

B-3-3.3 Deflector Type Ball Screws

1. Features

Deflector type has the smallest nut compared to the other recirculation systems, and suitable for fine lead operation.

2. Specifications

(1) Recirculation system

It has a compact nut outside diameter, and suits for small lead driving. Fig.1 shows the structure of the deflector recirculation system.

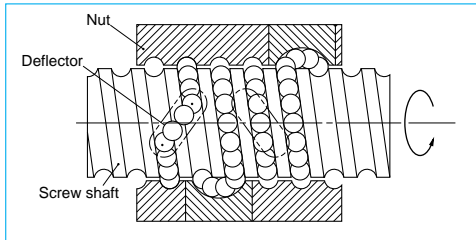


Fig. 1 Structure of deflector recirculation system

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 (Preload); T, 0.005 mm or less S, 0.020 mm or less; N, 0.050 mm or less

Table 2 Deflector 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)

(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

Allowable d·n value and the 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 : 84000 or less

High-speed specification; 100000 or less

Standard of rotational speed : 3000 min⁻¹

Note: Please also review the critical speed. Refer to "Technical Description: Permissible rotational speed" (Page B51) for details.

(4) Other specifications

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

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 for MSFD, MPFD, and has enhanced the smooth recirculation of balls.

NSK has a patent for this product.

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 B84) and "Handling Precautions" (Page B103).

5. Example of model number in dimension tables

A structure of "Model number" and "Reference number for ball screw" are as follows.

◇Model number

SFD 40 08 - 4

Nut model: SFD, ZFD, DFD
MSFD, MPFD

Screw shaft diameter (mm)

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

Screw shaft diameter (mm)

Effective threaded length (in the unit of 100mm)

NSK design serial number

Preload code:
No code, non-preload;
Z, Z preload; D, D preload; P, P preload

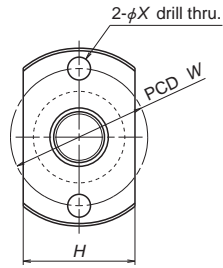
Lead (mm)

Axial play code: Z, T, S, N

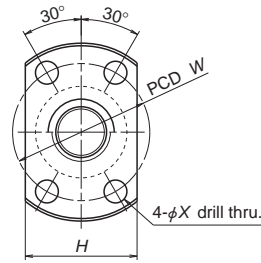
Accuracy grade code:
C0, C1, C2, C3, C5, C7(Ct7)

Deflector recirculation system

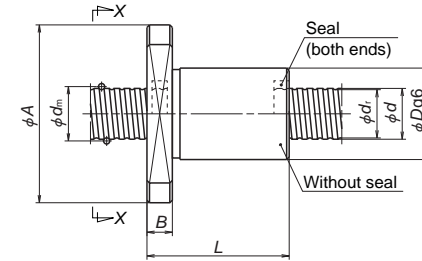
View X-X



Lead $l = 0.5\text{mm}$



Lead $l > 1\text{mm}$



Unit: mm

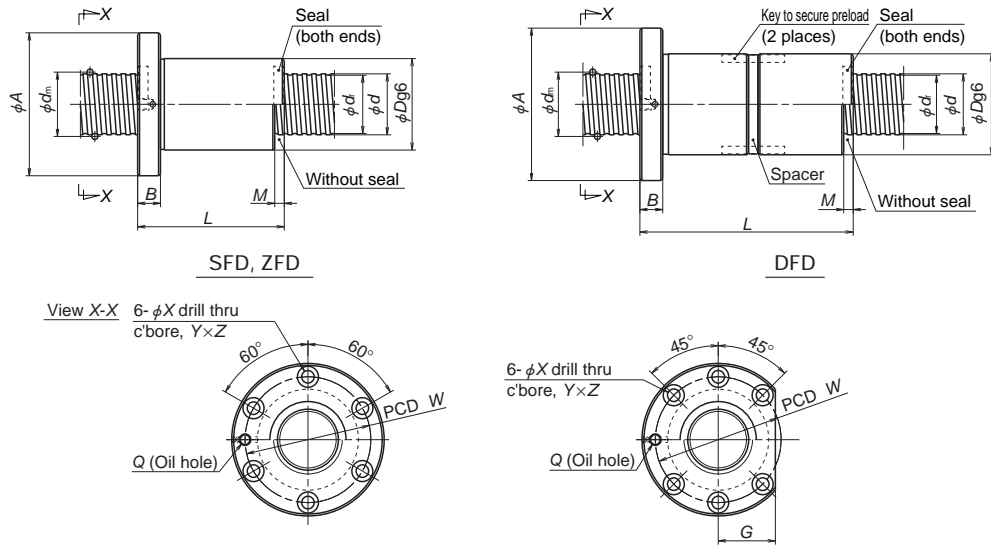
Model No.	Preload system	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective turns of balls Turns \times Circuits	Basic load rating (N)	
								Dynamic C_a	Static C_{0a}
MSFD 0400.5-3 MPFD 0400.5-3	Clearance P	4	0.5	0.400	4.1	3.6	1 \times 3	170	280
MSFD 0401-2 MPFD 0401-2	Clearance P		1	0.800	4.2	3.2	1 \times 2	315	370
MSFD 0600.5-3 MPFD 0600.5-3	Clearance P	6	0.5	0.400	6.1	5.6	1 \times 3	205	430
MSFD 0601-3 MPFD 0601-3	Clearance P		1	0.800	6.2	5.2	1 \times 3	575	925
MSFD 0602-3 MPFD 0602-3	Clearance P		2	0.800	6.2	5.2	1 \times 3	575	925
MSFD 0800.5-3 MPFD 0800.5-3	Clearance P	8	0.5	0.400	8.1	7.6	1 \times 3	230	595
MSFD 0801-3 MPFD 0801-3	Clearance P		1	0.800	8.2	7.2	1 \times 3	670	1290
MSFD 0801.5-3 MPFD 0801.5-3	Clearance P		1.5	1.000	8.3	7.0	1 \times 3	1080	1980
MSFD 0802-3 MPFD 0802-3	Clearance P		2	1.200	8.3	6.9	1 \times 3	1320	2210
MSFD 1001-3 MPFD 1001-3	Clearance P	10	1	0.800	10.2	9.2	1 \times 3	745	1660
MSFD 1002-3 MPFD 1002-3	Clearance P		2	1.200	10.3	8.9	1 \times 3	1490	2850
MSFD 1002.5-3 MPFD 1002.5-3	Clearance P		2.5	1.588	10.4	8.6	1 \times 3	2130	3640
MSFD 1201-3 MPFD 1201-3	Clearance P	12	1	0.800	12.2	11.2	1 \times 3	795	1980
MSFD 1202-3 MPFD 1202-3	Clearance P		2	1.200	12.3	10.9	1 \times 3	1660	3620
MSFD 1202.5-3 MPFD 1202.5-3	Clearance P		2.5	1.588	12.4	10.6	1 \times 3	2360	4540
MSFD 1203-3 MPFD 1203-3	Clearance P		3	2.000	12.5	10.2	1 \times 3	3120	5420
MSFD 1402-3 MPFD 1402-3	Clearance P	14	2	1.200	14.3	12.9	1 \times 3	1780	4270
MSFD 1403-3 MPFD 1403-3	Clearance P		3	2.000	14.5	12.2	1 \times 3	3400	6490

Remarks 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. (Refer to Page B72 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							
22	12	10	20	3	14	2.9	15
34							
42	13	12	24	3	13	3.4	18
66							
49	15	12	24	3.5	16	3.4	18
76							
49	17	13	25	4	17	3.4	19
76							
54	13	14	27	3	15	3.4	21
85							
64	16	14	27	4	18	3.4	21
99							
76	22	15	28	4	19	3.4	22
117							
73	26	16	29	4	20	3.4	23
113							
77	16	16	29	4	20	3.4	23
120							
91	28	18	35	5	22	4.5	27
138							
90	32	19	36	5	23	4.5	28
140							
88	16	18	31	4	22	3.4	25
137							
108	28	20	37	5	24	4.5	29
168							
107	32	21	38	5	25	4.5	30
167							
107	36	22	39	5	26	4.5	31
166							
122	29	22	41	6	26	5.5	32
191							
127	37	24	43	6	28	5.5	34
196							

Remarks 4. The axial rigidity 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 clearance, 10% with D preload, and 5% with P preload. Refer to "Technical description" (Page B41) if axial load differs from the conditions above, or when considering change in the deformation of the ball nut itself.
 5. The models marked with * are in MA type of standard ball screw with finished shaft end.
 6. Preload system: P: Oversize ball preload (Refer to Page B5)

Deflector type

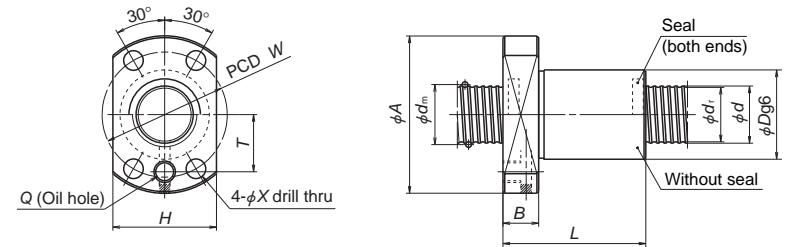


Circular shape I

Circular shape II

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	3510	8450	185
MPFD 1602-4										288
* MSFD 1602.5-4	Clearance P	16	2.5	1.588	16.4	14.6	1×4	3510	8450	185
MPFD 1602.5-4										288
* MSFD 2002-4	Clearance P	20	2	1.588	20.4	18.6	1×4	3910	10900	225
MPFD 2002-4										351
SFD 2005-3	Clearance Z	20	5	3.175	20.75	17.4	1×3	8620	17500	196
ZFD 2005-6							1×3	8620	17500	382
SFD 2005-4	Clearance D	20	5	3.175	20.75	17.4	1×4	11000	23300	255
DFD 2005-4							1×4	11000	23300	509
SFD 2006-3	Clearance Z	20	6	3.969	21	16.9	1×3	11100	20600	196
ZFD 2006-6							1×3	11100	20600	382
SFD 2006-4	Clearance D	20	6	3.969	21	16.9	1×4	14300	27500	255
DFD 2006-4							1×4	14300	27500	498
* MSFD 2502-4	Clearance P	25	2	1.588	25.4	23.6	1×4	4310	13900	273
MPFD 2502-4										425
* SFD 2505-3	Clearance Z	25	5	3.175	25.75	22.4	1×3	9790	22900	245
ZFD 2505-6							1×3	9790	22900	480
SFD 2505-4	Clearance D	25	5	3.175	25.75	22.4	1×4	12500	30500	323
DFD 2505-4							1×4	12500	30500	630
SFD 2506-3	Clearance Z	25	6	3.969	26	21.9	1×3	12900	27300	245
ZFD 2506-6							1×3	12900	27300	470
SFD 2506-4	Clearance D	25	6	3.969	26	21.9	1×4	16500	36500	323
DFD 2506-4							1×4	16500	36500	626
ZFD 2510-4	Clearance D	25	10	4.762	26.25	21.3	1×2	11400	21400	323
SFD 2510-3							1×3	16100	32000	245
DFD 2510-3	1×3	16100	32000	479						

- Remarks
1. It 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, MPFD.

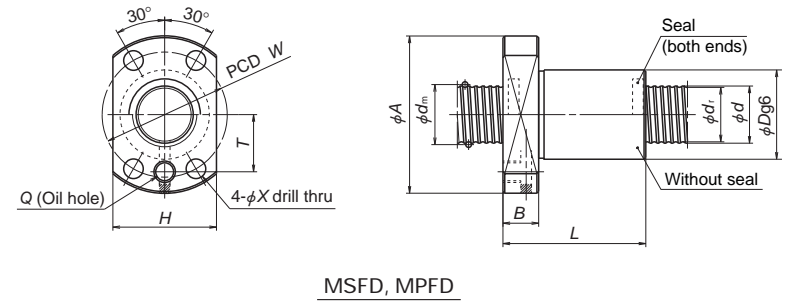
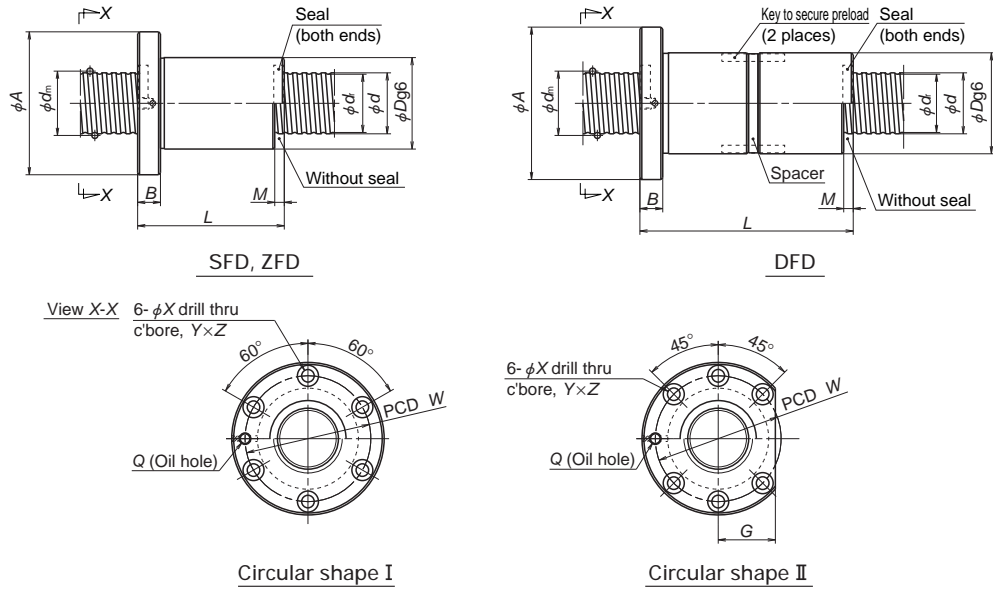


MSFD, MPFD

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>			
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	—	22.5	—	5	5.5	9.5	5.5	46	—	M6×1
66	35	58	11	22.5	—							
51	35	58	—	22.5	—	6	5.5	9.5	5.5	46	—	M6×1
91	41	64	11	25	—							
52	35	58	—	22.5	—	6	5.5	9.5	5.5	46	—	M6×1
76	35	58	11	22.5	—							
60	35	58	—	22.5	—	10	6.6	11	6.5	55	—	M6×1
108	42	65	15	25	—							
40	36	55	10	—	40	—	5.5	—	—	46	21.5	M6×1
46	40	63	—	24	—	5	5.5	9.5	5.5	51	—	M6×1
66	40	63	11	24	—							
51	40	63	—	24	—	6	5.5	9.5	5.5	51	—	M6×1
91	46	69	11	26	—							
52	40	63	—	24	—	6	5.5	9.5	5.5	51	—	M6×1
76	40	63	11	24	—							
60	40	63	—	24	—	10	6.6	11	6.5	55	—	M6×1
108	47	70	15	27	—							
88	42	69	—	26	—	10	6.6	11	6.5	55	—	M6×1
80	42	69	15	26	—							
140	47	74	—	28	—	10	6.6	11	6.5	55	—	M6×1
140	47	74	15	28	—							

- Remarks
4. The axial rigidity 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 clearance, 10% with D preload, and 5% with P preload. Refer to "Technical description" (Page B41) if axial load differs from the conditions above, or when considering change in the deformation of the ball nut itself.
 5. It is recommended to use with seal when shaft diameter is 16 mm or larger and have oil hole.
 6. The models marked with * are in MA type of standard ball screw with finished shaft end.
 7. Preload system: Z, Offset preload; P, Oversize ball preload; D, Double nut preload (Refer to Page B5)

Deflector type



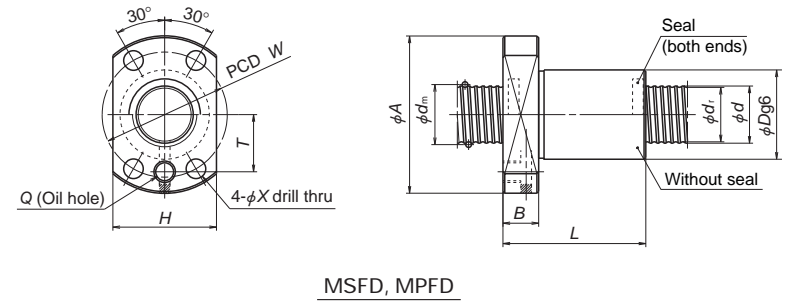
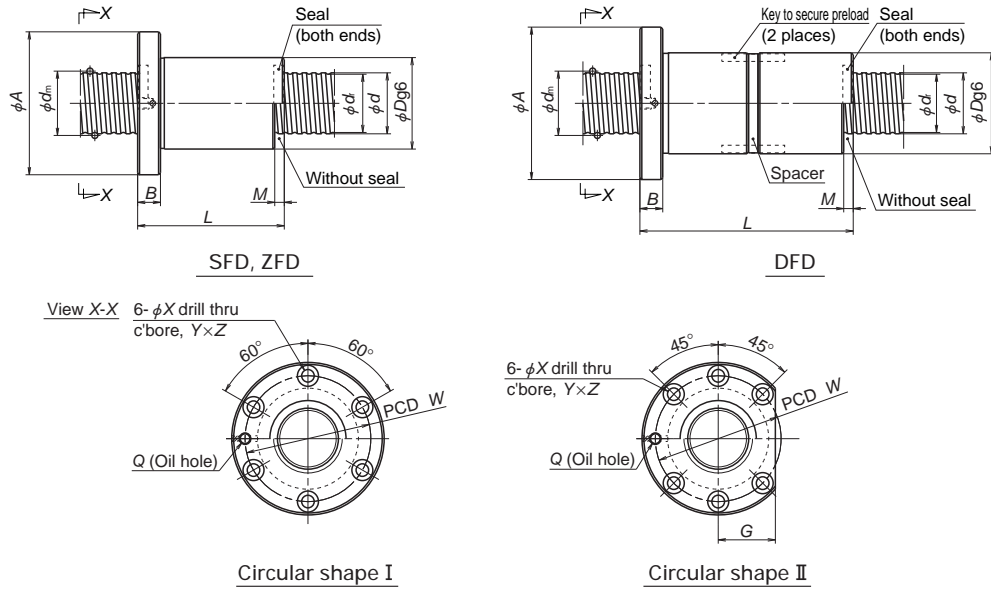
Model No.	Preload system	Shaft dia. <i>d</i>	Lead <i>l</i>	Ball dia. <i>D_w</i>	Ball circle dia. <i>d_m</i>	Root dia. <i>d_r</i>	Effective turns of balls Turns × Circuits	Basic load rating (N)		Axial rigidity <i>K</i> (N/μm)								
								Dynamic <i>C_a</i>	Static <i>C_{0a}</i>									
MSFD 3202-6 MPFD 3202-6	Clearance P	32	2	1.588	32.4	30.6	1×6	6790	27200	494								
SFD 3205-3 ZFD 3205-6	Clearance Z									304								
SFD 3205-4 ZFD 3205-8 SFD 3205-6 DFD 3205-6	Clearance Z Clearance D									598 409 784 588 1160								
SFD 3206-3 ZFD 3206-6 SFD 3206-4 ZFD 3206-8 SFD 3206-6 DFD 3206-6	Clearance Z Clearance Z Clearance D		6	3.969	33	28.9	1×4 1×4 1×6 1×6	15000 15000 19200 19200 27200 27200	37500 37500 49900 49900 74900 74900	314 608 412 804 598 1190								
SFD 3208-3 ZFD 3208-6 SFD 3208-4 ZFD 3208-8	Clearance Z Clearance Z										8	4.762	33.25	28.3	1×3 1×3 1×4 1×4	18300 18300 23500 23500	41800 41800 55800 55800	304 588 392 774
SFD 3210-3 ZFD 3210-6 SFD 3210-4 DFD 3210-4	Clearance Z Clearance D																	

Remarks 1. It 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, 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	—	29	—	5	6.6	11	6.5	61	—	M6×1
67	48	75	—	29	12							
52	48	75	12	29						61		
77	48	75	—	29						61		
62	48	75	—	29						61		
112	53	80	—	30						66		
53	48	75	—	29	6	6.6	11	6.5	61	—	M6×1	
77	48	75	—	29								
61	48	75	12	29					61			
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	54	88	15	34	—							
76										70		
116										70		
80										70		
120	90	—	10	9	14	8.5	70	—	M6×1			
160	—	—	—	—	—	—	—	—	—	—	—	—

Remarks 4. The axial rigidity 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 clearance, 10% with D preload, and 5% with P preload. Refer to "Technical description" (Page B41) if axial load differs from the conditions above, or when considering change in the deformation of the ball nut itself.
5. It is recommended to use with seal when shaft diameter is 16 mm or larger and have oil hole.
6. The models marked with * are in SS type of standard ball screw with blank shaft end.
7. Preload system: Z, Offset preload; P, Oversize ball preload; D, Double nut preload (Refer to Page B5)

Deflector type

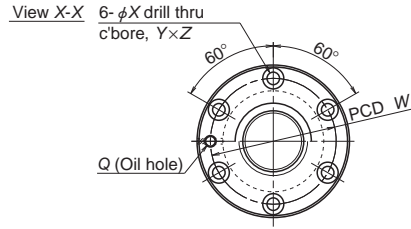


Model No.	Preload system	Shaft dia. <i>d</i>	Lead <i>l</i>	Ball dia. <i>D_w</i>	Ball circle dia. <i>d_m</i>	Root dia. <i>d_r</i>	Effective turns of balls Turns × Circuits	Basic load rating (N)		Axial rigidity <i>K</i> (N/μm)	
								Dynamic <i>C_a</i>	Static <i>C_{0a}</i>		
MSFD 4002-6 MPFD 4002-6	Clearance P	40	2	1.588	40.4	38.6	1×6	7380	33900	588 916	
SFD 4005-4 ZFD 4005-8 SFD 4005-6 ZFD 4005-12	Clearance Z		5	3.175	40.75	37.4	1×4 1×4 1×6 1×6	15800 15800 22400 22400	52300 52300 78400 78400	490 960 725 1410	
SFD 4006-4 ZFD 4006-8 SFD 4006-6 ZFD 4006-12	Clearance Z		6	3.969	41.0	36.9	1×4 1×4 1×6 1×6	21300 21300 30100 30100	63500 63500 95300 95300	490 970 725 1431	
SFD 4008-4 ZFD 4008-8 SFD 4008-6 DFD 4008-6	Clearance D		8	4.762	41.25	36.3	1×4 1×4 1×6 1×6	27200 27200 38500 38500	75200 75200 113000 113000	500 990 735 1460	
SFD 4010-3 ZFD 4010-6 SFD 4010-4 ZFD 4010-8	Clearance Z		10	6.35	41.75	35.1	1×3 1×3 1×4 1×4	30000 30000 38400 38400	70000 70000 93300 93300	372 735 490 970	
SFD 5005-4 ZFD 5005-8 SFD 5005-6 ZFD 5005-12	Clearance Z		50	5	3.175	50.75	47.4	1×4 1×4	17500 17500	66800 66800	593 1170
SFD 5006-4 ZFD 5006-8 SFD 5006-6 ZFD 5006-12	Clearance Z							6	3.969	51.0	46.9

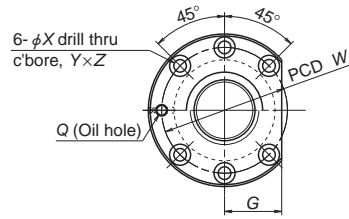
Remarks 1. It comes in circular shape I and circular shape II for shaft diameter 20 mm or larger. Select a flange that is suitable for the space available for nut installation.
 2. If there is no seal for SFD, ZFD, and DFD, the nut length "L" is shortened by dimension "M". For MSFD and MPFD, the nut 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, 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>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	56	90	15	34	—	6	9	14	8.5	72	—	Rc1/8	
64													
93													
76	60	94	15	36	—	8	9	14	8.5	76	76	—	Rc1/8
118													
76													
116	62	94	15	36	—	8	9	14	8.5	76	76	—	Rc1/8
93													
168													
62	62	96	15	37	—	10	11	17.5	11	82	—	Rc1/8	
83													
123													
93	66	100	15	38	—	5	9	14	8.5	82	—	Rc1/8	
143													
55													
64	66	100	15	38	—	6	9	14	8.5	82	—	Rc1/8	
93													
76													
118													

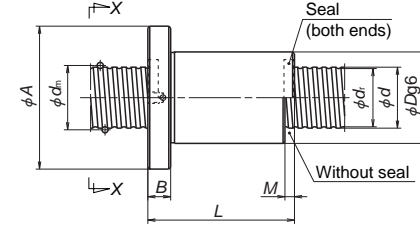
Remarks 4. The axial rigidity in the table above is a theoretical value obtained from the elastic deformation between screw groove and ball when the axial load is 30% of the basic dynamic load rating (*C_a*) with clearance, 10% with D preload, and 5% with P preload. Refer to "Technical description" (Page B41) if axial load differs from the conditions above, or when considering change in the deformation of the ball nut itself.
 5. It is recommended to use with seal when shaft diameter is 16 mm or larger and have oil hole.
 6. Preload system: Z, Offset preload; P, Oversize ball preload; D, Double nut preload (Refer to Page B5)



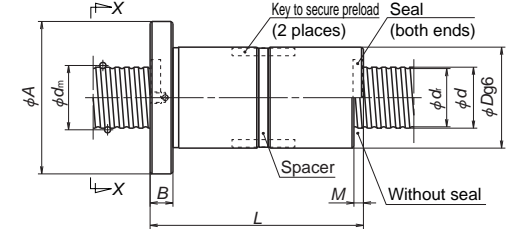
Circular shape I



Circular shape II



SFD, ZFD



DFD

Unit: mm

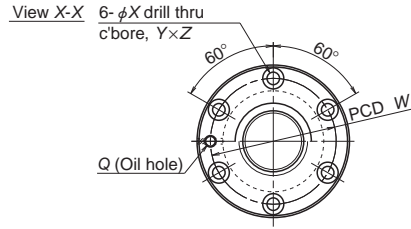
Model No.	Preload system	Shaft dia. <i>d</i>	Lead <i>l</i>	Ball dia. <i>D_w</i>	Ball circle dia. <i>d_m</i>	Root dia. <i>d_r</i>	Effective turns of balls Turns × Circuits	Basic load rating (N)		Axial rigidity <i>K</i> (N/μm)
								Dynamic <i>C_a</i>	Static <i>C_{0a}</i>	
SFD 5008-4	Clearance	50	8	4.762	51.25	46.3	1×4	29900	94800	598
ZFD 5008-8	Z						1×4	29900	94800	1180
SFD 5008-6	Clearance						1×6	42400	142000	887
DFD 5008-6	D		1×6	42400	142000	1740				
SFD 5010-3	Clearance		10	6.35	51.75	45.1	1×3	34100	91600	461
ZFD 5010-6	Z						1×3	34100	91600	914
SFD 5010-4	Clearance						1×4	43600	122000	608
ZFD 5010-8	Z						1×4	43600	122000	1200
SFD 5010-6	Clearance						1×6	61800	183000	902
DFD 5010-6	D						1×6	61800	183000	1770
SFD 5012-3	Clearance		12	7.938	52.25	44	1×3	44800	109000	461
ZFD 5012-6	Z						1×3	44800	109000	906
SFD 5012-4	Clearance	1×4					57300	146000	608	
DFD 5012-4	D	1×4					57300	146000	1200	
SFD 5020-3	Clearance	20	7.938	52.25	44	1×3	44800	109000	461	
DFD 5020-3	D					1×3	44800	109000	908	
SFD 6306-4	Clearance	63	6	3.969	64.0	59.9	1×4	26100	104000	735
ZFD 6306-8	Z						1×4	26100	104000	1430
SFD 6306-6	Clearance						1×6	36900	157000	1180
ZFD 6306-12	Z		1×6	36900	157000	2110				
SFD 6308-4	Clearance		8	4.762	64.25	59.3	1×4	33600	124000	745
ZFD 6308-8	Z						1×4	33600	124000	1460
SFD 6308-6	Clearance						1×6	47600	186000	1100
DFD 6308-6	D						1×6	47600	186000	2150
SFD 6310-4	Clearance		10	6.35	64.75	58.1	1×4	49700	163000	764
ZFD 6310-8	Z						1×4	49700	163000	1510
SFD 6310-6	Clearance						1×6	70500	244000	1130
DFD 6310-6	D						1×6	70500	244000	2210
ZFD 6312-6	Z	12	7.938	65.25	57	1×3	50800	143000	1120	
SFD 6312-4	Clearance					1×4	65100	191000	755	
DFD 6312-4	D					1×4	65100	191000	1480	
SFD 6312-6	Clearance					1×6	92200	286000	1110	
DFD 6312-6	D					1×6	92200	286000	2180	
SFD 6320-3	Clearance					20	9.525	65.75	56	1×3
DFD 6320-3	D	1×3	83700	232000	1440					

- Remarks
1. It 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.

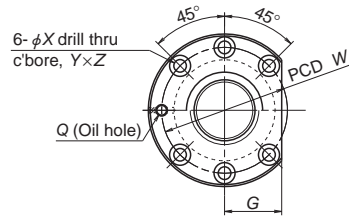
Ball nut dimensions													
Nut entire length <i>L</i>	Nut diameter <i>D</i>	Flanged diameter <i>A</i>	Flanged width <i>B</i>	Notched flange <i>G</i>	Seal dimension <i>M</i>	Bolt hole dimension			Bolt hole PCD <i>W</i>	Oil hole <i>Q</i>			
						<i>X</i>	<i>Y</i>	<i>Z</i>					
79	70	112		43	8	11	17.5	11	90	Rc1/8			
119	70	112	18	43									
96	70	112		43									
171	72	114		44									
83				461									
123				914									
93	72	114	18	44	10	11	17.5	11	92	Rc1/8			
143													1200
114													902
205													1770
99				461									
147	75	121	22	47	12	14	20	13	97	Rc1/8			
111													608
195													1200
146	75	121	28	47	20	14	20	13	97	Rc1/8			
253													908
67				735									
96	80	122	18	47	6	11	17.5	11	100	Rc1/8			
79													1180
121													2110
79	82	124	18	47	8	11	17.5	11	102	Rc1/8			
119													1460
96													1100
175													2150
97	85	131	22	50	10	14	20	13	107	Rc1/8			
147													1120
118													1510
214													2210
147	90	136	22	52	12	14	20	13	112	Rc1/8			
111													755
195													1480
136													1110
248													2180
146	95	153	28	59	20	18	26	17.5	123	Rc1/8			
253													1440

- Remarks
4. The axial rigidity 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 clearance, 10% with D preload, and 5% with P preload. Refer to "Technical description" (Page B41) if axial load differs from the conditions above, or when considering change in the deformation of the ball nut itself.
 5. It is recommended to use with seal when shaft diameter is 16 mm or larger and have oil hole.
 6. Preload system: Z, Offset preload; D, Double nut preload (Refer to Page B5)

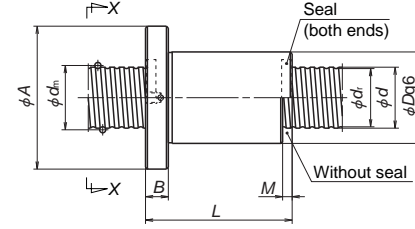
Deflector type



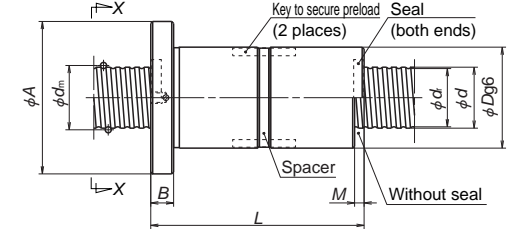
Circular shape I



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_a</i>	Static <i>C_{0a}</i>	
SFD 8010-4	Clearance D	80	10	6.35	81.75	75.1	1×4	55100	209000	931
DFD 8010-4	Clearance D						1×4	55100	209000	1840
SFD 8010-6	Clearance D						1×6	78000	314000	1370
DFD 8010-6	Clearance D		1×6	78000	314000	2710				
SFD 8012-4	Clearance D		12	7.938	82.25	74	1×4	74000	254000	941
DFD 8012-4	Clearance D						1×4	74000	254000	1860
SFD 8012-6	Clearance D	1×6					105000	381000	1392	
DFD 8012-6	Clearance D	1×6	105000	381000	2730					
SFD 8020-3	Clearance D	20	9.525	82.75	73	1×3	96600	313000	931	
DFD 8020-3	Clearance D					1×3	96600	313000	1830	
SFD 8020-4	Clearance D					1×4	124000	417000	1230	
DFD 8020-4	Clearance D					1×4	124000	417000	2410	
SFD 10010-6	Clearance D	100	10	6.35	101.75	95.1	1×6	86200	401000	1670
DFD 10010-6	Clearance D									3270
SFD 10012-6	Clearance D									12
DFD 10012-6	Clearance D	3320								
SFD 10020-4	Clearance D	20	9.525	102.75	93	1×4	136000	526000	1470	
DFD 10020-4	Clearance D								2890	

- Remarks
1. It 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.

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	130	188	28	71	12	18	26	17.5	158	Rc1/8
254										
172	135	205	32	79	20	22	32	21.5	169	Rc1/8
301										

- Remarks
4. The axial rigidity 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 clearance, 10% with D preload, and 5% with P preload. Refer to "Technical description" (Page B41) if axial load differs from the conditions above, or when considering change in the deformation of the ball nut itself.
 5. It is recommended to use with seal when shaft diameter is 16 mm or larger and have oil hole.
 6. Preload system: D; Double nut preload (Refer to Page B5)