Large-Lead Precision Ball Screw

High-Speed Ball Screw with Ball Cage Model SBK

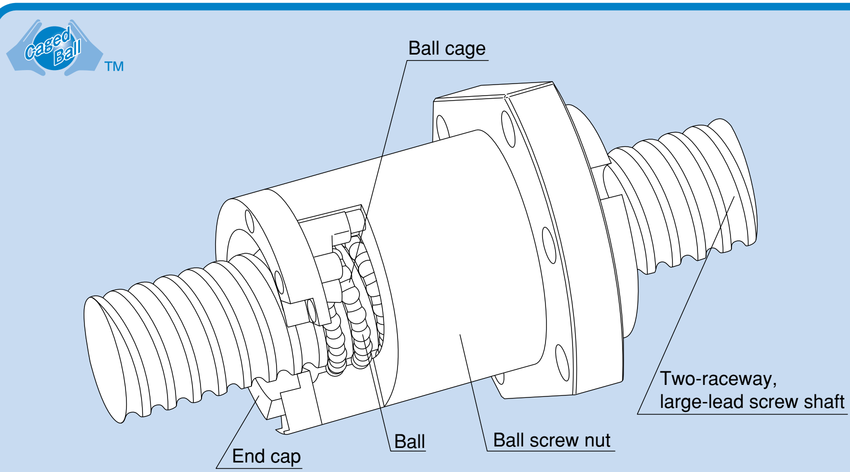


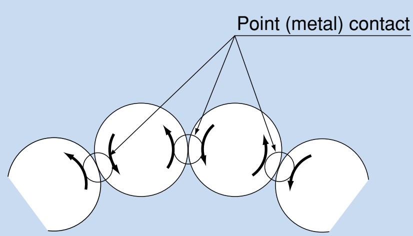
Fig. 1 Structure of High-Speed Ball Screw with Ball Cage Model SBK

Structure and Features

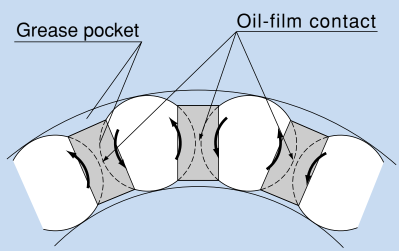
With High-Speed Ball Screw with Ball Cage model SBK, balls are evenly spaced by a ball cage to eliminate collision and friction between the balls ensure and a high level of grease retention. As a result, low noise, low torque fluctuation and long-term maintenance-free operation are achieved.

In addition, this model has a circulation structure where balls are picked up at the tangential direction by a return pipe (Fig. 2), thus to achieve a DN value* of 160,000 (* DN value = ball center diameter x rotation speed per minute) in high-speed operation.

As a result of adopting the offset preloading method, which shifts the lead in the central area of the ball screw nut, its overall ball screw nut length is shorter and its body is more compact than the double-nut type, which uses the spacer-based preloading method.



Structure of the conventional type



Structure of the Ball Screw with Ball Cage

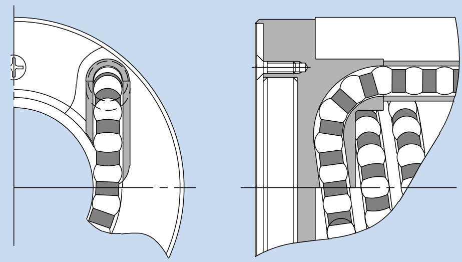


Fig. 2 Circulation Structure of Model SBK

Ball Cage Effect

●Low noise, acceptable running sound

Use of a ball cage eliminates collision noise between balls.
In addition, the fact that balls are picked up at the tangential direction also contributes to eliminating collision noise generated from circulating balls.

●Long-term maintenance-free operation

Since friction between balls is eliminated and grease is retained in the grease pocket, long-term maintenance-free operation (replenishment of grease is unnecessary for a long period) is achieved.

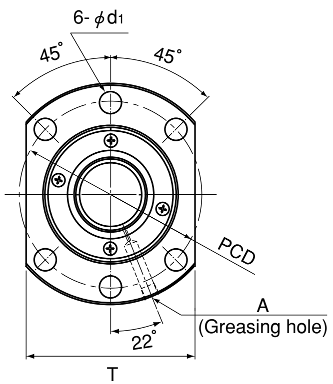
●Smooth motion

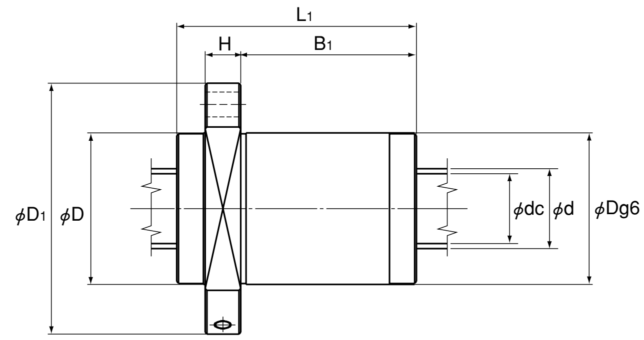
Use of a ball cage eliminates friction between balls and minimizes torque fluctuation, thus allowing smooth motion to be achieved.

Type

Offset-preload Type Model SBK

Model SBK





Unit: mm

Model No.	Screw shaft outer diameter d	Lead R	Ball center diameter dp	Thread minor diameter dc	No. of loaded circuits Rows x turns	Basic load rating Ca kN	Basic load rating C_0a kN	Rigidity K N/μm	Nut dimensions: Outer diameter D	Flange diameter D_1	Overall length L_1	H	B_1	PCD	d_1	T	Greasing hole A	Screw shaft inertial moment/mm kg·cm²/mm
SBK 3620-7.6	36	20	37.75	30.4	2×3.8	48.5	85	870	73	114	110	18	81	93	11	86	PT1/8	1.29×10^{-2}
SBK 4020-7.6	40	20	42	34.1	2×3.8	59.7	112.7	970	80	136	110	20	79	112	14	103	PT1/8	1.97×10^{-2}
SBK 4030-7.6	40	30	42	34.1	2×3.8	59.2	107.5	970	80	136	148	20	117	112	14	103	PT1/8	1.97×10^{-2}
SBK 5030-7.6	50	30	52	44.1	2×3.8	66.5	135	1170	90	146	149	22	116	122	14	110	PT1/8	4.82×10^{-2}
SBK 5036-7.6	50	36	52	44.1	2×3.8	65.9	135	1170	90	146	172	22	139	122	14	110	PT1/8	4.82×10^{-2}
SBK 5530-7.6	55	30	57	49.1	2×3.8	69.2	147	1250	96	152	149	22	116	128	14	114	PT1/8	7.05×10^{-2}
SBK 5536-7.6	55	36	57	49.1	2×3.8	69.1	148.7	1260	96	152	172	22	139	128	14	114	PT1/8	7.05×10^{-2}

Model number coding

SBK3620-7.6 RR G0 +1500L C5

1 2 3 4 5

1 Model number
2 Seal symbol - RR : Labyrinth seal attached to both ends of the ball screw nut (see page k-25)
WW: Wiper ring attached to both ends of the ball screw nut (see page k-26)
3 Axial clearance symbol (see page k-15) 4 Overall screw shaft length (in mm)
5 Accuracy symbol (see page k-8)

Note The rigidity values in the table represent spring constants each obtained from the load and the elastic displacement when providing a preload 10% of the basic dynamic load rating (Ca) and applying an axial load three times greater than the preload.
These values do not include the rigidity of the components related to mounting the ball screw nut. Therefore, it is normally appropriate to regard roughly 80% of the value in the table as the actual value.
If the applied preload (Fa_0) is not 0.1 Ca, the rigidity value (K_N) is obtained from the following equation.

where

$$K_N = K\left(\frac{Fa_0}{0.1\,Ca}\right)^{\frac{1}{3}}$$

K: Rigidity value in the dimensional table.