

## Multi-purpose Products (Miniature Ball Screw with Ball Spline : BSSP)

### ●Features

- This is a combined product which is possible for linear and rotational motion as well as suction at the same time with one unit.
- Achieved very compact design by overlapped groove of Miniature Ball Screws and Miniature Ball Splines.

#### Separated type (SP)

It's a combined products, which has Ball Screw and Ball Spline processed on the same Shaft.



#### Overlap type (OL)

By processing Ball Screw and Ball Spline on one place makes product have longer travel and compact.



Table of Shaft dia. and Lead combination (Model distinction)

Shaft dia. (mm)	Lead (mm)			
	2	4	6	10
6	SP		SP OL	SP OL
8	SP	SP		SP OL

Specifications (Accuracy Grade & Axial/Radial play) Unit:mm

Type	Parts	C3 (Max.)	C5 (Max.)
Separated type	Ball Screw (Axial play)	0 or 0.005	0.005
	Ball Spline (Radial play)	0	
Overlap type	Ball Screw (Axial play)	0.005	
	Ball Spline (Radial play)	0.002	

## Multi-Functional VZθ Actuators

The brand new products which applied the KSS miniature Ball Screw with Ball Spline (BSSP), and realized three functions, linear motion (Z), rotary motion (θ), and vacuum (V), with one product.

### ●Types and Features

KSS provides 3-types of VZθ Actuators, which are Direct Drive type, Hybrid Drive type, and Belt-Drive type including high speed type. It is possible to select one of them according to your specifications or application.

#### [Direct Drive type] (Photo right)

Slim form is realized by driving a Ball Screw and a Ball Spline Nut directly built in a Hollow Motor.



#### [Hybrid Drive type] (Photo left)

Combination of the Hollow Motor and Normal Motor gives dramatically short length of Actuator Body.

#### [Belt Drive type] (Photo center)

Wide variety of Motor can be set on this Actuator. This means various options are available based on Motor Specifications.

### Specifications

Model	Shaft dia. (mm)	Lead (mm)	Travel (mm)	Max. Speed (Z) (mm/sec)	Max. speed (θ) (rev/sec)	Thrust Force (N)	Max. Permissible Moment (kg·m <sup>2</sup> )
Direct Drive type	φ6	10	50	120	3	5	0.15 × 10 <sup>-4</sup>
	φ8	10	50	200	3	25	0.15 × 10 <sup>-3</sup>
Hybrid Drive type	φ6	10	60	200	3	5	0.15 × 10 <sup>-4</sup>
Belt-Drive type	φ4	4	60	80	3	5	0.8 × 10 <sup>-5</sup>
	φ6	10	60,120	200	3	10	0.4 × 10 <sup>-4</sup>
Belt-Drive High speed type	φ8	10	120	200	3	15	0.1 × 10 <sup>-3</sup>
	φ6	10	80	500	25	3	0.15 × 10 <sup>-4</sup>

## Compact Electric Gripper

### ●Features

- Utilize KSS miniature technology to achieve compactness and weight reduction.
- The combination of Ball Screw, DC Motor and Linear scale utilizes multi-point positioning drive and grip force control.
- It can be mounted from 4 sides as a flexible design
- This design enables customers to allow regular maintenance. (Motor replacement, Greasing).
- Manual opening/closing operation is possible.
- Centering and dimensional measurement are possible. (only with our designated Driver).



General Specification		Note
Gripping Force Range	2~20N	One side
Gripping Speed Range	0.5~10mm/sec	One side
Positioning Speed Range	0.5~20mm/sec	One side
Stroke	14mm	7mm for one side
Repeatability	±0.01mm	-
Permissible Moment	Mo	0.98Nm
	Mx	0.56Nm
	My	0.47Nm

## Precision Lead Screws

### Possible to select small Pitch

It is possible to select small Pitch which Ball Screws do not have.

### Wide variety of size

Metric Fine Thread and Metric Coarse Thread based on JIS (Japanese Industrial Standard) are standardized but we also manufacture Trapezoidal Thread, Unified Screw Thread, ACME Screw Thread, special Pitch, and multiple start Thread.

### Low torque

With knowhow of screw gauge, we make use of grinding technique and lapping technique, so fine surface roughness and low wobble become reality, which lead low torque and less wear.

### Flexibility of Nut configuration

Nut configuration is not restricted and it is possible to manufacture in accordance with customer's design.

- Recommended model including Metric Fine Pitch Thread.
- Metric Coarse Pitch Thread.
- Metric Trapezoidal Thread.

\*\*\*Blank : Can be manufactured, but please inquire KSS.



Combination of Shaft dia. & Pitch Unit:mm

Pitch	0.25	0.35	0.4	0.45	0.5	0.7	0.75	0.8	1.0	1.25	1.5	2.0
Shaft dia.												
2	○		○									
2.5		○										
3			○		○							
4					○	○						
5						○		○				
6							○	○	○			
7								○	○	○		
8									○	○	□	
9										○	○	□
10											○	□

## Original Grease for Miniature Ball Screws

### ●Features

This grease has high lubrication performance without deteriorating Ball Screw function. The original Grease for Clean room usage is also available.

#### General use

MSG No.1: High positioning usage appropriate for high smoothness requirement.  
MSG No.2: General usage appropriate for high speed.

#### Clean room use

MCG No.1: High positioning usage in clean room focused on less contamination, high smoothness.



## Company Outline

### Trade Name

**KSS CO.,LTD.**

Date of incorporation June, 1964 (Date of establishment : June, 1960)

Capital 120,700,000JPY

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Certification Ojiya Plant ISO9001 (JQA-QM4131) ISO14001 (JQA-EM4583) ISO13485 (JQA-MD0144)

### ■Contact us

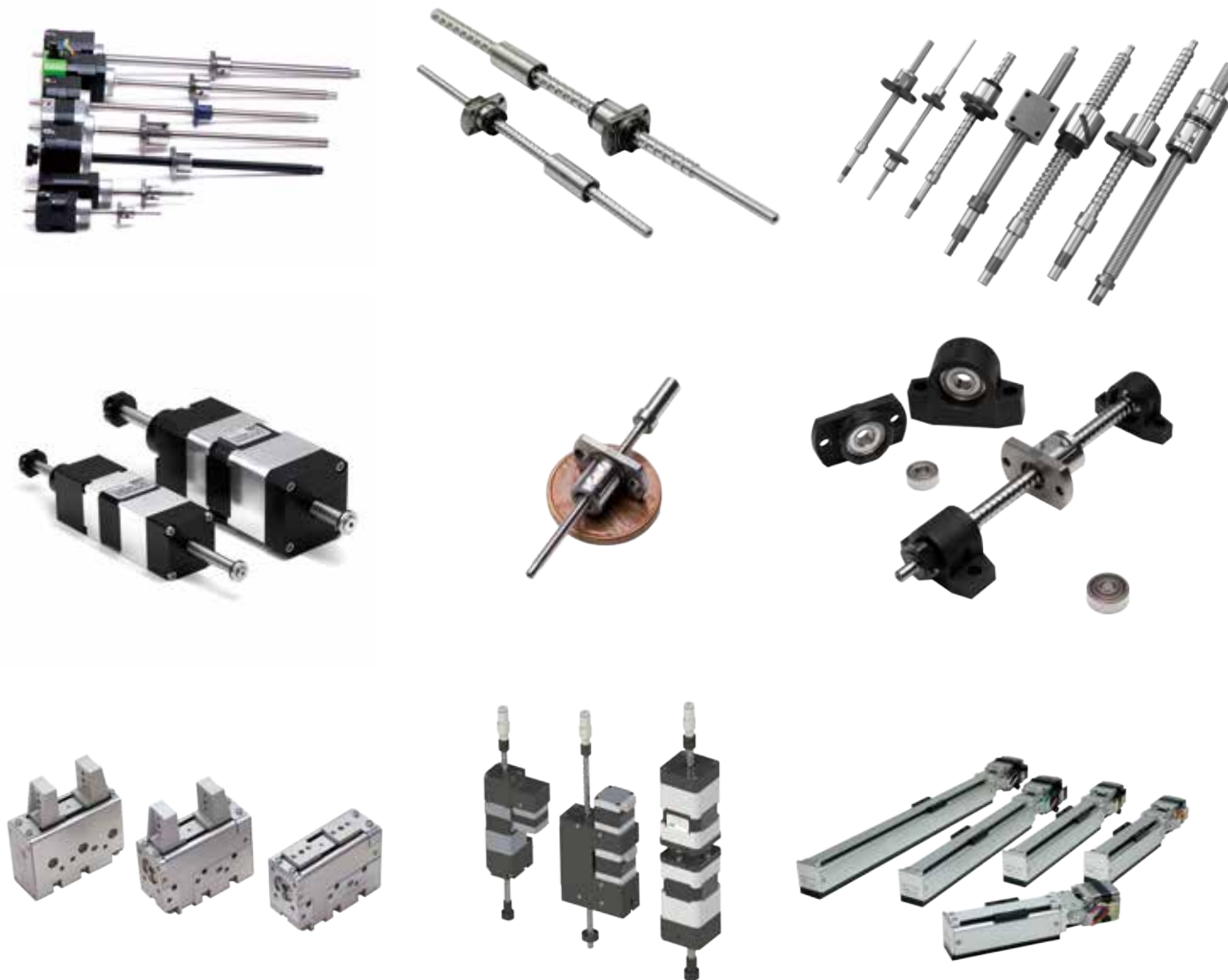
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# Miniature Ball Screws & Actuators

## Ball Screws

### Standard Products

#### 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.

#### 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.

#### 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 also Rolled Ball Screws made of stainless steel (SSR series) in stock.

#### SRT series (Integrated end-journal Rolled Ball Screws)

#### SSRT series (Integrated end-journal stainless Rolled Ball Screws)

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

#### PSRT series (Precision Rolled Ball Screws)

- The conventional type of Rolled Ball Screws can reach the accuracy grade of Ct10 or Ct7. KSS newly developed the high grade accuracy of Rolled Ball Screw, which can achieve JIS C5 grade.
- End-journal profile and dimension are standardized, so KSS Compact Support - Unit can be installed.
- Zero backlash is possible by your request.



Standard Products in stock  
Table of Shaft dia. and Lead combination (Model distinction)

Shaft dia. (mm)	Lead (mm)													
	0.5	1	2	2.5	4	5	6	8	10	12	15	20	25	30
3	SG	SG												
4	SG	SD	SR	SRT										
5					SG	SR	SRT							
6	SG	SD	SR	SRT	SG			SG	SR	SRT				
8	SG	SD	SR	SRT	SG	SR	SRT		SG	SR	SRT			
10	SG	SD	SR	SRT	SG	SR	SRT		SG	SR	SRT		SG	SR
12		SG	SD	SR	SRT				SG	SR	SRT			
14		SG	SR		SG	SR								
15						SG	SR			SG	SR			SG

### Customized Products

We offer customized products. To reduce design process at customer, each Nut type is standardized.

#### Single Nut with Flange (FBS,FKB,FDB,FEB,MRB series)

It is the most simple Single Nut type. Nut should be mounted using bolt holes in Flange.



#### Sleeve type Single Nut (BS,BSR series)

It is Cylindrical Single Nut which is compact. The Nut should be mounted by clamping on the key way on the Nut outer and Nut end surface.



#### Single Nut with M-thread (MS,MSR series)

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 (KS series)

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.



#### Bi-directional Nut with Flange (FKB,FBS series)

Since there are both Right-handed thread and Left-handed thread on a Shaft, it has Bi-directional function. In addition, absolute position control for both Nut is available.



### Customized Products Nut style list for Precision Ball Screws & Rolled Ball Screws.

Nut style	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*	—

Customized Products Table of Shaft dia. and Lead combination (Model distinction)

Shaft dia. (mm)	Lead (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	FKB	FBS													
4	FBS	FKB	FBS	MRB	BSR	FBS	FEB		FEB							
5	FBS	FKB	FBS			FBS	MRB	BSR								
6	FBS	FKB	FBS	MRB	BSR	FBS	MRB	BSR	FEB	MRB	FEB	FEB				
8	FBS	FKB	FBS	MRB	BSR	FBS	MRB	BSR	FEB	MRB	FEB	MRB	FEB	MRB		
10	FBS	FKB	FBS	MRB	BSR	FBS	MRB	BSR	MRB	BSR	FEB	MRB	FEB	MRB	FEB	FEB
12	FBS	FKB	FBS	MRB	BSR	FBS	MRB	BSR	FEB	MRB						
13											FEB	MRB	FEB	MRB	FEB	MRB
14	FBS	FKB	FBS	MRB	BSR	FBS	MRB	BSR	FEB	MRB						
15	FBS	FKB	FBS	MRB	BSR	FBS	MRB	BSR	FEB	MRB			FEB	MRB		FEB
16	FBS	FKB	FBS	MRB	BSR	FBS	MRB	BSR	FEB	MRB						
20											FBS					

Note) \* means Bi-directional Nut with Flange.

## Ball Screw Support Units

### Features

KSS Support Units are suitable for Miniature Ball Screw end journal. Several types of Support Units are available with Ball Screws.

### MSU series (Compact type)

- By eliminating extra shape of Housing, and minimizing pitch of mounting holes, light-weight & compact design Support Units became reality.
- Ultra-compact size ( $\phi 3$ : fixed side,  $\phi 2$ : supported side) is standardized, it would be suitable for Ultra Miniature Ball Screws.
- Pillow & Flange type are standardized for both fixed & supported side, so wide variety of choices are available.



### Combination of inner dia.

Inner dia.	MSU	
	fixed side	supported side
$\phi 2$		○
$\phi 3$	○	○
$\phi 4$		○
$\phi 5$	○	
$\phi 6$	○	○
$\phi 8$	○	

## Linear Actuators External type (Ball Screw type)

### Features

- It's a Compact Linear Actuator installed Motor directly onto the Ball Screw Shaft, which makes less-Coupling structure available.
- Ball Screw Shaft is ideally constructed to form the Motor Rotor Shaft.
- Since combining the Motor Shaft and Ball Screw Shaft, Coupling-less, saving total length, low lost-motion can be achieved.



### Combination of Drive Screw and Stepping Motor

Type	Ball Screw type		Stepping Motor	
	Precision type	Rolled type	2-phase	5-phase
DMB		○ JIS Ct7 equivalent	○	
2TMB		○ JIS Ct7 equivalent	○	
TMB		○ JIS Ct7		○
MB	○ JIS C3			○
MMB		○ JIS Ct7 equivalent	○	

### Combination of Shaft Nominal dia. & Lead

Shaft Nominal dia.	Lead							
	0.5	1	2	4	5	6	10	12
4	MB	DMB TMB MB SIMB	DMB					
5				DMB TMB				
6		DMB TMB MB	DMB TMB MB MMB			TMB	DMB	
8		DMB TMB 2TMB MB	DMB TMB 2TMB MB		DMB TMB 2TMB		DMB	TMB 2TMB

## Linear Actuators Captive type and Non-Captive type (Miniature Electric cylinder)

Compact Cylinder with 2-phase Hollow Stepping Motor integrated with Ball Screw or Ball Spline with Ball Spline (BSSP).

### Features

- The new Cylinder type Actuator comes with 2 Motor sizes, NEMA11 ( $\square 28$ ) & NEMA17 ( $\square 42$ ). Captive type with anti-rotating device or Non-Captive type without anti-rotating device can be selected in each Motor size as standard.
- Variety of Shaft diameter & Lead combination allows wider selection of Accuracy and Thrust Force.

### Types

#### Captive type (AR Cylinder)

KSS miniature Ball Screw with Ball Spline (BSSP) is used for an anti-rotating device.



#### Non-Captive type (CL Cylinder)

Simple combination of the Hollow Motor and the Ball Screw contributes to lightweight and compact body.



### Specifications

	Drive Screw	Unit:mm			
		NEMA 11 ( $\square 28$ )		NEMA 17 ( $\square 42$ )	
		Lead	Travel	Lead	Travel
Captive type	Precision Ball Screw	1,2	40	2,5	50
Non-Captive type	Precision Ball Screw	1,2	40,80	2,5	50,100
	Rolled Ball Screw	1,2	40,80	2,5	50,100

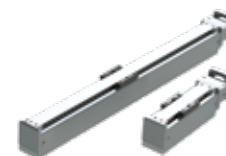
## Single Axis Actuators

### Flex Actuator (FA Series)

There are many variety of choices among accuracy (Screw type), speed (Screw Lead), travel length and power (Motor type).

### Features

- Depending on kinds of Drive Screws, wide range of choices related to positioning accuracy are available.
- Several variations of Screw Lead & Travel for each Screw type are standardized. So wide variety of choice for speed is available.
- Motor-less type is our standard, but a couple of Motors are in stock as an option. Suitable Motor and Actuator would be assembled in accordance with your specifications.
- Accessories can be provided as special design, such as outside photo-sensor, Brake unit and so on.



### Compact Actuator NEMA 6 size (CAS Series)

The most compact single axis Actuator in KSS with NEMA 6 size of 2 phase stepping Motor.

### Features

Realized compactness not only the body width, but total length of the Actuator by combining NEMA 6 Stepping Motor using our unique coupling - less connection.



### Specifications

	Unit:mm	
	Rolled Ball Screw	
Lead	1	2
Travel	20, 40	

### MoBo Actuator (MA Series)

External Ball Screw type (MoBo) is built in this series, what we call MoBo Actuators. All of MoBo Actuators are produced as customized products, in accordance with customer's order.

### Features

More compact design of Unit products in longitudinal dimension became reality by using Direct Motor Drive Ball Screws / Resin Lead Screws.



### Specifications

	Unit:mm	
	Precision Ball Screw	Rolled Ball Screw
Lead	1	1
Travel	15, 30	