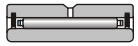
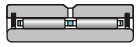
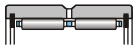
Needle Roller Bearings and Universal Joint Bearings


241

Single Row Needle Roller Bearings

Double-Row Needle Roller Bearings

253

Long Cylindrical Roller Bearing

247

Needle Roller Bearings and Universal Joint Bearings

LYC's needle roller bearings have small axial section dimension, good rigidity and capacity to carry high radial loads, which are suitable for limited radial installing when positions. These are widely applied under working situation with swinging shaft and bearing housing. However, needle roller bearing can only carry pure radial load, but, can't prevent the axial displacement between shaft and bearing housing. In addition, the angle error for inner axle and outer axle is not allowed.

Type NA, RNA

LYC's standard needle roller bearings are NA type, which has flange or spring lock ring at the two sides of outer ring, and a flangeless inner ring. There are two structures including single row and double rows. Either the single or double-row bearings can be produced into type NA with inner ring, or type RNA without inner ring.

For larger sizes, there are circularity lubrication grooves and holes on outer ring. Outer assembly of type NA's (outer ring, needle rollers and cage) are non-separated, but inner ring can be parted from outer assembly.

When needle rollers bearings are without an inner ring, its rollers would have direct contact with shaft surface. In this way, the hardness and dimension of journal must reach the requirements of bearing raceway.

Type NAV, RNAV

Bearings of type NAV and RNAV are filled with rollers without a cage. These are another type derived from type NA and RNA. Their carrying capacity is larger than type NA and RNA. However the rotating speeds are lower.

Type NAO

Type NAO have a flangeless inner ring and outer ring, with two structures as single row and double rows. For double-row needle roller bearing, it has a lubrication groove and hole on the outer ring.

Type K

Type K is also called "needle and cage assembly" without an inner and outer ring, it has the smallest radial dimension of bearing. It works directly on shaft surface and bearing housing, so the matching shaft and bearing houses must ensure hardness and dimensional accuracy.

Long Cylindrical Roller Bearings

The characteristics of long cylindrical roller bearings are similar to needle roller bearing, however, their radial section dimensions are larger than needle roller bearings. Therefore, they can carry a larger radial load.

For the long cylindrical roller and needle roller, the length-diameter ratios are both greater than 3. The major difference is that the former's roller length is over 5mm, the later is smaller than 5mm. So they are mostly similar on their structures.

Similar to the needle roller bearing, long cylindrical roller bearings can also only take pure radial load, but, do not prevent the axial displacement between the shaft and bearing housing, additionaly, the angle error for inner axial and outer axial is not allowed.

Type NAOL

Similar to the type NAO, bearings of type NAOL have flangeless inner ring and outer ring.

Type NAL

Similar to type NA, these bearings have flanges or spring lock rings at the two sides of outer ring, but, are without a flange on inner ring.

Universal Joint Bearings

LYC's universal joint bearing has a outer ring with a particular figured structure and an assembly side and full set of rollers or needle rollers, but, is without a inner ring. Universal joint bearings usually have a shield or sealed cup to prevent contaminants entering into bearing.

The universal joint bearing is widely used in universal joint applications such as motor, steel mills, crane, and transport machinery. The rings of this type of bearing are required to be specially heat treated, so that it can endure heavy impact loads. The design of this smaller section dimension allows space saving in the structure of universal joint cross axis.

The universal joint bearing works directly on the shaft surface and bearing housing. Therefore, the matching shaft and bearing housing must maintain enough hardness and dimensional precision.

LYC can provide other structures of needle roller bearings or long cylindrical roller bearing to meet customers requirements, such as needle roller bearing (or long cylindrical roller bearing) with a pressed outer ring etc. All these configurations can not be listed here. If customers require these applications, please consult the LYC technical department.

Cage

LYC's needle roller bearings are supplied with a pressed steel cage, a machined solid cage or glass fiber reinforced polyamide 66 on other engineering plastics. The cages of materials are identified by a suffix, these suffix are explained in the chapter "LYC Bearing Designation".

Minimum load

In order to maintain bearings working in a good condition, a minimum load must be imposed on bearings, particularly on bearings working at high speeds, with high accelerations, or with the load direction changing frequently, because under these working conditions, inertial force of balls and cage and lubricant friction will have bad influence on the rotation of bearings, and detrimental sliding movement may be caused.

The minimum load of a needle roller bearing can be obtained from.

$$F_{min}=0.02C$$

where

C-Basic dynamic loading rating, N

Dimension, Tolerance, Clearance

LYC's standard needle roller bearing boundary dimensions are according to GB/T273.3 <Rolling Bearing, Radial Bearing, and Boundary Dimension General Specification>, GB/T290 <Rolling Bearing, Needle Roller Bearing with Pressed Outer Ring, and Boundary Dimension>, JB/T7918 <Rolling Bearing, Radial Needle and Cage Assembly>.

JB/T 3588 <Rolling Bearing, Needle Roller Bearing Full of Rollers, Boundary Dimension and Tolerance>, G/T3370 <Rolling Bearing, and Cylindrical Roller Bearing for Universal Joints >.

LYC's standard needle roller bearing tolerance is according to GB/T307.1 <Rolling Bearing, Radial Bearing, and Tolerance>

The clearance of LYC's needle rolling bearing with inner and outer ring is according to GB/T4604 <Rolling Bearing, and Radial Clearance>. Clearance for the bearings without inner and outer ring or only with one ring is dependant on the diameter of axle or diameter tolerance of bearing housing's inner hole.

The dimensional tolerance of LYC's standard needle roller bearing is the normal grade P0, the clearance is group 0. If customers have additional special requirements on dimension, tolerance, and clearance, then LYC have the ability to supply the corresponding products, including non-standard type.

Equivalent Dynamic (Static) Load

This type of bearing can only carry pure radial load, so the equivalent dynamic load is the same as its equivalent static load. The equivalent dynamic (static) load is calculated from

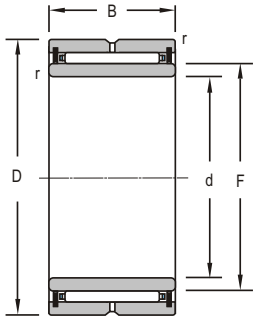
$$P=P_0=Fr$$

Where

P – Equivalent dynamic load, N

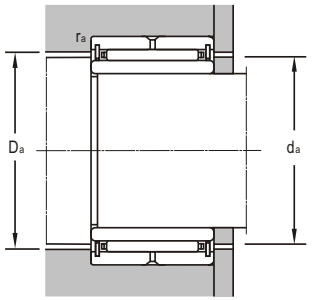
P_0 – Equivalent static load, N

Fr – Radial load, N

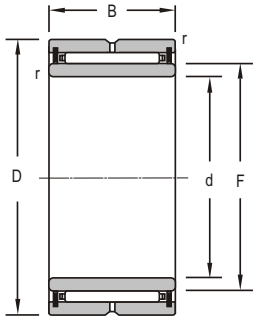


d 12～220mm

Boundary Dimensions					Basic Load Ratings		Limiting Speeds	
					Dynamic	Static	Grease	Oil
d	*D*	*B*	*F*	*r*	*C*	C_0		
mm					kN		r/min	
12	24	13	16	0.3	10.1	11.7	15000	23000
20	37	17	25	0.3	21.3	25.5	11000	16000
25	42	17	30	0.3	24	31.5	8500	13000
30	47	17	35	0.3	25.5	35.5	7500	11000
35	55	20	42	0.6	32	50	6600	9500
40	65	22	48	0.6	43.5	66.5	5500	8500
	62	22	48	0.6	43.5	66.5	5500	8500
45	68	22	52	0.6	45	72	5500	8000
50	72	22	58	0.6	48	80	5000	7000
55	85	25	63	1	58.5	99.5	4300	6000
	80	25	63	1	58.5	99.5	4500	6300
65	90	25	72	1	62.5	112	3700	5500
70	100	30	80	1	85.5	156	3300	5500
80	110	30	90	1	90.5	174	2900	4400
85	120	35	100	1.1	112	237	2500	3800
90	125	35	105	1.1	116	252	2500	3800
110	150	40	125	1.1	149	315	2100	3200
120	165	45	135	1.1	192	395	2000	3000
140	175	35	155	1.1	133	340	1700	2600
170	215	45	185	1.1	185	495	1500	2200
180	225	45	195	1.1	195	540	1400	2100
220	270	50	240	1.5	242	770	1100	1700

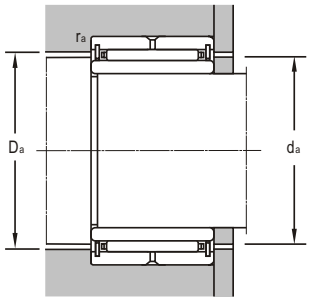


Bearing Designations		Mounting Dimensions			Mass
Present	Original	d_{amin}	D_{amax}	r_{amax}	
		mm			kg
NA4901	4524901	14	22	0.3	0.0303
NA4904	4524904K	22	35	0.3	0.0851
NA4905	4524905	27	40	0.3	0.0963
NA4906	4524906	32	45	0.3	0.109
NA4907	4524907	39	51	0.6	0.179
NA608	524708	44	58	0.6	0.315
NA4908	4524908	45	60	0.6	0.266
NA4909	4524909	49	64	0.6	0.298
NA4910	4524910	54	68	0.6	0.319
NA611	524711	61.5	78.5	1	0.562
NA4911	4524911	60	75	1	0.448
NA4913	4524913	70	85	1	0.521
NA4914	4524914	75	95	1	0.825
NA4916	4524916	85	105	1	0.91
NA4917	4524917	91.5	113.5	1	1.39
NA4918	4524918	96.5	118.5	1	1.43
NA4922	4524922	116.5	143.5	1	2.28
NA4924	4524924	126.5	158.5	1	2.96
NA4828	4524828	146.5	168.5	1	2.17
NA4834	4524834	176.5	208.5	1	4.31
NA4836	4524836	186.5	218.5	1	4.6
NA4844	4524844	228	262	1.5	7.12

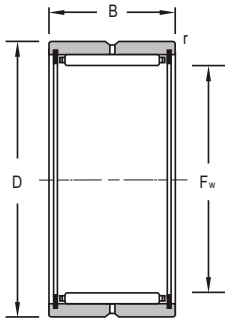


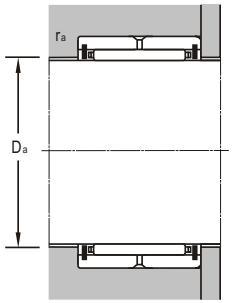
d 260～340mm

Boundary Dimensions					Basic Load Ratings		Limiting Speeds	
					Dynamic	Static	Grease	Oil
d	*D*	*B*	*F*	*r*	*C*	C_0		
mm					kN		r/min	
260	320	60	285	2	375	1160	900	1400
280	350	69	305	2	455	1300	850	1300
300	380	80	330	2.1	525	1610	750	1100
320	400	80	350	2.1	542	1700	750	1100
340	420	80	370	2.1	556	1800	700	1000



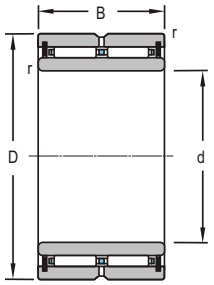
Bearing Designations		Mounting Dimensions			Mass
Present	Original	d_{amin}	D_{amax}	r_{amax}	
		mm			kg
NA4852	4524852	269	311	2	11.3
NA4856		289	341	2	16.3
NA4860		311	369	2	23.2
NA4864		331	389	2	24.6
NA4868		351	409	2	26.5

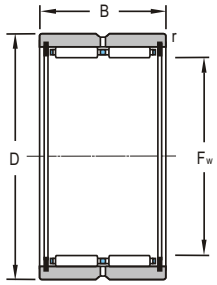




Boundary Dimensions				Basic Load Ratings		Limiting Speeds	
				Dynamic	Static	Grease	Oil
F	*D*	*B*	*r*	*C*	*C0*		
mm				kN		r/min	
25	37	17	0.3	31.3	25.5	7500	14000
30	42	17	0.3	24	31.5	6300	13000
32	42	20	0.3	23.5	37.5	6300	13000
35	47	17	0.3	25.5	35.5	5600	11000
37	52	22	1	30	42	5000	14000
42	55	20	0.6	32	50	4800	9500
48	62	22	0.6	43.5	66.5	4000	8500
52	68	22	0.6	45	72	3800	8000
55	68	25	1	41	82	3600	7500
58	72	22	0.6	48	80	3400	7000
80	100	30	1	85.5	156	2800	5500
100	120	35	1.1	112	237	2500	3800

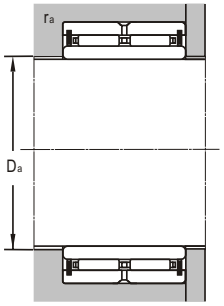
Bearing Designations		Mounting Dimensions		Mass
Present	Original	D_{amax}	r_{amax}	
		mm		kg
RAN4904A	4624904	35	0.3	0.061
RNA4905A	4624905	40	0.3	0.0677
RNA6/28A	624706	40	0.3	0.0807
RNA4906A	4624906	45	0.3	0.0744
RNA6/32	624707	50	0.3	0.14
RNA4907A	4624907	51	0.6	0.115
RNA4908A	4624908	58	0.6	0.171
RNA4909A	4624909	64	0.6	0.209
RNA6/48A	624711	64	0.6	0.199
RNA4910A	4624910	68	0.6	0.207
RNA4914A	4624914	95	1	0.55
RNA4917	4624917	115	1	0.798

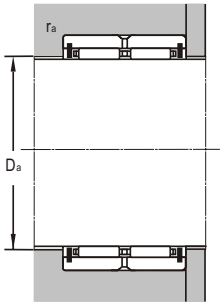




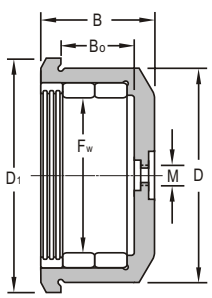
d 25～80mm

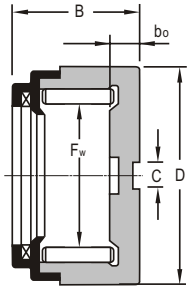
Boundary Dimensions					Basic Load Ratings		Limiting Speeds	
					Dynamic	Static	Grease	Oil
d	F_w	*D*	*B*	*r*	*C*	C_0		
mm					kN		r/min	
25		42	30	0.3	41.5	63	8500	13000
30		47	30	0.3	44	71.5	7500	11000
35		55	36	0.6	57.5	106	6100	9500
40		62	40	0.6	72	137	5600	8000
45		68	40	0.6	76	149	5300	7500
80		110	54	1	149	325	3200	4500
	20	32	30	0.3	17.6	12.8	13000	20000
	22	30	30	0.3	18.6	28.8	12000	18000
	25	37	30	0.3	36.5	50.5	11000	16000
	32	45	30	0.5	43	67	8500	13000
	35	47	30	0.3	44	71.5	7500	11000
	42	55	36	0.6	57.5	106	6500	9500
	52	68	40	0.6	76	149	5000	7500



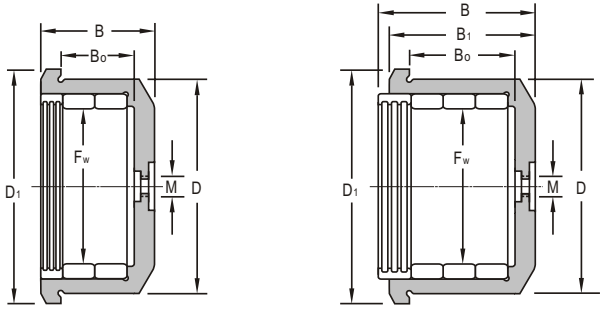


Bearing Designations		Mass
Present	Original	
		kg
NA6905A	6534905	0.167
NA6906A	6534906	0.202
NA6907A	6534907	0.329
NA6908A	6534908	0.488
NA6909A	6534909	0.544
NA6916A	6534916	1.67
RNA602A	6634102	0.0938
RNA6903X2A	634704	0.059
RNA6904A	6634904	0.108
RNA69/28A	634906	0.138
RAN6906A	6634906	0.143
RNA6907A	6634907	0.211
RNA6909A	6634909	0.38

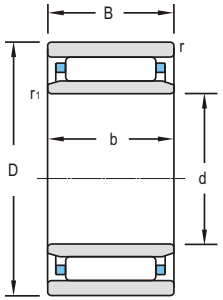




Boundary Dimensions								Bearing Designations		Mass
F_w	D	D_1	B	b	b_a	H	C	Present	Original	
mm										kg
14	24		16.6		3			**58049/14**	804902	0.0301
	24		16.6		3			**58049/14/YA**	804902K	0.035
15.2	28	25.7	19	11	4.25	2.5		**57049/15**	704902	0.06
16.3	30	27.5	21	12.5	3.95	3		**57049/16**	704702	0.0701
22	35		3		4		10	**58049/22**	804704	0.0949
25	39		28		5		9.9	**58049/25-FS**	804705	0.127
	39		32.6		5		9.9	**58049/25-RSFS**	804705K	0.137
	39		32.6		5		9.9	**58049/25-RS**	804705K1	0.14
	39		32.6		5			**58049/25-RS/YA**	804705K2	0.145
33.65	50		34.4		4		9	**58049/34**	804906	0.306
	50		28.4		4		9	**58049/34 X2**	804907	0.203
45	62		34.4		4		9	**58049/45**	804709	0.435
	62		36.5		4		9	**58049/45-RS**	804709K	0.45

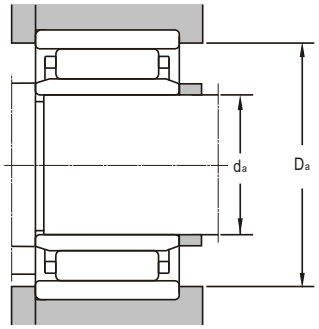


Boundary Dimensions							Bearing Designations		Mass
F_w	D	D_1	B	B_0	B_1	M	Present	Original	
mm									kg
32.44	52	60	47	26		6	**604906**	604906	0.673
36.3	60	68	53	31		6	**604907**	604907	0.799
40.1	66	74	59	34		6	**604908**	604908	1.06
45.8	74	82	65	36		6	**604909**	604909	1.42
	74	82	65	36			**604909/YA3**	604909K	1.43
51.5	83	91	73.5	44.5			**604910/YA3**	604909K	1.9
	83	91	73.5	44.5		10x1	**604910**	604710Y	1.9
60.5	95	105	81	49.5			**604912/YA3**	604712	2.67
	95	105	81	49.5		10x1	**604912**	604712Y	2.66
70	110	122	89	56			**604914/YA3**	604714	3.75
	110	122	89	56		10x1	**604914**	604714Y	3.74
76.25	120	134	88	64			**604915/YA3**	604715	4.42
	120	134	95	64	88		**604915**	607415K	4.69
80.2	124	135	96	60		10x1	**604916**	604716	5.18
86.8	130	142	103	69		10x1	**604917**	604717	5.48
100	154	166	111	76		10x1	**604920**	604920	9.17
109.7	164	175	105	85		10x1	**604922/YB2**	604722	9.2
109.7	164	175	113	78		10x1	**604922**	604922	9.77
158	230	250	160	110	170	10x1	**604932**	3-476	27.2
188.8	260	280	195	134	185	10x1	**604938**	3-475	37.1

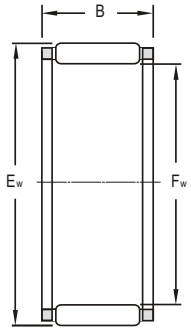
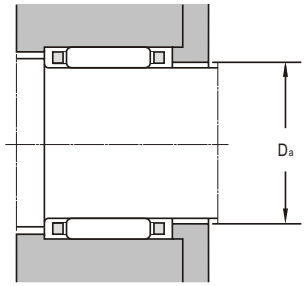


d 60～850mm

Boundary Dimensions						Basic Load Ratings		Limiting Speeds	
						Dynamic	Static	Grease	Oil
d	*D*	*B*	*b*	r_1	*r*	*C*	C_0		
mm						kN		r/min	
60	120	58	60	3.5	0.8	161.4	201.7	5556	7000
	120	58	60	3.5	0.8	148.9	186.2	5556	7000
	120	58	60	3.5	0.8	161.4	201.7	5556	7000
100	165	65		2	2	326	524	2000	3000
180	280	219		2.1	2.1	1490	3240	1600	2500
206.375	285.75	222.225		4	4	1330	3960	1500	2200
209.55	282.575	236.525		2.1	2.1	1330	3960	1500	2200
220	380	175		2	2	1814.4	2268	1333	1680
240	380	100		5	5	1054	1317.5	1290	1626
	400	160		4	4	1736	2170	1234	1555
282	334	87	118		1	829.6	1073	1299	1636
355	470	110		3.5	3.5	1418.1	1772.6	874	1101
380	485	75		3.5	3.5	846	1057.5	797	1004
450	590	100		5	5	1434.4	1793	615	763
850	1030	136		6	6	4121	5151.6	234	295



Bearing Designations		Mass
Present	Original	
		kg
NAOL612WB	404712	3.29
NAOL612WBJ	404712K	3.17
NAOL612WBJW	404712F	3.32
NAL4120M/YA		5.51
NNAL6036X2M		50
	254941HKU	46.5
NNAL6209.55Q1/C9W33XYB2		44.8
NAOL644	4744	87.1
NAOL648	4748	46.6
NAOL4148	4004748	83.8
NAOL6/282WBJR	414956	16.48
NAOL671	4771	53
NAOL3876X1	4776	38.5
NAOL690	4990	70.5
NAOL38/850	32048/850	263



Boundary Dimensions			Bearing Designations		Mass
F_w	E_w	B	Present	Original	
mm					kg
19.05	31.775	34	**K19.05X31.775X34JR**	64804	0.0903
19.051	28.588	36.75	**K19.051X28.588X36.75JR**	64903	0.068
19.051	28.588	43.25	**K19.051X28.588X43.25JR**	64904	0.08
20	30.02	18	**K20X30.02X18JR**	64704	0.0386
20.612	33.325	35	**K20.612X33.325X35JR**	64904K	0.1
25	38	24.7	**K25X38X24.7JR**	64805	0.0783
25.4	41.288	60.4	**K25.4X41.288X60.4JR**	64905	0.265
27.71	42.825	44.1	**K27.71X42.825X44.1JR**	64906	0.183
29.975	42	44.1	**K29.975X42X44.1JR**	64706	0.147
31.675	46.81	44.1	**K31.675X46.81X44.1JR**	64906K	0.217
32	52.012	49	**K32X52.012X49JR**	64907	0.329
32	37	35.8	**K32X37X35.8ZWDTN1**		0.028
37	42	29.79	**K37X42X29.79ZWDTN1**		0.0277
38	43	35.7	**K38X43X35.7ZWDTN1**		0.0333
52.412	71.425	43.3	**K52.412X71.425X43.3JR**	64911	0.441
82.5	92	38	**K82.5X92X38**		0.224
88.8	101.5	38	**K88.8X101.5X38**		0.348
130	138	25	**K130X138X25JR**	9247/130	0.212