NACHI

EXS1

Spherical Roller Thrust Bearings

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High-load capacity

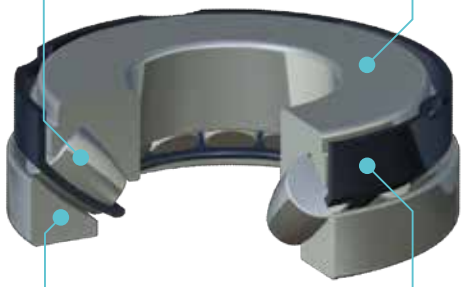
■Higher load capacity by using large-diameter rollers.
■Long life has been achieved by using high cleanliness steel.

Lower temperature rise and higher limiting speed

■Reduced sliding resistance is achieved through cage design optimization.
■Temperature rise is lowered through cage design optimization. Reduced temperature increase with grease lubrication, particularly on horizontal shaft applications when compared to conventional bearings.
■Reduced rotational torque is achieved by improving the surface finish of the end faces of the rollers.
■Higher limiting speed is achieved because of low temperature rise.

Roller
■High-load capacity by using large-diameter rollers.
■Reduced rotational torque is achieved by improving the surface finish of the end faces of the rollers.

Inner ring
■Even stress distribution is achieved by optimizing the curvature of the raceway surface.
■Capable of continuous operating temperatures up to 200°C.



Outer ring
■Uniform stress by optimizing the curvature of the raceway surface.
■Capable of continuous operating temperatures up to 200°C.

Stamped steel cage
■Reduced sliding resistance by optimizing the design.
■Can be used on horizontal shaft as well as on vertical shaft applications.

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Bearing number	Boundary dimensions(mm)				Basic dynamic load rating Ca (kN)	Basic static load rating Coa (kN)	Limiting speed(min^{-1})*		Reference dimensions(mm)					
	d	D	T	r(min)			Grease lubrication	Oil lubrication	d_1	D_1	B	B_1	C	A
29320EXS1	100	170	42	1.5	545	1,400	1,500	3,200	147.8	126	27	38.2	20.8	58
29322EXS1	110	190	48	2	695	1,730	1,300	2,700	165.4	140	30.9	44	23	64
29328EXS1	140	240	60	2.1	1,080	2,840	950	2,100	210.6	179	38.5	54.8	29	82

294SERIES

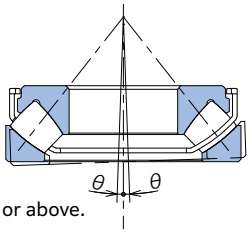
Bearing number	Boundary dimensions(mm)				Basic dynamic load rating Ca (kN)	Basic static load rating Coa (kN)	Limiting speed(min^{-1})*		Reference dimensions(mm)					
	d	D	T	r(min)			Grease lubrication	Oil lubrication	d_1	D_1	B	B_1	C	A
29412EXS1	60	130	42	1.5	445	915	1,800	3,600	113	87	27	37.1	20	38
29413EXS1	65	140	45	2	520	1,110	1,700	3,500	123	93.5	29.5	40	21	42
29414EXS1	70	150	48	2	610	1,350	1,600	3,100	128.3	98.4	32	42.7	23	44
29415EXS1	75	160	51	2	670	1,470	1,600	3,000	140	105.6	34.5	45.6	24	47
29416EXS1	80	170	54	2.1	760	1,630	1,500	2,700	149	113	36	48.2	26	50
29417EXS1	85	180	58	2.1	820	1,810	1,300	2,600	158.2	120.5	37	50.6	28	54
29418EXS1	90	190	60	2.1	935	2,080	1,300	2,400	162	127	40.5	53	29	56
29420EXS1	100	210	67	3	1,150	2,530	1,100	2,200	181	139	44.5	59.6	32	62
29422EXS1	110	230	73	3	1,350	3,150	950	1,900	199.6	153.4	48	64.4	35	69
29424EXS1	120	250	78	4	1,510	3,750	900	1,800	218	166.5	54	70.9	37	74
29426EXS1	130	270	85	4	1,750	4,300	850	1,500	236.4	181	56	75	41	81
29428EXS1	140	280	85	4	1,760	4,350	850	1,500	246	196	53.6	74.4	41	86
29430EXS1	150	300	90	4	2,130	5,150	800	1,400	265.4	207.5	58.5	80.8	44	92
29432EXS1	160	320	95	5	2,350	5,750	750	1,300	283.8	222	62.5	85.7	45	99
29434EXS1	170	340	103	5	2,560	6,550	700	1,200	299.7	237	67	91.1	50	104
29436EXS1	180	360	109	5	2,850	7,350	650	1,100	317	250	71.5	97.6	52	110
29438EXS1	190	380	115	5	3,200	8,250	600	1,000	334.5	264	77	102.3	55	117
29440EXS1	200	400	122	5	3,500	8,950	550	950	351.2	276	80	109	59	122

*Limiting speed is defined as follows.
●Oil lubrication When operated with a lubricant of VG32 viscosity supplied at a flowrate of 1 liter/min of circulating oil lubrication under 5% of the basic static load
●Grease lubrication When operated after filling 100% of the internal free space volume with an NLGI3 consistency grease under 5% of the basic static load capacity
With either lubrication method, the bearing temperature will increase differently if the operating conditions (applied load, rotating speed, lubricating conditions, etc.)
**In case of heavy applied loads (generally exceeding 10% Ca), the value of da should be high enough to support the inner ring flange. Consult NACHI.

Precautions for use

Permissible alignment angle

Under general service conditions, it is permissible to operate with up to a 2°misalignment angle θ. Note that this may be restricted depending on the machine structure surrounding the bearing.



Safety factor

Ensure that the safety factor So is normally 4 or above.

Permissible radial load

Ensure that the effective radial load is 50% or less of the axial load.

Minimum axial load

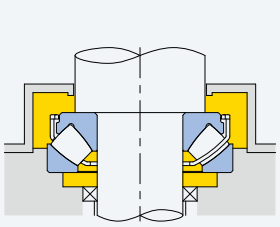
To prevent skidding between the rollers and raceway, the spherical roller thrust bearing must be always subjected to a minimum axial load. The minimum axial load Famin is as mentioned on the right.

$$Famin = \frac{Coa}{1000}$$

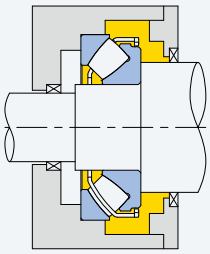
Precautions for Lubrication

The spherical roller thrust bearing design does not allow easy lubrication of the roller end face and the inner ring flange surface. Ensure that they are fully lubricated.When grease is used for lubrication, it is recommended to completely fill 100% of free space volume of the bearing and housing with grease as shown in the figure below.
(For the free space volume of the bearing, see the Dimension Table.)

100% fill the space volume with the grease in the part marked with yellow.



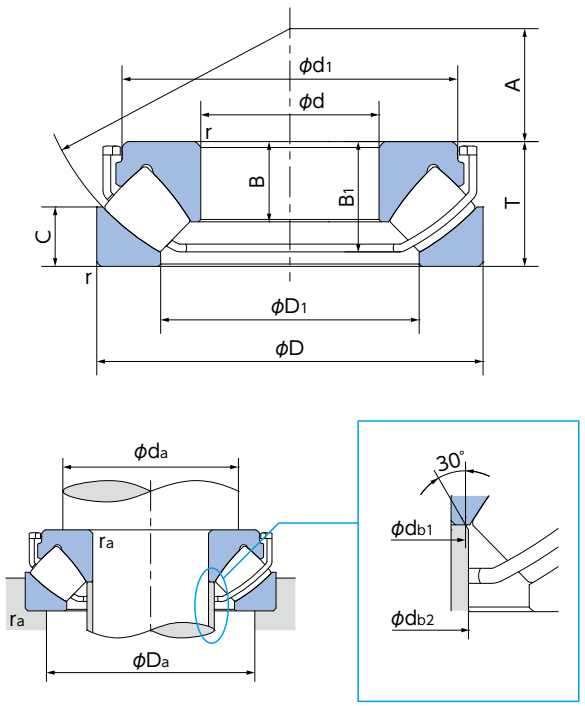
When used in a vertical shaft application



When used in a horizontal shaft application

	Abutment and fillet dimensions (mm)			Spacer dimensions (mm)		Mass (kg) (Reference)	Space volume (cm^3) (Reference)
	d_a** (min)	D_a (max)	r_a (max)	d_{b1} (max)	d_{b2} (min)		
	130	150	1.5	105	107	3.61	160
	145	165	2	116	117	5.22	240
	185	205	2	147.5	149	10.5	450

	Abutment and fillet dimensions (mm)			Spacer dimensions (mm)		Mass (kg) (Reference)	Space volume (cm^3) (Reference)
	d_a** (min)	D_a (max)	r_a (max)	d_{b1} (max)	d_{b2} (min)		
	91	108	1.5	66	66	2.5	120
	99	115	2	72	72	3.2	135
	106	125	2	75.5	77.5	3.82	175
	113	132	2	82.5	82.5	4.7	200
	120	140	2	88	88	5.6	240
	130	150	2	94	94	6.69	290
	135	157	2	99	99	7.83	320
	150	175	2.5	108	110	10.6	440
	165	190	2.5	119.5	120	14	550
	180	205	3	131	132	17.6	700
	195	225	3	141.5	143	22.3	890
	205	235	3	153	160	22.8	1,000
	220	250	3	163	169	27.8	1,200
	230	265	4	174.5	181	33.4	1,450
	245	285	4	185	185	41	1,800
	260	300	4	195	195	48.7	2,100
	275	320	4	204	205	57.4	2,450
	290	335	4	214	215	66.6	3,000



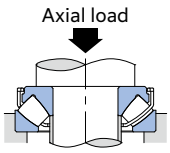
Dynamic equivalent axial load	Pa=Fa+1.2Fr
Static equivalent axial load	Poa=Fa+2.7Fr Fa:Axial load Fr:Radial load However Fr/Fa≦0.55

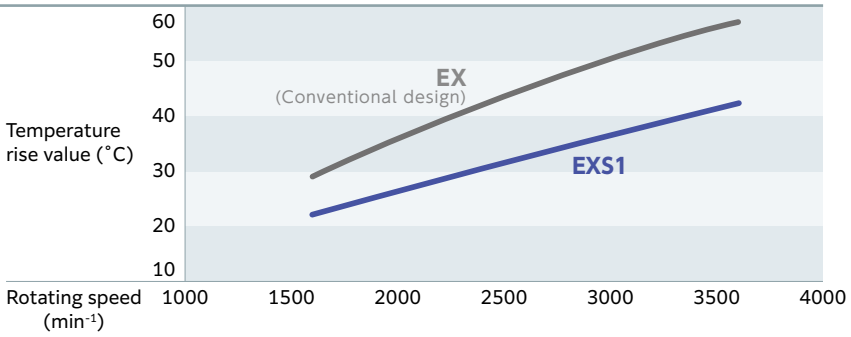
capacity(Coa), the rotating speed shall allow the outer ring temperature to operate at 80°C or less.
(Coa), the rotating speed shall allow the outer ring temperature to operate at 80°C or less.
vary. Select the appropriate limiting speed mentioned in the catalog.

Bearing performance

Vertical shaft temperature increase test

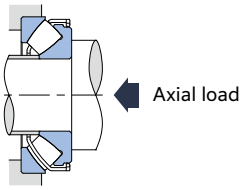
■Bearing number 29412EXS1 and 29412EX
■Axial load 22kN(5%Ca)
■Rotating speed 2000~3600min^{-1}
■Lubrication method Oil lubrication (Forced lubrication)

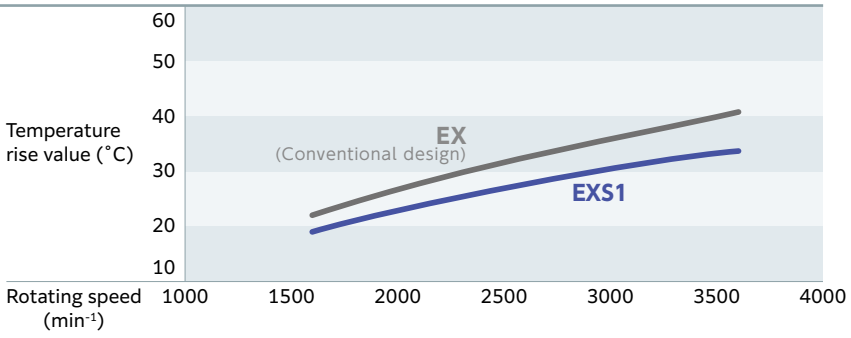




Horizontal shaft temperature rise test

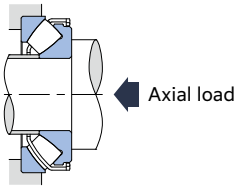
■Bearing number 29412EXS1 and 29412EX
■Axial load 22kN(5%Ca)
■Rotating speed 2000~3600min^{-1}
■Lubrication method Oil lubrication (Forced lubrication)

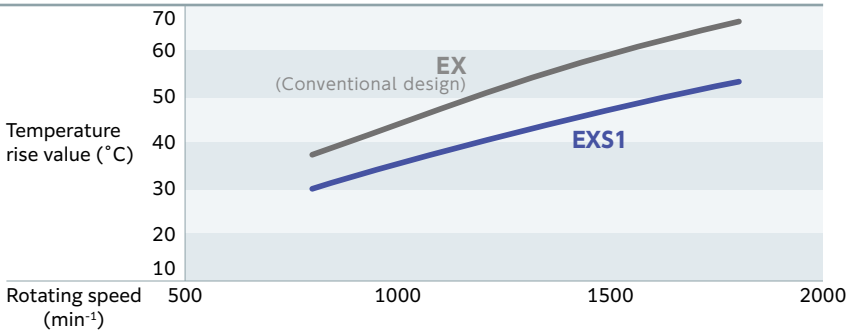




Horizontal shaft temperature rise test with grease lubrication

■Bearing number 29412EXS1 and 29412EX
■Axial load 22kN(5%Ca)
■Rotating speed 1000~1800min^{-1}
■Lubrication method Grease lubrication





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