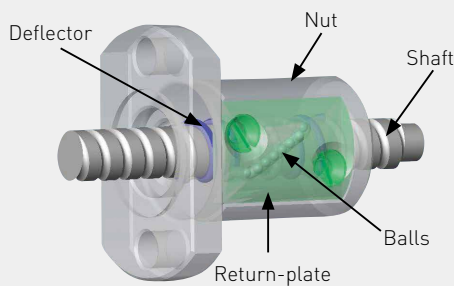


Q&A

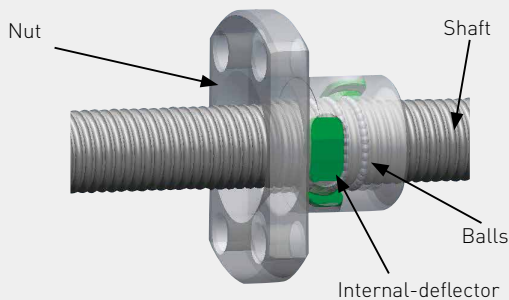
Question: What kind of re-circulation systems are there in Ball Screws?

There are many Balls between Shaft and Nut in Ball Screws. Therefore Ball Screws need re-circulation function, which makes Balls circulate endlessly inside the Ball Nut. Re-circulation parts have the role of this function. Various types of re-circulation have been contrived, we call them "re-circulation system". Each re-circulation system has good points and weak points, so KSS uses appropriate system for customer's usage.



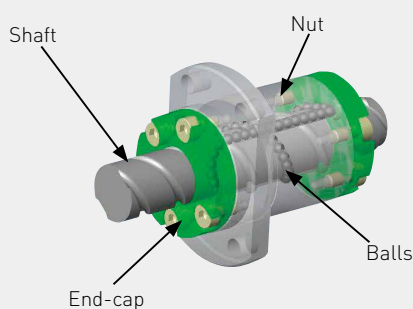
● Return-plate system

The Return-plate system uses coil-type deflectors incorporated inside the Nut to pick up the Balls and circulate them via the Return-plate channel. This system has the advantage of allowing the use of a Nut that is smaller in diameter than those employed in Return-tube systems. In addition, the upward-angle installation of the Return-plate ensures even smoother rotation.



● Internal-deflector system

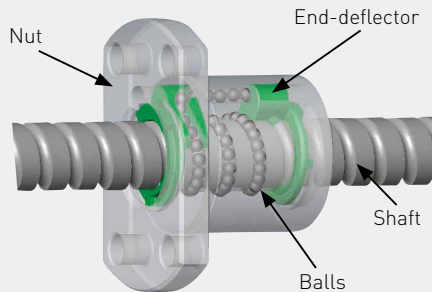
The internal-deflector system employs a lightweight Miniature Ball Screw, which enables the Nut diameter and length to be reduced to the smallest possible size. The Balls bear the load while rolling along the screw groove between the Shaft and the Nut. The Balls are continuously circulated, transferred to the adjacent groove in the screw via Internal-deflector channel and then back to the loaded groove area.



● End-cap system

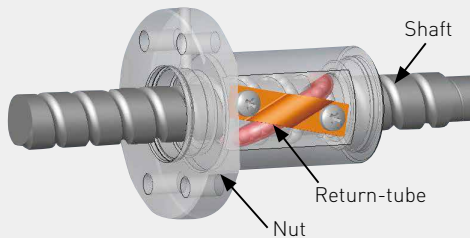
The End-cap system is a re-circulating system in which the Balls advance by rolling through the screw groove between the Nut and the Shaft. The Balls are then returned via the holes in the Nut and channels in the re-circulating sections of the End-caps on either end of the Nut.

Q&A



● End-deflector system

The Balls are circulated from End-deflector incorporated inside the Nut or outside the Nut through the hole in the Nut and the channels in the re-circulating sections. Ball Nut diameter can be smaller than Return-plate system. This is suitable for the middle lead Ball Screws.



● Return-tube system

In the Return-tube system, Balls rolling between the Nut and the Shaft are picked up from the screw groove by the end of the Return-tube built into the Nut. Then, they flow back through the Return-tube to the screw groove.

In Ball re-circulation, circuits mean that how many rotation Balls run through screw groove inside the Nut, and Turns mean how many re-circulation devices on the Nut. If there is one re-circulation device on the Nut with 3.7 revolutions of Balls, it is described as 3.7 x 1 on the drawing. Table below shows features for each re-circulation system.

Re-circulation system	Ball Pick-up device	Re-circulation part	Circuits	Turns	Nut dia.	Usage
Return-plate system	Deflector (Coil-spring)	Return-plate	Various No integral	One	Middle	Small size
Internal-deflector system	Internal deflector	Internal deflector	One	Arbitrary	Small	Small Lead
End-cap system	End-cap	Holes inside Nut	Arbitrary	One	Middle	High Lead Multi-start
End-deflector system	End-deflector	Holes inside Nut	Arbitrary	One	Middle	Middle Lead High Lead
Return-tube system	Tongue of Return-tube	Return-tube	Various No integral	Arbitrary	Large	General Except small size Ball

Various re-circulation types are utilized for Ball Screw size or usage!!!