

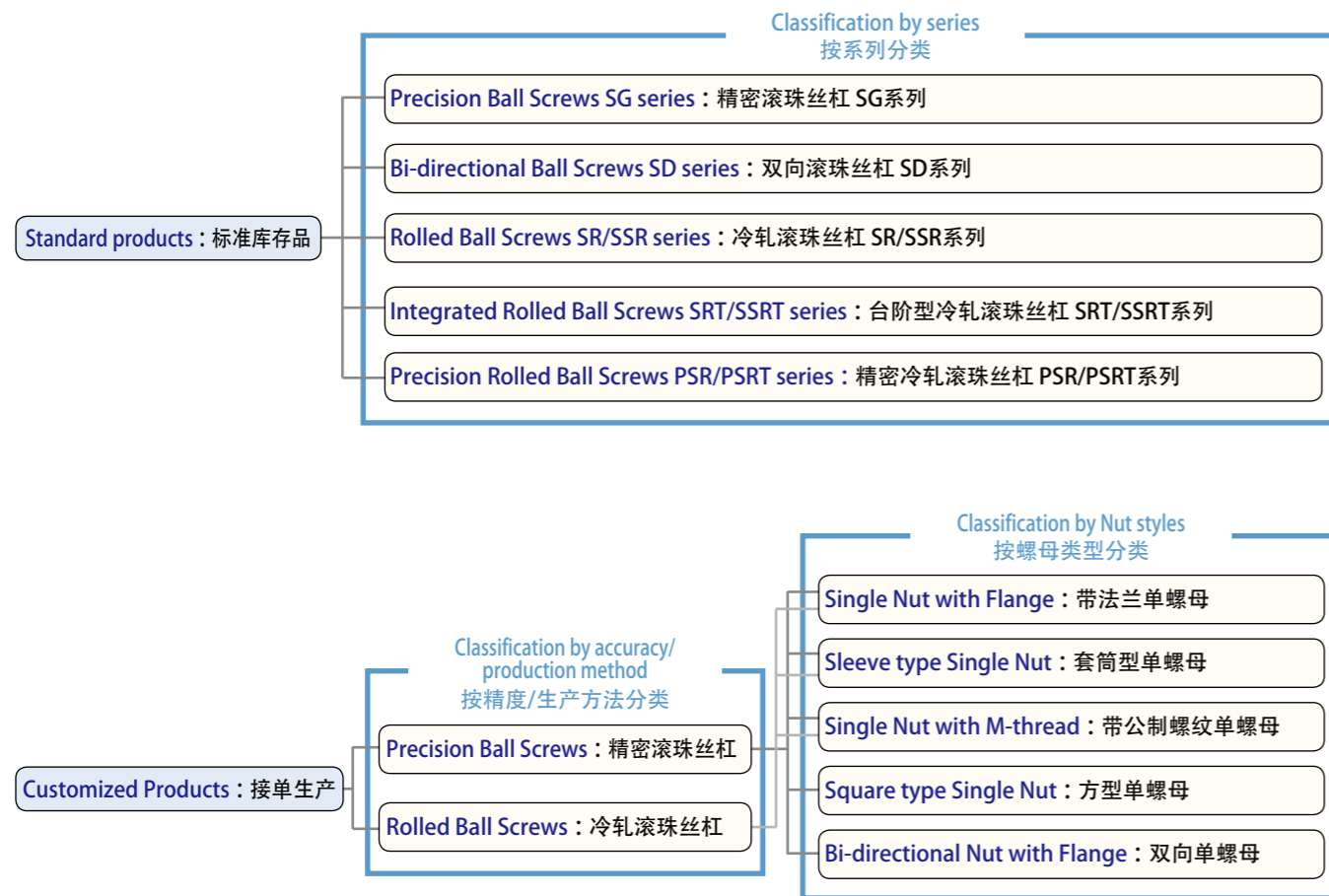
# 滚珠丝杠篇 Ball Screws

## 序言 Outline

自1978年开始生产、销售滚珠丝杠以来，作为微型滚珠丝杠行业的先锋，本公司一直积极致力于各种产品的开发。此外，本公司还致力于使用了滚珠丝杠的成套产品的开发，将迄今为止开发的产品整合到了一本产品目录中。

### ●KSS滚珠丝杠的分类

为了让您进一步深入了解KSS滚珠丝杠，以下对本公司滚珠丝杠的种类和分类进行了说明。



图A-11：滚珠丝杠的分类  
Fig. A-11：Classification of KSS Ball Screws

### ●标准库存品

为满足客户要求，实现短期交货，本公司备有特定型号的标准库存品。轴端形状实现了标准化，可有效缩减客户的设计时间。此外，凭借本公司独有的追加加工技术，可对轴端进行高精度加工。如图A-11所示，标准库存品种类繁多，精密滚珠丝杠、冷轧滚珠丝杠均可从中选择。

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.

### ●Standard Products

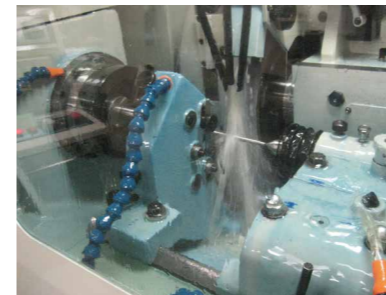
To meet customer's request of quick delivery, KSS has specified model type in stock. The end-journal configuration is standardized and it is possible to reduce numbers of design process by customer. Moreover, since we have end machining knowhow, high accurate end machining is possible. Standard products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

### ●接单生产

对于标准库存品以外的型号，本公司承接各种接单生产。为减少客户在设计方面花费的时间，螺母尺寸按照图A-11所示的螺母类型，实现了不同型号尺寸的标准化。对于非标准化的型号、形状、尺寸，如果您有需求，可随时咨询洽谈。此外，本公司还提供不锈钢、特殊材料的产品及表面处理等，欢迎垂询。

### ●精密滚珠丝杠和冷轧滚珠丝杠

本公司的滚珠丝杠生产工序因客户的精度要求而异。大体可分为采用研磨加工制成的高精度精密滚珠丝杠和采用滚丝模形成螺纹槽的冷轧滚珠丝杠。C5以上精度等级的滚珠丝杠一般采用研磨加工（精密滚珠丝杠），C7、C10级的滚珠丝杠则采用冷轧加工。对于无滚丝模（冷轧加工模具）的型号，也可采用研磨加工生产C7、C10级产品。



通过螺纹磨床进行的高精度螺纹槽加工  
High accurate shaft groove process by Grinding machine



通过滚丝模进行的冷轧加工  
Rolling process by Rolling dies

### ●质量和环保活动 Approach of quality and environment



KSS滚珠丝杠包括设计、制造在内，通过了ISO-9001认证，并具备完善的出厂检查、可追溯性等质量管理体系，可放心使用。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.



在环境方面，本公司不仅通过了ISO-14001认证，还积极使用符合RoHS指令的零件，致力于环保型设计和削减CO<sub>2</sub>排量。For environmental side, KSS is qualified by ISO-14001. We make an effort to reduce CO<sub>2</sub> and take care of environmentally friendly design by using parts, which conform to RoHs regulation.

### ●出口管理

本公司的产品、技术出口均以遵守外汇法、外贸法及其他相关法令为基本方针。因此，本公司谢绝以军事用途（大规模杀伤武器、武器与兵器相关领域）为目的的产品出口。关于本公司产品是否属于出口管理法中管制物品清单的管制对象，请登录KSS网站查看。<http://www.kssballscrew.com/cn/index.htm> 此外，希望获取KSS受管与否判断资料时，请在KSS网站上填写受管与否判断委托书后与本公司联系。

### ●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.

### ●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. Please refer to KSS homepage regarding list regulation by Export administration. <http://www.kssballscrew.com>

## 标准库存品 Standard Products

KSS滚珠丝杠标准库存品分为以下几类。如选择这些标准库存品,即可在短期内供货。

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

### ●精密滚珠丝杠 Precision Ball Screws



SG系列(精密滚珠丝杠)  
SG series (Precision Ball Screws)

- 通过将固定侧轴端形状标准化、支撑侧轴端自由化,设定标准行程。
- 支撑侧轴端未进行加工,因此可根据所需行程进行追加加工。
- 分为C3(轴向间隙为0)、C5(轴向间隙为5 $\mu$ m以下)两种。
- 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 $\mu$ m or less) available.



SD系列(精密双向滚珠丝杠)  
SD series (Bi-directional Ball Screws)

- 可单轴左右开闭的经济型滚珠丝杠。
- 库存品的固定侧、支撑侧轴端均未进行加工,提高了设计自由度。
- 分为C3(轴向间隙为0)、C5(轴向间隙为5 $\mu$ m以下)两种。
- 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 $\mu$ m or less) available.

### ●冷轧滚珠丝杠 Rolled Ball Screws



SR系列(冷轧滚珠丝杠)/SSR系列(不锈钢冷轧滚珠丝杠)  
SR series (Rolled Ball Screws)/SSR series (Stainless Rolled Ball Screws)

- 通过槽冷轧加工制成的经济型库存品。
- 库存品的固定侧、支撑侧轴端均未进行加工,提高了设计自由度。
- 分为Ct7(轴向间隙20 $\mu$ m以下)、Ct10(轴向间隙50 $\mu$ m以下)两种。
- 不锈钢材质的冷轧滚珠丝杠(SSR系列)也备有的标准库存品。
- 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 $\mu$ m or less), Ct7 (Axial play 50 $\mu$ m or less) available.
- There are also Rolled Ball Screws made of stainless steel (SSR series) in stock.



SRT

SRT系列(台阶型冷轧滚珠丝杠)/SSRT系列(台阶型不锈钢冷轧滚珠丝杠)  
SRT series (Integrated Rolled Ball Screws)  
SSRT series (Integrated stainless Rolled Ball Screws)

- 冷轧滚珠丝杠库存品的固定侧轴端较粗,未进行加工。
- 与传统冷轧滚珠丝杠相比,进一步提高了设计自由度。
- 轴端形状采用可与SG系列兼容的设计。
- 备有台阶型不锈钢冷轧滚珠丝杠(SSRT系列)的标准库存品。
- 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.



SSRT

### ●精密冷轧滚珠丝杠 Precision Rolled Ball Screws



PSR系列(精密冷轧滚珠丝杠)/PSRT系列(精密冷轧滚珠丝杠满)  
PSR series (Precision Rolled Ball Screws)  
PSRT series (Integrated Precision Rolled Ball Screws)

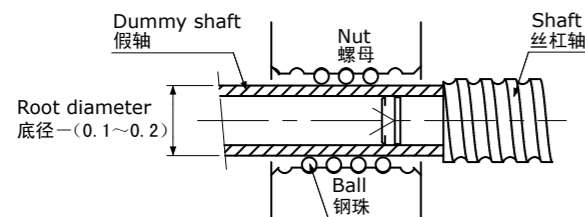
- 以前的冷轧加工只能加工到Ct7、Ct10的普通级,现在已经实现了精密级(JIS C5)加工。
- 轴端加工产品PSR系列和对轴端进行了加粗的台阶型(PSRT)系列均备有库存,进一步提高了客户设计的自由度。
- 轴向间隙设定在5 $\mu$ m以下,但可根据客户需求消除轴向间隙(预压)。
- 台阶型的固定侧轴端已实现标准化,可直接安装KSS支架组件。
- KSS newly developed the high grade accuracy (JIS C5) Rolled Ball Screws, which surpasses the conventional type of Ct7 or 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 $\mu$ 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.

## ●轴端追加加工

凭借本公司独有的追加加工技术,可进行无精度劣化的轴端加工。如需轴端追加加工,请与本公司联系。追加加工时的注意事项如下所示。

- 1) 建议由本公司进行轴端追加加工。如果由其他公司进行轴端追加加工,本公司将不能保证追加加工后的精度,敬请谅解。
- 2) 对于产品目录中所示标准形状以外的追加加工,请附上追加加工指示图(示意图)进行指示。
- 3) 由于不进行螺母的追加加工,因此请对照尺寸表设计法兰形状等。
- 4) 润滑  
使用滚珠丝杠时,请务必涂抹润滑剂。  
KSS标准库存品以长期存放为前提,因此在涂抹防锈油后进行了真空包装。  
如果在委托追加加工时指定了润滑剂,交货时将在滚珠丝杠上涂抹该指定润滑剂。  
此外,防锈油并非润滑剂,使用前请用精制煤油等清洗滚珠丝杠,去除防锈油后涂抹润滑剂(油脂或润滑油)。  
请每隔2~3个月检查一次油脂。使用过程中油脂变脏时,请擦去旧的油脂后涂抹新油脂。
- 5) 螺母的自重下落  
以间隙规格使用滚珠丝杠时,螺母会因自重而下落,敬请注意。
- 6) 由客户进行的追加加工  
对于客户自行进行的追加加工,本公司将不予保证精度。不得已而由客户自行进行追加加工时,除上述注意事项外,还应注意以下各点。
  - 防止粉尘进入螺母内部  
追加加工时,请注意防止粉尘进入螺母内部。  
不拆下螺母而直接对丝杠轴进行追加加工时,请用塑料袋等包住螺母、或用胶带密封螺母两端,切实保护螺母。
  - 拆下螺母时  
拆下螺母时,请按照图A-21所示使用假轴。假轴根据客户要求提供。  
通过假轴拆卸或重新组装螺母时,请在确认钢珠与螺纹槽啮合的同时,沉着缓慢地进行操作。
  - 追加加工后的清洗  
追加加工后,请用清洁的精制煤油将附着在滚珠丝杠上的脏物清洗干净。
  - 涂抹润滑剂  
使用追加加工后的产品之前,请先涂抹润滑剂。
  - 存放  
追加加工后需长期存放时,请切实进行防锈处理。

图A-21：拆卸假轴和螺母

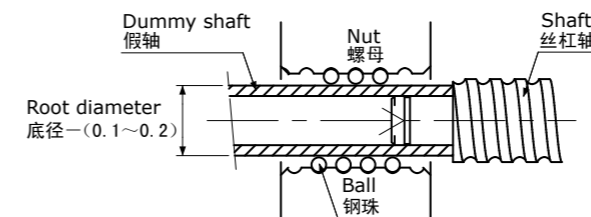


## ●Additional end-journal machining

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 3months. 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



## 接单生产 Customized products

为了满足客户的各种设计需求,除标准库存品以外,本公司还承接接单生产。为节省客户的设计时间,我们对各种螺母类型进行了标准化。

### ●接单生产的种类

接单生产产品选择我司推荐螺母可大幅节省设计工时及成本。各个型号的详细技术参数,请垂询我司或我司代理商

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 following description about Standardized Ball Nut type. If you need special Ball Nut other than below, feel free to ask KSS. KSS will provide with required Ball Nut as a special order.

### ●按轴径和导程分类的型号一览

Table of Shaft dia. and Lead combination

注)\*表示双向螺母。  
Note)\* means Bi-directional Nut with Flange.

Shaft dia. / 轴径 (mm)	Lead / 导程 (mm)															
	0.5	1	1.5	2	2.5	3	4	5	6	8	10	12	15	20	25	30
1.8	FBS															
3	FBS	FBS BS														
4	FBS	FKB FBS BS MS FKB* FBS* MRB BSR MSR		FBS BS MRB BSR		FBS BS	FEB									
5	FBS	FKB FBS BS FKB* FBS*					FBS BS MRB BSR									
6	FBS	FKB FBS BS KS FKB* FBS* MRB BSR	FBS BS	FBS BS MS KS MRB BSR	FBS BS			FEB MRB		FEB MRB	FEB					
8	FBS	FKB FBS BS KS FKB* FBS* MRB BSR	FKB FBS BS MS FKB* FBS*	FKB FBS BS MS FKB* FBS* MRB BSR MSR	FDB FBS BS MS MRB BSR MSR	FBS BS MS	FBS BS MS	FBS BS MS MRB BSR MSR		FEB MRB	FEB MRB	FEB MRB				
10		FKB FBS BS KS FKB* FBS*	FKB FBS BS FKB* FBS*	FKB FBS BS MS FKB* FBS* MRB BSR MSR	FKB FBS BS FKB* FBS*	FBS BS FBS*	FBS BS FBS* MRB BSR	FDB FBS BS FBS* MRB BSR	MRB BSR		FEB MRB	FEB MRB	FEB MRB	FEB MRB	FEB	FEB
12		FKB FBS BS FKB* FBS*		FKB FBS BS MS FKB* FBS* MRB BSR MSR	FKB FBS BS FKB* FBS*	FKB FBS BS FKB* FBS*	FBS BS FBS*	FBS BS			FEB MRB					
13											FEB MRB	FEB MRB	FEB MRB			
14		FBS BS FBS*		FKB FBS BS MS FKB* FBS* MRB BSR MSR	FKB FBS BS FKB* FBS*	FKB FBS BS FKB* FBS*	FKB FBS BS MS FKB* FBS* MRB BSR MSR	FBS BS FBS*								
15								FBS	FEB FBS MRB			FEB FBS MRB		FEB FBS MRB		FEB
16		FBS BS FBS*		FKB FBS BS FKB* FBS*	FKB FBS BS FKB* FBS*	FKB FBS BS FKB* FBS*	FKB FBS BS FKB* FBS*	FBS BS FBS*								
20								FBS						FBS		

### ●按螺母种类分类的型号一览 Nut style list

Nut type 螺母形状	Precision Ball Screws 精密滚珠丝杠	Rolled Ball Screws 冷轧滚珠丝杠
Single Nut with Flange 带法兰单螺母	FKB FBS FDB FEB	MRB
Sleeve type Single Nut 套筒型单螺母	BS	BSR
Single Nut with M-thread 带公制螺纹单螺母	MS	MSR
Square type Single Nut 方型单螺母	KS	—
Bi-directional Nut with Flange 双向螺母	FBS* FKB*	—

注)\*表示双向螺母。  
Note)\* means Bi-directional Nut with Flange.

### ●滚珠丝杠的生产范围 Maximum limit of overall lengths

Unit(单位):mm

Accuracy grade 精密等级	C0	C1	C3	C5	C7 & C10 (Rolled Ball Screw / 冷轧)
Shaft nominal dia. 轴径					
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	—

### ●带法兰单螺母 (FBS,FKB,FDB,FEB,MRB系列) Single Nut with Flange



用法兰部螺栓孔安装螺母的最简单的单螺母丝杠。有复式回路板循环方式(FBS, MRB系列), 陀螺式循环方式(FKB系列), 偏转器式循环方式(FDB系列)以及端盖式循环方式(FEB系列)等的多种产品供您选择。

It is the most simple Single Nut type. Normally Ball Screws are used with small Axial play, but using oversized Balls allows for 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.

### ●套筒型单螺母 (BS,BSR系列) Sleeve type Single Nut



采用圆筒型单螺母实现了径向紧凑化。  
可用圆筒面键槽和螺母端面安装螺母。

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.

### ●带公制螺纹单螺母 (MS,MSR系列) Single Nut with M-thread



圆筒型螺母端面设有公制螺纹用于直接安装螺母。  
最适用于气缸, 电动缸等用途。

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.

### ●方型单螺母 (KS系列) Square type Single Nut



平行于螺母中心设有较宽安装面的方形螺母丝杠。  
螺母与支座一体, 可实现紧凑型设计。

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

### ●双向单螺母 (FKB,FBS系列) Bi-directional Nut with Flange



单轴同时加工左旋和右旋螺纹, 实现双向丝杠, 左右相位控制等的功能。

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.

### ●其他 Others



作为特殊规格, 也生产双螺母产品, 需要时请垂询本公司。

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.



### ●公称型号的构成 Model number notation

FBS 04 01 B — 100 R 120 C3 — 05  
1 2 3 4 5 6 7 8 9

#### 1螺母类型符号

##### 精密滚珠丝杠:

FBS : 带法兰单螺母  
BS : 套筒型单螺母  
MS : 带公制螺纹单螺母  
KS : 方型单螺母

##### 冷轧滚珠丝杠

MRB : 带法兰单螺母  
BSR : 套筒型单螺母  
MSR : 带公制螺纹单螺母

#### 2丝杠轴公称外径 (mm)

#### 3导程 (mm)

#### 4循环数符号 (详情参照尺寸表)

#### 5螺纹部长度 (mm)

#### 6螺纹旋向 (R=右旋, L=左旋)

#### 7丝杠轴总长 (mm)

#### 8精度等级 (C0, C1, C3, C5, C7, C10)

#### 9轴向间隙 (μm)

#### 1Ball Nut type No.

##### Precision Ball Screws

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

##### Rolled Ball Screws

MRB : Single Nut with Flange  
BSR : Sleeve type Single Nut  
MSR : 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 (μm)

### ●注意事项

- 有关具体尺寸、额定负载、刚性等, 请参照各型号相应的尺寸表。
- 有关精度、轴向间隙、材质、生产范围等详情, 请参照技术解说p-A801。
- 接单生产时, 丝杠轴的形状、尺寸未进行标准化。本公司可根据客户需求, 制作KSS规格图。
- 设计丝杠轴时, 由于组装螺母的关系, 请注意使丝杠轴的其中一端(双向丝杠及冷轧滚珠丝杠时应为两端)不超过底径。
- 有关其它注意事项, 请参照“存放、操作及使用注意事项”p-A901。

### ●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.