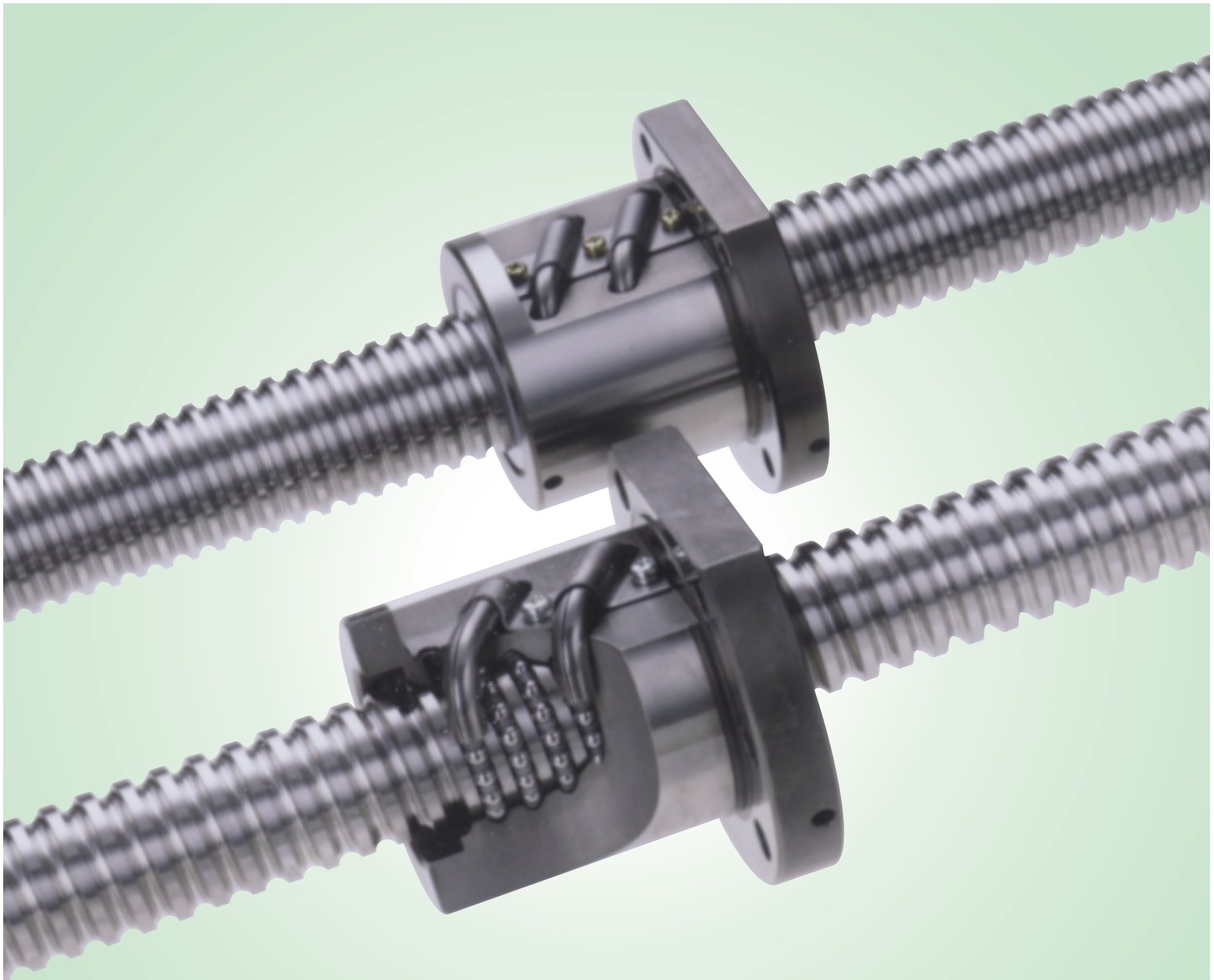


NSK S1 Series™ Precision Ball Screw

S1 Series ball screws bring a new level of “gentleness” to machine drive systems. Quieter and smoother movement is friendlier to both people and the environment.



Patent Pending



NSK's new ball screws feature low noise emission and superior movement, enabling improved environmental compatibility and a higher degree of functionality for machinery and other equipment!
Designed for the 21st Century, this series is friendlier to both people and the environment.

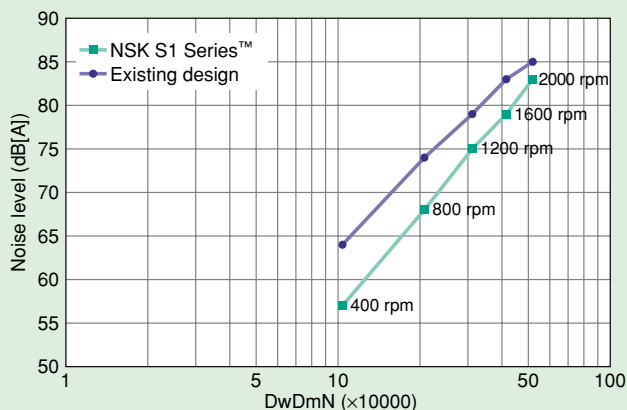


The NSK S1 Series™ Precision Ball Screw features plastic retainers between the balls to prevent them from colliding or rubbing.

1. Features

1.1 Lower level of noise and vibration

The retainers eliminate collision amongst the balls, improving both the level and quality of noise, as well as reducing vibration.



Test piece: Shaft diameter: $\phi 40$ mm
Lead: 10 mm
Ball diameter: 6.35 mm
Test conditions: Lubrication: Oil (VG68)
Position of Microphone: 400 mm above the test piece

Figure 1 Noise level

1.2 Smoother motion

The elimination of friction between the balls improves characteristics of dynamic torque and enables smooth, stable movement, particularly during low-speeds or oscillating motion.

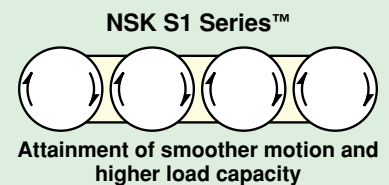
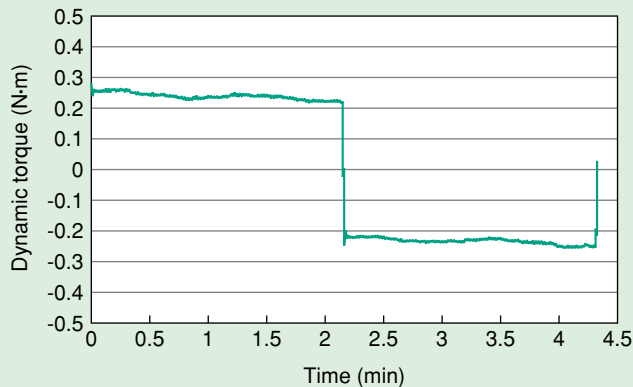
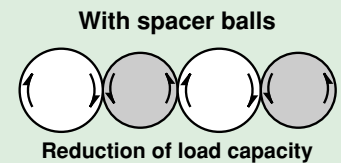
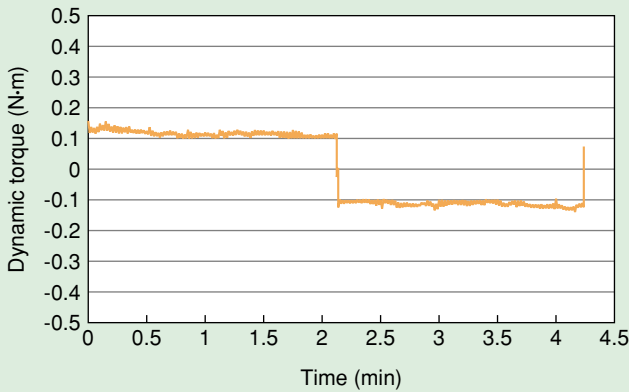
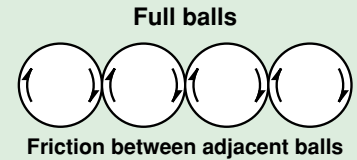
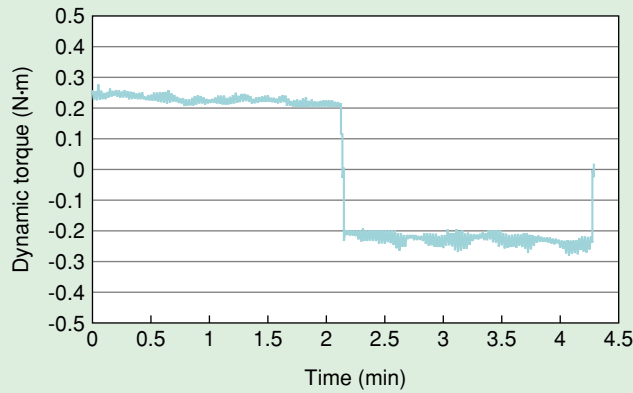


Figure 2 Smoothness [dynamic torque in a low rotational speed (10 rpm)]

1.3 Improved load carrying capacity and rigidity

Spacer balls are often incorporated to improve smoothness. As a result, however, load carrying capacity and rigidity are compromised due to the reduction in number of load carrying balls. Incorporation of the retaining piece design minimizes such a reduction and thereby improves load carrying capacity and rigidity, compared to the use of spacer balls.

1.4 Interchangeability

Incorporating the retaining piece does not affect any of the external dimensions of a ball nut. Thus, interchangeability with existing series with regard to their dimensions is maintained.

2. Specifications

(1) Accuracy

Accuracy grade: C5 of JIS B1192 (1997) or better.

(2) Axial play

Standard axial play is 0 (with oversize ball preload).

(3) Recirculation method

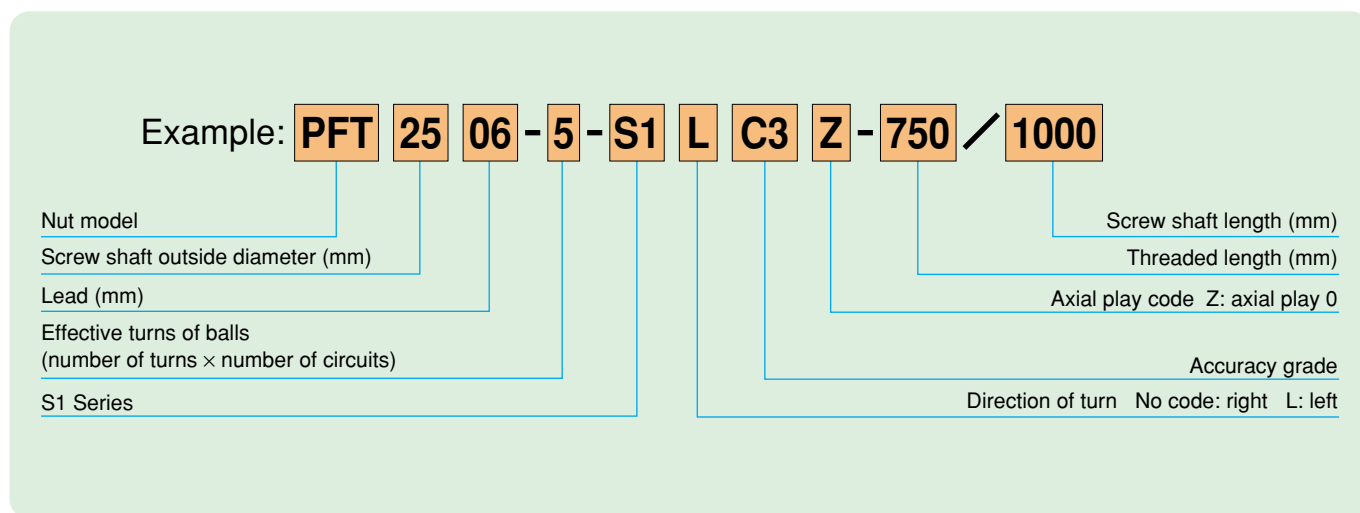
Ball return tube type is used.

* Option

For information about equipment of the NSK K1™ Lubrication Unit and ball screws beyond the Series, please contact NSK.

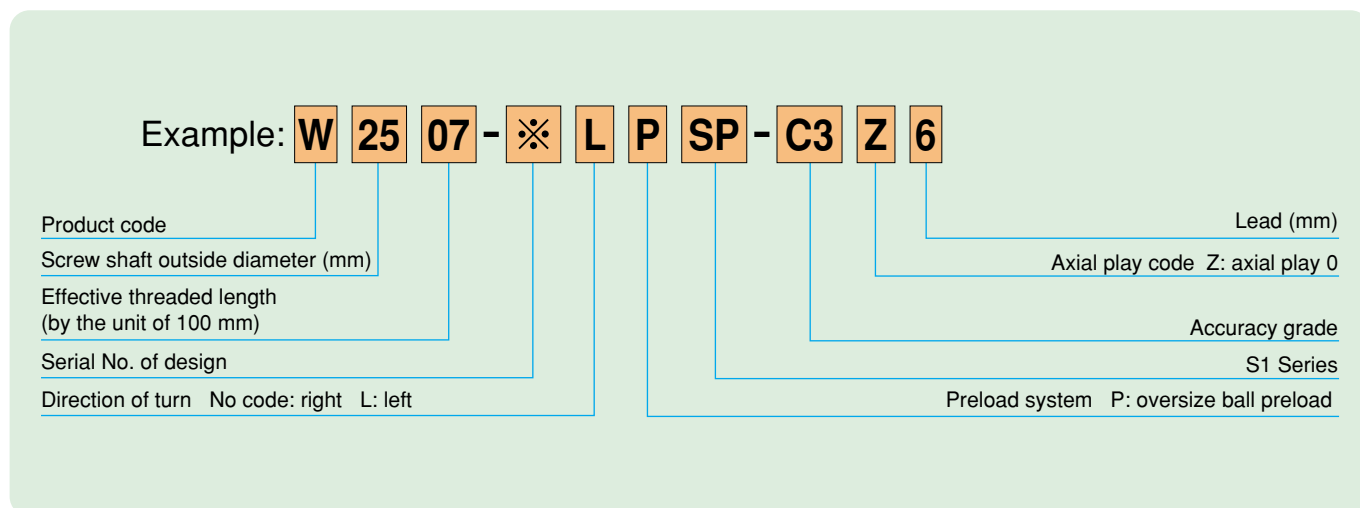
3. Specification number

This number comprises codes and numbers which indicate key specifications, and is generated when the customer and NSK define specifications.



4. Reference number

Each ball screw has a number, and once the specifications have been defined, this number is recorded on approval drawings of the product to be supplied. When placing an order, please provide this product number.



5. Application examples

Applications that require lower noise levels and a lower level of vibration

Measuring equipment,
pattern generators,
medical equipment,
office equipment

Applications that require smoother motion

Electric wire cutting
discharge machines,
scanners,
pattern generators,
steppers

Applications that require higher load carrying capacity and rigidity

Those applications which
require their characteristics,
but with a compact nut.

Handling Precautions

1. Temperature range

- Maximum operating temperature: 50°C
- Maximum momentary temperature: 80°C

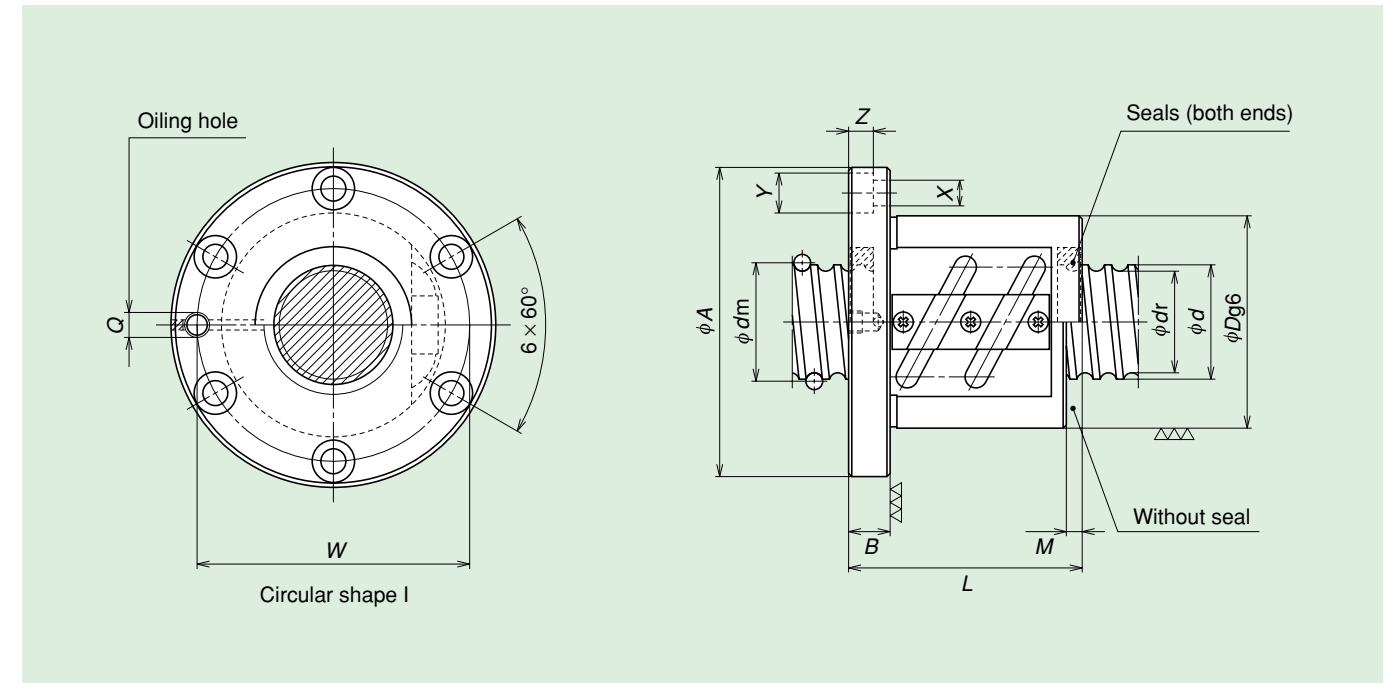
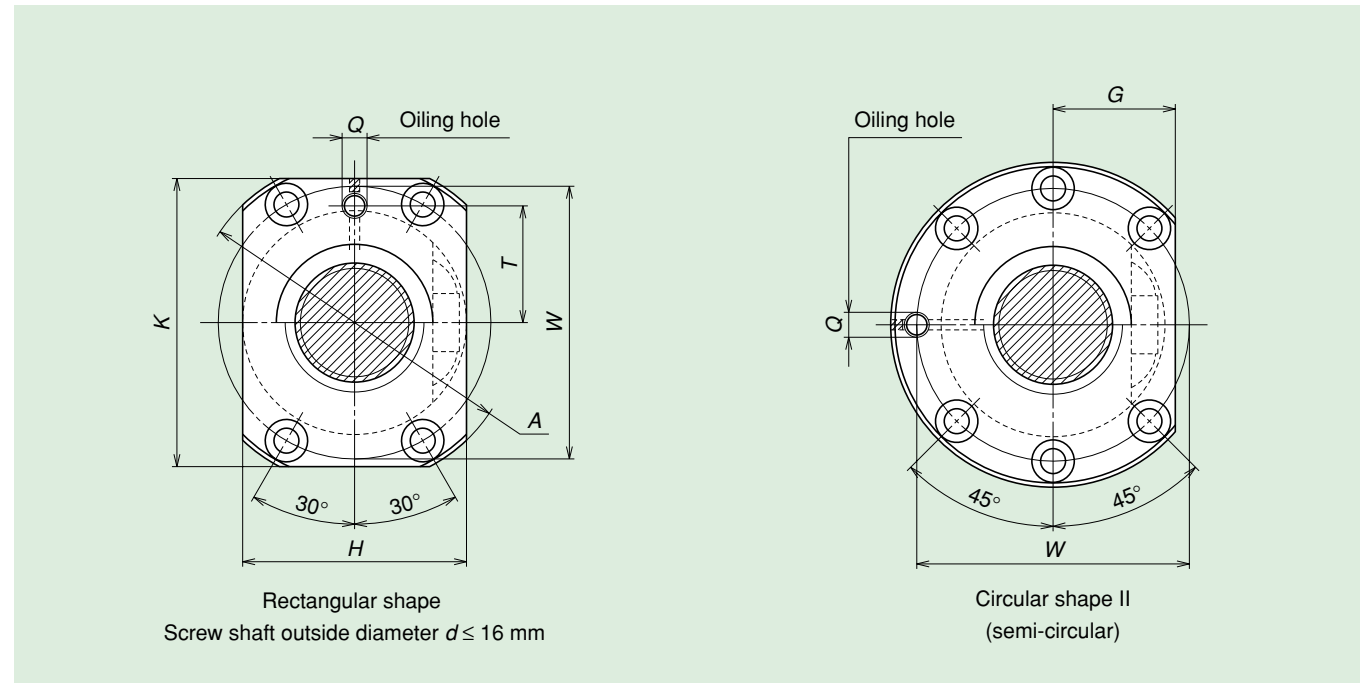
2. Usage conditions

- We recommend using “NSK S1 Series™” products in a clean environment in order to extract their full range of capabilities.

6. Dimensions

Return tube type, flanged single nut

Nut model: PFT (oversize ball preload)



Unit: mm

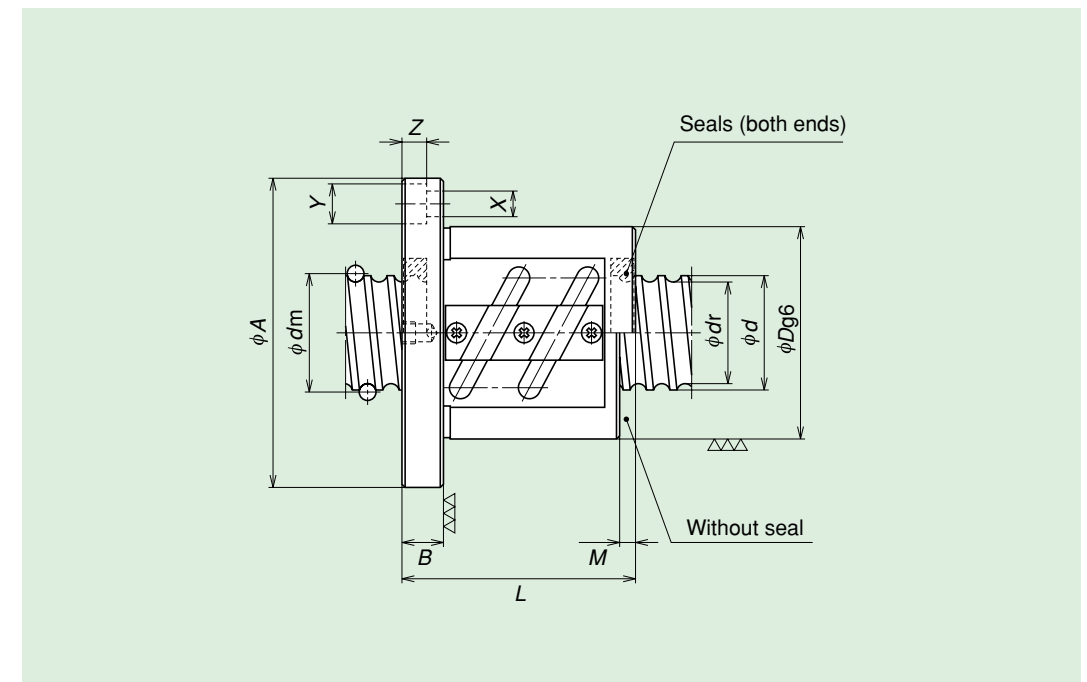
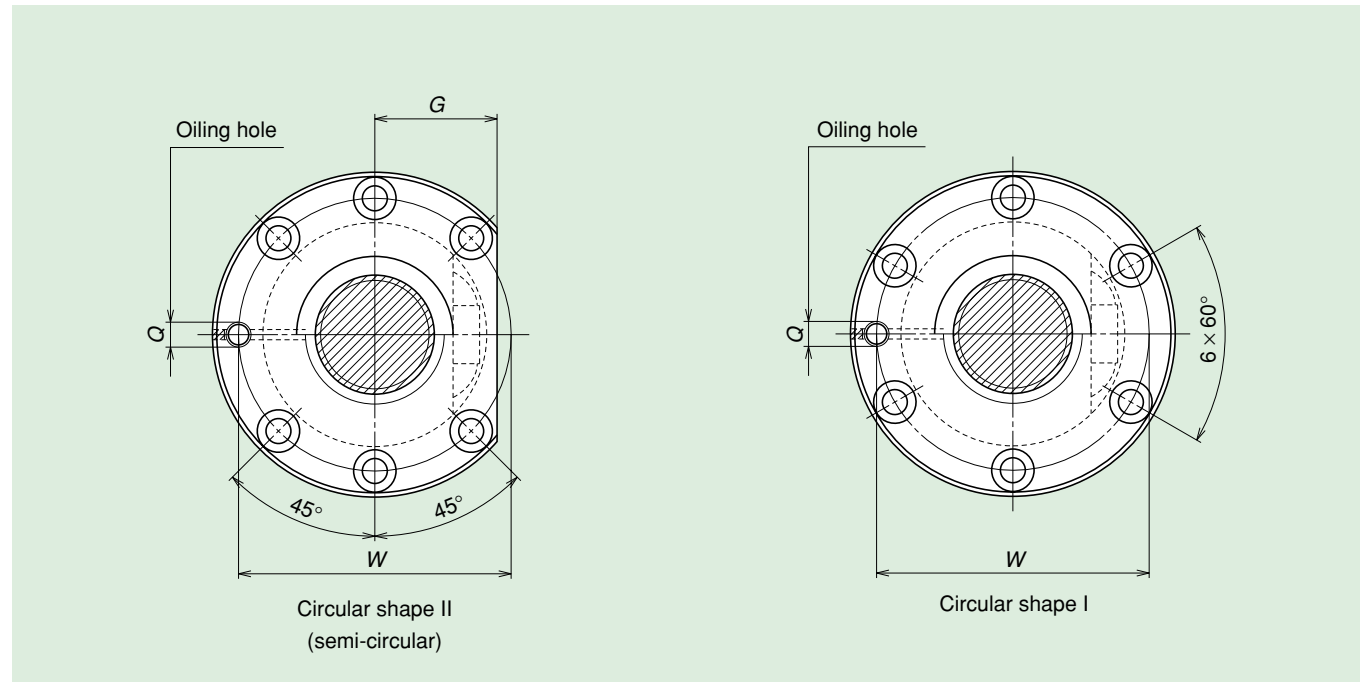
Model No.	Screw shaft diameter d	Lead l	Ball diameter D_w	Ball circle diameter d_m	Root diameter d_r	Effective turns of balls No. of turns × No. of circuits	Basic load rating (N)		Axial rigidity K (N/μm)	Ball nut dimensions													
							Dynamic C_d	Static C_{sa}		D	A	G	H	K	B	L	M	W	X	Y	Z	Q	T
PFT 1605-3-S1 PFT 1605-5-S1	16	5	3.175	16.5	13.2	1.5 × 2 2.5 × 2	8210 12700	14900 25000	271 447	40	63	-	40	55	11	52 57	-	51	5.5	9.5	5.5	M6 × 1	20
PFT 1606-2.5-S1		6	3.175	16.5	13.2	2.5 × 1	7020	12500	229	40	63	-	40	55	11	44	-	51	5.5	9.5	5.5	M6 × 1	20
PFT 2005-3-S1 PFT 2005-5-S1	20	5	3.175	20.5	17.2	1.5 × 2 2.5 × 2	8970 13900	18500 31500	320 532	44	67	26	-	-	11	52 56	3	55	5.5	9.5	5.5	M6 × 1	-
PFT 2006-2.5-S1 PFT 2006-3-S1		6	3.969	20.5	16.4	2.5 × 1 1.5 × 2	10500 12300	19500 23200	283 335	48	71	27	-	-	11	44 56	3	59	5.5	9.5	5.5	M6 × 1	-
PFT 2008-2.5-S1		8	3.969	20.5	16.4	2.5 × 1	10500	19500	284	48	75	28	-	-	13	54	5	61	6.6	11	6.5	M6 × 1	-
PFT 2505-3-S1 PFT 2505-5-S1	25	5	3.175	25.5	22.2	1.5 × 2 2.5 × 2	10100 15700	23600 39500	389 639	50	73	28	-	-	11	52 55	3	61	5.5	9.5	5.5	M6 × 1	-
PFT 2506-3-S1 PFT 2506-5-S1		6	3.969	25.5	21.4	1.5 × 2 2.5 × 2	13400 20800	28900 48200	396 655	53	76	29	-	-	11	56 62	3	64	5.5	9.5	5.5	M6 × 1	-

Note: 1. With a shaft outer diameter of 16 mm, the flange form is rectangular. For shafts with outside diameters of 20 mm or more, both Circular I and Circular II flange forms are available. Please select the type in accordance with the nut mounting space.
2. Where there is no seal, the nut is shortened by M in comparison to its length with a seal.
3. Right-turning screws are standard. With left-turning screws, "L" is affixed to the end of the model description.

4. Because the ratio of loading balls to retaining pieces is 1:1, basic load ratings are different from those of other models.
5. Rigidity values in this table are theoretical values derived from elastic displacement between screw grooves and balls when axial load is added to preload, which is set at 5% of the basic dynamic load rating (C_d). Please see "Technical Description of Ball Screws" in the general catalog of precision machine components (No. 3155) when preload conditions are different from those indicated above, or when ball nut deformation is to be taken into account.

Return tube type, flanged single nut

Nut model: PFT (oversize ball preload)



Unit: mm

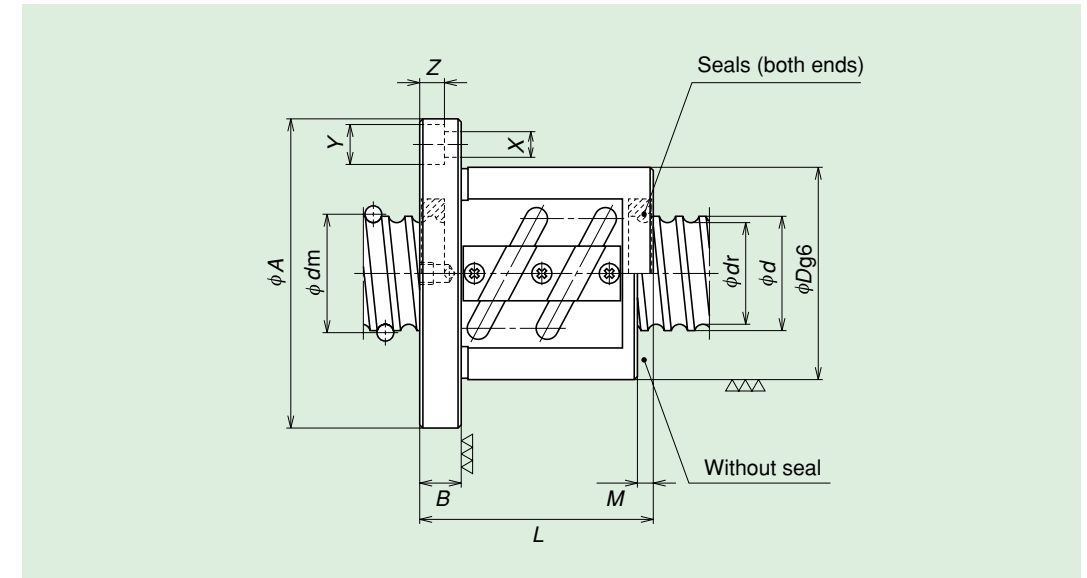
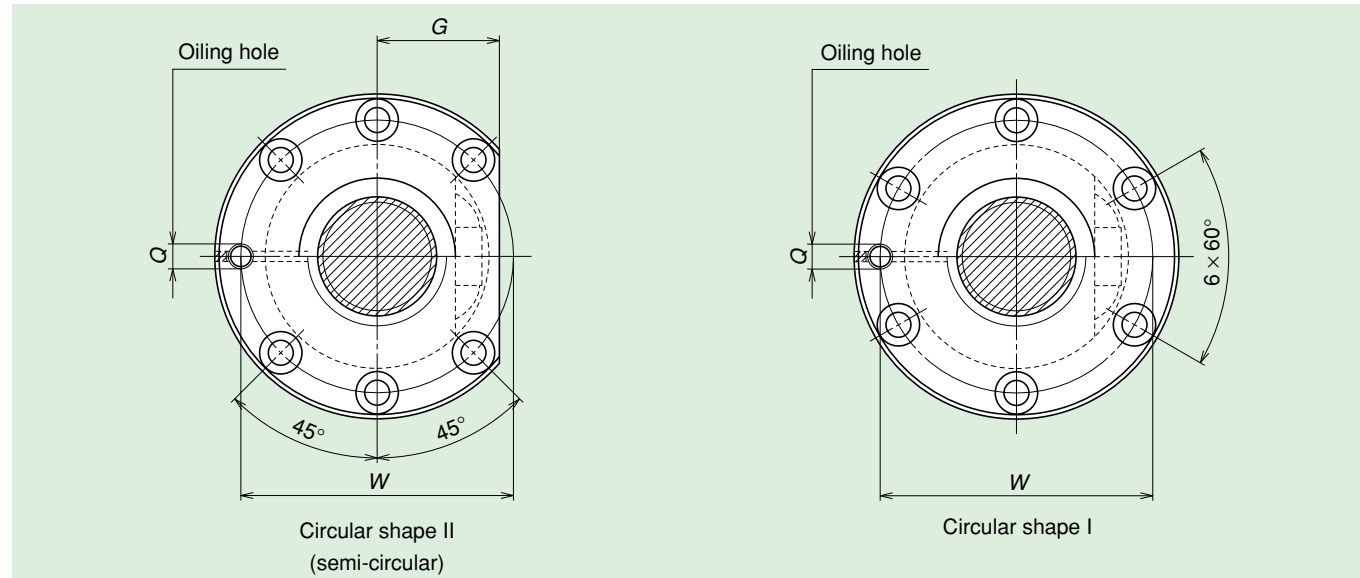
Model No.	Screw shaft diameter <i>d</i>	Lead <i>l</i>	Ball diameter <i>D_w</i>	Ball circle diameter <i>d_m</i>	Root diameter <i>d_r</i>	Effective turns of balls No. of turns × No. of circuits	Basic load rating (N)		Axial rigidity K (N/μm)	Ball nut dimensions												
							Dynamic <i>C_a</i>	Static <i>C_{0a}</i>		<i>D</i>	<i>A</i>	<i>G</i>	<i>B</i>	<i>L</i>	<i>M</i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>	<i>Q</i>		
PFT 2508-2.5-S1 PFT 2508-3-S1	25	8	4.762	25.5	20.5	2.5 × 1 1.5 × 2	14500 17000	28900 35000	343 409	58	85	32	13	56	5	71	6.6	11	6.5	M6 × 1		
69																						
PFT 2510-2.5-S1 PFT 2510-3-S1	25	10	4.762	25.5	20.5	2.5 × 1 1.5 × 2	14500 17000	28900 35000	343 410	58	85	32	15	67	8	71	6.6	11	6.5	M6 × 1		
81																						
PFT 2805-5-S1	28	5	3.175	28.5	25.2	2.5 × 2	16200	43900	696	55	85	31	12	56	3	69	6.6	11	6.5	M6 × 1		
PFT 2806-3-S1 PFT 2806-5-S1		6												57							63	
PFT 2810-2.5-S1 PFT 2810-3-S1		10												68							82	
PFT 3205-3-S1 PFT 3205-5-S1 PFT 3205-7.5-S1	32	5	3.175	32.5	29.2	1.5 × 2 2.5 × 2 2.5 × 3	11100 17300 24500	30100 50500 75700	473 770 1130	58	85	32	12	53	3	71	6.6	11	6.5	M6 × 1		
PFT 3206-3-S1 PFT 3206-5-S1														6							57	63
PFT 3208-3-S1 PFT 3208-5-S1														8							71	82
PFT 3210-2.5-S1 PFT 3210-3-S1 PFT 3210-5-S1	32	10	6.35	33.0	26.4	1.5 × 2 2.5 × 2	24400 28600 44400	50000 59400 99900	440 521 853	74	108	41	15	70	7	90	9	14	8.5	M6 × 1		
PFT 3212-2.5-S1 PFT 3212-3-S1														81							97	
100																						

Notes: 1. Both Circular I and Circular II flange forms are available. Please select the type in accordance with the nut mounting space.
2. Where there is no seal, the nut is shortened by M in comparison to its length with a seal.
3. Right-turning screws are standard. With left-turning screws, "L" is affixed to the end of the model description.

4. Because the ratio of loading balls to retaining pieces is 1:1, basic load ratings are different from those of other models.
5. Rigidity values in this table are theoretical values derived from elastic displacement between screw grooves and balls when axial load is added to preload, which is set at 5% of the basic dynamic load rating (*C_a*). Please see "Technical Description of Ball Screws" in the general catalog of precision machine components (No. 3155) when preload conditions are different from those indicated above, or when ball nut deformation is to be taken into account.

Return tube type, flanged single nut

Nut model: PFT (oversize ball preload)



Unit: mm

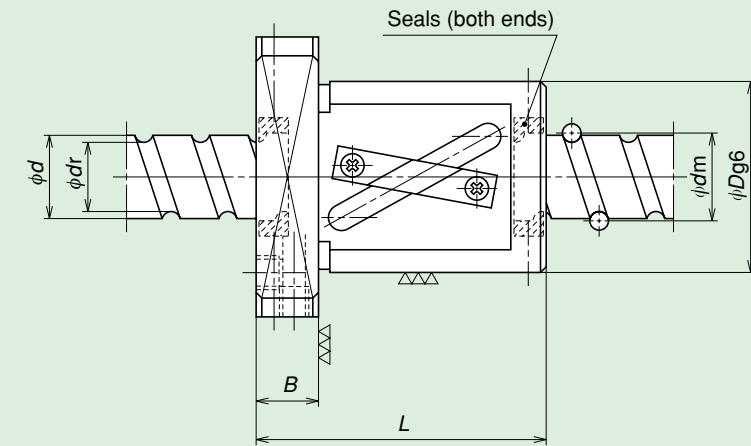
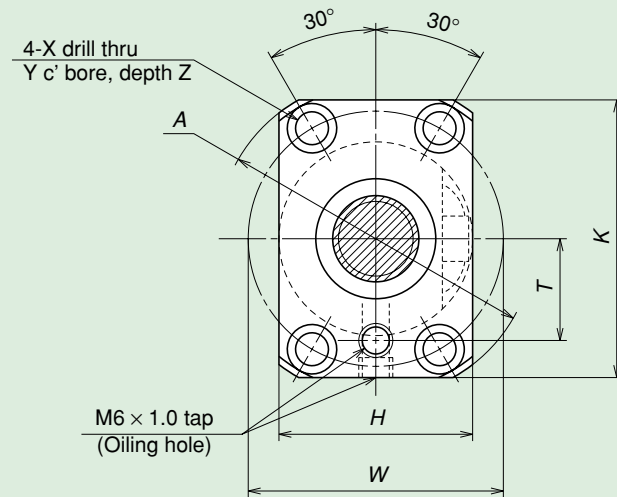
Model No.	Screw shaft diameter <i>d</i>	Lead <i>ℓ</i>	Ball diameter <i>D_w</i>	Ball circle diameter <i>d_m</i>	Root diameter <i>d_r</i>	Effective turns of balls No. of turns × No. of circuits	Basic load rating (N)		Axial rigidity K (N/μm)	Ball nut dimensions										
							Dynamic <i>C_a</i>	Static <i>C_{0a}</i>		<i>D</i>	<i>A</i>	<i>G</i>	<i>B</i>	<i>L</i>	<i>M</i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>	<i>Q</i>
PFT 3605-5-S1 PFT 3605-7.5-S1	36	5	3.175	36.5	33.2	2.5 × 2 2.5 × 3	18300 25900	57000 85500	849 1250	65	100	38	15	59	3	82	9	14	8.5	M6 × 1
74																				
PFT 3606-5-S1 PFT 3606-7.5-S1		6	3.969	36.5	32.4	2.5 × 2 2.5 × 3	24700 34900	70900 106000	871 1280	65	100	38	15	66	3	82	9	14	8.5	M6 × 1
84																				
PFT 3610-2.5-S1 PFT 3610-3-S1 PFT 3610-5-S1		10	6.35	37.0	30.4	1.5 × 2 2.5 × 2	25100 29400 45600	55800 68100 112000	476 573 921	75	120	45	18	73	7	98	11	17.5	11	M6 × 1
90																				
103																				
PFT 4005-3-S1 PFT 4005-5-S1 PFT 4005-7.5-S1	40	5	3.175	40.5	37.2	1.5 × 2 2.5 × 2 2.5 × 3	12200 18900 26700	38100 63500 95300	566 920 1350	67	101	39	15	56	3	83	9	14	8.5	PT1/8
59																				
74																				
PFT 4006-5-S1 PFT 4006-7.5-S1		6	3.969	40.5	36.4	2.5 × 2 2.5 × 3	25900 36600	78800 118000	950 1390	70	104	40	15	66	3	86	9	14	8.5	PT1/8
84																				
PFT 4008-3-S1 PFT 4008-5-S1		8	4.762	40.5	35.5	1.5 × 2 2.5 × 2	21300 33000	56300 93900	595 969	74	108	41	15	71	5	90	9	14	8.5	PT1/8
82																				
PFT 4010-2.5-S1 PFT 4010-3-S1 PFT 4010-5-S1	10	6.35	41.0	34.4	1.5 × 2 2.5 × 2	26700 31200 48500	63100 74000 126000	524 615 1010	82	124	47	18	73	7	102	11	17.5	11	PT1/8	
90																				
103																				
PFT 4510-2.5-S1 PFT 4510-5-S1 PFT 4510-7.5-S1	45	10	6.35	46.0	39.4	2.5 × 1 2.5 × 2 2.5 × 3	28000 50900 72100	70400 141000 211000	571 1100 1620	88	132	50	18	73	7	110	11	17.5	11	PT1/8
103																				
133																				
PFT 5005-3-S1 PFT 5005-4.5-S1	50	5	3.175	50.5	47.2	1.5 × 2 1.5 × 3	13300 18800	47600 71400	670 990	80	114	43	15	58	3	96	9	14	8.5	PT1/8
68																				
PFT 5006-5-S1 PFT 5006-7.5-S1		6	3.969	50.5	46.4	2.5 × 2 2.5 × 3	28200 40000	99300 149000	1130 1670	84	118	45	15	68	3	100	9	14	8.5	PT1/8
86																				
PFT 5008-5-S1 PFT 5008-7.5-S1		8	4.762	50.5	45.5	2.5 × 2 2.5 × 3	36400 51500	118000 178000	1160 1700	87	129	49	18	85	5	107	11	17.5	11	PT1/8
109																				
PFT 5010-2.5-S1 PFT 5010-5-S1 PFT 5010-7.5-S1	10	6.35	51.0	44.4	2.5 × 1 2.5 × 2 2.5 × 3	30100 54600 77400	79100 158000 237000	629 1210 1790	93	135	51	18	73	7	113	11	17.5	11	PT1/8	
103																				
133																				

Notes: 1. Both Circular I and Circular II flange forms are available. Please select the type in accordance with the nut mounting space.
2. Where there is no seal, the nut is shortened by M in comparison to its length with a seal.
3. Right-turning screws are standard. With left-turning screws, "L" is affixed to the end of the model description.

4. Because the ratio of loading balls to retaining pieces is 1:1, basic load ratings are different from those of other models.
5. Rigidity values in this table are theoretical values derived from elastic displacement between screw grooves and balls when axial load is added to preload, which is set at 5% of the basic dynamic load rating (*C_a*). Please see "Technical Description of Ball Screws" in the general catalog of precision machine components (No. 3155) when preload conditions are different from those indicated above, or when ball nut deformation is to be taken into account.

Return tube type, medium/high helix lead, flanged single nut

Nut model: LPFT (oversize ball preload)



Model No.	Screw shaft diameter d	Lead ℓ	Ball diameter D_w	Ball circle diameter d_m	Root diameter d_r	Effective turns of balls No. of turns \times No. of circuits	Basic load rating (N)		Axial rigidity K (N/ μ m)	Ball nut dimensions										
							Dynamic C_a	Static C_{oa}		D	A	H	K	B	L	W	X	Y	Z	T
LPFT 1616-1.5-S1	16	16	3.175	16.75	13.4	1.5 \times 1	4520	7440	147	40	63	40	55	12	56	51	5.5	9.5	5.5	17
LPFT 2010-2.5-S1	20	10	3.969	21.0	16.9	2.5 \times 1	10500	19500	289	46	74	46	66	13	54	59	6.6	11	6.5	24
LPFT 2016-2.5-S1		16	3.969	21.0	16.9	2.5 \times 1	10500	19500	291	46	74	46	66	13	72	59	6.6	11	6.5	24
LPFT 2020-1.5-S1		20	3.969	21.0	16.9	1.5 \times 1	6750	11600	180	46	74	46	66	13	63	59	6.6	11	6.5	24

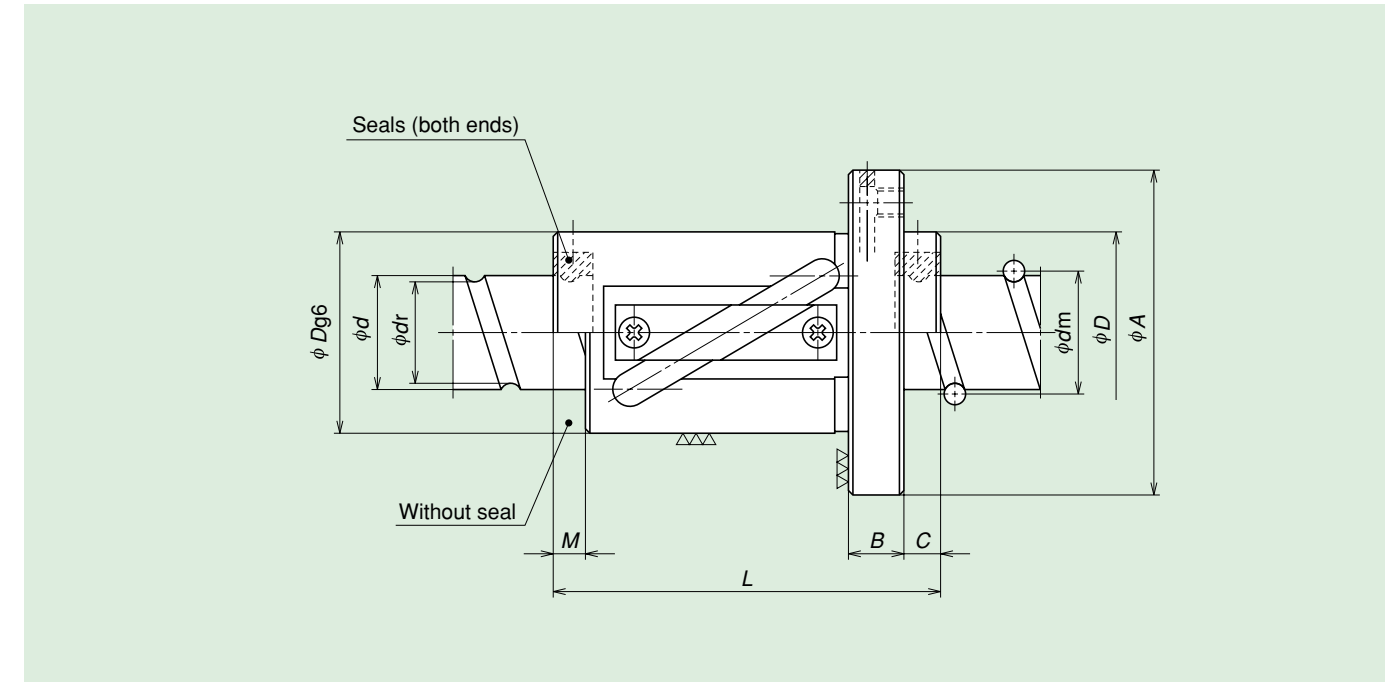
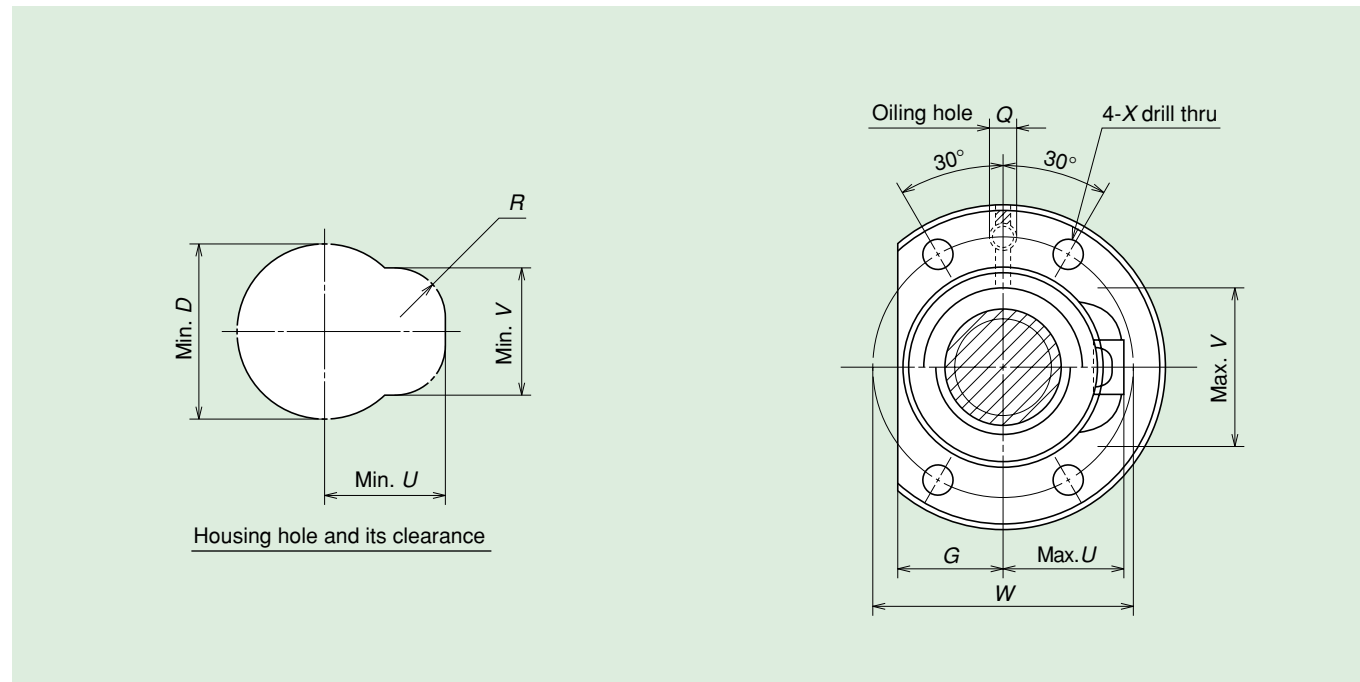
Unit: mm

Notes: 1. Inclusion of seals is standard. Outside dimensions are unchanged by the removal of seals.
2. Right-turning screws are standard. With left-turning screws, "L" is affixed to the end of the model description.

3. Because the ratio of loading balls to retaining pieces is 1:1, basic load ratings are different from those of other models.
4. Rigidity values in this table are theoretical values derived from elastic displacement between screw grooves and balls when axial load is added to preload, which is set at 5% of the basic dynamic load rating (C_a). Please see "Technical Description of Ball Screws" in the general catalog of precision machine components (No. 3155) when preload conditions are different from those indicated above, or when ball nut deformation is to be taken into account.

Return tube type, medium/high helix lead, flanged single nut

Nut model: LPFT (oversize ball preload)



Unit: mm

Model No.	Screw shaft diameter d	Lead ℓ	Ball diameter D_w	Ball circle diameter d_m	Root diameter d_r	Effective turns of balls No. of turns x No. of circuits	Basic load rating (N)		Axial rigidity K (N/ μ m)	Ball nut dimensions													
							Dynamic C_a	Static C_{oa}		D	A	G	B	C	L	M	W	X	U	V	R	Q	
LPFT 2516-2.5-S1 LPFT 2516-3-S1	25	16	4.762	26.25	21.3	2.5 x 1 1.5 x 2	15100 17600	29800 35100	361 429	44	71	23	12	8	84 100	6	57	6.6	31	35	12	M6 x 1	
LPFT 2520-2.5-S1 LPFT 2520-3-S1		20	4.762	26.25	21.3	2.5 x 1 1.5 x 2	15100 17600	29800 35100	362 431	44	71	23	12	8	96 116	7	57	6.6	31	35	12	M6 x 1	
LPFT 2525-1.5-S1		25	4.762	26.25	21.3	21.3	1.5 x 1	9720	17500	223	44	71	23	12	10	90	10	57	6.6	32	34	12	M6 x 1
LPFT 3220-2.5-S1 LPFT 3220-3-S1	32	20	4.762	33.25	28.3	2.5 x 1 1.5 x 2	16800 19700	38000 46500	433 516	51	85	26	15	8	99 119	7	67	9	34	42	12	M6 x 1	
LPFT 3225-2.5-S1 LPFT 3225-3-S1		25	4.762	33.25	28.3	28.3	2.5 x 1 1.5 x 2	16800 19700	38000 46500	440 518	51	85	26	15	10	117 142	10	67	9	34	42	12	M6 x 1
LPFT 3232-1.5-S1		32	4.762	33.25	28.3	28.3	1.5 x 1	10800	23200	275	51	85	26	15	12	109	13	67	9	34	42	12	M6 x 1
LPFT 4020-2.5-S1 LPFT 4020-3-S1	40	20	6.35	41.75	35.1	2.5 x 1 1.5 x 2	27600 32300	63100 76900	539 638	64	106	33	18	10	99 119	10	84	11	42	52	15	PT1/8	
LPFT 4025-2.5-S1 LPFT 4025-3-S1		25	6.35	41.75	35.1	35.1	2.5 x 1 1.5 x 2	27600 32300	63100 76900	540 640	64	106	33	18	10	123 148	10	84	11	42	52	15	PT1/8
LPFT 4032-2.5-S1		32	6.35	41.75	35.1	35.1	2.5 x 1	27600	63100	550	64	106	33	18	12	146	13	84	11	42	52	15	PT1/8

Notes: 1. Where there are no seals, the nut is shortened by M and C in comparison to its length with seals.
2. Right-turning screws are standard. With left-turning screws, "L" is affixed to the end of the model description.

3. Because the ratio of loading balls to retaining pieces is 1:1, basic load ratings are different from those of other models.
4. Rigidity values in this table are theoretical values derived from elastic displacement between screw grooves and balls when axial load is added to preload, which is set at 5% of the basic dynamic load rating (C_a). Please see "Technical Description of Ball Screws" in the general catalog of precision machine components (No. 3155) when preload conditions are different from those indicated above, or when ball nut deformation is to be taken into account.