

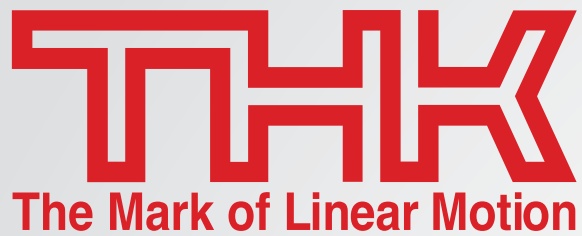


**ROLMAN  
WORLD**



**THK**  
The Mark of Linear Motion





THK's creative ideas and unique technology made the company worldwide pioneers in the development of the Linear Motion (LM) Guide mechanism. Today, our LM Guide devices are an indispensable component of mechanical and electronic systems in a wide variety of industries.

THK has also developed many other unique mechanical components, including the Ball Spline, Ball Screws and Link Balls, which are manufactured by us for supply to customers worldwide.

Our company name "THK" stands for "Toughness", "High Quality" and "Know-how". We aim to contribute to the improvement of society and development of industry by focusing on these three principles in our technology development and product manufacturing processes.



## LINEAR MOTION



## FEED SCREWS



## ROTATING PRODUCTS

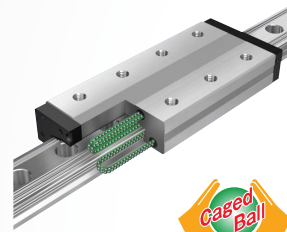
## LINEAR MOTION PRODUCTS

### LM GUIDE (LINEAR MOTION GUIDE)

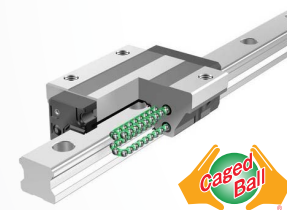


The LM Guide (Linear Motion Guide) is our main product, incorporating a part with a linear rolling motion into practical usage for the first time in the world. It realizes the development of high-precision, high-rigidity, energy-saving, high-speed machines with long service lives.

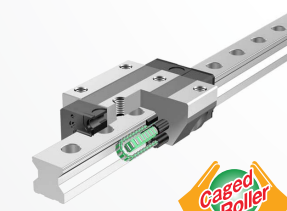
### CAGED BALL/ROLLER LM GUIDE (Linear Motion Guide)



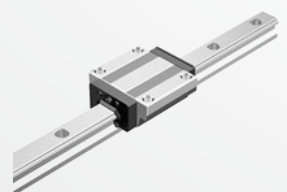
**SPR, SPS**  
Models SPR/SPS realize super-low waving comparable to hydrostatic guides. In addition, the deformation of the ball is minimized to achieve ultra-high rigidity that surpasses even roller guides.



**SHS, SSR, SHW, SRS, SCR, EPF, SVR/SVS**  
Use of a ball cage eliminates friction between balls, and achieves low noise, acceptable running sound, long-term maintenance-free operation, and superbly high speed response.



**SRG, SRN, SRW**  
A ultra high rigidity Roller Guide that achieves low friction, smooth motion and long-term maintenance-free operation by using a roller cage.



**HSR, SR, NR/NRS-X, HRW, SRS-G, RSR, RSX, HR, GSR, CSR, MX, JR, HCR, HMG, NSR-TBC, HSR-M1, SR-M1, RSR-M1, HSR-M2, HSR-M1VV, SR-MS**  
LM Guide(full-ball type) A series of types are available from miniature types to large types for machine tools, from linear guides to curved guides that suit a wide-range of applications.

### LM GUIDE ACTUATOR



Compact actuator with high rigidity and high precision that has an integrated LM Guide with a ball screw. Reductions in the number of parts and design man-hours can be realised by adopting the LM Guide Actuator.



**Caged Ball LM Guide Actuator Model SKR**  
This model achieves higher speed operation, lower noise and longer-term maintenance-free operation than the conventional type model KR by using ball cages in the LM Guide units and the Ball Screw unit.

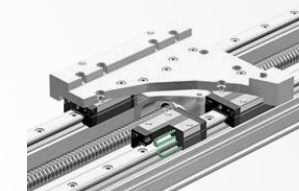


**LM Guide Actuator (full-ball type) Model KR**  
A series of various types are available from 1 mm to 25 mm in ball screw lead.

### LM ACTUATOR (LINEAR ACTUATOR)



The LM Actuator comprises an aluminium base combined with an LM Guide, a standardized top table, drive system, and so on. The free selection of main parts from a rich collection of options enables users to realize specifications optimal for particular applications.



**LM Actuator Long-term Maintenance-free Type Model GL-N**  
Lightweight, high rigidity aluminium base with Caged Ball LM Guides has been utilized for the guide portion. A screw or belt options are available for the drive system. In addition, Caged Ball LM Guides and QZ Lubricator for the Ball Screw has been utilized to provide a long-term maintenance free actuator.

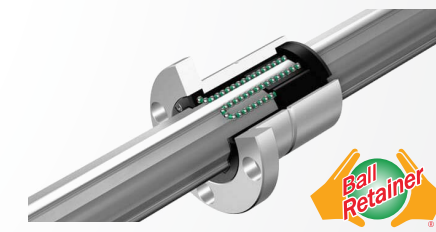


**LM Actuator Model GL-15, GL-20**  
Model GL is a single-axis actuator that allows a ball screw drive or a belt drive to be integrated with an aluminium base on which the LM Guide model GSR is mounted.

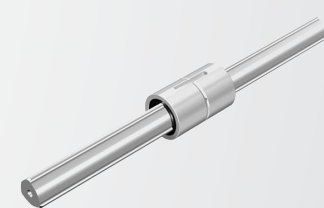
### BALL SPLINE



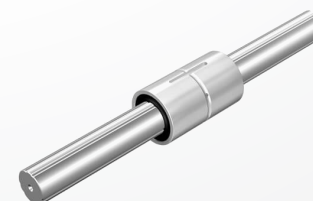
The Ball Spline is a rolling guide spline bearing. This is an innovative product with a ball rolling on a groove connected to the shaft, realizing allowable loads greater than with linear bushing and enabling torque transmission while making linear movements.



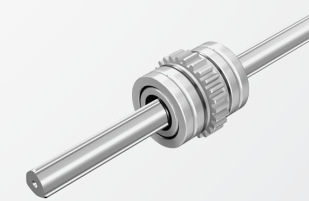
**Caged Ball Spline SLS, SLF**  
The adoption of the ball cage enables the circulating motion of evenly spaced balls to be maintained and high speed response to be achieved. In addition, it eliminates collision and mutual friction between balls, and realizes low noise, pleasant running sound and low particle generation. As the grease retention is increased, long-term maintenance-free operation is also realized.



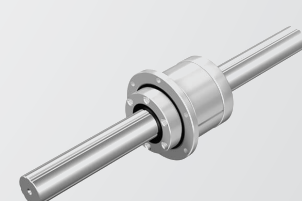
**High Torque Model LBS**  
This Ball Spline has no angular backlash to increase the rigidity by providing a preload with one spline nut since the spline shaft has 3 crests equidistantly arranged at 120 degrees on the circumference, each held by 2 rows (6 rows in total) of balls under a load.



**Medium Torque Model LT, LT-X, LF, LF-X**  
This Ball Spline has a large load capacity in the radial and torque directions since the spline shaft has 2 to 3 crests on the circumference, each held by 2 rows (4 or 6 rows in total) of balls under a load in order to reasonably provide a preload.



**Rotary with Gears Model LBG**  
This model is a unit type that has gear teeth on the flange circumference, and radial and thrust needle bearings compactly integrated on the spline nut. This Ball Spline is optimal for a torque transmission mechanism with spline nut drive.



**Rotary Model LTR**  
This model is a compact unit type of Ball Spline whose support bearings are directly integrated with the outer surface of the spline nut.



# LINEAR MOTION GUIDES

*Rails & Blocks Stocked Individually for Easy/ Fast Interchangeability*

**THK's** original technology is behind the smooth and silent movement of the “Linear Motion System.”

The rotating movement of “rolling” uses bearings that have been used in products for over 100 years.

However, the world's first “rolling” in linear movement was achieved in 1972 when **THK** developed the “Linear Motion System.”

Since then, all **THK** technologies have been employed for the only purpose of providing smoothness and accuracy to “movement” of all mechanisms.



## LINEAR MOTION PRODUCTS

### SPLINE NUT DPM, DP, SS



Since the spline shaft's surface is provided with a mirror finish, smooth slide is achieved. In addition, the large contact area and the concentricity, which enables the centre to be automatically determined as a torque is applied, allow the product to demonstrate stable torque transmission.

### PRECISION LINEAR PACK ER



The Precision Linear Pack is a superbly thin and lightweight linear guide. It is most suitable for precision measuring devices, semiconductor manufacturing and inspection equipment, and other applications where accurate linear motion is essential.

### CROSS ROLLER GUIDE VR, VB



The Cross Roller Guide is a limited stroke linear guide that has precision rollers orthogonalized alternately. This product provides rigid yet supple linear motion and is particularly suitable for linear guidance where high rigidity and supple movement is demanded.

### CROSS ROLLER TABLE



The Cross Roller Table is a compact, high-precision, high-rigidity, limited linear guide unit with built-in cross roller guide. Easily installed with bolts, this product provides a high accuracy linear guiding mechanism.



#### Base tap Model **VRT**

Miniature type whose base has tapped holes. All stainless steel for high corrosion resistance, model VRT-M is also offered as a series.



#### Mounting Hole Model **VRT-A**

Miniature type whose base has mounting holes. All stainless steel for high corrosion resistance, model VRT-AM is also offered as a series.



#### Mounting Hole Model **VRU**

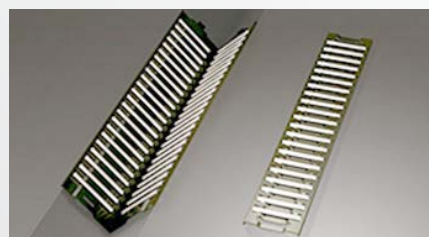
With this type, a Cross Roller Guide is incorporated between the table and the base, both of which are machined to high accuracy.

### LM ROLLER LR, LR-Z, LRA, LRA-Z, LRB, LRB-Z, LRU



The LM Roller is a compact linear guide with high load performance and a mallet type roller able to make infinite circular motions. This product is optimally applicable to machines required for high positioning accuracy, repeatability and rigidity.

### FLAT ROLLER FT, FTV, FTW, FTW-V



Available as two variants: (1) These models have a single row of rollers and are mainly used on the flat surface. (2) Multiple rows of rollers are arranged at 90°.

### SLIDE PACK FBW-XR



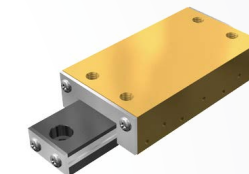
The Slide Pack is an inexpensive linear guide configured with the press-formed slider and roll-formed rails. It provides lightweight, compact and supple linear motion.

## LINEAR MOTION PRODUCTS

### LINEAR BALL SLIDE

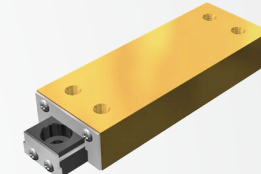


The Linear Ball Slide is a lightweight, compact, limited stroke linear guide unit that operates with very low sliding resistance. It excels in high-speed responsive performance due to its very small frictional factor and low inertia.



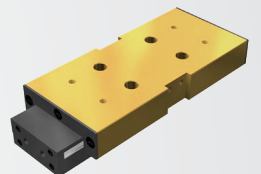
#### With Rack Model **LS**

Its cage, based on that of model LS, has a rack and pinion mechanism, thereby preventing the cage from slipping.



#### Without Rack Model **LS**

A highly corrosion resistant slide unit with an extremely small friction coefficient.



#### With Rack Model **LSC**

The base contains an air cylinder for drive. Feeding air from the two ports on the side face of the base allows the slide to perform reciprocating motion.

### SLIDE PACK & RAIL



The Slide Rail is a low-priced limited-type linear guide made of steel plate precision-formed by rolling. Thin, compact and easy to install, this product is suitable for linear guides for various applications.



#### Single Slide Models **FBL27S, FBL27S-P14, FBL35S, FBL35M, FBL35J, FBL35J-P13, FBL35J-P14, FBL35B, FBL35T**

This model is a basic unit type whose stroke length is designed at approximately 70% of the overall rail length.



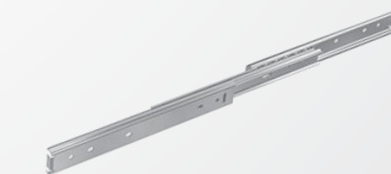
#### Double Slide Models **FBL27D, FBL35E-P14, FBL35G-P13, FBL35G-P14, FBL35D, FBL35W, FBL51H, FBL51H-P13, FBL51H-P14, FBL35K, FBL56H, FBL56H-P13, FBL56H-P14**

This model is a 2-stage, double-unit type whose stroke length is allowed to exceed the overall length.



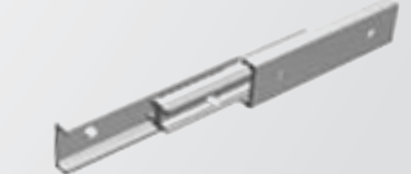
#### Linear Type Models **FBL35F, FBL56F, FBL48DR**

Using a flange type that can easily be mounted, this slide-type model is capable of performing straight, finite motion.



#### Aluminium Alloy / Single Slide Models **E15, E20**

A single-slide type of the aluminium alloy series optimal for locations where antirust measures and appearance are important factors.



#### Aluminium Alloy / Double Slide Model **D20**

A double-slide type of an aluminium alloy series.



## CROSS-ROLLER RING

The Cross Roller Ring is a roller bearing with high rotation accuracy capable of bearing loads in every direction. Because it has orthogonally arranged cylindrical rollers, it can bear loads in every direction.

## BALL SCREW

Efficiently converts rotary motion to linear motion by circulating multiple balls between the screw shaft and the nut.

## LINEAR MOTION GUIDE

Achieves a high load-carrying capacity and high running accuracy by converting "sliding" to "rolling"

## FEED SCREWS

### BALL SCREW

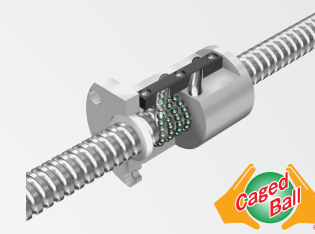


The Ball Screw is a high-efficiency feed screw with the ball making a rolling motion between the screw axis and the nut. Compared with a conventional sliding screw, this product has drive torque of one-third or less, making it most suitable for saving drive motor power.



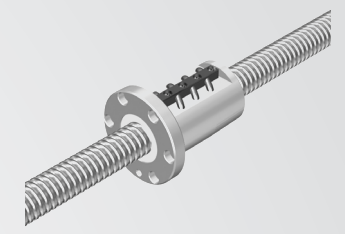
#### DIN Standard Compliant Ball Screw Models EBB, EPB

In the DIN standard compliant Ball Screw, balls under a load roll in the raceway cut between the screw shaft and the nut while receiving the axial load, travel along the groove of a deflector embedded inside the nut to the adjacent raceway, and then circulate back to the loaded area. Thus, the balls perform infinite rolling motion.



#### Precision, Caged Ball Screw Models SBN-V/SBN, SBK, HBN, SDA-V, SBKH

A Ball Screw that achieves low noise, small torque fluctuations and long-term maintenance-free operation by using a ball cage.



#### Precision Ball Screw Models BIF-V/BIF, DIK, DIR, BNFN-V/BNFN, DKN, BLW, BNF-V/BNF, BNT, DK, MDK, WHF, BLK, WGF, BLR

A Ball Screw using a screw shaft ground to high accuracy.



#### Finished Shaft Ends Model BNK

For this model, screw shafts with a screw shaft outer diameter 4 to 25 mm and a lead 1 to 20 mm are available as the standard.



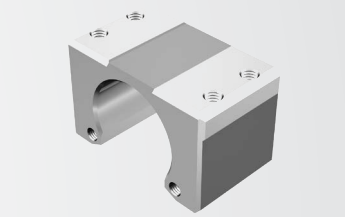
#### Precision Ball Screw / Spline Models BNS, BNS-V, NS, NS-V

A Stroke/Rotary unit that has Ball Screw grooves and a Ball Spline groove crossing one another on a single shaft. The nuts of the Ball Screw and the Ball Spline have dedicated support bearings directly embedded on the circumference of the nuts.



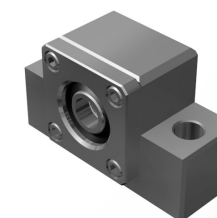
#### Rolled Ball Screw Models JPF, BTK-V, MTF, WHF, BNT, BLK, WTF, CNF, BLR

A Ball Screw using a screw shaft roll-formed to high accuracy.



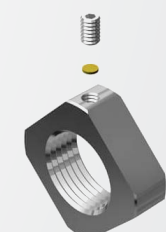
#### Nut Bracket Models MC

The nut bracket is standardized for standard Ball Screw assembly provided with finished shaft ends. This model is designed to be secured directly on the table using bolts. Since the height is low, it can be mounted on the table only using bolts.



#### Support Unit Models EK, BK, FK, EF, BF, FF

The Support Unit comes in six types: models EK, FK, EF, and FF, which are standardized for standard Ball Screw assembly provided with finished shaft ends, and models BK and BF, which are standardized for ball screws in general. The Support Unit on the fixed side contains a JIS Class 5-compliant angular bearing provided with an adjusted preload.



#### Lock Nut Model RN

The Lock Nut for Ball Screws is capable of easily fastening the screw shaft and the bearing with high accuracy. A loosening prevention mechanism comprising a hexagonal socket-head setscrew and a set piece prevents the Lock Nut from loosening and ensures firm fastening.

### LEAD SCREW UNIT



The Screw Nut is a sliding feed nut compatible with the standards for a 30-degree trapezoidal screw thread. Formed by die-casting special bearing alloy of superb abrasion resistance, it is an inexpensive high precision product.

### CHANGE NUT



The Change Nut is a sliding feed screw of 45° lead angle not easily available from machining. Its large lead angle is best suited to acquiring a quick traverse mechanism at a low revolution rate.

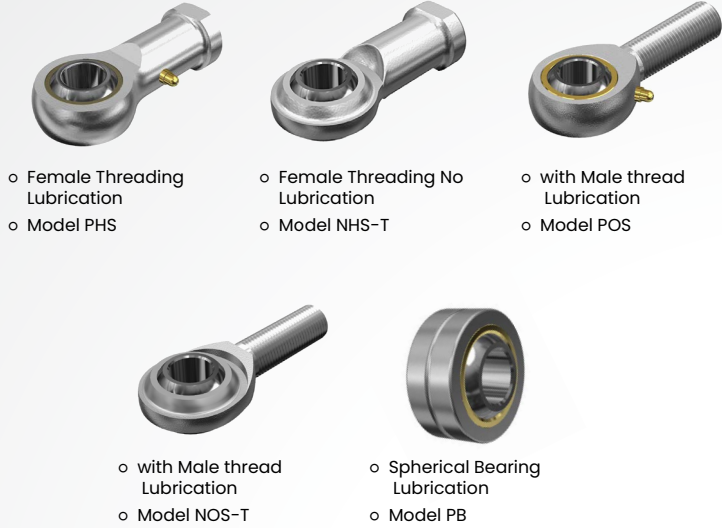


ROTATING PRODUCTS

ROD END



The Rod End is a spherical slide bearing incorporating a spherical inner ring with precision and hardness equivalent to that of steel ball bearings. It provides very smooth rotating and oscillating motion without play.



- Female Threading Lubrication
- Model PHS
- Female Threading No Lubrication
- Model NHS-T
- with Male thread Lubrication
- Model POS
- with Male thread Lubrication
- Model NOS-T
- Spherical Bearing Lubrication
- Model PB

CAM FOLLOWER  
NUCF-AB



The Cam Follower is a compact bearing with a high-rigidity shaft and a built-in needle bearing. Most suitable as a guide roller for cam mechanisms and linear motion of automated machines and dedicated machines.

ROLLER FOLLOWER  
NAST, RNAST, NART-R, NURT



The Roller Follower is a compact bearing with a high-rigidity shaft and a built-in needle bearing. Most suitable as a guide roller for cam mechanisms and linear motion.

SPHERICAL PLAIN BEARING  
SB, SAI

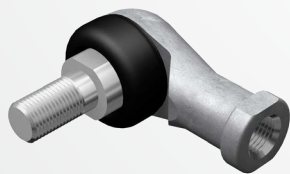


The Spherical Bearing is a heavy-duty self-aligning sliding bearing. Highly resistant to impact loads, this product is most fitted to the oscillating section under slow, heavy loads.

LINK BALL



The Link Ball is a spherical slide bearing with a ball stud that provides smooth operation with a minimal clearance. With superb abrasion resistance and large oscillating angle, this product is suitable for the link motion mechanism of various types of automated machines.



High Strength Zinc Alloy Model **BL**

This model's holder made of high strength-zinc alloy is connected in perpendicular to the ball shank. With grease pockets provided on the top and bottom of the spherical area, this model achieves high lubricity and high wear resistance.



Female Threading Holder Model **RBI**

With this Link Ball model, the high strength zinc alloy is used in its holder and the mounting bolt and the holder are arranged on the same axis, allowing this model to receive both a compressive load and a pulling load. Since grease is contained in the boot, this model achieves high lubricity and high wear resistance.

ROTATING PRODUCTS

DOUBLE-ROW ANGULAR  
CONTACT ROLLER RINGS



By integrating double-row small-diameter rollers on the raceway, the number of rollers incorporated in this new model (RW228) is approximately 5 times that of Cross-Roller Ring model RU. While maintaining the compactness, it achieves higher rigidity and accuracy and a lower torque. In addition, the inner and outer rings in integrated structures have mounting holes, allowing the product to be directly mounted to the machine.

CROSS-ROLLER RINGS



The Cross Roller Ring is a roller bearing with high rotation accuracy capable of bearing loads in every direction. Because it has orthogonally arranged cylindrical rollers, it can bear loads in every direction.



For Inner Ring Rotation / Outer Ring Rotation Model **RU**

An integrated inner/outer ring type that can be used for both inner ring rotation and outer ring rotation.



For Inner Ring Rotation Model **RB, RA, RA-C**

Optimal for areas where the inner ring is required to have high rotation accuracy.



For Outer Ring Rotation Model **RE**

Optimal for areas where the outer ring is required to have high rotation accuracy.

LINEAR BUSHING



The Linear Bush is a linear guide used in combination with a LM shaft that has a cylindrical shaft. This product makes linear movements with a minimum of frictional resistance to provide highly accurate and supple movement.



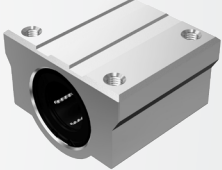
Linear Bushing Models **LM, LM-GA, LM-MG, LME, LM-L**

With the Linear Bushing nut having the most accurate cylindrical shape, this type is widely used.



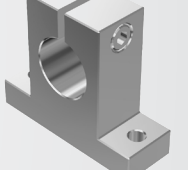
Linear Bushing flanged type Models **LMF, LMF-M, LMK, LMK-M, LMF-L, LMF-ML, LMK-L, LMK-ML, LMH, LMH-L**

The nut is integrated with a flange. This enables this model to be directly mounted onto the housing with bolts, thus achieving easy installation.



Linear Bushing Models **SC, SL, SH, SH-L**

Since the small, lightweight aluminum casing contains one unit of model LM and two units of model SL, it can easily be mounted simply by securing it with the table using bolts.



**LM Shaft Support SK**  
An aluminum - made light fulcrum for securing an LM shaft. Since the LM shaft mounting section has a slit, the fulcrum is capable of firmly securing an LM shaft using bolts.

LM STROKE



The LM Stroke is a linear guide of a type with limited strokes that can provide rolling guidance for rotational and reciprocating motion. With a very small frictional coefficient, the LM Stroke provides a compact, highly precise guiding mechanism at an inexpensive price.



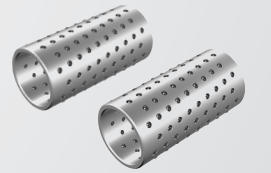
LM Stroke Model **ST**

A standard type and a seal type are available. In addition, each of both is divided into light-load and medium-load types.



Miniature Stroke Model **MST**

A ball-based precision rolled bearing capable of performing linear motion, rolling motion and a combination of both.



Die-setting Ball Cage Model **KS/BS**

A ball cage mainly used in the guide of precision die-setting guide posts, and capable of easily following high-speed reciprocating motion.



## EXAMPLE APPLICATIONS BY INDUSTRY

### MACHINE TOOLS



All the various parts used in machine tools are made by "mother machines" that produce machine parts themselves. Whether fine and complex or massive and heavy, the manufacturing precision of parts produced by machine tool is increasing at an accelerating pace. THK's linear motion systems help provide the guidance that makes this precision and speed possible.



### AEROSPACE



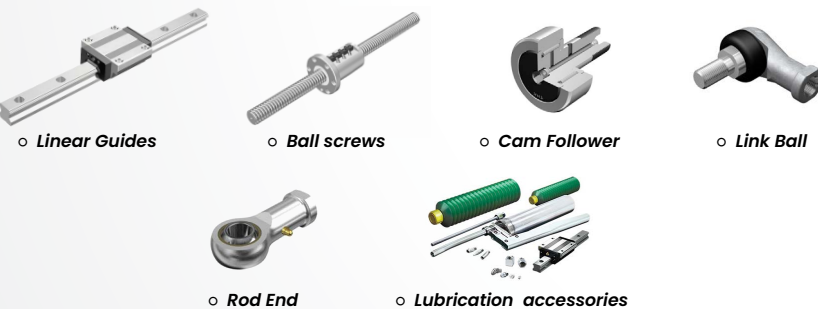
LM Guide Model SR are used in the seat sliding mechanism of small aircraft. Because the floors in aircraft are generally made from sheet metal, measuring errors relating to mounting sections are common, and mounting can be a lengthy process. Because Model SR have excellent error absorbing capabilities, they can be mounted directly on the floor of aircraft, reducing the work required for assembly.



### TRANSPORT SYSTEMS



THK's products are widely used on critical parts of railway cars, automobiles and other vehicles. In particular, in the automobile manufacturing process, THK's products are used in almost all types of equipment, robots, processing machines, and assembling machines.



### ELECTRONIC DEVICES



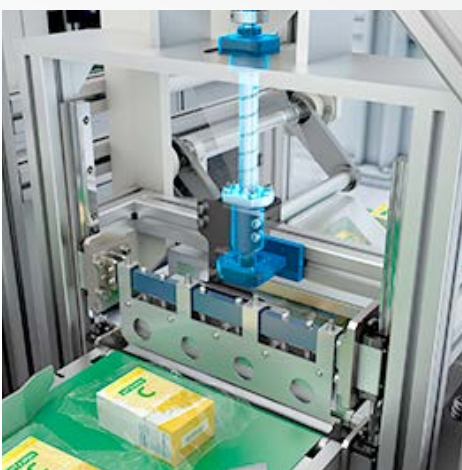
An electronic device is a collection of small units and actuators. The manufacturing equipment for these units is also a collection of small actuators. THK supplies a wide variety of actuators to all market areas where space-saving and energy-saving actuators are continually in demand.

- Portable TV Camera systems
- ATMs
- Compact Photo Development Machines

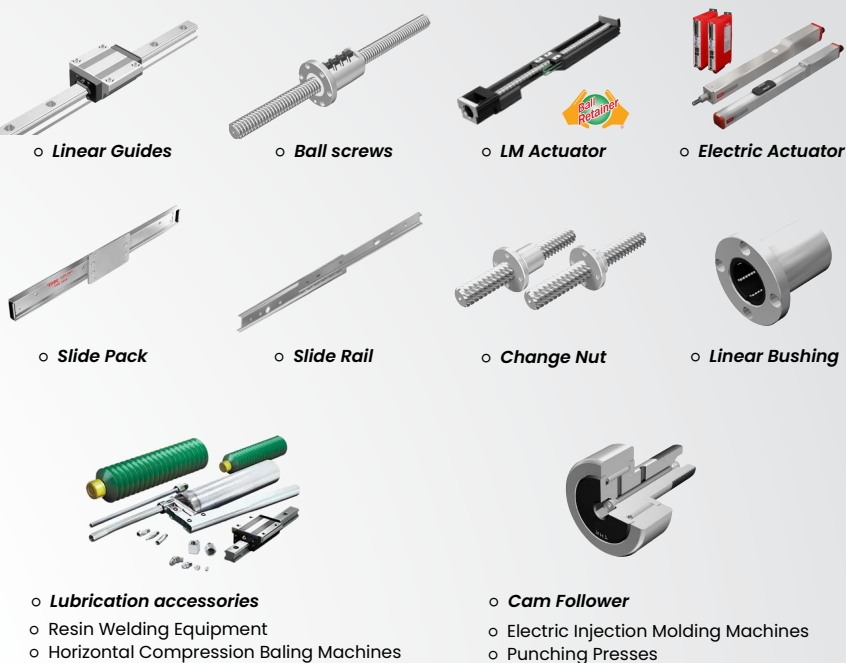


## EXAMPLE APPLICATIONS BY INDUstry

### GENERAL INDUSTRIAL MACHINE



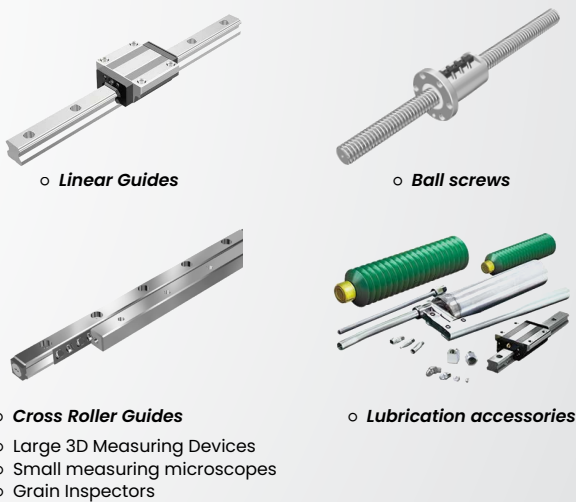
Various types of manufacturing machines are being used for automation and labor saving purposes in fields where production was previously carried out by manual labor. THK's products are being used in this context, from devices which simply repeat the same operation accurately and efficiently to those enabling crafts person-like precision.



### PRECISION INSTRUMENTS



As equipment becomes smaller and more accurate, the need for precision in the manufacturing of machine parts increases. Measuring instruments allowing higher accuracy to be maintained help to meet this need. THK products are making great contributions to the ability of precision instruments to detect very fine movements and changes.



## OTHER MANUFACTURING INDUSTRIES

- Dyeing Machines – LM guides, Cam Followers
- Stone Cutters – LM guides, Lubrication accessories
- Foam Polystyrene Processing Machines for Casting – LM guides, Ball screws, Lubrication accessories

► The Optimal Product Selection Tool





**ROLMAN  
WORLD**



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