

Ball Screws

Outline

Since KSS started production and sales of Ball Screw in 1978, we have been working on product development as a pioneer of Miniature Ball Screws. In addition, we developed Unit Products related Ball Screw. At this time, we have combined developed products until now into one catalogue for more usability.

●Classification of KSS Ball Screws

For better understanding of KSS Ball Screws, kinds and classification of KSS Ball Screws are as follows.

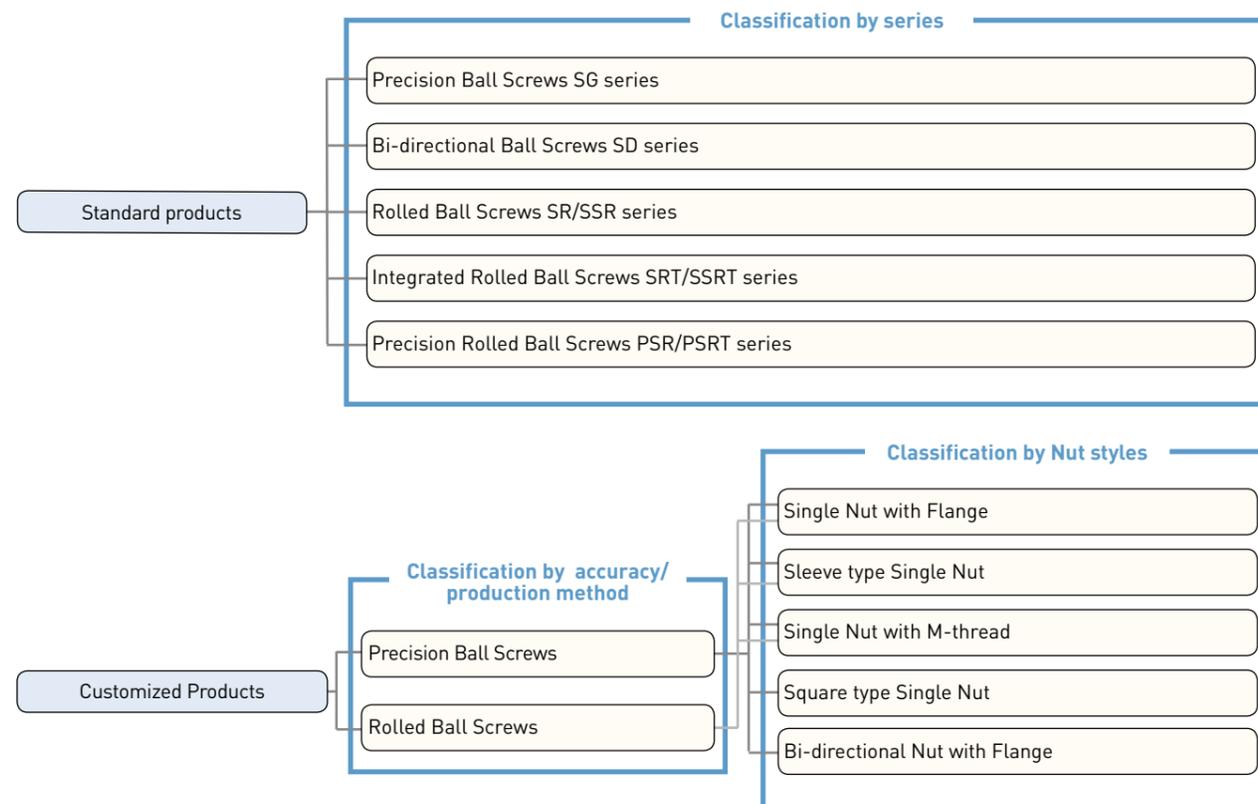


Fig. A-11 : Classification of KSS Ball Screws

●Standard Products

To meet customer's request of quick delivery, KSS has specified model type in stock. The end-journal configuration is standardized and it is possible to reduce numbers of design process by customer. Moreover, since we have end machining knowhow, high accurate end machining is possible. Standard products can be chosen from many kinds of Precision Ball Screws and Rolled Ball Screws shown in Fig. A-11.

●Customized products

Products other than standardized model are customized products. To reduce numbers of design process by customer, dimensions of each model are standardized as Nut type shown in Fig. A-11. Please consult KSS if you need products which are not standardized model, configuration, dimension are requested. Please also inquire KSS when stainless steel products, special material, surface treatment are needed.

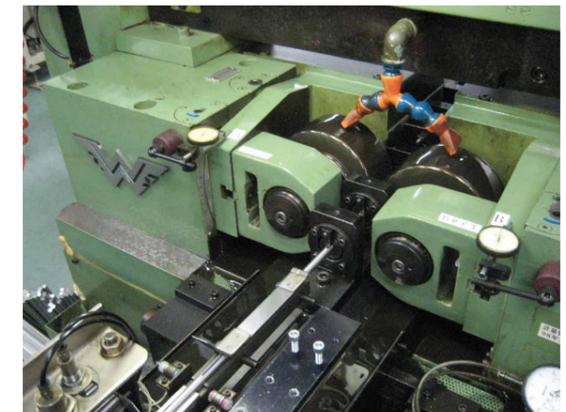
●Precision Ball Screws and Rolled Ball Screws

Production procedures vary by accuracy requested from customers. Precision Ball Screws with high accuracy by Grinding process and Rolled Ball Screws with formed groove by Rolling dies (Tooling for Rolling process) can be classified.

Generally, C5 or higher grade is manufactured by Grinding process and accuracy of C7, C10 are manufactured by Rolling process. It is also possible to produce C7, C10 by Grinding when Rolling dies do not exist.



High accurate shaft groove process by Grinding machine



Rolling process by Rolling dies

●Approach of quality and environment



JQA-QM4131

小千谷工場

ボールねじ、精密送りねじ及びユニット類の設計・開発及び製造



JQA-EM4583

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KSS Ball Screws including design, production are qualified by ISO-9001. Since quality management system such as shipping inspection, traceability is organized, KSS products can be used with safety.

For environmental side, KSS is qualified by ISO-14001. We make an effort to reduce CO₂ and take care of environmentally friendly design by using parts, which conform to RoHs regulation.

●Export administration

Our policy is to comply with Foreign Exchange, Foreign Trade Act, and other related laws when KSS products and technologies are exported. Therefore if the purpose of using our products is military use (weapon of mass destruction, things related with arms), we decline to export our products except specific country. Please refer to KSS homepage regarding list regulation by Export administration.

<http://www.kssballscrew.com>

Standard Products

KSS has several varieties of standard products as follows. It is possible to make quick delivery to customers by using standard products.

● Precision Ball Screws



SG series (Precision Ball Screws)

- Configuration of fixed side end-journal is standardized, supported side end-journal is free type and standard travel is set up.
- Since supported side end-journal is unfinished, it is possible to do additional end machining with your requested thread length.
- There are C3 (Axial play 0), C5 (Axial play 5 μ m or less) available.



SD series (Bi-directional Ball Screws)

- These are economical Ball Screws because a shaft has bi-directional thread.
- Since fixed and supported side end-journal are unfinished, design flexibility is enlarged.
- There are C3 (Axial play 0), C5 (Axial play 5 μ m or less) available.

● Rolled Ball Screws



SR series (Rolled Ball Screws)/SSR series (Stainless Rolled Ball Screws)

- Standard and reasonable price products by Rolling formed process.
- Since fixed and supported side end-journal are unfinished, design flexibility is enlarged.
- There are Ct7 (Axial play 20 μ m or less), Ct10 (Axial play 50 μ m or less) available.
- There are also Rolled Ball Screws made of stainless steel (SSR series) in stock.



SRT



SSRT

SRT series (Integrated Rolled Ball Screws)

SSRT series (Integrated stainless Rolled Ball Screws)

- Fixed side end-journal is set up bigger than Shaft nominal diameter and unfinished.
- More design flexibility compared to current Rolled Ball Screws.
- It is possible to design end-journal configuration compatible with SG series.
- There are also Integrated Rolled Ball Screws made of stainless steel (SSRT series) in stock.

● Precision Rolled Ball Screws



PSR series (Precision Rolled Ball Screws)

PSRT series (Integrated Precision Rolled Ball Screws)

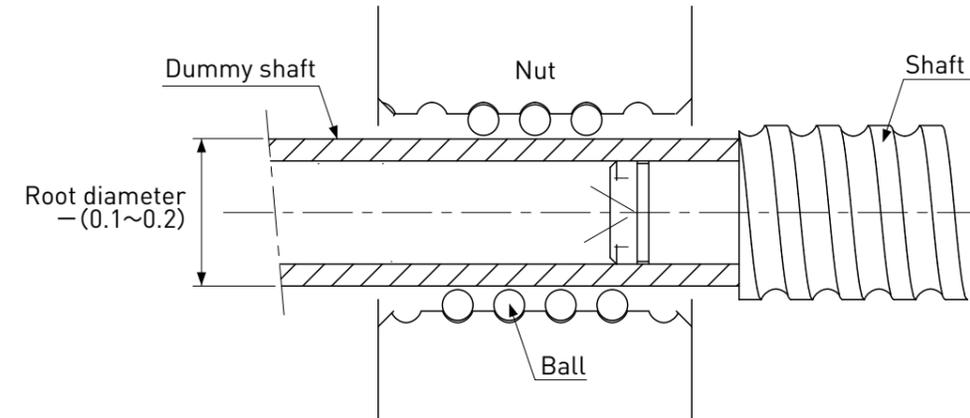
- KSS newly developed the high grade accuracy (JIS C5) Rolled Ball Screws, which surpasses the conventional type of Ct7 or Ct10 grade.
- PSR series with unfinished end-journal and PSRT series with integrated end-journal are in stock, so wide variety of design choices are available.
- The axial play is set at 5 μ m or less, but zero backlash is possible by your request.
- For integrated type, fixed side end-journal is standardized and finished, KSS Compact Support Unit can be installed.

Additional end-journal machining

Technology of KSS end-journal machining enables to keep high accuracy of Ball Screws after re-works. Please ask for end-journal machining to us. Precautions of end-journal machining are as follows.

- 1) We recommend additional end-journal machining is done by KSS. We do not guarantee accuracy after re-works done by other than KSS.
- 2) When additional end-journal machining other than standard configuration in catalogue is requested, please send us drawing with end-journal profile on it.
- 3) Additional machining is not applied to the Nut. Please design flange configuration according to our dimension table.
- 4) Lubrication
In Ball Screws use, lubricant should be applied on them.
KSS Ball Screws are in vacuum wrapping with anti-rust oil due to purpose for long term stock.
If you need specified lubricant, we will supply Ball Screws with lubricant you requested when requesting additional end-journal machining.
Since anti-rust oil is not lubricant, Ball Screws should be washed off anti-rust oil with clean Kerosene and apply lubricant (Grease or lubricating oil).
Please check the lubricant condition every 2 or 3 months. If grease is contaminated, remove old grease, and replace with the new one.
- 5) Ball Nut falling by weight
If Ball Screw is not preloaded, Ball Nut will fall down due to its own weight. Care must be taken.
- 6) Additional end-journal machining by customer
Additional end-journal machining done by customer is out of our guarantee, but in case of unavoidably conducting, please take caution regarding above precautions as well as following points.
 - Invasion of dust inside Nut
Care must be taken regarding invasion of dust inside Nut when additional end-journal machining.
If additional end-journal machining is being done to the Shaft with Ball Nut, wrap the Nut with vinyl, sealing up both ends and surely protect it from dust.
 - Nut removal
In case of Nut removal, please use dummy shaft shown in Fig. A-21. We can supply dummy shaft with products if you request.
Make sure Balls and Screw Shaft groove are meshing correctly and remove the Nut slowly as well as re-assembling.
 - Cleaning after additional end-journal machining
After additional end-journal machining, Ball Screws should be washed dust off with clean Kerosene.
 - Applying lubrication
After additional end-journal machining, apply lubricant before using Ball Screw.
 - Storage
After additional end-journal machining, surely conduct anti-rust treatment when Ball Screws are in long term stock.

Fig. A-21 : Dummy shaft and Nut removal



Customized products

In order to meet the needs of customer's requested design, we offer customized products.
To reduce design process at customer, each Nut type is standardized.

●Variety of Customized products

Customized Precision Ball Screws and Rolled Ball Screws are both standardized in Ball Nut dimension only.
Please refer to description about Standardized Ball Nut type in page A503.
If you need special Ball Nut other than page A503, feel free to ask KSS.
KSS will provide with required Ball Nut as a special order.

●Table of Shaft dia. and Lead combination

Note)* means Bi-directional Nut with Flange.

Shaft dia. (φ)	Lead (mm)															
	0.5	1	1.5	2	2.5	3	4	5	6	8	10	12	15	20	30	
1.8	FBS															
3	FBS	FBS BS														
4	FBS	FKB FBS BS MS FKB* MRB MRB(K) BSR MSR		FBS BS MRB BSR			FEB			FEB						
5	FBS	FKB FBS BS FKB*					FBS BS MRB BSR									
6	FBS	FKB FBS BS KS FKB* MRB MRB(K) BSR	FBS BS	FBS BS MS KS MRB BSR	FBS BS				FEB MRB		FEB MRB	FEB				
8	FBS	FKB FBS BS KS FKB* MRB MRB(K) BSR	FKB FBS BS MS FKB*	FKB FBS BS MS FKB* MRB MRB(K) BSR MSR	FDB FBS BS MS	FBS BS MS	FBS BS MS	FBS BS MS MRB BSR MSR		FEB MRB	FEB MRB	FEB MRB				
10		FKB FBS BS KS FKB*	FKB FBS BS FKB*	FKB FBS BS MS FKB* MRB MRB(K) BSR MSR	FKB FBS BS FKB*	FBS BS FKB* MRB BSR MSR	FBS BS FKB* MRB BSR	FDB FBS BS FKB* MRB BSR	MRB BSR		FEB MRB	FEB MRB	FEB MRB	FEB MRB	FEB	
12		FKB FBS BS FKB*		FKB FBS BS MS FKB* MRB MRB(K) BSR MSR	FKB FBS BS FKB*	FKB FBS BS FKB*	FBS BS MS FKB*	FBS BS				FEB FBS MRB				
13												FEB MRB	FEB MRB	FEB MRB		
14		FBS BS FKB*		FKB FBS BS MS FKB* MRB BSR MSR	FKB FBS BS FKB*	FKB FBS BS FKB*	FKB FBS BS FKB*	FKB FBS BS MS FKB* MRB BSR MSR	FBS BS FKB*							
15								FBS	FEB FBS MRB					FEB FBS MRB	FEB	
16		FBS BS FKB*		FKB FBS BS FKB*	FKB FBS BS FKB*	FKB FBS BS FKB*	FKB FBS BS FKB*	FBS BS FKB*								

●Nut style list

Nut type	Precision Ball Screws	Rolled Ball Screws
Single Nut with Flange	FKB FBS FDB FEB	MRB
Sleeve type Single Nut	BS	BSR
Single Nut with M-thread	MS	MSR
Square type Single Nut	KS	—
Bi-directional Nut with Flange	FBS* FKB*	—

Note)* means Bi-directional Nut with Flange.

●Maximum limit of overall lengths

Unit:mm

Accuracy grade	C0	C1	C3	C5	C7 & C10 (Rolled Ball Screw)
Shaft nominal dia.					
4	90	120	160	170	240
5	90	120	160	170	300
6	140	180	240	250	350
8	200	250	330	350	450
10	260	320	420	450	650
12	320	390	510	550	700
13	320	390	510	550	700
14	380	460	600	660	700
15	380	460	600	660	1000
16	450	540	700	770	-

●Single Nut with Flange



Precision & Rolled Ball Screws

It is the most simple Single Nut type. Normally Ball Screws are used with small Axial play, but using oversized Balls allows the application of light preloading and eliminates backlash(only Precision grade). Nut should be mounted using bolt holes in Flange. FBS,MRB(Return-plate), FKB(Internal-deflector), FDB(End-deflector), FEB(End-cap) circulation system can be distinguished. Please refer to dimension table .

●Sleeve type Single Nut



Precision & Rolled Ball Screws

It is Cylindrical Single Nut which is compact. Alike Single Nut with Flange, Axial play can be eliminated(only Precision grade). The Nut should be mounted by clamping on the key way on the Nut outer and Nut end surface.

●Single Nut with M-thread



Precision & Rolled Ball Screws

The Cylindrical type with M-thread at the Nut end. The Nut should be mounted using M-thread. It is suitable for mounting with cylinder.

●Square type Single Nut



Precision Ball Screws only

The Square Nut is finished with a large mounting face parallel to the Nut center. Nut itself has Housing function. This allows more compact design compared to Flange type.

●Bi-directional Nut with Flange



Precision Ball Screws only

Since there are both Right-handed thread and Left-handed thread on a Shaft, it has Bi-directional function. Single Nut with Flange type is standardized, but it is also possible to manufacture Sleeve type Nut. In addition, absolute position control for both Nut is available.

●Others



Double Nut with Flange

KSS can provide Double Nut style as one of choices for pre-loaded Ball Screws as special customized products. Please ask KSS representative if necessary.



Sleeve type Double Nut

●Model number notation

FBS **04** **01** **B** — **100** **R** **120** **C3** — **05**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

①Ball Nut type No.

FBS : Precision Ball Screws Single Nut with Flange
 BS : Precision Ball Screws Sleeve type Single Nut
 MS : Precision Ball Screws Single Nut with M-thread
 KS : Precision Ball Screws Square type Single Nut

MRB : Rolled Ball Screws Single Nut with Flange
 BSR : Rolled Ball Screws Sleeve type Single Nut
 MSR : Rolled Ball Screws Single Nut with M-thread

②Screw Shaft nominal diameter(mm)

③Lead(mm)

④Re-circulation number(In detail refer to dimension table)

⑤Screw thread length(mm)

⑥Thread direction(R=Right-hand, L=Left-hand)

⑦Screw shaft total length(mm)

⑧Accuracy grade(C0,C1,C3,C5,C7,C10)

⑨Axial play(μ m)

●Precaution

- Please refer to dimension table of each model regarding dimension, Load Rating, Rigidity.
- Please refer to Technical Description in p-A801 regarding Accuracy, Axial play, Material, production range and so on.
- Shaft configuration, Shaft dimension of Customized products are not standardized. KSS will create a Drawing based on customer's specifications.
- When designing Shaft configuration, fixed end or supported end (in case of Bi-directional Ball Screws and Rolled Ball Screw, both ends) should be smaller than Shaft Root diameter due to Nut assemble.
- Please refer to [Precaution of storage, handling, and operating] in p-A901 in detail other than the above.