

Needle roller and cage assemblies is a kind of independent bearing unit with high load capacity and rigidity especially applicable for the tray of shaft and seat holes with the unit which is limited in radial dimension. Each needle have excellent operative characteristic due to each needle exactly guided and kept by the retainer.



Structure

K	Needle retainer assembly
K...ZW	Double row needle retainer assembly

Needle roller and cage assemblies is divided into two series: single row and double row. In the case of crank shaft where difficulty of using and mounting occur, SPT will supply the divided structure. In general case, M type punched retainer is used, besides, there are metal solid retainer, fiber glass reinforced nylon 66 retainer. The latter can work under the temperature of 120°C for a long period while it can even operate under 150°C for short time.

Precision

The dimensional tolerances of needle roller and cage assemblies are listed in Table 1. When bearings of more than two types are used in parallel on a same shaft, the needles must belong to the sub group with same value. The retainer width tolerance Bc is -0.2/-0.55mm.

Table 1 needle diameter tolerance			
Precision grade	Needle diameter tolerance		
G2	0~-2	-2~-4	-4~-6
G3	0~-3	-3~-6	-6~-9

Combination

The radial gap of needle roller and cage assemblies depends on the machined precision of the inner and outer trays and the needles. Table 2 shows the combination recommended as per the different operational conditions.

Table 2 the recommended shaft tolerances of the casing when machined as per G6

Operational conditions \ Nominal shaft diameter	Recommended shaft tolerance	
	≤80	>80
High speed, high precision	j5	h5
General operational condition	h5	g5
High temperature or great mounting tolerance	g6	f6

When the needles are running directly in the shaft or in outer case, to make the needle roller and cage assemblies reaches its fully load capacity, the hardness of the inner and outer tray surface must reach HRC58-62 and the roughness must not greater than 0.32μm. The surface quality must be the same of rolling bearing tray.

Assembling and relative dimensions

Figure 2, Figure 3 show the relative dimensions of the needle retainer assembly. The axial fixed way used in bearing assembling is shown in Fig 4 and 6. When used for high speed, a heat treated washer should be added between the retainer and the axial limit so that direct contact of retainer and limit can be avoided.

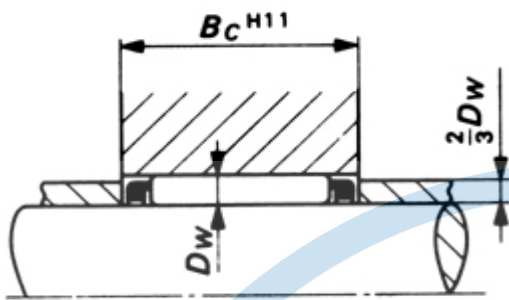


Figure 1

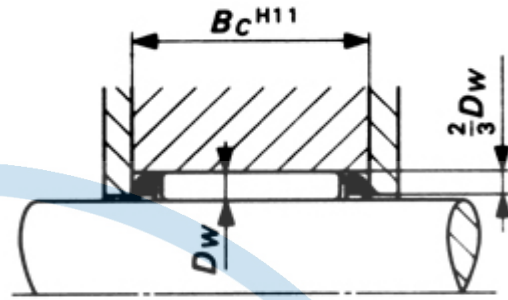


Figure 2

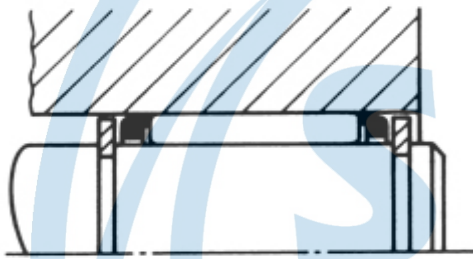


Figure 3

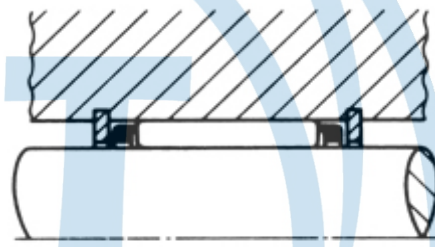


Figure 4

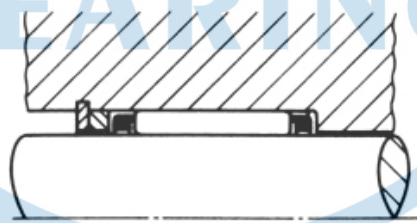


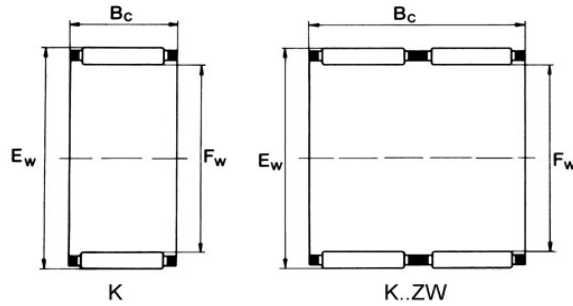
Figure 5

SERVICE / PRECISION / TECHNOLOGY

Radial Needle Roller and Cage Assemblies



Series K

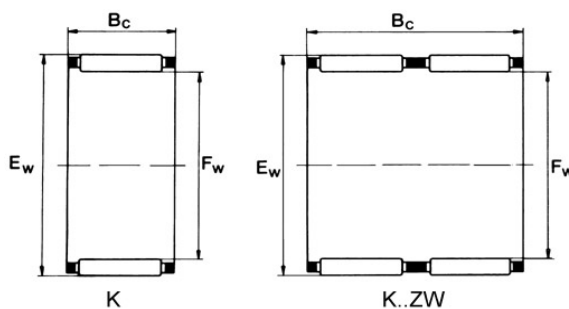


Shaft Diameter (mm)	Bearing Designation	Mass (g)	Boundary Dimensions (mm)			Basic Load Rating		Limiting Speed Oil
			Fw	Ew	Bc	Dynamic Cr(N)	Static Cor(N)	
5	K 5X8X8 TN	0.7	5	8	8	2100	1800	33000
	K 5X8X10 TN	0.9	5	8	10	2700	2400	33000
6	K 6X9X8 TN	0.8	6	9	8	2500	2100	32000
	K 6X9X10 TN	1	6	9	10	3200	2800	32000
	K 6X10X13 TN	1.3	6	10	13	3500	2800	31000
7	K 7X10X8 TN	0.9	7	10	8	2600	2400	29000
	K 7X10X10 TN	1.1	7	10	10	3300	3300	29000
8	K 8X11X10 TN	1.3	8	11	10	3600	3700	27000
	K 8X11X13 TN	1.7	8	11	13	4600	5200	27000
	K 8X12X10 TN	1.8	8	12	10	4500	4500	27000
9	K 9X12X10 TN	1.5	9	12	10	4100	4500	26000
	K 9X12X13 TN	1.9	9	12	13	5300	6400	26000
10	K 10X13X10 TN	1.6	10	13	10	4500	4900	25000
	K 10X13X13 TN	2.1	10	13	13	5600	6900	25000
	K 10X14X10 TN	2.2	10	14	10	5500	5500	25000
	K 10X14X13 TN	2.9	10	14	13	6800	7500	25000
	K 10X16X12 TN	4.3	10	16	12	7300	6400	24000
12	K 12X15X10 TN	1.9	12	15	10	4500	5500	23000
	K 12X15X13 TN	2.4	12	15	13	5800	7700	23000
	K 12X16X13 TN	3.4	12	16	13	7200	8500	23000
	K 12X17X13 TN	4.4	12	17	13	8600	9400	22000
	K 12X18X12 TN	5	12	18	12	9000	8900	22000
14	K 14X18X10	4.8	14	18	10	6400	7700	21000
	K 14X18X13	6.3	14	18	13	7400	9100	21000
	K 14X18X15	7.3	14	18	15	9400	12500	21000
	K 14X18X17	8.1	14	18	17	9500	13000	21000
	K 14X20X12	8.6	14	20	12	9400	9600	200000
15	K 15X19X10	5.1	15	19	10	6800	8200	200000
	K 15X19X13	7	15	19	13	7700	9800	200000
	K 15X19X17	8.8	15	19	17	10200	14000	200000
	K 15X20X13	8.9	15	20	13	8900	10300	200000
	K 15X21X15	13	15	21	15	12900	14800	200000
	K 15X21X21	18.2	15	21	21	17500	21900	200000
16	K 16X20X10	5.8	16	20	10	7000	8900	200000
	K 16X20X13	7.2	16	20	13	8000	10800	200000
	K 16X20X17	9.2	16	20	17	10500	15100	200000
	K 16X22X12	10.5	16	22	12	10400	11300	19500
	K 16X22X13	12	16	22	13	11700	12500	19500
	K 16X22X16	13.8	16	22	16	13400	15600	19500

Radial Needle Roller and Cage Assemblies



Series K

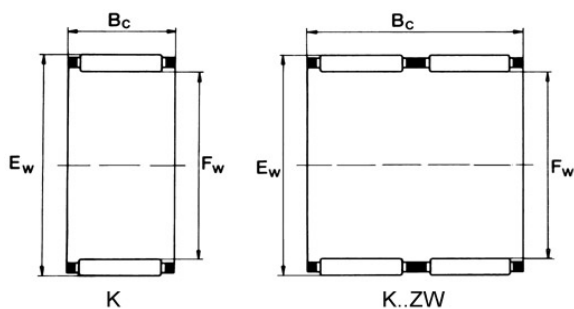


Shaft Diameter (mm)	Bearing Designation	Mass (g)	Boundary Dimensions (mm)			Basic Load Rating		Limiting Speed Oil
			Fw	Ew	Bc	Dynamic Cr(N)	Static Cor(N)	
16	K 16X22X20	16.8	16	22	20	16500	21000	19500
	K 16X24X20	25	16	24	20	19300	21200	19000
17	K 17X21X10	5.6	17	21	10	7300	9500	19500
	K 17X21X13	7.5	17	21	13	9400	13000	19500
	K 17X21X17	9.5	17	21	17	11000	16100	19500
18	K 18X22X10	6.1	18	22	10	7700	10200	19000
	K 18X22X13	7.7	18	22	13	8300	11400	19000
	K 18X22X17	10.8	18	22	17	10900	16200	19000
	K 18X24X12	11.8	18	24	12	10500	12500	19000
	K 18X24X13	12.6	18	24	13	11800	13800	19000
	K 18X24X20	19	18	24	20	19000	25000	19000
	K 18X25X22	24.3	18	25	22	20800	26000	19000
19	K 19X23X13	8.2	19	23	13	8600	12600	19000
	K 19X23X17	11.2	19	23	17	11300	17300	19000
20	K 20X24X10	6.5	20	24	10	8100	11400	18000
	K 20X24X13	8.9	20	24	13	8800	12900	18000
	K 20X24X17	11.2	20	24	17	11600	18400	18000
	K 20X26X12	13.2	20	26	12	12100	14600	18000
	K 20X26X13	14.3	20	26	13	13000	16100	18000
	K 20X26X17	18.2	20	26	17	17500	23400	18000
	K 20X26X20	22	20	26	20	19000	26000	18000
	K 20X28X20	26.8	20	28	20	21500	25700	17000
	K 20X28X25	36.3	20	28	25	27500	35000	17000
21	K 21X25X13	9	21	25	13	9100	13600	18500
	K 21X25X17	12	21	25	17	12000	19400	18500
	K 21X25X20	15	21	25	20	13000	20500	18500
22	K 22X26X10	8	22	26	10	8200	12500	18000
	K 22X26X13	10	22	26	13	9300	14300	18000
	K 22X26X17	12	22	26	17	12000	20500	18000
	K 22X28X17	20	22	28	17	17500	25000	18000
	K 22X29X16	22	22	29	16	18000	23000	17000
	K 22X30X15 TN	14.4	22	30	15	18500	21100	17000
	K 22X30X20	20.5	22	30	20	21500	25700	17000
24	K 24X28X10	8.1	24	28	10	31000	13300	17000
	K 24X28X13	10.1	24	28	13	9900	15000	17000
	K 24X28X17	13.2	24	28	17	13100	21200	17000
25	K 25X29X10	8.3	25	29	10	8900	13100	15500
	K 25X29X13	10.4	25	29	13	10200	15700	15500
	K 25X29X17	13.7	25	29	17	13400	22100	15500
	K 25X30X20	20.5	25	30	20	19500	34000	15500

Radial Needle Roller and Cage Assemblies



Series K

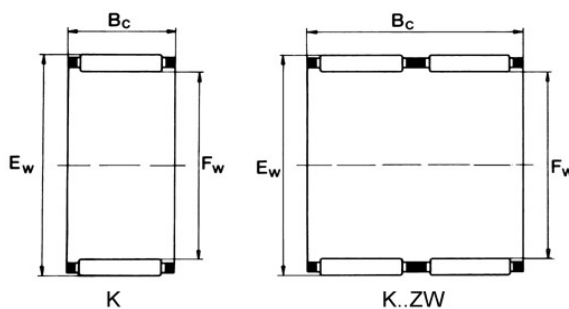


Shaft Diameter (mm)	Bearing Designation	Mass (g)	Boundary Dimensions (mm)			Basic Load Rating		Limiting Speed Oil
			Fw	Ew	Bc	Dynamic Cr(N)	Static Cor(N)	
25	K 25X31X17	21.8	25	31	17	17500	24000	15500
	K 25X31X21	26.2	25	31	21	22200	35000	15500
	K 25X32X16	24.5	25	32	16	19000	24000	14500
	K 25X33X20	32	25	33	20	25700	35000	14500
	K 25X33X24	38.7	25	33	24	31000	40000	15500
	K 25X35X30	65.5	25	35	30	43000	53000	14000
26	K 26X30X10	9	26	30	10	9100	13700	15500
	K 26X30X13	11.4	26	30	13	10500	16300	15500
	K 26X30X17	15	26	30	17	13700	13800	15500
28	K 28X33X13	15.2	28	33	13	13500	20600	14000
	K 28X33X17	19.5	28	33	17	17700	28500	14000
	K 28X33X27 TN	19	28	33	27	21000	35000	14000
	K 28X34X17	24.2	28	34	17	19600	28500	14000
	K 28X35X16	29	28	35	16	19400	25100	14000
	K 28X35X18	31	28	35	18	20400	29000	14000
30	K 30X34X13	14.6	30	34	13	10500	18500	13000
	K 30X35X13	16.3	30	35	13	14000	21700	13000
	K 30X35X17	21.3	30	35	17	16700	29000	13000
	K 30X35X27	33.3	30	35	27	25900	50000	13000
	K 30X37X16	26.4	30	37	16	19600	28500	13000
	K 30X37X18	34	30	37	18	22100	32700	13000
	K 30X40X30	78	30	40	30	41700	59000	13000
32	K 32X37X13	18.3	32	37	13	13200	21700	12000
	K 32X37X17	22.4	32	37	17	17000	30200	12000
	K 32X37X27	36.7	32	37	27	25500	51000	12000
	K 32X38X20	31	32	38	20	25500	38300	12000
	K 32X39X16	36.7	32	39	16	20200	30200	12000
	K 32X40X25	54	32	40	25	31900	49300	12000
	K 32X40X36 ZW	73	32	40	36	51000	89000	12000
	K 32X40X42 ZW TN	77.1	32	40	42	45000	78000	12000
35	K 35X40X13	18.8	35	40	13	13800	25100	12000
	K 35X40X17	25.3	35	40	17	18700	33000	12000
	K 35X40X27 TN	23.4	35	40	27	22500	44000	11100
	K 35X42X16	34	35	42	16	21500	35000	11100
	K 35X42X18	39.2	35	42	18	24000	38000	11100
	K 35X42X30	62.4	35	42	30	35000	62000	11100
37	K 37X42X17	25.8	37	42	17	20100	39000	10800
38	K 38X43X17	26.1	38	43	17	19000	34000	10800
	K 38X46X20	46	38	46	20	32000	53000	10800

Radial Needle Roller and Cage Assemblies



Series K

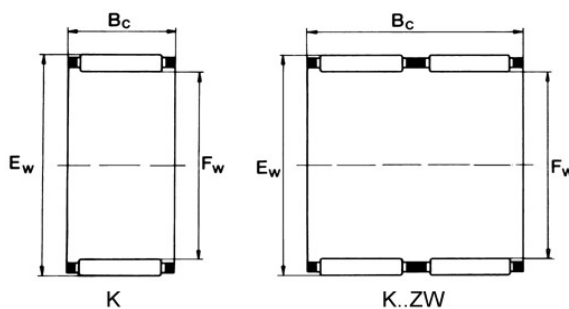


Shaft Diameter (mm)	Bearing Designation	Mass (g)	Boundary Dimensions (mm)			Basic Load Rating		Limiting Speed Oil
			Fw	Ew	Bc	Dynamic Cr(N)	Static Cor(N)	
38	K 38X46X32	72.7	38	46	32	49000	89000	10800
40	K 40X45X17	27.4	40	45	17	19000	38000	10800
	K 40X45X27	46	40	45	27	30000	67000	10800
	K 40X46X17	30	40	46	17	22000	41000	9900
	K 40X47X18	45.2	40	47	18	25000	45000	9900
	K 40X48X20	57.7	40	48	20	32000	55000	9900
	K 40X45X30 ZW	41	40	45	30	31000	62000	9900
42	K 42X47X13	22.5	42	47	13	16000	30100	9900
	K 42X47X17	31.2	42	47	17	19500	39000	9900
	K 42X47X27	46.6	42	47	27	31000	68000	9900
	K 42X50X20	54	42	50	20	32000	50000	9900
43	K 43X48X17	29.3	43	48	17	20000	39000	9900
	K 43X48X27	45.7	43	48	27	31000	68000	9900
	K 43X50X18	48.5	43	50	18	28000	49000	9900
45	K 45X50X17	25.5	45	50	17	21000	42000	9000
	K 45X50X27	50	45	50	27	31000	72000	9000
	K 45X52X18	51	45	52	18	30000	51000	9000
	K 45X53X20	62.2	45	53	20	35000	60000	9000
	K 45X53X28	78	45	53	28	48000	88000	9000
47	K 47X52X17	32	47	52	17	21000	45000	9000
	K 47X52X27	50.7	47	52	27	34000	75000	9000
50	K 50X55X20	39.4	50	55	20	24000	54000	8600
	K 50X55X30	59.4	50	55	30	35000	88000	8600
	K 50X57X18	53.4	50	57	18	31500	56000	8100
	K 50X58X20	65	50	58	20	32000	55000	8100
	K 50X58X25	81	50	58	25	38000	73000	8100
52	K 52X57X12	24	52	57	12	16000	34000	8100
55	K 55X60X20	43.4	55	60	20	25000	59000	7700
	K 55X60X30	68.6	55	60	30	38000	97000	7700
	K 55X62X18	58.5	55	62	18	32000	63000	7700
	K 55X60X40 ZW	96.5	55	60	40	45000	11000	7700
58	K 58X65X36 ZW	106	58	65	36	45000	98000	7300
60	K 60X65X20	50.5	60	65	20	25000	68000	7300
	K 60X65X30	71.2	60	65	30	40000	110000	7300
	K 60X68X20	79	60	68	20	41000	82000	7000
	K 60X68X23	94	60	68	23	45000	98000	7000
	K 60X68X25	97	60	68	25	50000	10000	7000
65	K 65X70X20	49	65	70	20	26000	62000	6700
	K 65X70X30	83	65	70	30	35000	110000	6700

Radial Needle Roller and Cage Assemblies



Series K

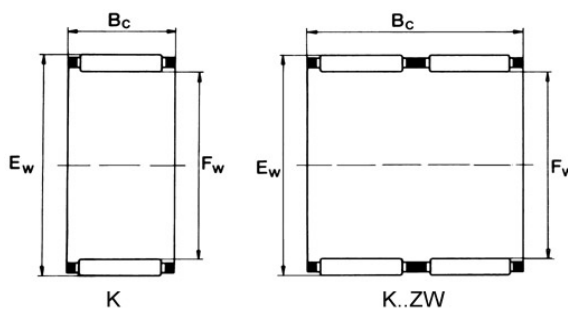


Shaft Diameter (mm)	Bearing Designation	Mass (g)	Boundary Dimensions (mm)			Basic Load Rating		Limiting Speed Oil
			Fw	Ew	Bc	Dynamic Cr(N)	Static Cor(N)	
65	K 65X73X23	100	65	73	23	36000	87000	6300
	K 65X73X30	126	65	73	30	47000	110000	6300
68	K 68X74X20	65	68	74	20	32000	78000	6300
	K 68X74X30	97	68	74	30	42000	100000	6300
70	K 70X76X20	70	70	76	20	32000	82000	5800
	K 70X76X30	100	70	76	30	48000	120000	5800
	K 70X78X25	115	70	78	25	48000	100000	5800
	K 70X78X30	136	70	78	30	53000	120000	5800
72	K 72X80X20	94	72	80	20	38000	70000	5800
73	K 73X79X20	69	73	79	20	34000	78000	5800
75	K 75X81X20	72	75	81	20	32000	81000	5800
	K 75X81X30	106	75	81	30	32000	85000	5800
	K 75X83X23	113	75	83	23	45000	102000	5500
	K 75X83X30	147	75	83	30	55000	125000	5500
80	K 80X86X20	76	80	86	20	35000	91000	5500
	K 80X86X30	114	80	86	30	52000	130000	5500
	K 80X88X30	141	80	88	30	67000	150000	5500
85	K 85X92X20	96	85	92	20	38000	98000	4800
90	K 90X97X20	103	90	97	20	39000	10100	4500
	K 90X98X27	150	90	98	27	50000	120000	4500
	K 90X98X30	172	90	98	30	55000	150000	4500
95	K 95X103X30	177	95	103	30	56000	155000	4400
100	K 100X107X21	120	100	107	21	41000	110000	4100
	K 100X108X27	176	100	108	27	49000	120000	4100
	K 100X108X30	190	100	108	30	58000	160000	4200
105	K 105X112X21	123	105	112	21	43000	110000	4000
	K 105X113X30	198	105	113	30	60000	170000	4000
110	K 110X117X24	146	110	117	24	50000	125000	3900
	K 110X118X30	217	110	118	30	62000	180000	3900
115	K 115X123X27	200	115	123	27	52000	150000	3700
120	K 120X127X24	166	120	127	24	48000	150000	3600
125	K 125X133X35	275	125	133	35	70000	230000	3500
130	K 130X137X24	170	130	137	24	50000	150000	3400
135	K 135X143X35	300	135	143	35	77000	250000	3200
145	K 145X153X26	250	145	153	26	65000	210000	3000
	K 145X153X36	300	145	153	36	80000	300000	3000
150	K 150X160X46	570	150	160	46	125000	420000	2900
155	K 155X163X26	265	155	163	26	64000	210000	2800
	K 155X163X36	356	155	163	36	85000	310000	2800

Radial Needle Roller and Cage Assemblies



Series K



Shaft Diameter (mm)	Bearing Designation	Mass (g)	Boundary Dimensions (mm)			Basic Load Rating		Limiting Speed Oil
			Fw	Ew	Bc	Dynamic Cr(N)	Static Cor(N)	
160	K 160X170X46	550	160	170	46	130000	480000	2700
165	K 165X173X26	284	165	173	26	65000	230000	2600
170	K 170X180X46	620	170	180	46	135000	520000	2550
175	K 175X183X32	360	175	183	32	85000	320000	2500
185	K 185X195X37	607	185	195	37	110000	380000	2300
195	K 195X205X37	620	195	205	37	115000	385000	2200
210	K 210X220X42	740	210	220	42	125000	500000	2000
220	K 220X230X42	790	220	230	42	130000	550000	1900
240	K 240X250X42	850	240	250	42	140000	580000	1800
265	K 265X280X50	1810	265	280	50	200000	750000	1700

Remarks:

1. TN=The allowable working temperature for plastic cage: 120°C (continuously); 150°C (temporarily); 180°C (for a short time).
2. Allowable rotational speed applies to oil lubrication. For grease lubrication, a maximum of 60% of this value is allowable.

SERVICE / PRECISION / TECHNOLOGY

Radial Needle Roller and Cage Assemblies

Connecting Rod Supporting Needle Roller and Cage Assemblies

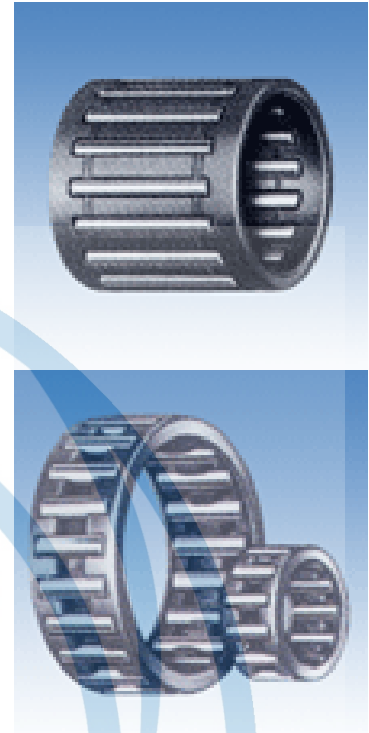
Connecting rod supporting needle roller and cage assemblies is applicable to the medium and small size diesels.

The needle bearings, due to its special operational conditions, must bear the shock force from the explosion in the cylinder, the inertia forces of the piston, the connecting rod and the crank shaft. Therefore, needles and the retainer must sustain the great centrifugal forces and acceleration forces. Besides, it is responsible for the heat dissipation. So, the flow of lubricant oils must be taken into account during the entity designing of the bearing so that enough cooling area is increased, or coating copper, silver on the surface to prevent the abnormal abrasion during the starting period. To conclude, the Connecting rod supporting needle retainer assembly has the following merits:

Light weight, lower inertial force, the use of highly anti-fatigue, highly rigid and highly abrasion-resistant materials, low abrasion force in low speed operation and high cooling capability.

Structure

KZK	Crank pin supporting needle roller and cage assemblies
KBK	Piston pin supporting needle roller and cage assemblies



KBK Piston pin supporting needle and retainer assembly (small end bearing)

Piston pin supporting needle and retainer assembly transmit the engine power through the piston pin. To reduce the impact and lower the noise, the inner diameter of the retainer is often close to the piston pin which means inner guiding method is used. The retainer of piston pin supporting needle retainer assembly is generally made of 20 steel. The small end bearing retainer of high torque force and high speed, is always made of 15CrMo steel.

KZK Crank pin supporting needle and retainer assembly (big end bearing)

The crank is driven by the big end of the connecting rod. Therefore, the outer diameter of the retainer should be as close as possible to the inner diameter of the big end of the connecting rod so that the impact can be reduced and the noise lowered. That means outer guiding method is used.

The big end of the bearing revolves around the center of the crank shaft and at the same time it rotates itself. When the speed reaches very high (over 8000rpm), the centrifugal force will be very huge and thus extremely big load resulted on the retainer creating very poor conditions. The retainer of the crank pin supporting needle retainer assembly is generally made of suitably heat treated 15CrMo steel, this greatly increases the strength and abrasion resistance. Meanwhile this will ensure the material the same as the piston pin steel so that they have the same heat expansion factor under the same condition. When the working speed exceeds 8000rpm or the temperature is very high, silver coating to the retainer is suggested.

Applicable materials

It is suggested that 15CrMo be used for connecting rod material. After carbonization quenching and tempering, its toughness is increased. The tray surface hardness of the apertures of both small and big ends are no less than HV700 with effective hardened layer no less than 0.5mm. The surfaces of seat holes and the pin tray must be ground very precisely till its surface roughness doesn't exceed Ra0.2. The circularity, cylindricity will be controlled within 0.003mm. The parallelism of the two ends: For high speed 0.02/100. For general purpose 0.03/100. For low speed, 0.04/100. If the above mentioned precision can not be reached, it is suggested to widen the radial combination gap. Or damage will happen on the bearing due to the abnormal load resulted from over heat.

Big End Guidance and Small End Guidance

Big end guidance(lower guidance)and small end guidance(upper guidance)are constituted as shown in Fig 1.Big end guidance is more commonly used . Lower end guidance is considered only in case of very high speed or the overheat resulted from big end guidance.

Big end (lower guidance):

The big end of the connecting rod and the needle bearings are mounted between the two cranks.So when big end guidance is used,the oil film lubrication among the crank,connecting rod big end and the bearings must be noticed.On the big ends of the connecting rod,the end surfaces are always made into slit, hole or groove shapes so that the lubricating oil can enter the needle bearing smoothly and normal lubrication oil circulation can be maintained.The width of the big end needle bearing is the same as the connecting big end.To ensure the effective guidance to the big end bearings and to prevent the connecting from slanting, two washers made of phosphorus bronze are added by the two sides of the big end and a gap of 0.2~0.5mm between cranks are ensured.

Big end (upper guidance)

The small end of the connecting rod and the needle bearings are mounted between the piston and the pin and are guided by piston body.To reduce the axle gap,two hardened washers are added onto the end surface of the small end bearings to limit the axial movement of the connecting small end.

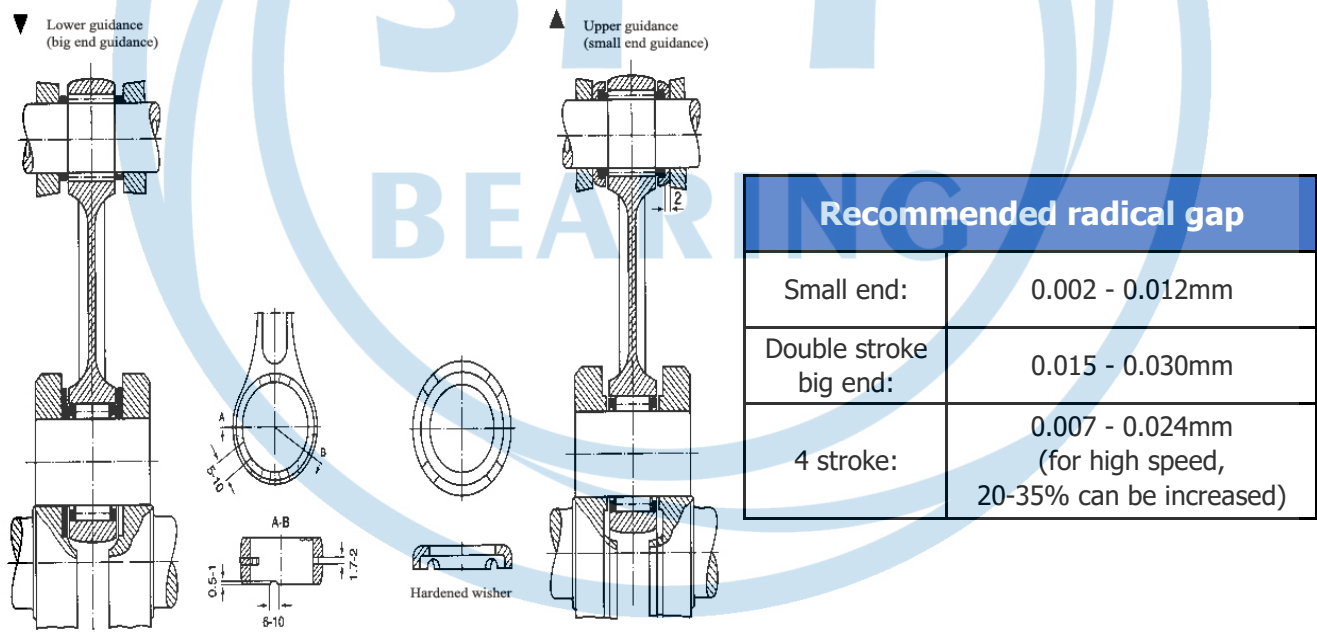


Figure 1

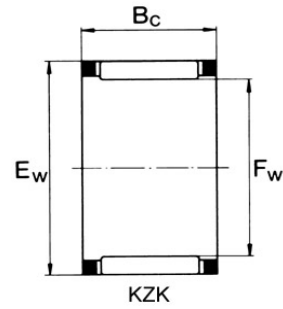
Radical gap

The radical gap should be selected as per the engine type and the operational conditions. The speed, load, lubrication, temperature, the material and machining precision of the engine must be specially noticed. The selection of smaller gap can be used to increase the efficiency of the engine but all the parts must be guaranteed by the matched precision. Or the bearing might be burnt. Suitable radical gap should take experience and the test values.

Radial Needle Roller and Cage Assemblies for connecting rod bearing arrangements



Series KZK for crank pin bearing arrangements



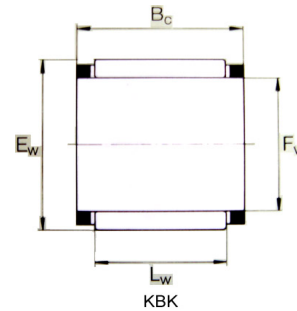
Shaft Diameter (mm)	Bearing Designation	Mass (g)	Boundary Dimensions (mm)			Basic Load Rating	
			Fw	Ew	Bc	Dynamic Cr(N)	Static Cor(N)
12	KZK 12X16X10	3.5	12	16	10	5500	5800
	KZK 12X17X10	5	12	17	10	5900	5900
14	KZK 14X18X10	4	14	18	10	5800	7300
	KZK 14.4X20.4X10	6.9	14.4	20.4	10	6800	6600
16	KZK 16X21X10	5.8	16	21	10	7000	7800
	KZK 16X22X12	9.5	16	22	12	94000	10100
18	KZK 18X24X12	10	18	24	12	95000	11000
	KZK 18X24X15	14	18	24	15	12000	12000
20	KZK 20X26X12	9.6	20	26	12	11000	11500
	KZK 20X26X17	17	20	26	17	13000	15000
22	KZK 22X28X13	15	22	28	13	1200	13000
	KZK 22X28X16	18	22	28	16	13500	17000
	KZK 22X29X15	15.2	22	29	15	15000	18600
	KZK 22X29X16	15.6	22	29	16	15000	18600
25	KZK 25X32X16	22.7	25	32	16	16000	20000
28	KZK 28X35X16	27	28	35	16	16000	21000
30	KZK 30X37X16	29	30	37	16	18000	26000
35	KZK 35X42X20	40	35	42	20	22000	33000
40	KZK 40X48X20	54	40	48	20	31000	42000

SERVICE / PRECISION / TECHNOLOGY

Radial Needle Roller and Cage Assemblies for connecting rod bearing arrangements



Series KBK for piston pin bearing arrangements



Shaft Diameter (mm)	Bearing Designation	Mass (g)	Boundary Dimensions (mm)			Basic Load Rating	
			Fw	Ew	Bc	Dynamic Cr(N)	Static Cor(N)
9	KBK 9X13X12.5	4.9	9	13	12.5	5100	5500
10	KBK 10X13X14.5	5.1	10	13	14.5	4600	6000
	KBK 10X14X13	5.9	10	14	13	5100	5800
12	KBK 12X15X13	4.6	12	15	13	4800	7000
	KBK 12X15X15	5.6	12	15	15	5100	7100
	KBK 12X15X17.5	6.5	12	15	17.5	6500	9900
	KBK 12X16X13	6.7	12	16	13	6100	7000
	KBK 12X16X16	8.5	12	16	16	6800	8900
13	KBK 13X17X14.5	7.1	13	17	14.5	7100	9500
	KBK 13X17X17.5	8.6	13	17	17.5	8600	11100
14	KBK 14X18X13	7.6	14	18	13	6200	8400
	KBK 14X18X14.5	8	14	18	14.5	6200	8400
	KBK 14X18X17	10.1	14	18	17	8500	11100
	KBK 14X18X21	10.8	14	18	21	11000	15000
15	KBK 15X19X20	12.9	15	19	20	10000	13500
16	KBK 16X20X20	13.5	16	20	20	10500	14000
18	KBK 18X22X22	17	18	22	22	12000	18500
	KBK 18X22X24	18.5	18	22	24	12500	21000
	KBK 18X22X25	19.2	18	22	25	12000	20000
20	KBK 20X24X30	22.1	20	24	30	13000	24000
	KBK 20X25X22	19.5	20	25	22	13600	21000

SERVICE / PRECISION / TECHNOLOGY