



**B-I-7.3 M Type (Miniature · fine lead) Ball Screws**

**(1) Product categories**

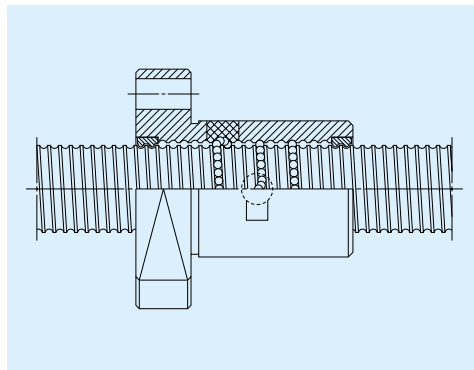
Like D Type, M Type ball screws use internal recirculation deflector type. There are several models by the difference in the preload system (Table I-7•3).

**Table I-7•3 Product categories of M Type ball screws**

Nut models	Shape	Flange shape	Preload system	Nut length	Page
MSFD		Flanged	Non-preload, Slight axial play	Short	B377
MPFD		Circular III			
MJFD		Flanged	J preload (spring preload) (medium preload)	Long	B381
		Circular III			

**(2) Features**

- Internal recirculation system contributes to the compact nut outside diameter.
  - Synthetic resin that shows superb characteristics against wear is used in the recirculation deflector, and has enhanced the smooth recirculation of balls.
- NSK has a patent for this product.

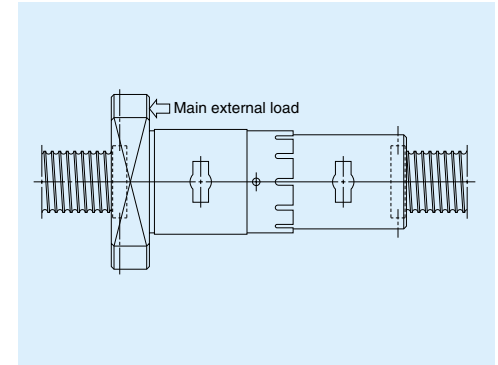


**Fig. I-7-2 M type recirculation system**

**(3) Precaution in designing**

◇ When designing the screw shaft end, please note that it is impossible to assemble the nut unless one end of the ball thread is cut through, and, unless this side of shaft end is smaller than the ball groove root diameter.

◇ When using nut model MJFD, it is recommended applying major external load to the direction as shown in Fig. I-7•3 in order to effectively use the characteristic of the constant pressure pre-load.



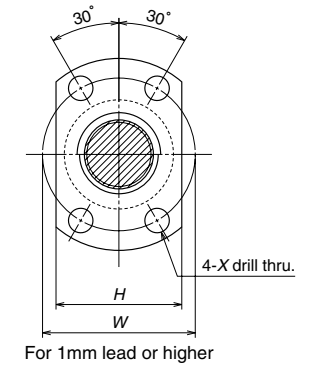
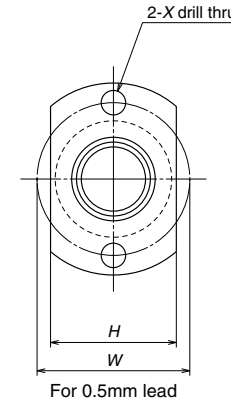
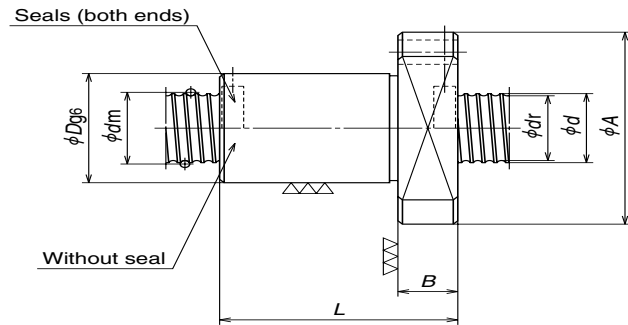
**Fig. I-7-3 Constant pressure pre-load and major external load direction**

**(4) Model number**

A model number that indicates specification factors is structured as shown below.

(example) Nut model MSFD; shaft diameter 4 mm; lead 1 mm; effective turns of balls 3





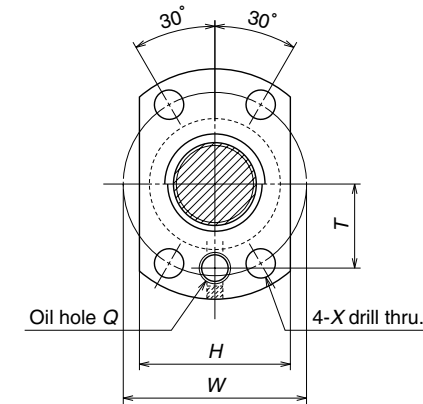
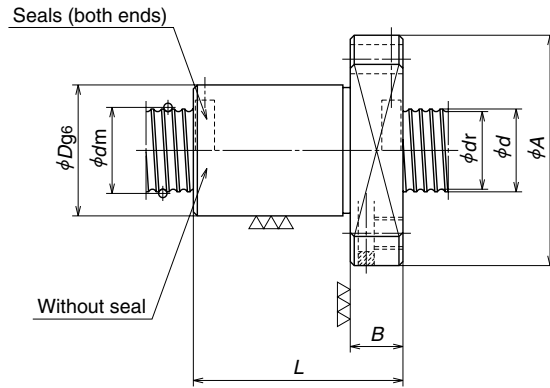
Model No.	Shaft dia. <i>d</i>	Lead <i>l</i>	Ball dia. <i>D<sub>w</sub></i>	Ball circle dia. <i>d<sub>m</sub></i>	Root dia. <i>d<sub>r</sub></i>	Effective turns of balls Turns × Circuits	Basic load rating (N)	
							Dynamic <i>C<sub>a</sub></i>	Static <i>C<sub>0s</sub></i>
<b>MSFD 0400.5-3</b> <b>MPFD 0400.5-3</b>	4	0.5	0.400	4.1	3.6	1×3	170	280
<b>MSFD 0401-2</b> <b>MPFD 0401-2</b>								
<b>MSFD 0600.5-3</b> <b>MPFD 0600.5-3</b>	6	0.5	0.400	6.1	5.6	1×3	205	430
<b>MSFD 0601-3</b> <b>MPFD 0601-3</b>								
<b>MSFD 0602-3</b> <b>MPFD 0602-3</b>								
<b>MSFD 0800.5-3</b> <b>MPFD 0800.5-3</b>	8	0.5	0.400	8.1	7.6	1×3	230	595
<b>MSFD 0801-3</b> <b>MPFD 0801-3</b>								
<b>MSFD 0801.5-3</b> <b>MPFD 0801.5-3</b>								
<b>MSFD 0802-3</b> <b>MPFD 0802-3</b>								
<b>MSFD 1001-3</b> <b>MPFD 1001-3</b>	10	1	0.800	10.2	9.2	1×3	745	1660
<b>MSFD 1002-3</b> <b>MPFD 1002-3</b>								
<b>MSFD 1002.5-3</b> <b>MPFD 1002.5-3</b>								

Remarks 1. Seal is not put on the lead is 1 mm or smaller, or if the shaft outer diameter is 6 mm or smaller. (Refer to Page B526 for dust protection.)  
2. Right turn screw is standard. Please consult NSK for left turn screw.

Unit: mm

Axial rigidity <i>K</i> (N/μm)	Ball nut dimensions						
	<i>D</i>	<i>A</i>	<i>H</i>	<i>B</i>	<i>L</i>	<i>W</i>	<i>X</i>
30 47	10	22	11	3	13	16	3.4
22 34	10	20	14	3	12	15	2.9
42 66	12	24	13	3	13	18	3.4
49 76	12	24	16	3.5	15	18	3.4
49 76	13	25	17	4	17	19	3.4
54 85	14	27	15	3	13	21	3.4
64 99	14	27	18	4	16	21	3.4
76 117	15	28	19	4	22	22	3.4
73 113	16	29	20	4	26	23	3.4
77 120	16	29	20	4	16	23	3.4
91 138	18	35	22	5	28	27	4.5
90 140	19	36	23	5	32	28	4.5

3. For MSFD, rigidity in the Table is theoretical value when an axial load equivalent to 30% of the dynamic load rating (*C<sub>a</sub>*) is applied. For MPFD, the rigidity is theoretical value when the axial load is applied and the preload is 0.05*C<sub>a</sub>*. Refer to "Technical Explanation" (Page B521) if axial load differs from the conditions above, or when considering change in the deformation of the ball nut itself.



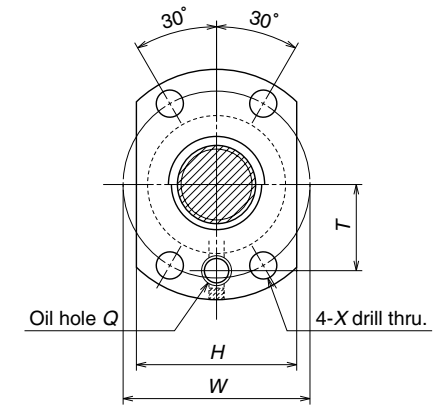
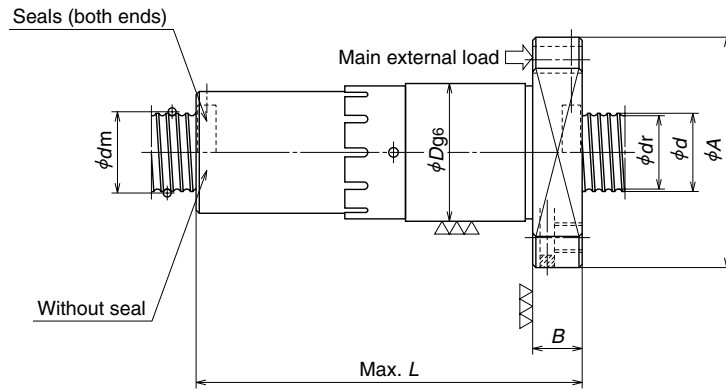
Model No.	Shaft dia. $d$	Lead $l$	Ball dia. $D_w$	Ball circle dia. $d_m$	Root dia. $d_r$	Effective turns of balls Turns × Circuits	Basic load rating (N)	
							Dynamic $C_a$	Static $C_{0a}$
MSFD 1201-3 MPFD 1201-3	12	1	0.800	12.2	11.2	1×3	795	1980
MSFD 1202-3 MPFD 1202-3		2	1.200	12.3	10.9	1×3	1660	3620
MSFD 1202.5-3 MPFD 1202.5-3		2.5	1.588	12.4	10.6	1×3	2360	4540
MSFD 1203-3 MPFD 1203-3		3	2.000	12.5	10.2	1×3	3120	5420
MSFD 1402-3 MPFD 1402-3	14	2	1.200	14.3	12.9	1×3	1780	4270
MSFD 1403-3 MPFD 1403-3		3	2.000	14.5	12.2	1×3	3400	6490
MSFD 1602-4 MPFD 1602-4	16	2	1.588	16.4	14.6	1×4	3510	8450
MSFD 1602.5-4 MPFD 1602.5-4		2.5	1.588	16.4	14.6	1×4	3510	8450
MSFD 2002-4 MPFD 2002-4	20	2	1.588	20.4	18.6	1×4	3910	10900
MSFD 2502-4 MPFD 2502-4	25	2	1.588	25.4	23.6	1×4	4310	13900
MSFD 3202-6 MPFD 3202-6	32	2	1.588	32.4	30.6	1×6	6790	27200
MSFD 4002-6 MPFD 4002-6	40	2	1.588	40.4	38.6	1×6	7380	33900

- Remarks
1. Seal is not put on the lead is 1 mm or smaller. (Refer to Page B526 for dust protection.)
  2. Those with shaft diameter of 14 mm or smaller do not have lubrication oil hole. It is recommended to use those with seal when shaft diameter is 16 mm or larger and have lubrication oil hole.
  3. The right turn screw is standard. Please consult NSK for left turn screw.

Unit: mm

Axial rigidity $K$ (N/ $\mu$ m)	Ball nut dimensions								
	$D$	$A$	$H$	$B$	$L$	$W$	$X$	$Q$	$T$
88 137	18	31	22	4	16	25	3.4	—	—
108 168	20	37	24	5	28	29	4.5	—	—
107 167	21	38	25	5	32	30	4.5	—	—
107 166	22	39	26	5	36	31	4.5	—	—
122 191	22	41	26	6	29	32	5.5	—	—
127 196	24	43	28	6	37	34	5.5	—	—
185 288	25	44	29	10	40	35	5.5	M6×1	16
185 288	25	44	29	10	44	35	5.5	M6×1	16
225 351	30	49	34	10	40	40	5.5	M6×1	18.5
273 425	36	55	40	10	40	46	5.5	M6×1	21.5
494 769	42	65	46	10	50	54	6.6	M6×1	26.5
588 916	51	74	55	10	50	63	6.6	M6×1	31

4. For MSFD, rigidity in the Table is theoretical value when an axial load equivalent to 30% of the dynamic rating load ( $C_a$ ) is applied. For MPFD, rigidity is theoretical value when an axial load is applied and the pre-load is 0.05 $C_a$ . Refer to "Technical Description" (Page B521) if axial load differs from the conditions above, or when considering change in the deformation of the ball nut itself.



Model No.	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 $C_o$	Static $C_{0s}$
<b>MJFD 0801.5-3</b>	8	1.5	1.000	8.3	7	1×3	1080	1980
<b>MJFD 1002-3</b>	10	2	1.200	10.3	8.9	1×3	1490	2850
<b>MJFD 1202-3</b>	12	2	1.200	12.3	10.9	1×3	1660	3620
<b>MJFD 1202.5-3</b>		2.5	1.588	12.4	10.6	1×3	2360	4540
<b>MJFD 1203-3</b>		3	2.000	12.5	10.2	1×3	3120	5420
<b>MJFD 1402-3</b>	14	2	1.200	14.3	12.9	1×3	1780	4270
<b>MJFD 1403-3</b>		3	2.000	14.5	12.2	1×3	3400	6490
<b>MJFD 1602-4</b>	16	2	1.588	16.4	14.6	1×4	3510	8450
<b>MJFD 1602.5-4</b>		2.5	1.588	16.4	14.6	1×4	3510	8450
<b>MJFD 2002-4</b>	20	2	1.588	20.4	18.6	1×4	3910	10900
<b>MJFD 2502-4</b>	25	2	1.588	25.4	23.6	1×4	4310	13900
<b>MJFD 3202-6</b>	32	2	1.588	32.4	30.6	1×6	6790	27200
<b>MJFD 4002-6</b>	40	2	1.588	40.4	38.6	1×6	7380	33900

Remarks 1. Those under the shaft diameter of 14 mm do not have an oil hole. It is recommended to use those with seal when shaft diameter is 16 mm or larger and have the oil hole.  
2. Right turn thread screw is standard. Please consult NSK for left turn screw.

Axial rigidity $K$ (N/ $\mu$ m)	Ball nut dimensions								
	$D$	$A$	$H$	$B$	$L$	$W$	$X$	$Q$	$T$
103	18	31	22	4	47	25	3.4	—	—
125	21	38	25	5	58	30	4.5	—	—
148	23	40	27	5	58	32	4.5	—	—
147	24	41	28	5	68	33	4.5	—	—
146	25	42	29	5	75	34	4.5	—	—
168	25	44	29	6	59	35	5.5	—	—
168	27	46	31	6	76	37	5.5	—	—
257	28	47	32	10	79	38	5.5	M6×1	17.5
257	28	47	32	10	87	38	5.5	M6×1	17.5
308	34	53	38	10	79	44	5.5	M6×1	20.5
373	40	59	44	10	80	50	5.5	M6×1	23.5
676	46	69	50	10	98	58	6.6	M6×1	28.5
805	56	79	60	10	98	68	6.6	M6×1	33.5

3. Rigidity in the Table is theoretical value when the axial load of 0.30C<sub>o</sub> is applied to the major external load (above figure), and the preload is 0.10C<sub>o</sub>. Consult NSK if preload differs from above condition.