

B-3-2.3 Deflector(bridge) Type Ball Screws

1. Features

The deflector(bridge) type has the smallest ball nut compared to the other recirculation systems, and suitable for fine lead operation.

2. Specifications

(1) Ball recirculation system

It has a small ball nut outside diameter, and suits for small lead ball screws. **Fig.1** shows the structure of the deflector(bridge) recirculation system.

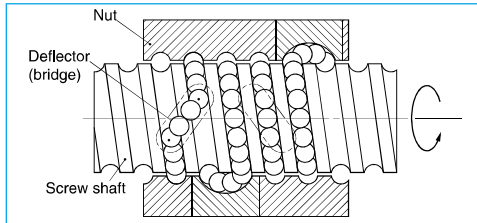


Fig. 1 Structure of deflector(bridge) recirculation system

(2) Accuracy grade and axial play

The available standard accuracy grade and axial play are shown in **Table 1**. Please consult NSK for other grades.

(3) Allowable d·n value and the criterion of maximum rotational speed

The allowable d·n value and criterion of maximum rotational speed are shown below. Please consult NSK if the rotational speed exceeds the permissible range below. Basic measure must be taken for the high speed ball screws respectively.

Allowable d·n value:

Standard specification ; 84 000 or less

High-speed specification; 100 000 or less

Standard of rotational speed : 3 000 min⁻¹

Note: Please also review the critical speed. Refer to "Technical Description: Permissible Rotational Speed" (page B47) for details.

(4) Other specifications

Please consult NSK for other specifications not listed in the dimension tables.

Table 1 Accuracy grade and axial play

Accuracy grade	C0, C1, C2, C3, C5, Ct7 (Ct7 is not included in DFD)
Axial play	Z, 0 mm (preloaded); T, 0.005 mm or less S, 0.020 mm or less; N, 0.050 mm or less

Table 2 Deflector(bridge) type ball screw product categories

Nut model	Shape	Flange shape	Preload system
MSFD		Flanged Circular III	Non-preload, Slight axial play
MPFD			P-preload (light preload) no spacer ball
SFD		Screw shaft diameter of 16 mm or smaller: Flanged Screw shaft diameter of 20 mm or smaller: Rectangle Circular I, II	Non-preload, Slight axial play
ZFD		Flanged Circular I, II	Z-preload (medium preload)
DFD		Flanged Circular I, II	D-preload (medium preload) (heavy preload)

3. Product categories

There are four different preload systems (Table 2). Synthetic resin that shows superb characteristics against wear is used in the recirculation deflector (bridge) for MSFD, MPFD, and has enhanced the smooth recirculation of balls. This product is being applied for a patent.

4. Design Precautions

When designing the screw shaft end, one end of the screw must meet either one of the following conditions. If not, we cannot install the ball nut on the screw shaft.

- Cut the ball groove through to the shaft end.

- The diameters of bearing journals and the gear or pulley seat must be less than the root diameter of ball groove "dr" specified on the dimension table.

For general precautions regarding ball screws, refer to "Design Precautions" (page B83) and "Handling Precautions" (page B103).

5. Structure of model number and reference number

The followings describe the structure of "Model number" and "Reference number for ball screw".

◇Model number

SFD 40 08 - 4

Nut model:
SFD, ZFD, DFD
MSFD, MPFD
Screw shaft diameter (mm)

40 08
Screw shaft diameter (mm)
Effective threaded length (in the unit of 100 mm)

- 4
Effective turns of balls (Note)
Lead (mm)

Note: In case of ZFD, the number here is twice as large as the effective turns of balls.

◇Reference number for ball screw

W 40 08 - ** D Y - C3 Z 5

Product code
W
Screw shaft diameter (mm)
Effective threaded length (in the unit of 100 mm)
NSK design serial number
Preload code:
No code, non-preload;
Z, Z-preload; D, D-preload; P, P-preload (page B5)

40 08
Screw shaft diameter (mm)
Effective threaded length (in the unit of 100 mm)

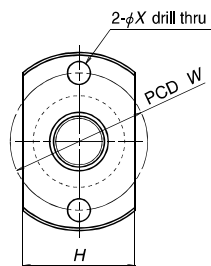
- **
Effective turns of balls (Note)
Lead (mm)

D Y
Preload code:
No code, non-preload;
Z, Z-preload; D, D-preload; P, P-preload (page B5)

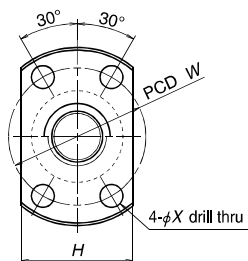
- C3 Z 5
Axial play code:
Z, T, S, N (page B20)
Accuracy grade code:
C0, C1, C2, C3, C5, C7(Ct7) (page B37 to B42)
Deflector(bridge) recirculation system

Deflector(bridge) type

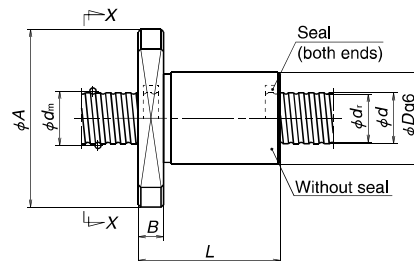
View X-X



Lead $l = 0.5$ mm



Lead $l > 1$ mm



Unit: mm

Model No.	Preload system	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective turns of balls Turns × Circuits	Basic load rating (N)	
								Dynamic C_d	Static C_{0s}
MSFD 0400.5-3	Clearance P	4	0.5	0.400	4.1	3.6	1×3	170	280
MPFD 0400.5-3									
MSFD 0401-2	Clearance P	4	1	0.800	4.2	3.2	1×2	315	370
MPFD 0401-2									
MSFD 0600.5-3	Clearance P	6	0.5	0.400	6.1	5.6	1×3	205	430
MPFD 0600.5-3									
MSFD 0601-3	Clearance P	6	1	0.800	6.2	5.2	1×3	575	925
MPFD 0601-3									
MSFD 0602-3	Clearance P	6	2	0.800	6.2	5.2	1×3	575	925
MPFD 0602-3									
MSFD 0800.5-3	Clearance P	8	0.5	0.400	8.1	7.6	1×3	230	595
MPFD 0800.5-3									
MSFD 0801-3	Clearance P	8	1	0.800	8.2	7.2	1×3	670	1 290
MPFD 0801-3									
MSFD 0801.5-3	Clearance P	8	1.5	1.000	8.3	7.0	1×3	1 080	1 980
MPFD 0801.5-3									
MSFD 0802-3	Clearance P	8	2	1.200	8.3	6.9	1×3	1 320	2 210
MPFD 0802-3									
MSFD 1001-3	Clearance P	10	1	0.800	10.2	9.2	1×3	745	1 660
MPFD 1001-3									
MSFD 1002-3	Clearance P	10	2	1.200	10.3	8.9	1×3	1 490	2 850
MPFD 1002-3									
MSFD 1002.5-3	Clearance P	10	2.5	1.588	10.4	8.6	1×3	2 130	3 640
MPFD 1002.5-3									
MSFD 1201-3	Clearance P	12	1	0.800	12.2	11.2	1×3	795	1 980
MPFD 1201-3									
MSFD 1202-3	Clearance P	12	2	1.200	12.3	10.9	1×3	1 660	3 620
MPFD 1202-3									
MSFD 1202.5-3	Clearance P	12	2.5	1.588	12.4	10.6	1×3	2 360	4 540
MPFD 1202.5-3									
MSFD 1203-3	Clearance P	12	3	2.000	12.5	10.2	1×3	3 120	5 420
MPFD 1203-3									
MSFD 1402-3	Clearance P	14	2	1.200	14.3	12.9	1×3	1 780	4 270
MPFD 1402-3									
MSFD 1403-3	Clearance P	14	3	2.000	14.5	12.2	1×3	3 400	6 490
MPFD 1403-3									

Notes: 1. If the shaft OD is less than 6 mm or the lead is less than 1 mm, a seal is not installed in the nut. (See page B68 for dust protection.)

2. Ball nuts with shaft diameters under 14 mm do not have oil holes.

3. Right turn screw is standard. Please consult NSK for left turn screw.

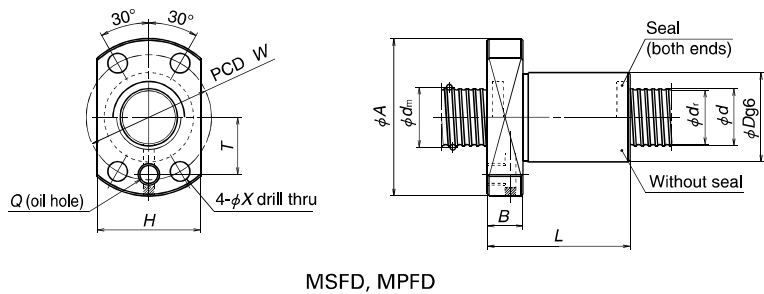
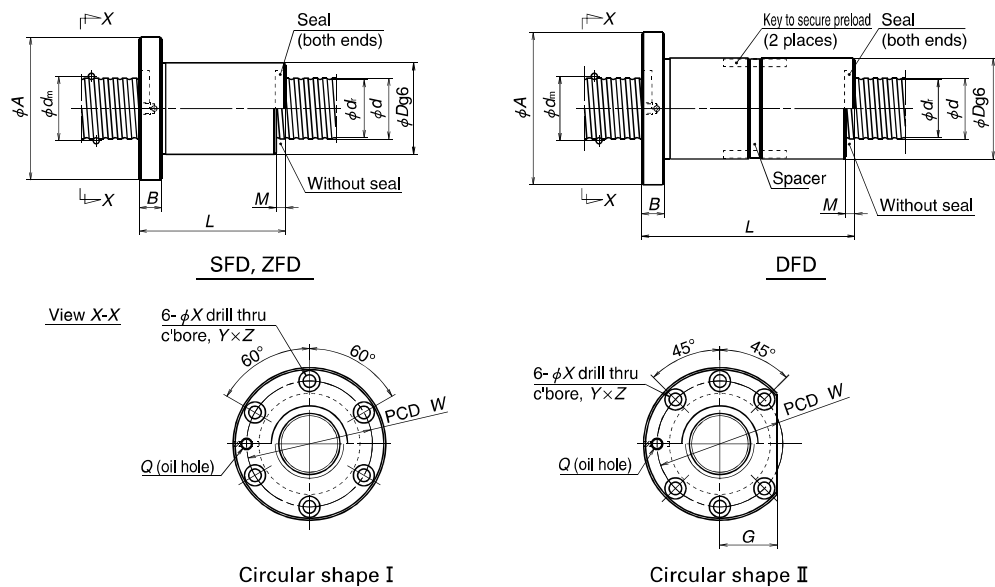
Axial rigidity K (N/μm)	Ball nut dimensions						
	Nut entire length L	Nut diameter D	Flanged diameter A	Flanged width B	Flanged dimension H	Bolt hole dimension X	Bolt hole PCD W
30	13	10	22	3	11	3.4	16
47	12	10	20	3	14	2.9	15
22	13	12	24	3	13	3.4	18
34	15	12	24	3.5	16	3.4	18
42	17	13	25	4	17	3.4	19
66	13	14	27	3	15	3.4	21
49	16	14	27	4	18	3.4	21
76	22	15	28	4	19	3.4	22
49	26	16	29	4	20	3.4	23
76	16	16	29	4	20	3.4	23
54	28	18	35	5	22	4.5	27
85	32	19	36	5	23	4.5	28
64	16	18	31	4	22	3.4	25
99	28	20	37	5	24	4.5	29
76	32	21	38	5	25	4.5	30
117	36	22	39	5	26	4.5	31
73	29	22	41	6	26	5.5	32
113	37	24	43	6	28	5.5	34
77	16	16	29	4	20	3.4	23
120	28	18	35	5	22	4.5	27
91	32	19	36	5	23	4.5	28
138	16	18	31	4	22	3.4	25
90	28	20	37	5	24	4.5	29
140	32	21	38	5	25	4.5	30
88	36	22	39	5	26	4.5	31
137	29	22	41	6	26	5.5	32
108	37	24	43	6	28	5.5	34
168	16	18	31	4	22	3.4	25
107	28	20	37	5	24	4.5	29
167	32	21	38	5	25	4.5	30
107	36	22	39	5	26	4.5	31
166	29	22	41	6	26	5.5	32
122	37	24	43	6	28	5.5	34
191	16	18	31	4	22	3.4	25
127	28	20	37	5	24	4.5	29
196	32	21	38	5	25	4.5	30

4. The axial rigidity K in the table above is a theoretical value obtained from the elastic deformation between screw groove and ball when the axial load is 30% of the basic dynamic load rating (C_d) with non-preload, 10% with D-preload, and 5% with P-preload. Refer to "Technical Description" (page B37) if the axial load and preload differ from the conditions above, or when the deformation of the ball nut body must be considered.

5. The models marked with * (asterisk) are available in the MA type standard ball screw with finished shaft end.

6. Preload system: P; Oversize ball preload (See page B5.)

Deflector(bridge) type



Model No.	Preload system	Shaft dia. <i>d</i>	Lead <i>l</i>	Ball dia. <i>D_w</i>	Ball circle dia. <i>d_m</i>	Root dia. <i>d_r</i>	Effective turns of balls Turns × Circuits	Basic load rating (N)		Axial rigidity <i>K</i> (N/μm)
								Dynamic <i>C_a</i>	Static <i>C_{0a}</i>	
MSFD 1602-4	Clearance P	16	2	1.588	16.4	14.6	1×4	3 510	8 450	185
MPFD 1602-4	Clearance P									288
MSFD 1602.5-4	Clearance P	20	2.5	1.588	16.4	14.6	1×4	3 510	8 450	185
MPFD 1602.5-4	Clearance P									288
MSFD 2002-4	Clearance P	20	2	1.588	20.4	18.6	1×4	3 910	10 900	225
MPFD 2002-4	Clearance P									351
SFD 2005-3	Clearance Z	20	5	3.175	20.75	17.4	1×3	8 620	17 500	196
ZFD 2005-6	Clearance Z						1×3	8 620	17 500	382
SFD 2005-4	Clearance D	20	5	3.175	20.75	17.4	1×4	11 000	23 300	255
DFD 2005-4	Clearance D						1×4	11 000	23 300	509
SFD 2006-3	Clearance Z	20	6	3.969	21	16.9	1×3	11 100	20 600	196
ZFD 2006-6	Clearance Z						1×3	11 100	20 600	382
SFD 2006-4	Clearance D	20	6	3.969	21	16.9	1×4	14 300	27 500	255
DFD 2006-4	Clearance D						1×4	14 300	27 500	498
MSFD 2502-4	Clearance P	25	2	1.588	25.4	23.6	1×4	4 310	13 900	273
MPFD 2502-4	Clearance P									425
SFD 2505-3	Clearance Z	25	5	3.175	25.75	22.4	1×3	9 790	22 900	245
ZFD 2505-6	Clearance Z						1×3	9 790	22 900	480
SFD 2505-4	Clearance D	25	5	3.175	25.75	22.4	1×4	12 500	30 500	323
DFD 2505-4	Clearance D						1×4	12 500	30 500	630
SFD 2506-3	Clearance Z	25	6	3.969	26	21.9	1×3	12 900	27 300	245
ZFD 2506-6	Clearance Z						1×3	12 900	27 300	470
SFD 2506-4	Clearance D	25	6	3.969	26	21.9	1×4	16 500	36 500	323
DFD 2506-4	Clearance D						1×4	16 500	36 500	626
SFD 2510-4	Clearance Z	25	10	4.762	26.25	21.3	1×2	11 400	21 400	323
ZFD 2510-3	Clearance Z						1×2	11 400	21 400	323
DFD 2510-3	Clearance D						1×3	16 100	32 000	245
DFD 2510-3	Clearance D						1×3	16 100	32 000	479

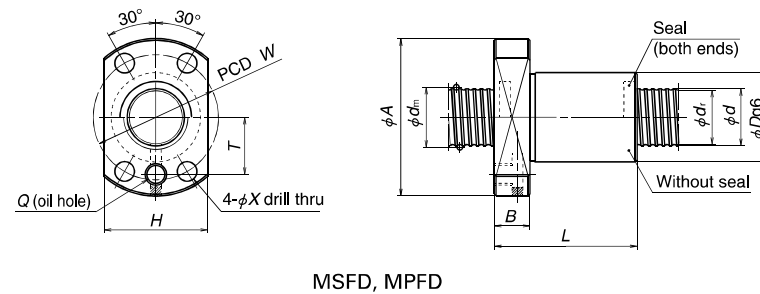
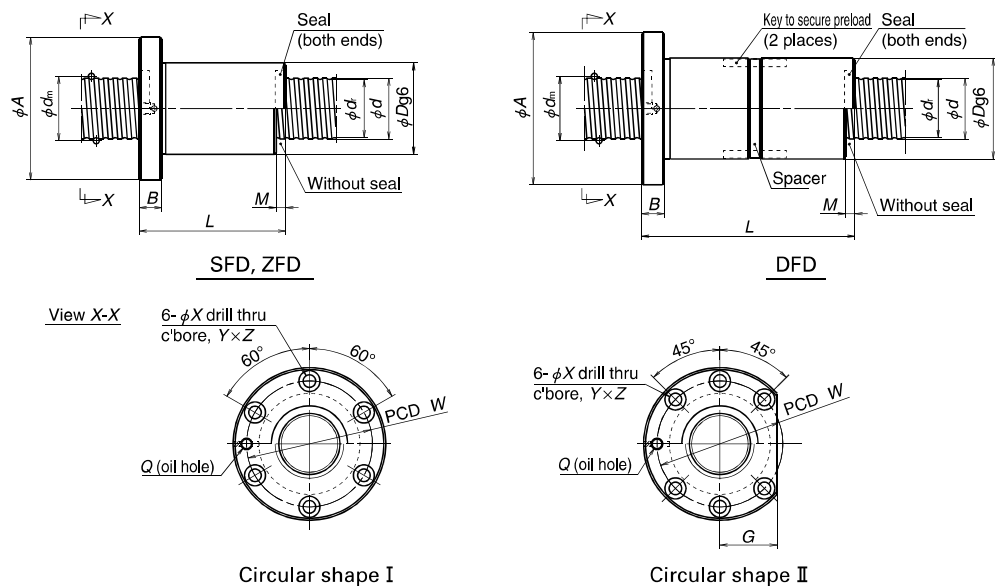
Ball nut dimensions												
Nut entire length <i>L</i>	Nut diameter <i>D</i>	Flanged diameter <i>A</i>	Flanged width <i>B</i>	Notched flange		Seal dimension <i>M</i>	Bolt hole dimension			Bolt hole PCD <i>W</i>	Oil hole dimension <i>T</i>	Oil hole <i>Q</i>
				<i>G</i>	<i>H</i>		<i>X</i>	<i>Y</i>	<i>Z</i>			
40	25	44	10	—	29	—	5.5	—	—	35	16	M6×1
44	25	44	10	—	29	—	5.5	—	—	35	16	M6×1
40	30	49	10	—	34	—	5.5	—	—	40	18.5	M6×1
46	35	58	11	22.5	—	5	5.5	9.5	5.5	46	—	M6×1
66	35	58		22.5						46		
51	35	58	11	22.5	—	6	5.5	9.5	5.5	46	—	M6×1
91	41	64		25						52		
52	35	58	11	22.5	—	6	5.5	9.5	5.5	46	—	M6×1
76	35	58		22.5						46		
60	35	58	11	22.5	—	6	5.5	9.5	5.5	46	—	M6×1
108	42	65		25						53		
40	36	55	10	—	40	—	5.5	—	—	46	21.5	M6×1
46	40	63	11	24	—	5	5.5	9.5	5.5	51	—	M6×1
66	40	63		24						51		
51	40	63	11	24	—	6	5.5	9.5	5.5	51	—	M6×1
91	46	69		26						57		
52	40	63	11	24	—	6	5.5	9.5	5.5	51	—	M6×1
76	40	63		24						51		
60	40	63	11	24	—	10	6.6	11	6.5	55	—	M6×1
108	47	70		27						58		
88	42	69	15	26	—	10	6.6	11	6.5	55	—	M6×1
80	42	69		26						55		
140	47	74	15	28	—	10	6.6	11	6.5	60	—	M6×1

Notes: 1. Nut comes in circular shape I and circular shape II for shaft diameter 20 mm or larger. Select a flange that is suitable for the space available for nut installation.
 2. If there is no seal for SFD, ZFD, and DFD, the nut length "L" is shortened by dimension "M". For MSFD and MPFD, the nut length is the same as those with seal.
 3. The right turn screw is standard. "L" is added to the end of the model code for the left turn screw. Please consult NSK for MSFD and MPFD.

4. The axial rigidity *K* in the table above is a theoretical value obtained from the elastic deformation between screw groove and ball when the axial load is 30% of the basic dynamic load rating (*C_a*) with non-preload, 10% with D-preload, and 5% with P-preload. Refer to "Technical Description" (page B37) if the axial load and preload differ from the conditions above, or when the deformation of the ball nut body must be considered.
 5. It is recommended to use with seals when the shaft diameter is 16 mm or over and an oil hole is provided on the ball nut.
 6. The models marked with * (asterisk) are available in the MA type standard ball screw with finished shaft end.
 7. Preload system: Z, Offset preload; P, Oversize ball preload; D, Double nut preload (See page B5).

Deflector(bridge) type

Deflector(bridge) type



Unit: mm

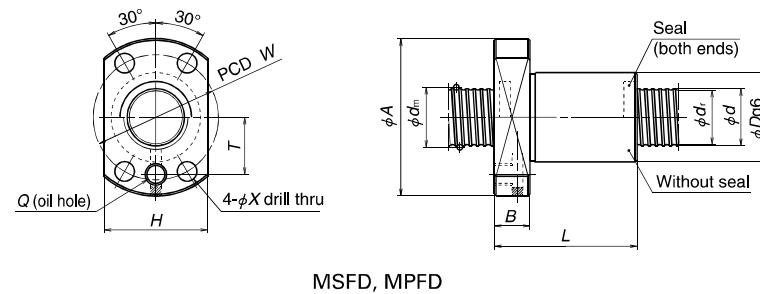
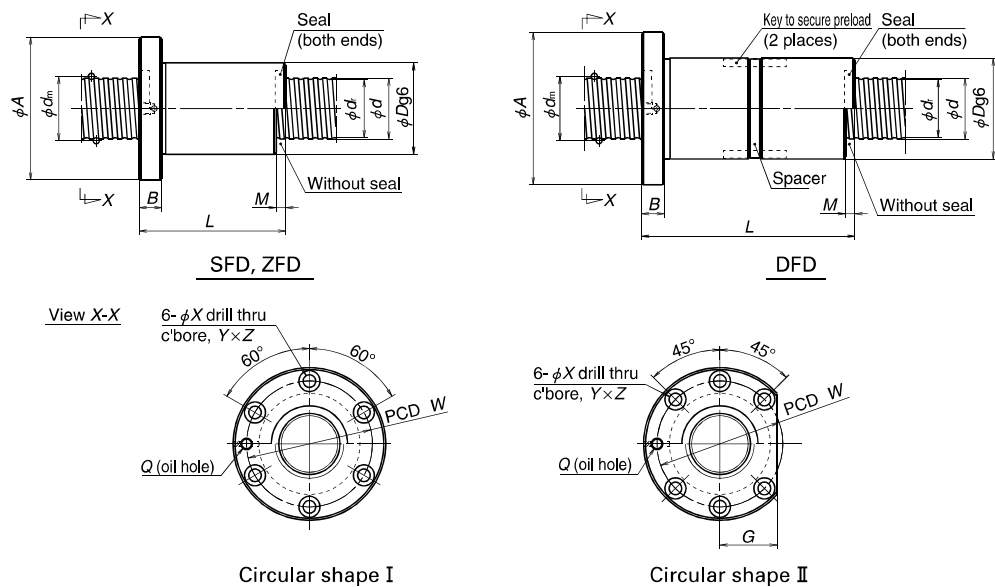
Model No.	Preload system	Shaft dia. <i>d</i>	Lead <i>l</i>	Ball dia. <i>D_w</i>	Ball circle dia. <i>d_m</i>	Root dia. <i>d_r</i>	Effective turns of balls Turns × Circuits	Basic load rating (N)		Axial rigidity <i>K</i> (N/μm)
								Dynamic <i>C_d</i>	Static <i>C_s</i>	
MSFD 3202-6	Clearance	32	2	1.588	32.4	30.6	1×6	6 790	27 200	494
MPFD 3202-6	P									769
SFD 3205-3	Clearance		5	3.175	32.75	29.4	1×3	11 100	30 500	304
ZFD 3205-6	Z									598
SFD 3205-4	Clearance		6	3.969	33	28.9	1×4	14 200	40 700	409
ZFD 3205-8	Z									784
SFD 3205-6	Clearance		8	4.762	33.25	28.3	1×6	20 200	61 000	588
DFD 3205-6	D									1 160
SFD 3206-3	Clearance		10	6.35	33.75	27.1	1×3	15 000	37 500	314
ZFD 3206-6	Z									608
SFD 3206-4	Clearance		15	7.62	34.5	26.5	1×4	19 200	49 900	412
ZFD 3206-8	Z									804
SFD 3206-6	Clearance		20	8.91	35.5	25.5	1×6	27 200	74 900	598
DFD 3206-6	D									1 190
SFD 3208-3	Clearance		25	10.5	36.5	24.5	1×3	18 300	41 800	304
ZFD 3208-6	Z									588
SFD 3208-4	Clearance	30	12.7	37.5	23.5	1×4	23 500	55 800	392	
ZFD 3208-8	Z								774	
SFD 3210-3	Clearance	35	15.0	38.5	22.5	1×3	25 900	52 800	300	
ZFD 3210-6	Z								588	
SFD 3210-4	Clearance	40	18.0	39.5	21.5	1×4	33 200	70 300	392	
DFD 3210-4	D								773	

Notes: 1. Nut comes in circular shape I and circular shape II for shaft diameter 20 mm or larger. Select a flange that is suitable for the space available for nut installation.
 2. If there is no seal for SFD, ZFD, and DFD, the nut length "L" is shortened by dimension "M". For MSFD and MPFD, the nut length is the same as those with seal.
 3. The right turn screw is standard. "L" is added to the end of the model code for the left turn screw. Please consult NSK for MSFD and MPFD.

Ball nut dimensions													
Nut entire length <i>L</i>	Nut diameter <i>D</i>	Flanged diameter <i>A</i>	Flanged width <i>B</i>	Notched flange		Seal dimension <i>M</i>	Bolt hole dimension			Bolt hole PCD <i>W</i>	Oil hole dimension <i>T</i>	Oil hole <i>Q</i>	
				<i>G</i>	<i>H</i>		<i>X</i>	<i>Y</i>	<i>Z</i>				
50	42	65	10	—	46	—	6.6	—	—	54	26.5	M6×1	
47	48	75	12	29	—	5	6.6	11	6.5	61	—	M6×1	
67	48	75		29						61			
52	48	75		29						61			
77	48	75		29						61			
62	48	75	29	61	6	6.6	11	6.5	61	—	M6×1		
112	53	80	30	66									
53	48	75	29	61									
77	48	75	29	61									
61	48	75	12	29	—	6	6.6	11	6.5	61	—	M6×1	
90	48	75	29	61									
73	48	75	29	61									
133	54	81	31	67									
67	50	84	15	32	—	8	9	14	8.5	66	—	M6×1	
99													66
76													66
116													66
80	54	88	15	34	—	10	9	14	8.5	70	—	M6×1	
120													70
90													70
160													70

4. The axial rigidity *K* in the table above is a theoretical value obtained from the elastic deformation between screw groove and ball when the axial load is 30% of the basic dynamic load rating (*C_d*) with non-preload, 10% with D-preload, and 5% with P-preload. Refer to "Technical Description" (page B37) if the axial load and preload differ from the conditions above, or when the deformation of the ball nut body must be considered.
 5. It is recommended to use with seals when the shaft diameter is 16 mm or over and an oil hole is provided on the ball nut.
 6. The models marked with * (asterisk) are available in the SS type standard ball screw with finished shaft end.
 7. Preload system: Z, Offset preload; P, Oversize ball preload; D, Double nut preload (See page B5.)

Deflector(bridge) type



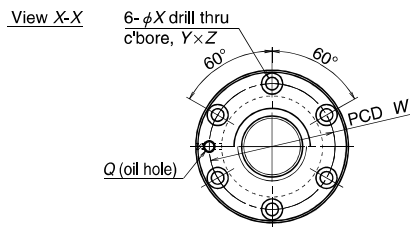
Unit: mm

Model No.	Preload system	Shaft dia. <i>d</i>	Lead <i>l</i>	Ball dia. <i>D_w</i>	Ball circle dia. <i>d_m</i>	Root dia. <i>d_t</i>	Effective turns of balls Turns × Circuits	Basic load rating (N)		Axial rigidity <i>K</i> (N/μm)
								Dynamic <i>C_a</i>	Static <i>C_{0a}</i>	
MSFD 4002-6	Clearance P	40	2	1.588	40.4	38.6	1×6	7 380	33 900	588
MPFD 4002-6										916
SFD 4005-4	Clearance Z		5	3.175	40.75	37.4	1×4	15 800	52 300	490
ZFD 4005-8										960
SFD 4005-6	Clearance Z		6	3.969	41.0	36.9	1×6	30 100	95 300	725
ZFD 4005-12										1 410
SFD 4006-4	Clearance Z		8	4.762	41.25	36.3	1×4	27 200	75 200	500
ZFD 4006-8										970
SFD 4006-6	Clearance Z		10	6.35	41.75	35.1	1×6	38 500	113 000	735
ZFD 4006-12										1 431
SFD 4008-4	Clearance Z		5	3.175	50.75	47.4	1×4	17 500	66 800	593
ZFD 4008-8										1 170
SFD 4008-6	Clearance Z		6	3.969	51.0	46.9	1×6	24 800	100 000	872
ZFD 4008-12										1 720
SFD 5005-4	Clearance Z		5	3.175	50.75	47.4	1×4	17 500	66 800	593
ZFD 5005-8										1 170
SFD 5005-6	Clearance Z	6	3.969	51.0	46.9	1×6	24 800	100 000	872	
ZFD 5005-12									1 720	
SFD 5006-4	Clearance Z	5	3.175	50.75	47.4	1×4	17 500	66 800	593	
ZFD 5006-8									1 170	
SFD 5006-6	Clearance Z	6	3.969	51.0	46.9	1×6	24 800	100 000	872	
ZFD 5006-12									1 720	

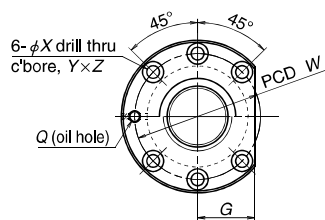
Notes: 1. Nut comes in circular shape I and circular shape II for shaft diameter 20 mm or larger. Select a flange that is suitable for the space available for nut installation.
 2. If there is no seal for SFD, ZFD, and DFD, the nut length "L" is shortened by dimension "M". For MSFD and MPFD, the nut length is the same as those with seal.
 3. The right turn screw is standard. "L" is added to the end of the model code for the left turn screw. Please consult NSK for MSFD and MPFD.

Ball nut dimensions												
Nut entire length <i>L</i>	Nut diameter <i>D</i>	Flanged diameter <i>A</i>	Flanged width <i>B</i>	Notched flange		Seal dimension <i>M</i>	Bolt hole dimension			Bolt hole PCD <i>W</i>	Oil hole dimension <i>T</i>	Oil hole <i>Q</i>
				<i>G</i>	<i>H</i>		<i>X</i>	<i>Y</i>	<i>Z</i>			
50	51	74	10	—	55	—	6.6	—	—	63	31	M6×1
55	56	90	15	34	—	5	9	14	8.5	72	—	Rc1/8
80												
65												
101												
64	56	90	15	34	—	6	9	14	8.5	72	—	Rc1/8
93												
76												
118												
76	60	94	15	36	—	8	9	14	8.5	76	—	Rc1/8
116												
93												
168												
83	62	104	18	40	—	10	11	17.5	11	82	—	Rc1/8
123												
93												
143												
55	66	100	15	38	—	5	9	14	8.5	82	—	Rc1/8
80												
65												
101												
64	66	100	15	38	—	6	9	14	8.5	82	—	Rc1/8
93												
76												
118												

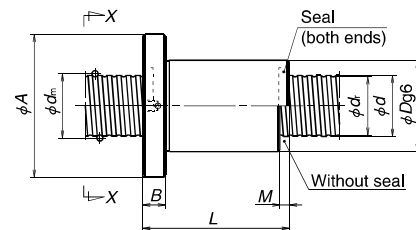
4. The axial rigidity *K* in the table above is a theoretical value obtained from the elastic deformation between screw groove and ball when the axial load is 30% of the basic dynamic load rating (*C_a*) with non-preload, 10% with D-preload, and 5% with P-preload. Refer to "Technical Description" (page B37) if the axial load and preload differ from the conditions above, or when the deformation of the ball nut body must be considered.
 5. It is recommended to use with seals when the shaft diameter is 16 mm or over and an oil hole is provided on the ball nut.
 6. Preload system: Z, Offset preload; P, Oversize ball preload; D, Double nut preload (See page B5.)



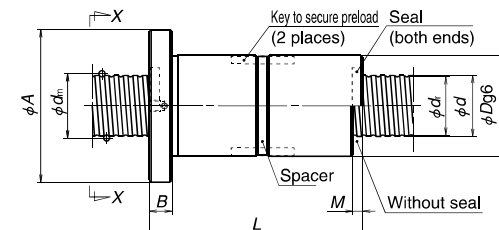
Circular shape I



Circular shape II



SFD, ZFD



DFD

Unit: mm

Model No.	Preload system	Shaft dia. <i>d</i>	Lead <i>l</i>	Ball dia. <i>D_w</i>	Ball circle dia. <i>d_m</i>	Root dia. <i>d_r</i>	Effective turns of balls Turns × Circuits	Basic load rating (N)		Axial rigidity <i>K</i> (N/μm)
								Dynamic <i>C_d</i>	Static <i>C_s</i>	
SFD 5008-4	Clearance	50	8	4.762	51.25	46.3	1×4	29 900	94 800	598
ZFD 5008-8	Z						1×4	29 900	94 800	1 180
SFD 5008-6	Clearance						1×6	42 400	142 000	887
DFD 5008-6	D						1×6	42 400	142 000	1 740
SFD 5010-3	Clearance						1×3	34 100	91 600	461
ZFD 5010-6	Z						1×3	34 100	91 600	914
SFD 5010-4	Clearance		1×4	43 600	122 000	608				
ZFD 5010-8	Z		1×4	43 600	122 000	1 200				
SFD 5010-6	Clearance		1×6	61 800	183 000	902				
DFD 5010-6	D		1×6	61 800	183 000	1 770				
SFD 5012-3	Clearance		1×3	44 800	109 000	461				
ZFD 5012-6	Z		1×3	44 800	109 000	906				
SFD 5012-4	Clearance	1×4	57 300	146 000	608					
DFD 5012-4	D	1×4	57 300	146 000	1 200					
SFD 5020-3	Clearance	1×3	44 800	109 000	461					
DFD 5020-3	D	1×3	44 800	109 000	908					
SFD 6306-4	Clearance	63	6	3.969	64.0	59.9	1×4	26 100	104 000	735
ZFD 6306-8	Z						1×4	26 100	104 000	1 430
SFD 6306-6	Clearance						1×6	36 900	157 000	1 180
ZFD 6306-12	Z						1×6	36 900	157 000	2 110
SFD 6308-4	Clearance						1×4	33 600	124 000	745
ZFD 6308-8	Z						1×4	33 600	124 000	1 460
SFD 6308-6	Clearance		1×6	47 600	186 000	1 100				
DFD 6308-6	D		1×6	47 600	186 000	2 150				
SFD 6310-4	Clearance		1×4	49 700	163 000	764				
ZFD 6310-8	Z		1×4	49 700	163 000	1 510				
SFD 6310-6	Clearance		1×6	70 500	244 000	1 130				
DFD 6310-6	D		1×6	70 500	244 000	2 210				
ZFD 6312-6	Z	1×3	50 800	143 000	1 120					
SFD 6312-4	Clearance	1×4	65 100	191 000	755					
DFD 6312-4	D	1×4	65 100	191 000	1 480					
SFD 6312-6	Clearance	1×6	92 200	286 000	1 110					
DFD 6312-6	D	1×6	92 200	286 000	2 180					
SFD 6320-3	Clearance	1×3	83 700	232 000	735					
DFD 6320-3	D	1×3	83 700	232 000	1 440					

Notes: 1. Nut comes in circular shape I and circular shape II for shaft diameter 20 mm or larger. Select a flange that is suitable for the space available for nut installation.

2. If there is no seal the nut length "L" is shortened by dimension "M".

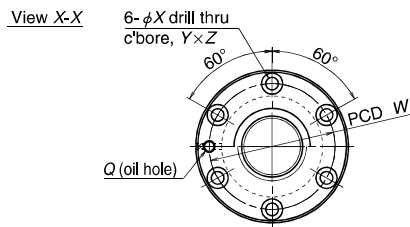
3. The right turn screw is standard. "L" is added to the end of the model code for the left turn screw.

Ball nut dimensions													
Nut entire length <i>L</i>	Nut diameter <i>D</i>	Flanged diameter <i>A</i>	Flanged width <i>B</i>	Notched flange <i>G</i>	Seal dimension <i>M</i>	Bolt hole dimension			Bolt hole PCD <i>W</i>	Oil hole <i>Q</i>			
						<i>X</i>	<i>Y</i>	<i>Z</i>					
79	70	112		43	8	11	17.5	11	90	Rc1/8			
119	70	112	18	43									
96	70	112		43									
171	72	114		44									
83													
123	72	114	18	44	10	11	17.5	11	92	Rc1/8			
93													
143													
114													
205													
99	75	121	22	47	12	14	20	13	97	Rc1/8			
147													
111													
195													
146													
253	75	121	28	47	20	14	20	13	97	Rc1/8			
67	80	122	18	47	6	11	17.5	11	100	Rc1/8			
96													
79													
121													
79									82		124		47
119	82	124	18	47									
96	82	124		47									
175	85	127		48									
97													
147	85	131	22	50	10	14	20	13	107	Rc1/8			
118													
214													
147													
111													
195	90	136	22	52	12	14	20	13	112	Rc1/8			
136													
248													
146													
253									95		153	28	59

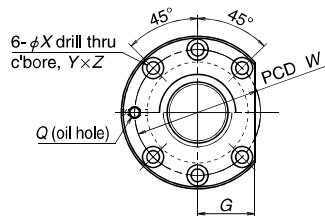
4. The axial rigidity *K* in the table above is a theoretical value obtained from the elastic deformation between screw groove and ball when the axial load is 30% of the basic dynamic load rating (*C_d*) with non-preload, 10% with D-preload, and 5% with P-preload. Refer to "Technical Description" (page B37) if the axial load and preload differ from the conditions above, or when the deformation of the ball nut body must be considered.

5. It is recommended to use with seals when the shaft diameter is 16 mm or over and an oil hole is provided on the ball nut.

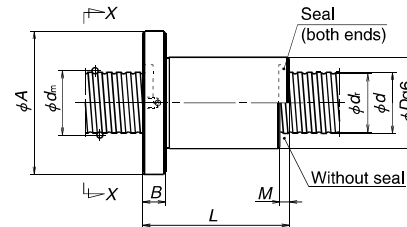
6. Preload system: Z, Offset preload; D, Double nut preload (See page B5.)



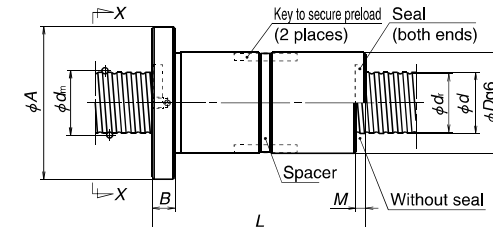
Circular shape I



Circular shape II



SFD



DFD

Unit: mm

Model No.	Preload system	Shaft dia. <i>d</i>	Lead <i>l</i>	Ball dia. <i>D_w</i>	Ball circle dia. <i>d_m</i>	Root dia. <i>d_r</i>	Effective turns of balls Turns × Circuits	Basic load rating (N)		Axial rigidity <i>K</i> (N/μm)									
								Dynamic <i>C_s</i>	Static <i>C_{0s}</i>										
SFD 8010-4	Clearance D	80	10	6.35	81.75	75.1	1×4	55 100	209 000	931									
DFD 8010-4	D						1×4	55 100	209 000	1 840									
SFD 8010-6	Clearance D						1×6	78 000	314 000	1 370									
DFD 8010-6	D						1×6	78 000	314 000	2 710									
SFD 8012-4	Clearance D						12	7.938	82.25	74	1×4	74 000	254 000	941					
DFD 8012-4	D										1×4	74 000	254 000	1 860					
SFD 8012-6	Clearance D		1×6	105 000	381 000	1 392													
DFD 8012-6	D		1×6	105 000	381 000	2 730													
SFD 8020-3	Clearance D		20	9.525	82.75	73					1×3	96 600	313 000	931					
DFD 8020-3	D										1×3	96 600	313 000	1 830					
SFD 8020-4	Clearance D						1×4	124 000	417 000	1 230									
DFD 8020-4	D						1×4	124 000	417 000	2 410									
SFD 10010-6	Clearance D	100					10	6.35	101.75	95.1	1×6	86 200	401 000	1 670					
DFD 10010-6	D										1×6	86 200	401 000	3 270					
SFD 10012-6	Clearance D		12	7.938	102.25	94					1×6	117 000	490 000	1 680					
DFD 10012-6	D											3 320							
SFD 10020-4	Clearance D											20	9.525	102.75	93	1×4	136 000	526 000	1 470
DFD 10020-4	D																2 890		

- Notes
1. Nut comes in circular shape I and circular shape II for shaft diameter 20 mm or larger. Select a flange that is suitable for the space available for nut installation.
 2. If there is no seal the nut length "L" is shortened by dimension "M".
 3. The right turn screw is standard, "L" is added to the end of the model code for the left turn screw.

Ball nut dimensions										
Nut entire length <i>L</i>	Nut diameter <i>D</i>	Flanged diameter <i>A</i>	Flanged width <i>B</i>	Notched flange <i>G</i>	Seal dimension <i>M</i>	Bolt hole dimension			Bolt hole PCD <i>W</i>	Oil hole <i>Q</i>
						<i>X</i>	<i>Y</i>	<i>Z</i>		
97	105	151	22	57	10	14	20	13	127	Rc1/8
172										
118										
214										
111	110	156	22	59	12	14	20	13	132	Rc1/8
195										
136										
248										
146	115	173	28	66	20	18	26	17.5	143	Rc1/8
253										
168										
297										
118	125	171	22	64	10	14	20	13	147	Rc1/8
214										
142										
254										
172	135	205	32	79	20	22	32	21.5	169	Rc1/8
301										

4. The axial rigidity *K* in the table above is a theoretical value obtained from the elastic deformation between screw groove and ball when the axial load is 30% of the basic dynamic load rating (*C_s*) with non-preload, 10% with D-preload, and 5% with P-preload. Refer to "Technical Description" (page B37) if the axial load and preload differ from the conditions above, or when the deformation of the ball nut body must be considered.
5. It is recommended to use with seals when the shaft diameter is 16 mm or over and an oil hole is provided on the ball nut.
6. Preload system: D; Double nut preload (See page B5.)