

# Precision, Caged Ball Screw



Models SBN, SBK and HBN

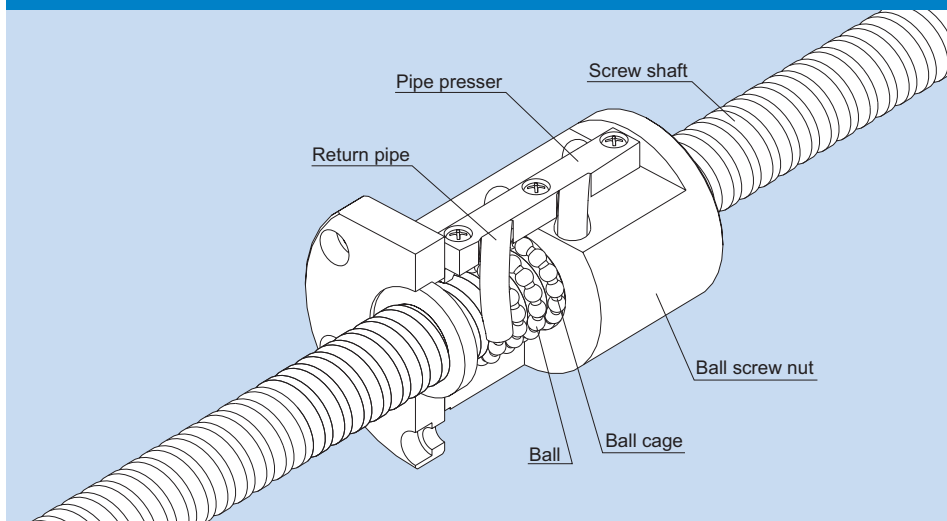


Fig.1 Structure of High-Speed Ball Screw with Ball Cage Model SBN

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## Structure and Features

The use of a ball cage in the Ball Screw with the Ball Cage eliminates collision and friction between balls and increases the grease retention. This makes it possible to achieve a low noise, a low torque fluctuation and a long-term maintenance-free operation.

In addition, this Ball Screw is superbly capable of responding to the high speed because of an ideal ball recirculation structure, a strengthened circulation path and an adoption of the ball cage.

## Ball Cage Effect

### [Low Noise, Acceptable Running Sound]

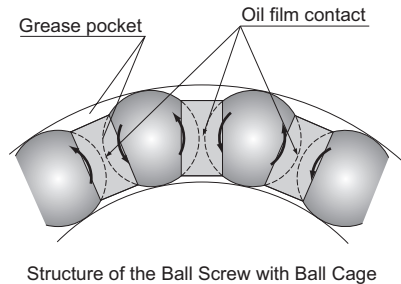
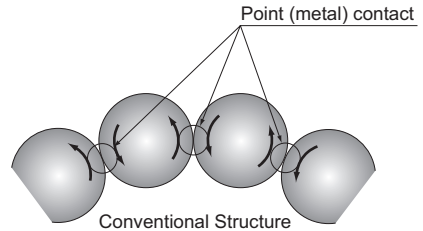
The use of the ball cage eliminates the collision noise between the balls. Additionally, as balls are picked up in the tangential direction, the collision noise from the ball circulation has also been eliminated.

### [Long-term Maintenance-free Operation]

The friction between the balls has been eliminated, and the grease retention has been improved through the provision of grease pockets. As a result, the long-term maintenance-free operation (i.e., lubrication is unnecessary over a long period) is achieved.

### [Smooth Motion]

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



[Low Noise]

● **Noise Level Data**

Since the balls in the Ball Screw with the Ball Cage do not collide with each other, they do not produce a metallic sound and a low noise level is achieved.

■ **Noise Measurement**

[Conditions]

Item	Description
Sample	High load ball screw with ball cage HBN3210-5 Conventional type: model BNF3210-5
Stroke	600mm
Lubrication	Grease lubrication (lithium-based grease containing extreme pressure agent)

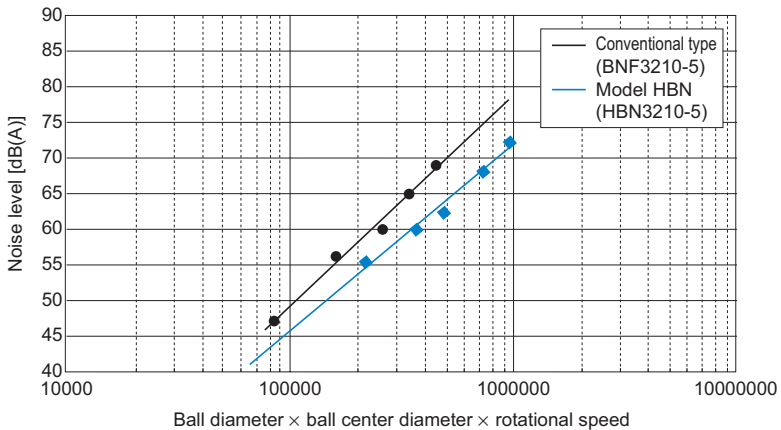
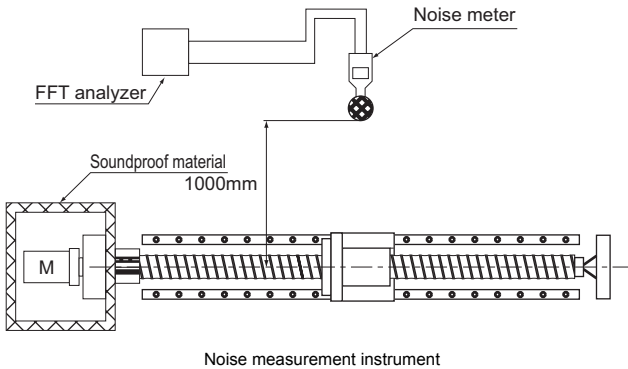


Fig.2 Ball Screw Noise Level

[Long-term Maintenance-free Operation]

● **High speed, Load-bearing Capacity**

Thanks to the ball circulating method supporting high speed and the caged ball technology, the Ball Screw with Ball Cage excels in high speed and load-bearing capacity.

■ **High Speed Durability Test**

[Test conditions]

Item	Description
Sample	High Speed Ball Screw with Ball Cage SBN3210-7
Speed	3900(min <sup>-1</sup> )(DN value: 130,000)
Stroke	400mm
Lubricant	THK AFG Grease
Quantity	12cm <sup>3</sup> (lubricated every 1000km)
Applied load	1.73kN
Acceleration	1G

\* DN value: Ball center-to-center diameter x revolutions per minute

[Test result]

Shows no deviation after running 10,000 km.

■ **Load Bearing Test**

[Test conditions]

Item	Description
Sample	High Speed Ball Screw with Ball Cage SBN3210-7
Speed	1500(min <sup>-1</sup> )(DN value: 50,000)
Stroke	300mm
Lubricant	THK AFG Grease
Quantity	12cm <sup>3</sup>
Applied load	17.3kN(0.5Ca)
Acceleration	0.5G

[Test result]

Shows no deviation after running a distance 2.5 times the calculated service life.

[Smooth Motion]

● **Low Torque Fluctuation**

The caged ball technology allows smoother motion than the conventional type to be achieved, thus to reduce torque fluctuation.

[Conditions]

Item	Description
Shaft diameter/lead	32/10mm
Shaft rotational speed	60min <sup>-1</sup>

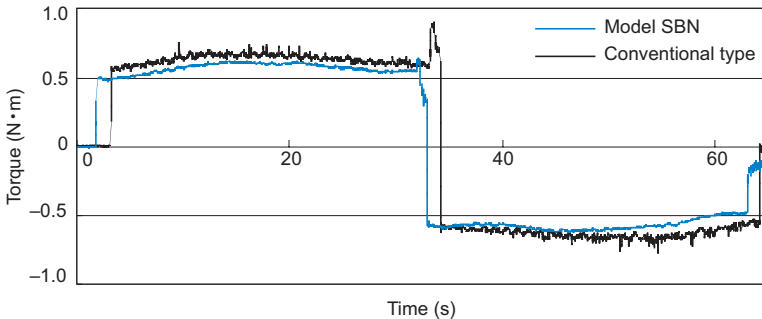


Fig.3 Torque Fluctuation Data

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## Types and Features

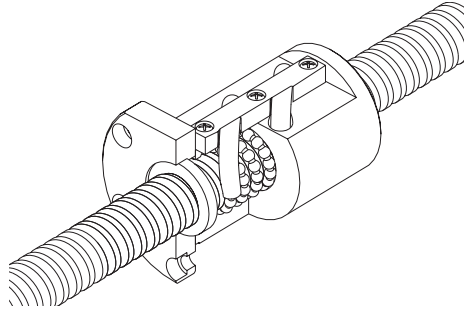
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[Preload Type]

### Model SBN

Specification Table⇒B-576

Model SBN has a circulation structure where balls are picked up in the tangential direction and is provided with a strengthened circulation path, thus to achieve a DN value of 130,000.

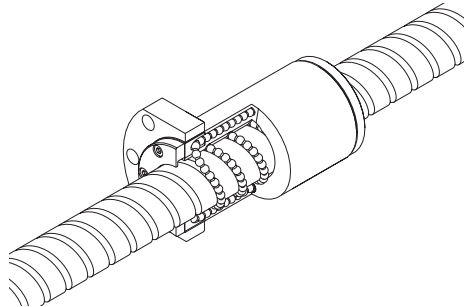


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### Model SBK

Specification Table⇒B-578

As a result of adopting the offset preloading method, which shifts two rows of grooves of the ball screw nut, a compact structure is achieved.

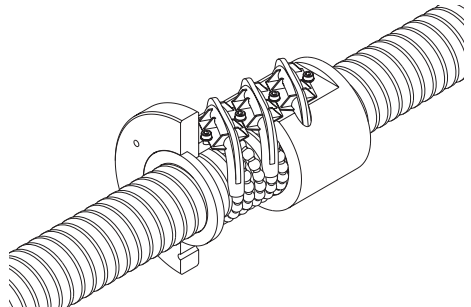


[No Preload Type]

### Model HBN

Specification Table⇒B-580

With the optimal design for high loads, this Ball Screw model achieves a rated load more than twice the conventional type.



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## **Service Life**

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For details, see A-704.

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## **Axial Clearance**

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For details, see A-685.

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## **Accuracy Standards**

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For details, see A-678.