	RNA 5913	90	34	1.0	84000	165000	8600	16800

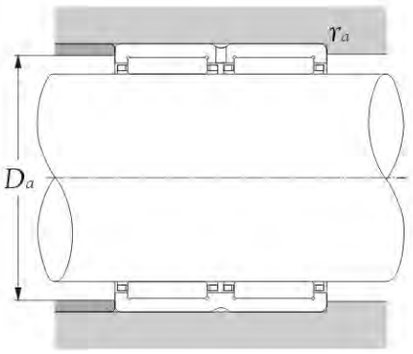
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

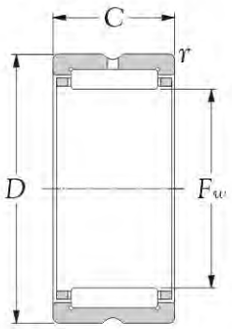
Machined-ring needle roller bearings without inner ring
series RNA 49-59-69



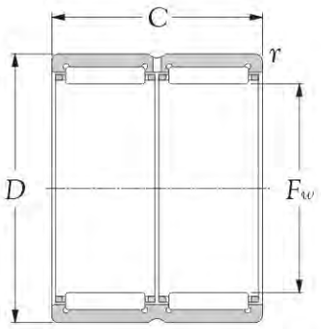


Limiting speeds grease rpm	Limiting speeds oil rpm	Abutment dimensions D_a max	Abutment dimensions r_{as} max	Mass kg. (approx.)
7500	11000	45	0.3	0.069
7500	11000	45	0.3	0.108
7500	11000	45	0.3	0.126
6500	10000	48	0.6	0.089
6500	10000	48	0.6	0.149
6500	10000	48	0.6	0.162
6500	9500	51	0.6	0.107
6500	9500	51	0.6	0.176
6500	9500	51	0.6	0.193
5500	8500	58	0.6	0.140
5500	8500	58	0.6	0.225
5500	8500	58	0.6	0.256
5000	7500	64	0.6	0.182
5000	7500	64	0.6	0.232
5000	7500	64	0.6	0.273
4700	7000	68	0.6	0.163
4700	7000	68	0.6	0.289
4700	7000	68	0.6	0.320
4300	6500	75	1.0	0.255
4300	6500	75	1.0	0.367
4300	6500	75	1.0	0.470
4000	6000	80	1.0	0.275
4000	6000	80	1.0	0.408
4000	6000	80	1.0	0.488
3700	5500	85	1.0	0.312
3700	5500	85	1.0	0.462

Machined-ring needle roller bearings without inner ring
series RNA 48-49-59-69



Type RNA 48
Type RNA 49 (Fw≥14 mm)
Type RNA 59



Type RNA 69 ZW (Fw≥40 mm)

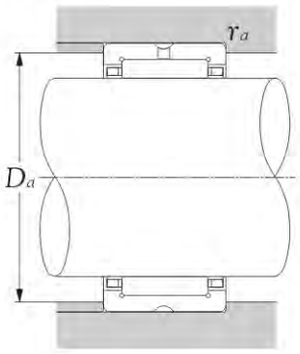
Inner bore F_w	Bearing number	Principal dimensions			Basic load ratings			
		D	C	r_s min[1]	dynamic C_r	static C_{or}	dynamic C_r	static C_{or}
		mm			N		kgf	
$72^{+0.049}_{+0.030}$	RNA 6913 ZW	90	45	1.0	97000	198000	9900	20200
$80^{+0.049}_{+0.030}$	RNA 4914	100	30	1.0	85500	156000	8750	15900
$80^{+0.049}_{+0.030}$	RNA 5914	100	40	1.0	103000	187000	10500	19100
$80^{+0.049}_{+0.030}$	RNA 6914 ZW	100	54	1.0	130000	267000	13300	27200
$85^{+0.058}_{+0.036}$	RNA 4915	105	30	1.0	87000	162000	8900	16500
$85^{+0.058}_{+0.036}$	RNA 5915	105	40	1.0	109000	205000	11100	20900
$85^{+0.058}_{+0.036}$	RNA 6915 ZW	105	54	1.0	132000	277000	13500	28300
$90^{+0.058}_{+0.036}$	RNA 4916	110	30	1.0	90500	174000	9250	17700
$90^{+0.058}_{+0.036}$	RNA 5916	110	40	1.0	115000	223000	11700	22700
$90^{+0.058}_{+0.036}$	RNA 6916 ZW	110	54	1.0	137000	298000	14000	30500
$100^{+0.058}_{+0.036}$	RNA 4917	120	35	1.1	112000	237000	11500	24200
$100^{+0.058}_{+0.036}$	RNA 5917	120	46	1.1	137000	290000	14000	29600
$100^{+0.058}_{+0.036}$	RNA 6917 ZW	120	63	1.1	169000	400000	17300	41000
$105^{+0.058}_{+0.036}$	RNA 4918	125	35	1.1	116000	252000	11900	25700
$105^{+0.058}_{+0.036}$	RNA 5918	125	46	1.1	143000	310000	14600	32000
$105^{+0.058}_{+0.036}$	RNA 6918 ZW	125	63	1.1	175000	425000	17900	43500
$110^{+0.058}_{+0.036}$	RNA 4919	130	35	1.1	118000	260000	12000	26500
$110^{+0.058}_{+0.036}$	RNA 5919	130	46	1.1	149000	335000	15200	34000
$110^{+0.058}_{+0.036}$	RNA 6919 ZW	130	63	1.1	177000	440000	18100	45000
$115^{+0.058}_{+0.036}$	RNA 4920	140	40	1.1	127000	260000	12900	26500
$115^{+0.058}_{+0.036}$	RNA 5920	140	54	1.1	182000	395000	18600	40500
$120^{+0.058}_{+0.036}$	RNA 4822	140	30	1.0	93500	210000	9550	21400
$125^{+0.068}_{+0.043}$	RNA 4922	150	40	1.1	131000	279000	13300	28400
$125^{+0.068}_{+0.043}$	RNA 5922	150	54	1.1	193000	440000	19700	45000
$130^{+0.068}_{+0.043}$	RNA 4824	150	30	1.0	99500	233000	10100	23800
$135^{+0.068}_{+0.043}$	RNA 4924	165	45	1.1	180000	380000	18300	38500

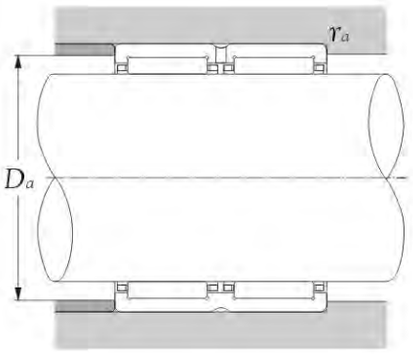
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

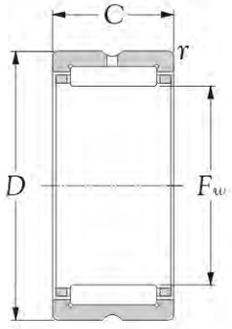
Machined-ring needle roller bearings without inner ring
series RNA 49-59-69





Limiting speeds grease rpm	oil rpm	Abutment dimensions D_a max	r_{as} max	Mass kg(s). (approx.)
3700	5500	85.0	1	0.520
3300	5000	95.0	1	0.460
3300	5000	95.0	1	0.706
3300	5000	95.0	1	0.857
3100	4700	100.0	1	0.489
3100	4700	100.0	1	0.745
3100	4700	100.0	1	0.935
2900	4400	105.0	1	0.516
2900	4400	105.0	1	0.787
2900	4400	105.0	1	0.987
2700	4000	113.5	1	0.657
2700	4000	113.5	1	1.000
2700	4000	113.5	1	1.200
2500	3800	118.5	1	0.697
2500	3800	118.5	1	1.040
2500	3800	118.5	1	1.330
2400	3600	123.5	1	0.719
2400	3600	123.5	1	1.130
2400	3600	123.5	1	1.460
2300	3500	133.5	1	1.150
2300	3500	133.5	1	1.760
2200	3300	135.0	1	0.670
2100	3200	143.5	1	1.240
2100	3200	143.5	1	1.890
2100	3100	145.0	1	0.730
2000	3000	158.5	1	1.860

Machined-ring needle roller bearings without inner ring
series RNA 48-49-59



Type RNA 48
Type RNA 49 (Fw≥14 mm)
Type RNA 59

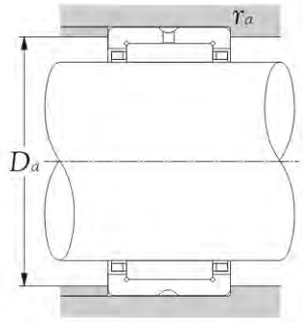
Inner bore F_w	Bearing number	Principal dimensions			Basic load ratings			
		D	C	r_s min[1]	dynamic C_r	static C_{or}	dynamic C_r	static C_{or}
		mm			N		kgf	
$135^{+0.068}_{+0.043}$	RNA 5924	165	60	1.1	245000	525000	25000	53500
$145^{+0.068}_{+0.043}$	RNA 4826	165	35	1.1	118000	305000	12100	31000
$150^{+0.068}_{+0.043}$	RNA 4926	180	50	1.5	202000	455000	20600	46500
$150^{+0.068}_{+0.043}$	RNA 5926	180	67	1.5	294000	685000	30000	70000
$155^{+0.068}_{+0.043}$	RNA 4828	175	35	1.1	121000	315000	12300	32500
$160^{+0.068}_{+0.043}$	RNA 4928	190	50	1.5	209000	485000	21300	49500
$160^{+0.068}_{+0.043}$	RNA 5928	190	67	1.5	310000	755000	31500	77000
$165^{+0.068}_{+0.043}$	RNA 4830	190	40	1.1	152000	390000	15500	40000
$170^{+0.068}_{+0.043}$	RNA 4930	210	60	2.0	261000	610000	26600	62500
$175^{+0.068}_{+0.043}$	RNA 4832	200	40	1.1	160000	425000	16300	43500
$180^{+0.068}_{+0.043}$	RNA 4932	220	60	2.0	270000	650000	27600	66500
$185^{+0.079}_{+0.050}$	RNA 4834	215	45	1.1	185000	495000	18800	50500
$190^{+0.079}_{+0.050}$	RNA 4934	230	60	2.0	279000	690000	28500	70500
$195^{+0.079}_{+0.050}$	RNA 4836	225	45	1.1	195000	540000	19800	55000
$205^{+0.079}_{+0.050}$	RNA 4936	250	69	2.0	375000	890000	38500	90500
$210^{+0.079}_{+0.050}$	RNA 4838	240	50	1.5	227000	680000	23200	69000
$215^{+0.079}_{+0.050}$	RNA 4938	260	69	2.0	390000	945000	40000	96500
$220^{+0.079}_{+0.050}$	RNA 4840	250	50	1.5	231000	705000	23600	71500
$225^{+0.079}_{+0.050}$	RNA 4940	280	80	2.1	505000	1180000	51500	120000
$240^{+0.079}_{+0.050}$	RNA 4844	270	50	1.5	242000	770000	24700	78500
$245^{+0.079}_{+0.050}$	RNA 4944	300	80	2.1	525000	1270000	53500	129000
$265^{+0.088}_{+0.056}$	RNA 4848	300	60	2.0	360000	1080000	37000	110000
$265^{+0.088}_{+0.056}$	RNA 4948	320	80	2.1	540000	1350000	55000	138000
$285^{+0.088}_{+0.056}$	RNA 4852	320	60	2.0	375000	1160000	38000	119000
$290^{+0.088}_{+0.056}$	RNA 4952	360	100	2.1	805000	1900000	82000	193000
$305^{+0.088}_{+0.056}$	RNA 4856	350	69	2.0	455000	1300000	46500	133000

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

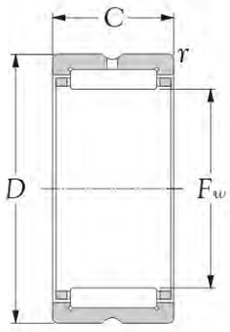
If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Machined-ring needle roller bearings without inner ring
series RNA 48-49-59



Limiting speeds grease rpm	oil rpm	Abutment dimensions D_a max	r_{as} max	Mass kg(s). (approx.)
2000	3000	158.5	1.0	2.67
1900	2800	158.5	1.0	0.95
1800	2700	172.0	1.5	2.21
1800	2700	172.0	1.5	3.21
1700	2600	168.5	1.0	1.02
1700	2500	182.0	1.5	2.35
1700	2500	182.0	1.5	3.48
1600	2400	183.5	1.0	1.60
1600	2400	201.0	2.0	2.98
1500	2300	193.5	1.0	1.70
1500	2200	211.0	2.0	3.10
1500	2200	208.5	1.0	2.54
1400	2100	221.0	2.0	3.22
1400	2100	218.5	1.0	2.68
1300	2000	241.0	2.0	4.48
1300	1900	232.0	1.5	3.21
1300	1900	251.0	2.0	4.53
1200	1800	242.0	1.5	3.35
1200	1800	269.0	2.0	7.20
1100	1700	262.0	1.5	3.62
1100	1600	289.0	2.0	7.81
1000	1500	291.0	2.0	5.40
1000	1500	309.0	2.0	8.40
950	1400	311.0	2.0	5.80
950	1400	349.0	2.0	15.90
850	1300	341.0	2.0	9.30

Machined-ring needle roller bearings without inner ring
series RNA 48-49



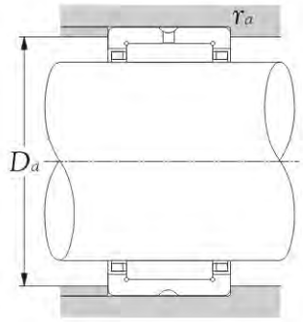
Type RNA 48
Type RNA 49 (Fw≥14 mm)

Inner bore F_w	Bearing number	Principal dimensions			Basic load ratings			
		D	C	r_s min[1]	dynamic C_r	static C_{or}	dynamic C_r	static C_{or}
		mm			N		kgf	
$310^{+0.088}_{+0.056}$	**RNA 4956**	380	100	2.1	835000	2030000	85000	207000
$330^{+0.098}_{+0.062}$	**RNA 4860**	380	80	2.1	625000	1770000	64000	180000
$340^{+0.098}_{+0.062}$	**RNA 4960**	420	118	3.0	1080000	2640000	110000	269000
$350^{+0.098}_{+0.062}$	**RNA 4864**	400	80	2.1	640000	1850000	655000	189000
$360^{+0.098}_{+0.062}$	**RNA 4964**	440	118	3.0	1120000	2820000	114000	288000
$370^{+0.098}_{+0.062}$	**RNA 4868**	420	80	2.1	665000	1940000	66500	197000
$380^{+0.098}_{+0.062}$	**RNA 4968**	460	118	3.0	1160000	3000000	118000	305000
$390^{+0.098}_{+0.062}$	**RNA 4872**	440	80	2.1	665000	2020000	68000	206000
$400^{+0.108}_{+0.068}$	**RNA 4972**	480	118	3.0	1200000	3200000	122000	325000
$415^{+0.108}_{+0.068}$	**RNA 4876**	480	100	2.1	1000000	2840000	102000	289000
$430^{+0.108}_{+0.068}$	**RNA 4976**	520	140	4.0	1400000	3750000	143000	385000
$450^{+0.108}_{+0.068}$	**RNA 4980**	540	140	4.0	1450000	4000000	148000	410000
$470^{+0.108}_{+0.068}$	**RNA 4984**	560	140	4.0	1500000	4250000	153000	430000
$490^{+0.108}_{+0.068}$	**RNA 4988**	600	160	4.0	1750000	4600000	179000	470000

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.
Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

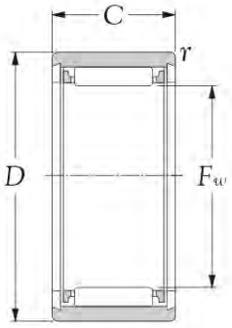
Machined-ring needle roller bearings without inner ring
series RNA 48-49



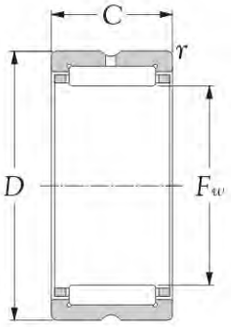
Limiting speeds grease rpm	oil	Abutment dimensions D_a max	r_{as} max	Mass kg(s). (approx.)
850	1300	369	2.0	16.70
800	1200	369	2.0	12.70
800	1200	407	2.5	24.00
750	1100	389	2.0	13.40
750	1100	427	2.5	25.20
750	1100	409	2.0	14.00
750	1100	447	2.5	26.50
650	1000	429	2.0	14.80
650	1000	467	2.5	28.20
650	950	469	3.0	26.00
650	950	504	3.0	38.60
600	900	524	3.0	40.10
550	850	544	3.0	51.60
550	800	584	3.0	66.90

KSM®

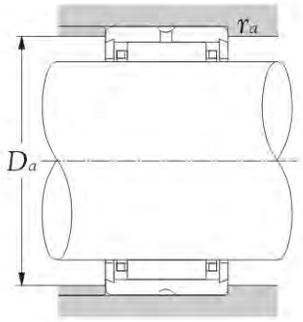
Machined-ring needle roller bearings without inner ring
series NK

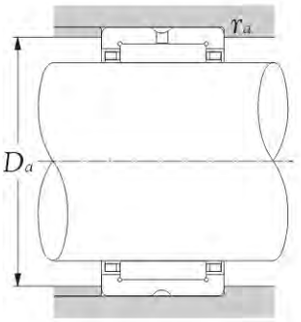


Type NK (Fw≤12 mm)



Type NK (Fw≥14 mm)





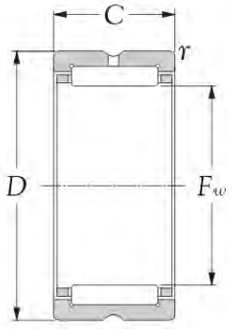
Inner bore F_w mm	Bearing number	Principal dimensions D	C	rs min[1] (mm)	Basic load ratings dynamic C_r (N)	static C_{or} (N)	dynamic C_r (kgf)	static C_{or} (kgf)	Limiting speeds grease (rpm)	oil (rpm)	Abutment dimensions D_a max (mm)	D_b max (mm)	Mass kg. (approx.)
5 $^{+0.018}_{+0.010}$	NK 5/10 TV	10	10	0.15	2640	2190	269	224	27000	40000	6.5	0.15	0.0031
5 $^{+0.018}_{+0.010}$	NK 5/12 TV	10	12	0.15	2720	2250	277	230	27000	40000	6.5	0.15	0.0037
6 $^{+0.018}_{+0.010}$	NK 6/10 TV	12	10	0.15	2660	2280	272	233	25000	37000	7.5	0.15	0.0047
6 $^{+0.018}_{+0.010}$	NK 6/12 TV	12	12	0.15	3400	3150	345	320	25000	37000	7.5	0.15	0.0057
7 $^{+0.022}_{+0.013}$	NK 7/10 TV	14	10	0.30	2670	2350	272	239	23000	34000	8.5	0.30	0.0069
7 $^{+0.022}_{+0.013}$	NK 7/12 TV	14	12	0.30	3400	3200	345	330	23000	34000	8.5	0.30	0.0082
8 $^{+0.022}_{+0.013}$	NK 8/12 TV	15	12	0.30	4000	4100	410	420	21000	32000	9.5	0.30	0.0087
8 $^{+0.022}_{+0.013}$	NK 8/16 TV	15	16	0.30	4850	5200	495	535	21000	32000	9.5	0.30	0.0120
9 $^{+0.022}_{+0.013}$	NK 9/12 TV	16	12	0.30	4550	5000	465	510	20000	30000	10.5	0.30	0.0100
9 $^{+0.022}_{+0.013}$	NK 9/16 TV	16	16	0.30	5500	6400	560	650	20000	30000	10.5	0.30	0.0130
10 $^{+0.022}_{+0.013}$	NK 10/12 TV	17	12	0.30	4550	5100	460	520	19000	28000	11.5	0.30	0.0100
10 $^{+0.022}_{+0.013}$	NK 10/16 TV	17	16	0.30	5450	6450	555	660	19000	28000	11.5	0.30	0.0130
12 $^{+0.027}_{+0.016}$	NK 12/12	19	12	0.30	5000	6100	510	620	17000	26000	13.5	0.30	0.0130
12 $^{+0.027}_{+0.016}$	NK 12/16	19	16	0.30	6000	7700	615	785	17000	26000	13.5	0.30	0.0160
14 $^{+0.027}_{+0.016}$	NK 14/16	22	16	0.30	10300	11500	1050	1170	16000	24000	20.0	0.30	0.0210
14 $^{+0.027}_{+0.016}$	NK 14/20	22	20	0.30	13000	15600	1330	1590	16000	24000	20.0	0.30	0.0260
15 $^{+0.027}_{+0.016}$	NK 15/16	23	16	0.30	10900	12700	1110	1290	15000	23000	21.0	0.30	0.0220
15 $^{+0.027}_{+0.016}$	NK 15/20	23	20	0.30	13800	17200	1410	1750	15000	23000	21.0	0.30	0.0270
16 $^{+0.027}_{+0.016}$	NK 16/16	24	16	0.30	12200	14900	1240	1520	15000	23000	22.0	0.30	0.0220
16 $^{+0.027}_{+0.016}$	NK 16/20	24	20	0.30	14600	18800	1490	1920	15000	23000	22.0	0.30	0.0280
17 $^{+0.027}_{+0.016}$	NK 17/16	25	16	0.30	12100	15000	1240	1530	15000	22000	23.0	0.30	0.0240
17 $^{+0.027}_{+0.016}$	NK 17/20	25	20	0.30	15400	20400	1570	2080	15000	22000	23.0	0.30	0.0300
18 $^{+0.027}_{+0.016}$	NK 18/16	26	16	0.30	12700	16200	1300	1650	14000	21000	24.0	0.30	0.0250
18 $^{+0.027}_{+0.016}$	NK 18/20	26	20	0.30	16100	22000	1640	2250	14000	21000	24.0	0.30	0.0310
19 $^{+0.033}_{+0.020}$	NK 19/16	27	16	0.30	13300	17400	1350	1780	14000	21000	25.0	0.30	0.0260
19 $^{+0.033}_{+0.020}$	NK 19/20	27	20	0.30	16000	22200	1630	2260	14000	21000	25.0	0.30	0.0320

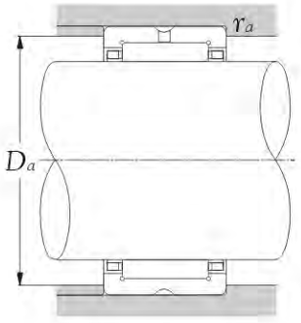
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cages] - Steel, Polyamide 66 (TV)
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Machined-ring needle roller bearings without inner ring
series NK





Type NK (Fw≥14 mm)

Inner bore F_w	Bearing number	Principal dimensions			Basic load ratings				Limiting speeds		Abutment dimensions		Mass
					dynamic	static	dynamic	static	grease	oil			kg.
		D	C	rs min[1]	Cr	Cor	Cr	Cor			D_a max	D_b max	
mm		mm			N		kgf		rpm				(approx.)
20 $^{+0.033}_{+0.020}$	NK 20/16	28	16	0.30	13200	17500	1340	1790	13000	20000	26	0.3	0.027
20 $^{+0.033}_{+0.020}$	NK 20/20	28	20	0.30	16700	23800	1700	2420	13000	20000	26	0.3	0.034
21 $^{+0.033}_{+0.020}$	NK 21/16	29	16	0.30	13700	18700	1400	1910	13000	19000	27	0.3	0.028
21 $^{+0.033}_{+0.020}$	NK 21/20	29	20	0.30	18300	27100	1860	2760	13000	19000	27	0.3	0.035
22 $^{+0.033}_{+0.020}$	NK 22/16	30	16	0.30	14200	19900	1450	2030	12000	18000	28	0.3	0.034
22 $^{+0.033}_{+0.020}$	NK 22/20	30	20	0.3	18000	27000	1840	2760	12000	18000	28	0.3	0.037
24 $^{+0.033}_{+0.020}$	NK 24/16	32	16	0.3	15200	22300	1550	2280	11000	17000	30	0.3	0.032
24 $^{+0.033}_{+0.020}$	NK 24/20	32	20	0.3	18600	28800	1890	2930	11000	17000	30	0.3	0.040
25 $^{+0.033}_{+0.020}$	NK 25/16	33	16	0.3	15100	22400	1540	2280	11000	16000	31	0.3	0.033
25 $^{+0.033}_{+0.020}$	NK 25/20	33	20	0.3	19200	30500	1960	3100	11000	16000	31	0.3	0.042
26 $^{+0.033}_{+0.020}$	NK 26/16	34	16	0.3	15600	23600	1590	2410	10000	15000	32	0.3	0.034
26 $^{+0.033}_{+0.020}$	NK 26/20	34	20	0.3	19100	30500	1940	3100	10000	15000	32	0.3	0.042
28 $^{+0.033}_{+0.020}$	NK 28/20	37	20	0.3	22300	34000	2280	3450	9500	14000	35	0.3	0.052
28 $^{+0.033}_{+0.020}$	NK 28/30	37	30	0.3	26700	48000	2720	4900	9500	14000	35	0.3	0.082
29 $^{+0.033}_{+0.020}$	NK 29/20 TV	38	20	0.3	22200	34000	2270	3450	9500	14000	36	0.3	0.054
29 $^{+0.033}_{+0.020}$	NK 29/30	38	30	0.3	27500	50500	2810	5150	9500	14000	36	0.3	0.084
30 $^{+0.033}_{+0.020}$	NK 30/20 TV	40	20	0.3	22100	34000	2260	3500	8500	13000	38	0.3	0.065
30 $^{+0.033}_{+0.020}$	NK 30/30 TV	40	30	0.3	33000	57000	3350	5800	8500	13000	38	0.3	0.098
32 $^{+0.041}_{+0.025}$	NK 32/20	42	20	0.3	23500	37500	2400	3850	8500	13000	40	0.3	0.068
32 $^{+0.041}_{+0.025}$	NK 32/30	42	30	0.3	34000	60500	3450	6150	8500	13000	40	0.3	0.102
35 $^{+0.041}_{+0.025}$	NK 35/20	45	20	0.3	24800	41500	2520	4250	7500	11000	43	0.3	0.074
35 $^{+0.041}_{+0.025}$	NK 35/30	45	30	0.3	36000	66500	3650	6800	7500	11000	43	0.3	0.112
37 $^{+0.041}_{+0.025}$	NK 37/20	47	20	0.3	25300	43500	2580	4400	7500	11000	45	0.3	0.077
37 $^{+0.041}_{+0.025}$	NK 37/30	47	30	0.3	36500	69500	3750	7100	7500	11000	45	0.3	0.107
38 $^{+0.041}_{+0.025}$	NK 38/20	48	20	0.3	25900	45000	2640	4600	7500	11000	46	0.3	0.079
38 $^{+0.041}_{+0.025}$	NK 38/30	48	30	0.3	37500	73000	3850	7400	7500	11000	46	0.3	0.107

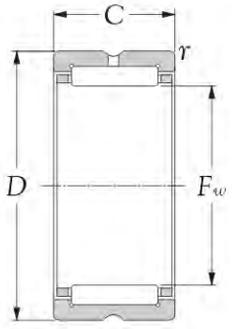
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

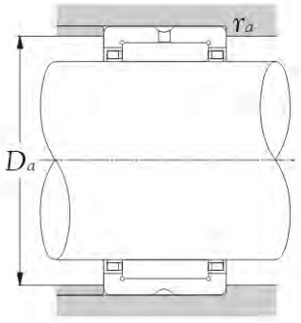
Remark: [Precision] - Class 0 (JIS)
[Cages] - Steel, Polyamide 66 (TV)
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

Machined-ring needle roller bearings without inner ring
series NK





Type NK (Fw≥14 mm)

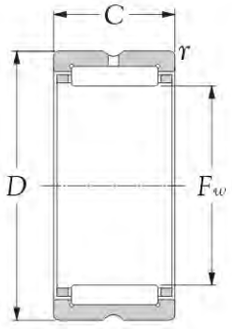
Inner bore F_w	Bearing number	Principal dimensions			Basic load ratings				Limiting speeds		Abutment dimensions		Mass
					dynamic	static	dynamic	static	grease	oil			kg.
		D	C	r s min[1]	C_r	C_{or}	C_r	C_{or}			D_a max	D_b max	
mm		mm			N		kgf		rpm				(approx.)
40 $^{+0.041}_{+0.025}$	NK 40/20	50	20	0.3	26400	47000	2700	4800	6500	10000	48	0.3	0.083
40 $^{+0.041}_{+0.025}$	NK 40/30	50	30	0.3	38500	76000	3900	7750	6500	10000	48	0.3	0.125
42 $^{+0.041}_{+0.025}$	NK 42/20	52	20	0.3	26900	49000	2750	5000	6500	9500	50	0.3	0.086
42 $^{+0.041}_{+0.025}$	NK 42/30	52	30	0.3	39000	79000	4000	8050	6500	9500	50	0.3	0.130
43 $^{+0.041}_{+0.025}$	NK 43/20	53	20	0.3	27500	51000	2810	5200	6500	9500	51	0.3	0.086
43 $^{+0.041}_{+0.025}$	NK 43/30	53	30	0.3	40000	82000	4100	8400	6500	9500	51	0.3	0.133
45 $^{+0.041}_{+0.025}$	NK 45/20	55	20	0.3	28000	52500	2860	5400	6000	9000	53	0.3	0.092
45 $^{+0.041}_{+0.025}$	NK 45/30	55	30	0.3	41000	85500	4150	8700	6000	9000	53	0.3	0.139
47 $^{+0.041}_{+0.025}$	NK 47/20	57	20	0.3	28800	55500	2940	5650	5500	8500	55	0.3	0.095
47 $^{+0.041}_{+0.025}$	NK 47/30	57	30	0.3	42500	91500	4350	9350	5500	8500	55	0.3	0.142
50 $^{+0.041}_{+0.025}$	NK 50/25	62	25	0.6	38500	74500	3950	7550	5500	8000	58	0.6	0.158
50 $^{+0.041}_{+0.025}$	NK 50/35	62	35	0.6	51000	106000	5200	10800	5500	8000	58	0.6	0.221
55 $^{+0.049}_{+0.030}$	NK 55/25	68	25	0.6	41000	82000	4150	8400	5000	7500	64	0.6	0.193
55 $^{+0.049}_{+0.030}$	NK 55/35	68	35	0.6	54000	118000	5500	12000	5000	7500	64	0.6	0.267
60 $^{+0.049}_{+0.030}$	NK 60/25	72	25	0.6	41000	85000	4200	8700	4300	6500	68	0.6	0.185
60 $^{+0.049}_{+0.030}$	NK 60/35	72	35	0.6	57000	130000	5800	13200	4300	6500	68	0.6	0.258
65 $^{+0.049}_{+0.030}$	NK 65/25	78	25	0.6	45000	98000	4550	10000	4000	6000	74	0.6	0.221
65 $^{+0.049}_{+0.030}$	NK 65/35	78	35	0.6	60000	142000	6100	14400	4000	6000	74.	0.6	0.310
68 $^{+0.049}_{+0.030}$	NK 68/25	82	25	1.0	44500	89000	4500	9050	4000	6000	77	0.6	0.241
68 $^{+0.049}_{+0.030}$	NK 68/35	82	35	0.6	63000	139000	6400	14200	4000	6000	78	0.6	0.338
70 $^{+0.049}_{+0.030}$	NK 70/25	85	25	0.6	45000	91500	4600	9350	3700	5500	81	0.6	0.275
70 $^{+0.049}_{+0.030}$	NK 70/35	85	35	0.6	64000	144000	6550	14700	3700	5500	81	0.6	0.386
73 $^{+0.049}_{+0.030}$	NK 73/25	90	25	0.6	54000	100000	5500	10200	3700	5500	86	0.6	0.302
73 $^{+0.049}_{+0.030}$	NK 73/35	90	35	0.6	76500	156000	7800	16000	3700	5500	86	0.6	0.428
75 $^{+0.049}_{+0.030}$	NK 75/25	92	25	0.6	55000	104000	5600	10600	3700	5500	88	0.6	0.315
75 $^{+0.049}_{+0.030}$	NK 75/35	92	35	0.6	78000	162000	7950	16500	3700	5500	88	0.6	0.492

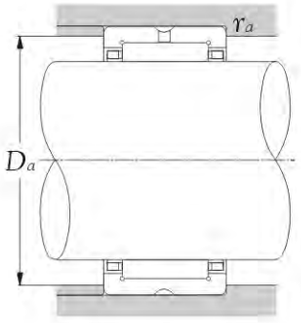
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Machined-ring needle roller bearings without inner ring
series NK





Type NK (Fw≥14 mm)

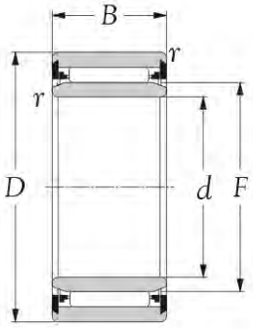
Inner bore F_w mm	Bearing number	Principal dimensions D	C	rs min[1]	Basic load ratings dynamic C_r	static C_{or}	dynamic C_r	static C_{or}	Limiting speeds grease	oil	Abutment dimensions D_a max	D_b max	Mass kg(s). (approx.)
		mm			N		kgf		rpm				
80 $^{+0.049}_{+0.030}$	**NK 80/25**	95	25	1.0	57000	119000	5800	12200	3300	5000	90.0	1.0	0.301
80 $^{+0.049}_{+0.030}$	**NK 80/35**	95	35	1.0	79500	184000	8150	18700	3300	5000	90.0	1.0	0.425
85 $^{+0.058}_{+0.036}$	**NK 85/25**	105	25	1.0	70500	123000	7200	12600	3100	4700	100.0	1.0	0.404
85 $^{+0.058}_{+0.036}$	**NK 85/35**	105	35	1.0	100000	193000	10200	19700	3100	4700	100.0	1.0	0.517
90 $^{+0.058}_{+0.036}$	**NK 90/25**	110	25	1.0	71500	128000	7300	13100	2900	4400	105.0	1.0	0.426
90 $^{+0.058}_{+0.036}$	**NK 90/35**	110	35	1.0	104000	208000	10600	21200	2900	4400	105.0	1.0	0.604
95 $^{+0.058}_{+0.036}$	**NK 95/26**	115	26	1.0	74500	137000	7600	14000	2800	4200	110.0	1.0	0.364
95 $^{+0.058}_{+0.036}$	**NK 95/36**	115	36	1.0	108000	223000	11100	22700	2800	4200	110.0	1.0	0.652
100 $^{+0.058}_{+0.036}$	**NK 100/26**	120	26	1.0	73500	137000	7500	14000	2700	4000	115.0	1.0	0.487
100 $^{+0.058}_{+0.036}$	**NK 100/36**	120	36	1.0	107000	223000	11000	22800	2700	4000	115.0	1.0	0.679
105 $^{+0.058}_{+0.036}$	**NK 105/26**	125	26	1.0	76500	147000	7800	14900	2500	3800	120.0	1.0	0.506
105 $^{+0.058}_{+0.036}$	**NK 105/36**	125	36	1.0	111000	238000	11400	24300	2500	3800	120.0	1.0	0.713
110 $^{+0.058}_{+0.036}$	**NK 110/30**	130	30	1.1	97500	204000	9950	20800	2400	3600	123.5	1.0	0.612
110 $^{+0.058}_{+0.036}$	**NK 110/40**	130	40	1.1	129000	292000	13100	29700	2400	3600	123.5	1.0	0.830
120 $^{+0.058}_{+0.036}$	**NK 120/40**	140	40	1.1	113000	268000	11500	27300	2200	3300	133.5	1.0	0.910
130 $^{+0.068}_{+0.043}$	**NK 130/40**	150	40	1.1	116000	283000	11800	28800	2100	3100	143.5	1.0	0.980
145 $^{+0.068}_{+0.043}$	**NK 145/32**	170	32	1.5	111000	238000	11300	24300	1900	2800	162.5	1.5	1.120
145 $^{+0.068}_{+0.043}$	**NK 145/42**	170	42	1.5	153000	360000	15600	36500	1900	2800	162.5	1.5	1.490
155 $^{+0.068}_{+0.043}$	**NK 155/32**	180	32	1.5	114000	252000	11600	25700	1700	2600	172.0	1.5	1.200
155 $^{+0.068}_{+0.043}$	**NK 155/42**	180	42	1.5	156000	380000	16000	38500	1700	2600	172.0	1.5	1.590
165 $^{+0.068}_{+0.043}$	**NK 165/32**	190	32	1.5	117000	265000	11900	27000	1600	2400	182.0	1.5	1.420
165 $^{+0.068}_{+0.043}$	**NK 165/42**	190	42	1.5	160000	400000	16300	40500	1600	2400	182.0	1.5	1.660

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

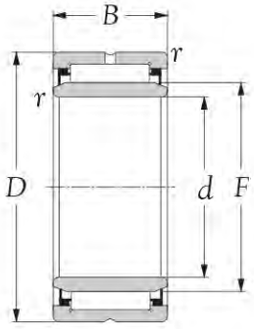
Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Machined-ring needle roller bearings with inner ring series NKI



Type NKI (d≤9 mm)



Type NKI (d≥10 mm)

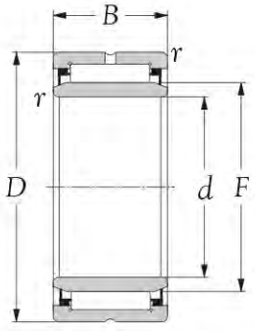
Inner bore d	Bearing number	Principal dimensions				Basic load ratings		Limiting speeds oil	Mass kg.
		F	D	B	rs min1)	dynamic Cr	static Cor		
mm		mm				N		rpm	(approx.)
5	NKI 5/12 TV	8	15	12	0.3	3950	4100	32000	0.012
5	NKI 5/16 TV	8	15	16	0.3	5100	5800	32000	0.015
6	NKI 6/12 TV	9	16	12	0.3	4500	5000	31000	0.014
6	NKI 6/16 TV	9	16	16	0.3	5900	7100	31000	0.018
7	NKI 7/12 TV	10	17	12	0.3	4750	5500	29000	0.014
7	NKI 7/16 TV	10	17	16	0.3	6200	7800	29000	0.018
9	NKI 9/12	12	19	12	0.3	6400	7100	27000	0.017
9	NKI 9/16	12	19	16	0.3	9000	11000	27000	0.022
10	NKI 10/16	14	22	16	0.3	10100	11500	25000	0.029
10	NKI 10/20	14	22	20	0.3	12800	15600	25000	0.037
12	NKI 12/16	16	24	16	0.3	11300	13900	23000	0.033
12	NKI 12/20	16	24	20	0.3	14400	18800	23000	0.042
15	NKI 15/16	19	27	16	0.3	13000	17400	22000	0.039
15	NKI 15/20	19	27	20	0.3	16500	23600	22000	0.049
17	NKI 17/16	21	29	16	0.3	13500	18700	21000	0.043
17	NKI 17/20	21	29	20	0.3	17100	25500	21000	0.054
20	NKI 20/16	24	32	16	0.3	15000	22300	18000	0.049
20	NKI 20/20	24	32	20	0.3	19000	30500	18000	0.061
22	NKI 22/16	26	34	16	0.3	15300	23600	17000	0.052
22	NKI 22/20	26	34	20	0.3	19400	32000	17000	0.065
25	NKI 25/20 TV	29	38	20	0.3	21900	34000	15000	0.080
25	NKI 25/30	29	38	30	0.3	32500	57000	15000	0.120
28	NKI 28/20 TV	32	42	20	0.3	23100	37500	14000	0.097
28	NKI 28/30	32	42	30	0.3	34500	63000	14000	0.150
30	NKI 30/20 TV	35	45	20	0.3	24300	41500	13000	0.110
30	NKI 30/30 TV	35	45	30	0.3	36500	69000	13000	0.170

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cages] - Steel, Polyamide 66 (TV)
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site: Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Machined-ring needle roller bearings with inner ring series NKI



Type NKI (d≥10 mm)

Inner bore d	Bearing number	Principal dimensions				Basic load ratings		Limiting speeds oil	Mass kg.
		F	D	B	rs min1)	dynamic Cr	static Cor		
mm		mm				N		rpm	(approx.)
32	NKI 32/20	37	47	20	0.3	24900	43500	12000	0.120
32	NKI 32/30	37	47	30	0.3	37000	73000	12000	0.180
35	NKI 35/20	40	50	20	0.3	26000	47000	11000	0.130
35	NKI 35/30	40	50	30	0.3	39000	79000	11000	0.190
38	NKI 38/20	43	53	20	0.3	27000	51000	11000	0.140
38	NKI 38/30	43	53	30	0.3	40500	85000	11000	0.210
40	NKI 40/20	45	55	20	0.3	27500	53000	10000	0.140
40	NKI 40/30	45	55	30	0.3	41000	88000	10000	0.220
42	NKI 42/20	47	57	20	0.3	28500	56000	10000	0.150
42	NKI 42/30	47	57	30	0.3	43000	94000	10000	0.220
45	NKI 45/25	50	62	25	0.6	38000	74000	9000	0.230
45	NKI 45/35	50	62	35	0.6	50000	106000	9000	0.320
50	NKI 50/25	55	68	25	0.6	40000	82000	8500	0.270
50	NKI 50/35	55	68	35	0.6	53000	118000	8500	0.380
55	NKI 55/25	60	72	25	0.6	42000	90000	7500	0.270
55	NKI 55/35	60	72	35	0.6	56000	130000	7500	0.380
60	NKI 60/25	68	82	25	0.6	43500	89000	7000	0.400
60	NKI 60/35	68	82	35	0.6	62000	139000	7000	0.550
65	NKI 65/25	73	90	25	1.0	53000	100000	6500	0.470
65	NKI 65/35	73	90	35	1.0	75000	156000	6500	0.660
70	NKI 70/25	80	95	25	1.0	56000	119000	6000	0.520
70	NKI 70/35	80	95	35	1.0	78000	184000	6000	0.740
75	NKI 75/25	85	105	25	1.0	69000	123000	5500	0.640
75	NKI 75/35	85	105	35	1.0	98000	193000	5500	0.910
80	NKI 80/25	90	110	25	1.0	72000	132000	5000	0.680
80	NKI 80/35	90	110	35	1.0	103000	208000	5000	0.960

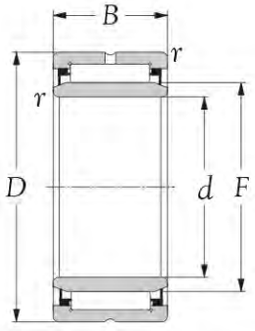
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

Machined-ring needle roller bearings with inner ring series NKI



Type NKI (d≥10 mm)

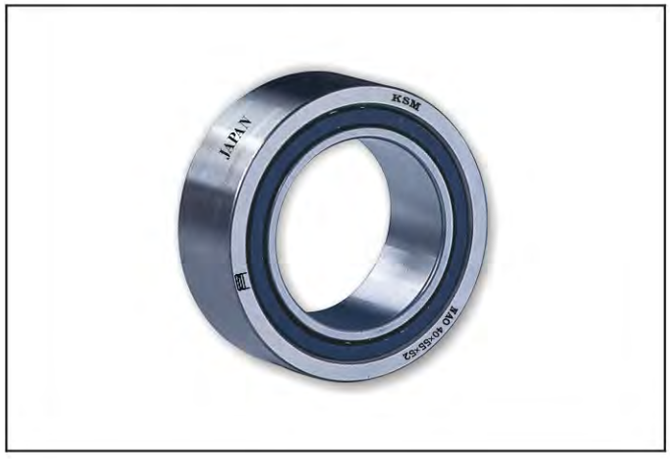
Inner bore d	Bearing number	Principal dimensions				Basic load ratings		Limiting speeds oil	Mass kg(s).
		F	D	B	rs min1)	dynamic Cr	static Cor		
mm		mm				N		rpm	(approx.)
85	NKI 85/26	95	115	26	1.0	73000	137000	4800	0.750
85	NKI 85/36	95	115	36	1.0	107000	223000	4800	1.050
90	NKI 90/26	100	120	26	1.0	76000	146000	4600	0.780
90	NKI 90/36	100	120	36	1.0	111000	237000	4600	1.100
95	NKI 95/26	105	125	26	1.0	78000	155000	4400	0.820
95	NKI 95/36	105	125	36	1.0	114000	250000	4400	1.150
100	NKI 100/30	110	130	30	1.1	98000	210000	4200	1.000
100	NKI 100/40	110	130	40	1.1	127000	290000	4200	1.350

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site: Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Machined-ring needle roller bearings, separable



TECHNICAL SUPPLEMENT

1. Bearing materials

The available **KSM** machined ring needle roller bearings, separable, include the series RNAO (without inner ring) and series NAO (with inner ring). The cage used for **KSM** machined ring needle roller bearings, separable, is usually a machined ring type. However, cages of molded polyamide reinforced with glass fiber or carbon fiber (suffix TV) may be used. The TV cage features a maximum allowable operating temperature of 120°C and maximum allowable continuous operating temperature of 100°C.

2. Interpreting bearing numbers

The bearing numbers of **KSM** machined ring needle roller bearings, separable, comprise a series number (RNAO, NAO), dimension code (inscribed enveloping circle diameter or bore diameter X outside diameter X width), and suffix (Fig. A ~ C).

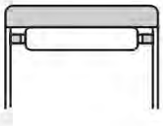


Fig. A Series RNAO

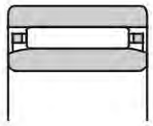


Fig. B Series NAO

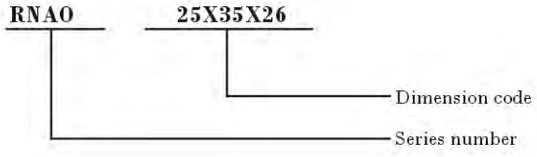
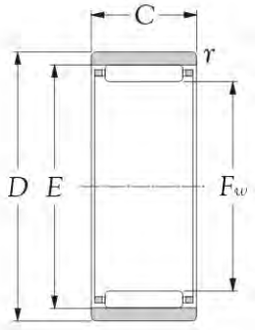


Fig. C

KSM® NOTE

Machined-ring needle roller bearings, separable
series RNAO



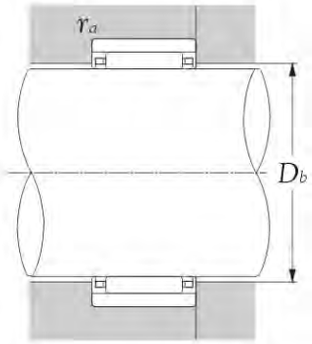
Inner bore F_w mm	Bearing number	Boundary dimensions mm				Basic load ratings dynamic C_r N	static C_{or} N	dynamic C_r kgf	static C_{or} kgf
		D	C	r_s min	E				
5 $^{+0.018}_{+0.010}$	RNAO 5x10x8	10	8.0	0.15	8	2640	2190	269	224
6 $^{+0.018}_{+0.010}$	RNAO 6x13x8	13	8.0	0.30	9	2660	2280	272	233
7 $^{+0.022}_{+0.013}$	RNAO 7x14x8	14	8.0	0.30	10	2670	2350	272	239
8 $^{+0.022}_{+0.013}$	RNAO 8x15x10	15	10.0	0.30	11	4000	4100	410	420
10 $^{+0.022}_{+0.013}$	RNAO 10x17x10	17	10.0	0.30	13	4550	5100	460	520
10 $^{+0.022}_{+0.013}$	RNAO 10x20x12	20	12.0	0.30	16	7100	5950	720	610
12 $^{+0.027}_{+0.016}$	RNAO 12x19x13.5	19	13.5	0.30	15	6000	7700	615	785
12 $^{+0.027}_{+0.016}$	RNAO 12x22x12	22	12.0	0.30	18	8650	8000	880	815
14 $^{+0.027}_{+0.016}$	RNAO 14x22x13	22	13.0	0.30	18	8300	10100	845	1030
14 $^{+0.027}_{+0.016}$	RNAO 14x26x12	26	12.0	0.30	20	9350	9150	955	930
15 $^{+0.027}_{+0.016}$	RNAO 15x23x13	23	13.0	0.30	19	8250	10200	840	1040
16 $^{+0.027}_{+0.016}$	RNAO 16x24x13	24	13.0	0.30	20	9050	11800	925	1200
16 $^{+0.027}_{+0.016}$	RNAO 16x28x12	28	12.0	0.30	22	11700	12500	1190	1280
17 $^{+0.027}_{+0.016}$	RNAO 17x25x13	25	13.0	0.30	21	9400	12600	960	1280
18 $^{+0.027}_{+0.016}$	RNAO 18x26x13	26	13.0	0.30	22	8900	11900	910	1210
18 $^{+0.027}_{+0.016}$	RNAO 18x30x12	30	12.0	0.30	24	12300	13800	1250	1410
20 $^{+0.033}_{+0.020}$	RNAO 20x28x13	28	13.0	0.30	24	10000	14300	1020	1460
20 $^{+0.033}_{+0.020}$	RNAO 20x32 x12	32	12.0	0.30	26	12900	15100	1320	1540
22 $^{+0.033}_{+0.020}$	RNAO 22x30x13	30	13.0	0.30	26	10200	15200	1040	1550
22 $^{+0.033}_{+0.020}$	RNAO 22x35x16	35	16.0	0.30	29	18700	22700	1910	2310
25 $^{+0.033}_{+0.020}$	RNAO 25x35x17	35	17.0	0.30	29	14200	24000	1450	2450
25 $^{+0.033}_{+0.020}$	RNAO 25x37x16	37	16.0	0.30	32	19500	24700	1990	2520
26 $^{+0.033}_{+0.020}$	RNAO 26x39x13	39	13.0	0.30	30	11800	19200	1200	1960
28 $^{+0.033}_{+0.020}$	RNAO 28x40x16	40	16.0	0.30	35	21200	28400	2160	2900
30 $^{+0.033}_{+0.020}$	RNAO 30x40x17	40	17.0	0.30	35	19400	32500	1970	3350
30 $^{+0.033}_{+0.020}$	RNAO 30x42x16	42	16.0	0.30	37	21900	30500	2230	3100
32 $^{+0.041}_{+0.025}$	RNAO 32x42x13	42	13.0	0.30	37	14500	23000	1480	2350

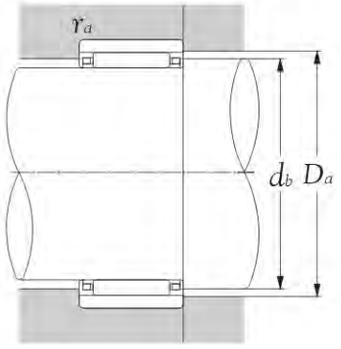
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

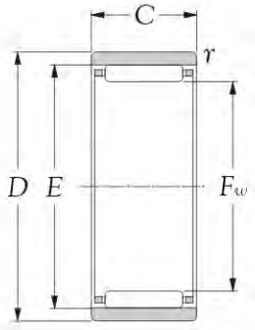
Machined-ring needle roller bearings, separable
series RNAO





Limiting speeds grease	Limiting speeds oil	Abutment dimensions				Mass kg.
rpm	rpm	D_b min	D_a max	d_b min	r_a max	(approx.)
27000	40000	7.7	8.8	5.3	0.15	0.003
25000	37000	8.7	11.0	6.3	0.30	0.006
23000	34000	9.7	12.0	7.3	0.30	0.006
21000	32000	10.7	13.0	8.3	0.30	0.008
19000	28000	12.7	15.0	10.3	0.30	0.010
19000	28000	15.7	18.0	10.3	0.30	0.018
17000	26000	14.7	17.0	12.3	0.30	0.015
17000	26000	17.6	20.0	12.3	0.30	0.019
16000	24000	17.6	20.0	14.4	0.30	0.018
16000	24000	19.6	24.0	14.4	0.30	0.029
15000	23000	18.6	21.0	15.4	0.30	0.020
15000	23000	19.6	22.0	16.4	0.30	0.021
15000	23000	21.6	26.0	16.4	0.30	0.032
15000	22000	20.6	23.0	17.4	0.30	0.022
14000	21000	21.6	24.0	18.4	0.30	0.022
14000	21000	23.6	28.0	18.4	0.30	0.035
13000	20000	23.6	26.0	20.4	0.30	0.025
13000	20000	25.6	30.0	20.4	0.30	0.038
12000	18000	25.6	28.0	22.4	0.30	0.027
12000	18000	28.4	33.0	22.4	0.30	0.059
11000	16000	28.4	33.0	25.6	0.30	0.053
11000	16000	31.4	35.0	25.6	0.30	0.060
10000	15000	29.4	37.0	26.6	0.30	0.060
9500	14000	34.4	38.0	28.6	0.30	0.061
9000	13000	34.4	38.0	30.6	0.30	0.060
9000	13000	36.4	40.0	30.6	0.30	0.069
8500	13000	36.4	40.0	32.6	0.30	0.049

Machined-ring needle roller bearings, separable
series RNAO



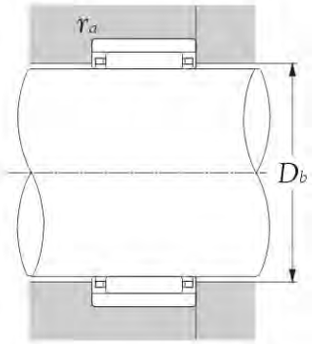
Inner bore F_w	Bearing number	Boundary dimensions				Basic load ratings			
		D	C	r_s min$^{1)}$	E	dynamic Cr	static Cor	dynamic Cr	static Cor
mm		mm				N		kgf	
35 $^{+0.041}_{+0.025}$	RNAO 35x45x13	45	13	0.3	40	15200	25100	1550	2560
35 $^{+0.041}_{+0.025}$	RNAO 35x45x17	45	17	0.3	40	20000	36000	2040	3650
35 $^{+0.041}_{+0.025}$	RNAO 35x47x16	47	16	0.3	42	24100	36000	2450	3650
35 $^{+0.041}_{+0.025}$	RNAO 35x47x18	47	18	0.3	42	24700	37000	2510	3750
37 $^{+0.041}_{+0.025}$	RNAO 37x47x13	47	13	0.3	42	15900	27100	1620	2770
37 $^{+0.041}_{+0.025}$	RNAO 37x52x18	52	18	0.3	44	26300	41000	2680	4150
40 $^{+0.041}_{+0.025}$	RNAO 40x50x17	50	17	0.3	45	21800	41500	2220	4250
40 $^{+0.041}_{+0.025}$	RNAO 40x55x20	55	20	0.3	47	31000	51500	3150	5250
45 $^{+0.041}_{+0.025}$	RNAO 45x55x17	55	17	0.3	50	22300	44500	2280	4550
45 $^{+0.041}_{+0.025}$	RNAO 45x62x20	62	20	0.3	53	36000	59000	3650	6000
50 $^{+0.041}_{+0.025}$	RNAO 50x62x20	62	20	0.3	55	27900	62000	2850	6300
50 $^{+0.041}_{+0.025}$	RNAO 50x65x20	65	20	0.3	58	38500	67500	3950	6850
55 $^{+0.049}_{+0.060}$	RNAO 55x68x20	68	20	0.6	60	28800	66500	2940	6750
55 $^{+0.049}_{+0.030}$	RNAO 55x68x25	68	25	0.6	63	50500	97500	5150	9950
55 $^{+0.049}_{+0.030}$	RNAO 55x72x20	72	20	0.6	63	39000	70000	3950	7100
60 $^{+0.049}_{+0.030}$	RNAO 60x78x20	78	20	1.0	68	40000	75000	4100	7650
65 $^{+0.049}_{+0.030}$	RNAO 65x85x30	85	30	1.0	73	61000	132000	6200	13400
70 $^{+0.049}_{+0.030}$	RNAO 70x90x30	90	30	1.0	78	65500	149000	6700	15200
75 $^{+0.049}_{+0.030}$	RNAO 75x95x30	95	30	1.0	83	67500	157000	6850	16100
80 $^{+0.049}_{+0.030}$	RNAO 80x95x30	95	30	1.0	86	57000	159000	5800	16200
80 $^{+0.049}_{+0.030}$	RNAO 80x100x30	100	30	1.0	88	69000	166000	7050	17000
85 $^{+0.058}_{+0.036}$	RNAO 85x105x25	105	25	1.0	93	61500	146000	6250	14900
85 $^{+0.058}_{+0.036}$	RNAO 85x105x30	105	30	1.0	93	71000	175000	7200	17900
90 $^{+0.058}_{+0.036}$	RNAO 90x105x26	105	26	1.0	98	64000	157000	6550	16000
90 $^{+0.058}_{+0.036}$	RNAO 90x110x30	110	30	1.0	98	72500	184000	7400	18800
95 $^{+0.058}_{+0.036}$	RNAO 95x115x30	115	30	1.0	103	74000	193000	7550	19600
100 $^{+0.058}_{+0.035}$	RNAO 100x120x30	120	30	1.0	108	76000	201000	7700	20500

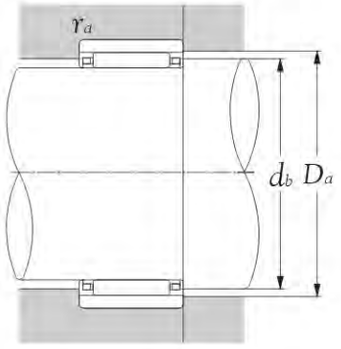
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

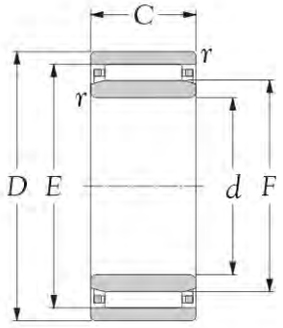
Machined-ring needle roller bearings, separable
series RNAO





Limiting speeds grease rpm	Limiting speeds oil rpm	Abutment dimensions D_b min	Abutment dimensions D_a max	Abutment dimensions d_b min	Abutment dimensions r_a max	Mass kg. (approx.)
7500	11000	39.4	43	35.6	0.3	0.053
7500	11000	39.4	43	35.6	0.3	0.069
7500	11000	41.4	45	35.6	0.3	0.078
7500	11000	41.4	45	35.6	0.3	0.089
7000	11000	41.4	45	37.6	0.3	0.056
7000	11000	43.4	50	37.6	0.3	0.125
6500	10000	44.4	48	40.6	0.3	0.074
6500	10000	46.2	53	40.6	0.3	0.145
6000	9000	49.2	53	45.6	0.3	0.083
6000	9000	52.2	60	45.6	0.3	0.175
5500	8000	54.2	60	50.6	0.3	0.140
5500	8000	57.2	63	50.6	0.3	0.168
4800	7500	59.4	64	55.8	0.6	0.166
4800	7500	62.4	64	55.8	0.6	0.200
4800	7500	62.4	68	55.8	0.6	0.216
4400	6500	67.2	73	60.8	1.0	0.255
4100	6000	72.2	80	66.0	1.0	0.464
3800	5500	77.2	85	71.0	1.0	0.199
3600	5500	82.2	90	76.0	1.0	0.520
3300	5000	85.2	90	81.0	1.0	0.405
3300	5000	87.2	95	81.0	1.0	0.580
3100	4700	92.2	100	86.0	1.0	0.459
3100	4700	92.2	100	86.0	1.0	0.585
3000	4400	97.2	100	91.0	1.0	0.373
3000	4400	97.2	105	91.0	1.0	0.610
2800	4200	102.2	110	96.0	1.0	0.640
2700	4000	107.2	115	101.0	1.0	0.694

Machined-ring needle roller bearings, separable
series NAO

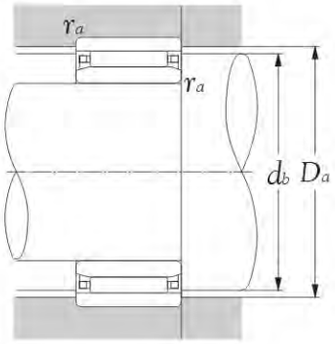


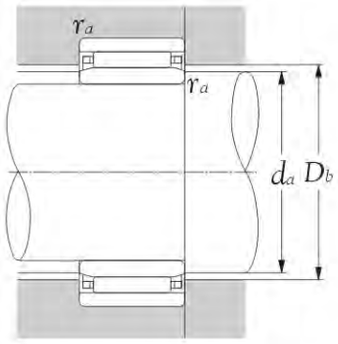
Inner bore d	Bearing number	Boundary dimensions					Basic load ratings			
		D	C	rs min[1]	F	E	dynamic Cr	static Cor	dynamic Cr	static Cor
mm		mm					N		kgf	
6	NAO 6x17x10	17	10	0.3	10	13	4550	5100	460	520
7	NAO 7x20x12	20	12	0.3	10	16	7100	5950	720	610
9	NAO 9x22x12	22	12	0.3	12	18	8650	8000	880	815
10	NAO 10x22x13	22	13	0.3	14	18	8300	10100	845	1030
10	NAO 10x26x12	26	12	0.3	14	20	9350	9150	955	930
12	NAO 12x24x13	24	13	0.3	16	20	9050	11800	925	1200
12	NAO 12x28x12	28	12	0.3	16	22	11700	12500	1190	1280
15	NAO 15x28x13	28	13	0.3	20	24	10000	14300	1020	1460
15	NAO 15x32x12	32	12	0.3	20	26	12900	15100	1320	1540
17	NAO 17x30x13	30	13	0.3	22	26	10200	15200	1040	1550
17	NAO 17x35x16	35	16	0.3	22	29	18700	22700	1910	2310
20	NAO 20x35x17	35	17	0.3	25	29	14200	24000	1450	2450
20	NAO 20x37x16	37	16	0.3	25	32	19500	24700	1990	2520
25	NAO 25x40x17	40	17	0.3	30	35	19400	32500	1970	3350
25	NAO 25x42x16	42	16	0.3	30	37	21900	30500	2230	3100
29	NAO 29x42x13	42	13	0.3	32	37	14500	23000	1480	2350
30	NAO 30x45x13	45	13	0.3	35	40	15200	25100	1550	2560
30	NAO 30x45x17	45	17	0.3	35	40	20000	36000	2040	3650
30	NAO 30x47x16	47	16	0.3	35	42	24100	36000	2450	3650
30	NAO 30x47x18	47	18	0.3	35	42	24700	37000	2510	3750
30	NAO 30x52x18	52	18	0.3	37	44	26300	41000	2680	4150
33	NAO 33x47x13	47	13	0.3	37	42	15900	27100	1620	2770
35	NAO 35x50x17	50	17	0.3	40	45	21800	41500	2220	4250
35	NAO 35x55x20	55	20	0.3	40	47	31000	51500	3150	5250
40	NAO 40x55x17	55	17	0.3	45	50	22300	44500	2280	4550
40	NAO 40x62x20	62	20	0.3	45	53	36000	59000	3650	6000
40	NAO 40x65x20	65	20	0.3	50	58	38500	67500	3950	6850

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.
Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

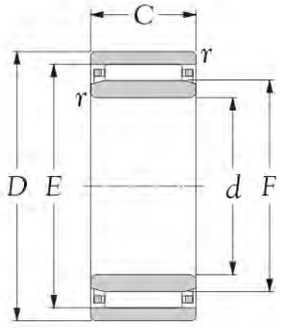
Machined-ring needle roller bearings, separable series NAO





Limiting speeds grease rpm	Limiting speeds oil rpm	Abutment dimensions d_a mm	d_b	D_a max.	D_b	r_a max.	Mass kg. (approx.)
19000	28000	8	12.7	15	10.3	0.3	0.014
19000	28000	9	15.7	18	10.3	0.3	0.022
17000	26000	11	17.6	20	12.3	0.3	0.024
16000	24000	12	17.6	20	14.4	0.3	0.026
16000	24000	12	19.6	24	14.4	0.3	0.036
15000	23000	14	19.6	22	16.4	0.3	0.030
15000	23000	14	21.6	26	16.4	0.3	0.040
13000	20000	17	23.6	26	20.4	0.3	0.029
13000	20000	17	25.6	30	20.4	0.3	0.050
12000	18000	19	25.6	28	22.4	0.3	0.042
12000	18000	19	28.4	33	22.4	0.3	0.078
11000	16000	22	28.4	33	25.6	0.3	0.076
11000	16000	22	31.4	35	25.6	0.3	0.082
9000	13000	27	34.4	38	30.6	0.3	0.088
9000	13000	27	36.4	40	30.6	0.3	0.086
8500	13000	31	36.4	40	32.6	0.3	0.062
7500	11000	32	39.4	43	35.6	0.3	0.077
7500	11000	32	39.4	43	35.6	0.3	0.102
7500	11000	32	41.4	45	35.6	0.3	0.109
7500	11000	32	41.4	45	35.6	0.3	0.119
7000	11000	32	43.4	50	37.6	0.3	0.177
7000	11000	35	41.4	45	37.6	0.3	0.085
6500	10000	37	44.4	48	40.6	0.3	0.113
6500	10000	37	46.2	53	40.6	0.3	0.190
6000	9000	42	49.2	53	45.6	0.3	0.127
6000	9000	42	52.2	60	45.6	0.3	0.230
5500	9000	42	57.2	63	50.6	0.3	0.279

Machined-ring needle roller bearings, separable
series NAO



Inner bore d	Bearing number	Boundary dimensions					Basic load ratings			
		D	C	rs min[1]	F	E	dynamic Cr	static Cor	dynamic Cr	static Cor
mm		mm					N		kgf	
45	NAO 45x62x20	62	20	0.3	50	55	27900	62000	2850	6300
45	NAO 45x72x20	72	20	0.6	55	63	39000	70000	3950	7100
50	NAO 50x68x20	68	20	0.6	55	60	28800	66500	2940	6750
50	NAO 50x78x20	78	20	1.0	60	68	40000	75000	4100	7650
55	NAO 55x85x30	85	30	1.0	65	73	61000	132000	6200	13400
60	NAO 60x90x30	90	30	1.0	70	78	65500	149000	6700	15200
65	NAO 65x95x30	95	30	1.0	75	83	67500	157000	6850	16100
70	NAO 70x95x30	95	30	1.0	80	86	57000	159000	5800	16200
70	NAO 70x100x30	100	30	1.0	80	88	69000	166000	7050	17000
75	NAO 75x105x25	105	25	1.0	85	93	61500	146000	6250	14900
75	NAO 75x105x30	105	30	1.0	85	93	71000	175000	7200	17900
80	NAO 80x110x30	110	30	1.0	90	98	72500	184000	7400	18800
85	NAO 85x115x30	115	30	1.0	95	103	74000	193000	7550	19600
90	NAO 90x120x30	120	30	1.0	100	108	76000	201000	7700	20500

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.
Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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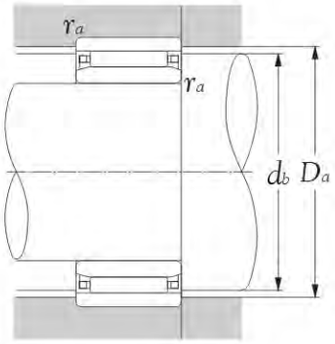
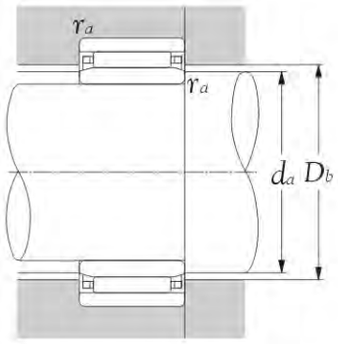
Machined-ring needle roller bearings, separable
series NAO

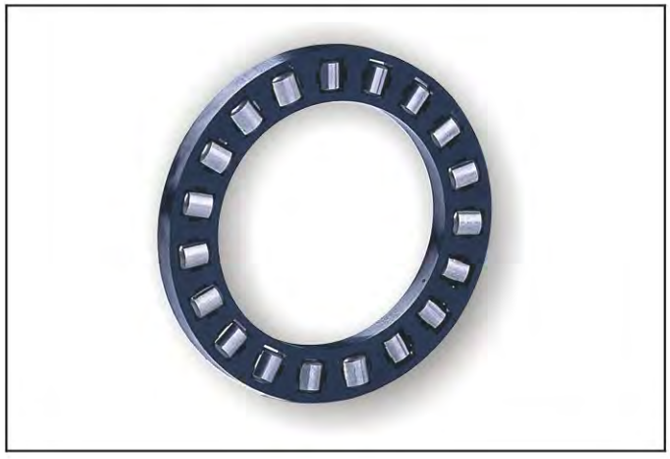




Limiting speeds grease	oil	Abutment dimensions					Mass kg(s).
rpm		d_a min	d_b	D_a max	D_b	r_a max	(approx.)
5500	8000	47	54.2	60	50.6	0.3	0.192
4800	7500	49	62.4	68	55.8	0.6	0.335
4800	7500	54	59.4	64	55.8	0.6	0.230
4400	6500	55	67.2	73	60.8	1.0	0.410
4100	6000	60	72.2	80	66.0	1.0	0.680
3800	5500	65	77.2	85	71.0	1.0	0.720
3600	5500	70	82.2	90	76.0	1.0	0.770
3300	5000	75	85.2	90	81.0	1.0	0.675
3300	5000	75	87.2	95	81.0	1.0	0.850
3100	4700	80	92.2	100	86.0	1.0	0.700
3100	4700	80	92.2	100	86.0	1.0	0.880
3000	4400	85	97.2	105	91.0	1.0	0.920
2800	4200	90	102.2	110	96.0	1.0	0.960
2700	4000	95	107.2	115	101.0	1.0	1.040

KSM® NOTE

Thrust roller bearings



TECHNICAL SUPPLEMENT T 168 & T 169

1. Types and designs

KSM roller and cage thrust assemblies are available in the series AXK, which has needle rollers; and in series K 811, K 812, each of which incorporates cylindrical rollers. Each pocket of the series K 811 and K 812 has a single row of cylindrical rollers. Series AXK bearings, which have needle rollers, use a pressed-steel cage. Series K 811, and K 812 they can optionally employ a pressed-steel cage or a cage of molded polyamide reinforced with glass fiber or carbon fiber (suffix TV). The TV cage features a maximum allowable operating temperature of 120°C and maximum allowable continuous operating temperature of 100°C. The bearing washers for **KSM** Thrust Roller Bearings are available in an AS model made of surface-hardened 1 mm-thick steel plate, and in WS and GS models, which are machined types.The AS model can be used on either the shaft or housing side. This bearing washer, however, requires that the adjacent mechanical components have sufficient rigidity and good form accuracy. Before being mounted, the bearing washer may remain somewhat warped. This phenomenon should not be regarded as a problem because the warpage will be eliminated once a predetermined level of thrust load is exerted on the washer.The bore of the WS model is fitted to a shaft, and the outside surface of the GS model is fitted to a housing.Both models therefore provide the bearings with greater rigidity and higher running accuracy. Bearing models 811, 812 are formed by respectively combining the roller and cage thrust assemblies of models K 811 and K 812 with the associated model WS or GS bearing washer. They are standard series bearings whose dimension series, specified in ISO 104 (Boundary dimensions for rolling bearings), are 11, 12, and 93, respectively.

T1

Fig. A Series AXK

Fig. B Series K 811, K 812

Fig. C Series AS

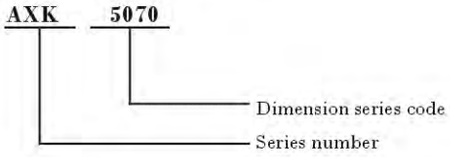
Fig. D Series WS

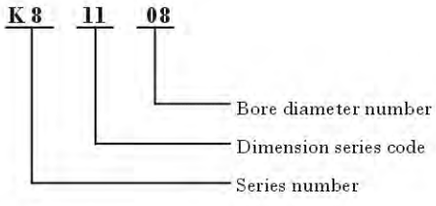
Fig. E Series GS

2. Interpreting bearing numbers

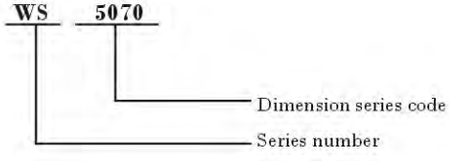
The bearing numbers of **KSM** roller and cage thrust assemblies, bearing rings, and thrust roller bearings comprise a series number, dimension series code, bore diameter number, and suffix.

Roller and cage thrust assembly





Bearing washer



3. Bearing tolerance

The dimensional accuracy, form accuracy, and running accuracy of series 811, 812 thrust cylindrical roller bearings are given in "Bearing Tolerances". The bore (Del) of roller and cage thrust assemblies (series AXK, K 811, K 812) is machined to a tolerance of E11 (or E12 for bearings having a suffix T2). The outside surface (Dc) of the series AXK is machined to a tolerance of c12, while those of the series K 811, K 812 are machined to a tolerance of a13.

4. Raceway surface requirements

When the shaft and housing are used as a raceway for arollerand cage thrust assembly, the raceway should satisfy the requirements in Table A.

Table A Raceway requirements

Characteristics	Requirement
Squareness (max.)	IT6 (IT4)
Surface roughness	0, 4a
Surface hardness	HRC 58~64

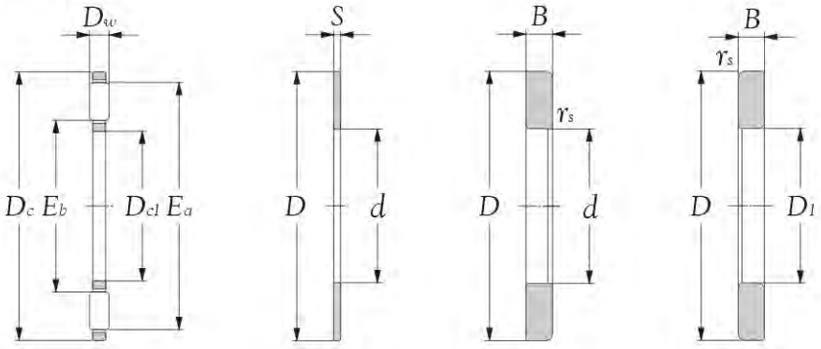
5. Bearing washer fits

The fits of the shafts and housing that mount the thrust bearing washers (AS, WS, and GS models) are given in Table B.

Table B Raceway requirements

Bearing washer	Shaft	Housing
Series AS	H10	H11
Series WS	h6	—
Series GS	—	H7

Thrust needle roller bearings
series AXK, AS, WS & GS



Type AXK | Type AS | Type WS | Type GS

Inner bore D_{cl} E11 mm	Bearing number: thrust needle roller and cage assembly (consistant with cylindrical)	Washer	Shaft locating washer	Housing locating washer	Boundary dimensions (mm): D_c C12	D_w 0 -0.01	D_b e13	D_{b1} E12	$S^{2)}$ ±0.05	d	d_1 -0.2 -0.5	D	D_1	B	r_s min[1]
10	AXK 1024	AS 1024	WS 1024	GS 1024	24	2	24	10	1	10	24	24	10	$2.75^{0}_{-0.060}$	0.3
12	AXK 1226	AS 1226	WS 1226	GS 1226	26	2	26	12	1	12	26	26	12	$2.75^{0}_{-0.060}$	0.3
15	AXK 1528	AS 1528	WS 1528	GS 1528	28	2	28	15	1	15	28	28	16	$2.75^{0}_{-0.060}$	0.3
17	AXK 1730	AS 1730	WS 1730	GS 1730	30	2	30	17	1	17	30	30	18	$2.75^{0}_{-0.060}$	0.3
20	AXK 2035	AS 2035	WS 2035	GS 2035	35	2	35	20	1	20	35	35	21	$2.75^{0}_{-0.060}$	0.3
25	AXK 2542	AS 2542	WS 2542	GS 2542	42	2	42	25	1	25	42	42	26	$3.00^{0}_{-0.060}$	0.6
30	AXK 3047	AS 3047	WS 3047	GS 3047	47	2	47	30	1	30	47	47	32	$3.00^{0}_{-0.060}$	0.6
35	AXK 3552	AS 3552	WS 3552	GS 3552	52	2	52	35	1	35	52	52	37	$3.50^{0}_{-0.075}$	0.6
40	AXK 4060	AS 4060	WS 4060	GS 4060	60	3	60	40	1	40	60	60	42	$3.50^{0}_{-0.075}$	0.6
45	AXK 4565	AS 4565	WS 4565	GS 4565	65	3	65	45	1	45	65	65	47	$4.00^{0}_{-0.075}$	0.6
50	AXK 5070	AS 5070	WS 5070	GS 5070	70	3	70	50	1	50	70	70	52	$4.00^{0}_{-0.075}$	0.6
55	AXK 5578	AS 5578	WS 5578	GS 5578	78	3	78	55	1	55	78	78	57	$5.00^{0}_{-0.075}$	0.6
60	AXK 6085	AS 6085	WS 6085	GS 6085	85	3	85	60	1	60	85	85	62	$4.75^{0}_{-0.075}$	1.0
65	AXK 6590	AS 6590	WS 6590	GS 6590	90	3	90	65	1	65	90	90	67	$5.25^{0}_{-0.075}$	1.0
70	AXK 7095	AS 7095	WS 7095	GS 7095	95	4	95	70	1	70	95	95	72	$5.25^{0}_{-0.075}$	1.0
75	AXK 75100	AS 75100	WS 75100	GS 75100	100	4	100	75	1	75	100	100	77	$5.75^{0}_{-0.075}$	1.0
80	AXK 80105	AS 80105	WS 80105	GS 80105	105	4	105	80	1	80	105	105	82	$5.75^{0}_{-0.075}$	1.0
85	AXK 85110	AS 85110	WS 85110	GS 85110	110	4	110	85	1	85	110	110	87	$5.75^{0}_{-0.075}$	1.0
90	AXK 90120	AS 90120	WS 90120	GS 90120	120	4	120	90	1	90	120	120	92	$6.50^{0}_{-0.090}$	1.0
100	AXK 100135	AS 100135	WS 100135	GS 100135	135	4	135	100	1	100	135	135	102	$7.00^{0}_{-0.090}$	1.0
110	AXK 110145	AS 110145	WS 110145	GS 110145	145	4	145	110	1	110	145	145	112	$7.00^{0}_{-0.090}$	1.0
120	AXK 120155	AS 120155	WS 120155	GS 120155	155	4	155	120	1	120	155	155	122	$7.00^{0}_{-0.090}$	1.0
130	AXK 130170	AS 130170	WS 130170	GS 130170	170	5	170	130	1	130	170	170	132	$9.00^{0}_{-0.090}$	1.0
140	AXK 140180	AS 140180	WS 140180	GS 140180	180	5	180	140	1	140	178	180	142	$9.50^{0}_{-0.090}$	1.0
150	AXK 150190	AS 150190	WS 150190	GS 150190	190	5	190	150	1	150	188	190	152	$9.50^{0}_{-0.090}$	1.0
160	AXK 160200	AS 160200	WS 160200	GS 160200	200	5	200	160	1	160	198	200	162	$9.50^{0}_{-0.090}$	1.0

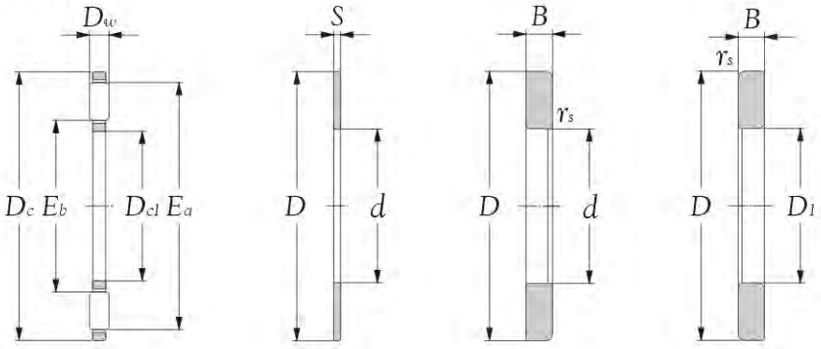
Notes: 1) These values are the allowable minimum dimensions of the chamfer dimension r.
2) Measured axial load is more than 20kgf.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

Thrust needle roller bearings
series AXK, AS, WS & GS

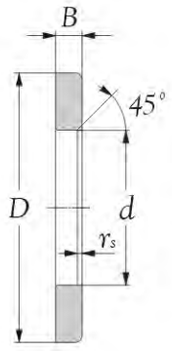


Type AXK | Type AS | Type WS | Type GS

Basic load ratings				Limiting speeds		Reference dimensions		Mass (approx.)		
dynamic	static	dynamic	static	grease	oil					WS..
Cr	*Cor*	*Cr*	*Cor*			*Eb*	*Ea*	AXK..	AS..	GS..
N		kgf		rpm		mm		kg.		
9150	25300	935	2580	3500	14000	11	21	0.0028	0.0030	0.008
9850	28900	1010	2940	3300	13000	13	23	0.0030	0.0033	0.009
11300	36000	1150	3700	2800	11000	17	27	0.0035	0.0035	0.010
11900	39500	1220	4050	2500	10000	19	29	0.0040	0.0038	0.011
13200	46500	1340	4750	2100	8500	22	34	0.0050	0.0051	0.014
14600	58000	1490	5900	1800	7000	29	41	0.0070	0.0070	0.021
16300	69500	1660	7100	1500	6000	35	46	0.0080	0.0080	0.025
17800	81500	1820	8300	1400	5500	40	51	0.0100	0.0091	0.033
27400	110000	2790	11300	1200	4700	45	58	0.0185	0.0123	0.044
29800	128000	3050	13100	1100	4300	50	63	0.0205	0.0136	0.055
31500	143000	3250	14500	1000	3900	55	68	0.0235	0.0148	0.060
38000	186000	3850	19000	900	3500	60	76	0.0308	0.0189	0.095
44500	234000	4550	23900	800	3200	65	83	0.0390	0.0223	0.101
46500	254000	4750	25900	750	3000	70	88	0.0400	0.0239	0.125
53500	253000	5500	25800	750	2900	74	93	0.0600	0.0254	0.134
55000	266000	5650	27100	700	2700	79	98	0.0610	0.0270	0.155
56500	279000	5750	28400	650	2600	84	103	0.0630	0.0284	0.163
57500	291000	5900	29700	600	2400	89	108	0.0668	0.0301	0.175
71000	390000	7250	39500	600	2300	94	118	0.0860	0.0388	0.250
90500	550000	9200	56500	500	2000	105	133	0.1120	0.0505	0.350
93500	590000	9550	60500	480	1900	115	143	0.1220	0.0549	0.385
99000	650000	10100	66500	430	1700	125	153	0.1310	0.0592	0.415
140000	900000	14300	92000	400	1600	136	167	0.2050	0.0740	0.663
145000	960000	14800	97500	380	1500	146	177	0.2190	0.0790	0.749
149000	1020000	15200	104000	350	1400	156	187	0.2320	0.0840	0.796
154000	1070000	15700	110000	330	1300	166	197	0.2460	0.0890	0.842

KSM®

Thrust needle roller bearings
series LS



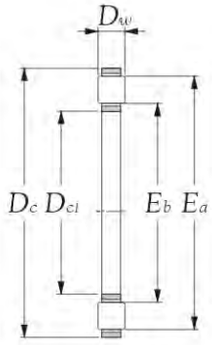
Inner bore d mm	Bearing number	Boundary dimensions D	B mm	rs min	Basic load ratings dynamic Cr N	static Cor N	Limiting speeds $n_{grease} \approx$ rpm	Roll path size Eb	Ea
6	**LS 0619**	19	2.75	0.3	6800	15500	16000	7	18
8	**LS 0821**	21	2.75	0.3	7800	19400	15000	9	20
10	**LS 1024**	24	2.75	0.3	9200	25500	14000	12	23
12	**LS 1226**	26	2.75	0.3	9900	29000	13000	14	25
15	**LS 1528**	28	2.75	0.3	11300	36000	11000	17	27
17	**LS 1730**	30	2.75	0.3	11900	39500	10000	19	29
20	**LS 2035**	35	2.75	0.3	13100	46500	8500	22	34
25	**LS 2542**	42	3.00	0.6	14700	58000	7000	29	41
30	**LS 3047**	47	3.00	0.6	16300	70000	6000	34	46
35	**LS 3552**	52	3.50	0.6	17800	81000	5500	39	51
40	**LS 4060**	60	3.50	0.6	28000	114000	4700	45	58
45	**LS 4565**	65	4.00	0.6	30000	128000	4300	50	63
50	**LS 5070**	70	4.00	0.6	32000	143000	3900	55	68
55	**LS 5578**	78	5.00	0.6	38000	186000	3500	60	76
60	**LS 6085**	85	4.75	1.0	44500	234000	3200	65	83
65	**LS 6590**	90	5.25	1.0	46500	255000	3000	70	88
70	**LS 7095**	95	5.25	1.0	54000	255000	2900	74	93
75	**LS 75100**	100	5.75	1.0	55000	265000	2700	79	98
80	**LS 80105**	105	5.75	1.0	56000	280000	2600	84	103
85	**LS 85110**	110	5.75	1.0	58000	290000	2400	89	108
90	**LS 90120**	120	6.50	1.0	73000	405000	2300	94	118
100	**LS 100135**	135	7.00	1.0	91000	560000	2000	105	133
110	**LS 110145**	145	7.00	1.0	97000	620000	1900	115	143

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

KSM®

Thrust needle roller bearings
series K 811



Inner bore D_{ci} E11	Bearing number thrust needle roller and cage assembly	Boundary dimensions D_c 0.13	D_w 0 -0.01	Basic load ratings dynamic Cr	static Cor	dynamic Cr	static Cor	Limiting speeds grease	oil	Reference dimensions E_b	E_a	Mass kg.
		mm		N		kgf		rpm				(approx.)
10	K 81100 TV	24	3.5	10800	21500	1110	2190	3400	13000	12	23	0.0035
12	K 81101 TV	26	3.5	11500	23900	1170	2430	3000	12000	14	25	0.0040
15	K 81102 TV	28	3.5	12900	28600	1310	2920	2800	11000	16	27	0.0060
17	K 81103 TV	30	3.5	13400	31000	1370	3150	2500	10000	18	29	0.0080
20	K 81104 TV	35	4.5	20200	46500	2060	4700	2100	8500	21	34	0.0120
25	K 81105 TV	42	5.0	27300	68000	2780	6900	1800	7000	27	40	0.0180
30	K 81106 TV	47	5.0	27800	72500	2840	7400	1500	6000	32	45	0.0200
35	K 81107 TV	52	5.0	31000	87000	3150	8900	1400	5500	37	50	0.0240
40	K 81108 TV	60	6.0	43000	121000	4350	12400	1200	4800	42	58	0.0350
45	K 81109 TV	65	6.0	45500	135000	4650	13800	1100	4400	47	63	0.0400
50	K 81110 TV	70	6.0	48000	150000	4900	15300	1000	4000	52	68	0.0450
55	K 81111 TV	78	6.0	62500	215000	6350	21900	900	3600	57	76	0.0600
60	K 81112 TV	85	7.5	69000	215000	7000	21900	830	3300	63	82	0.0830
65	K 81113 TV	90	7.5	73000	236000	7400	24100	780	3100	68	87	0.0900
70	K 81114 TV	95	7.5	76500	257000	7800	26200	730	2900	73	92	0.0970
75	K 81115 TV	100	7.5	78000	268000	7950	27300	680	2700	78	97	0.1150
80	K 81116 TV	105	7.5	79500	279000	8100	28400	650	2600	83	102	0.1190
85	K 81117 TV	110	7.5	83000	300000	8450	30500	630	2500	88	107	0.1250
90	K 81118 TV	120	9.0	112000	395000	11400	40500	580	2300	93	117	0.1700

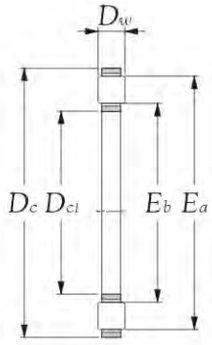
Notes: 1) The dimensional tolerance for a bearing with a T2 suffix is E12.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Polyamide 66 (TV)
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

Thrust needle roller bearings
series K 812



Inner bore D_{ci} E11 mm	Bearing number thrust needle roller and cage assembly	Boundary dimensions D_c 0.13 mm	D_w 0 -0.01 mm	Basic load ratings dynamic Cr N	static Cor N	dynamic Cr kgf	static Cor kgf	Limiting speeds grease rpm	oil rpm	Reference dimensions E_b	E_a	Mass kg. (approx.)
30	K 81206 TV	52	7.5	53500	129000	5450	13100	1500	6000	32	50	0.050
35	K 81207 TV	62	7.5	54500	139000	5550	14200	1200	4900	37	60	0.065
40	K 81208 TV	68	9.0	74500	190000	7600	19400	1100	4400	43	66	0.085
45	K 81209 TV	73	9.0	82000	222000	8350	22600	1000	4100	48	71	0.100
50	K 81210 TV	78	9.0	85000	238000	8650	24200	950	3800	53	76	0.105
55	K 81211 TV	90	11.0	121000	340000	12300	34500	830	3300	58	87	0.190
60	K 81212 TV	95	11.0	125000	365000	12800	37000	780	3100	64	92	0.200
65	K 81213 TV	100	11.0	130000	385000	13200	39500	730	2900	69	97	0.215
70	K 81214 TV	105	11.0	134000	410000	13700	42000	680	2700	74	102	0.225
75	K 81215 TV	110	11.0	138000	435000	14100	44500	650	2600	79	107	0.240
80	K 81216 TV	115	11.0	142000	460000	14500	47000	630	2500	84	112	0.250

Notes: 1) The dimensional tolerance for a bearing with a T2 suffix is E12.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Polyamide 66 (TV)
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Complex bearings

TECHNICAL SUPPLEMENT T 176 & T 177

1. Bearing materials

Depending on the thrust bearing type that is combined with a radial needle roller bearing, **KSM** complex bearings can be categorized as thrust ball bearings (series NKX), thrust cylindrical roller bearings (series NKXR). The series NKX and NKXR complex bearings can carry a relatively large axial load in one direction and can be axially located.
When used in opposing pairs, they can bear an axial load in both directions and can be axially located. However, because they cannot accommodate a greater axial expansion, they should be mounted on a shorter shaft whose axial expansion is small. The variant with a dust-proofing cover on its thrust bearing (suffix Z) is easily handled because the thrust bearing is a non-separable type. This arrangement can also prevent splashing of the grease within the thrust bearing.
Generally, radial needle roller bearings in these complex bearings use a shaft as a raceway surface, without using an inner ring. However, they can incorporate an inner ring when a shaft is inappropriate as a raceway surface.
The tolerance class of the inscribed enveloping circle diameter (*Fw*) with needle roller bearings is class F6, thesame as with machined ring needle roller bearings.

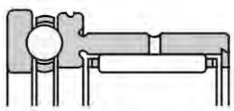


Fig. A Series NKX

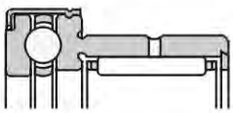


Fig. B Series NKX..Z

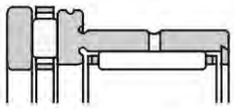


Fig. C Series NKXR

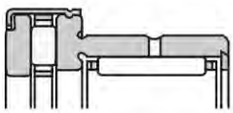


Fig. D Series NKXR..Z

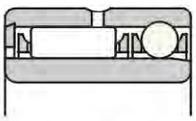


Fig. E Series NKIA

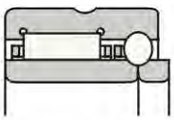
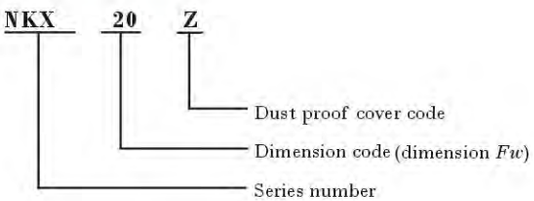


Fig. F Series NKIB

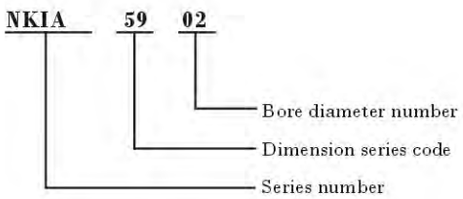
2. Interpreting bearing numbers

The bearing numbers of **KSM** complex bearings comprise a series number, dimension series code, dimension code, and suffix.

Series NKX, NKXR



Series NKIA, NKIB



3. Bearing fits

Table A summarizes the fits of radial needle roller bearings to a shaft and housing. The thrust bearing washers of series NKX and NKXR bearings are installed in a housing whose bore diameter is at least 0.5 mm larger than the outside diam eter D_1 or D_2 of the bearing washer.

Table A Fit to shaft and housing

Bearing number	Shaft	Housing
Series NKX, NKXR	k5	K6(M6)
Series NKIA, NKIB	k5	M6

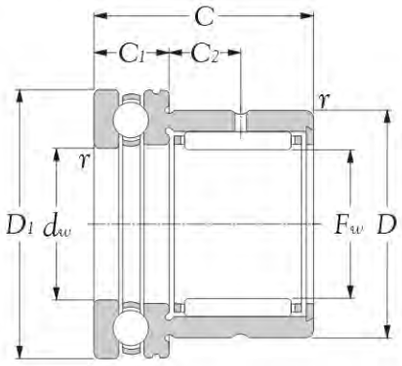
Remarks: Fits appearing in parentheses are for applications requiring greater rigidity.

4. Rating life calculation

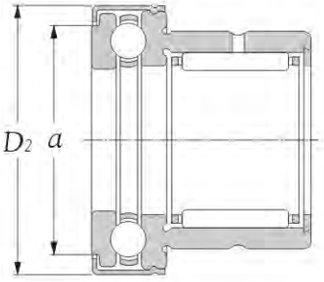
The rating life (L) of a complex bearings can be determined by inputting the results of the following calculations into the formula below:
Calculate the rating life (Lr) of the radial needle roller bearing according to the working radial load.
Calculate the rating life (La) of the thrust bearing according to the working axial load.

$$L = \frac{1}{\left(\frac{1}{Lr^{1.1}} + \frac{1}{La^{1.1}}\right)^{0.91}} \quad \text{.....(1)}$$

Needle roller bearings with thrust ball bearings
series NKX & NKX..Z



Type NKX
(Open type)



Type NKX..Z
(With cover)

Inner bore F_w mm	Bearing number		Boundary dimensions (mm)									Basic load ratings (Radial)			
												dynamic	static	dynamic	static
			d_w	D	D_1	D_2	C $^{0}_{-0.25}$	C_1 $^{0}_{-0.20}$	C_2	a	r_s min[1]	C_r	C_{or}	C_r	C_{or}
												N		kgf	
$10^{+0.022}_{+0.013}$	NKX 10	NKX 10 Z	$10^{+0.040}_{+0.025}$	19	24	25.0	23	9	6.5	19.7	0.3	5450	6450	555	660
$12^{+0.027}_{+0.016}$	NKX 12	NKX 12 Z	$12^{+0.050}_{+0.032}$	21	26	27.0	23	9	6.5	21.7	0.3	6000	7700	615	785
$15^{+0.027}_{+0.016}$	NKX 15	NKX 15 Z	$15^{+0.050}_{+0.032}$	24	28	29.0	23	9	6.5	23.7	0.3	8250	10200	840	1040
$17^{+0.027}_{+0.016}$	NKX 17	NKX 17 Z	$17^{+0.050}_{+0.032}$	26	30	31.0	25	9	8.0	25.7	0.3	10400	14400	1060	1460
$20^{+0.033}_{+0.020}$	NKX 20	NKX 20 Z	$20^{+0.061}_{+0.040}$	30	35	36.0	30	10	10.5	30.7	0.3	16400	27100	1670	2760
$25^{+0.033}_{+0.020}$	NKX 25	NKX 25 Z	$25^{+0.061}_{+0.040}$	37	42	43.0	30	11	9.5	37.7	0.6	14200	24000	1450	2450
$30^{+0.033}_{+0.020}$	NKX 30	NKX 30 Z	$30^{+0.061}_{+0.040}$	42	47	48.0	30	11	9.5	42.7	0.6	22300	39500	2280	4000
$35^{+0.041}_{+0.025}$	NKX 35	NKX 35 Z	$35^{+0.075}_{+0.050}$	47	52	53.0	30	12	9.0	47.7	0.6	20000	36000	2040	3650
$40^{+0.041}_{+0.025}$	NKX 40	NKX 40 Z	$40^{+0.075}_{+0.050}$	52	60	61.0	32	13	10.0	55.7	0.6	25900	52500	2650	5350
$45^{+0.041}_{+0.025}$	NKX 45	NKX 45 Z	$45^{+0.075}_{+0.050}$	58	65	66.5	32	14	9.0	60.5	0.6	27600	59000	2810	6000
$50^{+0.041}_{+0.025}$	NKX 50	NKX 50 Z	$50^{+0.075}_{+0.050}$	62	70	71.5	35	14	10.0	65.5	0.6	27900	62000	2850	6300
$60^{+0.049}_{+0.030}$	NKX 60	NKX 60 Z	$60^{+0.090}_{+0.060}$	72	85	86.5	40	17	12.0	80.5	1.0	29800	71500	3050	7300
$70^{+0.049}_{+0.030}$	NKX 70	NKX 70 Z	$70^{+0.090}_{+0.060}$	85	95	96.5	40	18	11.0	90.5	1.0	36500	86000	3700	8750

Notes: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

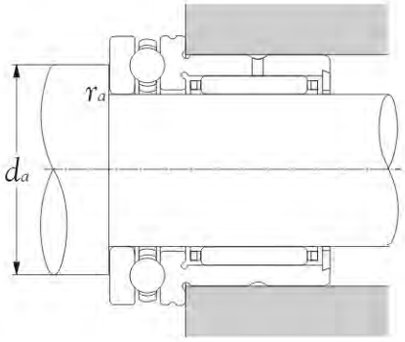
Remark: [Precision] - Class 0 (JIS)

[Cage] - Steel

[Grease] - Shell Alvania S2

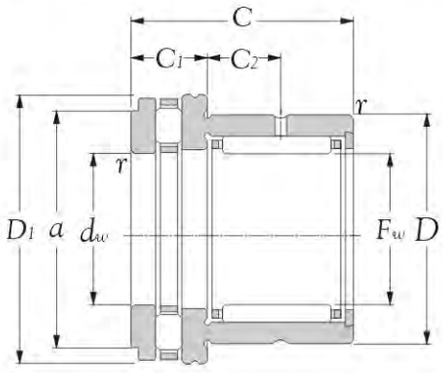
If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Needle roller bearings with thrust ball bearings
series NKX & NKX..Z

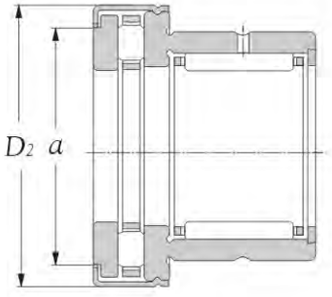


Basic load ratings (Axial)				Limiting speeds		Abutment dimensions		Mass (approx.)	
dynamic	static	dynamic	static	grease	oil			kg.	
Ca	Coa	Ca	Coa			d_a	r_{as}		
N		kgf		rpm		mm	max	Type NKX	Type NKX..Z
10000	14000	1020	1420	6700	9500	18	0.3	0.037	0.039
10300	15400	1050	1570	6400	9200	20	0.3	0.042	0.044
10500	16800	1070	1710	6200	8800	23	0.3	0.044	0.048
10800	18200	1100	1850	6000	8500	25	0.3	0.051	0.056
14200	24700	1450	2520	5200	7500	29	0.3	0.085	0.090
19600	37000	1990	3800	4600	6500	35	0.6	0.125	0.132
20400	42000	2080	4300	4300	6200	40	0.6	0.140	0.148
20400	44500	2080	4550	3900	5600	45	0.6	0.167	0.175
26900	63000	2740	6400	3500	5000	52	0.6	0.216	0.225
27900	69000	2840	7050	3200	4600	57	0.6	0.252	0.265
28800	75500	2930	7700	3100	4500	62	0.6	0.302	0.318
41500	113000	4200	11500	2600	3700	75	1.0	0.465	0.484
43000	127000	4400	12900	2400	3400	85	1.0	0.612	0.635

Needle roller bearings with angular contact ball bearings
series NKXR & NKXR..Z



Type NKXR
(Open type)



Type NKXR..Z
(With cover)

Inner bore Fw mm	Bearing number		Boundary dimensions (mm)									Basic load ratings (Radial)			
												dynamic	static	dynamic	static
			dw	D	D1	D2	C 0 -0.25	C1 0 -0.20	C2	a	r s min[1]	Cr	Cor	Cr	Cor
												N		kgf	
15 +0.027 +0.016	NKXR 15	NKXR 15 Z	15 +0.050 +0.032	24	28	29.0	23	9	6.5	23.7	0.3	8250	10200	840	1040
17 +0.027 +0.016	NKXR 17	NKXR 17 Z	17 +0.050 +0.032	26	30	31.0	25	9	8.0	25.7	0.3	10400	14400	1060	1460
20 +0.033 +0.020	NKXR 20	NKXR 20 Z	20 +0.061 +0.040	30	35	36.0	30	10	10.5	30.7	0.3	16400	27100	1670	2760
25 +0.033 +0.020	NKXR 25	NKXR 25 Z	25 +0.061 +0.040	37	42	43.0	30	11	9.5	37.7	0.6	14200	24000	1450	2450
30 +0.033 +0.020	NKXR 30	NKXR 30 Z	30 +0.061 +0.040	42	47	48.0	30	11	9.5	42.7	0.6	22300	39500	2280	4000
35 +0.041 +0.025	NKXR 35	NKXR 35 Z	35 +0.075 +0.050	47	52	53.0	30	12	9.0	47.7	0.6	20000	36000	2040	3650
40 +0.041 +0.025	NKXR 40	NKXR 40 Z	40 +0.075 +0.050	52	60	61.0	32	13	10.0	55.7	0.6	25900	52500	2650	5350
45 +0.041 +0.025	NKXR 45	NKXR 45 Z	45 +0.075 +0.050	58	65	66.5	32	14	9.0	60.5	0.6	27600	59000	2810	6000
50 +0.041 +0.025	NKXR 50	NKXR 50 Z	50 +0.075 +0.050	62	70	71.5	35	14	10.0	65.5	0.6	27900	62000	2850	6300

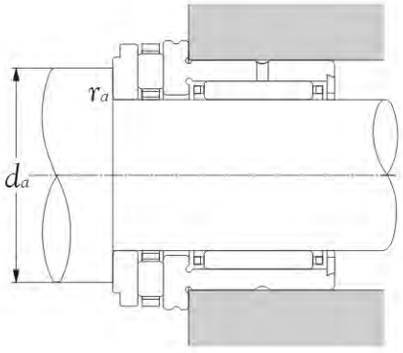
Notes: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter KSM web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

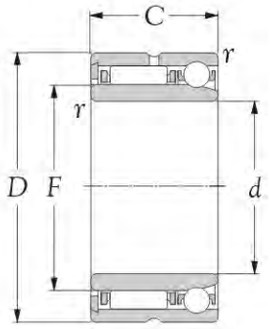
P2

Needle roller bearings with angular contact ball bearings
series NKXR & NKXR..Z



Basic load ratings (Axial)				Limiting speeds		Abutment dimensions		Mass (approx.)	
dynamic	static	dynamic	static	grease	oil			kg.	
Ca	Coa	Ca	Coa			d_a min	r_{as} max		
N		kgf		rpm				Type NKXR	Type NKXR..Z
12900	28600	1310	2920	2800	11000	25	0.3	0.048	0.052
13400	31000	1370	3150	2500	10000	27	0.3	0.050	0.053
20200	46500	2060	4700	2100	8500	32	0.3	0.090	0.095
27300	68000	2780	6900	1800	7000	39	0.6	0.128	0.135
27800	72500	2840	7400	1500	6000	44	0.6	0.162	0.169
31000	87000	3150	8900	1400	5500	49	0.6	0.184	0.195
43000	121000	4350	12400	1200	4800	56	0.6	0.226	0.237
45500	135000	4650	13800	1100	4400	61	0.6	0.267	0.286
48000	150000	4900	15300	1000	4000	66	0.6	0.309	0.329

Needle roller bearings with angular contact ball bearings
series NKIA 59



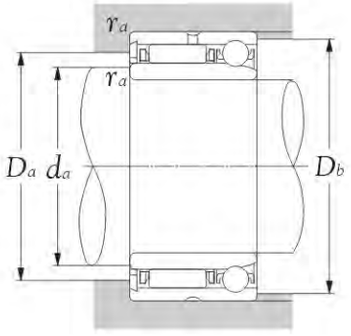
Inner bore d	Bearing number	Boundary dimensions				Basic load ratings (Radial)			
		D	C	F	$r_{s\,min}$[1]	dynamic C_r	static C_{or}	dynamic C_r	static C_{or}
mm		mm				N		kgf	
15	NKIA 5902	28	18	20	0.3	9500	13400	970	1370
17	NKIA 5903	30	18	22	0.3	10100	14900	1030	1520
20	NKIA 5904	37	23	25	0.3	16500	22100	1680	2250
22	NKIA 59/22	39	23	28	0.3	17500	24800	1790	2530
25	NKIA 5905	42	23	30	0.3	17400	25000	1770	2550
30	NKIA 5906	47	23	35	0.3	19400	30500	1980	3100
35	NKIA 5907	55	27	42	0.6	25700	46000	2630	4700
40	NKIA 5908	62	30	48	0.6	31000	61000	3150	6250
45	NKIA 5909	68	30	55	0.6	33000	69500	3350	7100
50	NKIA 5910	72	30	60	0.6	33500	73500	3450	7500
55	NKIA 5911	80	34	63	1.0	44500	95500	4500	9700
60	NKIA 5912	85	34	68	1.0	45500	101000	4600	10300
65	NKIA 5913	90	34	75	1.0	46000	106000	4700	10800
70	NKIA 5914	100	40	80	1.0	62500	146000	6350	14900

Notes: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

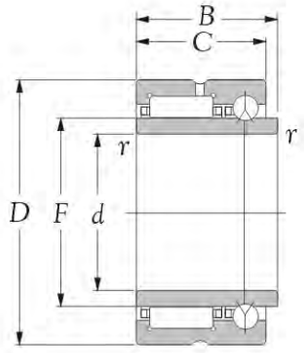
If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Needle roller bearings with angular contact ball bearings
series NKIA 59



Basic load ratings (Axial)				Limiting speeds		Abutment dimensions				Mass
dynamic	static	dynamic	static	grease	oil					kg(s).
Ca	Coa	Ca	Coa			da	Da	Db	r_{as}	
N		kgf		rpm		min	max	max	max	(approx.)
2340	3050	239	310	13000	20000	17.5	22.0	25.5	0.3	0.050
2530	3550	258	360	12000	18000	19.5	24.0	27.5	0.3	0.056
4700	6150	480	625	11000	16000	22.5	28.0	34.5	0.3	0.111
4900	6750	500	690	9500	14000	24.5	31.0	36.5	0.3	0.120
5100	7350	520	750	8500	13000	27.5	33.0	39.5	0.3	0.130
5400	8550	550	870	7500	11000	32.5	38.0	44.5	0.3	0.147
7400	12300	755	1260	6500	9500	40.0	45.0	50.0	0.6	0.243
7750	14000	790	1430	5500	8500	45.0	51.0	57.0	0.6	0.347
8500	17100	870	1740	5000	7500	50.0	58.0	63.0	0.6	0.401
8800	18700	900	1910	4300	6500	55.0	63.0	67.0	0.6	0.410
14300	33000	1460	3350	4300	6500	61.0	66.5	74.0	1.0	0.590
14800	36000	1510	3650	4000	6000	66.0	71.5	79.0	1.0	0.632
15200	39000	1550	4000	3700	5500	71.0	78.5	84.0	1.0	0.708
18600	47500	1890	4850	3300	5000	76.0	84.0	94.0	1.0	1.050

Needle roller bearings with three-point contact ball bearings
series NKIB 59



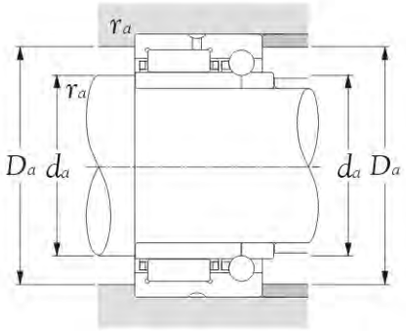
Inner bore d mm	Bearing number	Boundary dimensions D	B	C	F	r's mm[1]	Basic load ratings (Radial) dynamic Cr N	static Cor N	dynamic Cr kgf	static Cor kgf
15	NKIB 5902	28	20	18	20	0.3	10800	13600	1100	1390
17	NKIB 5903	30	20	18	22	0.3	11200	14600	1140	1490
20	NKIB 5904	37	25	23	25	0.3	21300	25500	2170	2600
22	NKIB 59/22	39	25	23	28	0.3	23200	29300	2360	2990
25	NKIB 5905	42	25	23	30	0.3	24000	31500	2450	3200
30	NKIB 5906	47	25	23	35	0.3	25500	35500	2600	3600
35	NKIB 5907	55	30	42	42	0.6	32000	50000	3300	5100
40	NKIB 5908	62	34	48	28	0.6	43500	66500	4450	6800
45	NKIB 5909	68	34	52	52	0.6	46000	73000	4700	7450
50	NKIB 5910	72	34	58	58	0.6	48000	80000	4900	8150
55	NKIB 5911	80	38	63	63	1.0	58500	99500	6000	10100
60	NKIB 5912	85	38	68	68	1.0	61500	108000	6250	11000
65	NKIB 5913	90	38	72	72	1.0	62500	112000	6350	11400
70	NKIB 5914	100	45	80	80	1.0	85500	156000	8750	15900

Notes: 1) These values are the allowable minimum dimensions of the chamfer dimension r.
Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

Needle roller bearings with three-point contact ball bearings
series NKIB 59



Basic load ratings (Axial)				Limiting speeds		Abutment dimensions			Mass
dynamic	static	dynamic	static	grease	oil				kg.
Ca	Coa	Ca	Coa			d_a	D_a	r_{as}	
N		kgf		rpm		mm	max	max	(approx.)
2750	4200	280	430	13000	20000	17.5	25.5	0.3	0.052
2960	4900	300	495	12000	18000	19.5	27.5	0.3	0.058
4650	7400	475	755	11000	16000	22.5	34.5	0.3	0.107
5000	8650	510	880	9500	14000	24.5	36.5	0.3	0.122
5150	9250	525	945	8500	13000	27.5	39.5	0.3	0.134
5600	11200	570	1140	7500	11000	32.5	44.5	0.3	0.151
7050	14900	720	1520	6500	9500	40.0	50.0	0.6	0.247
8700	19400	890	1980	5500	8500	45.0	57.0	0.6	0.320
9100	21400	925	2180	5000	7500	50.0	63.0	0.6	0.380
9600	24300	980	2480	4300	6500	55.0	67.0	0.6	0.385
11400	29400	1170	3000	4300	6500	61.0	74.0	1.0	0.555
11800	32000	1200	3250	4000	6000	66.0	79.0	1.0	0.595
12100	34000	1240	3500	3700	5500	71.0	84.0	1.0	0.640
15900	44500	1620	4550	3300	5000	76.0	94.0	1.0	0.985

KSM® NOTE

Roller followers

TECHNICAL SUPPLEMENT

T 188 - T 190

1. Bearing materials

KSM Yoke-type track rollers include the series RNA 22 (without inner ring) and series NA 22 (with inner ring), whose outer ring is not guided in the axial direction; and the NATR, NATV and series NUTR whose outer ring is guided in the axial direction. With the series RNA 22 and NA 22, a needle roller and cage assembly and steel platereinforced synthetic rubber seal are built into the outer ring, and these components are inseparable from each other. Since the bearing can be shifted in the axial direction, the shaft must have a thrust washer or flange to guide the outer ring.

Fig. A Series RNA 22..2RSR

Fig. B Series NA 22..2RSR

With the series NATR, NATV, the outer ring is guided in the axial direction by two side plates that are press-fit into the inner ring. The series NATR bearing has an integral cage and needle roller assembly. The series NATV full-complement type can carry a larger load compared with the series NATR bearing, although its limiting speed is low.
On **KSM** Yoke-type track rollers, a labyrinth occurs between the outer ring and inner ring to provide sealing. For enhanced sealing, one type of bearing (suffix PP) incorporates a synthetic rubber seal between the outer ring and inner ring.

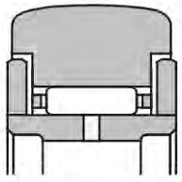


Fig. C Series NATR

Fig. D Series NATV

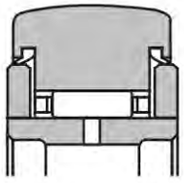


Fig. E Series NATR..PP

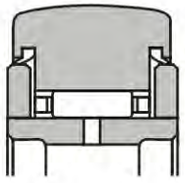


Fig. F Series NATV..PP

The rollers of the series NUTR are full-complement type rollers whose rolling elements are double-row cylindrical rollers. Compared with full-complement needle roller bearings, they feature greater load carrying capacity and thus are suitable for heavy load applications. Their outer ring incorporates a press-fit steel plate to form a labyrinth between the side plates on both sides of the inner ring to ensure reliable sealing and maint ain the position of the side plates. The outer ring is guided in the axial direction by the outer ring rib and end faces of the cylindrical rollers, and can carry some axial load. The inner ring and side plates are tightened in the axial direction to eliminate clearance.

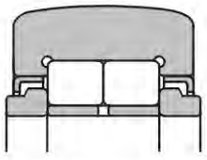
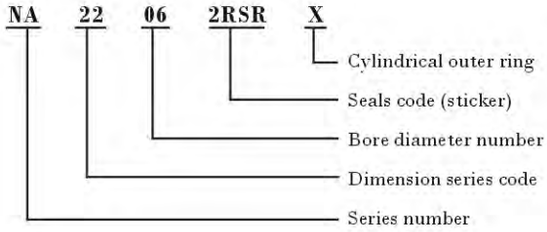


Fig. G Series NUTR

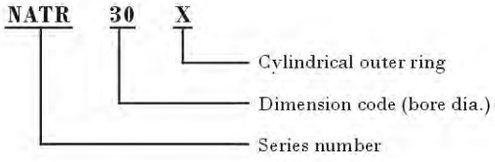
2. Interpreting bearing numbers

The bearing numbers of **KSM** yoke-type track rollers comprise a series number, dimension series code, dimension code, and suffix.

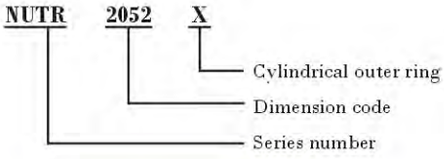
Series RNA, NA



Series NATR, NATV



Series NUTR



T1

3. Bearing fits and radial clearance

The tolerance class of the shaft in relation to a bearing with an inner ring is g6 (h6). If a shaft is used directly as a raceway surface (series RNA 22), the tolerance class of the shaft must be k5 (k6). Usually, the outer ring of an **KSM** Yoke-type track roller is not built into a housing.

Table A Radial clearance (Unit: μm)

Enveloping circle diameter F_w (mm)		Clearance							
		C2		Normal		C3		C4	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
3	6	0	10	3	17	15	30	20	40
6	10	0	12	5	20	15	30	25	45
10	18	0	15	5	25	15	35	30	55
18	30	0	20	10	30	20	40	40	65
30	50	0	25	10	40	25	55	50	80
50	80	0	30	15	50	30	65	60	100
80	100	0	35	20	55	35	75	70	115

4. Mounting dimensions

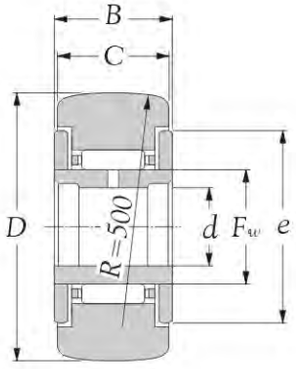
If a bearing lacks a function for axially guiding the outer ring, as in the case of the series RNA 22 series or NA 22 bearings, the shaft must be provided with a flange or thrust washer to guide the outer ring. The guide surface should preferably be hardened, and the guide width should be at least half the outer ring width. At minimum, the guide surface must be finished by a turning process, and must be smooth and free from burrs.The mounting surface for series NATR, NATV and NUTR rollers must at least adopt dimensions e specified in the associated bearing tables so that their side plates can make full contact.

5. Lubrication

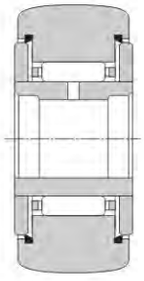
Rollers having a synthetic rubber seal (suffix PP) and those of the full-complement type are pre-filled with lithium soap grease and can operate at a temperature range of 25 °C to 100 °C. The internal bearing grease can be replenished through a lubrication hole on the inner ring. The rollers must be installed so that the lubrication hole is located in a non-load zone.The series NATV and NUTR being full-complement types, must be lubricated more frequently than the caged types.

KSM® NOTE

Roller followers yoke type truck rollers
series NATR



Type NATR
(With cage)



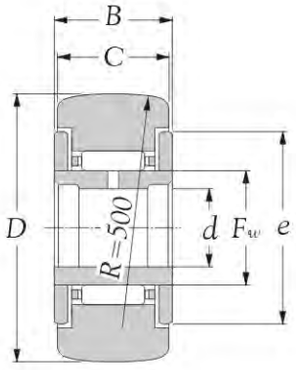
Type NATR..PP
(Double seals with cage)

Outer diamenter D $^{0}_{-0.05}$ mm	Bearing number		Boundary dimensions B	C	d	e	F_w	Basic load ratings dynamic C_r	static C_{or}	dynamic C_r	static C_{or}
			mm					N		kgf	
16	NATR 5	NATR 5 PP	12 $^{0}_{-0.180}$	11	5	12	8.0	3850	3950	395	400
19	NATR 6	NATR 6 PP	12 $^{0}_{-0.180}$	11	6	14	10.0	4500	5100	460	520
24	NATR 8	NATR 8 PP	15 $^{0}_{-0.180}$	14	8	19	12.0	6600	7300	675	745
30	NATR 10	NATR 10 PP	15 $^{0}_{-0.180}$	14	10	23	15.0	7500	9100	765	930
32	NATR 12	NATR 12 PP	15 $^{0}_{-0.180}$	14	12	25	17.0	8500	11100	865	1130
35	NATR 15	NATR 15 PP	19 $^{0}_{-0.210}$	18	15	27	20.0	13000	20100	1320	2050
40	NATR 17	NATR 17 PP	21 $^{0}_{-0.210}$	20	17	32	22.0	13600	22100	1390	2250
47	NATR 20	NATR 20 PP	25 $^{0}_{-0.210}$	24	20	37	25.0	20300	33000	2070	3350
52	NATR 25	NATR 25 PP	25 $^{0}_{-0.210}$	24	25	42	30.0	22300	39500	2280	4000
62	NATR 30	NATR 30 PP	29 $^{0}_{-0.210}$	28	30	51	38.0	35000	64000	3600	6550
72	NATR 35	NATR 35 PP	29 $^{0}_{-0.210}$	28	35	58	44.5	38000	74500	3850	7600
80	NATR 40	NATR 40 PP	32 $^{0}_{-0.250}$	30	40	66	50.0	48500	90000	4950	9150
85	NATR 45	NATR 45 PP	32 $^{0}_{-0.250}$	30	45	71	55.0	50500	97500	5150	9950
90	NATR 50	NATR 50 PP	32 $^{0}_{-0.250}$	30	50	76	60.0	52000	105000	5300	10700

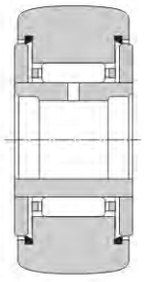
Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Roller followers yoke type truck rollers
series NATR



Type NATR
(With cage)

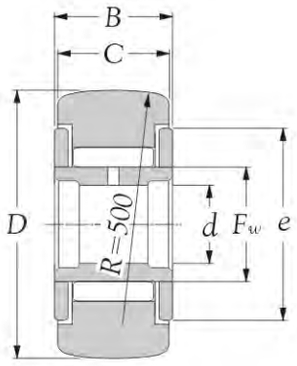


Type NATR..PP
(Double seals with cage)

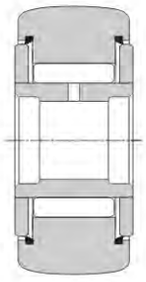
Load ratings of truck				Limiting speeds		Mass
Spherical outer ring	Cylindrical outer ring	Spherical outer ring	Cylindrical outer ring	grease	oil	kg.
N		kgf		rpm		(approx.)
1080	3400	110	350	※19000	※25000	0.018
1380	4050	141	415	※15000	※20000	0.025
1900	6650	193	680	※12000	※16000	0.042
2620	7700	267	785	10000	※13000	0.061
2860	8200	291	835	9000	※12000	0.069
3200	11900	325	1220	7500	10000	0.098
3850	14500	390	1480	7000	9000	0.140
4700	21000	480	2150	6000	8000	0.246
5500	23300	565	2370	5000	6500	0.275
6950	33000	710	3350	4000	5500	0.470
8050	37000	820	3750	3300	4500	0.635
9800	44500	1000	4500	3000	4000	0.875
10400	47000	1060	4800	2700	3600	0.910
11400	50000	1160	5100	2500	3300	0.960

Notes: 1) Limiting speed of sealed type bearings marked with ※ is approximately 10 000 r/min.
2) Suffix "X" means cylindrical outer ring.

Roller followers yoke type truck rollers
series NATV



Type NATV
(Full complement type)



Type NATV..PP
(Full complement type with seals)

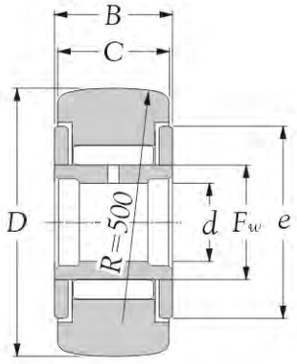
Outer diameter D $^{0}_{-0.05}$ mm	Bearing number		Boundary dimensions B	C	d	e	F_w	Basic load ratings dynamic C_r	static C_{or}	dynamic C_r	static C_{or}
			mm					N		kgf	
16	NATV 5	NATV 5 PP	12 $^{0}_{-0.180}$	11	5	12	8.0	6250	8900	640	910
19	NATV 6	NATV 6 PP	12 $^{0}_{-0.180}$	11	6	14	10.0	7200	11200	735	1140
24	NATV 8	NATV 8 PP	15 $^{0}_{-0.180}$	14	8	19	12.0	10300	15500	1050	1580
30	NATV 10	NATV 10 PP	15 $^{0}_{-0.180}$	14	10	23	15.0	11700	19500	1190	1980
32	NATV 12	NATV 12 PP	15 $^{0}_{-0.180}$	14	12	25	17.0	12600	22100	1280	2250
35	NATV 15	NATV 15 PP	19 $^{0}_{-0.210}$	18	15	27	20.0	18000	37000	1830	3750
40	NATV 17	NATV 17 PP	21 $^{0}_{-0.210}$	20	17	32	22.0	18900	40500	1930	4150
47	NATV 20	NATV 20 PP	25 $^{0}_{-0.210}$	24	20	37	25.0	28400	60000	2900	6100
52	NATV 25	NATV 25 PP	25 $^{0}_{-0.210}$	24	25	42	30.0	31000	72000	3150	7350
62	NATV 30	NATV 30 PP	29 $^{0}_{-0.210}$	28	30	51	38.0	46500	112000	4750	11400
72	NATV 35	NATV 35 PP	29 $^{0}_{-0.210}$	28	35	58	44.5	51000	130000	5200	13300
80	NATV 40	NATV 40 PP	32 $^{0}_{-0.250}$	30	40	66	50.0	67500	167000	6850	17100
90	NATV 50	NATV 50 PP	32 $^{0}_{-0.250}$	30	50	76	60.0	74500	200000	7600	20400

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

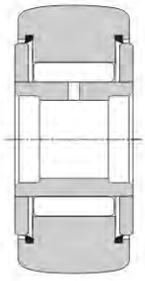
If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

Roller followers yoke type truck rollers
series NATV



Type NATV
(Full complement type)

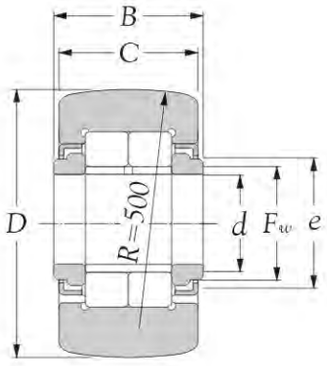


Type NATV..PP
(Full complement type with seals)

Load ratings of truck				Limiting speeds		Mass
Spherical outer ring	Cylindrical outer ring	Spherical outer ring	Cylindrical outer ring	grease	oil	kg.
N		kgf		rpm		(approx.)
1080	3400	110	350	※13000	※16000	0.020
1380	4050	141	415	10000	※13000	0.027
1900	6650	193	680	8500	※11000	0.044
2620	7700	267	785	6500	8500	0.065
2860	8200	291	835	6000	7500	0.074
3200	11900	325	1220	5000	6500	0.102
3850	14500	390	1480	4500	6000	0.145
4700	21000	480	2150	4000	5000	0.254
5500	23300	565	2370	3300	4500	0.285
6950	33000	710	3350	2600	3500	0.481
8050	37000	820	3750	2200	2900	0.647
9800	44500	1000	4500	2000	2600	0.890
11400	50000	1160	5100	1600	2100	0.990

Notes: 1) Limiting speed of sealed type bearings marked with ※ is approximately 10 000 r/min.
2) Suffix "X" means cylindrical outer ring.

Roller followers yoke type truck rollers
series NUTR



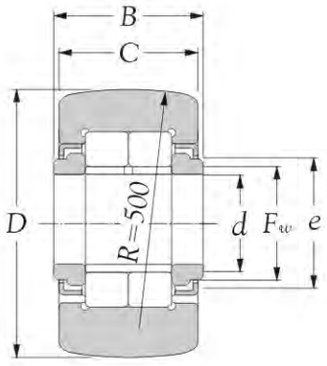
Outer diameter D $^{0}_{-0.05}$	Bearing number	Boundary dimensions						Basic load ratings			
		B	C	d	e	F_w	r_s min[1]	dynamic Cr	static Cor	dynamic Cr	static Cor
mm		mm						N		kgf	
35	**NUTR 15**	$19^{0}_{-0.210}$	18	15	20	19.0	0.3	22300	25700	2280	2620
40	**NUTR 17**	$21^{0}_{-0.210}$	20	17	22	21.5	0.3	24100	29100	2450	2970
42	**NUTR 1542**	$19^{0}_{-0.210}$	18	15	20	19.0	0.3	22300	25700	2280	2620
47	**NUTR 1747**	$21^{0}_{-0.210}$	20	17	22	21.5	0.3	24100	29100	2450	2970
47	**NUTR 20**	$25^{0}_{-0.210}$	24	20	27	25.5	0.3	38500	48000	3950	4900
52	**NUTR 2052**	$25^{0}_{-0.210}$	24	20	27	25.5	0.3	38500	48000	3950	4900
52	**NUTR 25**	$25^{0}_{-0.210}$	24	25	31	30.0	0.3	42500	57500	4350	5850
62	**NUTR 2562**	$25^{0}_{-0.210}$	24	25	31	30.0	0.3	42500	57500	4350	5850
62	**NUTR 30**	$29^{0}_{-0.210}$	28	30	38	35.0	0.3	56500	72500	5750	7400
72	**NUTR 3072**	$29^{0}_{-0.210}$	28	30	38	35.0	0.3	56500	72500	5750	7400
72	**NUTR 35**	$29^{0}_{-0.210}$	28	35	44	41.5	0.6	62000	85500	6350	8700
80	**NUTR 3580**	$29^{0}_{-0.210}$	28	35	44	41.5	0.6	62000	85500	6350	8700
80	**NUTR 40**	$32^{0}_{-0.250}$	30	40	51	47.5	0.6	87000	125000	8850	12700
85	**NUTR 45**	$32^{0}_{-0.250}$	30	45	55	52.5	0.6	92000	137000	9350	14000
90	**NUTR 4090**	$32^{0}_{-0.250}$	30	40	51	47.5	0.6	87000	125000	8850	12700
90	**NUTR 50**	$32^{0}_{-0.250}$	30	50	60	57.0	0.6	96500	150000	9800	15300
100	**NUTR 45100**	$32^{0}_{-0.250}$	30	45	55	52.5	0.6	92000	137000	9350	14000
110	**NUTR 50110**	$32^{0}_{-0.250}$	30	50	60	57.0	0.6	96500	150000	9800	15300

Notes: 1) These values are the allowable minimum dimensions of the chamfer dimension r.
2) Suffix "X" means cylindrical outer ring.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

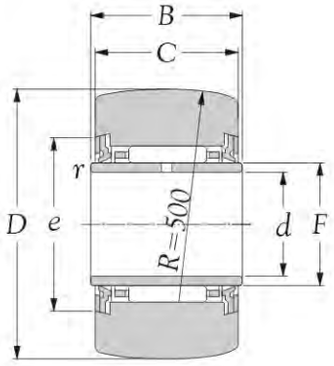
If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Roller followers yoke type truck rollers
series NUTR

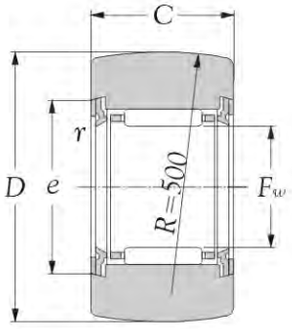


Load ratings of truck				Limiting speeds grease	Mass kg(s).
Spherical outer ring	Cylindrical outer ring	Spherical outer ring	Cylindrical outer ring		
N		kgf		rpm	(approx.)
3200	11900	325	1220	5500	0.100
3850	14500	390	1480	4700	0.147
4100	14300	415	1460	5500	0.160
4700	17000	480	1740	4700	0.222
4700	21000	480	2150	4000	0.245
5550	23300	565	2370	4000	0.321
5550	23300	565	2370	3300	0.281
6950	27800	710	2830	3300	0.450
6950	33000	710	3350	2900	0.466
8050	38500	820	3900	2900	0.697
8050	37000	820	3750	2400	0.630
9800	41000	1000	4150	2400	0.840
9800	44500	1000	4500	2100	0.817
10400	47000	1060	4800	1900	0.883
11400	50000	1160	5100	2100	1.130
11400	50000	1160	5100	1800	0.950
13000	55500	1330	5650	1900	1.400
14700	61000	1500	6200	1800	1.690

Roller followers yoke type truck rollers sealed type
series NA 22..2RSR & RNA 22..2RSR



Type NA 22..2RSR
(With inner ring and double seals)



Type RNA 22..2RSR
(Without inner ring and double seals)

Outer diamenter D 0/-0.05	Bearing number		Boundary dimensions							Basic load ratings			
			B	C	d	Fw	e	F	rs min[1]	dynamic Cr	static Cor	dynamic Cr	static Cor
mm			mm							N		kgf	
19	NA 22/6 2RSR	RNA 22/6 2RSR	12	11.8	6	$10^{+0.022}_{+0.013}$	16	10	0.3	4300	3950	435	405
24	NA 22/8 2RSR	RNA 22/8 2RSR	12	11.8	8	$12^{+0.027}_{+0.016}$	18	12	0.3	4850	4900	495	500
30	NA 2200 2RSR	RNA 2200 2RSR	14	13.8	10	$14^{+0.027}_{+0.016}$	20	14	0.3	7200	8500	735	865
32	NA 2201 2RSR	RNA 2201 2RSR	14	13.8	12	$16^{+0.027}_{+0.016}$	22	16	0.3	7750	9700	795	990
35	NA 2202 2RSR	RNA 2202 2RSR	14	13.8	15	$20^{+0.033}_{+0.020}$	26	20	0.3	9500	13400	970	1370
40	NA 2203 2RSR	RNA 2203 2RSR	16	15.8	17	$22^{+0.033}_{+0.020}$	28	22	0.3	10100	14900	1030	1520
47	NA 2204 2RSR	RNA 2204 2RSR	18	17.8	20	$25^{+0.033}_{+0.020}$	33	25	0.3	16500	22100	1680	2250
52	NA 2205 2RSR	RNA 2205 2RSR	18	17.8	25	$30^{+0.033}_{+0.020}$	38	30	0.3	17400	25000	1770	2550
62	NA 2206 2RSR	RNA 2206 2RSR	20	19.8	30	$35^{+0.041}_{+0.025}$	43	35	0.3	20900	33500	2130	3400
72	NA 2207 2RSR	RNA 2207 2RSR	23	22.7	35	$42^{+0.041}_{+0.025}$	50	42	0.6	25700	46000	2630	4700
80	NA 2208 2RSR	RNA 2208 2RSR	23	22.7	40	$48^{+0.041}_{+0.025}$	57	48	0.6	27800	53500	2830	5450
85	NA 2209 2RSR	RNA 2209 2RSR	23	22.7	45	$52^{+0.049}_{+0.030}$	62	52	0.6	28600	57000	2920	5800
90	NA 2210 2RSR	RNA 2210 2RSR	23	22.7	50	$58^{+0.049}_{+0.030}$	68	58	0.6	30500	64000	3100	6500

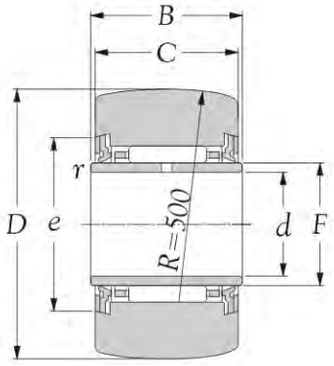
Notes: 1) These values are the allowable minimum dimensions of the chamfer dimension r.
2) Suffix "X" means cylindrical outer ring.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

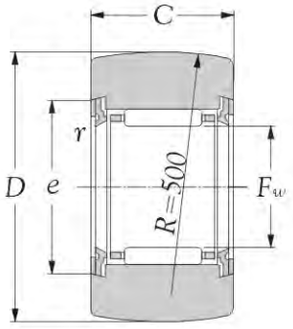
If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

Roller followers yoke type truck rollers sealed type
series NA 22..2RSR & RNA 22..2RSR



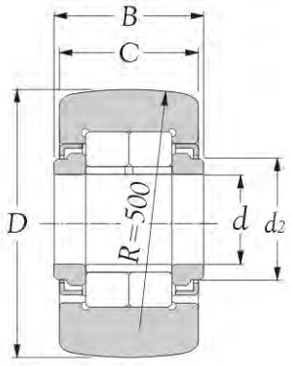
Type NA 22..2RSR
(With inner ring and double seals)



Type RNA 22..2RSR
(Without inner ring and double seals)

Load ratings of truck				Limiting speeds	Mass (approx.)	
Spherical outer ring	Cylindrical outer ring	Spherical outer ring	Cylindrical outer ring	grease	Typt	Typt
N		kgf		rpm	NA 22..2RSR	RNA 22..2RSR kg.
1380	4400	141	445	10000	0.023	0.018
1900	5500	193	565	10000	0.035	0.027
2620	7550	267	770	10000	0.060	0.052
2860	8050	291	820	9500	0.067	0.057
3200	8800	325	900	7500	0.075	0.060
3850	10900	390	1110	7000	0.113	0.094
4700	14800	480	1510	6000	0.176	0.152
5550	16400	565	1670	5000	0.209	0.179
6950	22200	710	2260	4300	0.322	0.284
8050	28700	820	2930	3600	0.506	0.432
9800	32000	1000	3250	3100	0.623	0.530
10400	34000	1060	3450	2900	0.638	0.545
11400	36000	1160	3650	2600	0.682	0.563

Needle yoke type track rollers
series PWTR .. 2RS



(Full complement cylindrical roller set, with axial guidance, lip seals on both side)

Outer diameter D $^{0}_{-0.05}$	Bearing number	Boundary dimensions						Basic load ratings				Fatigue limit load	Limiting speeds grease	Mass kg(s).
		d	B	C	d_2	r	r_1	dynamic C_r	static C_{or}	dynamic C_r	static C_{or}			
mm		mm						N		kgf		N	rpm	(approx.)
35	PWTR 15 2RS	15	19	18	20.0	0.6	0.3	12600	14600	10700	14600	1760	6000	0.099
40	PWTR 17 2RS	17	21	20	22.0	1.0	0.5	14300	17900	16500	17900	2160	5000	0.147
42	PWTR 1542 2RS	15	19	18	20.0	0.6	0.3	14700	16200	16200	16200	2140	6000	0.158
47	PWTR 1747 2RS	17	21	20	22.0	1.0	0.5	15900	18400	18400	18400	2440	5000	0.220
47	PWTR 20 2RS	20	25	24	27.0	1.0	0.5	24500	30500	20700	30500	3750	3800	0.245
52	PWTR 2052 2RS	20	25	24	27.0	1.0	0.5	27000	35000	31000	35000	4250	3800	0.321
52	PWTR 25 2RS	25	25	24	31.0	1.0	0.5	25000	33000	21800	33000	4100	3800	0.281
62	PWTR 2562 2RS	25	25	24	31.0	1.0	0.5	30000	42500	42500	42500	5200	3800	0.450
62	PWTR 30 2RS	30	29	28	38.0	1.0	0.5	35000	45500	29000	45500	5800	2200	0.465
72	PWTR 3072 2RS	30	29	28	38.0	1.0	0.5	41000	56000	54000	56000	7200	2200	0.697
72	PWTR 35 2RS	35	29	28	44.0	1.1	0.6	38500	54000	39000	54000	6900	1800	0.630
80	PWTR 3580 2RS	35	29	28	44.0	1.1	0.6	43500	63000	59000	63000	8100	1800	0.836
80	PWTR 40 2RS	40	32	30	50.5	1.1	0.6	45000	61000	39500	61000	7900	1500	0.816
85	PWTR 45 2RS	45	32	30	55.2	1.1	0.6	45500	63000	41000	63000	8200	1300	0.883
90	PWTR 4090 2RS	40	32	30	50.5	1.1	0.6	52000	75000	67000	75000	9600	1500	1.129
90	PWTR 50 2RS	50	32	30	59.8	1.1	0.6	46000	66000	42000	66000	8500	1100	0.950
100	PWTR 45100 2RS	45	32	30	55.2	1.1	0.6	56000	85000	85000	85000	10900	1300	1.396
110	PWTR 50110 2RS	50	32	30	59.8	1.1	0.6	59000	94000	94000	94000	12100	1100	1.690

Notes: 1) These values are the allowable minimum dimensions of the chamfer dimension r.
2) Suffix "X" means cylindrical outer ring.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

Cam followers

TECHNICAL SUPPLEMENT T 202 & T 203

1. Bearing materials

KSM Stud-type track rollers are available in three basic series: the series KR,whose rolling elements are needle rollers retained and guided by a cage; the full-complement series KRV lacking a cage, whose rolling elements are needle rollers; and the series NUKR, a full-complement type whose rolling elements are double-row cylindrical rollers. The cage of the stud-type track rollers is pressed steel. However, cages of molded polyamide reinforced with giass fiber or carbon fibre may be used. The carbon fibre cage features a maximum allowable operating temperature of 120° C and maximum allowable continuous operating temperature of 100° C. The series KR is suitable forhigh-speed applications because the cage guides the needle rollers. Compared with a full-comple -ment configuration, this bearing's larger internal volume holds a larger amount of grease, which contributes to relatively extended relubrication intervals. Also available is a variant (suffix PP) with synthetic rubber seal located between the outer ring, flange, and side plate.

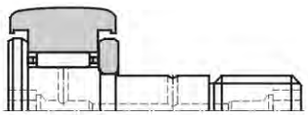


Fig. A Series KR

Compared with the series KR, the track roller series KRV has more needle rollers and therefore is suitable for heavy load applications, but it has a lower limiting speed. A variant (suffix PP) with seals is also available. Because this bearing holds less grease, the relubrication intervals for this type are shorter.

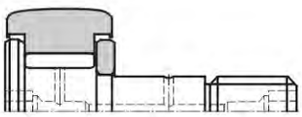


Fig. B Series KRV

Compared with full-complement needle roller bearings. The series NUKR track rollers can carry a greater load and are therefore suitable for applications involving heavy load and impact load, as they are full-complement types using double-row cylindrical rollers as rolling elements. They are guided in the axial direction by the outer ring rib and end faces of cylindrical rollers, and can carry some axial load. Although they are a full-complement configuration, their limiting speed is greater than that of series KRV rollers. Their outer ring incorporates a press- fit steel plate to form a labyrinth between the flange and the outer surface of the side plate. Because there is limited space available for adding grease to the bearing, the bearing must be relubricated more frequently.

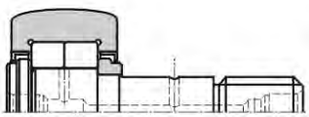
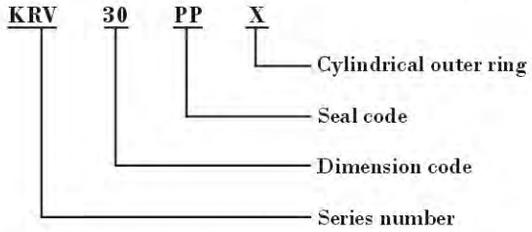


Fig. C Series NUKR

2. Interpreting bearing numbers

The bearing numbers of **KSM** Stud-type track rollers comprise a series number, dimension code (outside diameter), and suffix.



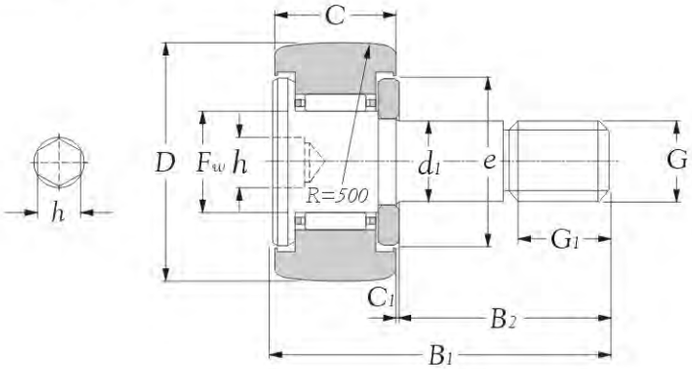
(Cylindrical outer ring, sealed, with hexagon socket)

Fig. 4

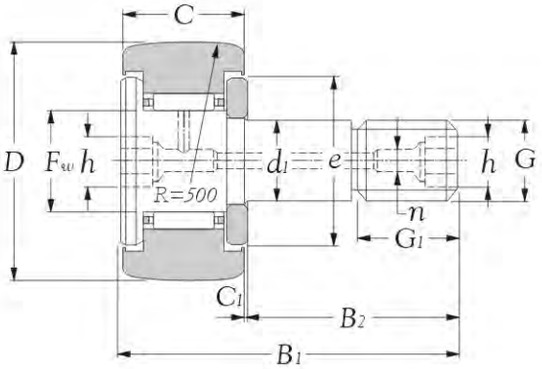
3. Lubrication

The rollers having synthetic rubber seals (suffix PP) as well as the full-complement type are pre-filled with lithium soap grease and can operate at a temperature range of -25 °C to 100 °C. The inside of the bearing can be refilled tirough a grease nipple installed on the bearing-side end face (flange end face) or threaded end face of the stud. Any lubrication holes not used for relubrication must be plugged. The necessary grease nipple and plug are included in the package and must be installed on the toller before the cam follower is mounted.

Cam followers stud type truck rollers
series KR



Type KR (10~19 mm)



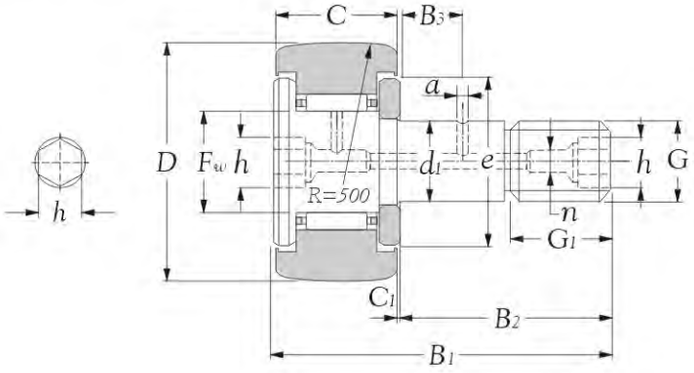
Type KR (22~26 mm)

Outer diameter $D_{0/-0.05}$	Bearing number		Boundary dimensions											
			C	d_1	F_w	B_1	B_2	G	G_1	C_1	n	B_3	a	e	h
mm	open	double seal	mm												
10	KR 10	KR 10 PP	7	$3^{0}_{-0.010}$	4.00	17	9.0	M 3 X 0.5	5.0	0.5	-	-	-	7.0	-
12	KR 12	KR 12 PP	8	$4^{0}_{-0.012}$	4.80	20	11.0	M 4 X 0.7	6.0	0.5	-	-	-	8.5	-
13	KR 13	KR 13 PP	9	$5^{0}_{-0.012}$	5.75	23	13.0	M 5 X 0.8	7.5	0.5	-	-	-	9.5	-
16	KR 16	KR 16 PP	11	$6^{0}_{-0.012}$	8.00	28	16.0	M 6 X 1.0	8.0	0.6	-	-	-	12.0	-
19	KR 19	KR 19 PP	11	$8^{0}_{-0.015}$	10.00	32	20.0	M 8 X 1.25	10.0	0.6	-	-	-	14.0	-
22	KR 22	KR 22 PP	12	$10^{0}_{-0.015}$	12.00	36	23.0	M 10 X 1.0	12.0	0.6	4	-	-	17.0	5
26	KR 26	KR 26 PP	12	$10^{0}_{-0.015}$	12.00	36	23.0	M 10 X 1.0	12.0	0.6	4	-	-	17.0	5
30	KR 30	KR 30 PP	14	$12^{0}_{-0.018}$	15.00	40	25.0	M 12 X 1.5	13.0	0.6	6	6	3	23.0	6
32	KR 32	KR 32 PP	14	$12^{0}_{-0.018}$	15.00	40	25.0	M 12 X 1.5	13.0	0.6	6	6	3	23.0	6
35	KR 35	KR 35 PP	18	$16^{0}_{-0.018}$	18.00	52	32.5	M 16 X 1.5	17.0	0.8	6	8	3	27.0	8
40	KR 40	KR 40 PP	20	$18^{0}_{-0.018}$	22.00	58	36.5	M 18 X 1.5	19.0	0.8	6	8	3	32.0	8
47	KR 47	KR 47 PP	24	$20^{0}_{-0.021}$	25.00	66	40.5	M 20 X 1.5	21.0	0.8	8	9	4	37.0	10
52	KR 52	KR 52 PP	24	$20^{0}_{-0.021}$	25.00	66	40.5	M 20 X 1.5	21.0	0.8	8	9	4	37.0	10
62	KR 62	KR 62 PP	29	$24^{0}_{-0.021}$	30.00	80	49.5	M 24 X 1.5	25.0	0.8	8	11	4	44.0	14
72	KR 72	KR 72 PP	29	$24^{0}_{-0.021}$	30.00	80	49.5	M 24 X 1.5	25.0	0.8	8	11	4	44.0	14
80	KR 80	KR 80 PP	35	$30^{0}_{-0.021}$	38.00	100	63.0	M 30 X 1.5	32.0	1.0	8	15	4	53.0	14
85	KR 85	KR 85 PP	35	$30^{0}_{-0.021}$	38.00	100	63.0	M 30 X 1.5	32.0	1.0	8	15	4	53.0	-
90	KR 90	KR 90 PP	35	$30^{0}_{-0.021}$	38.00	100	63.0	M 30 X 1.5	32.0	1.0	8	15	4	53.0	14

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Cam followers stud type truck rollers
series KR

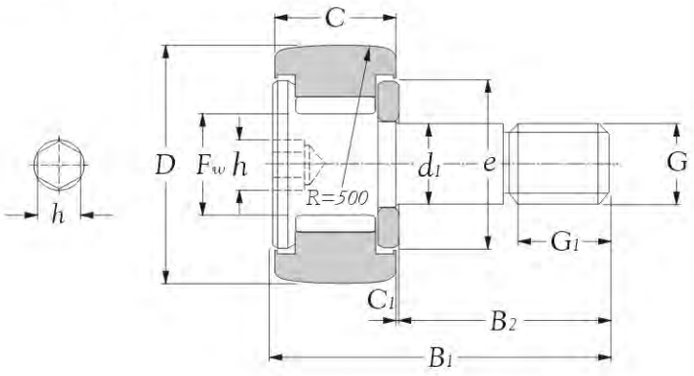


Type KR (30~90 mm)

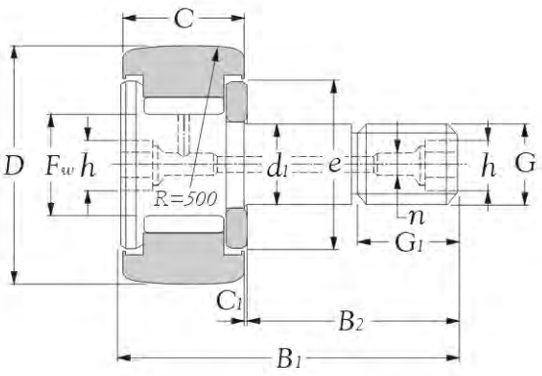
Basic load ratings				Load ratings of truck				Limiting speeds		Maximum tightening torque		Stud diameter	Mass kg(s).
dynamic Cr	static Cor	dynamic Cr	static Cor	Spherical outer ring	Cylindrical outer ring	Spherical outer ring	Cylindrical outer ring	grease	oil				
N		kgf		N		kgf		rpm		N.m	Kgf.m	mm	(approx.)
1510	1140	154	116	560	1360	57	139	※27000	※40000	0.5	0.05	3	0.005
2030	1550	207	159	725	1790	74	183	※25000	※36000	1.0	0.10	4	0.008
2480	2070	253	211	805	2220	82	226	※23000	※33000	2.0	0.20	5	0.010
3850	3950	395	400	1080	3400	110	350	※19000	※25000	3.0	0.30	6	0.019
4500	5100	460	520	1380	4050	141	415	※15000	※20000	8.0	0.80	8	0.031
5050	6250	515	635	1690	5150	172	525	※12000	※16000	15.0	1.50	10	0.046
5050	6250	515	635	2120	6100	216	620	※12000	※16000	15.0	1.50	10	0.059
7500	9100	765	930	2620	7700	267	785	10000	※13000	22.0	2.20	12	0.087
7500	9100	765	930	2860	8200	291	835	10000	※13000	22.0	2.20	12	0.097
11800	17300	1210	1760	3200	11900	325	1220	8000	※11000	58.0	5.80	16	0.169
13600	22100	1390	2250	3850	14500	390	1480	7000	9000	87.0	8.70	18	0.248
20300	33000	2070	3350	4700	21000	480	2150	6000	8000	120.0	12.00	20	0.386
20300	33000	2070	3350	5550	23300	565	2370	6000	8000	120.0	12.00	20	0.461
29100	55000	2960	5650	6950	34500	710	3500	5000	6500	220.0	22.00	24	0.790
29100	55000	2960	5650	8050	38500	820	3900	5000	6500	220.0	22.00	24	1.040
44000	86500	4500	8800	9800	53000	1000	5400	4000	5500	450.0	45.00	30	1.550
44000	86500	4500	8800	10400	56000	1060	5750	4000	5500	450.0	45.00	30	1.740
44000	86500	4500	8800	11400	59000	1160	6100	4000	5500	450.0	45.00	30	1.950

Notes: 1) Limiting speed of sealed type bearings marked with ※ is approximately 10 000 r/min.
2) Suffix "X" means cylindrical outer ring.

Cam followers stud type truck rollers
series KRV



Type KRV (10~19 mm)



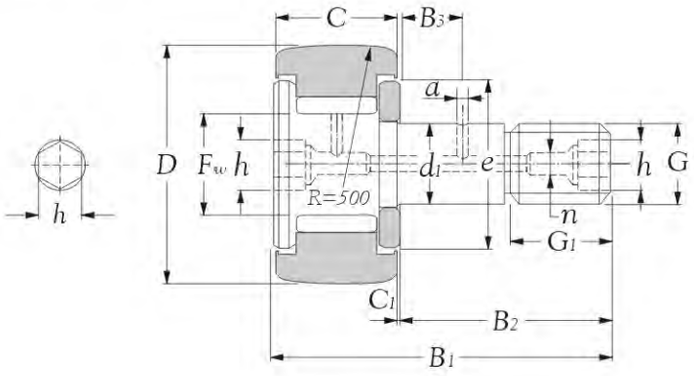
Type KRV (22~26 mm)

Outer diameter D 0/-0.05	Bearing number		Boundary dimensions											
			C	d1	Fw	B1	B2	G	G1	C1	n	B3	a	e	h
mm	open	double seal	mm												
10	KRV 10	KRV 10 PP	7	3 $^{0}_{-0.010}$	4.00	17	9.0	M 3 X 0.5	5.0	0.5	-	-	-	7.0	-
12	KRV 12	KRV 12 PP	8	4 $^{0}_{-0.012}$	4.80	20	11.0	M 4 X 0.7	6.0	0.5	-	-	-	8.5	-
13	KRV 13	KRV 13 PP	9	5 $^{0}_{-0.012}$	5.75	23	13.0	M 5 X 0.8	7.5	0.5	-	-	-	9.5	-
16	KRV 16	KRV 16 PP	11	6 $^{0}_{-0.012}$	8.00	28	16.0	M 6 X 1.0	8.0	0.6	-	-	-	12.0	-
19	KRV 19	KRV 19 PP	11	8 $^{0}_{-0.015}$	10.00	32	20.0	M 8 X 1.25	10.0	0.6	-	-	-	14.0	-
22	KRV 22	KRV 22 PP	12	10 $^{0}_{-0.015}$	12.00	36	23.0	M 10 X 1.0	12.0	0.6	4	-	-	17.0	5
26	KRV 26	KRV 26 PP	12	10 $^{0}_{-0.015}$	12.00	36	23.0	M 10 X 1.0	12.0	0.6	4	-	-	17.0	5
30	KRV 30	KRV 30 PP	14	12 $^{0}_{-0.018}$	15.00	40	25.0	M 12 X 1.5	13.0	0.6	6	6	3	23.0	6
32	KRV 32	KRV 32 PP	14	12 $^{0}_{-0.018}$	15.00	40	25.0	M 12 X 1.5	13.0	0.6	6	6	3	23.0	6
35	KRV 35	KRV 35 PP	18	16 $^{0}_{-0.018}$	18.00	52	32.5	M 16 X 1.5	17.0	0.8	6	8	3	27.0	8
40	KRV 40	KRV 40 PP	20	18 $^{0}_{-0.018}$	22.00	58	36.5	M 18 X 1.5	19.0	0.8	6	8	3	32.0	8
47	KRV 47	KRV 47 PP	24	20 $^{0}_{-0.021}$	25.00	66	40.5	M 20 X 1.5	21.0	0.8	8	9	4	37.0	10
52	KRV 52	KRV 52 PP	24	20 $^{0}_{-0.021}$	25.00	66	40.5	M 20 X 1.5	21.0	0.8	8	9	4	37.0	10
62	KRV 62	KRV 62 PP	29	24 $^{0}_{-0.021}$	30.00	80	49.5	M 24 X 1.5	25.0	0.8	8	11	4	44.0	14
72	KRV 72	KRV 72 PP	29	24 $^{0}_{-0.021}$	30.00	80	49.5	M 24 X 1.5	25.0	0.8	8	11	4	44.0	14
80	KRV 80	KRV 80 PP	35	30 $^{0}_{-0.021}$	38.00	100	63.0	M 30 X 1.5	32.0	1.0	8	15	4	53.0	14
90	KRV 90	KRV 90 PP	35	30 $^{0}_{-0.021}$	38.00	100	63.0	M 30 X 1.5	32.0	1.0	8	15	4	53.0	14

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Cam followers stud type truck rollers
series KRV

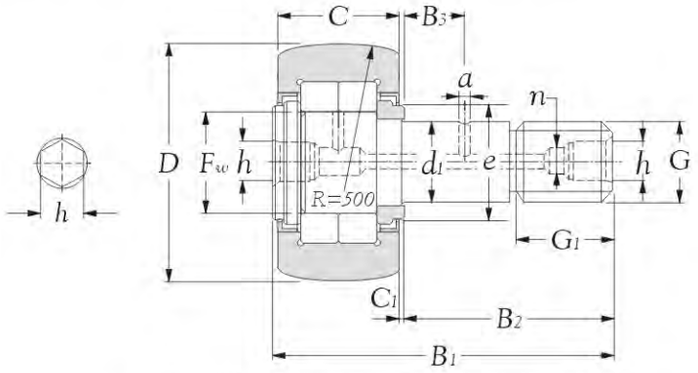


Type KRV (30~90 mm)

Basic load ratings				Load ratings of truck				Limiting speeds		Maximum tightening torque		Stud diameter	Mass kg(s).
dynamic Cr	static Cor	dynamic Cr	static Cor	Spherical outer ring	Cylindrical outer ring	Spherical outer ring	Cylindrical outer ring	grease	oil				
N		kgf		N		kgf		rpm		N.m	Kgf.m	mm	(approx.)
2330	2400	238	244	560	1360	57	139	※25000	※32000	0.5	0.05	3	0.005
3350	3550	340	360	725	1790	74	183	※20000	※27000	1.0	0.10	4	0.008
4300	5050	435	510	805	2220	82	226	※17000	※22000	2.0	0.20	5	0.011
6250	8900	640	910	1080	3400	110	350	※13000	※16000	3.0	0.30	6	0.020
7200	11200	735	1140	1380	4050	141	415	10000	※13000	8.0	0.80	8	0.032
7900	13300	810	1360	1690	5150	172	525	8500	※11000	15.0	1.50	10	0.047
7900	13300	810	1360	2120	6100	216	620	8500	※11000	15.0	1.50	10	0.061
11700	19500	1190	1980	2620	7700	267	785	6500	8500	22.0	2.20	12	0.089
11700	19500	1190	1980	2860	8200	291	835	6500	8500	22.0	2.20	12	0.100
17200	33000	1750	3400	3200	11900	325	1220	5500	7000	58.0	5.80	16	0.172
18900	40500	1930	4150	3850	14500	390	1480	4500	6000	87.0	8.70	18	0.252
28300	60000	2890	6100	4700	21000	480	2150	4000	5000	120.0	12.00	20	0.390
28300	60000	2890	6100	5550	23300	565	2370	4000	5000	120.0	12.00	20	0.465
39000	96500	3950	9850	6950	34500	710	3500	3300	4500	220.0	22.00	24	0.800
39000	96500	3950	9850	8050	38500	820	3900	3300	4500	220.0	22.00	24	1.050
57000	144000	5800	14700	9800	53000	1000	5400	2600	3500	450.0	45.00	30	1.560
57000	144000	5800	14700	11400	59000	1160	6100	2600	3500	450.0	45.00	30	1.970

Notes: 1) Limiting speed of sealed type bearings marked with ※ is approximately 10 000 r/min.
2) Suffix "X" means cylindrical outer ring.

Cam followers stud type truck rollers (Multi-row cylindrical roller bearings) series NUKR



Type NUKR (D<100 mm) (Double row type full complement with seals)

Outer diameter $D^{0}_{-0.05}$	Bearing number	Boundary dimensions												
		C	d_1	F_w	B_1	B_2	G	G_1	C_1	n	B_3	a	e	h
mm		mm												
35	NUKR 35	18	$16^{0}_{-0.018}$	19.0	52	32.5	M 16 X 1.5	17	0.8	6	8	3	21	8
40	NUKR 40	20	$18^{0}_{-0.018}$	21.5	58	36.5	M 18 X 1.5	19	0.8	6	8	3	23	8
47	NUKR 47	24	$20^{0}_{-0.021}$	25.5	66	40.5	M 20 X 1.5	21	0.8	8	9	4	27	10
52	NUKR 52	24	$20^{0}_{-0.021}$	30.0	66	40.5	M 20 X 1.5	21	0.8	8	9	4	31	10
62	NUKR 62	29	$24^{0}_{-0.021}$	35.0	80	49.5	M 24 X 1.5	25	0.8	8	11	4	38	14
72	NUKR 72	29	$24^{0}_{-0.021}$	41.5	80	49.5	M 24 X 1.5	25	0.8	8	11	4	44	14
80	NUKR 80	35	$30^{0}_{-0.021}$	47.5	100	63.0	M 30 X 1.5	32	1.0	8	15	4	51	14
90	NUKR 90	35	$30^{0}_{-0.021}$	47.5	100	63.0	M 30 X 1.5	32	1.0	8	15	4	51	14

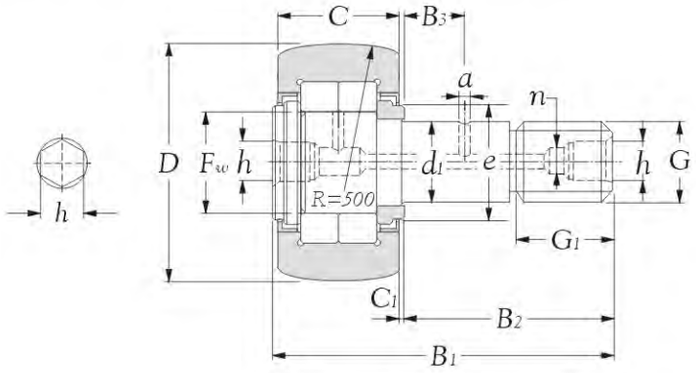
Notes: Suffix "X" means cylindrical outer ring.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site: Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

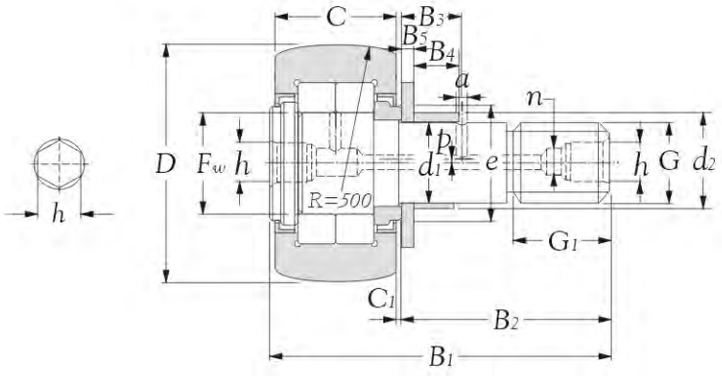
Cam followers stud type truck rollers (Multi-row cylindrical roller bearings)
series NUKR



Type NUKR (D<100 mm) (Double row type full complement shilelded type)

Basic load ratings				Load ratings of truck				Limiting speeds	Maximum tightening torque		Stud diameter	Mass kg(s).
dynamic Cr	static Cor	dynamic Cr	static Cor	Spherical outer ring	Cylindrical outer ring	Spherical outer ring	Cylindrical outer ring	grease				
N		kgf		N		kgf		rpm	N.m	Kgf.m	mm	(approx.)
22300	25700	2280	2620	3200	11900	325	1220	5500	58	5.8	16	0.165
24100	29100	2450	2970	3850	14500	390	1480	4700	87	8.7	18	0.242
38500	48000	3950	4900	4700	21000	480	2150	4000	120	12.0	20	0.380
42500	57500	4350	5850	5550	23300	565	2370	3300	120	12.0	20	0.450
56500	72500	5750	7400	6950	34500	710	3500	2900	220	22.0	24	0.795
62000	85500	6350	8700	8050	38500	820	3900	2400	220	22.0	24	1.010
101000	151000	10300	15400	9800	53000	1000	5400	2100	450	45.0	30	1.540
101000	151000	10300	15400	11400	59000	1160	6100	2100	450	45.0	30	1.960

Cam followers stud type truck rollers (Multi-row cylindrical roller bearings)
series NUKRE



Type NUKRE 35, 40

Outer diameter D 0/-0.05 mm	Bearing number	Boundary dimensions mm																
		C	d_1	F_w	B_1	B_2	G	G_1	C_1	n	B_3	a	e	h	d_2	B_4	p	B_5
35	**NUKRE 35**	18	$16^{0}_{-0.018}$	19.0	52	32.5	M 16 X 1.5	17	0.8	6	8	3	21	8	20	12	1.0	3.8
40	**NUKRE 40**	20	$18^{0}_{-0.018}$	21.5	58	36.5	M 18 X 1.5	19	0.8	6	8	3	23	8	22	14	1.0	3.8
47	**NUKRE 47**	24	$20^{0}_{-0.021}$	25.5	66	40.5	M 20 X 1.5	21	0.8	8	9	4	27	10	24	18	1.0	-
52	**NUKRE 52**	24	$20^{0}_{-0.021}$	30.0	66	40.5	M 20 X 1.5	21	0.8	8	9	4	31	10	24	18	1.0	-
62	**NUKRE 62**	29	$24^{0}_{-0.021}$	35.0	80	49.5	M 24 X 1.5	25	0.8	8	11	4	38	14	28	22	1.0	-
72	**NUKRE 72**	29	$24^{0}_{-0.021}$	41.5	80	49.5	M 24 X 1.5	25	0.8	8	11	4	44	14	28	22	1.0	-
80	**NUKRE 80**	35	$30^{0}_{-0.021}$	47.5	100	63.0	M 30 X 1.5	32	1.0	8	15	4	51	14	35	29	1.5	-
90	**NUKRE 90**	35	$30^{0}_{-0.021}$	47.5	100	63.0	M 30 X 1.5	32	1.0	8	15	4	51	14	35	29	1.5	-

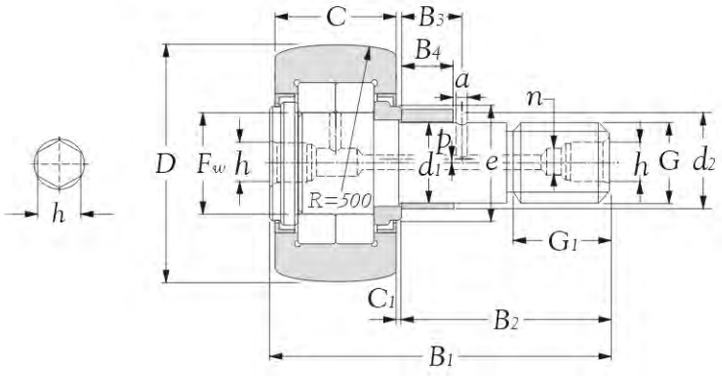
Notes: 1) These values are the allowable minimum dimensions of the chamfer dimension r.
2) Suffix "X" means cylindrical outer ring.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

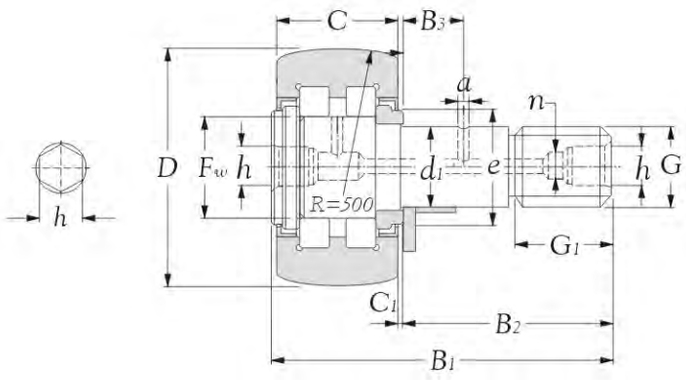
Cam followers stud type truck rollers (Multi-row cylindrical roller bearings)
series NUKRE



Type NUKRE 47, 52, 62, 72, 80, 90

Basic load ratings				Load ratings of truck				Limiting speeds	Maximum tightening torque		Stud diameter	Mass kg(s).
dynamic	static	dynamic	static	Spherical outer ring	Cylindrical outer ring	Spherical outer ring	Cylindrical outer ring	grease				
Cr	Cor	Cr	Cor	N		kgf		rpm	N.m	Kgf.m	mm	(approx.)
22300	25700	2280	2620	3200	11900	325	1220	5500	58	5.8	16	0.177
24100	29100	2450	2970	3850	14500	390	1480	4700	87	8.7	18	0.258
38500	48000	3950	4900	4700	21000	480	2150	4000	120	12.0	20	0.400
42500	57500	4350	5850	5550	23300	565	2370	3300	120	12.0	20	0.470
56500	72500	5750	7400	6950	34500	710	3500	2900	220	22.0	24	0.824
62000	85500	6350	8700	8050	38500	820	3900	2400	220	22.0	24	1.050
101000	151000	10300	15400	9800	53000	1000	5400	2100	450	45.0	30	1.670
101000	151000	10300	15400	11400	59000	1160	6100	2100	450	45.0	30	2.020

Cam followers stud type truck rollers
series PWKR .. 2RS



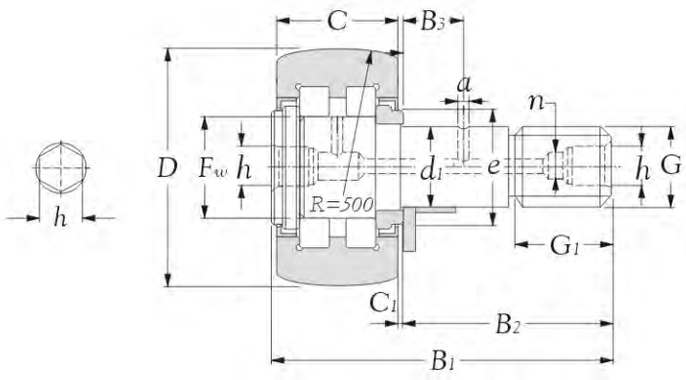
Outer diameter $D_{0/-0.05}$	Bearing number	Boundary dimensions												
		C	d_1	F_w	B_1	B_2	G	G_1	C_1	n	B_3	a	e	h
mm		mm												
35	PWKR 35 2RS	18	$16^{0}_{-0.018}$	19.0	52	32.5	M 16 X 1.5	17	0.8	6	8	3	21	8
40	PWKR 40 2RS	20	$18^{0}_{-0.018}$	21.5	58	36.5	M 18 X 1.5	19	0.8	6	8	3	23	8
47	PWKR 47 2RS	24	$20^{0}_{-0.021}$	25.5	66	40.5	M 20 X 1.5	21	0.8	8	9	4	27	10
52	PWKR 52 2RS	24	$20^{0}_{-0.021}$	30.0	66	40.5	M 20 X 1.5	21	0.8	8	9	4	31	10
62	PWKR 62 2RS	29	$24^{0}_{-0.021}$	35.0	80	49.5	M 24 X 1.5	25	0.8	8	11	4	38	14
72	PWKR 72 2RS	29	$24^{0}_{-0.021}$	41.5	80	49.5	M 24 X 1.5	25	0.8	8	11	4	44	14
80	PWKR 80 2RS	35	$30^{0}_{-0.021}$	47.5	100	63.0	M 30 X 1.5	32	1.0	8	15	4	51	14
90	PWKR 90 2RS	35	$30^{0}_{-0.021}$	47.5	100	63.0	M 30 X 1.5	32	1.0	8	15	4	51	14

Notes: 1) These values are the allowable minimum dimensions of the chamfer dimension r.
2) Suffix "X" means cylindrical outer ring.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

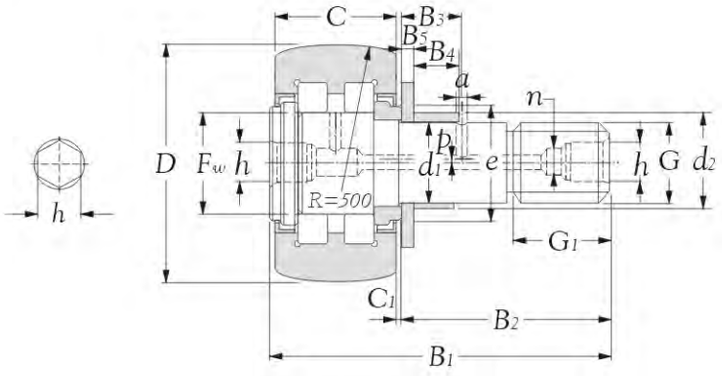
If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Cam followers stud type truck rollers
series PWKR .. 2RS



Basic load ratings				Load ratings of truck				Limiting speeds	Maximum tightening torque		Stud diameter	Mass kg(s).
dynamic	static	dynamic	static	Spherical outer ring	Cylindrical outer ring	Spherical outer ring	Cylindrical outer ring	grease				
Cr	Cor	Cr	Cor	N		kgf		rpm	N.m	Kgf.m	mm	(approx.)
12600	14600	1290	1490	3200	11900	325	1220	5500	58	5.8	16	0.164
14300	17900	1460	1830	3850	14500	390	1480	4700	87	8.7	18	0.242
24500	30500	2500	3110	4700	21000	480	2150	4000	120	12.0	20	0.380
25000	33000	2550	3370	5550	23300	565	2370	3300	120	12.0	20	0.450
35000	45500	3570	4640	6950	34500	710	3500	2900	220	22.0	24	0.795
38500	54000	3930	5510	8050	38500	820	3900	2400	220	22.0	24	1.020
56000	79000	5710	8060	9800	53000	1000	5400	2100	450	45.0	30	1.600
62000	92000	6330	9390	11400	59000	1160	6100	2100	450	45.0	30	1.960

Cam followers stud type truck rollers
series PWKRE .. 2RS



Type PWKRE 35, 40

Outer diameter D $^{0}_{-0.05}$ mm	Bearing number	Boundary dimensions																
		C	d_1	F_w	B_1	B_2	G	G_1	C_1	n	B_3	a	e	h	d_2	B_4	p	B_5
		mm																
35	**PWKRE 35 2RS**	18	$16^{0}_{-0.018}$	19.0	52	32.5	M 16 X 1.5	17	0.8	6	8	3	21	8	20	12	1.0	3.8
40	**PWKRE 40 2RS**	20	$18^{0}_{-0.018}$	21.5	58	36.5	M 18 X 1.5	19	0.8	6	8	3	23	8	22	14	1.0	3.8
47	**PWKRE 47 2RS**	24	$20^{0}_{-0.021}$	25.5	66	40.5	M 20 X 1.5	21	0.8	8	9	4	27	10	24	18	1.0	-
52	**PWKRE 52 2RS**	24	$20^{0}_{-0.021}$	30.0	66	40.5	M 20 X 1.5	21	0.8	8	9	4	31	10	24	18	1.0	-
62	**PWKRE 62 2RS**	29	$24^{0}_{-0.021}$	35.0	80	49.5	M 24 X 1.5	25	0.8	8	11	4	38	14	28	22	1.0	-
72	**PWKRE 72 2RS**	29	$24^{0}_{-0.021}$	41.5	80	49.5	M 24 X 1.5	25	0.8	8	11	4	44	14	28	22	1.0	-
80	**PWKRE 80 2RS**	35	$30^{0}_{-0.021}$	47.5	100	63.0	M 30 X 1.5	32	1.0	8	15	4	51	14	35	29	1.5	-
90	**PWKRE 90 2RS**	35	$30^{0}_{-0.021}$	47.5	100	63.0	M 30 X 1.5	32	1.0	8	15	4	51	14	35	29	1.5	-

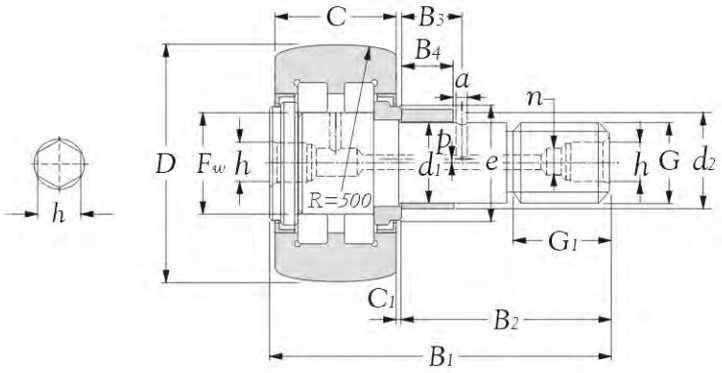
Notes: 1) These values are the allowable minimum dimensions of the chamfer dimension r.
2) Suffix "X" means cylindrical outer ring.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

Cam followers stud type truck rollers
series PWKRE .. 2RS



Type PWKRE 47, 52, 62, 72, 80, 90

Basic load ratings				Load ratings of truck				Limiting speeds	Maximum tightening torque		Stud diameter	kg(s).
dynamic	static	dynamic	static	Spherical outer ring	Cylindrical outer ring	Spherical outer ring	Cylindrical outer ring	grease				
Cr	Cor	Cr	Cor	N		kgf		rpm	N.m	Kgf.m	mm	(approx.)
12600	14600	1290	1490	3200	11900	325	1220	5500	58	5.8	16	
14300	17900	1460	1830	3850	14500	390	1480	4700	87	8.7	18	
24500	30500	2500	3110	4700	21000	480	2150	4000	120	12.0	20	
25000	33000	2550	3370	5550	23300	565	2370	3300	120	12.0	20	
35000	45500	3570	4640	6950	34500	710	3500	2900	220	22.0	24	
38500	54000	3930	5510	8050	38500	820	3900	2400	220	22.0	24	
56000	79000	5710	8060	9800	53000	1000	5400	2100	450	45.0	30	
62000	92000	6330	9390	11400	59000	1160	6100	2100	450	45.0	30	

P2

KSM® NOTE

TECHNICAL SUPPLEMENT

1. Bearing materials

KSM Inner rings are available in the series IR, whose boundary dimensions are in metric measurements. Both ends of the inner ring are lead-chamfered for easier assembly. Inner rings marked with an asterisk have a slight chamfer in order to provide greater axial displacement. **KSM** Also offers inner rings having a lubrication hole at their midpoint (suffix D). For much greater running accuracy, the raceway of the inner ring can be finish ground after the inner ring has been mounted to a shaft. To accommodate this need, **KSM** can supply an inner ring whose raceway surface allows for grinding. For details, contact **KSM** Engineering.

2. Interpreting inner ring numbers

The inner ring numbers of **KSM** Inner rings comprise of a series number (IR), dimension code inside dia. (D) × raceway dia. (F) × width (B), and a suffix.

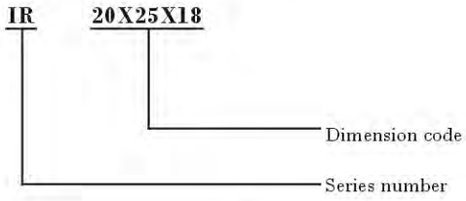
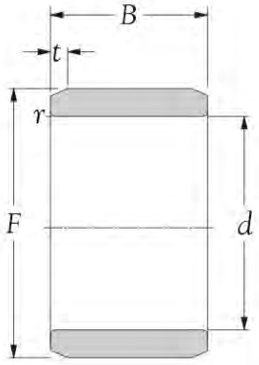
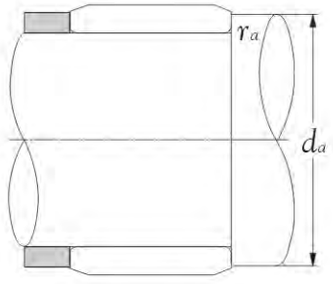


Fig. A

Inner rings
series IR





Inner bore d mm	Bearing number	Principal dimensions F [1]	B	r_s min [2]	t	Abutment dimensions d_a min	r_{as} max	Mass kg. (approx.)
		mm				mm		
5	IR 5x7x10	$7^{\ 0}_{-0.006}$	10.0	0.15	1	6.2	0.15	0.0014
5	IR 5x8x12	$8^{\ 0}_{-0.006}$	12.0	0.30	1	7.0	0.30	0.0028
5	IR 5x8x16	$8^{\ 0}_{-0.006}$	16.0	0.30	-	7.0	0.30	0.0038
6	IR 6x8x10	$8^{\ 0}_{-0.006}$	10.0	0.15	1	7.2	0.15	0.0017
6	IR 6x9x12	$9^{\ 0}_{-0.006}$	12.0	0.30	1	8.0	0.30	0.0032
6	IR 6x9x16	$9^{\ 0}_{-0.006}$	16.0	0.30	1	8.0	0.30	0.0043
6	IR 6x10x10	$10^{\ 0}_{-0.006}$	10.0	0.30	1	8.0	0.30	0.0037
6	IR 6x10x12	$10^{\ 0}_{-0.006}$	12.0	0.30	-	8.0	0.30	0.0046
6	IR 6x10x13	$10^{\ 0}_{-0.006}$	13.0	0.30	1	8.0	0.30	0.0050
7	IR 7x9x10	$9^{\ 0}_{-0.006}$	10.0	0.15	1	8.2	0.15	0.0019
7	IR 7x10x10.5	$10^{\ 0}_{-0.006}$	10.5	0.30	1	9.0	0.30	0.0031
7	IR 7x10x12	$10^{\ 0}_{-0.006}$	12.0	0.30	1	9.0	0.30	0.0036
7	IR 7x10x16	$10^{\ 0}_{-0.006}$	16.0	0.30	1	9.0	0.30	0.0049
7	IR 7x12x16	$12^{\ 0}_{-0.008}$	16.0	0.30	1	9.0	0.30	0.0093
8	IR 8x10x11	$10^{\ 0}_{-0.006}$	11.0	0.15	1	9.2	0.15	0.0024
8	IR 8x12x10	$12^{\ 0}_{-0.008}$	10.0	0.30	1	10.0	0.30	0.0048
8	IR 8x12x10.5	$12^{\ 0}_{-0.008}$	10.5	0.30	1	10.0	0.30	0.0050
8	IR 8x12x12	$12^{\ 0}_{-0.008}$	12.0	0.30	-	10.0	0.30	0.0057
8	IR 8x12x12.5	$12^{\ 0}_{-0.008}$	12.5	0.30	1	10.0	0.30	0.0059
8	IR 8x14x16	$14^{\ 0}_{-0.008}$	16.0	0.30	1	10.0	0.30	0.0130
9	IR 9x12x11	$12^{\ 0}_{-0.008}$	11.0	0.30	1	11.0	0.30	0.0041
9	IR 9x12x12	$12^{\ 0}_{-0.008}$	12.0	0.30	1	11.0	0.30	0.0045
9	IR 9x12x16	$12^{\ 0}_{-0.008}$	16.0	0.30	1	11.0	0.30	0.0061
9	IR 9x15x16	$15^{\ 0}_{-0.008}$	16.0	0.30	1	11.0	0.30	0.0140
10	IR 10x13x12.5	$13^{\ 0}_{-0.008}$	12.5	0.30	1	12.0	0.30	0.0052
10	IR 10x14x12	$14^{\ 0}_{-0.008}$	12.0	0.30	1	12.0	0.30	0.0073

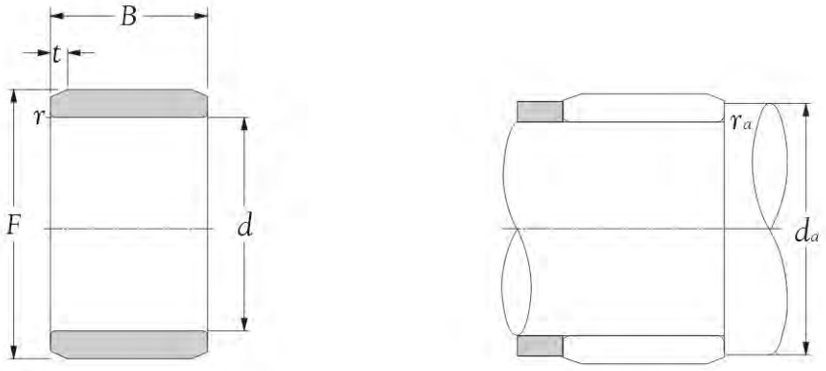
Notes: 1) The tolerance for this dimension provides regular clearance when an inner ring is combined with a needle roller bearing that lacks an inner ring.
2) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

Inner rings
series IR



Inner bore d	Bearing number	Principal dimensions				Abutment dimensions		Mass
		$F^{1)}$	B	$r_{s\,min}^{2)}$	t	$d_{a\,min}$	$r_{as\,max}$	kg.
mm		mm				mm		(approx.)
10	IR 10x14x13	14 $^{0}_{-0.008}$	13.0	0.3	1.0	12	0.3	0.0074
10	IR 10x14x14	14 $^{0}_{-0.008}$	14.0	0.3	-	12	0.3	0.0080
10	IR 10x14x16	14 $^{0}_{-0.008}$	16.0	0.3	-	12	0.3	0.0092
10	IR 10x14x20	14 $^{0}_{-0.008}$	20.0	0.3	1.0	12	0.3	0.0120
10	IR 10x15x15.5	15 $^{0}_{-0.008}$	15.5	0.3	1.0	12	0.3	0.0120
10	IR 10x15x20.5	15 $^{0}_{-0.008}$	20.5	0.3	1.0	12	0.3	0.0150
10	IR 10x16x16	16 $^{0}_{-0.008}$	16.0	0.3	1.0	12	0.3	0.0150
12	IR 12x15x12	15 $^{0}_{-0.008}$	12.0	0.3	1.0	14	0.3	0.0058
12	IR 12x15x12.5	15 $^{0}_{-0.008}$	12.5	0.3	1.0	14	0.3	0.0061
12	IR 12x15x16	15 $^{0}_{-0.008}$	16.0	0.3	1.0	14	0.3	0.0078
12	IR 12x15x16.5	15 $^{0}_{-0.008}$	16.5	0.3	-	14	0.3	0.0080
12	IR 12x15x22.5	15 $^{0}_{-0.008}$	22.5	0.3	-	14	0.3	0.0110
12	IR 12x16x12	16 $^{0}_{-0.008}$	12.0	0.3	1.5	14	0.3	0.0079
12	IR 12x16x13	16 $^{0}_{-0.008}$	13.0	0.3	1.5	14	0.3	0.0087
12	IR 12x16x14	16 $^{0}_{-0.008}$	14.0	0.3	-	14	0.3	0.0095
12	IR 12x16x16	16 $^{0}_{-0.008}$	16.0	0.3	1.5	14	0.3	0.0110
12	IR 12x16x20	16 $^{0}_{-0.008}$	20.0	0.3	1.5	14	0.3	0.0140
12	IR 12x16x22	16 $^{0}_{-0.008}$	22.0	0.3	1.5	14	0.3	0.0150
12	IR 12x17x20.5	17 $^{0}_{-0.008}$	20.5	0.3	1.5	14	0.3	0.0190
12	IR 12x17x25.5	17 $^{0}_{-0.008}$	25.5	0.3	1.5	14	0.3	0.0240
12	IR 12x18x16	18 $^{0}_{-0.008}$	16.0	0.3	1.5	14	0.3	0.0180
14	IR 14x17x17	17 $^{0}_{-0.008}$	17.0	0.3	1.5	16	0.3	0.0095
15	IR 15x18x12.5	18 $^{0}_{-0.008}$	12.5	0.3	1.5	17	0.3	0.0072
15	IR 15x18x16	18 $^{0}_{-0.008}$	16.0	0.3	1.5	17	0.3	0.0093
15	IR 15x18x16.5	18 $^{0}_{-0.008}$	16.5	0.3	1.5	17	0.3	0.0096
15	IR 15x18x17.5	18 $^{0}_{-0.008}$	17.5	0.3	1.5	17	0.3	0.0100

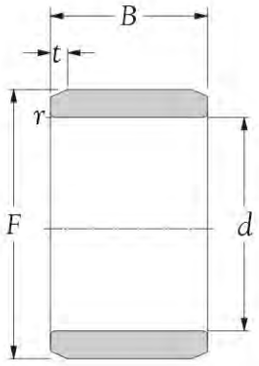
Notes: 1) The tolerance for this dimension provides regular clearance when an inner ring is combined with a needle roller bearing that lacks an inner ring.
2) These values are the allowable minimum dimensions of the chamfer dimension r.

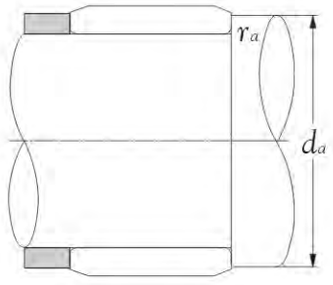
Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

Inner rings
series IR





Inner bore d mm	Bearing number	Principal dimensions $F^{1)}$	B	$r_{s\,min}^{2)}$	t	Abutment dimensions $d_{a\,min}$	$r_{as\,max}$	Mass kg. (approx.)
		mm				mm		
15	**IR 15x18x20.5**	$18^{\ 0}_{-0.008}$	20.5	0.3	1.5	17	0.3	0.012
15	**IR 15x18x25.5**	$18^{\ 0}_{-0.008}$	25.5	0.3	1.5	17	0.3	0.015
15	**IR 15x19x16**	$19^{\ 0}_{-0.009}$	16.0	0.3	1.5	17	0.3	0.013
15	**IR 15x19x20**	$19^{\ 0}_{-0.009}$	20.0	0.3	1.5	17	0.3	0.016
15	**IR 15x20x12**	$20^{\ 0}_{-0.009}$	12.0	0.3	1.5	17	0.3	0.012
15	**IR 15x20x13**	$20^{\ 0}_{-0.009}$	13.0	0.3	1.5	17	0.3	0.014
15	**IR 15x20x14**	$20^{\ 0}_{-0.009}$	14.0	0.3	-	17	0.3	0.015
15	**IR 15x20x18**	$20^{\ 0}_{-0.009}$	18.0	0.3	1.5	17	0.3	0.019
15	**IR 15x20x20.5**	$20^{\ 0}_{-0.009}$	20.5	0.3	1.5	17	0.3	0.021
15	**IR 15x20x23**	$20^{\ 0}_{-0.009}$	23.0	0.3	-	17	0.3	0.024
15	**IR 15x20x26**	$20^{\ 0}_{-0.009}$	26.0	0.3	1.5	17	0.3	0.027
15	**IR 15x20x30.5**	$20^{\ 0}_{-0.009}$	30.5	0.3	1.5	17	0.3	0.032
15	**IR 15x22x20**	$22^{\ 0}_{-0.009}$	20.0	0.6	1.5	19	0.6	0.032
17	**IR 17x20x16**	$20^{\ 0}_{-0.009}$	16.0	0.3	1.5	19	0.3	0.011
17	**IR 17x20x16.5**	$20^{\ 0}_{-0.009}$	16.5	0.3	1.5	19	0.3	0.011
17	**IR 17x20x20**	$20^{\ 0}_{-0.009}$	20.0	0.3	1.5	19	0.3	0.014
17	**IR 17x20x20.5**	$20^{\ 0}_{-0.009}$	20.5	0.3	-	19	0.3	0.014
17	**IR 17x20x30.5**	$20^{\ 0}_{-0.009}$	30.5	0.3	-	19	0.3	0.021
17	**IR 17x21x16**	$21^{\ 0}_{-0.009}$	16.0	0.3	1.5	19	0.3	0.014
17	**IR 17x21x20**	$21^{\ 0}_{-0.009}$	20.0	0.3	-	19	0.3	0.018
17	**IR 17x22x13**	$22^{\ 0}_{-0.009}$	13.0	0.3	1.5	19	0.3	0.015
17	**IR 17x22x14**	$22^{\ 0}_{-0.009}$	14.0	0.3	-	19	0.3	0.016
17	**IR 17x22x16**	$22^{\ 0}_{-0.009}$	16.0	0.3	-	19	0.3	0.019
17	**IR 17x22x18**	$22^{\ 0}_{-0.009}$	18.0	0.3	1.5	19	0.3	0.021
17	**IR 17x22x20.5**	$22^{\ 0}_{-0.009}$	20.5	0.3	1.5	19	0.3	0.024
17	**IR 17x22x23**	$22^{\ 0}_{-0.009}$	23.0	0.3	-	19	0.3	0.027

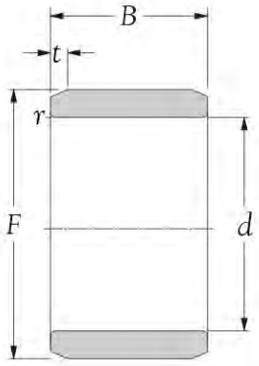
Notes: 1) The tolerance for this dimension provides regular clearance when an inner ring is combined with a needle roller bearing that lacks an inner ring.
2) These values are the allowable minimum dimensions of the chamfer dimension r.

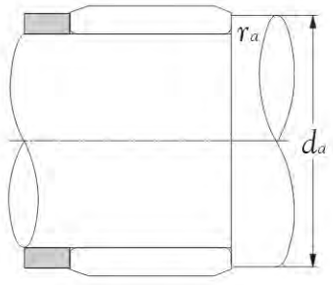
Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

Inner rings
series IR





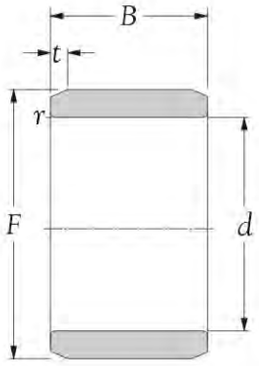
Inner bore d mm	Bearing number	Principal dimensions $F^{1)}$	B	$r_{s\,min}^{2)}$	t	Abutment dimensions $d_{a\,min}$	$r_{as\,max}$	Mass kg. (approx.)
		mm				mm		
17	IR 17x22x26	$22^{\ 0}_{-0.009}$	26.0	0.3	1.5	19	0.3	0.030
17	IR 17x22x32	$22^{\ 0}_{-0.009}$	32.0	0.3	1.5	19	0.3	0.036
17	IR 17x24x20	$24^{\ 0}_{-0.009}$	20.0	0.6	1.5	21	0.6	0.034
20	IR 20x24x16	$24^{\ 0}_{-0.009}$	16.0	0.3	1.8	22	0.3	0.017
20	IR 20x24x20	$24^{\ 0}_{-0.009}$	20.0	0.3	-	22	0.3	0.021
20	IR 20x24x28.5	$24^{\ 0}_{-0.009}$	28.5	0.3	-	22	0.3	0.030
20	IR 20x25x12.5	$25^{\ 0}_{-0.009}$	12.5	0.3	1.8	22	0.3	0.016
20	IR 20x25x16	$25^{\ 0}_{-0.009}$	16.0	0.3	-	22	0.3	0.021
20	IR 20x25x16.5	$25^{\ 0}_{-0.009}$	16.5	0.3	1.8	22	0.3	0.022
20	IR 20x25x17	$25^{\ 0}_{-0.009}$	17.0	0.3	1.8	22	0.3	0.022
20	IR 20x25x18	$25^{\ 0}_{-0.009}$	18.0	0.3	-	22	0.3	0.024
20	IR 20x25x20	$25^{\ 0}_{-0.009}$	20.0	0.3	-	22	0.3	0.027
20	IR 20x25x20.5	$25^{\ 0}_{-0.009}$	20.5	0.3	1.8	22	0.3	0.028
20	IR 20x25x23	$25^{\ 0}_{-0.009}$	23.0	0.3	1.8	22	0.3	0.031
20	IR 20x25x26	$25^{\ 0}_{-0.009}$	26.0	0.3	1.8	22	0.3	0.034
20	IR 20x25x26.5	$25^{\ 0}_{-0.009}$	26.5	0.3	-	22	0.3	0.036
20	IR 20x25x30	$25^{\ 0}_{-0.009}$	30.0	0.3	1.8	22	0.3	0.041
20	IR 20x25x32	$25^{\ 0}_{-0.009}$	32.0	0.3	1.8	22	0.3	0.041
20	IR 20x25x38.5	$25^{\ 0}_{-0.009}$	38.5	0.3	-	22	0.3	0.053
20	IR 20x28x20	$28^{\ 0}_{-0.009}$	20.0	0.6	1.8	24	0.6	0.045
22	IR 22x26x16	$26^{\ 0}_{-0.009}$	16.0	0.3	1.8	24	0.3	0.017
22	IR 22x26x20	$26^{\ 0}_{-0.009}$	20.0	0.3	-	24	0.3	0.022
22	IR 22x28x17	$28^{\ 0}_{-0.009}$	17.0	0.3	1.8	24	0.3	0.030
22	IR 22x28x20	$28^{\ 0}_{-0.009}$	20.0	0.3	1.8	24	0.3	0.035
22	IR 22x28x20.5	$28^{\ 0}_{-0.009}$	20.5	0.3	1.8	24	0.3	0.036
22	IR 22x28x23	$28^{\ 0}_{-0.009}$	23.0	0.3	1.8	24	0.3	0.042

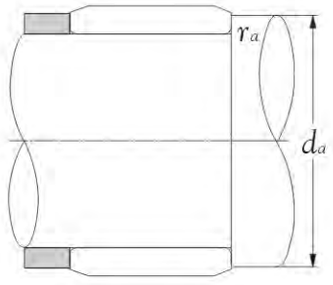
Notes: 1) The tolerance for this dimension provides regular clearance when an inner ring is combined with a needle roller bearing that lacks an inner ring.
2) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Inner rings
series IR





Inner bore d mm	Bearing number	Principal dimensions F [1]	B	$r_{s\,min}$ [2]	t	Abutment dimensions d_a min	r_{as} max	Mass kg. (approx.)
		mm				mm		
22	IR 22x28x30	$28^{\ 0}_{-0.009}$	30.0	0.3	-	24	0.3	0.054
25	IR 25x29x20	$29^{\ 0}_{-0.009}$	20.0	0.3	-	27	0.3	0.026
25	IR 25x29x30	$29^{\ 0}_{-0.009}$	30.0	0.3	1.8	27	0.3	0.039
25	IR 25x30x12.5	$30^{\ 0}_{-0.009}$	12.5	0.3	1.8	27	0.3	0.020
25	IR 25x30x16	$30^{\ 0}_{-0.009}$	16.0	0.3	1.0	27	0.3	0.024
25	IR 25x30x16.5	$30^{\ 0}_{-0.009}$	16.5	0.3	1.8	27	0.3	0.026
25	IR 25x30x17	$30^{\ 0}_{-0.009}$	17.0	0.3	1.8	27	0.3	0.027
25	IR 25x30x18	$30^{\ 0}_{-0.009}$	18.0	0.3	-	27	0.3	0.030
25	IR 25x30x20	$30^{\ 0}_{-0.009}$	20.0	0.3	1.8	27	0.3	0.033
25	IR 25x30x20.5	$30^{\ 0}_{-0.009}$	20.5	0.3	1.8	27	0.3	0.034
25	IR 25x30x23	$30^{\ 0}_{-0.009}$	23.0	0.3	1.8	27	0.3	0.038
25	IR 25x30x26	$30^{\ 0}_{-0.009}$	26.0	0.3	1.8	27	0.3	0.041
25	IR 25x30x26.5	$30^{\ 0}_{-0.009}$	26.5	0.3	-	27	0.3	0.043
25	IR 25x30x30	$30^{\ 0}_{-0.009}$	30.0	0.3	1.8	27	0.3	0.050
25	IR 25x30x32	$30^{\ 0}_{-0.009}$	32.0	0.3	1.0	27	0.3	0.054
25	IR 25x30x38.5	$30^{\ 0}_{-0.009}$	38.5	0.3	-	27	0.3	0.064
25	IR 25x32x22	$32^{\ +0.008}_{\ -0.002}$	22.0	0.6	1.8	29	0.6	0.052
25	IR 25x32x30.5	$32^{\ +0.008}_{\ -0.002}$	30.5	0.6	1.8	29	0.6	0.072
28	IR 28x32x17	$32^{\ +0.008}_{\ -0.002}$	17.0	0.3	1.8	30	0.3	0.025
28	IR 28x32x20	$32^{\ +0.008}_{\ -0.002}$	20.0	0.3	1.8	30	0.3	0.028
28	IR 28x32x23	$32^{\ +0.008}_{\ -0.002}$	23.0	0.3	1.8	30	0.3	0.034
28	IR 28x32x30	$32^{\ +0.008}_{\ -0.002}$	30.0	0.3	-	30	0.3	0.044
29	IR 29x32x13	$32^{\ +0.008}_{\ -0.002}$	13.0	0.3	1.8	31	0.3	0.015
30	IR 30x35x12.5	$35^{\ +0.008}_{\ -0.002}$	12.5	0.3	1.8	32	0.3	0.024
30	IR 30x35x13	$35^{\ +0.008}_{\ -0.002}$	13.0	0.3	1.3	32	0.3	0.025
30	IR 30x35x16	$35^{\ +0.008}_{\ -0.002}$	16.0	0.3	-	32	0.3	0.031

Notes: 1) The tolerance for this dimension provides regular clearance when an inner ring is combined with a needle roller bearing that lacks an inner ring.
2) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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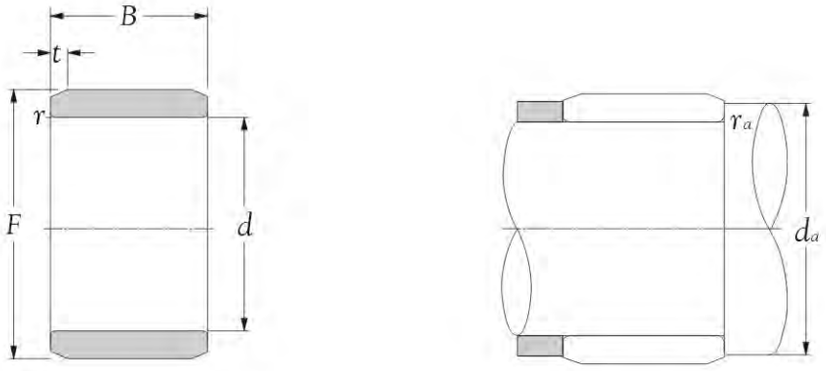
Inner rings
series IR



Inner bore d	Bearing number	Principal dimensions				Abutment dimensions		Mass
		$F^{1)}$	B	$r_{s\,min}^{2)}$	t	$d_{a\,min}$	$r_{as\,max}$	kg.
mm		mm				mm		(approx.)
30	IR 30x35x16.5	$35^{+0.008}_{-0.002}$	16.5	0.3	1.8	32	0.3	0.032
30	IR 30x35x17	$35^{+0.008}_{-0.002}$	17.0	0.3	1.8	32	0.3	0.032
30	IR 30x35x18	$35^{+0.008}_{-0.002}$	18.0	0.3	-	32	0.3	0.035
30	IR 30x35x20	$35^{+0.008}_{-0.002}$	20.0	0.3	-	32	0.3	0.038
30	IR 30x35x20.5	$35^{+0.008}_{-0.002}$	20.5	0.3	1.8	32	0.3	0.039
30	IR 30x35x23	$35^{+0.008}_{-0.002}$	23.0	0.3	1.8	32	0.3	0.044
30	IR 30x35x26	$35^{+0.008}_{-0.002}$	26.0	0.3	1.8	32	0.3	0.050
30	IR 30x35x30	$35^{+0.008}_{-0.002}$	30.0	0.3	-	32	0.3	0.059
30	IR 30x35x32	$35^{+0.008}_{-0.002}$	32.0	0.3	1.8	32	0.3	0.063
30	IR 30x37x18	$37^{+0.008}_{-0.002}$	18.0	0.3	1.8	32	0.3	0.050
30	IR 30x37x22	$37^{+0.008}_{-0.002}$	22.0	0.6	1.8	34	0.6	0.061
30	IR 30x38x20	$38^{+0.008}_{-0.002}$	20.0	0.6	-	34	0.6	0.065
32	IR 32x37x20	$37^{0}_{-0.011}$	20.0	0.3	2.0	34	0.3	0.040
32	IR 32x37x30	$37^{0}_{-0.011}$	30.0	0.3	-	34	0.3	0.063
32	IR 32x38x32	$38^{0}_{-0.011}$	32.0	0.3	2.0	34	0.3	0.082
32	IR 32x40x20	$40^{0}_{-0.011}$	20.0	0.6	2.0	36	0.6	0.068
32	IR 32x40x27	$40^{0}_{-0.011}$	27.0	0.6	2.0	36	0.6	0.092
32	IR 32x40x36	$40^{0}_{-0.011}$	36.0	0.6	2.0	36	0.6	0.124
33	IR 33x37x13	$37^{0}_{-0.011}$	13.0	0.3	2.0	35	0.3	0.022
35	IR 35x40x12.5	$40^{0}_{-0.011}$	12.5	0.3	2.0	37	0.3	0.027
35	IR 35x40x16.5	$40^{0}_{-0.011}$	16.5	0.3	2.0	37	0.3	0.037
35	IR 35x40x17	$40^{0}_{-0.011}$	17.0	0.3	2.0	37	0.3	0.038
35	IR 35x40x20	$40^{0}_{-0.011}$	20.0	0.3	2.0	37	0.3	0.044
35	IR 35x40x20.5	$40^{0}_{-0.011}$	20.5	0.3	2.0	37	0.3	0.046
35	IR 35x40x30	$40^{0}_{-0.011}$	30.0	0.3	-	37	0.3	0.068
35	IR 35x40x34	$40^{0}_{-0.011}$	34.0	0.3	1.8	37	0.3	0.079

Notes: 1) The tolerance for this dimension provides regular clearance when an inner ring is combined with a needle roller bearing that lacks an inner ring.
2) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

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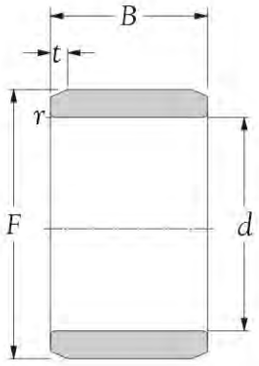
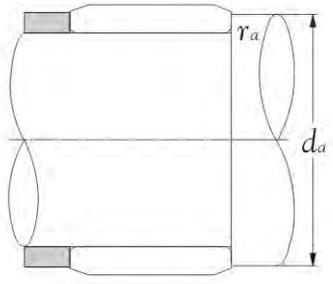
Inner rings
series IR





Inner bore d mm	Bearing number	Principal dimensions				Abutment dimensions		Mass kg.
		$F^{1)}$	B	$r_{s\,min}^{2)}$	t	$d_{a\,min}$	$r_{as\,max}$	
		mm				mm		(approx.)
35	IR 35x40x40	$40^{\ 0}_{-0.011}$	40.0	0.3	2.0	37	0.3	0.091
35	IR 35x42x20	$42^{\ 0}_{-0.011}$	20.0	0.6	1.8	39	0.3	0.064
35	IR 35x42x21	$42^{\ 0}_{-0.011}$	21.0	0.6	-	39	0.6	0.068
35	IR 35x42x23	$42^{\ 0}_{-0.011}$	23.0	0.6	-	39	0.6	0.074
35	IR 35x42x27	$42^{\ 0}_{-0.011}$	27.0	0.6	2.0	39	0.6	0.080
35	IR 35x42x36	$42^{\ 0}_{-0.011}$	36.0	0.6	2.0	39	0.6	0.117
35	IR 35x43x22	$43^{\ 0}_{-0.011}$	22.0	0.6	2.0	39	0.6	0.081
38	IR 38x43x20	$43^{\ 0}_{-0.011}$	20.0	0.3	1.8	40	0.6	0.048
38	IR 38x43x30	$43^{\ 0}_{-0.011}$	30.0	0.3	-	40	0.3	0.074
40	IR 40x45x16.5	$45^{\ 0}_{-0.011}$	16.5	0.3	2.0	42	0.3	0.042
40	IR 40x45x17	$45^{\ 0}_{-0.011}$	17.0	0.3	2.0	42	0.3	0.043
40	IR 40x45x20	$45^{\ 0}_{-0.011}$	20.0	0.3	2.0	42	0.3	0.051
40	IR 40x45x20.5	$45^{\ 0}_{-0.011}$	20.5	0.3	2.0	42	0.3	0.053
40	IR 40x45x26.5	$45^{\ 0}_{-0.011}$	26.5	0.3	-	42	0.3	0.068
40	IR 40x45x30	$45^{\ 0}_{-0.011}$	30.0	0.3	2.0	42	0.3	0.077
40	IR 40x45x34	$45^{\ 0}_{-0.011}$	34.0	0.3	2.0	42	0.3	0.088
40	IR 40x45x40	$45^{\ 0}_{-0.011}$	40.0	0.3	2.0	42	0.3	0.106
40	IR 40x48x22	$48^{\ 0}_{-0.011}$	22.0	0.6	2.0	44	0.3	0.092
40	IR 40x48x23	$48^{\ 0}_{-0.011}$	23.0	0.6	-	44	0.6	0.097
40	IR 40x48x30	$48^{\ 0}_{-0.011}$	30.0	0.6	2.0	44	0.6	0.123
40	IR 40x48x40	$48^{\ 0}_{-0.011}$	40.0	0.6	2.0	44	0.6	0.170
40	IR 40x50x20	$50^{\ 0}_{-0.011}$	20.0	0.3	0.8	44	0.6	0.106
40	IR 40x50x22	$50^{\ 0}_{-0.011}$	22.0	1.0	2.0	45	0.3	0.118
42	IR 42x47x20	$47^{\ 0}_{-0.011}$	20.0	0.3	2.0	44	1.0	0.053
42	IR 42x47x30	$47^{\ 0}_{-0.011}$	30.0	0.3	2.0	44	0.3	0.080
45	IR 45x50x20	$50^{\ 0}_{-0.011}$	20.0	0.3	2.0	47	0.3	0.057

Notes: 1) The tolerance for this dimension provides regular clearance when an inner ring is combined with a needle roller bearing that lacks an inner ring.
2) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

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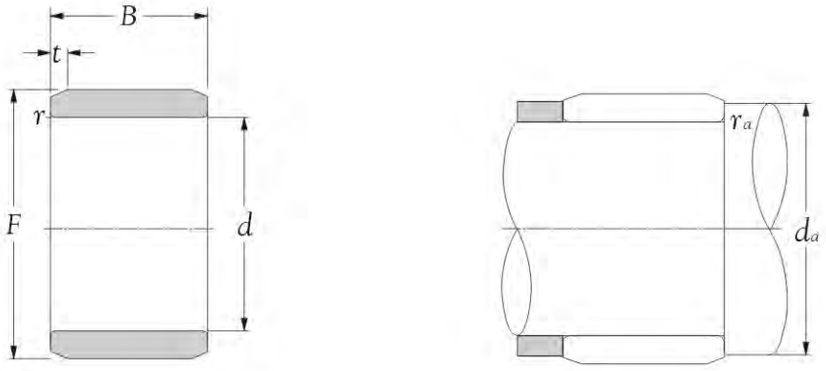
P2

Inner rings
series IR



Inner bore d	Bearing number	Principal dimensions				Abutment dimensions		Mass
		$F^{1)}$	B	$r_s\ min^{2)}$	t	d_a min	r_{as} max	kg.
mm		mm				mm		(approx.)
45	IR 45x50x25	$50^{\ 0}_{-0.011}$	25.0	0.6	2.0	49.0	0.3	0.071
45	IR 45x50x25.5	$50^{\ 0}_{-0.011}$	25.5	0.3	-	47.0	0.6	0.074
45	IR 45x50x32	$50^{\ 0}_{-0.011}$	32.0	0.6	-	49.0	0.3	0.092
45	IR 45x50x35	$50^{\ 0}_{-0.011}$	35.0	0.6	2.0	49.0	0.6	0.101
45	IR 45x50x40	$50^{\ 0}_{-0.011}$	40.0	0.3	1.5	47.0	0.6	0.115
45	IR 45x52x22	$52^{+0.008}_{-0.004}$	22.0	0.6	2.0	49.0	0.6	0.088
45	IR 45x52x23	$52^{+0.008}_{-0.004}$	23.0	0.6	-	49.0	0.6	0.093
45	IR 45x52x30	$52^{+0.008}_{-0.004}$	30.0	0.6	2.0	49.0	0.6	0.123
45	IR 45x52x40	$52^{+0.008}_{-0.004}$	40.0	0.6	2.0	49.0	0.6	0.164
45	IR 45x55x20	$55^{+0.008}_{-0.004}$	20.0	0.6	2.0	49.0	0.6	0.116
45	IR 45x55x22	$55^{+0.008}_{-0.004}$	22.0	1.0	2.0	50.0	1.0	0.130
45	IR 45x55x40	$55^{+0.008}_{-0.004}$	40.0	0.6	2.0	49.0	0.6	0.173
50	IR 50x55x20	$55^{+0.008}_{-0.004}$	20.0	0.6	2.0	54.0	0.6	0.063
50	IR 50x55x25	$55^{+0.008}_{-0.004}$	25.0	0.6	2.0	54.0	0.6	0.780
50	IR 50x55x35	$55^{+0.008}_{-0.004}$	35.0	0.6	2.0	54.0	0.6	0.112
50	IR 50x55x40	$55^{+0.008}_{-0.004}$	40.0	0.6	2.0	54.0	0.6	0.128
50	IR 50x58x22	$58^{+0.008}_{-0.004}$	22.0	0.6	2.0	54.0	0.6	0.113
50	IR 50x58x23	$58^{+0.008}_{-0.004}$	23.0	0.6	-	54.0	0.6	0.119
50	IR 50x58x30	$58^{+0.008}_{-0.004}$	30.0	0.6	2.0	54.0	0.6	0.159
50	IR 50x58x40	$58^{+0.008}_{-0.004}$	40.0	0.6	2.0	54.0	0.6	0.209
50	IR 50x60x20	$60^{+0.008}_{-0.004}$	20.0	1.0	2.0	55.0	1.0	0.129
50	IR 50x60x25	$60^{+0.008}_{-0.004}$	25.0	1.0	2.0	55.0	1.0	0.163
50	IR 50x60x28	$60^{+0.008}_{-0.004}$	28.0	1.1	2.0	56.5	1.0	0.183
50	IR 50x60x40	$60^{+0.008}_{-0.004}$	40.0	1.0	2.0	55.0	1.0	0.262
55	IR 55x60x25	$60^{\ 0}_{-0.013}$	25.0	0.6	2.2	59.0	0.6	0.086
55	IR 55x60x35	$60^{\ 0}_{-0.013}$	35.0	0.6	2.0	59.0	0.6	0.121

Notes: 1) The tolerance for this dimension provides regular clearance when an inner ring is combined with a needle roller bearing that lacks an inner ring.
2) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

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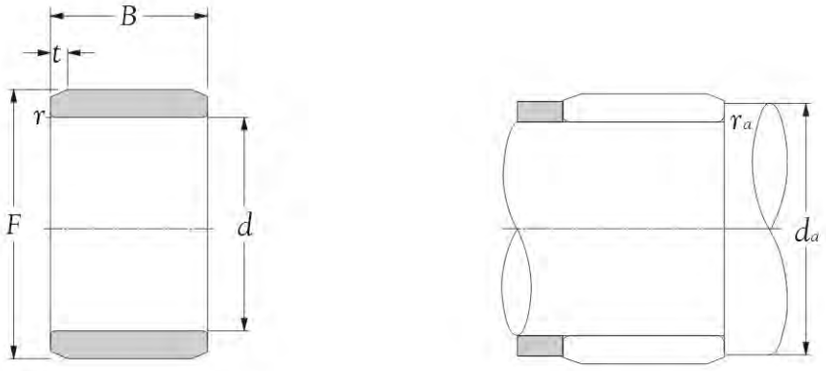
Inner rings
series IR



Inner bore d mm	Bearing number	Principal dimensions $F^{1)}$	B	$r_{s\,min}^{2)}$	t	Abutment dimensions $d_{a\,min}$	$r_{as\,max}$	Mass kg. (approx.)
		mm				mm		
55	IR 55x63x25	$63^{0}_{-0.013}$	25	1.0	2.0	60.0	1.0	0.141
55	IR 55x63x34	$63^{0}_{-0.013}$	34	1.0	2.2	60.0	1.0	0.192
55	IR 55x63x45	$63^{0}_{-0.013}$	45	1.0	2.2	60.0	1.0	0.256
55	IR 55x65x28	$65^{0}_{-0.013}$	28	1.1	2.2	61.5	1.0	0.206
55	IR 55x65x30	$65^{0}_{-0.013}$	30	1.0	2.2	60.0	1.0	0.220
55	IR 55x65x60	$65^{0}_{-0.013}$	60	1.0	1.5	60.0	1.0	0.440
60	IR 60x68x25	$68^{0}_{-0.013}$	25	1.0	2.2	65.0	1.0	0.152
60	IR 60x68x34	$68^{0}_{-0.013}$	34	1.0	2.2	65.0	1.0	0.206
60	IR 60x68x35	$68^{0}_{-0.013}$	35	0.6	2.2	64.0	0.6	0.213
60	IR 60x68x45	$68^{0}_{-0.013}$	45	1.0	2.2	65.0	1.0	0.270
60	IR 60x70x25	$70^{0}_{-0.013}$	25	1.0	2.2	65.0	1.0	0.195
60	IR 60x70x28	$70^{0}_{-0.013}$	28	1.1	2.2	66.5	1.0	0.216
60	IR 60x70x30	$70^{0}_{-0.013}$	30	1.0	2.2	65.0	1.0	0.232
60	IR 60x70x60	$70^{0}_{-0.013}$	60	1.0	2.2	65.0	1.0	0.463
65	IR 65x72x25	$72^{0}_{-0.013}$	25	1.0	2.2	70.0	1.0	0.142
65	IR 65x72x34	$72^{0}_{-0.013}$	34	1.0	2.2	70.0	1.0	0.193
65	IR 65x72x45	$72^{0}_{-0.013}$	45	1.0	2.2	70.0	1.0	0.259
65	IR 65x73x25	$73^{0}_{-0.013}$	25	0.6	2.2	69.0	0.6	0.164
65	IR 65x73x35	$73^{0}_{-0.013}$	35	0.6	2.2	69.0	0.6	0.232
65	IR 65x75x28	$75^{0}_{-0.013}$	28	1.1	2.2	71.5	1.0	0.240
65	IR 65x75x30	$75^{0}_{-0.013}$	30	1.0	2.2	70.0	1.0	0.256
65	IR 65x75x60	$75^{0}_{-0.013}$	60	1.0	2.2	70.0	1.0	0.513
70	IR 70x80x25	$80^{0}_{-0.013}$	25	1.0	2.2	75.0	1.0	0.224
70	IR 70x80x28	$80^{0}_{-0.013}$	28	1.1	2.2	76.5	1.0	0.250
70	IR 70x80x30	$80^{0}_{-0.013}$	30	1.0	2.2	75.0	1.0	0.267
70	IR 70x80x35	$80^{0}_{-0.013}$	35	1.0	2.2	75.0	1.0	0.313

Notes: 1) The tolerance for this dimension provides regular clearance when an inner ring is combined with a needle roller bearing that lacks an inner ring.
2) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

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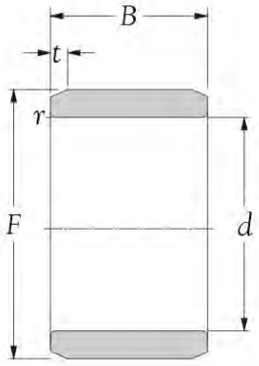
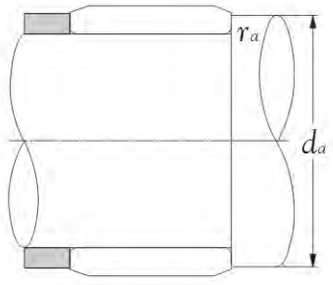
P2

Inner rings
series IR





Inner bore d mm	Bearing number	Principal dimensions $F^{1)}$	B	$r_{s\,min}^{2)}$	t	Abutment dimensions $d_{a\,min}$	$r_{as\,max}$	Mass kg(s). (approx.)
		mm				mm		
70	**IR 70x80x40**	$80^{\ 0}_{-0.013}$	40	1.0	2.2	75.0	1	0.358
70	**IR 70x80x54**	$80^{\ 0}_{-0.013}$	54	1.0	2.2	75.0	1	0.483
70	**IR 70x80x56**	$80^{\ 0}_{-0.013}$	56	1.0	2.2	75.0	1	0.502
70	**IR 70x80x60**	$80^{\ 0}_{-0.013}$	60	1.0	2.2	75.0	1	0.540
75	**IR 75x85x25**	$85^{\ 0}_{-0.015}$	25	1.0	2.2	80.0	1	0.238
75	**IR 75x85x30**	$85^{\ 0}_{-0.015}$	30	1.0	2.2	80.0	1	0.287
75	**IR 75x85x35**	$85^{\ 0}_{-0.015}$	35	1.0	2.2	80.0	1	0.336
75	**IR 75x85x40**	$85^{\ 0}_{-0.015}$	40	1.0	2.2	80.0	1	0.385
75	**IR 75x85x54**	$85^{\ 0}_{-0.015}$	54	1.0	2.2	80.0	1	0.515
75	**IR 75x90x32**	$90^{\ 0}_{-0.015}$	32	1.1	2.2	81.5	1	0.480
80	**IR 80x90x25**	$90^{\ 0}_{-0.015}$	25	1.0	2.2	85.0	1	0.254
80	**IR 80x90x30**	$90^{\ 0}_{-0.015}$	30	1.0	2.2	85.0	1	0.304
80	**IR 80x90x35**	$90^{\ 0}_{-0.015}$	35	1.0	2.2	85.0	1	0.355
80	**IR 80x90x40**	$90^{\ 0}_{-0.015}$	40	1.0	2.2	85.0	1	0.408
80	**IR 80x90x54**	$90^{\ 0}_{-0.015}$	54	1.0	2.2	85.0	1	0.543
80	**IR 80x95x32**	$95^{\ 0}_{-0.015}$	32	1.1	2.2	86.5	1	0.510
85	**IR 85x95x26**	$95^{\ 0}_{-0.015}$	26	1.0	2.5	90.0	1	0.280
85	**IR 85x95x30**	$95^{\ 0}_{-0.015}$	30	1.0	2.5	90.0	1	0.323
85	**IR 85x95x36**	$95^{\ 0}_{-0.015}$	36	1.0	2.5	90.0	1	0.398
85	**IR 85x100x32**	$100^{\ 0}_{-0.015}$	32	1.1	2.5	91.5	1	0.530
85	**IR 85x100x35**	$100^{\ 0}_{-0.015}$	35	1.1	2.5	91.5	1	0.580
85	**IR 85x100x46**	$100^{\ 0}_{-0.015}$	46	1.1	2.5	91.5	1	0.760
85	**IR 85x100x63**	$100^{\ 0}_{-0.015}$	63	1.1	2.5	91.5	1	1.050
90	**IR 90x100x26**	$100^{\ 0}_{-0.015}$	26	1.0	2.5	95.0	1	0.294
90	**IR 90x100x30**	$100^{\ 0}_{-0.015}$	30	1.0	2.5	95.0	1	0.340
90	**IR 90x100x36**	$100^{\ 0}_{-0.015}$	36	1.0	2.5	95.0	1	0.406

Notes: 1) The tolerance for this dimension provides regular clearance when an inner ring is combined with a needle roller bearing that lacks an inner ring.
2) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

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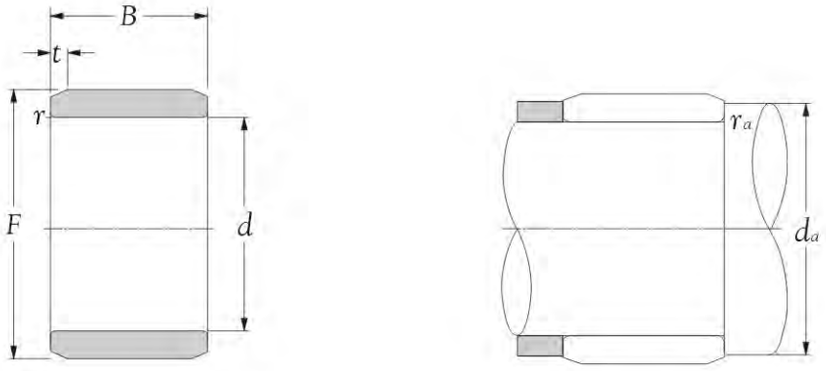
Inner rings
series IR



Inner bore d	Bearing number	Principal dimensions				Abutment dimensions		Mass kg(s).
		$F^{1)}$	B	$r_{s\,min}^{2)}$	t	$d_{a\,min}$	$r_{as\,max}$	
mm		mm				mm		(approx.)
90	**IR 90x105x32**	$105\,^{0}_{-0.015}$	32	1.1	2.5	96.5	1.0	0.560
90	**IR 90x105x35**	$105\,^{0}_{-0.015}$	35	1.1	2.5	96.5	1.0	0.610
90	**IR 90x105x46**	$105\,^{0}_{-0.015}$	46	1.1	2.5	96.5	1.0	0.800
90	**IR 90x105x63**	$105\,^{0}_{-0.015}$	63	1.1	2.5	96.5	1.0	1.110
95	**IR 95x105x26**	$105\,^{0}_{-0.015}$	26	1.0	2.5	100.0	1.0	0.313
95	**IR 95x105x36**	$105\,^{0}_{-0.015}$	36	1.0	2.5	100.0	1.0	0.430
95	**IR 95x110x32**	$110\,^{0}_{-0.015}$	32	1.1	2.5	101.5	1.0	0.590
95	**IR 95x110x35**	$110\,^{0}_{-0.015}$	35	1.1	2.5	101.5	1.0	0.640
95	**IR 95x110x46**	$110\,^{0}_{-0.015}$	46	1.1	2.5	101.5	1.0	0.850
95	**IR 95x110x63**	$110\,^{0}_{-0.015}$	63	1.1	2.5	101.5	1.0	1.170
100	**IR 100x110x30**	$110\,^{0}_{-0.015}$	30	1.1	2.5	106.5	1.0	0.375
100	**IR 100x110x40**	$110\,^{0}_{-0.015}$	40	1.1	2.5	106.5	1.0	0.505
100	**IR 100x115x32**	$115\,^{0}_{-0.015}$	32	1.1	2.5	106.5	1.0	0.620
100	**IR 100x115x40**	$115\,^{0}_{-0.015}$	40	1.1	2.5	106.5	1.0	0.775
100	**IR 100x115x54**	$115\,^{0}_{-0.015}$	54	1.1	2.5	106.5	1.0	1.090
110	**IR 110x120x30**	$120\,^{0}_{-0.015}$	30	1.0	2.5	115.0	1.0	0.440
110	**IR 110x120x40**	$120\,^{0}_{-0.015}$	40	1.1	2.5	116.5	1.0	0.580
110	**IR 110x125x40**	$125\,^{0}_{-0.018}$	40	1.1	2.5	116.5	1.0	0.840
110	**IR 110x125x54**	$125\,^{0}_{-0.018}$	54	1.1	2.5	116.5	1.0	1.160
120	**IR 120x130x30**	$130\,^{0}_{-0.018}$	30	1.0	2.2	125.0	1.0	0.440
120	**IR 120x130x40**	$130\,^{0}_{-0.018}$	40	1.1	2.5	126.5	1.0	0.590
120	**IR 120x135x40**	$135\,^{0}_{-0.018}$	40	2.0	2.5	129.0	2.0	0.870
120	**IR 120x135x45**	$135\,^{0}_{-0.018}$	45	1.1	2.5	126.5	1.0	0.980
120	**IR 120x135x60**	$135\,^{0}_{-0.018}$	60	1.1	2.5	126.5	1.0	1.250
130	**IR 130x145x32**	$145\,^{0}_{-0.018}$	32	1.5	3.0	138.0	1.5	0.780
130	**IR 130x145x35**	$145\,^{0}_{-0.018}$	35	1.1	3.0	136.5	1.0	0.855

Notes: 1) The tolerance for this dimension provides regular clearance when an inner ring is combined with a needle roller bearing that lacks an inner ring.
2) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

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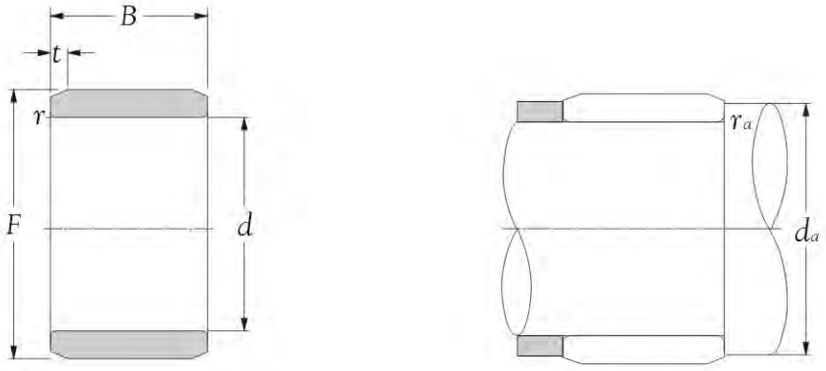
Inner rings
series IR



Inner bore d	Bearing number	Principal dimensions				Abutment dimensions		Mass kg(s).
		$F^{1)}$	B	$r_{s\,min}^{2)}$	t	$d_{a\,min}$	$r_{as\,max}$	
mm		mm				mm		(approx.)
130	IR 130x145x42	$145\,^{0}_{-0.018}$	42	1.5	3.0	138.0	1.5	1.050
130	IR 130x150x50	$150\,^{0}_{-0.018}$	50	1.5	3.0	138.0	1.5	1.690
130	IR 130x150x52	$150\,^{0}_{-0.018}$	52	2.0	3.0	139.0	2.0	1.750
130	IR 130x150x67	$150\,^{0}_{-0.018}$	67	1.5	3.0	138.0	1.5	2.250
140	IR 140x155x32	$155\,^{0}_{-0.018}$	32	1.5	3.0	148.0	1.5	0.840
140	IR 140x155x35	$155\,^{0}_{-0.018}$	35	1.1	3.0	146.5	1.0	0.917
140	IR 140x155x42	$155\,^{0}_{-0.018}$	42	1.5	3.0	148.0	1.5	1.100
140	IR 140x160x50	$160\,^{0}_{-0.018}$	50	1.5	3.0	148.0	1.5	1.700
140	IR 140x160x52	$160\,^{0}_{-0.018}$	52	2.0	3.0	149.0	2.0	1.780
140	IR 140x160x67	$160\,^{0}_{-0.018}$	67	1.5	3.0	148.0	1.5	2.300
150	IR 150x165x32	$165\,^{-0.017}_{-0.035}$	32	1.5	3.0	158.0	1.5	0.900
150	IR 150x165x40	$165\,^{-0.017}_{-0.035}$	40	1.1	3.0	156.5	1.0	1.120
150	IR 150x165x42	$165\,^{-0.017}_{-0.035}$	42	1.5	3.0	158.0	1.5	1.180
150	IR 150x170x52	$170\,^{-0.017}_{-0.035}$	52	2.0	3.0	159.0	2.0	2.000
150	IR 150x170x60	$170\,^{-0.017}_{-0.035}$	60	2.0	3.0	159.0	2.0	2.350
160	IR 160x175x40	$175\,^{-0.017}_{-0.035}$	40	1.1	3.0	166.5	1.0	1.200
160	IR 160x180x60	$180\,^{-0.017}_{-0.035}$	60	2.0	3.0	169.0	2.0	2.500
170	IR 170x185x45	$185\,^{-0.018}_{-0.043}$	45	1.1	3.0	176.5	1.0	1.450
170	IR 170x190x60	$190\,^{-0.018}_{-0.043}$	60	2.0	3.0	179.0	2.0	2.650
180	IR 180x195x45	$195\,^{-0.018}_{-0.043}$	45	1.1	3.0	186.5	1.0	1.510
180	IR 180x205x69	$205\,^{-0.018}_{-0.043}$	69	2.0	3.0	189.0	2.0	4.100
190	IR 190x210x50	$210\,^{-0.020}_{-0.050}$	50	1.5	3.5	198.0	1.5	2.410
190	IR 190x215x69	$215\,^{-0.020}_{-0.050}$	69	2.0	3.5	199.0	2.0	4.100
200	IR 200x220x50	$220\,^{-0.020}_{-0.050}$	50	1.5	3.5	208.0	1.5	2.490
200	IR 200x225x80	$225\,^{-0.020}_{-0.050}$	80	2.1	3.5	211.0	2.0	5.100
220	IR 220x240x50	$240\,^{-0.033}_{-0.063}$	50	1.5	3.5	228.0	1.5	2.750

Notes: 1) The tolerance for this dimension provides regular clearance when an inner ring is combined with a needle roller bearing that lacks an inner ring.
2) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

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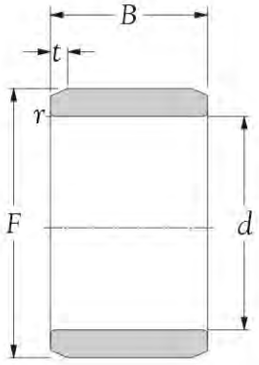
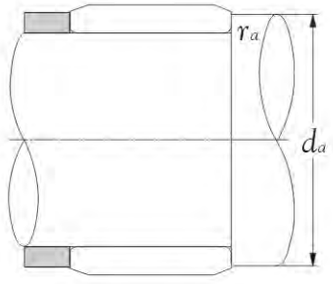
P2

Inner rings
series IR





Inner bore d mm	Bearing number	Principal dimensions $F^{1)}$	B	$r_{s\,min}^{2)}$	t	Abutment dimensions $d_{a\,min}$	$r_{as\,max}$	Mass kg(s). (approx.)
		mm				mm		
220	**IR 220x245x80**	$245^{-0.038}_{-0.068}$	80	2.1	3.5	231	2.0	5.70
240	**IR 240x265x60**	$265^{-0.087}_{-0.069}$	60	2.0	3.5	249	2.0	4.60
240	**IR 240x265x80**	$265^{-0.087}_{-0.069}$	80	2.1	3.5	251	2.0	6.30
260	**IR 260x285x60**	$285^{-0.064}_{-0.092}$	60	2.0	4.0	269	2.0	4.98
260	**IR 260x290x100**	$290^{-0.064}_{-0.092}$	100	2.1	4.0	271	2.0	10.00
280	**IR 280x305x69**	$305^{-0.064}_{-0.092}$	69	2.0	4.0	289	2.0	6.20
280	**IR 280x310x100**	$310^{-0.064}_{-0.092}$	100	2.1	4.0	291	2.0	10.80
300	**IR 300x330x80**	$330^{-0.062}_{-0.098}$	80	2.1	4.0	311	2.0	9.30
300	**IR 300x340x118**	$340^{-0.062}_{-0.098}$	118	3.0	4.0	313	2.5	18.50
320	**IR 320x350x80**	$350^{-0.062}_{-0.098}$	80	2.1	5.0	331	2.0	9.80
320	**IR 320x360x118**	$360^{-0.062}_{-0.098}$	118	3.0	5.0	333	2.5	20.00
340	**IR 340x370x80**	$370^{-0.062}_{-0.098}$	80	2.1	5.0	351	2.0	10.10
340	**IR 340x380x118**	$380^{-0.062}_{-0.098}$	118	3.0	5.0	353	2.5	22.00
360	**IR 360x390x80**	$390^{-0.090}_{-0.126}$	80	2.1	5.0	371	2.0	10.90
360	**IR 360x400x118**	$400^{-0.090}_{-0.126}$	118	3.0	5.0	373	2.5	22.00
380	**IR 380x415x100**	$415^{-0.080}_{-0.120}$	100	2.1	5.0	391	2.0	18.50
380	**IR 380x430x140**	$430^{-0.080}_{-0.120}$	140	4.0	5.0	396	3.0	35.00
400	**IR 400x450x140**	$450^{-0.080}_{-0.120}$	140	4.0	5.0	416	3.0	36.50
420	**IR 420x470x140**	$470^{-0.105}_{-0.145}$	140	4.0	5.0	436	3.0	38.20
440	**IR 440x490x160**	$490^{-0.105}_{-0.145}$	160	4.0	5.0	456	3.0	46.50

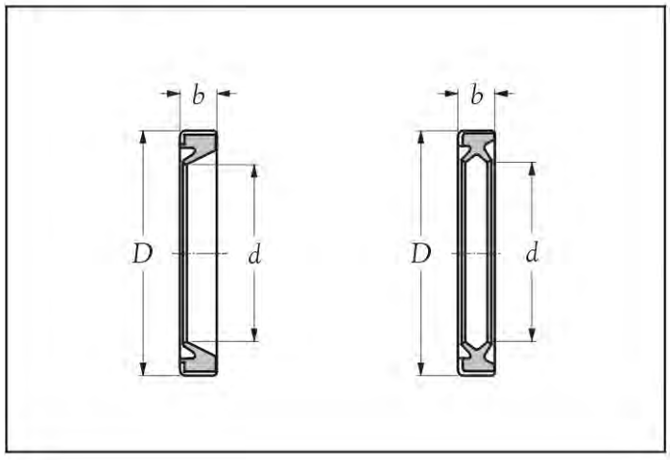
Notes: 1) The tolerance for this dimension provides regular clearance when an inner ring is combined with a needle roller bearing that lacks an inner ring.
2) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P2

KSM® NOTE



TECHNICAL SUPPLEMENT T 234 & T 235

1. Seals

Seals for needle roller bearings are special seals having a low cross-sectional height to accommodate needle roller bearings. These steel plate-reinforced synthetic rubber contact seals should be used within a standard operating temperature range of -25 to 120°C; the seals should not be used in excess of 100°C or continuous operation. Consult **KSM** Engineering if you are considering an application involving special operating conditions including operating temperature of 120°C or higher.

2. Seal types

Seals for needle roller bearings are available in the series G, which has a single lip, and the series SD, which has a double lip. For special operating conditions, such as an operating temperature exceeding 120°C, consult **KSM** Engineering. Where good seal seating and lubricating conditions are present, the maximum allowable peripheral velocity is 10m/s for the single-lip series G, and 6 m/s for the double lip series SD.

Fig. A Series G

Fig. B Series SD

3. Interpreting seal numbers

Seal numbers comprise a series number (G or SD) and a dimension code (inside diameter X outside diameter X width.)

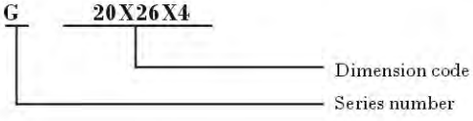


Fig. C

4. Mounting practices

To achieve a reliable seal, the seal seating must be hardened and finish-ground. If the raceway surface of an inner ring is used as the seal seat, an extended inner ring should be used. To prevent the seal lip and outside surface of the seal from being damaged during mounting, the shaft end or housing end should be tapered (Fig. D). If the shaft end lacks a taper or rounding, use of the mounting jig as shoun in Fig. F is recommended. Sufficient interference between the seal and housing will be obtained from an ordinary housing tolerance of S7 to R7.

To lubricate the lip, apply lubricant to the lip before mounting the seal.

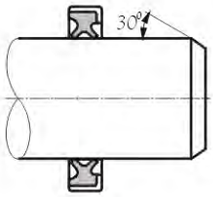


Fig. D

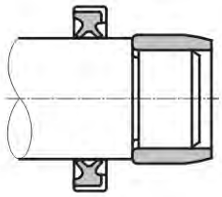


Fig. E

5. Typical seal applications

Fig. F to H illustrate typical designs of seals for needle roller bearings.

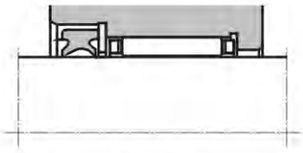


Fig. F

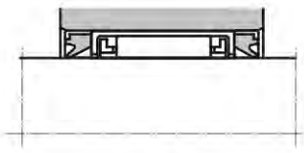


Fig. G

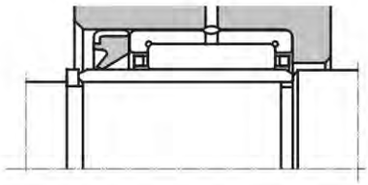
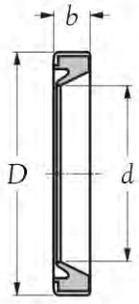
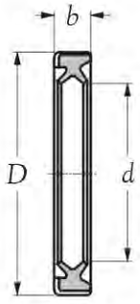


Fig. H

Sealing rings
series G & SD



Type G



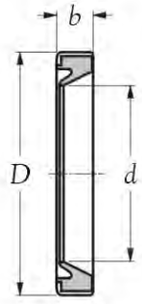
Type SD

Inner bore d mm	Bearing number		Boundary dimensions $D^{1)}$ mm	b $^{-0.2}_{0}$	Mass kg(s). (approx.) G	SD
4	G 4x8x2	-	$8^{+0.081}_{+0.023}$	2	0.18	-
5	G 5x9x3	-	$9^{+0.081}_{+0.023}$	2	0.19	-
5	G 5x10x2	-	$10^{+0.081}_{+0.023}$	2	0.22	-
6	G 6x10x2	-	$10^{+0.081}_{+0.023}$	2	0.21	-
6	G 6x12x2	-	$12^{+0.098}_{+0.028}$	2	0.38	-
7	G 7x11x2	-	$11^{+0.098}_{+0.028}$	2	0.25	-
7	G 7x14x2	-	$14^{+0.098}_{+0.028}$	2	0.52	-
8	G 8x12x3	-	$12^{+0.098}_{+0.028}$	3	0.41	-
8	G 8x15x3	-	$15^{+0.098}_{+0.028}$	3	0.74	-
9	G 9x13x3	-	$13^{+0.098}_{+0.028}$	3	0.44	-
9	G 9x16x3	-	$16^{+0.098}_{+0.028}$	3	0.69	-
10	G 10x14x3	-	$14^{+0.098}_{+0.028}$	3	0.50	-
10	G 10x17x3	-	$17^{+0.098}_{+0.028}$	3	0.87	-
12	G 12x16x3	-	$16^{+0.098}_{+0.028}$	3	0.56	-
12	G 12x18x3	-	$18^{+0.098}_{+0.028}$	3	0.86	-
12	G 12x19x3	-	$19^{+0.119}_{+0.035}$	3	0.94	-
13	G 13x19x3	-	$19^{+0.119}_{+0.035}$	3	0.87	-
14	G 14x20x3	SD 14x20x3	$20^{+0.119}_{+0.035}$	3	0.96	0.99
14	G 14x21x3	SD 14x21x3	$21^{+0.119}_{+0.035}$	3	1.10	1.10
14	G 14x22x3	SD 14x22x3	$22^{+0.119}_{+0.035}$	3	1.30	1.30
15	G 15x21x3	SD 15x21x3	$21^{+0.119}_{+0.035}$	3	1.00	1.00
15	G 15x23x3	SD 15x23x3	$23^{+0.119}_{+0.035}$	3	1.30	1.30
16	G 16x22x3	SD 16x22x3	$22^{+0.119}_{+0.035}$	3	1.30	1.10
16	G 16x24x3	SD 16x24x3	$24^{+0.119}_{+0.035}$	3	1.30	1.30
16	G 16x25x3	SD 16x25x3	$25^{+0.119}_{+0.035}$	3	1.60	1.60
17	G 17x23x3	SD 17x23x3	$23^{+0.119}_{+0.035}$	3	1.30	1.10
17	G 17x25x3	SD 17x25x3	$25^{+0.119}_{+0.035}$	3	1.50	1.40

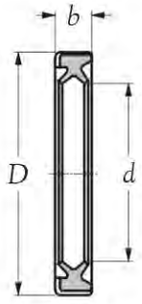
Notes: 1) The tolerance of the outside diameter is an average of two measurements taken at equally spaced points on the outside surface.
Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Sealing rings
series G & SD



Type G



Type SD

Inner bore d	Bearing number		Boundary dimensions		Mass kgs. (approx.)	
			$D^{1)}$	$b\ {}^{0}_{-0.2}$	G	SD
18	G 18x24x3	SD 18x24x3	$24\ {}^{+0.119}_{+0.085}$	3	1.2	1.2
18	G 18x26x4	SD 18x26x4	$26\ {}^{+0.119}_{+0.085}$	4	1.8	1.8
19	G 19x27x4	SD 19x27x4	$27\ {}^{+0.119}_{+0.085}$	4	2.0	1.9
20	G 20x26x4	SD 20x26x4	$26\ {}^{+0.119}_{+0.085}$	4	1.8	1.8
20	G 20x28x4	SD 20x28x4	$28\ {}^{+0.119}_{+0.085}$	4	2.1	2.1
21	G 21x29x4	SD 21x29x4	$29\ {}^{+0.119}_{+0.085}$	4	2.2	2.1
22	G 22x28x4	SD 22x28x4	$28\ {}^{+0.119}_{+0.085}$	4	1.8	1.9
22	G 22x30x4	SD 22x30x4	$30\ {}^{+0.119}_{+0.085}$	4	2.2	2.3
24	G 24x32x4	SD 24x32x4	$32\ {}^{+0.143}_{+0.043}$	4	2.5	2.4
25	G 25x32x4	SD 25x32x4	$32\ {}^{+0.143}_{+0.043}$	4	2.3	2.2
25	G 25x33x4	SD 25x33x4	$33\ {}^{+0.143}_{+0.043}$	4	2.5	2.5
25	G 25x35x4	SD 25x35x4	$35\ {}^{+0.143}_{+0.043}$	4	2.6	2.6
26	G 26x34x4	SD 26x34x4	$34\ {}^{+0.143}_{+0.043}$	4	2.6	2.6
28	G 28x35x4	SD 28x35x4	$35\ {}^{+0.143}_{+0.043}$	4	2.4	2.5
28	G 28x37x4	SD 28x37x4	$37\ {}^{+0.143}_{+0.043}$	4	3.1	2.8
29	G 29x37x4	SD 29x37x4	$37\ {}^{+0.143}_{+0.043}$	4	2.7	2.7
29	G 29x38x4	SD 29x38x4	$38\ {}^{+0.143}_{+0.043}$	4	3.2	2.9
30	G 30x37x4	SD 30x37x4	$37\ {}^{+0.143}_{+0.043}$	4	2.7	2.6
30	G 30x40x4	SD 30x40x4	$40\ {}^{+0.143}_{+0.043}$	4	3.6	3.3
32	G 32x42x4	SD 32x42x4	$42\ {}^{+0.143}_{+0.043}$	4	3.7	3.9
32	G 32x45x4	SD 32x45x4	$45\ {}^{+0.143}_{+0.043}$	4	5.1	5.2
35	G 35x42x4	SD 35x42x4	$42\ {}^{+0.143}_{+0.043}$	4	3.0	2.9
35	G 35x45x4	SD 35x45x4	$45\ {}^{+0.143}_{+0.043}$	4	4.1	3.6
37	G 37x47x4	SD 37x47x4	$47\ {}^{+0.143}_{+0.043}$	4	4.0	3.8
38	G 38x48x4	SD 38x48x4	$48\ {}^{+0.143}_{+0.043}$	4	4.4	4.0
40	G 40x47x4	SD 40x47x4	$47\ {}^{+0.143}_{+0.043}$	4	3.3	3.5
40	G 40x50x4	SD 40x50x4	$50\ {}^{+0.143}_{+0.043}$	4	4.6	4.0

Notes: 1) The tolerance of the outside diameter is an average of two measurements taken at equally spaced points on the outside surface.

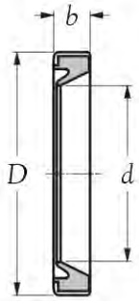
Remark: [Precision] - Class 0 (JIS)

[Cage] - Nil

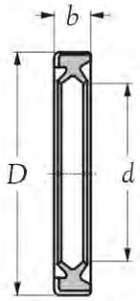
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Sealing rings
series G & SD



Type G



Type SD

Inner bore d	Bearing number		Boundary dimensions $D^{1)}$	b $^{-0.2}_{0}$	Mass kgs. (approx.) G	SD
40	G 40x52x4	SD 40x52x4	$52^{+0.173}_{+0.053}$	4	4.8	4.7
42	G 42x52x4	SD 42x52x4	$52^{+0.173}_{+0.053}$	4	4.7	4.2
43	G 43x53x4	SD 43x53x4	$53^{+0.173}_{+0.053}$	4	4.8	4.3
45	G 45x52x4	SD 45x52x4	$52^{+0.173}_{+0.053}$	4	3.8	3.8
45	G 45x55x4	SD 45x55x4	$55^{+0.173}_{+0.053}$	4	5.2	5.5
50	G 50x58x4	SD 50x58x4	$58^{+0.173}_{+0.053}$	4	4.5	5.2
50	G 50x62x4	SD 50x62x4	$62^{+0.173}_{+0.053}$	4	10.4	10.0

Notes: 1) The tolerance of the outside diameter is an average of two measurements taken at equally spaced points on the outside surface.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

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Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P3

KSM®

TRACK ROLLER BEARINGS

Technical supplement		Pages for refer
		T 242 - T 250
1	Bearing materials	T 242
2	Shields and seals	T 242
3	Bearing tolerances	T 243 - T 245
4	Bearing fits	T 246 & T 247
5	Bearing internal clearance	T 247
6	Lubrication	T 248
7	Load rating and life	T 248
8	Bearing handling	T 249
9	Allowable speed	T 249 & T 250

1. Bearing materials

The internal design of **KSM** track rollers is the same as in single row or double-row angular contact ball bearings. The units can carry axial loads in both directions and, due to the thickness of the outer ring, large radial loads. The standard product are produced from high quality bearing steel, with a hardness of 58 to 62 HRC. Some types are also available in stainless steel (440C) with hardness >58 HRC.
The track rollers contained in this catalogue are produced with standard tolerances (ISO 492) and standard clearance (Normal).
The track rollers are produced in two distinct families. Cylindrical or crowned outer ring and profiled outer ring.

These track rollers are available in single and double row design. They are available with straight cylindrical OD or crowned profile OD. The crowned OD is used to reduce the edge stresses caused by possible misalignment errors. The cylindrical OD can provide increased support due to the longer contact profile.

There products are used typically on flat surfaces. Some of the most common applications are:
-Transfer rolls
-idler rollers
-Support rollers
-Straightening rolls

2. Shields and seals

2.1 Types

2.1.1 Track rollers LR 2, LR 2..RRU

These single row ball track rollers are available in following different versions.
- LR 2..X-2RS: cylindrical OD, with light contact seals.
- LR 2..X-2RSR: crowned cylindrical OD, with contact seals.
- LR 2..2RS: crowned OD, with light contact seals.
- LR 2..2RSR: crowned OD, with contact seals.
- LR 2..RRU: crowned OD with contact seals protected by a metal shield, inner ring with increased width to allow additional lubricant storage.

2.1.2 Track rollers LR 52, LR 53

These are double row angular contact ball track rollers. Due to their internal design, they can carry axial loads of large magnitude. They are available in three versions:
- LR 52..2RS, LR 53..2RS: crowned OD, with light contact seals.
- LR 52..X-2Z, LR 53..X-2Z: cylindrical OD, with metal shields.
- LR 52..2Z, LR 53..2Z: crowned OD, with metal shields.

The track rollers with profiled outer ring are basically double-row angular contact ball bearings with a reinforced and profiled outer ring. The outer ring profile allows the units to operate on round shafts or other types of profiled raceways. The outer profile can have three different designs;

- Track rollers with gothic arch groove - type LFR.

2.2 Types - Track rollers LFR

The track rollers series LFR can be used on round shafts with diameter from 4 mm to 50 mm. The contact between track roller gothic arch groove profile and shaft is on two points.
This allows the units to carry loads in both axial and radial direction.
The track rollers are available with either shields 2Z or contact seals 2RS.

They are available with either non-contacting seals 2RS or contact seals 2RSR.

3. Bearing tolerances

3.1 Standard of tolerances

Track roller bearing "tolerances" or dimensional accuracy and running accuracy, are regulated by ISO standard (rolling bearing tolerances). For dimensional accuracy, these standards prescribe the tolerances necessary when installing bearings on shafts or in housings.
Running accuracy is defined as the allowable limits for bearing runout during operation.

Table 3A Comparison of tolerance classifications of national standards

Standard		Tolerance class				
International Organization for Standardization (ISO)	ISO	P0	P6	P5	P4	P2
Deutsches Institut fur Normung (DIN)	DIN	Normal class Class 6X	Class 6	Class 5	Class 4	Class 2
American National Standards Institute (ANSI)	JIS	ABEC-1	ABEC-3	ABEC-5	ABEC-7	ABEC-9

Table 3B Tolerances for radial bearings

Inner rings

(Unit : μm)

Nominal bore diameter d mm		Single plane mean bore diameter deviation $\triangle d_{mp}$										Single radial plane bore diameter variation V_{dp}									
		class 0		class 6		class 5		class 4 ❶		class 2 ❶		diameter series 9					maxdiameter series 0,1				
												class 0	class 6	class 5	class 4	class 2	class 0	class 6	class 5	class 4	class 2
over	incl.	high	low	high	low	high	low	high	low	high	low	max.					max.				
10	18	0	-8	0	-7	0	-5	0	-4	0	-2.5	10	9	5	4	2.5	8	7	4	3	2.5
18	30	0	-10	0	-8	0	-6	0	-5	0	-2.5	13	10	6	5	2.5	10	8	5	4	2.5
30	50	0	-12	0	-10	0	-8	0	-6	0	-2.5	15	13	8	6	2.5	12	10	6	5	2.5

(Unit : μm)

Nominal bore diameter d mm		Single radial plane bore diameter variation V_{dp} maxdiameter series 2,3,4					Mean single plane bore diameter variation V_{dmp}					Inner ring radial runout K_{ia}					Face runout with bore S_d		
		class 0	class 6	class 5	class 4	class 2	class 0	class 6	class 5	class 4	class 2	class 0	class 6	class 5	class 4	class 2	class 5	class 4	class 2
over	incl.	max.					max.					max.					max.		
10	18	6	5	4	3	2.5	6	5	3	2.0	1.5	10	7	4	2.5	1.5	7.0	3.0	1.5
18	30	8	6	5	4	2.5	8	6	3	2.5	1.5	13	8	4	3.0	2.5	8.0	4.0	1.5
30	50	9	8	6	5	2.5	9	8	4	3.0	1.5	15	10	5	4.0	2.5	8.0	4.0	1.5

(Unit : μm)

Nominal bore diameter d mm		Inner ring axial runout (with side) S_{ia} ❷			Inner ring width deviation $\triangle B_s$										Inner ring width variation V_{Bs}				
					normal						modified ❸								
		class 5	class 4	class 2	class 0,6		class 5,4		class 2		class 0,6		class 5,4		class 0	class 6	class 5	class 4	class 2
over	incl.				high	low	high	low	high	low	high	low	high	low			max.		
10	18	7	3	1.5	0	-120	0	- 80	0	- 80	0	-250	0	-250	20	20	5	2.5	1.5
18	30	8	4	2.5	0	-120	0	-120	0	-120	0	-250	0	-250	20	20	5	2.5	1.5
30	50	8	4	2.5	0	-120	0	-120	0	-120	0	-380	0	-250	20	20	5	3.0	1.5

T1

Note: ❶ The dimensional difference $\triangle ds$ of bore diameter to applied for class 4 and 2 is the same as the tolerance of dimentional difference $\triangle dmp$ of average bore diameter. However, the dimensional difference is applied to diameter series 0, 1, 2, 3 and 4 against Class 4, and to all the diameter series against Class 2.

❷ To be applied for deep groove ball bearing and angular contact ball bearings.

❸ To be applied for individual raceway rings manufactured for combined bearing use.

Symbols: $\triangle dmp$: deviation of the mean bore diameter from the nominal ($\triangle dmp = dmp - d$).

Vdp: bore diameter variation; difference between the largest and smallest single bore diameters in one plane.

$Vdmp$: mean bore diameter variation; difference between the largest and smallest mean bore diameters of one ring or washer.

Kia: radial runout of assembled bearing inner ring and assembled bearing outer ring, respectively.

Sd: side face runout with reference to bore (of inner ring).

Sia: side face runout of assembled bearing inner ring and assembled bearing outer ring, respectively.

$\triangle Bs$: deviation of single inner ring width or single outer ring width from the nominal ($\triangle Bs = Bs - B$ etc.)

VBs: ring width variation; difference between the largest and smallest single widths of inner ring and of outer ring, respectively.

Outer rings

(Unit : μm)

Nominal Outside diameter D mm		Single plane mean outside diameter deviation $\triangle D_{mp}$										Single radial plane outside diameter variation V_{Dp}									
												diameter series 9					maxdiameter series 0,1				
		class 0		class 6		class 5		class 4 ❺		class 2 ❺		class 0	class 6	class 5	class 4	class 2	class 0	class 6	class 5	class 4	class 2
over	incl.	high	low	high	low	high	low	high	low	high	low			max.					max.		
6	18	0	-8	0	-7	0	-5	0	-4	0	-2.5	10	9	5	4	2.5	8	7	4	3	2.5
18	30	0	-9	0	-8	0	-6	0	-5	0	-4.0	12	10	6	5	4.0	9	8	5	4	4.0
30	50	0	-11	0	-9	0	-7	0	-6	0	-4.0	14	11	7	6	4.0	11	9	5	5	4.0
50	80	0	-13	0	-11	0	-9	0	-7	0	-4.0	16	14	9	7	4.0	13	11	7	5	4.0
80	120	0	-15	0	-13	0	-10	0	-8	0	-5.0	19	16	10	8	5.0	19	16	8	6	5.0

(Unit : μm)

Nominal Outside diameter D mm		Single radial plane outside diameter variation V_{Dp} max diameter series 2,3,4					Single radial plane outside diameter variation V_{Dp} ❻ capped bearings diameter series		Mean single plane outside diameter variation V_{Dmp}				
		class 0	class 6	class 5	class 4	class 2	2,3,4 class 0	0,1,2,3,4 class 6	class 0	class 6	class 5	class 4	class 2
over	incl.	max.					max.		max.				
6	18	6	5	4	3	2.5	10	9	6	5	3	2.0	1.5
18	30	7	6	5	4	4.0	12	10	7	6	3	2.5	2.0
30	50	8	7	5	5	4.0	16	13	8	7	4	3.0	2.0
50	80	10	8	7	5	4.0	20	16	10	8	5	3.5	2.0
80	120	11	10	8	6	5.0	26	20	11	10	5	4.0	2.5

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Symbols: $\triangle D_{mp}$: deviation of the mean outside diameter from the nominal ($\triangle D_{mp} = D_{mp} - D$).
V_{Dp}: outside diameter variation; difference between the largest and smallest single outside diameters in one plane.
V_{dmp}: mean outside diameter variation; difference between the largest and smallest mean outside diameters of one ring or washer.

(Unit : μm)

Nominal Outside diameter D mm		Outer ring radial runout K_{ea}					Outside surface inclination S_D			Outside ring axial runout S_{ea} ❼			Outer ring width deviation $\triangle C_s$	Outer ring width variation V_{Cs}			
		class 0	class 6	class 5	class 4	class 2	class 5	class 4	class 2	class 5	class 4	class 2		class 0,6	class 5	class 4	class 2
over	incl.	max.					max.			max.			all type	max.			
6	18	15	8	5	3	1.5	8	4	1.5	8	5	1.5	Identical to	Identical to	5	2.5	1.5
18	30	15	9	6	4	2.5	8	4	1.5	8	5	2.5	△Bs of inner	△Bs and Vbs	5	2.5	1.5
30	50	20	10	7	5	2.5	8	4	1.5	8	5	2.5	ring of same	of inner	5	2.5	1.5
50	80	25	13	8	5	4.0	8	4	1.5	10	5	4.0	bearing	ring of same	6	3.0	1.5
80	120	35	18	10	6	5.0	9	5	2.5	11	6	5.0		bearing	8	4.0	2.5

Note: ❺ The dimensional difference $\triangle D_s$ of outer diameter to be applied for classes 4 and 2 is the same as the tolerance of dimensional difference $\triangle D_{mp}$ of average outer diameter. However, the dimensional difference is applied to diameter series 0,1.2.3 and 4 against Class 4, and also to all the diameter series against class 2.
❻ To be applied in case snap rings are not installed on the bearings.
❼ To be applied for Track Roller Bearings.

Symbols: K_{ea}: radial runout of assembled bearing inner ring and assembled bearing outer ring, respectively.
S_D: outside inclination variation: variation in inclination of outside cylindrical surface to outer ring side face.
S_{ea}: side face runout of assembled bearing inner ring and assembled bearing outer ring, respectively.
$\triangle C_s$: deviation of single inner ring width or single outer ring width from the nominal ($\triangle B_s = B_s - B$ etc.)
V_{cs}: ring width variation; difference between the largest and smallest single widths of inner ring and of outer ring, respectively.

4. Bearing fits

Track rollers are precision machine elements. These products must be very carefully handled before and during fitting. Their trouble-free operation depends largely on the care taken during fitting.

4.1 Compatibility and miscibility

The anti-corrosive preservation oil used for rolling bearings is compatible and miscible with oils and greases with a mineral oil base. Compatibility should be checked if the following are used:

- synthetic lubricants
- thickeners other than lithium or lithium complex soaps.

If there is an incompatibility, the anti-corrosive oil should be washed out before greasing, particularly in the following cases:

- lubricants based on PTFE / alkoxy fluorometry
- lubricants with a polycarbamide thickener

and if

- the lubricant is changed
- the rolling bearings are contaminated.

If in doubt, please contact the relevant lubricant manufacturer.

4.2 Guidelines for fitting

- The assembly area must be kept clean and free from dust
- Protect bearings from dust, contaminants and moisture
  - contaminants have a detrimental influence on the running and operating life of rolling bearings
- Inspect the housing bore and shaft / axis seating for
  - dimensional and geometrical tolerances
  - cleanliness
- Lightly oil the bearing ring seating surfaces or rub with solid lubricant
- Do not cool the bearings excessively
  - Moisture due to condensation can lead to corrosion in the bearings and bearing seatings
- After fitting
  - charge ungreased rolling bearings with lubricant
  - check the correct functioning of the bearing arrangement.

4.3 Fitting tools

- Induction heating device (see figure below)
- Heating cupboard
  - heating up to +80 °C
- Mechanical or hydraulic press
  - fitting sleeves should be used which cover the whole circumference of the bearing ring end faces
- Hammer and fitting sleeve
  - light hammer blows should be centrally directed on the fitting sleeve

Note: Fitting forces must never be directed through the rolling elements.
Direct blows on the bearing rings must be avoided.

Heating with an induction heater

4.4 Dismantling guidelines

- Dismantling should be taken into consideration in the original design of the bearing location
- If the bearings are to be reused:
  - direct blows on the bearing rings should be avoided
  - dismantling forces should not be applied through the rolling elements
  - bearings should be carefully cleaned once dismantled
  - do not use a concentrated or hard flame.

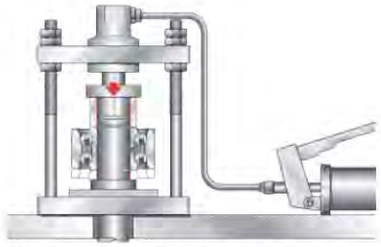
4.5 Fitting and dismantling of yoke type track rollers (ball type)

- If the tolerance zone is unfavourable: the bearing should be pressed into place using a fitting press (see figure below)
  - The inner ring must be fitted such that the pressing-in force is distributed uniformly on theend face of the inner ring.

Note: Fitting forces must not be directed through the rolling elements. It must be ensured that the seals are not damaged during fitting.

- Track rollers must be secured axially according to the advice given.

Note: Extraction forces must not be directed through the outer ring. This could damage the rolling elements and seals.

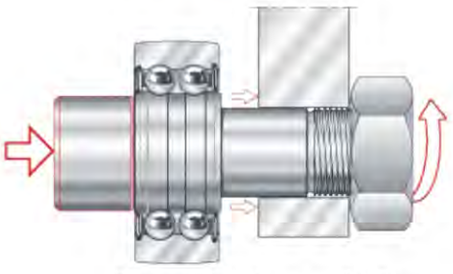


Fitting of the yoke type track roller using a fitting press

4.6 Fitting and dismantling of stud type track rollers (ball type)

Stud type track rollers are fitted and dismantled by methods similar to those used for yoke type track rollers (see figure below).

Note: The tightening torques given in the dimension table must be observed. Only then can the permissible radial load be ensured. Screws and nuts of grade ≥ 8.8 must be used.



Fitting of a stud type track roller

5. Bearing internal clearance

Track roller bearing internal clearance (initial clearance) is the amount of internal clearance a bearing has before being installed on a shaft or in a housing. The internal clearance valves for **KSM** track roller bearing classes are shown in Tables 5A.

Table 5A Radial internal clearance of track roller bearings (Unit : μm)

Nominal bore diameter d (mm)		C2		Normal		C3		C4	
over	Incl.	min.	max.	min.	max.	min.	max.	min.	max.
-	10	6	12	8	15	15	22	22	30
10	18	6	12	8	15	15	24	30	40
18	30	6	12	10	20	20	32	40	55
30	50	8	14	14	25	25	40	55	75

6. Lubrication

6.1 Track rollers series LR 2.. are supplied grease filled. (The lithium soap grease).

6.2 Track rollers series LR 52.. Are supplied grease filled. (The lithium soap grease).

6.3 Track rollers LFR

The units are supplied with lifetime grease lubrication
The size with an outside diameter 52 mm or greater have a lubrication hole in the inner ring. To prevent mixing of greases with different characteristics, please insure to perform the lubrication of the units with lubricants that have the same characteristics as the grease used at the factory. Mounting bolts are available in both eccentric.

7. Load rating and life

If the track rollers operate on a flat surface / raceway, the outer ring deforms (Fig.7A)
When compared with a bearing mounted in a suitable housing, track rollers have the following characteristics:
- Modified load distribution
This is accounted for by using the load factors *Cw* and *Cow* when calculating the life.
- Alternating bending stress on the outer ring
This is taken into account by the load coefficients *Fr* perm and *Fro* perm (see dimension tables). The stresses must not exceed the allowable limits.

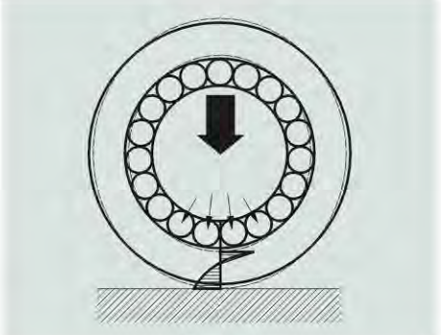


Fig. 7A

7.1 Load ratings and life calculation

The dynamic load rating of the track roller is determined by the fatigue limit of the material. The life of the track roller is defined as the period of use before the pearance of fatigue. The ability of a track roller to carry dynamicloads is statistically derived.

7.1.1 Life calculation

The formula to calculate the nominal life is as follows:

$$L = \left(\frac{C_W}{P}\right)^3$$

$$L_h = \frac{833}{H.nosz}\left(\frac{C_W}{P}\right)^3$$

$$L_h = \frac{1666}{V_m}\left(\frac{C_W}{P}\right)^3$$

L = nominal life in 10^5 m reached by 90% of a statistically significant number of apparently identical bearing operating under the same loading condition before the onset of metal fatigue.
L_h [*h*] = nominal life in hours
C_w [*N*] = dynamic load rating. Is the load that would yield a nominal life of 105 m.
P [*N*] = equivalent dynamic load
H [*m*] = stroke
n_{osz} [min^{-1}] = frequency of operation
V_m [m/min] = mean operating velocity

7.1.2 Radial dynamic limit load *Fr* perm

When selecting the product it is necessary to insure that no loading condition will exceed the allowable load.

8. Bearing handling

8.1 Storage

The bearings should be stored:
- in dry, clean rooms with the temperature as constant as possible
- at a relative humidity of max. 65%.

The storage period for greased and sealed bearings is limited by the shelf life of the grease.

8.2 Removal from packaging

Perspiration from handling leads to corrosion. Hands should be kept clean and dry and gloves worn if necessary.
Bearings should only be removed from their original packaging immediately before assembly.
If only a few bearings are taken out of a multi-piece package preserved by volatile corrosion inhibitor paper, the package must be closed again immediately
- the protective vapour phase is only effective when the package is closed
- the bearings which have been taken out must be greased or oiled immediately.

9. Allowable speed

As bearing speed increases, the temperature of the bearing also increases due to friction heat generated in the bearing interior. If the temperature continues to rise and exceeds certain limits, the efficiency of the lubricant start to fail down drastically, and the bearing can no longer continue to operate in a stable manner. Therefore, the maximum speed at which it is possible for the bearing to continuously operate without the generation of excessive heat beyond specified limits, is called the allowable speed (r/min). The allowable speed of a bearing depends on the type of bearing, bearing dimensions, type of cage, load, lubricating conditions, and cooling conditions.

The allowable speeds listed in the bearing tables for grease and oil lubrication are for **KSM** track roller under normal operating conditions, correctly installed, using the suitable lubricants with adequate supply and proper maintenance. Moreover, these values are based on normal load conditions ($P \leq 0.09C$, $Fa/Fr \leq 0.3$). For track roller with contact seals, the allowable speed is determined by the peripheral lip speed of the seal.

For track roller to be used under heavier than normal load conditions, the allowable speed values listed in the bearing tables must be multiplied by an adjustment factor. The adjustment factors f_L and f_C are given in Figs. 9A and 9B.

Under such high speed operating conditions, when special care is taken, the standard allowable speeds given in the bearing tables can be adjusted upward. The maximum speed adjustment values, /B, by which the bearing table speeds can be multiplied, are shown in Table 9A. However, for any application requiring speeds in excess of the standard allowable speed, please consult **KSM** engineering.

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Fig. 9A Value of adjustment factor F_L depends on bearing load

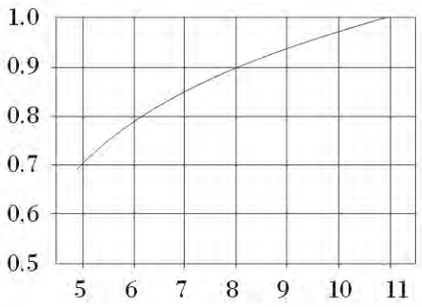


Fig. 9B Value of adjustment factor F_C depends on combined load

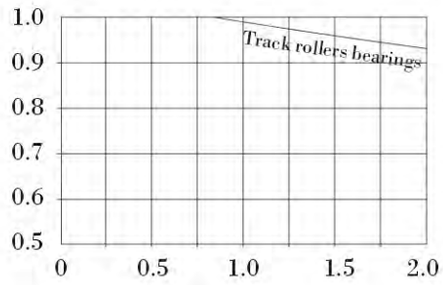
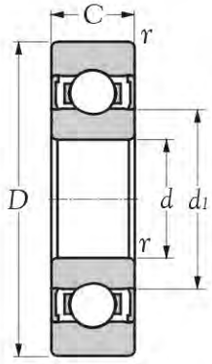


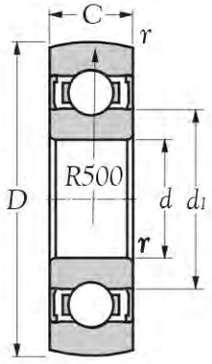
Table 9A Adjustment factor, f_B, for allowable number of revolutions

Type of bearing	Adjustment factor f_B
Track rollers bearings	2.0

Track roller bearings double row series LR 2



Type LR 2..X-2RS
(Double seals)



Type LR 2..2RS
(Double seals)

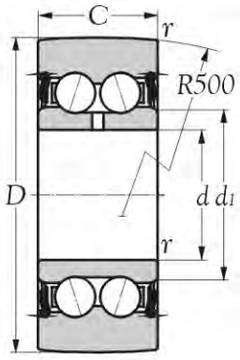
Boundary dimensions mm					Basic load ratings dynamic static N		Limiting speeds grease rpm	Bearing number		Mass kg.
d	D	C	rs min[1]	d1	Cr	Cor				(approx.)
10	32	9	0.6	15.4	4200	2050	13000	LR 200 X-2RS	LR 200 2RS	0.05
12	35	10	0.6	17.1	5500	2600	15000	LR 201 X-2RS	LR 201 2RS	0.05
15	40	11	0.6	20.0	6700	3150	14000	LR 202 X-2RS	LR 202 2RS	0.07
17	47	12	0.6	22.5	9100	4200	11000	LR 203 X-2RS	LR 203 2RS	0.11
20	52	14	1.0	26.5	11800	5400	10000	LR 204 X-2RS	LR 204 2RS	0.15
25	62	15	1.0	30.3	14900	6800	9000	LR 205 X-2RS	LR 205 2RS	0.23
30	72	16	1.0	37.4	20800	9200	5500	LR 206 X-2RS	LR 206 2RS	0.33
35	80	17	1.1	42.4	26100	11400	4500	LR 207 X-2RS	LR 207 2RS	0.40
45	90	19	1.1	53.2	30300	13100	3600	LR 209 X-2RS	LR 209 2RS	0.45

Note: 1) These values are the allowable minimal dimension of the chamfer dimension r.
2) X: Cylindrical outside surface.
3) 2RS: Lip seals on both sides, giving axial sealing action.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Track roller bearings double row series LR 50



Type LR 50..2RS
(Double seals)

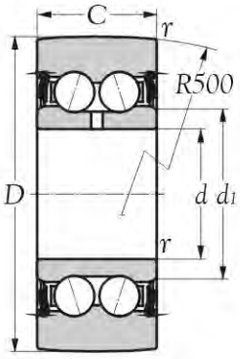
Boundary dimensions mm					Basic load ratings dynamic static N		Limiting speeds grease rpm	Bearing number	Mass kg. (approx.)
d	D	C	rs min1)	d1	Cr	Cor			
5	17	7	0.2	8.2	1960	940	12000	LR 50/5 2RS	0.01
6	19	9	0.3	9.3	2700	1370	11000	LR 50/6 2RS	0.02
7	22	10	0.3	10.5	3300	1700	10000	LR 50/7 2RS	0.02
8	24	11	0.3	10.5	4300	2390	10000	LR 50/8 2RS	0.03
10	28	12	0.3	13.5	4750	2850	9000	LR 5000 2RS	0.03
12	30	12	0.3	15.5	5100	3100	8500	LR 5001 2RS	0.03
15	35	13	0.3	20.4	6500	4150	7000	LR 5002 2RS	0.05
17	40	14	0.3	21.6	7800	5300	6000	LR 5003 2RS	0.07
20	47	16	0.6	25.2	11700	7700	5500	LR 5004 2RS	0.12
25	52	16	0.6	29.8	11800	8200	4700	LR 5005 2RS	0.15
30	62	19	1.0	35.5	16100	11900	4000	LR 5006 2RS	0.25
35	68	20	1.0	41.7	17800	13300	4300	LR 5007 2RS	0.30

Note: 1) These values are the allowable minimal dimension of the chamfer dimension r.

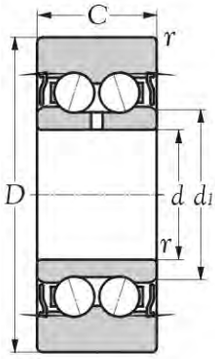
Remark: [Precision] - Class 0 (JIS)
[Cage] - Polyamide 66
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter KSM web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

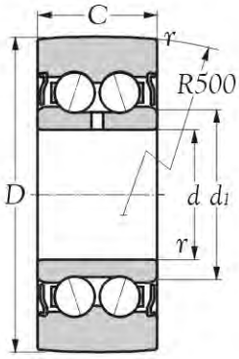
Track roller bearings double row series LR 52



Type LR 52..2RS
(Double seals)



Type LR 52..X-2Z
(Double shields)



Type LR 52..2Z
(Double shields)

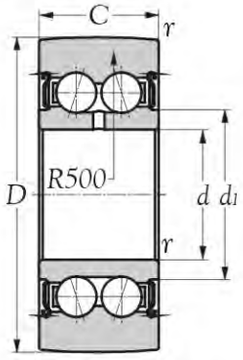
Boundary dimensions mm					Basic load ratings dynamic static N		Limiting speeds grease rpm	Bearing number		Mass kg.
d	D	C	$r_{s\,min}$ [1]	d_1	C_r	C_{or}				(approx.)
10	32	14.0	0.6	15.4	6800	4100	8000	LR 5200 2RS	-	0.07
12	35	15.9	0.6	17.1	8700	5200	7500	LR 5201 2RS	-	0.08
15	40	15.9	0.6	20.0	10000	6300	7000	LR 5202 2RS	-	0.11
17	47	17.5	0.6	22.5	12800	8400	5500	LR 5203 2RS	-	0.17
20	52	20.6	1.0	26.5	16100	10700	5000	LR 5204 2RS	-	0.23
25	62	20.6	1.0	30.3	18800	13200	4500	LR 5205 2RS	-	0.34
30	72	23.8	1.0	37.4	25000	18000	3500	LR 5206 2RS	-	0.51
35	80	27.0	1.1	42.4	31000	22800	2800	LR 5207 2RS	-	0.66
40	85	30.2	1.1	48.4	35000	26000	2500	LR 5208 2RS	-	0.75
10	32	14.0	0.6	15.4	6800	4100	11000	LR 5200 X-ZZ	LR 5200 ZZ	0.07
12	35	15.9	0.6	17.1	8700	5200	10000	LR 5201 X-ZZ	LR 5201 ZZ	0.08
15	40	15.9	0.6	20.0	10000	6300	10000	LR 5202 X-ZZ	LR 5202 ZZ	0.11
17	47	17.5	0.6	22.5	12800	8400	7500	LR 5203 X-ZZ	LR 5203 ZZ	0.17
20	52	20.6	1.0	26.5	16100	10700	7000	LR 5204 X-ZZ	LR 5204 ZZ	0.23
25	62	20.6	1.0	30.3	18800	13200	6500	LR 5205 X-ZZ	LR 5205 ZZ	0.34
30	72	23.8	1.0	37.4	25000	18000	5000	LR 5206 X-ZZ	LR 5206 ZZ	0.51
35	80	27.0	1.1	42.4	31000	22800	3900	LR 5207 X-ZZ	LR 5207 ZZ	0.66
40	85	30.2	1.1	48.4	35000	26000	3500	LR 5208 X-ZZ	LR 5208 ZZ	0.75

Note: 1) These values are the allowable minimal dimension of the chamfer dimension r.
2) X: Cylindrical outside surface.
3) 2RS: Lip seals on both sides, giving axial sealing action.
4) 2Z: Sealing shields on both sides

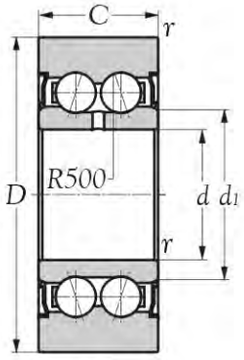
Remark: [Precision] - Class 0 (JIS)
[Cage] - Polyamide 66
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter KSM web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Track roller bearings double row series LR 53



Type LR 53..2RS
(Double seals)



Type LR 53..2Z
(Double shields)

Boundary dimensions mm					Basic load ratings dynamic static N		Limiting speeds grease rpm	Bearing number	Mass kg(s). (approx.)
d	D	C	rs min1)	d1	Cr	Cor			
17	52	22.2	1.0	23.5	17500	11300	4700	LR 5303 2RS	0.21
20	62	22.2	1.1	29.0	21500	14800	4500	LR 5304 2RS	0.34
25	72	25.4	1.1	34.4	28000	19900	3900	LR 5305 2RS	0.50
30	80	30.2	1.1	41.4	35500	25500	3100	LR 5306 2RS	0.67
35	90	34.9	1.5	47.7	44000	32500	2500	LR 5307 2RS	0.97
40	100	36.5	1.5	52.4	54000	40500	2300	LR 5308 2RS	1.20
25	72	25.4	1.1	34.4	28000	19900	5500	LR 5305 ZZ	0.50
30	80	30.2	1.1	41.4	35500	25500	4300	LR 5306 ZZ	0.67
35	90	34.9	1.5	47.7	44000	32500	3600	LR 5307 ZZ	0.97
40	100	36.5	1.5	52.4	54000	40500	3300	LR 5308 ZZ	1.20

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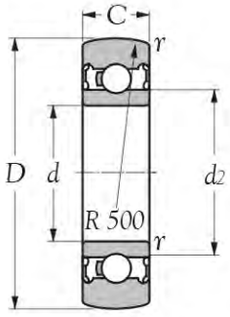
Note: 1) These values are the allowable minimal dimension of the chamfer dimension r.
2) 2RS: Lip seals on both sides, giving axial sealing action.
3) 2Z: Sealing shields on both sides.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Polyamide 66
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Track roller bearings double row
series LR 60..2RS



Type LR 60..2RS
(Double seals)

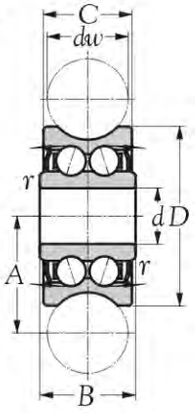
Boundary dimensions mm					Basic load ratings dynamic static N		Limiting speeds grease rpm	Bearing number	Mass kg. (approx.)
d	D	C	rs min[1]	d1	Cr	Cor			
6	19	6	0.3	8.7	1840	790	22000	LR 606 2RSR	0.01
7	22	6	0.3	9.0	2120	880	20000	LR 607 2RSR	0.01
8	24	7	0.3	10.0	2750	1240	19000	LR 608 2RSR	0.02
10	28	8	0.3	14.6	4550	2500	16000	LR 6000 2RSR	0.02
12	30	8	0.3	16.6	4750	2800	15000	LR 6001 2RSR	0.03

Note: 1) These values are the allowable minimal dimension of the chamfer dimension r.

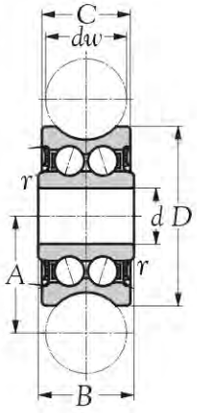
Remark: [Precision] - Class 0 (JIS)
[Cage] - Polyamide 66
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter KSM web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Track roller bearings double row series LFR.. ZZ & 2RS



Type LFR..ZZ
(Double shields)



Type LFR..2RS
(Double seals)

Boundary dimensions mm							Basic load ratings dynamic N	static N	Limiting speeds grease rpm	oil rpm	Bearing numbers		Mass kg(s). (approx.)
d	dw	D	C	B	A	r s mn[1]	Cr	Cor					
5	4	16	7.0	8.0	9.00	0.2	1200	860	1300	1780	LFR 50/5-4 ZZ	LFR 50/5-4 2RS	0.009
5	6	17	7.0	8.0	10.50	0.2	1270	820	1300	1780	LFR 50/5-6 ZZ	LFR 50/5-6 2RS	0.010
8	6	24	11.0	11.0	14.00	0.3	3670	2280	1300	4560	LFR 50/8-6 ZZ	LFR 50/8-6 2RS	0.020
12	10	35	15.9	15.9	20.65	0.3	8500	5100	5100	10200	LFR 5201-10 ZZ	LFR 5201-10 2RS	0.080
12	10	42	19.0	19.0	24.00	0.6	13000	7700	7500	14200	LFR 5301-10 ZZ	LFR 5301-10 2RS	0.100
15	10	47	19.0	19.0	26.65	1.0	16200	9200	6200	18400	LFR 5302-10 ZZ	LFR 5302-10 2RS	0.170
12	12	35	15.9	15.9	21.75	0.3	8400	5000	5100	10000	LFR 5201-12 ZZ	LFR 5201-12 2RS	0.085
20	16	52	20.6	22.6	31.50	0.6	16800	9500	12100	16600	LFR 5204-16 ZZ	LFR 5204-16 2RS	0.230
25	20	72	23.8	25.8	41.00	0.6	29500	16600	20700	33200	LFR 5206-20 ZZ	LFR 5206-20 2RS	0.250
25	25	72	23.8	25.8	43.50	0.6	29200	16400	23100	32800	LFR 5206-25 ZZ	LFR 5206-25 2RS	0.250
30	30	80	27.0	29.0	51.00	1.0	38000	20800	21400	36200	LFR 5207-30 ZZ	LFR 5207-30 2RS	0.660
40	40	98	36.0	38.0	62.50	1.0	54800	29000	55000	58000	LFR 5208-40 ZZ	LFR 5208-40 2RS	1.360
40	50	110	44.0	46.0	72.50	1.1	53000	39500	69000	79000	LFR 5308-50 ZZ	LFR 5308-50 2RS	1.400

P3

Note: 1) These values are the allowable minimal dimension of the chamfer dimension r.
2) 2Z: Sealing shields on both sides.
3) 2RS: Lip seals on both sides, giving axial sealing action.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Polyamide 66
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P4

KSM®

LINEAR BEARINGS

Technical supplement		Pages for refer
		T 260 - T 265
1	Linear ball bearing, drawn shell design, compact type, series KH	T 260
2	Linear ball bearing precision series types KB	T 260 & T 261
3	Linear ball bearing precision series types KB	T 261 & T 262
4	Load ratings	T 262 - T 264
5	Static safety factor	T 264
6	Friction	T 265
7	Operating temperature	T 265

1. Linear ball bearing, drawn shell design, compact type, series KH

The linear ball bearings KH are composed of asteel drawn shell, made of case hardened steel, a retainer made from engineered resin and precision balls. The drawn shell has pockets designed to allow the recirculation of the balls. This bearing type can only beused for linear movement and does not allow rotational movements.

1.1 Seals
The linear bearings of KH type are available in two different variants.
Without seals: KH
With contact seals: KH..PP
The seals have the dual function to prevent ingress of contaminants and the retention of lubricants in the bearings.

1.2 Lubrication
Linear bearings type KH are supplied coated with rust inhibiting oil. Linear bearings type KH..PP are supplied packaged with lithium soap grease.

1.3 Mounting tolerances
The table below shows the tolerances to be used for a proper bearing installation. They insure a precise and smooth motion.

1.4 Assembly
Linear bearings type KH are assembled with a light press fit. This insures not only the retention of the bearing but also the proper rounding of the unit. A proper fitting should be performed with the help of a mounting arbor as shown in Fig. 1A.

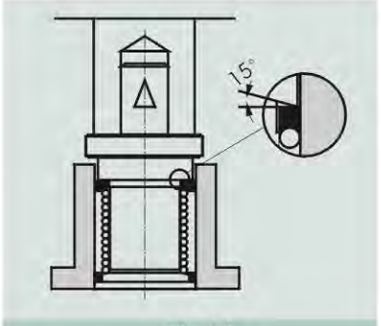


Fig. 1A

Table 1A Recommended mounting tolerances

Housing materials	General applications		Vertical operation Precision applications	
	Housing tolerance	Shaft tolerance	Housing tolerance	Shaft tolerance
Steel/cast iron	H7	h6	H6	i5
Aluminium/alloy	K7	h6	K6	i5

2. Linear ball bearing precision series type LME

KSM Linear Bearing type LME are composed by a cylindrical outer ring, by a cage that retains the balls, by two end rings to retain the cage and / or, when required, contact seals. All of the components are designed and assem bled to optimize the unit performance. The outer ring is suitably hardened to provide the longest possible life expectancy. The cage made of steel or engineered resin, depending upon the type of bearing selected, provide the retention and allow the proper recirculation of the balls.

2.1 Characteristics of linear bearings type LME

2.1.1 High rigidity

Linear bearings with steel outer ring offer high rigidity due to the large number of balls incontact. The units can be supplied with a steel cage and, when low weight is required, with resin cage.

2.1.2 Ease of assembly

The standard units can carry load in every direction. The large variety of housing units and shaft supports allow simple and easy mounting.

2.1.3 Ease of replacement

These units follow internationally recognized boundary and are therefore dimensionally inter changeable with competitive units. Replacement due to wear or damage is quick and simple.

2.1.4 Complete range

The **KSM** range of products is quite broad. The characteristics can be summarized as follows:

A) Closed type - standard version

B) Adjustable type - These units have a longitudinal slot that allows the reduction of the operating clearance and the optimization of the unit rigidity.

C) Open type - These units have an opening that corresponds to a single recirculating channel (50 to 100 deg). These units are used in conjunction with long shafts that are typically supported along the entire length to reduce the elastic deflection. When mounted in a suitable housing, the units allow the adjustment of the operating clearance.

D) Flanged type - These units have a flange on the outer ring to allow the mounting without conventional housings.

2.2 Seals

Linear bearings LME can be supplied in the following versions:

- Without seals - LME
- With contact seals - LME..UU

The seals have the following functions:

- Prevent the ingress of contaminants
- Retain the lubricant in the bearing

In some applications, it may be necessary to use additional seals to prevent grease migration and thus prolong the maintenance interval.

3. Linear ball bearing precision series type LME

3.1 Lubrication

Linear bearings type LME are supplied coated with rust inhibiting oil. Linear bearings type LME..UU are supplied packaged with lithium soap grease.

3.2 Mounting tolerances

The bearing assembly should be performed as to insure operation with adequate clearance. Unsuitable operating clearance could lead to poor running performance or lower than expected durability. The operating clearance of the adjustable or open version of the linear bearings can be adjusted by elastically deforming the outer ring. The suitable mounting tolerances for the mating components are shown in Table 3A.

Note: The operating clearance is application dependent and could be zero or negative (preload). In the latter case the friction as well as the smooth running should be checked for suitability.

Table 3A

Dimensional series	Shaft		Housing	
	Normal operating clearance	Operation without clearance	Normal operating clearance	Operation without clearance
LME	h6	j6	H7	J7

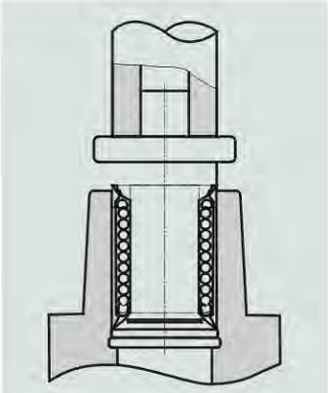
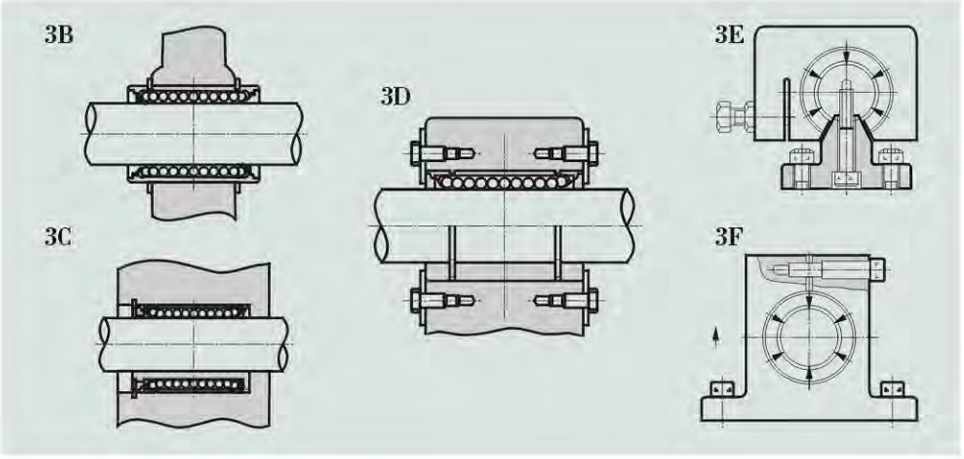


Fig. 3A



3.3 Installation

Some cleanliness precautions should be taken before assembling **KSM** Linear bearings in their housings. Lack of cleanliness could lead to reduction of the bearing life. The installation of the units is not particularly difficult, though precaution should be observed to avoid potential damages to the unit. Direct pressing onto the cage retaining rings should be avoided. A suitable tool should be used (Fig. 3A) to provide pressure on the rim of the outer ring. Once the bearing is mounted in the housing, the assembled unit should be installed onto the shaft paying attention not to score the shaft or to pop the balls from the bearing. When two shafts assemblies are assembled in a parallel assembly, the parallelism between the shafts should be checked to insure smooth running. The mounting examples shown in Fig. 3B through 3F should be used as guidelines to design and select the suitable bearings and support units.

4. Load ratings

Dynamic load rating C

The dynamic load rating C is a load of constant magnitude under which 90% of a statistically significant number of apparently identical bearings would reach a theoretical life of 50 km without the apparent appearance of metal fatigue.

Static load rating Co

The static load rating Co is defined as the load that would cause a permanent deformation equal to 1/10,000 of the ball diameter at the most stressed contact point.

4.1 Life of a linear ball bearing

Repeated stresses onto the contact surfaces could lead to material fatigue. This will lead to the appearance of surface pitting. The life of the unit is defined as the duration before the appearance of pitting.

4.1.1 Rated life (L)

The rated life L is the total travelled distance which 90% of a statistically significant number of apparently identical bearings would reach under the same operating conditions without the apparent appearance of metal fatigue.

$$L = \left(\frac{C}{P}\right)^3 \cdot 50 \quad \text{..... (1)}$$

L = rated life [km]
C = dynamic load ratings [N]
P = equivalent dynamic load [N]

When a system is subjected to a load equal to the dynamic load rating C the resulting life equal the rated life (50 km). The theoretical life of a linear bearing is affected by the load and by the operating conditions (temperature, vibration, shocks, load distribution, etc.). In such cases the theoretical life is calculated with the help of equation 2.

$$L = \left(\frac{f_H \cdot F_T \cdot f_C \cdot C}{F_w \cdot P}\right) 50 \quad \text{..... (2)}$$

L = Rated life[km]
C = Dynamic load rating [N]
P = Equivalent dynamic load [N]
fh = Hardness factor (see fig. 8)
ft = Temperature factor (see fig. 9)
fc = Contact coefficient (see table 4)
fw = Load factor (see table 5)

The following equation (3) allows the conversion of the rated life in hours.

$$L_h = \left(\frac{L \cdot 10}{2 \cdot l_s \cdot 1 \cdot 60}\right)^3 \quad \text{..... (3)}$$

L_h = rated life [hours]
L_s = stroke length [m]
L = rated life [km]
n_1 = operating frequency [strokes/min]

- Hardness factor (f_H)

The load ratings for the linear bearing are calculated with the raceway hardness equal or higher than 58 HRC. When the raceway hardness is reduced, the load rating of the bearing is also reduced and must be corrected using the accompanying chart (Fig. 4A).

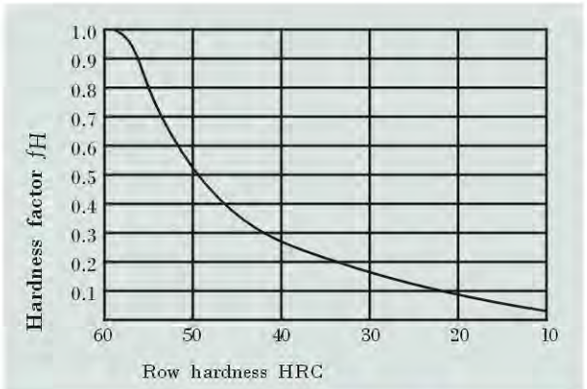


Fig. 4A Raceway hardness factor

- Temperature factor (f_T)

When a linear bearing operates at temperatures in excess of 100 deg. C, its hardness is affected and son is its ability to carry load. The load rating can be corrected by using the accompanying chart (Fig. 4B).

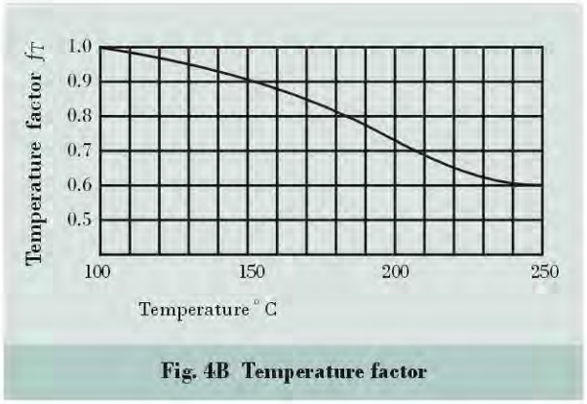


Fig. 4B Temperature factor

- Contact factor (f_C)

Load biasing, attributed to mounting errors and multiple bearing assemblies can be accounted for by using the coefficient in Table 4A.

Table 4A Contact factor

Number of bearings for shaft	Contact factor f_c
1	1.00
2	0.81
3	0.72
4	0.66
5	0.61

- Load factor (f_w)

The loads acting on the linear units include payload, inertial effects during acceleration and deceleration as well as moment loads. All of these factors are difficult to assess and are further complicated by the potential presence of shocks and vibrations. A more practical solution involves the use of the coefficients in Table 4B.

Table 4B Contact factor

Operating conditions	f_w
Low speed operations (<15 m/min) without shocks	1 - 1,5
Medium speed operation (60m/min) without shocks	1,5 - 2
High speed operations (>60m/min) with shocks	2 - 3,5

5. Static safety factor

For applications with a high requirement for accuracy and smooth running, the static safety factor fs should be higher than the values shown in Table 5A to prevent permanent deformation at the contact points.

$$f_s = \frac{C_O}{P_O}$$

f_s = static safety factor
P_o = static equivalent load (N)
C_o = static load rating (N)

Table 5A Static safety factor

Operating conditions	f_S
Shafts subjected to small deflections and low shocks	1÷2
Elastic deflection can cross load the units	2÷4
System subjected to shock & vibration	3÷5

6. Friction

Linear ball bearings have a very low static coefficient of friction, virtually identical to the dynamic coefficient of friction. This results in low and uniform motion in any condition of load and speed without sick-slip.

$F = \mu \cdot W + f$.....(4)
F = Friction force [N]
U = Friction coefficient [-]
f = Seal drag [N]
w = Load [N]

The magnitude of the friction force is affected by several factors. The type of bearing, the operating conditions, the type and quantity of the lubricant, the presence or lack of seals all impact the overall frictional behavior. Standard seals can add between 2 and 5 N to the overall friction force. The magnitude of the coefficient of friction depends upon the operating conditions such as load, moments and/or preload. Table 6.1 shows the dynamic coefficient of friction for each type of bearing under normal operating condition (P/C< =0.2) and proper assembly.

Table 6.1 Friction coefficient

Type of bearing	Friction coefficient
KH	0.004 to 0.006
LME	0.002 to 0.003

7. Operating temperature

The operating temperature ranges of the various bearings are shown in table 7.1 Should the operating temperature exceed the limits shown in the table, please contact fait international engineering. Stainless steel units, without seals, can operate between -20 / +120 degree°C.

Table 7.1 Operating temperature

Bearing type	Operating temperature
KH	-20 to +120°C
LME	-20 to +110°C

8. Linear Ball Bushings interchangeability list

Table 8.1 Ball Bushing - Compact Type

KSM	NTN	STAR	INA	SKF	FAG
KH..	KH..	0658-0..-00	KH.. (LBBS)	LBBR..	LNA.. (LNA..)
HK..PP	HK..LL	0658-2..-40	KH..PP(LBBS..2LS)	LBBR..2LS	LNA..2RS (LNA..2RS)

T1

Table 8.2 Ball Bushing - Resin Retainer

KSM	NB	THK	EASE
LM..	SM..G	LM..	SDM..
LM..UU	SM..GUU	LM..UU	SDM..UU
LM..AJ	SM..GAJ	LM..AJ	SDM..AJ
LM..UUAJ	SM..GUUAJ	LM..UUAJ	SDM..UUAJ
LM..OP	SM..GOP	LM..OP	SDM..OP
LM..UUOP	SM..GUUOP	LM..UUOP	SDM..UUOP

The above types are metric dimension series generally used in Japan and other countries.

KSM	NB	THK	EASE
LMB..	SW..G	LMB..	SDB..
LMB..UU	SW..GUU	LMB..UU	SDB..UU
LMB..AJ	SW..GAJ	LMB..AJ	SDB..AJ
LMB..UUAJ	SW..GUUAJ	LMB..UUAJ	SDB..UUAJ
LMB..OP	SW..GOP	LMB..OP	SDB..OP
LMB..UUOP	SW..GUUOP	LMB..UUOP	SDB..UUOP

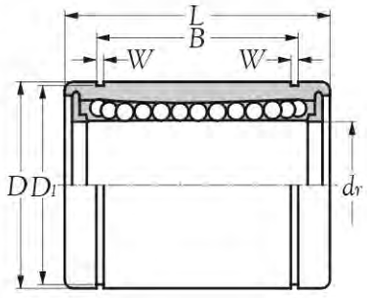
The above types are inch dimension series generally used in US.

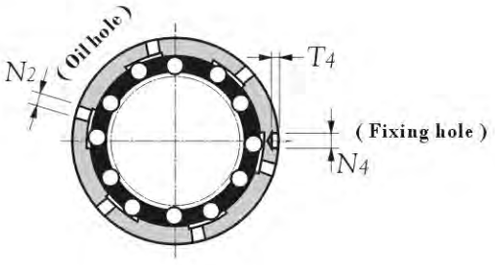
KSM	NB	INA	SKF	THK	IKO	IKO	EASE
LME..	KB..G	KB..	LBAR/LBCR..	LME..	LBE..	MA M..	SDE..
LME..UU	KB..GUU	KB..PP	LBAR/LBCR..2LS	LME..UU	LBE..UU	MA M..WW	SDE..UU
LME..AJ	KB..GAJ	KBS..	LBAS..	LME..AJ	LBE..AJ	MA M..ADJ	SDE..AJ
LME..UUAJ	KB..GUUAJ	KBS..PP	LBAS..2LS	LME..UUAJ	LBE..UUAJ	MA M..ADJ WW	SDE..UUAJ
LME..OP	KB..GOP	KBO..	LBAT/LBCT..	LME..OP	LBE..OP	MA M..OPN	SDE..OP
LME..UUOP	KB..GUUOP	KBO..PP	LBAT/LBCT..2LS	LME..UUOP	LBE..UUOP	MA M..OPN WW	SDE..UUOP

The above types are metric dimension series generally used in Europe.

KSM®

Linear ball bearings
series LME..





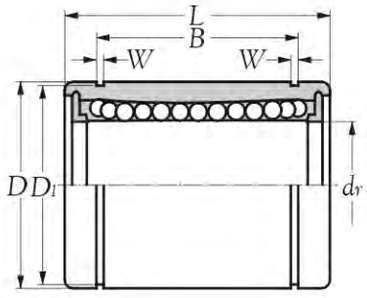
Bearing number				Number of ball circuits	Principal dimensions					
standard steel retainer	standard resin retainer	with seals steel retainer	with seals resin retainer		d_r tolerance		D tolerance		L tolerance	
					mm	0.001mm	mm	0.001mm	mm	mm
-	LME 5 AS	-	LME 5 UU AS	3	5	(+8/0)	12	(0/-8)	22	(0/-0.2)
LME 8 A AS	LME 8 AS	LME 8 A UU AS	LME 8 UU AS	4	8	(+8/0)	16	(0/-8)	25	(0/-0.2)
LME 10 A AS	-	LME 10 A UU AS	-	4	10	(+8/0)	19	(0/-9)	29	(0/-0.2)
LME 12 A AS	LME 12 AS	LME 12 A UU AS	LME 12 UU AS	4	12	(+8/0)	22	(0/-9)	32	(0/-0.2)
LME 16 A AS	LME 16 AS	LME 16 A UU AS	LME 16 UU AS	5	16	(+9/-1)	26	(0/-9)	36	(0/-0.2)
LME 20 A AS	LME 20 AS	LME 20 A UU AS	LME 20 UU AS	5	20	(+9/-1)	32	(0/-11)	45	(0/-0.2)
LME 25 A AS	LME 25 AS	LME 25 A UU AS	LME 25 UU AS	6	25	(+11/-1)	40	(0/-11)	58	(0/-0.3)
LME 30 A AS	LME 30 AS	LME 30 A UU AS	LME 30 UU AS	6	30	(+11/-1)	47	(0/-11)	68	(0/-0.3)
LME 40 A AS	LME 40 AS	LME 40 A UU AS	LME 40 UU AS	6	40	(+13/-2)	62	(0/-13)	80	(0/-0.3)
LME 50 A AS	LME 50 AS	LME 50 A UU AS	LME 50 UU AS	6	50	(+13/-2)	75	(0/-13)	100	(0/-0.3)
LME 60 A AS	LME 60 AS	LME 60 A UU AS	LME 60 UU AS	6	60	(+13/-2)	90	(0/-15)	125	(0/-0.4)

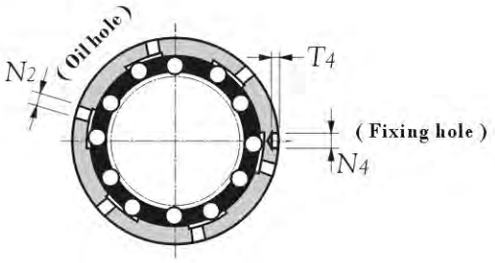
P4

Remark: [Precision] - Class 0 (JIS)
[Cages] - Steel (A), Polyamide 66
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Linear ball bearings
series LME..

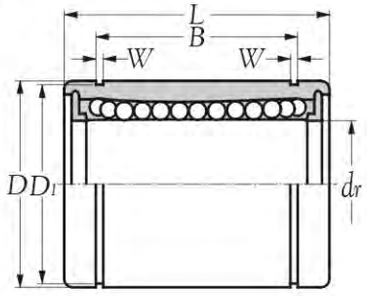


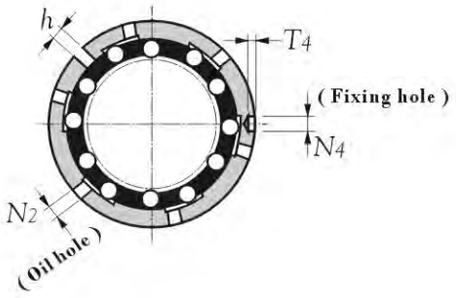


Principal dimensions							Roundness	Steel retainer maximum radial clearance	Resin retainer maximum radial clearance	Load ratings		Mass	
B	tolerance	W	D_1	N_2	T_4	N_4				dynamic C	static C_0	steel retainer	resin retainer
mm	mm		mm				0.001mm	0.001mm	0.001mm	N		kg(s).	
14.5	(0/-0.2)	1.10	11.5	-	-	-	12	-	-5	206	265	-	0.011
16.5	(0/-0.2)	1.10	15.2	-	-	-	12	-3	-5	265	402	0.022	0.020
22.0	(0/-0.2)	1.30	18.0	-	-	-	12	-4	-	372	549	0.036	-
22.9	(0/-0.2)	1.30	21.0	1.5	1.2	2.2	12	-4	-7	510	784	0.045	0.041
24.9	(0/-0.2)	1.30	24.9	2.0	1.2	2.2	12	-4	-7	578	892	0.060	0.065
31.5	(0/-0.2)	1.60	30.3	2.0	1.2	2.2	15	-6	-9	862	1370	0.102	0.091
44.1	(0/-0.3)	1.85	37.5	2.5	1.5	3.0	15	-6	-9	980	1570	0.235	0.215
52.1	(0/-0.3)	1.85	44.5	2.5	1.5	3.0	15	-8	-9	1570	2740	0.360	0.325
60.6	(0/-0.3)	2.15	59.0	3.0	1.5	3.0	17	-8	-13	2160	4020	0.770	0.705
77.6	(0/-0.3)	2.65	72.0	4.0	1.5	3.0	17	-13	-13	3820	7940	1.250	1.130
101.7	(0/-0.4)	3.15	86.5	4.0	1.5	3.0	20	-13	-16	4700	9800	2.220	2.220

P4

Linear ball bearings
series LME.. AJ AS





Bearing number				Number of ball circuits	Principal dimensions					
standard steel retainer	standard resin retainer	with seals steel retainer	with seals resin retainer		dr tolerance		D tolerance		L tolerance	
					mm	0.001mm	mm	0.001mm	mm	mm
-	LME 5 AJ AS	-	LME 5 UUAJ AS	3	5	(+8/0)	12	(0/-8)	22	(0/-0.2)
-	LME 8 AJ AS	-	LME 8 UUAJ AS	4	8	(+8/0)	16	(0/-8)	25	(0/-0.2)
LME 12 A-AJ AS	LME 12 AJ AS	LME 12 A-UUAJ AS	LME 12 UUAJ AS	4	12	(+8/0)	22	(0/-9)	32	(0/-0.2)
LME 16 A-AJ AS	LME 16 AJ AS	LME 16 A-UUAJ AS	LME 16 UUAJ AS	5	16	(+9/-1)	26	(0/-9)	36	(0/-0.2)
LME 20 A-AJ AS	LME 20 AJ AS	LME 20 A-UUAJ AS	LME 20 UUAJ AS	5	20	(+9/-1)	32	(0/-11)	45	(0/-0.2)
LME 25 A-AJ AS	LME 25 AJ AS	LME 25 A-UUAJ AS	LME 25 UUAJ AS	6	25	(+11/-1)	40	(0/-11)	58	(0/-0.3)
LME 30 A-AJ AS	LME 30 AJ AS	LME 30 A-UUAJ AS	LME 30 UUAJ AS	6	30	(+11/-1)	47	(0/-11)	68	(0/-0.3)
LME 40 A-AJ AS	LME 40 AJ AS	LME 40 A-UUAJ AS	LME 40 UUAJ AS	6	40	(+13/-2)	62	(0/-13)	80	(0/-0.3)
LME 50 A-AJ AS	LME 50 AJ AS	LME 50 A-UUAJ AS	LME 50 UUAJ AS	6	50	(+13/-2)	75	(0/-13)	100	(0/-0.3)
LME 60 A-AJ AS	LME 60 AJ AS	LME 60 A-UUAJ AS	LME 60 UUAJ AS	6	60	(+13/-2)	90	(0/-15)	125	(0/-0.4)

Remark: [Precision] - Class 0 (JIS)
[Cages] - Steel (A), Polyamide 66
[Grease] - Shell Alvania S2

P4

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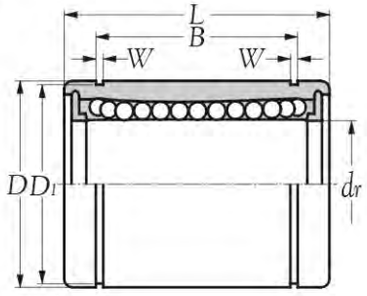
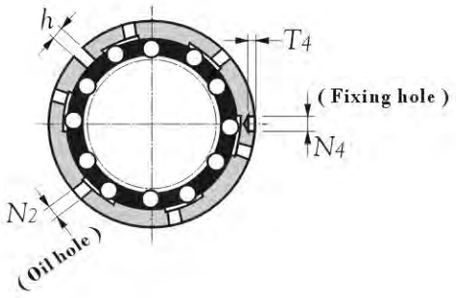
Linear ball bearings
series LME.. AJ AS

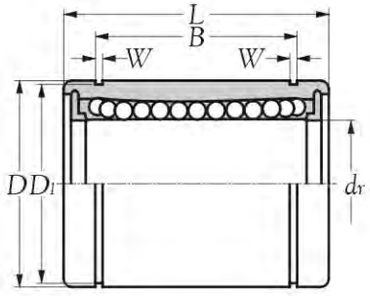


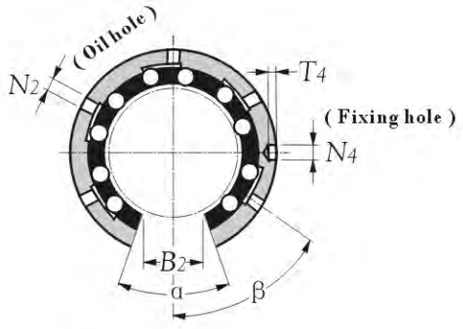


Principal dimensions								Roundness	Steel retainer maximum radial clearance	Resin retainer maximum radial clearance	Load ratings		Mass	
B	tolerance	W	D_1	h	N_2	T_4	N_4				dynamic C	static C_0	steel retainer	resin retainer
mm	mm	mm						0.001mm	0.001mm	0.001mm	N		kg(s).	
14.5	(0/-0.2)	1.10	11.5	1.0	-	-	-	12	-	-5	206	265	-	0.011
16.5	(0/-0.2)	1.10	15.2	1.0	-	-	-	12	-3	-5	265	402	-	0.022
22.9	(0/-0.2)	1.30	21.0	1.5	1.5	1.2	2.2	12	-4	-7	510	784	0.041	0.045
24.9	(0/-0.2)	1.30	24.9	1.5	2.0	1.2	2.2	12	-4	-7	578	892	0.065	0.060
31.5	(0/-0.2)	1.60	30.3	2.0	2.0	1.2	2.2	15	-6	-9	862	1370	0.091	0.102
44.1	(0/-0.3)	1.85	37.5	2.0	2.5	1.5	3.0	15	-6	-9	980	1570	0.215	0.235
52.1	(0/-0.3)	1.85	44.5	2.0	2.5	1.5	3.0	15	-8	-9	1570	2740	0.325	0.360
60.6	(0/-0.3)	2.15	59.0	3.0	3.0	1.5	3.0	17	-8	-13	2160	4020	0.705	0.770
77.6	(0/-0.3)	2.65	72.0	3.0	4.0	1.5	3.0	17	-13	-13	3820	7940	1.130	1.250
101.7	(0/-0.4)	3.15	86.5	3.0	4.0	1.5	3.0	20	-13	-16	4700	9800	2.220	2.220

KSM®

Linear ball bearings
series LME..OP





Bearing number				Number of ball circuits	Principal dimensions					
					dr		D		L	
standard steel retainer	standard resin retainer	with seals steel retainer	with seals resin retainer		tolerance		tolerance		tolerance	
					mm	0.001mm	mm	0.001mm	mm	mm
LME 12 A OP	LME 12 OP AS	LME 12 A UUOP AS	LME 12 UUOP AS	3	12	(+8/0)	22	(0/-9)	32	(0/-0.2)
LME 16 A OP	LME 16 OP AS	LME 16 A UUOP AS	LME 16 UUOP AS	4	16	(+9/-1)	26	(0/-9)	36	(0/-0.2)
LME 20 A OP	LME 20 OP AS	LME 20 A UUOP AS	LME 20 UUOP AS	4	20	(+9/-1)	32	(0/-11)	45	(0/-0.2)
LME 25 A OP	LME 25 OP AS	LME 25 A UUOP AS	LME 25 UUOP AS	5	25	(+11/-1)	40	(0/-11)	58	(0/-0.3)
LME 30 A OP	LME 30 OP AS	LME 30 A UUOP AS	LME 30 UUOP AS	5	30	(+11/-1)	47	(0/-11)	68	(0/-0.3)
LME 40 A OP	LME 40 OP AS	LME 40 A UUOP AS	LME 40 UUOP AS	5	40	(+13/-2)	62	(0/-13)	80	(0/-0.3)
LME 50 A OP	LME 50 OP AS	LME 50 A UUOP AS	LME 50 UUOP AS	5	50	(+13/-2)	75	(0/-13)	100	(0/-0.4)
LME 60 A OP	LME 60 OP AS	LME 60 A UUOP AS	LME 60 UUOP AS	5	60	(+13/-2)	90	(0/-15)	125	(0/-0.4)

Remark: [Precision] - Class 0 (JIS)
[Cages] - Steel (A), Polyamide 66
[Grease] - Shell Alvania S2

P4

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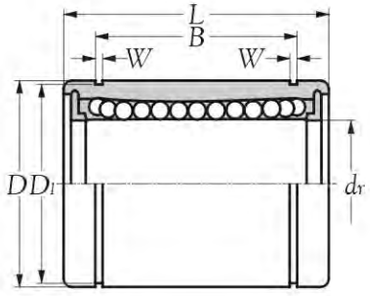
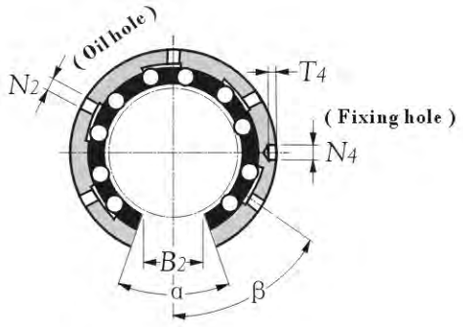
Linear ball bearings
series LME..OP





Principal dimensions						Roundness	Steel retainer maximum radial clearance	Resin retainer maximum radial clearance	Load ratings		Mass	
B	tolerance	W	D_1	h_1	θ				dynamic C	static C_0	steel retainer	resin retainer
mm	mm	mm				0.001mm	0.001mm	0.001mm	N		kg(s).	
22.9	(0/-0.2)	1.30	21.0	7.5	78°	12	-4	-7	510	784	0.045	0.041
24.9	(0/-0.2)	1.30	24.9	10.0	78°	12	-4	-7	578	892	0.060	0.065
31.5	(0/-0.2)	1.60	30.3	10.0	60°	15	-6	-9	862	1370	0.102	0.091
44.1	(0/-0.3)	1.85	37.5	12.5	60°	15	-6	-9	980	1570	0.235	0.215
52.1	(0/-0.3)	1.85	44.5	12.5	50°	15	-8	-9	1570	2740	0.360	0.325
60.6	(0/-0.3)	2.15	59.0	16.8	50°	17	-8	-13	2160	4020	0.770	0.705
77.6	(0/-0.4)	2.65	72.0	21.0	50°	17	-13	-13	3820	7940	1.250	1.130
101.7	(0/-0.4)	3.15	86.5	27.2	54°	20	-13	-16	4700	9800	2.220	2.220

P4

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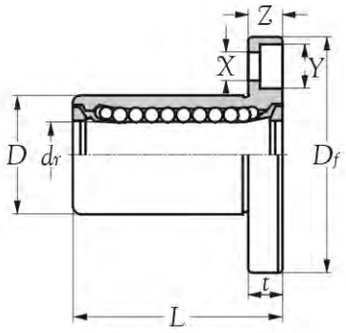
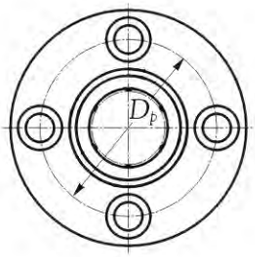
Linear ball bearings
series LMEF..





Bearing number		Number of ball circuits	Principal dimensions					
standard resin retainer	with seals resin retainer		d_r tolerance		D tolerance		L tolerance	
			mm	0.001mm	mm	0.001mm	mm	mm
LMEF 8	LMEF 8 UU	4	8	(+8/0)	16	(0/-13)	25	(±0.3)
LMEF 12	LMEF 12 UU	4	12	(+8/0)	22	(0/-16)	32	(±0.3)
LMEF 16	LMEF 16 UU	5	16	(+9/-1)	26	(0/-16)	36	(±0.3)
LMEF 20	LMEF 20 UU	5	20	(+9/-1)	32	(0/-19)	45	(±0.3)
LMEF 25	LMEF 25 UU	6	25	(+11/-1)	40	(0/-19)	58	(±0.3)
LMEF 30	LMEF 30 UU	6	30	(+11/-1)	47	(0/-19)	68	(±0.3)
LMEF 40	LMEF 40 UU	6	40	(+13/-2)	62	(0/-22)	80	(±0.3)
LMEF 50	LMEF 50 UU	6	50	(+13/-2)	75	(0/-22)	100	(±0.3)
LMEF 60	LMEF 60 UU	6	60	(+13/-2)	90	(0/-25)	125	(±0.3)

Remark: [Precision] - Class 0 (JIS)
[Cage] - Polyamide 66
[Grease] - Shell Alvania S2

P4

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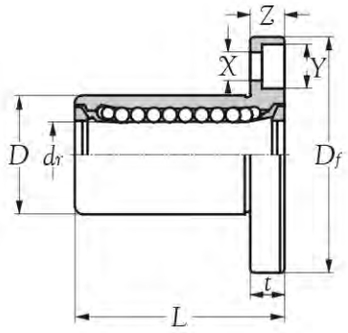
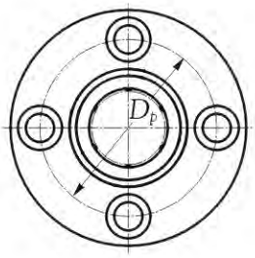
Linear ball bearings
series LMEF..





Principal dimensions flange				Roundness	Squareness	Load ratings		Mass
D_f	t	D_p	XxYxZ			dynamic C	static C_o	kg(s).
		mm		0.001mm	0.001mm	N		(approx.)
32	5	24	3.5 x 6.0 x 3.1	12	12	265	402	0.041
42	6	32	4.5 x 7.5 x 4.1	12	12	510	784	0.080
46	6	36	4.5 x 7.5 x 4.1	12	12	578	892	0.103
54	8	43	5.5 x 9.0 x 5.1	15	15	862	1370	0.182
62	8	51	5.5 x 9.0 x 5.1	15	15	980	1570	0.335
76	10	62	6.6 x 11 x 6.1	15	15	1570	2740	0.560
98	13	80	9.0 x 14 x 8.1	17	17	2160	4020	1.175
112	13	94	9.0 x 14 x 8.1	17	17	3820	7940	1.745
134	18	112	11 x 17 x 11.1	20	20	4700	9800	3.220

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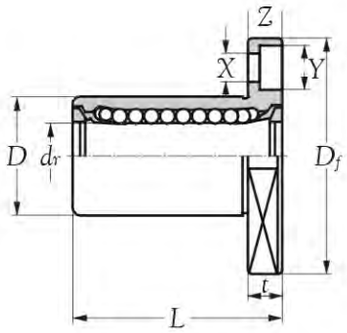
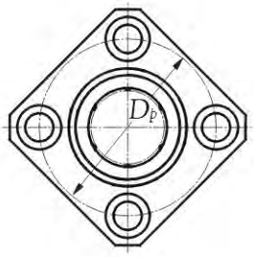
Linear ball bearings
series LMEK..





Bearing number		Number of ball circuits	Principal dimensions					
			d_r		D		L	
standard resin retainer	with seals resin retainer		tolerance		tolerance		tolerance	
			mm	0.001mm	mm	0.001mm	mm	mm
LMEK 8	LMEK 8 UU	4	8	(+8/0)	16	(0/-13)	25	(±0.3)
LMEK 12	LMEK 12 UU	4	12	(+8/0)	22	(0/-16)	32	(±0.3)
LMEK 16	LMEK 16 UU	5	16	(+9/-1)	26	(0/-16)	36	(±0.3)
LMEK 20	LMEK 20 UU	5	20	(+9/-1)	32	(0/-19)	45	(±0.3)
LMEK 25	LMEK 25 UU	6	25	(+11/-1)	40	(0/-19)	58	(±0.3)
LMEK 30	LMEK 30 UU	6	30	(+11/-1)	47	(0/-19)	68	(±0.3)
LMEK 40	LMEK 40 UU	6	40	(+13/-2)	62	(0/-22)	80	(±0.3)
LMEK 50	LMEK 50 UU	6	50	(+13/-2)	75	(0/-22)	100	(±0.3)
LMEK 60	LMEK 60 UU	6	60	(+13/-2)	90	(0/-25)	125	(±0.3)

Remark: [Precision] - Class 0 (JIS)
[Cage] - Polyamide 66
[Grease] -Shell Alvania S2

P4

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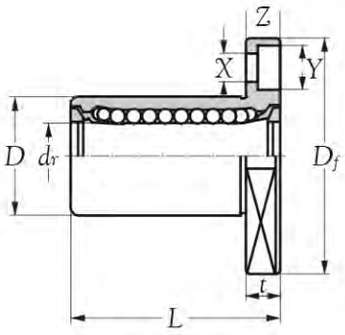
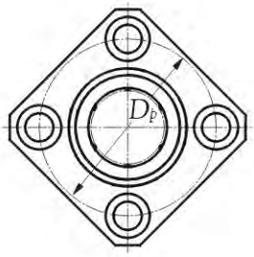
Linear ball bearings
series LMEK..

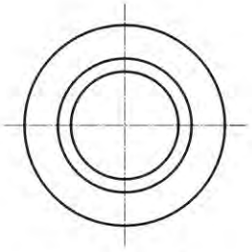




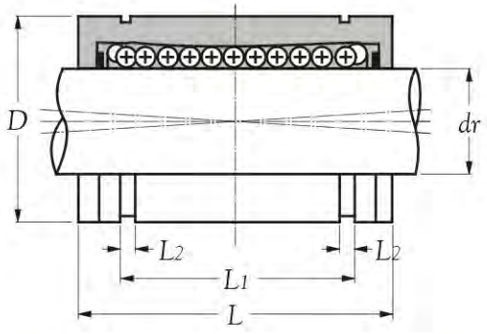
Principal dimensions flange				Roundness	Squareness	Load ratings		Mass
D_f	t	D_p	XxYxZ			dynamic C	static C_o	kg(s).
mm				0.001mm	0.001mm	N		(approx.)
32	5	24	3.5 x 6.0 x 3.1	12	12	265	402	0.041
42	6	32	4.5 x 7.5 x 4.1	12	12	510	784	0.080
46	6	36	4.5 x 7.5 x 4.1	12	12	578	892	0.103
54	8	43	5.5 x 9.0 x 5.1	15	15	862	1370	0.182
62	8	51	5.5 x 9.0 x 5.1	15	15	980	1570	0.335
76	10	62	6.6 x 11 x 6.1	15	15	1570	2740	0.560
98	13	80	9.0 x 14 x 8.1	17	17	2160	4020	1.175
112	13	94	9.0 x 14 x 8.1	17	17	3820	7940	1.745
134	18	112	11.0 x 17 x 11.1	20	20	4700	9800	3.220

KSM®

Linear ball bearings
series LMES



LMES..close, UU



Boundary dimensions d mm	Bearing number		Number of ball circuits	Principal dimensions dr tolerance mm	0.001mm	D ±0.1	L ±0.2	L1 ±0.2	L2 min.	Load ratings dynamic C N	static Co N	Mass kg. (approx.)
10	LMES 10	LMES 10 UU	5	10	+8 ~ 0	19	29	21.7	1.35	750	550	0.017
12	LMES 12	LMES 12 UU	5	12	+8 ~ 0	22	32	22.7	1.35	1230	1100	0.023
16	LMES 16	LMES 16 UU	5	16	+9 ~ 1	26	36	24.7	1.35	1550	1250	0.028
20	LMES 20	LMES 20 UU	6	20	+9 ~ 1	32	45	31.3	1.65	2580	1670	0.061
25	LMES 25	LMES 25 UU	6	25	+11 ~ 1	40	58	43.8	1.90	3800	2750	0.122
30	LMES 30	LMES 30 UU	6	30	+11 ~ 1	47	68	51.8	1.90	4710	2800	0.185
40	LMES 40	LMES 40 UU	6	40	+13 ~ 2	62	80	60.4	2.20	6500	5720	0.360
50	LMES 50	LMES 50 UU	6	50	+13 ~ 2	75	100	77.4	2.70	11460	7940	0.580

Remark: [Precision] - Class 0 (JIS)
[Cage] - Polyamide 66
[Grease] - Shell Alvania S2

P4

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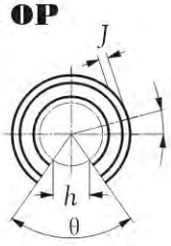
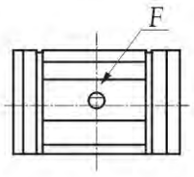
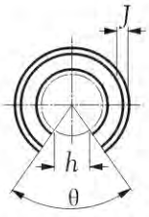
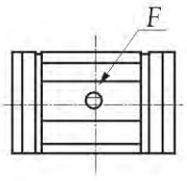
Linear ball bearings
series LMES.. OP



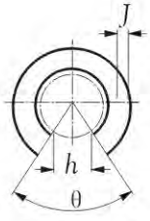


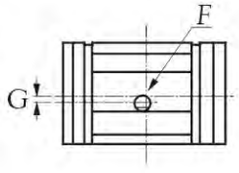
LMES 12 OP



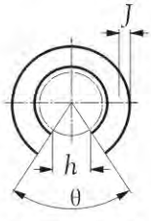


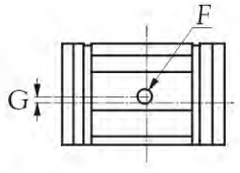
LMES 16 OP, LMES 20 OP





LMES 25 OP





LMES 30 OP, LMES 40 OP, LMES 50 OP

Boundary dimensions d mm	Bearing number	Number of ball circuits	Principal dimensions D ±0.1	L ±0.2	L2	h	θ°	F	G	J	Load ratings dynamic C N	static Co N	Mass kg. (approx.)
12	LMES 12 OP LMES 12 UUOP	4	22	32	1.35	6.5	66	3.0	-	0.7	1290	1260	0.018
16	LMES 16 OP LMES 16 UUOP	4	26	36	1.35	9.0	68	3.0	-	0.7	1640	1320	0.022
20	LMES 20 OP LMES 20 UUOP	5	32	45	1.65	9.0	55	3.0	-	0.9	2630	1720	0.051
25	LMES 25 OP LMES 25 UUOP	5	40	58	1.90	11.5	57	3.0	1.5	1.4	3910	2850	0.102
30	LMES 30 OP LMES 30 UUOP	5	47	68	1.90	14.0	57	3.0	2.0	2.2	4850	2900	0.155
40	LMES 40 OP LMES 40 UUOP	5	62	80	2.20	19.5	56	3.0	1.5	2.7	6700	5900	0.300
50	LMES 50 OP LMES 50 UUOP	5	75	100	2.70	22.5	54	3.0	2.5	2.3	11700	8100	0.480

Remark: [Precision] - Class 0 (JIS)
[Cage] - Polyamide 66
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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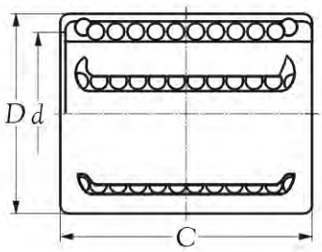
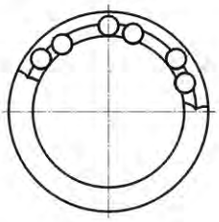
P4

KSM®

Linear ball bearings
series KH





Boundary dimensions d mm	Bearing number	Number of ball circuits	Principal dimensions D mm	C	Basic load ratings dynamic C N	static Co N	Max runout speed grease r/min	oil r/min	Mass kg. (approx.)
6	KH 0622	4	12	22	400	239	41	24	0.0070
6	KH 0622 PP	4	12	22	400	239	41	24	0.0070
8	KH 0824	4	15	24	435	280	44	29	0.0120
8	KH 0824 PP	4	15	24	435	280	44	29	0.0120
10	KH 1026	4	17	26	500	370	51	38	0.0145
10	KH 1026 PP	4	17	26	500	370	51	38	0.0145
12	KH 1228	5	19	28	620	510	63	52	0.0185
12	KH 1228 PP	5	19	28	620	510	63	52	0.0185
14	KH 1428	5	21	28	620	520	63	53	0.0205
14	KH 1428 PP	5	21	28	620	520	63	53	0.0205
16	KH 1630	5	24	30	800	620	82	63	0.0275
16	KH 1630 PP	5	24	30	800	620	82	63	0.0275
20	KH 2030	6	28	30	950	790	97	81	0.0325
20	KH 2030 PP	6	28	30	950	790	97	81	0.0325
25	KH 2540	6	35	40	1990	1670	203	170	0.0660
25	KH 2540 PP	6	35	40	1990	1670	203	170	0.0660
30	KH 3050	7	40	50	2800	2700	285	275	0.0950
30	KH 3050 PP	7	40	50	2800	2700	285	275	0.0950
40	KH 4060	8	52	60	4400	4450	449	454	0.1820
40	KH 4060 PP	8	52	60	4400	4450	449	454	0.1820
50	KH 5070	9	62	70	5500	6300	561	642	0.2520
50	KH 5070 PP	9	62	70	5500	6300	561	642	0.2520

P4

Remark: [Precision] - INA Standard
[Cage] - Polyamide 66
[Grease] - Shell Alvania S2

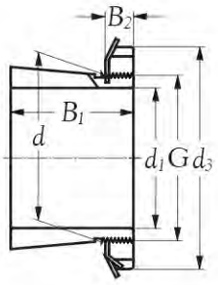
If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P5

KSM®

ADAPTER SLEEVES

Adapter sleeves
series H 2..



Boundary dimensions mm						Lock nut	Locking device	Unit numbers	Mass kg(s). (approx.)
d_1	d	d_3	B_1	B_2	G				
20	25	38	26	8	M 25 X 1.5	**AN 05**	**AW 05X**	**H 205X**	0.070
25	30	45	27	8	M 30 X 1.5	**AN 06**	**AW 06X**	**H 206X**	0.099
30	35	52	29	9	M 35 X 1.5	**AN 07**	**AW 07X**	**H 207X**	0.125
35	40	58	31	10	M 40 X 1.5	**AN 08**	**AW 08X**	**H 208X**	0.174
40	45	65	33	11	M 45 X 1.5	**AN 09**	**AW 09X**	**H 209X**	0.226
45	50	70	35	12	M 50 X 1.5	**AN 10**	**AW 10X**	**H 210X**	0.274
50	55	75	37	12	M 55 X 2.0	**AN 11**	**AW 11X**	**H 211X**	0.308
55	60	80	38	13	M 60 X 2.0	**AN 12**	**AW 12X**	**H 212X**	0.346
60	65	85	40	14	M 65 X 2.0	**AN 13**	**AW 13X**	**H 213X**	0.401
65	75	98	43	15	M 75 X 2.0	**AN 15**	**AW 15X**	**H 215X**	0.708
70	80	105	46	17	M 80 X 2.0	**AN 16**	**AW 16X**	**H 216X**	0.881
75	85	110	50	18	M 85 X 2.0	**AN 17**	**AW 17X**	**H 217X**	1.020
80	90	120	52	18	M 90 X 2.0	**AN 18**	**AW 18X**	**H 218X**	1.180
85	95	125	55	19	M 95 X 2.0	**AN 19**	**AW 19X**	**H 219X**	1.370
90	100	130	58	20	M 100X2.0	**AN 20**	**AW 20X**	**H 220X**	1.490
100	110	145	63	21	M 110X2.0	**AN 22**	**AW 22X**	**H 222X**	1.930

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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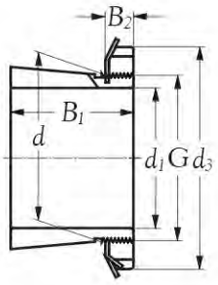
Adapter sleeves
series H 3..



Boundary dimensions mm						Lock nut	Locking device	Unit numbers	Mass kg(s). (approx.)
d_1	d	d_3	B_1	B_2	G				
20	25	38	29	8	M 25 X 1.5	**AN 05**	**AW 05X**	**H 305X**	0.075
25	30	45	31	8	M 30 X 1.5	**AN 06**	**AW 06X**	**H 306X**	0.109
30	35	52	35	9	M 35 X 1.5	**AN 07**	**AW 07X**	**H 307X**	0.142
35	40	58	36	10	M 40 X 1.5	**AN 08**	**AW 08X**	**H 308X**	0.189
40	45	65	39	11	M 45 X 1.5	**AN 09**	**AW 09X**	**H 309X**	0.248
45	50	70	42	12	M 50 X 1.5	**AN 10**	**AW 10X**	**H 310X**	0.302
50	55	75	45	12	M 55 X 2.0	**AN 11**	**AW 11X**	**H 311X**	0.345
55	60	80	47	13	M 60 X 2.0	**AN 12**	**AW 12X**	**H 312X**	0.393
60	65	85	50	14	M 65 X 2.0	**AN 13**	**AW 13X**	**H 313X**	0.459
60	70	92	52	14	M 70 X 2.0	**AN 14**	**AW 14X**	**H 314X**	0.723
65	75	98	55	15	M 75 X 2.0	**AN 15**	**AW 15X**	**H 315X**	0.830
70	80	105	59	17	M 80 X 2.0	**AN 16**	**AW 16X**	**H 316X**	1.030
75	85	110	63	18	M 85 X 2.0	**AN 17**	**AW 17X**	**H 317X**	1.180
80	90	120	65	18	M 90 X 2.0	**AN 18**	**AW 18X**	**H 318X**	1.370
85	95	125	68	19	M 95 X 2.0	**AN 19**	**AW 19X**	**H 319X**	1.560
90	100	130	71	20	M 100X2.0	**AN 20**	**AW 20X**	**H 320X**	1.690
100	110	145	77	21	M 110X2.0	**AN 22**	**AW 22X**	**H 322X**	2.180

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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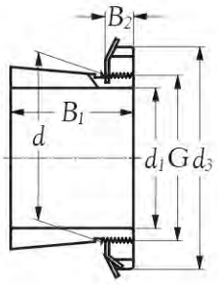
Adapter sleeves
series H 23..



Boundary dimensions mm						Lock nut	Locking device	Unit numbers	Mass kg(s). (approx.)
d_1	d	d_3	B_1	B_2	G				
20	25	38	35	8	M 25 X 1.5	AN 05	AW 05X	H 2305X	0.087
25	30	45	38	8	M 30 X 1.5	AN 06	AW 06X	H 2306X	0.126
30	35	52	43	9	M 35 X 1.5	AN 07	AW 07X	H 2307X	0.165
35	40	58	46	10	M 40 X 1.5	AN 08	AW 08X	H 2308X	0.224
40	45	65	50	11	M 45 X 1.5	AN 09	AW 09X	H 2309X	0.280
45	50	70	55	12	M 50 X 1.5	AN 10	AW 10X	H 2310X	0.362
50	55	75	59	12	M 55 X 2.0	AN 11	AW 11X	H 2311X	0.420
55	60	80	62	13	M 60 X 2.0	AN 12	AW 12X	H 2312X	0.480
60	65	85	65	14	M 65 X 2.0	AN 13	AW 13X	H 2313X	0.556
60	70	92	68	14	M 70 X 2.0	AN 14	AW 14X	H 2314X	0.897
65	75	98	73	15	M 75 X 2.0	AN 15	AW 15X	H 2315X	1.050
70	80	105	78	17	M 80 X 2.0	AN 16	AW 16X	H 2316X	1.280
75	85	110	82	18	M 85 X 2.0	AN 17	AW 17X	H 2317X	1.450
80	90	120	86	18	M 90 X 2.0	AN 18	AW 18X	H 2318X	1.700
85	95	125	90	19	M 95 X 2.0	AN 19	AW 19X	H 2319X	1.940
90	100	130	97	20	M 100X2.0	AN 20	AW 20X	H 2320X	2.150
100	110	145	105	21	M 110X2.0	AN 22	AW 22X	H 2322X	2.740
110	120	155	112	22	M 120X2.0	AN 24	AW 24X	H 2324X	3.200
115	130	165	121	23	M 130X2.0	AN 26	AW 26	H 2326	4.600
125	140	180	131	24	M 140X2.0	AN 28	AW 28	H 2328	5.520
135	150	195	139	26	M 150X2.0	AN 30	AW 30	H 2330	6.600
140	160	210	147	28	M 160X3.0	AN 32	AW 32	H 2332	9.150
170	190	240	169	31	M 190X3.0	AN 38	AW 38	H 2338	12.600
180	200	250	176	32	M 200X3.0	AN 40	AW 40	H 2340	13.900
200	220	280	183	32	M 220X4.0	AN 44	AL 44	H 2344	16.600

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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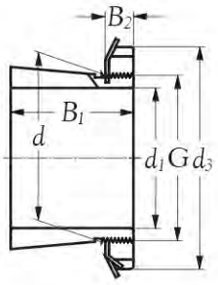
Adapter sleeves
series H 31..



Boundary dimensions mm						Lock nut	Locking device	Unit numbers	Mass kgs. (approx.)
d_1	d	d_3	B_1	B_2	G				
100	110	145	81	21	M 110 X 2	AN 22	AW 22X	H 3122X	2.25
110	120	155	88	22	M 120 X 2	AN 24	AW 24X	H 3124X	2.64
115	130	165	92	23	M 130 X 2	AN 26	AW 26	H 3126	3.66
125	140	180	97	24	M 140 X 2	AN 28	AW 28	H 3128	4.34
135	150	195	111	26	M 150 X 2	AN 30	AW 30	H 3130	5.54
140	160	210	119	28	M 160 X 3	AN 32	AW 32	H 3132	7.70
150	170	220	122	29	M 170 X 3	AN 34	AW 34	H 3134	8.40
160	180	230	131	30	M 180 X 3	AN 36	AW 36	H 3136	9.50
170	190	240	141	31	M 190 X 3	AN 38	AW 38	H 3138	10.80
180	200	250	150	32	M 200 X 3	AN 40	AW 40	H 3140	12.10
200	220	280	158	32	M 220 X 4	AN 44	AL 44	H 3144	14.70
220	240	300	169	34	M 240 X 4	AN 48	AL 44	H 3148	17.30
240	260	330	187	36	M 260 X 4	AN 52	AL 52	H 3152	22.00
260	280	350	192	38	M 280 X 4	AN 56	AL 52	H 3156	24.50
280	300	380	208	40	M 300 X 4	AN 60	AL 60	H 3160	30.30

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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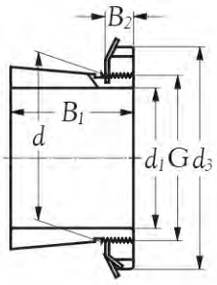
P5

Adapter sleeves
series HE 2..



Boundary dimensions inch d_1	d	d_3	mm B_1	B_2	G	Lock nut	Locking device	Unit numbers	Mass kg(s). (approx.)
3/4	25	38	26	8	M 25 X 1.5	AN 05	AW 05	HE 205	0.070
1	30	45	27	8	M 30 X 1.5	AN 06	AW 06	HE 206	0.099
1-1/4	40	58	31	10	M 40 X 1.5	AN 08	AW 08	HE 208	0.174
1-1/2	45	65	33	11	M 45 X 1.5	AN 09	AW 09	HE 209	0.226
1-3/4	50	70	35	12	M 50 X 1.5	AN 10	AW 10	HE 210	0.274
2	55	75	37	12	M 55 X 2.0	AN 11	AW 11	HE 211	0.308
2-1/4	65	85	40	14	M 65 X 2.0	AN 13	AW 13	HE 213	0.401
2-1/2	75	98	43	15	M 75 X 2.0	AN 15	AW 15	HE 215	0.708
2-3/4	80	105	46	17	M 80 X 2.0	AN 16	AW 16	HE 216	0.881
3	85	110	50	18	M 85 X 2.0	AN 17	AW 17	HE 217	1.020
3-1/4	90	120	52	18	M 90 X 2.0	AN 18	AW 18	HE 218	1.180
4	110	145	63	21	M 110X2.0	AN 22	AW 22	HE 222	1.930

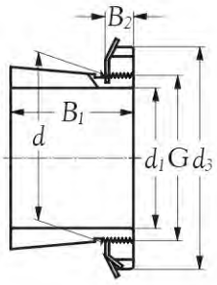
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

P5

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Adapter sleeves
series HE 3..



Boundary dimensions inch			mm			Lock nut	Locking device	Unit numbers	Mass kg(s).
d_1	d	d_3	B_1	B_2	G				(approx.)
3/4	25	38	29	8	M 25 X 1.5	AN 05	AW 05	HE 305	0.075
1	30	45	31	8	M 30 X 1.5	AN 06	AW 06	HE 306	0.109
1-1/4	40	58	36	10	M 40 X 1.5	AN 08	AW 08	HE 308	0.189
1-1/2	45	65	39	11	M 45 X 1.5	AN 09	AW 09	HE 309	0.248
1-3/4	50	70	42	12	M 50 X 1.5	AN 10	AW 10	HE 310	0.302
2	55	75	45	12	M 55 X 2.0	AN 11	AW 11	HE 311	0.345
2-1/4	65	85	50	14	M 65 X 2.0	AN 13	AW 13	HE 313	0.459
2-1/2	75	98	55	15	M 75 X 2.0	AN 15	AW 15	HE 315	0.830
2-3/4	80	105	59	17	M 80 X 2.0	AN 16	AW 16	HE 316	1.030
3	85	110	63	18	M 85 X 2.0	AN 17	AW 17	HE 317	1.180
3-1/4	90	120	65	18	M 90 X 2.0	AN 18	AW 18	HE 318	1.370
3-1/2	100	130	71	20	M 100X2.0	AN 20	AW 20	HE 320	1.690
4	110	145	77	21	M 110X2.0	AN 22	AW 22	HE 322	2.180

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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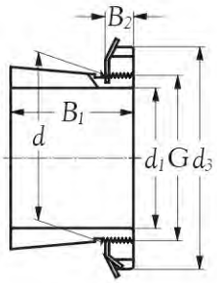
P5

Adapter sleeves
series HE 23..



Boundary dimensions inch			mm			Lock nut	Locking device	Unit numbers	Mass kg(s).
d_1	d	d_3	B_1	B_2	G				(approx.)
3/4	25	38	35	8	M 25 X 1.5	AN 05	AW 05	HE 2305	0.087
1	30	45	38	8	M 30 X 1.5	AN 06	AW 06	HE 2306	0.126
1-1/4	40	58	46	10	M 40 X 1.5	AN 08	AW 08	HE 2308	0.224
1-1/2	45	65	50	11	M 45 X 1.5	AN 09	AW 09	HE 2309	0.280
1-3/4	50	70	55	12	M 50 X 1.5	AN 10	AW 10	HE 2310	0.362
2	55	75	59	12	M 55 X 2.0	AN 11	AW 11	HE 2311	0.420
2-1/4	65	85	65	14	M 65 X 2.0	AN 13	AW 13	HE 2313	0.556
2-1/2	75	98	73	15	M 75 X 2.0	AN 15	AW 15	HE 2315	1.050
2-3/4	80	105	78	17	M 80 X 2.0	AN 16	AW 16	HE 2316	1.280
3	85	110	82	18	M 85 X 2.0	AN 17	AW 17	HE 2317	1.450
3-1/2	100	130	97	20	M 100X2.0	AN 20	AW 20	HE 2320	2.150
4	110	145	105	21	M 110X2.0	AN 22	AW 22	HE 2322	2.740
4-1/4	120	155	112	22	M 120X2.0	AN 24	AW 24	HE 2324	3.200
4-1/2	130	165	121	23	M 130X2.0	AN 26	AW 26	HE 2326	4.600
5	140	180	131	24	M 140X2.0	AN 28	AW 28	HE 2328	5.520
5-1/4	150	195	139	26	M 150X2.0	AN 30	AW 30	HE 2330	6.600
5-1/2	160	210	147	28	M 160X3.0	AN 32	AW 32	HE 2332	9.150
6-3/4	190	240	169	31	M 190X3.0	AN 38	AW 38	HE 2338	12.600

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r:

Remark: [Precision] - Class 0 (JIS)

[Cage] - Nil

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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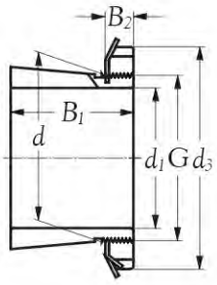
P5

Adapter sleeves
series HE 31..



Boundary dimensions inch d_1	d	d_3	mm B_1	B_2	G	Lock nut	Locking device	Unit numbers	Mass kgs. (approx.)
4	110	145	81	21	M 110 X 2	AN 22	AW 22	HE 3122	2.25
4 1/4	120	155	88	22	M 120 X 2	AN 24	AW 24	HE 3124	2.64
4 1/2	130	165	92	23	M 130 X 2	AN 26	AW 26	HE 3126	3.66
5	140	180	97	24	M 140 X 2	AN 28	AW 28	HE 3128	4.34
5-1/4	150	195	111	26	M 150 X 2	AN 30	AW 30	HE 3130	5.54
5-1/2	160	210	119	28	M 160 X 3	AN 32	AW 32	HE 3132	7.70
6	170	220	122	29	M 170 X 3	AN 34	AW 34	HE 3134	8.40
6-1/2	180	230	131	30	M 180 X 3	AN 36	AW 36	HE 3136	9.50
6-3/4	190	240	141	31	M 190 X 3	AN 38	AW 38	HE 3138	10.80
7	200	250	150	32	M 200 X 3	AN 40	AW 40	HE 3140	12.10

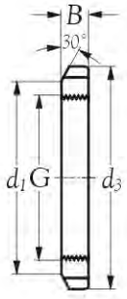
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

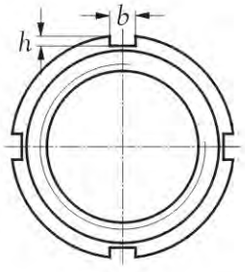
Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P5

Lock nuts
series AN..





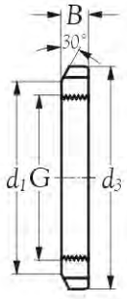
Boundary dimensions mm						Unit numbers	Mass kg(s). (approx.)
d_1	d_3	B	b	h	G		
13	18	4	3	2.0	M 10 X 0.75	**AN 00**	0.005
17	22	4	3	2.0	M 12 X 1.00	**AN 01**	0.007
21	25	5	4	2.0	M 15 X 1.00	**AN 02**	0.010
24	28	5	4	2.0	M 17 X 1.00	**AN 03**	0.013
26	32	6	4	2.0	M 20 X 1.00	**AN 04**	0.019
32	38	7	5	2.0	M 25 X 1.50	**AN 05**	0.025
38	45	7	5	2.0	M 30 X 1.50	**AN 06**	0.043
44	52	8	5	2.0	M 35 X 1.50	**AN 07**	0.053
50	58	9	6	2.5	M 40 X 1.50	**AN 08**	0.085
56	65	10	6	2.5	M 45 X 1.50	**AN 09**	0.119
61	70	11	6	2.5	M 50 X 1.50	**AN 10**	0.148
67	75	11	7	3.0	M 55 X 2.00	**AN 11**	0.158
73	80	11	7	3.0	M 60 X 2.00	**AN 12**	0.174
79	85	12	7	3.0	M 65 X 2.00	**AN 13**	0.203
85	92	12	8	3.5	M 70 X 2.00	**AN 14**	0.242
90	98	13	8	3.5	M 75 X 2.00	**AN 15**	0.287
95	105	15	8	3.5	M 80 X 2.00	**AN 16**	0.397
102	110	16	8	3.5	M 85 X 2.00	**AN 17**	0.451
108	120	16	10	4.0	M 90 X 2.00	**AN 18**	0.556
113	125	17	10	4.0	M 95 X 2.00	**AN 19**	0.658
120	130	18	10	4.0	M 100X2.00	**AN 20**	0.698
126	140	18	12	5.0	M 105X2.00	**AN 21**	0.845
133	145	19	12	5.0	M 110X2.00	**AN 22**	0.965
137	150	19	12	5.0	M 115X2.00	**AN 23**	1.010
138	155	20	12	5.0	M 120X2.00	**AN 24**	1.080

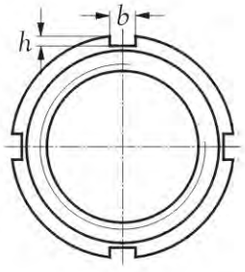
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Lock nuts
series AN..





Boundary dimensions mm						Unit numbers	Mass kgs. (approx.)
d_1	d_3	B	b	h	G		
148	160	21	12	5	M 125X2	**AN 25**	1.19
149	165	21	12	5	M 130X2	**AN 26**	1.25
160	175	22	14	6	M 135X2	**AN 27**	1.55
160	180	22	14	6	M 140X2	**AN 28**	1.56
171	190	24	14	6	M 145X2	**AN 29**	2.00
171	195	24	14	6	M 150X2	**AN 30**	2.03

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.
Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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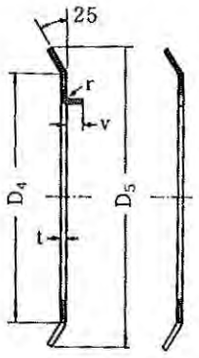
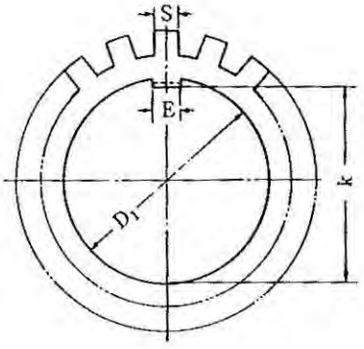
Washers
series AW..



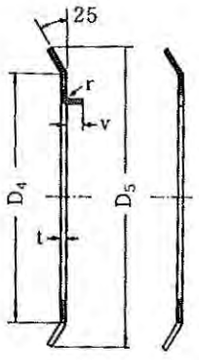


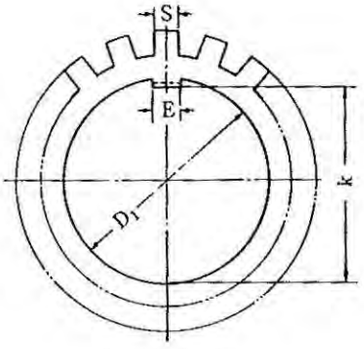
Boundary dimensions mm							Bent tab type		Numbers of cog	Unit numbers Bent tab type		Mass kg(s)./100 (approx.)
D_1	K	E	t	s	D_4	D_5	r	v				
10	8.5	3	1.0	3	13	21	0.5	2.0	9	AW 00	AW 00X	0.131
12	10.5	3	1.0	3	17	25	0.5	2.0	9	AW 01	AW 01X	0.192
15	13.5	4	1.0	4	21	28	0.8	2.5	13	AW 02	AW 02X	0.253
17	15.5	4	1.0	4	24	32	0.8	2.5	13	AW 03	AW 03X	0.313
20	18.5	4	1.0	4	26	36	1.0	2.5	13	AW 04	AW 04X	0.350
25	23.0	5	1.2	5	32	42	1.0	2.5	13	AW 05	AW 05X	0.640
30	27.5	5	1.2	5	38	49	1.0	2.5	13	AW 06	AW 06X	0.780
35	32.5	6	1.2	5	44	57	1.0	2.5	15	AW 07	AW 07X	1.040
40	37.5	6	1.2	6	50	62	1.0	2.5	15	AW 08	AW 08X	1.230
45	42.5	6	1.2	6	56	69	1.0	2.5	17	AW 09	AW 09X	1.520
50	47.5	6	1.2	6	61	74	1.0	2.5	17	AW 10	AW 10X	1.600
55	52.5	8	1.2	7	67	81	1.0	4.0	17	AW 11	AW 11X	1.960
60	57.5	8	1.5	7	73	86	1.2	4.0	17	AW 12	AW 12X	2.530
65	62.5	8	1.5	7	79	92	1.2	4.0	19	AW 13	AW 13X	2.900
70	66.5	8	1.5	8	85	98	1.2	4.0	19	AW 14	AW 14X	3.340
75	71.5	8	1.5	8	90	104	1.2	4.0	19	AW 15	AW 15X	3.560
80	76.5	10	1.8	8	95	112	1.2	4.0	19	AW 16	AW 16X	4.640
85	81.5	10	1.8	8	102	119	1.2	4.0	19	AW 17	AW 17X	5.240
90	86.5	10	1.8	10	108	126	1.2	4.0	19	AW 18	AW 18X	6.230
95	91.5	10	1.8	10	113	133	1.2	4.0	19	AW 19	AW 19X	6.700
100	96.5	12	1.8	10	120	142	1.2	6.0	19	AW 20	AW 20X	7.650
105	100.5	12	1.8	12	126	145	1.2	6.0	19	AW 21	AW 21X	8.260
110	105.5	12	1.8	12	133	154	1.2	6.0	19	AW 22	AW 22X	9.400
115	110.5	12	2.0	12	137	159	1.5	6.0	19	AW 23	AW 23X	10.800
120	115.0	14	2.0	12	138	164	1.5	6.0	19	AW 24	AW 24X	10.500

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.
Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Washers
series AW..





Boundary dimensions mm							Bent tab type		Numbers of cog	Unit numbers Bent tab type		Mass kgs. / 100 (approx.)
D_1	K	E	t	s	D_4	D_5	r	v				
125	120	14	2.0	12	148	170	1.5	6	19	AW 25	AW 25X	11.8
130	125	14	2.0	12	149	175	1.5	6	19	AW 26	AW 26X	11.3
135	130	14	2.0	14	160	185	1.5	6	19	AW 27	AW 27X	14.4
140	135	16	2.0	14	160	192	1.5	8	19	AW 28	AW 28X	14.2
145	140	16	2.0	14	171	202	1.5	8	19	AW 29	AW 29X	16.8
150	145	16	2.0	14	171	205	1.5	8	19	AW 30	AW 30X	15.5
160	154	18	2.5	16	182	217	1.5	8	19	AW 32	AW 32X	20.9
170	164	18	2.5	16	193	232	1.5	8	19	AW 34	AW 34X	22.2
180	174	20	2.5	18	203	242	1.5	8	19	AW 36	AW 36X	24.1
190	184	20	2.5	18	214	252	1.5	8	19	AW 38	AW 38X	24.7
200	194	20	2.5	18	226	262	1.5	8	19	AW 40	AW 40X	26.8

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.
Remark: [Precision] - Class 0 (JIS)
[Cage] - Nil
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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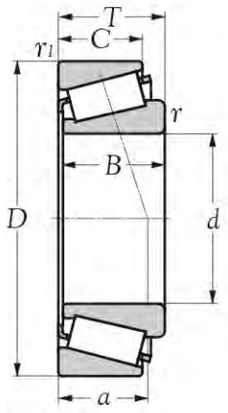
KSM® NOTE

KSM®

P6

TAPER ROLLER BEARINGS

Taper roller bearings
series 302.. A



Boundary dimensions mm							Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	T	B	C	$r_{s\,min}$ 1)	$r_{ls\,min}$ 1)	Cr	Cor	Cr	Cor			
17	40	13.25	12	11	1.0	1.0	20500	20300	2090	2070	9900	13000	**30203 A**
20	47	15.25	14	12	1.0	1.0	28200	28700	2870	2930	8800	12000	**30204 A**
25	52	16.25	15	13	1.0	1.0	31500	34000	3200	3450	7300	9800	**30205 A**
30	62	17.25	16	14	1.0	1.0	43500	48000	4450	4900	6300	8400	**30206 A**
35	72	18.25	17	15	1.5	1.5	55500	61500	5650	6250	5500	7400	**30207 A**
40	80	19.75	18	16	1.5	1.5	61000	67000	6250	6850	4900	6600	**30208 A**
45	85	20.75	19	16	1.5	1.5	67500	78500	6900	8000	4400	5900	**30209 A**
50	90	21.75	20	17	1.5	1.5	77000	93000	7850	9450	4000	5300	**30210 A**
55	100	22.75	21	18	2.0	1.5	93000	111000	9500	11300	3600	4900	**30211 A**
60	110	23.75	22	19	2.0	1.5	105000	125000	10700	12700	3400	4500	**30212 A**
65	120	24.75	23	20	2.0	1.5	123000	148000	12500	15000	3100	4200	**30213 A**
70	125	26.25	24	21	2.0	1.5	131000	162000	13400	16500	2900	3900	**30214 A**
75	130	27.25	25	22	2.0	1.5	139000	175000	14200	17900	2700	3600	**30215 A**
80	140	28.25	26	22	2.5	2.0	160000	200000	16300	20400	2500	3400	**30216 A**
85	150	30.50	28	24	2.5	2.0	183000	232000	18600	23600	2400	3200	**30217 A**
90	160	32.50	30	26	2.5	2.0	208000	267000	21200	27200	2200	3000	**30218 A**
95	170	34.50	32	27	3.0	2.5	226000	290000	23000	29600	2100	2800	**30219 A**
100	180	37.00	34	29	3.0	2.5	258000	335000	26300	34500	2000	2700	**30220 A**

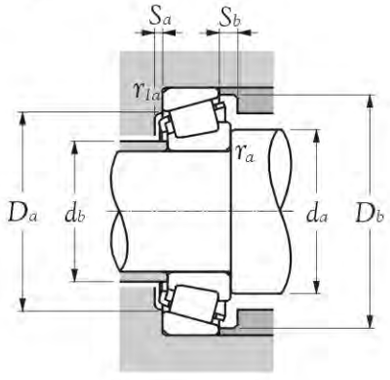
P6

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Taper roller bearings
series 302.. A



Equivalent radial load
dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	0	0.4	Y2

Static

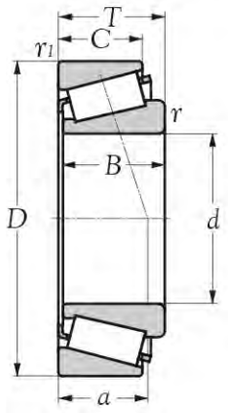
$Pr = 0.5Fr + YoFa$

When $Por < Fr$ **use** $Por = Fr$
For values of e, $Y2$ **and** Yo
see the tabla below.

Abutment and fillet dimensions mm									Load center mm	Constant	Axial load factors		Mass kg(s).
da min	db max	Da max	Da min	Db min	Sa min	Sb min	ras max	$r1as$ max	a	e	$Y2$	Yo	(approx.)
22.5	23	34.5	33	37	2	2.0	1.0	1.0	9.5	0.35	1.74	0.96	0.080
25.5	27	41.5	40	44	2	3.0	1.0	1.0	11.5	0.35	1.74	0.96	0.127
30.5	31	46.5	44	48	2	3.0	1.0	1.0	12.5	0.37	1.60	0.88	0.154
35.5	37	56.5	53	57	2	3.0	1.0	1.0	13.5	0.37	1.60	0.88	0.241
43.5	44	63.5	62	67	3	3.0	1.5	1.5	15.0	0.37	1.60	0.88	0.344
48.5	49	71.5	69	75	3	3.5	1.5	1.5	16.5	0.37	1.60	0.88	0.435
53.5	54	76.5	74	80	3	4.5	1.5	1.5	18.0	0.40	1.48	0.81	0.495
58.5	58	81.5	79	85	3	4.5	1.5	1.5	19.5	0.42	1.43	0.79	0.563
65.0	64	91.5	88	94	4	4.5	2.0	1.5	21.0	0.40	1.48	0.81	0.740
70.0	70	101.5	96	103	4	4.5	2.0	1.5	22.0	0.40	1.48	0.81	0.949
75.0	77	111.5	106	113	4	4.5	2.0	1.5	23.5	0.40	1.48	0.81	1.180
80.0	81	116.5	110	118	4	5.0	2.0	1.5	25.5	0.42	1.43	0.79	1.260
85.0	85	121.5	115	124	4	5.0	2.0	1.5	27.0	0.44	1.38	0.76	1.410
92.0	91	130.0	124	132	4	6.0	2.0	2.0	27.5	0.42	1.43	0.79	1.720
97.0	97	140.0	132	141	5	6.5	2.0	2.0	30.0	0.42	1.43	0.79	2.140
102.0	103	150.0	140	150	5	6.5	2.0	2.0	32.0	0.42	1.43	0.79	2.660
109.0	110	158.0	149	159	5	7.5	2.5	2.0	34.0	0.42	1.43	0.79	3.070
114.0	116	168.0	157	168	5	8.0	2.5	2.0	36.0	0.42	1.43	0.79	3.780

P6

Taper roller bearings
series 303.. A



Boundary dimensions mm							Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	T	B	C	$r_{s\,min}$ 1)	$r_{ls\,min}$ 1)	Cr	Cor	Cr	Cor			
17	47	15.25	14	12	1.0	1.0	28900	26300	2940	2680	9000	12000	**30303 A**
20	52	16.25	16	13	1.5	1.5	35500	34000	3600	3450	8000	11000	**30304 A**
25	62	18.25	17	15	1.5	1.5	48500	47500	4950	4850	6700	8900	**30305 A**
30	72	20.75	19	16	1.5	1.5	60000	61000	6100	6200	5700	7600	**30306 A**
35	80	22.75	21	18	2.0	1.5	75000	77000	7650	7900	5000	6600	**30307 A**
40	90	25.25	23	20	2.0	1.5	91500	102000	9350	10400	4400	5900	**30308 A**
45	100	27.25	25	22	2.0	1.5	111000	126000	11300	12800	4000	5300	**30309 A**
50	110	29.25	27	23	2.5	2.0	133000	152000	13500	15500	3600	4800	**30310 A**
55	120	31.50	29	25	2.5	2.0	155000	179000	15800	18300	3300	4400	**30311 A**
60	130	33.50	31	26	3.0	2.5	180000	210000	18300	21400	3000	4000	**30312 A**
65	140	36.00	33	28	3.0	2.5	203000	238000	20700	24300	2800	3700	**30313 A**
70	150	38.00	35	30	3.0	2.5	230000	272000	23400	27800	2600	3500	**30314 A**
75	160	40.00	37	31	3.0	2.5	255000	305000	26000	31000	2400	3200	**30315 A**
80	170	42.50	39	33	3.0	2.5	291000	350000	29700	36000	2300	3000	**30316 A**

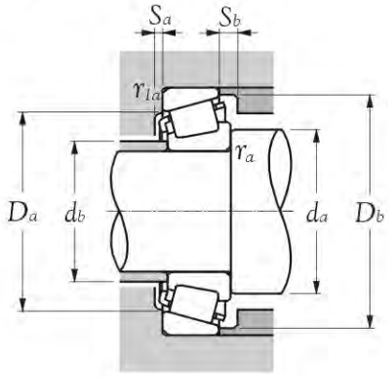
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

P6

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Taper roller bearings
series 303.. A



Equivalent radial load
dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	0	0.4	Y2

Static

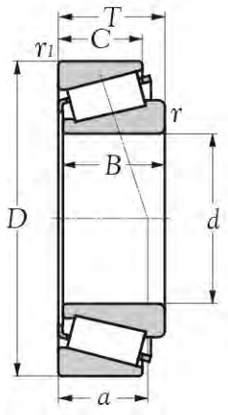
$Pr = 0.5Fr + YoFa$

When $Por < Fr$ **use** $Por = Fr$
For values of e, $Y2$ **and** Yo **see the tabla below.**

Abutment and fillet dimensions mm									Load center mm	Constant	Axial load factors		Mass kg(s).
da min	db max	Da max	Da min	Db min	Sa min	Sb min	ras max	ras max	a	e	$Y2$	Yo	(approx.)
22.5	24.0	41.5	40.0	42.0	3	3.5	1.0	1.0	10.5	0.29	2.11	1.16	0.134
28.5	28.0	43.5	42.5	47.5	3	3.0	1.5	1.5	10.5	0.30	2.00	1.10	0.176
33.5	34.0	53.5	52.0	57.0	3	3.0	1.5	1.5	13.0	0.30	2.00	1.10	0.272
38.5	40.0	63.5	62.0	66.0	3	4.5	1.5	1.5	15.0	0.31	1.90	1.05	0.408
45.0	45.0	71.5	70.0	74.0	3	4.5	2.0	1.5	17.0	0.31	1.90	1.05	0.540
50.0	52.0	81.5	77.0	82.0	3	5.0	2.0	1.5	19.5	0.35	1.74	0.96	0.769
55.0	59.0	91.5	86.0	93.0	3	5.0	2.0	1.5	21.0	0.35	1.74	0.96	1.010
62.0	65.0	100.0	95.0	102.0	3	6.0	2.0	2.0	23.0	0.35	1.74	0.96	1.310
67.0	71.0	110.0	104.0	111.0	4	6.5	2.0	2.0	24.5	0.35	1.74	0.96	1.660
74.0	77.0	118.0	112.0	120.0	4	7.5	2.5	2.0	26.5	0.35	1.74	0.96	2.060
79.0	83.0	128.0	122.0	130.0	4	8.0	2.5	2.0	28.5	0.35	1.74	0.96	2.550
84.0	89.0	138.0	130.0	140.0	4	8.0	2.5	2.0	30.0	0.35	1.74	0.96	3.060
89.0	95.0	148.0	139.0	149.0	4	9.0	2.5	2.0	32.0	0.35	1.74	0.96	3.570
94.0	102.0	158.0	148.0	159.0	4	9.5	2.5	2.0	34.0	0.35	1.74	0.96	4.410

P6

Taper roller bearings
series 320.. X



Boundary dimensions mm							Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	T	B	C	$r_{s\,min}$ 1)	$r_{ls\,min}$ 1)	C_r	C_{or}	C_r	C_{or}			
22	44	15	15	11.5	0.6	0.6	27000	31500	2760	3250	8900	12000	**320/22 X**
28	52	16	16	12.0	1.0	1.0	33000	40500	3400	4150	7300	9700	**320/28 X**
32	58	17	17	13.0	1.0	1.0	37000	46500	3750	4750	6600	8700	**320/32 X**
20	42	15	15	12.0	0.6	0.6	24900	27900	2540	2840	9500	13000	**32004 X**
25	47	15	15	11.5	0.6	0.6	27800	33500	2830	3450	7900	11000	**32005 X**
30	55	17	17	13.0	1.0	1.0	37500	46000	3800	4700	6900	9200	**32006 X**
35	62	18	18	14.0	1.0	1.0	41500	52500	4250	5350	6100	8100	**32007 X**
40	68	19	19	14.5	1.0	1.0	50000	65500	5100	6650	5300	7100	**32008 X**
45	75	20	20	15.5	1.0	1.0	57500	76500	5850	7800	4800	6400	**32009 X**
50	80	20	20	15.5	1.0	1.0	62500	88000	6400	9000	4400	5800	**32010 X**
55	90	23	23	17.5	1.5	1.5	80500	118000	8200	12000	4000	5400	**32011 X**
60	95	23	23	17.5	1.5	1.5	82000	123000	8350	12500	3700	4900	**32012 X**
65	100	23	23	17.5	1.5	1.5	83000	128000	8450	13000	3400	4600	**32013 X**
70	110	25	25	19.0	1.5	1.5	105000	160000	10700	16400	3200	4200	**32014 X**
75	115	25	25	19.0	1.5	1.5	106000	167000	10800	17000	3000	4000	**32015 X**
80	125	29	29	22.0	1.5	1.5	139000	216000	14200	22000	2800	3700	**32016 X**
85	130	29	29	22.0	1.5	1.5	142000	224000	14400	22900	2600	3500	**32017 X**
90	140	32	32	24.0	2.0	1.5	168000	270000	17200	27600	2500	3300	**32018 X**
95	145	32	32	24.0	2.0	1.5	171000	280000	17500	28600	2300	3100	**32019 X**
100	150	32	32	24.0	2.0	1.5	170000	281000	17300	28600	2200	3000	**32020 X**
105	160	35	35	26.0	2.5	2.0	201000	335000	20500	34000	2100	2800	**32021 X**
110	170	38	38	29.0	2.5	2.0	236000	390000	24000	39500	2000	2700	**32022 X**
120	180	38	38	29.0	2.5	2.0	245000	420000	25000	43000	1800	2500	**32024 X**

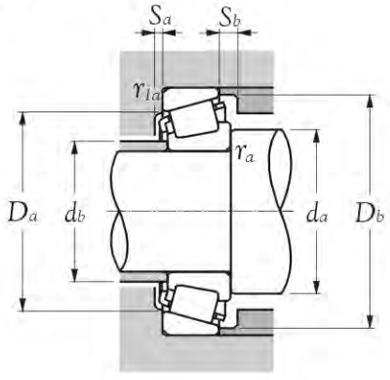
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P6

Taper roller bearings
series 320.. X



Equivalent radial load
dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	0	0.4	Y2

Static

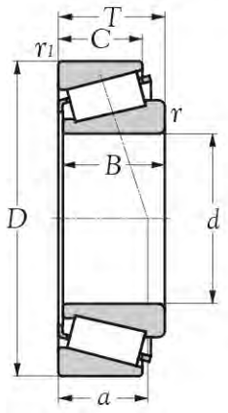
$Pr = 0.5Fr + YoFa$

When $Por < Fr$ **use** $Por = Fr$
For values of e, $Y2$ **and** Yo **see the tabla below.**

Abutment and fillet dimensions mm									Load center mm	Constant	Axial load factors		Mass kg(s).
da min	db max	Da max	Da min	Db min	Sa min	Sb min	ras max	$r1as$ max	a	e	$Y2$	Yo	(approx.)
26.5	27	39.5	38	41	3	3.5	0.6	0.6	11.0	0.40	1.51	0.83	0.106
33.5	33	46.5	45	49	3	4.0	1.0	1.0	12.5	0.43	1.39	0.77	0.146
37.5	38	52.5	50	55	3	4.0	1.0	1.0	14.5	0.45	1.32	0.73	0.181
24.5	25	37.5	36	39	3	3.0	0.6	0.6	10.5	0.37	1.60	0.88	0.097
29.5	30	42.5	40	44	3	3.5	0.6	0.6	12.0	0.43	1.39	0.77	0.114
35.5	35	49.5	48	52	3	4.0	1.0	1.0	13.5	0.43	1.39	0.77	0.166
40.5	40	56.5	54	59	4	4.0	1.0	1.0	15.5	0.45	1.32	0.73	0.224
45.5	46	62.5	60	65	4	4.5	1.0	1.0	15.0	0.38	1.58	0.87	0.273
50.5	51	69.5	67	72	4	4.5	1.0	1.0	16.5	0.39	1.53	0.84	0.346
55.5	56	74.5	72	77	4	4.5	1.0	1.0	17.5	0.42	1.42	0.78	0.366
63.5	63	81.5	81	86	4	5.5	1.5	1.5	20.0	0.41	1.48	0.81	0.563
68.5	67	86.5	85	91	4	5.5	1.5	1.5	21.0	0.43	1.39	0.77	0.576
73.5	72	91.5	90	97	4	5.5	1.5	1.5	22.5	0.46	1.31	0.72	0.630
78.5	78	101.5	98	105	5	6.0	1.5	1.5	24.0	0.43	1.38	0.76	0.848
83.5	83	106.5	103	110	5	6.0	1.5	1.5	25.5	0.46	1.31	0.72	0.909
88.5	89	116.5	112	120	6	7.0	1.5	1.5	27.0	0.42	1.42	0.78	1.280
93.5	94	121.5	117	125	6	7.0	1.5	1.5	28.5	0.44	1.36	0.75	1.350
100.0	100	131.5	125	134	6	8.0	2.0	1.5	30.0	0.42	1.42	0.78	1.790
105.0	105	136.5	130	140	6	8.0	2.0	1.5	31.5	0.44	1.36	0.75	1.830
110.0	109	141.5	134	144	6	8.0	2.0	1.5	32.5	0.46	1.31	0.72	1.910
117.0	116	150.0	143	154	6	9.0	2.0	2.0	34.5	0.44	1.35	0.74	2.420
122.0	122	160.0	152	163	7	9.0	2.0	2.0	36.5	0.43	1.39	0.77	3.070
132.0	131	170.0	161	173	7	9.0	2.0	2.0	39.0	0.46	1.31	0.72	3.250

P6

Taper roller bearings
series 322.. A



Boundary dimensions mm							Basic load ratings dynamic N		static N		Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	T	B	C	$r_{s\,min}$ 1)	$r_{ls\,min}$ 1)	Cr	Cor	Cr kgf	Cor			
25	52	19.25	18	16	1.0	1.0	42000	47000	4300	4800	7300	9800	**32205 A**
30	62	21.25	20	17	1.0	1.0	54500	64000	5600	6550	6300	8400	**32206 A**
35	72	24.25	23	19	1.5	1.5	72500	87000	7400	8900	5500	7400	**32207 A**
40	80	24.75	23	19	1.5	1.5	79500	93500	8100	9550	4900	6600	**32208 A**
45	85	24.75	23	19	1.5	1.5	82000	100000	8350	10200	4400	5900	**32209 A**
50	90	24.75	23	19	1.5	1.5	87500	109000	8900	11100	4000	5300	**32210 A**
55	100	26.75	25	21	2.0	1.5	108000	134000	11000	13700	3600	4900	**32211 A**
60	110	29.75	28	24	2.0	1.5	130000	164000	13200	16800	3400	4500	**32212 A**
65	120	32.75	31	27	2.0	1.5	159000	206000	16200	21000	3100	4200	**32213 A**
70	125	33.25	31	27	2.0	1.5	166000	220000	16900	22400	2900	3900	**32214 A**
75	130	33.25	31	27	2.0	1.5	168000	224000	17100	22800	2700	3600	**32215 A**
80	140	35.25	33	28	2.5	2.0	199000	265000	20300	27000	2500	3400	**32216 A**
85	150	38.50	36	30	2.5	2.0	224000	300000	22900	30500	2400	3200	**32217 A**

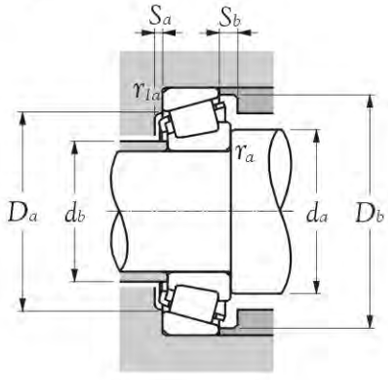
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

P6

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Taper roller bearings
series 322.. A



Equivalent radial load
dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	0	0.4	Y2

Static

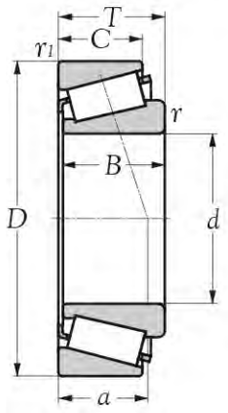
$Pr = 0.5Fr + YoFa$

When $Por < Fr$ **use** $Por = Fr$
For values of e, $Y2$ **and** Yo
see the tabla below.

Abutment and fillet dimensions mm									Load center mm	Constant	Axial load factors		Mass kg(s).
da min	db max	Da max	Da min	Db min	Sa min	Sb min	ras max	$r1as$ max	a	e	$Y2$	Yo	(approx.)
30.5	31	46.5	43	49.5	2.0	4.0	1.0	1.0	14.0	0.36	1.67	0.92	0.187
35.5	37	56.5	52	58.0	2.5	4.0	1.0	1.0	15.5	0.37	1.60	0.88	0.301
43.5	43	63.5	61	67.0	3.0	5.0	1.5	1.5	17.5	0.37	1.60	0.88	0.457
48.5	48	71.5	68	75.0	3.0	5.5	1.5	1.5	19.0	0.37	1.60	0.88	0.558
53.5	53	76.5	73	81.0	3.0	5.5	1.5	1.5	20.0	0.40	1.48	0.81	0.607
58.5	58	81.5	78	85.0	3.0	5.5	1.5	1.5	21.0	0.42	1.43	0.79	0.648
65.0	63	91.5	87	95.0	4.0	5.5	2.0	1.5	22.5	0.40	1.48	0.81	0.876
70.0	69	101.5	95	104.0	4.0	5.5	2.0	1.5	25.0	0.40	1.48	0.81	1.180
75.0	75	111.5	104	115.0	4.0	5.5	2.0	1.5	27.0	0.40	1.48	0.81	1.580
80.0	80	116.5	108	119.0	4.0	6.0	2.0	1.5	28.5	0.42	1.43	0.79	1.680
85.0	85	121.5	114	125.0	4.0	6.0	2.0	1.5	30.0	0.44	1.38	0.76	1.740
92.0	90	130.0	122	134.0	4.0	7.0	2.0	2.0	31.0	0.42	1.43	0.79	2.180
97.0	96	140.0	130	142.0	5.0	8.5	2.0	2.0	33.5	0.42	1.43	0.79	2.750

P6

Taper roller bearings
series 323.. A



Boundary dimensions mm							Basic load ratings dynamic N		static N		Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	T	B	C	$r_{s\,min}$ 1)	$r_{ls\,min}$ 1)	Cr	Cor	Cr kgf	Cor			
20	52	22.25	21	18	1.5	1.5	46500	48500	4750	4950	8000	11000	**32304 A**
25	62	25.25	24	20	1.5	1.5	61500	64500	6250	6600	6700	8900	**32305 A**
30	72	28.75	27	23	1.5	1.5	81000	90000	8250	9150	5700	7600	**32306 A**
35	80	32.75	31	25	2.0	1.5	101000	115000	10300	11700	5000	6600	**32307 A**
40	90	35.25	33	27	2.0	1.5	122000	150000	12500	15300	4400	5900	**32308 A**
45	100	38.25	36	30	2.0	1.5	154000	191000	15700	19500	4000	5300	**32309 A**
50	110	42.25	40	33	2.5	2.0	184000	232000	18700	23600	3600	4800	**32310 A**
55	120	45.50	43	35	2.5	2.0	215000	275000	21900	28000	3300	4400	**32311 A**
60	130	48.50	46	37	3.0	2.5	244000	315000	24900	32000	3000	4000	**32312 A**

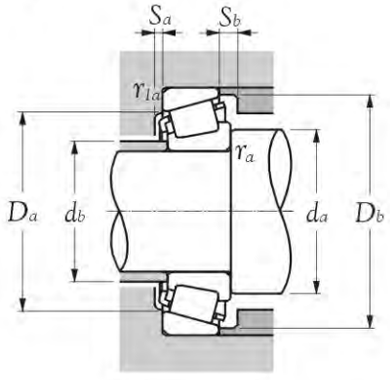
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P6

Taper roller bearings
series 323.. A



Equivalent radial load
dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	0	0.4	Y2

Static

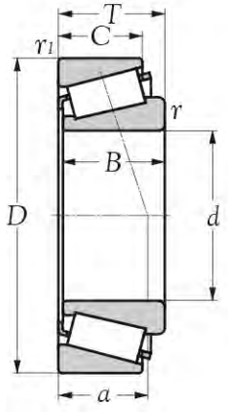
$Pr = 0.5Fr + YoFa$

When $Por < Fr$ **use** $Por = Fr$
For values of e, $Y2$ **and** Yo **see the tabla below.**

Abutment and fillet dimensions mm									Load center mm	Constant	Axial load factors		Mass kg(s).
da min	db max	Da max	Da min	Db min	Sa min	Sb min	ras max	$r1as$ max	a	e	$Y2$	Yo	(approx.)
28.5	27	43.5	43	47	3	4.0	1.5	1.5	14.0	0.30	2.00	1.10	0.245
33.5	32	53.5	52	57	3	5.0	1.5	1.5	16.0	0.30	2.00	1.10	0.381
38.5	38	63.5	59	66	3	5.5	1.5	1.5	18.5	0.31	1.90	1.05	0.583
45.0	43	71.5	66	74	3	7.5	2.0	1.5	20.5	0.31	1.90	1.05	0.787
50.0	50	81.5	73	82	3	8.0	2.0	1.5	23.0	0.35	1.74	0.96	1.080
55.0	56	91.5	82	93	3	8.0	2.0	1.5	25.5	0.35	1.74	0.96	1.460
62.0	62	100.0	90	102	3	9.0	2.0	2.0	28.5	0.35	1.74	0.96	1.920
67.0	68	110.0	99	111	4	10.5	2.0	2.0	30.5	0.35	1.74	0.96	2.440
74.0	74	118.0	107	120	4	11.5	2.5	2.0	32.0	0.35	1.74	0.96	3.020

P6

Taper roller bearings
series 332



Boundary dimensions mm							Basic load ratings dynamic N		static N		Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	T	B	C	$r_{s\,min}$ 1)	$r_{ls\,min}$ 1)	C_r	C_{or}	C_r kgf	C_{or}			
25	52	22	22	18.0	1.0	1.0	47500	57500	4850	5850	7300	9800	**33205**
30	62	25	25	19.5	1.0	1.0	65000	77000	6600	7850	6300	8400	**33206**
35	72	28	28	22.0	1.5	1.5	87500	109000	8900	11200	5500	7400	**33207**
40	80	32	32	25.0	1.5	1.5	103000	132000	10500	13400	4900	6600	**33208**
45	85	32	32	25.0	1.5	1.5	107000	141000	10900	14400	4400	5900	**33209**
50	90	32	32	24.5	1.5	1.5	115000	158000	11700	16100	4000	5300	**33210**
55	100	35	35	27.0	2.0	1.5	138000	188000	14100	19100	3600	4900	**33211**

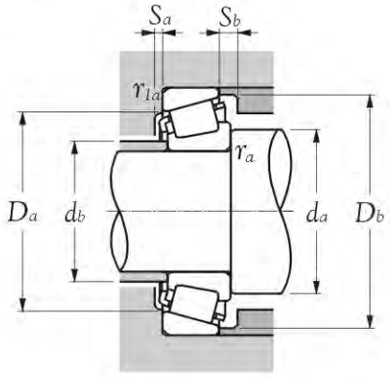
Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P6

Taper roller bearings
series 332



Equivalent radial load
dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	0	0.4	Y2

Static

$Pr = 0.5Fr + YoFa$

When $Por < Fr$ **use** $Por = Fr$
For values of e, $Y2$ **and** Yo
see the tabla below.

Abutment and fillet dimensions mm									Load center mm	Constant	Axial load factors		Mass kg(s).
da min	db max	Da max	Da min	Db min	Sa min	Sb min	ras max	ras max	a	e	$Y2$	Yo	(approx.)
30.5	30	46.5	43	49	4	4.0	1.0	1.0	14.0	0.35	1.71	0.94	0.217
35.5	36	56.5	53	59	5	5.5	1.0	1.0	16.0	0.34	1.76	0.97	0.344
43.5	42	63.5	61	68	5	6.0	1.5	1.5	18.5	0.35	1.70	0.93	0.531
48.5	47	71.5	67	76	5	7.0	1.5	1.5	21.0	0.36	1.68	0.92	0.728
53.5	52	76.5	72	81	5	7.0	1.5	1.5	22.0	0.39	1.56	0.86	0.783
58.5	57	81.5	77	87	5	7.5	1.5	1.5	23.5	0.41	1.45	0.80	0.852
65.0	62	91.5	85	96	6	8.0	2.0	1.5	25.5	0.40	1.50	0.83	1.150

P6

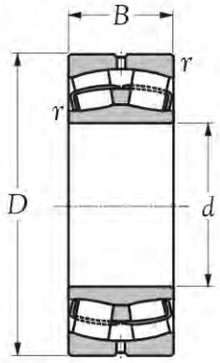
KSM® NOTE

KSM®

P7

SPHERICAL ROLLER BEARINGS

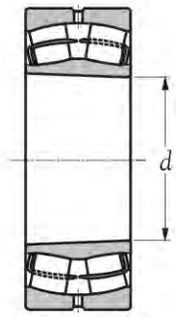
Spherical roller bearings series 213



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	r_s min[1]	C_r	C_{or}	C_r	C_{or}			
20	52	15	1.1	41000	33000	4182	3366	9700	15000	21304 MB W33
20	52	15	1.1	41000	33000	4182	3366	9700	15000	21304 MB/K W33
20	52	15	1.1	41000	33000	4182	3366	9700	15000	21304 CA W33
20	52	15	1.1	41000	33000	4182	3366	9700	15000	21304 CA/K W33
25	62	17	1.1	53000	43500	5406	4437	8400	13000	21305 MB W33
25	62	17	1.1	53000	43500	5406	4437	8400	13000	21305 MB/K W33
25	62	17	1.1	53000	43500	5406	4437	8400	13000	21305 CA W33
25	62	17	1.1	53000	43500	5406	4437	8400	13000	21305 CA/K W33
30	72	19	1.1	72000	63000	7344	6426	7300	11000	21306 MB W33
30	72	19	1.1	72000	63000	7344	6426	7300	11000	21306 MB/K W33
30	72	19	1.1	72000	63000	7344	6426	7300	11000	21306 CA W33
30	72	19	1.1	72000	63000	7344	6426	7300	11000	21306 CA/K W33
30	72	19	1.1	72000	63000	7344	6426	7300	11000	21306 CC W33
30	72	19	1.1	72000	63000	7344	6426	7300	11000	21306 CC/K W33
35	80	21	1.5	83000	74000	8466	7548	6800	9500	21307 MB W33
35	80	21	1.5	83000	74000	8466	7548	6800	9500	21307 MB/K W33
35	80	21	1.5	83000	74000	8466	7548	6800	9500	21307 CA W33
35	80	21	1.5	83000	74000	8466	7548	6800	9500	21307 CA/K W33
35	80	21	1.5	83000	74000	8466	7548	6800	9500	21307 CC W33
35	80	21	1.5	83000	74000	8466	7548	6800	9500	21307 CC/K W33
40	90	23	1.5	88000	90000	8950	9150	4900	6400	21308 MB W33
40	90	23	1.5	88000	90000	8950	9150	4900	6400	21308 MB/K W33
40	90	23	1.5	88000	90000	8950	9150	4900	6400	21308 CA W33
40	90	23	1.5	88000	90000	8950	9150	4900	6400	21308 CA/K W33

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

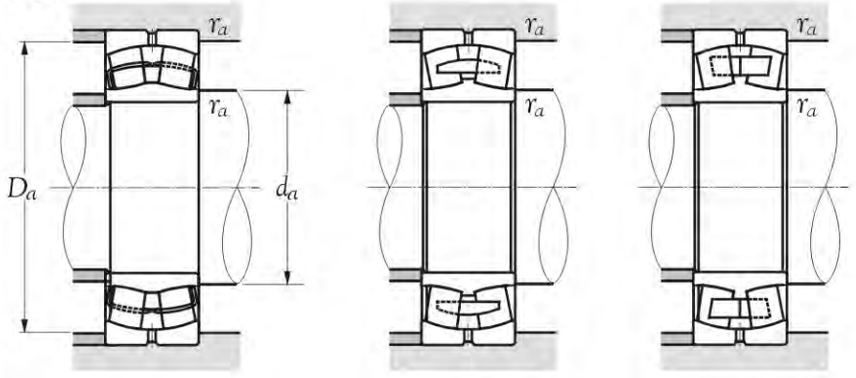
Remark: [Precision] - Class 0 (JIS)

[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Spherical roller bearings
series 213



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

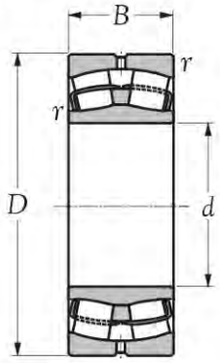
Statie

$Pr = Fr + Y_o Fa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kg.	Mass tapered bore kg.
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0		
27.0	45.0	1.0	0.30	2.25	3.34	2.20	0.160	-
27.0	45.0	1.0	0.30	2.25	3.34	2.20	-	0.155
27.0	45.0	1.0	0.30	2.25	3.34	2.20	0.160	-
27.0	45.0	1.0	0.30	2.25	3.34	2.20	-	0.155
32.0	55.0	1.0	0.28	2.43	3.61	2.37	0.254	-
32.0	55.0	1.0	0.28	2.43	3.61	2.37	-	0.247
32.0	55.0	1.0	0.28	2.43	3.61	2.37	0.254	-
32.0	55.0	1.0	0.28	2.43	3.61	2.37	-	0.247
37.0	65.0	1.0	0.27	2.49	3.71	2.43	0.386	-
37.0	65.0	1.0	0.27	2.49	3.71	2.43	-	0.375
37.0	65.0	1.0	0.27	2.49	3.71	2.43	0.386	-
37.0	65.0	1.0	0.27	2.49	3.71	2.43	-	0.375
37.0	65.0	1.0	0.27	2.49	3.71	2.43	0.386	-
37.0	65.0	1.0	0.27	2.49	3.71	2.43	-	0.375
44.0	71.0	1.5	0.26	2.55	3.80	2.50	0.503	-
44.0	71.0	1.5	0.26	2.55	3.80	2.50	-	0.488
44.0	71.0	1.5	0.26	2.55	3.80	2.50	0.503	-
44.0	71.0	1.5	0.26	2.55	3.80	2.50	-	0.488
44.0	71.0	1.5	0.26	2.55	3.80	2.50	0.503	-
44.0	71.0	1.5	0.26	2.55	3.80	2.50	-	0.488
48.5	81.5	1.5	0.26	2.55	3.80	2.50	0.705	-
48.5	81.5	1.5	0.26	2.55	3.80	2.50	-	0.694
48.5	81.5	1.5	0.26	2.55	3.80	2.50	0.705	-
48.5	81.5	1.5	0.26	2.55	3.80	2.50	-	0.694

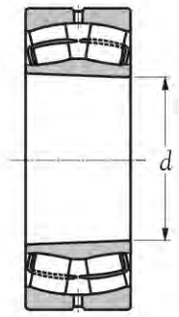
Spherical roller bearings
series 213



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	r_s min[1]	C_r	C_{or}	C_r	C_{or}			
40	90	23	1.5	88000	90000	8950	9150	4900	6400	21308 CC W33
40	90	23	1.5	88000	90000	8950	9150	4900	6400	21308 CC/K W33
45	100	25	1.5	102000	106000	10400	10800	4400	5700	21309 MB W33
45	100	25	1.5	102000	106000	10400	10800	4400	5700	21309 MB/K W33
45	100	25	1.5	102000	106000	10400	10800	4400	5700	21309 CA W33
45	100	25	1.5	102000	106000	10400	10800	4400	5700	21309 CA/K W33
45	100	25	1.5	102000	106000	10400	10800	4400	5700	21309 CC W33
45	100	25	1.5	102000	106000	10400	10800	4400	5700	21309 CC/K W33
50	110	27	2.0	118000	127000	12000	12900	4000	5200	21310 MB W33
50	110	27	2.0	118000	127000	12000	12900	4000	5200	21310 MB/K W33
50	110	27	2.0	118000	127000	12000	12900	4000	5200	21310 CA W33
50	110	27	2.0	118000	127000	12000	12900	4000	5200	21310 CA/K W33
50	110	27	2.0	118000	127000	12000	12900	4000	5200	21310 CC W33
50	110	27	2.0	118000	127000	12000	12900	4000	5200	21310 CC/K W33
55	120	29	2.0	145000	163000	14800	16600	3700	4800	21311 MB W33
55	120	29	2.0	145000	163000	14800	16600	3700	4800	21311 MB/K W33
55	120	29	2.0	145000	163000	14800	16600	3700	4800	21311 CA W33
55	120	29	2.0	145000	163000	14800	16600	3700	4800	21311 CA/K W33
55	120	29	2.0	145000	163000	14800	16600	3700	4800	21311 CC W33
55	120	29	2.0	145000	163000	14800	16600	3700	4800	21311 CC/K W33
60	130	31	2.1	167000	191000	17100	19500	3400	4400	21312 MB W33
60	130	31	2.1	167000	191000	17100	19500	3400	4400	21312 MB/K W33
60	130	31	2.1	167000	191000	17100	19500	3400	4400	21312 CA W33
60	130	31	2.1	167000	191000	17100	19500	3400	4400	21312 CA/K W33

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)

[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

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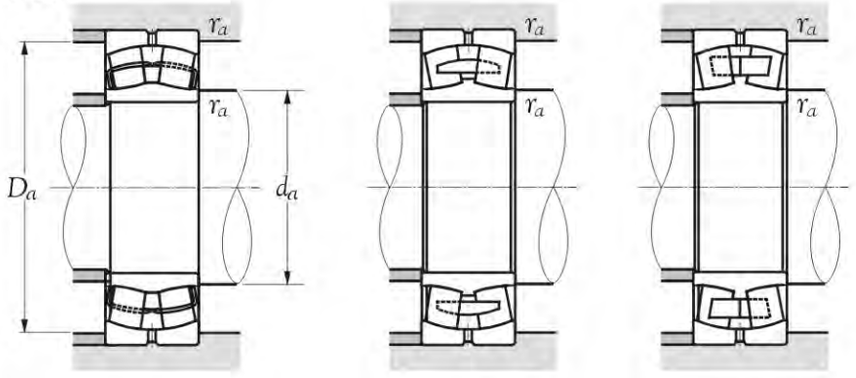
Spherical roller bearings
series 213



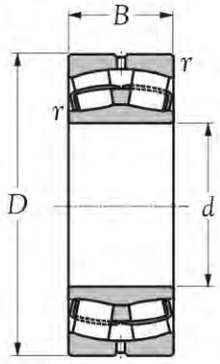
Equivalent radial load
dynamic
$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Statie
$Pr = Fr + Y_o Fa$
For values of *e*, *Y2* and *Yo*
see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kg(s).	Mass tapered bore kg(s).
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0		
48.5	81.5	1.5	0.26	2.55	3.80	2.50	0.705	-
48.5	81.5	1.5	0.26	2.55	3.80	2.50	-	0.694
53.5	91.5	1.5	0.26	2.60	3.87	2.54	0.927	-
53.5	91.5	1.5	0.26	2.60	3.87	2.54	-	0.912
53.5	91.5	1.5	0.26	2.60	3.87	2.54	0.927	-
53.5	91.5	1.5	0.26	2.60	3.87	2.54	-	0.912
53.5	91.5	1.5	0.26	2.60	3.87	2.54	0.927	-
53.5	91.5	1.5	0.26	2.60	3.87	2.54	-	0.912
60.0	100.0	2.0	0.26	2.64	3.93	2.58	1.210	-
60.0	100.0	2.0	0.26	2.64	3.93	2.58	-	1.190
60.0	100.0	2.0	0.26	2.64	3.93	2.58	1.210	-
60.0	100.0	2.0	0.26	2.64	3.93	2.58	-	1.190
60.0	100.0	2.0	0.26	2.64	3.93	2.58	1.210	-
60.0	100.0	2.0	0.26	2.64	3.93	2.58	-	1.190
65.0	110.0	2.0	0.25	2.69	4.01	2.63	1.710	-
65.0	110.0	2.0	0.25	2.69	4.01	2.63	-	1.690
65.0	110.0	2.0	0.25	2.69	4.01	2.63	1.710	-
65.0	110.0	2.0	0.25	2.69	4.01	2.63	-	1.690
65.0	110.0	2.0	0.25	2.69	4.01	2.63	1.710	-
65.0	110.0	2.0	0.25	2.69	4.01	2.63	-	1.690
72.0	118.0	2.0	0.25	2.69	4.00	2.63	2.100	-
72.0	118.0	2.0	0.25	2.69	4.00	2.63	-	2.070
72.0	118.0	2.0	0.25	2.69	4.00	2.63	2.100	-
72.0	118.0	2.0	0.25	2.69	4.00	2.63	-	2.070

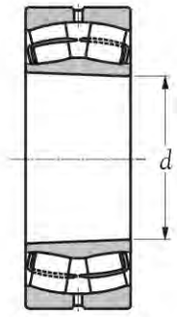
Spherical roller bearings
series 213



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	r's min 1)	Cr	Cor	Cr	Cor			
60	130	31	2.1	167000	191000	17100	19500	3400	4400	21312 CC W33
60	130	31	2.1	167000	191000	17100	19500	3400	4400	21312 CC/K W33
65	140	33	2.1	194000	228000	19800	23200	3100	4000	21313 MB W33
65	140	33	2.1	194000	228000	19800	23200	3100	4000	21313 MB/K W33
65	140	33	2.1	194000	228000	19800	23200	3100	4000	21313 CA W33
65	140	33	2.1	194000	228000	19800	23200	3100	4000	21313 CA/K W33
65	140	33	2.1	194000	228000	19800	23200	3100	4000	21313 CC W33
65	140	33	2.1	194000	228000	19800	23200	3100	4000	21313 CC/K W33
70	150	35	2.1	220000	262000	22400	26800	2900	3800	21314 MB W33
70	150	35	2.1	220000	262000	22400	26800	2900	3800	21314 MB/K W33
70	150	35	2.1	220000	262000	22400	26800	2900	3800	21314 CA W33
70	150	35	2.1	220000	262000	22400	26800	2900	3800	21314 CA/K W33
70	150	35	2.1	220000	262000	22400	26800	2900	3800	21314 CC W33
70	150	35	2.1	220000	262000	22400	26800	2900	3800	21314 CC/K W33
75	160	37	2.1	239000	287000	24300	29300	2700	3500	21315 MB W33
75	160	37	2.1	239000	287000	24300	29300	2700	3500	21315 MB/K W33
75	160	37	2.1	239000	287000	24300	29300	2700	3500	21315 CA W33
75	160	37	2.1	239000	287000	24300	29300	2700	3500	21315 CA/K W33
75	160	37	2.1	239000	287000	24300	29300	2700	3500	21315 CC W33
75	160	37	2.1	239000	287000	24300	29300	2700	3500	21315 CC/K W33
80	170	39	2.1	260000	315000	26500	32000	2500	3300	21316 MB W33
80	170	39	2.1	260000	315000	26500	32000	2500	3300	21316 MB/K W33
80	170	39	2.1	260000	315000	26500	32000	2500	3300	21316 CA W33
80	170	39	2.1	260000	315000	26500	32000	2500	3300	21316 CA/K W33

P7

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)

[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
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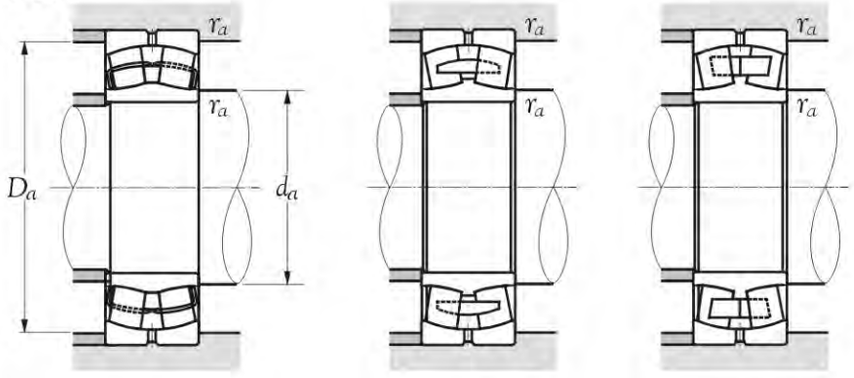
Spherical roller bearings
series 213



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

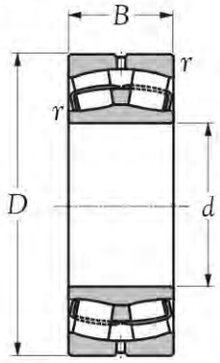
Statie

$Pr = Fr + Y_o Fa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kgs.	Mass tapered bore kgs.
d_a min	D_a max	r_a max	e	Y1	Y2	Y0		
72	118	2	0.25	2.69	4.00	2.63	2.100	-
72	118	2	0.25	2.69	4.00	2.63	-	2.070
77	128	2	0.25	2.69	4.00	2.63	2.550	-
77	128	2	0.25	2.69	4.00	2.63	-	2.510
77	128	2	0.25	2.69	4.00	2.63	2.550	-
77	128	2	0.25	2.69	4.00	2.63	-	2.510
77	128	2	0.25	2.69	4.00	2.63	2.550	-
77	128	2	0.25	2.69	4.00	2.63	-	2.510
82	138	2	0.25	2.69	4.00	2.63	3.180	-
82	138	2	0.25	2.69	4.00	2.63	-	3.140
82	138	2	0.25	2.69	4.00	2.63	3.180	-
82	138	2	0.25	2.69	4.00	2.63	-	3.140
82	138	2	0.25	2.69	4.00	2.63	3.180	-
82	138	2	0.25	2.69	4.00	2.63	-	3.140
87	148	2	0.24	2.84	4.23	2.78	3.810	-
87	148	2	0.24	2.84	4.23	2.78	-	3.760
87	148	2	0.24	2.84	4.23	2.78	3.810	-
87	148	2	0.24	2.84	4.23	2.78	-	3.760
87	148	2	0.24	2.84	4.23	2.78	3.810	-
87	148	2	0.24	2.84	4.23	2.78	-	3.760
92	158	2	0.23	2.95	4.39	2.88	4.530	-
92	158	2	0.23	2.95	4.39	2.88	-	4.470
92	158	2	0.23	2.95	4.39	2.88	4.530	-
92	158	2	0.23	2.95	4.39	2.88	-	4.470

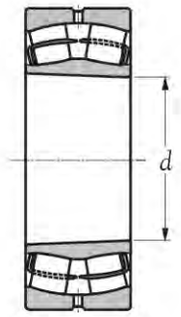
Spherical roller bearings
series 213



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	r_s min[1]	C_r	C_{or}	C_r	C_{or}			
80	170	39	2.1	260000	315000	26500	32000	2500	3300	21316 CC W33
80	170	39	2.1	260000	315000	26500	32000	2500	3300	21316 CC/K W33
85	180	41	3.0	289000	355000	29500	36000	2400	3100	21317 MB W33
85	180	41	3.0	289000	355000	29500	36000	2400	3100	21317 MB/K W33
85	180	41	3.0	289000	355000	29500	36000	2400	3100	21317 CA W33
85	180	41	3.0	289000	355000	29500	36000	2400	3100	21317 CA/K W33
85	180	41	3.0	289000	355000	29500	36000	2400	3100	21317 CC W33
85	180	41	3.0	289000	355000	29500	36000	2400	3100	21317 CC/K W33
90	190	43	3.0	320000	400000	32500	40500	2300	3000	21318 MB W33
90	190	43	3.0	320000	400000	32500	40500	2300	3000	21318 MB/K W33
90	190	43	3.0	320000	400000	32500	40500	2300	3000	21318 CA W33
90	190	43	3.0	320000	400000	32500	40500	2300	3000	21318 CA/K W33
90	190	43	3.0	320000	400000	32500	40500	2300	3000	21318 CC W33
90	190	43	3.0	320000	400000	32500	40500	2300	3000	21318 CC/K W33
95	200	45	3.0	335000	420000	34000	43000	2100	2700	21319 MB W33
95	200	45	3.0	335000	420000	34000	43000	2100	2700	21319 MB/K W33
95	200	45	3.0	335000	420000	34000	43000	2100	2700	21319 CA W33
95	200	45	3.0	335000	420000	34000	43000	2100	2700	21319 CA/K W33
95	200	45	3.0	335000	420000	34000	43000	2100	2700	21319 CC W33
95	200	45	3.0	335000	420000	34000	43000	2100	2700	21319 CC/K W33
100	215	47	3.0	370000	465000	37500	47500	2000	2600	21320 MB W33
100	215	47	3.0	370000	465000	37500	47500	2000	2600	21320 MB/K W33
100	215	47	3.0	370000	465000	37500	47500	2000	2600	21320 CA W33
100	215	47	3.0	370000	465000	37500	47500	2000	2600	21320 CA/K W33

P7

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

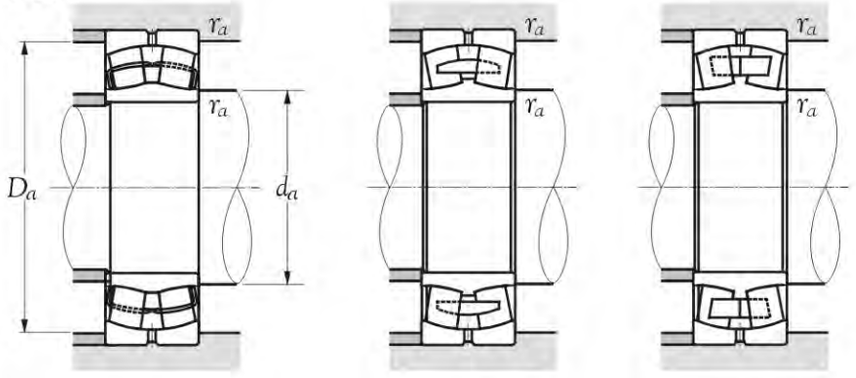
Remark: [Precision] - Class 0 (JIS)

[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Spherical roller bearings
series 213



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

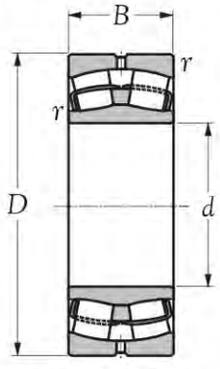
Statie

$Pr = Fr + Y_o Fa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kgs.	Mass tapered bore kgs.
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0		
92	158	2.0	0.23	2.95	4.39	2.88	4.530	-
92	158	2.0	0.23	2.95	4.39	2.88	-	4.470
99	166	2.5	0.25	2.69	4.00	2.63	5.350	-
99	166	2.5	0.25	2.69	4.00	2.63	-	5.280
99	166	2.5	0.25	2.69	4.00	2.63	5.350	-
99	166	2.5	0.25	2.69	4.00	2.63	-	5.280
99	166	2.5	0.25	2.69	4.00	2.63	5.350	-
99	166	2.5	0.25	2.69	4.00	2.63	-	5.280
104	176	2.5	0.24	2.83	4.22	2.77	6.300	-
104	176	2.5	0.24	2.83	4.22	2.77	-	6.210
104	176	2.5	0.24	2.83	4.22	2.77	6.300	-
104	176	2.5	0.24	2.83	4.22	2.77	-	6.210
104	176	2.5	0.24	2.83	4.22	2.77	6.300	-
104	176	2.5	0.24	2.83	4.22	2.77	-	6.210
109	186	2.5	0.23	3.00	4.46	2.93	7.100	-
109	186	2.5	0.23	3.00	4.46	2.93	-	7.000
109	186	2.5	0.23	3.00	4.46	2.93	7.100	-
109	186	2.5	0.23	3.00	4.46	2.93	-	7.000
109	186	2.5	0.23	3.00	4.46	2.93	7.100	-
109	186	2.5	0.23	3.00	4.46	2.93	-	7.000
114	201	2.5	0.22	3.01	4.48	2.94	8.890	-
114	201	2.5	0.22	3.01	4.48	2.94	-	8.780
114	201	2.5	0.22	3.01	4.48	2.94	8.890	-
114	201	2.5	0.22	3.01	4.48	2.94	-	8.780

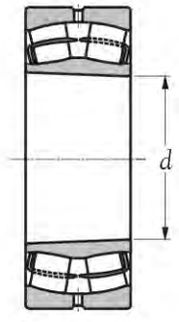
Spherical roller bearings
series 213



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	$r_{s\,min}$ [1]	C_r	C_{or}	C_r	C_{or}			
100	215	47	3	370000	465000	37500	47500	2000	2600	21320 CC W33
100	215	47	3	370000	465000	37500	47500	2000	2600	21320 CC/K W33
110	240	50	3	495000	615000	50500	62500	1800	2300	21322 MB W33
110	240	50	3	495000	615000	50500	62500	1800	2300	21322 MB/K W33
110	240	50	3	495000	615000	50500	62500	1800	2300	21322 CA W33
110	240	50	3	495000	615000	50500	62500	1800	2300	21322 CA/K W33
110	240	50	3	495000	615000	50500	62500	1800	2300	21322 CC W33
110	240	50	3	495000	615000	50500	62500	1800	2300	21322 CC/K W33

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)

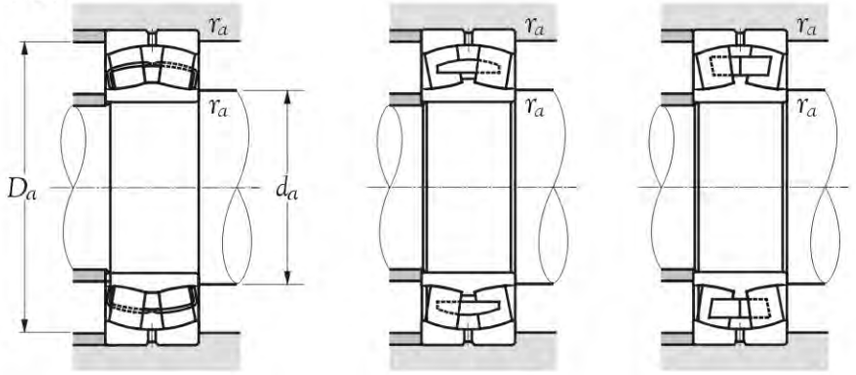
[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P7

Spherical roller bearings
series 213



Equivalent radial load
dynamic
$Pr = XFr + YFa$

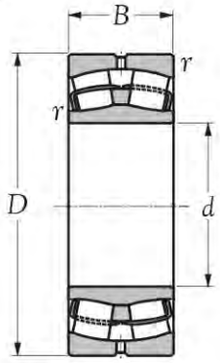
$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Statie
$Pr = Fr + Y_o Fa$
For values of *e*, *Y2* and *Yo*
see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kgs.	Mass tapered bore kgs.
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0		
114	201	2.5	0.22	3.01	4.48	2.94	8.89	-
114	201	2.5	0.22	3.01	4.48	2.94	-	8.78
124	226	2.5	0.21	3.20	4.77	3.13	11.20	-
124	226	2.5	0.21	3.20	4.77	3.13	-	11.10
124	226	2.5	0.21	3.20	4.77	3.13	11.20	-
124	226	2.5	0.21	3.20	4.77	3.13	-	11.10
124	226	2.5	0.21	3.20	4.77	3.13	11.20	-
124	226	2.5	0.21	3.20	4.77	3.13	-	11.10

P7

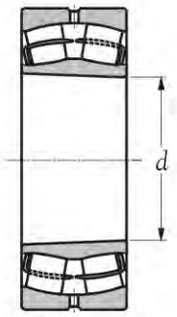
Spherical roller bearings series 222



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	$r_{s\,min}$ [1]	C_r	C_{or}	C_r	C_{or}			
25	52	18	1.0	36500	36000	3750	3650	8500	11000	22205 MB W33
25	52	18	1.0	36500	36000	3750	3650	8500	11000	22205 MB/K W33
25	52	18	1.0	36500	36000	3750	3650	8500	11000	22205 CA W33
25	52	18	1.0	36500	36000	3750	3650	8500	11000	22205 CA/K W33
25	52	18	1.0	36500	36000	3750	3650	8500	11000	22205 CC W33
25	52	18	1.0	36500	36000	3750	3650	8500	11000	22205 CC/K W33
30	62	20	1.0	49000	49000	5000	5000	7500	9500	22206 MB W33
30	62	20	1.0	49000	49000	5000	5000	7500	9500	22206 MB/K W33
30	62	20	1.0	49000	49000	5000	5000	7500	9500	22206 CA W33
30	62	20	1.0	49000	49000	5000	5000	7500	9500	22206 CA/K W33
30	62	20	1.0	49000	49000	5000	5000	7500	9500	22206 CC W33
30	62	20	1.0	49000	49000	5000	5000	7500	9500	22206 CC/K W33
35	72	23	1.1	69500	71000	7050	7200	6500	8500	22207 MB W33
35	72	23	1.1	69500	71000	7050	7200	6500	8500	22207 MB/K W33
35	72	23	1.1	69500	71000	7050	7200	6500	8500	22207 CA W33
35	72	23	1.1	69500	71000	7050	7200	6500	8500	22207 CA/K W33
35	72	23	1.1	69500	71000	7050	7200	6500	8500	22207 CC W33
35	72	23	1.1	69500	71000	7050	7200	6500	8500	22207 CC/K W33
40	80	23	1.1	79000	88500	8050	9000	6000	7600	22208 MB W33
40	80	23	1.1	79000	88500	8050	9000	6000	7600	22208 MB/K W33
40	80	23	1.1	79000	88500	8050	9000	6000	7600	22208 CA W33
40	80	23	1.1	79000	88500	8050	9000	6000	7600	22208 CA/K W33
40	80	23	1.1	79000	88500	8050	9000	6000	7600	22208 CC W33
40	80	23	1.1	79000	88500	8050	9000	6000	7600	22208 CC/K W33

P7

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

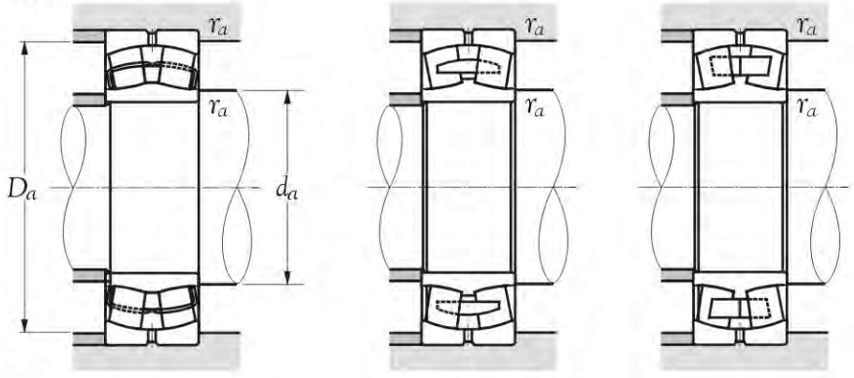
Remark: [Precision] - Class 0 (JIS)

[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Spherical roller bearings series 222



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

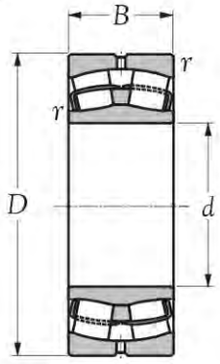
Statie

$Pr = Fr + Y_o Fa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kg.	Mass tapered bore kg.
d_a min	D_a max	r_a max	e	Y1	Y2	Y0		
31	46	1	0.35	1.92	2.86	1.88	0.186	-
31	46	1	0.35	1.92	2.86	1.88	-	0.182
31	46	1	0.35	1.92	2.86	1.88	0.186	-
31	46	1	0.35	1.92	2.86	1.88	-	0.182
31	46	1	0.35	1.92	2.86	1.88	0.186	-
31	46	1	0.35	1.92	2.86	1.88	-	0.182
36	56	1	0.33	2.07	3.09	2.03	0.287	-
36	56	1	0.33	2.07	3.09	2.03	-	0.282
36	56	1	0.33	2.07	3.09	2.03	0.287	-
36	56	1	0.33	2.07	3.09	2.03	-	0.282
36	56	1	0.33	2.07	3.09	2.03	0.287	-
36	56	1	0.33	2.07	3.09	2.03	-	0.282
42	65	1	0.32	2.09	3.11	2.04	0.446	-
42	65	1	0.32	2.09	3.11	2.04	-	0.437
42	65	1	0.32	2.09	3.11	2.04	0.446	-
42	65	1	0.32	2.09	3.11	2.04	-	0.437
42	65	1	0.32	2.09	3.11	2.04	0.446	-
42	65	1	0.32	2.09	3.11	2.04	-	0.437
47	73	1	0.29	2.35	3.50	2.30	0.526	-
47	73	1	0.29	2.35	3.50	2.30	-	0.515
47	73	1	0.29	2.35	3.50	2.30	0.526	-
47	73	1	0.29	2.35	3.50	2.30	-	0.515
47	73	1	0.29	2.35	3.50	2.30	0.526	-
47	73	1	0.29	2.35	3.50	2.30	-	0.515

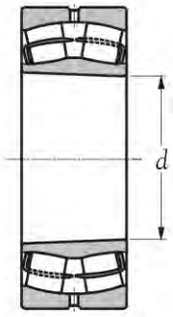
Spherical roller bearings series 222



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	$r_{s\,min}$[1]	C_r	C_{or}	C_r	C_{or}			
45	85	23	1.1	82500	95000	8400	9700	5300	6800	22209 MB W33
45	85	23	1.1	82500	95000	8400	9700	5300	6800	22209 MB/K W33
45	85	23	1.1	82500	95000	8400	9700	5300	6800	22209 CA W33
45	85	23	1.1	82500	95000	8400	9700	5300	6800	22209 CA/K W33
45	85	23	1.1	82500	95000	8400	9700	5300	6800	22209 CC W33
45	85	23	1.1	82500	95000	8400	9700	5300	6800	22209 CC/K W33
50	90	23	1.1	86000	102000	8750	10400	4900	6300	22210 MB W33
50	90	23	1.1	86000	102000	8750	10400	4900	6300	22210 MB/K W33
50	90	23	1.1	86000	102000	8750	10400	4900	6300	22210 CA W33
50	90	23	1.1	86000	102000	8750	10400	4900	6300	22210 CA/K W33
50	90	23	1.1	86000	102000	8750	10400	4900	6300	22210 CC W33
50	90	23	1.1	86000	102000	8750	10400	4900	6300	22210 CC/K W33
55	100	25	1.5	93500	110000	9500	11200	4500	5800	22211 MB W33
55	100	25	1.5	93500	110000	9500	11200	4500	5800	22211 MB/K W33
55	100	25	1.5	93500	110000	9500	11200	4500	5800	22211 CA W33
55	100	25	1.5	93500	110000	9500	11200	4500	5800	22211 CA/K W33
55	100	25	1.5	93500	110000	9500	11200	4500	5800	22211 CC W33
55	100	25	1.5	93500	110000	9500	11200	4500	5800	22211 CC/K W33
60	110	28	1.5	115000	147000	11700	15000	4100	5300	22212 MB W33
60	110	28	1.5	115000	147000	11700	15000	4100	5300	22212 MB/K W33
60	110	28	1.5	115000	147000	11700	15000	4100	5300	22212 CA W33
60	110	28	1.5	115000	147000	11700	15000	4100	5300	22212 CA/K W33
60	110	28	1.5	115000	147000	11700	15000	4100	5300	22212 CC W33
60	110	28	1.5	115000	147000	11700	15000	4100	5300	22212 CC/K W33

P7

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)

[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

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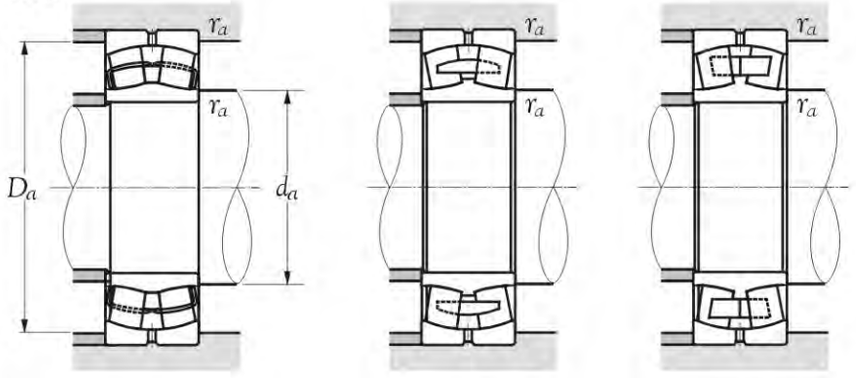
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Spherical roller bearings series 222



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

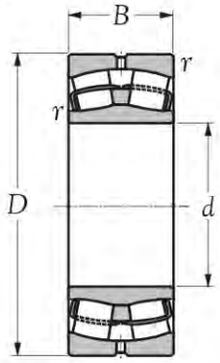
Statie

$Pr = Fr + Y_o Fa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kg(s).	Mass tapered bore kg(s).
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0		
52.0	78.0	1.0	0.27	2.50	3.72	2.44	0.584	-
52.0	78.0	1.0	0.27	2.50	3.72	2.44	-	0.572
52.0	78.0	1.0	0.27	2.50	3.72	2.44	0.584	-
52.0	78.0	1.0	0.27	2.50	3.72	2.44	-	0.572
52.0	78.0	1.0	0.27	2.50	3.72	2.44	0.584	-
52.0	78.0	1.0	0.27	2.50	3.72	2.44	-	0.572
57.0	83.0	1.0	0.25	2.69	4.01	2.63	0.630	-
57.0	83.0	1.0	0.25	2.69	4.01	2.63	-	0.616
57.0	83.0	1.0	0.25	2.69	4.01	2.63	0.630	-
57.0	83.0	1.0	0.25	2.69	4.01	2.63	-	0.616
57.0	83.0	1.0	0.25	2.69	4.01	2.63	0.630	-
57.0	83.0	1.0	0.25	2.69	4.01	2.63	-	0.616
63.5	91.5	1.5	0.28	2.42	3.61	2.37	0.850	-
63.5	91.5	1.5	0.28	2.42	3.61	2.37	-	0.832
63.5	91.5	1.5	0.28	2.42	3.61	2.37	0.850	-
63.5	91.5	1.5	0.28	2.42	3.61	2.37	-	0.832
63.5	91.5	1.5	0.28	2.42	3.61	2.37	0.850	-
63.5	91.5	1.5	0.28	2.42	3.61	2.37	-	0.832
68.5	101.5	1.5	0.27	2.49	3.71	2.44	1.150	-
68.5	101.5	1.5	0.27	2.49	3.71	2.44	-	1.130
68.5	101.5	1.5	0.27	2.49	3.71	2.44	1.150	-
68.5	101.5	1.5	0.27	2.49	3.71	2.44	-	1.130
68.5	101.5	1.5	0.27	2.49	3.71	2.44	1.150	-
68.5	101.5	1.5	0.27	2.49	3.71	2.44	-	1.130

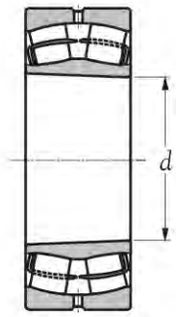
Spherical roller bearings series 222



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	r_s min[1]	C_r	C_{or}	C_r	C_{or}			
65	120	31	1.5	143000	179000	14600	18300	3900	5000	22213 MB W33
65	120	31	1.5	143000	179000	14600	18300	3900	5000	22213 MB/K W33
65	120	31	1.5	143000	179000	14600	18300	3900	5000	22213 CA W33
65	120	31	1.5	143000	179000	14600	18300	3900	5000	22213 CA/K W33
65	120	31	1.5	143000	179000	14600	18300	3900	5000	22213 CC W33
65	120	31	1.5	143000	179000	14600	18300	3900	5000	22213 CC/K W33
70	125	31	1.5	154000	201000	15700	20500	3500	4600	22214 MB W33
70	125	31	1.5	154000	201000	15700	20500	3500	4600	22214 MB/K W33
70	125	31	1.5	154000	201000	15700	20500	3500	4600	22214 CA W33
70	125	31	1.5	154000	201000	15700	20500	3500	4600	22214 CA/K W33
70	125	31	1.5	154000	201000	15700	20500	3500	4600	22214 CC W33
70	125	31	1.5	154000	201000	15700	20500	3500	4600	22214 CC/K W33
75	130	31	1.5	166000	223000	16900	22800	3200	4200	22215 MB W33
75	130	31	1.5	166000	223000	16900	22800	3200	4200	22215 MB/K W33
75	130	31	1.5	166000	223000	16900	22800	3200	4200	22215 CA W33
75	130	31	1.5	166000	223000	16900	22800	3200	4200	22215 CA/K W33
75	130	31	1.5	166000	223000	16900	22800	3200	4200	22215 CC W33
75	130	31	1.5	166000	223000	16900	22800	3200	4200	22215 CC/K W33
80	140	33	2.0	179000	239000	18300	24400	3100	4000	22216 MB W33
80	140	33	2.0	179000	239000	18300	24400	3100	4000	22216 MB/K W33
80	140	33	2.0	179000	239000	18300	24400	3100	4000	22216 CA W33
80	140	33	2.0	179000	239000	18300	24400	3100	4000	22216 CA/K W33
80	140	33	2.0	179000	239000	18300	24400	3100	4000	22216 CC W33
80	140	33	2.0	179000	239000	18300	24400	3100	4000	22216 CC/K W33

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

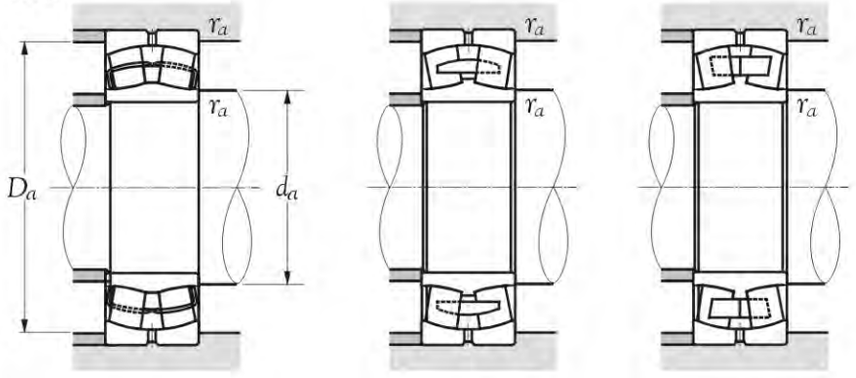
Remark: [Precision] - Class 0 (JIS)

[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Spherical roller bearings series 222



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

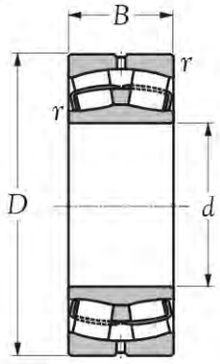
Statie

$Pr = Fr + Y_o Fa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore	Mass tapered bore
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0	kg(s).	
73.5	111.5	1.5	0.28	2.42	3.60	2.37	1.500	-
73.5	111.5	1.5	0.28	2.42	3.60	2.37	-	1.470
73.5	111.5	1.5	0.28	2.42	3.60	2.37	1.500	-
73.5	111.5	1.5	0.28	2.42	3.60	2.37	-	1.470
73.5	111.5	1.5	0.28	2.42	3.60	2.37	1.500	-
73.5	111.5	1.5	0.28	2.42	3.60	2.37	-	1.470
78.5	116.5	1.5	0.26	2.55	3.80	2.50	1.550	-
78.5	116.5	1.5	0.26	2.55	3.80	2.50	-	1.520
78.5	116.5	1.5	0.26	2.55	3.80	2.50	1.550	-
78.5	116.5	1.5	0.26	2.55	3.80	2.50	-	1.520
78.5	116.5	1.5	0.26	2.55	3.80	2.50	1.550	-
78.5	116.5	1.5	0.26	2.55	3.80	2.50	-	1.520
83.5	121.5	1.5	0.24	2.81	4.19	2.75	1.650	-
83.5	121.5	1.5	0.24	2.81	4.19	2.75	-	1.610
83.5	121.5	1.5	0.24	2.81	4.19	2.75	1.650	-
83.5	121.5	1.5	0.24	2.81	4.19	2.75	-	1.610
83.5	121.5	1.5	0.24	2.81	4.19	2.75	1.650	-
83.5	121.5	1.5	0.24	2.81	4.19	2.75	-	1.610
90.0	130.0	2.0	0.26	2.64	3.93	2.58	2.150	-
90.0	130.0	2.0	0.26	2.64	3.93	2.58	-	2.110
90.0	130.0	2.0	0.26	2.64	3.93	2.58	2.150	-
90.0	130.0	2.0	0.26	2.64	3.93	2.58	-	2.110
90.0	130.0	2.0	0.26	2.64	3.93	2.58	2.150	-
90.0	130.0	2.0	0.26	2.64	3.93	2.58	-	2.110

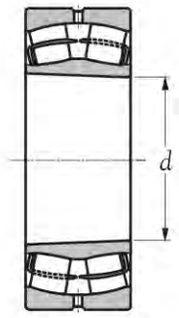
Spherical roller bearings series 222



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	r_s min[1]	C_r	C_{or}	C_r	C_{or}			
85	150	36	2.0	206000	272000	21000	27800	2900	3800	22217 MB W33
85	150	36	2.0	206000	272000	21000	27800	2900	3800	22217 MB/K W33
85	150	36	2.0	206000	272000	21000	27800	2900	3800	22217 CA W33
85	150	36	2.0	206000	272000	21000	27800	2900	3800	22217 CA/K W33
85	150	36	2.0	206000	272000	21000	27800	2900	3800	22217 CC W33
85	150	36	2.0	206000	272000	21000	27800	2900	3800	22217 CC/K W33
90	160	40	2.0	256000	345000	26200	35000	2700	3500	22218 MB W33
90	160	40	2.0	256000	345000	26200	35000	2700	3500	22218 MB/K W33
90	160	40	2.0	256000	345000	26200	35000	2700	3500	22218 CA W33
90	160	40	2.0	256000	345000	26200	35000	2700	3500	22218 CA/K W33
90	160	40	2.0	256000	345000	26200	35000	2700	3500	22218 CC W33
90	160	40	2.0	256000	345000	26200	35000	2700	3500	22218 CC/K W33
95	170	43	2.1	294000	390000	30000	39500	2500	3300	22219 MB W33
95	170	43	2.1	294000	390000	30000	39500	2500	3300	22219 MB/K W33
95	170	43	2.1	294000	390000	30000	39500	2500	3300	22219 CA W33
95	170	43	2.1	294000	390000	30000	39500	2500	3300	22219 CA/K W33
95	170	43	2.1	294000	390000	30000	39500	2500	3300	22219 CC W33
95	170	43	2.1	294000	390000	30000	39500	2500	3300	22219 CC/K W33
100	180	46	2.1	315000	415000	32000	42500	2400	3200	22220 MB W33
100	180	46	2.1	315000	415000	32000	42500	2400	3200	22220 MB/K W33
100	180	46	2.1	315000	415000	32000	42500	2400	3200	22220 CA W33
100	180	46	2.1	315000	415000	32000	42500	2400	3200	22220 CA/K W33
100	180	46	2.1	315000	415000	32000	42500	2400	3200	22220 CC W33
100	180	46	2.1	315000	415000	32000	42500	2400	3200	22220 CC/K W33

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

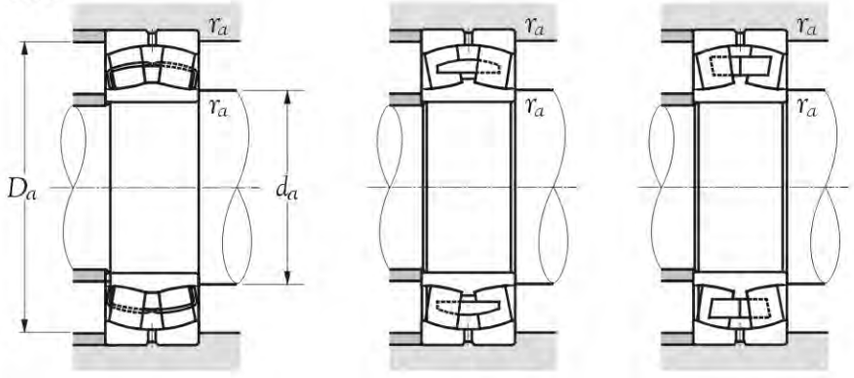
Remark: [Precision] - Class 0 (JIS)

[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Spherical roller bearings series 222



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

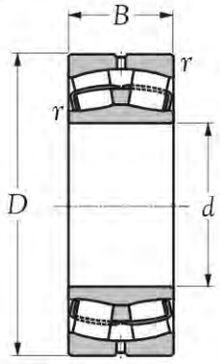
Statie

$Pr = Fr + Y_o Fa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore	Mass tapered bore
d_a min	D_a max	r_a max	e	Y1	Y2	Y0	kg(s).	
95	140	2	0.26	2.60	3.88	2.55	2.660	-
95	140	2	0.26	2.60	3.88	2.55	-	2.610
95	140	2	0.26	2.60	3.88	2.55	2.660	-
95	140	2	0.26	2.60	3.88	2.55	-	2.610
95	140	2	0.26	2.60	3.88	2.55	2.660	-
95	140	2	0.26	2.60	3.88	2.55	-	2.610
100	150	2	0.26	2.55	3.80	2.49	3.500	-
100	150	2	0.26	2.55	3.80	2.49	-	3.420
100	150	2	0.26	2.55	3.80	2.49	3.500	-
100	150	2	0.26	2.55	3.80	2.49	-	3.420
100	150	2	0.26	2.55	3.80	2.49	3.500	-
100	150	2	0.26	2.55	3.80	2.49	-	3.420
107	158	2	0.26	2.63	3.92	2.57	4.200	-
107	158	2	0.26	2.63	3.92	2.57	-	2.800
107	158	2	0.26	2.63	3.92	2.57	4.200	-
107	158	2	0.26	2.63	3.92	2.57	-	2.800
107	158	2	0.26	2.63	3.92	2.57	4.200	-
107	158	2	0.26	2.63	3.92	2.57	-	2.800
112	168	2	0.26	2.55	3.80	2.49	4.950	-
112	168	2	0.26	2.55	3.80	2.49	-	4.840
112	168	2	0.26	2.55	3.80	2.49	4.950	-
112	168	2	0.26	2.55	3.80	2.49	-	4.840
112	168	2	0.26	2.55	3.80	2.49	4.950	-
112	168	2	0.26	2.55	3.80	2.49	-	4.840

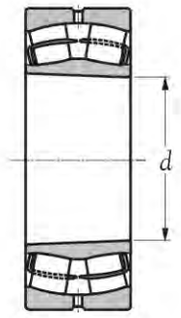
Spherical roller bearings
series 222



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	r_s min[1]	C_r	C_{or}	C_r	C_{or}			
110	200	53	2.1	410000	570000	42000	58000	2200	2800	22222 MB W33
110	200	53	2.1	410000	570000	42000	58000	2200	2800	22222 MB/K W33
110	200	53	2.1	410000	570000	42000	58000	2200	2800	22222 CA W33
110	200	53	2.1	410000	570000	42000	58000	2200	2800	22222 CA/K W33
110	200	53	2.1	410000	570000	42000	58000	2200	2800	22222 CC W33
110	200	53	2.1	410000	570000	42000	58000	2200	2800	22222 CC/K W33
120	215	58	2.1	485000	700000	49500	71500	2000	2600	22224 MB W33
120	215	58	2.1	485000	700000	49500	71500	2000	2600	22224 MB/K W33
120	215	58	2.1	485000	700000	49500	71500	2000	2600	22224 CA W33
120	215	58	2.1	485000	700000	49500	71500	2000	2600	22224 CA/K W33
120	215	58	2.1	485000	700000	49500	71500	2000	2600	22224 CC W33
120	215	58	2.1	485000	700000	49500	71500	2000	2600	22224 CC/K W33
130	230	64	3.0	570000	790000	58000	80500	1800	2400	22226 MB W33
130	230	64	3.0	570000	790000	58000	80500	1800	2400	22226 MB/K W33
130	230	64	3.0	570000	790000	58000	80500	1800	2400	22226 CA W33
130	230	64	3.0	570000	790000	58000	80500	1800	2400	22226 CA/K W33
130	230	64	3.0	570000	790000	58000	80500	1800	2400	22226 CC W33
130	230	64	3.0	570000	790000	58000	80500	1800	2400	22226 CC/K W33
140	250	68	3.0	685000	975000	70000	99500	1700	2200	22228 MB W33
140	250	68	3.0	685000	975000	70000	99500	1700	2200	22228 MB/K W33
140	250	68	3.0	685000	975000	70000	99500	1700	2200	22228 CA W33
140	250	68	3.0	685000	975000	70000	99500	1700	2200	22228 CA/K W33
140	250	68	3.0	685000	975000	70000	99500	1700	2200	22228 CC W33
140	250	68	3.0	685000	975000	70000	99500	1700	2200	22228 CC/K W33

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

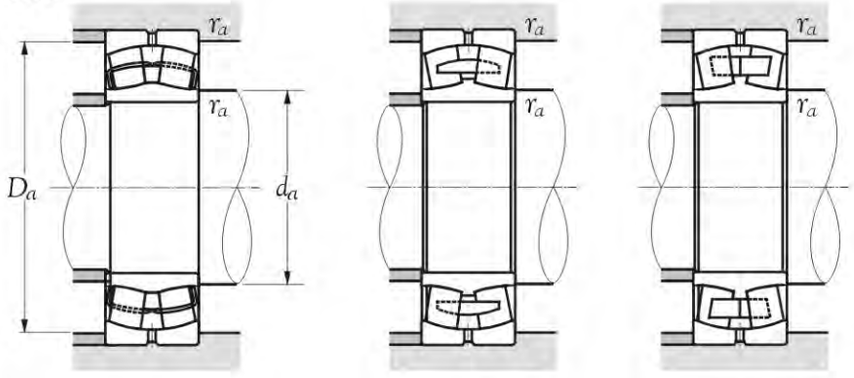
Remark: [Precision] - Class 0 (JIS)

[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Spherical roller bearings series 222



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

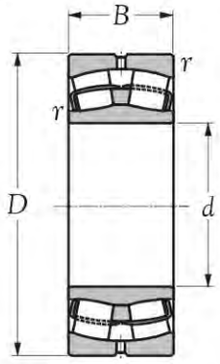
Statie

$Pr = Fr + Y_o Fa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore	Mass tapered bore
d_a min	D_a max	r_a max	e	Y1	Y2	Y0	kg(s).	
122	188	2.0	0.27	2.51	3.74	2.46	7.200	-
122	188	2.0	0.27	2.51	3.74	2.46	-	7.040
122	188	2.0	0.27	2.51	3.74	2.46	7.200	-
122	188	2.0	0.27	2.51	3.74	2.46	-	7.040
122	188	2.0	0.27	2.51	3.74	2.46	7.200	-
122	188	2.0	0.27	2.51	3.74	2.46	-	7.040
132	203	2.0	0.27	2.47	3.68	2.42	9.100	-
132	203	2.0	0.27	2.47	3.68	2.42	-	8.890
132	203	2.0	0.27	2.47	3.68	2.42	9.100	-
132	203	2.0	0.27	2.47	3.68	2.42	-	8.890
132	203	2.0	0.27	2.47	3.68	2.42	9.100	-
132	203	2.0	0.27	2.47	3.68	2.42	-	8.890
144	216	2.5	0.28	2.39	3.56	2.33	11.200	-
144	216	2.5	0.28	2.39	3.56	2.33	-	10.900
144	216	2.5	0.28	2.39	3.56	2.33	11.200	-
144	216	2.5	0.28	2.39	3.56	2.33	-	10.900
144	216	2.5	0.28	2.39	3.56	2.33	11.200	-
144	216	2.5	0.28	2.39	3.56	2.33	-	10.900
154	236	2.5	0.28	2.39	3.55	2.33	14.000	-
154	236	2.5	0.28	2.39	3.55	2.33	-	13.700
154	236	2.5	0.28	2.39	3.55	2.33	14.000	-
154	236	2.5	0.28	2.39	3.55	2.33	-	13.700
154	236	2.5	0.28	2.39	3.55	2.33	14.000	-
154	236	2.5	0.28	2.39	3.55	2.33	-	13.700

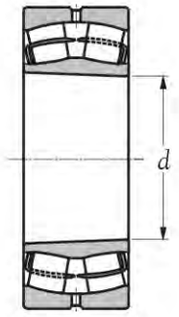
Spherical roller bearings
series 222



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	$r_{s\,min}$ 1)	C_r	C_{or}	C_r	C_{or}			
150	270	73	3	775000	1160000	79000	119000	1600	2000	**22230 MB W33**
150	270	73	3	775000	1160000	79000	119000	1600	2000	**22230 MB/K W33**
150	270	73	3	775000	1160000	79000	119000	1600	2000	**22230 CA W33**
150	270	73	3	775000	1160000	79000	119000	1600	2000	**22230 CA/K W33**
150	270	73	3	775000	1160000	79000	119000	1600	2000	**22230 CC W33**
150	270	73	3	775000	1160000	79000	119000	1600	2000	**22230 CC/K W33**

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)

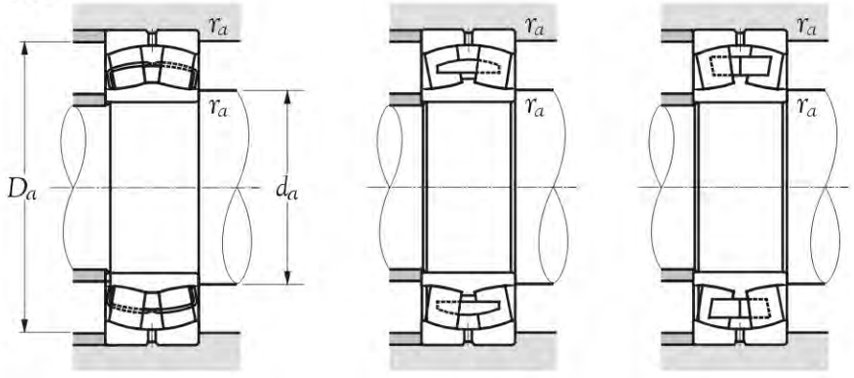
[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P7

Spherical roller bearings series 222



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Statie

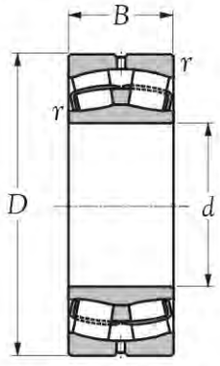
$Pr = Fr + Y_o Fa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore	Mass tapered bore
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0	kg(s).	
164	256	2.5	0.27	2.46	3.66	2.40	18.100	-
164	256	2.5	0.27	2.46	3.66	2.40	-	17.700
164	256	2.5	0.27	2.46	3.66	2.40	18.100	-
164	256	2.5	0.27	2.46	3.66	2.40	-	17.700
164	256	2.5	0.27	2.46	3.66	2.40	18.100	-
164	256	2.5	0.27	2.46	3.66	2.40	-	17.700

P7

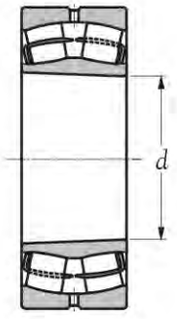
Spherical roller bearings series 223



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	r_s min[1]	C_r	C_{or}	C_r	C_{or}			
40	90	33	1.5	121000	128000	12300	13000	4500	5900	22308 MB W33
40	90	33	1.5	121000	128000	12300	13000	4500	5900	22308 MB/K W33
40	90	33	1.5	121000	128000	12300	13000	4500	5900	22308 CA W33
40	90	33	1.5	121000	128000	12300	13000	4500	5900	22308 CA/K W33
40	90	33	1.5	121000	128000	12300	13000	4500	5900	22308 CC W33
40	90	33	1.5	121000	128000	12300	13000	4500	5900	22308 CC/K W33
45	100	36	1.5	148000	167000	15100	17000	4100	5300	22309 MB W33
45	100	36	1.5	148000	167000	15100	17000	4100	5300	22309 MB/K W33
45	100	36	1.5	148000	167000	15100	17000	4100	5300	22309 CA W33
45	100	36	1.5	148000	167000	15100	17000	4100	5300	22309 CA/K W33
45	100	36	1.5	148000	167000	15100	17000	4100	5300	22309 CC W33
45	100	36	1.5	148000	167000	15100	17000	4100	5300	22309 CC/K W33
50	110	40	2.0	186000	212000	19000	21600	3700	4800	22310 MB W33
50	110	40	2.0	186000	212000	19000	21600	3700	4800	22310 MB/K W33
50	110	40	2.0	186000	212000	19000	21600	3700	4800	22310 CA W33
50	110	40	2.0	186000	212000	19000	21600	3700	4800	22310 CA/K W33
50	110	40	2.0	186000	212000	19000	21600	3700	4800	22310 CC W33
50	110	40	2.0	186000	212000	19000	21600	3700	4800	22310 CC/K W33
55	120	43	2.0	204000	234000	20800	23900	3400	4400	22311 MB W33
55	120	43	2.0	204000	234000	20800	23900	3400	4400	22311 MB/K W33
55	120	43	2.0	204000	234000	20800	23900	3400	4400	22311 CA W33
55	120	43	2.0	204000	234000	20800	23900	3400	4400	22311 CA/K W33
55	120	43	2.0	204000	234000	20800	23900	3400	4400	22311 CC W33
55	120	43	2.0	204000	234000	20800	23900	3400	4400	22311 CC/K W33

P7

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

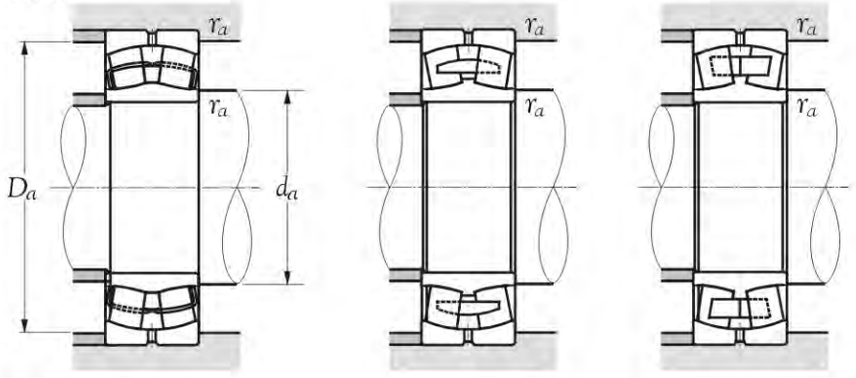
Remark: [Precision] - Class 0 (JIS)

[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Spherical roller bearings series 223



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

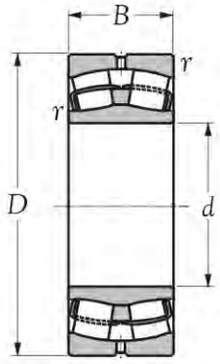
Statie

$Pr = Fr + Y_o Fa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore	Mass tapered bore
d_a min	D_a max	r_a max	e	Y1	Y2	Y0	kg(s).	
48.5	81.5	1.5	0.38	1.76	2.62	1.72	0.970	-
48.5	81.5	1.5	0.38	1.76	2.62	1.72	-	0.950
48.5	81.5	1.5	0.38	1.76	2.62	1.72	0.970	-
48.5	81.5	1.5	0.38	1.76	2.62	1.72	-	0.950
48.5	81.5	1.5	0.38	1.76	2.62	1.72	0.970	-
48.5	81.5	1.5	0.38	1.76	2.62	1.72	-	0.950
53.5	91.5	1.5	0.36	1.86	2.77	1.82	1.330	-
53.5	91.5	1.5	0.36	1.86	2.77	1.82	-	1.300
53.5	91.5	1.5	0.36	1.86	2.77	1.82	1.330	-
53.5	91.5	1.5	0.36	1.86	2.77	1.82	-	1.300
53.5	91.5	1.5	0.36	1.86	2.77	1.82	1.330	-
53.5	91.5	1.5	0.36	1.86	2.77	1.82	-	1.300
60.0	100.0	2.0	0.37	1.80	2.69	1.76	1.790	-
60.0	100.0	2.0	0.37	1.80	2.69	1.76	-	1.750
60.0	100.0	2.0	0.37	1.80	2.69	1.76	1.790	-
60.0	100.0	2.0	0.37	1.80	2.69	1.76	-	1.750
60.0	100.0	2.0	0.37	1.80	2.69	1.76	1.790	-
60.0	100.0	2.0	0.37	1.80	2.69	1.76	-	1.750
65.0	110.0	2.0	0.40	1.68	2.50	1.64	2.300	-
65.0	110.0	2.0	0.40	1.68	2.50	1.64	-	2.250
65.0	110.0	2.0	0.40	1.68	2.50	1.64	2.300	-
65.0	110.0	2.0	0.40	1.68	2.50	1.64	-	2.250
65.0	110.0	2.0	0.40	1.68	2.50	1.64	2.300	-
65.0	110.0	2.0	0.40	1.68	2.50	1.64	-	2.250

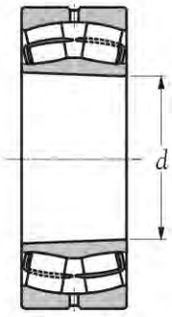
Spherical roller bearings series 223



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	r_s min[1]	C_r	C_{or}	C_r	C_{or}			
60	130	46	2.1	238000	273000	24300	27800	3100	4000	22312 MB W33
60	130	46	2.1	238000	273000	24300	27800	3100	4000	22312 MB/K W33
60	130	46	2.1	238000	273000	24300	27800	3100	4000	22312 CA W33
60	130	46	2.1	238000	273000	24300	27800	3100	4000	22312 CA/K W33
60	130	46	2.1	238000	273000	24300	27800	3100	4000	22312 CC W33
60	130	46	2.1	238000	273000	24300	27800	3100	4000	22312 CC/K W33
65	140	48	2.1	265000	320000	27100	32500	2800	3700	22313 MB W33
65	140	48	2.1	265000	320000	27100	32500	2800	3700	22313 MB/K W33
65	140	48	2.1	265000	320000	27100	32500	2800	3700	22313 CA W33
65	140	48	2.1	265000	320000	27100	32500	2800	3700	22313 CA/K W33
65	140	48	2.1	265000	320000	27100	32500	2800	3700	22313 CC W33
65	140	48	2.1	265000	320000	27100	32500	2800	3700	22313 CC/K W33
70	150	51	2.1	325000	380000	33000	39000	2700	3500	22314 MB W33
70	150	51	2.1	325000	380000	33000	39000	2700	3500	22314 MB/K W33
70	150	51	2.1	325000	380000	33000	39000	2700	3500	22314 CA W33
70	150	51	2.1	325000	380000	33000	39000	2700	3500	22314 CA/K W33
70	150	51	2.1	325000	380000	33000	39000	2700	3500	22314 CC W33
70	150	51	2.1	325000	380000	33000	39000	2700	3500	22314 CC/K W33
75	160	55	2.1	330000	410000	33500	42000	2500	3200	22315 MB W33
75	160	55	2.1	330000	410000	33500	42000	2500	3200	22315 MB/K W33
75	160	55	2.1	330000	410000	33500	42000	2500	3200	22315 CA W33
75	160	55	2.1	330000	410000	33500	42000	2500	3200	22315 CA/K W33
75	160	55	2.1	330000	410000	33500	42000	2500	3200	22315 CC W33
75	160	55	2.1	330000	410000	33500	42000	2500	3200	22315 CC/K W33

P7

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

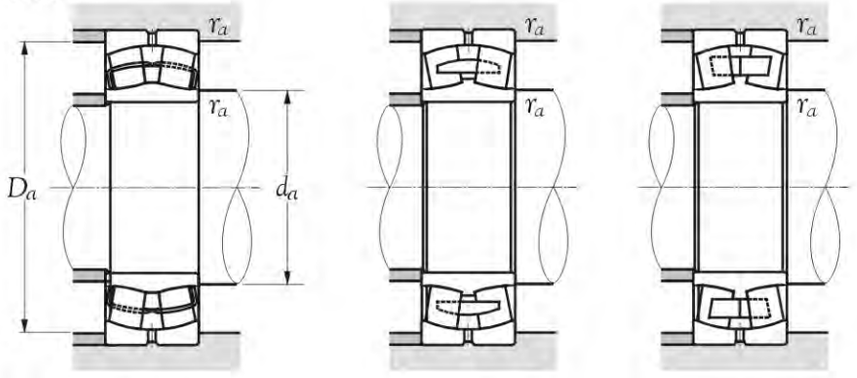
Remark: [Precision] - Class 0 (JIS)

[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Spherical roller bearings series 223



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

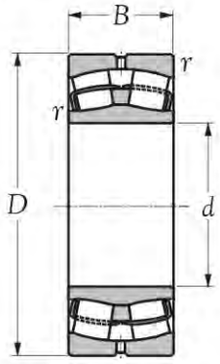
Statie

$Pr = Fr + Y_o Fa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kgs.	Mass tapered bore kgs.
d_a min	D_a max	r_a max	e	Y1	Y2	Y0		
72	118	2	0.42	1.62	2.42	1.59	2.900	-
72	118	2	0.42	1.62	2.42	1.59	-	2.830
72	118	2	0.42	1.62	2.42	1.59	2.900	-
72	118	2	0.42	1.62	2.42	1.59	-	2.830
72	118	2	0.42	1.62	2.42	1.59	2.900	-
72	118	2	0.42	1.62	2.42	1.59	-	2.830
77	128	2	0.38	1.79	2.67	1.75	3.450	-
77	128	2	0.38	1.79	2.67	1.75	-	3.370
77	128	2	0.38	1.79	2.67	1.75	3.450	-
77	128	2	0.38	1.79	2.67	1.75	-	3.370
77	128	2	0.38	1.79	2.67	1.75	3.450	-
77	128	2	0.38	1.79	2.67	1.75	-	3.370
82	138	2	0.37	1.81	2.70	1.77	4.220	-
82	138	2	0.37	1.81	2.70	1.77	-	4.120
82	138	2	0.37	1.81	2.70	1.77	4.220	-
82	138	2	0.37	1.81	2.70	1.77	-	4.120
82	138	2	0.37	1.81	2.70	1.77	4.220	-
82	138	2	0.37	1.81	2.70	1.77	-	4.120
87	148	2	0.37	1.80	2.69	1.76	5.250	-
87	148	2	0.37	1.80	2.69	1.76	-	5.130
87	148	2	0.37	1.80	2.69	1.76	5.250	-
87	148	2	0.37	1.80	2.69	1.76	-	5.130
87	148	2	0.37	1.80	2.69	1.76	5.250	-
87	148	2	0.37	1.80	2.69	1.76	-	5.130

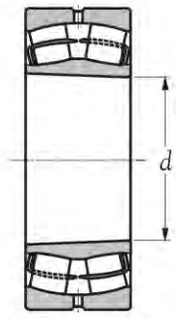
Spherical roller bearings series 223



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	r_s min[1]	C_r	C_{or}	C_r	C_{or}			
80	170	58	2.1	385000	470000	39500	48000	2300	3000	22316 MB W33
80	170	58	2.1	385000	470000	39500	48000	2300	3000	22316 MB/K W33
80	170	58	2.1	385000	470000	39500	48000	2300	3000	22316 CA W33
80	170	58	2.1	385000	470000	39500	48000	2300	3000	22316 CA/K W33
80	170	58	2.1	385000	470000	39500	48000	2300	3000	22316 CC W33
80	170	58	2.1	385000	470000	39500	48000	2300	3000	22316 CC/K W33
85	180	60	3.0	415000	510000	42500	52000	2200	2900	22317 MB W33
85	180	60	3.0	415000	510000	42500	52000	2200	2900	22317 MB/K W33
85	180	60	3.0	415000	510000	42500	52000	2200	2900	22317 CA W33
85	180	60	3.0	415000	510000	42500	52000	2200	2900	22317 CA/K W33
85	180	60	3.0	415000	510000	42500	52000	2200	2900	22317 CC W33
85	180	60	3.0	415000	510000	42500	52000	2200	2900	22317 CC/K W33
90	190	64	3.0	480000	590000	49000	60000	2100	2700	22318 MB W33
90	190	64	3.0	480000	590000	49000	60000	2100	2700	22318 MB/K W33
90	190	64	3.0	480000	590000	49000	60000	2100	2700	22318 CA W33
90	190	64	3.0	480000	590000	49000	60000	2100	2700	22318 CA/K W33
90	190	64	3.0	480000	590000	49000	60000	2100	2700	22318 CC W33
90	190	64	3.0	480000	590000	49000	60000	2100	2700	22318 CC/K W33
95	200	67	3.0	500000	615000	51000	63000	1900	2500	22319 MB W33
95	200	67	3.0	500000	615000	51000	63000	1900	2500	22319 MB/K W33
95	200	67	3.0	500000	615000	51000	63000	1900	2500	22319 CA W33
95	200	67	3.0	500000	615000	51000	63000	1900	2500	22319 CA/K W33
95	200	67	3.0	500000	615000	51000	63000	1900	2500	22319 CC W33
95	200	67	3.0	500000	615000	51000	63000	1900	2500	22319 CC/K W33

P7

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

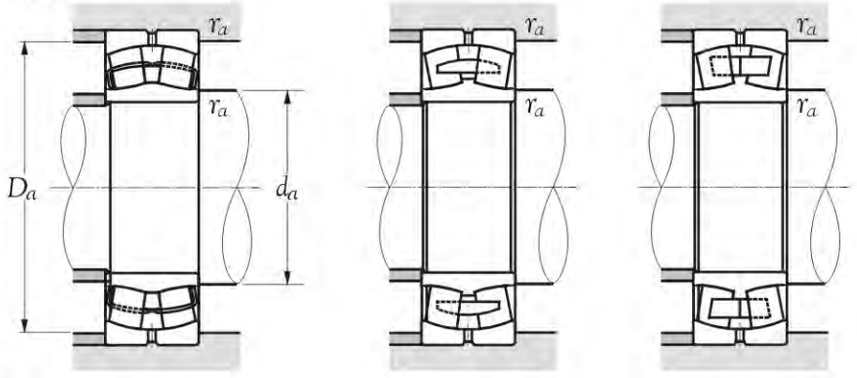
Remark: [Precision] - Class 0 (JIS)

[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Spherical roller bearings series 223



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

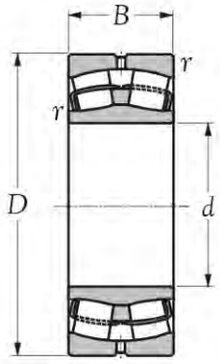
Statie

$Pr = Fr + Y_o Fa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore	Mass tapered bore
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0	kg(s).	
92	158	2.0	0.37	1.80	2.69	1.76	6.050	-
92	158	2.0	0.37	1.80	2.69	1.76	-	5.910
92	158	2.0	0.37	1.80	2.69	1.76	6.050	-
92	158	2.0	0.37	1.80	2.69	1.76	-	5.910
92	158	2.0	0.37	1.80	2.69	1.76	6.050	-
92	158	2.0	0.37	1.80	2.69	1.76	-	5.910
99	166	2.5	0.37	1.82	2.71	1.78	7.100	-
99	166	2.5	0.37	1.82	2.71	1.78	-	6.940
99	166	2.5	0.37	1.82	2.71	1.78	7.100	-
99	166	2.5	0.37	1.82	2.71	1.78	-	6.940
99	166	2.5	0.37	1.82	2.71	1.78	7.100	-
99	166	2.5	0.37	1.82	2.71	1.78	-	6.940
104	176	2.5	0.37	1.80	2.69	1.76	8.350	-
104	176	2.5	0.37	1.80	2.69	1.76	-	8.160
104	176	2.5	0.37	1.80	2.69	1.76	8.350	-
104	176	2.5	0.37	1.80	2.69	1.76	-	8.160
104	176	2.5	0.37	1.80	2.69	1.76	8.350	-
104	176	2.5	0.37	1.80	2.69	1.76	-	8.160
109	186	2.5	0.37	1.80	2.69	1.76	9.760	-
109	186	2.5	0.37	1.80	2.69	1.76	-	9.540
109	186	2.5	0.37	1.80	2.69	1.76	9.760	-
109	186	2.5	0.37	1.80	2.69	1.76	-	9.540
109	186	2.5	0.37	1.80	2.69	1.76	9.760	-
109	186	2.5	0.37	1.80	2.69	1.76	-	9.540

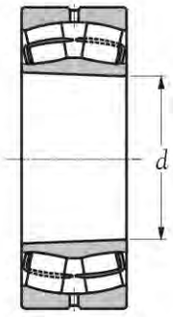
Spherical roller bearings series 223



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	$r_{s\,min}$[1]	C_r	C_{or}	C_r	C_{or}			
100	215	73	3	605000	755000	61500	77000	1800	2400	22320 MB W33
100	215	73	3	605000	755000	61500	77000	1800	2400	22320 MB/K W33
100	215	73	3	605000	755000	61500	77000	1800	2400	22320 CA W33
100	215	73	3	605000	755000	61500	77000	1800	2400	22320 CA/K W33
100	215	73	3	605000	755000	61500	77000	1800	2400	22320 CC W33
100	215	73	3	605000	755000	61500	77000	1800	2400	22320 CC/K W33
110	240	80	3	745000	930000	76000	95000	1700	2200	22322 MB W33
110	240	80	3	745000	930000	76000	95000	1700	2200	22322 MB/K W33
110	240	80	3	745000	930000	76000	95000	1700	2200	22322 CA W33
110	240	80	3	745000	930000	76000	95000	1700	2200	22322 CA/K W33
110	240	80	3	745000	930000	76000	95000	1700	2200	22322 CC W33
110	240	80	3	745000	930000	76000	95000	1700	2200	22322 CC/K W33
120	260	86	3	880000	1120000	89500	114000	1500	2000	22324 MB W33
120	260	86	3	880000	1120000	89500	114000	1500	2000	22324 MB/K W33
120	260	86	3	880000	1120000	89500	114000	1500	2000	22324 CA W33
120	260	86	3	880000	1120000	89500	114000	1500	2000	22324 CA/K W33
120	260	86	3	880000	1120000	89500	114000	1500	2000	22324 CC W33
120	260	86	3	880000	1120000	89500	114000	1500	2000	22324 CC/K W33

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)

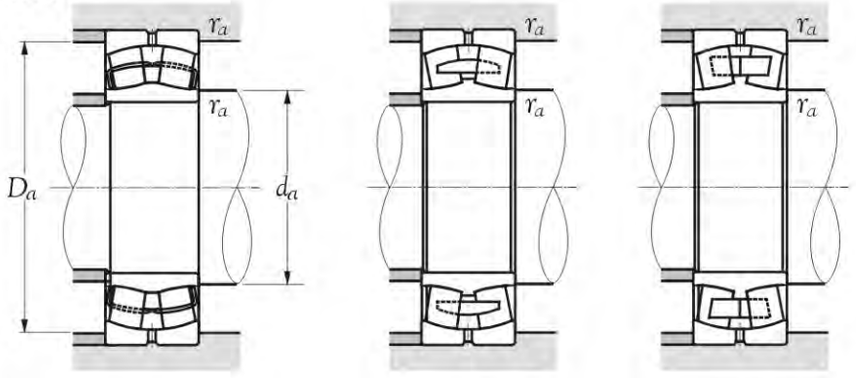
[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

P7

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site: Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Spherical roller bearings
series 223



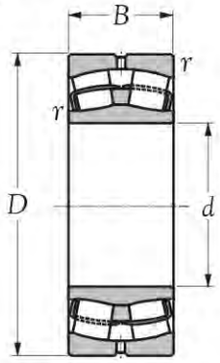
Equivalent radial load
dynamic
$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Statie
$Pr = Fr + Y_0 Fa$
For values of *e*, *Y2* and *Yo*
see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore	Mass tapered bore
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0	kg(s).	
114	201	2.5	0.37	1.80	2.69	1.76	12.400	
114	201	2.5	0.37	1.80	2.69	1.76		12.100
114	201	2.5	0.37	1.80	2.69	1.76	12.400	
114	201	2.5	0.37	1.80	2.69	1.76		12.100
114	201	2.5	0.37	1.80	2.69	1.76	12.400	
114	201	2.5	0.37	1.80	2.69	1.76		12.100
124	226	2.5	0.36	1.87	2.79	1.83	17.100	
124	226	2.5	0.36	1.87	2.79	1.83		16.700
124	226	2.5	0.36	1.87	2.79	1.83	17.100	
124	226	2.5	0.36	1.87	2.79	1.83		16.700
124	226	2.5	0.36	1.87	2.79	1.83	17.100	
124	226	2.5	0.36	1.87	2.79	1.83		16.700
134	246	2.5	0.37	1.80	2.69	1.76	21.500	
134	246	2.5	0.37	1.80	2.69	1.76		21.000
134	246	2.5	0.37	1.80	2.69	1.76	21.500	
134	246	2.5	0.37	1.80	2.69	1.76		21.000
134	246	2.5	0.37	1.80	2.69	1.76	21.500	
134	246	2.5	0.37	1.80	2.69	1.76		21.000

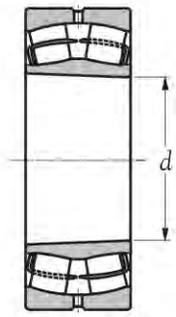
Spherical roller bearings series 230



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	r_s min[1]	C_r	C_{or}	C_r	C_{or}			
110	170	45	2	282000	455000	28800	46500	2200	2800	23022 MB W33
110	170	45	2	282000	455000	28800	46500	2200	2800	23022 MB/K W33
110	170	45	2	282000	455000	28800	46500	2200	2800	23022 CA W33
110	170	45	2	282000	455000	28800	46500	2200	2800	23022 CA/K W33
110	170	45	2	282000	455000	28800	46500	2200	2800	23022 CC W33
110	170	45	2	282000	455000	28800	46500	2200	2800	23022 CC/K W33
120	180	46	2	296000	495000	30000	50500	2000	2600	23024 MB W33
120	180	46	2	296000	495000	30000	50500	2000	2600	23024 MB/K W33
120	180	46	2	296000	495000	30000	50500	2000	2600	23024 CA W33
120	180	46	2	296000	495000	30000	50500	2000	2600	23024 CA/K W33
120	180	46	2	296000	495000	30000	50500	2000	2600	23024 CC W33
120	180	46	2	296000	495000	30000	50500	2000	2600	23024 CC/K W33
130	200	52	2	375000	620000	38500	63500	1800	2300	23026 MB W33
130	200	52	2	375000	620000	38500	63500	1800	2300	23026 MB/K W33
130	200	52	2	375000	620000	38500	63500	1800	2300	23026 CA W33
130	200	52	2	375000	620000	38500	63500	1800	2300	23026 CA/K W33
130	200	52	2	375000	620000	38500	63500	1800	2300	23026 CC W33
130	200	52	2	375000	620000	38500	63500	1800	2300	23026 CC/K W33
140	210	53	2	405000	690000	41000	70500	1700	2200	23028 MB W33
140	210	53	2	405000	690000	41000	70500	1700	2200	23028 MB/K W33
140	210	53	2	405000	690000	41000	70500	1700	2200	23028 CA W33
140	210	53	2	405000	690000	41000	70500	1700	2200	23028 /CA/K W33
140	210	53	2	405000	690000	41000	70500	1700	2200	23028 CC W33
140	210	53	2	405000	690000	41000	70500	1700	2200	23028 /CC/K W33

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

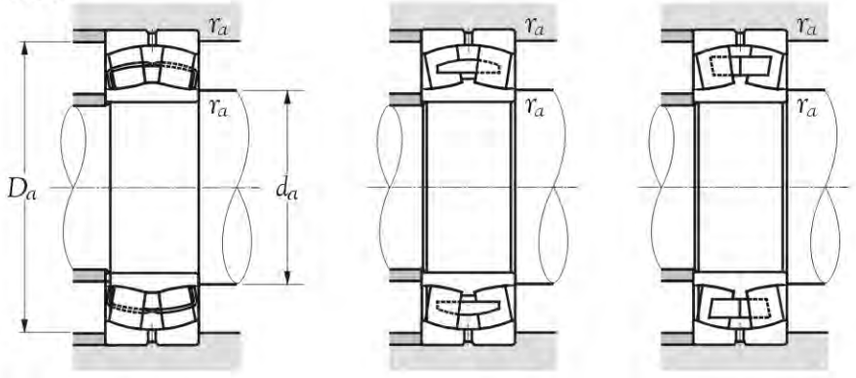
Remark: [Precision] - Class 0 (JIS)

[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Spherical roller bearings series 230



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

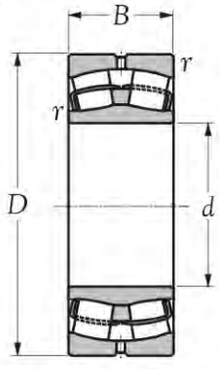
Statie

$Pr = Fr + Y_o Fa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kgs.	Mass tapered bore kgs.
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0		
120	160	2	0.26	2.59	3.85	2.53	3.710	-
120	160	2	0.26	2.59	3.85	2.53	-	3.580
120	160	2	0.26	2.59	3.85	2.53	3.710	-
120	160	2	0.26	2.59	3.85	2.53	-	3.580
120	160	2	0.26	2.59	3.85	2.53	3.710	-
120	160	2	0.26	2.59	3.85	2.53	-	3.580
130	170	2	0.25	2.69	4.01	2.63	4.050	-
130	170	2	0.25	2.69	4.01	2.63	-	3.900
130	170	2	0.25	2.69	4.01	2.63	4.050	-
130	170	2	0.25	2.69	4.01	2.63	-	3.900
130	170	2	0.25	2.69	4.01	2.63	4.050	-
130	170	2	0.25	2.69	4.01	2.63	-	3.900
140	190	2	0.26	2.63	3.92	2.57	5.900	-
140	190	2	0.26	2.63	3.92	2.57	-	5.690
140	190	2	0.26	2.63	3.92	2.57	5.900	-
140	190	2	0.26	2.63	3.92	2.57	-	5.690
140	190	2	0.26	2.63	3.92	2.57	5.900	-
140	190	2	0.26	2.63	3.92	2.57	-	5.690
150	200	2	0.25	2.73	4.06	2.67	6.350	-
150	200	2	0.25	2.73	4.06	2.67	-	6.120
150	200	2	0.25	2.73	4.06	2.67	6.350	-
150	200	2	0.25	2.73	4.06	2.67	-	6.120
150	200	2	0.25	2.73	4.06	2.67	6.350	-
150	200	2	0.25	2.73	4.06	2.67	-	6.120

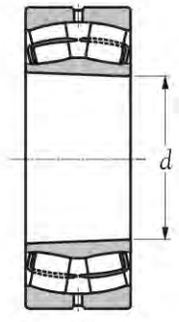
Spherical roller bearings
series 230



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	$r_{s\,min}$ [1]	C_r	C_{or}	C_r	C_{or}			
150	225	56	2.1	445000	775000	45500	79000	1500	2000	**23030 MB W33**
150	225	56	2.1	445000	775000	45500	79000	1500	2000	**23030 MB/K W33**
150	225	56	2.1	445000	775000	45500	79000	1500	2000	**23030 CA W33**
150	225	56	2.1	445000	775000	45500	79000	1500	2000	**23030 CA/K W33**
150	225	56	2.1	445000	775000	45500	79000	1500	2000	**23030 CC W33**
150	225	56	2.1	445000	775000	45500	79000	1500	2000	**23030 CC/K W33**
160	240	60	2.1	505000	885000	51500	90000	1500	1900	**23032 MB W33**
160	240	60	2.1	505000	885000	51500	90000	1500	1900	**23032 MB/K W33**
160	240	60	2.1	505000	885000	51500	90000	1500	1900	**23032 CA W33**
160	240	60	2.1	505000	885000	51500	90000	1500	1900	**23032 CA/K W33**
160	240	60	2.1	505000	885000	51500	90000	1500	1900	**23032 CC W33**
160	240	60	2.1	505000	885000	51500	90000	1500	1900	**23032 CC/K W33**

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)

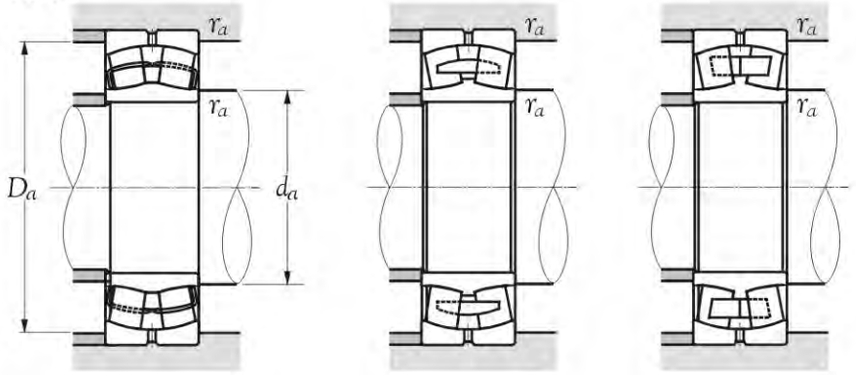
[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P7

Spherical roller bearings
series 230



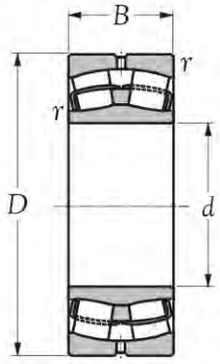
Equivalent radial load
dynamic
$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Statie
$Pr = Fr + Y_o Fa$
For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kgs.	Mass tapered bore kgs.
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0		
162	213	2	0.24	2.76	4.11	2.70	7.730	-
162	213	2	0.24	2.76	4.11	2.70	-	7.450
162	213	2	0.24	2.76	4.11	2.70	7.730	-
162	213	2	0.24	2.76	4.11	2.70	-	7.450
162	213	2	0.24	2.76	4.11	2.70	7.730	-
162	213	2	0.24	2.76	4.11	2.70	-	7.450
172	228	2	0.25	2.74	4.09	2.68	9.420	-
172	228	2	0.25	2.74	4.09	2.68	-	9.090
172	228	2	0.25	2.74	4.09	2.68	9.420	-
172	228	2	0.25	2.74	4.09	2.68	-	9.090
172	228	2	0.25	2.74	4.09	2.68	9.420	-
172	228	2	0.25	2.74	4.09	2.68	-	9.090

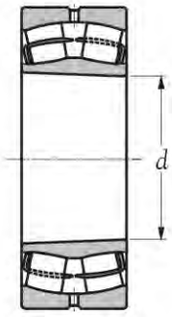
Spherical roller bearings
series 231



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	r_s min[1]	C_r	C_{or}	C_r	C_{or}			
100	165	52	2	310000	470000	31500	47500	2000	2600	23120 MB W33
100	165	52	2	310000	470000	31500	47500	2000	2600	23120 MB/K W33
100	165	52	2	310000	470000	31500	47500	2000	2600	23120 CA W33
100	165	52	2	310000	470000	31500	47500	2000	2600	23120 CA/K W33
100	165	52	2	310000	470000	31500	47500	2000	2600	23120 CC W33
100	165	52	2	310000	470000	31500	47500	2000	2600	23120 CC/K W33
110	180	56	2	370000	580000	37500	59500	1800	2400	23122 MB W33
110	180	56	2	370000	580000	37500	59500	1800	2400	23122 MB/K W33
110	180	56	2	370000	580000	37500	59500	1800	2400	23122 CA W33
110	180	56	2	370000	580000	37500	59500	1800	2400	23122 CA/K W33
110	180	56	2	370000	580000	37500	59500	1800	2400	23122 CC W33
110	180	56	2	370000	580000	37500	59500	1800	2400	23122 CC/K W33
120	200	62	2	455000	705000	46500	71500	1600	2100	23124 MB W33
120	200	62	2	455000	705000	46500	71500	1600	2100	23124 MB/K W33
120	200	62	2	455000	705000	46500	71500	1600	2100	23124 CA W33
120	200	62	2	455000	705000	46500	71500	1600	2100	23124 CA/K W33
120	200	62	2	455000	705000	46500	71500	1600	2100	23124 CC W33
120	200	62	2	455000	705000	46500	71500	1600	2100	23124 CC/K W33
130	210	64	2	495000	795000	50500	81000	1500	2000	23126 MB W33
130	210	64	2	495000	795000	50500	81000	1500	2000	23126 MB/K W33
130	210	64	2	495000	795000	50500	81000	1500	2000	23126 CA W33
130	210	64	2	495000	795000	50500	81000	1500	2000	23126 CA/K W33
130	210	64	2	495000	795000	50500	81000	1500	2000	23126 CC W33
130	210	64	2	495000	795000	50500	81000	1500	2000	23126 CC/K W33

P7

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

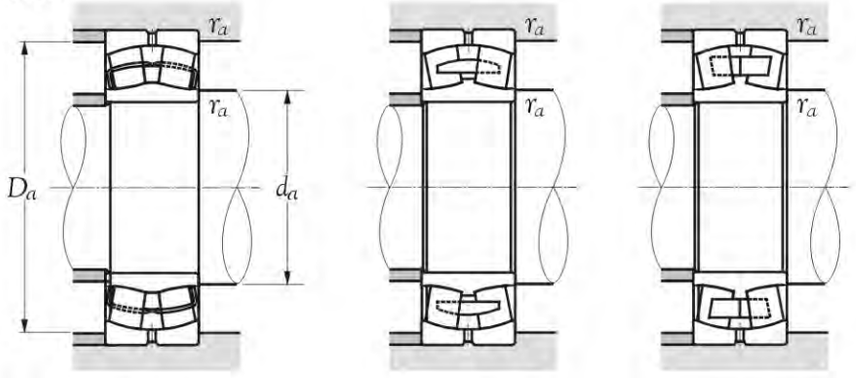
Remark: [Precision] - Class 0 (JIS)

[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Spherical roller bearings
series 231



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

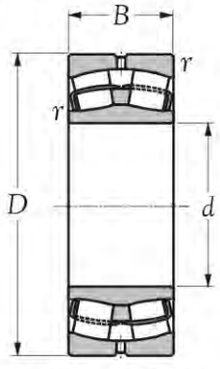
Statie

$Pr = Fr + Y_o Fa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kgs.	Mass tapered bore kgs.
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0		
110	155	2	0.32	2.12	3.15	2.07	4.300	-
110	155	2	0.32	2.12	3.15	2.07	-	4.160
110	155	2	0.32	2.12	3.15	2.07	4.300	-
110	155	2	0.32	2.12	3.15	2.07	-	4.160
110	155	2	0.32	2.12	3.15	2.07	4.300	-
110	155	2	0.32	2.12	3.15	2.07	-	4.160
120	170	2	0.31	2.17	3.24	2.13	5.400	-
120	170	2	0.31	2.17	3.24	2.13	-	5.220
120	170	2	0.31	2.17	3.24	2.13	5.400	-
120	170	2	0.31	2.17	3.24	2.13	-	5.220
120	170	2	0.31	2.17	3.24	2.13	5.400	-
120	170	2	0.31	2.17	3.24	2.13	-	5.220
130	190	2	0.31	2.17	3.24	2.13	7.700	-
130	190	2	0.31	2.17	3.24	2.13	-	7.460
130	190	2	0.31	2.17	3.24	2.13	7.700	-
130	190	2	0.31	2.17	3.24	2.13	-	7.460
130	190	2	0.31	2.17	3.24	2.13	7.700	-
130	190	2	0.31	2.17	3.24	2.13	-	7.460
140	200	2	0.30	2.23	3.32	2.18	8.470	-
140	200	2	0.30	2.23	3.32	2.18	-	8.200
140	200	2	0.30	2.23	3.32	2.18	8.470	-
140	200	2	0.30	2.23	3.32	2.18	-	8.200
140	200	2	0.30	2.23	3.32	2.18	8.470	-
140	200	2	0.30	2.23	3.32	2.18	-	8.200

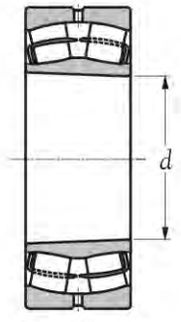
Spherical roller bearings
series 231



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	$r_{s\,min}$[1]	C_r	C_{or}	C_r	C_{or}			
140	225	68	2.1	540000	895000	55000	91000	1400	1800	23128 MB W33
140	225	68	2.1	540000	895000	55000	91000	1400	1800	23128 MB/K W33
140	225	68	2.1	540000	895000	55000	91000	1400	1800	23128 CA W33
140	225	68	2.1	540000	895000	55000	91000	1400	1800	23128 CA/K W33
140	225	68	2.1	540000	895000	55000	91000	1400	1800	23128 CC W33
140	225	68	2.1	540000	895000	55000	91000	1400	1800	23128 CC/K W33
150	250	80	2.1	730000	1190000	74500	121000	1300	1700	23130 MB W33
150	250	80	2.1	730000	1190000	74500	121000	1300	1700	23130 MB/K W33
150	250	80	2.1	730000	1190000	74500	121000	1300	1700	23130 CA W33
150	250	80	2.1	730000	1190000	74500	121000	1300	1700	23130 CA/K W33
150	250	80	2.1	730000	1190000	74500	121000	1300	1700	23130 CC W33
150	250	80	2.1	730000	1190000	74500	121000	1300	1700	23130 CC/K W33
160	270	86	2.1	840000	1370000	85500	140000	1200	1600	23132 MB W33
160	270	86	2.1	840000	1370000	85500	140000	1200	1600	23132 MB/K W33
160	270	86	2.1	840000	1370000	85500	140000	1200	1600	23132 CA W33
160	270	86	2.1	840000	1370000	85500	140000	1200	1600	23132 CA/K W33
160	270	86	2.1	840000	1370000	85500	140000	1200	1600	23132 CC W33
160	270	86	2.1	840000	1370000	85500	140000	1200	1600	23132 CC/K W33

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)

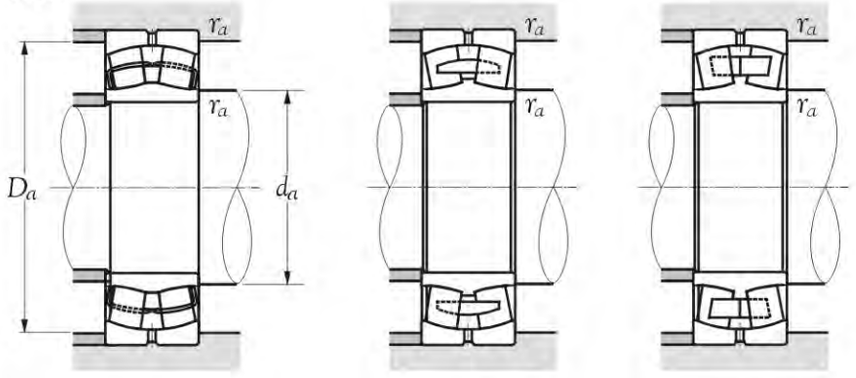
[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

P7

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Spherical roller bearings
series 231



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Statie

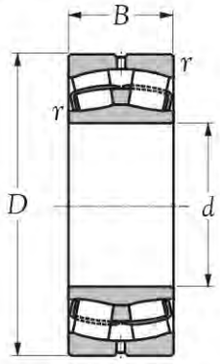
$Pr = Fr + Y_o Fa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kgs.	Mass tapered bore kgs.
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0		
152	213	2	0.30	2.25	3.35	2.20	10.200	-
152	213	2	0.30	2.25	3.35	2.20	-	9.860
152	213	2	0.30	2.25	3.35	2.20	10.200	-
152	213	2	0.30	2.25	3.35	2.20	-	9.860
152	213	2	0.30	2.25	3.35	2.20	10.200	-
152	213	2	0.30	2.25	3.35	2.20	-	9.860
162	238	2	0.32	2.11	3.15	2.06	15.600	-
162	238	2	0.32	2.11	3.15	2.06	-	15.100
162	238	2	0.32	2.11	3.15	2.06	15.600	-
162	238	2	0.32	2.11	3.15	2.06	-	15.100
162	238	2	0.32	2.11	3.15	2.06	15.600	-
162	238	2	0.32	2.11	3.15	2.06	-	15.100
172	258	2	0.32	2.11	3.15	2.07	19.800	-
172	258	2	0.32	2.11	3.15	2.07	-	19.200
172	258	2	0.32	2.11	3.15	2.07	19.800	-
172	258	2	0.32	2.11	3.15	2.07	-	19.200
172	258	2	0.32	2.11	3.15	2.07	19.800	-
172	258	2	0.32	2.11	3.15	2.07	-	19.200

P7

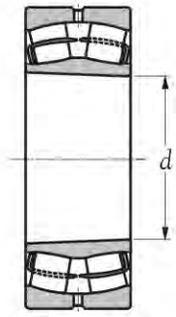
Spherical roller bearings series 232



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	r_s min[1]	C_r	C_{or}	C_r	C_{or}			
90	160	52.4	2.0	315000	455000	32500	46500	2200	2800	23218 MB W33
90	160	52.4	2.0	315000	455000	32500	46500	2200	2800	23218 MB/K W33
90	160	52.4	2.0	315000	455000	32500	46500	2200	2800	23218 CA W33
90	160	52.4	2.0	315000	455000	32500	46500	2200	2800	23218 CA/K W33
90	160	52.4	2.0	315000	455000	32500	46500	2200	2800	23218 CC W33
90	160	52.4	2.0	315000	455000	32500	46500	2200	2800	23218 CC/K W33
100	180	60.3	2.1	405000	580000	41500	59000	1900	2500	23220 MB W33
100	180	60.3	2.1	405000	580000	41500	59000	1900	2500	23220 MB/K W33
100	180	60.3	2.1	405000	580000	41500	59000	1900	2500	23220 CA W33
100	180	60.3	2.1	405000	580000	41500	59000	1900	2500	23220 CA/K W33
100	180	60.3	2.1	405000	580000	41500	59000	1900	2500	23220 CC W33
100	180	60.3	2.1	405000	580000	41500	59000	1900	2500	23220 CC/K W33
110	200	69.8	2.1	515000	760000	52500	77500	1700	2200	23222 MB W33
110	200	69.8	2.1	515000	760000	52500	77500	1700	2200	23222 MB/K W33
110	200	69.8	2.1	515000	760000	52500	77500	1700	2200	23222 CA W33
110	200	69.8	2.1	515000	760000	52500	77500	1700	2200	23222 CA/K W33
110	200	69.8	2.1	515000	760000	52500	77500	1700	2200	23222 CC W33
110	200	69.8	2.1	515000	760000	52500	77500	1700	2200	23222 CC/K W33
120	215	76.0	2.1	585000	880000	59500	89500	1500	2000	23224 MB W33
120	215	76.0	2.1	585000	880000	59500	89500	1500	2000	23224 MB/K W33
120	215	76.0	2.1	585000	880000	59500	89500	1500	2000	23224 CA W33
120	215	76.0	2.1	585000	880000	59500	89500	1500	2000	23224 CA/K W33
120	215	76.0	2.1	585000	880000	59500	89500	1500	2000	23224 CC W33
120	215	76.0	2.1	585000	880000	59500	89500	1500	2000	23224 CC/K W33

P7

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

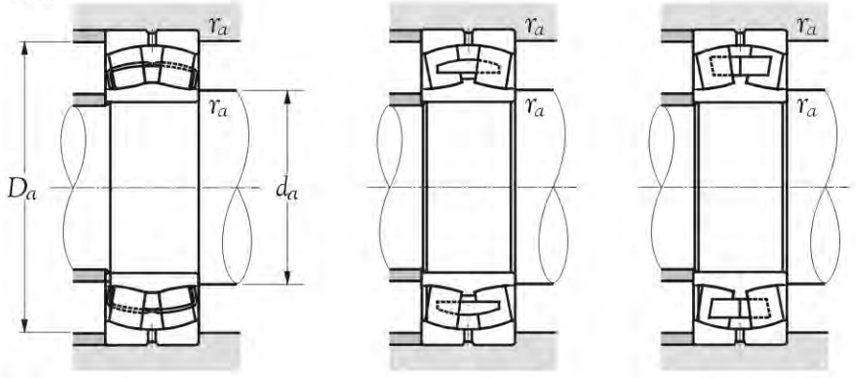
Remark: [Precision] - Class 0 (JIS)

[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Spherical roller bearings
series 232



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

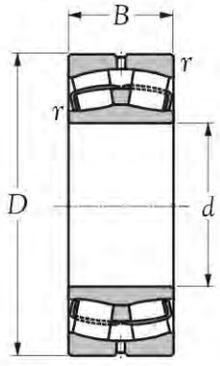
Statie

$Pr = Fr + Y_o Fa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kgs.	Mass tapered bore kgs.
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0		
100	150	2	0.33	2.04	3.03	1.99	4.450	-
100	150	2	0.33	2.04	3.03	1.99	-	4.320
100	150	2	0.33	2.04	3.03	1.99	4.450	-
100	150	2	0.33	2.04	3.03	1.99	-	4.320
100	150	2	0.33	2.04	3.03	1.99	4.450	-
100	150	2	0.33	2.04	3.03	1.99	-	4.320
112	168	2	0.34	1.98	2.94	1.93	6.470	-
112	168	2	0.34	1.98	2.94	1.93	-	6.280
112	168	2	0.34	1.98	2.94	1.93	6.470	-
112	168	2	0.34	1.98	2.94	1.93	-	6.280
112	168	2	0.34	1.98	2.94	1.93	6.470	-
112	168	2	0.34	1.98	2.94	1.93	-	6.280
122	188	2	0.35	1.91	2.84	1.86	9.710	-
122	188	2	0.35	1.91	2.84	1.86	-	9.430
122	188	2	0.35	1.91	2.84	1.86	9.710	-
122	188	2	0.35	1.91	2.84	1.86	-	9.430
122	188	2	0.35	1.91	2.84	1.86	9.710	-
122	188	2	0.35	1.91	2.84	1.86	-	9.430
132	203	2	0.36	1.89	2.82	1.85	12.100	-
132	203	2	0.36	1.89	2.82	1.85	-	11.700
132	203	2	0.36	1.89	2.82	1.85	12.100	-
132	203	2	0.36	1.89	2.82	1.85	-	11.700
132	203	2	0.36	1.89	2.82	1.85	12.100	-
132	203	2	0.36	1.89	2.82	1.85	-	11.700

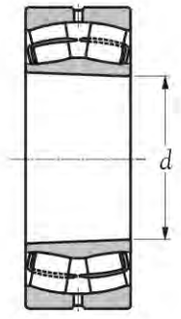
Spherical roller bearings
series 232



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 12

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	$r_{s\,min}$ [1]	C_r	C_{or}	C_r	C_{or}			
130	230	80	3	685000	1060000	70000	108000	1500	1900	23226 MB W33
130	230	80	3	685000	1060000	70000	108000	1500	1900	23226 MB/K W33
130	230	80	3	685000	1060000	70000	108000	1500	1900	23226 CA W33
130	230	80	3	685000	1060000	70000	108000	1500	1900	23226 CA/K W33
130	230	80	3	685000	1060000	70000	108000	1500	1900	23226 CC W33
130	230	80	3	685000	1060000	70000	108000	1500	1900	23226 CC/K W33
140	250	88	3	805000	1270000	82000	129000	1300	1700	23228 MB W33
140	250	88	3	805000	1270000	82000	129000	1300	1700	23228 MB/K W33
140	250	88	3	805000	1270000	82000	129000	1300	1700	23228 CA W33
140	250	88	3	805000	1270000	82000	129000	1300	1700	23228 CA/K W33
140	250	88	3	805000	1270000	82000	129000	1300	1700	23228 CC W33
140	250	88	3	805000	1270000	82000	129000	1300	1700	23228 CC/K W33

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)

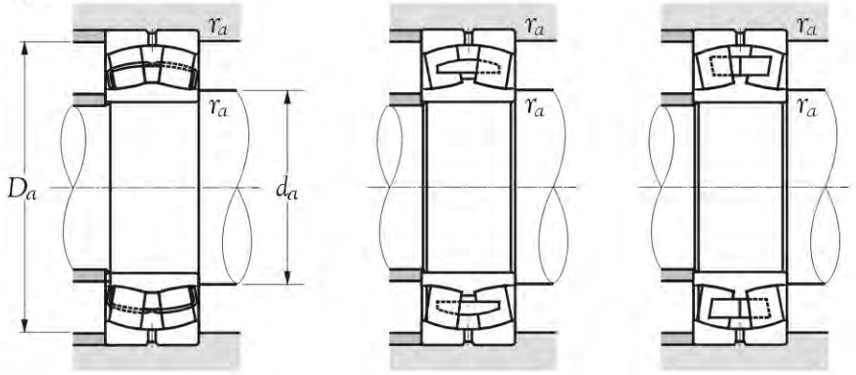
[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P7

Spherical roller bearings
series 232



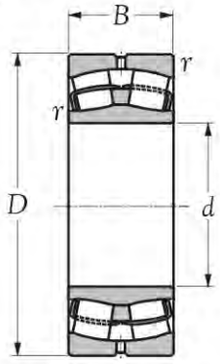
Equivalent radial load
dynamic
$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Statie
$Pr = Fr + Y_o Fa$
For values of *e*, *Y2* and *Yo*
see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kgs.	Mass tapered bore kgs.
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0		
144	216	2.5	0.35	1.92	2.86	1.88	14.300	-
144	216	2.5	0.35	1.92	2.86	1.88	-	13.900
144	216	2.5	0.35	1.92	2.86	1.88	14.300	-
144	216	2.5	0.35	1.92	2.86	1.88	-	13.900
144	216	2.5	0.35	1.92	2.86	1.88	14.300	-
144	216	2.5	0.35	1.92	2.86	1.88	-	13.900
154	236	2.5	0.36	1.90	2.83	1.86	18.800	-
154	236	2.5	0.36	1.90	2.83	1.86	-	18.200
154	236	2.5	0.36	1.90	2.83	1.86	18.800	-
154	236	2.5	0.36	1.90	2.83	1.86	-	18.200
154	236	2.5	0.36	1.90	2.83	1.86	18.800	-
154	236	2.5	0.36	1.90	2.83	1.86	-	18.200

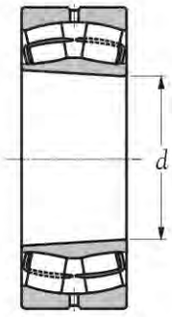
Spherical roller bearings series 240



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 30

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	r_s min[1]	C_r	C_{or}	C_r	C_{or}			
110	170	60	1.2	415000	620000	42330	63240	2400	3600	**24022 MB W33**
110	170	60	1.2	415000	620000	42330	63240	2400	3600	**24022 MB/K W33**
110	170	60	1.2	415000	620000	42330	63240	2400	3600	**24022 CA W33**
110	170	60	1.2	415000	620000	42330	63240	2400	3600	**24022 CA/K W33**
110	170	60	1.2	415000	620000	42330	63240	2400	3600	**24022 CC W33**
110	170	60	1.2	415000	620000	42330	63240	2400	3600	**24022 CC/K W33**
120	180	60	2.0	390000	670000	39500	68500	1800	2300	**24024 MB W33**
120	180	60	2.0	390000	670000	39500	68500	1800	2300	**24024 MB/K W33**
120	180	60	2.0	390000	670000	39500	68500	1800	2300	**24024 CA W33**
120	180	60	2.0	390000	670000	39500	68500	1800	2300	**24024 CA/K W33**
120	180	60	2.0	390000	670000	39500	68500	1800	2300	**24024 CC W33**
120	180	60	2.0	390000	670000	39500	68500	1800	2300	**24024 CC/K W33**
130	200	69	2.0	505000	895000	51500	91000	1600	2100	**24026 MB W33**
130	200	69	2.0	505000	895000	51500	91000	1600	2100	**24026 MB/K W33**
130	200	69	2.0	505000	895000	51500	91000	1600	2100	**24026 CA W33**
130	200	69	2.0	505000	895000	51500	91000	1600	2100	**24026 CA/K W33**
130	200	69	2.0	505000	895000	51500	91000	1600	2100	**24026 CC W33**
130	200	69	2.0	505000	895000	51500	91000	1600	2100	**24026 CC/K W33**
140	210	69	2.0	510000	945000	52000	96500	1500	1900	**24028 MB W33**
140	210	69	2.0	510000	945000	52000	96500	1500	1900	**24028 MB/K W33**
140	210	69	2.0	510000	945000	52000	96500	1500	1900	**24028 CA W33**
140	210	69	2.0	510000	945000	52000	96500	1500	1900	**24028 CA/K W33**
140	210	69	2.0	510000	945000	52000	96500	1500	1900	**24028 CC W33**
140	210	69	2.0	510000	945000	52000	96500	1500	1900	**24028 CC/K W33**

P7

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

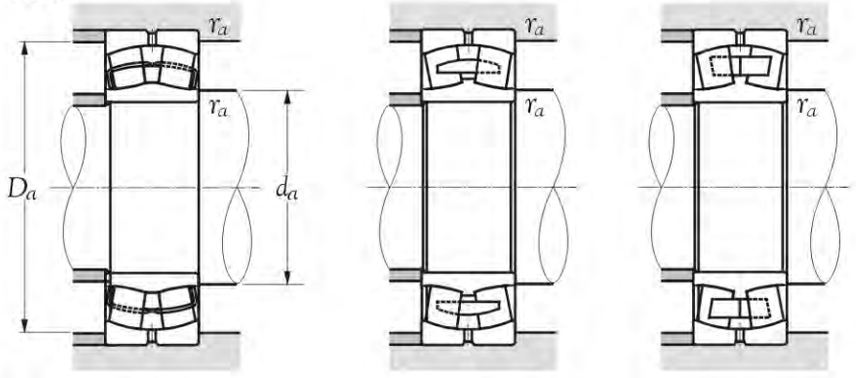
Remark: [Precision] - Class 0 (JIS)

[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site: Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Spherical roller bearings
series 240



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

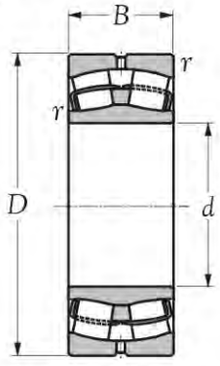
Statie

$Pr = Fr + Y_o Fa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kgs.	Mass tapered bore kgs.
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0		
119	161	2	0.33	2.00	3.00	2.00	5.000	-
119	161	2	0.33	2.00	3.00	2.00	-	4.900
119	161	2	0.33	2.00	3.00	2.00	5.000	-
119	161	2	0.33	2.00	3.00	2.00	-	4.900
119	161	2	0.33	2.00	3.00	2.00	5.000	-
119	161	2	0.33	2.00	3.00	2.00	-	4.900
130	170	2	0.33	2.06	3.07	2.02	5.480	-
130	170	2	0.33	2.06	3.07	2.02	-	5.390
130	170	2	0.33	2.06	3.07	2.02	5.480	-
130	170	2	0.33	2.06	3.07	2.02	-	5.390
130	170	2	0.33	2.06	3.07	2.02	5.480	-
130	170	2	0.33	2.06	3.07	2.02	-	5.390
140	190	2	0.34	1.98	2.95	1.94	8.080	-
140	190	2	0.34	1.98	2.95	1.94	-	7.950
140	190	2	0.34	1.98	2.95	1.94	8.080	-
140	190	2	0.34	1.98	2.95	1.94	-	7.950
140	190	2	0.34	1.98	2.95	1.94	8.080	-
140	190	2	0.34	1.98	2.95	1.94	-	7.950
150	200	2	0.32	2.09	3.12	2.05	8.570	-
150	200	2	0.32	2.09	3.12	2.05	-	8.430
150	200	2	0.32	2.09	3.12	2.05	8.570	-
150	200	2	0.32	2.09	3.12	2.05	-	8.430
150	200	2	0.32	2.09	3.12	2.05	8.570	-
150	200	2	0.32	2.09	3.12	2.05	-	8.430

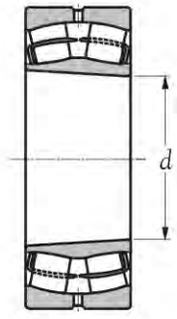
Spherical roller bearings series 240



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 30

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	$r_{s\,min}$ [1]	C_r	C_{or}	C_r	C_{or}			
150	225	75	2.1	585000	1060000	59500	108000	1400	1800	**24030 MB W33**
150	225	75	2.1	585000	1060000	59500	108000	1400	1800	**24030 MB/K W33**
150	225	75	2.1	585000	1060000	59500	108000	1400	1800	**24030 CA W33**
150	225	75	2.1	585000	1060000	59500	108000	1400	1800	**24030 CA/K W33**
150	225	75	2.1	585000	1060000	59500	108000	1400	1800	**24030 CC W33**
150	225	75	2.1	585000	1060000	59500	108000	1400	1800	**24030 CC/K W33**
160	240	80	2.1	650000	1200000	66500	122000	1300	1700	**24032 MB W33**
160	240	80	2.1	650000	1200000	66500	122000	1300	1700	**24032 MB/K W33**
160	240	80	2.1	650000	1200000	66500	122000	1300	1700	**24032 CA W33**
160	240	80	2.1	650000	1200000	66500	122000	1300	1700	**24032 CA/K W33**
160	240	80	2.1	650000	1200000	66500	122000	1300	1700	**24032 CC W33**
160	240	80	2.1	650000	1200000	66500	122000	1300	1700	**24032 CC/K W33**

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)

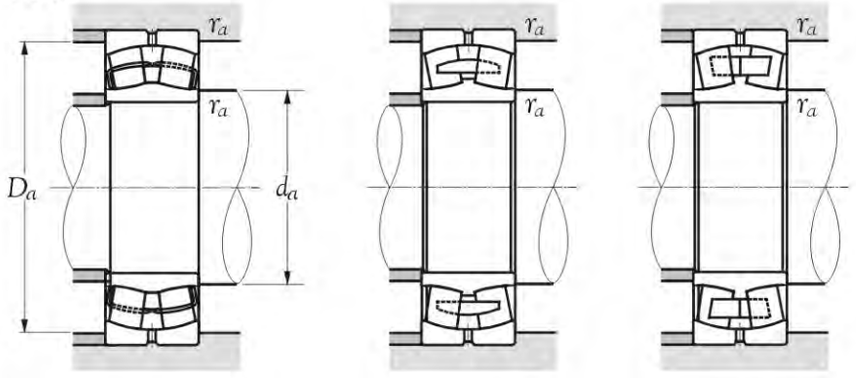
[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P7

Spherical roller bearings
series 240



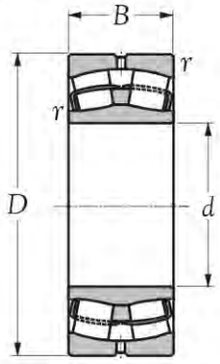
Equivalent radial load
dynamic
$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Statie
$Pr = Fr + Y_o Fa$
For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kgs.	Mass tapered bore kgs.
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0		
162	213	2	0.33	2.06	3.07	2.02	10.700	-
162	213	2	0.33	2.06	3.07	2.02	-	10.500
162	213	2	0.33	2.06	3.07	2.02	10.700	-
162	213	2	0.33	2.06	3.07	2.02	-	10.500
162	213	2	0.33	2.06	3.07	2.02	10.700	-
162	213	2	0.33	2.06	3.07	2.02	-	10.500
172	228	2	0.32	2.10	3.13	2.06	13.000	-
172	228	2	0.32	2.10	3.13	2.06	-	12.800
172	228	2	0.32	2.10	3.13	2.06	13.000	-
172	228	2	0.32	2.10	3.13	2.06	-	12.800
172	228	2	0.32	2.10	3.13	2.06	13.000	-
172	228	2	0.32	2.10	3.13	2.06	-	12.800

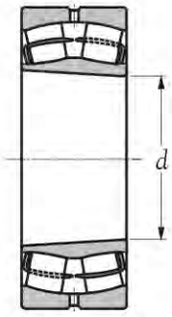
Spherical roller bearings series 241



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 30

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	r_s min[1]	C_r	C_{or}	C_r	C_{or}			
110	180	69	2.0	450000	755000	46000	77000	1800	2400	24122 MB W33
110	180	69	2.0	450000	755000	46000	77000	1800	2400	24122 MB/K W33
110	180	69	2.0	450000	755000	46000	77000	1800	2400	24122 CA W33
110	180	69	2.0	450000	755000	46000	77000	1800	2400	24122 CA/K W33
110	180	69	2.0	450000	755000	46000	77000	1800	2400	24122 CC W33
110	180	69	2.0	450000	755000	46000	77000	1800	2400	24122 CC/K W33
120	200	80	2.0	575000	945000	58500	96500	1600	2100	24124 MB W33
120	200	80	2.0	575000	945000	58500	96500	1600	2100	24124 MB/K W33
120	200	80	2.0	575000	945000	58500	96500	1600	2100	24124 CA W33
120	200	80	2.0	575000	945000	58500	96500	1600	2100	24124 CA/K W33
120	200	80	2.0	575000	945000	58500	96500	1600	2100	24124 CC W33
120	200	80	2.0	575000	945000	58500	96500	1600	2100	24124 CC/K W33
130	210	80	2.0	585000	995000	60000	102000	1500	2000	24126 MB W33
130	210	80	2.0	585000	995000	60000	102000	1500	2000	24126 MB/K W33
130	210	80	2.0	585000	995000	60000	102000	1500	2000	24126 CA W33
130	210	80	2.0	585000	995000	60000	102000	1500	2000	24126 CA/K W33
130	210	80	2.0	585000	995000	60000	102000	1500	2000	24126 CC W33
130	210	80	2.0	585000	995000	60000	102000	1500	2000	24126 CC/K W33
140	225	85	2.1	670000	1150000	68500	117000	1400	1800	24128 MB W33
140	225	85	2.1	670000	1150000	68500	117000	1400	1800	24128 MB/K W33
140	225	85	2.1	670000	1150000	68500	117000	1400	1800	24128 CA W33
140	225	85	2.1	670000	1150000	68500	117000	1400	1800	24128 CA/K W33
140	225	85	2.1	670000	1150000	68500	117000	1400	1800	24128 CC W33
140	225	85	2.1	670000	1150000	68500	117000	1400	1800	24128 CC/K W33

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

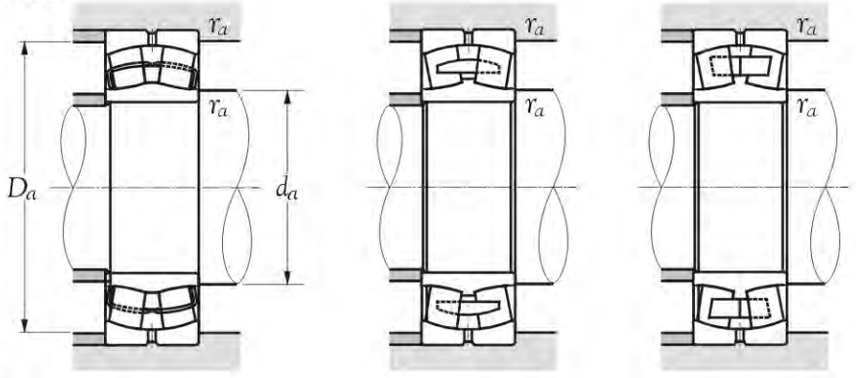
Remark: [Precision] - Class 0 (JIS)

[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site: Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Spherical roller bearings series 241



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y1	0.67	Y2

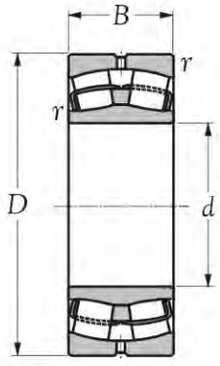
Statie

$Pr = Fr + YoFa$

For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kgs.	Mass tapered bore kgs.
d_a min	D_a max	r_a max	e	Y1	Y2	Y0		
120	170	2	0.38	1.76	2.63	1.73	7.070	-
120	170	2	0.38	1.76	2.63	1.73	-	6.960
120	170	2	0.38	1.76	2.63	1.73	7.070	-
120	170	2	0.38	1.76	2.63	1.73	-	6.960
120	170	2	0.38	1.76	2.63	1.73	7.070	-
120	170	2	0.38	1.76	2.63	1.73	-	6.960
130	190	2	0.40	1.68	2.50	1.64	10.300	-
130	190	2	0.40	1.68	2.50	1.64	-	10.100
130	190	2	0.40	1.68	2.50	1.64	10.300	-
130	190	2	0.40	1.68	2.50	1.64	-	10.100
130	190	2	0.40	1.68	2.50	1.64	10.300	-
130	190	2	0.40	1.68	2.50	1.64	-	10.100
140	200	2	0.38	1.78	2.65	1.74	11.000	-
140	200	2	0.38	1.78	2.65	1.74	-	10.800
140	200	2	0.38	1.78	2.65	1.74	11.000	-
140	200	2	0.38	1.78	2.65	1.74	-	10.800
140	200	2	0.38	1.78	2.65	1.74	11.000	-
140	200	2	0.38	1.78	2.65	1.74	-	10.800
152	213	2	0.38	1.80	2.68	1.76	13.300	-
152	213	2	0.38	1.80	2.68	1.76	-	13.100
152	213	2	0.38	1.80	2.68	1.76	13.300	-
152	213	2	0.38	1.80	2.68	1.76	-	13.100
152	213	2	0.38	1.80	2.68	1.76	13.300	-
152	213	2	0.38	1.80	2.68	1.76	-	13.100

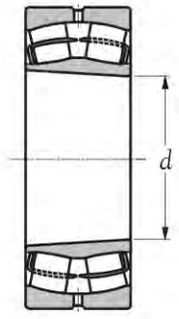
Spherical roller bearings
series 241



Cylindrical bore
CC type

Cylindrical bore
CA type

Cylindrical bore
MB type



Tapered bore
taper 1 : 30

Boundary dimensions mm				Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds grease rpm	oil rpm	Bearing numbers
d	D	B	$r_{s\,min}$ [1]	C_r	C_{or}	C_r	C_{or}			
150	250	100	2.1	885000	1520000	90500	155000	1300	1700	24130 MB W33
150	250	100	2.1	885000	1520000	90500	155000	1300	1700	24130 MB/K W33
150	250	100	2.1	885000	1520000	90500	155000	1300	1700	24130 CA W33
150	250	100	2.1	885000	1520000	90500	155000	1300	1700	24130 CA/K W33
150	250	100	2.1	885000	1520000	90500	155000	1300	1700	24130 CC W33
150	250	100	2.1	885000	1520000	90500	155000	1300	1700	24130 CC/K W33
160	270	109	2.1	1040000	1780000	106000	181000	1200	1600	24132 MB W33
160	270	109	2.1	1040000	1780000	106000	181000	1200	1600	24132 MB/K W33
160	270	109	2.1	1040000	1780000	106000	181000	1200	1600	24132 CA W33
160	270	109	2.1	1040000	1780000	106000	181000	1200	1600	24132 CA/K W33
160	270	109	2.1	1040000	1780000	106000	181000	1200	1600	24132 CC W33
160	270	109	2.1	1040000	1780000	106000	181000	1200	1600	24132 CC/K W33

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r.

Remark: [Precision] - Class 0 (JIS)

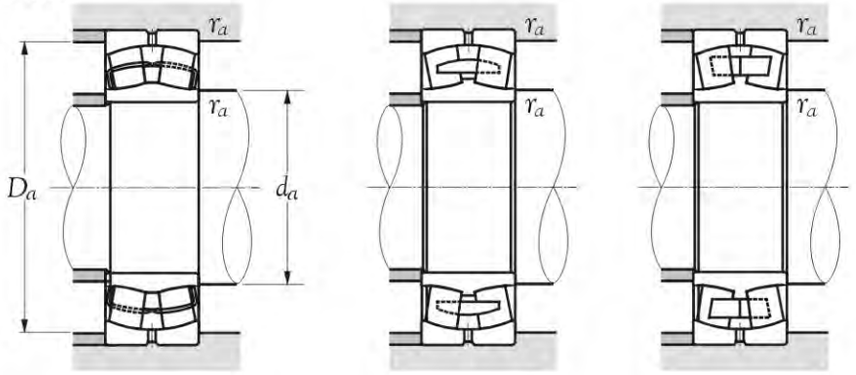
[Cages] - Two window - type steel cages (CC)
One-piece machined brass cage (CA)
Two-piece machined brass cages (MB)

[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P7

Spherical roller bearings
series 241



Equivalent radial load dynamic

$Pr = XFr + YFa$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y_1	0.67	Y_2

Statie

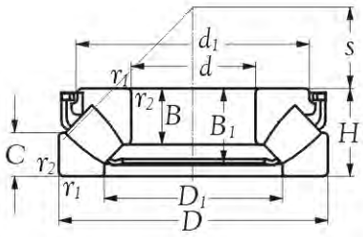
$Pr = Fr + Y_o Fa$

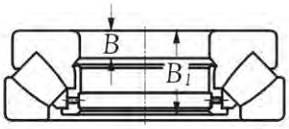
For values of *e*, *Y2* and *Yo* see the tabla below.

Abutment and fillet dimensions mm			Constant	Axial load factors			Mass cylindrical bore kgs.	Mass tapered bore kgs.
d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0		
162	238	2	0.40	1.69	2.51	1.65	20.200	-
162	238	2	0.40	1.69	2.51	1.65	-	20.000
162	238	2	0.40	1.69	2.51	1.65	20.200	-
162	238	2	0.40	1.69	2.51	1.65	-	20.000
162	238	2	0.40	1.69	2.51	1.65	20.200	-
162	238	2	0.40	1.69	2.51	1.65	-	20.000
172	258	2	0.40	1.67	2.48	1.63	26.000	-
172	258	2	0.40	1.67	2.48	1.63	-	25.600
172	258	2	0.40	1.67	2.48	1.63	26.000	-
172	258	2	0.40	1.67	2.48	1.63	-	25.600
172	258	2	0.40	1.67	2.48	1.63	26.000	-
172	258	2	0.40	1.67	2.48	1.63	-	25.600

P7

Spherical roller thrust bearings
series 292





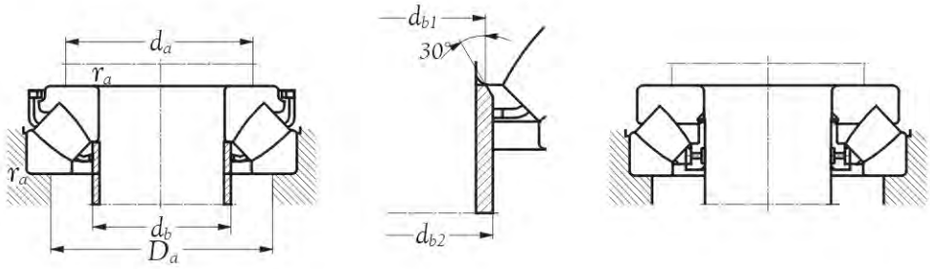
Boundary dimensions mm			Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Fatigue loda limit	Minimum load factor	Bearing numbers	Mass kgs. (approx.)
d	D	H	C_r	C_{or}						
150	215	39	345000	1370000	-	1800	146000	180	**29230**	4.55
160	225	39	357000	1460000	-	1700	156000	200	**29232**	4.80
170	240	42	408000	1660000	-	1600	176000	260	**29234**	5.95
180	250	42	420000	1760000	-	1600	186000	290	**29236**	6.25
190	270	48	518000	2200000	-	1400	212000	440	**29238**	8.70
200	280	48	535000	2280000	-	1400	232000	490	**29240**	8.90
220	300	48	546000	2400000	-	1300	240000	550	**29244**	10.00
240	340	60	799000	3450000	-	1100	335000	1100	**29248**	16.50
260	360	60	817000	3650000	-	1100	34500	1300	**29252**	18.50
280	380	60	863000	4000000	-	1000	375000	1500	**29256**	19.50
300	420	73	1070000	4800000	-	900	465000	2200	**29260**	30.50

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

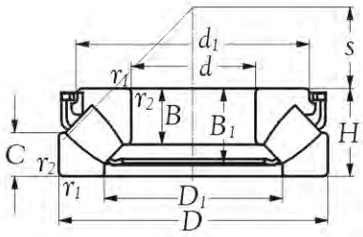
P7

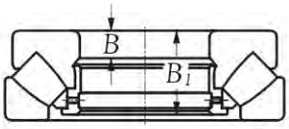
Spherical roller thrust bearings
series 292



Dimensions mm							Abutment and fillet dimensions mm				
d_1	D_1	B	B_1	C	$r_{1,2}$ min	S	d_a min	d_{b1} max	d_{b2} max	D_a max	r_a max
208	177	11	37	20.0	1.5	80	180	-	-	193	1.5
220	188	11	37	20.0	1.5	87	190	-	-	204	1.5
235	201	13	40	22.0	1.5	93	205	-	-	218	1.5
245	211	14	40	21.0	1.5	97	215	-	-	227	1.5
255	226	14	45	25.5	2.0	103	225	-	-	243	2.0
270	236	15	45	24.0	2.0	108	240	-	-	254	2.0
292	254	15	45	24.0	2.0	117	260	-	-	273	2.0
330	283	19	57	30.0	2.1	130	290	-	-	308	2.0
350	302	19	57	30.0	2.1	139	310	-	-	326	2.0
370	323	19	57	30.0	2.1	150	325	-	-	347	2.0
405	353	21	69	38.0	3.0	162	360	-	-	380	2.5

Spherical roller thrust bearings
series 293





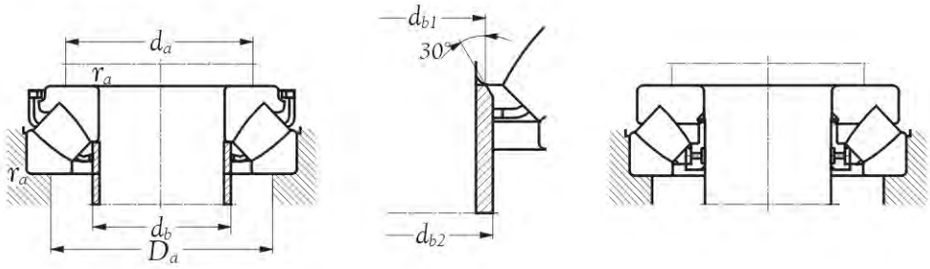
Boundary dimensions mm			Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Fatigue loda limit	Minimum load factor	Bearing numbers	Mass Kgs. (approx.)
d	D	H	C_r	C_{or}						
85	150	39	334000	1060000	1600	2200	129000	110	**29317 E**	2.75
90	155	39	345000	1080000	1600	2200	132000	110	**29318 E**	2.85
100	170	42	408000	1290000	1500	2000	156000	160	**29320 E**	3.65
110	190	48	535000	1730000	1300	1800	204000	280	**29322 E**	5.30
120	210	54	656000	2120000	1100	1600	245000	430	**29324 E**	7.35
130	225	58	753000	2500000	1000	1500	280000	590	**29326 E**	9.00
140	240	60	845000	2850000	950	1400	315000	770	**29328 E**	10.50
150	250	60	863000	2850000	950	1400	315000	770	**29330 E**	11.00
160	270	67	1010000	3450000	850	1200	375000	1100	**29332 E**	14.50
170	280	67	1050000	3550000	850	1200	365000	1200	**29334 E**	15.00
180	300	73	1240000	4300000	800	1100	440000	1800	**29336 E**	19.50
190	320	78	1400000	4750000	750	1000	490000	2100	**29338 E**	23.50
200	340	85	1610000	5500000	700	950	550000	2900	**29340 E**	29.50
220	360	85	1730000	6300000	700	950	610000	3800	**29344 E**	33.50
240	380	85	1790000	6550000	670	900	630000	4100	**29348 E**	35.50
260	420	95	2220000	8300000	600	800	780000	6500	**29352 E**	49.00
280	440	95	2190000	8650000	600	800	800000	7100	**29356 E**	53.00
300	480	109	2670000	10600000	530	700	930000	11000	**29360 E**	75.00

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

P7

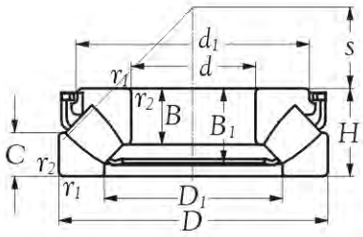
If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

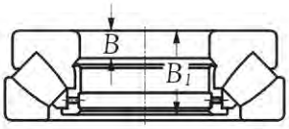
Spherical roller thrust bearings
series 293



Dimensions							Abutment and fillet dimensions				
mm							mm				
d_1	D_1	B	B_1	C	$r_{1,2}$ min	S	d_a min	d_{b1} max	d_{b2} max	D_a max	r_a max
135	110	24.5	33.8	20.0	1.5	50	115	90	90	129	1.5
139	115	24.5	34.5	19.5	1.5	53	120	95	95	134	1.5
152	128	26.2	36.3	20.5	1.5	58	130	107	107	147	1.5
171	140	30.3	41.7	24.8	2.0	64	145	117	117	164	2.0
188	155	34.0	48.2	27.0	2.1	70	160	128	128	181	2.0
203	166	36.7	50.6	30.1	2.1	76	175	138	143	194	2.0
216	177	38.5	54.0	30.0	2.1	82	185	148	154	208	2.0
224	190	38.0	54.9	28.0	2.1	87	195	158	163	219	2.0
244	203	42.0	60.0	33.0	3.0	92	210	169	176	235	2.5
251	215	42.2	61.1	30.5	3.0	96	220	178	188	245	2.5
270	227	46.0	66.2	35.5	3.0	103	235	189	195	262	2.5
286	244	49.0	71.3	36.0	4.0	110	250	200	211	280	3.0
304	257	53.5	76.7	40.0	4.0	116	265	211	224	297	3.0
326	274	55.0	77.7	41.0	4.0	125	285	229	240	316	3.0
345	296	54.0	77.8	40.5	4.0	135	305	249	259	336	3.0
282	324	61.0	86.6	46.0	5.0	148	335	273	286	370	4.0
401	343	62.0	86.7	45.5	5.0	158	355	293	305	390	4.0
434	372	70.0	98.9	51.0	5.0	168	385	313	329	423	4.0

Spherical roller thrust bearings
series 294





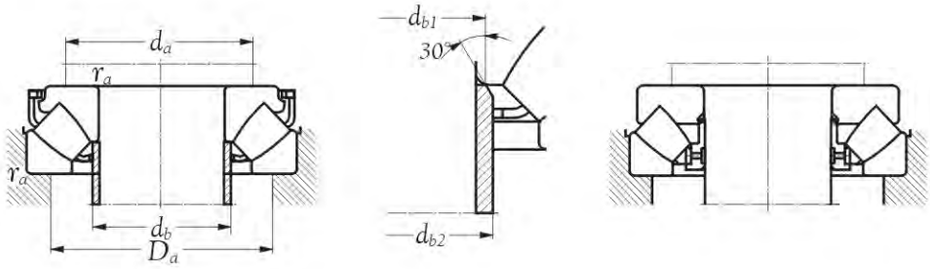
Boundary dimensions mm			Basic load ratings dynamic static N		Limiting speeds grease oil rpm		Fatigue loda limit	Minimum load factor	Bearing numbers	Mass kgs. (approx.)
d	D	H	C_r	C_{or}						
60	130	42	345000	915000	1800	2600	114000	79	**29412 E**	2.60
65	140	45	397000	1080000	1700	2400	137000	110	**29413 E**	3.20
70	150	48	449000	1250000	1600	2200	153000	150	**29414 E**	3.90
75	160	51	518000	1430000	1600	2200	173000	190	**29415 E**	4.70
80	170	54	575000	1630000	1500	2000	193000	250	**29416 E**	5.60
85	180	58	633000	1800000	1300	1800	212000	310	**29417 E**	6.75
90	190	60	702000	2000000	1300	1800	232000	380	**29418 E**	7.75
100	210	67	863000	2500000	1100	1600	275000	590	**29420 E**	10.50
110	230	73	1010000	3000000	950	1400	325000	860	**29422 E**	13.50
120	250	78	1170000	3450000	900	1300	375000	1100	**29424 E**	17.50
130	270	85	1380000	4050000	850	1200	430000	1600	**29426 E**	22.00
140	280	85	1400000	4300000	850	1200	455000	1800	**29428 E**	23.00
150	300	90	1610000	5100000	800	1100	520000	2500	**29430 E**	28.00
160	320	95	1790000	5600000	750	1000	570000	3000	**29432 E**	33.50
170	340	103	2020000	6550000	700	950	640000	4100	**29434 E**	44.50
180	360	109	2250000	7350000	670	900	710000	5100	**29436 E**	52.50
190	380	115	2480000	8000000	630	850	765000	6100	**29438 E**	60.50
200	400	122	2760000	9000000	600	800	850000	7700	**29440 E**	72.00
220	420	122	2880000	9650000	560	750	900000	8800	**29444 E**	75.00
240	440	122	2990000	10200000	560	750	930000	9900	**29448 E**	80.00
260	480	132	3510000	12900000	500	670	1080000	16000	**29452 E**	105.00
280	520	145	4310000	15300000	480	630	1320000	22000	**29456 E**	135.00
300	540	145	4370000	16600000	450	600	1340000	26000	**29460 E**	140.00

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Grease] - Nil

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P7

Spherical roller thrust bearings
series 294



Dimensions mm							Abutment and fillet dimensions mm				
d_1	D_1	B	B_1	C	$r_{1,2}$ min	S	d_a min	d_{b1} max	d_{b2} max	D_a max	r_a max
112	85.5	27.0	36.7	21.0	1.5	38	90	67.0	67.0	107	1.5
121	91.5	29.5	39.8	22.0	2.0	42	100	72.0	72.0	117	2.0
130	99.0	31.0	41.0	23.8	2.0	44	105	77.5	77.5	125	2.0
138	106.0	33.5	45.7	24.5	2.0	47	115	82.5	82.5	133	2.0
147	113.0	35.0	48.1	26.5	2.1	50	120	88.0	88.0	141	2.0
156	121.0	37.0	51.1	28.0	2.1	54	130	94.0	94.0	151	2.0
165	128.0	39.0	54.0	28.5	2.1	56	135	99.0	99.0	158	2.0
182	142.0	43.0	57.3	32.0	3.0	62	150	110.0	110	175	2.5
199	155.0	47.0	64.7	34.7	3.0	69	165	120.5	129	193	2.5
217	171.0	50.5	70.3	36.5	4.0	74	180	132.0	142	209	3.0
234	185.0	54.0	76.0	40.9	4.0	81	195	143.0	153	227	3.0
245	195.0	54.0	75.6	41.0	4.0	86	205	153.0	162	236	3.0
263	208.0	58.0	80.8	43.4	4.0.	92	220	163.0	175	253	3.0
279	224.0	60.5	84.3	45.5	5.0	99	235	175.0	189	270	4.0
298	236.0	65.5	91.2	50.0	5.0	104	250	185.0	199	286	4.0
316	250.0	69.5	96.4	53.0	5.0	110	265	196.0	210	304	4.0
333	265.0	73.0	101.0	55.5	5.0	117	280	207.0	223	321	4.0
351	278.0	77.0	107.1	59.4	5.0	122	295	217.5	234	337	4.0
372	300.0	77.0	107.4	58.5	6.0	132	315	238.0	254	358	5.0
392	322.0	76.0	107.1	59.0	6.0	142	335	258.0	276	378	5.0
428	346.0	86.0	119.0	63.0	6.0	154	365	278.0	296	412	5.0
464	372.0	95.0	129.9	70.0	6.0	166	395	300.0	320	446	5.0
485	392.0	95.0	130.3	70.5	6.0	175	415	319.0	340	465	5.0

KSM® NOTE

KSM®

PLUMMER BLOCK HOUSINGS

Technical information		Pages for refer T 368 - T 373
	Feature	T 368
1	Materials	T 368
2	Applicable bearings	T 368
3	Tolerances	T 369
4	Lubrication	T 370
5	The permitted loading capacity (SN, SNU)	T 370 & T 371
6	Specification of accessories (SN, SNU)	T 371 - T 373

Feature

The majority of **KSM** plummer block housing is made of gray cast iron and is of the models of 'SN', 'SNU' and 'SAF'. Its basic size conforms with 'ISO' standard and could meet the requirement of bearing with inner ring of 20 mm - 160 mm. It could not be interchangeable with the other parts of the housing cap or the housing base. Two parts through the fixing "pins" to ensure their correct assembly.

1. Materials

The majority of **KSM** plummer block housing is made of gray cast iron and is of the models of 'SN', 'SNU' and 'SAF'. Its basic size conforms with 'ISO' standard and could meet the requirement of bearing with inner ring of 20 mm - 160 mm. It could not be interchangeable with the other parts of the housing cap or the housing base. Two parts through the fixing "pins" to ensure their correct assembly.

1.1 Housing:

Grade 200 (FC 200), it is equivalents to U.S.A. standard ASTM A-48 (Grade 35)

1.2 Accessories:

Please refer to Table 1A.

Table 1A

Description	Part number	Materials
Felt Seal	FS	Wool + Rayon
Locating Ring	SR	Aluminum
Hexagon Bolt	M	Mild Steel
U-Ring	U-500 / U-600	NBR + Mild Steel Plate
Labyrinth Seal	LER / LOR	Aluminum + NBR
End Cover	500 NA / 500 UA	NBR + Mild Steel Plate
Eye-Bolt		Mild Steel
Cap		Plastic

2. Applicable bearings

All **KSM** plummer block housings applicable to the appropriate self-aligning ball bearings and spherical roller bearings, they are economic bearing units and normally require little maintenance.

3. Tolerances

3.1 Tolerance of housings bore-D

Please refer to Table 3A.

Table 3A **Unit: 0.001 mm**

Bore (mm)	G7	H7	H8	J7
50 - 80	+40	+30	+46	+18
	+10	0	0	-12
80 - 120	+42	+35	+54	+22
	+12	0	0	-13
120 - 180	+54	+40	+63	+26
	+14	0	0	-14
180 - 250	+61	+46	+72	+30
	+15	0	0	-16
250 - 315	+69	+52	+81	+36
	+17	0	0	-16

3.2 Dimension of housings: A, F, d1,d2

Please refer to Table 3B.

Table 3B **unit: mm**

Over	Incl.	A (h13)	F (H13)	d1 (H12)	d2 (H13)
		0	+0.33	+0.21	+0.33
18	30	-0.33	0	0	0
		0	+0.39	+0.25	+0.39
30	50	-0.39	0	0	0
		0	+0.46	+0.3	+0.46
50	80	-0.46	0	0	0
		0	+0.54	+0.35	+0.54
80	120	-0.54	0	0	0
		0	+0.63	+0.4	+0.63
120	180	-0.63	0	0	0
		0	+0.72	+0.46	+0.72
180	250	-0.72	0	0	0

3.3 Tolerances of other dimensions of housings

Please refer to Table 3C and Table 3D.

Table 3C **unit: mm**

One side machining		
Over	Incl.	
5	100	±1.5
10	200	±2.0

Table 3D **unit: mm**

General tolerances for casting					
Length			Thickness		
Over	Incl.		Over	Incl.	
up	120	±1.5	up	10	±1.5
120	250	±2.0	10	18	±2.0
250	400	±3.0	18	30	±3.0
400	800	±4.0	30	50	±3.5

4. Lubrication

SN and SNU plummer block housings usually uses grease for lubrication. During installation or periodic maintenance, the lubricating grease added is able to ensure that before next maintenance a good lubricating condition could be maintained. Lubricating grease usually uses lithium grease. The suitable temperature range is -30°C to +120°C. The filling quantity is 1/3 of the inner body of the housing base after the installation of the bearing. The normal usage life of the lubricating grease is 6 months. Upon expiry all the lubricating grease should be replaced.

When the plummer block housing is under high temperature, great speed or heavy loading working environment, constant replacement of the lubricating grease is necessary. At this time, grease nipple is required at the housing cap.

5. The permitted loading capacity (SN, SNU)

The permitted loading capacity of SN, SNU plummer block housings are related to the loading capacity and the strength of the bolt-screws. Under normal circumstances, Plummer block housing is applicable to axial load. When the loading is from other directions, apart from axial, a check should be carried out to see the bolt-screws between the housing cap and the housing base, between the frame.

When working out the permitted loading capacity, the safety factor should be considered. In normal engineering, the safety factor of bolt-screw is 3. The safety factor of breaking loading capacity of the housing is 6.

The reference value of the breaking loading capacity of housing in different directions and the maximum loading capacity of bolt-screw is set out in below Fig. 5A. The maximum loading capacity of plummer block housing could select P180° direction 2/3 of the breaking loading capacity. When the loading direction exceeds 90°, bolt screws should be fastened evenly with the housing set out in the Table 5A.

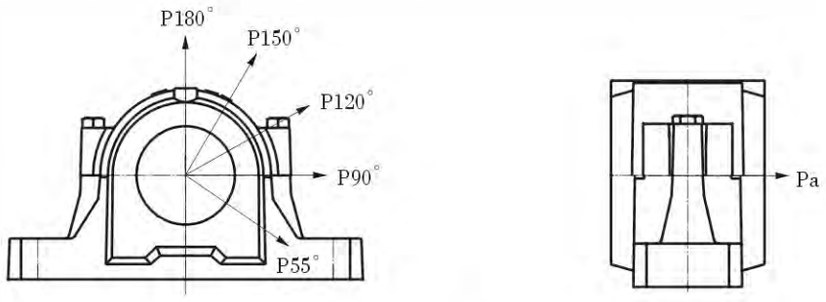


Fig. 5.1

Table 5A

Housing size	Breaking loads for load direction (KN)						Maximum load of 2 cap bolts for load direction (KN)			Cap bolts size	Suggest tightening torque (N.m)
	Pa	P55°	P90°	P120°	P150°	P180°	P120°	P150°	P180°		
SNU 505	48	145	90	65	60	75	40	23	20	M 8X40	25
SNU 506-605, SN 206, 506	55	165	100	75	65	85	40	23	20	M 8X40	25
SNU 507-606, SN 207, 507, 606	60	180	110	80	75	90	60	35	30	M 10X50	50
SNU 508-607, SN 208, 508, 607	67	200	120	90	80	100	60	35	30	M 10X50	50
SNU 509, SN 209, 509	70	210	130	95	85	105	60	35	30	M 10X50	50
SNU 510-608, SN 210, 510	80	240	145	110	95	120	60	35	30	M 10X50	50
SN 608							90	52	45	M 12X60	80
SNU 511-609, SN 211, 511, 609	87	260	155	120	105	130	90	52	45	M 12X60	80
SNU 512-610, SN 212, 512, 610	93	280	170	125	110	140	90	52	45	M 12X60	80
SNU 513-611, SN 213, 513, 611	103	310	185	140	125	155	90	52	45	M 12X65	80
SNU 515-612, SN 215, 515, 612	123	370	220	165	150	185	90	52	45	M 12X65	80
SNU 516-613	130	390	235	175	155	195	90	52	45	M 12X70	80
SN 216, 516, 613							170	98	85	M 16X70	160
SNU 517	147	440	270	200	175	220	90	52	45	M 12X70	80
SN 217, SN 517							170	98	85	M 16X80	160
SNU 518-615, SN 218, 518, 615	173	520	310	235	210	260	170	98	85	M 16X80	160
SNU 519-616, SN 219, 519, 616	180	540	330	245	215	270	170	98	85	M 16X80	160
SNU 520-617, SN 220, 520, 617	190	570	340	255	230	285	260	150	130	M 20X100	200
SNU 522-619, SN 222, 522, 618, 619	207	620	370	280	250	310	260	150	130	M 20X100	200
SNU 524-620, SN 224, 524, 620	243	730	440	330	295	365	260	150	130	M 20X100	200
SNU 526, SN 226, 526	277	830	500	375	330	415	380	220	190	M 24X120	200
SNU 528, SN 228, 528	327	980	590	440	390	490	380	220	190	M 24X120	350
SNU 530, SN 230, 530	370	1110	670	500	445	555	380	220	190	M 24X130	350
SNU 532, SN 232, 532	450	1350	810	610	540	675	380	220	190	M 24X130	350

When the loading capacity direction is between 55° to 120° and face the axial load, the plummer block housing should be installed end-cover follow the axial direction or pin should be added between the housing base and frame.

6. Specification of accessories (SN, SNU)

6.1 Locating ring

The bearing seating in the housing bore is machined to a tolerance H8 so that in most cases a loose fit of the bearing outer ring is assured and generally the seating width is such that the bearings has axial freedom.

Installation of the locating rings: in case of two rings to be fixed on both sides of the bearing; in case of one ring to be fixed on the side with the sleeve nut.

The symbol of the locating ring is SR. When customer place orders for it should state clearly the specification, size and quantity of the required locating ring.

Please refer to below drawing Fig. 6A and Table 6A.

Fig. 6A

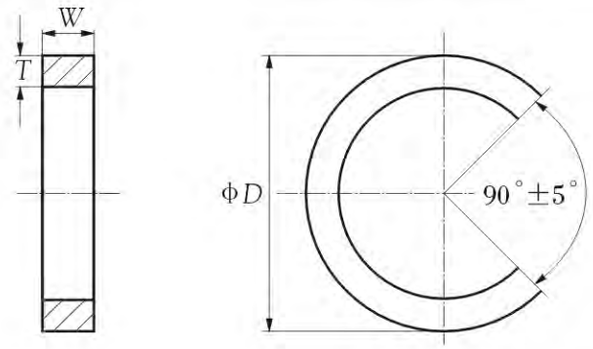


Table 6A Selection of locating rings **Unit: mm**

Housing number	T	D	$W^{0}_{\delta 2}$
SN 206 - SN 210 SN 506 - SN 510 SN 606 - SN 608 SNU 505 - SNU 510	3.5	Please refer to pages 360 - 369	
SN 211 - SN 230 SN 511 - SN 230 SN 609 - SN 620 SNU 511 - SNU 530	5.0		
SN 232 SN 532 SNU 532	7.5		

6.2 Nipple hole

SN, SNU plummer block housings will not supply grease nipple upon delivery under usual circumstances. If customer requests, we could supply according to the size / specification and please refer to Table 6B.

Table 6B Selection of nipple holes

Housing number	Nipple holes	Remarks
SN 206 - SN 210 SN 506 - SN 510 SN 606 - SN 608 SNU 505 - SNU 510	M 6	Or base on the request of client
SN 211 - SN 230 SN 511 - SN 520 SN 609 - SN 617 SNU 511 - SNU 520	1/8 - 27 NPT	
SN 222 - SN 232 SN 522 - SN 532 SN 618 - SN 622 SNU 522 - SNU 532	1/4 - 18 NPT	

6.3 Seals

KSM will usually provide customers with 2 kinds of standards of seals. SN plummer block housing uses felt seal. SNU plummer block housing uses U-ring seal.

SN plummer block housing using felt seal is a simple but reliable one. It is of a contact / brushing type. It is suitable for - 30°C to +100°C temperature. The perimeter contact rate is less than 4m/sec applicable situation. It can also be used in situation of greater speed. But in such situation there will be space between felt seal and machine shaft.

To ensure the function of felt seal, the coarse degree of the surface of the contact area between felt seal and machine shaft should be less than Ra1.6 μm. Before the fixing of oil seal, it should be soaked in hot oil for several minutes.

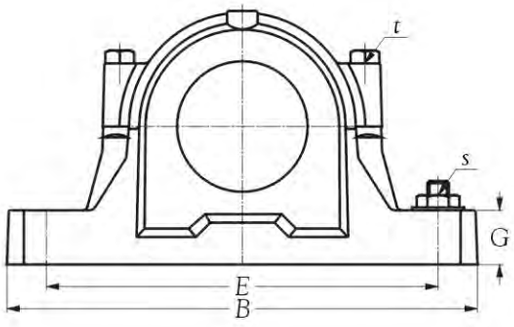
SNU plummer block housing uses U-ring seal is made of NBR plus mild steel plate. Complete U-ring is made of two equal halves. U-ring seal has 2 thin lips having close contact with the machine shaft surface. It is suitable for temperature between -30°C to +100°C. The perimeter contact speed is less than 8 m/sec applicable situation. During installation, lubricating grease should be added into the space between the two rings. Besides, the contact surface between machine shaft and two lips should be polished before hand.

To avoid oil leakage, during installation one layer of very thin silicon should be placed on the two surfaces.

6.4 Eye bolts

Only available for sizes of SN224-SN232, SN524-SN532, SN618-SN620, SNU524-SNU532.

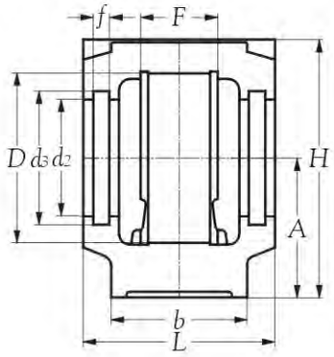
Plummer block housings series SNU 500-600

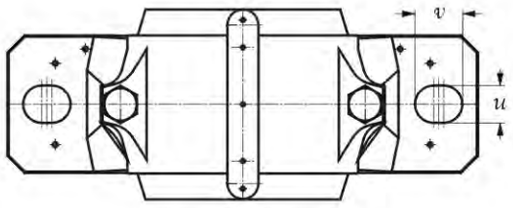


Housing size	Shaft diameter d (mm)	Plummer block housing	Plummer block housing dimensions (mm)										
			D (H8)	B	b	G	F (H13)	A (h13)	L	H	E	d_2 (H12)	d_3 (H13)
SNU 505	20	SNU 505	52	165	46	19	25	40	67	73	130	31.5	39.5
SNU 605	20	SNU 506-605	62	185	52	22	32	50	77	88	150	36.5	44.5
SNU 506	25	SNU 506-605	62	185	52	22	32	50	77	88	150	36.5	44.5
SNU 606	25	SNU 507-606	72	185	52	22	34	50	82	93	150	46.5	54.5
SNU 507	30	SNU 507-606	72	185	52	22	34	50	82	93	150	46.5	54.5
SNU 607	30	SNU 508-607	80	205	60	25	39	60	85	107	170	51.5	59.5
SNU 508	35	SNU 508-607	80	205	60	25	39	60	85	107	170	51.5	59.5
SNU 608	35	SNU 510-608	90	205	60	25	41	60	90	112	170	62.0	70.5
SNU 509	40	SNU 509	85	205	60	25	30	60	85	109	170	56.5	64.5
SNU 609	40	SNU 511-609	100	255	70	28	44	70	95	127	210	67.0	75.5
SNU 510	45	SNU 510-608	90	205	60	25	41	60	90	112	170	62.0	70.5
SNU 610	45	SNU 512-610	110	255	70	30	48	70	105	133	210	72.0	80.5
SNU 511	50	SNU 511-609	100	255	70	28	44	70	95	127	210	67.0	75.5
SNU 611	50	SNU 513-611	120	275	80	30	51	80	110	148	230	77.0	85.5
SNU 512	55	SNU 512-610	110	255	70	30	48	70	105	133	210	72.0	80.5
SNU 612	55	SNU 515-612	130	280	80	30	56	80	115	154	230	87.0	95.5
SNU 513	60	SNU 513-611	120	275	80	30	51	80	110	148	230	77.0	85.5
SNU 613	60	SNU 516-613	140	315	90	32	58	95	120	175	260	92.5	101.0

Noted: All SN housings available with felt-seals (fS).

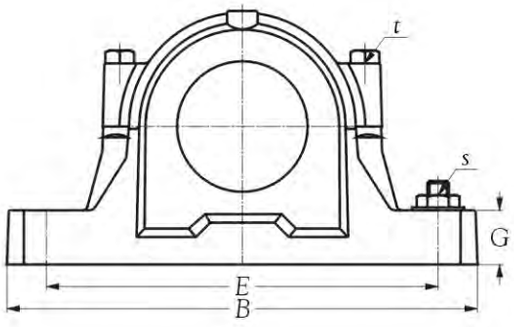
Plummer block housings
series SNU 500-600





Plummer block housing dimensions (mm)						Appropriate apartment					
f	u	v	s	t	Mass kgs.	Bearing number	Adapter sleeve	Locating ring number	Locating ring qty	Seal number	End cover
5	15	20	M 12	M 8	1.4	**1205 K** **2205 K** **22205 K**	H 205 H 305	SR 52X5 SR 52X7	2 1	U 505	505 UA
5	15	20	M 12	M 8	1.9	**1305 K** **2305 K**	H 305 H 2305	SR 62X7.5 SR 62X8	2 1	U 605	506 UA
5	15	20	M 12	M 8	1.9	**1206 K** **2206 K** **22206 K**	H 206 H 306	SR 62X8 SR 62X6	2 2	U 506	506 UA
5	15	20	M 12	M 10	2.0	**1306 K** **2306 K**	H 306 H 2306	SR 72X7.5 SR 72X7	2 1	U 606	507 UA
5	15	20	M 12	M 10	2.0	**1207 K** **2207 K** **22207 K**	H 207 H 307	SR 72X8.5 SR 72X5.5	2 2	U 507	507 UA
5	15	20	M 12	M 10	2.7	**1307 K** **2307 K**	H 307 H 2307	SR 80X9 SR 80X8	2 1	U 607	508 UA
5	15	20	M 12	M 10	2.7	**1208 K** **2208 K** **22208 K**	H 208 H 308	SR 80X10.5 SR 80X8	2 2	U 508	508 UA
5	15	20	M 12	M 10	2.9	**1308 K** **21308 K** **2308 K** **22308 K**	H 308 H 2308	SR 90X9 SR 90X8	2 1	U 608	511 NA-510 UA
5	15	20	M 12	M 10	2.8	**1209 K** **2209 K** **22209 K**	H 209 H 309	SR 85X5.5 SR 85X7	2 1	U 509	509 UA
5	18	24	M 16	M 12	4.5	**1309 K** **21309 K** **2309 K** **22309 K**	H 309 H 2309	SR 100X9.5 SR 100X8	2 1	U 609	512 NA-511 UA
5	15	20	M 12	M 10	2.9	**1210 K** **2210 K** **22210 K**	H 210 H 310	SR 90X10.5 SR 90X9	2 2	U 510	511 NA-510 UA
5	18	24	M 16	M 12	5.0	**1310 K** **21310 K** **2310 K** **22310 K**	H 310 H 2310	SR 110X10.5 SR 110X8	2 1	U 610	513 NA-512 UA
5	18	24	M 16	M 12	4.5	**1211 K** **2211 K** **22211 K**	H 211 H 311	SR 100X11.5 SR 100X9.5	2 2	U 511	512 NA-511 UA
5	18	24	M 16	M 12	6.3	**1311 K** **21311 K** **2311 K** **22311 K**	H 311 H 2311	SR 120X11 SR 120X8	2 1	U 611	515 NA-513 UA
5	18	24	M 16	M 12	5.0	**1212 K** **2212 K** **22212 K**	H 212 H 312	SR 110X13 SR 110X10	2 2	U 512	513 NA-512 UA
5	18	24	M 16	M 12	6.6	**1312 K** **21312 K** **2312 K** **22312 K**	H 312 H 2312	SR 130X12.5 SR 130X10	2 1	U 612	517 NA-515 UA
5	18	24	M 16	M 12	6.3	**1213 K** **2213 K** **22213 K**	H 213 H 313	SR 120X14 SR 120X10	2 2	U 513	515 NA-513 UA
5	22	28	M 20	M 16	9.4	**1313 K** **21313 K** **2313 K** **22313 K**	H 313 H 2313	SR 140X12.5 SR 140X10	2 1	U 613	518 NA-516 UA

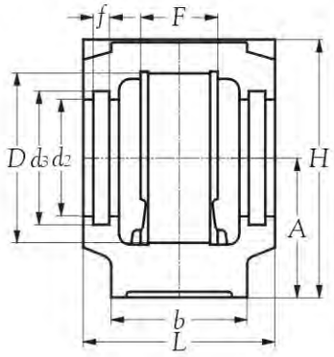
Plummer block housings series SNU 500-600

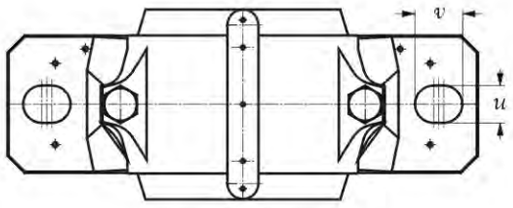


Housing size	Shaft diameter d (mm)	Plummer block housing	Plummer block housing dimensions (mm)										
			D (H8)	B	b	G	F (H13)	A (h13)	L	H	E	d_2 (H12)	d_3 (H13)
SNU 515	65	SNU 515-612	130	280	80	30	56	80	115	154	230	87.0	95.5
SNU 615	65	SNU 518-615	160	345	100	35	65	100	140	191	290	102.5	111.0
SNU 516	70	SNU 516-613	140	315	90	32	58	95	120	175	260	92.5	101.0
SNU 616	70	SNU 519-616	170	345	100	35	68	112	145	208	290	131.0	141.0
SNU 517	75	SNU 517	150	320	90	32	61	95	125	181	260	97.5	106.0
SNU 617	75	SNU 520-617	180	380	110	40	70	112	160	214	320	137.5	147.5
SNU 518	80	SNU 518-615	160	345	100	35	65	100	140	191	290	102.5	111.0
SNU 519	85	SNU 519-616	170	345	100	35	68	112	145	208	290	131.0	141.0
SNU 619	85	SNU 522-619	200	410	120	45	80	125	175	237	350	147.5	157.5
SNU 520	90	SNU 520-617	180	380	110	40	70	112	160	214	320	137.5	147.5
SNU 620	90	SNU 524-620	215	410	120	45	86	140	185	271	350	157.5	167.5
SNU 522	100	SNU 522-619	200	410	120	45	80	125	175	237	350	147.5	157.5
SNU 524	110	SNU 524-620	215	410	120	45	86	140	185	271	350	157.5	167.5
SNU 526	115	SNU 526	230	445	130	50	90	150	190	290	380	167.5	177.5
SNU 528	125	SNU 528	250	500	150	50	98	150	205	302	420	177.5	187.5
SNU 530	135	SNU 530	270	530	160	60	106	160	220	323	450	192.5	202.5
SNU 532	140	SNU 532	290	550	160	60	114	170	235	344	470	202.5	212.5

Noted: All SN housings available with felt-seals (FS).

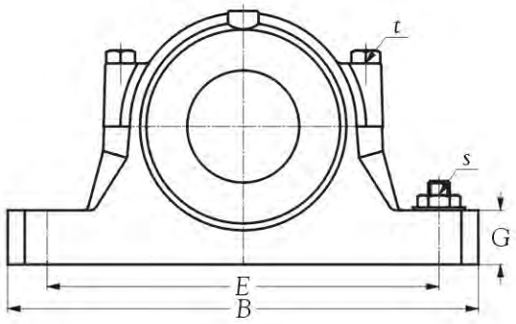
Plummer block housings
series SNU 500-600





Plummer block housing dimensions (mm)						Appropriate apartment					
f	u	v	s	t	Mass kgs.	Bearing number	Adapter sleeve	Locating ring number	Locating ring qty	Seal number	End cover
5	18	24	M 16	M 12	6.6	**1215 K** **2215 K** **22215 K**	H 215 H 315	SR 130X15.5 SR 130X12.5	2 2	U 515	517 NA-515 UA
5	22	28	M 20	M 16	12.3	**1315 K** **21315 K** **2315 K** **22315 K**	H 315 H 2315	SR 160X14 SR 160X10	2 1	U 615	520 NA-518 UA
5	22	28	M 20	M 16	9.4	**1216 K** **2216 K** **22216 K**	H 216 H 316	SR 140X16 SR 140X12.5	2 2	U 516	518 NA-516 UA
6	22	28	M 20	M 16	13.5	**1316 K** **21316 K** **2316 K** **22316 K**	H 316 H 2316	SR 170X14.5 SR 170X10	2 1	U 616	526 NA-519 UA
5	22	28	M 20	M 16	9.8	**1217 K** **2217 K** **22217 K**	H 217 H 317	SR 150X16.5 SR 150X12.5	2 2	U 517	519 NA-517 UA
6	26	32	M 24	M 20	16.6	**1317 K** **21317 K** **2317 K** **22317 K**	H 317 H 2317	SR 180X14.5 SR 180X10	2 1	U 617	520 UA
5	22	28	M 20	M 16	12.3	**1218 K** **2218 K** **22218 K** **23218 K**	H 218 H 318 H 2318	SR 160X17.5 SR 160X12.5 SR 160X12.5	2 2 1	U 518	520 NA-518 UA
6	22	28	M 20	M 16	13.5	**1219 K** **2219 K** **22219 K**	H 219 H 319	SR 170X18 SR 170X12.5	2 2	U 519	526 NA-519 UA
6	26	32	M 24	M 20	20.4	**1319 K** **21319 K** **2319 K** **22319 K**	H 319 H 2319	SR 200X17.5 SR 200X13	2 1	U 619	528 NA-522 UA
6	26	32	M 24	M 20	16.6	**1220 K** **2220 K** **22220 K** **23220 K**	H 220 H 320 H 2320	SR 180X18 SR 180X12 SR 180X9.7	2 2 1	U 520	520 UA
6	26	32	M 24	M 20	25.0	**1320 K** **21320 K** **2320 K** **22320 K**	H 320 H 2320	SR 215X19.5 SR 215X13	2 1	U 620	530 NA-524 UA
6	26	32	M 24	M 20	20.4	**1222 K** **2222 K** **22222 K** **23222 K**	H 222 H 322 H 2322	SR 200X21 SR 200X13.5 SR 200X10.2	2 2 1	U 522	528 NA-522 UA
6	26	32	M 24	M 20	25.0	**22224 K** **23224 K**	H 3124 H 2324	SR 215X14 SR 215X10	2 1	U 524	530 NA-524 UA
6	28	35	M 24	M 24	29.8	**22226 K** **23226 K**	H 3126 H 2326	SR 230X13 SR 230X10	2 1	U 526	532 NA-526 UA
6	35	42	M 30	M 24	37.5	**22228 K** **23228 K**	H 3128 H 2328	SR 250X15 SR 250X10	2 1	U 528	528 UA
6	35	42	M 30	M 24	46.0	**22230 K** **23230 K**	H 3130 H 2330	SR 270X16.5 SR 270X10	2 1	U 530	530 UA
6	35	42	M 30	M 24	51.0	**22232 K** **23232 K**	H 3132 H 2332	SR 290X17 SR 290X10	2 1	U 532	532 UA

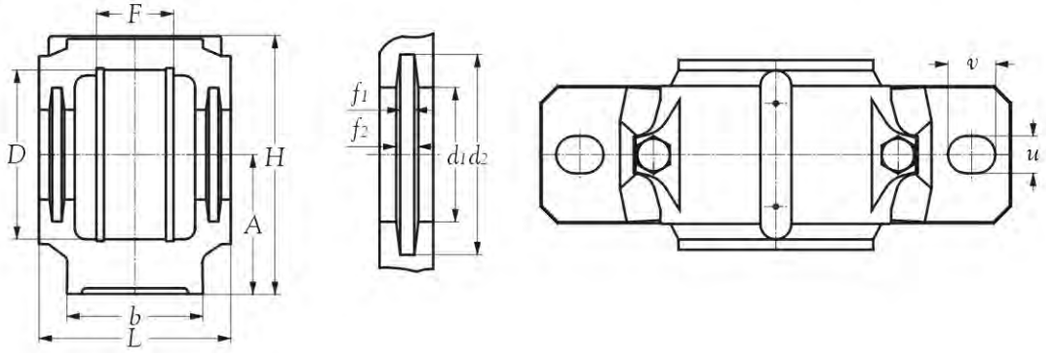
Plummer block housings series SN 500



Housing size	Shaft diameter d (mm)	Plummer block housing	Plummer block housing dimensions (mm)										
			D (H8)	B	b	G	F (H13)	A (h13)	L	H	E	d_2 (H12)	d_3 (H13)
SN 506	25	SN 506	62	185	52	22	30.0	50	77	90	150	26.5	38
SN 507	30	SN 507	72	185	52	22	33.0	50	82	95	150	31.5	43
SN 508	35	SN 508	80	205	60	25	33.0	60	85	112	170	36.5	48
SN 509	40	SN 509	85	205	60	25	31.0	60	85	112	170	41.5	53
SN 510	45	SN 510	90	205	60	25	33.0	60	90	115	170	46.5	58
SN 511	50	SN 511	100	255	70	28	33.0	70	95	130	210	51.5	67
SN 512	55	SN 512	110	255	70	30	38.0	70	105	135	210	56.5	72
SN 513	60	SN 513	120	275	80	30	43.0	80	110	150	230	62.0	77
SN 515	65	SN 515	130	280	80	30	41.0	80	115	155	230	67.0	82
SN 516	70	SN 516	140	315	90	32	43.0	95	120	175	260	72.0	89
SN 517	75	SN 517	150	320	90	32	46.0	95	125	185	260	77.0	94
SN 518	80	SN 518	160	345	100	35	62.4	100	145	195	290	82.0	99
SN 519	85	SN 519	170	345	100	35	53.0	112	140	210	290	87.0	104
SN 520	90	SN 520	180	380	110	40	70.3	112	160	215	320	92.0	111
SN 522	100	SN 522	200	410	120	45	80.0	125	175	239	350	102.0	125
SN 524	110	SN 524	215	410	120	45	86.0	140	185	270	350	113.0	135
SN 526	115	SN 526	230	445	130	50	90.0	150	190	290	380	118.0	140
SN 528	125	SN 528	250	500	150	50	98.0	150	205	305	420	128.0	154
SN 530	135	SN 530	270	530	160	60	106.0	160	220	325	450	138.0	164
SN 532	140	SN 532	290	550	160	60	114.0	170	235	340	470	143.0	173

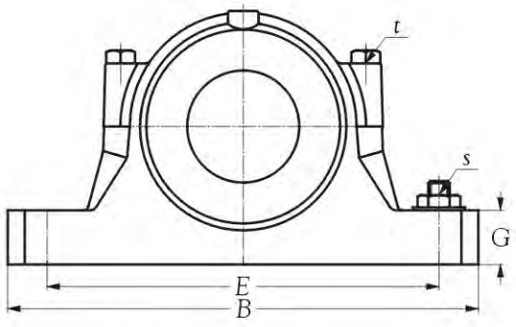
Noted: All SN housings available with felt-seals (FS).

Plummer block housings
series SN 500



Plummer block housing dimensions (mm)							Appropriate apartment					
f_1	f_2	u	v	s	t	Mass kgs.	Bearing number	Adapter sleeve	Locating ring number	Locating ring qty	Seal number	End cover
4	5.4	15	20	M 12	M 8	2.3	1206 K 2206 K 22206 K	H 206 H 306	SR 62X7 SR 62X10	2 1	FS 6X6X105	506 NA
4	5.4	15	20	M 12	M 10	2.5	1207 K 2207 K 22207 K	H 207 H 307	SR 72X8 SR 72X10	2 1	FS 6X6X120	507 NA
4	5.4	15	20	M 12	M 10	3.4	1208 K 2208 K 22208 K	H 208 H 308	SR 80X7.5 SR 80X10	2 1	FS 6X6X135	508 NA
4	5.4	15	20	M 12	M 10	3.4	1209 K 2209 K 22209 K	H 209 H 309	SR 85X6 SR 85X8	2 1	FS 6X6X150	509 NA
4	5.4	15	20	M 12	M 10	3.6	1210 K 2210 K 22210 K	H 210 H 310	SR 90X6.5 SR 90X10	2 1	FS 6X6X165	510 NA
5	6.9	18	23	M 16	M 12	4.8	1211 K 2211 K 22211 K	H 211 H 311	SR 100X6 SR 100X8	2 1	FS 6X9X190	511 NA-510 UA
5	6.9	18	23	M 16	M 12	5.4	1212 K 2212 K 22212 K	H 212 H 312	SR 110X8 SR 110X10	2 1	FS 6X9X205	512 NA-511 UA
5	6.8	18	23	M 16	M 12	6.3	1213 K 2213 K 22213 K	H 213 H 313	SR 120X10 SR 120X12	2 1	FS 6X9X220	513 NA-512 UA
5	6.8	18	23	M 16	M 12	7.4	1215 K 2215 K 22215 K	H 215 H 315	SR 130X8 SR 130X10	2 1	FS 6X9X235	515 NA-513 UA
6	8.1	22	27	M 20	M 16	9.6	1216 K 2216 K 22216 K	H 216 H 316	SR 140X8.5 SR 140X10	2 1	FS 8X10X255	516 NA
6	8.1	22	27	M 20	M 16	9.8	1217 K 2217 K 22217 K	H 217 H 317	SR 150X9 SR 150X10	2 1	FS 8X10X270	517 NA-515 UA
6	8.1	22	27	M 20	M 16	14.2	1218 K 2218 K 22218 K 23218 K	H 218 H 318 H 2318	SR 160X16.2 SR 160X11.2 SR 160X10	2 2 1	FS 8X10X285	518 NA-516 UA
6	8.1	22	27	M 20	M 16	15.2	1219 K 22219 K	H 219 H 319	SR 170X10.5 SR 170X10	2 1	FS 8X10X300	519 NA-517 UA
7	9.3	26	32	M 24	M 20	19.0	2220 K 22220 K 23220 K	H 320 H 2320	SR 180X12.1 SR 180X10	2 1	FS 9X10X320	520 NA-518 UA
8	10.8	26	32	M 24	M 20	23.1	2222 K 22222 K 23222 K	H 322 H 2322	SR 200X13.5 SR 200X10	2 1	FS 10X13X360	522 NA
8	10.7	26	32	M 24	M 20	26.0	22224 K 23224 K	H 3124 H 2324	SR 215X14 SR 215X10	2 1	FS 10X13X390	524 NA
8	10.7	28	36	M 24	M 24	32.7	22226 K 23226 K	H 3126 H 2326	SR 230X13 SR 230X10	2 1	FS 10X13X410	526 NA-519 UA
9	12.2	33	42	M 30	M 24	43.5	22228 K 23228 K	H 3128 H 2328	SR 250X15 SR 250X10	2 1	FS 12X14X445	528 NA-522 UA
9	12.2	33	42	M 30	M 24	48.7	22230 K 23230 K	H 3130 H 2330	SR 270X16.5 SR 270X10	2 1	FS 12X14X475	530 NA-524 UA
10	13.7	33	42	M 30	M 24	60.7	22232 K 23232 K	H 3132 H 2332	SR 290X17 SR 290X10	2 1	FS 12X17X500	532 NA-526 UA

Plummer block housings series SN 600

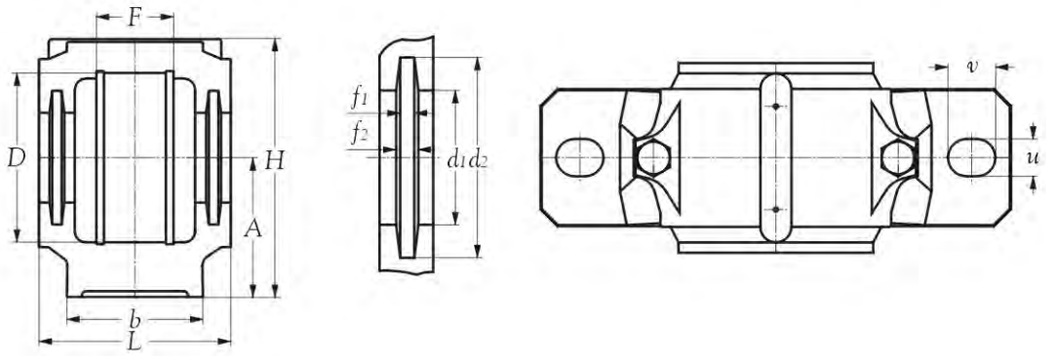


Housing size	Shaft diameter d (mm)	Plummer block housing	Plummer block housing dimensions (mm)										
			D (H8)	B	b	G	F (H13)	A (h13)	L	H	E	d_2 (H12)	d_3 (H13)
SN 606	25	SN 606	72	185	52	22	37	50	82	95	150	26.5	38
SN 607	30	SN 607	80	205	60	25	41	60	90	110	170	31.5	43
SN 608	35	SN 608	90	205	60	25	43	60	95	115	170	36.5	48
SN 609	40	SN 609	100	255	70	28	46	70	105	130	210	41.5	53
SN 610	45	SN 610	110	255	70	30	50	70	115	135	210	46.5	58
SN 611	50	SN 611	120	275	80	30	53	80	120	150	230	51.5	67
SN 612	55	SN 612	130	280	80	30	56	80	125	155	230	56.5	72
SN 613	60	SN 613	140	315	90	32	58	95	130	175	260	62.0	77
SN 615	65	SN 615	160	345	100	35	65	100	140	195	290	67.0	82
SN 616	70	SN 616	170	345	100	35	68	112	145	215	290	72.0	89
SN 617	75	SN 617	180	380	110	40	70	112	155	218	320	77.0	94
SN 618	80	SN 618	190	400	110	33	74	112	160	230	320	82.0	99
SN 619	85	SN 619	200	420	120	36	77	125	170	245	350	87.0	104
SN 620	90	SN 620	215	420	120	38	83	140	175	280	350	92.0	111

Noted: All SN housings available with felt-seals (FS).

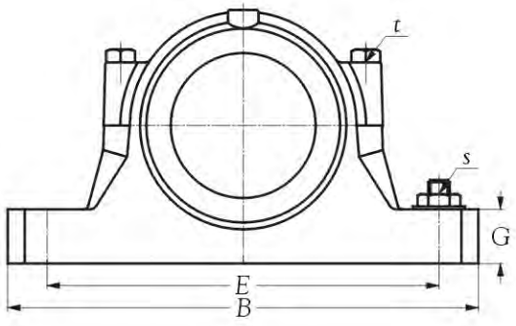
P8

Plummer block housings
series SN 600



Plummer block housing dimensions (mm)							Appropriate apartment					
f_1	f_2	u	v	s	t	Mass kgs.	Bearing number	Adapter sleeve	Locating ring number	Locating ring qty	Seal number	End cover
4	5.4	15	20	M 12	M 10	2.2	**1306 K** **2306 K**	H 306 H 2306	SR 72X9 SR 72X10	2 1	FS 6X6X105	506 NA
4	5.4	15	20	M 12	M 10	3.4	**1307 K** **2307 K**	H 307 H 2307	SR 80X10 SR 80X10	2 1	FS 6X6X120	507 NA
4	5.4	15	20	M 12	M 12	3.4	**1308 K** **21308 K** **2308 K** **22308 K**	H 308 H 2308	SR 90X10 SR 90X10	2 1	FS 6X6X135	508 NA
4	5.4	18	23	M 16	M 12	5.0	**1309 K** **21309 K** **2309 K** **22309 K**	H 309 H 2309	SR 100X10.5 SR 100X10	2 1	FS 6X6X150	509 NA
4	5.4	18	23	M 16	M 12	5.4	**1310 K** **21310 K** **2310 K** **22310 K**	H 310 H 2310	SR 110X11.5 SR 110X10	2 1	FS 6X6X165	510 NA
5	6.9	18	23	M 16	M 12	6.8	**1311 K** **21311 K** **2311 K** **22311 K**	H 311 H 2311	SR 120X12 SR 120X10	2 1	FS 6X9X190	511 NA-510 UA
5	6.9	18	23	M 16	M 12	7.1	**1312 K** **21312 K** **2312 K** **22312 K**	H 312 H 2312	SR 130X12.5 SR 130X10	2 1	FS 6X9X205	512 NA-511 UA
5	6.8	22	27	M 20	M 16	10.0	**1313 K** **21313 K** **2313 K** **22313 K**	H 313 H 2313	SR 140X12.5 SR 140X10	2 1	FS 6X9X220	513 NA-512 UA
5	6.8	22	27	M 20	M 16	13.8	**1315 K** **21315 K** **2315 K** **22315 K**	H 315 H 2315	SR 160X14 SR 160X10	2 1	FS 6X9X235	515 NA-513 UA
6	8.1	22	27	M 20	M 16	16.9	**1316 K** **21316 K** **2316 K** **22316 K**	H 316 H 2316	SR 170X14.5 SR 170X10	2 1	FS 8X10X255	516 NA
6	8.1	26	32	M 24	M 20	18.9	**1317 K** **21317 K** **2317 K** **22317 K**	H 317 H 2317	SR 180X14.5 SR 180X10	2 1	FS 8X10X270	517 NA-515 UA
6	8.1	26	35	M 24	M 20	19.8	**1318 K** **2318 K** **22318 K**	H 318 H 2318	SR 190X15.5 SR 190X10	2 1	FS 8X10X285	518 NA-516 UA
6	8.1	26	35	M 24	M 20	24.7	**1319 K** **2319 K** **22319 K**	H 319 H 2319	SR 200X16 SR 200X10	2 1	FS 8X10X300	519 NA-517 UA
7	9.3	26	35	M 24	M 20	27.0	**1320 K** **2320 K** **22320 K**	H 320 H 2320	SR 215X18 SR 215X10	2 1	FS 9X10X320	520 NA-518 UA

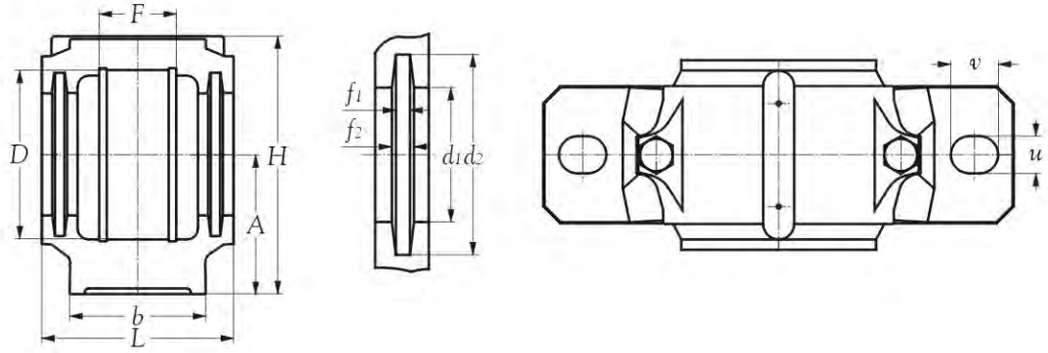
Plummer block housings series SN 200



Housing size	Shaft diameter d (mm)	Plummer block housing	Plummer block housing dimensions (mm)										
			D (H8)	B	b	G	F (H13)	A (h13)	L	H	E	d_2 (H12)	d_3 (H13)
SN 206	30	SN 206	62	185	52	22	30.0	50	77	90	150	36.5	48
SN 207	35	SN 207	72	185	52	22	33.0	50	82	95	150	46.5	58
SN 208	40	SN 208	80	205	60	25	33.0	60	85	112	170	51.5	67
SN 209	45	SN 209	85	205	60	25	31.0	60	85	112	170	56.5	72
SN 210	50	SN 210	90	205	60	25	33.0	60	90	115	170	62.0	77
SN 211	55	SN 211	100	255	70	28	33.0	70	95	130	210	67.0	82
SN 212	60	SN 212	110	255	70	30	38.0	70	105	135	210	72.0	89
SN 213	65	SN 213	120	275	80	30	43.0	80	110	150	230	77.0	94
SN 215	75	SN 215	130	280	80	30	41.0	80	115	155	230	87.0	104
SN 216	80	SN 216	140	315	90	32	43.0	95	120	175	260	92.0	111
SN 217	85	SN 217	150	320	90	32	46.0	95	125	185	260	97.0	120
SN 218	90	SN 218	160	345	100	35	62.4	100	145	195	290	102.0	125
SN 220	100	SN 220	180	380	110	40	70.3	112	160	215	320	118.0	140
SN 222	110	SN 222	200	410	120	45	80.0	125	175	239	350	128.0	154
SN 224	120	SN 224	215	410	120	45	86.0	140	185	270	350	138.0	164
SN 226	130	SN 226	230	445	130	50	90.0	150	190	290	380	148.0	178
SN 228	140	SN 228	250	500	150	50	98.0	150	205	305	420	158.0	188
SN 230	150	SN 230	270	530	160	60	106.0	160	220	325	450	168.0	198
SN 232	160	SN 232	290	550	160	60	114.0	170	235	340	470	178.0	208

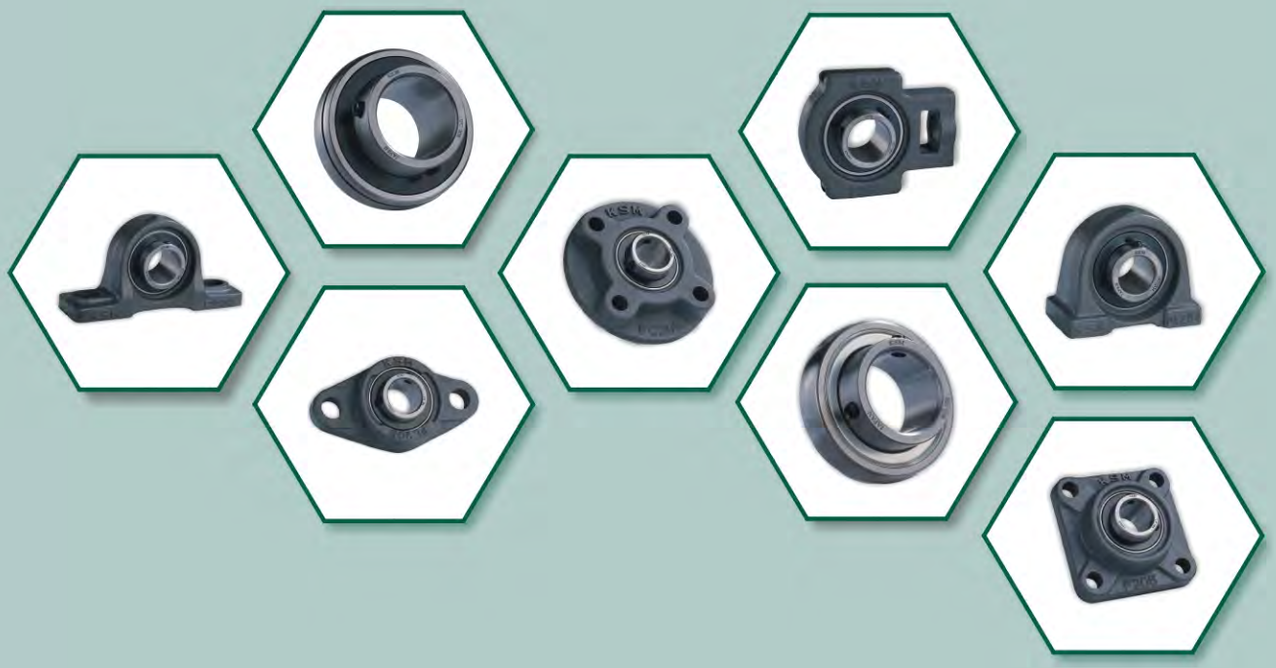
Noted: All SN housings available with felt-seals (FS).

Plummer block housings
series SN 200



Plummer block housing dimensions (mm)						Appropriate apartment					
f_1	f_2	u	v	s	t	Mass kgs.	Bearing number	Locating ring number	Locating ring qty	Seal number	End cover
4	5.4	15	20	M 12	M 8	2.3	**1206** **2206 22206**	SR 62X7 SR 62X10	2 1	FS 6X6X135	508 NA
4	5.4	15	20	M 12	M 10	2.3	**1207** **2207 22207**	SR 72X8 SR 72X10	2 1	FS 6X6X165	510 NA
5	6.9	15	20	M 12	M 10	3.2	**1208** **2208 22208**	SR 80X7.5 SR 80X10	2 1	FS 6X9X190	511 NA-510 UA
5	6.9	15	20	M 12	M 10	3.2	**1209** **2209 22209**	SR 85X6 SR 85X8	2 1	FS 6X9X205	512 NA-511 UA
5	6.8	15	20	M 12	M 10	3.3	**1210** **2210 22210**	SR 90X6.5 SR 90X10	2 1	FS 6X9X220	513 NA-512 UA
5	6.8	18	23	M 16	M 12	4.4	**1211** **2211 22211**	SR 100X6 SR 100X8	2 1	FS 6X9X235	515 NA-513 UA
6	8.1	18	23	M 16	M 12	5.0	**1212** **2212 22212**	SR 110X8 SR 110X10	2 1	FS 8X10X255	516 NA
6	8.1	18	23	M 16	M 12	5.9	**1213** **2213 22213**	SR 120X10 SR 120X12	2 1	FS 8X10X270	517 NA-515 UA
6	8.1	18	23	M 16	M 12	7.0	**1215** **2215 22215**	SR 130X8 SR 130X10	2 1	FS 8X10X300	519 NA-517 UA
7	9.3	22	27	M 20	M 16	8.9	**1216** **2216 22216**	SR 140X8.5 SR 140X10	2 1	FS 9X10X320	520 NA-518 UA
8	10.8	22	27	M 20	M 16	9.1	**1217** **2217 22217**	SR 150X9 SR 150X10	2 1	FS 10X13X340	217 NA
8	10.8	22	27	M 20	M 16	13.1	**1218** **2218 22218** **23218**	SR 160X16.2 SR 160X11.2 SR 160X10	2 2 1	FS 10X13X360	522 NA
8	10.7	26	32	M 24	M 20	17.5	**2220 22220** **22320**	SR 180X12.1 SR 180X10	2 1	FS 10X13X410	526 NA-519 UA
9	12.2	26	32	M 24	M 20	21.6	**2222 22222** **23222**	SR 200X13.5 SR 200X10	2 1	FS 12X14X445	528 NA-522 UA
9	12.2	26	32	M 24	M 20	24.2	**22224** **23224**	SR 215X14 SR 215X10	2 1	FS 12X14X475	530 NA-524 UA
10	13.7	28	36	M 24	M 24	30.2	**22226** **23226**	SR 230X13 SR 230X10	2 1	FS 12X17X515	226 NA
10	13.7	33	42	M 30	M 24	41.0	**22228** **23228**	SR 250X15 SR 250X10	2 1	FS 12X17X545	228 NA
10	13.7	33	42	M 30	M 24	46.0	**22230** **23230**	SR 270X16.5 SR 270X10	2 1	FS 12X17X580	230 NA
10	13.7	33	42	M 30	M 24	57.5	**22232** **23232**	SR 290X17 SR 290X10	2 1	FS 12X17X610	232 NA

KSM® NOTE



KSM®

BEARING UNITS

Technical information		Pages for refer
		T 388 - T 403
1	Feature	T 388
2	Lubrication	T 388 & T 389
3	Tolerances for mounted units	T 389 - T 394
4	Radial internal clearance of bearings	T 395
5	Selection of bearing size	T 396 - T 400
6	Selection of shafts	T 400 & T 401
7	Mounting of mounted units on shafts	T 401 & T 402
8	Standard of set-screws	T 402
9	Material for cast iron housing	T 403

1. Feature

The insert ball bearings of **KSM** are deep groove ball bearing with wide and narrow inner rings, consisting of insert bearings (SB200, UC200, UK200, SA200, CSA200, CSB200, SER200) and various housings. The types of mounted unitsare defined according to the different mounting methods of the bearings to shafts: the set-screws type, the adapter type.

The **KSM** housings are mainly casting housings. There are pressed steel plate housings as well align with ease during operation and can be conveniently mounted or dismounted.

The mounted units can operate satisfactorily under working conditions, especially for machines operating in dusty or muddy surroundings. Thus, they are widely used in agricultural, construction and transmission machineries, etc.

There are various types of sealing devices for our products, such as synthetic rubber seals, slinger with synthetic rubber seals and triple lip seals etc.

Sufficient lubricating grease has been put into the bearings during manufacturing, which can act as lubricating as well as rust proof. No more grease is needed to put in during the lubricating period when the bearings operate under normal conditions. Lubricating grease can be added from the fittings when the relubricate bearings operate under hard conditions.

The outer ring of the bearing has spherical outside surface which can be fitted to the concave spherical surface of the housing, and the fit between them can be clearance fit or interference fit according to different conditions. This combination provides self-alignment between the self-contained bearing and the housing, and compensates for a certain alignment errors orflexing of the shaft when the bearing is in operation. This definitely increases the bearing service life.

2. Lubrication

The insert ball bearings of **KSM** generally use CG-2 rust proof lithium based lubricating grease, with physical chemical properties shown in the following Table 2A. grease is filled in the Insert Ball Bearings during manufacturing.

Table 2A Physical chemical properties of lubricating grease

Density (1/mm)	Without operation	268
	Operated 60 times	260
Dropping point (°C)		128
Mechanical impurities	10-25 μm	within 1000
(pc / gram)	25-75 μm	within 500
	above 75 μm	0
Base oil kinematical Viscosity 40°C cst		80.3

The bearings usually operate below the temperature of 120°C (the measuring temperature of the outer rings is 100° C). Grease life reduction has to be taken into account when the bearing continues to operate at a temperature above 70°C. The lowest operating temperature should not be lower than - 30°C.

The permissible speed of rotation is connected with the fit between shaft and bearing. It is recommended that, under normal operating conditions, the fit between the bearing and the shaft is h7. Looser fit allowing lower speed is recommended when heavier load is applied.

3. Tolerances for mounted units

Table 3A Tolerances on inner rings of bearing with cylindrical bore **Unit: 0.001 mm**

Nominal bore diameter d		Cylindrical bore						Radial run-out
		Bore diameter				Width		
		dm		d		Bi		
		Deviations		Deviations		Deviations		
Over (mm)	Incl. (mm)	High	Low	High	Low	High	Low	(Max.)
10	18	+18	0	+22	-4	0	-120	12
18	30	+21	0	+25	-4	0	-120	15
30	50	+25	0	+30	-5	0	-120	18
50	80	+30	0	+36	-6	0	-150	22
80	120	+35	0	+42	-7	0	-200	28
120	150	+40	0	+48	-8	0	-250	35

Note: dm is defined as the arithmetical mean of the largest and the smallest diameter obtained by two-point measurements.

Table 3B Tolerances on inner rings of bearings with tapered bore

Unit: 0.001 mm

Nominal bore diameter d		Δd Deviations		$\Delta d_1 - \Delta d$	
Over (mm)	Incl. (mm)	High	Low	Max.	Min.
18	30	+33	0	+21	0
30	50	+39	0	+25	0
50	80	+46	0	+30	0
80	120	+54	0	+35	0
120	150	+63	0	+40	0

Note (1) The deviations from nominal taper are defined by the limits of (Δd_1 -Δd), where (Δd_1 is actual deviation of d_1 from nominal diameter at the largest end of bore and Δd is actual deviation of d from bearing bore nominal diameter.

(2) d1 is obtained by the following formula:
$d_1 = d + 0.083333\ B$
Where B is width of the bearing inner ring.

(3) The nominal taper angle = 2° 23'9.4"

(4) Pleas refer to the Fig. 3A.

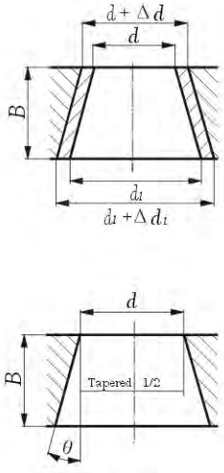


Fig. 3A

T3

Table 3C Tolerances on outer ring **Unit: 0.001 mm**

Nominal bore diameter D		Dm Deviations		Radial run-out
Over (mm)	Incl. (mm)	High	Low	(Max.)
40	50	0	-11	20
50	80	0	-13	25
80	120	0	-15	35
120	180	0	-18	40
180	250	0	-20	45

Note: (1) Dm is defined as the arithmetical means of the largest and the smallest diameter obtained by two-point measurement.

(2) The low deviation of outside diameter Dm does not apply within the distance of 1/4 the width of outer ring from the sides.

Table 3D Tolerance for distance "n" between the radial plane passing through center of outer ring and aside of inner ring

Unit: 0.001 mm

Nominal bore diameter d		n Deviations
Over (mm)	Incl. (mm)	
40	50	±200
50	80	±250
80	120	±300
120	160	±350

Please refer to Fig. 3B

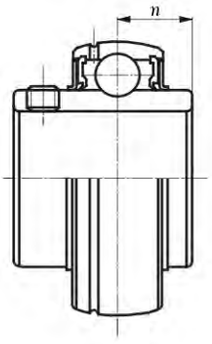


Fig. 3B

Table 3E Chamfer dimensions

Nominal dimensions r (mm)	r	
	Max. (mm)	Min. (mm)
1.0	1.5	0.6
1.5	2.0	1.0
2.0	2.5	1.5
2.5	3.0	2.0
3.0	3.5	2.5
3.5	4.0	3.0
4.0	4.5	3.5
5.0	6.0	4.0

Please refer to Fig. 3C

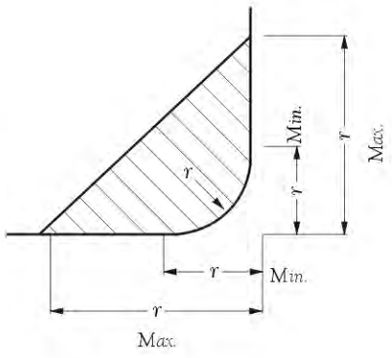


Fig. 3C

3.2.1 Center height tolerances for pillow block type housings

Please refer to below Figs. 3E and Table 3F.

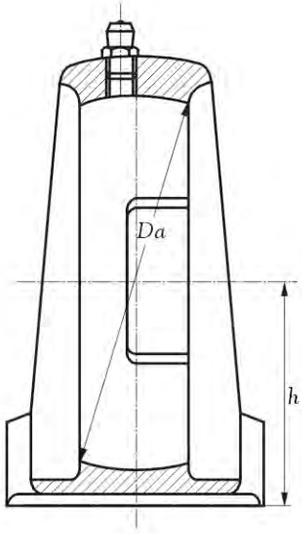


Fig. 3E

Table 3F Center height tolerances for pillow block type housings **Unit: 0.001 mm**

Housing No.				h Deviations
P 201		PA 201	PH 201	±150
P 202	AK 204	PA 202	PH 202	
P 203	AK 205	PA 203	PH 203	
P 204	AK 206	PA 204	PH 204	
P 205	AK 207	PA 205	PH 205	
P 206	AK 208	PA 206	PH 206	
P 207	AK 209	PA 207	PH 207	
P 208	AK 210	PA 208	PH 208	
P 209	AK 211	PA 209	PH 209	
P 210	AK 212	PA 210	PH 210	
P 211	AK 213	PA 211	PH 211	±200
P 212	AK 214	PA 212	PH 212	
P 213	AK 215	PA 213	PH 213	
P 214				
P 215				
P 216				
P 217				
P 218				

3.2.2 Tolerances for flanged type housings (F, FL, FA, FB, FC)

Please refer to below Fig. 3F (a), 3F (b) and Table 3G (a), 3G (b).

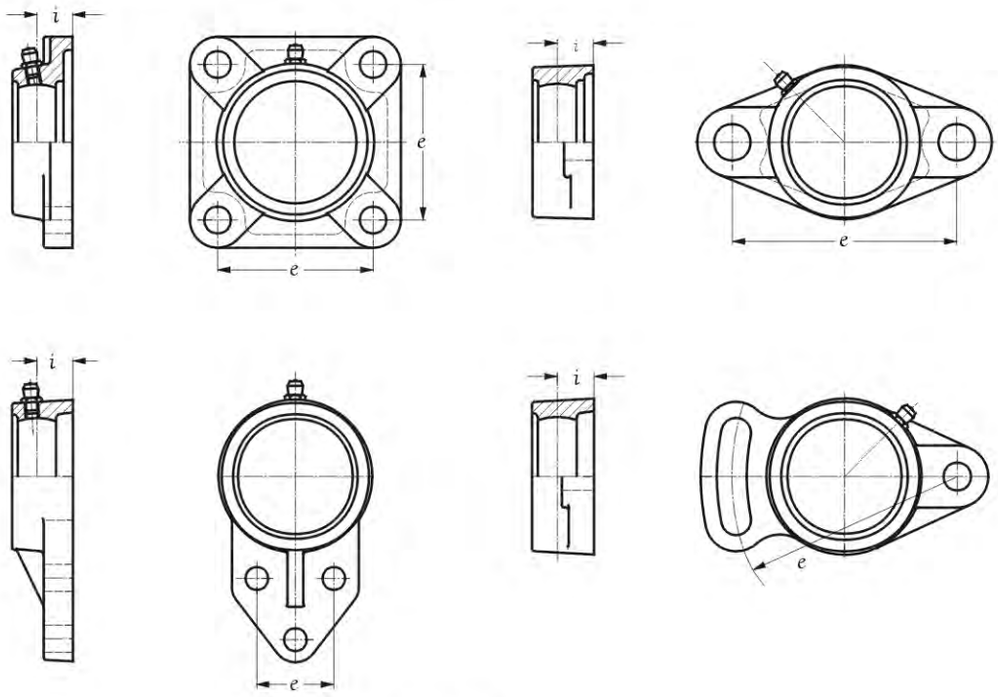


Fig. 3F (a)

Table 3G (a) Tolerances for flanged type housings (F, FL, FA, FB) **Unit: 0.001 mm**

Housing No.				*e* Deviations	*i* Deviations
F 201	FL 201	FA 201	FB 201	±700	±500
F 202	FL 202	FA 202	FB 202		
F 203	FL 203	FA 203	FB 203		
F 204	FL 204	FA 204	FB 204		
F 205	FL 205	FA 205	FB 205		
F 206	FL 206	FA 206	FB 206		
F 207	FL 207	FA 207	FB 207		
F 208	FL 208	FA 208	FB 208		
F 209	FL 209	FA 209	FB 209		
F 210	FL 210	FA 210	FB 210		
F 211	FL 211	FA 211	FB 211	±1000	±800
F 212	FL 212	FA 212	FB 212		
F 213	FL 213	FA 213	FB 213		
F 214	FL 214				
F 215	FL 215				
F 216	FL 216				
F 217	FL 217				
F 218	FL 218				

Table 3G (b) Tolerance for flanged type housing (FC) **Unit: 0.001 mm**

Housing No.	f Deviations High	Low	e Deviations	i Deviations	Radial run-out of machined pilot Max.
FC 201	0	-46	±700	±700	200
FC 202					
FC 203					
FC 204					
FC 205					
FC 206					
FC 207	0	-54			
FC 208					
FC 209					
FC 210					
FC 211	0	-63	±1000	±800	300
FC 212					
FC 213					
FC 214					
FC 215					
FC 216					
FC 217	0	-72			
FC 218					

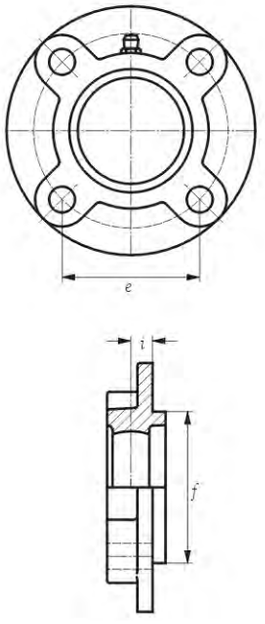


Fig. 3F (b)

3.2.3 Tolerance for take-up type housing (T)

Please refer to below Fig. 3G and Table 3H.

Table 3H Tolerance for take-up type housing (T) **Unit: 0.001 mm**

Housing No.	k Deviations High	Low	e Deviations	Parallelism of guide Max.
T 201 ~ T 210	+200	0	0, -500	500
T 211 ~ T 217	+300	0	0, -800	600

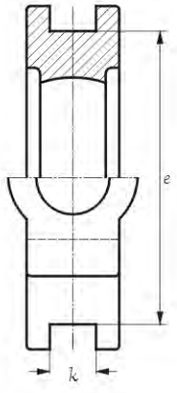


Fig. 3G

T3

Table 3I Tolerance on spherical inside diameter **Unit: 0.001 mm**

Nominal spherical inside diameter *Da*		Symbol J7				Symbol H7			
		Dam Deviations		*Da* Deviations		*Dam* Deviations		*Da* Deviations	
Over (mm)	Incl. (mm)	High	Low	High	Low	High	Low	High	Low
30	50	+14	-11	+19	-16	+25	0	+30	-5
50	80	+18	-12	+24	-18	+30	0	+36	-6
80	120	+22	-13	+29	-20	+35	0	+42	-7
120	180	+26	-14	+34	-22	+40	0	+48	-8
180	250	+30	-16	+39	-25	+46	0	+55	-9

Note: (1) *Dam* = (*Da* max + *Da* min)/2

Da max - maximum measured value of *Da*

Da min - minimum measured value of *Da*

(2) Dimensional tolerances for spherical inside diameter of housing are classified as H7 for clearance fit and J7 for interference fit.

(3) As the self-contained for bearings are equipped with locking-pin, clearance fit H7 is normally applied.

T3

Table 3J Machining tolerances

Nominal dimension		Dimensional Tolerance
Over (mm)	Incl. (mm)	(mm)
4	16	±0.2
16	63	±0.3
63	250	±0.5

Table 3K Casting tolerances on length

Nominal dimension		Dimensional Tolerance
Over (mm)	Incl. (mm)	(mm)
Up	100	±1.5
100	200	±2.0
200	400	±3.0
400	800	±4.0

Table 3L Casting tolerances on thickness

Nominal dimension		Dimensional Tolerance
Over (mm)	Incl. (mm)	(mm)
Up	5	±1.0
5	10	±1.5
10	20	±2.0
20	30	±3.0
30	50	±3.5

Table 3M One side machining tolerances

Nominal dimension			Dimensional Tolerance
Over (mm)		Incl. (mm)	(mm)
Up	~	5	±1.0
5	~	100	±1.5
100	~	200	±2.0
200	~	400	±3.0

Note: (1) Dimensional tolerances and deviations are for ordinary grade.

(2) Dimensional tolerances on length and thickness may be added with deviations on draft taper.

4. Radial internal clearance of bearings

The internal radial clearance for the insert ball bearing is usually greater than that for the same size of deep groove ball bearing. The clearance for the cylindrical bore bearing is shown in Table 4A while the clearance for the tapered bore bearing is shown in Table 4B.

Table 4A Radial internal clearance of cylindrical bore bearings (with set-screws and eccentric locking collar)

Unit: 0.001mm

Nominal bore diameter d		Clearance symbol					
		C 2		Normal		C 3	
Over (mm)	Incl. (mm)	Min.	Max.	Min.	Max.	Min.	Max.
10	18	0	9	3	18	11	25
18	24	0	10	5	20	13	28
24	30	1	11	5	20	13	28
30	40	1	11	6	20	15	33
40	50	1	11	6	23	18	36
50	65	1	15	8	28	23	43
65	80	1	15	10	30	25	51
80	100	1	18	12	36	30	58
100	120	2	20	15	41	36	66
120	140	2	23	18	48	41	81

Table 4B Radial internal clearance of tapered bore bearings (with adapter sleeve)

Unit: 0.001mm

Nominal bore diameter d		Clearance symbol					
		C 2		Normal		C 3	
Over (mm)	Incl. (mm)	Min.	Max.	Min.	Max.	Min.	Max.
24	30	5	20	13	28	23	41
30	40	6	20	15	33	28	46
40	50	6	23	18	36	30	51
50	65	8	28	23	43	38	61
65	80	10	30	25	51	46	71
80	100	12	36	30	58	53	84
100	120	15	41	36	66	61	97
120	140	18	48	41	81	71	114

5. Selection of bearing size

5.1 The bearing size is usually selected according to the required life and reliability under a specific type of load charged on the Insert Ball Bearing

The load applied to the bearing operating under static or slow oscillating and rotating($n<10r/min$)condition is defined as static load, while the load applied to the bearing operating under a speedy rotating ($n>10\ r/min$) condition is defined as dynamic load.

The load capacity of the bearing is expressed by the basic dynamic load rating which is shown in the Insert Ball Bearing's table.

Under normal mounting, lubricating and maintaining conditions, the operating bearing will have fatigue flaking due to the repeating action of variable load charged on the contact area between the rings and rolling elements. Generally, the fatigue flaking is the cause of normal damage of rolling bearings. Therefore , the usual bearing life refers to the bearing fatigue life. The life of group of apparently identical bearings operating under a considerable dispersion. For this reason , the bearing life is closely connected with the damaging probability or the reliability requirement.

The radial rating load of ball bearing with 90% reliability and 500 hours minimum life is shown in fig. 5.1 (Refer to page 18).

Life: The life of a rolling bearing is defined as the total number of revolution which the bearing is capable of enduring before the first evidence of fatigue flaking develops on any one rings or rolling elements.

Reliability: The reliability is the percentage of the bearings of a group of apparently identical bearings operating under identical conditions which can expect to attain or exceed a certain defined life. The reliability of individual bearing is the probability of the bearing to attain or exceed a defined life.

Basic rating life: For a group of apparently identical rolling bearings operating under identical conditions, the basic rating life is defined as the total number of revolution that 90% of the bearings can be expected to complete or exceed.

Basic rating life

The fatigue rating life of insert ball bearing is calculated by the following formula:

$$L_{10} = \left(\frac{C}{P}\right)^3 \text{ or } \frac{C}{P} = L_{10}^{1/3}$$

Where L_{10} = basic rating life ($10^6 r$)
P = basic dynamic load rating (N)
N = equivalent dynamic bearing load (N)

The basic dynamic load rating C is a hypothetical constant load with a fixed direction under which the bearing can attain a basic life of one million revolutions theoretically. For radial bearings , the load refers to the radial load.

The equivalent dynamic bearing load P is a constant load with a fixed direction under which the bearing life is identical to that of the bearing operating under actual load.

For a bearing operating with a constant rotation speed, the basic rating life can be expressed in terms of operating hours:

$$L_{10h} = \frac{10^6}{60n}\left(\frac{C}{P}\right)^3 \text{ or } L_{10h} = \frac{10^6}{60n} \quad L_{10h} = \frac{16666}{n}\left(\frac{C}{P}\right)^3$$

Where L_{10h} = basic rating life (h)
n = bearing operating speed of rotation (r/min)

For easier calculation, 500 hours as base of rating life is taken, and the speed factor f_n and the life factor f_h is introduced.

$$f_n = \left(\frac{331/3}{n}\right)^{1/3} \qquad f_h = \left(\frac{L_{10h}}{500}\right)^{1/3}$$

In this way, the formula is simplified to: $C = \frac{f_h}{f_n} P$

The values of f_h and f_n can be found in Fig. 5A by referring to the operation speed n and the anticipated bearing service life L_{10h}. Then, with the radial load (or the equivalent dynamic bearing load), the basic dynamic load rating can be determined. By this way, the bearing size can be determined according to the basic dynamic load rating value in the Insert Ball Bearing's table. If the bearing operate under indeterminate loads and rotation speed, the following formula should be applied when calculating the bearing life:

$$Pm = \sqrt[3]{\frac{1}{N}\int_0^N P^3 dN}$$

Where Pm = mean equivalent dynamic bearing load (N)
P = equivalent dynamic bearing load (N)
N = total revolution numbers within one load changing cycle (r)

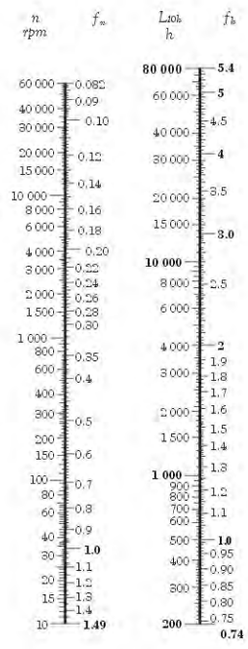


Fig. 5A

T3

5.2 Anticipated bearing service life

Where selecting a bearing, one should usually predetermine an appropriate service life according to the relevant machine type, operating condition and reliability requirement. Generally the anticipated bearing service life can be determined by referring to the maintenance period of a machine.

Calculating method of equivalent dynamic bearing load P

The basic equivalent dynamic bearing load is determined under a hypothetical condition. When calculating the bearing life, the actual load has to be converted to dynamic bearing load which is in conformity with the load condition determining the dynamic load rating. General equation for calculating the equivalent dynamic bearing load:

$$P = XFr + YFa$$

Where: P --- equivalent dynamic bearing load (N)
Fr --- actual radial load (N)
Fa --- actual axial load (N)
X --- radial factor
Y --- thrust factor

The values of X and Y are determined by the ratio between the applied axial load *Fa* and the basic static load rating Co. The axial load which the Insert Ball Bearing can carry is determined by the mounting method of the bearing on the shaft.

For bearings of set-screw Locking type or eccentric Locking collar type, if flexible shafts are applied and the set-screws are tightened enough, the axial load *Fa* which the bearings can carry not surpass 20% of the radial load *Fr*.

For bearing of adapter sleeve Locking type, if the nut is properly tightened, the axial load *Fa* can be maximally 15% to 20% of the radial load.

The value of radial and thrust factors X and Y for Insert Ball Bearings can be obtained from the following Table 5A.

When twist load is applied to the bearing, the equivalent dynamic bearing load is calculated by the following equation:

Where: $Pm = fm \cdot P$

Pm --- equivalent dynamic bearing load when considering twist load

fm --- twist load factor, which is defined as follows:

when the twist load is small : $fm = 1.5$

when the twist load is big : $fm = 2$

5.3 Example of bearing size selection

When shocking load is applied to the bearing, the equivalent dynamic bearing load can be calculated by the following equation:

$$Pd = fd \cdot P$$

Where: *Pd* --- equivalent dynamic bearing load when considerating shocking load

fd --- shocking load factor, which is defined as follows:

when no shocking load or mirror shocking load is applied: $fd = 1 - 1.2$

when adequate shocking load is applied: $fd = 1.2 - 1.8$

Table 5A Radial and thrust factors X and Y for insert ball bearings

$\frac{Fa}{Ca}$	Clearance for normal				*e*	Clearance for C3				*e*
	$\frac{Fa}{Fr} \leqslant e$		$\frac{Fa}{Fr} > e$			$\frac{Fa}{Fr} \leqslant e$		$\frac{Fa}{Fr} > e$		
	X	Y	X	Y		X	Y	X	Y	
0.025	1	0	0.56	2.0	0.22	1	0	0.46	1.74	0.3
0.04	1	0	0.56	1.8	0.24	1	0	0.46	1.61	0.33
0.07	1	0	0.56	1.6	0.27	1	0	0.46	1.46	0.36
0.13	1	0	0.56	1.4	0.31	1	0	0.46	1.30	0.41
0.25	1	0	0.56	1.2	0.37	1	0	0.46	1.14	0.47
0.5	1	0	0.56	1.0	0.44	1	0	0.46	1.00	0.54

How to select the size of bearing

One insert ball bearings is to operate at a rotation speed of 1000 r/min under only a radial load of $Fr = 3000\ N$, with a basic rating life of at least 20,000 hours.Select the bearing size.

From the required rotation speed it can be found that:

$fn = 0.322$ (Fig. 5A shows about 0.32)

From the required basic rating life (anticipated service life), it can be found that:

$fh = 3.42$ (Fig. 5A shows about 3.4)

Under only radial load, i.e.

$P = Fr = 3000\ N$

Therefore,

$$C = \frac{Fh}{fn} P = \frac{3.42}{0.322} \times 3000 = 31,863\ (N)$$

A simplified way to calculate the bearing life can be applied by using Fig. 5B. By connecting n and the required basic rating life L_{10h} with a straight line, it can be found that C/P value is 10.6 . As is known, $P = Fr = 3000\ N$, thus the required basic dynamic load rating is:

$C = 3000 \times 10.6 = 31,800$(N)

In this way, we can select the insert ball bearings inside this catalogue.

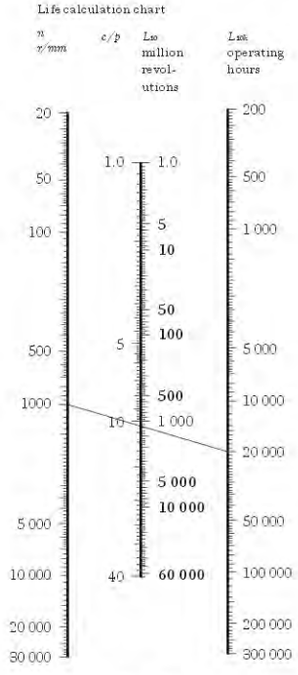


Fig. 5B

5.4 Adjusted rating life equation

The basic rating life L_{10} calculated with the bearing life calculation formula can be applied to calculate the rating life of bearing made of ordinary bearing steel (i.e. bearing life with reliability of 90%).

Due to more and more of machinery products demanding higher reliability and better quality steel (ISO 281/1-1977), an adjusted rating life calculation equation is suggested, i. e.

$Ln = a1 \cdot a2 \cdot a3 \cdot L_{10}$

For spherical outside surface ball bearing:

$Ln = a1 \cdot a2 \cdot a3 \cdot (C/P)3$

Where Ln---under specified material and lubricating conditions, bearing life with (100-n)% no breaking probability (i. e. reliability).

***a1* ---- life adjustment factor for reliability (Table 5B)**

***a2* ---- life adjustment factor materials (Table 5C)**

***a3* ---- life adjustment factor for operating conditions (Table 5D)**

Table 5B Life adjustment factor for reliability *a1*

Reliability%	90	95	96	97	98	99
Ln	L_{10}	L_5	L_4	L_3	L_2	L_1
a1	1	0.62	0.53	0.44	0.33	0.21

Table 5C Life adjustment factor for materials a_2

Normal chromium bearing steel		$a_2 = 1$
Special smelted bearing steel	--- Vacuum degassed bearing steel	$a_2 = 3$
	--- Vacuum resmelted bearing steel	$a_2 = 5$
When material hardness lowered by high frequency tempering		$a_2 < 1$

Table 5D Life adjustment factor for operating conditions a_3

When under normal operating conditions: (1) Properly mounted, (2) Sufficiently lubricated, (3) Without outside matters intrusion.	$a_3 = 1$
When under operating temperature, the insert ball bearings lubricating grease viscosity lower than 13 mm^2/s	$a_3 < 1$

6. Selection of shafts

The shaft on which bearing units are mounted shall be free from bend and flexure.

For the units with cylindrical bore (with set-screws or eccentric locking collar) clearance fit is usually adopted for mounting the units on the shaft, and shaft tolerances in Table 6A are recommended for such loose fit, but for high speed or highly accurate operation or such application which is accompanied by heavy shock loads, interference fit is to be adopted. Table 6B shows recommended shaft tolerances for interference fit, when mounted units with eccentric locking collar are mounted on the shaft with interference fit, the eccentric locking collar may be omitted.

Tapered bore bearings permit wider tolerances of the shaft since they are locked to the shaft by means of adapted sleeves.

Recommended shaft tolerances for tapered bore bearings listed in Table 6C.

Table 6A Shaft tolerances for clearance fit for bearing with cylindrical bore

Shaft diameter		Deviation of tolerances in shaft							
		For lower speed h9		For medium speed h8		For rather high speed h7		For high speed j6	
Over mm	Incl. mm	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
10	18	0	-43	0	-27	0	-18	+8	-3
18	30	0	-52	0	-33	0	-21	+9	-4
30	50	0	-62	0	-39	0	-25	+11	-5
50	80	0	-74	0	-46	0	-30	+12	-7
80	120	0	-87	0	-54	0	-35	+13	-9
120	180	0	-100	0	-63	0	-40	+14	-11

Table 6B Shaft tolerance for interference fit for bearing with cylindrical bore

Shaft diameter		Deviation of tolerances in shaft							
		Higher speed		Rather heavy load		Highest load		Heavy load	
		m6		m7		m6		m7	
Over mm	Incl. mm	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
10	18	+18	+7	+25	+7	+23	+12	+30	+12
18	30	+21	+8	+29	+8	+28	+15	+36	+15
30	50	+25	+9	+34	+9	+33	+17	+42	+17
50	80	+30	+11	+41	+11	+39	+20	+50	+20
80	120	+35	+13	+48	+13	+45	+23	+58	+23
120	180	+40	+15	+55	+15	+52	+27	+67	+27

Table 6C Shaft tolerances for bearing with tapered bore

Shaft diameter		Deviation of tolerances in shaft			
		For shot shaft		For shot shaft	
		h9		h10	
Over mm	Incl. mm	Max.	Min.	Max.	Min.
10	18	0	-43	0	-70
18	30	0	-52	0	-84
30	50	0	-62	0	-100
50	80	0	-74	0	-120
80	120	0	-87	0	-140
120	180	0	-100	0	-160

7. Mounting of mounted units on shafts

The mounted units can be easily installed in principle at any place. However, in order to have a long service life, it is desirable that the mounting base is flat and rigid.

In case of either the vibration is caused to the bearing, the alternating movement takes place, the load applied to the bearing is large, or the shaft rotation speed is rapid, it is desired to provide with the filed seat or concave section at the part where the set-screws contact with the shaft. If large thrust load is charged, it is recommended that joggling tightened with nuts be used to install the bearing most effectively to the shaft: As shown in Fig 7A.

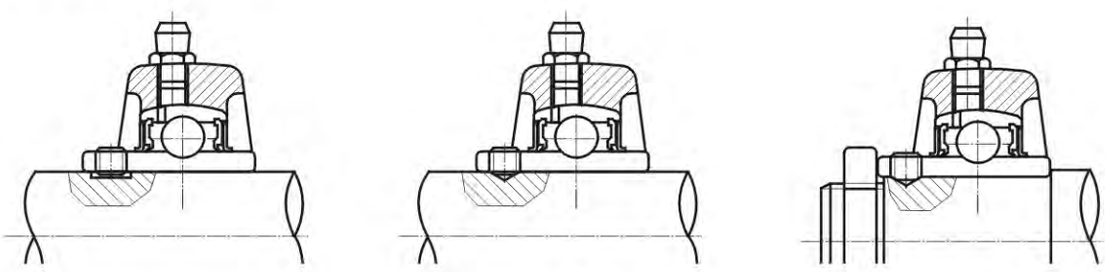


Fig 7A

7.1 Mounted units with adapter sleeves

Mounted unit with adapter sleeve permits wider shaft tolerance and can be used in applications where vibrations and shocks are heavy.

Mounting processes of these units are as follows:
First, the sleeve is installed to an arbitrary position. After the shark proof washer is inserted, the nut is tightened. The proper nut tightening condition can be obtained if it is tightened enough by hand and then rotated by 2/5 to 3/5 revolution with a spanner.

After tightening the nut, bend the shark proof washer within the slot. Otherwise, the nut may be loosened and creep may be caused between the shaft and sleeve. It is necessary the nut can not be tightened too much.

7.2 Mounted units with eccentric locking collars

The eccentric part of the collar mates with the inner ring of the bearing which is made eccentric with the collar. When locked to the shaft by hand in direction of the shaft rotation, the eccentric locking collar tightens automatically to the shaft by force of working radial load. Then, lock the set-screws provided on the collar to fix the eccentric collar to the shaft. At the shaft rotation force or load is not charged on the set-screws directly, it will not loosen during operation.

8. Standard of set-screws

There are two set-screws located at two places on one side of the wide inner ring 120 apart with which the bearing units can be mounted to the shaft. When mounting the bearing to the shaft, the torque shown in the following Table 8A is recommended to tighten the set-screws to shaft.

Table 8A Proper tightening torque of set-screws

Set-screws tap (mm)	Set-screws tap (inch)	Model Nos. of insert ball bearings	Tightening torque (N.m)	Tightening torque (lbf.in)
M5 x 0.8	10#-32 UNF	UC 201~UC 203, SB 201~SB 203, CSB 201~CSB 203 CSB 201-8~CSB 203-11	3.0~3.5	28
M6 x 0.75		UC 204~UC 206, SB 204~SB 206	3.0~3.5	28
M6 x 1	1/4-28 UNF	SA 201~SA 206, CSA 201~CSA 206, CSB 204~CSB 207 SER 201~SER 206 CSB 204-12~CSB 207-22, SER 201-10~SER 206-20	3.5~4.0	30~35.4
M8 x 1	5/16-24 UNF	UC 207~UC 209, SA 207~SA 210, SB 207~SB 208 CSA 207~CSA 210, CSB 208, SER 207~SER 209 CSB 208-24, SER 207-22~SER 209-28	8.0~8.5	69~73.5
M10 x 1.25	3/8-24 UNF	UC 210~UC 213, SA 211, CSA 211~CSA 212, SER 210~SER 212 SER 210-30~SER 212-36	16.5~17.5	144~152
M12 x 1.25	7/16-20 UNF	SER 214~SER 215 SER 214-40~SER 215-47	26.5~27.5	235~243
M12 x 1.5		UC 214~UC 218	33.5~34.5	296~304

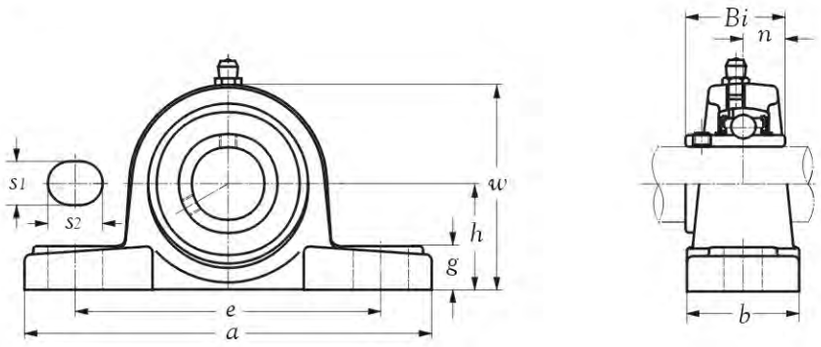
9. Material for cast iron housing

The material of cast iron housing under ISO / DIS GG20, the mechanical properties please refer to Tabel 9A.

Table 9A The mechanical properties of cast iron housing

Number	Major wall thickness of casting piece (mm)	Strain stress σb (N/mm²)	Hardness HB
JIS FC20	2.5 - 10	220	170 - 220
	>10 - 20	195	
	>20 - 30	170	
	>30 - 50	160	

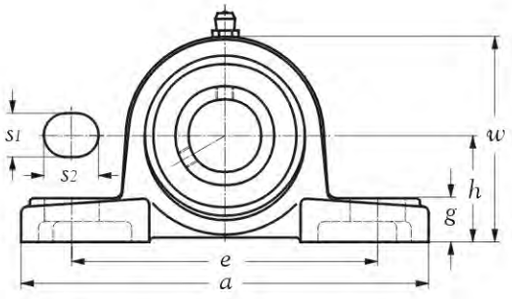
Standard duty pillow blocks cast housing set screws type
series UCAK 200

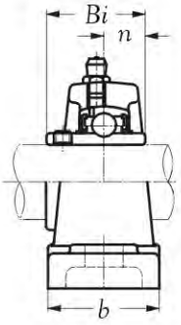


Shaft dia. mm inch	Unit number	Nominal dimensions mm inch h	a	e	b	s1	s2	g	w	Bi	n	Bolt size mm inch	Bearing number	Housing number	Mass of unit kg(s).
20	UCAK 204	31.8	128	98	38	11.0	14	14	63.0	31.0	12.7	M 10	UC 204	AK 204	0.74
3/4	UCAK 204-12	1-1/4	5-1/16	3-55/64	1-1/2	7/16	35/64	35/64	2-31/64	1.2205	0.5000	3/8	UC 204-12		0.75
25	UCAK 205	33.3	140	105	40	11.0	14	15	66.5	34.0	14.3	M 10	UC 205	AK 205	0.85
1	UCAK 205-16	1-5/16	5-3/64	4-9/64	1-37/64	7/16	35/64	19/32	2-5/8	1.3386	0.5630	3/8	UC 205-16		0.84
30	UCAK 206	39.7	160	121	44	14.0	19	17	79.0	38.1	15.9	M 12	UC 206		1.24
1-1/8	UCAK 206-18	1-9/16	6-19/64	4-49/64	1-47/64	35/64	3/4	43/64	3-7/64	1.5000	0.6260	7/16	UC 206-18	AK 206	1.26
1-1/4	UCAK 206-20												UC 206-20		1.22
35	UCAK 207	46.0	167	127	48	14.0	19	18	91.0	42.9	17.5	M 12	UC 207		1.70
1-1/4	UCAK 207-20	1-13/16	6-37/64	5	1-57/64	35/64	3/4	45/64	3-37/64	1.6890	0.6890	7/16	UC 207-20	AK 207	1.76
1-3/8	UCAK 207-22												UC 207-22		1.71
40	UCAK 208	49.2	181	140	52	14.0	19	19	98.0	49.2	19.0	M 12	UC 208	AK 208	2.13
1-1/2	UCAK 208-24	1-15/16	7-1/8	5-3/64	2-1/16	35/64	3/4	3/4	3-55/64	1.9370	0.7480	7/16	UC 208-24		2.17
45	UCAK 209	52.4	189	146	54	14.0	19	20	105.0	49.2	19.0	M 12	UC 209	AK 209	2.39
1-5/8	UCAK 209-26	2-1/16	7-7/16	5-3/4	2-1/8	35/64	3/4	25/32	4-9/64	1.9370	0.7480	7/16	UC 209-26		2.49
50	UCAK 210	55.6	203	159	57	17.5	21	21	111.5	51.6	19.0	M 16	UC 210	AK 210	2.83
1-7/8	UCAK 210-30	2-3/16	7-63/64	6-17/64	2-1/4	11/16	53/64	53/64	4-25/64	2.0315	0.7480	5/8	UC 210-30		2.90
55	UCAK 211	61.9	232	181	60	18.0	24	23	123.0	55.6	22.2	M 16	UC 211	AK 211	3.85
2	UCAK 211-32	2-7/16	9-9/64	7-1/8	2-23/64	45/64	15/16	29/32	4-27/32	2.1890	0.8740	5/8	UC 211-32		4.00
60	UCAK 212	68.3	241	191	64	18.0	24	25	136.0	65.1	25.4	M 16	UC 212	AK 212	4.92
2-1/4	UCAK 212-36	2-11/16	9-31/64	7-3/64	2-3/64	45/64	15/16	63/64	5-23/64	2.5630	1.0000	5/8	UC 212-36		5.06
65	UCAK 213	74.6	262	203	70	21.0	28	27	147.5	65.1	25.4	M 20	UC 213	AK 213	6.13
2-1/2	UCAK 213-40	2-15/16	10-5/16	7-63/64	2-3/4	53/64	1-7/64	1-1/16	5-13/16	2.5630	1.0000	3/4	UC 213-40		6.21
70	UCAK 214	77.8	266	210	74	21.0	28	28	153.5	74.6	30.2	M 20	UC 214	AK 214	6.90
2-3/4	UCAK 214-44	3-1/16	10-15/32	8-17/64	2-29/32	53/64	1-7/64	1-7/64	6-1/16	2.9370	1.1890	3/4	UC 214-44		6.91
75	UCAK 215	82.6	304	241	78	22.0	32	30	162.0	77.8	33.3	M 20	UC 215	AK 215	8.56
3	UCAK 215-48	3-1/4	11-31/32	9-31/64	3-5/64	55/64	1-17/64	1-3/16	6-3/8	3.0630	1.3110	3/4	UC 215-48		8.48

P9

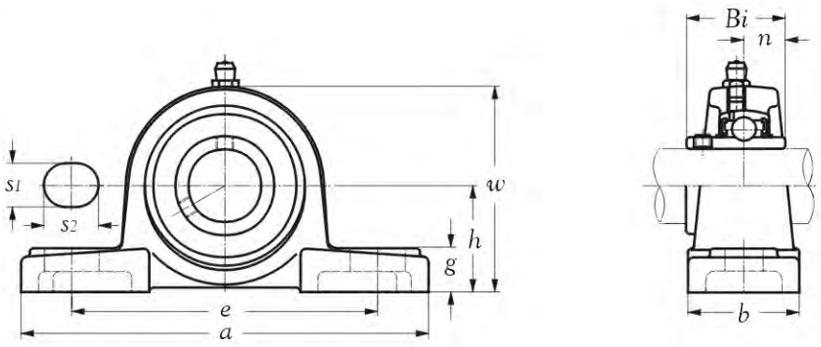
Standard duty pillow blocks cast housing set screws type
series UCP 200





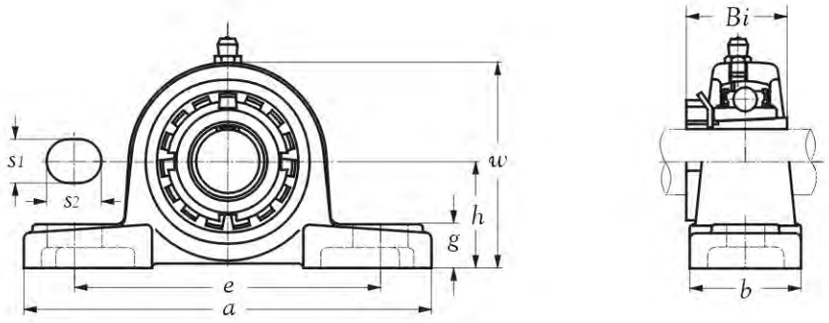
Shaft dia. mm inch	Unit number	Nominal dimensions mm inch h	a	e	b	s1	s2	g	w	Bi	n	Bolt size mm inch	Bearing number	Housing number	Mass of unit kg(s).
12	UCP 201	30.2	127	96	38	13	16	11	60.7	31.0	12.7	M 10	UC 201	P 203	0.68
1/2	UCP 201-8	1-3/16	5	3-25/32	1-1/2	3/64	5/8	7/16	2-25/64	1.2205	0.5000	3/8	UC 201-8		0.68
15	UCP 202	30.2	127	96	38	13	16	11	60.7	31.0	12.7	M 10	UC 202	P 203	0.67
5/8	UCP 202-10	1-3/16	5	3-25/32	1-1/2	3/64	5/8	7/16	2-25/64	1.2205	0.5000	3/8	UC 202-10		0.67
17	UCP 203	30.2	127	96	38	13	16	11	60.7	31.0	12.7	M 10	UC 203	P 203	0.66
11/16	UCP 203-11	1-3/16	5	3-25/32	1-1/2	3/64	5/8	7/16	2-25/64	1.2205	0.5000	3/8	UC 203-11		0.66
20	UCP 204	33.3	127	96	35	13	19	14	65.0	31.0	12.7	M 10	UC 204	P 204	0.66
3/4	UCP 204-12	1-5/16	5	3-25/32	1-3/8	3/64	3/4	35/64	2-9/16	1.2205	0.5000	3/8	UC 204-12		0.67
25	UCP 205	36.5	140	105	36	13	19	15	71.0	34.0	14.3	M 10	UC 205	P 205	0.77
1	UCP 205-16	1-7/16	5-3/64	4-9/64	1-27/64	3/64	3/4	19/32	2-51/64	1.3386	0.5630	3/8	UC 205-16		0.76
30	UCP 206	42.9	160	121	42	17	22	16	84.0	38.1	15.9	M 14	UC 206	P 206	1.22
1-1/8	UCP 206-18	1-11/16	6-19/64	4-49/64	1-21/32	43/64	55/64	5/8	3-5/16	1.5000	0.6260	1/2	UC 206-18		1.24
1-1/4	UCP 206-20												UC 206-20		1.20
35	UCP 207	47.6	167	127	45	17	22	17	94.0	42.9	17.5	M 14	UC 207	P 207	1.55
1-1/4	UCP 207-20	1-7/8	6-37/64	5	1-49/64	43/64	55/64	43/64	3-45/64	1.6890	0.6890	1/2	UC 207-20		1.61
1-3/8	UCP 207-22												UC 207-22		1.56
40	UCP 208	49.2	180	137	49	17	22	18	100.0	49.2	19.0	M 14	UC 208	P 208	1.88
1-1/2	UCP 208-24	1-15/16	7-3/32	5-25/64	1-59/64	43/64	55/64	45/64	3-15/16	1.9370	0.7480	1/2	UC 208-24		1.92
45	UCP 209	54	189	146	50	17	22	20	107.5	49.2	19.0	M 14	UC 209	P 209	2.19
1-5/8	UCP 209-26	2-1/8	7-7/16	5-3/4	1-31/32	43/64	55/64	25/32	4-15/64	1.9370	0.7480	1/2	UC 209-26		2.29
50	UCP 210	57.2	204	159	56	20	25	21	114.0	51.6	19.0	M 16	UC 210	P 210	2.73
1-7/8	UCP 210-30	2-1/4	8-1/64	6-17/64	2-13/64	25/32	63/64	53/64	4-31/64	2.0315	0.7480	5/8	UC 210-30		2.80
55	UCP 211	63.5	217	172	58	20	25	22	126	55.6	22.2	M 16	UC 211	P 211	3.38
2	UCP 211-32	2-1/2	8-35/64	6-49/64	2-9/32	25/32	63/64	55/64	4-61/64	2.1890	0.8740	5/8	UC 211-32		3.53
60	UCP 212	69.9	238	186	64	20	25	24	139	65.1	25.4	M 16	UC 212	P 212	4.75
2-1/4	UCP 212-36	2-3/4	9-3/8	7-21/64	2-3/64	25/32	63/64	15/16	5-15/32	2.5630	1.0000	5/8	UC 212-36		4.89
65	UCP 213	76.2	262	203	70	25	30	26	149	65.1	25.4	M 20	UC 213	P 213	5.81
2-1/2	UCP 213-40	3	10-5/16	7-63/64	2-3/4	63/64	1-3/16	1-1/64	5-55/64	2.5630	1.0000	3/4	UC 213-40		5.89
70	UCP 214	79.4	266	210	72	25	30	27	155	74.6	30.2	M 20	UC 214	P 214	6.50
2-3/4	UCP 214-44	3-1/8	10-15/32	8-17/64	2-53/64	63/64	1-3/16	1-1/16	6-7/64	2.9370	1.1890	3/4	UC 214-44		6.51
75	UCP 215	82.6	274	217	74	25	30	28	161.6	77.8	33.3	M 20	UC 215	P 215	7.11
3	UCP 215-48	3-1/4	10-25/32	8-35/64	2-29/32	63/64	1-3/16	1-7/64	6-23/64	3.0630	1.3110	3/4	UC 215-48		7.03

Standard duty pillow blocks cast housing set screws type
series UCP 200



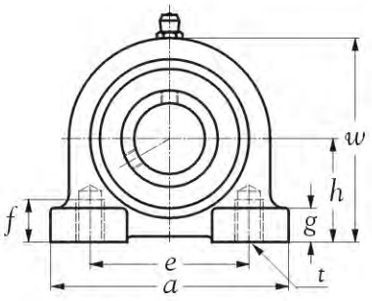
Shaft dia. mm inch	Unit number	Nominal dimensions mm inch h	a	e	b	s1	s2	g	w	Bi	n	Bolt size mm inch	Bearing number	Housing number	Mass of unit kgs.
80	**UCP 216**	88.9	292	232	78	25	30	30	174	82.6	33.3	M 20	**UC 216**	**P 216**	8.69
3-1/8	**UCP 216-50**	3-1/2	11-1/2	9-9/64	3-5/64	63/64	1-3/16	1-3/16	6-27/32	3.2520	1.3110	3/4	**UC 216-50**		8.74
85	**UCP 217**	95.2	310	247	83	25	30	32	186	85.7	34.1	M 20	**UC 217**	**P 217**	10.63
3-1/4	**UCP 217-52**	3-3/4	12-13/64	9-23/32	3-17/64	63/64	1-3/16	1-17/64	7-21/64	3.3740	1.3425	3/4	**UC 217-52**		10.85
90	**UCP 218**	101.6	326	262	88	27	30	33	198	96.0	39.7	M 22	**UC 218**	**P 218**	12.95
3-1/2	**UCP 218-56**	4	12-53/64	10-5/16	3-15/32	1-1/16	1-3/16	1-19/64	7-51/64	3.7800	1.5630	7/8	**UC 218-56**		13.06

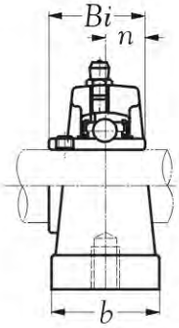
Standard duty pillow blocks cast housing adapter type
series UKP 200



Shaft dia. mm	Unit number	Nominal dimensions mm									Bolt size mm	Bearing number	Housing number	Mass of unit kg(s).
		h	*a*	*e*	*b*	*s1*	*s2*	*g*	*w*	*Bi*				
20	**UKP 205**	36.5	140	105	36	13	19	15	71.0	35	M 10	**UK 205**	**P 205**	0.71
25	**UKP 206**	42.9	160	121	42	17	22	16	84.0	38	M 12	**UK 206**	**P 206**	1.15
30	**UKP 207**	47.6	167	127	45	17	22	17	94.0	43	M 12	**UK 207**	**P 207**	1.45
35	**UKP 208**	49.2	180	137	49	17	22	18	100.0	46	M 12	**UK 208**	**P 208**	1.72
40	**UKP 209**	54.0	189	146	50	17	22	20	107.5	50	M 12	**UK 209**	**P 209**	2.04
45	**UKP 210**	57.2	204	159	56	20	25	21	114.0	55	M 16	**UK 210**	**P 210**	2.52
50	**UKP 211**	63.5	217	172	58	20	25	22	126.0	59	M 16	**UK 211**	**P 211**	3.03
55	**UKP 212**	69.9	238	186	64	20	25	24	139.0	62	M 16	**UK 212**	**P 212**	4.25
60	**UKP 213**	76.2	262	203	70	25	30	26	149.0	65	M 20	**UK 213**	**P 213**	5.31

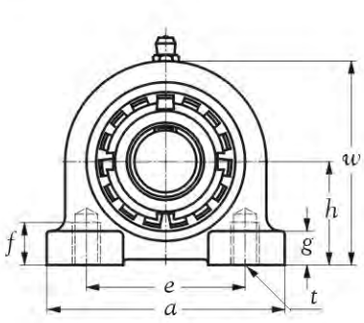
Standard duty pillow blocks cast housing set screws type
series UCPA 200

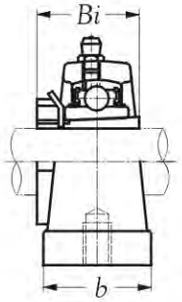




Shaft dia. mm inch	Unit number	Nominal dimensions mm inch h	a	e	b	g	w	f	t	Bi	n	Bolt size mm inch	Bearing number	Housing number	Mass of unit kg(s).
12	UCPA 201	30.2	76	52	40	11	62	13	M 10	31.0	12.7	M 10	UC 201	PA 204	0.57
1/2	UCPA 201-8	1-3/16	2-63/64	2-1/16	1-37/64	7/16	2-7/16	3/64	3/8	1.2205	0.5000	3/8	UC 201-8		0.57
15	UCPA 202	30.2	76	52	40	11	62	13	M 10	31.0	12.7	M 10	UC 202	PA 204	0.56
5/8	UCPA 202-10	1-3/16	2-63/64	2-1/16	1-37/64	7/16	2-7/16	3/64	3/8	1.2205	0.5000	3/8	UC 202-10		0.56
17	UCPA 203	30.2	76	52	40	11	62	13	M 10	31.0	12.7	M 10	UC 203	PA 204	0.55
11/16	UCPA 203-11	1-3/16	2-63/64	2-1/16	1-37/64	7/16	2-7/16	3/64	3/8	1.2205	0.5000	3/8	UC 203-11		0.55
20	UCPA 204	30.2	76	52	40	11	62	13	M 10	31.0	12.7	M 10	UC 204	PA 204	0.53
3/4	UCPA 204-12	1-3/16	2-63/64	2-1/16	1-37/64	7/16	2-7/16	3/64	3/8	1.2205	0.5000	3/8	UC 204-12		0.54
25	UCPA 205	36.5	84	56	38	12	72	15	M 10	34.0	14.3	M 10	UC 205	PA 205	0.71
1	UCPA 205-16	1-7/16	3-5/16	2-13/64	1-1/2	15/32	2-53/64	19/32	3/8	1.3386	0.5630	3/8	UC 205-16		0.70
30	UCPA 206	42.9	94	66	48	13	84	18	M 14	38.1	15.9	M 14	UC 206	PA 206	1.07
1-1/8	UCPA 206-18	1-11/16	3-45/64	2-19/32	1-57/64	3/64	3-5/16	45/64	1/2	1.5000	0.6260	1/2	UC 206-18		1.09
1-1/4	UCPA 206-20												UC 206-20		1.05
35	UCPA 207	47.6	110	80	48	13	95	20	M 14	42.9	17.5	M 14	UC 207	PA 207	1.49
1-1/4	UCPA 207-20	1-7/8	4-21/64	3-5/32	1-57/64	3/64	3-47/64	25/32	1/2	1.6890	0.6890	1/2	UC 207-20		1.55
1-3/8	UCPA 207-22												UC 207-22		1.50
40	UCPA 208	49.2	116	84	54	13	100	20	M 14	49.2	19.0	M 14	UC 208	PA 208	1.75
1-1/2	UCPA 208-24	1-15/16	4-9/16	3-5/16	2-1/8	3/64	3-15/16	25/32	1/2	1.9370	0.7480	1/2	UC 208-24		1.79
45	UCPA 209	54.2	120	90	60	13	108	25	M 14	49.2	19.0	M 14	UC 209	PA 209	2.17
1-5/8	UCPA 209-26	2-9/64	4-23/32	3-35/64	2-23/64	3/64	4-1/4	63/64	1/2	1.9370	0.7480	1/2	UC 209-26		2.27
50	UCPA 210	57.2	130	94	60	14	116	25	M 16	51.6	19.0	M 16	UC 210	PA 210	2.53
1-7/8	UCPA 210-30	2-1/4	5-1/8	3-45/64	2-23/64	35/64	4-9/16	63/64	5/8	2.0315	0.7480	5/8	UC 210-30		2.60
55	UCPA 211	63.5	140	104	66	14	125	25	M 16	55.6	22.2	M 16	UC 211	PA 211	3.17
2	UCPA 211-32	2-1/2	5-3/64	4-3/32	2-19/32	35/64	4-59/64	63/64	5/8	2.1890	0.8740	5/8	UC 211-32		3.32
60	UCPA 212	69.9	150	114	68	15	138	25	M 16	65.1	25.4	M 16	UC 212	PA 212	4.17
2-1/4	UCPA 212-36	2-3/4	5-29/32	4-31/64	2-43/64	19/32	5-7/16	63/64	5/8	2.5630	1.0000	5/8	UC 212-36		4.31
65	UCPA 213	76.2	160	124	70	15	150	25	M 16	65.1	25.4	M 16	UC 213	PA 213	4.96
2-1/2	UCPA 213-40	3	6-19/64	4-7/8	2-3/4	19/32	5-29/32	63/64	5/8	2.5630	1.0000	5/8	UC 213-40		5.04

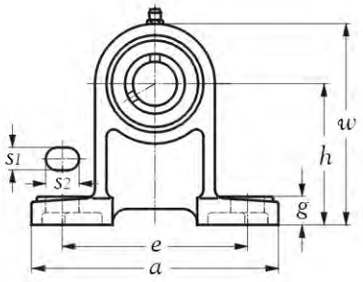
Standard duty pillow blocks cast housing adapter type series UKPA 200

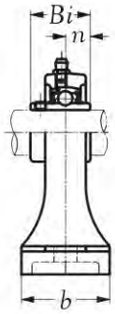




Shaft dia. mm	Unit number	Nominal dimensions mm									Bolt size mm	Bearing number	Housing number	Mass of unit kg(s).
		h	a	e	b	g	w	f	t	Bi				
20	UKPA 205	36.5	84	56	38	12	72	15	M 10	35	M 10	UK 205	PA 205	0.65
25	UKPA 206	42.9	94	66	48	13	84	18	M 14	38	M 14	UK 206	PA 206	1.00
30	UKPA 207	47.6	110	80	48	13	95	20	M 14	43	M 14	UK 207	PA 207	1.39
35	UKPA 208	49.2	116	84	54	13	100	20	M 14	46	M 14	UK 208	PA 208	1.59
40	UKPA 209	54.2	120	90	60	13	108	25	M 14	50	M 14	UK 209	PA 209	2.02
45	UKPA 210	57.2	130	94	60	14	116	25	M 16	55	M 16	UK 210	PA 210	2.32
50	UKPA 211	63.5	140	104	66	14	125	25	M 16	59	M 16	UK 211	PA 211	2.82
55	UKPA 212	69.9	150	114	68	15	138	25	M 16	62	M 16	UK 212	PA 212	3.67
60	UKPA 213	76.2	160	124	70	15	150	25	M 16	65	M 16	UK 213	PA 213	4.46

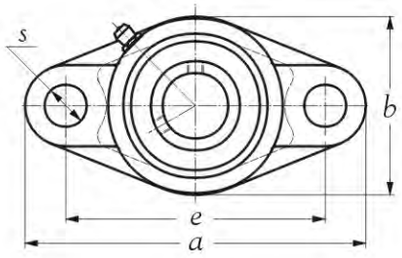
Standard duty pillow blocks cast housing set screws type
series UCPH 200

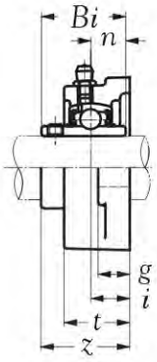




Shaft dia. mm inch	Unit number	Nominal dimensions mm inch										Bolt size mm inch	Bearing number	Housing number	Mass of unit kg(s).
		h	*a*	*e*	*b*	*s1*	*s2*	*g*	*w*	*Bi*	*n*				
12	**UCPH 201**	70	127	95	40	12	16	13	101	31.0	12.7	M 10	**UC 201**	**PH 204**	0.81
1/2	**UCPH 201-8**	2-3/4	5	3-47/64	1-37/64	15/32	5/8	3/64	3-31/32	1.2205	0.5000	3/8	**UC 201-8**		0.81
15	**UCPH 202**	70	127	95	40	12	16	13	101	31.0	12.7	M 10	**UC 202**	**PH 204**	0.80
5/8	**UCPH 202-10**	2-3/4	5	3-47/64	1-37/64	15/32	5/8	3/64	3-31/32	1.2205	0.5000	3/8	**UC 202-10**		0.80
17	**UCPH 203**	70	127	95	40	12	16	13	101	31.0	12.7	M 10	**UC 203**	**PH 204**	0.79
11/16	**UCPH 203-11**	2-3/4	5	3-47/64	1-37/64	15/32	5/8	3/64	3-31/32	1.2205	0.5000	3/8	**UC 203-11**		0.79
20	**UCPH 204**	70	127	95	40	12	16	13	101	31.0	12.7	M 10	**UC 204**	**PH 204**	0.77
3/4	**UCPH 204-12**	2-3/4	5	3-47/64	1-37/64	15/32	5/8	3/64	3-31/32	1.2205	0.5000	3/8	**UC 204-12**		0.78
25	**UCPH 205**	80	140	105	50	13	19	16	114	34.0	14.3	M 10	**UC 205**	**PH 205**	1.01
1	**UCPH 205-16**	3-5/32	5-3/64	4-9/64	1-31/32	3/64	3/4	5/8	4-31/64	1.3386	0.5630	3/8	**UC 205-16**		1.00
30	**UCPH 206**	90	165	121	50	17	21	18	130	38.1	15.9	M 14	**UC 206**	**PH 206**	1.56
1-1/8	**UCPH 206-18**	3-35/64	6-1/2	4-49/64	1-31/32	43/64	53/64	45/64	5-1/8	1.5000	0.6260	1/2	**UC 206-18**		1.58
1-1/4	**UCPH 206-20**												**UC 206-20**		1.54
35	**UCPH 207**	95	167	127	60	17	21	19	140	42.9	17.5	M 14	**UC 207**	**PH 207**	1.88
1-1/4	**UCPH 207-20**	3-47/64	6-37/64	5	2-23/64	43/64	53/64	3/4	5-3/64	1.6890	0.6890	1/2	**UC 207-20**		1.94
1-3/8	**UCPH 207-22**												**UC 207-22**		1.89
40	**UCPH 208**	100	184	137	66	17	21	20	150	49.2	19.0	M 14	**UC 208**	**PH 208**	2.44
1-1/2	**UCPH 208-24**	3-15/16	7-1/4	5-25/64	2-19/32	43/64	53/64	25/32	5-29/32	1.9370	0.7480	1/2	**UC 208-24**		2.48
45	**UCPH 209**	105	190	146	70	17	21	20	158	49.2	19.0	M 14	**UC 209**	**PH 209**	2.72
1-5/8	**UCPH 209-26**	4-9/64	7-31/64	5-3/4	2-3/4	43/64	53/64	25/32	6-7/32	1.9370	0.7480	1/2	**UC 209-26**		2.82
50	**UCPH 210**	110	204	159	70	19	22	22	165	51.6	19.0	M 16	**UC 210**	**PH 210**	3.08
1-7/8	**UCPH 210-30**	4-21/64	8-1/64	6-17/64	2-3/4	3/4	55/64	55/64	6-1/2	2.0315	0.7480	5/8	**UC 210-30**		3.15
55	**UCPH 211**	120	217	171	75	19	22	23	181	55.6	22.2	M 16	**UC 211**	**PH 211**	4.05
2	**UCPH 211-32**	4-23/32	8-35/64	6-47/64	2-61/64	3/4	55/64	29/32	7-1/8	2.1890	0.8740	5/8	**UC 211-32**		4.20
60	**UCPH 212**	130	236	186	80	19	22	24	197	65.1	25.4	M 16	**UC 212**	**PH 212**	4.78
2-1/4	**UCPH 212-36**	5-1/8	9-19/64	7-21/64	3-5/32	3/4	55/64	15/16	7-3/4	2.5630	1.0000	5/8	**UC 212-36**		4.92
65	**UCPH 213**	140	258	203	85	23	28	26	213	65.1	25.4	M 20	**UC 213**	**PH 213**	5.93
2-1/2	**UCPH 213-40**	5-3/64	10-5/32	7-63/64	3-11/32	29/32	1-7/64	1-1/64	8-25/64	2.563	1.0000	3/4	**UC 213-40**		6.01

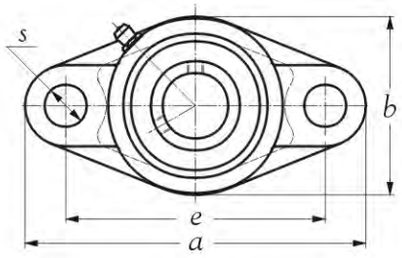
Standard duty two bolts flanged units cast housing set screws type
series UCFL 200

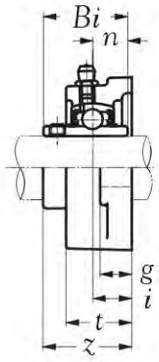




Shaft dia. mm inch	Unit number	Nominal dimensions mm inch a	e	i	g	t	s	b	z	Bi	n	Bolt size mm inch	Bearing number	Housing number	Mass of unit kg(s).
12	UCFL 201	113	90	15	11	25.5	12	60	33.3	31.0	12.7	M 10	UC 201	FL 204	0.47
1/2	UCFL 201-8	4-29/64	3-35/64	19/32	7/16	1	15/32	2-23/64	1-5/16	1.2205	0.5000	3/8	UC 201-8		0.47
15	UCFL 202	113	90	15	11	25.5	12	60	33.3	31.0	12.7	M 10	UC 202	FL 204	0.46
5/8	UCFL 202-10	4-29/64	3-35/64	19/32	7/16	1	15/32	2-23/64	1-5/16	1.2205	0.5000	3/8	UC 202-10		0.46
17	UCFL 203	113	90	15	11	25.5	12	60	33.3	31.0	12.7	M 10	UC 203	FL 204	0.45
11/16	UCFL 203-11	4-29/64	3-35/64	19/32	7/16	1	15/32	2-23/64	1-5/16	1.2205	0.5000	3/8	UC 203-11		0.45
20	UCFL 204	113	90	15	11	25.5	12	60	33.3	31.0	12.7	M 10	UC 204	FL 204	0.43
3/4	UCFL 204-12	4-29/64	3-35/64	19/32	7/16	1	15/32	2-23/64	1-5/16	1.2205	0.5000	3/8	UC 204-12		0.44
25	UCFL 205	130	99	16	13	27.0	16	68	35.7	34.0	14.3	M 14	UC 205	FL 205	0.60
1	UCFL 205-16	5-1/8	3-57/64	5/8	3/64	1-1/16	5/8	2-43/64	1-13/32	1.3386	0.5630	1/2	UC 205-16		0.59
30	UCFL 206	148	117	18	13	31.0	16	80	40.2	38.1	15.9	M 14	UC 206		0.91
1-1/8	UCFL 206-18	5-53/64	4-39/64	45/64	3/64	1-7/32	5/8	3-5/32	1-37/64	1.5000	0.6260	1/2	UC 206-18	FL 206	0.93
1-1/4	UCFL 206-20												UC 206-20		0.89
35	UCFL 207	161	130	19	14	34.0	16	90	44.4	42.9	17.5	M 14	UC 207		1.14
1-1/4	UCFL 207-20	6-11/32	5-1/8	3/4	35/64	1-11/32	5/8	3-35/64	1-3/4	1.6890	0.6890	1/2	UC 207-20	FL 207	1.20
1-3/8	UCFL 207-22												UC 207-22		1.15
40	UCFL 208	175	144	21	14	36.0	16	100	51.2	49.2	19.0	M 14	UC 208	FL 208	1.43
1-1/2	UCFL 208-24	6-57/64	5-43/64	53/64	35/64	1-27/64	5/8	3-15/16	2-1/64	1.9370	0.7480	1/2	UC 208-24		1.47
45	UCFL 209	188	148	22	16	38.0	19	108	52.2	49.2	19.0	M 16	UC 209	FL 209	1.80
1-5/8	UCFL 209-26	7-13/32	5-53/64	55/64	5/8	1-1/2	3/4	4-1/4	2-1/16	1.9370	0.7480	5/8	UC 209-26		1.90
50	UCFL 210	197	157	22	16	40.0	19	115	54.6	51.6	19.0	M 16	UC 210	FL 210	2.13
1-7/8	UCFL 210-30	7-3/4	6-3/16	55/64	5/8	1-37/64	3/4	4-17/32	2-5/32	2.0315	0.7480	5/8	UC 210-30		2.20
55	UCFL 211	224	184	25	18	43.0	19	130	58.4	55.6	22.2	M 16	UC 211	FL 211	2.86
2	UCFL 211-32	8-13/16	7-1/4	63/64	45/64	1-11/16	3/4	5-1/8	2-19/64	2.1890	0.8740	5/8	UC 211-32		3.01
60	UCFL 212	250	202	29	18	48.0	23	140	68.7	65.1	25.4	M 20	UC 212	FL 212	3.76
2-1/4	UCFL 212-36	9-27/32	7-61/64	1-9/64	45/64	1-57/64	29/32	5-3/64	2-45/64	2.5630	1.0000	3/4	UC 212-36		3.90
65	UCFL 213	258	210	30	20	50.0	23	155	69.7	65.1	25.4	M 20	UC 213	FL 213	4.63
2-1/2	UCFL 213-40	10-5/32	8-17/64	1-3/16	25/32	1-31/32	29/32	6-7/64	2-3/4	2.5630	1.0000	3/4	UC 213-40		4.71
70	UCFL 214	265	216	31	20	54.0	23	160	75.4	74.6	30.2	M 20	UC 214	FL 214	5.22
2-3/4	UCFL 214-44	10-7/16	8-1/2	1-7/32	25/32	2-1/8	29/32	6-19/64	2-31/32	2.9370	1.1890	3/4	UC 214-44		5.23
75	UCFL 215	275	225	34	22	55.0	23	164	78.5	77.8	33.3	M 20	UC 215	FL 215	5.36
3	UCFL 215-48	10-53/64	8-55/64	1-11/32	25/32	2-13/64	29/32	6-1/2	3-3/32	3.0630	1.3110	3/4	UC 215-48		5.28

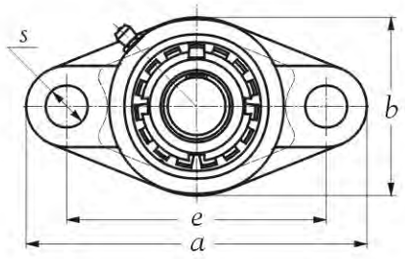
Standard duty two bolts flanged units cast housing set screws type series UCFL 200

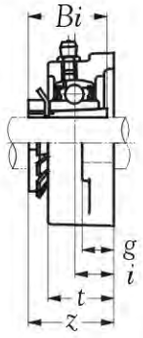




Shaft dia. mm inch	Unit number	Nominal dimensions mm inch a	e	i	g	t	s	b	z	Bi	n	Bolt size mm inch	Bearing number	Housing number	Mass of unit kgs.
80	**UCFL 216**	290	233	34	22	58.0	25	180	83.3	82.6	33.3	M 22	**UC 216**	**FL 216**	6.99
3-1/8	**UCFL 216-50**	11-27/64	9-11/64	1-11/32	55/64	2-9/32	63/64	7-3/32	3-9/32	3.2520	1.3110	7/8	**UC 216-50**		7.04
85	**UCFL 217**	305	248	36	22	63.0	25	190	87.6	85.7	34.1	M 22	**UC 217**	**FL 217**	8.28
3-1/4	**UCFL 217-52**	12-1/64	9-49/64	1-27/64	55/64	2-31/64	63/64	7-31/64	3-29/64	3.3740	1.3425	7/8	**UC 217-52**		8.50
90	**UCFL 218**	320	265	40	23	68.0	25	205	96.3	96.0	39.7	M 22	**UC 218**	**FL 218**	10.70
3-1/2	**UCFL 218-56**	12-19/32	10-7/16	1-37/64	29/32	2-43/64	63/64	8-5/64	3-51/64	3.7800	1.5630	7/8	**UC 218-56**		10.81

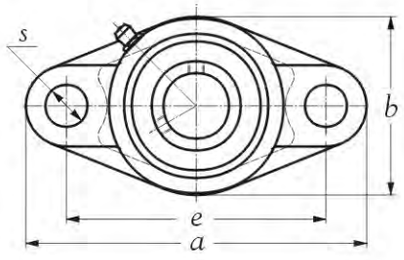
Standard duty two bolts flanged units cast housing adapter type series UKFL 200

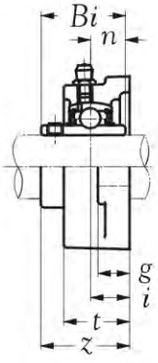




Shaft dia. mm	Unit number	Nominal dimensions mm									Bolt size mm	Bearing number	Housing number	Mass of unit kg(s).
		a	*e*	*i*	*g*	*t*	*b*	*s*	*z*	*Bi*				
20	**UKFL 205**	130	99	16	13	27	68	16	35.5	35	M 14	**UK 205**	**FL 205**	0.54
25	**UKFL 206**	148	117	18	13	31	80	16	39.0	38	M 14	**UK 206**	**FL 206**	0.84
30	**UKFL 207**	161	130	19	14	34	90	16	42.5	43	M 14	**UK 207**	**FL 207**	1.04
35	**UKFL 208**	175	144	21	14	36	100	16	46.5	46	M 14	**UK 208**	**FL 208**	1.27
40	**UKFL 209**	188	148	22	16	38	108	19	48.5	50	M 16	**UK 209**	**FL 209**	1.65
45	**UKFL 210**	197	157	22	16	40	115	19	50.0	55	M 16	**UK 210**	**FL 210**	1.92
50	**UKFL 211**	224	184	25	18	43	130	19	54.5	59	M 16	**UK 211**	**FL 211**	2.51
55	**UKFL 212**	250	202	29	18	48	140	23	61.0	62	M 20	**UK 212**	**FL 212**	3.26
60	**UKFL 213**	258	210	30	20	50	155	23	64.0	65	M 20	**UK 213**	**FL 213**	4.13

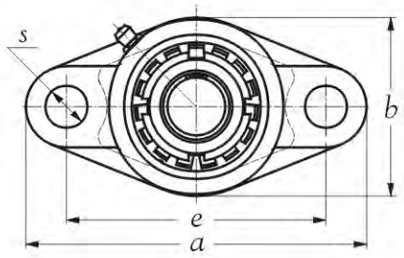
Standard duty two bolts flanged units cast housing set screws type series UCFT 200

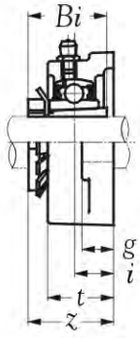




Shaft dia. mm inch	Unit number	Nominal dimensions mm inch a	e	i	g	t	s	b	z	Bi	n	Bolt size mm inch	Bearing number	Housing number	Mass of unit kg(s).
20	UCFT 204	112.5	90.0	19	15	29.5	10.0	61	37.3	31.0	12.7	M 8	UC 204	FT 204	0.51
3/4	UCFT 204-12	4-27/64	3-35/64	3/4	19/32	1-5/32	25/64	2-13/33	1-15/32	1.2205	0.5000	5/16	UC 204-12		0.52
25	UCFT 205	123.0	99.0	19	15	30.0	11.5	70	38.7	34.0	14.3	M 10	UC 205	FT 205	0.60
1	UCFT 205-16	4-27/32	3-57/64	3/4	19/32	1-3/16	29/64	2-3/5	1-17/32	1.3386	0.5630	3/8	UC 205-16		0.59
30	UCFT 206	142.0	116.5	20	16	32.5	11.5	82	42.2	38.1	15.9	M 10	UC 206		0.85
1-1/8	UCFT 206-18	5-19/32	4-19/32	25/32	5/8	1-9/32	29/64	3-15/65	1-21/32	1.5000	0.6260	3/8	UC 206-18	FT 206	0.87
1-1/4	UCFT 206-20												UC 206-20		0.83
35	UCFT 207	158.0	130.0	21	17	36.0	13.0	94	46.4	42.9	17.5	M 10	UC 207		1.27
1-1/4	UCFT 207-20	6-7/32	5-1/8	53/64	43/64	1-27/64	3/64	3-45/65	1-53/64	1.6890	0.6890	7/16	UC 207-20	FT 207	1.33
1-3/8	UCFT 207-22												UC 207-22		1.28
40	UCFT 208	172.0	143.5	24	17	39.0	13.0	103	54.2	49.2	19.0	M 10	UC 208	FT 208	1.49
1-1/2	UCFT 208-24	6-49/64	5-21/32	15/16	43/64	1-17/32	3/64	4-1/17	2-9/64	1.9370	0.7480	7/16	UC 208-24		1.53

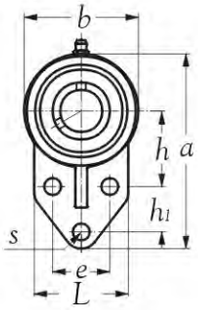
Standard duty two bolts flanged units cast housing adapter type series UKFT 200

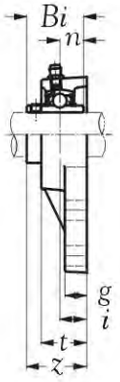




Shaft dia. mm inch	Unit number	Nominal dimensions mm inch										Bolt size mm inch	Bearing number	Housing number	Mass of unit kg(s).
		a	*e*	*i*	*g*	*t*	*s*	*b*	*z*	*Bi*	*n*				
20	**UKFT 204**	112.5	90.0	19	15	29.5	10.0	61	37.3	31	12.7	M 8	**UK 204**	**FT 204**	0.51
25	**UKFT 205**	123.0	99.0	19	15	30.0	11.5	70	38.7	35	14.3	M 10	**UK 205**	**FT 205**	0.60
30	**UKFT 206**	142.0	116.5	20	16	32.5	11.5	82	42.2	38	15.9	M 10	**UK 206**	**FT 206**	0.85
35	**UKFT 207**	158.0	130.0	21	17	36.0	13.0	94	46.4	43	17.5	M 10	**UK 207**	**FT 207**	1.27
40	**UKFT 208**	172.0	143.5	24	17	39.0	13.0	103	54.2	46	19.0	M 10	**UK 208**	**FT 208**	1.49

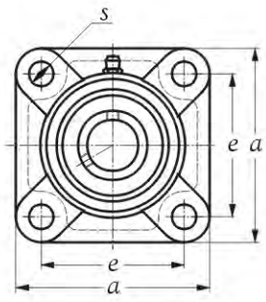
Standard duty flanged units cast housing special type set screws type series UCFB 200

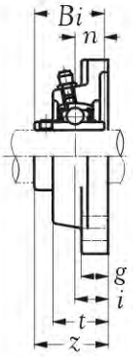




Shaft dia. mm inch	Unit number	Nominal dimensions mm inch a	e	i	g	t	s	h	h1	L	b	z	Bi	n	Bolt size mm inch	Bearing number	Housing number	Mass of unit kg(s).
12	UCFB 201	109	32	15	11	25.5	10	42	27	52	60	33.3	31.0	12.7	M 8	UC 201	FB 204	0.53
1/2	UCFB 201-8	4-19/64	1-17/64	19/32	7/16	1	25/64	1-21/32	1-1/16	2-1/16	2-23/64	1-5/16	1.2205	0.5000	5/16	UC 201-8		0.53
15	UCFB 202	109	32	15	11	25.5	10	42	27	52	60	33.3	31.0	12.7	M 8	UC 202	FB 204	0.52
5/8	UCFB 202-10	4-19/64	1-17/64	19/32	7/16	1	25/64	1-21/32	1-1/16	2-1/16	2-43/64	1-5/16	1.2205	0.5000	5/16	UC 202-10		0.52
17	UCFB 203	109	32	15	11	25.5	10	42	27	52	60	33.3	31.0	12.7	M 8	UC 203	FB 204	0.51
11/16	UCFB 203-11	4-19/64	1-17/64	19/32	7/16	1	25/64	1-21/32	1-1/16	2-1/16	2-43/64	1-5/16	1.2205	0.5000	5/16	UC 203-11		0.51
20	UCFB 204	109	32	15	11	25.5	10	42	27	52	60	33.3	31.0	12.7	M 8	UC 204	FB 204	0.49
3/4	UCFB 204-12	4-19/64	1-17/64	19/32	7/16	1	25/64	1-21/32	1-1/16	2-1/16	2-43/64	1-5/16	1.2205	0.5000	5/16	UC 204-12		0.50
25	UCFB 205	116	34	16	13	27.0	10	45	27	56	68	35.7	34.0	14.3	M 8	UC 205	FB 205	0.66
1	UCFB 205-16	4-9/16	1-11/32	5/8	3/64	1-1/16	25/64	1-49/64	1-1/16	2-13/64	2-43/64	1-13/32	1.3386	0.5630	5/16	UC 205-16		0.65
30	UCFB 206	132	40	18	13	31.0	10	50	29	65	80	40.2	38.1	15.9	M 8	UC 206	FB 206	0.99
1-1/8	UCFB 206-18	5-13/64	1-37/64	45/64	3/64	1-7/32	25/64	1-31/32	1-9/64	2-9/16	3-5/32	1-37/64	1.5000	0.6260	5/16	UC 206-18		1.01
1-1/4	UCFB 206-20															UC 206-20		0.97
35	UCFB 207	144	46	19	14	33.0	10	55	32	70	90	44.4	42.9	17.5	M 8	UC 207	FB 207	1.21
1-1/4	UCFB 207-20	5-43/64	1-13/16	3/4	35/64	1-19/64	25/64	2-11/64	1-17/64	2-3/4	3-35/64	1-3/4	1.6890	0.6890	5/16	UC 207-20		1.27
1-3/8	UCFB 207-22															UC 207-22		1.22
40	UCFB 208	164	50	21	16	35.0	12	60	41	78	100	51.2	49.2	19.0	M 10	UC 208	FB 208	1.72
1-1/2	UCFB 208-24	6-29/64	1-31/32	53/64	5/8	1-3/8	15/32	2-23/64	1-39/64	3-5/64	3-15/16	2-1/64	1.9370	0.7480	3/8	UC 208-24		1.76
45	UCFB 209	175	54	22	16	38.0	12	65	43	80	108	52.2	49.2	19.0	M 10	UC 209	FB 209	1.86
1-5/8	UCFB 209-26	6-57/64	2-1/8	55/64	5/8	1-1/2	15/32	2-9/16	1-11/16	3-5/32	4-1/4	2-1/16	1.9370	0.7480	3/8	UC 209-26		1.96
50	UCFB 210	184	58	22	16	39.0	12	68	46	86	114	54.6	51.6	19.0	M 10	UC 210	FB 210	2.36
1-7/8	UCFB 210-30	7-1/4	2-9/32	55/64	5/8	1-17/32	15/32	2-43/64	1-13/16	3-25/64	4-31/64	2-5/32	2.0315	0.7480	3/8	UC 210-30		2.43
55	UCFB 211	207	62	25	18	42.5	14	78	50	90	128	58.4	55.6	22.2	M 12	UC 211	FB 211	3.11
2	UCFB 211-32	8-5/32	2-7/16	63/64	45/64	1-43/64	35/64	3-5/64	1-31/32	3-35/64	5-1/16	2-19/64	2.1890	0.8740	7/16	UC 211-32		3.26
60	UCFB 212	224	66	29	19	47.5	14	84	55	94	140	68.7	65.1	25.4	M 12	UC 212	FB 212	4.07
2-1/4	UCFB 212-36	8-13/16	2-19/32	1-9/64	3/4	1-7/8	35/64	3-5/16	2-11/64	3-45/64	5-3/64	2-45/64	2.5630	1.0000	7/16	UC 212-36		4.21
65	UCFB 213	244	70	30	20	49.0	14	92	60	102	152	69.7	65.1	25.4	M 12	UC 213	FB 213	4.86
2-1/2	UCFB 213-40	9-39/64	2-3/4	1-3/16	25/32	1-59/64	35/64	3-5/8	2-23/64	4-1/64	5-63/64	2-3/4	2.5630	1.0000	7/16	UC 213-40		4.94

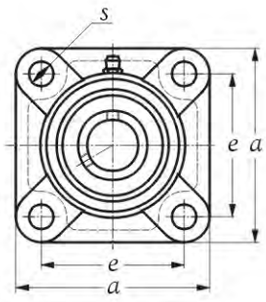
Standard duty flanged units cast housing set screws type
series UCF 200

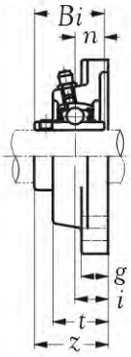




Shaft dia. mm / inch	Unit number	Nominal dimensions mm / inch a	e	i	g	t	s	z	Bi	n	Bolt size mm / inch	Bearing number	Housing number	Mass of unit kg(s).
12	UCF 201	86	64	15	12	25.5	12	33.3	31.0	12.7	M 10	UC 201	F 204	0.57
1/2	UCF 201-8	3-25/64	2-3/64	19/32	15/32	1	15/32	1-5/16	1.2205	0.5000	3/8	UC 201-8		0.57
15	UCF 202	86	64	15	12	25.5	12	33.3	31.0	12.7	M 10	UC 202	F 204	0.56
5/8	UCF 202-10	3-25/64	2-3/64	19/32	15/32	1	15/32	1-5/16	1.2205	0.5000	3/8	UC 202-10		0.56
17	UCF 203	86	64	15	12	25.5	12	33.3	31.0	12.7	M 10	UC 203	F 204	0.55
11/16	UCF 203-11	3-25/64	2-3/64	19/32	15/32	1	15/32	1-5/16	1.2205	0.5000	3/8	UC 203-11		0.55
20	UCF 204	86	64	15	12	25.5	12	33.3	31.0	12.7	M 10	UC 204	F 204	0.53
3/4	UCF 204-12	3-25/64	2-3/64	19/32	15/32	1	15/32	1-5/16	1.2205	0.5000	3/8	UC 204-12		0.54
25	UCF 205	95	70	16	13	27.0	12	35.7	34.0	14.3	M 10	UC 205	F 205	0.74
1	UCF 205-16	3-47/64	2-3/4	5/8	3/64	1-1/16	15/32	1-13/32	1.3386	0.5630	3/8	UC 205-16		0.73
30	UCF 206	108	83	18	13	31.0	12	40.2	38.1	15.9	M 10	UC 206		1.05
1-1/8	UCF 206-18	4-1/4	3-17/64	45/64	3/64	1-7/32	15/32	1-37/64	1.5000	0.6260	3/8	UC 206-18	F 206	1.07
1-1/4	UCF 206-20											UC 206-20		1.03
35	UCF 207	117	92	19	15	34.0	14	44.4	42.9	17.5	M 12	UC 207		1.34
1-1/4	UCF 207-20	4-39/64	3-5/8	3/4	19/32	1-11/32	35/64	1-3/4	1.6890	0.6890	7/16	UC 207-20	F 207	1.40
1-3/8	UCF 207-22											UC 207-22		1.35
40	UCF 208	130	102	21	15	36.0	16	51.2	49.2	19.0	M 14	UC 208	F 208	1.77
1-1/2	UCF 208-24	5-1/8	4-1/64	53/64	19/32	1-27/64	5/8	2-1/64	1.9370	0.7480	1/2	UC 208-24		1.81
45	UCF 209	137	105	22	16	38.0	16	52.2	49.2	19.0	M 14	UC 209	F 209	2.05
1-5/8	UCF 209-26	5-25/64	4-9/64	55/64	5/8	1-1/2	5/8	2-1/16	1.9370	0.7480	1/2	UC 209-26		2.15
50	UCF 210	143	111	22	16	40.0	16	54.6	51.6	19.0	M 14	UC 210	F 210	2.35
1-7/8	UCF 210-30	5-5/8	4-3/8	55/64	5/8	1-37/64	5/8	2-5/32	2.0315	0.7480	1/2	UC 210-30		2.42
55	UCF 211	162	130	25	18	43.0	19	58.4	55.6	22.2	M 16	UC 211	F 211	3.00
2	UCF 211-32	6-3/8	5-1/8	63/64	45/64	1-11/16	3/4	2-19/64	2.1890	0.8740	5/8	UC 211-32		3.15
60	UCF 212	175	143	29	18	48.0	19	68.7	65.1	25.4	M 16	UC 212	F 212	3.57
2-1/4	UCF 212-36	6-57/64	5-5/8	1-9/64	45/64	1-57/64	3/4	2-45/64	2.5630	1.0000	5/8	UC 212-36		3.71
65	UCF 213	187	149	30	22	50.0	19	69.7	65.1	25.4	M 16	UC 213	F 213	4.92
2-1/2	UCF 213-40	7-23/64	5-55/64	1-3/16	55/64	1-31/32	3/4	2-3/4	2.5630	1.0000	5/8	UC 213-40		5.00
70	UCF 214	193	152	31	22	54.0	19	75.4	74.6	30.2	M 16	UC 214	F 214	5.62
2-3/4	UCF 214-44	7-19/32	5-63/64	1-7/32	55/64	2-1/8	3/4	2-31/32	2.9370	1.1890	5/8	UC 214-44		5.63
75	UCF 215	200	159	34	22	56.0	19	78.5	77.8	33.3	M 16	UC 215	F 215	5.55
3	UCF 215-48	7-7/8	6-17/64	1-11/32	55/64	2-13/64	3/4	3-3/32	3.0630	1.3110	5/8	UC 215-48		5.47

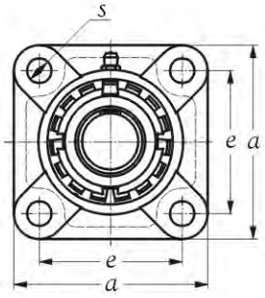
Standard duty flanged units cast housing set screws type
series UCF 200

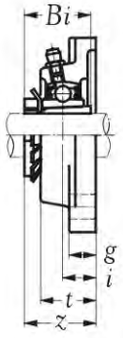




Shaft dia. mm inch	Unit number	Nominal dimensions mm inch a	e	i	g	t	s	z	Bi	n	Bolt size mm inch	Bearing number	Housing number	Mass of unit kgs.
80	**UCF 216**	208	165	34	24	58.0	23	83.3	82.6	33.3	M 20	**UC 216**	**F 216**	6.99
3-1/8	**UCF 216-50**	8-3/16	6-1/2	1-11/32	15/16	2-9/32	29/32	3-9/32	3.2520	1.3110	3/4	**UC 216-50**		7.04
85	**UCF 217**	220	175	36	26	63.0	23	87.6	85.7	34.1	M 20	**UC 217**	**F 217**	8.58
3-1/4	**UCF 217-52**	8-21/32	6-57/64	1-27/64	1-1/64	2-31/64	29/32	3-29/64	3.3740	1.3425	3/4	**UC 217-52**		8.80
90	**UCF 218**	235	187	40	26	68.0	23	96.3	96.0	39.7	M 20	**UC 218**	**F 218**	11.20
3-1/2	**UCF 218-56**	9-1/4	7-23/64	1-37/64	1-1/64	2-43/64	29/32	3-51/64	3.7800	1.5630	3/4	**UC 218-56**		11.31

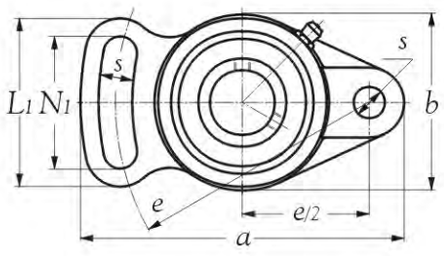
Standard duty flanged units cast housing adapter type
series UKF 200

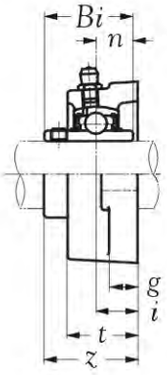




Shaft dia. mm	Unit number	Nominal dimensions inch a	e	i	g	t	s	z	Bi	Bolt size mm	Bearing number	Housing number	Mass of unit kgs.
20	**UKF 205**	95	70	16	13	27	12	35.5	35	M 10	**UK 205**	**F 205**	0.68
25	**UKF 206**	108	83	18	13	31	12	39.0	38	M 10	**UK 206**	**F 206**	0.98
30	**UKF 207**	117	92	19	15	34	14	42.5	43	M 12	**UK 207**	**F 207**	1.24
35	**UKF 208**	130	102	21	15	36	16	46.5	46	M 14	**UK 208**	**F 208**	1.61
40	**UKF 209**	137	105	22	16	38	16	48.5	50	M 14	**UK 209**	**F 209**	1.90
45	**UKF 210**	143	111	22	16	40	16	50.0	55	M 14	**UK 210**	**F 210**	2.14
50	**UKF 211**	162	130	25	18	43	19	54.5	59	M 16	**UK 211**	**F 211**	2.65
55	**UKF 212**	175	143	29	18	48	19	61.0	62	M 16	**UK 212**	**F 212**	3.07
60	**UKF 213**	187	149	30	22	50	19	64.0	65	M 16	**UK 213**	**F 213**	4.42

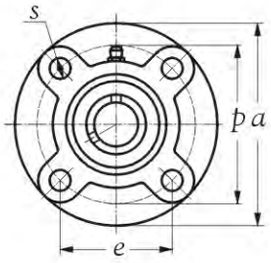
Standard duty flanged units cast housing special type set screws type series UCFA 200

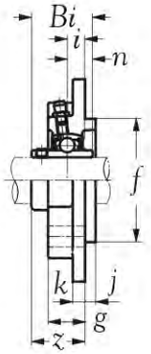




Shaft dia. mm inch	Unit number	Nominal dimensions mm inch a	e	i	g	t	s	N1	b	L1	z	Bi	n	Bolt size mm inch	Bearing number	Housing number	Mass of unit kg(s).
12	UCFA 201	102	78	15	12	25.5	10	40	60	54	33.3	31.0	12.7	M 8	UC 201	FA 204	0.49
1/2	UCFA 201-8	4-1/64	3-5/64	19/32	15/32	1	25/64	1-37/64	2-23/64	2-1/8	1-5/16	1.2205	0.5000	5/16	UC 201-8		0.49
15	UCFA 202	102	78	15	12	25.5	10	40	60	54	33.3	31.0	12.7	M 8	UC 202	FA 204	0.48
5/8	UCFA 202-10	4-1/64	3-5/64	19/32	15/32	1	25/64	1-37/64	2-23/64	2-1/8	1-5/16	1.2205	0.5000	5/16	UC 202-10		0.48
17	UCFA 203	102	78	15	12	25.5	10	40	60	54	33.3	31.0	12.7	M 8	UC 203	FA 204	0.47
11/16	UCFA 203-11	4-1/64	3-5/64	19/32	15/32	1	25/64	1-37/64	2-23/64	2-1/8	1-5/16	1.2205	0.5000	5/16	UC 203-11		0.47
20	UCFA 204	102	78	15	12	25.5	10	40	60	54	33.3	31.0	12.7	M 8	UC 204	FA 204	0.45
3/4	UCFA 204-12	4-1/64	3-5/64	19/32	15/32	1	25/64	1-37/64	2-23/64	2-1/8	1-5/16	1.2205	0.5000	5/16	UC 204-12		0.46
25	UCFA 205	125	98	16	14	27.0	12	51	68	65	34.7	34.0	14.3	M 10	UC 205	FA 205	0.64
1	UCFA 205-16	4-59/64	3-55/64	5/8	35/64	1-1/16	15/32	2-1/64	2-43/64	2-9/16	1-23/64	1.3386	0.5630	3/8	UC 205-16		0.63
30	UCFA 206	144	117	18	14	31.0	12	58	80	72	40.2	38.1	15.9	M 10	UC 206	FA 206	0.92
1-1/8	UCFA 206-18	5-43/64	4-39/64	45/64	35/64	1-7/32	15/32	2-9/32	3-5/32	2-53/64	1-37/64	1.5000	0.6260	3/8	UC 206-18		0.94
1-1/4	UCFA 206-20														UC 206-20		0.90
35	UCFA 207	161	130	19	16	34.0	14	66	90	82	45.4	42.9	17.5	M 12	UC 207	FA 207	1.27
1-1/4	UCFA 207-20	6-11/32	5-1/8	3/4	5/8	1-11/32	35/64	2-19/32	3-35/64	3-15/64	1-25/32	1.6890	0.6890	7/16	UC 207-20		1.33
1-3/8	UCFA 207-22														UC 207-22		1.28
40	UCFA 208	175	144	21	16	36.0	14	71	100	87	52.2	49.2	19.0	M 12	UC 208	FA 208	1.62
1-1/2	UCFA 208-24	6-57/64	5-43/64	53/64	5/8	1-27/64	35/64	2-51/64	3-15/16	3-27/64	2-1/16	1.9370	0.7480	7/16	UC 208-24		1.66
45	UCFA 209	178	146	22	16	38.0	16	72	108	88	52.2	49.2	19.0	M 14	UC 209	FA 209	1.84
1-5/8	UCFA 209-26	7-1/64	5-3/4	55/64	5/8	1-1/2	5/8	2-53/64	4-1/4	3-15/32	2-1/16	1.9370	0.7480	1/2	UC 209-26		1.94
50	UCFA 210	188	155	22	16	39.0	16	75	114	92	54.6	51.6	19.0	M 14	UC 210	FA 210	2.10
1-7/8	UCFA 210-30	7-13/32	6-7/64	55/64	5/8	1-17/32	5/8	2-61/64	4-31/64	3-5/8	2-5/32	2.0315	0.7480	1/2	UC 210-30		2.17
55	UCFA 211	216	182	25	18	42.5	16	84	128	102	58.4	55.6	22.2	M 14	UC 211	FA 211	2.16
2	UCFA 211-32	8-1/2	7-11/64	63/64	45/64	1-43/64	5/8	3-5/16	5-1/16	4-1/64	2-19/64	2.1890	0.8740	1/2	UC 211-32		2.31
60	UCFA 212	238	202	29	19	47.5	18	104	140	122	68.7	65.1	25.4	M 16	UC 212	FA 212	2.92
2-1/4	UCFA 212-36	9-3/8	7-61/64	1-9/64	3/4	1-7/8	45/64	4-3/32	5-3/64	4-51/64	2-45/64	2.5630	1.0000	5/8	UC 212-36		3.06
65	UCFA 213	248	210	30	20	49.0	18	106	152	126	69.7	65.1	25.4	M 16	UC 213	FA 213	3.61
2-1/2	UCFA 213-40	9-49/64	8-17/64	1-3/16	25/32	1-59/64	45/64	4-11/64	5-63/64	4-61/64	2-3/4	2.5630	1.0000	5/8	UC 213-40		3.69

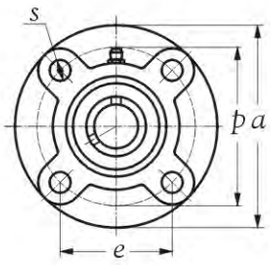
Standard duty flanged cartridge units cast housing set screws type series UCFC 200

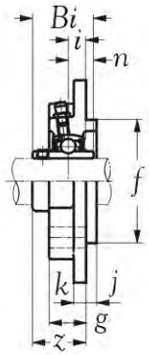




Shaft dia. mm inch	Unit number	Nominal dimensions mm inch a												Bolt size mm inch	Bearing number	Housing number	Mass of unit kg(s).
		a	b	e	i	s	j	k	g	f	z	Bi	n				
12	UCFC 201	100	78	55.1	10	12	5	6	20.5	62	28.3	31.0	12.7	M 10	UC 201	FC 204	0.73
1/2	UCFC 201-8	3-15/16	3-5/64	2-11/64	25/64	15/32	13/64	15/64	13/16	2-7/16	1-7/64	1.2205	0.5000	3/8	UC 201-8		0.73
15	UCFC 202	100	78	55.1	10	12	5	6	20.5	62	28.3	31.0	12.7	M 10	UC 202	FC 204	0.72
5/8	UCFC 202-10	3-15/16	3-5/64	2-11/64	25/64	15/32	13/64	15/64	13/16	2-7/16	1-7/64	1.2205	0.5000	3/8	UC 202-10		0.72
17	UCFC 203	100	78	55.1	10	12	5	6	20.5	62	28.3	31.0	12.7	M 10	UC 203	FC 204	0.71
11/16	UCFC 203-11	3-15/16	3-5/64	2-11/64	25/64	15/32	13/64	15/64	13/16	2-7/16	1-7/64	1.2205	0.5000	3/8	UC 203-11		0.71
20	UCFC 204	100	78	55.1	10	12	5	6	20.5	62	28.3	31.0	12.7	M 10	UC 204	FC 204	0.69
3/4	UCFC 204-12	3-15/16	3-5/64	2-11/64	25/64	15/32	13/64	15/64	13/16	2-7/16	1-7/64	1.2205	0.5000	3/8	UC 204-12		0.70
25	UCFC 205	115	90	63.6	10	12	6	7	21.0	70	29.7	34.0	14.3	M 10	UC 205	FC 205	0.99
1	UCFC 205-16	4-17/32	3-35/64	2-1/2	25/64	15/32	15/64	9/32	53/64	2-3/4	1-11/64	1.3386	0.5630	3/8	UC 205-16		0.98
30	UCFC 206	125	100	70.7	10	12	8	8	23.0	80	32.2	38.1	15.9	M 10	UC 206	FC 206	1.25
1-1/8	UCFC 206-18	4-59/64	3-15/16	2-25/32	25/64	15/32	5/16	5/16	29/32	3-5/32	1-17/64	1.5000	0.6260	3/8	UC 206-18		1.27
1-1/4	UCFC 206-20														UC 206-20		1.23
35	UCFC 207	135	110	77.8	11	14	8	9	26.0	90	36.4	42.9	17.5	M 12	UC 207	FC 207	1.64
1-1/4	UCFC 207-20	5-5/16	4-21/64	3-1/16	7/16	35/64	5/16	23/64	1-1/64	3-35/64	1-7/16	1.6890	0.6890	7/16	UC 207-20		1.70
1-3/8	UCFC 207-22														UC 207-22		1.65
40	UCFC 208	145	120	84.8	11	14	10	9	26.0	100	41.2	49.2	19.0	M 12	UC 208	FC 208	2.01
1-1/2	UCFC 208-24	5-45/64	4-23/32	3-11/32	7/16	35/64	25/64	23/64	1-1/64	3-15/16	1-5/8	1.9370	0.7480	7/16	UC 208-24		2.05
45	UCFC 209	160	132	93.3	10	16	12	10	26.0	105	40.2	49.2	19.0	M 14	UC 209	FC 209	2.57
1-5/8	UCFC 209-26	6-19/64	5-13/64	3-43/64	25/64	5/8	15/32	25/64	1-1/64	4-9/64	1-37/64	1.9370	0.7480	1/2	UC 209-26		2.67
5	UCFC 210	165	138	97.6	10	16	12	14	28.0	110	42.6	51.6	19.0	M 14	UC 210	FC 210	2.85
1-7/8	UCFC 210-30	6-1/2	5-7/16	3-27/32	25/64	5/8	15/32	35/64	1-7/64	4-21/64	1-43/64	2.0315	0.7480	1/2	UC 210-30		2.92
55	UCFC 211	185	150	106.1	13	19	12	13	30.0	125	46.4	55.6	22.2	M 16	UC 211	FC 211	3.92
2	UCFC 211-32	7-9/32	5-29/32	4-11/64	3/64	3/4	15/32	3/64	1-3/16	4-59/64	1-53/64	2.1890	0.8740	5/8	UC 211-32		4.07
60	UCFC 212	195	160	113.1	17	19	12	15	36.0	135	56.7	65.1	25.4	M 16	UC 212	FC 212	5.03
2-1/4	UCFC 212-36	7-43/64	6-19/64	4-29/64	43/64	3/4	15/32	19/32	1-27/64	5-5/16	2-15/64	2.5630	1.0000	5/8	UC 212-36		5.17
65	UCFC 213	205	170	120.2	16	19	14	15	35.0	145	55.7	65.1	25.4	M 16	UC 213	FC 213	5.52
2-1/2	UCFC 213-40	8-5/64	6-11/16	4-47/64	5/8	3/4	35/64	19/32	1-3/8	5-45/64	2-3/16	2.5630	1.0000	5/8	UC 213-40		5.60
70	UCFC 214	215	177	125.1	17	19	14	16	38.0	150	61.4	74.6	30.2	M 16	UC 214	FC 214	6.55
2-3/4	UCFC 214-44	8-15/32	6-31/32	4-59/64	43/64	3/4	35/64	5/8	1-1/2	5-29/32	2-27/64	2.9370	1.1890	5/8	UC 214-44		6.56
75	UCFC 215	220	184	130.1	18	19	16	17	39.0	160	62.5	77.8	33.3	M 16	UC 215	FC 215	7.01
3	UCFC 215-48	8-21/32	7-1/4	5-1/8	45/64	3/4	5/8	43/64	1-17/32	6-19/64	2-29/64	3.0630	1.3110	5/8	UC 215-48		6.93

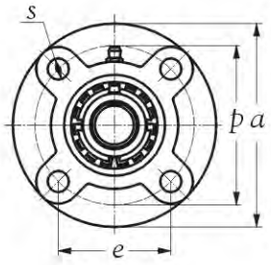
Standard duty flanged cartridge units cast housing set screws type series UCFC 200

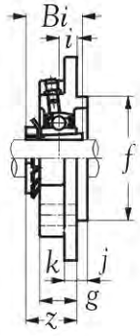




Shaft dia. mm inch	Unit number	Nominal dimensions mm inch a	p	e	i	s	j	k	g	f	z	Bi	n	Bolt size mm inch	Bearing number	Housing number	Mass of unit kgs.
80	UCFC 216	240	200	141.4	18	23	16	18	42.0	170	67.3	82.6	33.3	M 20	UC 216	FC 216	8.94
3-1/8	UCFC 216-50	9-29/64	7-7/8	5-9/16	45/64	29/32	5/8	45/64	1-21/32	6-11/16	2-21/32	3.2520	1.3110	3/4	UC 216-50		8.99
85	UCFC 217	250	208	147.1	18	23	18	20	45.0	180	69.6	85.7	34.1	M 20	UC 217	FC 217	10.68
3-1/4	UCFC 217-52	9-27/32	8-3/16	5-51/64	45/64	29/32	45/64	25/32	1-49/64	7-3/32	2-47/64	3.3740	1.3425	3/4	UC 217-52		10.90
90	UCFC 218	265	220	155.5	22	23	18	20	50.0	190	78.3	96.0	39.7	M 20	UC 218	FC 218	12.95
3-1/2	UCFC 218-56	10-7/16	8-21/32	6-1/8	55/64	29/32	45/64	25/32	1-31/32	7-31/64	3-5/64	3.7800	1.5630	3/4	UC 218-56		13.06

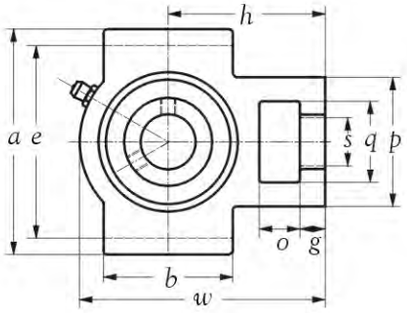
Standard duty flanged cartridge units housing adapter type series UKFC 200

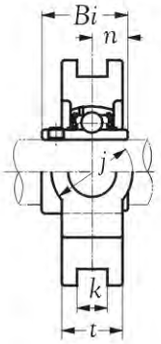




Shaft dia. mm	Unit number	Nominal dimensions mm											Bolt size mm	Bearing number	Housing number	Mass of unit kg(s).
		a	*p*	*e*	*i*	*s*	*j*	*k*	*g*	*f*	*z*	*Bi*				
20	**UKFC 205**	115	90	63.6	10	12	6	7	21	70	29.5	35	M 10	**UK 205**	**FC 205**	0.93
25	**UKFC 206**	125	100	70.7	10	12	8	8	23	80	31.0	38	M 10	**UK 206**	**FC 206**	1.18
30	**UKFC 207**	135	110	77.8	11	14	8	9	26	90	34.5	43	M 12	**UK 207**	**FC 207**	1.54
35	**UKFC 208**	145	120	84.8	11	14	10	9	26	100	36.5	46	M 12	**UK 208**	**FC 208**	1.85
40	**UKFC 209**	160	132	93.3	10	16	12	10	26	105	36.5	50	M 14	**UK 209**	**FC 209**	2.42
45	**UKFC 210**	165	138	97.6	10	16	12	14	28	110	38.0	55	M 14	**UK 210**	**FC 210**	2.64
50	**UKFC 211**	185	150	106.1	13	19	12	13	30	125	42.5	59	M 16	**UK 211**	**FC 211**	3.57
55	**UKFC 212**	195	160	113.1	17	19	12	15	36	135	49.0	62	M 16	**UK 212**	**FC 212**	4.53
60	**UKFC 213**	205	170	120.2	16	19	14	15	35	145	50.0	65	M 16	**UK 213**	**FC 213**	5.02

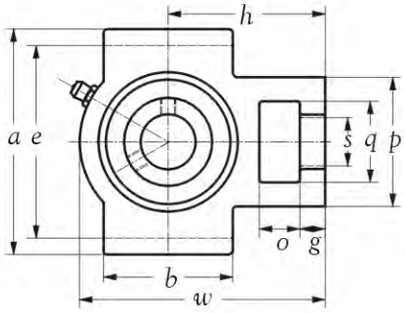
Standard duty take-up units cast housing set screws type series UCT 200

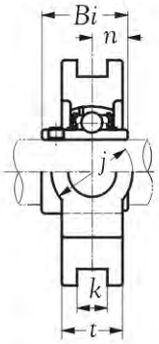




Shaft dia. mm inch	Unit number	Nominal dimensions mm inch o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n	Bearing number	Housing number	Mass of unit kg(s).
12	UCT 201	16	10	51	32	19	51	12	76	89	94	32	21	61	31.0	12.7	UC 201	T 204	0.77
1/2	UCT 201-8	5/8	25/64	2-1/64	1-17/64	3/4	2-1/64	15/32	2-63/64	3-1/2	3-45/64	1-17/64	53/64	2-13/32	1.2205	0.5000	UC 201-8		0.77
15	UCT 202	16	10	51	32	19	51	12	76	89	94	32	21	61	31.0	12.7	UC 202	T 204	0.76
5/8	UCT 202-10	5/8	25/64	2-1/64	1-17/64	3/4	2-1/64	15/32	2-63/64	3-1/2	3-45/64	1-17/64	53/64	2-13/32	1.2205	0.5000	UC 202-10		0.76
17	UCT 203	16	10	51	32	19	51	12	76	89	94	32	21	61	31.0	12.7	UC 203	T 204	0.75
11/16	UCT 203-11	5/8	25/64	2-1/64	1-17/64	3/4	2-1/64	15/32	2-63/64	3-1/2	3-45/64	1-17/64	53/64	2-13/32	1.2205	0.5000	UC 203-11		0.75
20	UCT 204	16	10	51	32	19	51	12	76	89	94	32	21	61	31.0	12.7	UC 204	T 204	0.73
3/4	UCT 204-12	5/8	25/64	2-1/64	1-17/64	3/4	2-1/64	15/32	2-63/64	3-1/2	3-45/64	1-17/64	53/64	2-13/32	1.2205	0.5000	UC 204-12		0.74
25	UCT 205	16	10	51	32	19	51	12	76	89	97	32	24	62	34.0	14.3	UC 205	T 205	0.83
1	UCT 205-16	5/8	25/64	2-1/64	1-17/64	3/4	2-1/64	15/32	2-63/64	3-1/2	3-13/16	1-17/64	15/16	2-7/16	1.3385	0.5630	UC 205-16		0.82
30	UCT 206	16	10	56	37	22	57	12	89	102	113	37	28	70	38.1	15.9	UC 206		1.26
1-1/8	UCT 206-18	5/8	25/64	2-13/64	1-29/64	55/64	2-1/4	15/32	3-1/2	4-1/64	4-29/64	1-29/64	1-7/64	2-3/4	1.5000	0.6260	UC 206-18	T 206	1.28
1-1/4	UCT 206-20																UC 206-20		1.24
35	UCT 207	16	13	64	37	22	64	12	89	102	129	37	30	78	42.9	17.5	UC 207		1.58
1-1/4	UCT 207-20	5/8	3/64	2-3/64	1-29/64	55/64	2-3/64	15/32	3-1/2	4-1/64	5-5/64	1-29/64	1-3/16	3-5/64	1.6890	0.6890	UC 207-20	T 207	1.64
1-3/8	UCT 207-22																UC 207-22		1.59
	UCT 208	19	16	83	49	29	83	16	102	114	144	49	33	88	49.2	19.0	UC 208	T 208	2.31
1-1/2	UCT 208-24	3/4	5/8	3-17/64	1-59/64	1-9/64	3-17/64	5/8	4-1/64	4-31/64	5-43/64	1-59/64	1-19/64	3-15/32	1.9370	0.7480	UC 208-24		2.35
	UCT 209	19	16	83	49	29	83	16	102	117	144	49	35	87	49.2	19.0	UC 209	T 209	2.28
1-5/8	UCT 209-26	3/4	5/8	3-17/64	1-59/64	1-9/64	3-17/64	5/8	4-1/64	4-39/64	5-43/64	1-59/64	1-3/8	3-27/64	1.9370	0.7480	UC 209-26		2.38
50	UCT 210	19	16	83	49	29	86	16	102	117	149	49	37	90	51.6	19.0	UC 210	T 210	2.50
1-7/8	UCT 210-30	3/4	5/8	3-17/64	1-59/64	1-9/64	3-25/64	5/8	4-1/64	4-39/64	5-55/64	1-59/64	1-29/64	3-35/64	2.0315	0.7480	UC 210-30		2.57
55	UCT 211	25	19	102	64	35	95	22	130	146	171	64	38	106	55.6	22.2	UC 211	T 211	3.79
2	UCT 211-32	63/64	3/4	4-1/64	2-3/64	1-3/8	3-47/64	55/64	5-1/8	5-3/4	6-47/64	2-3/64	1-1/2	4-11/64	2.1890	0.8740	UC 211-32		3.94
60	UCT 212	32	19	102	64	35	102	22	130	146	194	64	42	119	65.1	25.4	UC 212	T 212	4.79
2-1/4	UCT 212-36	1-17/64	3/4	4-1/64	2-3/64	1-3/8	4-1/64	55/64	5-1/8	5-3/4	7-41/64	2-3/64	1-21/32	4-11/16	2.5630	1.0000	UC 212-36		4.93
65	UCT 213	32	21	111	70	41	121	26	151	167	224	70	44	137	65.1	25.4	UC 213	T 213	6.66
2-1/2	UCT 213-40	1-17/64	53/64	4-3/8	2-3/4	1-39/64	4-49/64	1-1/64	5-15/16	6-37/64	8-13/16	2-3/4	1-47/64	5-25/64	2.5630	1.0000	UC 213-40		6.74
70	UCT 214	32	21	111	70	41	121	26	151	167	224	70	46	137	74.6	30.2	UC 214	T 214	6.75
2-3/4	UCT 214-44	1-17/64	53/64	4-3/8	2-3/4	1-39/64	4-49/64	1-1/64	5-15/16	6-37/64	8-13/16	2-3/4	1-13/16	5-25/64	2.9370	1.1890	UC 214-44		6.76
75	UCT 215	32	21	111	70	41	121	26	151	167	232	70	48	140	77.8	33.3	UC 215	T 215	7.11
3	UCT 215-48	1-17/64	53/64	4-3/8	2-3/4	1-39/64	4-49/64	1-1/64	5-15/16	6-37/64	9-9/64	2-3/4	1-57/64	5-3/64	3.0630	1.3110	UC 215-48		7.03

Standard duty take-up units cast housing set screws type
series UCT 200

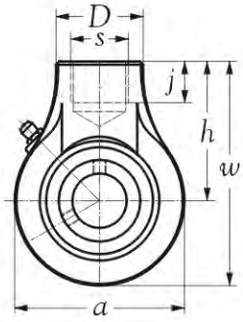


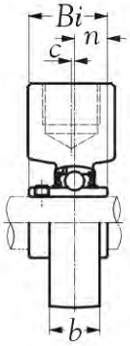


Shaft dia. mm inch	Unit number	Nominal dimensions mm inch o	g	p	q	s	b	k	e	a	w	j	t	h	Bi	n	Bearing number	Housing number	Mass of unit kgs.
80	UCT 216	32	21	111	70	41	121	26	165	184	235	70	51	140	82.6	33.3	UC 216	T 216	8.19
3-1/8	UCT 216-50	1-17/64	53/64	4-3/8	2-3/4	1-39/64	4-49/64	1-1/64	6-1/2	7-1/4	9-1/4	2-3/4	2-1/64	5-3/64	3.2520	1.3110	UC 216-50		8.24
85	UCT 217	38	29	124	73	48	157	30	173	198	260	73	54	162	85.7	34.1	UC 217	T 217	10.58
3-1/4	UCT 217-52	1-1/2	1-9/64	4-7/8	2-7/8	1-57/64	6-3/16	1-3/16	6-13/16	7-51/64	10-15/64	2-7/8	2-1/8	6-3/8	3.3740	1.3425	UC 217-52		10.80

P9

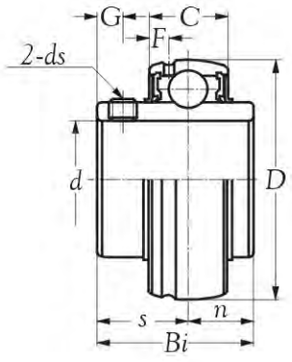
Standard duty hanger units set screws type
series UCHA 200





Shaft dia. mm inch	Unit number	Nominal dimensions mm inch a	w	c	b	h	s	D	j	Bi	n	Bearing number	Housing number	Mass of unit kg(s).
12	UCHA 201	64	96.0	0	22	64	RP 3/4	40	19	31.0	12.7	UC 201	HA 204	0.66
1/2	UCHA 201-8	2-3/64	3-25/32	0	55/64	2-3/64	RP 3/4	1-37/64	3/4	1.2205	0.5000	UC 201-8		0.66
15	UCHA 202	64	96.0	0	22	64	RP 3/4	40	19	31.0	12.7	UC 202	HA 204	0.65
5/8	UCHA 202-10	2-3/64	3-25/32	0	55/64	2-3/64	RP 3/4	1-37/64	3/4	1.2205	0.5000	UC 202-10		0.65
17	UCHA 203	64	96.0	0	22	64	RP 3/4	40	19	31.0	12.7	UC 203	HA 204	0.64
11/16	UCHA 203-11	2-3/64	3-25/32	0	55/64	2-3/64	RP 3/4	1-37/64	3/4	1.2205	0.5000	UC 203-11		0.64
20	UCHA 204	64	96.0	0	22	64	RP 3/4	40	19	31.0	12.7	UC 204	HA 204	0.62
3/4	UCHA 204-12	2-3/64	3-25/32	0	55/64	2-3/64	RP 3/4	1-37/64	3/4	1.2205	0.5000	UC 204-12		0.63
25	UCHA 205	78	103.0	0	23	64	RP 3/4	40	19	34.0	14.3	UC 205	HA 205	0.83
1	UCHA 205-16	3-5/64	4-1/16	0	29/32	2-3/64	RP 3/4	1-37/64	3/4	1.3386	0.5630	UC 205-16		0.82
30	UCHA 206	78	103.0	0	25	64	RP 3/4	40	19	38.1	15.9	UC 206		0.78
1-1/8	UCHA 206-18	3-5/64	4-1/16	0	63/64	2-3/64	RP 3/4	1-37/64	3/4	1.5000	0.6260	UC 206-18	HA 206	0.80
1-1/4	UCHA 206-20											UC 206-20		0.76
35	UCHA 207	92	116.0	0	26	70	RP 3/4	40	19	42.9	17.5	UC 207		1.11
1-1/4	UCHA 207-20	3-5/8	4-9/16	0	1-1/64	2-3/4	RP 3/4	1-37/64	3/4	1.6890	0.6890	UC 207-20	HA 207	1.17
1-3/8	UCHA 207-22											UC 207-22		1.12
40	UCHA 208	96	121.0	2.0	30	73	RP 3/4	40	19	49.2	19.0	UC 208	HA 208	1.25
1-1/2	UCHA 208-24	3-25/32	4-49/64	5/64	1-3/16	2-7/8	RP 3/4	1-37/64	3/4	1.9370	0.7480	UC 208-24		1.29
45	UCHA 209	108	136.0	5.0	30	82	RP 1	48	21	49.2	19.0	UC 209	HA 209	1.65
1-5/8	UCHA 209-26	4-1/4	5-23/64	13/64	1-3/16	3-15/64	RP 1	1-57/64	53/64	1.9370	0.7480	UC 209-26		1.75
50	UCHA 210	115	140.5	5.0	32	83	RP 1	48	21	51.6	19.0	UC 210	HA 210	1.95
1-7/8	UCHA 210-30	4-17/32	5-17/32	13/64	1-17/64	3-17/64	RP 1	1-57/64	53/64	2.0315	0.7480	UC 210-30		2.02
55	UCHA 211	126	150.0	7.0	33	87	RP 1-1/4	60	24	55.6	22.2	UC 211	HA 211	2.48
2	UCHA 211-32	4-61/64	5-29/32	9/32	1-19/64	3-27/64	RP 1-1/4	2-23/64	15/16	2.1890	0.874	UC 211-32		2.63
60	UCHA 212	142	173.0	9.0	36	102	RP 1-1/4	60	28	65.1	25.4	UC 212	HA 212	3.59
2-1/4	UCHA 212-36	5-19/32	6-13/16	23/64	1-27/64	4-1/64	RP 1-1/4	2-23/64	1-7/64	2.5630	1.0000	UC 212-36		3.73
65	UCHA 213	166	200.0	9.5	38	117	RP 1-1/2	70	32	65.1	25.4	UC 213	HA 213	5.37
2-1/2	UCHA 213-40	6-17/32	7-7/8	3/8	1-1/2	4-39/64	RP 1-1/2	2-3/4	1-17/64	2.5630	1.0000	UC 213-40		5.45

Standard duty spherical outside surface ball bearings set screws type series UC 200

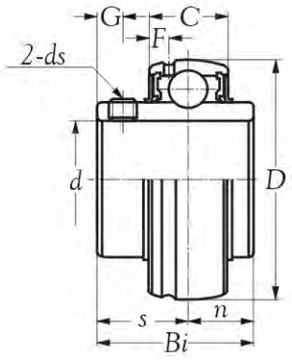


Shaft dia. mm / inch	Bearing number	Nominal dimensions mm / inch d	D	Bi	C	n	s	G	F	ds	Basic load ratings N dynamic Cr	static Cor	Mass kg(s).
12	UC 201	12	47	31.0	16	12.7	18.3	5.0	3.5	M 5 x 0.8	12800	6650	0.21
1/2	UC 201-8	0.5000	1.8504	1.2205	0.6299	0.5000	0.7205	0.1969	0.1378	1/4-28			0.21
15	UC 202	15	47	31.0	16	12.7	18.3	5.0	3.5	M 5 x 0.8	12800	6650	0.20
5/8	UC 202-10	0.6250	1.8504	1.2205	0.6299	0.5000	0.7205	0.1969	0.1378	1/4-28			0.20
17	UC 203	17	47	31.0	16	12.7	18.3	5.0	3.5	M 5 x 0.8	12800	6650	0.19
11/16	UC 203-11	0.6875	1.8504	1.2205	0.6299	0.5000	0.7205	0.1969	0.1378	1/4-28			0.19
20	UC 204	20	47	31.0	16	12.7	18.3	5.0	3.80	M6 x 1.0	12800	6650	0.17
3/4	UC 204-12	0.7500	1.8504	1.2205	0.6299	0.5000	0.7205	0.1969	0.1496	1/4-28			0.18
25	UC 205	25	52	34.1	17	14.3	19.8	5.0	4.30	M6 x 1.0	14000	7850	0.21
1	UC 205-16	1.0000	2.0472	1.3425	0.6693	0.5630	0.7795	0.1969	0.1693	1/4-28			0.20
30	UC 206	30	62	38.1	19	15.9	22.2	5.0	4.30	M6 x 1.0			0.32
1-1/8	UC 206-18	1.1250	2.4409	1.5000	0.7480	0.6260	0.8740	0.1969	0.1693	1/4-28	19500	11300	0.34
1-1/4	UC 206-20	1.2500											0.30
35	UC 207	35	72	42.9	20	17.5	25.4	7.0	4.3	M8 x 1.0			0.47
1-1/4	UC 207-20	1.2500	2.8346	1.6890	0.7874	0.6890	1.0000	0.2756	0.1693	5/16-24	25700	15300	0.53
1-3/8	UC 207-22	1.3750											0.48
40	UC 208	40	80	49.2	21	19.0	30.2	8.0	4.30	M8 x 1.0	29100	17800	0.64
1-1/2	UC 208-24	1.5000	3.1496	1.9370	0.8268	0.7480	1.1890	0.3150	0.1693	5/16-24			0.68
45	UC 209	45	85	49.2	22	19.0	30.2	8.0	4.70	M8 x 1.0	32500	20400	0.68
1-5/8	UC 209-26	1.6250	3.3465	1.9370	0.8661	0.7480	1.1890	0.3150	0.1850	5/16-24			0.78
50	UC 210	50	90	51.6	24	19.0	32.6	10	5.20	M10 x 1.25	35000	23200	0.80
1-7/8	UC 210-30	1.8750	3.5433	2.0315	0.9449	0.7480	1.2835	0.3937	0.2047	3/8-24			0.87
55	UC 211	55	100	55.6	25	22.2	33.4	10	5.20	M10 x 1.25	43500	29200	1.12
2	UC 211-32	2.0000	3.9370	2.1890	0.9843	0.8740	1.3150	0.3937	0.2047	3/8-24			1.27
60	UC 212	60	110	65.1	27	25.4	39.7	10	5.50	M10 x 1.25	52500	36000	1.53
2-1/4	UC 212-36	2.2500	4.3307	2.5630	1.0630	1.0000	1.5630	0.3937	0.2165	3/8-24			1.67

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Slingers] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site: Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Standard duty spherical outside surface ball bearings set screws type series UC 200



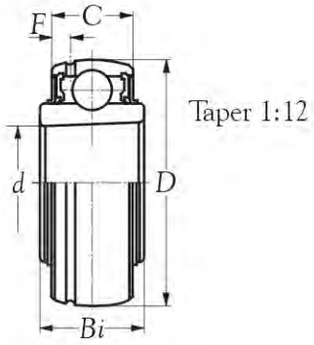
Shaft dia. mm inch	Bearing number	Nominal dimensions mm inch									Basic load ratings N dynamic Cr	Basic load ratings N static Cor	Mass kgs.
		d	D	Bi	C	n	s	G	F	ds			
65	UC 213	65	120	65.1	29	25.4	39.7	10	5.50	M10 x 1.25	57500	40000	1.86
2-1/2	UC 213-40	2.5000	4.7244	2.5630	1.1417	1.0000	1.5630	0.3937	0.2165	3/8-24			1.94
70	UC 214	70	125	74.6	30	30.2	44.4	12.0	5.90	M12 x 1.5	62000	44000	2.05
2-3/4	UC 214-44	2.7500	4.9213	2.9370	1.1811	1.1890	1.7480	0.4724	0.2323	7/16-20			2.06
75	UC 215	75	130	77.8	32	33.3	44.5	12.0	6.6	M12 x 1.5	66000	49500	2.21
3	UC 215-48	3.0000	5.1181	3.0630	1.2598	1.3110	1.7520	0.4724	0.2598	7/16-20			2.13
80	UC 216	80	140	82.6	33	33.3	49.3	12.0	6.7	M12 x 1.5	72500	53000	2.79
3-1/8	UC 216-50	3.1250	5.5118	3.2520	1.2992	1.3110	1.9409	0.4724	0.2638	7/16-20			2.84
85	UC 217	85	150	85.7	35	34.1	51.6	12.0	6.9	M12 x 1.5	83500	64000	3.38
3-1/4	UC 217-52	3.2500	5.9055	3.3740	1.3780	1.3425	2.0315	0.4724	0.2717	7/16-20			3.60
90	UC 218	90	160	96.0	37	39.7	56.3	12.0	7.0	M12 x 1.5	96000	71500	4.45
3-1/2	UC 218-56	3.5000	6.2992	3.7795	1.4567	1.5630	2.2165	0.4724	0.2756	1/2-20			4.56

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Slingers] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P9

Standard duty spherical outside surface ball bearings adapter type series UK 200



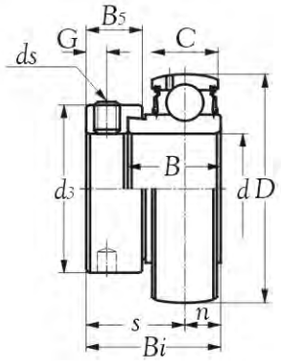
Shaft dia. mm	Bearing number	Nominal dimensions mm					Basic load ratings N		Mass
		d	D	Bi	C	F	dynamic Cr	static Cor	kg(s).
20	UK 205	25	52	23	17	4.2	14000	7850	0.15
25	UK 206	30	62	26	19	4.5	19500	11300	0.25
30	UK 207	35	72	27	20	4.2	25700	15300	0.37
35	UK 208	40	80	29	21	4.2	29100	17800	0.48
40	UK 209	45	85	31	22	4.2	32500	20400	0.53
45	UK 210	50	90	31	24	5.0	35000	23200	0.59
50	UK 211	55	100	33	25	6.3	43500	29200	0.77
55	UK 212	60	110	36	27	5.3	52500	36000	1.03
60	UK 213	65	120	36	29	6.0	57500	40000	1.36

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Slingers] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P9

Standard duty spherical outside surface ball bearings eccentric locking collar type series SA 200



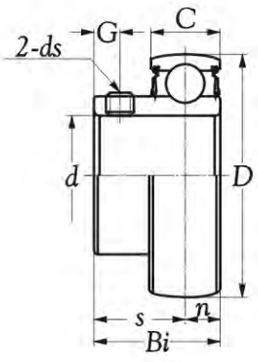
Shaft dia. mm inch	Bearing number	Nominal dimensions mm inch											Basic load ratings N dynamic Cr	static Cor	Mass kg(s).
		d	D	Bi	B	C	n	s	G	ds	d3	B5			
12	SA 201	12	40	28.5	19.0	12	6.0	22.5	4.8	M 6 x 1	28.6	13.5	9600	4600	0.14
1/2	SA 201-8	0.5000	1.5748	1.1220	0.7480	0.4724	0.2362	0.8858	0.1890	1/4-28	1.1260	0.5315			0.14
15	SA 202	15	40	28.5	19.0	12	6.0	22.5	4.8	M 6 x 1	28.6	13.5	9600	4600	0.13
5/8	SA 202-10	0.6250	1.5748	1.1220	0.7480	0.4724	0.2362	0.8858	0.1890	1/4-28	1.1260	0.5315			0.13
17	SA 203	17	40	28.5	19.0	12	6.0	22.5	4.8	M 6 x 1	28.6	13.5	9600	4600	0.12
11/16	SA 203-11	0.6875	1.5748	1.1220	0.7480	0.4724	0.2362	0.8858	0.1890	1/4-28	1.1260	0.5315			0.12
20	SA 204	20	47	30.9	20.0	14	7.0	23.9	4.8	M 6 x 1	33.3	13.5	12800	6650	0.18
3/4	SA 204-12	0.7500	1.8504	1.2165	0.7874	0.5512	0.2756	0.8858	0.1890	1/4-28	1.3110	0.5315			0.19
25	SA 205	25	52	30.9	21.0	15	7.5	23.4	4.8	M 6 x 1	38.1	13.5	14000	7850	0.20
1	SA 205-16	1.0000	2.0472	1.2165	0.8268	0.5906	0.2953	0.9055	0.1890	1/4-28	1.5000	0.5315			0.18
30	SA 206	30	62	35.7	22.0	16	8.0	27.7	6.0	M 6 x 1	44.5	15.9			0.33
1-1/8	SA 206-18	1.1250	2.4409	1.4055	0.8661	0.6299	0.3150	1.0197	0.2362	1/4-28	1.7520	0.6260	19500	11300	0.35
1-1/4	SA 206-20	1.2500													0.28
35	SA 207	35	72	38.9	24.0	17	8.5	30.4	6.8	M 8 x 1	55.6	17.5			0.50
1-1/4	SA 207-20	1.2500	2.8346	1.5315	0.9449	0.6693	0.3346	1.1417	0.2677	5/16-24	2.1890	0.6890	25700	15300	0.56
1-3/8	SA 207-22	1.3750													0.51
40	SA 208	40	80	43.6	27.0	18	9	34.6	6.8	M 8 x 1	60.3	18.3	29100	17800	0.65
1-1/2	SA 208-24	1.5000	3.1496	1.7165	1.0630	0.7087	0.3740	1.2205	0.2677	5/16-24	2.3740	0.7205			0.68
45	SA 209	45	85	43.6	28.7	19	9.5	34.1	6.8	M 8 x 1	63.5	18.3	32500	20400	0.69
1-5/8	SA 209-26	1.6250	3.3465	1.7165	1.1299	0.7480	0.3937	1.2677	0.2677	5/16-24	2.5000	0.7205			0.82
50	SA 210	50	90	43.6	30.2	20	10	33.6	6.8	M 8 x 1	69.9	18.3	35000	23200	0.80
1-7/8	SA 210-30	1.8750	3.5433	1.7165	1.1890	0.7874	0.4134	1.3071	0.2677	3/8-24	2.7520	0.7205			0.85
55	SA 211	55	100	48.4	32.4	21	11.5	36.9	8.0	M 10 x 1.25	76.2	18.3	43500	29200	0.87
2	SA 211-32	2.0000	3.9370	1.9055	1.2756	0.8268	0.4528	1.4528	0.3150	3/8-24	3.0000	0.7205			1.18

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Slingers] - Steel
[Grease] - Shell Alvania S2

P9

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Standard duty spherical outside surface ball bearings set screws type series SB 200



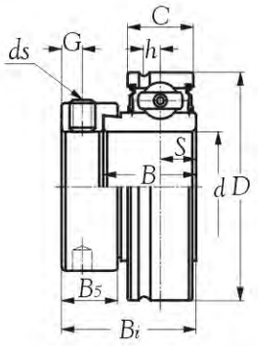
Shaft dia. mm inch	Bearing number	Nominal dimensions mm inch d	D	Bi	C	n	s	G	ds	Basic load ratings N dynamic Cr	static Cor	Mass kg.
12	SB 201	12	40	22	12	6.0	16.0	4.0	M 5 x 0.8	9600	4600	0.10
1/2	SB 201-8	0.5000	1.5748	0.8661	0.4724	0.2362	0.6299	0.1575	1/4-28			0.10
15	SB 202	15	40	22	12	6.0	16.0	4.0	M 5 x 0.8	9600	4600	0.09
5/8	SB 202-10	0.6250	1.5748	0.8661	0.4724	0.2362	0.6299	0.1575	1/4-28			0.09
17	SB 203	17	40	22	12	6.0	16.0	4.0	M 5 x 0.8	9600	4600	0.08
11/16	SB 203-11	0.6875	1.5748	0.8661	0.4724	0.2362	0.6299	0.1575	1/4-28			0.08
20	SB 204	20	47	24.8	14	7.0	17.8	5.0	M 6 x 1	12800	6650	0.13
3/4	SB 204-12	0.7500	1.8504	0.9920	0.5512	0.2756	0.7087	0.1969	1/4-28			0.15
25	SB 205	25	52	27	15	7.5	19.5	5.5	M 6 x 1	14000	7850	0.17
1	SB 205-16	1.0000	2.0472	1.0800	0.5906	0.2953	0.7677	0.2165	1/4-28			0.16
30	SB 206	30	62	30	16	8.0	22.0	6.0	M 6 x 1			0.26
1-1/8	SB 206-18	1.1250	2.4409	1.2000	0.6299	0.3150	0.8268	0.2362	1/4-28	19500	11300	0.27
1-1/4	SB 206-20	1.2500										0.24
35	SB 207	35	72	32	17	8.5	23.5	6.5	M 8 x 1			0.38
1-1/4	SB 207-20	1.2500	2.8346	1.2800	0.6693	0.3346	0.9252	0.2559	5/16-24	25700	15300	0.43
1-3/8	SB 207-22	1.3750										0.41
40	SB 208	40	80	34	18	9	25	7.0	M 8 x 1	29100	17800	0.50
1-1/2	SB 208-24	1.5000	3.1496	1.3600	0.7087	0.3543	0.9646	0.2756	5/16-24			0.54

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Slingers] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P9

Standard duty cylindrical surface ball bearings eccentric locking collar type series CSA 200



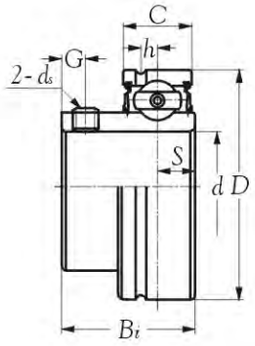
Shaft dia. mm inch	Bearing number	Nominal dimensions mm inch										Basic load ratings N dynamic Cr	static Cor	Mass kg(s).
		d	D	C	B	B1	S	h	B5	G	ds			
12	CSA 201	12	40	13	19.1	28.6	6.5	3.6	13.5	4.8	M 6X1	9550	4780	0.14
1/2	CSA 201-8	0.5000	1.5748	0.5118	0.7520	1.1260	0.2559	0.1417	0.5315	0.1890				0.14
15	CSA 202	15	40	13	19.1	28.6	6.5	3.6	13.5	4.8	M 6X1	9550	4780	0.13
5/8	CSA 202-10	0.6250	1.5748	0.5118	0.7520	1.1260	0.2559	0.1417	0.5315	0.1890				0.13
17	CSA 203	17	40	13	19.1	28.6	6.5	3.6	13.5	4.8	M 6X1	9550	4780	0.13
11/16	CSA 203-11	0.6875	1.5748	0.5118	0.7520	1.1260	0.2559	0.1417	0.5315	0.1890				0.13
20	CSA 204	20	47	14	21.4	30.9	7.5	4	13.5	4.8	M 6X1	12800	6650	0.15
3/4	CSA 204-12	0.7500	1.8504	0.5512	0.8425	1.2165	0.2953	0.1575	0.5315	0.1890				0.18
25	CSA 205	25	52	15	21.4	30.9	7.5	4.3	13.5	4.8	M 6X1	14000	7880	0.19
1	CSA 205-16	1.0000	2.0472	0.5906	0.8425	1.2165	0.2953	0.1693	0.5315	0.1890				0.18
30	CSA 206	30	62	16	23.8	35.7	9	5	15.9	6.0				0.33
1-1/8	CSA 206-18	1.1250	2.4409	0.6299	0.9370	1.4055	0.3543	0.1969	0.6260	0.2362	M 6X1	19500	11200	0.35
1-1/4	CSA 206-20	1.2500												0.29
35	CSA 207	35	72	17	25.4	38.9	9.5	5.7	17.5	6.8				0.50
1-1/4	CSA 207-20	1.2500	2.8346	0.6693	1.0000	1.5315	0.3740	0.2244	0.6890	0.2677	M 8X1	25700	15200	0.52
1-3/8	CSA 207-22	1.3750												0.51
40	CSA 208	40	80	18	30.2	43.6	11	6.2	18.3	6.8	M 8X1	29600	18200	0.65
1-1/2	CSA 208-24	1.5000	3.1496	0.7087	1.1890	1.7165	0.4331	0.2441	0.7205	0.2677				0.68
45	CSA 209	45	85	19	30.2	43.7	11	6.5	18.3	6.8	M 8X1	31850	20800	0.69
1-3/4	CSA 209-28	1.7500	3.3465	0.7480	1.1890	1.7205	0.4331	0.2677	0.7205	0.2677				0.69
50	CSA 210	50	90	20	30.2	43.6	11	6.5	18.3	6.8	M 8X1	35100	23200	0.79
1-7/8	CSA 210-30	1.8750	3.5433	0.7874	1.1890	1.7165	0.4331	0.2559	0.7205	0.2677				0.83
55	CSA 211	55	100	24	32.4	48.4	12	7.2	20.7	8.0	M10X1.25	43550	29200	0.84
2	CSA 211-32	2.0000	3.9370	0.9449	1.2756	1.9055	0.4724	0.2835	0.8150	0.3150				0.96
60	CSA 212	60	110	24	33.4	49.3	12	8	22.3	8.4	M10X1.25	47800	32800	1.20
2-1/4	CSA 212-36	2.2500	4.3307	0.9449	1.3150	1.9409	0.4724	0.3150	0.8780	0.3307				1.30

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Slingers] - Steel
[Grease] - Shell Alvania S2

P9

If you require more individual technical information for each of above bearing model, please enter KSM web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

Standard duty cylindrical surface ball bearings eccentric locking collar type series CSB 200



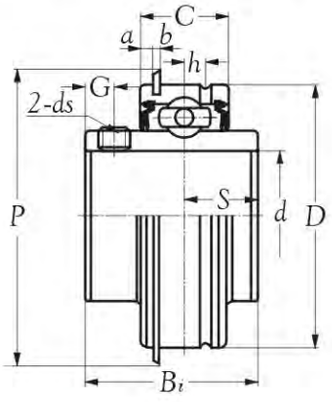
Shaft dia. mm inch	Bearing number	Nominal dimensions mm inch								Basic load ratings N dynamic Cr	Basic load ratings N static Cor	Mass kg.
		d	D	C	h	Bi	S	G	ds			
12	CSB 201	12	40	12	3.6	22	6	4	M5x0.8	9550	4780	0.90
1/2	CSB 201-8	0.5000	1.5748	0.4724	0.1417	0.8661	0.2362	0.1575	10#-32UNF			0.90
15	CSB 202	15	40	12	3.6	22	6	4	M5x0.8	9550	4780	0.80
5/8	CSB 202-10	0.6250	1.5748	0.4724	0.1417	0.8661	0.2362	0.1575	10#-32UNF			0.80
17	CSB 203	17	40	12	3.6	22	6	4	M5x0.8	9550	4780	0.10
11/16	CSB 203-11	0.6875	1.5748	0.4724	0.1417	0.8661	0.2362	0.1575	10#-32UNF			0.10
20	CSB 204	20	47	14	4	25	7	5	M6x1	12800	6650	0.13
3/4	CSB 204-12	0.7500	1.8504	0.5512	0.1575	0.9843	0.2756	0.1969	1/4-28UNF			0.15
25	CSB 205	25	52	15	4.3	27	7.5	5.5	M6x1	14000	7880	0.17
1	CSB 205-16	1.0000	2.0472	0.5906	0.1693	1.0630	0.2953	0.2165	1/4-28UNF			0.16
30	CSB 206	30	62	16	5	29	8	6	M6x1			0.27
1-1/8	CSB 206-18	1.1250	2.4409	0.6299	0.1969	1.1417	0.3150	0.2362	1/4-28UNF	19500	11200	0.28
1-1/4	CSB 206-20	1.2500										0.24
35	CSB 207	35	72	18	5.7	32	9	6	M6x1			0.38
1-1/4	CSB 207-20	1.2500	2.8346	0.7087	0.2244	1.2598	0.3543	0.2362	1/4-28UNF	25700	15200	0.42
1-3/8	CSB 207-22	1.3750										0.41
40	CSB 208	40	80	19	6.2	34	9.5	7	M8x1	29600	18200	0.50
1-1/2	CSB 208-24	1.5000	3.1496	0.7480	0.2441	1.3386	0.3740	0.2756	5/16-24UNF			0.60

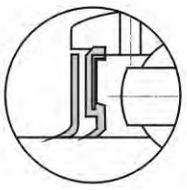
Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Slingers] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P9

Standard duty cylindrical surface ball bearings eccentric locking collar type series SER 200





Dual seals

Shaft dia. mm / inch	Bearing number	Nominal dimensions mm / inch											Basic load ratings N dynamic Cr	Basic load ratings N static Cor	Mass kg(s).
		d	D	B1	C	S	a	b	p	G	h	ds			
15	SER 202	15	47	31	15.9	12.7	2.38	1.07	52.7	4.7	4.4	M6x1	12800	6650	0.17
5/8	SER 202-10	0.6250	1.8504	1.2205	0.6260	0.5000	0.0937	0.0421	2.0748	0.1850	0.1732	1/4-28UNF			
17	SER 203	17	47	31	15.9	12.7	2.38	1.07	52.7	4.7	4.4	M6x1	12800	6650	0.17
11/16	SER 203-11	0.6875	1.8504	1.2205	0.6260	0.5000	0.0937	0.0421	2.0748	0.1850	0.1732	1/4-28UNF			
20	SER 204	20	47	31	15.9	12.7	2.38	1.07	52.7	4.7	4.4	M6x1	12800	6650	0.24
3/4	SER 204-12	0.7500	1.8504	1.2205	0.626	0.5	0.0937	0.0421	2.0748	0.1850	0.1732	1/4-28UNF			
25	SER 205	25	52	34	19	14.3	2.38	1.07	57.9	5.5	4.5	M6x1	14000	7880	0.27
15/16	SER 205-16	1.0000	2.0472	1.3386	0.7480	0.5630	0.0937	0.0421	2.2795	0.2165	0.1772	1/4-28UNF			
30	SER 206	30	62	38.1	22.2	15.9	3.18	1.65	67.7	5.5	5.3	M6x1			
1-1/8	SER 206-18	1.1250	2.4409	1.5000	0.8740	0.6260	0.1252	0.0650	2.6654	0.2165	0.2087		19500	11200	0.39
1-1/4	SER 206-20	1.2500										1/4-28UNF			
35	SER 207	35	72	42.9	23.8	17.5	3.18	1.65	78.6	6.5	5.8	M8x1			
1-1/4	SER 207-20	1.2500	2.8346	1.6890	0.9370	0.6890	0.1252	0.0650	3.0945	0.2559	0.2283		25700	15200	0.61
1-3/8	SER 207-22	1.3750										5/16-24UNF			
40	SER 208	40	80	49.2	27.8	19	3.18	1.65	86.6	8	6.3	M8x1	29600	18200	0.81
1-9/16	SER 208-26	1.5625	3.1496	1.9370	1.0945	0.7480	0.1252	0.0650	3.4094	0.3150	0.2480	5/16-24UNF			
45	SER 209	45	85	49.2	27.8	19	3.18	1.65	91.6	8	7.5	M8x1	31850	20800	0.90
1-3/4	SER 209-28	1.7500	3.3465	1.9370	1.0945	0.7480	0.1252	0.0650	3.6063	0.3150	0.2953	5/16-24UNF			
50	SER 210	50	90	51.6	28.6	19	3.18	2.41	96.5	9	6.8	M10x1.25	35100	23200	0.96
1-7/8	SER 210-30	1.8750	3.5433	2.0315	1.1260	0.7480	0.1252	0.0949	3.7992	0.3543	0.2677	3/8-24UNF			
55	SER 211	55	100	55.6	30.2	22.2	3.18	2.41	106.5	9	7.6	M10x1.25	43550	29200	1.41
2	SER 211-32	2.0000	3.9370	2.1890	1.1890	0.8740	0.1252	0.0949	4.1929	0.3543	0.2992	3/8-24UNF			
60	SER 212	60	110	65.1	31.8	25.4	3.18	2.41	116.6	10.5	8.4	M10x1.25	47800	32800	1.95
2-1/4	SER 212-36	2.2500	4.3307	2.5630	1.2520	1.0000	0.1252	0.0949	4.5906	0.4134	0.3307	3/8-24UNF			

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Slingers] - Steel
[Grease] - Shell Alvania S2

P9

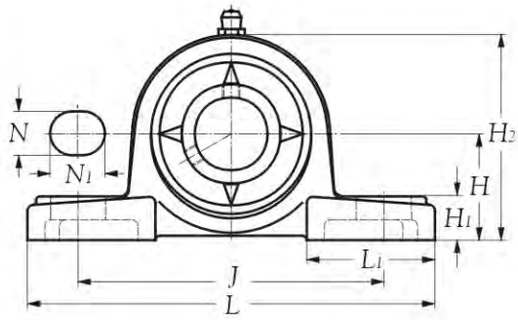
If you require more individual technical information for each of above bearing model, please enter KSM web-site: Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

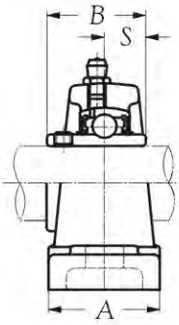
KSM®

SUPER BEARING UNITS

P9

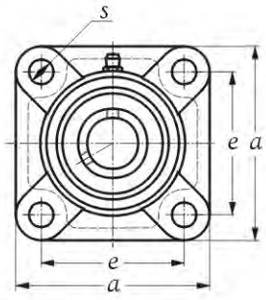
Standard duty pillow blocks cast housing set screws type series UCP 200

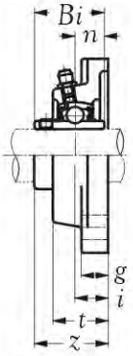




Shaft dia. mm	Unit number	Nominal dimensions mm											Bolt size mm	Bearing number	Housing number	Mass kg(s). (approx.)
		H	L	J	A	N	N1	H1	H2	L1	B	S				
12	UCP 201 (H)	30.2	127	95	38	13	16	14	62	42	31.0	12.7	M10	UC 201	P 203	0.7
15	UCP 202 (H)	30.2	127	95	38	13	16	14	62	42	31.0	12.7	M10	UC 202	P 203	0.7
17	UCP 203 (H)	30.2	127	95	38	13	16	14	62	42	31.0	12.7	M10	UC 203	P 203	0.7
20	UCP 204 (H)	33.3	127	95	38	13	16	14	65	42	31.0	12.7	M10	UC 204	P 204	0.7
25	UCP 205 (H)	36.5	140	105	38	13	16	15	71	42	34.1	14.3	M10	UC 205	P 205	0.8
30	UCP 206 (H)	42.9	165	121	48	17	20	17	83	54	38.1	15.9	M14	UC 206	P 206	1.3
35	UCP 207 (H)	47.6	167	127	48	17	20	18	93	54	42.9	17.5	M14	UC 207	P 207	1.6
40	UCP 208 (H)	49.2	184	137	54	17	20	18	98	52	49.2	19.0	M14	UC 208	P 208	1.9
45	UCP 209 (H)	54.0	190	146	54	17	20	20	106	60	49.2	19.0	M14	UC 209	P 209	2.2
50	UCP 210 (H)	57.2	206	159	60	20	23	21	114	65	51.6	19.0	M16	UC 210	P 210	2.6
55	UCP 211 (H)	63.5	219	171	60	20	23	23	126	65	55.6	22.2	M16	UC 211	P 211	3.3
60	UCP 212 (H)	69.8	241	184	70	20	23	25	138	70	65.1	25.4	M16	UC 212	P 212	4.6
65	UCP 213 (H)	76.2	265	203	70	25	28	27	151	77	65.1	25.4	M20	UC 213	P 213	5.9

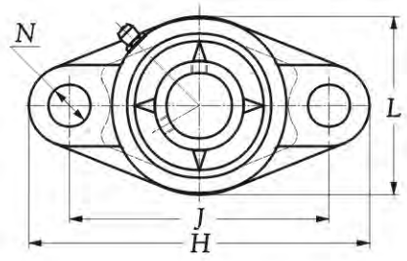
Standard duty flanged units cast housing set screws type
series UCF 200

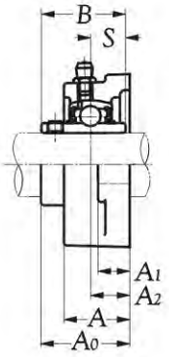




Shaft dia. mm	Unit number	Nominal dimensions mm									Bolt size mm	Bearing number	Housing number	Mass kg(s). (approx.)
		L	J	A2	A1	A	N	A0	B	S				
12	UCF 201 (H)	86	64	15	11	25.5	12	33.3	31.0	12.7	M10	UC 201	F 204	0.7
15	UCF 202 (H)	86	64	15	11	25.5	12	33.3	31.0	12.7	M10	UC 202	F 204	0.7
17	UCF 203 (H)	86	64	15	11	25.5	12	33.3	31.0	12.7	M10	UC 203	F 204	0.6
20	UCF 204 (H)	86	64	15	11	25.5	12	33.3	31.0	12.7	M10	UC 204	F 204	0.6
25	UCF 205 (H)	95	70	16	13	27.0	12	35.8	34.1	14.3	M10	UC 205	F 205	0.8
30	UCF 206 (H)	108	83	18	13	31.0	12	40.2	38.1	15.9	M10	UC 206	F 206	1.0
35	UCF 207 (H)	117	92	19	15	34.0	14	44.4	42.9	17.5	M12	UC 207	F 207	1.4
40	UCF 208 (H)	130	102	21	15	36.0	16	51.2	49.2	19.0	M14	UC 208	F 208	1.8
45	UCF 209 (H)	137	105	22	16	38.0	16	52.2	49.2	19.0	M14	UC 209	F 209	2.2
50	UCF 210 (H)	143	111	22	16	40.0	16	54.6	51.6	19.0	M14	UC 210	F 210	2.4
55	UCF 211 (H)	162	130	25	18	43.0	19	58.4	55.6	22.2	M16	UC 211	F 211	3.6
60	UCF 212 (H)	175	143	29	18	48.0	19	68.7	65.1	25.4	M16	UC 212	F 212	4.4
65	UCF 213 (H)	187	149	30	22	50.0	19	69.7	65.1	25.4	M16	UC 213	F 213	5.5

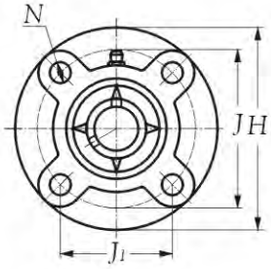
Standard duty two bolts flanged units cast housing set screws type series UCFL 200

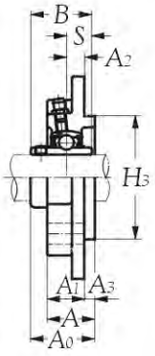




Shaft dia. mm	Unit number	Nominal dimensions mm										Bolt size mm	Bearing number	Housing number	Mass kg(s). (approx.)
		H	J	A2	A1	A	N	L	A0	B	S				
12	UCFL 201 (H)	113	90	15	11	25.5	12	60	33.3	31.0	12.7	M10	UC 201	FL 204	0.6
15	UCFL 202 (H)	113	90	15	11	25.5	12	60	33.3	31.0	12.7	M10	UC 202	FL 204	0.6
17	UCFL 203 (H)	113	90	15	11	25.5	12	60	33.3	31.0	12.7	M10	UC 203	FL 204	0.5
20	UCFL 204 (H)	113	90	15	11	25.5	12	60	33.3	31.0	12.7	M10	UC 204	FL 204	0.5
25	UCFL 205 (H)	130	99	16	13	27.0	16	68	35.8	34.1	14.3	M14	UC 205	FL 205	0.6
30	UCFL 206 (H)	148	117	18	13	31.0	16	80	40.2	38.1	15.9	M14	UC 206	FL 206	0.9
35	UCFL 207 (H)	161	130	19	15	34.0	16	90	44.4	42.9	17.5	M14	UC 207	FL 207	1.2
40	UCFL 208 (H)	175	144	21	15	36.0	16	100	51.2	49.2	19.0	M14	UC 208	FL 208	1.6
45	UCFL 209 (H)	188	148	22	16	38.0	19	108	52.2	49.2	19.0	M16	UC 209	FL 209	1.9
50	UCFL 210 (H)	197	157	22	16	40.0	19	115	54.6	51.6	19.0	M16	UC 210	FL 210	2.2
55	UCFL 211 (H)	224	184	25	18	43.0	19	130	58.4	55.6	22.2	M16	UC 211	FL 211	3.1
60	UCFL 212 (H)	250	202	29	18	48.0	23	140	68.7	65.1	25.4	M20	UC 212	FL 212	4.0
65	UCFL 213 (H)	258	210	30	22	50.0	23	155	69.7	65.1	25.4	M20	UC 213	FL 213	5.0

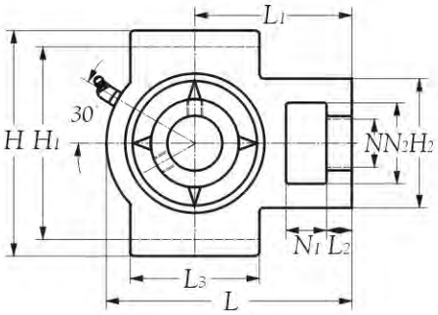
Standard duty flanged cartridge units cast housing set screws type series UCFC 200

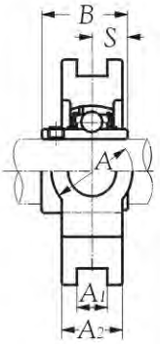




Shaft dia. mm	Unit number	Nominal dimensions mm												Bolt size mm	Bearing number	Housing number	Mass kg(s). (approx.)
		H	J	J1	A2	N	A3	A1	A	H3	A0	B	S				
12	UCFC 201 (H)	100	78	55.1	10	12	5	20.5	25.5	62	33.3	31.0	12.7	M10	UC 201	FC 204	0.8
15	UCFC 202 (H)	100	78	55.1	10	12	5	20.5	25.5	62	33.3	31.0	12.7	M10	UC 202	FC 204	0.8
17	UCFC 203 (H)	100	78	55.1	10	12	5	20.5	25.5	62	33.3	31.0	12.7	M10	UC 203	FC 204	0.7
20	UCFC 204 (H)	100	78	55.1	10	12	5	20.5	25.5	62	33.3	31.0	12.7	M10	UC 204	FC 204	0.7
25	UCFC 205 (H)	115	90	63.6	10	12	6	21.0	27.0	70	35.8	34.1	14.3	M10	UC 205	FC 205	1.0
30	UCFC 206 (H)	125	100	70.7	10	12	8	23.0	31.0	80	40.2	38.1	15.9	M10	UC 206	FC 206	1.3
35	UCFC 207 (H)	135	110	77.8	11	14	8	26.0	34.0	90	44.4	42.9	17.5	M12	UC 207	FC 207	1.6
40	UCFC 208 (H)	145	120	84.8	11	14	10	26.0	36.0	100	51.2	49.2	19.0	M12	UC 208	FC 208	2.1
45	UCFC 209 (H)	160	132	93.3	10	16	12	26.0	38.0	105	52.2	49.2	19.0	M14	UC 209	FC 209	2.7
50	UCFC 210 (H)	165	138	97.6	10	16	12	28.0	40.0	110	54.6	51.6	19.0	M14	UC 210	FC 210	3.1
55	UCFC 211 (H)	185	150	106.1	13	19	12	31.0	43.0	125	58.4	55.6	22.2	M16	UC 211	FC 211	4.2
60	UCFC 212 (H)	195	160	113.1	17	19	12	36.0	48.0	135	68.7	65.1	25.4	M16	UC 212	FC 212	5.3
65	UCFC 213 (H)	205	170	120.2	16	19	14	36.0	50.0	145	69.7	65.1	25.4	M16	UC 213	FC 213	6.0

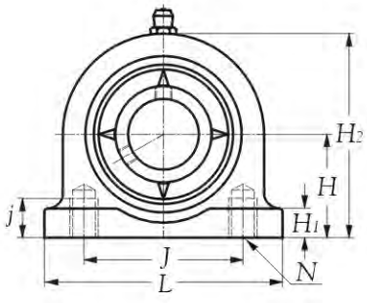
Standard duty take-up units cast housing set screws type
series UCT 200

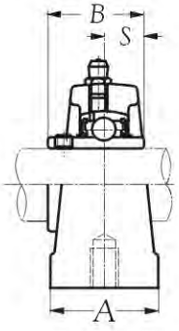




Shaft dia. mm	Unit number	Nominal dimensions mm																Bearing number	Housing number	Mass kg(s). (approx.)
		N_1	L_2	H_2	N_2	N	L_3	A_1	H_1	H	L	A_2	A	r	L_1	B	S			
12	UCT 201 (H)	16	12	51	32	19	51	12	76	89	94	21	32	33	61	31.0	12.7	UC 201	T 204	0.8
15	UCT 202 (H)	16	12	51	32	19	51	12	76	89	94	21	32	33	61	31.0	12.7	UC 202	T 204	0.8
17	UCT 203 (H)	16	12	51	32	19	51	12	76	89	94	21	32	33	61	31.0	12.7	UC 203	T 204	0.8
20	UCT 204 (H)	16	12	51	32	19	51	12	76	89	94	21	32	33	61	31.0	12.7	UC 204	T 204	0.8
25	UCT 205 (H)	16	12	51	32	19	51	12	76	89	97	24	32	35	62	34.1	14.3	UC 205	T 205	0.9
30	UCT 206 (H)	16	12	56	37	22	57	12	89	102	113	28	37	43	70	38.1	15.9	UC 206	T 206	1.3
35	UCT 207 (H)	16	15	64	37	22	64	12	89	102	129	30	37	51	78	42.9	17.5	UC 207	T 207	1.7
40	UCT 208 (H)	19	18	83	49	29	83	16	102	114	144	33	49	56	88	49.2	19.0	UC 208	T 208	2.3
45	UCT 209 (H)	19	18	83	49	29	83	16	102	117	145	35	49	57	88	49.2	19.0	UC 209	T 209	2.4
50	UCT 210 (H)	19	18	83	49	29	86	16	102	117	151	37	49	59	92	51.6	19.0	UC 210	T 210	2.5
55	UCT 211 (H)	25	21	102	64	35	95	22	130	146	171	38	64	65	106	55.6	22.2	UC 211	T 211	3.8
60	UCT 212 (H)	32	21	102	64	35	102	22	130	146	194	42	64	75	119	65.1	25.4	UC 212	T 212	4.7
65	UCT 213 (H)	32	23	111	70	41	121	26	151	167	224	44	70	87	137	65.1	25.4	UC 213	T 213	7.0

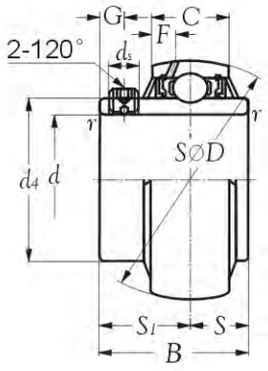
Standard duty pillow blocks cast housing set screws type
series UCUP 200





Shaft dia. mm	Unit number	Nominal dimensions mm										Bearing number	Housing number	Mass kg(s). (approx.)
		H	L	J	A	j	H1	H2	B	S	N			
12	UCUP 201 (H)	30.2	76	52	38	13	11	62	31.0	12.7	M10x1.5	UC 201	UP 204	0.6
15	UCUP 202 (H)	30.2	76	52	38	13	11	62	31.0	12.7	M10x1.5	UC 202	UP 204	0.6
17	UCUP 203 (H)	30.2	76	52	38	13	11	62	31.0	12.7	M10x1.5	UC 203	UP 204	0.6
20	UCUP 204 (H)	30.2	76	52	38	13	11	62	31.0	12.7	M10x1.5	UC 204	UP 204	0.6
25	UCUP 205 (H)	36.5	84	56	38	15	12	72	34.1	14.3	M10x1.5	UC 205	UP 205	0.8
30	UCUP 206 (H)	42.9	94	66	48	18	12	84	38.1	15.9	M14x2.0	UC 206	UP 206	1.2
35	UCUP 207 (H)	47.6	110	80	48	20	13	95	42.9	17.5	M14x2.0	UC 207	UP 207	1.7
40	UCUP 208 (H)	49.2	116	84	54	20	13	100	49.2	19.0	M14x2.0	UC 208	UP 208	2.0
45	UCUP 209 (H)	54.2	120	90	54	25	13	108	49.2	19.0	M14x2.0	UC 209	UP 209	2.2
50	UCUP 210 (H)	57.2	130	94	60	25	14	116	51.6	19.0	M16x2.0	UC 210	UP 210	2.9

Standard duty spherical outside surface ball bearings set screws type series UC 200



Shaft dia. mm	Unit number	Nominal dimensions mm											Basic load ratings N		Mass kg(s).
		d	D	B	C	r_s	S	S1	G	ds	d4	F	dynamic Cr	static Cor	(approx.)
12	UC 201 D1	12	47	31.0	16	0.6	12.7	18.3	5.0	M5 x 0.8	29.6	3.5	12800	6650	0.21
15	UC 202 D1	15	47	31.0	16	0.6	12.7	18.3	5.0	M5 x 0.8	29.6	3.5	12800	6650	0.20
17	UC 203 D1	17	47	31.0	16	0.6	12.7	18.3	5.0	M5 x 0.8	29.6	3.5	12800	6650	0.18
20	UC 204 D1	20	47	31.0	16	1.0	12.7	18.3	5.0	M6 x 1.0	29.6	3.8	12800	6650	0.17
25	UC 205 D1	25	52	34.1	17	1.0	14.3	19.8	5.0	M6 x 1.0	33.9	4.3	14000	7850	0.20
30	UC 206 D1	30	62	38.1	19	1.0	15.9	22.2	5.0	M6 x 1.0	40.8	4.3	19500	11300	0.33
35	UC 207 D1	35	72	42.9	20	1.5	17.5	25.4	7.0	M6 x 1.0	46.8	4.3	25700	15300	0.49
40	UC 208 D1	40	80	49.2	21	1.5	19.0	30.2	8.0	M8 x 1.0	53.0	4.3	29100	17800	0.65
45	UC 209 D1	45	85	49.2	22	1.5	19.0	30.2	8.0	M8 x 1.0	57.5	4.7	32500	20400	0.70
50	UC 210 D1	50	90	51.6	24	1.5	19.0	32.6	10.0	M10x1.25	62.4	5.2	35000	23200	0.80
55	UC 211 D1	55	100	55.6	25	2.0	22.2	33.4	10.0	M10x1.25	69.0	5.2	43500	29200	1.08
60	UC 212 D1	60	110	65.1	27	2.0	25.4	39.7	10.0	M10x1.25	77.0	5.5	52500	36000	1.53
65	UC 213 D1	65	120	65.1	29	2.0	25.4	39.7	10.0	M10x1.25	82.5	5.5	57500	40000	1.85

Note: 1) UC 201 ~ UC 213 same with NTN technical datasheet.

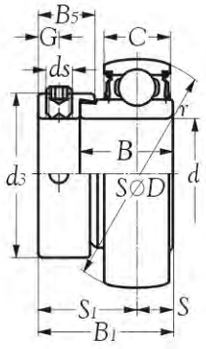
2) It s applied to assemble with **KSM** housings P, F, FL, FC, T and UP.

Remark: [**Precision**] - Class 0 (JIS)
[**Cage**] - Steel
[**Slingers**] - Steel
[**Grease**] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P9

Standard duty spherical outside surface ball bearings set screw type series AEL 200



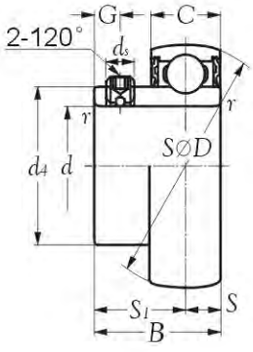
Shaft dia. mm	Unit number	Nominal dimensions mm												Basic load ratings N		Mass kg.
		d	D	B1	B	C	rs	S	S1	G	ds	d3	B5	dynamic Cr	static Cor	(approx.)
12	AEL 201 D1	12	40	28.5	19.0	12	0.6	6.0	22.5	4.8	M6 x 1	29.0	13.6	9600	4600	0.12
15	AEL 202 D1	15	40	28.5	19.0	12	0.6	6.0	22.5	4.8	M6 x 1	29.0	13.6	9600	4600	0.11
17	AEL 203 D1	17	40	28.5	19.0	12	0.6	6.0	22.5	4.8	M6 x 1	29.0	13.6	9600	4600	0.10
20	AEL 204 D1	20	47	30.9	21.5	14	1.0	7.0	23.9	4.8	M6 x 1	33.0	13.5	12800	6650	0.17
25	AEL 205 D1	25	52	30.9	21.5	15	1.0	7.5	23.4	4.8	M6 x 1	38.0	13.5	14000	7850	0.20
30	AEL 206 D1	30	62	35.7	23.8	16	1.0	8.0	27.7	6.0	M6 x 1	44.5	15.9	19500	11300	0.31
35	AEL 207 D1	35	72	38.9	25.4	17	1.5	8.5	30.4	6.8	M8 x 1	55.5	17.5	25700	15300	0.49
40	AEL 208 D1	40	80	43.6	30.2	18	1.5	9.0	34.6	6.8	M8 x 1	60.0	18.3	29100	17800	0.66

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Slingers] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P9

Standard duty spherical outside surface ball bearings set screws type
series AS 200



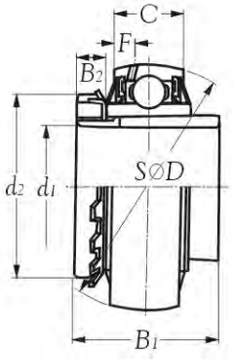
Shaft dia. mm	Unit number	Nominal dimensions mm										Basic load ratings N		Mass kg.
		d	D	B	C	r_s	S	S_1	G	d_s	d_4	dynamic Cr	static Cor	(approx.)
12	AS 201 D1	12	40	22.0	12	0.6	6.0	16.0	4.0	M5 x 0.8	24.3	9600	4600	0.10
15	AS 202 D1	15	40	22.0	12	0.6	6.0	16.0	4.0	M5 x 0.8	24.3	9600	4600	0.09
17	AS 203 D1	17	40	22.0	12	0.6	6.0	16.0	4.0	M5 x 0.8	24.3	9600	4600	0.08
20	AS 204 D1	20	47	24.8	14	1.0	7.0	17.8	5.0	M6 x 1.0	29.6	12800	6650	0.13
25	AS 205 D1	25	52	27.0	15	1.0	7.5	19.5	5.5	M6 x 1.0	33.9	14000	7850	0.16
30	AS 206 D1	30	62	30.0	16	1.0	8.0	22.0	6.0	M6 x 1.0	40.8	19500	11300	0.25
35	AS 207 D1	35	72	32.0	17	1.5	8.5	23.5	6.5	M8 x 1.0	46.8	25700	15300	0.37
40	AS 208 D1	40	80	34.0	18	1.5	9.0	25.0	7.0	M8 x 1.0	53.0	29100	17800	0.50

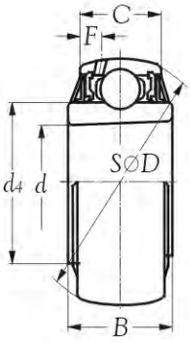
Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Slingers] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P9

Standard duty spherical outside surface ball bearings adapter type series UK 200





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Shaft dia. mm	Unit number	Nominal dimensions mm										Basic load ratings N		Mass kg(s).
		d	D	B	C	d4	d1	B1	B2	d2	F	dynamic Cr	static Cor	(approx.)
20	UK 205 D1	25	52	23	17	33.9	20	35	8	38	4.2	14000	7850	0.25
25	UK 206 D1	30	62	26	19	40.8	25	38	8	45	4.2	19500	11300	0.36
30	UK 207 D1	35	72	27	20	46.8	30	43	9	52	4.2	25700	15300	0.57
35	UK 208 D1	40	80	29	21	53.0	35	46	10	58	4.2	29100	17800	0.74
40	UK 209 D1	45	85	31	22	57.5	40	50	11	65	4.2	32500	20400	0.83
45	UK 210 D1	50	90	31	24	62.4	45	55	12	70	5.0	35000	23200	0.97
50	UK 211 D1	55	100	33	25	69.0	50	59	12	75	6.3	43500	29200	1.26
55	UK 212 D1	60	110	36	27	77.0	55	62	13	80	5.3	52500	36000	1.59
60	UK 213 D1	65	120	36	29	82.5	60	65	14	85	6.0	57500	40000	2.00
65	UK 215 D1	75	130	44	34	93.0	65	73	15	98	9.0	66000	49500	2.56
70	UK 216 D1	80	140	45	35	98.1	70	78	17	105	9.5	72500	53000	3.23

Remark: [Precision] - Class 0 (JIS)
[Cage] - Steel
[Slingers] - Steel
[Grease] - Shell Alvania S2

If you require more individual technical information for each of above bearing model, please enter **KSM** web-site:
Http://www.minamiguchi-bearings.com, click into the bearing no., to obtain data sheet.

P9

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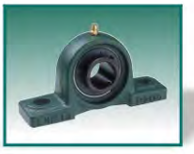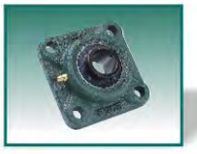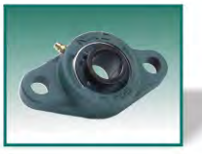
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