

**Open Type**

**Sealed Type**

# **Ball Screw Support Bearings**



# NACHI High Precision and High Rigidity

**Ball Screw Support Bearings have the ability to achieve high precision and high performance on your applications**



NACHI Ball Screw Support Bearings have been improved to exceed new industrial demands for high precision and high speed requirements.

NACHI TAB type ball screw support bearings support precision actuators in a wide range of applications such as machine tools, precision measuring equipment, and robot technologies.

## Features

### High Axial Rigidity

Greater number of balls with polyamide cage achieves significantly increased rigidity compared with conventional angular contact ball bearing.

### Simple and Compact

The 60° contact angles allows the bearing to simultaneously carry the thrust load and certain amount of radial load. This characteristic allows you to have a simple and compact design.

### High Capacity and Low Noise

The use of large balls results in higher bearing capacity beyond what NACHI adopted with the poly-amide cage combined with the high performance, quiet operating, grease to achieve low noise.

### Energy Saving

Superior seal designs offer low starting and running torque; minimizing power loss.

### Easy Assembly

Initial bearing preloading provides for ease of assembly by eliminating complex assembly adjustment.

## Line up contact and non-contact design seals.

### Proper Seal Type is Available Corresponding to Various Applications.

Seal types include contact type, excelling in sealability, and non-contact type for decreasing torque loss and temperature rise. Can select the best seal type corresponding to application needs.

### Pre Pack Grease

Bearings are prepacked with high performance grease eliminating the need for additional grease packing during assembly.

### Compatible Dimensions with Current Bearings

Boundary dimensions are compatible with current open bearing enabling interchangeability with existing applications.

### Universal Ground Set Combinations (Flush Ground)

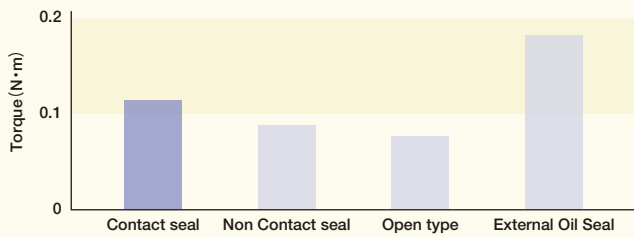
Universal ground set combination bearings are also available with a suffix U. This permits the use of random combinations where two or more bearings are mounted.





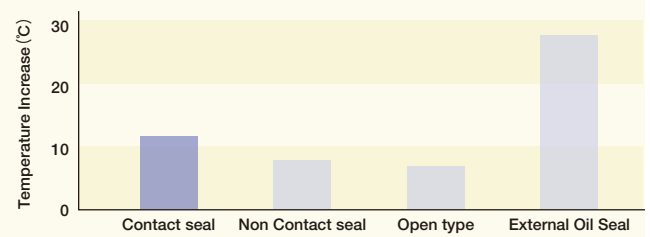
**Performance**

**Running Torque**



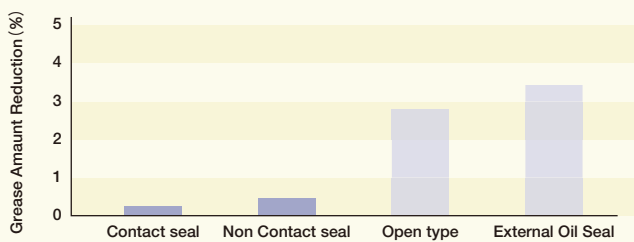
Running torque of contact type seal is 30% reduced, compare with external oil seal.

**Temperature Increase**



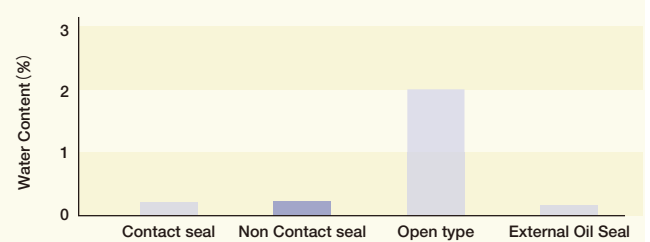
Temperature increase of contact type seal is half, compare with external oil seal.

**Grease Amount Reduction**



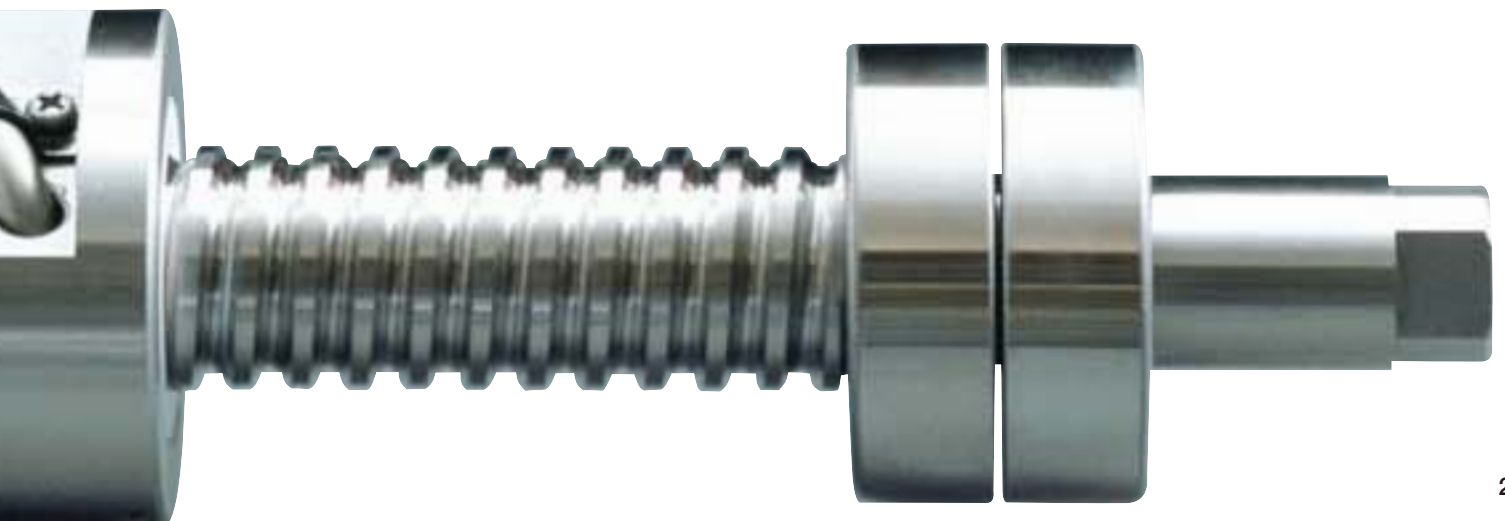
Contact/Non-contact type seal have good grease keeping capability.

**Water Resistance**



Water resistance performance of non-contact type seal is same as external oil seal.

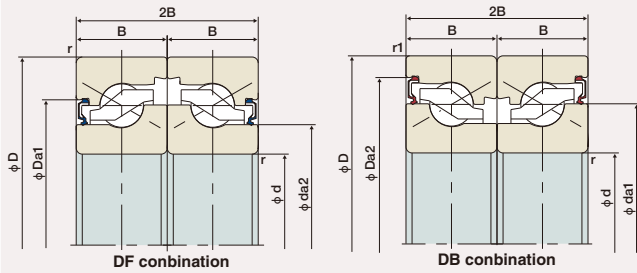
Test Conditions... ● Tested Bearings: 20TAB04DF (DB) -2LR ● Temperature: Room Temperature ● Speed: 1800min<sup>-1</sup> ● Grease: Multemp PS2 -2NK



## Dimensional Table

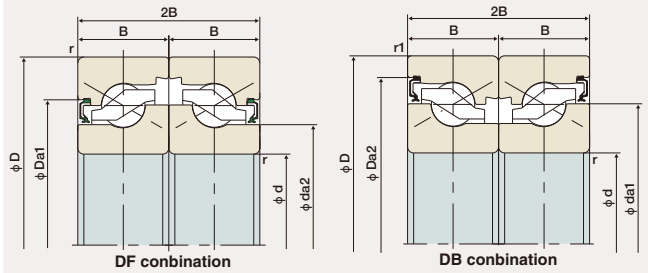


### ● With contact type seal (2LR)



(Seals are outside only for combination bearings)

### ● With non-contact type seal (2NK)



(Seals are outside only for combination bearings)

1N = 1/9.8kgf

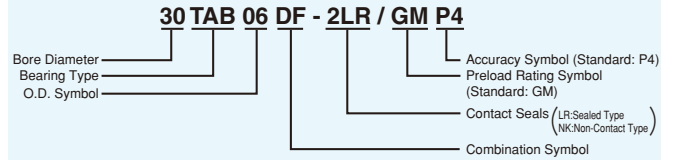
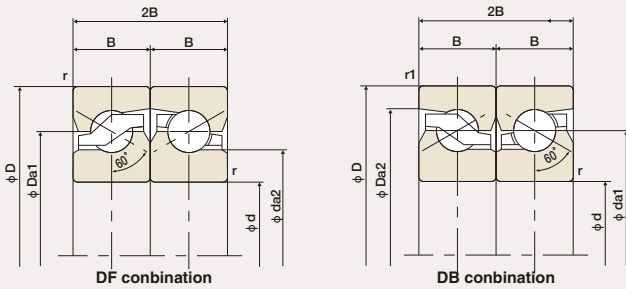
Bearing No.			Boundary Dimensions (mm)						Basic Dynamic Load Rating <sup>(2)</sup>
Contact Type	Non-Contact Type	Open Type	d	D	B	2B	r (min)	r <sub>1</sub> (min)	Ca (N)
15TAB04DF (DB) -2LR	15TAB04DF (DB) -2NK	15TAB04DF (DB)	15	47	15	30	1 <sup>(1)</sup>	0.6	25,900
17TAB04DF (DB) -2LR	17TAB04DF (DB) -2NK	17TAB04DF (DB)	17	47	15	30	1	0.6	25,900
20TAB04DF (DB) -2LR	20TAB04DF (DB) -2NK	20TAB04DF (DB)	20	47	15	30	1	0.6	25,900
25TAB06DF (DB) -2LR	25TAB06DF (DB) -2NK	25TAB06DF (DB)	25	62	15	30	1	0.6	29,900
30TAB06DF (DB) -2LR	30TAB06DF (DB) -2NK	30TAB06DF (DB)	30	62	15	30	1	0.6	29,900
35TAB07DF (DB) -2LR	35TAB07DF (DB) -2NK	35TAB07DF (DB)	35	72	15	30	1	0.6	32,500
40TAB07DF (DB) -2LR	40TAB07DF (DB) -2NK	40TAB07DF (DB)	40	72	15	30	1	0.6	32,500
40TAB09DF (DB) -2LR	40TAB09DF (DB) -2NK	40TAB09DF (DB)	40	90	20	40	1	0.6	65,000
		45TAB07DF (DB)	45	75	15	30	1	0.6	33,500
		45TAB10DF (DB)	45	100	20	40	1	0.6	68,000
		50TAB10DF (DB)	50	100	20	40	1	0.6	69,500
		55TAB10DF (DB)	55	100	20	40	1	0.6	69,500
		55TAB12DF (DB)	55	120	20	40	1	0.6	73,000
		60TAB12DF (DB)	60	120	20	40	1	0.6	73,000

Note (1) r (min) = 0.6 for inner ring.

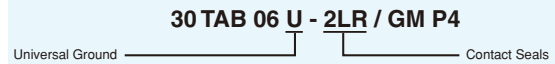
(2) When bearing sets carry axial load with two or three rows, the numbers should be multiplied by 1.64 or 2.16.

(3) When bearing sets carry axial load with two or three rows, the numbers should be multiplied by 2 or 3.

● Open Type



Universal Ground Type



**Dynamic Equivalent Axial Load**

$P_a = XFr + YFa$

No. of Bearing in set	2		3			4				
	1	2	1	2	3	1	2	3	4	
Brgs Loaded Axial Load	X	1.9	—	1.43	2.33	—	1.17	2.33	2.53	—
	Y	0.54	—	0.77	0.35	—	0.89	0.35	0.26	—
Fa/Fr > e	X	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	Y	1	1	1	1	1	1	1	1	1

e = 2.17

	Permissible Thrust Load <sup>(3)</sup> Coa (N)	Limiting Speed (rpm) Grease Lubrication		Starting Torque (N-cm) Grease Lubrication Open Type Non-Contact Type	Abutment and Fillet Dimensions (mm)								Mass (kg) (1pc.) (Ref.)
		Sealed Type	Open Type		Sealed Type				Open Type				
					da1	da2	Da1	Da2	da1	da2	Da1	Da2	
	32,000	4,400	6,300	15	33.7	26.8	35	41.9	33.7	26.8	33.5	41	0.14
	32,000	4,400	6,300	15	33.7	26.8	35	41.9	33.7	26.8	33.5	41	0.13
	32,000	4,400	6,300	15	33.7	26.8	35	41.9	33.7	26.8	33.5	41	0.12
	46,400	3,250	4,650	20	46.2	39.7	47.5	54.9	46.2	39.7	46	53.4	0.24
	46,400	3,250	4,650	20	46.2	39.7	47.5	54.9	46.2	39.7	46	53.4	0.21
	54,300	2,600	3,750	25	56.2	49.7	57.5	64.9	56.2	49.7	56	63.4	0.29
	54,300	2,600	3,750	25	56.2	49.7	57.5	64.9	56.2	49.7	56	63.4	0.26
	101,000	2,200	3,150	30	67.2	57.2	68.5	79.9	67.2	57.2	67	78.4	0.62
	595,000		3,400	50					61.7	55.2	61.5	68.9	0.25
	113,000		2,850	60					74.2	64.2	74	85.4	0.79
	119,000		2,700	65					78.2	68.2	78	89.4	0.72
	119,000		2,700	65					78.2	68.2	78	89.4	0.65
	137,000		2,300	70					92.2	82.2	92	103.4	1.15
	137,000		2,300	70					92.2	82.2	92	103.4	1.08



## Tolerances for Inner Ring

Nominal Bearing Bore Diameter (mm)		Single Plane Mean Bore Diameter Variation $\Delta_{dmp}, \Delta_{ds}$				Bore Diameter Variation in a Single Radial Plane $V_{Dp}$		Mean Bore Diameter Variation $V_{Dmp}$		Deviation of a Single Inner Ring Width (or a Single Outer Ring Width) $\Delta_{BS} (\Delta_{CS})$			
		P5		P4		P5	P4	P5	P4	P5		P4	
Over	Incl.	High	Low	High	Low	(Max)	(Max)	(Max)	(Max)	High	Low	High	Low
10	18	0	-5	0	-4	4	3	3	2	0	-80	0	-80
18	30	0	-6	0	-5	5	4	3	2.5	0	-120	0	-120
30	50	0	-8	0	-6	6	5	4	3	0	-120	0	-120
50	80	0	-9	0	-7	7	5	5	3.5	0	-150	0	-150

Note (1) These deviations are for single bearing. For combination bearings, multiply these values by row number.

## Tolerances for Outer Ring

Nominal Bearing Outside Diameter (mm)		Single Plane Mean Outside Diameter Variation of Outer Ring $\Delta_{Dmp}, \Delta_{DS}$				Outside Diameter Variation in a Single Radial Plane $V_{Dp}$		Mean Outside Diameter Variation $V_{Dmp}$		Width Deviation $V_{CS}$ of Outer Ring $V_{CS}$	
		P5		P4		P5	P4	P5	P4	P5	P4
Over	Incl.	High	Low	High	Low	(Max)	(Max)	(Max)	(Max)	(Max)	(Max)
30	50	0	-7	0	-6	5	5	4	3	5	2.5
50	80	0	-9	0	-7	7	5	5	3.5	6	3
80	120	0	-10	0	-8	8	6	5	4	8	4

## Preload and Axial Spring Constant

1N = 1/9.8kgf

Bearing No.	Preload M (N)				Axial Spring Constant (N/ $\mu$ m)			
	DF	BFF	BBFF	BFFF	DF	BFF	BBFF	BFFF
	DB	FFB	FFBB	FFFB	DB	FFB	FFBB	FFFB
15TAB04	2,160	2,940	4,310	3,430	735	1,080	1,470	1,320
17TAB04	2,160	2,940	4,310	3,430	735	1,080	1,470	1,320
20TAB04	2,160	2,940	4,310	3,430	735	1,080	1,470	1,320
25TAB06	3,330	4,510	6,670	5,200	981	1,470	1,960	1,910
30TAB06	3,330	4,510	6,670	5,200	981	1,470	1,960	1,910
35TAB07	3,920	5,300	7,840	6,180	1,230	1,770	2,350	2,300
40TAB07	3,920	5,300	7,840	6,180	1,230	1,770	2,350	2,300
40TAB09	5,200	7,060	10,400	8,140	1,320	1,910	2,550	2,500
45TAB07	4,120	5,590	8,240	6,470	1,270	1,910	2,550	2,500
45TAB10	5,980	8,140	12,000	9,410	1,470	2,160	2,890	2,790
50TAB10	6,280	8,530	12,600	9,810	1,520	2,260	3,040	2,940
55TAB10	6,280	8,530	12,600	9,810	1,520	2,260	3,040	2,940
55TAB12	7,060	9,610	14,100	11,100	1,770	2,550	3,480	3,380
60TAB12	7,060	9,610	14,100	11,100	1,770	2,550	3,480	3,380

## Basic Dynamic Load Rating

Bearing No.	In Case of Single Row	In Case of Double Rows	In Case of Triple Rows
	Single Brg., DF, DB	DT, BFF, FFB, BBFF, FFBB	FFF, BFFF, FFFB
15TAB04	25,900	42,000	56,000
17TAB04	25,900	42,000	56,000
20TAB04	25,900	42,000	56,000
25TAB06	29,900	48,500	64,500
30TAB06	29,900	48,500	64,500
35TAB07	32,500	53,000	70,000
40TAB07	32,500	53,000	70,000
40TAB09	65,000	105,000	140,000
45TAB07	33,500	54,500	72,500
45TAB10	68,000	111,000	147,000
50TAB10	69,500	113,000	150,000
55TAB10	69,500	113,000	150,000
55TAB12	73,000	119,000	158,000
60TAB12	73,000	119,000	158,000

Unit:  $\mu\text{m}=0.001\text{mm}$

Width Deviation $V_{BS}$ of Inner Ring		Radial Runout of Assembled Bearing Inner Ring		Side Face Runout $S_d$ with Reference to Bore		Side Face Runout with Reference to Raceway of Assembled Bearing Inner Ring $S_{ia}$ and of Assembled Bearing Outer Ring $S_{ea}$		Nominal Bearing Bore Diameter (mm)	
P5	P4	P5	P4	P5	P4	P5	P4	Over	Incl.
(Max)	(Max)	(Max)	(Max)	(Max)	(Max)	(Max)	(Max)		
5	2.5	4	2.5	7	3	4	2	10	18
5	2.5	4	3	8	4	5	2.5	18	30
5	3	5	4	8	4	6	2.5	30	50
6	4	5	4	8	5	7	2.5	50	80

Unit:  $\mu\text{m}=0.001\text{mm}$

Radial Runout of Assembled Bearing Outer Ring		Outside Inclination of Outer Ring		Nominal Bearing Outside Diameter (mm)	
P5	P4	P5	P4	Over	Incl.
(Max)	(Max)	(Max)	(Max)		
7	5	8	4	30	50
8	5	8	4	50	80
10	6	9	5	80	120

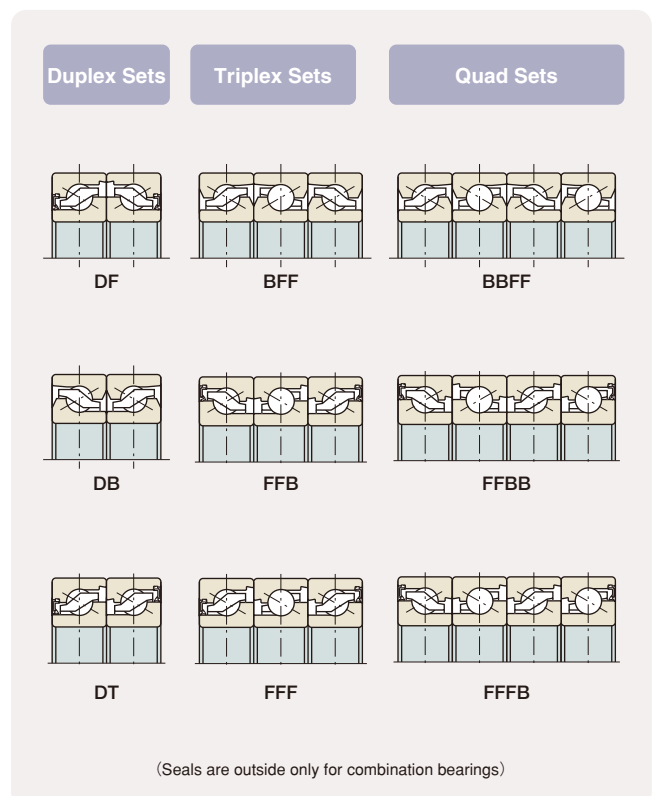
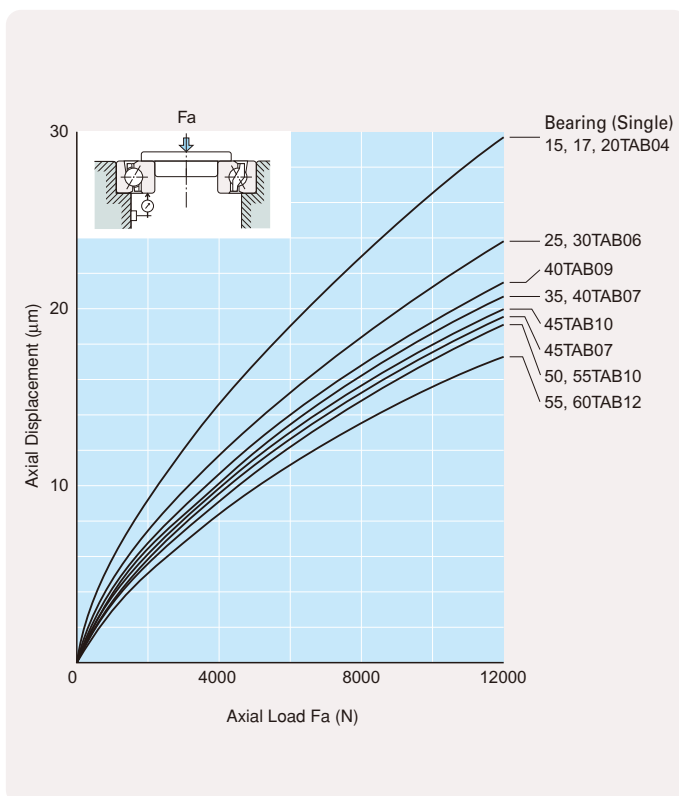
## Shaft and Housing Tolerance

① For the fit, refer to the following table.

Shaft Fit	h5
Housing Fit	H6

② For the squareness of a shoulder, refer to the following table.

Dimensions of Shaft Diameter and Housing Bore Diameter (mm)		Squareness ( $\mu\text{m}$ )
Over	Incl.	
—	80	4
80	120	5



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