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

Features

- •This is a combined product which is possible for linear and rotational movement as well as suction at the same time with one unit. •Achieved developing very compact product as "Overlap type" using 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) | | | | | | | | | | | |
|--|---|----|----|----------|----------|----------|--|--|--|--|--|
| Lead (mm) | | | | | | | | | | | |
| | | 2 | 4 | 6 | 10 | 12 | | | | | |
| Shaft dia. (mmj | 6 | SP | | SP OL | SP OL | | | | | | |
| (mm) | 8 | SP | SP | | | SP OL | | | | | |

Unit:mm

C5 (Max.)

0.005

0

0.005

0.002

C3 (Max.)

0 or 0.005

Specifications (Accuracy Grade & Axial/Radial play)

parts

Ball Screw (Axial play)

Ball Spline (Radial play)

Ball Screw (Axial play)

Ball Spline (Radial play)

Туре

Separated type

Overlap type



S Products Digest catalog

Multi-Functional VZ0 Actuator

The brand new products which applied the KSS miniature Ball Screw with Ball Spline (BSSP), and realized three functions, linear motion(2), rotary motion(θ), and vacuum (V), with one product.

•Types and Features

KSS provides 3-types of multi-functional VZØ Actuator, which are Direct Drive type, Hybrid Drive type, and Belt-Drive type. It is possible to select one of them according to your specifications or application.

[Direct Drive type] (Photo center) Slim form is realized by driving a Ball Screw and a Ball Spline Nut directly bult in a Hollow Motor.

[Hybrid Drive type] (Photo right)

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

[Belt Drive type] (Photo left)

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

Precision Lead Screw

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.

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.

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

Clean room use

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



Company Outline

Trade Name

Data



| Date of incorporation | June, 1964 (Date | of establishment - June, 1960) |
|-----------------------|--------------------------------|---|
| Capital | 120,700,000JPY | |
| Company Address | Head office ; Ojiya Plant ; | 1-22-14 Yaguchi, Ota-ku, Tokyo 146-0093, JapanTel. : +81-3-3756-3921 Fax. : +81-3-3756-3232 Aza Shinbo 4-14, Oaza Yamaya, Ojiya City,Niigata Pref. 947-0043, Japan |
| Director | President & Repr | esentative Director Akihisa Ota |
| Certification | Ojiya Plant | ISO9001 (JQA-QM4131) ISO14001 (JQA-EM4583) |

| Ĵ | Model | Shaft dia. | Lead Trave | | Max. Speed (Z) (mm/sec) | Max. speed (θ) (rev/sec) | Thrust Force (N) | Max. Permissible Moment (kg∙m²) |
|---|-------------------|------------|------------|------------|-------------------------------|--------------------------------|------------------------|--|
| 6 | Direct Drive type | Ø 6 | 6 | 50 | 72 | 3 | 7 | 0.15×10-4 |
| | | ψο | 10 | 50 | 120 | 3 | 5 | 0.13×10 |
| | | ø 8 | 5 | 50 | 100 | 3 | 50 | 0.15×10 ⁻³ |
| 4 | | ψο | 10 | 50 | 200 | 3 | 25 | 0.13×10 - |
| 3 | Hybrid Drive type | φ6 | 10 | 50 | 200 | 3 | 5 | 0.15×10-4 |
| | | φ4 | 4 | 50 | 80 | 3 | 5 | 0.9×10-5 |
| | Belt-Drive type | φ6 | 10 | 50, 100 | 200 | 3 | 10 | 0.5×10 ⁻⁴ |
| | | φ8 | 10 | 150 | 200 | 3 | 10 | 0.5×10 ⁻⁴ |

| 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 | 0 | | 0 | | | | | | | | | | |
| 2.5 | | O | | 0 | | | | | | | | | |
| 3 | | O | | | 0 | | | | | | | | |
| 4 | | | | | O | 0 | | | | | | | |
| 5 | | | | | O | | | 0 | | | | | |
| 6 | | | | | O | | O | | 0 | | | | |
| 7 | | | | | O | | O | | 0 | | | | |
| 8 | | | | | O | | 0 | | O | 0 | | | |
| 9 | | | | | O | | 0 | | O | | 0 | | |
| 10 0 0 0 0 | | | | | | | | | | | | | |

Metric Trapezoidal Thread.

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













vol.92.1

Miniature Ball Screws & Actuators

Ball Screw

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)

- Fixed side end-journal is set up bigger than Shaft orminal 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.

We offer customized products. To reduce design process at customer, each Customized Products Table of Shaft dia. and Lead combination (Model distinction) 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.FBS,MRB (Return-plate), FKB(Internal-deflector), FDB (End-deflector), FEB(End-cap) circulation system can be distinguished.

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 cvlinder.

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 tvpe.

Bi-directional Nut with Flange (FKB.FBS series)

Since there are both Right-handed thread and Left-handed thread on a Shaft, it has Bidirectional function. In addtion, absolute positon control for both Nut is available.



1.8 FBS

3 FBS

FBS

FBS

6 FBS

8 FBS

13

FBS

MS FKB* FBS* MRB

BSF

FKB FBS BS FKB FKB

FKB FBS

FKB FBS KS FKB* FBS* MRB BSR

FKB FBS BS KS FKB* FBS*

FKB FBS BS FKB³ FBS⁴

FBS BS FBS

FBS BS FBS

KS FKB* FBS* MRB

FKB FBS BS MS FKB* FBS*

FKB

BS FKB* FBS*

FBS BS MRB BSR

FBS BS MS KS MRB BSR

FKB FBS BS FBS FBS FBS FKB* MS FBSB BSR MSR MSR MSR

BS MS KS FKB* FBS5

FBS

FBS

FEB

FBS BS MRE BSR

FBS BS MS FBS BS MS

FBS BS FBS* MRB BSR

* BS FKB* FBS* FBS*

FKB FBS FBS BS MS FBS

EKB* FKB* FRS*

BS FKB* FBS*

ES FKB* FRS*

FKB EBS FKB FBS

FKB FBS FKB FBS

| 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* | _ | | |

Note)* means Bi-directional Nut with Flange.



| $ \left \begin{array}{c c c c c c c c c c c c c c c c c c c $ | | | | 0.5 | 1 | 2 | 2.5 | 4 | 5 | 6 | 8 | 10 | 12 | 15 | 20 |
|--|--|-----------------|----|-----|--|--------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------|
| $ \left \begin{array}{c c c c c c c c c c c c c c c c c c c $ | - A | | 3 | SG | SG | | | | | | | | | | |
| $ \begin{array}{ c c c c c c c } \hline & & & & & & & & & & & & & & & & & & $ | E. | | 4 | | SG SD SR SRT | SG SR SRT | | | | | | | | | |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $ | E. EE | | 5 | | | | | SG SR SRT | | | | | | | |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $ | | | 6 | | SG SD SR SSR SRT SRT SSRT | | SG | | | SG SR SRT | | SG SR SRT | | | |
| 10 SG SG SR SRT SG SR SG SR SRT SG SR SG SR | | Shaft dia. (🗄) | 8 | | SG SD SR SSR SRT SSRT SSRT PSRT | SRT SSRT PSRT | SG SR SRT | SG | SG SR SRT | | SG SR SRT | SR | SG SR SRT | | |
| 14 SG | KK | | 10 | | SG | SG SD SR SSR SRT SSRT | | SG SR | SG SR SRT | | | SG SR SRT | | SG SR SRT | SR SRT |
| 14 SG SR SG | | | 12 | | | SG SD SR SRT | | | | | | SG SR SRT | | | |
| 15 SG | RR | | 14 | | | SG SR | | SG SR | | | | | | | |
| | and the second s | | 15 | | | | | | SG SR | | | SG SR | | | SG SR |

0.5 1 1.5 2 2.5 3 4 5 6 8 10 12 15 20 25 30

FEB

FBS BS MS MRB BSR MSR

FDB FBS BS FBS* MRB BSR

FBS BS

FKB FBS BS FKB* FBS* FBS* FBS* FBS* MRB BSR MSR

FKB FBS BS FBS FBS FBS FBS FBS*

FBS

FBS

MRB

FEB

FEB FEB FEB

FEB

FEB

FBS

FEB

FEB FEB FEB FEB FEB

FEB FEB FEB

FEB

FEB

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 (ϕ 3) 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.

SUP & EK, EF series •Block type support units

Linear Actuator External (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.
 SiMB type has three features, which are "high accuracy positioning", "vibration free", "never step-out".

Combination of Drive Screw and Stepping Motor

| _ | Drive Scr | Stepping Motor | | |
|-----------------------------|----------------------|------------------------|---------|---------|
| Туре | Precision Ball Screw | Rolled Ball Screw | 2-phase | 5-phase |
| MB Precision type | O JIS C3 | | | 0 |
| TMB Rolled type | | O JIS Ct7 | | 0 |
| 2TMB 2-phase Rolled type | | O JIS Ct7 quivalent | 0 | |
| SiMB Hybrid type | O JIS C3 /C5 | | 0 | |

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

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(AR Cylinder)

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

Non-Captive(CL Cylinder)

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



Miniature Actuator **Flex Actuator** There are many variety of choices among accuracy (Screw type), speed(Screw Lead), travel length and power (Motor type). Features •We make full use of features of Miniature Ball Screw manufacturer and super compact design Actuator can be achieved. •Depending on kinds of Lead 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.

•Recommended Motor Drivers for each Motors are also in stock. •Accessories can be provided as special design, such as outside photosensor. Brake unit and so on.

MoBo Actuator (MA Series)



Save the longitudinal dimension by using Direct Motor Drive Ball Screws. MoBo Actuator series is classified into MoBo Cylinder and MoBo Slider, which is rod-type and table-type respectively.













Combination of inner dia

| | ١ | 1SU | SUP/EK | | | | | | | | | | | |
|------------|------------|----------------|------------|----------------|--|--|--|--|--|--|--|--|--|--|
| Inner dia. | fixed side | supported side | fixed side | supported side | | | | | | | | | | |
| φ2 | | 0 | | | | | | | | | | | | |
| φ3 | 0 | 0 | | 0 | | | | | | | | | | |
| φ4 | 0 | 0 | 0 | 0 | | | | | | | | | | |
| φ5 | 0 | | 0 | | | | | | | | | | | |
| φ6 | 0 | 0 | 0 | 0 | | | | | | | | | | |
| φ8 | 0 | | 0 | 0 | | | | | | | | | | |
| φ10 | | | 0 | 0 | | | | | | | | | | |
| φ12 | | | 0 | | | | | | | | | | | |
| | | | | | | | | | | | | | | |



Unitemm

| Combir | Combination of Shaft Nominal dia. & Lead | | | | | | | | | | | | | |
|--------------------|--|---------------------------|---------------------------|-----|---------------------|-----|-------------|--|--|--|--|--|--|--|
| Lead sfaft dia. | 0.5 | 1.0 | 2 | 4 | 5 | 6 | 12 | | | | | | | |
| 4 | МВ | MB TMB SiMB | | | | | | | | | | | | |
| 5 | | | | тмв | | | | | | | | | | |
| 6 | | MB TMB | MB TMB | | | ТМВ | | | | | | | | |
| 8 | | MB TMB 2TMB SiMB | MB TMB 2TMB SiMB | | TMB 2TMB SiMB | | TMB 2TMB | | | | | | | |
| 10 | | | MB | MB | | | | | | | | | | |

• The new Cylinder type Actuator comes with 2 Motor sizes, NEMA11 (28) & NEMA17 (22). Captive type with anti-rotating device or Non-Captive type without

Variation

| a lation | | | | | | Onic.min | |
|------------------------|----------------------|----------|--------|--------|--------------|----------|--|
| | Drive Screw | Notation | NEMA11 | (□28) | NEMA17 (🗌42) | | |
| | Drive Screw | Notation | Lead | Travel | Lead | Travel | |
| Captive (AR type) | Precision Ball Screw | G | 1,2 | 40 | 2,5 | 50 | |
| | Precision Ball Screw | G | 1,2 | 40,80 | 2,5 | 50,100 | |
| Non-Captive CL type | Rolled Ball Screw | R | 1,2 | 40,80 | 2,5 | 50,100 | |
| | Resin Lead Screw | Re | 2,6 | 40,80 | 2,5 | 50,100 | |

Specifications for each combination

| | | | | Resin Lead Screw | | | Rolled Ball Screw | | | | Precision Ball Screw | | | |
|------------|-----|---------------------|-----|------------------|-------|--------|-------------------|---|-------|--------|----------------------|---|--|--|
| Repeatabil | ± |).05 m | ax. | | ±0.01 | l max. | | : | ±0.00 | 5 max. | | | | |
| Lost motio | 0. | 0.05 max. 0.01 max. | | | | | | | 0.005 | max. | | | | |
| | 2 | 6 | 9 | 1 | 2 | 6 | 10 | 1 | 2 | 6 | 10 | | | |
| | 20 | | | | 0 | | | | 0 | | | | | |
| | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Travel | 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| (mm) | 120 | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | |
| | 160 | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | |
| | 200 | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | |

Direct Motor Drive Ball Screws are built in this series, what we call MoBo Actuators. All of MoBo Actuators are produced as customized products, in accordance with customer's order.