

# Lead Screws with Plastic Nuts

## Resin Lead Screws

### ● Features

- The Shaft is manufactured from SUS304 (or SUS303), which gives excellent corrosion resistance.
- Wide range of combination of Shaft dia. and Lead are available.
- MRH incorporates a lubricating agent so it can be used without oiling. It is possible to obtain smooth movement with lubricant.
- Uses the same gothic arc grooves as Ball Screws, ensuring smooth transmission.
- MRH is standard in stock, but Nut material can be changed to order, based on the environmental condition.
- Selecting backlash free type, Axial play can be 0.



### ● Type

#### Customized products

##### MRH-A,B series : KSS products

A Polyamide type Resin with good sliding properties is employed in the standard MRH Nut material. And because a lubricating agent is incorporated in the material, it can be used without oiling. Additionally, other Nut materials are available as options.



#### Customized products

##### MRH-BP2 series : KSS products

A Polyamide type Resin with good sliding properties is employed. Backlash free construction made possible with Double Nuts and a Spring in between.



#### Customized products

##### R-MSS(Y) series : NTN Corp. products

Corresponding to a wide range of environment and having corrosion resistance, heat resistance. High lead types (3 times as dia.) are available.

### ● Combination of Shaft nominal dia. & Lead

Unit: mm

Shaft dia. \ Lead	1	2	5	6	8	9	10	12	15	18	20	24	30	36
4	D109	D109												
6	D109	D105 D106 D109		D105 D106		D105 D106 D109				D109				
8	D109	D105 D106 D109	D105 D106		D105 D106			D105 D106 D109				D109		
10		D105 D106 D109		D105 D106			D105 D106		D105 D106 D109		D105 D106		D109	
12		D105 D106 D109		D105 D106			D105 D106			D109	D105 D106		D105 D106	D109

Note1) The numbers in each cell show pages in the catalogue. D105 and D109 are for back lash type, D106 is for backlash free type.

### ● Specifications

#### Accuracy grade and Axial play

Accuracy grade of KSS Resin Lead Screws is based on JIS Ct10. Tolerance on specified travel is calculated by following formula.

Axial play is 0.05 to 0.10mm (except Backlash free type).

$$\text{Tolerance on specified travel } \epsilon_p: \epsilon_p = \pm \frac{\ell_u}{300} \times 0.21 \text{ (mm)}$$

$\ell_u$  : Useful travel (mm)

#### Material

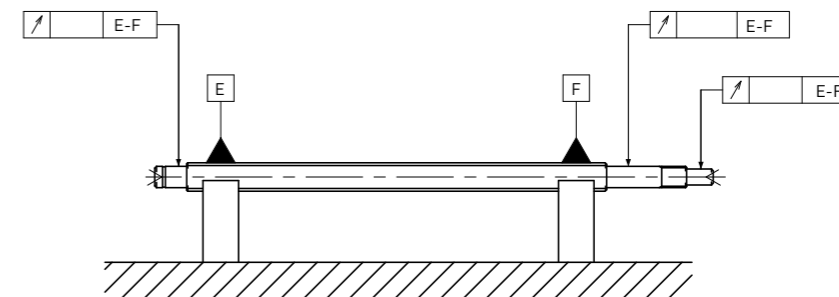
Parts	Material
Shaft	SUS304 or SUS303
Nut	MC nylon (MC703HL) Mitsubishi Chemical Advanced Materials

Note 1) Please refer to page D104 for Nut material suitable for special environment.  
Note 2) If material other than the table is requested, please inquire KSS

#### Description of Run-out and location tolerance

Description of Run-out and location tolerance for KSS Resin Lead Screws is as follows.

Each part of Run-out tolerance is based on JIS Ct10 of Ball Screws.



● **Technical Data**

**Thread groove profile**

The thread grooves are of a gothic arc design. This is basically the same as those used in our Ball Screws.

**Mechanical efficiency**

Mechanical efficiency of KSS Resin Lead Screws  $\eta$  (%) can be calculated by the following formula.

The expected "Mechanical efficiency" calculated from measurements is 20%-50%.

Generally, as the Lead increases, "Mechanical efficiency" tends to be high. Please use this number as a reference.

$$\eta = \frac{F_a \times \ell}{T \times 2\pi} \times 100 \quad (\%)$$

$F_a$  : Axial load(N)  
 $\ell$  : Screw Lead(m)  
 $T$  : Rotational torque(Nm)

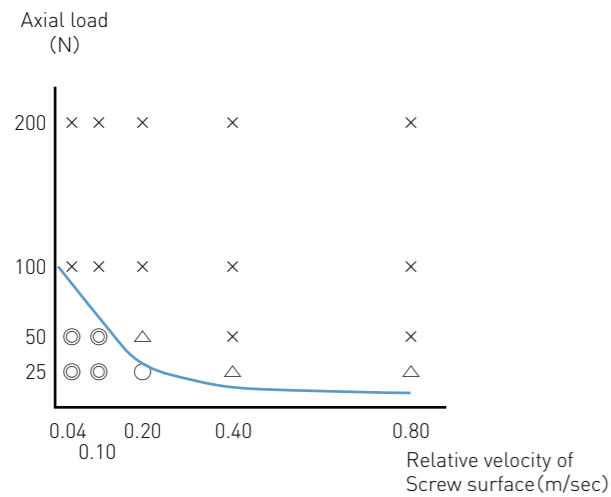
**FV value limits on use and endurance data**

• FV value limits on use

For KSS Resin Lead Screws, the product of Axial Load and relative velocity of Screw surface is defined as FV, and this definition is reference to check if it is usable or not. Fig. D-11 is maximum FV which can be operated without lubricants in case of using Nut material MRH(Material : MC703HL).

Please use it as one of the reference. It is expected to improve operational condition by applying lubricants.

Fig. D-11 : FV value limits



Model : MRH0805 / Lubricant : None

Evaluation :

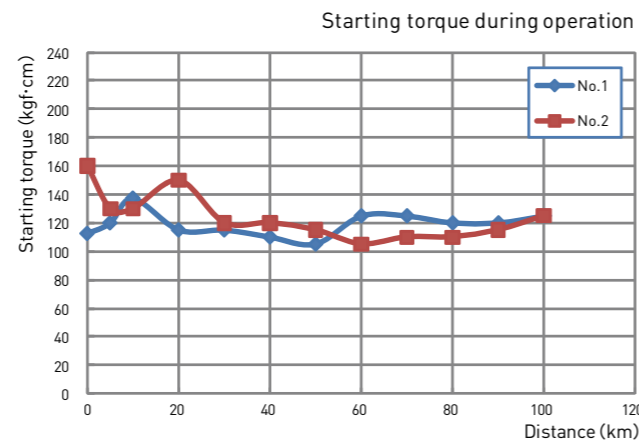
- ◎ Stable operational conditions were maintained for the long term.
- Operation were good, but some wears were seen on the Nuts.
- △ Operations became difficult in a relatively short time.
- × Operations became difficult in the short time.

In case of  $FV < 5 (N \cdot m/s)$ , stable operations were maintained. Operations under  $FV > 10 (N \cdot m/s)$ , maintaining stability was difficult.

Axial Load should be treated more carefully as to upper limits rather than relative speed.

• Endurance test data of Preloaded products(BP2 type)

Model :  $\phi 10$ mm、Lead = 6mm  
 Load : None  
 Speed : 1000rpm  
 Travel : 400mm(2-way)  
 Lubricant : None  
 Result : After running 100km, operation were good  
 Starting Torque monitor : see Diagram right



● **Special products**

Regarding KSS Resin Lead Screws, the standard material of Nut is MC nylon(MC703HL), but we also provide with the following Nut materials.

Please inquire KSS if Trapezoidal thread and ACME thread are needed.

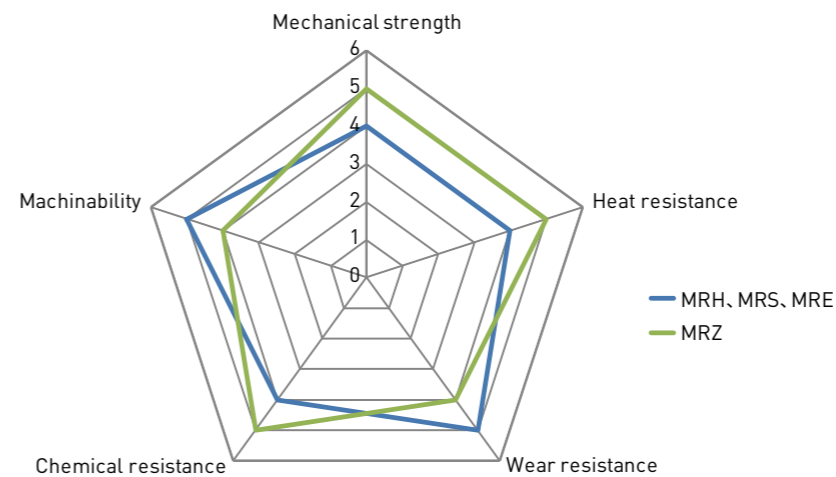
In case of bulk order, it is possible to save the price to select material which is manufactured by injection molding.

Table D-12 : Product performance comparison

Product	MRH	MRS	MRE	MRZ
Classification	Standard	Customized		
Operating environment	Standard environment			Special environment
Nut appearance				
Material	Polyamide type			Polyether ether ketone type
Features	Balanced performance			Flame resistance, heat/water resistance
Other	Good sliding properties	—	Good electrical conductivity	Food hygiene, chemical resistance
Mechanical strength	○	○	○	◎
Heat resistance	○	○	○	◎
Wear resistance	◎	◎	◎	○
Chemical resistance	○	○	○	◎
Machinability	◎	◎	◎	○

- ◎ superior
- usable
- △ relatively inferior
- ▲ inferior

Fig. D-13 : Evaluation each material



## ● Caution

### 1) Lubrication

- MC Nylon which is standard Nut material of MRH series includes oil, but depending on operating condition, abnormal noise or wearing at early stage might occur. In that case, surface treatment on shaft or grease applying are recommended.

### 2) Additional end-journal machining

- Additional machining of Screw Shaft should be performed by KSS. Note that accuracy cannot be guaranteed if additional end-journal machining is performed by someone other than KSS.
- Remove the Nut from the Screw Shaft for additional machining.  
After machining, wash away any debris on the Screw Shaft with clean refined kerosene or similar material. For Backlash free type, it is difficult to reproduce Preload if Nut is removed. We will do additional machining when needed.

### 3) Handling and use precaution.

- Do not subject to sudden impact, as this is a precision part.
- Do not disassemble Backlash free type Nut.
- When storing the products, please store in the original wrapping. Do not open the wrapping or tear the inner wrapping until ready to use. Dust may get inside the wrapper and may cause a decline in functionality.
- If the products falls, loss of functionality due to damage to component parts may result. Please send products back to KSS so that we can check the products. There will be a charge for this service.
- This product has been designed for normal use in temperatures under 80°C. In case of exceeding 80°C, please ask KSS.
- Resin Lead Screws are mechanical components that generates thrust toward the axis. It is not constructed to accept Radial Load (Radial direction). This may result in wear and damage at an early stage. Therefore, there should be no Radial Load on the Resin Nut parts, take care to set up with other linear equipment for Radial Load.
- Coarse mounting accuracy such as misalignment of Nut bracket and Support Bearing, perpendicularity of Nut mounting face, will affect Resin Lead Screws performance, so be careful with the mounting accuracy.