



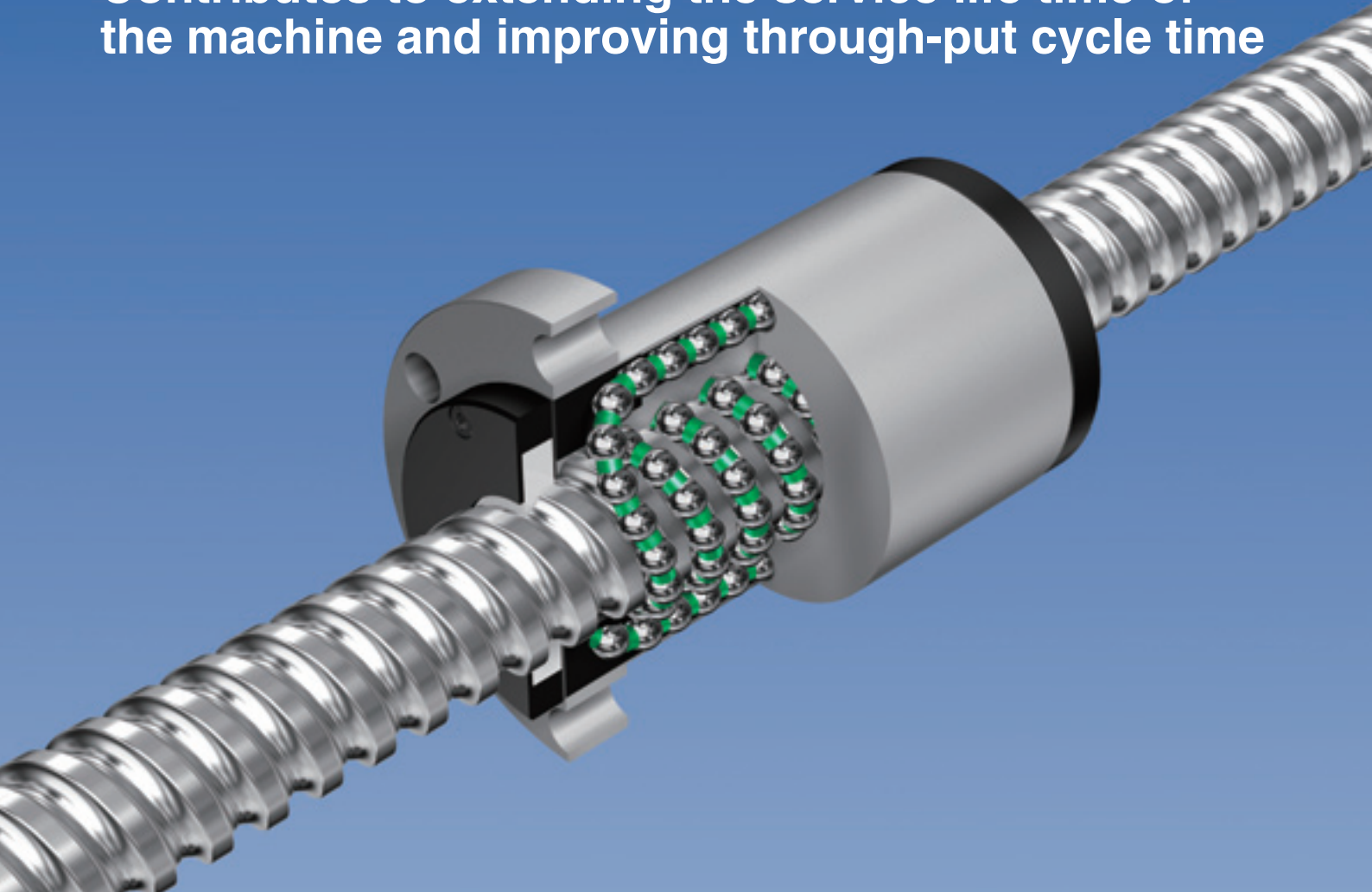
NEW

High-Load, High-Speed Caged Ball Screw

Achieves a high axial load capacity
(available shaft diameter: up to $\phi 120$)
Capable of high-speed operation at 92 m/min
(DN value: 130,000) at a maximum
Low noise, comfortable running sound

SBKH

Contributes to extending the service life time of
the machine and improving through-put cycle time

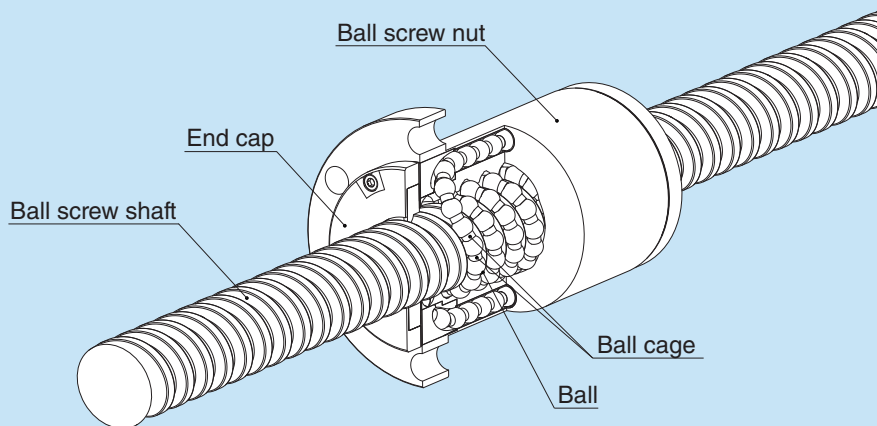


For details, visit THK at www.thk.com

*Product information is updated regularly on the THK website.

High-Load, High-Speed Caged Ball Screw

SBKH

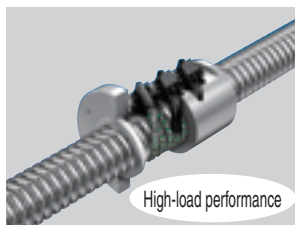


Diameter of ball screw shaft	Ball screw lead [mm]			
	32	40	50	60
φ63	●	●	—	—
φ80	—	—	●	●
φ100	—	—	●	●
φ120	—	—	—	●

● : Standard lead

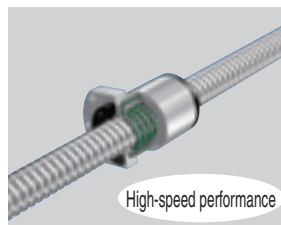
Structure of model SBKH

High-Load, High-Speed Caged Ball Screw model SBKH is a ball screw that achieves a high load carrying capacity and is capable of high-speed operation (92 m/min at a maximum). It provides both the high load carrying capacity of High-Load Caged Ball Screw model HBN, and the high-speed performance of High-Speed Ball Screw model SBK, which are among THK's Ball Screw series.



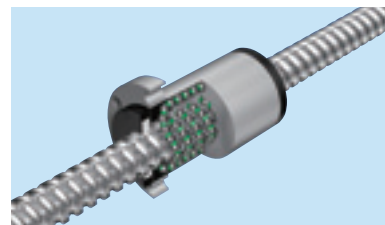
Model HBN

+



Model SBK

▶



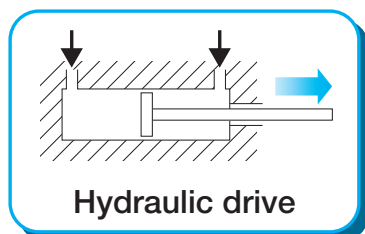
Model SBKH

Applications

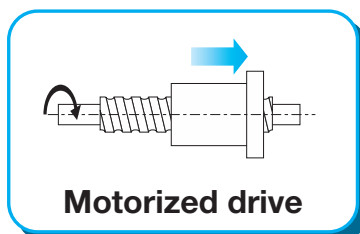
Applications of model SBKH include injection molding machines, pressing machines, blow molding machines, die-cast machines, extrusion molding machines, and other machines demanding high axial-load from ball screws.

Model SBKH, which provides both a high load performance and a high-speed performance, is optimal for replacing a hydraulic cylinder.

Replacing hydraulic drive with motorized drive, this model is environment friendly and achieves energy saving.



Replaced



Energy saving (power consumption: 1/3 to 1/5)

- Achieves clean environment
- Increased maintainability
- Improved machine controllability
- Increased positioning accuracy

Features

High load carrying capacity

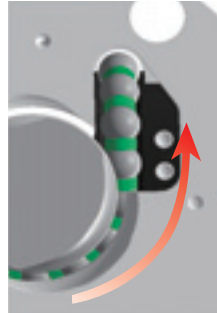
Optimally designed to operate under high axial loads, this model achieves a dynamic load rating approximately twice the other models.

High-speed operation

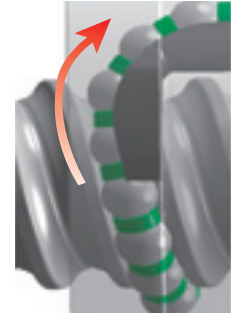
The ideal circulation structure for picking up the balls in the tangential and lead-angle direction achieves high-speed feed at 92 m/min at a maximum (DN value: 130,000).

Model number	Maximum speed [m/min]
SBKH6332-3.8	62
SBKH6340-7.6	78
SBKH8050-7.6	77
SBKH8060-7.6	92
SBKH10050-7.6	62
SBKH10060-7.6	75
SBKH12060-7.6	62

* Calculated from DN value



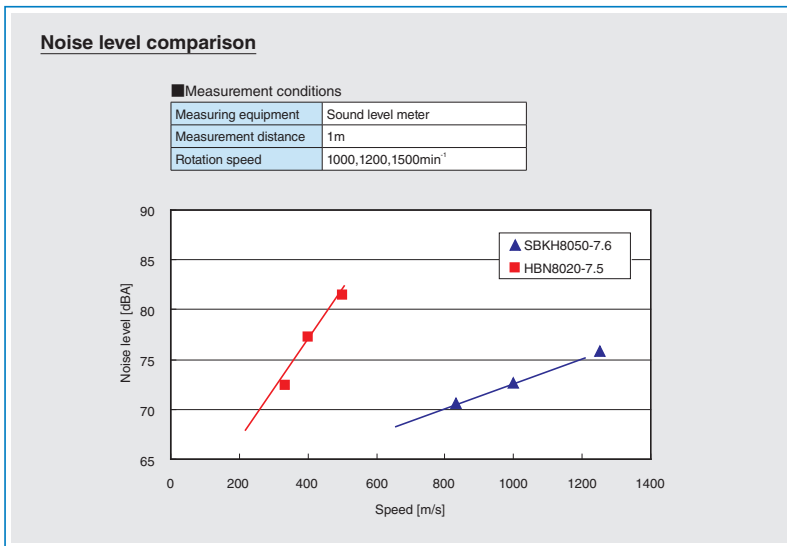
Circulate in the tangential direction



Circulate in the lead angle direction

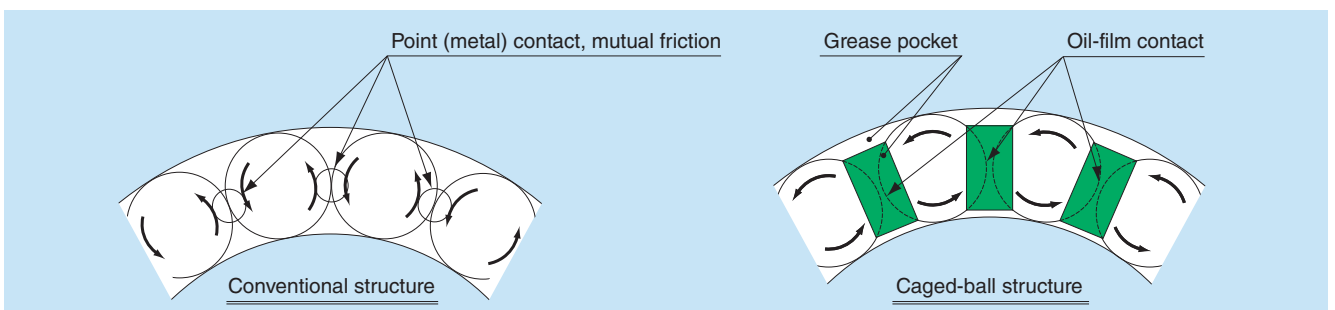
Low noise / comfortable running sound

Use of a ball cage eliminates collision noise between balls and provides comfortable running sound. A resin-made circulation path and an ideal circulation structure achieve further noise reduction. In addition, a larger lead than High-Load Ball Screw model HBN substantially reduces the noise level in relation to speed.



Smooth motion

Adoption of a ball cage eliminates collision and mutual friction between balls. This enables smooth, stable motion with little torque fluctuation.



Lead Accuracy and Axial Clearance

Lead accuracy

The high-load, high-speed ball screw is manufactured in compliance with the lead accuracy defined under JIS B1192 (for ball screws).

The accuracy of lead measurement is guaranteed with a reliable laser measuring equipment. For details on specification values, see the general catalog.

Axial clearance

Table 1 Axial clearance

Clearance symbol	Unit: mm		
	G1	G2	G3
Axial clearance	0 to 0.01	0 to 0.02	0 to 0.05

Examples of installation of model SBKH

If using model SBKH under a large load, arrange the nut flange and the fixed-side support unit in relation to the loading direction as indicated in the figure below while taking into account the load balance of the balls. In addition, while SBKH is operating, be sure not to apply a tensile load to the bolts. If you intend to use SBKH in other than the configurations below, contact THK.

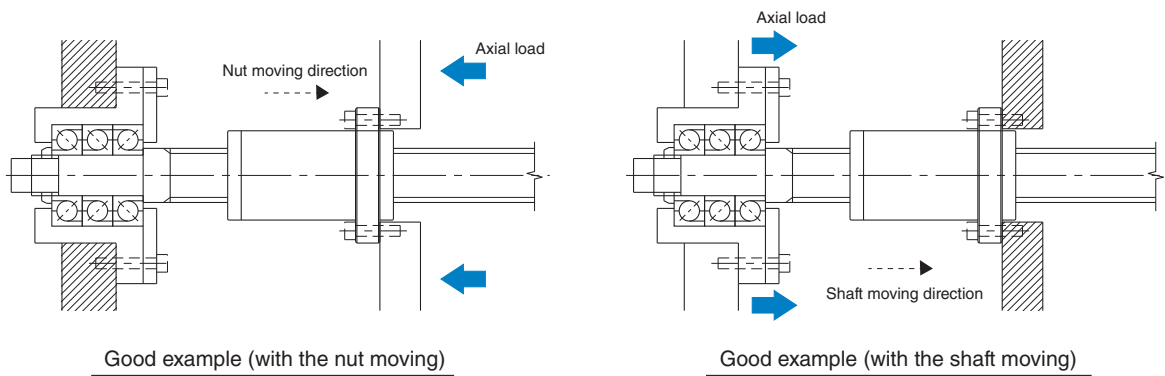


Figure 1 Example of recommended installation of model SBKH

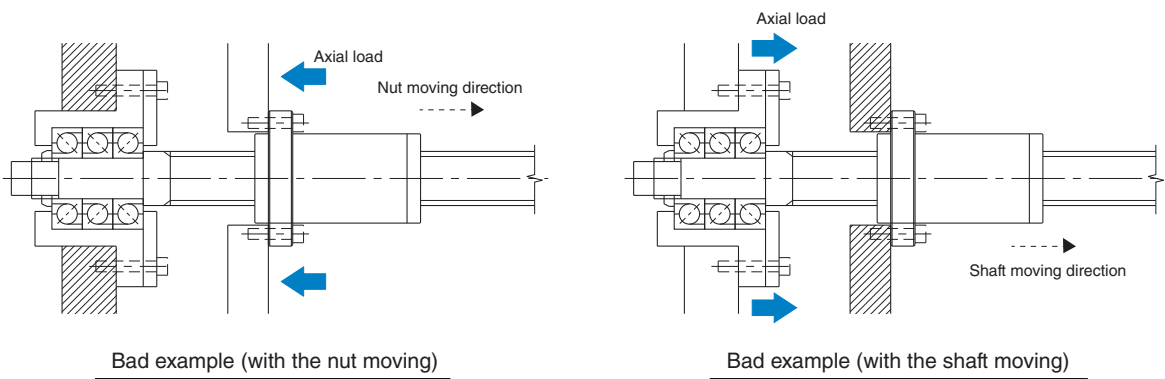


Figure 2 Example of incorrect installation of model SBKH

Safety Factor Corresponding to Permissible Load

Basic static load rating C_{0a} and permissible load F_p

The basic static load rating (C_{0a}) generally means the permissible axial load of a ball screw. It must be noted that while the ball screw is stationary or in motion, an unexpected force may be applied due to an inertial force caused by an impact or start/stop operation. Since model SBKH is designed to achieve a longer service life than conventional ball screws under high-load conditions, it is necessary to take into account the permissible load F_p for the axial load. The permissible load F_p means the maximum axial load that the high-load ball screw can receive, and it must not be exceeded when the ball screw is used. If the actually applied axial load changes due to a factor such as impact, take into account a safety margin for the permissible load F_p .

$$\frac{F_p}{F_a} > 1$$

F_p : Permissible load [kN]
 F_a : Axial load [kN]

* The basic static load rating (C_{0a}) means to a static load with a constant direction and magnitude at which the sum of the permanent deformation of the rolling element and the permanent deformation of the raceway is 0.0001 time the diameter of the rolling element in the contact area where the maximum stress is applied. For ball screws, it is defined in terms of axial load (individual values of a ball screw are indicated in the dimensional table of the respective model).

Rated Life and Service Life Time

Basic dynamic load rating C_a

The basic dynamic load rating (C_a) is used to calculate the service life of a ball screw in motion with its ball screw nut under an axial load.

The basic dynamic load rating C_a means an axial load at which 90% of a group of identical ball screw units independently operating under the same conditions achieve a rated load of 10^6 revs (1 million revolutions) without causing flaking.

Rated life

The service life of a ball screw is obtained from the following equation based on the basic dynamic load rating and the axial load.

$$L = \left(\frac{C_a}{f_w \cdot F_a} \right)^3 \times 10^6$$

L : Rated life [rev]
 C_a : Basic dynamic load rating [kN]
 F_a : Axial load [kN]
 f_w : Load factor (Table 2)

Table 2 Load factor

Vibrations/impact	Speed (V)	f_w
Faint	Very low $V \leq 0.25$ m/s	1.0 to 1.2
Weak	Low $0.25 \text{ m/s} < V \leq 1.0$ m/s	1.2 to 1.5
Medium	Moderate $1.0 \text{ m/s} < V \leq 2.0$ m/s	1.5 to 2.0
Strong	High $2.0 \text{ m/s} < V$	2.0 to 3.5

Service life time

When the rated life L has been obtained, the service life time is obtained from the following equation if the stroke length and the number of reciprocations are constant.

$$L_h = \frac{L \times Ph}{2 \times l_s \times n_1 \times 60}$$

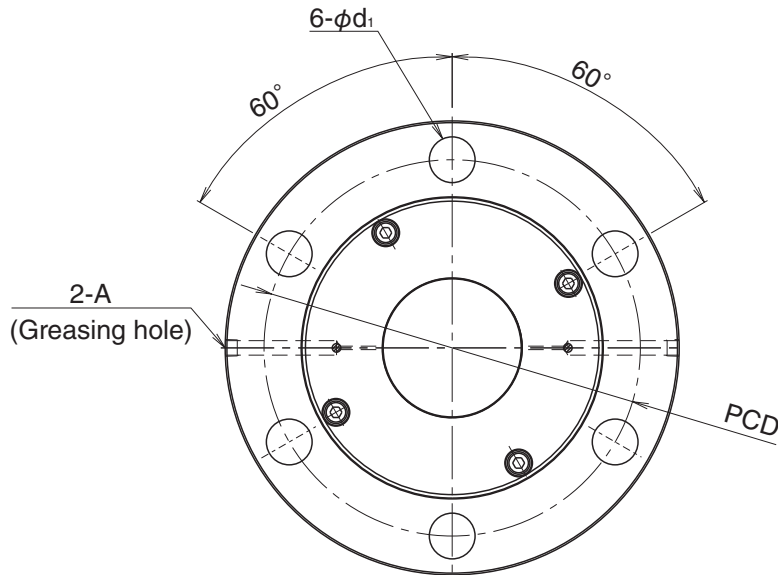
L_h : Service life time [h]
 l_s : Stroke length [mm]
 n_1 : Reciprocations per minute [min^{-1}]
 Ph : Lead [mm]

*1 We calculate the rated life through load calculation on the assumption that favorable lubrication is ensured and the system is assembled under the ideal mounting conditions.

The accuracy or deformation of the mounting member may affect the service life.

*2 In particular, when the ball screw is used under a large load, deformation of the mounting member may result in an eccentric load. Therefore, it is advisable to consider verifying the service life time using the real machine.

Dimensional Table of Model SBKH



Model No.	Outer diameter of screw shaft d	Lead Ph	Ball center-to-center diameter d_p	Root diameter of screw shaft d_c	No. of circuits under load Rows \times turns	Basic load rating		Permissible load F_p^* [kN]
						C_a [kN]	C_{0a} [kN]	
SBKH6332-3.8	63	32	66.5	49.8	1 \times 3.8	304	631	88
SBKH6340-7.6	63	40	66.0	52.6	2 \times 3.8	413	967	135
SBKH8050-7.6	80	50	84.0	63.6	2 \times 3.8	777	1788	250
SBKH8060-7.6	80	60	84.0	63.6	2 \times 3.8	780	1824	255
SBKH10050-7.6	100	50	104.0	83.6	2 \times 3.8	876	2401	336
SBKH10060-7.6	100	60	104.0	83.6	2 \times 3.8	880	2294	321
SBKH12060-7.6	120	60	124.0	103.6	2 \times 3.8	962	2941	411

* Permissible load F_p means the maximum axial load that the ball screw can receive.

Example of model number coding

SBKH8050-7.6 RR G2 +1200L C7

1

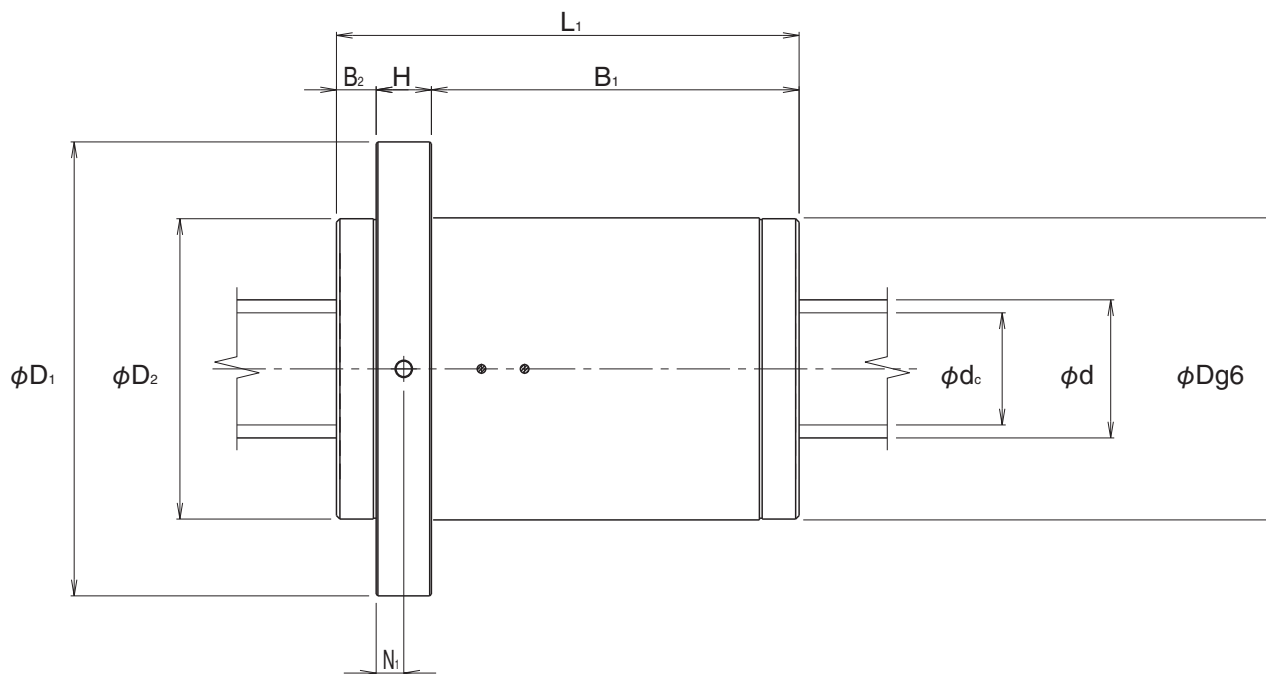
2

3

4

5

1 Model number **2** Seal symbol (RR: labyrinth seal on both ends) **3** Axial clearance symbol (see page 3)
4 Overall ball screw length (in mm) **5** Accuracy symbol



Unit: mm

Rigidity K [N/μm]	Nut dimensions												Nut mass [kg]	Shaft mass [kg/m]
	Outer diameter D	Flange diameter D ₁	Cap diameter D ₂	Overall length L ₁	H	B ₁	B ₂	PCD	d _i	N _i	Greasing hole A			
1435	140	205	(140)	190	28	143	(19)	173	22	14	PT1/8	17.2	21.0	
2723	127	191	(127)	209	30	163	(16)	159	22	15	PT1/8	15.5	21.0	
3402	175	253	(175)	268	32	213	(23)	214	26	16	PT1/8	36.9	31.3	
3452	175	253	(175)	306	40	243	(23)	214	26	20	PT1/8	43.5	32.5	
4098	195	273	(195)	269	40	206	(23)	234	26	20	PT1/8	44.5	51.3	
4149	195	273	(195)	307	40	244	(23)	234	26	20	PT1/8	50.5	52.9	
4809	210	288	(210)	308	45	240	(23)	249	26	22.5	PT1/8	53.7	78.1	

Note 1: Attaching a seal will not change the dimensions.

Note 2: The rigidity value (K) in the table indicates the spring constant obtained from the load value and elastic deformation measured when an axial load equivalent to 30% of the basic dynamic load rating (C_a) is applied. This value does not include the rigidity of the part related to the ball screw nut mounting section. Therefore, it is generally advisable to use 80% of the rigidity value (K) indicated in the table.

If the axial load (F_a) differs from 0.3 C_a, the rigidity value (K_N) is obtained from the following equation.

$$K_N = K \left(\frac{F_a}{0.3 C_a} \right)^{\frac{1}{3}} \quad K: \text{Rigidity value in the dimensional table}$$

● Precautions

If you desire the diameter of the both ends of the screw shaft to be larger than the outer diameter of the screw shaft, contact THK.

THK High-Load, High-Speed Caged Ball Screw Model SBKH

Precautions on use

● Handling

- Do not disassemble the parts. Doing so may allow dust to enter the product and/or cause functional loss.
- Tilting the ball screw shaft and the ball screw nut may cause them to fall by its own weights.
- Do not drop or hit the Ball Screw. Doing so may cause personal injury and/or damage the product. Applying an impact to the product may cause functional loss even if the product looks intact.
- Do not remove the ball screw nut from the ball screw shaft. Doing so may cause balls or a ball cage to fall and make the product inoperable.
- Take care not to allow foreign material such as dust and cutting chips to enter the product. Failure to do so may damage the ball circulation part or cause functional loss.
- Some types of coolants may affect the functionality of the product. If using the product in an environment where a coolant could enter the ball screw nut, contact THK.
- Do not use the product at temperature exceeding 80°C.
- If foreign material such as dust and cutting chips adheres to the product, replenish the lubricant after cleaning the product. For the type of the cleaning fluid, contact THK.
- If using the product for vertical application, take a measure to prevent it from falling such as adding a safety mechanism. Failure to do so may cause the ball screw nut to fall by its own weight.
- Do not use the product at speed exceeding the permissible rotation speed. Doing so may damage the product or cause an accident. Make sure that the service rotation speed is within the specification range designated by THK.
- Do not forcefully drive any component into the ball screw shaft or the ball screw nut. Doing so may cause an indentation on the raceway. Take care when mounting components.
- If misalignment or skewing occurs in the ball screw shaft support and the ball screw nut, it may substantially shorten the service life. Pay much attention to the components to be mounted and to the mounting accuracy.
- If using the product in a location constantly exposed to vibrations or in a special environment such as a clean room, vacuum, low temperature and high temperature, contact THK.
- Do not let the ball screw nut overshoot. Doing so may cause balls to fall or damage the ball circulation part.

● Lubrication

- Thoroughly wipe off anti-corrosion oil and feed lubricant before using the product.
- For use with high-speed rotation application, we have selected THK Grease AFJ for SDA Ball Screw. THK Grease AFJ provides superior performance in low-heat-generating characteristics.
- Do not mix lubricants with different physical properties.
- In locations constantly exposed to vibrations or in special environments such as a clean room, vacuum, low temperature and high temperature, normal lubricants may not be used. Contact THK for details.
- If planning to use a special lubricant, contact THK before using it.
- Lubrication interval varies according to the service conditions. Contact THK for details.

● Storage

- When storing the Ball Screw, enclose it in a package designated by THK and store it in a horizontal orientation while avoiding low temperature, high temperature and high humidity.

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