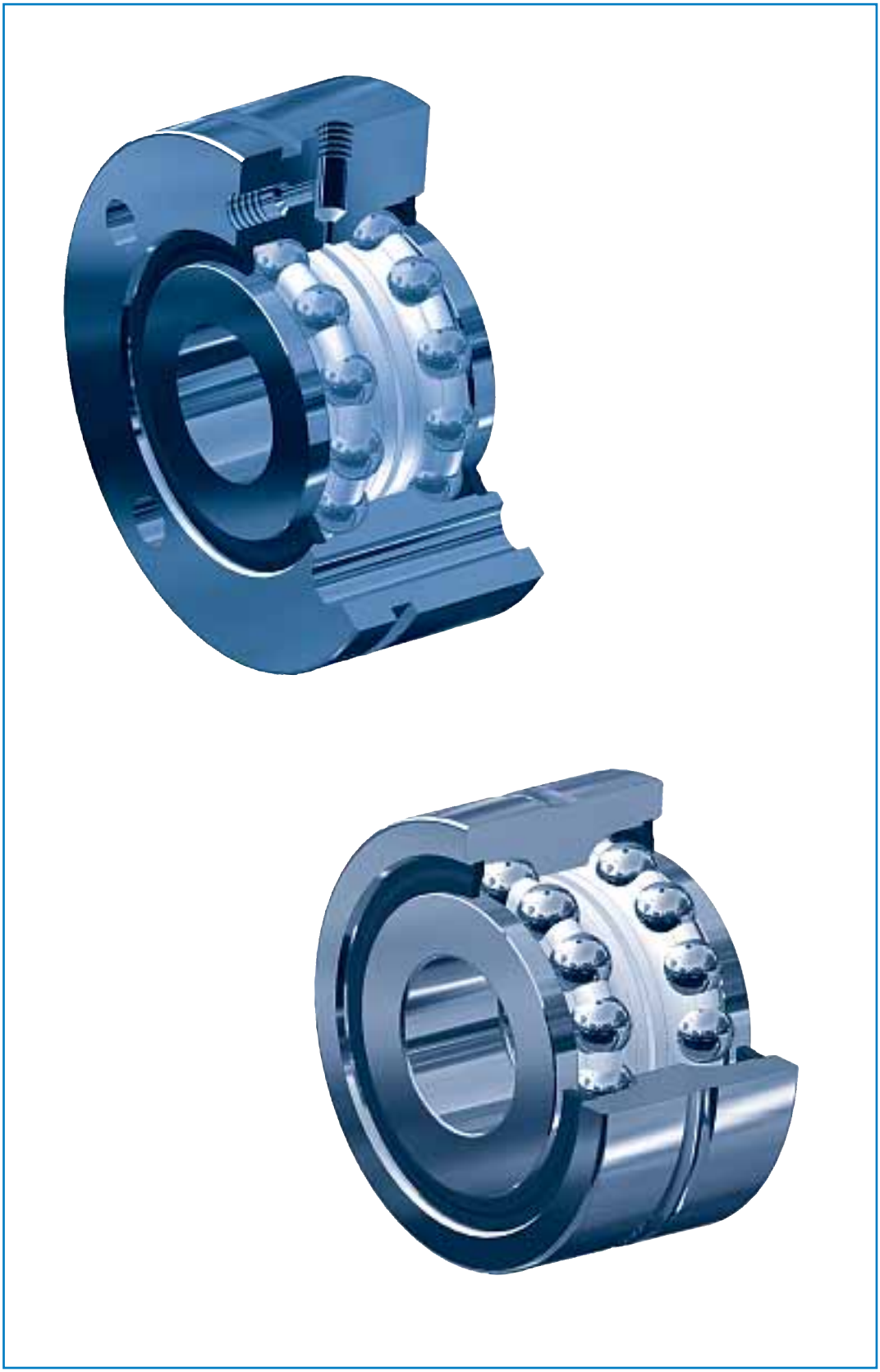
NADELLA
Linear and Motion Solutions

Precision bearings and adjusting nuts for ball screws

SF 2007 E

Directory

Bearings for ball screws



Bearings for ball screws series MMN & MMF

Sealed bearings for ball screw spindles increase precision, productivity and lifetime of machine tools.

Due to a number of improved characteristics the new double-row bearings type MMN and MMF for ball screws meet the requirement for shock-free and precise positioning of the machine tool spindles. Integrated seals of low friction effectively keep pollution away from the bearing, thus ensuring a steady operation and longer service life.

These high-precision double-row bearings absorb axial forces in both directions as well as combinations of radial forces and overturning moments. The new cage offers space for more balls which leads to a higher load capacity. Tolerances according to ABEC9/ISO P2 for axial running precision guarantee minimum axial run-out and highest precision and thus precise tool positioning and repeatability. This results in a high and constant machining quality and a maximum productivity of the machine tools.

Type series with flange (MMF) and without flange (MMN) are available. Being complete sealed units, they simplify the installation with standard nut or rotating nut. When using the type with flange it is not necessary to tighten the outer ring.

Advantages of MMN/MMF bearings

Higher service life

The integrated seals with low friction on both sides of the bearing offer optimum protection in polluted environment and thus a longer service life. The bearings are greased and can be re-lubricated during operation.

High load carrying capacity

Due to the double-row version axial forces and combined loads can be absorbed. A larger number of balls increases the load carrying capacity.

Constant pre-stress guarantees repeatability

Precise pre-stress can easily be achieved by tensioning the two-piece inner ring together with outer ring and cage against the shaft shoulder.

Highest precision

The normal backlash tolerance acc. to ABEC 9/ISO 2 guarantees a minimum axial run-out and highest positioning precision of the spindle. A small width tolerance and low friction torque improve the endurance and productivity of the system.

Increased stiffness

The 60° pressure angle and a maximum number of steel balls ensure a high axial stiffness and precision.

High speed

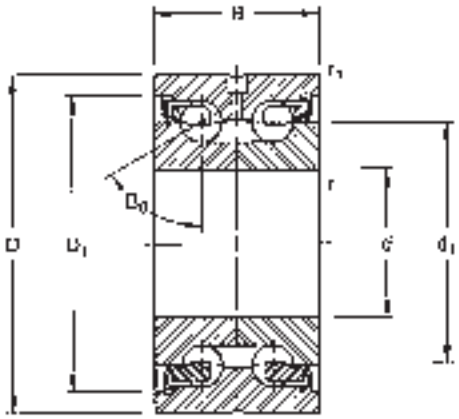
The heavy duty grease NGLI #2 ensures optimum capacity. When ceramic balls and special grease are used, highest speed and acceleration are possible.

Simple and flexible assembly

One-piece bearings units with integrated seals simplify the installation both with fixed or with rotating nut. When using the flange version external tensioning is not necessary.

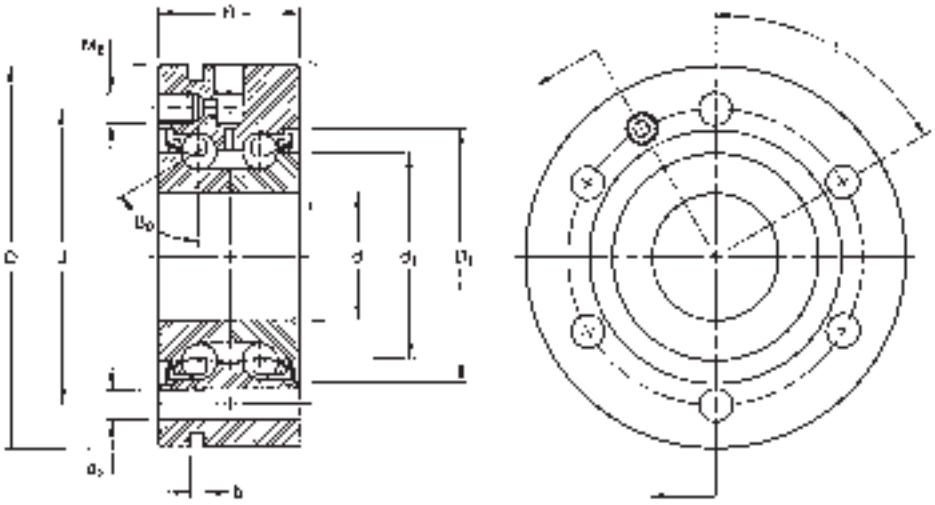
Adjustment of the cover no longer necessary

Due to precision-ground side surfaces (five times smaller width tolerance than ABEC 9/ISO P2) reworking the cover during fitting in is not necessary. This increases productivity and reduces assembly costs.

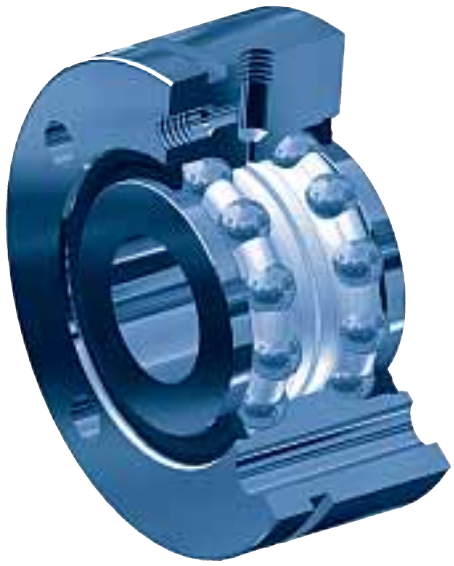


Part number			MMN512BS42	MMN512BS45	MMN517BS47
Fitting dimensions					
Bore	mm	D	12	15	17
Outer diameter	mm	D	42	45	47
Width	mm	B	25	25	25
Bore outer ring min.	mm	D_1	33,1	37	37,8
Bore housing shoulder min.	mm	Da	32	21,5	36,5
Bore bearing inner ring max.	mm	d_1	25	27,6	28,4
Outer diameter shaft shoulder max.	mm	da	19	21,5	23,5
Chamfer radius housing max.	mm	Rs_1	0,6	0,6	0,6
Chamfer radius shaft max.	mm	Rs	0,3	0,3	0,3
Assembly bores					
Reference circle	mm	J			
Hole diameter	mm	d_2			
Number of holes	-				
Hole distance	degree	t			
Technical data					
Pressure angle	degree	B_0	60	60	60
Weight	kg		0,2	0,23	0,24
Axial load rating:					
Static	kN	Co	18	20,2	22,2
Dynamic	kN	C	15,3	16,1	16,8
Speed limit (grease)	rpm	n_G	4700	*	4000
Axiale stiffness	N / µm	C_{aL}	380	*	450
Radial stiffness	N / µm	Cr_L	610	*	725
Moment of inertia	Kg.cm2	M_M	0,072	*	0,13
** Other sizes upon request*					

MMN520BS52	MMN525BS57	MMN530BS62	MMN540BS75	MMN550BS90	MMN550BS110	MMN560BS110
20	25	30	40	50	50	60
52	57	62	75	90	110	110
28	28	28	34	34	54	45
43,2	49,3	54,3	68,7	82,6	99,6	100
42,5	48	53,5	67	81	98,5	98
34,5	40,6	45,6	57,5	71,5	81,1	84
27,5	33,5	38,5	49	63	66	72
0,6	0,6	0,6	0,6	0,6	0,6	0,6
0,3	0,3	0,3	0,3	0,3	0,6	0,6
	The type MMN does not need assembly bores					
60	60	60	60	60	60	60
0,32	0,35	0,4	0,64	0,91	2,42	1,82
30,6	36,2	41,5	57,8	65,8	85,9	139,7
21,8	23,2	24,5	34,4	36,3	40,5	71,2
3400	2900	2600	*	*	*	*
625	750	845	*	*	*	*
990	1185	1335	*	*	*	*
0,282	0,508	0,76	*	*	*	*

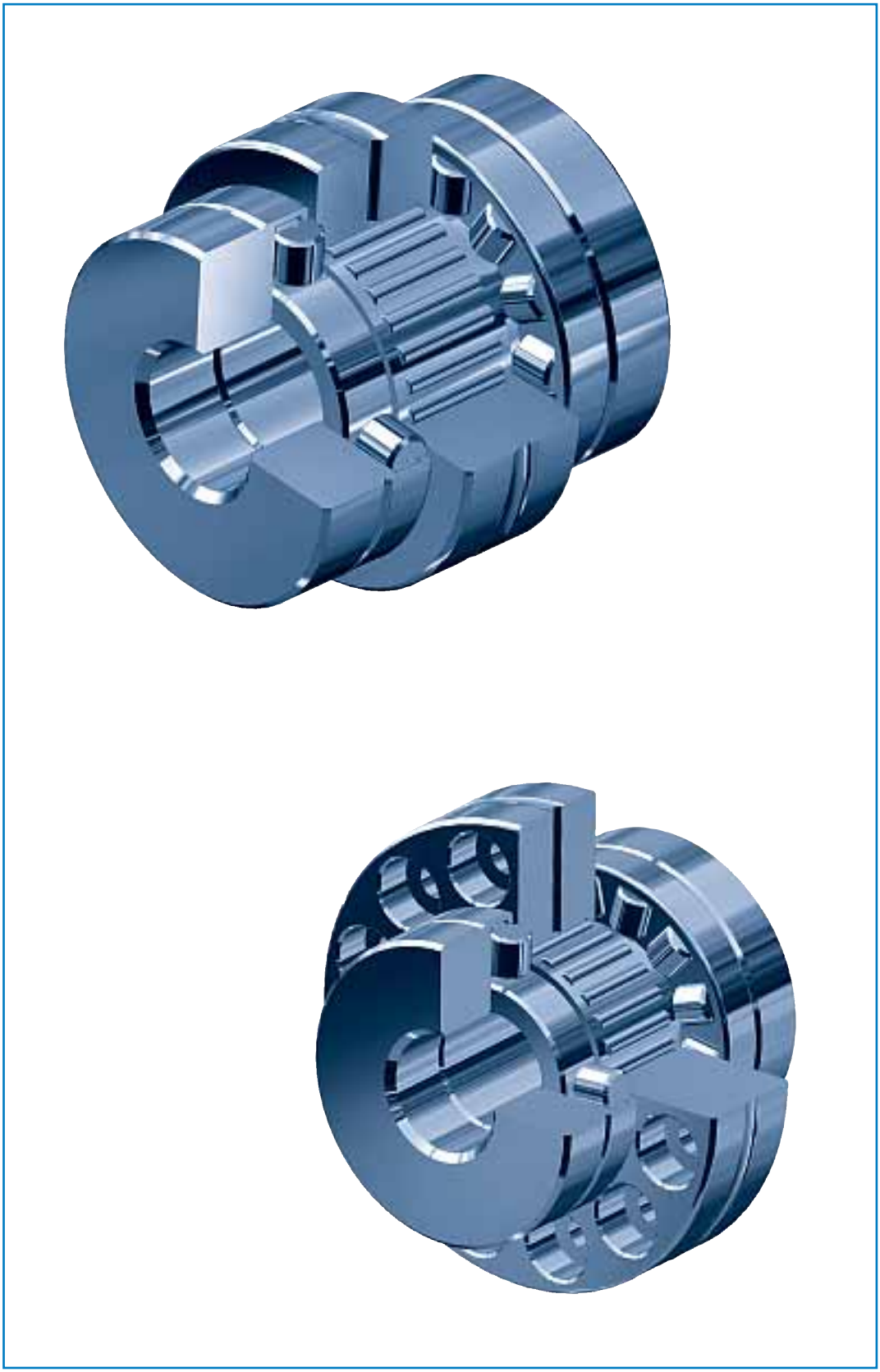


Part number			MMF512BS55	MMF515BS60	MMF517BS62
Fitting dimensions					
Bore	mm	D	12	15	17
Outer diameter	mm	D	55	60	62
Width	mm	B	25	25	25
Bore outer ring min.	mm	D_1	33,1	37	37,8
Bore housing shoulder min.	mm	Da	32	34,5	36,5
Bore bearing inner ring max.	mm	d_1	25	27,6	28,4
Outer diameter shaft shoulder max.	mm	da	19	21,5	23,5
Chamfer radius housing max.	mm	Rs_1	0,6	0,6	0,6
Chamfer radius shaft max.	mm	Rs	0,3	0,3	0,3
Assembly bores					
Reference circle	mm	J	42	46	48
Hole diameter	mm	d_2	6,5	6,5	6,5
Number of holes	-		3	3	3
Hole distance	degree	t	120	120	120
Technical data					
Pressure angle	degree	B_0	60	60	60
Weight	kg		0,4	0,47	0,49
Axial load rating:					
Static	kN	Co	18	20,2	22,2
Dynamic	kN	C	15,3	16,1	16,8
Speed limit (grease)	rpm	n_G	4700	*	4000
Axial stiffness	N / µm	C_{aL}	380	*	450
Radial stiffness	N / µm	Cr_L	610	*	725
Moment of inertia	Kg.cm2	M_M	0,072	*	0,13
** Other sizes on request*					



MMF520BS68	MMF525BS75	MMF530BS80	MMF540BS100	MMF550BS115	MMF550BS140	MMF560BS145
20	25	30	40	50	50	60
68	75	80	100	115	140	145
28	28	28	34	34	54	45
43,2	49,5	54,3	68,7	82,6	99,6	100
42,5	48	53,5	67	81	98,5	98
34,5	40,6	45,6	57,5	71,5	81,1	89
27,5	33,5	38,5	49	63	66	72
0,6	0,6	0,6	0,6	0,6	0,6	0,6
0,3	0,3	0,3	0,3	0,3	0,6	0,6
53	58	63	80	94	113	120
6,5	6,5	6,5	8,5	8,5	10,5	8,5
4	4	6	4	6	12	8
90	90	60	90	60	30	45
60	60	60	60	60	60	60
0,64	0,76	0,84	1,5	1,37	4,89	4,28
30,6	36,2	41,5	57,8	65,8	85,9	139,7
21,8	23,2	24,5	34,4	36,3	40,5	71,2
3400	2900	2600	*	*	*	*
625	750	845	*	*	*	*
990	1185	1335	*	*	*	*
0,282	0,508	0,76	*	*	*	*

Precision combined bearings



Types AXNA, AXNB and ARNB combined bearings and their derivatives consist of a needle bearing with or without a cage, in an outer race, with a high radial thickness, each face of which acts as a raceway for a needle or roller thrust bearing. The inner ring, secured laterally between the thrust plates, acts as the inner radial raceway.

These bearings which take up very little space, are particularly recommended for shafts requiring very precise axial positioning, operating under load, such as leading spindles, ballscrews for numerically-controlled machine tools, drive shafts on control apparatus, etc.

SERIES TYPE	With attachment holes	Radial caged bearing	Thrust bearing	
			needle	roller
AXNA			●	
AXNAT	●		●	
AXNB		●	●	
AXNBT	●	●	●	
ARNB		●		●
ARNBT	●	●		●

SELECTION OF BEARING TYPE

Subject to calculations made for each application, the following general classifications can be made:

AXNA, AXNAT and **AXNB, AXNBT** bearings for slow speed assemblies with low operating loads: the particularly high axial rigidity of needle thrust bearings, together with the advantages of preloading, ensure a very high axial precision and satisfactory working life.

For example: displacement drive shafts on control apparatus.

ARNB and ARNBT, series 1 and 2 bearings generally enable preloading to be chosen which suit the precision and working life required of production machine tools.

ARNB series 3 bearings for machine tools, machining units or special equipment requiring very high axial rigidity with high loads and slow speeds.

PRELOAD

This technique consists in subjecting the thrust bearings to controlled preload during assembly, using an adjusting nut, in order to eliminate play and reduce the axial displacement caused by the operating stress regardless of the direction of the axial load.

NADELLA has always made the inner ring slightly longer than the space between the thrust plates before adjustment. This means that when the nut is tightened, the inner ring is compressed between the thrust plates and exerts a stress, by reaction, on the internal thread of the screw. This prevents it from being loosened and loss of adjustment occurring.

In an assembly with an axial preload of Fo, an operating stress F1 overloads one of the thrust bearings and frees the other of a load approximately equal to F1/2. In an assembly without preload, the loaded thrust bearing must carry the entire stress F1.

In a preloaded assembly, the axial rigidity is therefore approximately twice that of an assembly without preload. This result is obtained as long as the operating stress F1 remains less than about twice the preload stress Fo. When $F1 > 2\ Fo$, one of the thrust bearings is total freed and the other thrust bearing completely carries the load F1; in this case, the axial run-out remains less than it would have been for an assembly without preload (see figure).

DETERMINING OF PRELOAD

Preload should be determined according to the axial precision required under maximum load and the working life required.

The working life of the thrust bearing carrying the greater load depends on the resulting stress applied, i.e. $Fo + F1/2$ when $F1 < 2\ Fo$ or when $F1 > 2\ Fo$. Since these two cases can both occur on the same machine according to the type of machining carried out, the calculations must take into account the running time ratios under the various loads and speeds.

For more usual assemblies, a preload stress Fo of 5 to 10% of the dynamical load carrying capacity C of the thrust bearing, is usually suitable.

For certain applications, with slow rotating speeds, for example, the preload stress can be increased to allow for a higher operating load while remaining within the limit of the preload effect, and achieving a satisfactory working life.

ADJUSTMENT OF PRELOAD

For a given assembly, the shaft torque is defined first, which corresponds to the preload required. Series adjustments can then be made on each machine by simply checking the torque. If, as a result of assembly, this is not possible, the nut tightening torque needed to obtain preload is determined separately on the test assemblies. The torque must then be respected for series adjustments. The torque must be measured after starting up the thrust bearing, since it can be up to 50% higher at the beginning of rotation.

BEARING TOLERANCES

The outer and inner rings of the combined bearings are manufactured with class 5 tolerances according to ISO Standard 492 (class P6 of standard DIN 620).

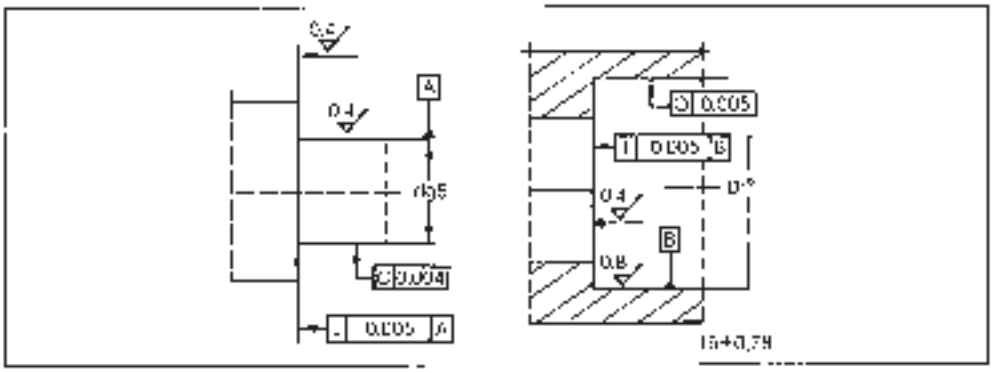
The radial play before assembly is kept within the limits of group 2 given for inner and outer paired rings according to ISO Standard 5753 (class C2 "paired rings" of standard DIN 620). See table page 45 (play C2ZS).

The axial run-out of the thrust bearing plates is in accordance with tolerance class 4 according to ISO Standard 199 (class P4 of standard DIN 620).

ASSEMBLY RECOMMENDATIONS

Shaft tolerance: g5 on dimension Di.
Tolerance of outer ring housing: J6 on dimension De.

The bearing parts of the thrust bearings must be rigid, with plane faces, perpendicular to the rotation axis and of very good surface quality to avoid caulking during use as this decreases the preloading. Their outside diameter must be at least equal to the average diameter of the race, dimension Dm.



The outer ring of the combined bearings should be blocked against a shoulder in order to avoid any axial displacement under load.

In type AXNA, AXNB and ARNB bearings, they are usually blocked by a spacer positioned lengthways during assembly. A flange attached by screws to the frame is located against the spacer.

The outer ring of type AXNAT, AXNBT and ARNBT bearings has three attachment screw holes for direct attachment to the frame.

Apart from watertight bearings (AXNBT.../2 or ARNBT.../2) or the use of long plates (AXNB (T)../1 or ARNB (T)../1), friction of joints on the outside diameter of the thrust bearing plates (dimension A) can be envisaged. In this case, please consult us for positioning.

NADELLA's technical services will supply any further information concerning the choice or assembly of these bearings, on request, together with calculation and adjustment of the axial preload.

LUBRICATION

The oil used to lubricate the other parts of the assembly is generally suitable for combined bearings whose outer ring has three 120° holes connected by a groove. Grease can generally be used if the rotating speed is in the order of 50% of the maximum speeds given in the dimensional tables. However, special top quality greases enable higher speeds to be reached. By way of information, oils with viscosities of 30 to 150 cSt are recommended.

EXAMPLES OF CALCULATIONS

► *Choice of bearing*

P: stress under which precision is needed.

P < 2 x Preloading.

In this field of preloading, the axial rigidity is equal to 2K.

The interference is $\frac{1}{2K} P$

Example: if P = 7000 N, ARNB 50 90 will be chosen, since the preloading value is 3800 N and

2 x 3800 = 7600 N > P.

Rigidity in this field k = 2 K = 3900 N/µm.

Under P, the interference will be

$\frac{1}{3900} \times 7000 = 1{,}79$ µm.

► *Working life*

The hypotheses given in the table below enable the equivalent speed and an equivalent load to be determined according to the maximum load and maximum speed, which enables a rapid calculation of the theoretical working life to be made under average operating conditions.

	1	2	3	4
Loads	Fmax	0,8 x Fmax	0,5 x Fmax	0,2 x Fmax
Speeds	0,05 x Vmax	0,2 x Vmax	0,5 x Vmax	Vmax
Fraction of time	0,15	0,40	0,30	0,15

► *Calculation of equivalent speed:*

$V_{eq} = (0{,}15 \times 0{,}05 + 0{,}40 \times 0{,}2 + 0{,}30 \times 0{,}5 + 0{,}15) V_{max} \approx 0{,}39 \times V_{max}$

Calculation of equivalent load:

$$P_{eq} \approx \sqrt[p]{\frac{P^p_{max} \times n_{max}(0{,}0075 + 0{,}08 \times 0{,}8^p + 0{,}15 \times 0{,}5^p + 0{,}15 \times 0{,}2^p)}{0{,}39 \times V_{max}}}$$

$P_{eq} \approx 0{,}575 \times P_{max}$

p = 10/3

This comparative method can be used for traverse mechanisms on conventional machine tools.

For special machines and control apparatus, the breakdown of loads and speeds can be different and the formula must be applied with caution.

Note: in this rapid calculation, preload is not taken into consideration; its influence on the working life of the bearings is actually very low for most applications if the adjustment conditions given in the literature are respected: preload between 5 and 10% of the dynamic capacity of the thrust bearings.

Example: for a maximum load P of 14 000 N and a maximum speed of 1000 r.p.m.

Equivalent speed: 0.39 x 1000 = 390 r.p.m.

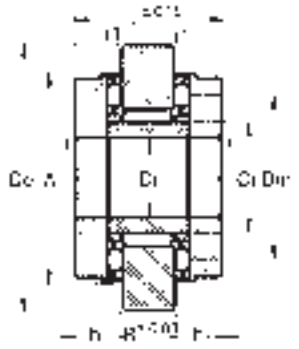
Equivalent load: 0.575 x 14 000 = 8050 N.

Theoretical working life of ARNB 50 90:

$$\frac{\left(\frac{C}{P}\right)^{\frac{10}{3}} \times 10^6}{60n} = \frac{\left(\frac{60\,000}{8050}\right)^{\frac{10}{3}} \times 10^6}{60 \times 390} = 31\,600 \text{ hours}$$

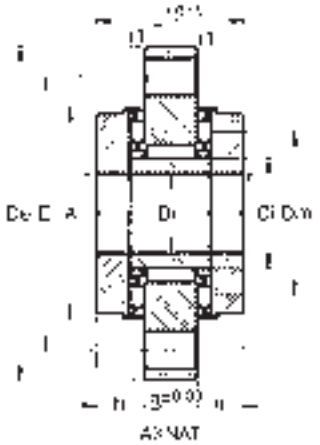
In this example, it is assumed that the time fraction n° 2 is a time fraction when precision machining is not required.

Precision combined bearings with adjustable axial preload



AXNA

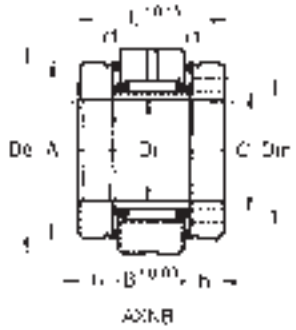
Shaft ø mm	Designation AXNA	AXNAT	Dimensions in mm Di	De	Ci	A	Dm	L	a	h	r min	r1 min	Attachment CHC screw grade (M)	Nº of screws	E mm	Torque Nm
5	5 22	5 32	5 5	22 32	7.3 7.3	17 17	12,5 12,5	12 12	4 4	4 4	0,35 0,35	0,35 0,35	3 x 10	4	24	1,4
6	6 28	6 38	6 6	28 38	8.7 8.7	22 22	15,3 15,3	16 16	6 6	5 5	0,35 0,35	0,35 0,35	4 x 12	4	30	3
7	7 32	7 42	7 7	32 42	11,1 11,1	25 25	18,8 18,8	18 18	6 6	6 6	0,35 0,35	0,35 0,35	4 x 12	6	34	3
8	8 32	8 42	8 8	32 42	11,1 11,1	25 25	18,8 18,8	18 18	6 6	6 6	0,35 0,35	0,35 0,35	4 x 12	6	34	3
9	9 35	9 45	9 9	35 45	12,8 12,8	28 28	20,8 20,8	20 20	8 8	6 6	0,35 0,35	0,35 0,35	4 x 16	6	37	3
10	10 37	10 48	10 10	37 48	14,1 14,1	30 30	22,8 22,8	22 22	8 8	7 7	0,35 0,35	0,35 0,35	5 x 16	6	39	6
12	12 40	12 50	12 12	40 50	16,6 16,6	32 32	24,8 24,8	22 22	8 8	7 7	0,35 0,35	0,35 0,35	5 x 16	6	41	6



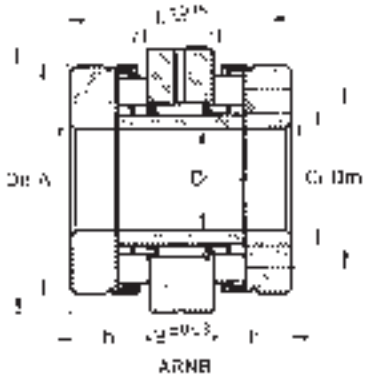
Basic loads (N)				Maximum speed	Preload 1)	Residual torque 2)	Rigidity K 3)	Threading (M)	Bearing reference
radial		axial							
Dyn. Cr	Stat. Cor	Dyn. Ca	Stat. Coa	r.p.m.	N	Nmm	N/µm	(M)	
2 350	2 650	4 000	9 400	19 000	252	55	32	5 x 0,8	AXNA 5 22
2 350	2 650	4 000	9 400	19 000	252	55	32	5 x 0,8	AXNAT 5 32
4 900	5 800	7 200	17 500	15 500	340	70	50	6 x 1	AXNA 6 28
4 900	5 800	7 200	17 500	15 500	340	70	50	6 x 1	AXNAT 6 38
5 800	7 400	7 900	21 000	13 000	469	130	100	7 x 1	AXNA 7 32
5 800	7 400	7 900	21 000	13 000	469	130	100	7 x 1	AXNAT 7 42
5 800	7 400	7 900	21 000	13 000	469	130	100	8 x 1	AXNA 8 32
5 800	7 400	7 900	21 000	13 000	469	130	100	8 x 1	AXNAT 8 42
9 000	11 900	8 500	23 800	11 500	497	190	116	9 x 1	AXNA 9 35
9 000	11 900	8 500	23 800	11 500	497	190	116	9 x 1	AXNAT 9 45
9 700	13 100	9 000	26 500	10 500	525	180	119	10 x 1	AXNA 10 37
9 700	13 100	9 000	26 500	10 500	525	180	119	10 x 1	AXNAT 10 48
10 900	15 500	9 200	27 800	10 000	532	220	120	12 x 1,5	AXNA 12 40
10 900	15 500	9 200	27 800	10 000	532	220	120	12 x 1,5	AXNAT 12 50

1) 6% of basic dynamic axial load
2) With axial play equal to preload.
3) Rigidity of a single thrust bearing with load equal to preload

Precision combined bearings with adjustable axial preload



Shaft Ø	Designation				Dimensions in mm									
mm	AXNB	ARNB Series 1	ARNB Series 2	ARNB Series 3	Di	De	Ci	A	Dm	L	B	h	r mini.	r1 mini.
15	15 45	15 45			15	45	20	35	26,8	40	16	12	0,85	0,85
					15	45	20	35	26,8	46	16	15	0,85	0,85
20	20 52	20 52			20	52	25	42	32,5	40	16	12	0,85	0,85
					20	52	25	42	32,5	46	16	15	0,85	0,85
			20 62		20	62	30	52	39,9	60	20	20	1,3	0,85
				20 72	20	72	30	60	49,5	60	20	20	1,3	0,85
25	25 57	25 57			25	57	30	47	37,5	44	20	12	0,85	0,85
					25	57	30	47	37,5	50	20	15	0,85	0,85
			25 72		25	72	35	62	46,7	60	20	20	1,3	0,85
				25 80	25	80	35	68	49,8	60	20	20	1,3	0,85
30	30 62	30 62			30	62	35	53	43,1	44	20	12	0,85	0,85
					30	62	35	53,4	42,8	50	20	15	0,85	0,85
			30 80		30	80	40	68	52,7	66	20	23	1,3	0,85
				30 90	30	90	40	78	57	66	20	23	1,3	0,85
35	35 70	35 70			35	70	40	60	48,9	48	20	14	1,3	0,85
					35	70	40	60,4	48,8	54	20	17	1,3	0,85
			35 85		35	85	45	73	57,7	66	20	23	1,3	0,85
				35 100	35	100	45	85	63	66	20	23	1,3	0,85
40	40 75	40 75			40	75	45	65	53,9	48	20	14	1,3	0,85
					40	75	45	65,4	53,8	54	20	17	1,3	0,85
			40 90		40	90	50	78	62,7	75	25	25	1,3	0,85
				40 110	40	110	50	95	70	75	25	25	1,3	0,85
45	45 80	45 80			45	80	50	70	59,5	54	25	14,5	1,3	0,85
					45	80	50	70,4	59,8	60	25	17,5	1,3	0,85
			45 105		45	105	55	90	70,9	82	25	26,5	1,3	0,85
				45 120	45	120	55	105	78,2	82	25	26,5	1,3	0,85
50	50 90	50 90			50	90	55	78	65,5	54	25	14,5	1,3	0,85
					50	90	55	78,4	65,5	60	25	17,5	1,3	0,85
			50 110		50	110	60	95	75,9	82	25	26,5	1,75	0,85
				50 125	50	125	60	110	83,2	82	25	26,5	1,75	0,85
55			55 115		55	115	65	100	80,9	82	25	26,5	1,75	0,85
				55 130	55	130	65	115	88,2	82	25	26,5	1,75	0,85
60			60 120		60	120	70	105	85,9	82	25	26,5	1,75	0,85
				60 140	60	140	70	125	96	82	25	26,5	1,75	0,85
65			65 125		65	125	75	110	90,9	82	25	26,5	1,75	0,85
70			70 130		70	130	80	115	96,9	82	25	26,5	1,75	0,85
75			75 155		75	155	90	135	109,9	100	30	35	1,75	0,85
90			90 180		90	180	110	160	132,9	110	35	37,5	1,75	0,85

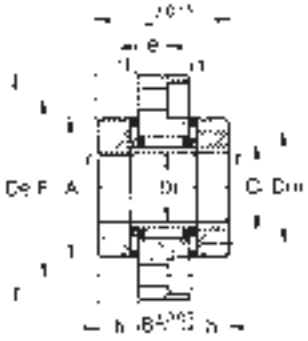


ARNB

Basic loads (N) radial Dyn. Cr	Stat. Cor	axial Dyn. Ca	Stat. Coa	Maximum speed r.p.m.	Preload 1) N	Residual torque 2) Nmm	Rigidity K 3) N/µm	Mass g	Bearing reference
16 200	22 000	12 000	40 000	9 000	735	120	1 250	295	AXNB 15 45
16 200	22 000	20 500	49 000	9 000	1 340	350	780	316	ARNB 15 45
18 900	28 800	13 500	50 000	7 500	820	160	1 480	392	AXNB 20 52
18 900	28 800	23 500	63 000	7 500	1 550	500	950	418	ARNB 20 52
28 000	44 500	48 000	115 000	6 300	3 010	1 200	1 130	875	ARNB 20 62
28 000	44 500	42 500	148 000	5 600	2 765	850	1 700	1 300	ARNB 20 72
28 000	44 500	14 800	58 500	6 500	880	200	1 780	515	AXNB 25 57
28 000	44 500	24 800	70 000	6 500	1 620	550	1 090	543	ARNB 25 57
30 500	53 000	66 000	165 000	5 300	4 130	1 900	1 270	1 180	ARNB 25 72
30 500	53 000	48 000	179 000	4 900	3 060	1 000	1 900	1 565	ARNB 25 80
30 500	53 000	19 000	85 000	5 500	1 190	300	1 880	585	AXNB 30 62
30 500	53 000	32 000	88 000	5 500	2 100	850	1 070	620	ARNB 30 62
32 500	59 000	83 000	210 000	4 200	5 040	2 600	1 450	1 520	ARNB 30 80
32 500	59 000	68 000	250 000	4 200	4 340	1 600	2 300	2 145	ARNB 30 90
32 500	59 000	20 500	97 000	5 000	1 210	350	2 250	787	AXNB 35 70
32 500	59 000	45 000	124 000	5 000	2 910	1 350	1 300	815	ARNB 35 70
34 500	67 000	86 000	228 000	4 300	5 250	2 900	1 520	1 642	ARNB 35 85
34 500	67 000	90 000	328 000	3 800	5 770	2 400	2 500	2 535	ARNB 35 100
34 500	67 000	22 000	110 000	4 500	1 300	400	2 630	860	AXNB 40 75
34 500	67 000	47 500	138 000	4 500	3 070	1 550	1 470	908	ARNB 40 75
44 000	95 000	93 000	260 000	4 000	5 740	3 500	1 620	2 110	ARNB 40 90
44 000	95 000	106 000	420 000	3 400	6 750	3 200	3 000	3 570	ARNB 40 110
44 000	95 000	22 700	139 000	4 000	1 340	450	2 980	1 100	AXNB 45 80
44 000	95 000	50 000	150 000	4 000	3 280	1 750	1 480	1 232	ARNB 45 80
44 000	98 000	127 000	345 000	3 600	7 770	5 300	1 930	3 060	ARNB 45 105
44 000	98 000	122 000	520 000	3 100	7 700	4 100	3 400	4 700	ARNB 45 120
44 000	98 000	26 500	164 000	3 800	1 680	650	3 500	1 385	AXNB 50 90
44 000	98 000	60 000	187 000	3 800	3 800	2 350	1 950	1 440	ARNB 50 90
48 000	113 000	131 000	370 000	3 300	8 120	5 900	2 020	3 320	ARNB 50 110
48 000	113 000	128 000	560 000	2 900	8 050	4 000	3 450	4 945	ARNB 50 125
53 500	119 000	135 000	395 000	3 100	8 400	6 500	2 170	3 535	ARNB 55 115
53 500	119 000	134 000	610 000	2 800	8 330	4 900	3 750	5 256	ARNB 55 130
56 000	128 000	147 000	445 000	2 900	9 100	7 500	2 500	3 717	ARNB 60 120
56 000	128 000	174 000	710 000	2 600	10 640	6 800	4 100	5 976	ARNB 60 140
64 000	143 000	150 000	470 000	2 800	9 310	8 100	2 550	3 960	ARNB 65 125
73 000	148 000	155 000	485 000	2 600	9 520	8 800	2 720	4 136	ARNB 70 130
77 000	165 000	230 000	730 000	2 300	14 140	14 800	3 050	7 700	ARNB 75 155
118 000	268 000	288 000	990 000	1 900	17 640	22 200	3 700	11 654	ARNB 90 180

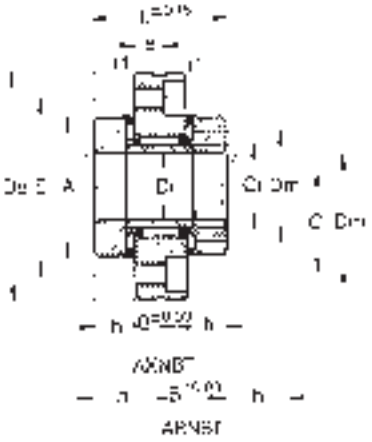
1) 6% of basic dynamic axial load
2) With axial load equal to preload
3) Rigidity of a single thrust bearing with load equal to preload.

Precision combined bearings with adjustable axial preload



AXNBT

Shaft ⌀ mm	Designation AXNBT	ARNBT Series 1	ARNBT Series 2	Dimensions in mm Di	Do	Ci	A	Dm	L	B	in	r mini	r1 mini	Attachment CHC screw grade (M)	N° of screws	E mm	e mm	Torque Nm
15	15 60	15 60		15	60	20	35	26,8	40	16	12	0,85	0,85	6 x 20	6	46	9	10
				15	60	20	35	26,8	46	16	15	0,85	0,85	6 x 20	6	46	9	10
20	20 68	20 68		20	68	25	42	32,5	40	16	12	0,85	0,85	6 x 20	8	53	9	10
				20	68	25	42	32,5	46	16	15	0,85	0,85	6 x 20	8	53	9	10
			20 80	20	80	30	52	39,9	50	20	20	1,30	0,85	6 x 25	12	63	13	10
25	25 75	25 75		25	75	30	47	37,5	44	20	12	0,85	0,85	6 x 25	8	58	13	10
				25	75	30	47	37,5	50	20	15	0,85	0,85	6 x 25	8	58	13	10
			25 90	25	90	35	62	46,7	60	20	20	1,30	0,85	6 x 25	12	73	13	10
30	30 80	30 80		30	80	35	53	43,1	44	20	12	0,85	0,85	6 x 25	12	63	13	10
				30	80	35	53,4	42,8	50	20	15	0,85	0,85	6 x 25	12	63	13	10
			30 105	30	105	40	68	52,7	66	20	23	1,30	0,85	8 x 25	12	85	11	24
35	35 90	35 90		35	90	40	60	48,3	48	20	14	1,30	0,85	6 x 25	12	73	13	10
				35	90	40	60,4	48,8	54	20	17	1,30	0,85	6 x 25	12	73	13	10
			35 110	35	110	45	73	57,7	66	20	23	1,30	0,85	8 x 25	12	88	11	24
40	40 100	40 100		40	100	45	65	53,9	46	20	14	1,30	0,85	8 x 25	8	80	11	24
				40	100	45	65,4	53,8	54	20	17	1,30	0,85	8 x 25	8	80	11	24
			40 115	40	115	50	78	62,7	75	25	25	1,30	0,85	8 x 30	12	94	16	24
45	45 105	45 105		45	105	50	70	58,5	54	25	14,5	1,30	0,85	8 x 30	8	85	16	24
				45	105	50	70,4	58,8	60	25	17,5	1,30	0,85	8 x 30	8	85	16	24
			45 130	45	130	55	90	70,9	82	25	28,5	1,30	0,85	8 x 30	12	105	16	24
50	50 115	50 115		50	115	55	78	66,5	54	25	14,5	1,30	0,85	8 x 30	12	94	16	24
				50	115	55	78,4	66,5	60	25	17,5	1,30	0,85	8 x 30	12	94	16	24
			50 140	50	140	60	95	75,9	82	25	28,5	1,75	0,85	10 x 30	12	113	14	48
55			55 145	55	145	65	100	80,9	82	25	28,5	1,75	0,85	10 x 30	12	118	14	48
60			60 150	60	150	70	105	85,9	82	25	28,5	1,75	0,85	10 x 30	12	123	14	48
65			65 155	65	155	75	110	90,9	82	25	28,5	1,75	0,85	10 x 30	12	128	14	48
70			70 160	70	160	80	115	95,9	82	25	28,5	1,75	0,85	10 x 30	12	133	14	48
75			75 185	75	185	90	135	109,9	100	30	35	1,75	1,30	12 x 35	12	155	17	80
90			90 210	90	210	110	160	132,9	110	35	37,5	1,75	1,30	12 x 40	16	180	22	80



Basic loads (N)				Maximum speed	Preload 1)	Residual torque 2)	Rigidity K 3)	Mass	Bearing reference
radial		axial							
Dyn. Cr	Stat. Cor	Dyn. Ca	Stat. Coa	r.p.m.	N	Nmm	N/µm	g	
16 200	22 000	12 000	40 000	9 000	735	120	1 250	406	**AXNBT 15 60**
16 200	22 000	20 500	49 000	9 000	1 340	350	780	427	**ARNBT 15 60**
18 900	28 800	13 500	50 000	7 500	820	160	1 480	521	**AXNBT 20 68**
18 900	28 800	23 500	63 000	7 500	1 550	500	950	548	**ARNBT 20 68**
28 000	44 500	43 000	115 000	6 300	3 010	1 200	1 130	1 088	**ARNBT 20 80**
28 000	44 500	14 800	58 500	6 500	880	200	1 780	740	**AXNBT 25 75**
28 000	44 500	24 800	70 000	6 500	1 620	550	1 090	766	**ARNBT 25 75**
30 500	53 000	66 000	165 000	5 300	4 130	1 900	1 270	1 436	**ARNBT 25 90**
30 500	53 000	19 000	85 000	5 500	1 130	300	1 880	798	**AXNBT 30 80**
30 500	53 000	32 000	88 000	5 500	2 100	850	1 070	883	**ARNBT 30 80**
32 500	59 000	83 000	210 000	4 800	5 040	2 600	1 450	1 676	**ARNBT 30 105**
32 500	59 000	20 500	97 000	5 000	1 210	350	2 250	1 079	**AXNBT 35 90**
32 500	59 000	45 000	124 000	5 000	2 910	1 350	1 300	1 108	**ARNBT 35 90**
34 500	67 000	86 000	228 000	4 300	5 250	2 900	1 520	2 029	**ARNBT 35 110**
34 500	67 000	22 000	110 000	4 500	1 300	400	2 630	1 257	**AXNBT 40 100**
34 500	67 000	47 500	138 000	4 500	3 070	1 550	1 470	1 306	**ARNBT 40 100**
44 000	95 000	93 000	260 000	4 000	5 740	3 500	1 620	2 657	**ARNBT 40 115**
44 000	95 000	22 700	119 000	4 000	1 340	450	2 980	1 652	**AXNBT 45 105**
44 000	95 000	50 000	150 000	4 000	3 230	1 750	1 480	1 684	**ARNBT 45 105**
44 000	98 000	127 000	345 000	3 600	7 770	5 300	1 930	3 723	**ARNBT 45 130**
44 000	98 000	28 500	164 000	3 800	1 680	650	3 500	1 932	**AXNBT 50 115**
44 000	98 000	60 000	197 000	3 800	3 800	2 350	1 950	1 987	**ARNBT 50 115**
48 000	113 000	131 000	370 000	3 300	8 120	5 900	2 020	4 091	**ARNBT 50 140**
53 500	119 000	135 000	395 000	3 100	8 400	6 500	2 170	4 353	**ARNBT 55 145**
56 000	128 000	147 000	445 000	2 900	9 100	7 500	2 500	4 581	**ARNBT 60 150**
64 000	143 000	150 000	470 000	2 800	9 310	8 100	2 550	4 871	**ARNBT 65 155**
79 000	148 000	155 000	495 000	2 600	9 520	8 800	2 720	5 093	**ARNBT 70 160**
77 000	165 000	230 000	730 000	2 300	14 140	14 800	3 050	8 915	**ARNBT 75 185**
116 000	268 000	288 000	990 000	1 900	17 640	22 200	3 700	13 200	**ARNBT 90 210**

1) 8% of basic dynamic axial load.
2) With axial load equal to preload.
3) Rigidity of a single thrust bearing with load equal to preload.

Adjusting locking/unlocking nuts and rings

Adjusting locking/unlocking nuts and rings

Applications

Threaded **spring nuts and rings** are used whenever **precision mechanisms** require a precision clamping as well as a **powerful and safe locking:**

- ❑ Power transmission and motion technology
- ❑ Adjusting and clamping all types of bearings
- ❑ Mount/dismantling of ball bearings
- ❑ Elimination of backlash
- ❑ Securing mechanical safety devices
- ❑ Templating spring-mounted measuring systems
- ❑ Safety nuts for use in high-temperature applications
- ❑ Periodical mounting and dismounting of adjusting locking/unlocking nuts and rings
- ❑ Assemblies subjected to vibrations
- ❑ Cyclic uneven rotation
- ❑ High and very high rotation spindle/shaft assemblies
- ❑ Frequent clockwise and counter-clockwise reversing rotation systems

SPRING NUTS AND RINGS

The latest range of spring nuts and rings comprises six different models of adjusting locking/unlocking devices featuring the same securing technique through a threaded locking spring.

CLAMPING	Radial	Axial
STANDARD	LR	LF
BALANCED	LRE	LFE
HEAVY-DUTY	LRP	

SPRING RING

CLAMPING	Axial
STANDARD	LX

Clamping system

- ❑ The **threaded bore** of the nuts and outside threading of the rings is partially wired EDM to form a **clamping spring.**
- ❑ When tightening the grub screws **clamping** is applied with a **very strong pressure onto the threaded** spring which meshes perfectly into the **corresponding threads** of the shaft or spindle.
- ❑ The **contacted threaded surface** of the **spring pressing onto the threaded surface of the shaft/spindle** amplifies the clamping power, ensuring thereby a highly efficient locking and **making any unlocking hazard or less of grip almost impossible.**

LR Mutter

LFE Mutter

LX Gewindering

The nuts and rings are used in many industrial domains:

- Transmissions
- Machine-tool
- Textile industry
- Printing industry
- Conditioning
- Special machinery
- Automotive industry
- Engine/turbine manufacturing
- Onshore and offshore industry
- Transportation
- Aeronautics
- Marine equipment
- Nuclear industry
- Agriculture and food industry
- Civil and military
- Construction machinery

The locking nuts and rings offer in one single part the advantages of nut/counternut locking systems.

The locking nuts and rings are re-usable without loss of precision.

Easy to secure through precise locking preventing any axial displacement on the shaft or spindle

Adjusting locking/unlocking nuts and rings

Advantages of the nuts

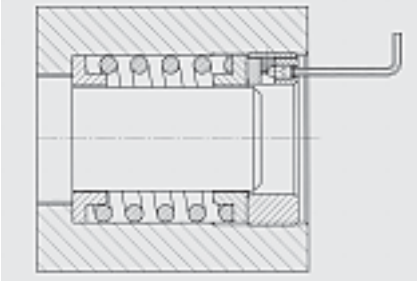
- **A precise and powerful locking of bearings in axial positioning after assembly.**
- **A higher unlocking torque when compared to other locking techniques.**
- Time saving through a more **simple technical design** and construction of **shaft bodies** and assemblies.
- No key slot required as for locking washers. Thus **saving thread deburring** operation.
- **No use of locking washers,** thus preventing seal damage.
- **Clamping and locking** the adjusting nut without **any loss of axial precision.**
- **Easy mount and dismantling,** re-usable many times **without loss of precision.**
- Recommended use under severe conditions (**high temperature, vibrations,** etc.).

Remarks about unlocking torques

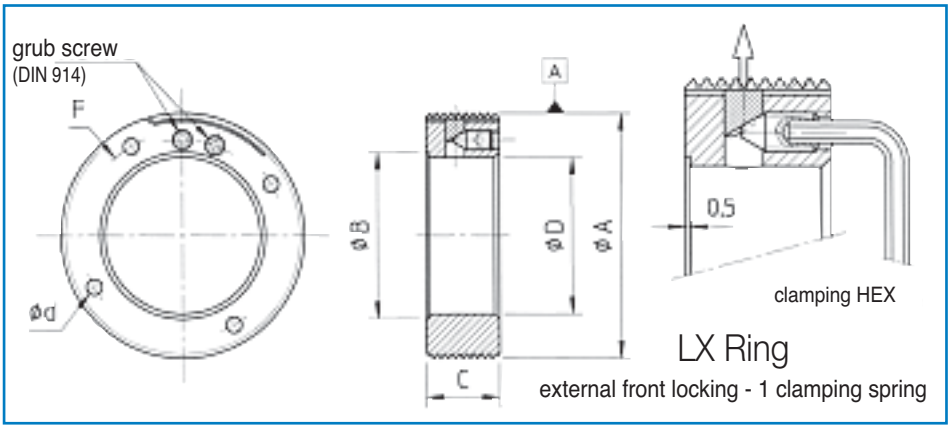
- **Numerous parameters influence the unlocking torque:**
  - **Precision of the screw-nut assembly**
  - **Clamping strength applied to the grub screws** (see chart)
  - Nature of materials and corresponding **surface quality,** various heat treatments and coatings
  - Environment (temperature, vibrations, atmospheric conditions, etc. …)
  - Overall toughness of the assembly.
- **The locking torque and axial loading values** in this catalogue are given for static assemblies. **They are indicative and do not involve the manufacturers responsibility.**

Mounting the nuts and rings

- **The mounting** occurs by driving the sping nuts and rings clockwise with standard spanner wrench (DIN 1810) adapting onto the **peripheral notches (b x h)** of the nuts.
- The mounting can also easily be achieved thanks to the **pin-key holes** on the front side of the nuts with the adequate key.
- Once in the correct position on the shaft/spindle the blocking can be simply secured by **turning the grub screws** located either on the outside diameter or on the front side of the nuts.
- For nuts showing two locking springs or additional clamping screws (LRE – LFE – LRP) it is recommended to activate these screws **alternatively and progressively** so as to ensure an efficient locking.
- The use of a **torque wrench** is recommended to achieve a safe clamping of the grub screw with the required value.
- However, using **HEX male keys** is also highly efficient.
- **Very easy dismantling of the nut through simple unlocking of the grub screws.**
- **ATTENTION: For dismantling loosen the grub screw first.**



Pre-loading or relief setting of a spring-mounted device inside a housing.



CHARACTERISTICS

- LX rings feature the same principles as those of the nuts, applying the same to the bores
- The axial strength activated by turning the grub screw is activated onto the threaded spring through 90° wedges.
- The resulting radial strength applies to the threaded spring.
- The clamping pressure applied to the threaded surface of the spring allows for a powerful locking.
- The contact surface perpendicular to the threaded side allows the adjusting and locking of all types of bearings as well as other mechanical elements requiring very precise tolerances.
- In addition to the notches, the holes located on the front side allow an easy positioning of the ring by means of a spanner wrench.

SPECIFICATIONS

- **Material:**
  High elastic limit steel
- 
  To allow for a high precision of the parameters (rectangularity / axial true run) thread and contact surface are machined in one single operation
- **Screws:**
  type set screws with cone tip, class 14.9
- **Standard manufacturing:**
  - **4g** class precision threading
  - right-hand thread
  - fine-ground contact surface
  - marking on the back side
  - black oxide
  - **fine-ground threads**

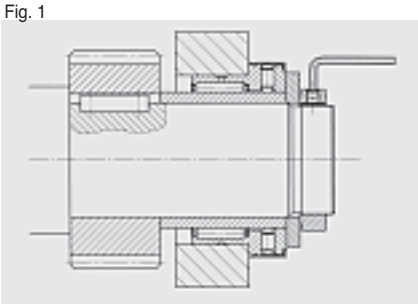
Part type	Thread A	Ø D	Ø B	C	Ø d	grub screw	Max. axial load (N)	Weight (kg)
LX 28	28 x 1,50	12	16				97 200	0,05
LX 30	30 x 1,50	14	20				104 400	0,06
LX 32	32 x 1,50	15	20			1×	119 500	0,06
LX 34	34 x 1,50	18	22			M 4	127 200	0,06
LX 37	37 x 1,50	20	26				138 800	0,06
LX 39	39 x 1,50	22	28				146 500	0,08
LX 40	40 x 1,50	23	29		3,2		152 800	0,08
LX 42	42 x 1,50	24	31				160 700	0,09
LX 44	44 x 1,50	26	32				168 500	0,09
LX 46	46 x 1,50	28	33	15			179 200	0,11
LX 47	47 x 1,50	29	34			2×	183 200	0,11
LX 49	49 x 1,50	31	34			M 4	188 100	0,10
LX 50	50 x 1,50	32	35				173 500	0,11
LX 54	54 x 1,50	36	40				187 700	0,15
LX 57	57 x 1,50	39	44				198 300	0,14
LX 60	60 x 1,50	42	50				208 900	0,14
LX 63	63 x 1,50	43	46				219 500	0,17
LX 64	64 x 1,50	44	46				223 000	0,18
LX 67	67 x 1,50	47	47				237 400	0,19
LX 70	70 x 1,50	48	48				248 200	0,21
LX 74	74 x 1,50	54	57				262 600	0,21
LX 77	77 x 1,50	55	64				275 000	0,33
LX 80	80 x 1,50	55	55		4,2	2×	384 800	0,37
LX 82	82 x 1,50	62	68			M 5	394 500	0,33
LX 87	87 x 1,50	67	76				421 400	0,34
LX 92	92 x 1,50	72	80				450 000	0,35
LX 97	97 x 1,50	77	85				474 700	0,37
LX 100	100 x 2,00	80	90				488 000	0,40
LX 102	102 x 2,00	82	91				497 900	0,42
LX 107	107 x 2,00	82	92				522 600	0,53
LX 112	112 x 2,00	87	100				547 300	0,55
LX 117	117 x 2,00	92	101	20			575 500	0,57
LX 122	122 x 2,00	97	107				602 200	0,60
LX 125	125 x 2,00	100	110			2×	620 800	0,62
LX 127	127 x 2,00	102	110		5,2	M 6	630 900	0,63
LX 132	132 x 2,00	107	116				661 800	0,66
LX 142	142 x 2,00	117	118				714 600	0,73
LX 147	147 x 2,00	122	133				740 000	0,74
LX 152	152 x 2,00	127	138				767 600	0,78
LX 160	160 x 2,00	135	145				808 400	0,83

OPTIONS

- **Other versions are also available upon request:**
  - left-hand thread
  - other sizes
  - other materials

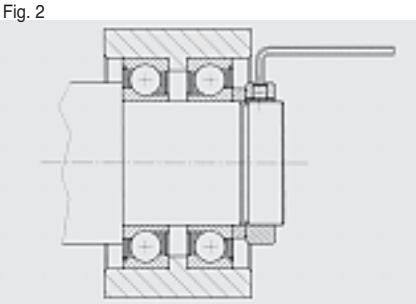
Nut series LR

Fig. 1



Set up of a combined needle bearing on a drill spindle

Fig. 2



Set up the pre-loading of a tapered roller bearing

CHARACTERISTICS

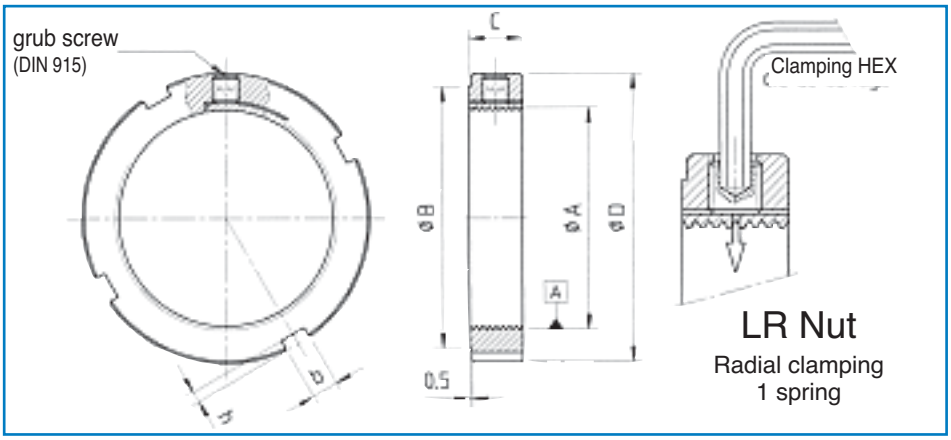
- LR nuts are used wherever a strong radial clamping is required.
- The radial strength activated by turning the grub screw is applied to the threaded spring.
- The contact surface perpendicular to the threaded side allows the adjusting and locking of all types of bearings as well as other mechanical elements requiring very precise tolerances.

SPECIFICATIONS

- **Material:**
  High elastic limit steel
- **Peripheral notches:**
  4 x 90°
- To allow for a high precision of the parameters (rectangularity / axial true run) thread and contact surface are machined in one single operation
- **Screws:**
  type screws with dog-point tip, class 14.9
- **Standard manufacturing:**
  - **4H** class precision threading
  - right-hand thread
  - fine-ground contact surface
  - marking on the back side
  - black oxide

OPTIONS

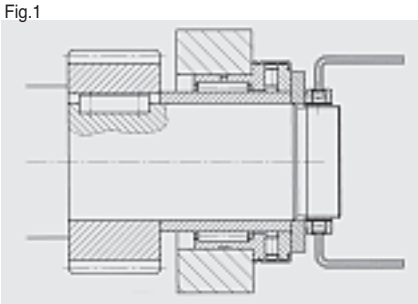
- **Other versions are also available upon request:**
  - fine-ground threads
  - left-hand thread
  - 2 twinned screws for increased locking torque
  - other sizes
  - other materials



Part type	Thread A	Ø D	Ø B	C	b x h	grub screw	Unlocking torque (Nm)*	Max. axial load (N)	Weight (kg)
LR 1	12 x 1,00	24	19				23	28 500	0,030
LR 2	14 x 1,00	26	21				26	33 500	0,035
LR 3	15 x 1,00	30	25				29	40 500	0,045
LR 4	17 x 1,00	32	27		4 x 2		32	46 100	0,055
LR 5	18 x 1,00	32	27				37	49 000	0,055
LR 6	20 x 1,00	35	30				42	54 600	0,060
LR 7	22 x 1,50	35	30				47	56 600	0,060
LR 8	25 x 1,50	40	35				53	67 100	0,070
LR 9	30 x 1,50	45	40			1×	59	81 100	0,085
LR 10	32 x 1,50	46	41	12	5 x 2	M 6	65	92 900	0,090
LR 11	35 x 1,50	50	45				75	98 000	0,095
LR 12	38 x 1,50	52	47				83	101 900	0,100
LR 13	40 x 1,50	55	49				94	104 000	0,100
LR 14	42 x 1,50	56	50				105	109 300	0,110
LR 15	45 x 1,50	60	54		6 x 2,5		118	119 200	0,120
LR 16	50 x 1,50	65	59				132	134 900	0,130
LR 17	52 x 1,50	67	61				147	140 400	0,130
LR 18	55 x 2,00	75	68				512	168 900	0,23
LR 19	60 x 2,00	80	73		7 x 3		532	184 600	0,25
LR 20	65 x 2,00	85	78				560	203 500	0,27
LR 21	70 x 2,00	90	82				587	219 500	0,28
LR 22	75 x 2,00	95	87		8 x 3,5		615	237 000	0,30
LR 23	80 x 2,00	105	97				650	255 400	0,42
LR 24	85 x 2,00	110	102				675	273 300	0,44
LR 25	90 x 2,00	115	106			1×	713	292 300	0,46
LR 26	95 x 2,00	120	111	15	10 x 4	M 8	750	308 800	0,49
LR 27	100 x 2,00	125	116				790	325 300	0,51
LR 28	105 x 2,00	130	119				830	341 700	0,52
LR 29	110 x 2,00	135	124				870	358 200	0,55
LR 30	115 x 2,00	140	129		12 x 5		930	377 000	0,57
LR 31	120 x 2,00	145	134				960	394 000	0,59
LR 32	125 x 2,00	150	139				1040	413 800	0,62
LR 33	130 x 2,00	155	144				> 2000	434 400	0,65
LR 34	135 x 2,00	165	152				> 2000	677 000	1,10
LR 35	140 x 2,00	170	157	20	14 x 6	1×	> 2000	704 400	1,13
LR 36	145 x 2,00	175	162			M 10	> 2000	729 800	1,15
LR 37	150 x 2,00	180	167				> 2000	757 400	1,20

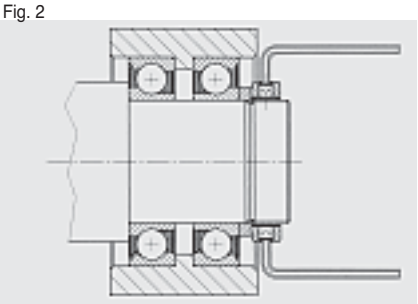
*** Values obtained with grub screws**
- M 6 screw – clamping torque 8 Nm
- M 8 screw – clamping torque 18 Nm
- M10 screw – clamping torque 36 Nm

Fig.1

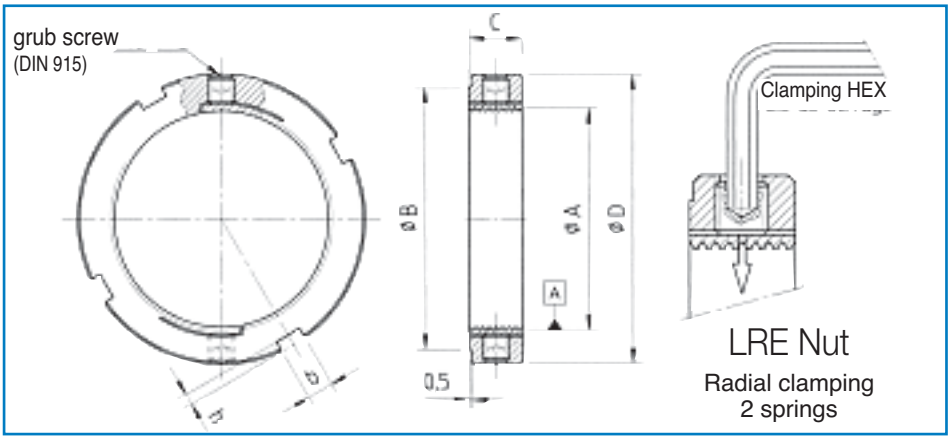


Set up of a combined needle bearing on a drill spindle

Fig. 2



Application example of a LRE nut



Part type	Thread A	Ø D	Ø B	C	b x h	grub screw	Unlocking torque (Nm)*	Max axial load (N)	Weight (kg)
LRE 7	22 x 1,50	35	30		4 x 2		94	37 800	0,060
LRE 8	25 x 1,50	40	35				106	48 000	0,070
LRE 9	30 x 1,50	45	40				118	58 000	0,085
LRE 10	32 x 1,50	46	41		5 x 2		130	74 400	0,090
LRE 11	35 x 1,50	50	45			2×	150	77 700	0,095
LRE 12	38 x 1,50	52	47	12		M 6	166	82 000	0,100
LRE 13	40 x 1,50	55	49				188	85 200	0,100
LRE 14	42 x 1,50	56	50				210	89 600	0,110
LRE 15	45 x 1,50	60	54		6 x 2,5		236	100 000	0,120
LRE 16	50 x 1,50	65	59				264	115 600	0,130
LRE 17	52 x 1,50	67	61				294	120 400	0,130
LRE 18	55 x 2,00	75	68				1024	144 800	0,23
LRE 19	60 x 2,00	80	73		7 x 3		1064	158 300	0,25
LRE 20	65 x 2,00	85	78				1120	178 100	0,27
LRE 21	70 x 2,00	90	82				1174	192 100	0,28
LRE 22	75 x 2,00	95	87		8 x 3,5		1230	209 000	0,30
LRE 23	80 x 2,00	105	97				1300	228 000	0,42
LRE 24	85 x 2,00	110	102				1350	245 800	0,44
LRE 25	90 x 2,00	115	106			2×	1426	265 800	0,46
LRE 26	95 x 2,00	120	111	15	10 x 4	M 8	1500	280 800	0,49
LRE 27	100 x 2,00	125	116				1580	295 800	0,51
LRE 28	105 x 2,00	130	119				1660	310 800	0,52
LRE 29	110 x 2,00	135	124				1740	325 700	0,55
LRE 30	115 x 2,00	140	129		12 x 5		1860	345 200	0,57
LRE 31	120 x 2,00	145	134				1920	362 800	0,59
LRE 32	125 x 2,00	150	139				2080	383 000	0,62
LRE 33	130 x 2,00	155	144				> 4000	406 200	0,65
LRE 34	135 x 2,00	165	152				> 4000	633 000	1,10
LRE 35	140 x 2,00	170	157	20	14 x 6	2×	> 4000	660 800	1,13
LRE 36	145 x 2,00	175	162			M 10	> 4000	684 600	1,15
LRE 37	150 x 2,00	180	167				> 4000	712 900	1,20

*** Values obtained with grub screws**
- M 6 screw – clamping torque 8 Nm
- M 8 screw – clamping torque 18 Nm
- M10 screw – clamping torque 36 Nm

CHARACTERISTICS

- LRE nuts are used wherever a strong radial clamping is required.
- Featuring 2 symmetrically opposed clamping springs at 180°, these nuts have two advantages compared to the LR nuts:
  - improved balance allowing higher rotation speeds
  - twice as much unlocking torque for the same size
- The radial strength activated by turning the 2 grub screws is applied to the threaded clamping spring.
- The contact surface perpendicular to the threaded side allows the adjusting and securing of all types of bearings as well as other mechanical elements requiring very precise tolerances.

SPECIFICATIONS

- **Material:**
  High elastic limit steel
- **Peripheral notches:**
  4 x 90°
- 
  To allow for a high precision of the parameters (rectangularity / axial true run) thread and contact surface are machined in one single operation
- **Screws:**
  type screws with dog-point tip, class 14.9
- **Standard manufacturing:**
  - **4H** class precision threading
  - right-hand thread
  - fine-ground contact surface
  - marking on the back side
  - black oxide

OPTIONS

- **Other versions are also available upon request:**
  - fine-ground threads
  - left-hand thread
  - other sizes
  - other materials

Nut series LF

CHARACTERISTICS

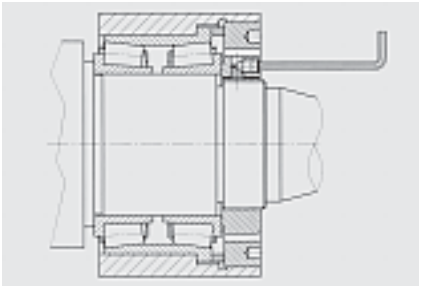
- LF nuts are used wherever a strong radial clamping is not possible. Thus they are especially recommended for securing parts that are only axially accessible.
- The axial strength axial strength activated by turning the front grub screw is applied to the threaded clamping spring through 90° wedges.
- The resulting radial strength applies onto the clamping spring. The clamping pressure applied to the threaded surface of the spring allows for a powerful locking.
- The contact surface perpendicular to the threaded side allows the adjusting and securing of all types of bearings as well as other mechanical elements requiring very precise tolerances.
- In addition to the notches, the holes located on the front side allow for an easy positioning of the nut by means of a spanner wrench.

SPECIFICATIONS

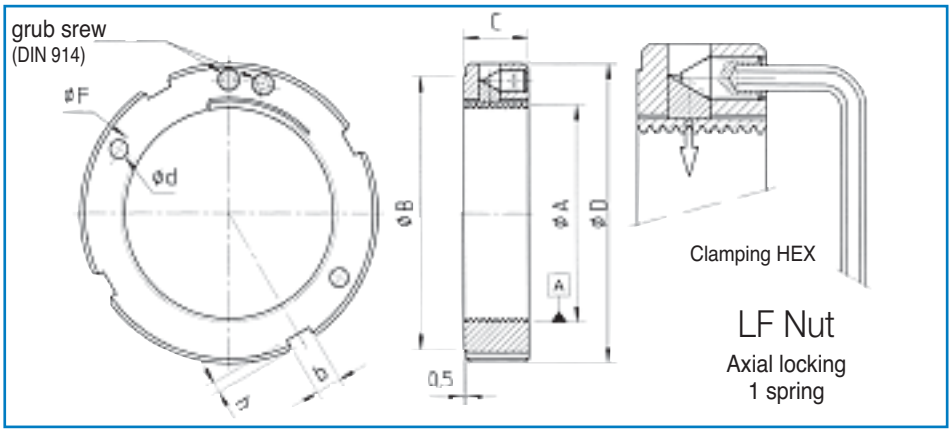
- **Material:**
  High elastic limit steel
- **Peripheral notches:**
  4 x 90°
- To allow for a high precision of the parameters (rectangularity / axial true run) thread and contact surface are machined in one single operation
- **Screws:**
  type set-screws with cone tip, class 14.9
- **Standard manufacturing:**
  - **4H** class precision threading
  - right-hand thread
  - fine-ground contact surface
  - marking on the back side
  - black oxide

OPTIONS

- **Other versions are also available upon request:**
  - fine-ground threads
  - left-hand thread
  - other sizes
  - other materials



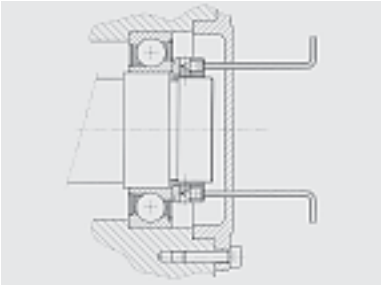
Set up of a tapered roller bearing onto a machine tool



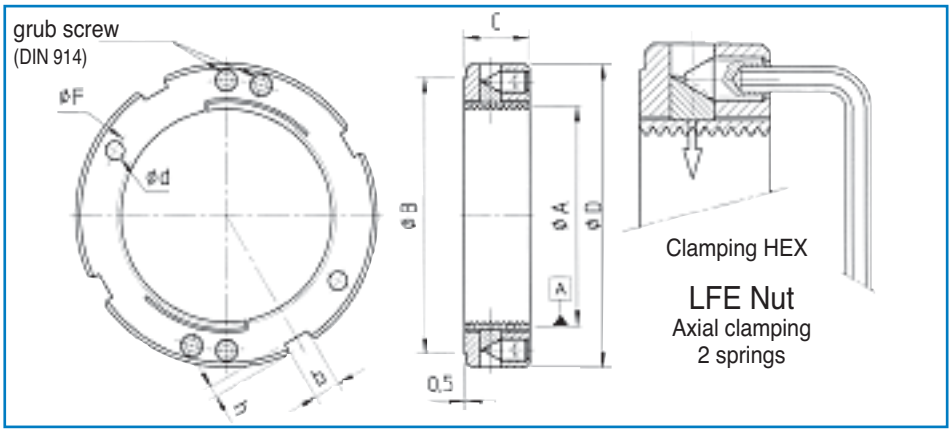
Part type	Thread A	Ø D	Ø B	C	b x h	Ø F	Ø d	grub screw	Unlocking torque (Nm)*	Max. axial load (N)	Weightt (kg)
LF 1	12 x 1,00	28	22			20		1×	4	36 200	0,050
LF 2	14 x 1,00	30	25			22			6	42 600	0,055
LF 3	15 x 1,00	31	26			23		M 4	6	51 500	0,060
LF 4	17 x 1,00	33	28		4 x 2	26	3,2		7	58 700	0,065
LF 5	18 x 1,00	34	29			26		2×	9	55 400	0,070
LF 6	20 x 1,00	37	32			29			10	61 800	0,080
LF 7	22 x 1,50	39	34			30		M 4	12	64 700	0,090
LF 8	25 x 1,50	43	38			33			15	80 200	0,100
LF 9	30 x 1,50	48	43			39			20	100 600	0,120
LF 10	32 x 1,50	50	45	15	5 x 2	41			24	113 500	0,125
LF 11	35 x 1,50	53	48			44			29	118 500	0,140
LF 12	38 x 1,50	56	51			47			35	124 500	0,145
LF 13	40 x 1,50	58	52			50			41	127 100	0,150
LF 14	42 x 1,50	62	56			52		2×	45	131 300	0,175
LF 15	45 x 1,50	65	59		6 x 2,5	55	4,2		55	143 400	0,185
LF 16	50 x 1,50	69	63			59		M 5	70	165 200	0,190
LF 17	52 x 1,50	72	66			62			85	171 900	0,215
LF 18	55 x 2,00	75	68			65			105	241 300	0,23
LF 19	60 x 2,00	80	73		7 x 3	72			130	263 800	0,33
LF 20	65 x 2,00	85	78			76			160	291 000	0,35
LF 21	70 x 2,00	90	82			81			200	313 900	0,36
LF 22	75 x 2,00	95	87		8 x 3,5	86			220	347 800	0,39
LF 23	80 x 2,00	105	97			93			240	371 300	0,55
LF 24	85 x 2,00	110	102			98			250	394 900	0,57
LF 25	90 x 2,00	115	106			104			265	422 500	0,60
LF 26	95 x 2,00	120	111	20	10 x 4	107			295	446 300	0,63
LF 27	100 x 2,00	125	116			114		2×	325	470 200	0,65
LF 28	105 x 2,00	130	119			118	5,2		365	494 000	0,68
LF 29	110 x 2,00	135	124			122		M 6	405	517 800	0,72
LF 30	115 x 2,00	140	129		12 x 5	127			450	545 000	0,75
LF 31	120 x 2,00	145	134			132			500	574 300	0,78
LF 32	125 x 2,00	150	139			137			560	598 500	0,80
LF 33	130 x 2,00	155	144			142			635	626 600	0,85
LF 34	135 x 2,00	165	152			150		2×	680	723 300	1,15
LF 35	140 x 2,00	170	157	22	14 x 6	155	6,2		1065	761 900	1,20
LF 36	145 x 2,00	175	162			160		M 8	1065	789 300	1,25
LF 37	150 x 2,00	180	167			165			1065	821 700	1,30

*** Values obtained with clamping screws**

- M 4 screw – clamping torque 2.5 Nm
- M 5 screw – clamping torque 5 Nm
- M 6 screw – clamping torque 8 Nm
- M 8 screw – clamping torque 18 Nm



Backlash set up on a tapered roller bearing



Part type	Thread A	Ø D	Ø B	C	b x h	Ø F	Ø d	grub screw	Unlocking torque (Nm)*	Max. axial load (N)	Weight (kg)
LFE 7	22 x 1,50	39	34		4 x 2	30	3,2	4 x M 4	24	37 800	0,090
LFE 8	25 x 1,50	43	38			33			30	49 400	0,100
LFE 9	30 x 1,50	48	43			39			40	67 100	0,120
LFE 10	32 x 1,50	50	45	15	5 x 2	41			48	83 600	0,125
LFE 11	35 x 1,50	53	48			44			58	87 400	0,140
LFE 12	38 x 1,50	56	51			47			70	91 700	0,145
LFE 13	40 x 1,50	58	52			50			82	96 500	0,150
LFE 14	42 x 1,50	62	56			52		4×	90	96 800	0,175
LFE 15	45 x 1,50	65	59		6 x 2,5	55	4,2		110	108 800	0,185
LFE 16	50 x 1,50	69	63			59		M 5	140	132 200	0,190
LFE 17	52 x 1,50	72	66			62			170	137 600	0,215
LFE 18	55 x 2,00	75	68			65			210	193 000	0,23
LFE 19	60 x 2,00	80	73		7 x 3	72			260	211 000	0,33
LFE 20	65 x 2,00	85	78			76			320	238 600	0,35
LFE 21	70 x 2,00	90	82			81			400	257 300	0,36
LFE 22	75 x 2,00	95	87		8 x 3,5	86			440	298 100	0,39
LFE 23	80 x 2,00	105	97			93			480	318 300	0,55
LFE 24	85 x 2,00	110	102			98			500	338 600	0,57
LFE 25	90 x 2,00	115	107			104			530	366 700	0,60
LFE 26	95 x 2,00	120	111	20	10 x 4	107			590	387 400	0,63
LFE 27	100 x 2,00	125	117			114		4×	650	408 100	0,65
LFE 28	105 x 2,00	130	119			118	5,2		730	428 800	0,68
LFE 29	110 x 2,00	135	124			122		M 6	810	449 500	0,72
LFE 30	115 x 2,00	140	129		12 x 5	127			900	476 900	0,75
LFE 31	120 x 2,00	145	134			132			1000	508 600	0,78
LFE 32	125 x 2,00	150	139			137			1120	530 000	0,80
LFE 33	130 x 2,00	155	144			142			1270	559 200	0,85
LFE 34	135 x 2,00	165	152			150		4×	1359	645 400	1,15
LFE 35	140 x 2,00	170	157	22	14 x 6	155	6,2		2130	692 600	1,20
LFE 36	145 x 2,00	175	162			160		M 8	2130	717 600	1,25
LFE 37	150 x 2,00	180	167			165			2130	752 500	1,30

CHARACTERISTICS

- LFE nuts are used wherever radial locking is not possible. Thus they are especially recommended for securing parts that are only axially accessible.
- Featuring 2 symmetrically opposed clamping springs at 180°, these nuts have two advantages compared to the LF nuts:
  - improved balance allowing higher rotation speeds
  - twice as much locking torque for the same size.
- The axial strength activated by turning the 2 grub screws is applied to the threaded spring through 90° wedges.
- The resulting radial strength applies onto the threaded spring. The clamping pressure applied onto the threaded surface of the spring allows for a powerful locking.
- The contact surface perpendicular to the threaded side allows the adjusting and clamping of all types of bearings as well as other mechanical elements requiring very precise tolerances.
- In addition to the notches, the holes located on the front side allow for an easy positioning of the nut by means of a spanner wrench.

SPECIFICATIONS

- **Material:**
  High elastic limit steel
- **Peripheral notches:**
  4 x 90°
- To allow for a high precision of the parameters (rectangularity / axial true run) thread and contact surface are machined in one single operation
- **Screws:**
  type screws with cone tip, class 14.9
- **Standard manufacturing:**
  - **4H** class precision threading
  - right-hand thread
  - fine-ground contact surface
  - marking on the back side
  - black oxide

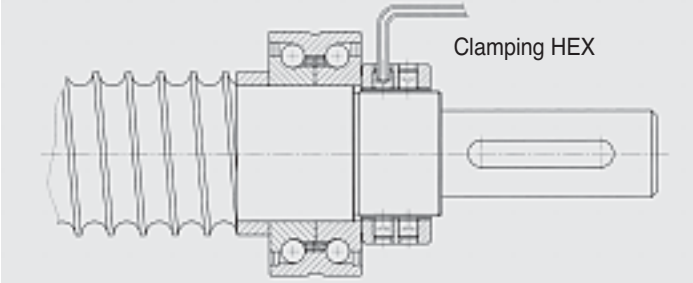
OPTIONS

- **Other versions are also available upon request:**
  - fine-ground threads
  - left-hand thread
  - other sizes
  - other materials

*** Values obtained with grub screws**

- M 4 screw – clamping torque 2.5 Nm
- M 5 screw – clamping torque 5 Nm
- M 6 screw – clamping torque 8 Nm
- M 8 screw – clamping torque 18 Nm

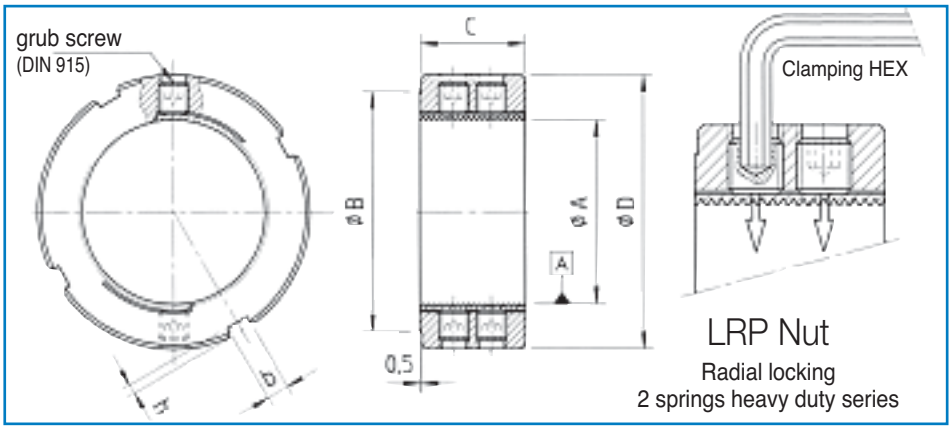
Nut Series LRP



LRP nuts for mounting and set up of a ball screw

CHARACTERISTICS

- LRP nuts are used wherever heavy duty locking for ball bearings is required.
- Larger nuts, symmetrical clamping springs and bigger screws ensure an increased unlocking torque as well as a much stronger resistance to axial load stress.
- The contact surface perpendicular to the threaded side allows the adjusting and securing of all types of bearings as well as other mechanical elements requiring very precise tolerances.



SPECIFICATIONS

- **Material:**
  High elastic limit steel
- **Peripheral notches:**
  4 x 90°
- To allow for a high precision of the parameters (rectangularity / axial true run) thread and contact surface are machined in one single operation
- **Screws:**
  type screws with dog-point tip, class 14.9
- **Standard manufacturing:**
  - **4H** class precision threading
  - right-hand thread
  - fine-ground contact surface
  - marking on the back side
  - black oxide

OPTIONS

- **Other versions are also available upon request:**
  - fine-ground threads
  - left-hand thread
  - 2 twinned screws for increased locking torque
  - other sizes
  - other materials

Part type	Thread A	Ø D	Ø B	C	b x h	M screw	Unlocking axial load (N)
LRP 20.150	20 x 1,50	42	37				48 861
LRP 22.150	22 x 1,50	44	39				56 997
LRP 25.150	25 x 1,50	47	42				68 558
LRP 30.150	30 x 1,50	52	47		5 x 2		91 109
LRP 32.150	32 x 1,50	55	50	16		2×	101 813
LRP 35.150	35 x 1,50	60	55			M 8	116 513
LRP 38.150	38 x 1,50	62	57				126 786
LRP 40.150	40 x 1,50	65	59				139 203
LRP 42.150	42 x 1,50	68	62		6 x 2,5		146 337
LRP 45.150	45 x 1,50	70	64				163 319
LRP 50.150	50 x 1,50	72	66				290 849
LRP 55.150	55 x 1,50	78	71				327 796
LRP 55.200	55 x 2,00	78	71				297 488
LRP 60.150	60 x 1,50	83	76		7 x 3		358 134
LRP 60.200	60 x 2,00	83	76				330 268
LRP 65.150	65 x 1,50	88	81	28		4×	402 859
LRP 65.200	65 x 2,00	88	81			M 8	358 400
LRP 70.150	70 x 1,50	96	88				440 525
LRP 70.200	70 x 2,00	96	88				407 345
LRP 75.150	75 x 1,50	104	96		8 x 3,5		482 416
LRP 75.200	75 x 2,00	104	96				446 561
LRP 80.200	80 x 2,00	110	102				558 080
LRP 85.200	85 x 2,00	115	107				606 075
LRP 90.150	90 x 1,50	120	111				666 863
LRP 90.200	90 x 2,00	120	111		10 x 4		651 140
LRP 95.200	95 x 2,00	125	116				687 844
LRP 100.200	100 x 2,00	130	121				734 407
LRP 105.200	105 x 2,00	135	124				776 789
LRP 110.200	110 x 2,00	138	127				825 099
LRP 115.200	115 x 2,00	145	134		12 x 5		868 730
LRP 120.200	120 x 2,00	148	137				912 861
LRP 125.200	125 x 2,00	155	144			4×	957 491
LRP 130.200	130 x 2,00	158	147	32		M 10	1 002 620
LRP 135.200	135 x 2,00	165	152				1 048 248
LRP 140.200	140 x 2,00	168	155				1 087 450
LRP 145.200	145 x 2,00	175	162				1 133 828
LRP 150.200	150 x 2,00	178	165				1 180 705
LRP 155.300	155 x 3,00	185	172				1 184 672
LRP 160.300	160 x 3,00	188	175		14 x 6		1 231 267
LRP 165.300	165 x 3,00	195	182				1 278 361
LRP 170.300	170 x 3,00	198	185				1 325 955
LRP 180.300	180 x 3,00	210	197				1 413 749
LRP 190.300	190 x 3,00	220	207				1 493 151
LRP 200.300	200 x 3,00	230	217				1 582 443

Notes

Notes

Nadella GmbH

Tränkestraße 7
70597 Stuttgart
Tel. +49 (0)711 720 63-0
Fax +49 (0)711 720 63-25
Internet: www.nadella.de
E-Mail: info@nadella.de

Nadella S.r.l.

Via Melette 16
20128 Milano
Tel. +39 02.27.093.297
Fax +39 02.25.51.768
Fax +39 02.25.76.479
Internet: www.nadella.it
E-Mail: customer.service@nadella.it

Printed in Germany

NADELLA
Linear and Motion Solutions