


B-I-7.5 U Type (High helix · ultra high helix lead) Ball Screws

(1) Product categories

U Type ball screws use end cap recirculation system. There are several models by difference in the preload system (Table I-7·5). Since the leads are in the range larger than 1.3 times of the screw

shaft diameter, U Type is even more suitable than L Type for high-speed operation.

Table I-7·5 Classification of U Type ball screws

| Nut models | Shape | Flange shape | Nut shape | Recirculation system Preload system | Page |
|------------|---|--------------|-----------|---|------|
| USFC |  | Flanged | Circular | End cap | B401 |
| | | Rectangle | | Non-pre-loaded, slight axial play | |
| UPFC | | Flanged | Circular | End cap P Preload (light load) No spacer ball | B401 |
| | | Rectangle | | | |

(2) Features

● **High-speed operation**

The ratio of lead to screw shaft diameter is larger than 1. This is a quite suitable specification for high-speed feed. The lead with the ratio of three times or larger than screw shaft diameter (three-times lead) is particularly ideal for high-speed operation.

(Example) High-speed feed at 180 m/min.
 Lead 50 mm → 3600 min⁻¹
 60 mm → 3000 min⁻¹
 80 mm → 2250 min⁻¹

● **Low noise**

The three-times lead significantly reduces noise more than the 2-times lead under the same traveling speed.

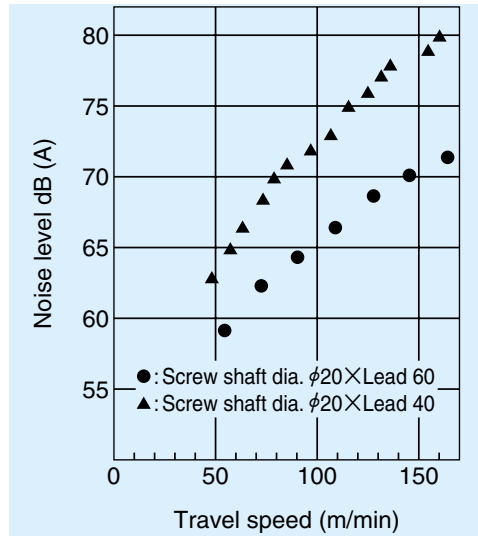


Fig. I-7-4 Noise levels by ultra high helix lead

(3) Accuracy grades

Three-times lead C5, Ct7 grades are available.

Other..... C3, C5, Ct7 grades are available.

※ Please consult NSK for C2 or higher grades.

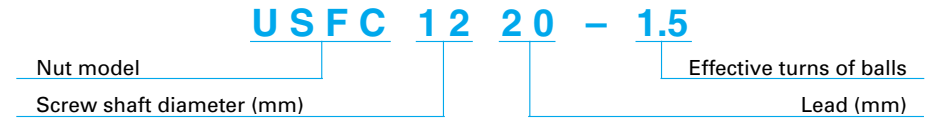
(4) Precaution in designing shaft end

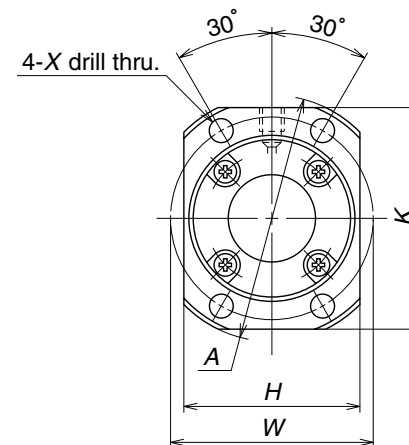
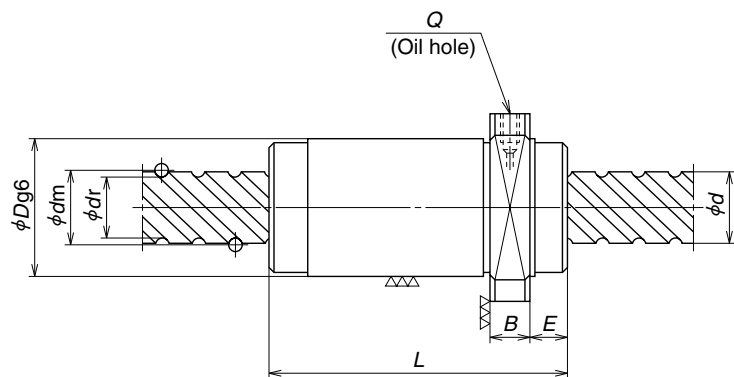
Please note that it is impossible to assemble nut unless one end of ball thread of screw shaft is cut through, and unless the shaft end of this side is smaller than the ball groove root diameter.

(5) Models number

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

(Example) Nut model USFC; shaft diameter 12 mm; lead 20 mm; effective turns of balls 1.5





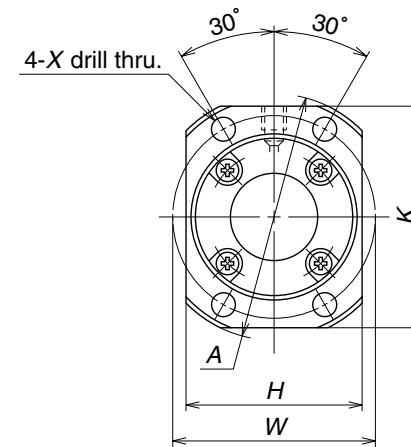
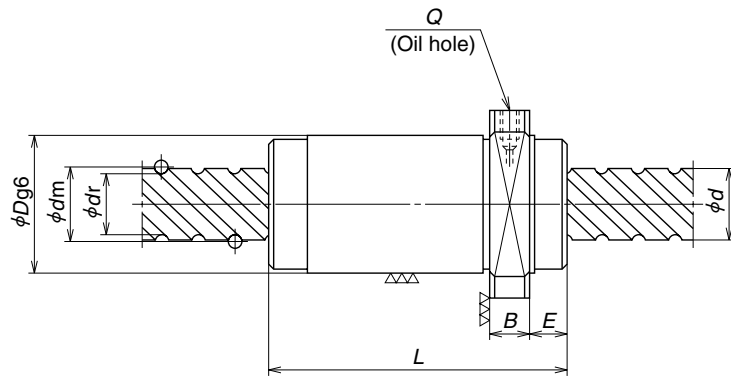
| Model No. | Shaft dia. <i>d</i> | Lead <i>l</i> | Ball dia. <i>D_w</i> | Ball circle dia. <i>d_m</i> | Root dia. <i>d_r</i> | Effective turns of balls Turns × Circuits | Basic load rating (N) | |
|--------------------------------|------------------------|------------------|-----------------------------------|--|-----------------------------------|--|---------------------------------|---------------------------------|
| | | | | | | | Dynamic <i>C_a</i> | Static <i>C_{0a}</i> |
| USFC 1220-1.5 UPFC 1220-1.5 | 12 | 20 | 2.381 | 12.5 | 9.9 | 1.7×1 | 2690 | 4420 |
| USFC 1520-1.5 UPFC 1520-1.5 | 15 | 20 | 3.175 | 15.5 | 12.2 | 1.7×1 | 5070 | 8730 |
| USFC 1540-1 UPFC 1540-1 | | 40 | 3.175 | 15.75 | 12.2 | 0.7×2 | 3860 | 6050 |
| USFC 1540-2 UPFC 1540-2 | 16 | 32 | 3.175 | 15.75 | 12.2 | 0.7×4 | 7000 | 12100 |
| USFC 1632-1 UPFC 1632-1 | | | | 16.75 | 13.4 | 0.7×2 | 4000 | 6690 |
| USFC 1632-3 UPFC 1632-3 | 16 | 32 | 3.175 | 16.75 | 13.4 | 1.7×2 | 8580 | 17000 |
| USFC 1632-6 UPFC 1632-6 | | | | 16.75 | 13.4 | 1.7×4 | 15600 | 34100 |
| USFC 1650-1 UPFC 1650-1 | 20 | 40 | 3.175 | 16.75 | 13.4 | 0.7×2 | 4000 | 6690 |
| USFC 1650-2 UPFC 1650-2 | | | | 16.75 | 13.4 | 0.7×4 | 7260 | 13400 |
| USFC 2040-1 UPFC 2040-1 | 20 | 40 | 3.175 | 20.75 | 17.4 | 0.7×2 | 4490 | 8640 |
| USFC 2040-3 UPFC 2040-3 | | | | 20.75 | 17.4 | 1.7×2 | 9620 | 21000 |
| USFC 2040-6 UPFC 2040-6 | | | | 20.75 | 17.4 | 1.7×4 | 17500 | 42000 |

Remarks 1. For USFC, rigidities in the Table are theoretical values obtained from the elastic deformation between screw groove and balls when axial load is 30% of the dynamic load rating (*C_a*).
For UPFC, rigidities are theoretical values when preload is 5% of the dynamic load rating, and axial load is

| Axial rigidity <i>K</i> (N/μm) | Ball nut dimensions | | | | | | | | | |
|--------------------------------------|---------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | <i>D</i> | <i>A</i> | <i>H</i> | <i>K</i> | <i>B</i> | <i>E</i> | <i>L</i> | <i>W</i> | <i>X</i> | <i>Q</i> |
| 83 129 | 26 | 44 | 28 | 40 | 10 | 9 | 44 | 35 | 4.5 | M6×1 |
| 113 176 | 34 | 55 | 36 | 50 | 10 | 11 | 45 | 45 | 5.5 | M6×1 |
| 105 163 | 32 | 53 | 33 | 48 | 10 | 12 | 40 | 43 | 5.5 | M6×1 |
| 203 315 | 32 | 53 | 33 | 48 | 10 | 12 | 40 | 43 | 5.5 | M6×1 |
| 102 159 | 34 | 55 | 36 | 50 | 10 | 10.5 | 34 | 45 | 5.5 | M6×1 |
| 240 374 | 34 | 55 | 36 | 50 | 10 | 10.5 | 66 | 45 | 5.5 | M6×1 |
| 466 725 | 34 | 55 | 36 | 50 | 10 | 10.5 | 66 | 45 | 5.5 | M6×1 |
| 124 194 | 34 | 55 | 36 | 50 | 10 | 12 | 50 | 45 | 5.5 | M6×1 |
| 240 374 | 34 | 55 | 36 | 50 | 10 | 12 | 50 | 45 | 5.5 | M6×1 |
| 122 191 | 38 | 58 | 40 | 52 | 10 | 11 | 41 | 48 | 5.5 | M6×1 |
| 290 451 | 38 | 58 | 40 | 52 | 10 | 11 | 81 | 48 | 5.5 | M6×1 |
| 562 875 | 38 | 58 | 40 | 52 | 10 | 11 | 81 | 48 | 5.5 | M6×1 |

applied to it. Refer to "Technical Description" (Page B521) if axial load and preload differ from the conditions above, or when considering change in the deformation of the ball nut itself.
2. The right turn screw is standard. Please consult NSK for left turn screw.

Unit: mm



| Model No. | 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) | |
|----------------------------|------------------------|------------------|-----------------------------------|--|-----------------------------------|--|---------------------------------|---------------------------------|
| | | | | | | | Dynamic <i>C_a</i> | Static <i>C_{0a}</i> |
| USFC 2060-1 UPFC 2060-1 | 20 | 60 | 3.175 | 20.75 | 17.4 | 0.7×2 | 4490 | 8640 |
| USFC 2060-2 UPFC 2060-2 | | | | 20.75 | 17.4 | 0.7×4 | 8140 | 17300 |
| USFC 2550-1 UPFC 2550-1 | 25 | 50 | 3.969 | 26 | 21.9 | 0.7×2 | 6700 | 13500 |
| USFC 2550-3 UPFC 2550-3 | | | | 26 | 21.9 | 1.7×2 | 14400 | 32800 |
| USFC 2550-6 UPFC 2550-6 | | | | 26 | 21.9 | 1.7×4 | 26100 | 65600 |
| USFC 2580-1 UPFC 2580-1 | | | | 26 | 21.9 | 0.7×2 | 6700 | 13500 |
| USFC 2580-2 UPFC 2580-2 | 12200 | 27000 | | | | | | |
| USFC 3264-1 UPFC 3264-1 | 32 | 64 | 4.762 | 33.25 | 28.3 | 0.7×2 | 9800 | 20900 |
| USFC 3264-3 UPFC 3264-3 | | | | 33.25 | 28.3 | 1.7×2 | 21000 | 51600 |
| USFC 3264-6 UPFC 3264-6 | | | | 33.25 | 28.3 | 1.7×4 | 38100 | 103000 |

| Axial rigidity <i>K</i> (N/μm) | Ball nut dimensions | | | | | | | | | |
|--------------------------------------|---------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | <i>D</i> | <i>A</i> | <i>H</i> | <i>K</i> | <i>B</i> | <i>E</i> | <i>L</i> | <i>W</i> | <i>X</i> | <i>Q</i> |
| 143 224 | 38 | 58 | 40 | 52 | 10 | 12.3 | 58 | 48 | 5.5 | M6×1 |
| 278 433 | 38 | 58 | 40 | 52 | 10 | 12.3 | 58 | 48 | 5.5 | M6×1 |
| 150 234 | 46 | 70 | 48 | 63 | 12 | 13 | 50 | 58 | 6.6 | M6×1 |
| 363 565 | 46 | 70 | 48 | 63 | 12 | 13 | 100 | 58 | 6.6 | M6×1 |
| 703 1090 | 46 | 70 | 48 | 63 | 12 | 13 | 100 | 58 | 6.6 | M6×1 |
| 184 288 | 46 | 70 | 48 | 63 | 12 | 14.5 | 75 | 58 | 6.6 | M6×1 |
| 359 558 | 46 | 70 | 48 | 63 | 12 | 14.5 | 75 | 58 | 6.6 | M6×1 |
| 196 305 | 58 | 92 | 60 | 82 | 12 | 15.5 | 62 | 74 | 9 | M6×1 |
| 452 703 | 58 | 92 | 60 | 82 | 12 | 15.5 | 126 | 74 | 9 | M6×1 |
| 879 1360 | 58 | 92 | 60 | 82 | 12 | 15.5 | 126 | 74 | 9 | M6×1 |

Remarks 1. For USFC, rigidities in the Table are theoretical values obtained from the elastic deformation between screw groove and balls when axial load is 30% of the dynamic load rating (*C_a*).
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2. The right turn screw is standard. Please consult NSK for left turn screw.