Lead Screws

Lead Screw Characteristics, Selection Flow & Application Examples

Features of Each Screw Type

Type	Slide Screws	Lead Screws	Rolled Ball Screws	Precision Ball Screws
Shape				
Features	Simple feed and adjust mechanisms, etc. Made up of Stainless Steel Shaft and a Resin Nut. No-grease operation is possible. (App. Example) Stoppers In/Out: Transfer pitch changeover	In case where thrust loads and high loads exist. (App. Example) Transfer pitch changeover Jacks: Feed screw for lathes	Can be applied at reasonable costs when precision ball screw accuracies are not required. (App. Example) Transfer Line	High positioning and velocity accuracy are required. (App. Example) Measurement Instruments
Allowable Rotational Speed	Low Speed	Medium Speed	High Speed	High Speed
Accuracy	★★	★★	★★★★	★★★★★
Efficiency	Acceptable Efficiency 0.7	Good Efficiency 0.8	Excellent Efficiency 0.95	Excellent Efficiency 0.95
Allowable Axial Load ( ) is for reference	Acceptable (max. 540 N)	Excellent (max. 30,000 N)	Good (max. 9,960 N)	Good (max. 9,960 N)
Price	★★★★	★★★★★	★★★	★★

Lead Screw Selection Flow

Screw Selection
Select by characteristics of each type.

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Shaft Dia. / Shaft Length (Stroke)
Screw Pitch Selection

↓ *Please also see Easy Pattern Designing.

Nut Selection (Config/Material)

OK ↓

Screw Shaft Selection (Materials/Surface Treatments)

↓

Shaft End Config Selection

↓

Re-confirming Lead Screw Technical Calculations

(3) Contact surface pressure, sliding speed calculated **P.818**

↓

Lead Screw Model Selection

NG →

Confirming Lead Screw Technical Calculations

↑ (2) Calculating Contact Pressure and Sliding Velocity **P.818**

Lead Screws → (1) Lead Screw Selection Chart **P.818**

Slide Screws → **P.850**

Ball Screw → Ball Screw Selection Procedure **P.754**

Lead Screw Nut Selection Chart

Material: Brass, round flange group is selected as a foundation.

Photo	Type	Part Number	Purpose
	Standard	MTS__	Regularly used nut type. The round flange group is selected initially, then a sub-type is selected based on mounting space constraints.
	Compact	MTSP_ _	Outer diameter and overall length are smaller than the Standard Type nuts. Can be used in space limited applications.
	Piloted	MTSJR	The Standard Nut with a pilot feature built-in. The pilot is inserted into bores to locate in Z axis applications, etc.
	Tapped Hole	MTSER	Mounting holes are tapped to mount from the reverse side with screws.
	Slotted Hole	MTSQR	The standard mounting holes are replaced with slotted holes. Can be used for fine position adjustments in mounting.
	RoHS Compliant	MTRFR MTXFR	The Standard Type that is RoHS compliant. Suitable when environmental concerns are of importance.
	Anti-Backlash	MTBLR	Reduced axial play type. Has better repeatability than the Standard Type.
	Oil-Free	MTSM_ _	Standard Type with embedded solid lubricant. Reduces lubrication maintenance requirements.
	Resin	MTSR_ _ MTSF_ _	A resin type dimension compatible with the Standard Type. Reduces lubrication maintenance cycles.

Lead screw shaft end configuration standards **P.820**
Both Ends Stepped Config. **P.824**
One End Stepped / One End Double Stepped Config. **P.826**
One End Stepped / One End Straight Config. **P.828**
Both Ends Double Stepped Config. **P.830**

Easy Pattern Designing

A complete lead screw unit can easily be designed by sequentially selecting the components from Easy Pattern Designing program.

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
					
Lead Screws (P.820)	**Fixed Side Support Unit (P.822)**	**Support Side Support Unit (P.823)**	**Lead Screw Nuts (Flanged Type) (P.834)**	**Lead Screw Nut Brackets (P.841)**	**Position Indicators (P.844–845)**

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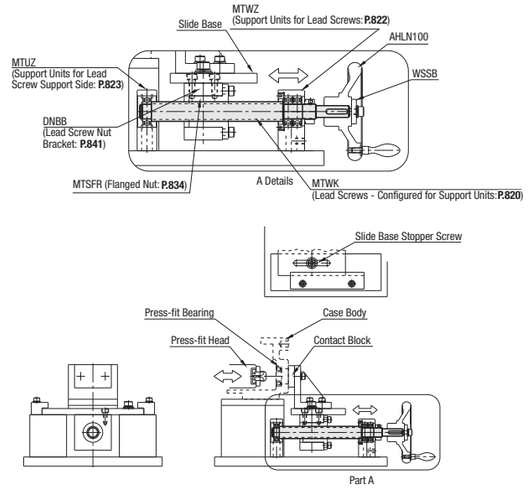
Lead Screws

Lead Screw Characteristics, Selection Flow & Application Examples, *continued*

Lead Screw Application Examples

Example 1 App. Machine Name Reference Shoulder Adjusting Mechanism



Configuration comprised of Shaft Support Unit for Lead Screws, Lead Screw Shaft and a Position Indicator.

Applications & Purposes

Used for transfer feeding, locating stoppers, and guiding of various work. Adjustments are relatively small, but shock loads in axial direction are anticipated. Additionally, the lead screw scheme is chosen for its economy.

Selection Criteria

Lead Screw Shaft: A lead screw shaft configured specifically for MISUMI Shaft Supports with a Keyway is selected. The configuration supports each end of the shaft with a bearing.

Shaft Support Unit for Lead Screws: A Shaft Support Unit for Lead Screws is selected for the fixed end. Selected support unit has two radial bearings in preloaded arrangement and can bear axial and thrust loads.

Shaft Support Unit for Lead Screws: A Shaft Support Unit for Lead Screws is selected for the shaft support side. Comes with a radial bearing in the set, and used as is.

Lead Screw Nut: Commonly used Round Flanged Lead Screw Nut is selected.

Nut Brackets: A Nut Bracket compatible with a lead screw nut is selected.

Use Condition

(1) Applied Load	200 N Material Mass: 300 N
(2) Setup change-over frequency	Once / Day for Rod changes, etc
(3) Positioning Accuracy	±0.5 mm
(4) Stroke	150 mm

Example 2 Machine Name Sheet Steel Roll Base

Applications & Purposes

Sheet steel roll's remaining O.D. is measured at set intervals, and the roll is raised accordingly with a lead screw.

The lead screw feed amount is measured by a position indicator, instead of using a conversion table.

Selection Criteria

Lead Screw Shaft: A lead screw shaft configured specifically for MISUMI Shaft Supports with no R machining on the support side (Alteration RC) is selected.

Shaft Sport Unit for Lead Screws: Shaft Sport Unit for Lead Screws is selected for the fixed side of the shaft. Selected since axial loads can be supported, and a Compact Position Indicator can be directly mounted.

Lead Screw Nut: Round Flanged Oil-less Lead Screw Nut is selected. Selected because the lubrication maintenance can be reduced to only once a year.

Position Indicators: A compact position indicator is selected for lead screw feed amount measurements.

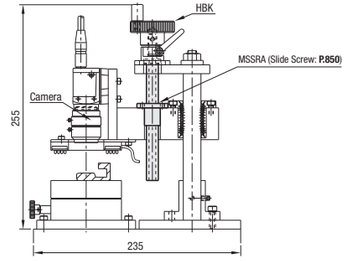
Use Condition

(1) Applied Load	20 kN
(2) Maintenance	Once / Year
(3) Positioning Accuracy	1–2 mm
(4) Stroke	150 mm

Slide Screw Application Example

A screw feed axis with a stainless steel shaft and a resin nut can be used without grease which is suitable for clean environments. Slide screws are economical and offer smooth motion.

App. Example 1 Machine Name Camera Inspection Unit



A slide screw is utilized as the Z axis.

Applications & Purposes

A slide screw is chosen for fine adjustability, and should be used with as little re-lubrications as possible.

Selection Criteria

Slide Screw Shaft: One end stepped type in 304 Stainless Steel material is selected.

Nut: Tribological resin nut is selected for zero grease requirement and good corrosion resistance.

Use Condition

(1) Applied Load	50 N
(2) Setup change-over frequency	Once a day for Rod changes, etc.
(3) Positioning Accuracy	±0.5 mm
(4) Stroke	100 mm