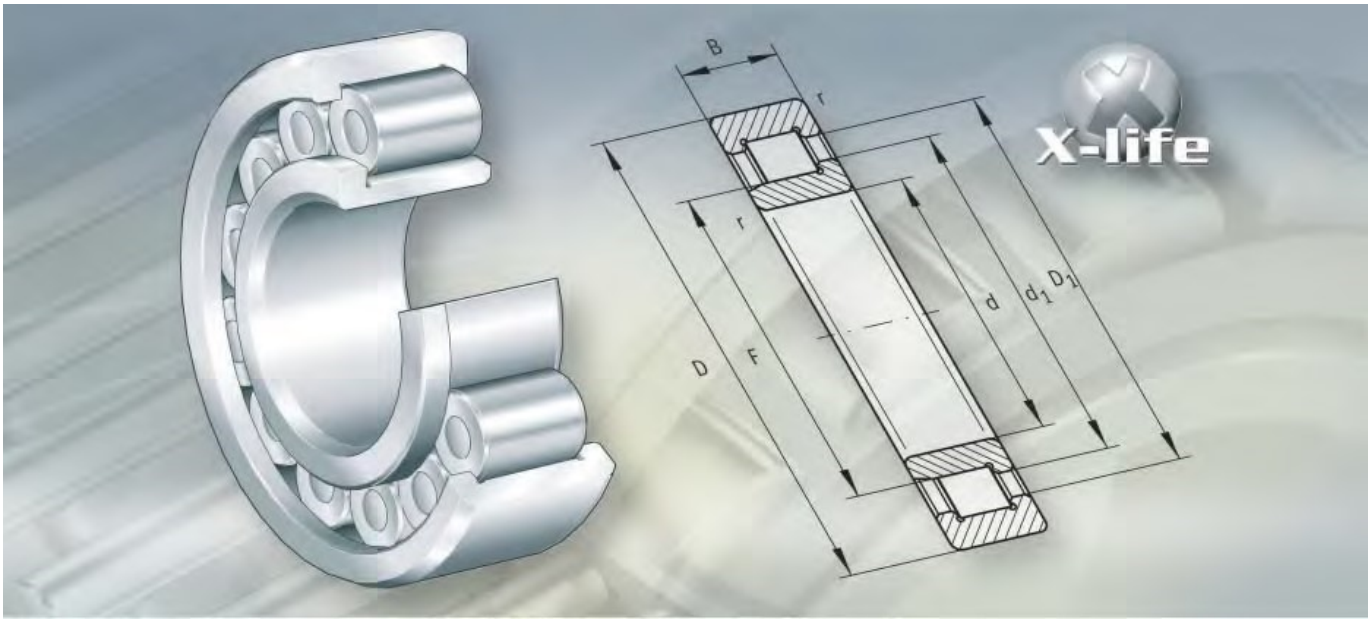


Cylindrical roller bearings

Cylindrical roller bearings with cage
Cylindrical roller bearings with disc cage or spacers
Single row full complement cylindrical roller bearings
Double row full complement cylindrical roller bearings
High precision cylindrical roller bearings

Cylindrical roller bearings

X-life
Cylindrical roller bearings with cage

394

Single row cylindrical roller bearings with cage have a very high radial load carrying capacity and are suitable for higher speeds compared to full complement designs. The rollers are guided between rigid ribs in one of the two bearing rings and are combined by means of the cage to form a unit with this ring.
Since one bearing ring of this type can always be removed, the rings can be mounted separately. The bearings are available as non-locating, semi-locating and locating bearings.

X-life
Cylindrical roller bearings with disc cage or spacers

446

In these cylindrical roller bearings, contact between the rolling elements is prevented by a brass disc cage or plastic spacers. The bearings constitute the transition from the full complement bearing design to the cage type bearing. The rollers are guided in the inner ring between rigid ribs. The inner ring is separable and can therefore be mounted separately. The bearings are exclusively in the form of semi-locating bearings.

X-life
Single row full complement cylindrical roller bearings

460

These single bearings have full complement cylindrical roller sets. The rolling elements are guided by ribs on the bearing rings. Since they have the maximum possible number of rolling elements, bearings with a full complement of cylindrical rollers have extremely high load carrying capacity and high rigidity. Due to the kinematic conditions, however, they do not achieve the high speeds that are possible when using cylindrical roller bearings with cage.
The bearings are exclusively in the form of semi-locating bearings.

Double row full complement cylindrical roller bearings

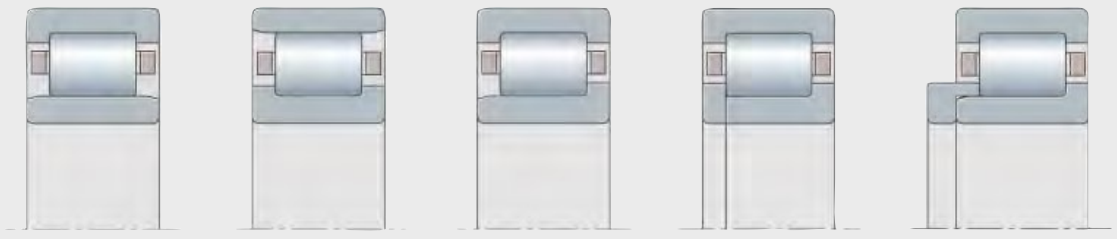
478

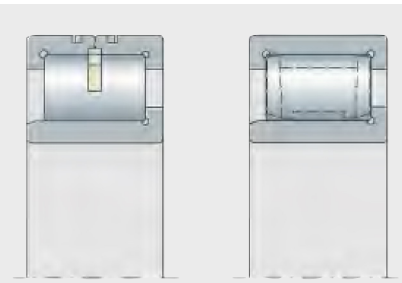
The rolling elements are guided by ribs on the bearing rings. The bearings have extremely high load carrying capacity and rigidity. However, they do not achieve the high speeds that are possible when using cylindrical roller bearings with a cage. In cable sheave bearings (bearings with grooves in the outer rings), the bearing rings can easily be axially located using retaining rings. Double row full complement bearings are available as non-locating, semi-locating and locating bearings.

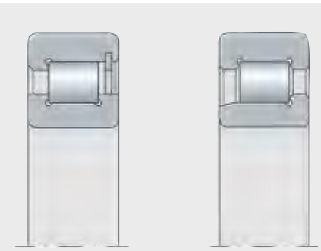
High precision cylindrical roller bearings

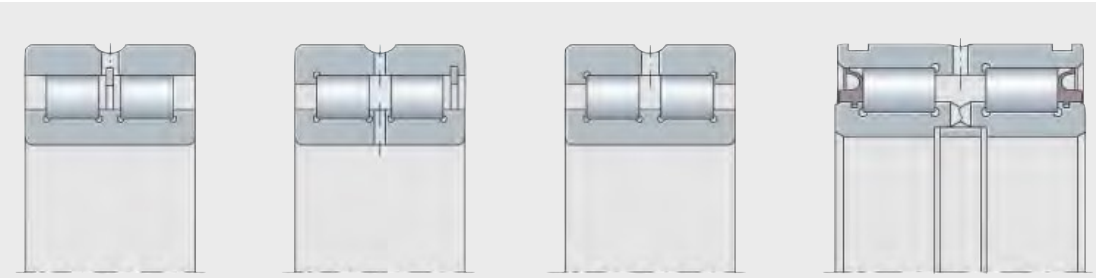
500

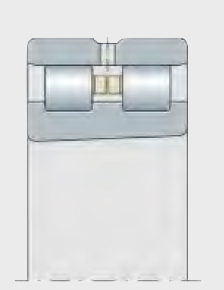
Cylindrical roller bearings of this design are double row high precision bearings (non-locating bearings) for machine tools and correspond to tolerance class SP. They are used to give radial support for main spindles. The bearings are separable and are therefore easier to fit and dismantle. The inner ring has a tapered bore for optimum setting of the radial internal clearance.


NU
N
NJ
NUP
NJ + HJ
000140C5

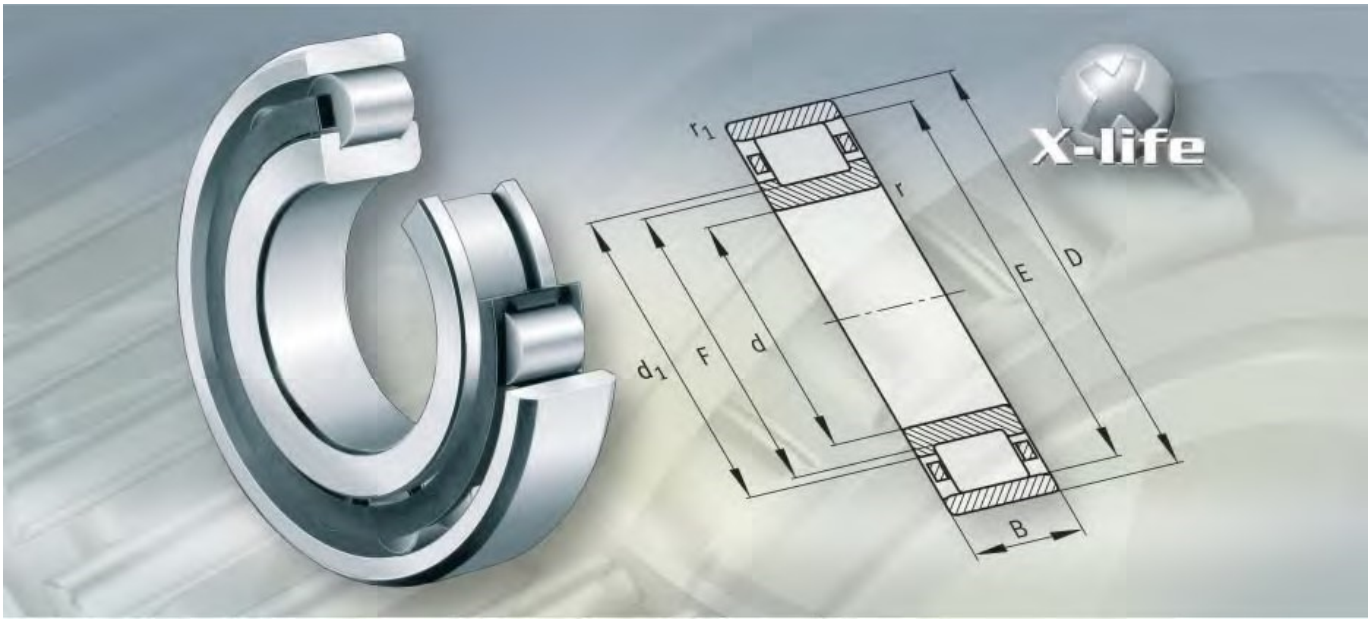

LSL1923
ZSL1923
000140C6


SL1818, SL1829,
SL1830, SL1822
SL1923
00014087


SL0248, SL0249
SL1850
SL0148, SL0149
SL0450..-PP, SL04..-PP
00014088


NN30..-AS-K-M-SP
000140c7

FAG



Cylindrical roller bearings with cage

Cylindrical roller bearings with cage

Non-locating bearings

NU10, NU19, NU2..-E, NU3..-E, NU4, NU22..-E, NU23..-E

N2..-E, N3..-E

Semi-locating bearings

NJ2..-E, NJ3..-E, NJ4, NJ22..-E, NJ23..-E

Locating bearings

With rib washer

NUP2..-E, NUP3..-E, NUP22..-E, NUP23..-E

With L-section ring

NJ2..-E + HJ, NJ3..-E + HJ, NJ4 + HJ, NJ22..-E + HJ, NJ23..-E + HJ

Cylindrical roller bearings with cage

Features

Single row cylindrical roller bearings with cage are units comprising solid inner and outer rings together with cylindrical roller and cage assemblies. The outer rings have rigid ribs on both sides or no ribs, the inner rings have one or two rigid ribs or are designed without ribs. The cage prevents the cylindrical rollers from coming into contact with each other during rolling.

The cage type bearings are very rigid, can support high radial loads and, due to the cage, are suitable for higher speeds than the full complement designs. Bearings with the suffix E have a higher capacity roller set and are thus designed for very high load carrying capacity.

The bearings are separable and are therefore easier to fit and dismantle. Both bearing rings can be given a tight fit by this process.

Single row cylindrical roller bearings with cage are available as non-locating, semi-locating and locating bearings.

X-life

Numerous sizes are supplied in the X-life grade.
These bearings are indicated in the dimension tables.

Bearings of X-life quality have, for example, lower roughness R_a and higher geometrical accuracy of the raceways than comparable designs that are not X-life. As a result, these bearings have higher load carrying capacity and longer life for the same dimensioning. In certain applications, this means that a smaller bearing arrangement can be designed.

Non-locating bearings

Cylindrical roller bearings NU and N are non-locating bearings and can support radial forces only.
In series NU, the outer ring has two ribs, while the inner ring has no ribs. Bearings N have two ribs on the inner ring and an outer ring without ribs.

Axial displacement

The outer and inner ring can be axially displaced relative to each other from the central position by the value “s”.

Semi-locating bearings

Cylindrical roller bearings NJ are semi-locating bearings.
Semi-locating bearings can support not only high radial forces but also axial forces in one direction and can therefore guide shafts axially in one direction. They act as non-locating bearings in the opposite direction.
The bearings have two ribs on the outer ring and one rib on the inner ring.

Bearings with L-section ring

Non-locating bearings NU can be combined with an L-section ring HJ to form a semi-locating bearing unit. They must not be installed with two L-section rings (due to the risk of jamming).

Axial displacement

The outer and inner ring can be axially displaced relative to each other in one direction only by the value “s”.

Cylindrical roller bearings with cage

Locating bearings

Cylindrical roller bearings NUP and NJ with HJ are locating bearings. They can support not only high radial forces but also axial forces in both directions and can therefore guide shafts axially in both directions.

Bearings with rib washer

Type NUP has two ribs on the outer ring and one rigid rib on the inner ring. A loose rib washer is fitted on the opposite side.

Bearings with L-section ring

Non-locating bearings NJ can be combined with an L-section ring HJ to form a locating bearing unit. This design has two ribs on the outer ring, one rib on the inner ring and an L-section ring for the ribless side of the inner ring. The L-section rings suitable for the bearings are indicated in the dimension tables. The bearing and L-section ring must be ordered separately.

L-section rings

L-section rings are advantageous where, under high loads, the seating surface of the inner ring in NUP bearings with a loose rib washer is too small to provide a sufficiently high bearing seat. In some applications, they make it easier to fit and dismantle the bearings.

Sealing

The bearings are supplied without seals.

Lubrication

They can be lubricated from the end faces using grease or oil.

Operating temperature

Single row cylindrical roller bearings with cage can be used at operating temperatures from –30 °C to +150 °C.
For continuous operating temperatures above +120 °C, please contact us.

Bearings with a plastic cage (suffix TVP2) are suitable up to +120 °C; the operating life is heavily dependent on the lubricant used.

Cages

The suffix M1 indicates bearings with brass cages guided by rollers.

Cylindrical roller bearings with the suffix TVP2 have a cage made from glass fibre reinforced polyamide PA66.
Other cage suffixes: see table Available designs, page 399.

Check the chemical resistance of polyamide to synthetic greases and lubricants with EP additives.

Aged oil and additives in the oil can impair the operating life of plastic cages at high temperatures.
The oil change intervals must be observed.

Standard cages

Standard cages for single row cylindrical roller bearings: see table, page 399.

Bearing series and cage material

Series	Solid cage made from polyamide PA66 TVP2 Bore code	Solid brass cage M1
NU10	–	from 05
NU19	–	from 92
NU2..-E	up to 26	from 28
NU3..-E	up to 28	from 30
NU4	–	All
NU22..-E	up to 26	from 28
NU23..-E	up to 22	from 24
N2..-E	up to 20, 22 to 26	21, from 28
N3..-E	up to 16	from 17
NJ2..-E	up to 26	from 28
NJ3..-E	up to 28	from 30
NJ4	–	All
NJ22..-E	up to 26	from 28
NJ23..-E	up to 22	from 24
NUP2..-E	up to 26	from 28
NUP3..-E	up to 28	from 30
NUP22..-E	up to 26	from 28
NUP23..-E	up to 22	from 24

Other cage designs

Other cage designs are available by agreement. In such cages, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for bearings with standard cages.

Suffixes

Suffixes for available designs: see table.

Available designs

Suffix	Description	Design
C3	Radial internal clearance larger than normal	by agreement
C4	Radial internal clearance larger than C3	
J30P	Black oxide coated	
E	Increased capacity design	Standard
EX	Increased capacity design, design modified in accordance with standard (parts from these bearings must not be interchanged with parts from bearings of the same size of the previous design E)	
M1	Solid brass cage, two-piece, roller-guided	
TVP2	Solid window cage made from glass fibre reinforced polyamide PA66	
JP3	Sheet steel window cage, single-piece, roller-guided	by agreement
MP1A	Solid brass cage, single-piece, rib-guided on outer ring	
MP1B	Machined brass cage, single-piece, rib-guided on inner ring	
M1A	Solid brass cage, two-piece, rib-guided on outer ring	
M1B	Solid brass cage, two-piece, rib-guided on inner ring	

Design and safety guidelines

Permissible skewing

There is no significant reduction in rating life if the misalignment of the inner ring relative to the outer ring does not exceed the following values:

4′ in bearings of series 10, 19, 2, 3, 4

3′ in bearings of series 22, 23.

Axial load carrying capacity

The axial load carrying capacity is dependent on:

- the size of the sliding surfaces between the ribs and the end faces of the rolling elements
- the sliding velocity at the ribs
- the lubrication on the contact surfaces
- tilting of the bearing.

Ribs subjected to load must be supported across their entire height.

The permissible axial load $F_{a\,per}$ must not be exceeded, in order to avoid an unacceptable increase in temperature.

The axial limiting load $F_{a\,max}$ must not be exceeded, in order to avoid impermissible pressure at the contact surfaces.

The ratio F_a/F_r should not exceed the value 0,4.
Continuous axial loading without simultaneous radial loading is not permissible.

Permissible and maximum axial load

$$F_{a\,per} = k_S \cdot k_B \cdot d_M^{1,5} \cdot n^{-0,6} \leqq F_{a\,max}$$

$$F_{a\,max} = 0,075 \cdot k_B \cdot d_M^{2,1}$$

$F_{a\,per}$ — N
Permissible axial load

$F_{a\,max}$ — N
Axial limiting load

k_S — –
Factor dependent on the lubrication method, see table, page 401

k_B — –
Factor dependent on the bearing series, see table, page 401

d_M — mm
Mean bearing diameter (d + D)/2, see dimension table

n — min^{-1}
Operating speed.

Factor k_S for the lubrication method

Lubrication method[1)]	Factor k_S
Minimal heat dissipation, drip feed oil lubrication, oil mist lubrication, low operating viscosity ($\nu < 0{,}5 \cdot \nu_1$)	7,5 to 10
Poor heat dissipation, oil sump lubrication, oil spray lubrication, low oil flow	10 to 15
Good heat dissipation, recirculating oil lubrication (pressurised oil lubrication)	12 to 18
Very good heat dissipation, recirculating oil lubrication with oil cooling, high operating viscosity ($\nu > 2 \cdot \nu_1$)	16 to 24

1) Doped oils should be used, e.g. CLP (DIN 51517) and HLP (DIN 51524) of ISO-VG classes 32 to 460 and ATF oils (DIN 51502) and gearbox oils (DIN 51512) of SAE viscosity classes 75 W to 140 W.

Bearing factor k_B

Series	Bearing factor k_B
NJ2..-E, NJ22..-E, NUP2..-E, NUP22..-E	15
NJ3..-E, NJ23..-E, NUP3..-E, NUP23..-E	20
NJ4	22

Skewing of the bearing, for example due to shaft deflection, can lead to alternating stresses on the inner ring ribs. In this case, the axial load must be restricted to F_{as} for bearing tilting of up to max. 2 angular minutes.

$$F_{as} = 20 \cdot d_M^{1,42}$$

If even greater tilting is present, special strength analysis is required.

Minimum radial load

In continuous operation, a minimum radial load of the order of $F_{r\,min} = C_{0r}/60$ is necessary.

If $F_{r\,min} < C_{0r}/60$, please contact us.

Equivalent dynamic bearing load

Non-locating bearings

For bearings under dynamic loading, the following applies:

$$P = F_r$$

Semi-locating and locating bearings

If an axial force F_a is present in addition to the radial force F_r, the load ratio must be taken into consideration.

Load ratio and equivalent dynamic load

Load ratio	Equivalent dynamic bearing load
$\frac{F_a}{F_r} \leq e$	$P = F_r$
$\frac{F_a}{F_r} > e$	$P = 0,92 \cdot F_r + Y \cdot F_a$

P N
Equivalent dynamic bearing load for combined load
F_a N
Axial dynamic bearing load
F_r N
Radial dynamic bearing load
e, Y –
Factors: see table Factors e and Y.

Factors e and Y

Series	Calculation factors	
	e	Y
NJ2, NUP2, NJ3, NUP3, NJ4	0,2	0,6
NJ22, NUP22, NJ23, NUP23	0,3	0,4

Equivalent static bearing load

For bearings under static loading, the following applies:

$$P_0 = F_{0r}$$

Design of bearing arrangements

Shaft and housing tolerances

Recommended shaft tolerances for bearings with cylindrical bore, see table, page 150.
Recommended housing tolerances for radial bearings, see table, page 152.

Axial location

In order to prevent lateral creep of the bearing rings, they must be located by force or physical locking means.

The abutment shoulders (shaft and housing) should be sufficiently high and perpendicular to the bearing axis.

The transition from the bearing seat to the abutment shoulder must be designed with rounding to DIN 5 418 or an undercut to DIN 509. The minimum values for the chamfer dimensions r in the dimension tables must be observed.

In the case of semi-locating bearings, the bearing rings only require support on one side, on the rib supporting the axial load.

Full support must be provided for ribs transmitting forces in axially loaded bearings.

Accuracy

The dimensional and geometrical tolerances of the bearings correspond to tolerance class PN to DIN 620.

Radial internal clearance

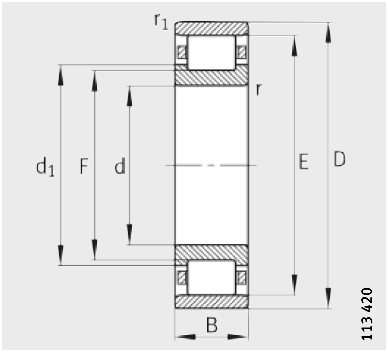
The radial internal clearance corresponds to internal clearance group CN to DIN 620-4.

Radial internal clearance

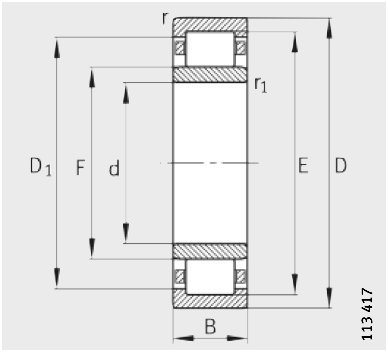
Bore d mm		Radial internal clearance					
		CN µm		C3 µm		C4 µm	
over	incl.	min.	max.	min.	max.	min.	max.
–	24	20	45	35	60	50	75
24	30	20	45	35	60	50	75
30	40	25	50	45	70	60	85
40	50	30	60	50	80	70	100
50	65	40	70	60	90	80	110
65	80	40	75	65	100	90	125
80	100	50	85	75	110	105	140
100	120	50	90	85	125	125	165
120	140	60	105	100	145	145	190
140	160	70	120	115	165	165	215
160	180	75	125	120	170	170	220
180	200	90	145	140	195	195	250
200	225	105	165	160	220	220	280
225	250	110	175	170	235	235	300
250	280	125	195	190	260	260	330
280	315	130	205	200	275	275	350
315	355	145	225	225	305	305	385
355	400	190	280	280	370	370	460
400	450	210	310	310	410	410	510
450	500	220	330	330	440	440	550
500	560	240	360	360	480	480	600
560	630	260	380	380	500	500	620
630	710	285	425	425	565	565	705

Cylindrical roller bearings with cage

Non-locating bearings



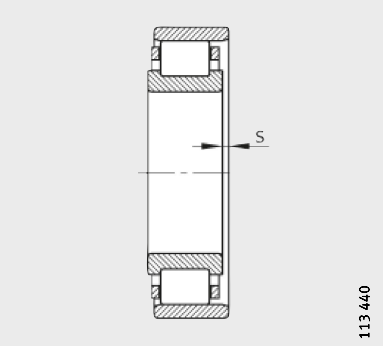
N



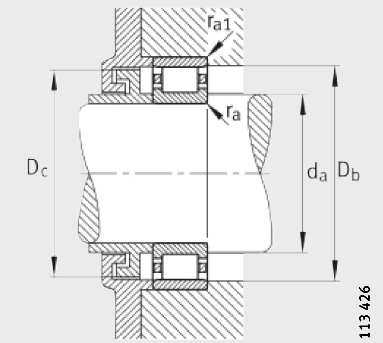
NU

Dimension table · Dimensions in mm

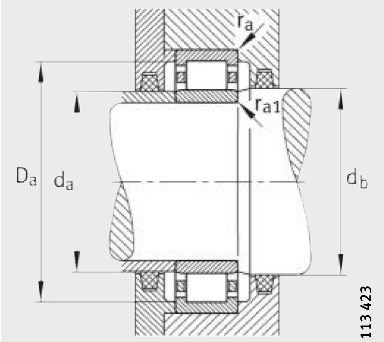
Designation		Mass	Dimensions									
	X-life	m ≈kg	d	D	B	r min.	r_1 min.	$s^{1)}$	E	F	D_1 ≈	d_1 ≈
N202-E-TVP2	**XL**	0,047	**15**	35	11	0,6	0,3	0,5	30,3	19,3	–	21,6
NU202-E-TVP2	**XL**	0,048	**15**	35	11	0,6	0,3	1,6	30,3	19,3	28	–
N203-E-TVP2	**XL**	0,068	**17**	40	12	0,6	0,3	1,2	35,1	22,1	–	24,9
NU203-E-TVP2	**XL**	0,069	**17**	40	12	0,6	0,3	1,2	35,1	22,1	32,5	–
NU2203-E-TVP2	**XL**	0,051	**17**	40	16	0,6	0,3	1,7	35,1	22,1	32,5	–
NU303-E-TVP2	**XL**	0,121	**17**	47	14	1	0,6	1,2	40,2	24,2	37,1	–
N204-E-TVP2	**XL**	0,112	**20**	47	14	1	0,6	0,8	41,5	26,5	–	29,7
NU204-E-TVP2	**XL**	0,114	**20**	47	14	1	0,6	0,8	41,5	26,5	38,8	–
NU2204-E-TVP2	**XL**	0,146	**20**	47	18	1	0,6	1,8	41,5	26,5	38,8	–
NU304-E-TVP2	**XL**	0,153	**20**	52	15	1,1	0,6	1	45,5	27,5	42,4	–
NU2304-E-TVP2	**XL**	0,215	**20**	52	21	1,1	0,6	1,9	45,5	27,5	42,4	–
NU1005-M1	**XL**	0,092	**25**	47	12	0,6	0,3	2,4	41,5	30,5	39,3	–
N205-E-TVP2	**XL**	0,135	**25**	52	15	1	0,6	1,3	46,5	31,5	–	34,7
NU205-E-TVP2	**XL**	0,137	**25**	52	15	1	0,6	1,2	46,5	31,5	43,8	–
NU2205-E-TVP2	**XL**	0,165	**25**	52	18	1	0,6	1,7	46,5	31,5	43,8	–
N305-E-TVP2	**XL**	0,242	**25**	62	17	1,1	1,1	1,4	54	34	–	38,1
NU305-E-TVP2	**XL**	0,245	**25**	62	17	1,1	1,1	1,5	54	34	50,7	–
NU2305-E-TVP2	**XL**	0,349	**25**	62	24	1,1	1,1	1,9	54	34	50,7	–
NU1006-M1	**XL**	0,134	**30**	55	13	1	0,6	2,4	48,5	36,5	46,1	–
N206-E-TVP2	**XL**	0,205	**30**	62	16	1	0,6	1,4	55,5	37,5	–	41,1
NU206-E-TVP2	**XL**	0,207	**30**	62	16	1	0,6	1,5	55,5	37,5	52,5	–
NU2206-E-TVP2	**XL**	0,255	**30**	62	20	1	0,6	1,6	55,5	37,5	52,5	–
N306-E-TVP2	**XL**	0,366	**30**	72	19	1,1	1,1	0,6	62,5	40,5	–	45
NU306-E-TVP2	**XL**	0,368	**30**	72	19	1,1	1,1	1,2	62,5	40,5	59,2	–
NU2306-E-TVP2	**XL**	0,529	**30**	72	27	1,1	1,1	2,2	62,5	40,5	59,2	–
NU406-M1	**XL**	0,859	**30**	90	23	1,5	1,5	2,3	73	45	68,4	–
NU1007-M1	**XL**	0,177	**35**	62	14	1	0,6	2,6	55	42	52,4	–
N207-E-TVP2	**XL**	0,301	**35**	72	17	1,1	0,6	0,7	64	44	–	48
NU207-E-TVP2	**XL**	0,303	**35**	72	17	1,1	0,6	0,7	64	44	61	–
NU2207-E-TVP2	**XL**	0,406	**35**	72	23	1,1	0,6	2,2	64	44	61	–
N307-E-TVP2	**XL**	0,486	**35**	80	21	1,5	1,1	0,6	70,2	46,2	–	51
NU307-E-TVP2	**XL**	0,486	**35**	80	21	1,5	1,1	0,6	70,2	46,2	66,6	–
NU2307-E-TVP2	**XL**	0,723	**35**	80	31	1,5	1,1	3	70,2	46,2	66,6	–
NU407-M1	**XL**	1,14	**35**	100	25	1,5	1,5	2,6	83	53	78,2	–



[1] Axial displacement “s” for N and NU



Mounting dimensions for N

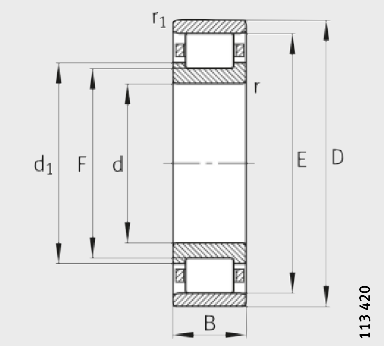


Mounting dimensions for NU

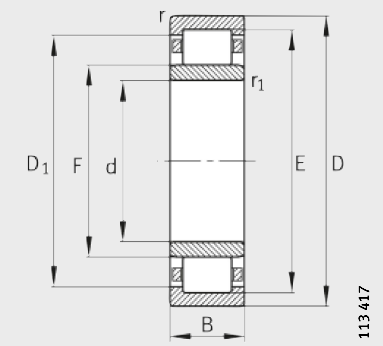
Mounting dimensions								Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
d_a		d_b	D_a	D_b	D_c	r_a	r_{a1}	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
min.	max.	min.	max.	min.	max.	max.	max.	N	N	N	min^{-1}	min^{-1}
17,4	–	–	32,6	31	29	0,6	0,3	15 100	10 400	1 470	22 000	17 600
17,4	18,5	20	32,6	–	–	0,6	0,3	15 100	10 400	1 290	22 000	17 600
21	–	–	36	36	34	0,6	0,3	20 800	14 600	2 110	18 000	15 400
21	21,5	23	36	–	–	0,6	0,3	20 800	14 600	1 820	18 000	15 400
21	21,5	23	36	–	–	0,6	0,3	28 500	21 900	3 500	18 000	13 300
21,2	23,5	25	42,8	–	–	1	0,6	30 000	21 200	2 650	16 000	13 700
24	–	–	41	43	40	1	0,6	32 500	24 700	3 850	16 000	13 100
24	26	29	41	–	–	1	0,6	32 500	24 700	3 100	16 000	13 100
24	26	29	41	–	–	1	0,6	38 500	31 000	5 000	16 000	11 400
24	27	30	45	–	–	1	0,6	36 500	26 000	3 250	14 000	12 100
24	27	30	45	–	–	1	0,6	48 500	38 000	6 300	14 000	9 900
27	30	32	44	–	–	0,6	0,3	16 700	12 900	1 520	28 000	13 100
29	–	–	46	48	45	1	0,6	34 500	27 500	4 350	15 000	11 800
29	31	34	46	–	–	1	0,6	34 500	27 500	3 500	15 000	11 800
29	31	34	46	–	–	1	0,5	41 500	34 500	5 700	15 000	9 800
32	–	–	55	55	53	1	1	48 000	36 500	5 800	12 000	10 200
32	33	37	55	–	–	1	1	48 000	36 500	4 700	12 000	10 200
32	33	37	55	–	–	1	1	66 000	55 000	9 400	12 000	8 400
33	35	38	50	–	–	1	0,6	22 900	19 300	2 400	24 000	11 000
34	–	–	56	57	54	1	0,6	45 000	36 000	5 700	12 000	9 800
34	37	40	56	–	–	1	0,6	45 000	36 000	4 650	12 000	9 800
34	37	40	56	–	–	1	0,6	57 000	48 500	8 100	12 000	8 200
37	–	–	65	64	61	1	1	61 000	48 000	8 000	10 000	9 000
37	40	44	65	–	–	1	1	61 000	48 000	6 400	10 000	9 000
37	40	44	65	–	–	1	1	86 000	75 000	13 200	10 000	7 300
41	44	47	79	–	–	1,5	1,5	83 000	64 000	10 400	14 000	–
38	41	44	57	–	–	1	0,6	29 000	26 000	3 150	20 000	9 700
39	–	–	65	65	63	1	0,6	58 000	48 500	7 900	10 000	8 300
39	43	46	65	–	–	1	0,6	58 000	48 500	6 400	10 000	8 300
39	43	46	65	–	–	1	0,6	72 000	64 000	10 800	10 000	7 300
42	–	–	71	71	69	1,5	1	76 000	63 000	10 700	9 000	8 100
42	45	48	71	–	–	1,5	1	76 000	63 000	8 600	9 000	8 100
42	45	48	71	–	–	1,5	1	108 000	98 000	17 400	9 000	6 700
46	52	55	89	–	–	1,5	1,5	102 000	83 000	10 900	12 000	–

Cylindrical roller bearings with cage

Non-locating bearings



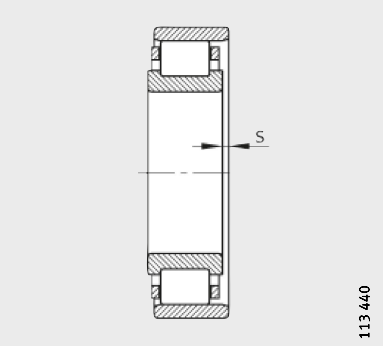
N



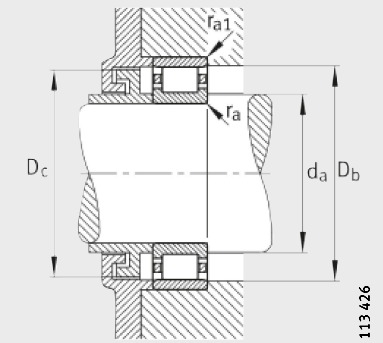
NU

Dimension table (continued) · Dimensions in mm

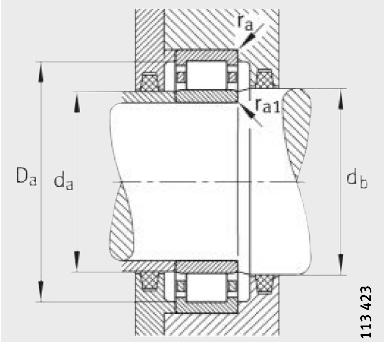
Designation		Mass	Dimensions									
	X-life	m ≈kg	d	D	B	r min.	r_1 min.	$s^{1)}$	E	F	D_1 ≈	d_1 ≈
NU1008-M1	**XL**	0,216	**40**	68	15	1	0,6	2	61	47	58,2	–
N208-E-TVP2	**XL**	0,358	**40**	80	18	1,1	1,1	1	71,5	49,5	–	54
NU208-E-TVP2	**XL**	0,379	**40**	80	18	1,1	1,1	1	71,5	49,5	68,3	–
NU2208-E-TVP2	**XL**	0,492	**40**	80	23	1,1	1,1	1,5	71,5	49,5	68,3	–
N308-E-TVP2	**XL**	0,656	**40**	90	23	1,5	1,5	1,2	80	52	–	57,6
NU308-E-TVP2	**XL**	0,659	**40**	90	23	1,5	1,5	1,3	80	52	75,9	–
NU2308-E-TVP2	**XL**	0,958	**40**	90	33	1,5	1,5	2,7	80	52	75,9	–
NU408-M1	**XL**	1,47	**40**	110	27	2	2	2,8	92	58	86,4	–
NU1009-M1	**XL**	0,277	**45**	75	16	1	0,6	2,5	67,5	52,5	64,5	–
N209-E-TVP2	**XL**	0,434	**45**	85	19	1,1	1,1	1	76,5	54,5	–	59
NU209-E-TVP2	**XL**	0,434	**45**	85	19	1,1	1,1	1	76,5	54,5	73,3	–
NU2209-E-TVP2	**XL**	0,532	**45**	85	23	1,1	1,1	1,5	76,5	54,5	73,3	–
N309-E-TVP2	**XL**	0,891	**45**	100	25	1,5	1,5	1	88,5	58,5	–	64,4
NU309-E-TVP2	**XL**	0,893	**45**	100	25	1,5	1,5	1	88,5	58,5	84,1	–
NU2309-E-TVP2	**XL**	1,3	**45**	100	36	1,5	1,5	2,5	88,5	58,5	84,1	–
NU409-M1	**XL**	1,87	**45**	120	29	2	2	2,9	100,5	64,5	94,6	–
NU1010-M1	**XL**	0,305	**50**	80	16	1	0,6	2,1	72,5	57,5	69,5	–
N210-E-TVP2	**XL**	0,488	**50**	90	20	1,1	1,1	1,3	81,5	59,5	–	64
NU210-E-TVP2	**XL**	0,49	**50**	90	20	1,1	1,1	1,3	81,5	59,5	78,3	–
NU2210-E-TVP2	**XL**	0,573	**50**	90	23	1,1	1,1	1,3	81,5	59,5	78,3	–
N310-E-TVP2	**XL**	1,16	**50**	110	27	2	2	1,7	97	65	–	71,3
NU310-E-TVP2	**XL**	1,16	**50**	110	27	2	2	1,7	97	65	92,5	–
NU2310-E-TVP2	**XL**	1,75	**50**	110	40	2	2	3,2	97	65	92,5	–
NU410-M1	**XL**	2,33	**50**	130	31	2,1	2,1	3	110,8	70,8	104,3	–
NU1011-E-M1	**XL**	0,451	**55**	90	18	1,1	1	2,1	82	64	79,2	–
N211-E-TVP2	**XL**	0,668	**55**	100	21	1,5	1,1	0,8	90	66	–	70,8
NU211-E-TVP2	**XL**	0,665	**55**	100	21	1,5	1,1	0,8	90	66	86,6	–
NU2211-E-TVP2	**XL**	0,796	**55**	100	25	1,5	1,1	1,3	90	66	86,6	–
N311-E-TVP2	**XL**	1,48	**55**	120	29	2	2	1,8	106,5	70,5	–	77,5
NU311-E-TVP2	**XL**	1,48	**55**	120	29	2	2	1,8	106,5	70,5	101,4	–
NU2311-E-TVP2	**XL**	2,23	**55**	120	43	2	2	3,3	106,5	70,5	101,4	–
NU411-M1	**XL**	2,83	**55**	140	33	2,1	2,1	3,3	117,2	77,2	110,7	–



[1] Axial displacement “s” for N and NU



Mounting dimensions for N

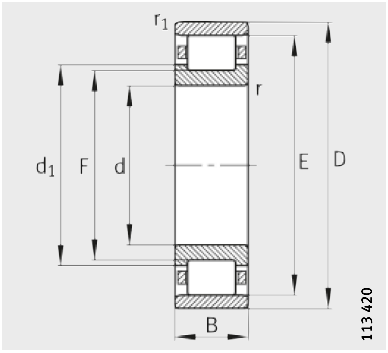


Mounting dimensions for NU

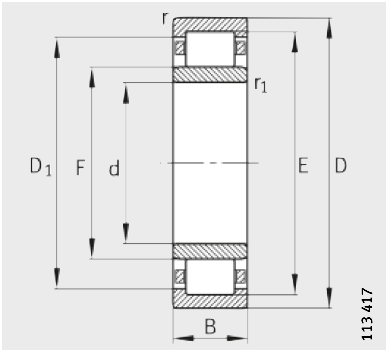
Mounting dimensions								Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
d_a		d_b	D_a	D_b	D_c	r_a	r_{a1}	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
min.	max.	min.	max.	min.	max.	max.	max.	N	N	N	min^{-1}	min^{-1}
43	46	49	63	–	–	1	0,6	33 500	30 500	3 350	19 000	8 900
47	–	–	73	73	70	1	1	63 000	53 000	8 700	9 000	7 600
47	49	52	73	–	–	1	1	63 000	53 000	7 000	9 000	7 600
47	49	52	73	–	–	1	1	83 000	75 000	12 900	9 000	6 400
49	–	–	81	81	79	1,5	1,5	95 000	78 000	12 900	7 500	7 300
49	51	55	81	–	–	1,5	1,5	95 000	78 000	10 400	7 500	7 300
49	51	55	81	–	–	1,5	1,5	132 000	119 000	20 700	7 500	6 000
53	57	60	97	–	–	2	2	119 000	95 000	12 700	11 000	–
48	52	54	70	–	–	1	0,6	40 000	37 500	4 800	16 000	8 100
52	–	–	78	78	75	1	1	72 000	63 000	10 600	8 500	7 100
52	54	57	78	–	–	1	1	72 000	63 000	8 600	8 500	7 100
52	54	57	78	–	–	1	1	87 000	82 000	14 100	8 500	5 800
54	–	–	91	90	87	1,5	1,5	115 000	98 000	16 400	6 700	6 500
54	57	60	91	–	–	1,5	1,5	115 000	98 000	13 300	6 700	6 500
54	57	60	91	–	–	1,5	1,5	162 000	153 000	27 000	6 700	5 400
58	63	66	107	–	–	2	2	143 000	119 000	16 000	9 500	–
53	57	59	75	–	–	1	0,6	42 500	41 500	5 300	15 000	7 400
57	–	–	83	83	80	1	1	75 000	69 000	11 500	8 000	6 700
57	58	62	83	–	–	1	1	75 000	69 000	9 300	8 000	6 700
57	58	62	83	–	–	1	1	92 000	88 000	15 300	8 000	5 400
61	–	–	99	98	96	2	2	130 000	113 000	19 100	6 300	6 100
61	63	67	99	–	–	2	2	130 000	113 000	15 500	6 300	6 100
61	63	67	99	–	–	2	2	192 000	187 000	33 000	6 300	5 000
64	69	73	116	–	–	2	2	175 000	148 000	25 000	8 500	–
60	63	65	84	–	–	1,1	1	61 000	60 000	7 100	13 000	6 900
62	–	–	91	91	89	1,5	1	99 000	95 000	16 300	7 000	5 800
62	65	68	91	–	–	1,5	1	99 000	95 000	13 200	7 000	5 800
62	65	68	91	–	–	1,5	1	117 000	118 000	20 700	7 000	4 750
66	–	–	109	108	105	2	2	159 000	139 000	23 600	5 600	5 600
66	69	72	109	–	–	2	2	159 000	139 000	19 100	5 600	5 600
66	69	72	109	–	–	2	2	235 000	230 000	41 000	5 600	4 600
69	76	79	126	–	–	2	2	187 000	164 000	22 400	8 000	–

Cylindrical roller bearings with cage

Non-locating bearings



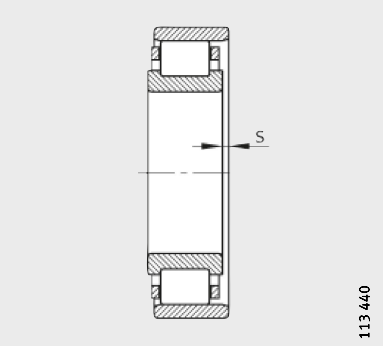
N



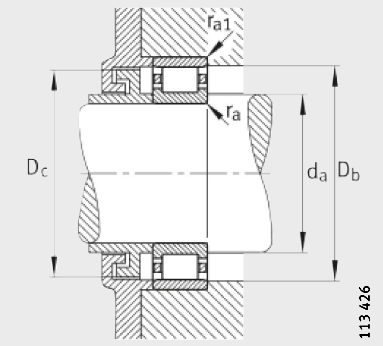
NU

Dimension table (continued) · Dimensions in mm

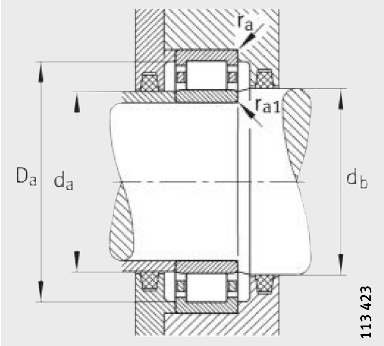
Designation		Mass	Dimensions									
	X-life	m ≈kg	d	D	B	r min.	r_1 min.	$s^{1)}$	E	F	D_1 ≈	d_1 ≈
NU1012-M1	**XL**	0,48	**60**	95	18	1,1	1	3,3	85,5	69,5	82,3	–
N212-E-TVP2	**XL**	0,827	**60**	110	22	1,5	1,5	1,6	100	72	–	77,6
NU212-E-TVP2	**XL**	0,824	**60**	110	22	1,5	1,5	1,6	100	72	96,1	–
NU2212-E-TVP2	**XL**	1,08	**60**	110	28	1,5	1,5	1,6	100	72	96,1	–
N312-E-TVP2	**XL**	1,84	**60**	130	31	2,1	2,1	1,9	115	77	–	84,4
NU312-E-TVP2	**XL**	1,85	**60**	130	31	2,1	2,1	1,8	115	77	109,6	–
NU2312-E-TVP2	**XL**	2,78	**60**	130	46	2,1	2,1	3,5	115	77	109,6	–
NU412-M1	**XL**	2,3	**60**	150	35	2,1	2,1	3,4	127	83	119,5	–
NU1013-M1	**XL**	0,507	**65**	100	18	1,1	1	3,3	90,5	74,5	87,3	–
N213-E-TVP2	**XL**	1,05	**65**	120	23	1,5	1,5	1,4	108,5	78,5	–	84,4
NU213-E-TVP2	**XL**	1,04	**65**	120	23	1,5	1,5	1,4	108,5	78,5	104,3	–
NU2213-E-TVP2	**XL**	1,43	**65**	120	31	1,5	1,5	1,9	108,5	78,5	104,3	–
N313-E-TVP2	**XL**	2,28	**65**	140	33	2,1	2,1	1,4	124,5	82,5	–	90,5
NU313-E-TVP2	**XL**	2,28	**65**	140	33	2,1	2,1	1,5	124,5	82,5	118,6	–
NU2313-E-TVP2	**XL**	3,32	**65**	140	48	2,1	2,1	4	124,5	82,5	118,6	–
NU413-M1	**XL**	4,08	**65**	160	37	2,1	2,1	3,5	135,3	89,3	127,7	–
NU1014-M1	**XL**	0,706	**70**	110	20	1,1	1	2,5	100	80	96	–
N214-E-TVP2	**XL**	1,16	**70**	125	24	1,5	1,5	1,6	113,5	83,5	–	89,4
NU214-E-TVP2	**XL**	1,15	**70**	125	24	1,5	1,5	1,6	113,5	83,5	109,4	–
NU2214-E-TVP2	**XL**	1,52	**70**	125	31	1,5	1,5	1,6	113,5	83,5	109,4	–
N314-E-TVP2	**XL**	2,79	**70**	150	35	2,1	2,1	1,6	133	89	–	97,4
NU314-E-TVP2	**XL**	2,79	**70**	150	35	2,1	2,1	1,7	133	89	126,8	–
NU2314-E-TVP2	**XL**	4,02	**70**	150	51	2,1	2,1	4,7	133	89	126,8	–
NU414-M1	**XL**	5,97	**70**	180	42	3	3	4	152	100	142,7	–
NU1015-M1	**XL**	0,737	**75**	115	20	1,1	1	2,5	105	85	101,7	–
N215-E-TVP2	**XL**	1,29	**75**	130	25	1,5	1,5	1,1	118,5	88,5	–	94,4
NU215-E-TVP2	**XL**	1,27	**75**	130	25	1,5	1,5	1,2	118,5	88,5	114,4	–
NU2215-E-TVP2	**XL**	1,6	**75**	130	31	1,5	1,5	1,6	118,5	88,5	114,4	–
N315-E-TVP2	**XL**	3,34	**75**	160	37	2,1	2,1	1,1	143	95	–	104,1
NU315-E-TVP2	**XL**	3,33	**75**	160	37	2,1	2,1	1,2	143	95	136,2	–
NU2315-E-TVP2	**XL**	4,95	**75**	160	55	2,1	2,1	4,2	143	95	136,2	–
NU415-M1	**XL**	7,09	**75**	190	45	3	3	4,5	160,5	104,5	150,7	–



[1] Axial displacement “s” for N and NU



Mounting dimensions for N

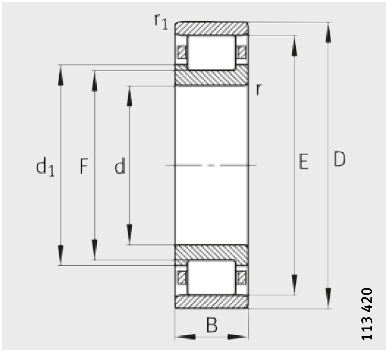


Mounting dimensions for NU

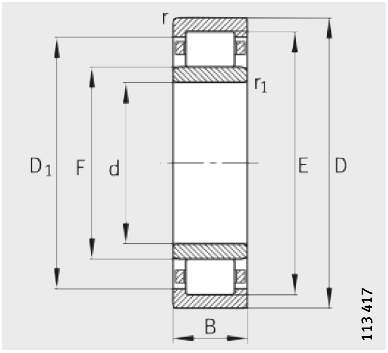
Mounting dimensions								Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
d_a		d_b	D_a	D_b	D_c	r_a	r_{a1}	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
min.	max.	min.	max.	min.	max.	max.	max.	N	N	N	min^{-1}	min^{-1}
65	68	71	89	–	–	1,1	1	52 000	55 000	7 100	13 000	6 400
69	–	–	101	101	99	1,5	1,5	111 000	102 000	16 800	6 300	5 400
69	71	75	101	–	–	1,5	1,5	111 000	102 000	13 900	6 300	5 400
69	71	75	101	–	–	1,5	1,5	151 000	152 000	26 500	6 300	4 400
72	–	–	118	116	114	2,1	2,1	177 000	157 000	26 500	5 000	5 300
72	75	79	118	–	–	2,1	2,1	177 000	157 000	21 700	5 000	5 300
72	75	79	118	–	–	2,1	2,1	265 000	260 000	47 000	5 000	4 300
74	82	85	136	–	–	2	2	211 000	184 000	24 700	7 500	–
70	73	76	94	–	–	1,1	1	53 000	58 000	7 500	12 000	5 900
74	–	–	111	110	107	1,5	1,5	127 000	119 000	19 800	6 000	5 000
74	77	81	111	–	–	1,5	1,5	127 000	119 000	16 300	6 000	5 000
74	77	81	111	–	–	1,5	1,5	176 000	181 000	32 000	5 600	4 150
77	–	–	128	126	123	2,1	2,1	214 000	191 000	32 000	4 800	4 900
77	81	85	128	–	–	2,1	2,1	214 000	191 000	26 000	4 800	4 900
77	81	85	128	–	–	2,1	2,1	295 000	285 000	50 000	4 800	4 050
79	88	91	146	–	–	2	2	230 000	203 000	26 500	7 000	–
75	78	82	104	–	–	1	1	75 000	78 000	10 600	11 000	5 500
79	–	–	116	115	112	1,5	1,5	140 000	137 000	23 100	5 300	4 750
79	82	86	116	–	–	1,5	1,5	140 000	137 000	19 000	5 300	4 750
79	82	86	116	–	–	1,5	1,5	184 000	194 000	34 000	5 300	3 900
82	–	–	138	135	131	2,1	2,1	242 000	222 000	37 000	4 500	4 550
82	87	92	138	–	–	2,1	2,1	242 000	222 000	30 000	4 500	4 550
82	87	92	138	–	–	2,1	2,1	325 000	325 000	56 000	4 500	3 850
86	99	102	164	–	–	2,5	2,5	285 000	255 000	33 500	6 300	–
80	83	87	109	–	–	1,1	1	76 000	82 000	11 100	10 000	5 200
84	–	–	121	120	117	1,5	1,5	154 000	156 000	26 500	5 300	4 500
84	87	90	121	–	–	1,5	1,5	154 000	156 000	21 700	5 300	4 500
84	87	90	121	–	–	1,5	1,5	191 000	207 000	36 000	5 300	3 700
87	–	–	148	145	141	2,1	2,1	285 000	265 000	43 000	4 000	4 200
87	93	97	148	–	–	2,1	2,1	285 000	265 000	34 500	4 000	4 200
87	93	97	148	–	–	2,1	2,1	390 000	395 000	67 000	4 000	3 600
91	103	107	174	–	–	2,5	2,5	325 000	295 000	37 500	6 000	–

Cylindrical roller bearings with cage

Non-locating bearings



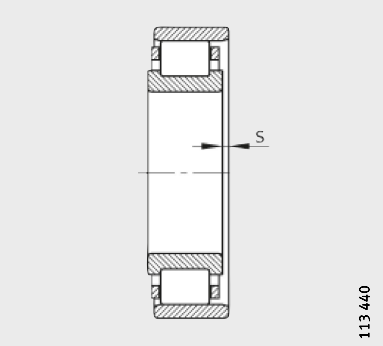
N



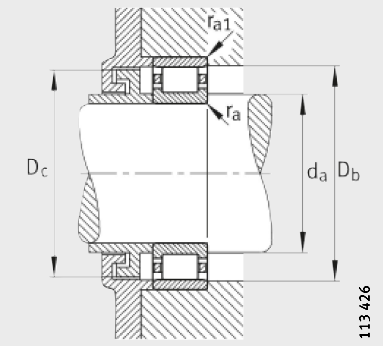
NU

Dimension table (continued) · Dimensions in mm

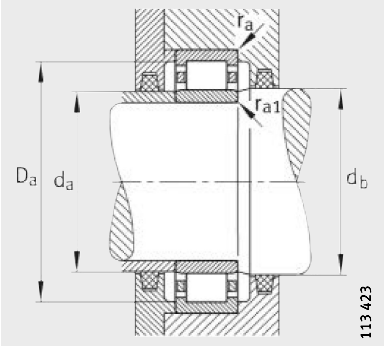
Designation		Mass	Dimensions									
	X-life	m ≈kg	d	D	B	r min.	r_1 min.	$s^{1)}$	E	F	D_1 ≈	d_1 ≈
NU1016-M1	**XL**	0,99	**80**	125	22	1,1	1	2,7	113,5	91,5	109,8	–
N216-E-TVP2	**XL**	1,55	**80**	140	26	2	2	1,2	127,3	95,3	–	101,5
NU216-E-TVP2	**XL**	1,55	**80**	140	26	2	2	1,3	127,3	95,3	122,9	–
NU2216-E-TVP2	**XL**	2,01	**80**	140	33	2	2	1,3	127,3	95,3	122,9	–
N316-E-TVP2	**XL**	4,12	**80**	170	39	2,1	2,1	0,6	151	101	–	110,4
NU316-E-TVP2	**XL**	3,96	**80**	170	39	2,1	2,1	0,7	151	101	143,9	–
NU2316-E-TVP2	**XL**	5,89	**80**	170	58	2,1	2,1	3,7	151	101	143,9	–
NU416-M1	**XL**	8,37	**80**	200	48	3	3	4,6	170	110	159,7	–
NU1017-M1	**XL**	1,04	**85**	130	22	1,1	1	4	118,5	96,5	114,8	–
N217-E-TVP2	**XL**	1,92	**85**	150	28	2	2	0,7	136,5	100,5	–	107,5
NU217-E-TVP2	**XL**	1,91	**85**	150	28	2	2	0,8	136,5	100,5	131,5	–
NU2217-E-TVP2	**XL**	2,5	**85**	150	36	2	2	1,3	136,5	100,5	131,5	–
N317-E-M1	**XL**	5,3	**85**	180	41	3	3	1,1	160	108	–	117,8
NU317-E-TVP2	**XL**	4,62	**85**	180	41	3	3	1,3	160	108	152,7	–
NU2317-E-TVP2	**XL**	6,72	**85**	180	60	3	3	4,7	160	108	152,7	–
NU417-M1	**XL**	9,85	**85**	210	52	4	4	5,2	177	113	165,7	–
NU1018-M1	**XL**	1,31	**90**	140	24	1,5	1,1	3	127	103	122,9	–
N218-E-TVP2	**XL**	2,37	**90**	160	30	2	2	1,4	145	107	–	114,3
NU218-E-TVP2	**XL**	2,36	**90**	160	30	2	2	1,5	145	107	139,7	–
NU2218-E-TVP2	**XL**	3,17	**90**	160	40	2	2	2,5	145	107	139,7	–
N318-E-M1	**XL**	6,19	**90**	190	43	3	3	1,3	169,5	113,5	–	124
NU318-E-TVP2	**XL**	5,39	**90**	190	43	3	3	1,5	169,5	113,5	161,6	–
NU2318-E-TVP2	**XL**	8,04	**90**	190	64	3	3	5	169,5	113,5	161,6	–
NU418-M1	**XL**	11,8	**90**	225	54	4	4	5	191,5	123,5	179,7	–
NU1019-M1	**XL**	1,41	**95**	145	24	1,5	1,1	4,1	132	108	127,9	–
N219-E-TVP2	**XL**	2,89	**95**	170	32	2,1	2,1	0,6	154,5	112,5	–	120,5
NU219-E-TVP2	**XL**	2,88	**95**	170	32	2,1	2,1	0,7	154,5	112,5	148,6	–
NU2219-E-TVP2	**XL**	3,9	**95**	170	43	2,1	2,1	2,2	154,5	112,5	148,6	–
N319-E-M1	**XL**	7,05	**95**	200	45	3	3	1,4	177,5	121,5	–	132
NU319-E-TVP2	**XL**	6,32	**95**	200	45	3	3	1,4	177,5	121,5	169,6	–
NU2319-E-TVP2	**XL**	9,4	**95**	200	67	3	3	5,6	177,5	121,5	169,6	–
NU419-M1	**XL**	13,9	**95**	240	55	4	4	5,2	201,5	133,5	189,7	–



[1] Axial displacement “s” for N and NU



Mounting dimensions for N

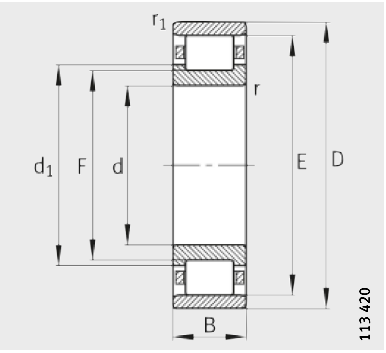


Mounting dimensions for NU

Mounting dimensions								Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
d_a		d_b	D_a	D_b	D_c	r_a	r_{a1}	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
min.	max.	min.	max.	min.	max.	max.	max.	N	N	N	min^{-1}	min^{-1}
85	90	94	119	–	–	1	1	91 000	99 000	13 600	9 500	5 000
91	–	–	129	129	126	2	2	165 000	167 000	27 500	4 800	4 250
91	94	97	129	–	–	2	2	165 000	167 000	22 600	4 800	4 250
91	94	97	129	–	–	2	2	220 000	243 000	42 000	4 800	3 450
92	–	–	158	153	149	2,1	2,1	300 000	275 000	46 000	3 800	4 150
92	99	105	158	–	–	2,1	2,1	300 000	275 000	37 000	3 800	4 150
92	99	105	158	–	–	2,1	2,1	420 000	425 000	73 000	3 800	3 500
96	109	112	184	–	–	2,5	2,5	395 000	365 000	57 000	5 600	–
90	95	99	124	–	–	1	1	93 000	103 000	14 000	9 000	4 750
96	–	–	139	138	135	2	2	194 000	194 000	31 500	4 500	4 100
96	99	104	139	–	–	2	2	194 000	194 000	26 000	4 500	4 100
96	99	104	139	–	–	2	2	255 000	275 000	46 500	4 500	3 350
99	–	–	166	162	158	2,5	2,5	340 000	325 000	53 000	5 600	3 850
99	106	110	166	–	–	2,5	2,5	320 000	300 000	40 000	3 600	4 000
99	106	110	166	–	–	2,5	2,5	435 000	445 000	75 000	3 600	3 350
105	111	115	190	–	–	3	3	420 000	385 000	60 000	5 300	–
96	101	106	133	–	–	1,5	1	111 000	124 000	16 800	8 500	4 550
101	–	–	149	147	143	2	2	215 000	217 000	35 000	4 300	3 950
101	105	109	149	–	–	2	2	215 000	217 000	28 500	4 300	3 950
101	105	109	149	–	–	2	2	285 000	315 000	52 000	4 300	3 300
104	–	–	176	171	168	2,5	2,5	370 000	350 000	55 000	5 300	3 750
104	111	117	176	–	–	2,5	2,5	370 000	350 000	44 000	3 400	3 750
104	111	117	176	–	–	2,5	2,5	510 000	530 000	86 000	3 400	3 050
110	122	125	205	–	–	3	3	465 000	425 000	67 000	5 000	–
101	106	111	138	–	–	1,5	1	113 000	130 000	17 300	8 000	4 350
107	–	–	158	156	153	2,1	2,1	260 000	265 000	41 500	3 800	3 700
107	111	116	158	–	–	2,1	2,1	260 000	265 000	34 000	3 800	3 700
107	111	116	158	–	–	2,1	2,1	340 000	370 000	60 000	3 800	3 100
109	–	–	186	179	176	2,5	2,5	390 000	380 000	59 000	5 300	3 600
109	119	124	186	–	–	2,5	2,5	390 000	380 000	48 000	3 400	3 600
109	119	124	186	–	–	2,5	2,5	540 000	580 000	93 000	3 400	2 850
115	132	136	220	–	–	3	3	495 000	470 000	73 000	4 800	–

Cylindrical roller bearings with cage

Non-locating bearings



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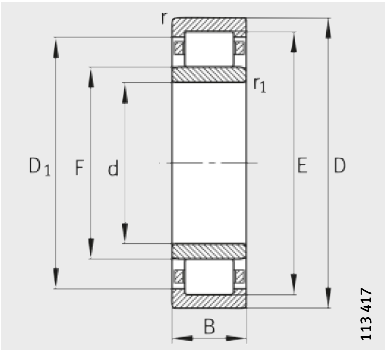
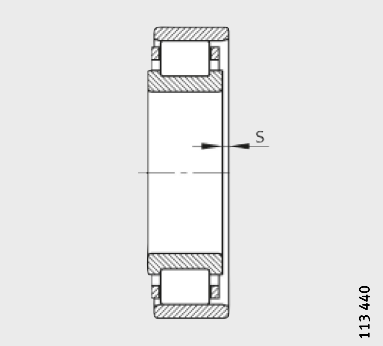


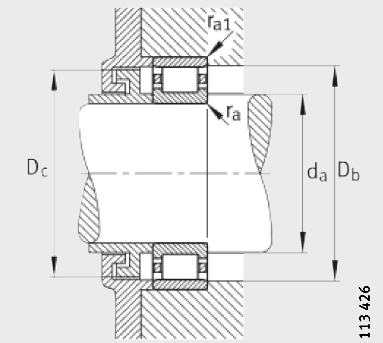
NU

Dimension table (continued) · Dimensions in mm

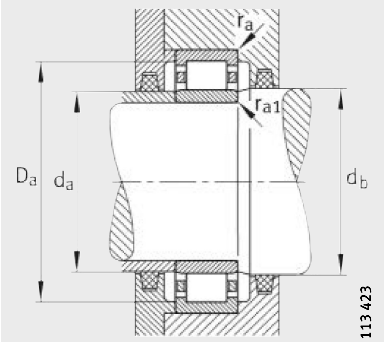
Designation		Mass	Dimensions									
	X-life	m ≈kg	d	D	B	r min.	r_1 min.	$s^{1)}$	E	F	D_1 ≈	d_1 ≈
NU1020-M1	**XL**	1,46	**100**	150	24	1,5	1,1	4,3	137	113	132,9	–
N220-E-TVP2	**XL**	3,5	**100**	180	34	2,1	2,1	1,4	163	119	–	127,3
NU220-E-TVP2	**XL**	3,49	**100**	180	34	2,1	2,1	1,5	163	119	156,9	–
NU2220-E-TVP2	**XL**	4,77	**100**	180	46	2,1	2,1	2,5	163	119	156,9	–
N320-E-M1	**XL**	8,75	**100**	215	47	3	3	1,2	191,5	127,5	–	139,4
NU320-E-TVP2	**XL**	7,67	**100**	215	47	3	3	1,2	191,5	127,5	182	–
NU2320-E-TVP2	**XL**	12,1	**100**	215	73	3	3	4,2	191,5	127,5	182	–
NU420-M1	**XL**	15,8	**100**	250	58	4	4	5,7	211	139	198,2	–
NU1021-M1	**XL**	1,84	**105**	160	26	2	1,1	4,5	145,5	119,5	141	–
N221-E-M1	**XL**	4,63	**105**	190	36	2,1	2,1	1,2	171,5	125,5	–	134,5
NU221-E-TVP2	**XL**	4,08	**105**	190	36	2,1	2,1	1,3	171,5	125,5	165,1	–
NU421-M1	**XL**	17,7	**105**	260	60	4	4	5,7	220,5	144,5	207,4	–
NU1022-M1	**XL**	2,31	**110**	170	28	2	1,1	3,2	155	125	149,7	–
N222-E-TVP2	**XL**	4,85	**110**	200	38	2,1	2,1	1,4	180,5	132,5	–	141,6
NU222-E-TVP2	**XL**	4,84	**110**	200	38	2,1	2,1	1,5	180,5	132,5	173,8	–
NU2222-E-TVP2	**XL**	6,76	**110**	200	53	2,1	2,1	4	180,5	132,5	173,8	–
N322-E-M1	**XL**	11,7	**110**	240	50	3	3	1,3	211	143	–	155,6
NU322-E-TVP2	**XL**	10,3	**110**	240	50	3	3	1,3	211	143	200,9	–
NU2322-E-TVP2	**XL**	16,6	**110**	240	80	3	3	5,8	211	143	200,9	–
NU422-M1	**XL**	22,4	**110**	280	65	4	4	6,2	235	155	220,9	–
NU1024-M1	**XL**	2,47	**120**	180	28	2	1,1	3,2	165	135	159,7	–
N224-E-TVP2	**XL**	5,67	**120**	215	40	2,1	2,1	1,4	195,5	143,5	–	153,2
NU224-E-TVP2	**XL**	5,8	**120**	215	40	2,1	2,1	1,4	195,5	143,5	187,8	–
NU2224-E-TVP2	**XL**	8,38	**120**	215	58	2,1	2,1	4,5	195,5	143,5	187,8	–
N324-E-M1	**XL**	15,1	**120**	260	55	3	3	3,5	230	154	–	168,7
NU324-E-TVP2	**XL**	13,3	**120**	260	55	3	3	3,5	230	154	218,7	–
NU2324-E-M1	**XL**	23,2	**120**	260	86	3	3	7,2	230	154	218,7	–
NU424-M1	**XL**	30,8	**120**	310	72	5	5	6,9	260	170	243,9	–
NU1026-M1	**XL**	3,81	**130**	200	33	2	1,1	3,9	182	148	175,9	–
N226-E-TVP2	**XL**	6,51	**130**	230	40	3	3	1,2	209,5	153,5	–	164
NU226-E-TVP2	**XL**	6,5	**130**	230	40	3	3	1,2	209,5	153,5	201,2	–
NU2226-E-TVP2	**XL**	10,4	**130**	230	64	3	3	5,2	209,5	153,5	201,2	–
N326-E-M1	**XL**	18,4	**130**	280	58	4	4	3,5	247	167	–	181,7
NU326-E-TVP2	**XL**	16,2	**130**	280	58	4	4	3,5	247	167	235,2	–
NU2326-E-M1	**XL**	28,8	**130**	280	93	4	4	8,1	247	167	235,2	–



[1] Axial displacement “s” for N and NU



Mounting dimensions for N

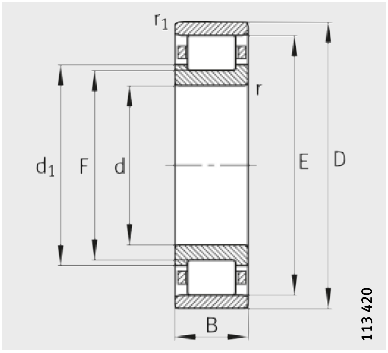


Mounting dimensions for NU

Mounting dimensions								Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
d_a		d_b	D_a	D_b	D_c	r_a	r_{a1}	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
min.	max.	min.	max.	min.	max.	max.	max.	N	N	N	min^{-1}	min^{-1}
106	111	116	143	–	–	1,5	1	116 000	135 000	17 900	7 500	4 150
112	–	–	168	165	161	2,1	2,1	295 000	305 000	47 500	3 800	3 500
112	117	122	168	–	–	2,1	2,1	295 000	305 000	38 500	3 800	3 500
112	117	122	168	–	–	2,1	2,1	395 000	445 000	72 000	3 800	2 900
114	–	–	201	193	190	2,5	2,5	450 000	425 000	65 000	5 000	3 400
114	125	132	201	–	–	2,5	2,5	450 000	425 000	53 000	3 200	3 400
114	125	132	201	–	–	2,5	2,5	680 000	720 000	114 000	3 200	2 550
120	137	141	230	–	–	3	3	550 000	530 000	79 000	4 800	–
111	118	122	151	–	–	2	1	131 000	153 000	19 400	7 000	4 050
117	–	–	178	173	170	2,1	2,1	310 000	320 000	49 000	5 600	3 450
117	123	128	178	–	–	2,1	2,1	310 000	320 000	40 000	3 600	3 450
125	143	147	240	–	–	3	3	610 000	590 000	70 000	4 500	–
116	124	128	161	–	–	2	1	166 000	190 000	24 200	7 000	3 850
122	–	–	188	182	179	2	2	345 000	365 000	56 000	3 400	3 300
122	130	135	188	–	–	2,1	2,1	345 000	365 000	56 000	3 400	3 300
122	130	135	188	–	–	2,1	2,1	455 000	520 000	81 000	3 400	2 800
124	–	–	226	213	209	2,5	2,5	520 000	510 000	78 000	4 800	3 000
124	140	145	226	–	–	2,5	2,5	495 000	475 000	59 000	3 000	3 100
124	140	145	226	–	–	2,5	2,5	750 000	800 000	126 000	2 800	2 320
130	153	157	260	–	–	3	3	680 000	660 000	96 000	4 500	–
126	134	138	171	–	–	2	1	174 000	207 000	26 000	6 300	3 550
132	–	–	203	197	194	2,1	2,1	390 000	415 000	64 000	3 200	3 100
132	141	146	203	–	–	2,1	2,1	390 000	415 000	52 000	3 200	3 100
132	141	146	203	–	–	2,1	2,1	530 000	610 000	97 000	3 200	2 550
134	–	–	246	232	228	2,5	2,5	610 000	600 000	87 000	4 500	2 700
134	151	156	246	–	–	2,5	2,5	610 000	600 000	70 000	2 800	2 700
134	151	156	246	–	–	2,5	2,5	930 000	1 010 000	153 000	4 300	2 000
144	168	172	286	–	–	4	4	850 000	840 000	96 000	3 800	–
136	146	151	191	–	–	2	1	212 000	250 000	31 000	5 600	3 500
144	–	–	216	212	207	2,5	2,5	425 000	445 000	65 000	3 000	2 850
144	151	158	216	–	–	2,5	2,5	425 000	445 000	54 000	3 000	2 850
144	151	158	216	–	–	2,5	2,5	620 000	730 000	111 000	3 000	2 300
147	–	–	263	249	245	3	3	720 000	720 000	103 000	4 300	2 460
147	164	169	263	–	–	3	3	680 000	670 000	79 000	2 600	2 460
147	164	169	263	–	–	3	3	1 080 000	1 220 000	180 000	3 800	1 780

Cylindrical roller bearings with cage

Non-locating bearings



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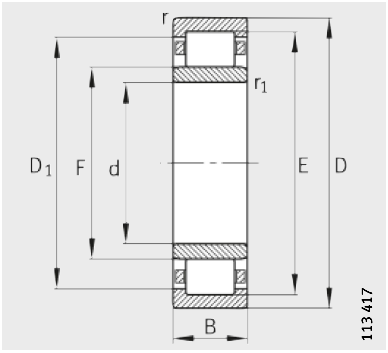

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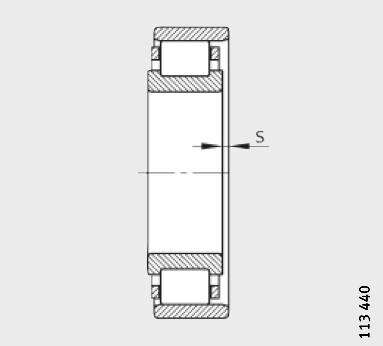
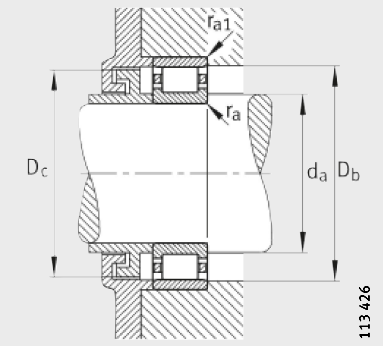
Dimension table (continued) · Dimensions in mm

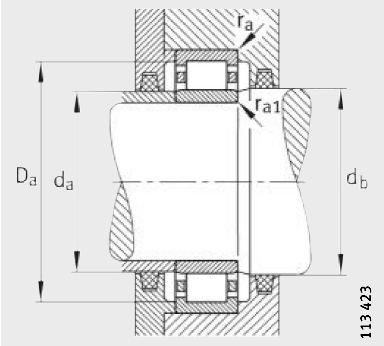
Designation		Mass	Dimensions									
	X-life	m ≈kg	d	D	B	r min.	r_1 min.	$s^{1)}$	E	F	D_1 ≈	d_1 ≈
NU1028-M1	**XL**	3,94	**140**	210	33	2	1,1	3,8	192	158	185,9	–
N228-E-M1	**XL**	9,3	**140**	250	42	3	3	2	225	169	–	179,4
NU228-E-M1	**XL**	9,31	**140**	250	42	3	3	2	225	169	216,7	–
NU2228-E-M1	**XL**	14,5	**140**	250	68	3	3	7	225	169	216,7	–
N328-E-M1	**XL**	22,5	**140**	300	62	4	4	5,2	264	180	–	195,4
NU328-E-TVP2	**XL**	20,1	**140**	300	62	4	4	5,2	264	180	251,7	–
NU2328-E-M1	**XL**	36	**140**	300	102	4	4	9,2	264	180	251,7	–
NU1030-M1	**XL**	4,93	**150**	225	35	2,1	1,5	4,2	205,5	169,5	199	–
N230-E-M1	**XL**	11,7	**150**	270	45	3	3	4	242	182	–	193,1
NU230-E-M1	**XL**	11,8	**150**	270	45	3	3	4	242	182	233,2	–
NU2230-E-M1	**XL**	18,4	**150**	270	73	3	3	7,5	242	182	233,2	–
N330-E-M1	**XL**	26,8	**150**	320	65	4	4	5,5	283	193	–	209,5
NU330-E-M1	**XL**	26,8	**150**	320	65	4	4	5,5	283	193	269,8	–
NU2330-E-M1	**XL**	43,2	**150**	320	108	4	4	9,7	283	193	269,8	–
NU1032-M1	**XL**	5,92	**160**	240	38	2,1	1,5	4,3	220	180	212,9	–
N232-E-M1	**XL**	14,6	**160**	290	48	3	3	4,1	259	195	–	206,8
NU232-E-M1	**XL**	14,6	**160**	290	48	3	3	4,1	259	195	249,6	–
NU2232-E-M1	**XL**	23,5	**160**	290	80	3	3	7,2	261	193	251,1	–
N332-E-M1	–	32,6	**160**	340	68	4	4	5,5	300	204	–	221,6
NU332-E-M1	–	31,8	**160**	340	68	4	4	5,6	300	204	286	–
NU2332-E-M1	–	51,5	**160**	340	114	4	4	9,9	300	204	286	–
NU1034-M1	**XL**	8,03	**170**	260	42	2,1	2,1	4,8	237	193	229,1	–
N234-E-M1	**XL**	18	**170**	310	52	4	4	4,3	279	207	–	218,4
NU234-E-M1	**XL**	18,1	**170**	310	52	4	4	4,3	279	207	268,5	–
NU2234-E-M1	**XL**	29,4	**170**	310	86	4	4	7,2	281	205	269,9	–
N334-E-M1	–	37,9	**170**	360	72	4	4	5,9	318	218	–	237
NU334-E-M1	–	38	**170**	360	72	4	4	6	318	218	301,6	–
NU2334-EX-M1	–	61,4	**170**	360	120	4	4	10,2	320	216	303	–
NU1036-M1	**XL**	10,5	**180**	280	46	2,1	2,1	5	255	205	245,9	–
N236-E-M1	**XL**	18,9	**180**	320	52	4	4	4,7	289	217	–	230,2
NU236-E-M1	**XL**	18,9	**180**	320	52	4	4	4,7	289	217	278,6	–
NU2236-E-M1	**XL**	30,5	**180**	320	86	4	4	7,2	291	215	280	–
NU336-E-M1	–	43,9	**180**	380	75	4	4	6,1	335	231	319,8	–
NU2336-EX-M1	–	71,8	**180**	380	126	4	4	10,5	339	227	320,8	–



[1] Axial displacement “s” for N and NU



Mounting dimensions for N

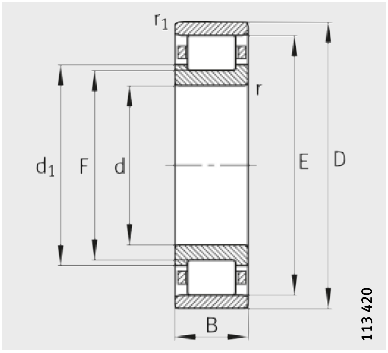


Mounting dimensions for NU

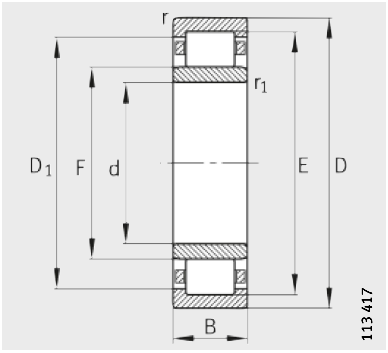
Mounting dimensions								Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
d_a		d_b	D_a	D_b	D_c	r_a	r_{a1}	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
min.	max.	min.	max.	min.	max.	max.	max.	N	N	N	min^{-1}	min^{-1}
146	156	161	201	–	–	2	1	216 000	265 000	32 000	5 300	3 250
154	–	–	236	227	223	2,5	2,5	460 000	510 000	72 000	4 800	2 600
154	166	171	236	–	–	2,5	2,5	460 000	510 000	59 000	4 800	2 600
154	166	171	236	–	–	2,5	2,5	670 000	830 000	123 000	4 500	2 080
157	–	–	283	266	262	3	3	790 000	800 000	113 000	3 800	2 200
157	176	182	283	–	–	3	3	790 000	800 000	92 000	2 400	2 200
157	176	182	283	–	–	3	3	1 210 000	1 390 000	202 000	3 600	1 640
158	167	173	215	–	–	2,1	1,5	248 000	310 000	37 000	5 000	3 100
164	–	–	256	244	240	2,5	2,5	520 000	590 000	82 000	4 500	2 390
164	179	184	256	–	–	2,5	2,5	520 000	590 000	68 000	4 500	2 390
164	179	184	256	–	–	2,5	2,5	780 000	970 000	142 000	4 300	1 860
167	–	–	303	285	281	3	3	900 000	930 000	126 000	3 600	1 970
167	190	195	303	–	–	3	3	900 000	930 000	103 000	3 600	1 970
167	190	195	303	–	–	3	3	1 380 000	1 600 000	226 000	3 200	1 480
168	178	184	230	–	–	2,1	1,5	290 000	355 000	42 500	4 800	3 000
174	–	–	276	261	257	2,5	2,5	590 000	670 000	93 000	4 300	2 190
174	192	197	276	–	–	2,5	2,5	590 000	670 000	76 000	4 300	2 190
174	192	197	276	–	–	2,5	2,5	940 000	1 170 000	172 000	3 800	1 670
177	–	–	323	302	298	3	3	865 000	1 060 000	114 000	3 000	1 790
177	200	211	323	–	–	3	3	865 000	1 060 000	96 000	3 000	1 790
177	200	211	323	–	–	3	3	1 320 000	1 830 000	204 000	3 000	1 350
180	190	197	250	–	–	2,1	2,1	350 000	435 000	49 500	4 500	2 800
187	–	–	293	281	277	3	3	700 000	780 000	107 000	3 600	2 010
187	204	211	293	–	–	3	3	700 000	780 000	88 000	3 600	2 010
187	204	211	293	–	–	3	3	1 130 000	1 400 000	198 000	3 200	1 500
187	–	–	343	320	316	3	3	965 000	1 220 000	132 000	3 000	1 630
187	215	221	343	–	–	3	3	965 000	1 220 000	105 000	3 000	1 630
187	214	218	343	–	–	3	3	1 500 000	2 080 000	231 000	2 800	1 230
190	203	209	270	–	–	2,1	2,1	425 000	520 000	61 000	4 500	2 550
197	–	–	303	292	286	3	3	730 000	830 000	112 000	3 600	1 880
197	214	221	303	–	–	3	3	730 000	830 000	93 000	3 600	1 880
197	214	221	303	–	–	3	3	1 180 000	1 490 000	209 000	3 200	1 390
197	228	234	363	–	–	3	3	1 040 000	1 320 000	112 000	2 800	1 520
197	225	229	363	–	–	3	3	1 660 000	2 320 000	260 000	2 800	1 130

Cylindrical roller bearings with cage

Non-locating bearings



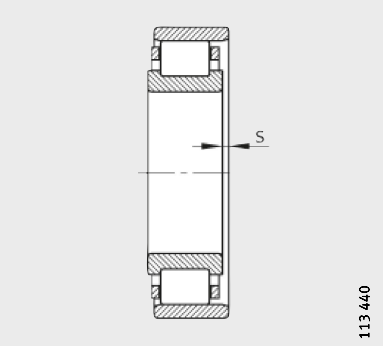
N



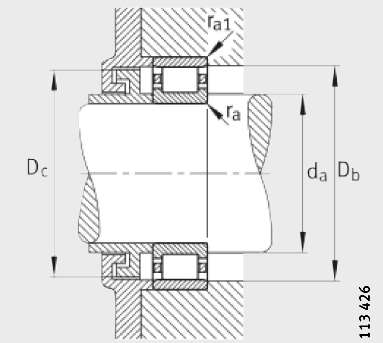
NU

Dimension table (continued) · Dimensions in mm

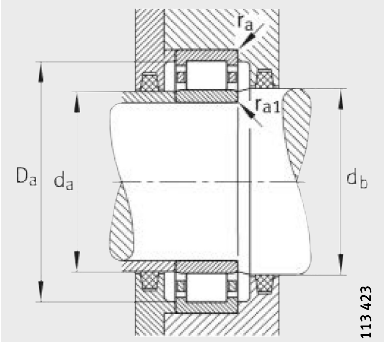
Designation		Mass	Dimensions									
	X-life	m ≈kg	d	D	B	r min.	r_1 min.	$s^{1)}$	E	F	D_1 ≈	d_1 ≈
NU1038-M1	**XL**	10,9	**190**	290	46	2,1	2,1	5	265	215	255,9	–
N238-E-M1	–	22,8	**190**	340	55	4	4	4,7	306	230	–	244
NU238-E-M1	–	22,8	**190**	340	55	4	4	4,7	306	230	295	–
NU2238-E-M1	–	37,1	**190**	340	92	4	4	8	308	228	296,4	–
NU338-E-M1	–	50,6	**190**	400	78	5	5	6,3	353	245	336	–
NU2338-EX-M1	–	83,1	**190**	400	132	5	5	11	360	240	340,5	–
NU1040-M1	**XL**	14,1	**200**	310	51	2,1	2,1	8,3	281	229	271,5	–
N240-E-M1	–	27,2	**200**	360	58	4	4	4,8	323	243	–	257,6
NU240-E-M1	–	27,2	**200**	360	58	4	4	4,8	323	243	311,5	–
NU2240-E-M1	–	44,7	**200**	360	98	4	4	8,2	325	241	312,9	–
NU340-E-M1	–	57,3	**200**	420	80	5	5	6,3	370	258	351,8	–
NU2340-EX-M1	–	95,6	**200**	420	138	5	5	11,3	377	253	356,9	–
NU1044-M1	–	20,5	**220**	340	56	3	3	6,2	310	250	298,9	–
NU244-E-M1	–	38,5	**220**	400	65	4	4	5,5	358	268	344,9	–
NU2244-EX-M1	–	61,6	**220**	400	108	4	4	8,4	367	259	349,4	–
NU344-E-M1	–	75,5	**220**	460	88	5	5	7	406	282	386	–
NU2344-EX-M1	–	121	**220**	460	145	5	5	11,9	413	277	391,2	–
NU1048-M1	–	19,8	**240**	360	56	3	3	6,4	330	270	318,9	–
N248-E-M1	–	51,5	**240**	440	72	4	4	6	393	293	–	312
NU248-E-M1	–	51,8	**240**	440	72	4	4	6	393	293	376,6	–
NU2248-EX-M1	–	82,8	**240**	440	120	4	4	10,2	399	287	380,7	–
NU348-E-M1	–	95,7	**240**	500	95	5	5	7,4	442	306	421,2	–
NU2348-EX-M1	–	151	**240**	500	155	5	5	13,3	447	303	424	–
NU1052-M1	–	29,7	**260**	400	65	4	4	7,2	364	296	351,3	–
NU252-E-M1	–	68,4	**260**	480	80	5	5	6,2	429	317	410,8	–
NU2252-E-M1	–	109	**260**	480	130	5	5	10,5	433	313	413,6	–
NU352-E-M1	–	121	**260**	540	102	6	6	10	477	337	454,6	–
NU2352-EX-M1	–	189	**260**	540	165	6	6	13,7	484	324	458,4	–
NU1056-M1	–	31,3	**280**	420	65	4	4	7,2	384	316	371,3	–
NU256-E-M1	–	72,1	**280**	500	80	5	5	6,3	449	337	430,8	–
NU2256-E-M1	–	114	**280**	500	130	5	5	10,5	453	333	436	–
NU356-E-M1	–	147	**280**	580	108	6	6	8,7	512	362	488	–
NU2356-EX-M1	–	234	**280**	580	175	6	6	13,8	521	351	493,8	–



[1] Axial displacement “s” for N and NU



Mounting dimensions for N

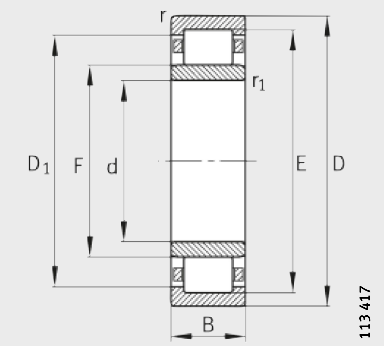


Mounting dimensions for NU

Mounting dimensions								Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
d_a		d_b	D_a	D_b	D_c	r_a	r_{a1}	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
min.	max.	min.	max.	min.	max.	max.	max.	N	N	N	min^{-1}	min^{-1}
200	213	219	280	–	–	2,1	2,1	435 000	550 000	63 000	4 300	2 410
207	–	–	323	309	303	3	3	680 000	930 000	100 000	3 200	1 750
207	227	234	323	–	–	3	3	680 000	930 000	85 000	3 200	1 750
207	227	234	323	–	–	3	3	1 100 000	1 660 000	184 000	3 000	1 300
210	242	248	380	–	–	4	4	1 120 000	1 430 000	120 000	2 800	1 430
210	237,8	242,2	380	–	–	4	4	1 900 000	2 650 000	285 000	2 600	1 030
210	226	233	300	–	–	2,1	2,1	470 000	600 000	68 000	3 800	2 310
217	–	–	343	326	320	3	3	750 000	1 040 000	110 000	3 000	1 620
217	240	247	343	–	–	3	3	750 000	1 040 000	94 000	3 000	1 620
217	240	247	343	–	–	3	3	1 220 000	1 860 000	206 000	2 800	1 210
220	255	261	400	–	–	4	4	1 180 000	1 530 000	128 000	2 600	1 340
220	250,7	255,3	400	–	–	4	4	2 040 000	2 900 000	310 000	2 400	960
232	248	254	328	–	–	2,5	2,5	510 000	765 000	69 000	3 200	2 040
237	265	271	383	–	–	3	3	950 000	1 320 000	109 000	2 800	1 400
237	256,7	261,3	383	–	–	3	3	1 630 000	2 360 000	250 000	2 600	1 020
240	279	285	440	–	–	4	4	1 430 000	1 900 000	152 000	2 400	1 160
240	274,7	279,3	440	–	–	4	4	2 360 000	3 350 000	340 000	2 200	840
252	268	275	348	–	–	2,5	2,5	540 000	850 000	74 000	3 000	1 840
257	–	–	423	396	390	3	3	1 140 000	1 600 000	163 000	2 600	1 240
257	290	296	423	–	–	3	3	1 140 000	1 600 000	132 000	2 600	1 240
257	284,5	289,5	423	–	–	3	3	1 830 000	2 800 000	295 000	2 400	910
260	303	309	480	–	–	4	4	1 730 000	2 280 000	176 000	2 200	1 010
260	300,5	305,5	480	–	–	4	4	2 600 000	3 750 000	375 000	2 000	770
275	292	300	385	–	–	3	3	655 000	1 020 000	90 000	2 800	1 690
280	314	320	460	–	–	4	4	1 340 000	1 900 000	154 000	2 400	1 120
280	310	316	460	–	–	4	4	2 160 000	3 350 000	345 000	2 200	790
286	334,3	339,7	514	–	–	5	5	1 900 000	2 600 000	198 000	2 000	920
286	321,3	326,7	514	–	–	5	5	3 100 000	4 500 000	435 000	1 800	670
295	312	321	405	–	–	3	3	680 000	1 100 000	96 000	2 800	1 550
300	334	340	480	–	–	4	4	1 400 000	2 000 000	163 000	2 200	1 040
300	330	336	480	–	–	4	4	2 280 000	3 600 000	360 000	2 000	730
306	359	366	554	–	–	5	5	2 160 000	3 050 000	224 000	1 900	810
306	348	354	554	–	–	5	5	3 550 000	5 200 000	495 000	1 600	600

Cylindrical roller bearings with cage

Non-locating bearings



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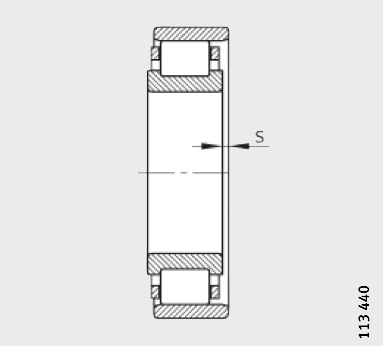
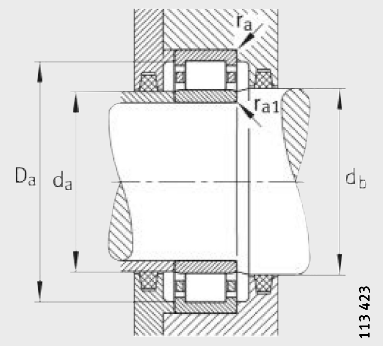


1) Axial displacement “s” for N and NU

Dimension table (continued) · Dimensions in mm

Designation	Mass	Dimensions								
	m	d	D	B	r	r_1	s[1)]	E	F	D_1
	≈kg				min.	min.				≈
NU1060-M1	44,6	**300**	460	74	4	4	7,9	420	340	405,2
NU260-E-M1	90,4	**300**	540	85	5	5	6,9	484	364	464,6
NU2260-EX-M1	143	**300**	540	140	5	5	12,2	495	355	472,6
NU1064-M1	46,9	**320**	480	74	4	4	11,5	440	360	425,1
NU264-EX-M1	113	**320**	580	92	5	5	7,5	520	392	499,4
NU2264-EX-M1	180	**320**	580	150	5	5	11,9	530	380	506
NU1068-M1	63,2	**340**	520	82	5	5	12,5	475	385	458,2
NU1072-M1	66	**360**	540	82	5	5	12,5	495	405	478,1
NU2272-E-M1	254	**360**	650	170	6	6	15	588	428	562
NU1076-M1	69,1	**380**	560	82	5	5	9	515	425	498,1
NU2276-E-M1	288	**380**	680	175	6	6	13,8	615	451	588,8
NU1080-M1	89,8	**400**	600	90	5	5	13,5	550	450	531,5
NU1084-M1	92,9	**420**	620	90	5	5	9,6	570	470	551,5
NU1088-M1	107	**440**	650	94	6	6	9,8	597	493	577,6
NU1992-M1	63,1	**460**	620	74	4	4	8,4	578	502	562,8
NU1092-M1	125	**460**	680	100	6	6	11,2	624	516	603,9
NU1996-M1	74,2	**480**	650	78	5	5	6,8	605	525	589
NU1096-M1	129	**480**	700	100	6	6	10,7	644	536	623,9
NU10/500-M1	133	**500**	720	100	6	6	10,7	664	556	643,9
NU19/560-M1	105	**560**	750	85	5	5	9,6	700	610	682
NU10/560-M1	213	**560**	820	115	6	6	9,8	754	626	731
NU19/600-M1	125	**600**	800	90	5	5	9,9	748	652	730,7
NU19/670-M1	186	**670**	900	103	6	6	11,3	839	731	817
NU19/710-M1	213	**710**	950	106	6	6	9,3	886	774	867,7

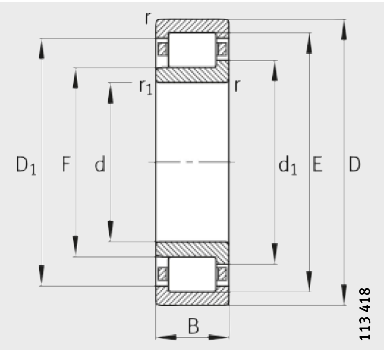


Mounting dimensions for NU

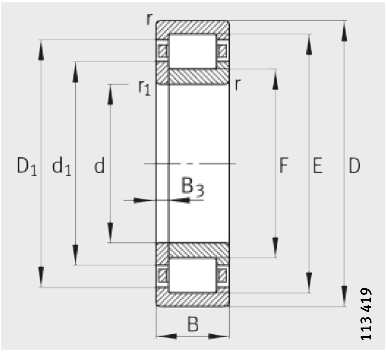
Mounting dimensions						Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
d_a		d_b	D_a	r_a	r_{a1}	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
min.	max.	min.	max.	max.	max.	N	N	N	min^{-1}	min^{-1}
315	336	345	445	3	3	900 000	1 430 000	120 000	2 400	1 390
320	359	367	520	4	4	1 600 000	2 320 000	182 000	2 000	930
320	352	358	520	4	4	2 700 000	4 150 000	395 000	1 900	660
335	356	365	465	3	3	915 000	1 500 000	124 000	2 400	1 300
340	388,5	395,5	560	4	4	1 800 000	2 700 000	204 000	1 900	850
340	376,5	383,5	560	4	4	3 150 000	4 900 000	460 000	1 600	580
357	381	390	503	4	4	1 120 000	1 830 000	147 000	2 200	1 190
377	400	410	523	4	4	1 140 000	1 900 000	151 000	2 200	1 120
386	424	432	624	5	5	3 600 000	5 700 000	520 000	1 400	520
397	420	430	543	4	4	1 180 000	2 000 000	156 000	2 000	1 050
406	446	456	654	5	5	4 050 000	6 700 000	610 000	1 400	455
417	445	455	583	4	4	1 370 000	2 320 000	177 000	1 900	980
437	465	475	603	4	4	1 400 000	2 450 000	183 000	1 800	920
463	488	498	627	5	5	1 560 000	2 750 000	203 000	1 600	860
475	498	506	605	3	3	1 020 000	1 960 000	135 000	1 800	–
483	510	522	657	5	5	1 660 000	3 000 000	218 000	1 600	820
497	521	529	633	4	4	1 140 000	2 240 000	172 000	1 800	–
503	530	542	677	5	5	1 700 000	3 100 000	225 000	1 500	780
523	550	562	697	5	5	1 760 000	3 200 000	232 000	1 500	750
577	606	614	733	4	4	1 460 000	3 000 000	215 000	1 400	–
583	620	632	797	5	5	2 700 000	5 100 000	355 000	1 200	590
617	647	657	783	4	4	1 700 000	3 450 000	249 000	1 400	–
693	726	736	877	5	5	2 040 000	4 250 000	300 000	1 200	–
733	769	779	927	5	5	2 240 000	4 750 000	300 000	1 100	–

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



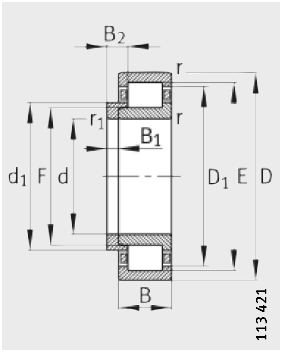
NJ
Semi-locating bearings



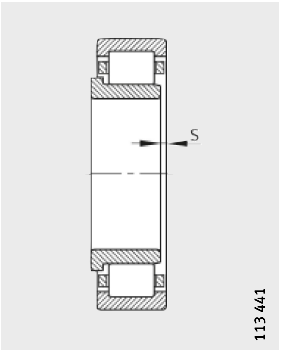
NUP
Locating bearings

Dimension table · Dimensions in mm

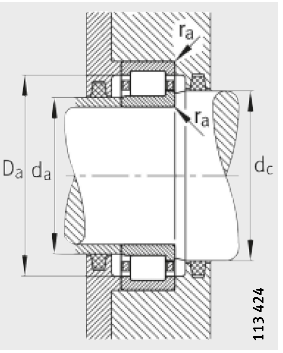
Designation			Mass m		Dimensions									
Bearing	X-life	L-section ring	Bearing ≈kg	L-section ring ≈kg	d	D	B	r min.	r_1 min.	$s^{1)}$	E	F	D_1 ≈	d_1 ≈
NJ202-E-TVP2	**XL**	–	0,049	–	**15**	35	11	0,6	0,3	1,6	30,3	19,3	28	21,6
NJ202-E-TVP2	**XL**	**HJ202-E**	0,049	0,005	**15**	35	11	0,6	0,3	–	30,3	19,3	28	21,6
NJ203-E-TVP2	**XL**	–	0,07	–	**17**	40	12	0,6	0,3	1,2	35,1	22,1	32,5	24,7
NJ203-E-TVP2	**XL**	**HJ203-E**	0,07	0,008	**17**	40	12	0,6	0,3	–	35,1	22,1	32,5	24,7
NUP203-E-TVP2	**XL**	–	0,073	–	**17**	40	12	0,6	0,3	–	35,1	22,1	32,5	24,7
NJ2203-E-TVP2	**XL**	–	0,053	–	**17**	40	16	0,6	0,3	1,7	35,1	22,1	32,5	24,7
NJ2203-E-TVP2	**XL**	**HJ2203-E**	0,053	0,008	**17**	40	16	0,6	0,3	–	35,1	22,1	32,5	24,7
NUP2203-E-TVP2	**XL**	–	0,055	–	**17**	40	16	0,6	0,6	–	35,1	22,1	32,5	24,7
NJ303-E-TVP2	**XL**	–	0,124	–	**17**	47	14	1	0,6	1,2	40,2	24,2	37,1	27,6
NJ303-E-TVP2	**XL**	**HJ303-E**	0,124	0,014	**17**	47	14	1	0,6	–	40,2	24,2	37,1	27,6
NUP303-E-TVP2	**XL**	–	0,142	–	**17**	47	14	1	0,6	–	40,2	24,2	37,1	27,6
NJ204-E-TVP2	**XL**	–	0,117	–	**20**	47	14	1	0,6	1	41,5	26,5	38,8	29,7
NJ204-E-TVP2	**XL**	**HJ204-E**	0,117	0,011	**20**	47	14	1	0,6	–	41,5	26,5	38,8	29,7
NUP204-E-TVP2	**XL**	–	0,119	–	**20**	47	14	1	0,6	–	41,5	26,5	38,8	29,7
NJ2204-E-TVP2	**XL**	–	0,15	–	**20**	47	18	1	0,6	1,8	41,5	26,5	38,8	29,7
NJ2204-E-TVP2	**XL**	**HJ2204-E**	0,15	0,012	**20**	47	18	1	0,6	–	41,5	26,5	38,8	29,7
NUP2204-E-TVP2	**XL**	–	0,154	–	**20**	47	18	1	0,6	–	41,5	26,5	38,8	29,7
NJ304-E-TVP2	**XL**	–	0,156	–	**20**	52	15	1,1	0,6	1	45,5	27,5	42,4	31,3
NJ304-E-TVP2	**XL**	**HJ304-E**	0,156	0,017	**20**	52	15	1,1	0,6	–	45,5	27,5	42,4	31,3
NUP304-E-TVP2	**XL**	–	0,16	–	**20**	52	15	1,1	0,6	–	45,5	27,5	42,4	31,3
NJ2304-E-TVP2	**XL**	–	0,219	–	**20**	52	21	1,1	0,6	1,9	45,5	27,5	42,4	31,3
NJ2304-E-TVP2	**XL**	**HJ2304-E**	0,219	0,019	**20**	52	21	1,1	0,6	–	45,5	27,5	42,4	31,3
NUP2304-E-TVP2	**XL**	–	0,224	–	**20**	52	21	1,1	0,6	–	45,5	27,5	42,4	31,3
NJ205-E-TVP2	**XL**	–	0,14	–	**25**	52	15	1	0,6	1,2	46,5	31,5	43,8	34,7
NJ205-E-TVP2	**XL**	**HJ205-E**	0,14	0,014	**25**	52	15	1	0,6	–	46,5	31,5	43,8	34,7
NUP205-E-TVP2	**XL**	–	0,145	–	**25**	52	15	1	0,6	–	46,5	31,5	43,8	34,7
NJ2205-E-TVP2	**XL**	–	0,17	–	**25**	52	18	1	0,6	1,7	46,5	31,5	43,8	34,7
NJ2205-E-TVP2	**XL**	**HJ2205-E**	0,17	0,015	**25**	52	18	1	0,6	–	46,5	31,5	43,8	34,7
NUP2205-E-TVP2	**XL**	–	0,174	–	**25**	52	18	1	0,6	–	46,5	31,5	43,8	34,7
NJ305-E-TVP2	**XL**	–	0,25	–	**25**	62	17	1,1	1,1	1,5	54	34	50,7	38,1
NJ305-E-TVP2	**XL**	**HJ305-E**	0,25	0,025	**25**	62	17	1,1	1,1	–	54	34	50,7	38,1
NUP305-E-TVP2	**XL**	–	0,256	–	**25**	62	17	1,1	1,1	–	54	34	50,7	38,1
NJ2305-E-TVP2	**XL**	–	0,356	–	**25**	62	24	1,1	1,1	1,9	54	34	50,7	38,1
NJ2305-E-TVP2	**XL**	**HJ2305-E**	0,356	0,027	**25**	62	24	1,1	1,1	–	54	34	50,7	38,1
NUP2305-E-TVP2	**XL**	–	0,364	–	**25**	62	24	1,1	1,1	–	54	34	50,7	38,1



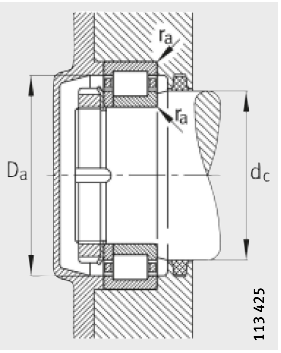
NJ and HJ
Locating bearings



1) Axial displacement “s” for NJ



Mounting dimensions for NJ



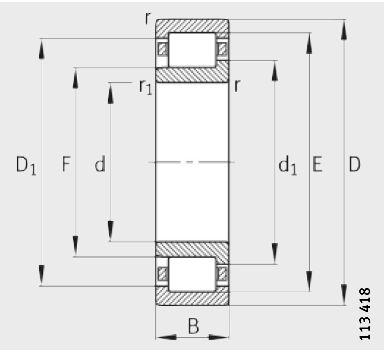
Mounting dimensions for NUP

			Mounting dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
B_1	B_2	B_3	d_a		d_c	D_a	r_a	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
			min.[2]	max.	min.	max.[2]	max.	N	N	N	min^{-1}	min^{-1}
–	–	–	17,4	18,5	22	32,6	0,6	15 100	10 400	1 460	22 000	17 600
2,5	5	–	17,4	–	22	32,6	0,6	15 100	10 400	1 460	22 000	17 600
–	–	–	21	21,5	28	36	0,6	20 800	14 600	2 100	18 000	15 400
3	5,5	–	21	–	28	36	0,6	20 800	14 600	2 100	18 000	15 400
–	–	2,5	21	–	28	36	0,6	20 800	14 600	2 110	18 000	15 400
–	–	–	21	21,5	26	36	0,6	28 500	21 900	3 500	18 000	13 300
3	6	–	21	–	26	36	0,6	28 500	21 900	3 500	18 000	13 300
–	–	3	21	–	26	36	0,6	28 500	21 900	3 500	18 000	13 300
–	–	–	21,2	23,5	28	42,8	1	30 000	21 200	3 300	16 000	13 700
4	6,5	–	21,2	–	28	42,8	1	30 000	21 200	3 300	16 000	13 700
–	–	2,5	21,2	–	28	42,8	1	30 000	21 200	3 250	16 000	13 700
–	–	–	24	26	32	41	1	32 500	24 700	3 850	16 000	13 100
3	5,5	–	24	–	32	41	1	32 500	24 700	3 850	16 000	13 100
–	–	2,5	24	–	32	41	1	32 500	24 700	3 850	16 000	13 100
–	–	–	24	26	32	41	1	38 500	31 000	5 000	16 000	11 400
3	6,5	–	24	–	32	41	1	38 500	31 000	5 000	16 000	11 400
–	–	3,5	24	–	32	41	1	38 500	31 000	5 000	16 000	11 400
–	–	–	24	27	33	45	1	36 500	26 000	4 050	14 000	12 100
4	6,5	–	24	–	33	45	1	36 500	26 000	4 050	14 000	12 100
–	–	2,5	24	–	33	45	1	36 500	26 000	4 050	14 000	12 100
–	–	–	24	27	33	45	1	48 500	38 000	6 300	14 000	9 900
4	7,5	–	24	–	33	45	1	48 500	38 000	6 300	14 000	9 900
–	–	3,5	24	–	33	45	1	48 500	38 000	6 300	14 000	9 900
–	–	–	29	31	37	46	1	34 500	27 500	4 350	15 000	11 800
3	6	–	29	–	37	46	1	34 500	27 500	4 350	15 000	11 800
–	–	3	29	–	37	46	1	34 500	27 500	4 350	15 000	11 800
–	–	–	29	31	37	46	1	41 500	34 500	5 700	15 000	9 800
3	6,5	–	29	–	37	46	1	41 500	34 500	5 700	15 000	9 800
–	–	3,5	29	–	37	46	1	41 500	34 500	5 700	15 000	9 800
–	–	–	32	33	40	55	1	48 000	36 500	5 800	12 000	10 200
4	7	–	32	–	40	55	1	48 000	36 500	5 800	12 000	10 200
–	–	3	32	–	40	55	1	48 000	36 500	5 800	12 000	10 200
–	–	–	32	33	40	55	1	66 000	55 000	9 400	12 000	8 400
4	8	–	32	–	40	55	1	66 000	55 000	9 400	12 000	8 400
–	–	4	32	–	40	55	1	66 000	55 000	9 400	12 000	8 400

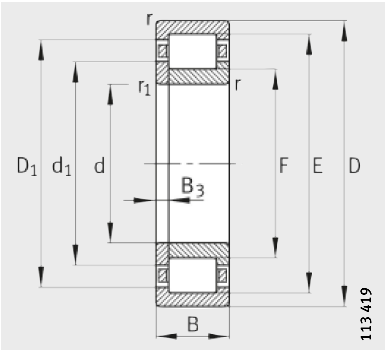
2) If axial load is present, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



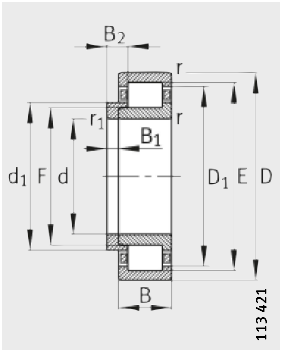
NJ
Semi-locating bearings



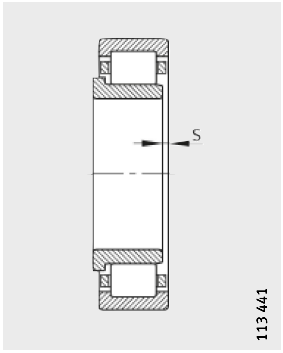
NUP
Locating bearings

Dimension table (continued) · Dimensions in mm

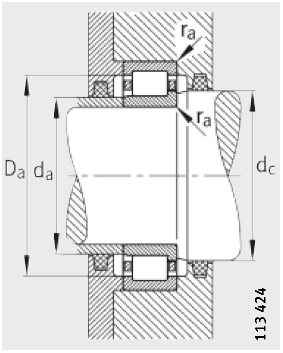
Designation			Mass m		Dimensions									
Bearing	X-life	L-section ring	Bearing ≈kg	L-section ring ≈kg	d	D	B	r min.	r_1 min.	$s^{1)}$	E	F	D_1 ≈	d_1 ≈
NJ206-E-TVP2	**XL**	–	0,213	–	**30**	62	16	1	0,6	1,5	55,5	37,5	52,5	41,1
NJ206-E-TVP2	**XL**	**HJ206-E**	0,213	0,024	**30**	62	16	1	0,6	–	55,5	37,5	52,5	41,1
NUP206-E-TVP2	**XL**	–	0,219	–	**30**	62	16	1	0,6	–	55,5	37,5	52,5	41,1
NJ2206-E-TVP2	**XL**	–	0,261	–	**30**	62	20	1	0,6	1,6	55,5	37,5	52,5	41,3
NJ2206-E-TVP2	**XL**	**HJ2206-E**	0,261	0,025	**30**	62	20	1	0,6	–	55,5	37,5	52,5	41,3
NUP2206-E-TVP2	**XL**	–	0,268	–	**30**	62	20	1	0,6	–	55,5	37,5	52,5	41,3
NJ306-E-TVP2	**XL**	–	0,376	–	**30**	72	19	1,1	1,1	1,2	62,5	40,5	59,2	45
NJ306-E-TVP2	**XL**	**HJ306-E**	0,376	0,042	**30**	72	19	1,1	1,1	–	62,5	40,5	59,2	45
NUP306-E-TVP2	**XL**	–	0,385	–	**30**	72	19	1,1	1,1	–	62,5	40,5	59,2	45
NJ2306-E-TVP2	**XL**	–	0,54	–	**30**	72	27	1,1	1,1	2,2	62,5	40,5	59,2	45
NJ2306-E-TVP2	**XL**	**HJ2306-E**	0,54	0,044	**30**	72	27	1,1	1,1	–	62,5	40,5	59,2	45
NUP2306-E-TVP2	**XL**	–	0,551	–	**30**	72	27	1,1	1,1	–	62,5	40,5	59,2	45
NJ406-M1	**XL**	–	0,859	–	**30**	90	23	1,5	1,5	2,3	73	45	68,4	50,3
NJ406-M1	**XL**	**HJ406**	0,859	0,082	**30**	90	23	1,5	1,5	–	73	45	68,4	50,3
NJ207-E-TVP2	**XL**	–	0,309	–	**35**	72	17	1,1	0,6	0,7	64	44	61	48
NJ207-E-TVP2	**XL**	**HJ207-E**	0,309	0,032	**35**	72	17	1,1	0,6	–	64	44	61	48
NUP207-E-TVP2	**XL**	–	0,317	–	**35**	72	17	1,1	0,6	–	64	44	61	48
NJ2207-E-TVP2	**XL**	–	0,416	–	**35**	72	23	1,1	0,6	2,2	64	44	61	48
NJ2207-E-TVP2	**XL**	**HJ2207-E**	0,416	0,035	**35**	72	23	1,1	0,6	–	64	44	61	48
NUP2207-E-TVP2	**XL**	–	0,427	–	**35**	72	23	1,1	0,6	–	64	44	61	48
NJ307-E-TVP2	**XL**	–	0,496	–	**35**	80	21	1,5	1,1	0,6	70,2	46,2	66,6	51
NJ307-E-TVP2	**XL**	**HJ307-E**	0,496	0,06	**35**	80	21	1,5	1,1	–	70,2	46,2	66,6	51
NUP307-E-TVP2	**XL**	–	0,506	–	**35**	80	21	1,5	1,1	–	70,2	46,2	66,6	51
NJ2307-E-TVP2	**XL**	–	0,736	–	**35**	80	31	1,5	1,1	2,1	70,2	46,2	66,6	51
NJ2307-E-TVP2	**XL**	**HJ2307-E**	0,736	0,063	**35**	80	31	1,5	1,1	–	70,2	46,2	66,6	51
NUP2307-E-TVP2	**XL**	–	0,751	–	**35**	80	31	1,5	1,5	–	70,2	46,2	66,6	51
NJ407-M1	**XL**	–	1,16	–	**35**	100	25	1,5	1,5	2,6	83	53	78,2	58,8
NJ407-M1	**XL**	**HJ407**	1,16	0,127	**35**	100	25	1,5	1,5	–	83	53	78,2	58,8



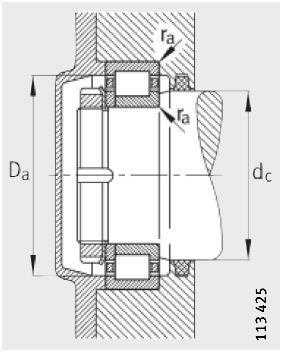
NJ and HJ
Locating bearings



1) Axial displacement “s” for NJ



Mounting dimensions for NJ



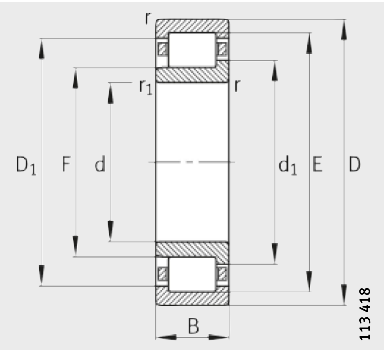
Mounting dimensions for NUP

			Mounting dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
B_1	B_2	B_3	d_a		d_c	D_a	r_a	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
			min.[2]	max.	min.	max.[2]	max.	N	N	N	min^{-1}	min^{-1}
–	–	–	34	37	44	56	1	45 000	36 000	5 700	12 000	9 800
4	7	–	34	–	44	56	1	45 000	36 000	5 700	12 000	9 800
–	–	3	34	–	44	56	1	45 000	36 000	5 700	12 000	9 800
–	–	–	34	37	44	56	1	57 000	48 500	8 100	12 000	8 200
4	7,5	–	34	–	44	56	1	57 000	48 500	8 100	12 000	8 200
–	–	3,5	34	–	44	56	1	57 000	48 500	8 100	12 000	8 200
–	–	–	37	40	48	65	1	61 000	48 000	8 000	10 000	9 000
5	8,5	–	37	–	48	65	1	61 000	48 000	8 000	10 000	9 000
–	–	3,5	37	–	48	65	1	61 000	48 000	8 000	10 000	9 000
–	–	–	37	40	48	65	1	86 000	75 000	13 200	10 000	7 300
5	9,5	–	37	–	48	65	1	86 000	75 000	13 200	10 000	7 300
–	–	4,5	37	–	48	65	1	86 000	75 000	13 200	10 000	7 300
–	–	–	41	44	52	79	1,5	83 000	64 000	8 500	14 000	–
7	11,5	–	41	–	52	79	1,5	83 000	64 000	8 500	14 000	–
–	–	–	39	43	50	65	1	58 000	48 500	7 900	10 000	8 300
4	7	–	39	–	50	65	1	58 000	48 500	7 900	10 000	8 300
–	–	3	39	–	50	65	1	58 000	48 500	7 900	10 000	8 300
–	–	–	39	43	50	65	1	72 000	64 000	10 800	10 000	7 300
4	8,5	–	39	–	50	65	1	72 000	64 000	10 800	10 000	7 300
–	–	4,5	39	–	50	65	1	72 000	64 000	10 800	10 000	7 300
–	–	–	42	45	53	71	1,5	76 000	63 000	10 700	9 000	8 100
6	9,5	–	42	–	53	71	1,5	76 000	63 000	10 700	9 000	8 100
–	–	3,5	42	–	53	71	1,5	76 000	63 000	10 700	9 000	8 100
–	–	–	42	45	53	71	1,5	108 000	98 000	17 400	9 000	6 700
6	11	–	42	–	53	71	1,5	108 000	98 000	17 400	9 000	6 700
–	–	5	42	–	53	71	1,5	108 000	98 000	17 400	9 000	6 700
–	–	–	46	52	61	89	1,5	102 000	83 000	13 600	12 000	–
8	13	–	46	–	61	89	1,5	102 000	83 000	13 600	12 000	–

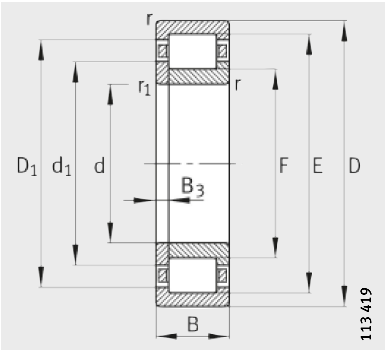
2) If axial load is present, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



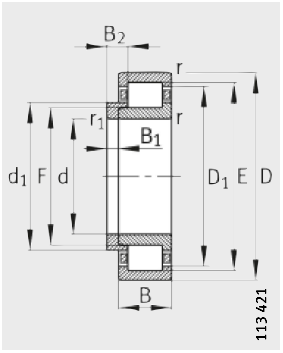
NJ
Semi-locating bearings



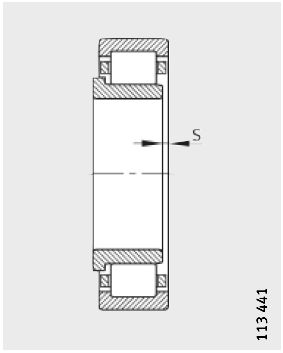
NUP
Locating bearings

Dimension table (continued) · Dimensions in mm

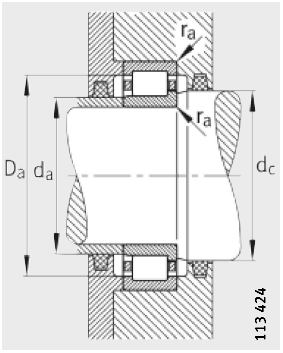
Designation			Mass m		Dimensions									
Bearing	X-life	L-section ring	Bearing ≈kg	L-section ring ≈kg	d	D	B	r min.	r_1 min.	$s^{1)}$	E	F	D_1 ≈	d_1 ≈
NJ208-E-TVP2	**XL**	–	0,389	–	**40**	80	18	1,1	1,1	1	71,5	49,5	68,3	54
NJ208-E-TVP2	**XL**	**HJ208-E**	0,389	0,049	**40**	80	18	1,1	1,1	–	71,5	49,5	68,3	54
NUP208-E-TVP2	**XL**	–	0,399	–	**40**	80	18	1,1	1,1	–	71,5	49,5	68,3	54
NJ2208-E-TVP2	**XL**	–	0,504	–	**40**	80	23	1,1	1,1	1,5	71,5	49,5	68,3	54
NJ2208-E-TVP2	**XL**	**HJ2208-E**	0,504	0,05	**40**	80	23	1,1	1,1	–	71,5	49,5	68,3	54
NUP2208-E-TVP2	**XL**	–	0,518	–	**40**	80	23	1,1	1,1	–	71,5	49,5	68,3	54
NJ308-E-TVP2	**XL**	–	0,674	–	**40**	90	23	1,5	1,5	1,3	80	52	75,9	57,6
NJ308-E-TVP2	**XL**	**HJ308-E**	0,674	0,087	**40**	90	23	1,5	1,5	–	80	52	75,9	57,6
NUP308-E-TVP2	**XL**	–	0,688	–	**40**	90	23	1,5	1,5	–	80	52	75,9	57,6
NJ2308-E-TVP2	**XL**	–	0,978	–	**40**	90	33	1,5	1,5	2,7	80	52	75,9	57,6
NJ2308-E-TVP2	**XL**	**HJ2308-E**	0,978	0,091	**40**	90	33	1,5	1,5	–	80	52	75,9	57,6
NUP2308-E-TVP2	**XL**	–	0,999	–	**40**	90	33	1,5	1,5	–	80	52	75,9	57,6
NJ408-M1	**XL**	–	1,5	–	**40**	110	27	2	2	2,8	92	58	86,4	64,6
NJ408-M1	**XL**	**HJ408**	1,5	0,148	**40**	110	27	2	2	–	92	58	86,4	64,6
NJ209-E-TVP2	**XL**	–	0,445	–	**45**	85	19	1,1	1,1	1,9	76,5	54,5	73,3	59
NJ209-E-TVP2	**XL**	**HJ209-E**	0,445	0,054	**45**	85	19	1,1	1,1	–	76,5	54,5	73,3	59
NUP209-E-TVP2	**XL**	–	0,457	–	**45**	85	19	1,1	1,1	–	76,5	54,5	73,3	59
NJ2209-E-TVP2	**XL**	–	0,544	–	**45**	85	23	1,1	1,1	1,5	76,5	54,5	73,3	59
NJ2209-E-TVP2	**XL**	**HJ2209-E**	0,544	0,055	**45**	85	23	1,1	1,1	–	76,5	54,5	73,3	59
NUP2209-E-TVP2	**XL**	–	0,559	–	**45**	85	23	1,1	1,1	–	76,5	54,5	73,3	59
NJ309-E-TVP2	**XL**	–	0,913	–	**45**	100	25	1,5	1,5	1	88,5	58,5	84,1	64,4
NJ309-E-TVP2	**XL**	**HJ309-E**	0,913	0,109	**45**	100	25	1,5	1,5	–	88,5	58,5	84,1	64,4
NUP309-E-TVP2	**XL**	–	0,937	–	**45**	100	25	1,5	1,5	–	88,5	58,5	84,1	64,4
NJ2309-E-TVP2	**XL**	–	1,33	–	**45**	100	36	1,5	1,5	2,5	88,5	58,5	84,1	64,4
NJ2309-E-TVP2	**XL**	**HJ2309-E**	1,33	0,115	**45**	100	36	1,5	1,5	–	88,5	58,5	84,1	64,4
NUP2309-E-TVP2	**XL**	–	1,36	–	**45**	100	36	1,5	1,5	–	88,5	58,5	84,1	64,4
NJ409-M1	**XL**	–	1,84	–	**45**	120	29	2	2	2,9	100,5	64,5	94,6	71,6
NJ409-M1	**XL**	**HJ409**	1,84	0,181	**45**	120	29	2	2	–	100,5	64,5	94,6	71,6



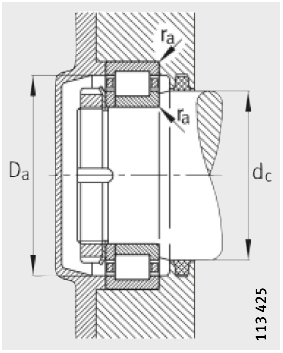
NJ and HJ
Locating bearings



1) Axial displacement “s” for NJ



Mounting dimensions for NJ



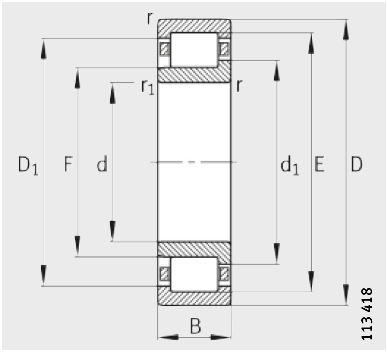
Mounting dimensions for NUP

			Mounting dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
B_1	B_2	B_3	d_a		d_c	D_a	r_a	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
			min.[2]	max.	min.	max.[2]	max.	N	N	N	min^{-1}	min^{-1}
–	–	–	47	49	56	73	1	63 000	53 000	8 700	9 000	7 600
5	8,5	–	47	–	56	73	1	63 000	53 000	8 700	9 000	7 600
–	–	3,5	47	–	56	73	1	63 000	53 000	8 700	9 000	7 600
–	–	–	47	49	56	73	1	83 000	75 000	12 900	9 000	6 400
5	9	–	47	–	56	73	1	83 000	75 000	12 900	9 000	6 400
–	–	4	47	–	56	73	1	83 000	75 000	12 900	9 000	6 400
–	–	–	49	51	60	81	1,5	95 000	78 000	12 900	7 500	7 300
7	11	–	49	–	60	81	1,5	95 000	78 000	12 900	7 500	7 300
–	–	4	49	–	60	81	1,5	95 000	78 000	12 900	7 500	7 300
–	–	–	49	51	60	81	1,5	132 000	119 000	20 700	7 500	6 000
7	12,5	–	49	–	60	81	1,5	132 000	119 000	20 700	7 500	6 000
–	–	5,5	49	–	60	81	1,5	132 000	119 000	20 700	7 500	6 000
–	–	–	53	57	67	97	2	119 000	95 000	15 800	11 000	–
8	13	–	53	–	67	97	2	119 000	95 000	15 800	11 000	–
–	–	–	52	54	61	78	1	72 000	63 000	10 600	8 500	7 100
5	8,5	–	52	–	61	78	1	72 000	63 000	10 600	8 500	7 100
–	–	3,5	52	–	61	78	1	72 000	63 000	10 600	8 500	7 100
–	–	–	52	54	61	78	1	87 000	82 000	14 100	8 500	5 800
5	9	–	52	–	61	78	1	87 000	82 000	14 100	8 500	5 800
–	–	4	52	–	61	78	1	87 000	82 000	14 100	8 500	5 800
–	–	–	54	57	66	91	1,5	115 000	98 000	16 400	6 700	6 500
7	11,5	–	54	–	66	91	1,5	115 000	98 000	16 400	6 700	6 500
–	–	4,5	54	–	66	91	1,5	115 000	98 000	16 400	6 700	6 500
–	–	–	54	57	66	91	1,5	162 000	153 000	27 000	6 700	5 400
7	13	–	54	–	66	91	1,5	162 000	153 000	27 000	6 700	5 400
–	–	6	54	–	66	91	1,5	162 000	153 000	27 000	6 700	5 400
–	–	–	58	63	74	107	2	143 000	119 000	16 000	6 000	–
8	13,5	–	58	–	74	107	2	143 000	119 000	16 000	6 000	–

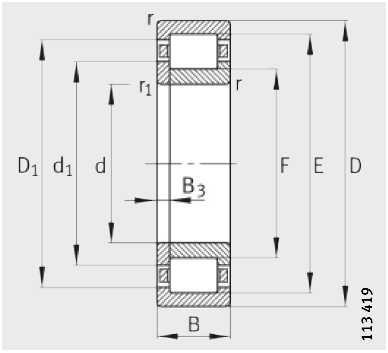
2) If axial load is present, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



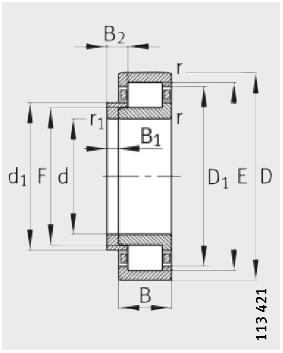
NJ
Semi-locating bearings



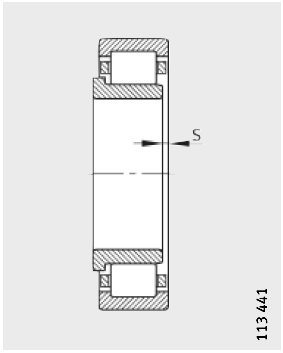
NUP
Locating bearings

Dimension table (continued) · Dimensions in mm

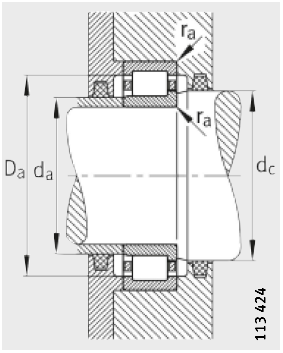
Designation			Mass m		Dimensions									
Bearing	X-life	L-section ring	Bearing ≈kg	L-section ring ≈kg	d	D	B	r min.	r_1 min.	$s^{1)}$	E	F	D_1 ≈	d_1 ≈
NJ210-E-TVP2	**XL**	–	0,503	–	**50**	90	20	1,1	1,1	1,3	81,5	59,5	78,3	64
NJ210-E-TVP2	**XL**	**HJ210-E**	0,503	0,06	**50**	90	20	1,1	1,1	–	81,5	59,5	78,3	64
NUP210-E-TVP2	**XL**	–	0,517	–	**50**	90	20	1,1	1,1	–	81,5	59,5	78,3	64
NJ2210-E-TVP2	**XL**	–	0,586	–	**50**	90	23	1,1	1,1	1,3	81,5	59,5	78,3	64
NJ2210-E-TVP2	**XL**	**HJ210-E**	0,586	0,06	**50**	90	23	1,1	1,1	–	81,5	59,5	78,3	64
NUP2210-E-TVP2	**XL**	–	0,597	–	**50**	90	23	1,1	1,1	–	81,5	59,5	78,3	64
NJ310-E-TVP2	**XL**	–	1,19	–	**50**	110	27	2	2	1,7	97	65	92,5	71,3
NJ310-E-TVP2	**XL**	**HJ310-E**	1,19	0,149	**50**	110	27	2	2	–	97	65	92,5	71,3
NUP310-E-TVP2	**XL**	–	1,21	–	**50**	110	27	2	2	–	97	65	92,5	71,3
NJ2310-E-TVP2	**XL**	–	1,77	–	**50**	110	40	2	2	4,2	97	65	92,5	71,3
NJ2310-E-TVP2	**XL**	**HJ2310-E**	1,77	0,156	**50**	110	40	2	2	–	97	65	92,5	71,3
NUP2310-E-TVP2	**XL**	–	1,82	–	**50**	110	40	2	2	–	97	65	92,5	71,3
NJ410-M1	**XL**	–	2,36	–	**50**	130	31	2,1	2,1	3	110,8	70,8	104,3	78,6
NJ410-M1	**XL**	**HJ410**	2,36	0,238	**50**	130	31	2,1	2,1	–	110,8	70,8	104,3	78,6
NJ211-E-TVP2	**XL**	–	0,679	–	**55**	100	21	1,5	1,1	0,8	90	66	86,6	70,8
NJ211-E-TVP2	**XL**	**HJ211-E**	0,679	0,087	**55**	100	21	1,5	1,1	–	90	66	86,6	70,8
NUP211-E-TVP2	**XL**	–	0,693	–	**55**	100	21	1,5	1,1	–	90	66	86,6	70,8
NJ2211-E-TVP2	**XL**	–	0,812	–	**55**	100	25	1,5	1,1	1,3	90	66	86,6	70,8
NJ2211-E-TVP2	**XL**	**HJ2211-E**	0,812	0,087	**55**	100	25	1,5	1,1	–	90	66	86,6	70,8
NUP2211-E-TVP2	**XL**	–	0,828	–	**55**	100	25	1,5	1,1	–	90	66	86,6	70,8
NJ311-E-TVP2	**XL**	–	1,51	–	**55**	120	29	2	2	1,8	106,5	70,5	101,4	77,5
NJ311-E-TVP2	**XL**	**HJ311-E**	1,51	0,192	**55**	120	29	2	2	–	106,5	70,5	101,4	77,5
NUP311-E-TVP2	**XL**	–	1,54	–	**55**	120	29	2	2	–	106,5	70,5	101,4	77,5
NJ2311-E-TVP2	**XL**	–	2,27	–	**55**	120	43	2	2	3,3	106,5	70,5	101,4	77,5
NJ2311-E-TVP2	**XL**	**HJ2311-E**	2,27	0,2	**55**	120	43	2	2	–	106,5	70,5	101,4	77,5
NUP2311-E-TVP2	**XL**	–	2,31	–	**55**	120	43	2	2	–	106,5	70,5	101,4	77,5
NJ411-M1	**XL**	–	2,88	–	**55**	140	33	2,1	2,1	3,3	117,2	77,2	110,7	85
NJ411-M1	**XL**	**HJ411**	2,88	0,302	**55**	140	33	2,1	2,1	–	117,2	77,2	110,7	85



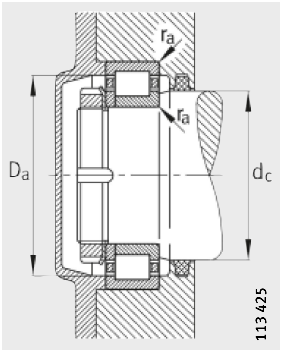
NJ and HJ
Locating bearings



1) Axial displacement “s” for NJ



Mounting dimensions for NJ



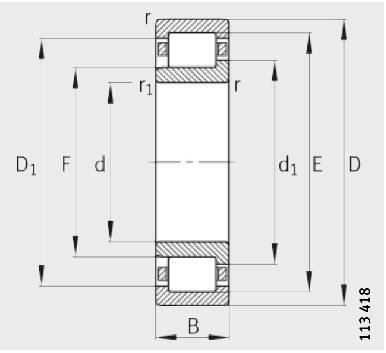
Mounting dimensions for NUP

			Mounting dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
B_1	B_2	B_3	d_a		d_c	D_a	r_a	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
			min.[2]	max.	min.	max.[2]	max.	N	N	N	min^{-1}	min^{-1}
–	–	–	57	58	67	83	1	75 000	69 000	11 500	8 000	6 700
5	9	–	57	–	67	83	1	75 000	69 000	11 500	8 000	6 700
–	–	4	57	–	67	83	1	75 000	69 000	11 500	8 000	6 700
–	–	–	57	58	67	83	1	92 000	88 000	15 300	8 000	5 400
5	9	–	57	–	67	83	1	92 000	88 000	15 300	8 000	5 400
–	–	4	57	–	67	83	1	92 000	88 000	15 300	8 000	5 400
–	–	–	61	63	73	99	2	130 000	113 000	19 100	6 300	6 100
8	13	–	61	–	73	99	2	130 000	113 000	19 100	6 300	6 100
–	–	5	61	–	73	99	2	130 000	113 000	19 100	6 300	6 100
–	–	–	61	63	73	99	2	192 000	187 000	33 000	6 300	5 000
8	14,5	–	61	–	73	99	2	192 000	187 000	33 000	6 300	5 000
–	–	6,5	61	–	73	99	2	192 000	187 000	33 000	6 300	5 000
–	–	–	64	69	81	116	2	175 000	148 000	20 200	8 500	–
9	14,5	–	64	–	81	116	2	175 000	148 000	20 200	8 500	–
–	–	–	62	65	73	91	1,5	99 000	95 000	16 300	7 000	5 800
6	9,5	–	62	–	73	91	1,5	99 000	95 000	16 300	7 000	5 800
–	–	3,5	62	–	73	91	1,5	99 000	95 000	16 300	7 000	5 800
–	–	–	62	65	73	91	1,5	117 000	118 000	20 700	7 000	4 750
6	10	–	62	–	73	91	1,5	117 000	118 000	20 700	7 000	4 750
–	–	4	62	–	73	91	1,5	117 000	118 000	20 700	7 000	4 750
–	–	–	66	69	80	109	2	159 000	139 000	23 600	5 600	6 000
9	14	–	66	–	80	109	2	159 000	139 000	23 600	5 600	6 000
–	–	5	66	–	80	109	2	159 000	139 000	23 600	5 600	5 600
–	–	–	66	69	80	109	2	235 000	230 000	41 000	5 600	4 600
9	15,5	–	66	–	80	109	2	235 000	230 000	41 000	5 600	4 600
–	–	6,5	66	–	80	109	2	235 000	230 000	41 000	5 600	4 600
–	–	–	69	76	87	126	2,1	187 000	164 000	28 000	8 000	–
10	16,5	–	69	–	87	126	2,1	187 000	164 000	28 000	8 000	–

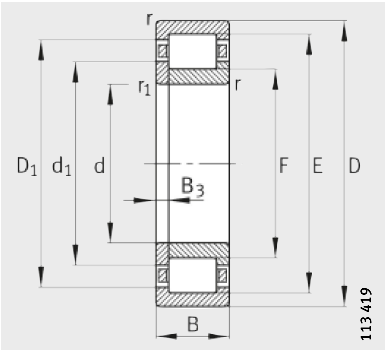
2) If axial load is present, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



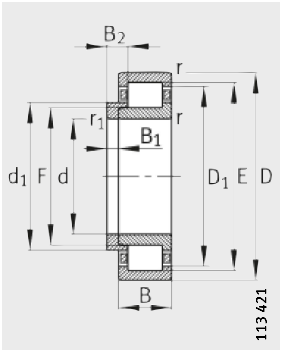
NJ
Semi-locating bearings



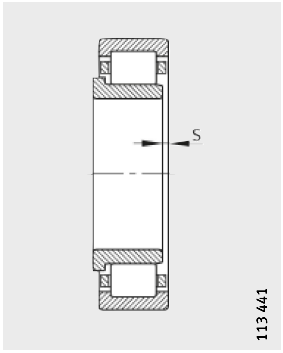
NUP
Locating bearings

Dimension table (continued) · Dimensions in mm

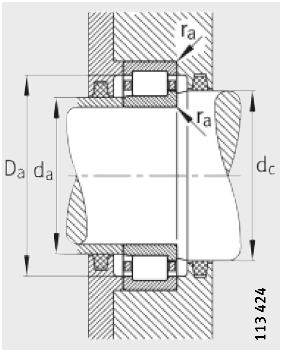
Designation			Mass m		Dimensions									
Bearing	X-life	L-section ring	Bearing ≈kg	L-section ring ≈kg	d	D	B	r min.	r_1 min.	$s^{1)}$	E	F	D_1 ≈	d_1 ≈
NJ212-E-TVP2	**XL**	–	0,845	–	**60**	110	22	1,5	1,5	1,6	100	72	96,1	77,6
NJ212-E-TVP2	**XL**	**HJ212-E**	0,845	0,106	**60**	110	22	1,5	1,5	–	100	72	96,1	77,6
NUP212-E-TVP2	**XL**	–	0,865	–	**60**	110	22	1,5	1,5	–	100	72	96,1	77,6
NJ2212-E-TVP2	**XL**	–	1,1	–	**60**	110	28	1,5	1,5	1,6	100	72	96,1	77,6
NJ2212-E-TVP2	**XL**	**HJ212-E**	1,1	0,106	**60**	110	28	1,5	1,5	–	100	72	96,1	77,6
NUP2212-E-TVP2	**XL**	–	1,12	–	**60**	110	28	1,5	1,5	–	100	72	96,1	77,6
NJ312-E-TVP2	**XL**	–	1,89	–	**60**	130	31	2,1	2,1	1,8	115	77	109,6	84,4
NJ312-E-TVP2	**XL**	**HJ312-E**	1,89	0,229	**60**	130	31	2,1	2,1	–	115	77	109,6	84,4
NUP312-E-TVP2	**XL**	–	1,93	–	**60**	130	31	2,1	2,1	–	115	77	109,6	84,4
NJ2312-E-TVP2	**XL**	–	2,83	–	**60**	130	46	2,1	2,1	3,5	115	77	109,6	84,4
NJ2312-E-TVP2	**XL**	**HJ2312-E**	2,83	0,238	**60**	130	46	2,1	2,1	–	115	77	109,6	84,4
NUP2312-E-TVP2	**XL**	–	2,88	–	**60**	130	46	2,1	2,1	–	115	77	109,6	84,4
NJ412-M1	**XL**	–	3,42	–	**60**	150	35	2,1	2,1	3,4	127	83	119,5	91,6
NJ412-M1	**XL**	**HJ412**	3,42	0,347	**60**	150	35	2,1	2,1	–	127	83	119,5	91,6
NJ213-E-TVP2	**XL**	–	1,06	–	**65**	120	23	1,5	1,5	1,4	108,5	78,5	104,3	84,4
NJ213-E-TVP2	**XL**	**HJ213-E**	1,06	0,127	**65**	120	23	1,5	1,5	–	108,5	78,5	104,3	84,4
NUP213-E-TVP2	**XL**	–	1,09	–	**65**	120	23	1,5	1,5	–	108,5	78,5	104,3	84,4
NJ2213-E-TVP2	**XL**	–	1,46	–	**65**	120	31	1,5	1,5	1,9	108,5	78,5	104,3	84,4
NJ2213-E-TVP2	**XL**	**HJ2213-E**	1,46	0,13	**65**	120	31	1,5	1,5	–	108,5	78,5	104,3	84,4
NUP2213-E-TVP2	**XL**	–	1,54	–	**65**	120	31	1,5	1,5	–	108,5	78,5	104,3	84,4
NJ313-E-TVP2	**XL**	–	2,32	–	**65**	140	33	2,1	2,1	1,5	124,5	82,5	118,6	90,5
NJ313-E-TVP2	**XL**	**HJ313-E**	2,32	0,285	**65**	140	33	2,1	2,1	–	124,5	82,5	118,6	90,5
NUP313-E-TVP2	**XL**	–	2,37	–	**65**	140	33	2,1	2,1	–	124,5	82,5	118,6	90,5
NJ2313-E-TVP2	**XL**	–	3,38	–	**65**	140	48	2,1	2,1	4	124,5	82,5	118,6	90,5
NJ2313-E-TVP2	**XL**	**HJ2313-E**	3,38	0,303	**65**	140	48	2,1	2,1	–	124,5	82,5	118,6	90,5
NUP2313-E-TVP2	**XL**	–	3,45	–	**65**	140	48	2,1	2,1	–	124,5	82,5	118,6	90,5
NJ413-M1	**XL**	–	4,15	–	**65**	160	37	2,1	2,1	3,5	135,3	89,3	127,7	98,3
NJ413-M1	**XL**	**HJ413**	4,15	0,432	**65**	160	37	2,1	2,1	–	135,3	89,3	127,7	98,3



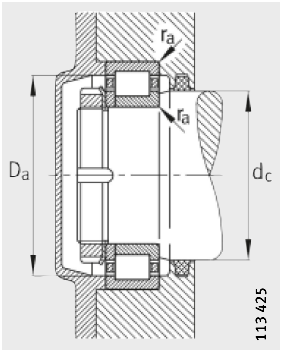
NJ and HJ
Locating bearings



1) Axial displacement “s” for NJ



Mounting dimensions for NJ



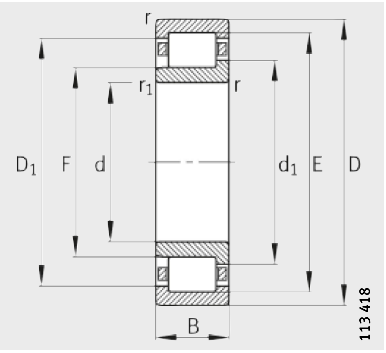
Mounting dimensions for NUP

			Mounting dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
B_1	B_2	B_3	d_a		d_c	D_a	r_a	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
			min.[2]	max.	min.	max.[2]	max.	N	N	N	min^{-1}	min^{-1}
–	–	–	69	71	80	101	1,5	111 000	102 000	16 800	6 300	5 400
6	10	–	69	–	80	101	1,5	111 000	102 000	16 800	6 300	5 400
–	–	4	69	–	80	101	1,5	111 000	102 000	16 800	6 300	5 400
–	–	–	69	71	80	101	1,5	151 000	152 000	26 500	6 300	4 400
6	10	–	69	–	80	101	1,5	151 000	152 000	26 500	6 300	4 400
–	–	4	69	–	80	101	1,5	151 000	152 000	26 500	6 300	4 400
–	–	–	72	75	86	118	2,1	177 000	157 000	26 500	5 000	5 300
9	14,5	–	72	–	86	118	2,1	177 000	157 000	26 500	5 000	5 300
–	–	5,5	72	–	86	118	2,1	177 000	157 000	26 500	5 000	5 300
–	–	–	72	75	86	118	2,1	265 000	260 000	47 000	5 000	4 300
9	16	–	72	–	86	118	2,1	265 000	260 000	47 000	5 000	4 300
–	–	7	72	–	86	118	2,1	265 000	260 000	47 000	5 000	4 300
–	–	–	74	82	94	136	2	211 000	184 000	30 500	7 500	–
10	16,5	–	74	–	94	136	2	211 000	184 000	30 500	7 500	–
–	–	–	74	77	87	111	1,5	127 000	119 000	19 800	6 000	5 000
6	10	–	74	–	87	111	1,5	127 000	119 000	19 800	6 000	5 000
–	–	4	74	–	87	111	1,5	127 000	119 000	19 800	6 000	5 000
–	–	–	74	77	87	111	1,5	176 000	181 000	32 000	5 600	4 150
6	10,5	–	74	–	87	111	1,5	176 000	181 000	32 000	5 600	4 150
–	–	4,5	74	–	87	111	1,5	176 000	181 000	32 000	5 600	4 150
–	–	–	77	81	93	128	2,1	214 000	191 000	32 000	4 800	4 900
10	15,5	–	77	–	93	128	2,1	214 000	191 000	32 000	4 800	4 900
–	–	5,5	77	–	93	128	2,1	214 000	191 000	32 000	4 800	4 900
–	–	–	77	81	93	128	2,1	295 000	285 000	50 000	4 800	4 050
10	18	–	77	–	93	128	2,1	295 000	285 000	50 000	4 800	4 050
–	–	8	77	–	93	128	2,1	295 000	285 000	50 000	4 800	4 050
–	–	–	79	88	100	146	2,1	230 000	203 000	33 000	7 000	–
11	18	–	79	–	100	146	2,1	230 000	203 000	33 000	7 000	–

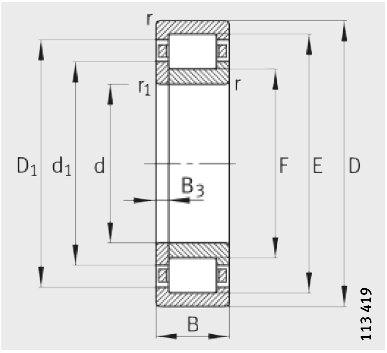
2) If axial load is present, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



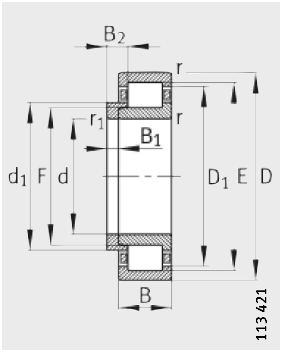
NJ
Semi-locating bearings



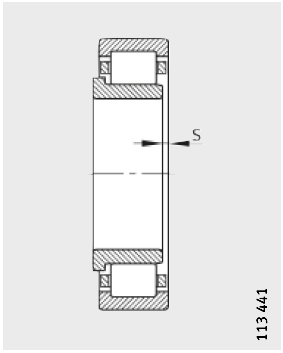
NUP
Locating bearings

Dimension table (continued) · Dimensions in mm

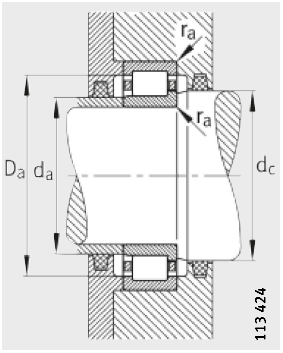
Designation			Mass m		Dimensions									
Bearing	X-life	L-section ring	Bearing ≈kg	L-section ring ≈kg	d	D	B	r min.	r_1 min.	$s^{1)}$	E	F	D_1 ≈	d_1 ≈
NJ214-E-TVP2	**XL**	–	1,18	–	**70**	125	24	1,5	1,5	1,6	113,5	83,5	109,4	89,4
NJ214-E-TVP2	**XL**	**HJ214-E**	1,18	0,155	**70**	125	24	1,5	1,5	–	113,5	83,5	109,4	89,4
NUP214-E-TVP2	**XL**	–	1,2	–	**70**	125	24	1,5	1,5	–	113,5	83,5	109,4	89,4
NJ2214-E-TVP2	**XL**	–	1,54	–	**70**	125	31	1,5	1,5	1,6	113,5	83,5	109,4	89,4
NJ2214-E-TVP2	**XL**	**HJ2214-E**	1,54	0,157	**70**	125	31	1,5	1,5	–	113,5	83,5	109,4	89,4
NUP2214-E-TVP2	**XL**	–	1,58	–	**70**	125	31	1,5	1,5	–	113,5	83,5	109,4	89,4
NJ314-E-TVP2	**XL**	–	2,84	–	**70**	150	35	2,1	2,1	1,7	133	89	126,8	97,4
NJ314-E-TVP2	**XL**	**HJ314-E**	2,84	0,328	**70**	150	35	2,1	2,1	–	133	89	126,8	97,4
NUP314-E-TVP2	**XL**	–	2,89	–	**70**	150	35	2,1	2,1	–	133	89	126,8	97,4
NJ2314-E-TVP2	**XL**	–	4,1	–	**70**	150	51	2,1	2,1	4,7	133	89	126,8	97,4
NJ2314-E-TVP2	**XL**	**HJ2314-E**	4,1	0,352	**70**	150	51	2,1	2,1	–	133	89	126,8	97,4
NUP2314-E-TVP2	**XL**	–	4,18	–	**70**	150	51	2,1	2,1	–	133	89	126,8	97,4
NJ414-M1	**XL**	–	6,07	–	**70**	180	42	3	3	4	152	100	142,7	110,3
NJ414-M1	**XL**	**HJ414**	6,07	0,63	**70**	180	42	3	3	–	152	100	142,7	110,3
NJ215-E-TVP2	**XL**	–	1,3	–	**75**	130	25	1,5	1,5	1,2	118,5	88,5	114,4	94,4
NJ215-E-TVP2	**XL**	**HJ215-E**	1,3	0,164	**75**	130	25	1,5	1,5	–	118,5	88,5	114,4	94,4
NUP215-E-TVP2	**XL**	–	1,33	–	**75**	130	25	1,5	1,5	–	118,5	88,5	114,4	94,4
NJ2215-E-TVP2	**XL**	–	1,64	–	**75**	130	31	1,5	1,5	1,6	118,5	88,5	114,4	94,4
NJ2215-E-TVP2	**XL**	**HJ2215-E**	1,64	0,165	**75**	130	31	1,5	1,5	–	118,5	88,5	114,4	94,4
NUP2215-E-TVP2	**XL**	–	1,67	–	**75**	130	31	1,5	1,5	–	118,5	88,5	114,4	94,4
NJ315-E-TVP2	**XL**	–	3,39	–	**75**	160	37	2,1	2,1	1,2	143	95	136,2	104,1
NJ315-E-TVP2	**XL**	**HJ315-E**	3,39	0,407	**75**	160	37	2,1	2,1	–	143	95	136,2	104,1
NUP315-E-TVP2	**XL**	–	3,45	–	**75**	160	37	2,1	2,1	–	143	95	136,2	104,1
NJ2315-E-TVP2	**XL**	–	5,04	–	**75**	160	55	2,1	2,1	4,2	143	95	136,2	104,1
NJ2315-E-TVP2	**XL**	**HJ2315-E**	5,04	0,436	**75**	160	55	2,1	2,1	–	143	95	136,2	104,1
NUP2315-E-TVP2	**XL**	–	5,14	–	**75**	160	55	2,1	2,1	–	143	95	136,2	104,1
NJ415-M1	**XL**	–	7,21	–	**75**	190	45	3	3	4,5	160,5	104,5	150,7	115,8
NJ415-M1	**XL**	**HJ415**	7,21	0,737	**75**	190	45	3	3	–	160,5	104,5	150,7	115,8



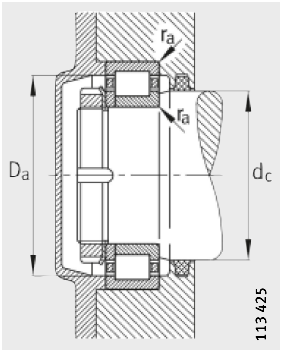
NJ and HJ
Locating bearings



1) Axial displacement “s” for NJ



Mounting dimensions for NJ



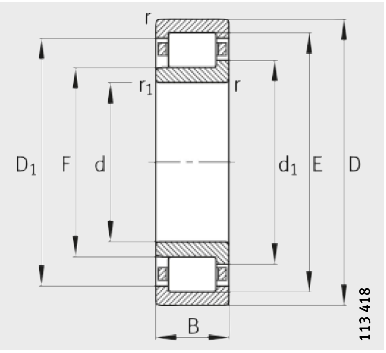
Mounting dimensions for NUP

			Mounting dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
B_1	B_2	B_3	d_a		d_c	D_a	r_a	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
			min.[2]	max.	min.	max.[2]	max.	N	N	N	min^{-1}	min^{-1}
–	–	–	79	82	92	116	1,5	140 000	137 000	23 100	5 300	4 750
7	11	–	79	–	92	116	1,5	140 000	137 000	23 100	5 300	4 750
–	–	4	79	–	92	116	1,5	140 000	137 000	23 100	5 300	4 750
–	–	–	79	82	92	116	1,5	184 000	194 000	34 000	5 300	3 900
7	11,5	–	79	–	92	116	1,5	184 000	194 000	34 000	5 300	3 900
–	–	4,5	79	–	92	116	1,5	184 000	194 000	34 000	5 300	3 900
–	–	–	82	87	100	138	2,1	242 000	222 000	37 000	4 500	4 550
10	15,5	–	82	–	100	138	2,1	242 000	222 000	37 000	4 500	4 550
–	–	5,5	82	–	100	138	2,1	242 000	222 000	37 000	4 500	4 550
–	–	–	82	87	100	138	2,1	325 000	325 000	56 000	4 500	3 850
10	18,5	–	82	–	100	138	2,1	325 000	325 000	56 000	4 500	3 850
–	–	8,5	82	–	100	138	2,1	325 000	325 000	56 000	4 500	3 850
–	–	–	86	99	112	164	2,5	285 000	255 000	42 000	6 300	–
12	20	–	86	–	112	164	2,5	285 000	255 000	42 000	6 300	–
–	–	–	84	87	96	121	1,5	154 000	156 000	26 500	5 300	4 500
7	11	–	84	–	96	121	1,5	154 000	156 000	26 500	5 300	4 500
–	–	4	84	–	96	121	1,5	154 000	156 000	26 500	5 300	4 500
–	–	–	84	87	96	121	1,5	191 000	207 000	36 000	5 300	3 700
7	11,5	–	84	–	96	121	1,5	191 000	207 000	36 000	5 300	3 700
–	–	4,5	84	–	96	121	1,5	191 000	207 000	36 000	5 300	3 700
–	–	–	87	93	106	148	2,1	285 000	265 000	43 000	4 000	4 200
11	16,5	–	87	–	106	148	2,1	285 000	265 000	43 000	4 000	4 200
–	–	5,5	87	–	106	148	2,1	285 000	265 000	43 000	4 000	4 200
–	–	–	87	93	106	148	2,1	390 000	395 000	67 000	4 000	3 600
11	19,5	–	87	–	106	148	2,1	390 000	395 000	67 000	4 000	3 600
–	–	8,5	87	–	106	148	2,1	390 000	395 000	67 000	4 000	3 600
–	–	–	91	103	118	174	2,5	325 000	295 000	46 500	6 000	–
13	21,5	–	91	–	118	174	2,5	325 000	295 000	46 500	6 000	–

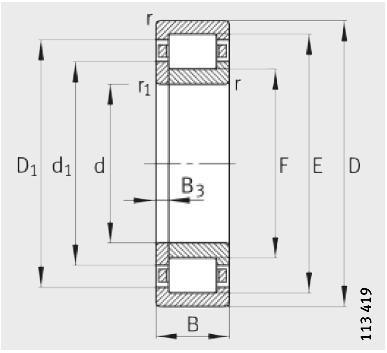
2) If axial load is present, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



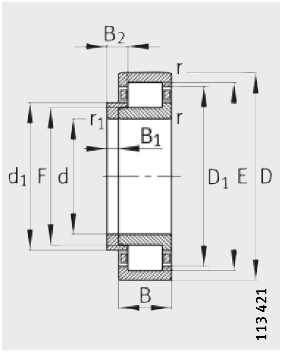
NJ
Semi-locating bearings



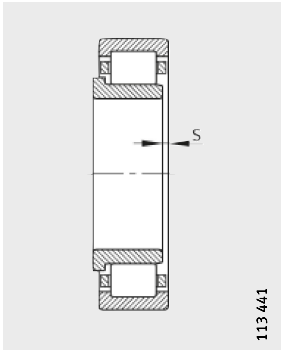
NUP
Locating bearings

Dimension table (continued) · Dimensions in mm

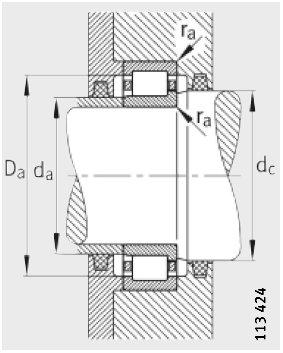
Designation			Mass m		Dimensions									
Bearing	X-life	L-section ring	Bearing ≈kg	L-section ring ≈kg	d	D	B	r min.	r_1 min.	$s^{1)}$	E	F	D_1 ≈	d_1 ≈
NJ216-E-TVP2	**XL**	–	1,58	–	**80**	140	26	2	2	1,3	127,3	95,3	122,9	101,5
NJ216-E-TVP2	**XL**	**HJ216-E**	1,58	0,22	**80**	140	26	2	2	–	127,3	95,3	122,9	101,5
NUP216-E-TVP2	**XL**	–	1,62	–	**80**	140	26	2	2	–	127,3	95,3	122,9	101,5
NJ2216-E-TVP2	**XL**	–	2,04	–	**80**	140	33	2	2	1,3	127,3	95,3	122,9	101,5
NJ2216-E-TVP2	**XL**	**HJ216-E**	2,04	0,22	**80**	140	33	2	2	–	127,3	95,3	122,9	101,5
NUP2216-E-TVP2	**XL**	–	2,08	–	**80**	140	33	2	2	–	127,3	95,3	122,9	101,5
NJ316-E-TVP2	**XL**	–	4,03	–	**80**	170	39	2,1	2,1	0,7	151	101	143,9	110,4
NJ316-E-TVP2	**XL**	**HJ316-E**	4,03	0,456	**80**	170	39	2,1	2,1	–	151	101	143,9	110,4
NUP316-E-TVP2	**XL**	–	4,11	–	**80**	170	39	2,1	2,1	–	151	101	143,9	110,4
NJ2316-E-TVP2	**XL**	–	6	–	**80**	170	58	2,1	2,1	3,7	151	101	143,9	110,4
NJ2316-E-TVP2	**XL**	**HJ2316-E**	6	0,488	**80**	170	58	2,1	2,1	–	151	101	143,9	110,4
NUP2316-E-TVP2	**XL**	–	6,11	–	**80**	170	58	2,1	2,1	–	151	101	143,9	110,4
NJ416-M1	**XL**	–	8,52	–	**80**	200	48	3	3	4,6	170	110	159,7	121,8
NJ416-M1	**XL**	**HJ416**	8,52	0,808	**80**	200	48	3	3	–	170	110	159,7	121,8
NJ217-E-TVP2	**XL**	–	1,95	–	**85**	150	28	2	2	0,8	136,5	100,5	131,5	107,5
NJ217-E-TVP2	**XL**	**HJ217-E**	1,95	0,247	**85**	150	28	2	2	–	136,5	100,5	131,5	107,5
NUP217-E-TVP2	**XL**	–	2,08	–	**85**	150	28	2	2	–	136,5	100,5	131,5	107,5
NJ2217-E-TVP2	**XL**	–	2,55	–	**85**	150	36	2	2	1,3	136,5	100,5	131,5	107,5
NJ2217-E-TVP2	**XL**	**HJ2217-E**	2,55	0,249	**85**	150	36	2	2	–	136,5	100,5	131,5	107,5
NUP2217-E-TVP2	**XL**	–	2,6	–	**85**	150	36	2	2	–	136,5	100,5	131,5	107,5
NJ317-E-TVP2	**XL**	–	4,71	–	**85**	180	41	3	3	1,3	160	108	152,7	117,8
NJ317-E-TVP2	**XL**	**HJ317-E**	4,71	0,566	**85**	180	41	3	3	–	160	108	152,7	117,8
NUP317-E-TVP2	**XL**	–	4,8	–	**85**	180	41	3	3	–	160	108	152,7	117,8
NJ2317-E-TVP2	**XL**	–	6,85	–	**85**	180	60	3	3	4,7	160	108	152,7	117,8
NJ2317-E-TVP2	**XL**	**HJ2317-E**	6,85	0,606	**85**	180	60	3	3	–	160	108	152,7	117,8
NUP2317-E-TVP2	**XL**	–	6,99	–	**85**	180	60	3	3	–	160	108	152,7	117,8
NJ417-M1	**XL**	–	10	–	**85**	210	52	4	4	5,2	177	113	165,7	125,8
NJ417-M1	**XL**	**HJ417**	10	0,901	**85**	210	52	4	4	–	177	113	165,7	125,8



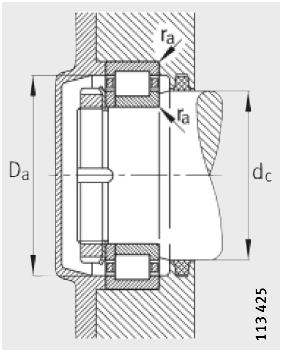
NJ and HJ
Locating bearings



1) Axial displacement “s” for NJ



Mounting dimensions for NJ



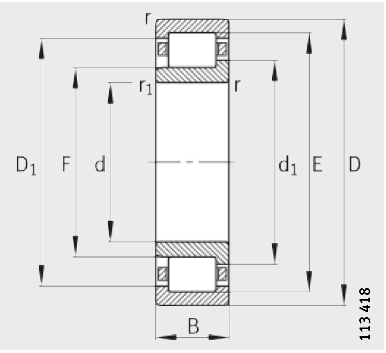
Mounting dimensions for NUP

			Mounting dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
B_1	B_2	B_3	d_a		d_c	D_a	r_a	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
			min.[2]	max.	min.	max.[2]	max.	N	N	N	min^{-1}	min^{-1}
–	–	–	91	94	104	129	2	165 000	167 000	27 500	4 800	4 250
8	12,5	–	91	–	104	129	2	165 000	167 000	27 500	4 800	4 250
–	–	4,5	91	–	104	129	2	165 000	167 000	27 500	4 800	4 250
–	–	–	91	94	104	129	2	220 000	243 000	42 000	4 800	3 450
8	12,5	–	91	–	104	129	2	220 000	243 000	42 000	4 800	3 450
–	–	4,5	91	–	104	129	2	220 000	243 000	42 000	4 800	3 450
–	–	–	92	99	114	158	2,1	300 000	275 000	46 000	3 800	4 150
11	17	–	92	–	114	158	2,1	300 000	275 000	46 000	3 800	4 150
–	–	6	92	–	114	158	2,1	300 000	275 000	46 000	3 800	4 150
–	–	–	92	99	114	158	2,1	420 000	425 000	73 000	3 800	3 500
11	20	–	92	–	114	158	2,1	420 000	425 000	73 000	3 800	3 500
–	–	9	92	–	114	158	2,1	420 000	425 000	73 000	3 800	3 500
–	–	–	96	109	124	184	2,5	395 000	365 000	46 500	5 600	–
13	22	–	96	–	124	184	2,5	395 000	365 000	46 500	5 600	–
–	–	–	96	99	110	139	2	194 000	194 000	31 500	4 500	4 100
8	12,5	–	96	–	110	139	2	194 000	194 000	31 500	4 500	4 100
–	–	4,5	96	–	110	139	2	194 000	194 000	31 500	4 500	4 100
–	–	–	96	99	110	139	2	255 000	275 000	46 000	4 500	3 350
8	13	–	96	–	110	139	2	255 000	275 000	46 000	4 500	3 350
–	–	5	96	–	110	139	2	255 000	275 000	46 000	4 500	3 350
–	–	–	99	106	119	166	2,5	320 000	300 000	49 500	3 600	4 000
12	18,5	–	99	–	119	166	2,5	320 000	300 000	49 500	3 600	4 000
–	–	6,5	99	–	119	166	2,5	320 000	300 000	49 500	3 600	4 000
–	–	–	99	106	119	166	2,5	435 000	445 000	75 000	3 600	3 350
12	22	–	99	–	119	166	2,5	435 000	445 000	75 000	3 600	3 350
–	–	10	99	–	119	166	2,5	435 000	445 000	75 000	3 600	3 350
–	–	–	105	111	128	190	3	420 000	385 000	48 500	5 300	–
14	24	–	105	–	128	190	3	420 000	385 000	48 500	5 300	–

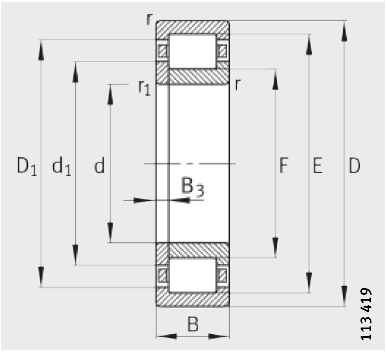
2) If axial load is present, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



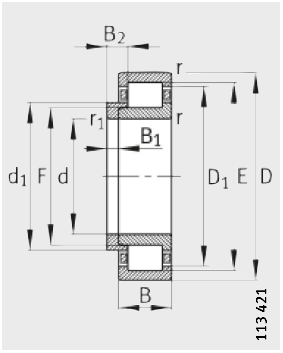
NJ
Semi-locating bearings



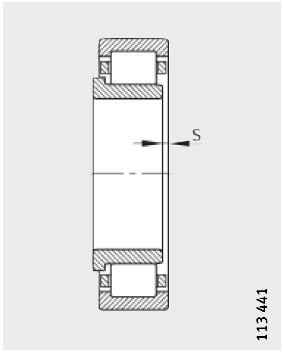
NUP
Locating bearings

Dimension table (continued) · Dimensions in mm

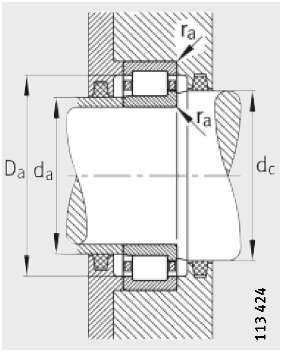
Designation			Mass m		Dimensions									
Bearing	X-life	L-section ring	Bearing ≈kg	L-section ring ≈kg	d	D	B	r min.	r_1 min.	s[1)]	E	F	D_1 ≈	d_1 ≈
NJ218-E-TVP2	**XL**	–	2,41	–	**90**	160	30	2	2	1,5	145	107	139,7	114,3
NJ218-E-TVP2	**XL**	**HJ218-E**	2,41	0,317	**90**	160	30	2	2	–	145	107	139,7	114,3
NUP218-E-TVP2	**XL**	–	2,46	–	**90**	160	30	2	2	–	145	107	139,7	114,3
NJ2218-E-TVP2	**XL**	–	3,23	–	**90**	160	40	2	2	2,5	145	107	139,7	114,3
NJ2218-E-TVP2	**XL**	**HJ2218-E**	3,23	0,323	**90**	160	40	2	2	–	145	107	139,7	114,3
NUP2218-E-TVP2	**XL**	–	3,29	–	**90**	160	40	2	2	–	145	107	139,7	114,3
NJ318-E-TVP2	**XL**	–	5,49	–	**90**	190	43	3	3	1,5	169,5	113,5	161,6	124
NJ318-E-TVP2	**XL**	**HJ318-E**	5,49	0,623	**90**	190	43	3	3	–	169,5	113,5	161,6	124
NUP318-E-TVP2	**XL**	–	5,59	–	**90**	190	43	3	3	–	169,5	113,5	161,6	124
NJ2318-E-TVP2	**XL**	–	8,19	–	**90**	190	64	3	3	5	169,5	113,5	161,6	124
NJ2318-E-TVP2	**XL**	**HJ2318-E**	8,19	0,669	**90**	190	64	3	3	–	169,5	113,5	161,6	124
NUP2318-E-TVP2	**XL**	–	8,35	–	**90**	190	64	3	3	–	169,5	113,5	161,6	124
NJ418-M1	**XL**	–	11,8	–	**90**	225	54	4	4	5	191,5	123,5	179,7	136,8
NJ418-M1	**XL**	**HJ418**	11,8	1,1	**90**	225	54	4	4	–	191,5	123,5	179,7	136,8
NJ219-E-TVP2	**XL**	–	2,94	–	**95**	170	32	2,1	2,1	0,7	154,5	112,5	148,6	120,5
NJ219-E-TVP2	**XL**	**HJ219-E**	2,94	0,352	**95**	170	32	2,1	2,1	–	154,5	112,5	148,6	120,5
NUP219-E-TVP2	**XL**	–	2,99	–	**95**	170	32	2,1	2,1	–	154,5	112,5	148,6	120,5
NJ2219-E-TVP2	**XL**	–	3,98	–	**95**	170	43	2,1	2,1	2,2	154,5	112,5	148,6	120,5
NJ2219-E-TVP2	**XL**	**HJ2219-E**	3,98	0,366	**95**	170	43	2,1	2,1	–	154,5	112,5	148,6	120,5
NUP2219-E-TVP2	**XL**	–	4,05	–	**95**	170	43	2,1	2,1	–	154,5	112,5	148,6	120,5
NJ319-E-TVP2	**XL**	–	6,44	–	**95**	200	45	3	3	1,4	177,5	121,5	169,6	132
NJ319-E-TVP2	**XL**	**HJ319-E**	6,44	0,777	**95**	200	45	3	3	–	177,5	121,5	169,6	132
NUP319-E-TVP2	**XL**	–	6,56	–	**95**	200	45	3	3	–	177,5	121,5	169,6	132
NJ2319-E-TVP2	**XL**	–	9,58	–	**95**	200	67	3	3	5,6	177,5	121,5	169,6	132
NJ2319-E-TVP2	**XL**	**HJ2319-E**	9,58	0,83	**95**	200	67	3	3	–	177,5	121,5	169,6	132
NUP2319-E-TVP2	**XL**	–	9,77	–	**95**	200	67	3	3	–	177,5	121,5	169,6	132
NJ419-M1	**XL**	–	14,1	–	**95**	240	55	4	4	5,2	201,5	133,5	189,7	146,8
NJ419-M1	**XL**	**HJ419**	14,1	1,36	**95**	240	55	4	4	–	201,5	133,5	189,7	146,8



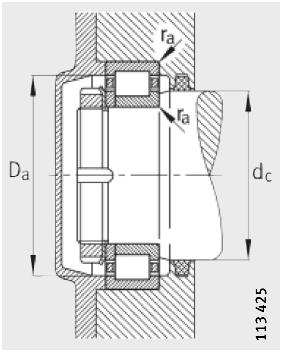
NJ and HJ
Locating bearings



1) Axial displacement “s” for NJ



Mounting dimensions for NJ



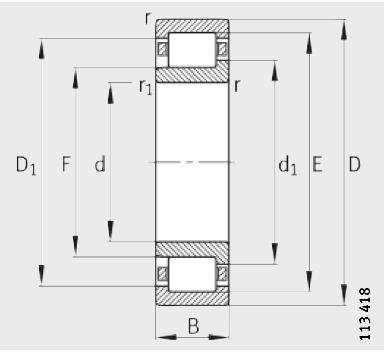
Mounting dimensions for NUP

			Mounting dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
B_1	B_2	B_3	d_a		d_c	D_a	r_a	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
			min.[2]	max.	min.	max.[2]	max.	N	N	N	min^{-1}	min^{-1}
–	–	–	101	105	116	149	2	215 000	217 000	35 000	4 300	3 950
9	14	–	101	–	116	149	2	215 000	217 000	35 000	4 300	3 950
–	–	5	101	–	116	149	2	215 000	217 000	35 000	4 300	3 950
–	–	–	101	105	116	149	2	285 000	315 000	52 000	4 300	3 300
9	15	–	101	–	116	149	2	285 000	315 000	52 000	4 300	3 300
–	–	6	101	–	116	149	2	285 000	315 000	52 000	4 300	3 300
–	–	–	104	111	127	176	2,5	370 000	350 000	55 000	3 400	3 750
12	18,5	–	104	–	127	176	2,5	370 000	350 000	55 000	3 400	3 750
–	–	6,5	104	–	127	176	2,5	370 000	350 000	55 000	3 400	3 750
–	–	–	104	111	127	176	2,5	510 000	530 000	86 000	3 400	3 050
12	22	–	104	–	127	176	2,5	510 000	530 000	86 000	3 400	3 050
–	–	10	104	–	127	176	2,5	510 000	530 000	86 000	3 400	3 050
–	–	–	110	122	139	205	3	465 000	425 000	54 000	5 000	–
14	24	–	110	–	139	205	3	465 000	425 000	54 000	5 000	–
–	–	–	107	111	123	158	2,1	260 000	265 000	41 500	3 800	3 700
9	14	–	107	–	123	158	2,1	260 000	265 000	41 500	3 800	3 700
–	–	5	107	–	123	158	2,1	260 000	265 000	41 500	3 800	3 700
–	–	–	107	111	123	158	2,1	340 000	370 000	60 000	3 800	3 100
9	15,5	–	107	–	123	158	2,1	340 000	370 000	60 000	3 800	3 100
–	–	6,5	107	–	123	158	2,1	340 000	370 000	60 000	3 800	3 100
–	–	–	109	119	134	186	2,5	390 000	380 000	59 000	3 400	3 600
13	20,5	–	109	–	134	186	2,5	390 000	380 000	59 000	3 400	3 600
–	–	7,5	109	–	134	186	2,5	390 000	380 000	59 000	3 400	3 600
–	–	–	109	119	134	186	2,5	540 000	580 000	92 000	3 400	2 850
13	24,5	–	109	–	134	186	2,5	540 000	580 000	92 000	3 400	2 850
–	–	11,5	109	–	134	186	2,5	540 000	580 000	92 000	3 400	2 850
–	–	–	115	132	149	220	3	495 000	470 000	58 000	4 800	–
15	25,5	–	115	–	149	220	3	495 000	470 000	58 000	4 800	–

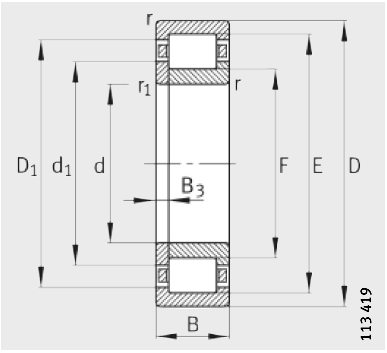
2) If axial load is present, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



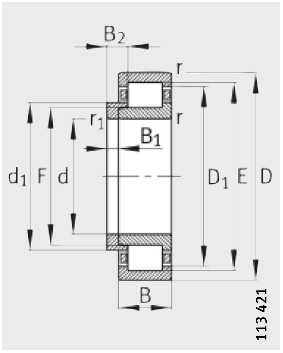
NJ
Semi-locating bearings



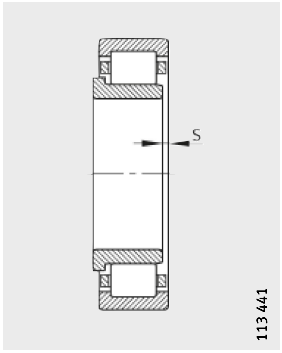
NUP
Locating bearings

Dimension table (continued) · Dimensions in mm

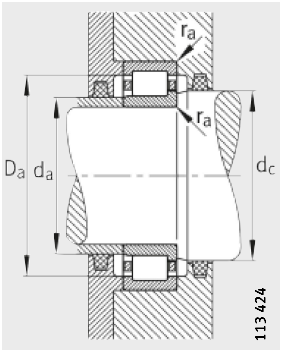
Designation			Mass m		Dimensions									
Bearing	X-life	L-section ring	Bearing ≈kg	L-section ring ≈kg	d	D	B	r min.	r_1 min.	$s^{1)}$	E	F	D_1 ≈	d_1 ≈
NJ220-E-TVP2	**XL**	–	3,55	–	**100**	180	34	2,1	2,1	1,5	163	119	156,9	127,3
NJ220-E-TVP2	**XL**	**HJ220-E**	3,55	0,436	**100**	180	34	2,1	2,1	–	163	119	156,9	127,3
NUP220-E-TVP2	**XL**	–	3,61	–	**100**	180	34	2,1	2,1	–	163	119	156,9	127,3
NJ2220-E-TVP2	**XL**	–	4,85	–	**100**	180	46	2,1	2,1	3	163	119	156,9	127,3
NJ2220-E-TVP2	**XL**	**HJ2220-E**	4,85	0,446	**100**	180	46	2,1	2,1	–	163	119	156,9	127,3
NUP2220-E-TVP2	**XL**	–	4,92	–	**100**	180	46	2,1	2,1	–	163	119	156,9	127,3
NJ320-E-TVP2	**XL**	–	7,82	–	**100**	215	47	3	3	1,2	191,5	127,5	182	139,4
NJ320-E-TVP2	**XL**	**HJ320-E**	7,82	0,883	**100**	215	47	3	3	–	191,5	127,5	182	139,4
NUP320-E-TVP2	**XL**	–	7,96	–	**100**	215	47	3	3	–	191,5	127,5	182	139,4
NJ2320-E-TVP2	**XL**	–	12,3	–	**100**	215	73	3	3	4,2	191,5	127,5	182	139,4
NJ2320-E-TVP2	**XL**	**HJ2320-E**	12,3	0,934	**100**	215	73	3	3	–	191,5	127,5	182	139,4
NUP2320-E-TVP2	**XL**	–	12,5	–	**100**	215	73	3	3	–	191,5	127,5	182	139,4
NJ420-M1	**XL**	–	16,1	–	**100**	250	58	4	4	5,7	211	139	198,2	152,8
NJ420-M1	**XL**	**HJ420**	16,1	1,55	**100**	250	58	4	4	–	211	139	198,2	152,8
NJ221-E-TVP2	**XL**	–	4,17	–	**105**	190	36	2,1	2,1	1,3	171,5	125,5	165,1	134,5
NJ221-E-TVP2	**XL**	**HJ221-E**	4,17	0,51	**105**	190	36	2,1	2,1	–	171,5	125,5	165,1	134,5
NUP221-E-TVP2	**XL**	–	4,26	–	**105**	190	36	2,1	2,1	–	171,5	125,5	165,1	134,5
NJ421-M1	**XL**	–	18	–	**105**	260	60	4	4	5,7	220,5	144,5	207,4	158,8
NJ421-M1	**XL**	**HJ421**	18	1,65	**105**	260	60	4	4	–	220,5	144,5	207,4	158,8
NJ222-E-TVP2	**XL**	–	4,93	–	**110**	200	38	2,1	2,1	1,5	180,5	132,5	173,8	141,6
NJ222-E-TVP2	**XL**	**HJ222-E**	4,93	0,616	**110**	200	38	2,1	2,1	–	180,5	132,5	173,8	141,6
NUP222-E-TVP2	**XL**	–	5,02	–	**110**	200	38	2,1	2,1	–	180,5	132,5	173,8	141,6
NJ2222-E-TVP2	**XL**	–	6,89	–	**110**	200	53	2,1	2,1	4	180,5	132,5	173,8	141,6
NJ2222-E-TVP2	**XL**	**HJ2222-E**	6,89	0,647	**110**	200	53	2,1	2,1	–	180,5	132,5	173,8	141,6
NUP2222-E-TVP2	**XL**	–	7,02	–	**110**	200	53	2,1	2,1	–	180,5	132,5	173,8	141,6
NJ322-E-TVP2	**XL**	–	10,3	–	**110**	240	50	3	3	1,3	211	143	200,9	155,6
NJ322-E-TVP2	**XL**	**HJ322-E**	10,3	1,21	**110**	240	50	3	3	–	211	143	200,9	155,6
NUP322-E-TVP2	**XL**	–	10,7	–	**110**	240	50	3	3	–	211	143	200,9	155,6
NJ2322-E-TVP2	**XL**	–	16,9	–	**110**	240	80	3	3	5,8	211	143	200,9	155,6
NJ2322-E-TVP2	**XL**	**HJ2322-E**	16,9	1,3	**110**	240	80	3	3	–	211	143	200,9	155,6
NUP2322-E-TVP2	**XL**	–	17,2	–	**110**	240	80	3	3	–	211	143	200,9	155,6
NJ422-M1	**XL**	–	22,8	–	**110**	280	65	4	4	6,2	235	155	220,9	170,3
NJ422-M1	**XL**	**HJ422**	22,8	2,1	**110**	280	65	4	4	–	235	155	220,9	170,3



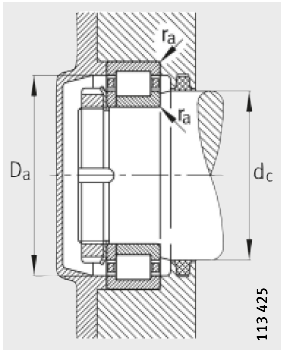
NJ and HJ
Locating bearings



1) Axial displacement “s” for NJ



Mounting dimensions for NJ



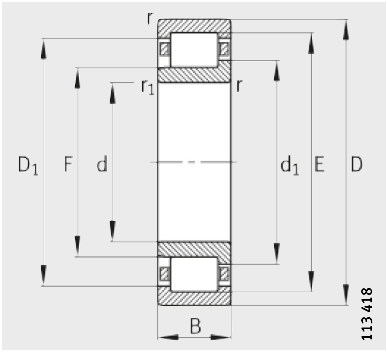
Mounting dimensions for NUP

			Mounting dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
B_1	B_2	B_3	d_a		d_c	D_a	r_a	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
			min.[2]	max.	min.	max.[2]	max.	N	N	N	min^{-1}	min^{-1}
–	–	–	112	117	130	168	2,1	295 000	305 000	47 500	3 800	3 500
10	15	–	112	–	130	168	2,1	295 000	305 000	47 500	3 800	3 500
–	–	5	112	–	130	168	2,1	295 000	305 000	47 500	3 800	3 500
–	–	–	112	117	130	168	2,1	395 000	445 000	72 000	3 800	2 900
10	16	–	112	–	130	168	2,1	395 000	445 000	72 000	3 800	2 900
–	–	6	112	–	130	168	2,1	395 000	445 000	72 000	3 800	2 900
–	–	–	114	125	143	201	2,5	450 000	425 000	65 000	3 200	3 400
13	20,5	–	114	–	143	201	2,5	450 000	425 000	65 000	3 200	3 400
–	–	7,5	114	–	143	201	2,5	450 000	425 000	65 000	3 200	3 400
–	–	–	114	125	143	201	2,5	680 000	720 000	114 000	3 200	2 550
13	23,5	–	114	–	143	201	2,5	680 000	720 000	114 000	3 200	2 550
–	–	10,5	114	–	143	201	2,5	680 000	720 000	114 000	3 200	2 550
–	–	–	120	137	156	230	3	550 000	530 000	63 000	4 800	–
16	27	–	120	–	156	230	3	550 000	530 000	63 000	4 800	–
–	–	–	117	123	137	178	2,1	310 000	320 000	49 000	3 600	3 450
10	16	–	117	–	137	178	2,1	310 000	320 000	49 000	3 600	3 450
–	–	6	117	–	137	178	2,1	310 000	320 000	49 000	3 600	3 450
–	–	–	125	143	162	240	3	610 000	590 000	87 000	4 500	–
16	27	–	125	–	162	240	3	610 000	590 000	87 000	4 500	–
–	–	–	122	130	144	188	2,1	345 000	365 000	55 000	3 400	3 300
11	17	–	122	–	144	188	2,1	345 000	365 000	55 000	3 400	3 300
–	–	6	122	–	144	188	2,1	345 000	365 000	56 000	3 400	3 300
–	–	–	122	130	144	188	2,1	455 000	520 000	81 000	3 400	2 800
11	19,5	–	122	–	144	188	2,1	455 000	520 000	81 000	3 400	2 800
–	–	8,5	122	–	144	188	2,1	455 000	520 000	81 000	3 400	2 800
–	–	–	124	140	158	226	2,5	495 000	475 000	73 000	3 000	3 100
14	22	–	124	–	158	226	2,5	495 000	475 000	73 000	3 000	3 100
–	–	8	124	–	158	226	2,5	495 000	475 000	72 000	3 000	3 100
–	–	–	124	140	158	226	2,5	750 000	800 000	126 000	2 800	2 320
14	26,5	–	124	–	158	226	2,5	750 000	800 000	126 000	2 800	2 320
–	–	12,5	124	–	158	226	2,5	750 000	800 000	126 000	2 800	2 320
–	–	–	130	153	173	260	3	680 000	660 000	77 000	4 500	–
17	29,5	–	130	–	173	260	3	680 000	660 000	77 000	4 500	–

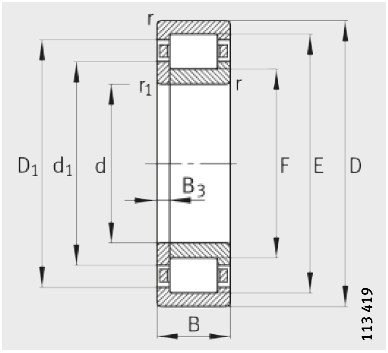
2) If axial load is present, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



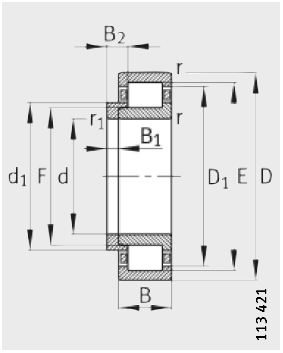
NJ
Semi-locating bearings



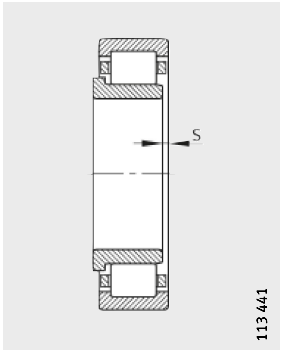
NUP
Locating bearings

Dimension table (continued) · Dimensions in mm

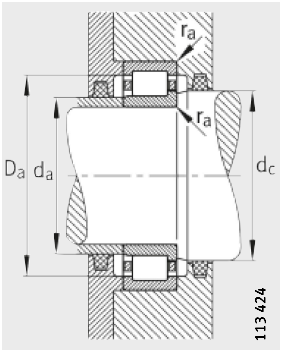
Designation			Mass m		Dimensions									
Bearing	X-life	L-section ring	Bearing ≈kg	L-section ring ≈kg	d	D	B	r min.	r_1 min.	$s^{1)}$	E	F	D_1 ≈	d_1 ≈
NJ224-E-TVP2	**XL**	–	5,91	–	**120**	215	40	2,1	2,1	1,4	195,5	143,5	187,8	153,2
NJ224-E-TVP2	**XL**	**HJ224-E**	5,91	0,707	**120**	215	40	2,1	2,1	–	195,5	143,5	187,8	153,2
NUP224-E-TVP2	**XL**	–	6,02	–	**120**	215	40	2,1	2,1	–	195,5	143,5	187,8	153,2
NJ2224-E-TVP2	**XL**	–	8,54	–	**120**	215	58	2,1	2,1	4,5	195,5	143,5	187,8	153,2
NJ2224-E-TVP2	**XL**	**HJ2224-E**	8,54	0,75	**120**	215	58	2,1	2,1	–	195,5	143,5	187,8	153,2
NUP2224-E-TVP2	**XL**	–	8,7	–	**120**	215	58	2,1	2,1	–	195,5	143,5	187,8	153,2
NJ324-E-TVP2	**XL**	–	13,5	–	**120**	260	55	3	3	3,5	230	154	218,7	168,1
NJ324-E-TVP2	**XL**	**HJ324-E**	13,5	1,41	**120**	260	55	3	3	–	230	154	218,7	168,1
NUP324-E-TVP2	**XL**	–	13,8	–	**120**	260	55	3	3	–	230	154	218,7	168,1
NJ2324-E-M1	**XL**	–	23,5	–	**120**	260	86	3	3	7,2	230	154	218,7	168,1
NJ2324-E-M1	**XL**	**HJ2324-E**	23,5	1,49	**120**	260	86	3	3	–	230	154	218,7	168,1
NUP2324-E-M1	**XL**	–	23,8	–	**120**	260	86	3	3	–	230	154	218,7	168,1
NJ424-M1	**XL**	–	31,3	–	**120**	310	72	5	5	6,9	260	170	243,9	187,3
NJ424-M1	**XL**	**HJ424**	31,3	2,61	**120**	310	72	5	5	–	260	170	243,9	187,3
NJ226-E-TVP2	**XL**	–	6,63	–	**130**	230	40	3	3	1,2	209,5	153,5	201,2	164
NJ226-E-TVP2	**XL**	**HJ226-E**	6,63	0,78	**130**	230	40	3	3	–	209,5	153,5	201,2	164
NUP226-E-TVP2	**XL**	–	6,74	–	**130**	230	40	3	3	–	209,5	153,5	201,2	164
NJ2226-E-TVP2	**XL**	–	10,6	–	**130**	230	64	3	3	5,2	209,5	153,5	201,2	164
NJ2226-E-TVP2	**XL**	**HJ2226-E**	10,6	0,849	**130**	230	64	3	3	–	209,5	153,5	201,2	164
NUP2226-E-TVP2	**XL**	–	10,8	–	**130**	230	64	3	3	–	209,5	153,5	201,2	164
NJ326-E-TVP2	**XL**	–	16,5	–	**130**	280	58	4	4	3,5	247	167	235,2	181,7
NJ326-E-TVP2	**XL**	**HJ326-E**	16,5	1,64	**130**	280	58	4	4	–	247	167	235,2	181,7
NUP326-E-TVP2	**XL**	–	16,7	–	**130**	280	58	4	4	–	247	167	235,2	181,7
NJ2326-E-M1	**XL**	–	29,2	–	**130**	280	93	4	4	8,1	247	167	235,2	181,7
NJ2326-E-M1	**XL**	**HJ2326-E**	29,2	1,77	**130**	280	93	4	4	–	247	167	235,2	181,7
NUP2326-E-M1	**XL**	–	29,7	–	**130**	280	93	4	4	–	247	167	235,2	181,7



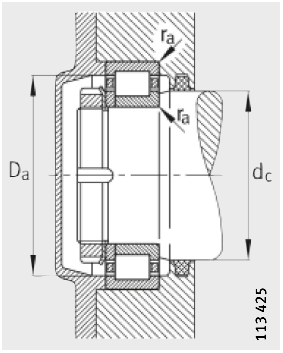
NJ and HJ
Locating bearings



1) Axial displacement “s” for NJ



Mounting dimensions for NJ



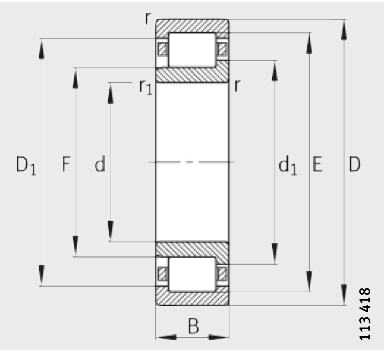
Mounting dimensions for NUP

			Mounting dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
B_1	B_2	B_3	d_a		d_c	D_a	r_a	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
			min.[2]	max.	min.	max.[2]	max.	N	N	N	min^{-1}	min^{-1}
–	–	–	132	141	156	203	2,1	390 000	415 000	64 000	3 200	3 100
11	17	–	132	–	156	203	2,1	390 000	415 000	64 000	3 200	3 100
–	–	6	132	–	156	203	2,1	390 000	415 000	64 000	3 200	3 100
–	–	–	132	141	156	203	2,1	530 000	610 000	960 00	3 200	2 550
11	20	–	132	–	156	203	2,1	530 000	610 000	960 00	3 200	2 550
–	–	9	132	–	156	203	2,1	530 000	610 000	96 000	3 200	2 550
–	–	–	134	151	171	246	2,5	610 000	600 000	87 000	2 800	2 700
14	22,5	–	134	–	171	246	2,5	610 000	600 000	87 000	2 800	2 700
–	–	8,5	134	–	171	246	2,5	610 000	600 000	87 000	2 800	2 700
–	–	–	134	151	171	246	2,5	930 000	1 010 000	153 000	4 300	2 000
14	26	–	134	–	171	246	2,5	930 000	1 010 000	153 000	4 300	2 000
–	–	12	134	–	171	246	2,5	930 000	1 010 000	153 000	4 300	2 000
–	–	–	144	168	190	286	4	850 000	840 000	117 000	3 800	–
17	30,5	–	144	–	190	286	4	850 000	840 000	117 000	3 800	–
–	–	–	144	151	168	216	2,5	425 000	445 000	65 000	3 000	2 850
11	17	–	144	–	168	216	2,5	425 000	445 000	65 000	3 000	2 850
–	–	6	144	–	168	216	2,5	425 000	445 000	65 000	3 000	2 850
–	–	–	144	151	168	216	2,5	620 000	730 000	111 000	3 000	2 300
11	21	–	144	–	168	216	2,5	620 000	730 000	111 000	3 000	2 300
–	–	10	144	–	168	216	2,5	620 000	730 000	111 000	3 000	2 300
–	–	–	147	164	184	263	3	680 000	670 000	96 000	2 600	2 460
14	23	–	147	–	184	263	3	680 000	670 000	96 000	2 600	2 460
–	–	9	147	–	184	263	3	680 000	670 000	96 000	2 600	2 460
–	–	–	147	164	184	263	3	1 080 000	1 220 000	180 000	3 800	1 780
14	28	–	147	–	184	263	3	1 080 000	1 220 000	180 000	3 800	1 780
–	–	14	147	–	184	263	3	1 080 000	1 220 000	180 000	3 800	1 780

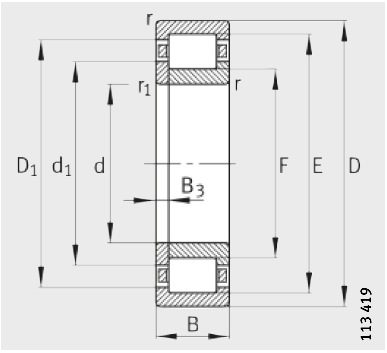
2) If axial load is present, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



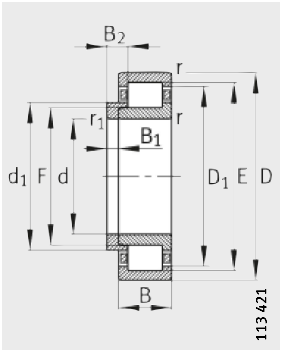
NJ
Semi-locating bearings



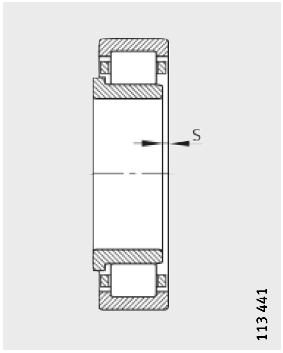
NUP
Locating bearings

Dimension table (continued) · Dimensions in mm

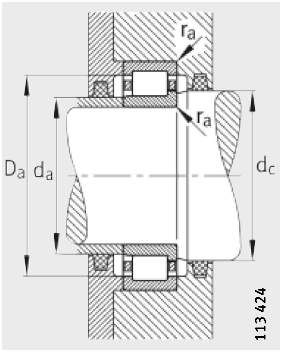
Designation			Mass m		Dimensions									
Bearing	X-life	L-section ring	Bearing ≈kg	L-section ring ≈kg	d	D	B	r min.	r_1 min.	s[1)]	E	F	D_1 ≈	d_1 ≈
NJ228-E-M1	**XL**	–	9,46	–	**140**	250	42	3	3	2	225	169	216,7	179,4
NJ228-E-M1	**XL**	**HJ228-E**	9,46	0,986	**140**	250	42	3	3	–	225	169	216,7	179,4
NUP228-E-M1	**XL**	–	9,61	–	**140**	250	42	3	3	–	225	169	216,7	179,4
NJ2228-E-M1	**XL**	–	14,7	–	**140**	250	68	3	3	7	225	169	216,7	179,4
NJ2228-E-M1	**XL**	**HJ2228-E**	14,7	1,08	**140**	250	68	3	3	–	225	169	216,7	179,4
NUP2228-E-M1	**XL**	–	16,8	–	**140**	250	68	3	3	–	225	169	216,7	180
NJ328-E-TVP2	**XL**	–	20,5	–	**140**	300	62	4	4	5,2	264	180	251,7	195,4
NJ328-E-TVP2	**XL**	**HJ328-E**	20,5	2,03	**140**	300	62	4	4	–	264	180	251,7	195,4
NUP328-E-TVP2	**XL**	–	20,8	–	**140**	300	62	4	4	–	264	180	251,7	195,4
NJ2328-E-M1	**XL**	–	36,6	–	**140**	300	102	4	4	9,2	264	180	251,7	195,4
NJ2328-E-M1	**XL**	**HJ2328-E**	36,6	2,2	**140**	300	102	4	4	–	264	180	251,7	195,4
NUP2328-E-M1	**XL**	–	37,1	–	**140**	300	102	4	4	–	264	180	251,7	195,4
NJ230-E-M1	**XL**	–	11,9	–	**150**	270	45	3	3	4	242	182	233,2	193,1
NJ230-E-M1	**XL**	**HJ230-E**	11,9	1,26	**150**	270	45	3	3	–	242	182	233,2	193,1
NUP230-E-M1	**XL**	–	12,1	–	**150**	270	45	3	3	–	242	182	233,2	193,1
NJ2230-E-M1	**XL**	–	18,7	–	**150**	270	73	3	3	7,5	242	182	233,2	193,1
NJ2230-E-M1	**XL**	**HJ2230-E**	18,7	1,36	**150**	270	73	3	3	–	242	182	233,2	193,1
NUP2230-E-M1	**XL**	–	19,1	–	**150**	270	73	3	3	–	242	182	233,2	193,1
NJ330-E-M1	**XL**	–	27,2	–	**150**	320	65	4	4	5,5	283	193	269,8	209,5
NJ330-E-M1	**XL**	**HJ330-E**	27,2	2,33	**150**	320	65	4	4	–	283	193	269,8	209,5
NUP330-E-M1	**XL**	–	27,7	–	**150**	320	65	4	4	–	283	193	269,8	209,5
NJ2330-E-M1	**XL**	–	43,8	–	**150**	320	108	4	4	9,7	283	193	269,8	209,5
NJ2330-E-M1	**XL**	**HJ2330-E**	43,8	2,55	**150**	320	108	4	4	–	283	193	269,8	209,5
NUP2330-E-M1	**XL**	–	44,6	–	**150**	320	108	4	4	–	283	193	269,8	209,5



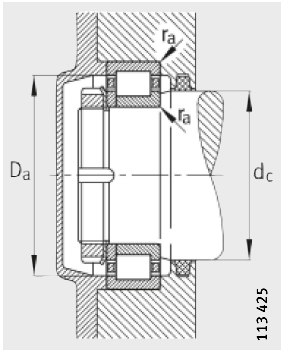
NJ and HJ
Locating bearings



1) Axial displacement “s” for NJ



Mounting dimensions for NJ



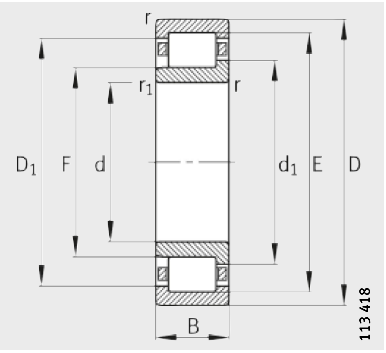
Mounting dimensions for NUP

			Mounting dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
B_1	B_2	B_3	d_a		d_c	D_a	r_a	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
			min.[2]	max.	min.	max.[2]	max.	N	N	N	min^{-1}	min^{-1}
–	–	–	154	166	182	236	2,5	460 000	510 000	72 000	4 800	2 600
11	18	–	154	–	182	236	2,5	460 000	510 000	72 000	4 800	2 600
–	–	7	154	–	182	236	2,5	460 000	510 000	72 000	4 800	2 600
–	–	–	154	166	182	236	2,5	670 000	830 000	123 000	4 500	2 080
11	23	–	154	–	182	236	2,5	670 000	830 000	123 000	4 500	2 080
–	–	12	154	–	182	236	2,5	670 000	830 000	123 000	4 500	2 080
–	–	–	157	176	198	283	3	790 000	800 000	113 000	2 400	2 200
15	25	–	157	–	198	283	3	790 000	800 000	113 000	2 400	2 200
–	–	10	157	–	198	283	3	790 000	800 000	113 000	2 400	2 200
–	–	–	157	176	198	283	3	1 210 000	1 390 000	202 000	3 600	1 640
15	31	–	157	–	198	283	3	1 210 000	1 390 000	202 000	3 600	1 640
–	–	16	157	–	198	283	3	1 210 000	1 390 000	202 000	3 600	1 640
–	–	–	164	179	196	256	2,5	520 000	590 000	82 000	4 500	2 390
12	19,5	–	164	–	196	256	2,5	520 000	590 000	82 000	4 500	2 390
–	–	7,5	164	–	196	256	2,5	520 000	590 000	82 000	4 500	2 390
–	–	–	164	179	196	256	2,5	780 000	970 000	142 000	4 300	1 860
12	24,5	–	164	–	196	256	2,5	780 000	970 000	142 000	4 300	1 860
–	–	12,5	164	–	196	256	2,5	780 000	970 000	142 000	4 300	1 860
–	–	–	167	190	213	303	3	900 000	930 000	126 000	3 600	1 970
15	25	–	167	–	213	303	3	900 000	930 000	126 000	3 600	1 970
–	–	10	167	–	213	303	3	900 000	930 000	126 000	3 600	1 970
–	–	–	167	190	213	303	3	1 380 000	1 600 000	226 000	3 200	1 480
15	31,5	–	167	–	213	303	3	1 380 000	1 600 000	226 000	3 200	1 480
–	–	16,5	167	–	213	303	3	1 380 000	1 600 000	226 000	3 200	1 480

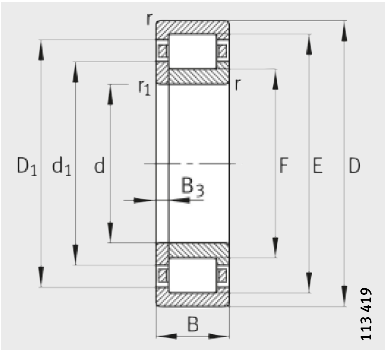
2) If axial load is present, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



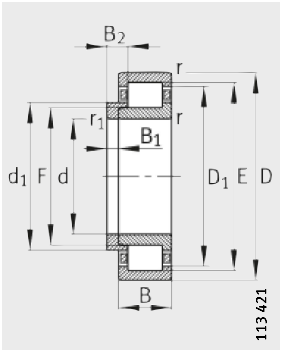
NJ
Semi-locating bearings



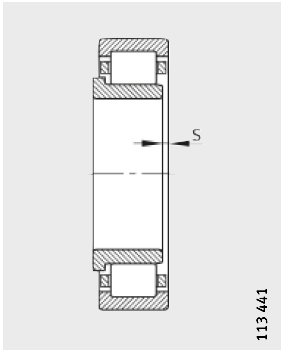
NUP
Locating bearings

Dimension table (continued) · Dimensions in mm

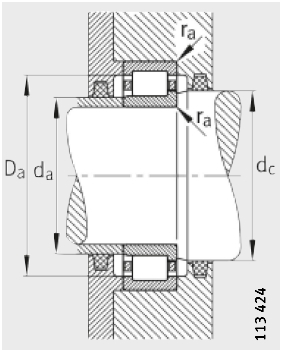
Designation			Mass m		Dimensions									
Bearing	X-life	L-section ring	Bearing ≈kg	L-section ring ≈kg	d	D	B	r min.	r_1 min.	s[1)]	E	F	D_1 ≈	d_1 ≈
NJ232-E-M1	**XL**	–	14,8	–	**160**	290	48	3	3	4,1	259	195	249,6	206,8
NJ232-E-M1	**XL**	**HJ232-E**	14,8	1,47	**160**	290	48	3	3	–	259	195	249,6	206,8
NUP232-E-M1	**XL**	–	15,1	–	**160**	290	48	3	3	–	259	195	249,6	206,8
NJ2232-E-M1	**XL**	–	23,9	–	**160**	290	80	3	3	7,2	261	193	251,1	205,5
NJ2232-E-M1	**XL**	**HJ2232-E**	23,9	1,56	**160**	290	80	3	3	–	261	193	251,1	205,5
NUP2232-E-M1	**XL**	–	24,3	–	**160**	290	80	3	3	–	261	193	251,1	205,5
NJ332-E-M1	–	–	32,3	–	**160**	340	68	4	4	5,6	300	204	286	221,6
NJ332-E-M1	–	**HJ332-E**	32,3	2,58	**160**	340	68	4	4	–	300	204	286	221,6
NJ2332-E-M1	–	–	52,3	–	**160**	340	114	4	4	9,9	300	204	286	221,6
NJ2332-E-M1	–	**HJ2332-E**	52,3	2,85	**160**	340	114	4	4	–	300	204	286	221,6
NJ234-E-M1	**XL**	–	18,4	–	**170**	310	52	4	4	4,3	279	207	268,5	218,4
NJ234-E-M1	**XL**	**HJ234-E**	18,4	1,58	**170**	310	52	4	4	–	279	207	268,5	218,4
NUP234-E-M1	**XL**	–	18,6	–	**170**	310	52	4	4	–	279	207	268,5	218,4
NJ2234-E-M1	**XL**	–	29,8	–	**170**	310	86	4	4	7,2	281	205	269,9	219
NJ2234-E-M1	**XL**	**HJ2234-E**	29,8	1,78	**170**	310	86	4	4	–	281	205	269,9	219
NUP2234-E-M1	**XL**	–	30,2	–	**170**	310	86	4	4	–	281	205	269,9	219
NJ334-E-M1	–	–	38,6	–	**170**	360	72	4	4	6	318	218	301,6	237
NJ334-E-M1	–	**HJ334-E**	38,6	3,21	**170**	360	72	4	4	–	318	218	301,6	237
NJ2334-EX-M1	–	–	62,3	–	**170**	360	120	4	4	10,2	320	216	303	235,7
NJ2334-EX-M1	–	**HJ2334-EX**	62,3	3,53	**170**	360	120	4	4	–	320	216	303	235,7
NJ236-E-M1	**XL**	–	19,2	–	**180**	320	52	4	4	4,7	289	217	278,6	230,2
NJ236-E-M1	**XL**	**HJ236-E**	19,2	1,76	**180**	320	52	4	4	–	289	217	278,6	230,2
NUP236-E-M1	**XL**	–	17,3	–	**180**	320	52	4	4	–	289	217	278,6	230,2
NJ2236-E-M1	**XL**	–	30,9	–	**180**	320	86	4	4	7,2	291	215	280	229
NJ2236-E-M1	**XL**	**HJ2236-E**	30,9	1,87	**180**	320	86	4	4	–	291	215	280	229
NUP2236-E-M1	**XL**	–	31,4	–	**180**	320	86	4	4	–	291	215	280	229
NJ336-E-M1	–	–	44,6	–	**180**	380	75	4	4	6,1	335	231	319,8	250,5
NJ336-E-M1	–	**HJ336E**	44,6	3,77	**180**	380	75	4	4	–	335	231	319,8	250,5
NJ2336-EX-M1	–	–	72,9	–	**180**	380	126	4	4	10,5	339	227	320,8	248
NJ2336-EX-M1	–	**HJ2336-EX**	72,9	4,05	**180**	380	126	4	4	–	339	227	320,8	248



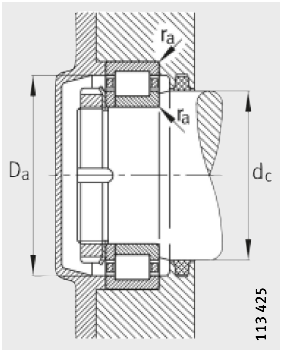
NJ and HJ
Locating bearings



1) Axial displacement “s” for NJ



Mounting dimensions for NJ



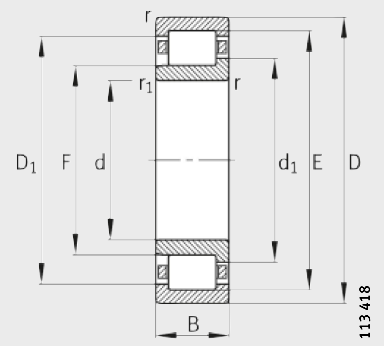
Mounting dimensions for NUP

			Mounting dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
B_1	B_2	B_3	d_a		d_c	D_a	r_a	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
			min.[2]	max.	min.	max.[2]	max.	N	N	N	min^{-1}	min^{-1}
–	–	–	174	192	210	276	2,5	590 000	670 000	93 000	4 300	2 190
12	20	–	174	–	210	276	2,5	590 000	670 000	93 000	4 300	2 190
–	–	8	174	–	210	276	2,5	590 000	670 000	93 000	4 300	2 190
–	–	–	174	192	210	276	2,5	940 000	1 170 000	171 000	3 800	1 670
12	24,5	–	174	–	210	276	2,5	940 000	1 170 000	171 000	3 800	1 670
–	–	12,5	174	–	210	276	2,5	940 000	1 170 000	171 000	3 800	1 670
–	–	–	177	200	228	323	3	865 000	1 060 000	114 000	3 000	1 790
15	25	–	177	–	228	323	3	865 000	1 060 000	114 000	3 000	1 790
–	–	–	177	200	228	323	3	1 320 000	1 830 000	204 000	3 000	1 350
15	32	–	177	–	228	323	3	1 320 000	1 830 000	204 000	3 000	1 350
–	–	–	187	204	223	293	3	700 000	780 000	107 000	3 600	2 010
12	20	–	187	–	223	293	3	700 000	780 000	107 000	3 600	2 010
–	–	8	187	–	223	293	3	700 000	780 000	107 000	3 600	2 010
–	–	–	187	204	223	293	3	1 130 000	1 400 000	198 000	3 200	1 500
12	24	–	187	–	223	293	3	1 130 000	1 400 000	198 000	3 200	1 500
–	–	12	187	–	223	293	3	1 130 000	1 400 000	197 000	3 200	1 500
–	–	–	187	215	240	343	3	965 000	1 220 000	132 000	3 000	1 630
16	27	–	187	–	240	343	3	965 000	1 220 000	132 000	3 000	1 630
–	–	–	187	214	238,3	343	3	1 500 000	2 080 000	230 000	2 800	1 230
16	33,5	–	187	–	238,3	343	3	1 500 000	2 080 000	230 000	2 800	1 230
–	–	–	197	214	233	303	3	730 000	830 000	112 000	3 600	1 880
12	20	–	197	–	233	303	3	730 000	830 000	112 000	3 600	1 880
–	–	8	197	–	233	303	3	730 000	830 000	112 000	3 600	1 880
–	–	–	197	214	233	303	3	1 180 000	1 490 000	208 000	3 200	1 390
12	24	–	197	–	233	303	3	1 180 000	1 490 000	208 000	3 200	1 390
–	–	12	197	–	233	303	3	1 180 000	1 490 000	208 000	3 200	1 390
–	–	–	197	228	254	363	3	1 040 000	1 320 000	141 000	2 800	1 520
17	28,5	–	197	–	254	363	3	1 040 000	1 320 000	141 000	2 800	1 520
–	–	–	197	225	250,6	363	3	1 660 000	2 320 000	260 000	2 800	1 130
17	35	–	197	–	250,6	363	3	1 660 000	2 320 000	260 000	2 800	1 130

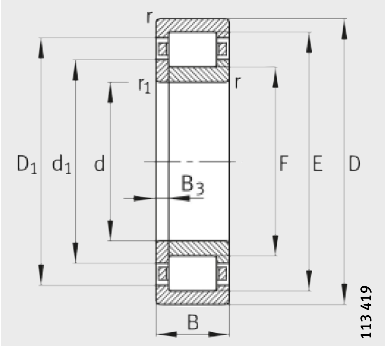
2) If axial load is present, observe the dimensions D_1 and d_1.

Cylindrical roller bearings with cage

Semi-locating bearings, locating bearings



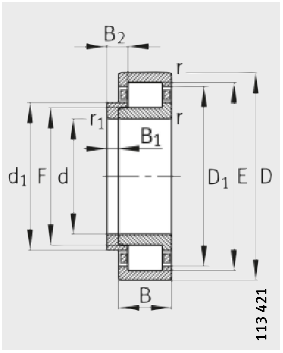
NJ
Semi-locating bearings



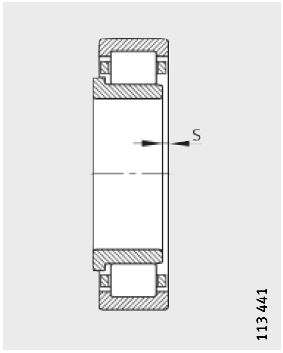
NUP
Locating bearings

Dimension table (continued) · Dimensions in mm

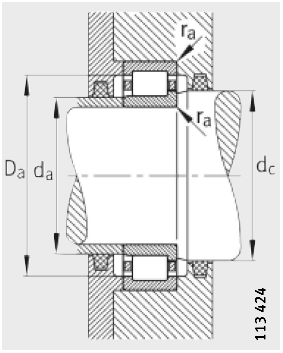
Designation		Mass m		Dimensions									
Bearing	L-section ring	Bearing ≈kg	L-section ring ≈kg	d	D	B	r min.	r_1 min.	$s^{1)}$	E	F	D_1 ≈	d_1 ≈
NJ238-E-M1	–	23,2	–	**190**	340	55	4	4	4,7	306	230	295	244
NJ238-E-M1	**HJ238-E**	23,2	2,17	**190**	340	55	4	4	–	306	230	295	244
NUP238-E-M1	–	23,5	–	**190**	340	55	4	4	–	306	230	295	244
NJ2238-E-M1	–	37,7	–	**190**	340	92	4	4	8	308	228	296,4	242,7
NJ2238-E-M1	**HJ2238-E**	37,7	2,31	**190**	340	92	4	4	–	308	228	296,4	242,7
NJ2338-EX-M1	–	84,4	–	**190**	400	132	5	5	11	360	240	340,5	262,5
NJ2338-EX-M1	**HJ2338-EX**	84,4	4,8	**190**	400	132	5	5	–	360	240	340,5	262,5
NJ240-E-M1	–	27,5	–	**200**	360	58	4	4	4,8	323	243	311,5	257,6
NJ240-E-M1	**HJ240-E**	27,5	2,62	**200**	360	58	4	4	–	323	243	311,5	257,6
NUP240-E-M1	–	28	–	**200**	360	58	4	4	–	323	243	311,5	257,6
NJ2240-E-M1	–	45,3	–	**200**	360	98	4	4	8,2	325	241	312,9	256,3
NJ2240-E-M1	**HJ2240-E**	45,3	2,78	**200**	360	98	4	4	–	325	241	312,9	256,3
NJ340-E-M1	–	58,1	–	**200**	420	80	5	5	6,3	370	258	351,8	279
NJ340-E-M1	**HJ340-E**	58,1	4,94	**200**	420	80	5	5	–	370	258	351,8	279
NJ2340-EX-M1	–	97,2	–	**200**	420	138	5	5	11,3	377	253	356,9	276,1
NJ2340-EX-M1	**HJ2340-EX**	97,2	5,28	**200**	420	138	5	5	–	377	253	356,9	276,1
NJ244-E-M1	–	38,7	–	**220**	400	65	4	4	5,5	358	268	344,9	285,2
NJ244-E-M1	**HJ244-E**	38,7	3,55	**220**	400	65	4	4	–	358	268	344,9	285,2
NUP244-E-M1	–	39,3	–	**220**	400	65	4	4	–	358	268	344,9	285,2
NUP2244-EX-M1	–	63,4	–	**220**	400	108	4	4	–	367	259	349,4	279,4
NUP2344-EX-M1	–	124	–	**220**	460	145	5	5	–	413	277	391,2	302,2
NJ248-E-M1	–	52,5	–	**240**	440	72	4	4	6	393	293	376,6	312
NJ248-E-M1	**HJ248-E**	52,5	4,6	**240**	440	72	4	4	–	393	293	376,6	312
NJ348-E-M1	–	97	–	**240**	500	95	5	5	7,4	442	306	421,2	331,3
NJ348-E-M1	**HJ348-E**	97	8,3	**240**	500	95	5	5	–	442	306	421,2	331,3
NJ252-E-M1	–	69,4	–	**260**	480	80	5	5	6,2	429	317	410,8	336,9
NJ252-E-M1	**HJ252-E**	69,4	5,92	**260**	480	80	5	5	–	429	317	410,8	336,9
NJ356-E-M1	–	149	–	**280**	580	108	6	6	8,7	512	362	488	389,8
NJ356-E-M1	**HJ356-E**	149	13,7	**280**	580	108	6	6	–	512	362	488	389,8



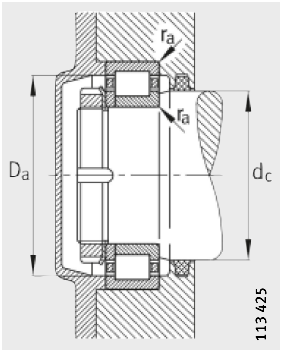
NJ and HJ
Locating bearings



1) Axial displacement “s” for NJ



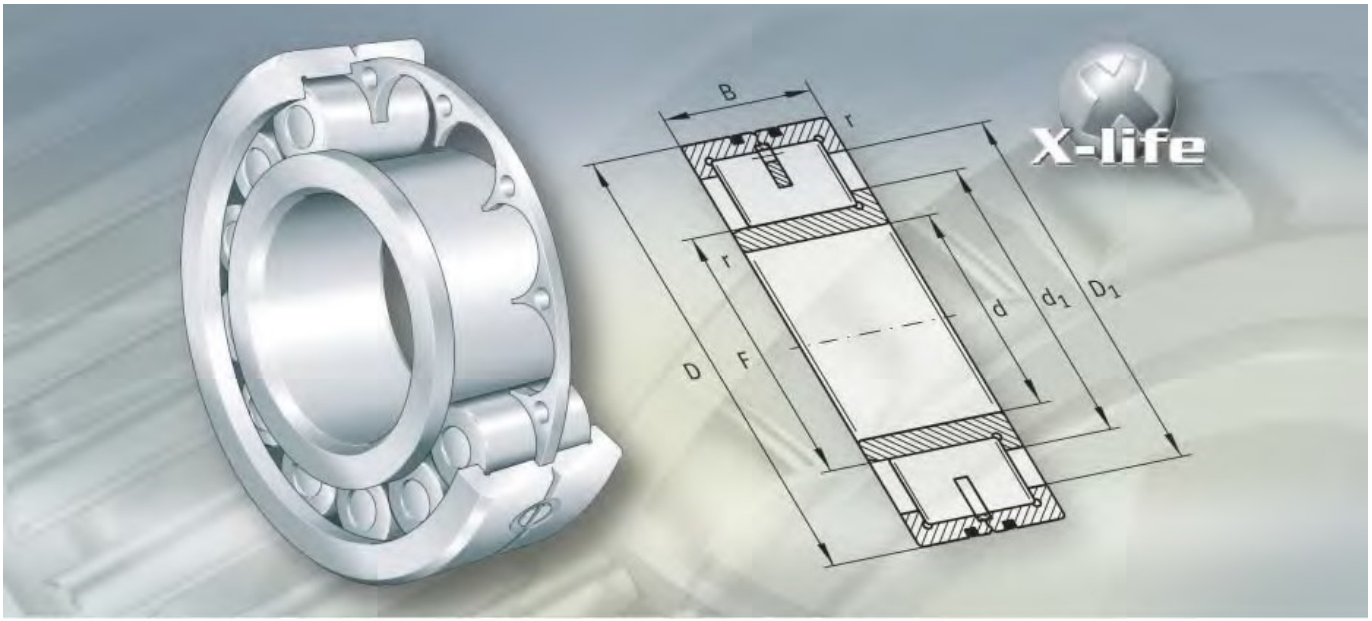
Mounting dimensions for NJ



Mounting dimensions for NUP

			Mounting dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
B_1	B_2	B_3	d_a		d_c	D_a	r_a	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
			min.[2]	max.	min.	max.[2]	max.	N	N	N	min^{-1}	min^{-1}
–	–	–	207	227	247	323	3	680 000	930 000	100 000	3 200	1 750
13	21,5	–	207	–	247	323	3	680 000	930 000	100 000	3 200	1 750
–	–	8,5	207	–	247	323	3	680 000	930 000	100 000	3 200	1 750
–	–	–	207	227	247	323	3	1 100 000	1 660 000	184 000	3 000	1 300
13	26,5	–	207	–	247	323	3	1 100 000	1 660 000	184 000	3 000	1 300
–	–	–	210	237,8	265,3	380	4	1 900 000	2 650 000	285 000	2 600	1 030
18	36,5	–	210	–	265,3	380	4	1 900 000	2 650 000	285 000	2 600	1 030
–	–	–	217	240	261	343	3	750 000	1 040 000	110 000	3 000	1 620
14	23	–	217	–	261	343	3	750 000	1 040 000	110 000	3 000	1 620
–	–	9	217	–	261	343	3	750 000	1 040 000	110 000	3 000	1 620
–	–	–	217	240	261	343	3	1 220 000	1 860 000	206 000	2 800	1 210
14	28	–	217	–	261	343	3	1 220 000	1 860 000	206 000	2 800	1 210
–	–	–	220	255	282	400	4	1 180 000	1 530 000	161 000	2 600	1 340
18	30	–	220	–	282	400	4	1 180 000	1 530 000	161 000	2 600	1 340
–	–	–	220	250,7	279	400	4	2 040 000	2 900 000	310 000	2 400	960
18	37	–	220	–	279	400	4	2 040 000	2 900 000	310 000	2 400	960
–	–	–	237	265	288	383	3	950 000	1 320 000	134 000	2 800	1 400
15	25	–	237	–	288	383	3	950 000	1 320 000	134 000	2 800	1 400
–	–	10	237	–	288	383	3	950 000	1 320 000	135 000	2 800	1 400
–	–	14	237	–	282,3	383	3	1 630 000	2 360 000	250 000	2 600	1 020
–	–	20	240	–	305,1	440	4	2 360 000	3 350 000	340 000	2 200	840
–	–	–	257	290	315	423	3	1 140 000	1 600 000	163 000	2 600	1 240
16	27	–	257	–	315	423	3	1 140 000	1 600 000	163 000	2 600	1 240
–	–	–	260	303	335	480	4	1 730 000	2 280 000	221 000	2 200	1 010
22	35,5	–	260	–	335	480	4	1 730 000	2 280 000	221 000	2 200	1 010
–	–	–	280	314	341	460	4	1 340 000	1 900 000	191 000	2 400	1 120
18	30	–	280	–	341	460	4	1 340 000	1 900 000	191 000	2 400	1 120
–	–	–	306	359	393,4	554	5	2 160 000	3 050 000	285 000	1 900	810
26	42,5	–	306	–	393,4	554	5	2 160 000	3 050 000	285 000	1 900	810

2) If axial load is present, observe the dimensions D_1 and d_1.



Cylindrical roller bearings with disc cage or spacers

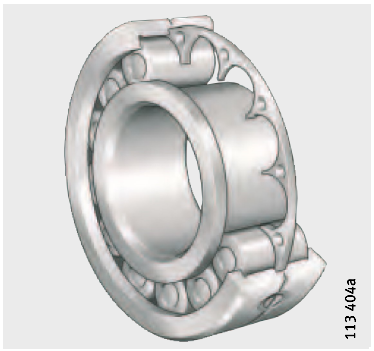
Cylindrical roller bearings with disc cage or spacers

Cylindrical roller bearings with disc cage or spacers

Semi-locating bearings

With disc cage

LSL1923



With spacers

ZSL1923

Cylindrical roller bearings with disc cage or spacers

Features

Cylindrical roller bearings with a disc cage (series LSL) or with spacers (series ZSL) are of a single row, self-retaining design and correspond to dimension series 23. They have solid outer rings with two ribs, while the inner rings have one rib. The inner ring is removable and thus allows easier mounting of the bearings.
The disc cages or spacers prevent the cylindrical rollers from coming into contact with each other during rolling.

Cylindrical roller bearings NJ23..-E and spherical roller bearings 223..-E1 have the same design envelope as LSL1923 and ZSL1923.

X-life

Numerous sizes are supplied in the X-life grade.
These bearings are indicated in the dimension tables.

Bearings of X-life quality have, for example, lower roughness R_a and higher geometrical accuracy of the raceways than comparable designs that are not X-life. As a result, they have higher load carrying capacity and longer life for the same dimensioning. In certain applications, this means that a smaller bearing arrangement can be designed.

Bearings of TB design

In the case of bearings of TB design, the axial load carrying capacity of cylindrical roller bearings was significantly improved with the aid of new calculation and manufacturing methods.

Optimum contact conditions between the roller and rib are ensured by means of a special curvature of the roller end faces. As a result, the axial contact pressures on the rib are significantly minimised and a lubricant film capable of supporting higher loads is formed. Under normal operating conditions, wear and fatigue at the rib contact running and roller end faces is completely eliminated.

In addition, axial frictional torque is reduced by up to 50%. The bearing temperature during operation is therefore significantly lower.

Cylindrical roller bearings with disc cage or spacers

Semi-locating bearings

Cylindrical roller bearings LSL1923 and ZSL1923 are semi-locating bearings. Semi-locating bearings can support not only high radial forces but also axial forces in one direction and can therefore guide shafts axially in one direction. They act as non-locating bearings in the opposite direction.

The bearings have two ribs on the outer ring and one rib on the inner ring.

Due to the large number of rolling elements and their dimensions, LSL and ZSL bearings have very high radial load carrying capacity. They can also withstand high shock loads and vibrations.

Due to the low frictional torque and the low level of heat generation, the bearings are characterised by high limiting speeds. In addition, the optimum heat dissipation ensures thermally stable conditions in the bearing.

With disc cage

In cylindrical roller bearings LSL1923, an externally-guided flat brass disc cage prevents the cylindrical rollers from coming into contact with each other during rolling.

The cage has pockets to accommodate the rolling elements. The rolling elements are guided between the ribs on the outer ring. Due to its low mass, the cage is subjected to only minimal strain under acceleration.

The outer ring is axially split and held together by fasteners.

With spacers

In cylindrical roller bearings ZSL1923, plastic spacers prevent the cylindrical rollers from coming into contact with each other during rolling.
The spacers are designed such that the rolling element set is self-retaining, so the bearing and inner ring can be mounted separately.

The spacers are guided axially between the two outer ring ribs.

Axial displacement

The outer and inner ring can be axially displaced relative to each other in one direction only by the dimension “s” stated in the dimension table.

Sealing

The cylindrical roller bearings are open on both sides.

Lubrication

They can be lubricated via the end faces with grease or oil.

Special design for vibratory machinery

In addition to high basic dynamic load ratings and thus long rating life values, bearings in vibratory machinery must also be able to compensate or support considerable shaft tilting due to load or misalignment. The bearings LSL and ZSL are therefore also available by agreement in the BIR design. In these bearings, the inner ring raceway is ground slightly spherical.

Operating temperature

Cylindrical roller bearings with disc cage or spacers are suitable for operating temperatures from –30 °C to +120 °C.

Suffixes

Suffixes for available designs: see table.

Available designs

Suffix	Description	Design
BIR	Inner ring raceway ground slightly spherical	Available by agreement
BR	Black oxide coated	
C3	Radial internal clearance larger than normal	
C4	Radial internal clearance larger than C3	
C5	Radial internal clearance larger than C4	
TB	Bearing with increased axial load carrying capacity	Standard depending on bearing size, see dimension table

Available bearings of TB design

Series[1)]	From bore diameter d mm
LSL1923	90
ZSL1923	

1) Available by agreement.

Cylindrical roller bearings with disc cage or spacers

Design and safety guidelines

Permissible skewing

There is no significant reduction in rating life if the misalignment of the inner ring relative to the outer ring does not exceed the following values:
3′ in bearings of series LSL1923, ZSL1923.

Axial load carrying capacity

Radial cylindrical roller bearings of a semi-locating bearing design can support axial forces in one direction as well as radial forces.

The axial load carrying capacity is dependent on:

- the size of the sliding surfaces between the ribs and the end faces of the rolling elements
- the sliding velocity at the ribs
- the lubrication on the contact surfaces
- tilting of the bearing.

Ribs subjected to load must be supported across their entire height.

The permissible axial load $F_{a\,per}$ must not be exceeded, in order to avoid an unacceptable increase in temperature.

The axial limiting load $F_{a\,max}$ according to the formula must not be exceeded, in order to avoid impermissible pressure at the contact surfaces.

The ratio F_a/F_r should not exceed 0,4.
In the case of bearings of TB design, the value 0,6 is permissible.

Continuous axial loading without simultaneous radial loading is not permissible.

Permissible and maximum axial load

The axial load $F_{a\,per}$ and the limiting load $F_{a\,max}$ are calculated as follows:

Bearings of standard design

$$F_{a\,per} = k_S \cdot k_B \cdot d_M^{1,5} \cdot n^{-0,6} \leqq F_{a\,max}$$

Bearings of TB design

$$F_{a\,per} = 1,5 \cdot k_S \cdot k_B \cdot d_M^{1,5} \cdot n^{-0,6} \leqq F_{a\,max}$$

Bearings of standard and TB design

$$F_{a\,max} = 0,075 \cdot k_B \cdot d_M^{2,1}$$

$F_{a\,per}$ N
Permissible axial load

$F_{a\,max}$ N
Axial limiting load

k_S –
Factor dependent on the lubrication method, see table, page 453

k_B –
Bearing factor, $k_B = 28$

d_M mm
Mean bearing diameter (d + D)/2, see dimension table

n min^{-1}
Operating speed.

Factor k_S for the lubrication method

Lubrication method[1)]	k_S
Minimal heat dissipation, drip feed oil lubrication, oil mist lubrication, low operating viscosity ($\nu < 0{,}5 \cdot \nu_1$)	7,5 to 10
Poor heat dissipation, oil sump lubrication, oil spray lubrication, low oil flow	10 to 15
Good heat dissipation, recirculating oil lubrication (pressurised oil lubrication)	12 to 18
Very good heat dissipation, recirculating oil lubrication with oil cooling, high operating viscosity ($\nu > 2 \cdot \nu_1$)	16 to 24

1) Doped oils should be used, e.g. CLP (DIN 51 517) and HLP (DIN 51 524) of ISO-VG classes 32 to 460 as well as ATF oils (DIN 51 502) and gearbox oils (DIN 51 512) of SAE viscosity classes 75 W to 140 W.

Misalignment of bearings

Misalignment caused by shaft deflection for example, may lead to alternating stresses on the inner ring ribs.
In this case, the axial load must be restricted to F_{as} for bearing tilting of up to max. 2 angular minutes.

$$F_{as} = 20 \cdot d_M^{1,42}$$

If even greater tilting is present, special strength analysis is required.

Cylindrical roller bearings with disc cage or spacers

Equivalent dynamic bearing load

Non-locating bearings

For bearings under dynamic loading, the following applies:

$$P = F_r$$

Semi-locating bearings

If an axial force F_a is present in addition to the radial force F_r, the load ratio must be taken into consideration.

Load ratio and equivalent dynamic load

Load ratio	Equivalent dynamic bearing load
$\frac{F_a}{F_r} \leq e$	$P = F_r$
$\frac{F_a}{F_r} > e$	$P = 0,92 \cdot F_r + Y \cdot F_a$

P N
Equivalent dynamic bearing load for combined load
F_a N
Axial dynamic bearing load
F_r N
Radial dynamic bearing load
e, Y –
Factors: see table Factors e and Y.

Factors e and Y

Series	Calculation factors	
	e	Y
LSL1923, ZSL1923	0,3	0,4

Equivalent static bearing load

For bearings under static loading, the following applies:

$$P_0 = F_{0r}$$

Minimum radial load

In continuous operation, a minimum radial load of the order of $F_{r\,min} = C_{0r}/60$ is necessary.

If $F_{r\,min} < C_{0r}/60$, please contact us.

Design of bearing arrangements

Shaft and housing tolerances

Recommended shaft tolerances for bearings with cylindrical bore, see table, page 150.
Recommended housing tolerances for radial bearings, see table, page 152.

Axial location

In order to prevent lateral creep of the bearing rings, they must be located by force or physical locking means.

The abutment shoulders (shaft and housing) should be sufficiently high and perpendicular to the bearing axis.

The transition from the bearing seating to the abutting shoulders must be designed with rounding to DIN 5 418 or an undercut to DIN 509. Observe the minimum values for the chamfer dimensions r in the dimension tables.

In the case of semi-locating bearings, the bearing rings only require support on one side, on the rib supporting the axial load.

Full support must be provided for ribs transmitting forces in axially loaded bearings.

Accuracy

The dimensional and geometrical tolerances of the bearings correspond to tolerance class PN to DIN 620.

Radial internal clearance

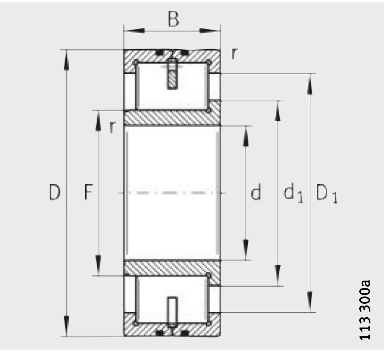
The radial internal clearance corresponds to internal clearance group CN to DIN 620-4.

Radial internal clearance

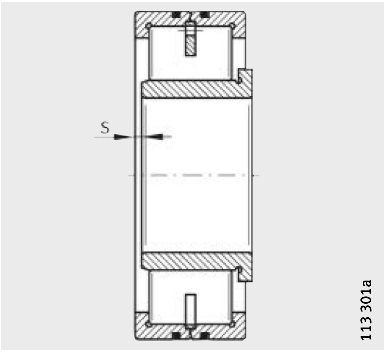
Bore d mm		Radial internal clearance							
		CN µm		C3 µm		C4 µm		C5 µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
–	24	20	45	35	60	50	75	65	90
24	30	20	45	35	60	50	75	70	95
30	40	25	50	45	70	60	85	80	105
40	50	30	60	50	80	70	100	95	125
50	65	40	70	60	90	80	110	110	140
65	80	40	75	65	100	90	125	130	165
80	100	50	85	75	110	105	140	155	190
100	120	50	90	85	125	125	165	180	220
120	140	60	105	100	145	145	190	200	245
140	160	70	120	115	165	165	215	225	275
160	180	75	125	120	170	170	220	250	300
180	200	90	145	140	195	195	250	275	330
200	225	105	165	160	220	220	280	305	365
225	250	110	175	170	235	235	300	330	395
250	280	125	195	190	260	260	330	370	440
280	315	130	205	200	275	275	350	410	485

Cylindrical roller bearings with disc cage

Semi-locating bearings



LSL1923



[1] Axial displacement “s”

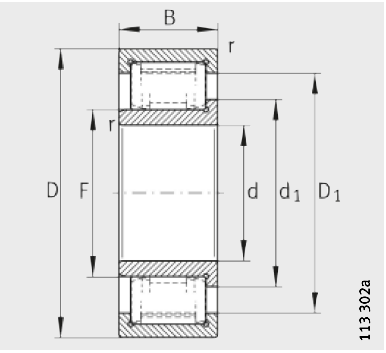
Dimension table · Dimensions in mm

Designation		Mass	Dimensions					Mounting dimensions		
	X-life	m ≈kg	d	D	B	r min.	s[1]	F	d_1 ≈	D_1 ≈
LSL192316	**XL**	6,1	**80**	170	58	2,1	3,5	94	104,5	134,8
LSL192317	**XL**	7,3	**85**	180	60	3	4	100	111,3	143,9
LSL192318-TB	**XL**	8,6	**90**	190	64	3	4	105,26	117,2	152,5
LSL192319-TB	**XL**	10	**95**	200	67	3	4	114,66	126,6	161
LSL192320-TB	**XL**	12,8	**100**	215	73	3	4	119,3	132,7	172
LSL192322-TB	**XL**	17,3	**110**	240	80	3	5	135,5	150,7	193,1
LSL192324-TB	**XL**	22	**120**	260	86	3	5	147,39	164,2	213,1
LSL192326-TB	**XL**	27,2	**130**	280	93	4	5	157,9	176	227,9
LSL192328-TB	**XL**	34	**140**	300	102	4	7	168,45	187,5	243,2
LSL192330-TB	–	40,7	**150**	320	108	4	7	182,49	203,3	263,9
LSL192332-TB	–	48,1	**160**	340	114	4	7	196,38	219	284,8
LSL192334-TB	–	57,5	**170**	360	120	4	7	230,55	226,6	295,4
LSL192336-TB	–	67,4	**180**	380	126	4	7	221,56	245	313,3
LSL192338-TB	–	78,1	**190**	400	132	5	7	224,43	250	325,5
LSL192340-TB	–	89,3	**200**	420	138	5	7	238,45	265,7	345,9
LSL192344-TB	–	108	**220**	460	145	5	7	266,71	297	385,9
LSL192348-TB	–	138,6	**240**	500	155	5	10	280,55	312,5	406,1
LSL192352-TB	–	168	**260**	540	165	6	10	315,6	351,6	457,2
LSL192356-TB	–	206,6	**280**	580	175	6	12	333,1	371	485
LSL192360-TB	–	253	**300**	620	185	7,5	12	350,93	390,9	508,5

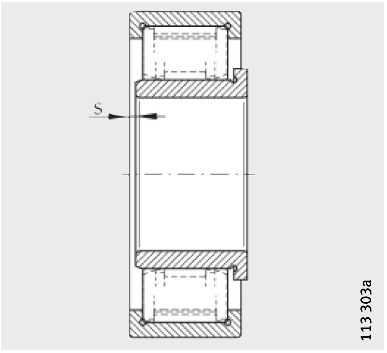
Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
dyn. C_r N	stat. C_{0r} N	C_{ur} N	n_G min^{-1}	n_B min^{-1}
475 000	495 000	89 000	8 300	4 600
500 000	520 000	90 000	7 800	4 350
590 000	610 000	104 000	7 400	4 050
610 000	660 000	112 000	6 900	3 750
750 000	790 000	133 000	6 500	3 450
880 000	930 000	151 000	5 800	3 000
1 060 000	1 140 000	181 000	5 300	2 650
1 190 000	1 280 000	200 000	4 950	2 450
1 340 000	1 460 000	224 000	4 600	2 300
1 410 000	1 760 000	199 000	4 250	2 020
1 600 000	2 010 000	224 000	3 950	1 820
1 740 000	2 210 000	241 000	3 800	1 760
1 840 000	2 430 000	260 000	3 600	1 620
2 100 000	2 750 000	295 000	3 450	1 540
2 340 000	3 050 000	315 000	3 250	1 420
2 500 000	3 200 000	320 000	2 900	1 270
2 750 000	3 550 000	350 000	2 750	1 220
3 350 000	4 350 000	425 000	2 470	1 010
3 700 000	4 850 000	460 000	2 330	950
4 150 000	5 500 000	510 000	2 220	890

Cylindrical roller bearings with spacers

Semi-locating bearings



ZSL1923

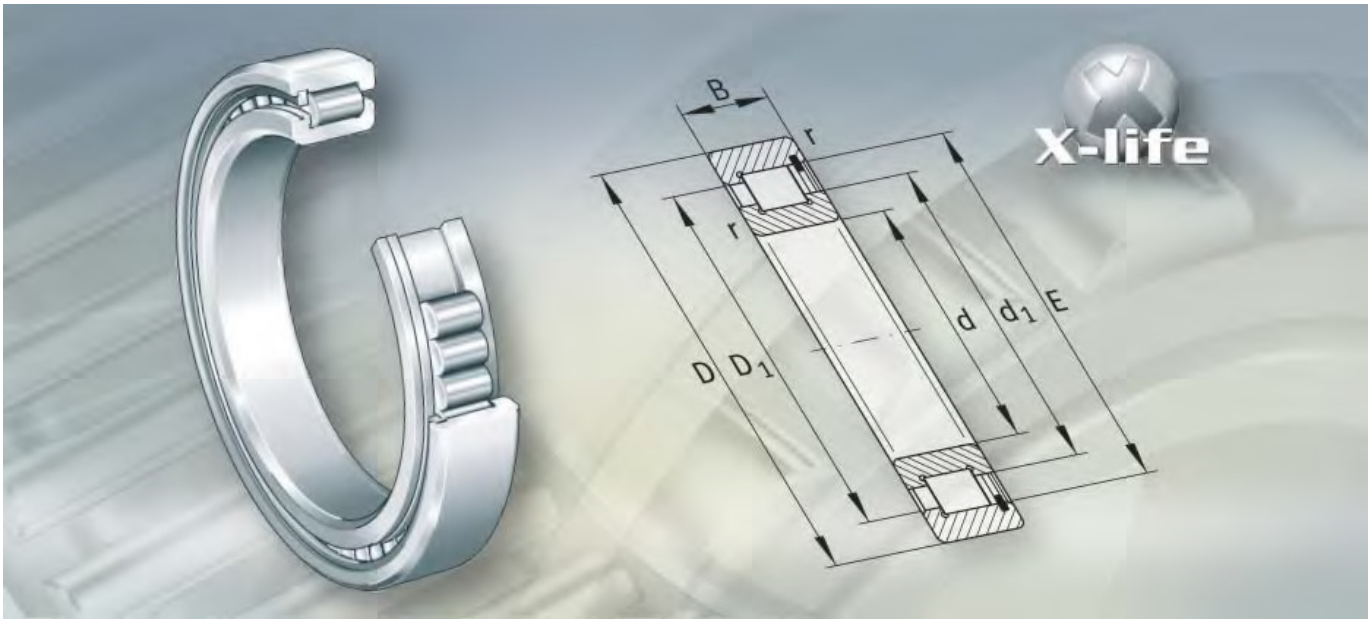


[1] Axial displacement “s”

Dimension table · Dimensions in mm

Designation		Mass	Dimensions					Mounting dimensions		
	X-life	m ≈kg	d	D	B	r min.	s[1]	F	d_1 ≈	D_1 ≈
ZSL192305	**XL**	0,36	**25**	62	24	1,1	2	31,72	36,7	47,5
ZSL192306	**XL**	0,55	**30**	72	27	1,1	2	38,3	43,5	56
ZSL192307	**XL**	0,72	**35**	80	31	1,5	2	44,68	50,7	65,8
ZSL192308	**XL**	1	**40**	90	33	1,5	2	51,12	57,5	75,2
ZSL192309	**XL**	1,34	**45**	100	36	1,5	3	56,1	62,5	80,3
ZSL192310	**XL**	1,76	**50**	110	40	2	3	60,72	68,3	89,7
ZSL192311	**XL**	2,22	**55**	120	43	2	3	67,11	75,5	99,3
ZSL192312	**XL**	2,82	**60**	130	46	2,1	3	73,62	82	105,8
ZSL192313	**XL**	3,44	**65**	140	48	2,1	3,5	80,69	90	116,5
ZSL192314	**XL**	4,27	**70**	150	51	2,1	3,5	84,14	93,5	121,6
ZSL192315	**XL**	5,2	**75**	160	55	2,1	3,5	91,22	101,6	131,9
ZSL192316	**XL**	6,2	**80**	170	58	2,1	3,5	98,24	109,5	142,1
ZSL192317	**XL**	7,23	**85**	180	60	3	4	107,01	118,2	150,9
ZSL192318-TB	**XL**	8,7	**90**	190	64	3	4	105,26	117,5	152,5
ZSL192319-TB	**XL**	10	**95**	200	67	3	4	114,65	126,6	161,9
ZSL192320-TB	**XL**	12,7	**100**	215	73	3	4	119,3	132,7	172,8
ZSL192322-TB	**XL**	16,5	**110**	240	80	3	5	134,27	151,1	199,9
ZSL192324-TB	**XL**	21,9	**120**	260	86	3	5	147,39	164,2	213,1

Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
dyn. C_r N	stat. C_{0r} N	C_{ur} N	n_G min^{-1}	n_B min^{-1}
68 000	54 000	8 700	16 400	10 000
94 000	80 000	13 400	13 900	8 500
118 000	101 000	17 500	11 900	7 500
160 000	142 000	25 000	10 400	6 300
171 000	157 000	27 500	9 700	6 300
219 000	199 000	35 500	8 800	5 800
255 000	231 000	42 000	7 900	5 400
270 000	255 000	46 500	7 400	5 200
335 000	320 000	59 000	6 800	4 600
365 000	355 000	64 000	6 500	4 600
435 000	435 000	78 000	6 000	4 200
510 000	520 000	90 000	5 500	3 850
540 000	570 000	96 000	5 200	3 600
590 000	610 000	104 000	5 200	3 750
620 000	660 000	112 000	4 850	3 450
750 000	790 000	133 000	4 550	3 200
890 000	900 000	144 000	3 950	2 700
1 060 000	1 140 000	181 000	3 700	2 400



Single row full complement cylindrical roller bearings

Single row full complement cylindrical roller bearings

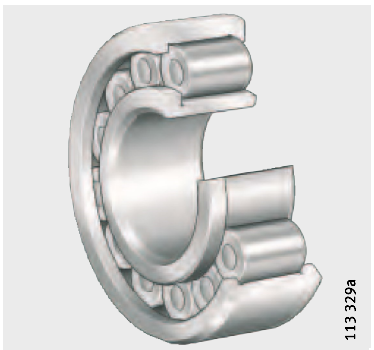
Single row full complement cylindrical roller bearings

Semi-locating bearings

Single row

SL1818, SL1829, SL1830, SL1822

SL1923



Single row full complement cylindrical roller bearings

Features

Single row full complement cylindrical roller bearings have solid outer and inner rings together with rib-guided cylindrical rollers. Since these bearings have the largest possible number of rolling elements, they have extremely high radial load carrying capacity, high rigidity and are suitable for particularly compact designs. Due to the kinematic conditions, however, they do not achieve the high speeds that are possible when using cylindrical roller bearings with cage.

Single row full complement cylindrical roller bearings are in the form of semi-locating bearings.

X-life

Numerous sizes are supplied in the X-life grade. These bearings are indicated in the dimension tables.

Bearings of X-life quality have, for example, lower roughness R_a and higher geometrical accuracy of the raceways than comparable designs that are not X-life. As a result, they have higher load carrying capacity and longer life for the same dimensioning.
In certain applications, this means that a smaller bearing arrangement can be designed.

Bearings of TB design

In the case of bearings of TB design, the axial load carrying capacity of cylindrical roller bearings was significantly improved with the aid of new calculation and manufacturing methods.

Optimum contact conditions between the roller and rib are ensured by means of a special curvature of the roller end faces. As a result, axial surface pressures on the rib are significantly reduced and a lubricant film with improved load-carrying capabilities is achieved. Under normal operating conditions, wear and fatigue at the rib contact running and roller end faces is completely eliminated.

In addition, axial frictional torque is reduced by up to 50%. The bearing temperature during operation is therefore significantly lower.

Single row full complement cylindrical roller bearings

Semi-locating bearings

Semi-locating bearings are available in single row design as SL1818 (dimension series 18), SL1829 (dimension series 29), SL1830 (dimension series 30), SL1822 (dimension series 22) and SL1923 (dimension series 23).
They can support not only high radial forces but also axial forces in one direction and can therefore guide shafts axially in one direction. They act as non-locating bearings in the opposite direction.

Series SL1923 has only one rib on the inner ring and a self-retaining rolling element set. As a result, the inner ring can be removed from the bearing. This makes fitting and dismantling considerably easier.

The bearings SL1818, SL1829, SL1830 and SL1822 are held together in handling and transport by a transport and mounting retaining device on the outer ring. This retaining device remains in the bearing and must not be subjected to axial load.

Axial displacement of inner ring

The inner ring can be axially displaced in one direction by the dimension “s” stated in the dimension table.

Sealing

The cylindrical roller bearings are supplied in an open design.

Lubrication

They are not supplied greased and can be lubricated with oil or grease via the end faces.

Operating temperature

Full complement cylindrical roller bearings are suitable for operating temperatures from –30 °C to +120 °C.

Suffixes

Suffixes for available designs: see table.

Available designs

Suffix	Description	Design
BR	Black oxide coated	Available by agreement
C3	Radial internal clearance larger than normal	
C4	Radial internal clearance larger than C3	
C5	Radial internal clearance larger than C4	
E	Increased capacity design	Standard depending on series, see dimension table
TB	Bearing with increased axial load carrying capacity	Standard depending on bearing size, see dimension table

Available bearings of TB design

Series[1)]	From bore diameter d mm
SL1818	460
SL1822	140
SL1829	300
SL1830	180
SL1923	90

1) Available by agreement.

Design and safety guidelines

Permissible skewing

There is no significant reduction in rating life if the misalignment of the inner ring relative to the outer ring does not exceed the following values:

4′ in bearings of series SL1818

3′ in bearings of series SL1923, SL1822, SL1829, SL1830.

Axial load carrying capacity

Radial cylindrical roller bearings of a semi-locating bearing design can support axial forces in one direction as well as radial forces.

The axial load carrying capacity is dependent on:

- the size of the sliding surfaces between the ribs and the end faces of the rolling elements
- the sliding velocity at the ribs
- the lubrication on the contact surfaces
- tilting of the bearing.

Ribs subjected to load must be supported across their entire height.

The permissible axial load $F_{a\,per}$ must not be exceeded, in order to avoid an unacceptable increase in temperature.

The axial limiting load $F_{a\,max}$ according to the formula must not be exceeded, in order to avoid impermissible pressure at the contact surfaces.

The ratio F_a/F_r should not exceed 0,4. In the case of bearings of TB design, the value 0,6 is permissible.
Continuous axial loading without simultaneous radial loading is not permissible.

Permissible and maximum axial load

The axial load $F_{a\,per}$ and the limiting load $F_{a\,max}$ are calculated as follows:

Bearings of standard design

$$F_{a\,per} = k_S \cdot k_B \cdot d_M^{1,5} \cdot n^{-0,6} \leqq F_{a\,max}$$

Bearings of TB design

$$F_{a\,per} = 1,5 \cdot k_S \cdot k_B \cdot d_M^{1,5} \cdot n^{-0,6} \leqq F_{a\,max}$$

Bearings of standard and TB design

$$F_{a\,max} = 0,075 \cdot k_B \cdot d_M^{2,1}$$

$F_{a\,per}$ N
Permissible axial load

$F_{a\,max}$ N
Axial limiting load

k_S –
Factor dependent on the lubrication method, see table, page 466

k_B –
Bearing factor, see table, page 466

d_M mm
Mean bearing diameter (d + D)/2 , see dimension table

n min^{-1}
Operating speed.

Factor k_S for the lubrication method

Lubrication method[1)]	k_S
Minimal heat dissipation, drip feed oil lubrication, oil mist lubrication, low operating viscosity ($\nu < 0{,}5 \cdot \nu_1$)	7,5 to 10
Poor heat dissipation, oil sump lubrication oil spray lubrication, low oil flow	10 to 15
Good heat dissipation, recirculating oil lubrication (pressurised oil lubrication)	12 to 18
Very good heat dissipation recirculating oil lubrication with oil cooling, high operating viscosity ($\nu > 2 \cdot \nu_1$)	16 to 24

1) Doped oils should be used, e.g. CLP (DIN 51517) and HLP (DIN 51524) of ISO-VG classes 32 to 460 as well as ATF oils (DIN 51502) and gearbox oils (DIN 51512) of SAE viscosity classes 75 W to 140 W.

Bearing factor k_B

Series	k_B
SL1818	4,5
SL1829	11
SL1830	17
SL1822	20
SL1923	30

Misalignment of bearings

Misalignment caused by shaft deflection for example, may lead to alternating stresses on the inner ring ribs.
In this case, the axial load must be restricted to F_{as} for bearing tilting of up to max. 2 angular minutes.

$$F_{as} = 20 \cdot d_M^{1,42}$$

If even greater tilting is present, special strength analysis is required.

Equivalent dynamic bearing load

Semi-locating bearings

If an axial force F_a is present in addition to the radial force F_r, the load ratio must be taken into consideration.

Load ratio and equivalent dynamic load

Load ratio	Equivalent dynamic bearing load
$\frac{F_a}{F_r} \leqq e$	$P = F_r$
$\frac{F_a}{F_r} > e$	$P = 0,92 \cdot F_r + Y \cdot F_a$

P N
Equivalent dynamic bearing load for combined load
F_a N
Axial dynamic bearing load
F_r N
Radial dynamic bearing load
e, Y –
Factors: see table Factors e and Y.

Factors e and Y

Series	Calculation factors	
	e	Y
SL1818	0,2	0,6
SL1923, SL1822, SL1829, SL1830	0,3	0,4

Equivalent static bearing load

For bearings under static loading, the following applies:

$$P_0 = F_{0r}$$

Minimum radial load

In continuous operation, a minimum radial load of the order of $F_{r\,min} = C_{0r}/60$ is necessary.

If $F_{r\,min} < C_{0r}/60$, please contact us.

Design of bearing arrangements

Shaft and housing tolerances

Recommended shaft tolerances for radial bearings with cylindrical bore, see table, page 150.
Recommended housing tolerances for radial bearings, see table, page 152.

Axial location

In order to prevent lateral creep of the bearing rings, they must be located by force or physical locking means.

The abutment shoulders (shaft and housing) should be sufficiently high and perpendicular to the bearing axis.

The transition from the bearing seating to the abutting shoulders must be designed with rounding to DIN 5 418 or an undercut to DIN 509. Note the minimum chamfer dimensions r as given in the dimension tables.

In the case of semi-locating bearings, the bearing rings only require support on one side, on the rib supporting the axial load.

Full support must be provided for ribs transmitting forces in axially loaded bearings.

Single row full complement cylindrical roller bearings

Accuracy

The dimensional and geometrical tolerances of the bearings correspond to tolerance class PN to DIN 620.

Radial internal clearance

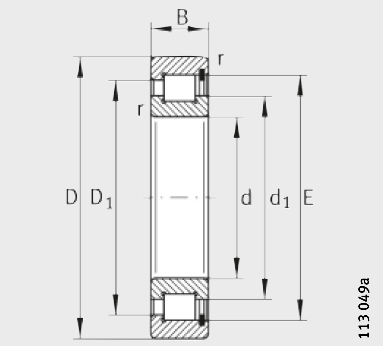
The radial internal clearance corresponds to internal clearance group CN to DIN 620-4.

Radial internal clearance

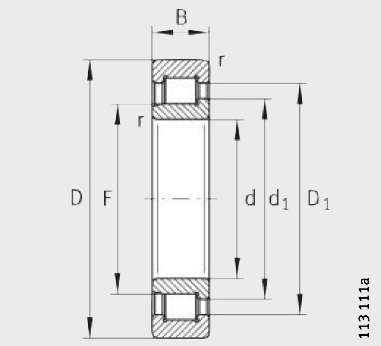
Bore d mm		Radial internal clearance							
		CN µm		C3 µm		C4 µm		C5 µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
–	24	20	45	35	60	50	75	65	90
24	30	20	45	35	60	50	75	70	95
30	40	25	50	45	70	60	85	80	105
40	50	30	60	50	80	70	100	95	125
50	65	40	70	60	90	80	110	110	140
65	80	40	75	65	100	90	125	130	165
80	100	50	85	75	110	105	140	155	190
100	120	50	90	85	125	125	165	180	220
120	140	60	105	100	145	145	190	200	245
140	160	70	120	115	165	165	215	225	275
160	180	75	125	120	170	170	220	250	300
180	200	90	145	140	195	195	250	275	330
200	225	105	165	160	220	220	280	305	365
225	250	110	175	170	235	235	300	330	395
250	280	125	195	190	260	260	330	370	440
280	315	130	205	200	275	275	350	410	485
315	355	145	225	225	305	305	385	455	535
355	400	190	280	280	370	370	460	510	600
400	450	210	310	310	410	410	510	565	665
450	500	220	330	330	440	440	550	625	735

Single row full complement cylindrical roller bearings

Semi-locating bearings



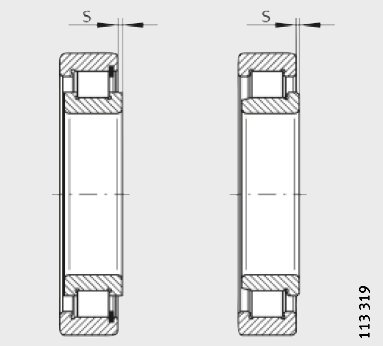
SL1829, SL1830, SL1822



SL1923

Dimension table · Dimensions in mm

Designation		Mass	Dimensions					Mounting dimensions	
	X-life	m ≈kg	d	D	B	r min.	s[1)]	F	d_1 ≈
SL183004	**XL**	0,11	**20**	42	16	0,6	1,5	–	28,8
SL182204	**XL**	0,16	**20**	47	18	1	1	–	30,3
SL183005	**XL**	0,12	**25**	47	16	0,6	1,5	–	34,6
SL182205	**XL**	0,18	**25**	52	18	1	1	–	35,3
SL192305	**XL**	0,37	**25**	62	24	1,1	2	31,72	36,7
SL183006	**XL**	0,2	**30**	55	19	1	2	–	40
SL182206	**XL**	0,3	**30**	62	20	1	1	–	42
SL192306	**XL**	0,56	**30**	72	27	1,1	2	38,3	43,5
SL183007	**XL**	0,26	**35**	62	20	1	2	–	44,9
SL182207	**XL**	0,44	**35**	72	23	1,1	1	–	47
SL192307	**XL**	0,74	**35**	80	31	1,5	2	44,68	50,7
SL183008	**XL**	0,31	**40**	68	21	1	2	–	50,5
SL182208	**XL**	0,55	**40**	80	23	1,1	1	–	54
SL192308	**XL**	1,01	**40**	90	33	1,5	2	51,12	57,5
SL183009	**XL**	0,4	**45**	75	23	1	2	–	55,3
SL182209	**XL**	0,59	**45**	85	23	1,1	1	–	57,5
SL192309	**XL**	1,37	**45**	100	36	1,5	3	56,1	62,5
SL183010	**XL**	0,43	**50**	80	23	1	2	–	59,1
SL182210	**XL**	0,64	**50**	90	23	1,1	1	–	64,4
SL192310	**XL**	1,81	**50**	110	40	2	3	60,72	68,3
SL183011	**XL**	0,64	**55**	90	26	1,1	2	–	68,5
SL182211	**XL**	0,87	**55**	100	25	1,5	1	–	70
SL192311	**XL**	2,28	**55**	120	43	2	3	67,11	75,5
SL182912	**XL**	0,29	**60**	85	16	1	1	–	69
SL183012	**XL**	0,69	**60**	95	26	1,1	2	–	71,7
SL182212	**XL**	1,18	**60**	110	28	1,5	1,5	–	76,8
SL192312	**XL**	2,88	**60**	130	46	2,1	3	73,62	82
SL182913	**XL**	0,31	**65**	90	16	1	1	–	75,7
SL183013	**XL**	0,73	**65**	100	26	1,1	2	–	78,1
SL182213	**XL**	1,57	**65**	120	31	1,5	1,5	–	82,3
SL192313	**XL**	3,52	**65**	140	48	2,1	3,5	80,69	90
SL182914	**XL**	0,49	**70**	100	19	1	1	–	81,2
SL183014	**XL**	1,02	**70**	110	30	1,1	3	–	81,5
SL182214	–	1,66	**70**	125	31	1,5	1,5	–	87
SL192314	**XL**	4,33	**70**	150	51	2,1	3,5	84,14	93,5

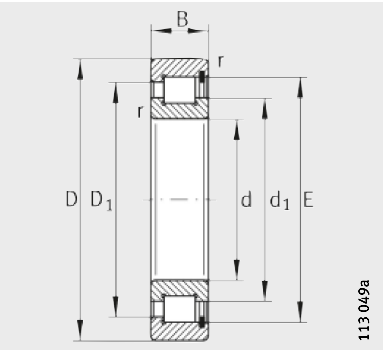


1) Axial displacement “s”

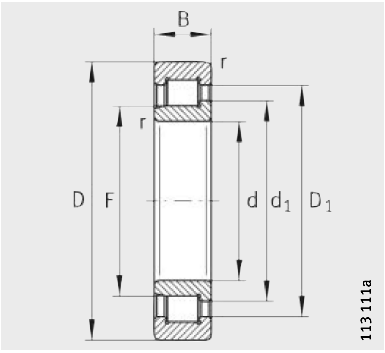
		Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
D_1	E	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
≈		N	N	N	min^{-1}	min^{-1}
32,8	36,81	30 500	26 000	4 450	10 500	7 500
36,9	41,47	45 500	37 000	6 100	9 700	6 500
38,5	42,51	35 000	32 000	5 500	8 900	6 000
41,9	46,52	51 000	44 500	7 400	8 400	5 500
47,5	–	73 000	60 000	9 400	7 600	4 800
45,4	49,6	45 000	42 000	7 500	7 600	5 600
50,6	55,19	70 000	64 000	10 200	7 000	4 550
56	–	100 000	88 000	14 500	6 400	4 050
51,3	55,52	55 000	53 000	9 400	6 700	4 950
59,3	63,97	88 000	78 000	12 700	6 100	4 250
65,8	–	126 000	112 000	19 000	5 500	3 600
57,1	61,74	66 000	67 000	11 200	6 000	4 350
66,3	70,94	97 000	91 000	14 900	5 400	3 650
75,2	–	170 000	156 000	27 000	4 850	3 050
62,2	66,85	70 000	74 000	12 500	5 500	4 200
69,8	74,43	101 000	98 000	16 000	5 100	3 450
80,3	–	181 000	165 000	28 500	4 450	3 000
67,7	72,33	88 000	94 000	15 100	5 100	3 700
76,7	81,4	109 000	111 000	18 100	4 600	3 000
89,7	–	232 000	219 000	38 500	4 050	2 800
78,8	83,54	120 000	136 000	22 600	4 400	3 100
84,1	88,81	140 000	148 000	25 000	4 200	2 700
99,3	–	270 000	255 000	45 500	3 700	2 550
74,4	78,55	63 000	76 000	13 700	4 550	2 900
82,1	86,74	123 000	143 000	23 700	4 200	3 000
93,9	99,17	169 000	176 000	31 000	3 800	2 550
105,8	–	285 000	280 000	50 000	3 400	2 480
81	85,24	67 000	84 000	15 100	4 150	2 550
88,4	93,09	130 000	157 000	26 000	3 900	2 700
100,7	106,25	198 000	210 000	37 000	3 550	2 480
116,5	–	350 000	355 000	63 000	3 100	2 180
87,8	92,31	88 000	111 000	18 800	3 850	2 550
95,6	100,28	153 000	174 000	29 500	3 650	2 800
105,2	111,45	181 000	223 000	32 000	3 350	2 340
121,6	–	385 000	390 000	69 000	3 000	2 170

Single row full complement cylindrical roller bearings

Semi-locating bearings



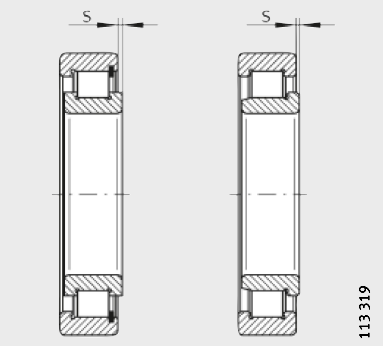
SL1829, SL1830, SL1822



SL1923

Dimension table (continued) · Dimensions in mm

Designation		Mass	Dimensions					Mounting dimensions	
	X-life	m ≈kg	d	D	B	r min.	s[1)]	F	d_1 ≈
SL182915	**XL**	0,52	**75**	105	19	1	1	–	86,3
SL183015	**XL**	1,06	**75**	115	30	1,1	3	–	89
SL182215	–	1,75	**75**	130	31	1,5	1,5	–	91,8
SL192315	**XL**	5,3	**75**	160	55	2,1	3,5	91,22	101,6
SL182916	**XL**	0,55	**80**	110	19	1	1	–	91,4
SL183016	–	1,43	**80**	125	34	1,1	4	–	95
SL182216	–	2,15	**80**	140	33	2	1,5	–	98,6
SL192316	**XL**	6,32	**80**	170	58	2,1	3,5	98,24	109,5
SL182917	**XL**	0,81	**85**	120	22	1,1	1	–	96,4
SL183017	–	1,51	**85**	130	34	1,1	4	–	99,4
SL182217	–	2,74	**85**	150	36	2	1,5	–	104,4
SL192317	**XL**	7,34	**85**	180	60	3	4	107,01	118,2
SL182918	**XL**	0,84	**90**	125	22	1,1	1	–	102
SL183018	–	1,97	**90**	140	37	1,5	4	–	106,1
SL182218	–	3,48	**90**	160	40	2	2,5	–	110,2
SL192318-TB	**XL**	8,83	**90**	190	64	3	4	105,26	117,5
SL182919	**XL**	0,86	**95**	130	22	1,1	1	–	106,7
SL182219	–	4,17	**95**	170	43	2,1	2,5	–	122
SL192319-TB	**XL**	10,2	**95**	200	67	3	4	114,65	126,6
SL182920	**XL**	1,14	**100**	140	24	1,1	1,5	–	113,4
SL183020	–	2,15	**100**	150	37	1,5	4	–	115,7
SL182220	–	5,13	**100**	180	46	2,1	2,5	–	127,5
SL192320-TB	**XL**	13	**100**	215	73	3	4	119,3	132,7
SL182922	**XL**	1,23	**110**	150	24	1,1	1,5	–	124
SL183022	–	3,5	**110**	170	45	2	5,5	–	127,3
SL182222	–	7,24	**110**	200	53	2,1	4	–	137
SL192322-TB	**XL**	17	**110**	240	80	3	5	134,27	151,1
SL182924	**XL**	1,73	**120**	165	27	1,1	1,5	–	134,8
SL183024	–	3,8	**120**	180	46	2	5,5	–	138,8
SL182224	–	9,08	**120**	215	58	2,1	4	–	150,7
SL192324-TB	**XL**	22,3	**120**	260	86	3	5	147,39	164,2
SL182926	**XL**	2,33	**130**	180	30	1,5	2	–	146
SL183026	–	5,65	**130**	200	52	2	5,5	–	148,6
SL182226	–	11,25	**130**	230	64	3	5	–	162,3
SL192326-TB	**XL**	27,95	**130**	280	93	4	5	157,9	176

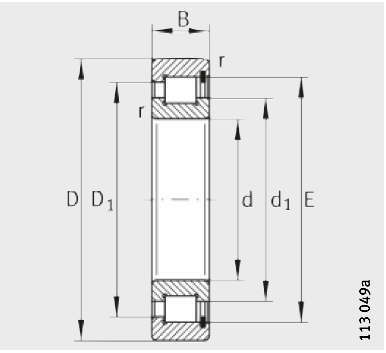


1) Axial displacement “s”

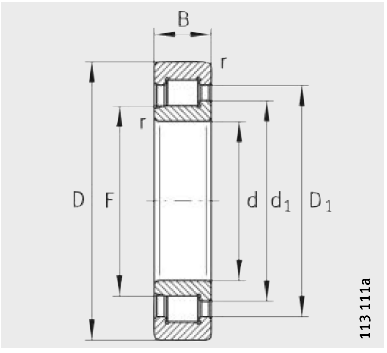
		Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
D_1	E	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
≈		N	N	N	min^{-1}	min^{-1}
92,8	97,41	91 000	119 000	20 100	3 600	2 370
103,2	107,9	162 000	192 000	32 500	3 400	2 490
110	116,2	187 000	236 000	33 500	3 200	2 210
131,5	–	460 000	475 000	83 000	2 750	2 000
98	102,51	94 000	126 000	21 400	3 450	2 220
111,7	117,4	170 000	220 000	31 000	3 150	2 470
119,3	126,3	223 000	280 000	38 500	3 000	2 040
142,1	–	540 000	560 000	96 000	2 550	1 820
105	109,58	118 000	159 000	25 500	3 200	2 200
116,1	121,95	175 000	231 000	32 000	3 000	2 360
126,3	133,75	255 000	320 000	44 500	2 800	2 000
150,9	–	570 000	620 000	103 000	2 400	1 710
110,7	115,75	122 000	169 000	26 500	3 050	2 050
124,5	130,65	205 000	275 000	38 000	2 800	2 240
133,3	141,15	285 000	365 000	51 000	2 650	1 990
152,5	–	620 000	650 000	112 000	2 400	1 760
117	122,25	132 000	177 000	27 500	2 900	1 940
147,3	155,95	330 000	425 000	58 000	2 410	1 780
161,9	–	650 000	710 000	120 000	2 240	1 620
125,7	130,95	152 000	203 000	31 500	2 700	1 870
134	140,2	216 000	300 000	40 500	2 600	2 040
154,3	163,35	390 000	510 000	70 000	2 300	1 700
172,8	–	790 000	850 000	143 000	2 110	1 490
136,2	141,5	155 000	213 000	34 000	2 490	1 710
149,3	156,7	280 000	385 000	52 000	2 350	2 010
168	177,6	450 000	580 000	78 000	2 130	1 720
199,9	–	950 000	970 000	156 000	1 840	1 270
149	154,3	199 000	285 000	45 500	2 290	1 590
160,7	168,15	295 000	425 000	56 000	2 170	1 840
183	192,9	530 000	720 000	95 000	1 950	1 500
213,1	–	1 130 000	1 230 000	195 000	1 710	1 120
161,1	167,15	238 000	350 000	54 000	2 110	1 500
175,5	184,4	425 000	600 000	79 000	2 000	1 660
197	207,75	620 000	850 000	110 000	1 810	1 360
227,9	–	1 260 000	1 380 000	216 000	1 600	1 040

Single row full complement cylindrical roller bearings

Semi-locating bearings



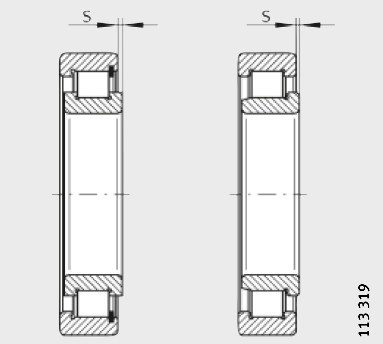
SL1818, SL1829, SL1830, SL1822



SL1923

Dimension table (continued) · Dimensions in mm

Designation		Mass	Dimensions					Mounting dimensions		
	X-life	m ≈kg	d	D	B	r min.	s[1)]	F	d_1 ≈	D_1 ≈
SL182928	**XL**	2,42	**140**	190	30	1,5	2	–	157	174
SL183028	–	6,04	**140**	210	53	2	5,5	–	162,2	189,5
SL182228	–	14,47	**140**	250	68	3	5	–	173,9	211,1
SL192328-TB	**XL**	34,9	**140**	300	102	4	7	168,45	187,8	243,4
SL182930	**XL**	3,77	**150**	210	36	2	2,5	–	169	189,6
SL183030	–	7,33	**150**	225	56	2,1	7	–	170	198
SL182230	–	18,43	**150**	270	73	3	6	–	185,5	225,2
SL192330-TB	–	42,1	**150**	320	108	4	7	182,49	203,3	263,5
SL182932	**XL**	4	**160**	220	36	2	2,5	–	179,7	200,5
SL183032	–	8,8	**160**	240	60	2,1	7	–	184,8	215,8
SL182232	–	23	**160**	290	80	3	6	–	208,7	253,4
SL192332-TB	–	49,7	**160**	340	114	4	7	196,38	219	284,4
SL182934	**XL**	4,3	**170**	230	36	2	2,5	–	190,6	211,3
SL183034	–	12,2	**170**	260	67	2,1	7	–	198,1	232,7
SL182234	–	28,65	**170**	310	86	4	7	–	220,3	267,4
SL192334-TB	–	59,2	**170**	360	120	4	7	203,55	226,6	295
SL182936	**XL**	6,2	**180**	250	42	2	3	–	200,7	224
SL183036	–	16,1	**180**	280	74	2,1	7	–	212,2	249,4
SL182236	–	29,8	**180**	320	86	4	7	–	232,4	279,5
SL192336-TB	–	69,1	**180**	380	126	4	7	221,56	245	312,9
SL182938	**XL**	6,5	**190**	260	42	2	2	–	211,5	238,5
SL183038	–	17	**190**	290	75	2,1	9	–	221,8	259
SL182238	–	35,65	**190**	340	92	4	9	–	243,5	295,5
SL192338-TB	–	80,3	**190**	400	132	5	7	224,43	250	326,8
SL181840	–	2,57	**200**	250	24	1,5	2	–	216,6	231,6
SL182940	**XL**	9,1	**200**	280	48	2,1	3	–	225,5	252,4
SL183040	–	21,8	**200**	310	82	2,1	9	–	236,6	276,2
SL182240	–	43,12	**200**	360	98	4	9	–	246,6	302,4
SL192340-TB	–	92,1	**200**	420	138	5	7	238,45	265,7	347,2
SL181844	–	2,8	**220**	270	24	1,5	2	–	237,3	252,3
SL182944	**XL**	9,9	**220**	300	48	2,1	3	–	246,3	273,2
SL183044	–	28,4	**220**	340	90	3	9	–	254,6	299,2
SL192344-TB	–	111,2	**220**	460	145	5	7	266,71	297	388,3
SL181848-E	–	4,29	**240**	300	28	2	2	–	260,5	281
SL182948	–	10,6	**240**	320	48	2,1	3	–	267,5	294,4
SL183048	–	30,9	**240**	360	92	3	11	–	277,5	322,1
SL192348-TB	–	142,3	**240**	500	155	5	10	280,55	312,5	408,5

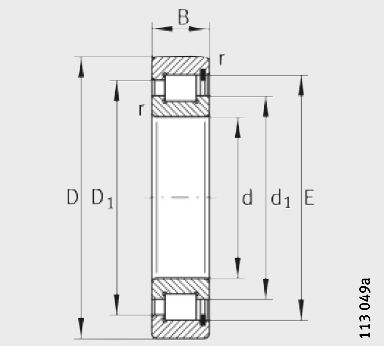


1) Axial displacement “s”

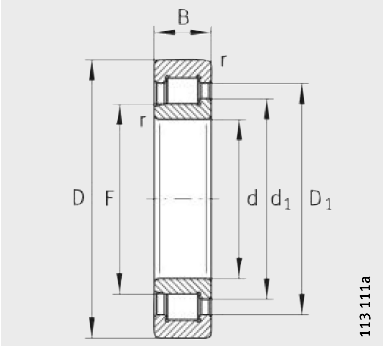
	Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
E	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	n_B
	N	N	N	min^{-1}	min^{-1}
180	260 000	375 000	57 000	1 960	1 370
198,4	450 000	660 000	85 000	1 840	1 470
222,55	720 000	1 000 000	127 000	1 690	1 230
–	1 410 000	1 570 000	241 000	1 500	970
196,75	340 000	480 000	73 000	1 810	1 360
207,45	475 000	700 000	88 000	1 760	1 430
237,35	820 000	1 160 000	147 000	1 580	1 130
–	1 680 000	1 900 000	265 000	1 380	840
207,6	350 000	510 000	77 000	1 710	1 270
225,45	540 000	800 000	99 000	1 620	1 280
267,1	1 020 000	1 470 000	178 000	1 410	920
–	1 900 000	2 170 000	300 000	1 280	760
218,45	365 000	540 000	80 000	1 610	1 190
243,55	700 000	1 050 000	129 000	1 510	1 120
281,9	1 140 000	1 660 000	199 000	1 330	870
–	2 070 000	2 380 000	320 000	1 240	730
231,85	455 000	680 000	100 000	1 530	1 150
261	810 000	1 240 000	150 000	1 410	1 020
294	1 180 000	1 760 000	208 000	1 270	800
–	2 190 000	2 600 000	345 000	1 160	670
244,15	510 000	770 000	112 000	1 450	1 030
270,6	830 000	1 300 000	155 000	1 350	970
311,5	1 300 000	1 900 000	223 000	1 210	770
–	2 500 000	2 950 000	390 000	1 120	630
237,6	178 000	320 000	33 500	1 450	1 040
261,6	610 000	940 000	134 000	1 360	950
288,6	950 000	1 510 000	178 000	1 270	890
319,4	1 410 000	2 010 000	235 000	1 180	770
–	2 800 000	3 300 000	420 000	1 060	570
258,5	187 000	350 000	36 000	1 320	940
282,45	650 000	1 030 000	144 000	1 250	840
312	1 150 000	1 820 000	209 000	1 170	800
–	3 000 000	3 450 000	425 000	950	520
287,5	265 000	490 000	51 000	1 200	870
303,7	600 000	1 120 000	124 000	1 150	750
336	1 210 000	1 990 000	224 000	1 080	720
–	3 300 000	3 800 000	465 000	900	500

Single row full complement cylindrical roller bearings

Semi-locating bearings



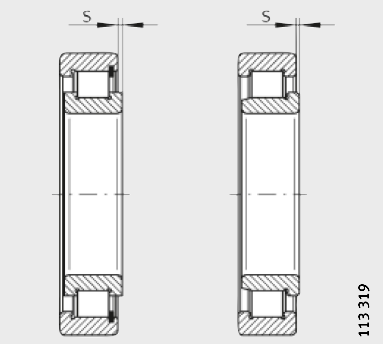
SL1818, SL1829, SL1830



SL1923

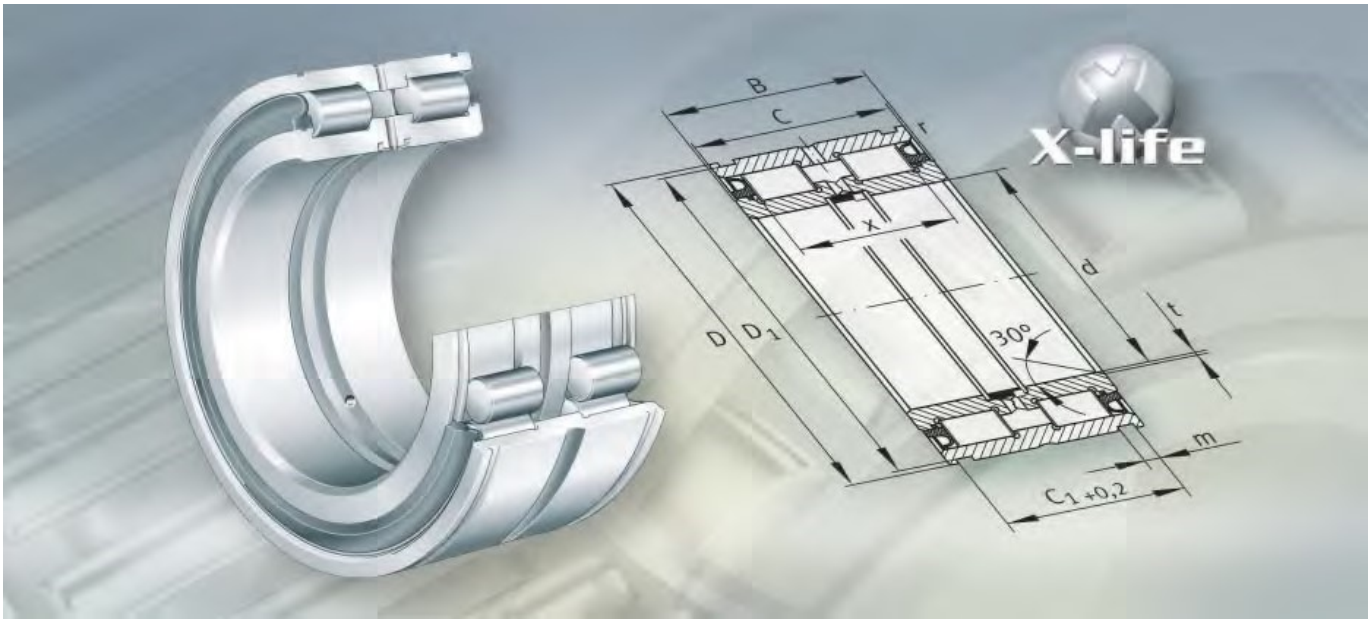
Dimension table (continued) · Dimensions in mm

Designation	Mass	Dimensions					Mounting dimensions		
	m	d	D	B	r	$s^{1)}$	F	d_1	D_1
	≈kg				min.			≈	≈
SL181852-E	4,61	**260**	320	28	2	2	–	281	301,5
SL182952	18,5	**260**	360	60	2,1	5	–	291,5	323,4
SL183052	44,5	**260**	400	104	4	11	–	304	358,4
SL192352-TB	173,2	**260**	540	165	6	10	315,6	351,6	459,6
SL181856-E	6,89	**280**	350	33	2	2,5	–	304	327
SL182956	19,7	**280**	380	60	2,1	3,5	–	314	348,5
SL183056	48	**280**	420	106	4	11	–	319,5	372,9
SL181860-E	9,79	**300**	380	38	2,1	3	–	323,5	350,5
SL182960	31,2	**300**	420	72	3	5	–	338	376,9
SL183060-TB	66,6	**300**	460	118	4	14	–	353,6	415,6
SL181864-E	10,36	**320**	400	38	2,1	3	–	344,5	371,5
SL182964	32,9	**320**	440	72	3	5	–	358,5	397,4
SL183064-TB	71,7	**320**	480	121	4	14	–	369,5	430,1
SL181868-E	10,93	**340**	420	38	2,1	3	–	365,5	392,5
SL182968	34,7	**340**	460	72	3	5	–	379	418,7
SL183068-TB	95,8	**340**	520	133	5	16	–	396,1	463,9
SL181872-E	11,49	**360**	440	38	2,1	3	–	387	413,5
SL182972	36,4	**360**	480	72	3	5	–	399,5	438,6
SL183072-TB	101	**360**	540	134	5	16	–	414	481,6
SL181876-E	18,87	**380**	480	46	2,1	4	–	415,5	448
SL182976	52,1	**380**	520	82	4	5	–	426	472,1
SL183076-TB	106	**380**	560	135	5	16	–	431,7	499,5
SL181880-E	19,81	**400**	500	46	2,1	4	–	432	464,5
SL182980	54,3	**400**	540	82	4	5	–	450	496,1
SL183080-TB	140	**400**	600	148	5	18	–	462,5	535,1
SL181884-E	20,6	**420**	520	46	2,1	4	–	457	489,5
SL182984	56,9	**420**	560	82	4	5	–	462	509
SL181888-E	21,54	**440**	540	46	2,1	4	–	473,5	506
SL182988	78,1	**440**	600	95	4	7	–	490	544,6
SL181892-E	33,21	**460**	580	56	3	5	–	501,5	541
SL182992	81,1	**460**	620	95	4	7	–	504	559,6
SL181896-E	34,53	**480**	600	56	3	5	–	522	561
SL182996	94,7	**480**	650	100	5	7	–	538	596,6
SL1818/500-E	35,73	**500**	620	56	3	5	–	542	581,5
SL1829/500	98,3	**500**	670	100	5	7	–	553	612,7



1) Axial displacement “s”

	Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
E	dyn. C_r N	stat. C_{0r} N	C_{ur} N	n_G min^{-1}	n_B min^{-1}
308	275 000	530 000	54 000	1 110	790
333,7	780 000	1 450 000	160 000	1 060	690
375,97	1 600 000	2 500 000	280 000	980	620
–	4 000 000	4 700 000	560 000	800	410
335	355 000	670 000	69 000	1 030	730
359,5	910 000	1 710 000	184 000	980	590
390,3	1 650 000	2 650 000	290 000	940	590
360	455 000	840 000	86 000	960	680
389,45	1 170 000	2 200 000	235 000	910	540
434,85	2 020 000	3 300 000	325 000	840	500
381	470 000	900 000	90 000	910	620
409,85	1 210 000	2 340 000	246 000	860	495
449,5	2 080 000	3 450 000	340 000	810	480
402,2	485 000	960 000	94 000	860	570
430,2	1 250 000	2 470 000	255 000	810	460
485,65	2 490 000	4 150 000	400 000	750	430
423,5	500 000	1 010 000	98 000	810	530
450,6	1 280 000	2 600 000	265 000	770	430
503,45	2 550 000	4 350 000	410 000	720	405
459	650 000	1 290 000	126 000	750	490
486,7	1 660 000	3 300 000	335 000	720	380
521,25	2 600 000	4 450 000	425 000	700	390
475,5	660 000	1 340 000	130 000	720	470
510,85	1 710 000	3 500 000	350 000	690	350
558,52	3 050 000	5 400 000	500 000	650	345
500	680 000	1 420 000	135 000	690	430
522,95	1 730 000	3 600 000	355 000	670	340
517	700 000	1 470 000	139 000	660	415
562	2 090 000	4 100 000	405 000	630	325
554	940 000	1 890 000	179 000	620	385
576,3	2 130 000	4 250 000	410 000	610	310
474,5	960 000	1 970 000	185 000	600	365
614,75	2 390 000	4 800 000	460 000	570	280
594,5	980 000	2 050 000	190 000	580	345
630	2 430 000	4 950 000	470 000	560	270



Double row full complement cylindrical roller bearings

Double row full complement cylindrical roller bearings

Product overview

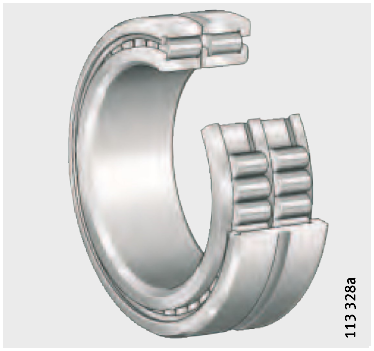
Double row full complement cylindrical roller bearings

Non-locating bearings

SL0248, SL0249

Semi-locating bearings

SL1850

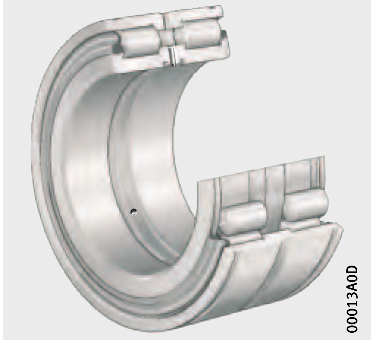


Locating bearings

SL0148, SL0149

Cable sheave bearings
With snap ring grooves
Sealed

SL0450..-PP, SL04..-PP



Double row full complement cylindrical roller bearings

Features

The bearings have solid outer and inner rings and rib-guided cylindrical rollers. Since these bearings have the largest possible number of rolling elements, they have extremely high radial load carrying capacity, high rigidity and are suitable for particularly compact designs. Due to the kinematic conditions, however, they do not achieve the high speeds that are possible when using cylindrical roller bearings with cage.

Double row full complement cylindrical roller bearings are available as non-locating, semi-locating and locating bearings. The bearings do not permit any skewing between the inner and outer ring.

X-life

Numerous sizes are supplied in the X-life grade. These bearings are indicated in the dimension tables.

Bearings of X-life quality have, for example, lower roughness R_a and higher geometrical accuracy of the raceways than comparable designs that are not X-life. As a result, for example, they have higher load carrying capacity and longer life for the same dimensioning. In certain applications, this means that a smaller bearing arrangement can be designed.

Bearings of TB design

In the case of bearings of TB design, the axial load carrying capacity was significantly improved through the use of new calculation and manufacturing methods.

Optimum contact conditions between the roller and rib are ensured by means of a special curvature of the roller end faces. As a result, the axial contact pressures on the rib are significantly minimised and a lubricant film capable of supporting higher loads is formed. Under normal operating conditions, wear and fatigue at the rib contact running and roller end faces is completely eliminated.

In addition, axial frictional torque is reduced by up to 50%. The bearing temperature during operation is therefore significantly lower.

Available bearings

By agreement, series SL1850 is available starting from a bore diameter d = 180 mm in the form of the TB design.

Non-locating bearings

Bearings SL0248 (designation to DIN 5 412-9: NNCL 48..V) and SL0249 (designation to DIN 5 412-9: NNCL 49..V) are non-locating bearings and can support radial forces only.

The bearings are held together in handling and transport by a transport and mounting retaining device on the outer ring. This retaining device remains in the bearing and must not be subjected to axial load.

Axial displacement

The outer ring without ribs can be axially displaced in both directions in relation to the inner ring. The inner ring has ribs on both sides.

Sealing

The cylindrical roller bearings are of an open design.

Lubrication

Oil or grease lubrication is possible. For lubrication, the outer ring has a lubrication groove and lubrication holes.

Double row full complement cylindrical roller bearings

Semi-locating bearings

The semi-locating bearings are available as SL1850 (dimension series 50). They can support not only high radial forces but also axial forces in one direction and can therefore guide shafts axially in one direction. They act as non-locating bearings in the opposite direction.

The bearings are held together in handling and transport by a transport and mounting retaining device on the outer ring. This retaining device remains in the bearing and must not be subjected to axial load.

Axial displacement of inner ring

The inner ring can be axially displaced in one direction by the dimension “s” stated in the dimension table.

Sealing

The cylindrical roller bearings are supplied in an open design.

Lubrication

Oil or grease lubrication is possible. The bearings can be lubricated via the end faces as well as via a lubrication groove and lubrication holes in the outer ring.

Locating bearings

Bearings SL0148 (designation to DIN 5 412-9: NNC 48..V) and SL0149 (designation to DIN 5 412-9: NNC 49..V) are locating bearings. These bearings can support axial forces from both directions as well as radial forces.

The outer ring has ribs on both sides, is axially split and held together by retaining rings. The inner ring has an additional central rib. The retaining rings must not be subjected to axial load.

Cable sheave bearings

Cable sheave bearings (cylindrical roller bearings with snap ring grooves) are locating bearings. These bearings are very rigid and can support moderate axial forces in both directions as well as high radial forces. They consist of solid outer and inner rings with ribs, rib-guided cylindrical rollers and sealing rings.

The outer rings have snap ring grooves for retaining rings. The inner rings are axially split, 1 mm wider than the outer rings and held together by a rolled-in steel strip.

Cylindrical roller bearings with snap ring grooves are available as a light series SL04..-PP and in the dimension series 50 as SL0450..-PP.

Sealing

In the case of cable sheave bearings, the running system is protected against contamination and moisture by sealing rings on both sides.

Lubrication

Open locating bearings can be lubricated with oil or grease. For lubrication, the outer ring has a lubrication groove and lubrication holes.

Cable sheave bearings are greased using a lithium complex soap grease to GA08 and can be lubricated via the outer or inner ring. Arcanol LOAD150 is suitable for relubrication.

Operating temperature

Open full complement cylindrical roller bearings are suitable for operating temperatures from –30 °C to +120 °C.

Cylindrical roller bearings with snap ring grooves are suitable for operating temperatures from –20 °C to +80 °C, restricted by the grease and seal material.

Suffixes

Suffixes for available designs: see table.

Available designs of SL01, SL02, SL1850

Suffix	Description	Design
BR	Black oxide coated	Available by agreement
C3	Radial internal clearance larger than normal	
C4	Radial internal clearance larger than C3	
C5	Radial internal clearance larger than C4	
TB	Bearing with increased axial load carrying capacity	

Available designs of cable sheave bearings

Suffix	Description	Design
C3	Radial internal clearance larger than normal	Available by agreement
C4	Radial internal clearance larger than C3	
C5	Radial internal clearance larger than C4	
RR	Corrosion-resistant design, with Corrotect® coating	
2NR	Cable sheave bearing supplied with two loose-packed retaining rings WRE	
–	Without seals	
P	Seal on one side	
PP	Seals on both sides, for cable sheave bearings	Standard

Double row full complement cylindrical roller bearings

Design and safety guidelines

Axial load carrying capacity

Radial cylindrical roller bearings used as semi-locating and locating bearings can support axial forces in one or both directions in addition to radial forces.

The axial load carrying capacity is dependent on:

- the size of the sliding surfaces between the ribs and the end faces of the rolling elements
- the sliding velocity at the ribs
- the lubrication on the contact surfaces.

Ribs subjected to load must be supported across their entire height.

The permissible axial load $F_{a\ per}$ must not be exceeded, in order to avoid an unacceptable increase in temperature.

The axial limiting load $F_{a\ max}$ according to the formula must not be exceeded, in order to avoid impermissible pressure at the contact surfaces.

The ratio F_a/F_r should not exceed 0,4. In the case of bearings of TB design, the value 0,6 is permissible.
Continuous axial loading without simultaneous radial loading is not permissible.

Permissible and maximum axial load

The axial load $F_{a\ per}$ and the limiting load $F_{a\ max}$ are calculated as follows:

Bearings of standard design

$$F_{a\ per} = k_S \cdot k_B \cdot d_M^{1,5} \cdot n^{-0,6} \leqq F_{a\ max}$$

Bearings of TB design

$$F_{a\ per} = 1,5 \cdot k_S \cdot k_B \cdot d_M^{1,5} \cdot n^{-0,6} \leqq F_{a\ max}$$

Bearings of standard and TB design

$$F_{a\ max} = 0,075 \cdot k_B \cdot d_M^{2,1}$$

$F_{a\ per}$ N
Permissible axial load

$F_{a\ max}$ N
Axial limiting load

k_S –
Factor dependent on the lubrication method, see table, page 485

k_B –
Bearing factor, see table, page 485

d_M mm
Mean bearing diameter (d + D)/2, see dimension table

n min^{-1}
Operating speed.

Cable sheave bearings

In the case of cylindrical roller bearings with snap ring grooves, application engineering advice is necessary. The limit values and calculations for $F_{a\ per}$ and $F_{a\ max}$ are not therefore valid for these bearings.

Factor k_S for the lubrication method

Lubrication method[1]	Factor k_S
Minimal heat dissipation, drip feed oil lubrication, oil mist lubrication, low operating viscosity ($\nu < 0{,}5 \cdot \nu_1$)	7,5 to 10
Poor heat dissipation, oil sump lubrication, oil spray lubrication, low oil flow	10 to 15
Good heat dissipation, recirculating oil lubrication (pressurised oil lubrication)	12 to 18
Very good heat dissipation, recirculating oil lubrication with oil cooling, high operating viscosity ($\nu > 2 \cdot \nu_1$)	16 to 24

[1] Doped oils should be used, e.g. CLP (DIN 51 517) and HLP (DIN 51 524) of ISO-VG classes 32 to 460 as well as ATF oils (DIN 51 502) and gearbox oils (DIN 51 512) of SAE viscosity classes 75 W to 140 W.

Bearing factor k_B

Series	Factor k_S
SL0148	4,5
SL0149	11
SL1850	17

Equivalent dynamic bearing load

Non-locating bearings and cable sheave bearings

For bearings under dynamic loading, the following applies:

$$P = F_r$$

Semi-locating and locating bearings

If an axial force F_a is present in addition to the radial force F_r, the load ratio must be taken into consideration.

Load ratio and equivalent dynamic load

Load ratio	Equivalent dynamic load
$\frac{F_a}{F_r} \leqq e$	$P = F_r$
$\frac{F_a}{F_r} > e$	$P = 0{,}92 \cdot F_r + Y \cdot F_a$

P N
Equivalent dynamic bearing load for combined load
F_a N
Axial dynamic bearing load
F_r N
Radial dynamic bearing load
e, Y –
Factors: see table Factors e and Y.

Factors e and Y

Series	Calculation factors	
	e	Y
SL1850	0,2	0,6
SL0148, SL0149	0,4	0,5

Double row full complement cylindrical roller bearings

Equivalent static bearing load

For bearings under static loading, the following applies:

$P_0 = F_{0r}$

Minimum radial load

In continuous operation, a minimum radial load of the order of $F_{r\,min} = C_{0r}/60$ is necessary.

If $F_{r\,min} < C_{0r}/60$, please contact us.

Design of bearing arrangements

Shaft and housing tolerances

Recommended shaft tolerances for radial bearings with cylindrical bore, see table, page 150.
Recommended housing tolerances for radial bearings, see table, page 152.

Cable sheave bearings

Cable sheave bearings normally have circumferential load on the outer ring and a press fit is therefore required on the outer ring.

Axial location

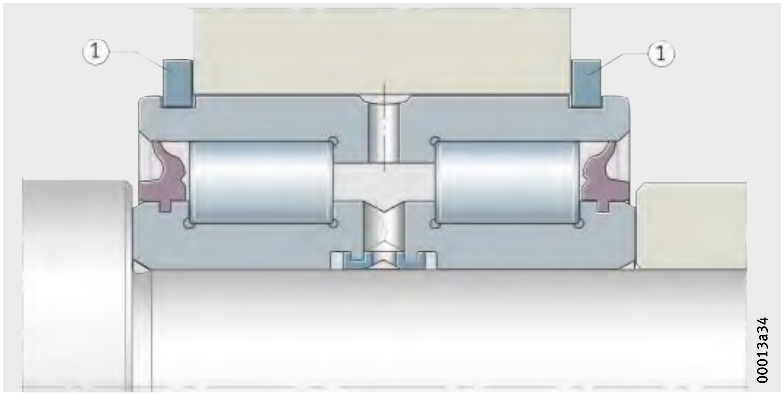
In order to prevent lateral creep of the bearing rings, they must be located by force or physical locking means.

The abutment shoulders (shaft and housing) should be sufficiently high and perpendicular to the bearing axis.

The transition from the bearing seating point to the abutment shoulder must be designed with rounding to DIN 5 418 or an undercut to DIN 509. The minimum chamfer dimensions r in the dimension tables must be observed.

In the case of semi-locating bearings, the bearing rings only require support on one side, on the rib supporting the axial load.

In axially loaded bearings, full support must be provided for the ribs transmitting forces, *Figure 1*.



① Retaining ring

Figure 1
Axial location of outer and inner ring, support of ribs

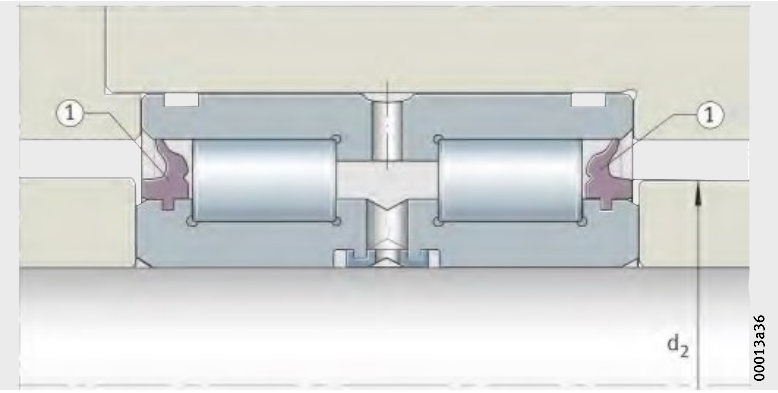
Location of cable sheave bearings

The grooves allow the outer rings to be axially located using retaining rings, *Figure 1*. Suitable fasteners are WRE rings or rings to DIN 471. Locating rings are not included in the delivery. The design 2NR is supplied with two retaining rings WRE packed loose.

The split inner ring must be axially secured, *Figure 1*.
The fasteners must not be subjected to axial load.

Support of sealing rings

The sealing rings must be supported to a sufficient height, so that they are not pressed out during lubrication of the bearings, *Figure 2*. The dimension d_2 in the dimension table must be observed.



① Sealing ring

Figure 2
Support of sealing rings

Fitting and dismantling of cable sheave bearings

During fitting and dismantling of the bearings, the mounting forces must never be directed through the rolling elements, sealing rings or the fasteners on the split inner ring.

Accuracy

The dimensional and geometrical tolerances of the bearings correspond to tolerance class PN to DIN 620.

Radial internal clearance

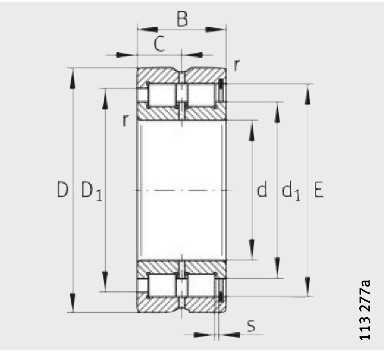
The radial internal clearance corresponds to internal clearance group CN to DIN 620-4.

Radial internal clearance

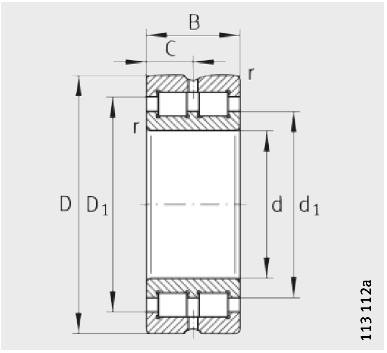
Bore d mm		Radial internal clearance							
		CN µm		C3 µm		C4 µm		C5 µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
–	24	20	45	35	60	50	75	65	90
24	30	20	45	35	60	50	75	70	95
30	40	25	50	45	70	60	85	80	105
40	50	30	60	50	80	70	100	95	125
50	65	40	70	60	90	80	110	110	140
65	80	40	75	65	100	90	125	130	165
80	100	50	85	75	110	105	140	155	190
100	120	50	90	85	125	125	165	180	220
120	140	60	105	100	145	145	190	200	245
140	160	70	120	115	165	165	215	225	275
160	180	75	125	120	170	170	220	250	300
180	200	90	145	140	195	195	250	275	330
200	225	105	165	160	220	220	280	305	365
225	250	110	175	170	235	235	300	330	395
250	280	125	195	190	260	260	330	370	440
280	315	130	205	200	275	275	350	410	485
315	355	145	225	225	305	305	385	455	535
355	400	190	280	280	370	370	460	510	600

Double row full complement cylindrical roller bearings

Semi-locating, locating and non-locating bearings



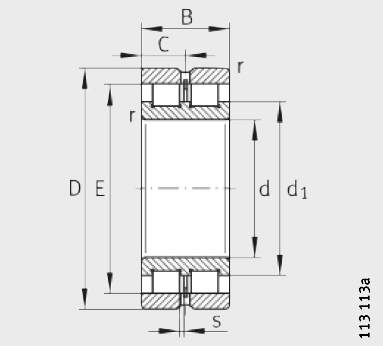
SL1850
Semi-locating bearings



SL0148, SL0149
Locating bearings

Dimension table · Dimensions in mm

Semi-locating bearings Designation		Locating bearings Designation	Non-locating bearings Designation	Designation to DIN 5 412	Mass	Dimensions				
	X-life				m ≈kg	d	D	B	r min.	s
SL185004	**XL**	–	–	–	0,2	**20**	42	30	0,6	1
SL185005	**XL**	–	–	–	0,23	**25**	47	30	0,6	1
SL185006	**XL**	–	–	–	0,35	**30**	55	34	1	1,5
SL185007	**XL**	–	–	–	0,46	**35**	62	36	1	1,5
SL185008	**XL**	–	–	–	0,56	**40**	68	38	1	1,5
SL185009	**XL**	–	–	–	0,71	**45**	75	40	1	1,5
SL185010	**XL**	–	–	–	0,76	**50**	80	40	1	1,5
SL185011	**XL**	–	–	–	1,16	**55**	90	46	1,1	1,5
–	–	**SL014912**	–	NNC 4912 V	0,49	**60**	85	25	1	–
–	–	–	**SL024912**	NNCL 4912 V	0,47	**60**	85	25	1	1
SL185012	**XL**	–	–	–	1,24	**60**	95	46	1,1	1,5
SL185013	**XL**	–	–	–	1,32	**65**	100	46	1,1	1,5
–	–	**SL014914**	–	NNC 4914 V	0,78	**70**	100	30	1	–
–	–	–	**SL024914**	NNCL 4914 V	0,75	**70**	100	30	1	1
SL185014	**XL**	–	–	–	1,85	**70**	110	54	1,1	3
SL185015	**XL**	–	–	–	1,93	**75**	115	54	1,1	3
–	–	**SL014916**	–	NNC 4916 V	0,88	**80**	110	30	1	–
–	–	–	**SL024916**	NNCL 4916 V	0,85	**80**	110	30	1	1
SL185016	–	–	–	–	2,59	**80**	125	60	1,1	3,5
SL185017	–	–	–	–	2,72	**85**	130	60	1,1	3,5
–	–	**SL014918**	–	NNC 4918 V	1,35	**90**	125	35	1,1	–
–	–	–	**SL024918**	NNCL 4918 V	1,3	**90**	125	35	1,1	1,5
SL185018	–	–	–	–	3,62	**90**	140	67	1,5	4
–	–	**SL014920**	–	NNC 4920 V	1,95	**100**	140	40	1,1	–
–	–	–	**SL024920**	NNCL 4920 V	1,9	**100**	140	40	1,1	2
SL185020	–	–	–	–	3,94	**100**	150	67	1,5	4
–	–	**SL014922**	–	NNC 4922 V	2,15	**110**	150	40	1,1	–
–	–	–	**SL024922**	NNCL 4922 V	2,1	**110**	150	40	1,1	2
SL185022	–	–	–	–	6,32	**110**	170	80	2	5
–	–	**SL014924**	–	NNC 4924 V	2,95	**120**	165	45	1,1	–
–	–	–	**SL024924**	NNCL 4924 V	2,85	**120**	165	45	1,1	3
SL185024	–	–	–	–	6,77	**120**	180	80	2	5

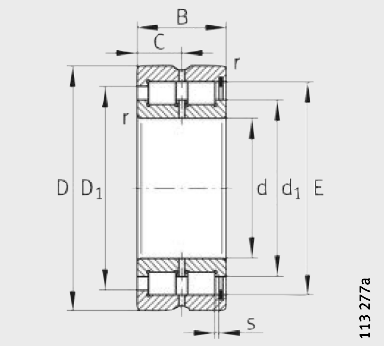


SL0248, SL0249
Non-locating bearings

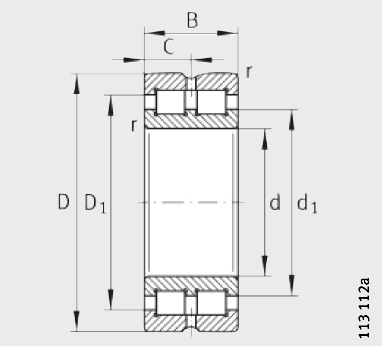
Mounting dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
C	d_1 ≈	D_1 ≈	E	dyn. C_r N	stat. C_{0r} N	C_{ur} N	n_G min^{-1}	n_B min^{-1}
15	28,4	33,3	36,81	53 000	52 000	8 900	10 500	7 400
15	34,5	39	42,51	60 000	64 000	11 100	8 900	6 000
17	40	45,3	49,6	78 000	84 000	15 000	7 600	5 300
18	44,9	51,2	55,52	94 000	107 000	18 800	6 700	4 750
19	50,5	57,2	61,74	113 000	133 000	22 400	6 000	4 200
20	55,3	62,6	66,85	120 000	148 000	24 900	5 500	3 950
20	59,1	67,6	72,33	151 000	188 000	30 000	5 100	3 450
23	68,5	78,7	83,54	206 000	275 000	45 000	4 400	2 900
12,5	70,3	73,5	–	70 000	121 000	17 300	4 500	2 650
12,5	70,3	–	77,51	70 000	121 000	17 300	4 500	2 650
23	71,7	81,9	86,74	212 000	285 000	47 500	4 200	2 800
23	78,1	88,3	93,09	223 000	315 000	52 000	3 900	2 500
15	82,5	87,4	–	106 000	185 000	27 000	3 800	2 330
15	82,5	–	91,87	106 000	185 000	27 000	3 800	2 330
27	81,5	95,7	100,28	265 000	350 000	59 000	3 650	2 650
27	89	102,9	107,9	275 000	385 000	65 000	3 400	2 370
15	91,4	96,2	–	112 000	206 000	30 000	3 450	2 090
15	91,4	–	100,78	112 000	206 000	30 000	3 450	2 090
30	95	111,7	117,4	290 000	440 000	62 000	3 150	2 320
30	99	116,1	121,95	300 000	465 000	64 000	3 000	2 210
17,5	103,9	110,7	–	153 000	290 000	39 000	3 000	1 870
17,5	103	–	115,2	153 000	290 000	39 000	3 000	1 870
33,5	106,1	124,5	130,65	350 000	550 000	76 000	2 800	2 140
20	116,4	125	–	191 000	370 000	47 500	2 700	1 720
20	116,4	–	129,6	191 000	370 000	47 500	2 700	1 720
33,5	115,7	134	140,2	370 000	600 000	81 000	2 600	1 930
20	125	133,6	–	198 000	400 000	50 000	2 500	1 600
20	125	–	138,2	198 000	400 000	50 000	2 500	1 600
40	127,3	149,3	156,7	485 000	770 000	104 000	2 350	1 730
22,5	138,6	148,6	–	222 000	440 000	55 000	2 260	1 540
22,5	138,6	–	153,55	222 000	440 000	55 000	2 260	1 540
40	138,8	160,7	168,15	510 000	850 000	111 000	2 170	1 530

Double row full complement cylindrical roller bearings

Semi-locating, locating and non-locating bearings



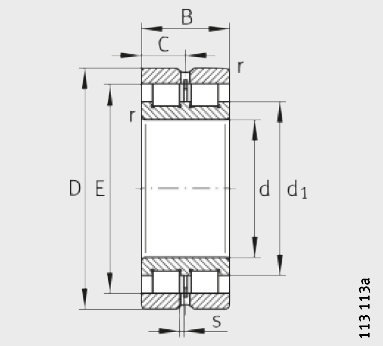
SL1850
Semi-locating bearings



SL0148, SL0149
Locating bearings

Dimension table (continued) · Dimensions in mm

Semi-locating bearings Designation	Locating bearings Designation	Non-locating bearings Designation	Designation to DIN 5 412	Mass	Dimensions				
				m	d	D	B	r	s
				≈kg				min.	
–	**SL014926**	–	NNC 4926 V	3,95	**130**	180	50	1,5	–
–	–	**SL024926**	NNCL 4926 V	3,8	**130**	180	50	1,5	4
SL185026	–	–	–	10,2	**130**	200	95	2	5
–	**SL014928**	–	NNC 4928 V	4,2	**140**	190	50	1,5	–
–	–	**SL024928**	NNCL 4928 V	4,1	**140**	190	50	1,5	4
SL185028	–	–	–	11,1	**140**	210	95	2	5
–	**SL014830**	–	NNC 4830 V	2,9	**150**	190	40	1,1	–
–	–	**SL024830**	NNCL 4830 V	2,8	**150**	190	40	1,1	2
–	**SL014930**	–	NNC 4930 V	6,65	**150**	210	60	2	–
–	–	**SL024930**	NNCL 4930 V	6,45	**150**	210	60	2	4
SL185030	–	–	–	13,3	**150**	225	100	2	6
–	**SL014832**	–	NNC 4832 V	3,1	**160**	200	40	1,1	–
–	–	**SL024832**	NNCL 4832 V	3	**160**	200	40	1,1	2
–	**SL014932**	–	NNC 4932 V	7	**160**	220	60	2	–
–	–	**SL024932**	NNCL 4932 V	6,8	**160**	220	60	2	4
SL185032	–	–	–	12,2	**160**	240	109	2,1	6
–	**SL014834**	–	NNC 4834 V	4,1	**170**	215	45	1,1	–
–	–	**SL024834**	NNCL 4834 V	3,95	**170**	215	45	1,1	3
–	**SL014934**	–	NNC 4934 V	7,35	**170**	230	60	2	–
–	–	**SL024934**	NNCL 4934 V	7,1	**170**	230	60	2	4
SL185034	–	–	–	22,5	**170**	260	122	2,1	6
–	**SL014836**	–	NNC 4836 V	4,3	**180**	225	45	1,1	–
–	–	**SL024836**	NNCL 4836 V	4,15	**180**	225	45	1,1	3
–	**SL014936**	–	NNC 4936 V	10,8	**180**	250	69	2	–
–	–	**SL024936**	NNCL 4936 V	10,5	**180**	250	69	2	4
SL185036	–	–	–	29,9	**180**	280	136	2,1	8
–	**SL014838**	–	NNC 4838 V	5,65	**190**	240	50	1,5	–
–	–	**SL024838**	NNCL 4838 V	5,45	**190**	240	50	1,5	4
–	**SL014938**	–	NNC 4938 V	11,2	**190**	260	69	2	–
–	–	**SL024938**	NNCL 4938 V	10,9	**190**	260	69	2	4
SL185038	–	–	–	31,3	**190**	290	136	2,1	8,2
–	**SL014840**	–	NNC 4840 V	5,9	**200**	250	50	1,5	–
–	–	**SL024840**	NNCL 4840 V	5,7	**200**	250	50	1,5	4
–	**SL014940**	–	NNC 4940 V	15,8	**200**	280	80	2,1	–
–	–	**SL024940**	NNCL 4940 V	15,3	**200**	280	80	2,1	5
SL185040	–	–	–	40,4	**200**	310	150	2,1	8,9

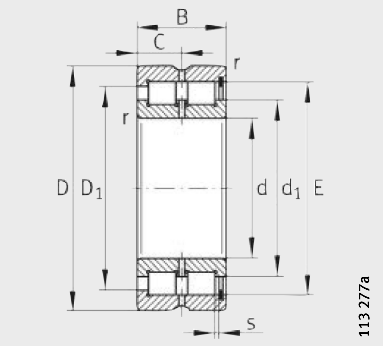


SL0248, SL0249
Non-locating bearings

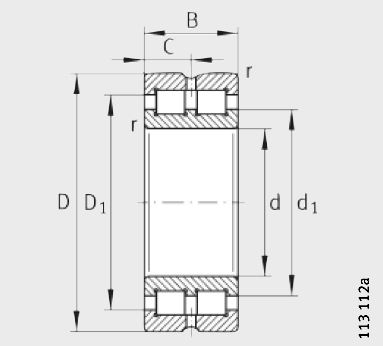
Mounting dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
C	d_1 ≈	D_1 ≈	E	dyn. C_r N	stat. C_{0r} N	C_{ur} N	n_G min^{-1}	n_B min^{-1}
25	148,4	160	–	260 000	510 000	63 000	2 100	1 500
25	149,5	–	165,4	260 000	510 000	63 000	2 100	1 500
47,5	148,6	175,5	184,4	730 000	1 210 000	158 000	2 000	1 340
25	159	170,5	–	270 000	550 000	66 000	1 960	1 370
25	160	–	175,9	270 000	550 000	66 000	1 960	1 370
47,5	162,6	189,5	198,4	770 000	1 330 000	169 000	1 840	1 180
20	165,1	174,2	–	231 000	530 000	62 000	1 910	1 270
20	165,1	–	178,3	231 000	530 000	62 000	1 910	1 270
30	171,8	187,2	–	410 000	820 000	98 000	1 810	1 200
30	171,8	–	192,77	410 000	820 000	98 000	1 810	1 200
50	170	198	207,45	810 000	1 390 000	175 000	1 760	1 150
20	173,7	182,8	–	237 000	560 000	64 000	1 820	1 200
20	173,7	–	186,9	237 000	560 000	64 000	1 820	1 200
30	184,2	200,3	–	425 000	880 000	104 000	1 690	1 080
30	184,2	–	206,16	425 000	880 000	104 000	1 690	1 080
54,5	184,8	215,8	224,8	930 000	1 610 000	199 000	1 620	1 030
22,5	186,3	197	–	260 000	600 000	68 000	1 690	1 180
22,5	186,3	–	201,3	260 000	600 000	68 000	1 690	1 180
30	193,1	209,1	–	435 000	930 000	108 000	1 610	1 010
30	193,1	–	215,08	435 000	930 000	108 000	1 610	1 010
61	198	332,7	242,85	1 200 000	2 110 000	260 000	1 510	900
22,5	199,1	209,8	–	270 000	640 000	72 000	1 590	1 070
22,5	199,1	–	214,1	270 000	640 000	72 000	1 590	1 070
34,5	204,9	224,1	–	570 000	1 200 000	140 000	1 510	920
34,5	204,9	–	230,5	570 000	1 200 000	140 000	1 510	920
68	212,2	249,4	260,22	1 390 000	2 480 000	300 000	1 410	820
25	207,6	220,7	–	310 000	730 000	81 000	1 510	1 030
25	207,6	–	225	310 000	730 000	81 000	1 510	1 030
34,5	215	234,3	–	580 000	1 270 000	145 000	1 440	860
34,5	215	–	240,7	580 000	1 270 000	145 000	1 440	860
68	221,8	259	269,76	1 430 000	2 600 000	310 000	1 350	770
25	218,1	231,2	–	320 000	770 000	84 000	1 440	960
25	218,1	–	235,5	320 000	770 000	84 000	1 440	960
40	230,5	252,3	–	680 000	1 440 000	165 000	1 340	820
40	230,5	–	259,34	680 000	1 440 000	165 000	1 340	820
75	236,6	276,2	287,75	1 630 000	3 000 000	355 000	1 270	710

Double row full complement cylindrical roller bearings

Semi-locating, locating and non-locating bearings



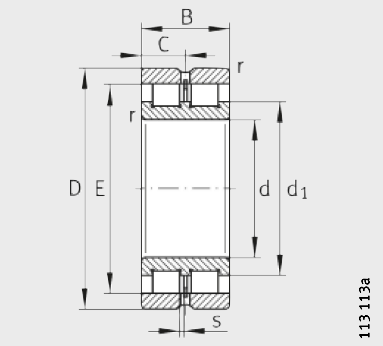
SL1850
Semi-locating bearings



SL0148, SL0149
Locating bearings

Dimension table (continued) · Dimensions in mm

Semi-locating bearings Designation	Locating bearings Designation	Non-locating bearings Designation	Designation to DIN 5 412	Mass m ≈kg	Dimensions d	D	B	r min.	s
–	**SL014844**	–	NNC 4844 V	6,4	**220**	270	50	1,5	–
–	–	**SL024844**	NNCL 4844 V	6,2	**220**	270	50	1,5	4
–	**SL014944**	–	NNC 4944 V	17,2	**220**	300	80	2,1	–
–	–	**SL024944**	NNCL 4944 V	16,7	**220**	300	80	2,1	5
SL185044	–	–	–	51,6	**220**	340	160	3	9
–	**SL014848**	–	NNC 4848 V	10	**240**	300	60	2	–
–	–	**SL024848**	NNCL 4848 V	9,9	**240**	300	60	2	4
–	**SL014948**	–	NNC 4948 V	18,5	**240**	320	80	2,1	–
–	–	**SL024948**	NNCL 4948 V	17,9	**240**	320	80	2,1	5
SL185048	–	–	–	55,2	**240**	360	160	3	9
–	**SL014852**	–	NNC 4852 V	11	**260**	320	60	2	–
–	–	**SL024852**	NNCL 4852 V	10,6	**260**	320	60	2	4
–	**SL014952**	–	NNC 4952 V	32	**260**	360	100	2,1	–
–	–	**SL024952**	NNCL 4952 V	31,2	**260**	360	100	2,1	6
SL185052	–	–	–	82,6	**260**	400	190	4	11,3
–	**SL014856**	–	NNC 4856 V	16	**280**	350	69	2	–
–	–	**SL024856**	NNCL 4856 V	15,6	**280**	350	69	2	4
–	**SL014956**	–	NNC 4956 V	34	**280**	380	100	2,1	–
–	–	**SL024956**	NNCL 4956 V	33,1	**280**	380	100	2,1	6
SL185056	–	–	–	88	**280**	420	190	4	11,3
–	**SL014860**	–	NNC 4860 V	23	**300**	380	80	2,1	–
–	–	**SL024860**	NNCL 4860 V	22	**300**	380	80	2,1	6
–	**SL014960**	–	NNC 4960 V	53	**300**	420	118	3	–
–	–	**SL024960**	NNCL 4960 V	51,9	**300**	420	118	3	6
SL185060-TB	–	–	–	124	**300**	460	218	4	12,5
–	**SL014864**	–	NNC 4864 V	24	**320**	400	80	2,1	–
–	–	**SL024864**	NNCL 4864 V	23,5	**320**	400	80	2,1	6
–	**SL014964**	–	NNC 4964 V	56	**320**	440	118	3	–
–	–	**SL024964**	NNCL 4964 V	54,9	**320**	440	118	3	6
SL185064-TB	–	–	–	128,4	**320**	480	218	4	12,5
–	**SL014868**	–	NNC 4868 V	25,5	**340**	420	80	2,1	–
–	–	**SL024868**	NNCL 4868 V	25	**340**	420	80	2,1	6
–	**SL014968**	–	NNC 4968 V	59	**340**	460	118	3	–
–	–	**SL024968**	NNCL 4968 V	57,8	**340**	460	118	3	6
SL185068-TB	–	–	–	178	**340**	520	243	5	14,3

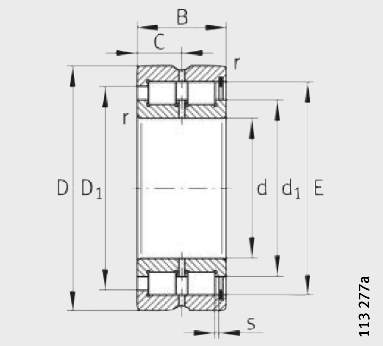


SL0248, SL0249
Non-locating bearings

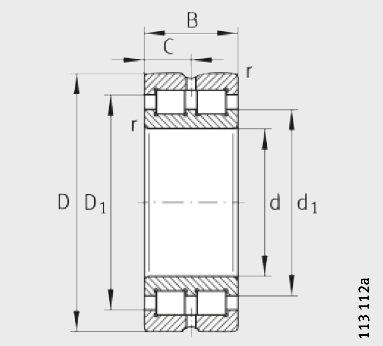
Mounting dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
C	d_1 ≈	D_1 ≈	E	dyn. C_r N	stat. C_{0r} N	C_{ur} N	n_G min^{-1}	n_B min^{-1}
25	239,1	252,3	–	335 000	840 000	90 000	1 320	850
25	239,1	–	256,5	335 000	840 000	90 000	1 320	850
40	248	268,5	–	700 000	1 550 000	174 000	1 250	750
40	248	–	276,52	700 000	1 550 000	174 000	1 250	750
80	254,6	297,8	312,2	1 980 000	3 650 000	420 000	1 170	630
30	259,5	276,7	–	510 000	1 260 000	135 000	1 210	730
30	259,5	–	281,9	510 000	1 260 000	135 000	1 210	730
40	270,6	292,3	–	740 000	1 700 000	186 000	1 150	660
40	270,6	–	299,46	740 000	1 700 000	186 000	1 150	660
80	277,5	322,1	335,1	2 080 000	4 000 000	445 000	1 080	550
30	281,8	298,8	–	540 000	1 370 000	143 000	1 120	650
30	281,8	–	304,2	540 000	1 370 000	143 000	1 120	650
50	294,5	322,1	–	1 100 000	2 470 000	270 000	1 050	570
50	294,5	–	331,33	1 100 000	2 470 000	270 000	1 050	570
95	304	359,7	375,97	2 750 000	5 000 000	560 000	980	490
34,5	306,8	326,4	–	700 000	1 820 000	189 000	1 020	570
34,5	306,8	–	332,4	700 000	1 820 000	189 000	1 020	570
50	316,5	344,6	–	1 150 000	2 650 000	285 000	980	520
50	316,5	–	353,34	1 150 000	2 650 000	285 000	980	520
95	318,3	374,1	390,3	2 850 000	5 300 000	580 000	940	460
40	327,9	349,9	–	820 000	2 070 000	214 000	960	550
40	327,9	–	356,7	820 000	2 070 000	214 000	960	550
59	340,7	374,3	–	1 630 000	3 700 000	390 000	910	445
59	340,7	–	385,51	1 630 000	3 700 000	390 000	910	445
109	353,6	413,6	433,6	3 450 000	6 600 000	650 000	840	395
40	350,9	372,9	–	850 000	2 220 000	225 000	900	495
40	350,9	–	379,7	850 000	2 220 000	225 000	900	495
59	367,5	401,1	–	1 700 000	4 050 000	415 000	840	395
59	367,5	–	412,27	1 700 000	4 050 000	415 000	840	395
109	369,5	431,5	449,5	3 550 000	6 900 000	680 000	810	375
40	368,1	390,1	–	870 000	2 330 000	233 000	860	465
40	368,1	–	396,9	870 000	2 330 000	233 000	860	465
59	385,3	418,9	–	1 750 000	4 250 000	430 000	810	375
59	385,3	–	430,11	1 750 000	4 250 000	430 000	810	375
121,5	396	465,5	485,65	4 250 000	8 300 000	800 000	750	355

Double row full complement cylindrical roller bearings

Semi-locating, locating and non-locating bearings



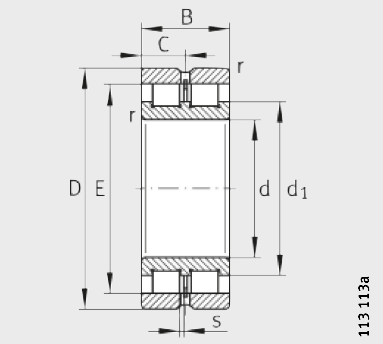
SL1850
Semi-locating bearings



SL0148, SL0149
Locating bearings

Dimension table (continued) · Dimensions in mm

Semi-locating bearings Designation	Locating bearings Designation	Non-locating bearings Designation	Designation to DIN 5 412	Mass m ≈kg	Dimensions d	D	B	r min.	s
–	**SL014872**	–	NNC 4872 V	27	**360**	440	80	2,1	–
–	–	**SL024872**	NNCL 4872 V	26	**360**	440	80	2,1	6
–	**SL014972**	–	NNC 4972 V	62,1	**360**	480	118	3	–
–	–	**SL024972**	NNCL 4972 V	60,8	**360**	480	118	3	6
SL185072-TB	–	–	–	178	**360**	540	243	5	14
–	**SL014876**	–	NNC 4876 V	45,5	**380**	480	100	2,1	–
–	–	**SL024876**	NNCL 4876 V	44	**380**	480	100	2,1	6
–	**SL014976**	–	NNC 4976 V	92,4	**380**	520	140	4	–
–	–	**SL024976**	NNCL 4976 V	90,5	**380**	520	140	4	7
SL185076-TB	–	–	–	196,5	**380**	560	243	5	14,1
–	**SL014880**	–	NNC 4880 V	46,5	**400**	500	100	2,1	–
–	–	**SL024880**	NNCL 4880 V	45,8	**400**	500	100	2,1	6
–	**SL014980**	–	NNC 4980 V	96,5	**400**	540	140	4	–
–	–	**SL024980**	NNCL 4980 V	94,6	**400**	540	140	4	7

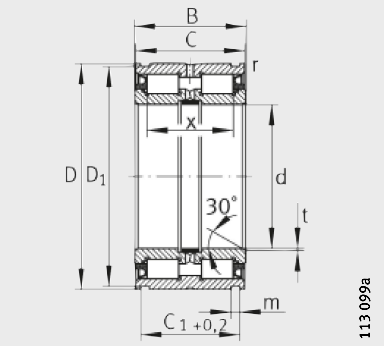


SL0248, SL0249
Non-locating bearings

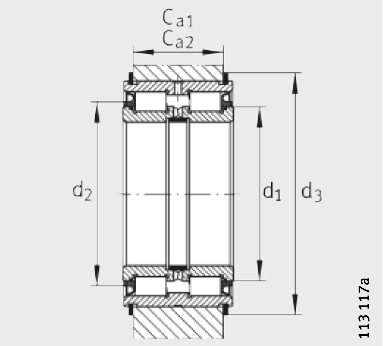
Mounting dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Reference speed
C	d_1 ≈	D_1 ≈	E	dyn. C_r N	stat. C_{0r} N	C_{ur} N	n_G min^{-1}	n_B min^{-1}
40	391	413,2	–	900 000	2 480 000	244 000	810	430
40	391	–	419,8	900 000	2 480 000	244 000	810	430
59	404	436,8	–	1 790 000	4 450 000	445 000	770	350
59	404	–	447,95	1 790 000	4 450 000	445 000	770	350
121,5	413,8	481	503,45	4 400 000	8 700 000	820 000	720	320
50	419	447,2	–	1 320 000	3 500 000	345 000	750	375
50	419	–	455,8	1 320 000	3 500 000	345 000	750	375
70	430,2	468,7	–	2 250 000	5 500 000	560 000	720	325
70	430,2	–	481,35	2 250 000	5 500 000	560 000	720	325
121,5	432	499	521,25	4 450 000	8 900 000	850 000	700	305
50	433,8	462	–	1 350 000	3 650 000	355 000	720	360
50	433,8	–	470,59	1 350 000	3 650 000	355 000	720	360
70	450,5	489	–	2 310 000	5 800 000	580 000	690	300
70	450,5	–	501,74	2 310 000	5 800 000	580 000	690	300

Cable sheave bearings

Cylindrical roller bearings
with snap ring grooves
Full complement, sealed
Locating bearings



SL0450..-PP
SL04..-PP



Mounting dimensions

Dimension table · Dimensions in mm

Designation	Mass	Dimensions									
	m	d	D	B	C	C_1	D_1	m	r	t	x
	≈kg					+0,2			min.		
SL045004-PP	0,2	**20**	42	30	29	24,7	40,2	1,8	0,3	0,5	22,5
SL045005-PP	0,24	**25**	47	30	29	24,7	45,2	1,8	0,3	0,5	22,5
SL045006-PP	0,37	**30**	55	34	33	28,2	53	2,1	0,3	0,5	25,5
SL045007-PP	0,48	**35**	62	36	35	30,2	60	2,1	0,3	0,5	27,5
SL045008-PP	0,56	**40**	68	38	37	32,2	65,8	2,7	0,6	0,8	28,5
SL045009-PP	0,7	**45**	75	40	39	34,2	72,8	2,7	0,6	0,8	30,5
SL045010-PP	0,76	**50**	80	40	39	34,2	77,8	2,7	0,6	0,8	30,5
SL045011-PP	1,18	**55**	90	46	45	40,2	87,4	3,2	0,6	1	36
SL045012-PP	1,26	**60**	95	46	45	40,2	92,4	3,2	0,6	1	36
SL045013-PP	1,33	**65**	100	46	45	40,2	97,4	3,2	0,6	1	36
SL045014-PP	1,87	**70**	110	54	53	48,2	107,1	4,2	0,6	1	42
SL045015-PP	1,96	**75**	115	54	53	48,2	112,1	4,2	0,6	1	42
SL045016-PP	2,71	**80**	125	60	59	54,2	122,1	4,2	0,6	1,5	48
SL045017-PP	2,83	**85**	130	60	59	54,2	127,1	4,2	0,6	1,5	48
SL045018-PP	3,71	**90**	140	67	66	59,2	137	4,2	0,6	1,5	54
SL045019-PP	3,88	**95**	145	67	66	59,2	142	4,2	0,6	1,5	54
SL045020-PP	3,95	**100**	150	67	66	59,2	147	4,2	0,6	1,5	54
SL045022-PP	6,57	**110**	170	80	79	70,2	167	4,2	0,6	1,8	64
SL045024-PP	7,04	**120**	180	80	79	71,2	176	4,2	0,6	1,8	64
SL045026-PP	10,5	**130**	200	95	94	83,2	196	4,2	0,6	1,8	77
SL04130-PP	7,5	**130**	190	80	79	71,2	186	4,2	0,6	1,8	64
SL045028-PP	11,1	**140**	210	95	94	83,2	206	5,2	0,6	1,8	77
SL04140-PP	8	**140**	200	80	79	71,2	196	4,2	0,6	1,8	64
SL045030-PP	13,3	**150**	225	100	99	87,2	221	5,2	0,6	2	80
SL04150-PP	8,4	**150**	210	80	79	71,2	206	5,2	0,6	1,8	64
SL045032-PP	16,6	**160**	240	109	108	95,2	236	5,2	0,6	2	89
SL04160-PP	8,8	**160**	220	80	79	71,2	216	5,2	0,6	1,8	64

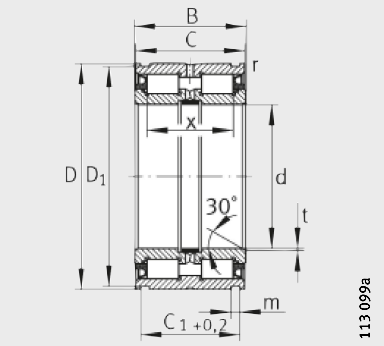
1) For snap rings WRE.

2) For retaining ring to DIN 471.

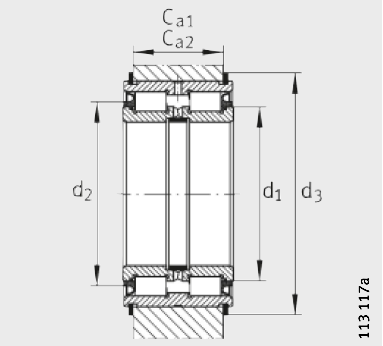
Mounting dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Snap ring WRE	Retaining ring to DIN 471
C_{a1} 1) −0,2	C_{a2} 2) −0,2	d_1	d_2	d_3 1)	dyn. C_r N	stat. C_{0r} N	C_{ur} N	n_G grease min^{-1}		
21,5	21	30,55	34	47	41 500	51 000	6 900	4 000	WRE42	42X1,75
21,5	21	35,35	39	52	46 000	60 000	8 100	3 600	WRE47	47X1,75
25	24	40,6	44	60	50 000	67 000	9 500	3 000	WRE55	55X2
27	26	46,1	50	67	63 000	88 000	12 400	2 600	WRE62	62X2
28	27	51,4	55	75	80 000	111 000	16 000	2 400	WRE68	68X2,5
30	29	57	61	82	97 000	139 000	19 900	2 200	WRE75	75X2,5
30	29	61,8	66	87	102 000	151 000	21 700	2 000	WRE80	80X2,5
35	34	68,6	73	99	120 000	186 000	25 500	1 800	WRE90	90X3
35	34	73,7	79	104	125 000	201 000	27 500	1 700	WRE95	95X3
35	34	78,8	84	109	130 000	215 000	29 500	1 600	WRE100	100X3
43	40	84,5	91	119	175 000	275 000	36 000	1 400	WRE110	110X4
43	40	89,95	97	124	201 000	315 000	42 000	1 400	WRE115	115X4
49	46	97,1	105	137	210 000	340 000	45 000	1 300	WRE125	125X4
49	46	103,9	112	142	219 000	365 000	47 500	1 200	WRE130	130X4
54	51	109,3	118	152	305 000	510 000	69 000	1 100	WRE140	140X4
54	51	113,35	122	157	315 000	530 000	71 000	1 100	WRE145	145X4
54	51	117,35	128	162	330 000	550 000	73 000	1 000	WRE150	150X4
65	62	131,55	143	182	395 000	680 000	89 000	900	WRE170	170X4
65	63	140,9	153	196	410 000	740 000	94 000	900	WRE180	180X4
77	75	156,75	170	216	540 000	960 000	122 000	800	WRE200	200X4
65	63	150,55	160	206	430 000	790 000	99 000	800	WRE190	190X4
77	73	165,4	181	226	610 000	1 100 000	139 000	750	WRE210	210X5
65	63	159,95	170	216	445 000	840 000	104 000	750	WRE200	200X4
81	77	175,7	192	245	710 000	1 260 000	156 000	700	WRE225	225X5
65	61	174,4	185	226	465 000	920 000	111 000	700	WRE210	210X5
89	85	189	207	260	740 000	1 360 000	165 000	650	WRE240	240X5
65	61	184,05	196	236	480 000	970 000	116 000	700	WRE220	220X5

Cable sheave bearings

Cylindrical roller bearings
with snap ring grooves
Full complement, sealed
Locating bearings



SL0450..-PP
SL04..-PP



Mounting dimensions

Dimension table (continued) · Dimensions in mm

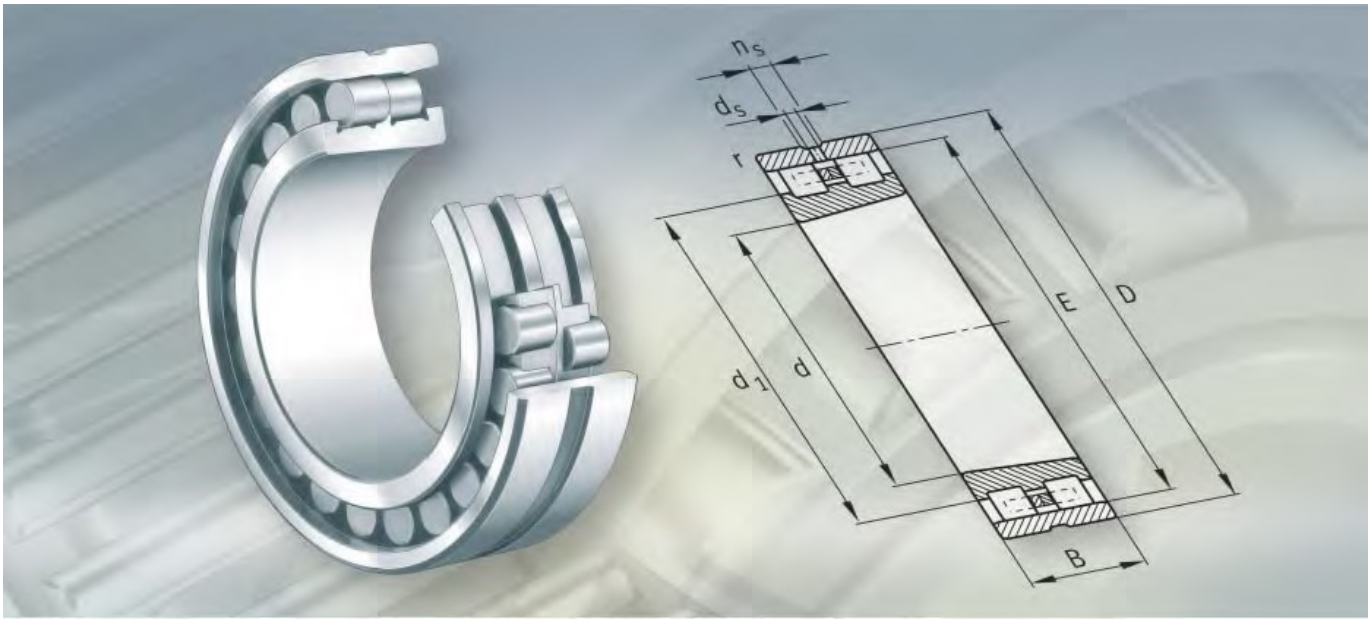
Designation	Mass	Dimensions									
	m	d	D	B	C	C_1	D_1	m	r	t	x
	≈kg					+0,2			min.		
SL045034-PP	22,6	**170**	260	122	121	107,2	254	5,2	0,6	2	100
SL04170-PP	9,3	**170**	230	80	79	71,2	226	5,2	0,6	1,8	64
SL045036-PP	30,1	**180**	280	136	135	118,2	274	5,2	0,6	2	112
SL04180-PP	9,8	**180**	240	80	79	71,2	236	5,2	0,6	1,8	64
SL045038-PP	31,5	**190**	290	136	135	118,2	284	5,2	0,6	2	112
SL04190-PP	12,7	**190**	260	80	79	73,2	254	5,2	0,6	1,8	64
SL045040-PP	40,8	**200**	310	150	149	128,2	304	6,3	0,6	2	126
SL04200-PP	13,2	**200**	270	80	79	73,2	264	5,2	0,6	1,8	64
SL045044-PP	52,5	**220**	340	160	159	138,2	334	6,3	1	2	132
SL04220-PP	19,5	**220**	300	95	94	83,2	294	5,2	1	2	72
SL045048-PP	56	**240**	360	160	159	138,2	354	6,3	1	2	132
SL04240-PP	21	**240**	320	95	94	83,2	314	6,3	1	2	72
SL045052-PP	84,5	**260**	400	190	189	162,2	394	6,3	1,1	3	150
SL04260-PP	22,5	**260**	340	95	94	83,2	334	6,3	1	3	75
SL045056-PP	90	**280**	420	190	189	163,2	413	7,3	1,1	3	150
SL045060-PP	126	**300**	460	218	216	185,2	453	7,3	1,1	3	170
SL04300-PP	25,5	**300**	380	95	94	83,2	374	6,3	1	3	75

1) For snap rings WRE.

2) For retaining ring to DIN 471.

Mounting dimensions					Basic load ratings		Fatigue limit load	Limiting speed	Snap ring WRE	Retaining ring to DIN 471
C_{a1} 1)	C_{a2} 2)	d_1	d_2	d_3 1)	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease		
−0,2	−0,2				N	N	N	min^{-1}		
99	97	200,7	220	282	960 000	1 750 000	212 000	600	WRE260	260X5
65	61	193,9	206	250	490 000	1 030 000	120 000	650	WRE230	230X5
110	108	217,8	239	302	1 140 000	2 130 000	255 000	550	WRE280	280X5
65	61	203,1	216	260	500 000	1 080 000	125 000	600	WRE240	240X5
110	108	225,65	248	312	1 160 000	2 210 000	260 000	550	WRE290	290X5
65	63	217,55	231	282	520 000	1 160 000	131 000	550	WRE260	260X5
120	116	243,05	267	336	1 350 000	2 600 000	300 000	500	WRE310	310X6
65	63	227,15	241	292	540 000	1 210 000	136 000	550	WRE270	270X5
130	126	259,85	286	366	1 570 000	3 050 000	350 000	480	WRE340	340X6
75	73	248,7	264	322	700 000	1 550 000	174 000	480	WRE300	300X5
130	126	279,25	305	386	1 630 000	3 300 000	370 000	440	WRE360	360X6
75	71	271,7	287	346	740 000	1 700 000	186 000	480	WRE320	320X6
154	150	304,95	336	426	2 380 000	4 700 000	520 000	400	WRE400	400X6
75	71	292,7	310	366	840 000	1 990 000	215 000	440	WRE340	340X6
154	149	320,95	354	453	2 600 000	5 200 000	570 000	380	WRE420	420X7
176	171	346,85	375	493	3 000 000	5 800 000	620 000	340	WRE460	460X7
75	71	328	346	406	900 000	2 250 000	234 000	380	WRE380	380X6

FAG



High precision cylindrical roller bearings

Double row

High precision cylindrical roller bearings

Non-locating bearings

NN30..-AS-K-M-SP

High precision cylindrical roller bearings

Features

Cylindrical roller bearings of this design are double row precision bearings for machine tools. They allow radially rigid, high precision bearing arrangements and are principally used to give radial support for main spindles.

The bearings comprise solid outer rings without ribs, solid inner rings with three ribs and cylindrical roller and cage assemblies with solid brass cages. For optimum setting of the radial internal clearance, the inner ring has a tapered bore with a bore taper 1:12. The cylindrical roller bearings are separable and are therefore easier to fit and dismantle. Both bearing rings can be given a tight fit by this process.

A detailed description of high precision cylindrical roller bearings (designs, calculation, lubrication, clearance adjustment) is given in Catalogue SP 1, Super Precision Bearings.

Non-locating bearings

Cylindrical roller bearings NN30..-AS-K-M-SP are non-locating bearings and can support radial forces only. Axial forces are normally supported by double direction axial angular contact ball bearings.

Axial displacement

The outer and inner ring can be axially displaced relative to each other from the central position by the values “s” stated in the dimension tables.

Sealing

The bearings are supplied without seals.

Lubrication

High precision cylindrical roller bearings can be lubricated from the end faces as well as through a lubrication groove and lubrication holes in the outer ring. The bearings can be lubricated with grease or oil.

Operating temperature

Cylindrical roller bearings with special precision (SP) can be used at operating temperatures from –30 °C to +150 °C.

For continuous operation above +120 °C, please contact us.

Cage

The cylindrical roller bearings have two roller-guided solid brass cages.

Suffixes

Suffixes for available designs: see table.

Available designs

Suffix	Description	Design
A	Modified internal construction	Standard
K	Tapered bore, taper 1:12	
M	Solid brass cage, roller-guided	
S	Lubrication groove and lubrication holes in outer ring	
SP	Tolerance class SP	

Design and safety guidelines

Operating life of the bearings

High precision bearings must guide machine parts with very high precision and must support forces at up to very high speeds. They are predominantly selected on the basis of accuracy, rigidity and running behaviour. In order that they can fulfil their tasks for as long as possible, the bearings must run without wear.
The precondition for this is the creation of a load-bearing hydrodynamic lubricant film at the contact points of the rolling contact partners. Under these conditions, they will achieve their fatigue life in a large number of applications. If the design is appropriate to the fatigue life, the operating life of the bearing is normally restricted by the lubricant operating life.

The decisive factors for the operating life from the perspective of load are the Hertzian pressures occurring at the contacts and the bearing kinematics. For high performance assemblies, individual design with the aid of special calculation programs is therefore advisable.

Since failure as a result of fatigue plays no part in practice, calculation of the rating life L_{10} in accordance with DIN ISO 281 is not appropriate as a means of determining the operating life.

Equivalent static bearing load

For bearings under static loading, the following applies:

$$P_0 = F_{0r}$$

Static load safety factor

$$S_0 = \frac{C_{0r}}{P_0}$$

S_0 –
Static load safety factor

C_{0r} N
Basic static load rating, see dimension tables

P_0 N
Equivalent static bearing load.

In order to achieve sufficiently smooth running, the static load safety factor should be $S_0 > 3$.

Speeds

The speed depends on the radial internal clearance while warm from operation. For calculation, the values from the dimension table are multiplied by the correction factor in the table.

The limiting speeds n_G are valid for lubrication with grease or minimal quantity lubrication with oil and must not be exceeded.

Correction factors

Clearance or preload in operation µm		Correction factor
0 to 5	(clearance)	1 to 1,1
–5 to 0	(preload)	0,8 to 1

Design of bearing arrangements

Design of tapered shaft

Recommendations for machining of the tapered shaft, see table and *Figure 1*.

Tapered shaft

Shaft diameter				Roundness	Flatness	Axial runout	Mean roughness
d		Deviation of small taper diameter		t_2	t_3	t_4	R_a
mm		µm		µm	µm	µm	µm
over	incl.	upper	lower				
18	30	+73	+64	1	1	1,5	0,2
30	40	+91	+80	1	1	1,5	0,2
40	50	+108	+97	1	1	1,5	0,2
50	65	+135	+122	1,2	1,2	2	0,2
65	80	+159	+146	1,2	1,2	2	0,2
80	100	+193	+178	1,5	1,5	2,5	0,2
100	120	+225	+210	1,5	1,5	2,5	0,2
120	140	+266	+248	2	2	3,5	0,2
140	160	+298	+280	2	2	3,5	0,2
160	180	+328	+310	2	2	3,5	0,2
180	200	+370	+350	3	3	4,5	0,2
200	225	+405	+385	3	3	4,5	0,2
225	250	+445	+425	3	3	4,5	0,2
250	280	+498	+475	4	4	6	0,4
280	315	+548	+525	4	4	6	0,4
315	355	+615	+590	5	5	7	0,4
355	400	+685	+660	5	5	7	0,4
400	450	+767	+740	6	6	8	0,4
450	500	+847	+820	6	6	8	0,4

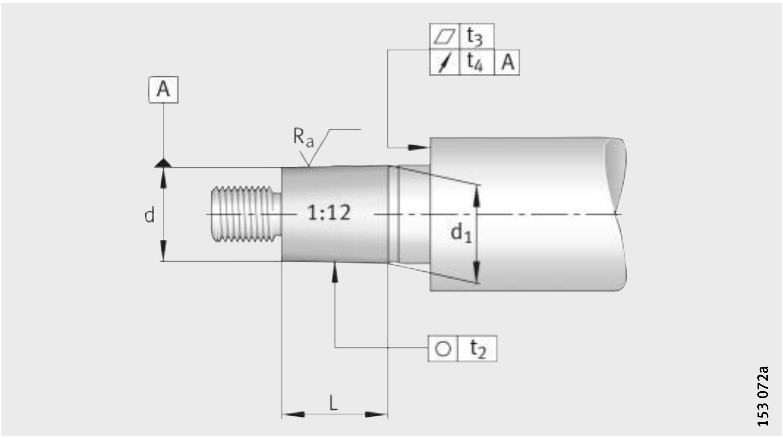


Figure 1
Design of shaft

Deviation of taper angle

The deviation of the taper angle of the shaft seat for bearings of tolerance class SP is shown in the table.

Taper length L mm		Taper angle tolerance AT_D µm			
L_U over	L_O incl.	AT_{DU}		AT_{DO}	
16	25	+2	0	+3,2	0
25	40	+2,5	0	+4	0
40	63	+3,2	0	+5	0
63	100	+4	0	+6,3	0
100	160	+5	0	+8	0
160	250	+6,3	0	+10	0

The taper angle tolerance AT_D applies vertical to the axis and is defined as the differential diameter.

If FAG taper gauges MGK132 are used, the AT_D values listed should be halved (inclination angle tolerance).

For taper lengths with nominal dimensions between the values listed in the table, the taper angle tolerance AT_D should be determined by means of interpolation.

Calculation example

Taper length of shaft seat 50 mm, tolerance class SP.

$$AT_D = AT_{DU} + \frac{AT_{DO} - AT_{DU}}{L_o - L_u} \cdot (L - L_u)$$

$$AT_D = 3{,}2 + \frac{5 - 3{,}2}{63 - 40} \cdot (50 - 40) = 3{,}98\ \mu m$$

Taper angle tolerance AT_D = +4 µm.

Design of housing

In order to allow fitting and dismantling of the bearings, the dimension $D_{b\ min}$ in the dimension tables must be observed.

Recommendations for machining of housings, see table and *Figure 2*.

Housing bore

Housing bore				Cylin-dricity	Flat-ness	Axial runout	Coaxiality	Mean roughness
D mm		Deviation µm		t_1 µm	t_3 µm	t_4 µm	t_5 µm	R_a µm
over	incl.	upper	lower					
30	50	+2	−9	1,5	1,5	2,5	4	0,4
50	80	+3	−10	2	2	3	5	0,4
80	120	+2	−13	2,5	2,5	4	6	0,8
120	180	+3	−15	3,5	3,5	5	8	0,8
180	250	+2	−18	4,5	4,5	7	10	0,8
250	315	+3	−20	6	6	8	12	1,6
315	400	+3	−22	7	7	9	13	1,6
400	500	+2	−25	8	8	10	15	1,6
500	630	0	−29	9	9	11	16	1,6
630	800	0	−32	10	10	12	18	1,6

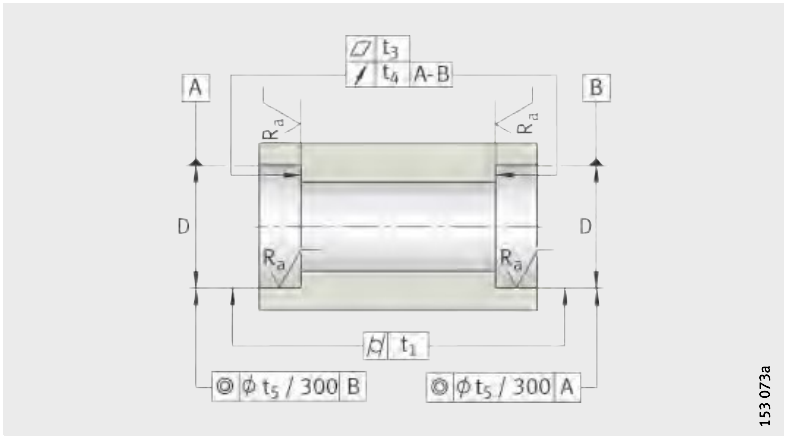


Figure 2
Design of housing

Mounting dimensions

The dimension tables give the maximum value of the radius r_a and the diameters of the abutment shoulders d_a, D_a and D_b.

Accuracy

The bearings correspond to tolerance class SP.
Bearings of the higher tolerance class UP are available by agreement.

Width tolerances

Bore d mm		Width deviation (in relation to bore) Δ_{Bs} µm		Width variation V_{Bs} µm
over	incl.			
18	30	0	−120	2,5
30	50	0	−120	3
50	80	0	−150	4
80	120	0	−200	4
120	180	0	−250	5
180	250	0	−300	6
250	315	0	−350	8
315	400	0	−400	10
400	500	0	−450	12

Tolerances of inner ring with tapered bore

Bore d mm		Deviation Δ_{dmp} µm		$\Delta_{d1\,mp} - \Delta_{dmp}$ µm		Variation V_{dp} µm	Radial runout K_{ia} µm	Axial runout S_d µm	Axial runout S_{ia} µm
over	incl.								
18	30	10	0	4	0	3	3	4	4
30	50	12	0	4	0	4	4	4	4
50	80	15	0	5	0	5	4	5	5
80	120	20	0	6	0	5	5	5	5
120	180	25	0	8	0	7	6	6	7
180	250	30	0	9	0	8	8	7	8
250	315	35	0	11	0	9	8	8	10
315	400	40	0	12	0	12	10	10	12
400	500	45	0	14	0	14	10	12	15

Outer ring tolerances

Outside diameter D mm		Outside diameter deviation Δ_{Ds} µm		Variation V_{Dp} µm	Radial runout K_{ea} µm	Axial runout S_D µm	Axial runout S_{ea} µm
over	incl.						
30	50	0	−7	4	5	4	5
50	80	0	−9	5	5	4	5
80	120	0	−10	5	6	5	6
120	150	0	−11	6	7	5	7
150	180	0	−13	7	8	5	8
180	250	0	−15	8	10	7	10
250	315	0	−18	9	11	8	10
315	400	0	−20	10	13	10	13
400	500	0	−23	12	15	11	15
500	630	0	−28	14	17	13	18
630	800	0	−35	18	20	15	22

Radial internal clearance

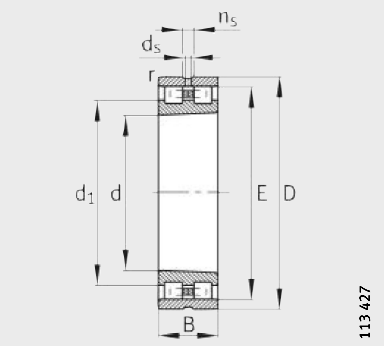
The radial internal clearance smaller than normal internal clearance corresponds to internal clearance group C1NA for accuracy SP and UP. The internal clearance is not stated in the designation. The bearing rings are not interchangeable.

Radial internal clearance of bearings with tapered bore (without measurement load)

Bore d mm		Radial internal clearance C1NA µm	
over	incl.	min.	max.
24	30	15	25
30	40	15	25
40	50	17	30
50	65	20	35
65	80	25	40
80	100	35	55
100	120	40	60
120	140	45	70
140	160	50	75
160	180	55	85
180	200	60	90
200	225	60	95
225	250	65	100
250	280	75	110
280	315	80	120
315	355	90	135
355	400	100	150
400	450	110	170
450	500	120	190

High precision cylindrical roller bearings

Double row
Non-locating bearings



NN30..-AS-K-M-SP
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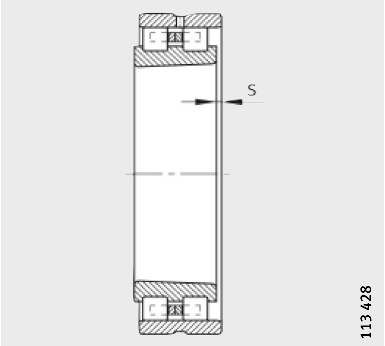
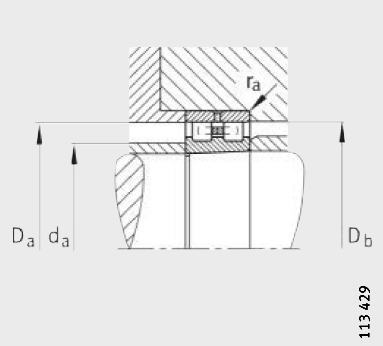


[1] Axial displacement “s”

Dimension table · Dimensions in mm

Designation	Mass	Dimensions								
	m	d	D	B	r	s[1]	E	d_1	d_s	n_s
	≈kg				min.			≈		
NN3006-AS-K-M-SP	0,191	**30**	55	19	1	1,4	48,5	39,7	3,2	4,8
NN3007-AS-K-M-SP	0,249	**35**	62	20	1	1,4	55	45,4	3,2	4,8
NN3008-AS-K-M-SP	0,303	**40**	68	21	1	1,4	61	50,6	3,2	4,8
NN3009-AS-K-M-SP	0,393	**45**	75	23	1	1,7	67,5	56,3	3,2	4,8
NN3010-AS-K-M-SP	0,426	**50**	80	23	1	1,7	72,5	61,3	3,2	4,8
NN3011-AS-K-M-SP	0,63	**55**	90	26	1,1	1,9	81	68,2	3,2	4,8
NN3012-AS-K-M-SP	0,674	**60**	95	26	1,1	1,9	86,1	73,3	3,2	4,8
NN3013-AS-K-M-SP	0,715	**65**	100	26	1,1	1,9	91	78,2	3,2	4,8
NN3014-AS-K-M-SP	1,04	**70**	110	30	1,1	2,3	100	85,6	3,2	6,5
NN3015-AS-K-M-SP	1,09	**75**	115	30	1,1	2,3	105	90,6	3,2	6,5
NN3016-AS-K-M-SP	1,51	**80**	125	34	1,1	2,5	113	97	3,2	6,5
NN3017-AS-K-M-SP	1,58	**85**	130	34	1,1	2,5	118	102	3,2	6,5
NN3018-AS-K-M-SP	2,05	**90**	140	37	1,5	2,5	127	109,4	3,2	6,5
NN3019-AS-K-M-SP	2,14	**95**	145	37	1,5	2,5	132	114,4	3,2	6,5
NN3020-AS-K-M-SP	2,23	**100**	150	37	1,5	2,5	137	119,4	3,2	6,5
NN3021-AS-K-M-SP	2,84	**105**	160	41	2	2,6	146	125,2	3,2	6,5
NN3022-AS-K-M-SP	3,61	**110**	170	45	2	2,9	155	132,6	3,2	6,5
NN3024-AS-K-M-SP	3,94	**120**	180	46	2	3,1	165	142,6	3,2	6,5
NN3026-AS-K-M-SP	5,79	**130**	200	52	2	3,4	182	156,4	4,8	9,5
NN3028-AS-K-M-SP	6,22	**140**	210	53	2	3,4	192	166,4	4,8	9,5
NN3030-AS-K-M-SP	7,58	**150**	225	56	2,1	3,7	206	178,8	4,8	9,5
NN3032-AS-K-M-SP	9,23	**160**	240	60	2,1	4,2	219	190,2	4,8	9,5
NN3034-AS-K-M-SP	12,5	**170**	260	67	2,1	4,5	236	204	4,8	9,5
NN3036-AS-K-M-SP	16,4	**180**	280	74	2,1	4,8	255	218,2	6,3	12,2
NN3038-AS-K-M-SP	17,3	**190**	290	75	2,1	4,8	265	228,2	6,3	12,2
NN3040-AS-K-M-SP	22,2	**200**	310	82	2,1	5,3	282	242	6,3	12,2
NN3044-AS-K-M-SP	29,1	**220**	340	90	3	4,5	310	265,2	8	15
NN3048-AS-K-M-SP	31,6	**240**	360	92	3	6	330	285,2	8	15
NN3052-AS-K-M-SP	46,2	**260**	400	104	4	6,5	364	312,8	8	15
NN3056-AS-K-M-SP	49,7	**280**	420	106	4	6,8	384	332,8	8	15
NN3060-AS-K-M-SP	68,8	**300**	460	118	4	7,5	418	360,4	9,5	17,7
NN3064-AS-K-M-SP	74,2	**320**	480	121	4	7,9	438	380,4	9,5	17,7
NN3068-AS-K-M-SP	99,3	**340**	520	133	5	8,7	473	409	9,5	17,7
NN3072-AS-K-M-SP	104	**360**	540	134	5	8,7	493	429	9,5	17,7

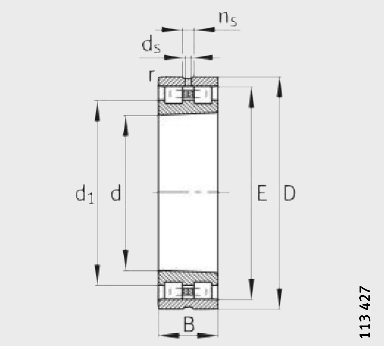


Mounting dimensions

Mounting dimensions				Basic load ratings		Fatigue limit load	Limiting speeds	
d_a	D_a	D_b	r_a	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil
min.	max.	min.	max.	N	N	N	min^{-1}	min^{-1}
35	50	49	1	29 000	34 000	4 800	16 000	19 000
40	57	56	1	35 500	44 000	6 500	14 000	17 000
45	63	62	1	45 000	58 500	8 400	12 000	15 000
50	70	69	1	54 000	72 000	10 700	11 000	14 000
55	75	74	1	57 000	80 000	11 800	10 000	13 000
61	84	82	1	72 000	100 000	15 600	9 000	11 000
66	89	87	1	75 000	110 000	17 200	8 500	10 000
71	94	92	1	76 500	116 000	18 000	8 000	9 500
76	104	102	1	98 000	150 000	22 400	7 000	8 500
81	109	107	1	100 000	156 000	23 400	6 700	8 000
86	119	115	1	120 000	186 000	28 500	6 300	7 500
91	124	120	1	125 000	200 000	30 500	6 000	7 000
98	132	129	1,5	140 000	224 000	36 000	5 600	6 700
103	137	134	1,5	143 000	236 000	37 000	5 300	6 300
108	142	139	1,5	146 000	245 000	38 000	5 300	6 300
114	151	148	2	190 000	310 000	46 000	4 800	5 600
119	161	157	2	220 000	360 000	54 000	4 500	5 300
129	171	167	2	232 000	390 000	57 000	4 300	5 000
139	191	184	2	290 000	500 000	72 000	3 800	4 500
149	201	194	2	300 000	520 000	74 000	3 600	4 300
160	215	208	2,1	335 000	585 000	83 000	3 400	4 000
170	230	222	2,1	375 000	670 000	93 000	3 200	3 800
180	250	239	2,1	450 000	800 000	111 000	3 000	3 600
190	270	258	2,1	570 000	1 000 000	134 000	2 800	3 400
200	280	268	2,1	585 000	1 040 000	138 000	2 600	3 200
210	300	285	2,1	655 000	1 200 000	161 000	2 400	3 000
232	328	313	2,5	800 000	1 460 000	187 000	2 200	2 800
252	348	334	2,5	850 000	1 560 000	199 000	2 000	2 600
275	385	368	3	1 060 000	2 000 000	249 000	1 900	2 400
295	405	388	3	1 080 000	2 080 000	255 000	1 800	2 200
315	445	422	3	1 270 000	2 400 000	290 000	1 600	1 900
335	465	442	3	1 320 000	2 600 000	310 000	1 600	1 900
357	503	477	4	1 630 000	3 250 000	380 000	1 400	1 700
377	523	497	4	1 660 000	3 350 000	390 000	1 400	1 700

High precision cylindrical roller bearings

Double row
Non-locating bearings



NN30..-AS-K-M-SP
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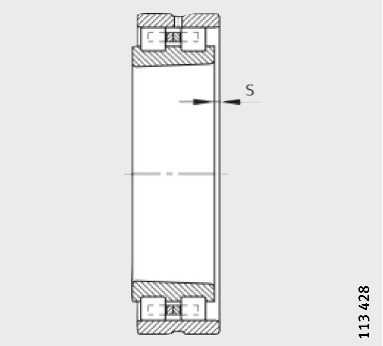

[1] Axial displacement “s”

Dimension table (continued) · Dimensions in mm

Designation	Mass	Dimensions								
	m	d	D	B	r	s[1]	E	d_1	d_s	n_s
	≈kg				min.			≈		
NN3076-AS-K-M-SP	110	**380**	560	135	5	9	513	449	9,5	17,7
NN3080-AS-K-M-SP	143	**400**	600	148	5	9,5	549	477	9,5	17,7
NN3084-AS-K-M-SP	150	**420**	620	150	5	10	569	497	9,5	17,7
NN3088-AS-K-M-SP	172	**440**	650	157	6	10,3	597	520,2	12,5	23,5
NN3092-AS-K-M-SP	197	**460**	680	163	6	10,5	624	544	12,5	23,5
NN3096-AS-K-M-SP	206	**480**	700	165	6	11	644	564	12,5	23,5
NN30/500-AS-K-M-SP	214	**500**	720	167	6	11,5	664	584	12,5	23,5