ACCU TECH USA

Automation and Motion Solutions

Presenting to:

AMMC golden motion

Sales and Capabilities

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ACCU TECH USA
Automation and Motion Solutions

Presentation Overview

Background

Services

Products & Partners

Sizing Product

Additional Capabilities

Locations & Resources

Our mission, history, and proposal to you

BACKGROUND

Mission Statement

We work closely with **trusted manufacturing partners** to guarantee consistent, reliable excellence in linear motion products.

History

2007	2018	2018+
Linear guides	Linear guides, **ball screws, actuators**	Linear guides, ball screws, actuators, **motion control, custom-built actuators**

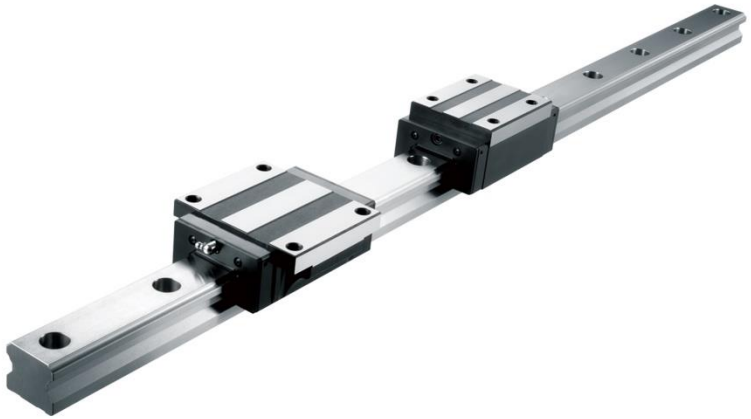
Value Add Proposition

1. Connect customers to best-fit product
2. Subject matter experts
3. Customization & adaptation

SERVICES

Standard Product Offerings (1/2)

Linear Guides



PMI, OME

Ball Screw Assemblies

PMI, TBI

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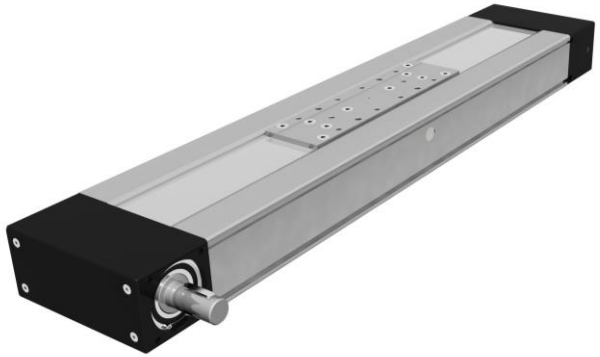
Standard Product Offerings (2/2)

Rod-Type Actuators
Ball Screw and ACME Screw

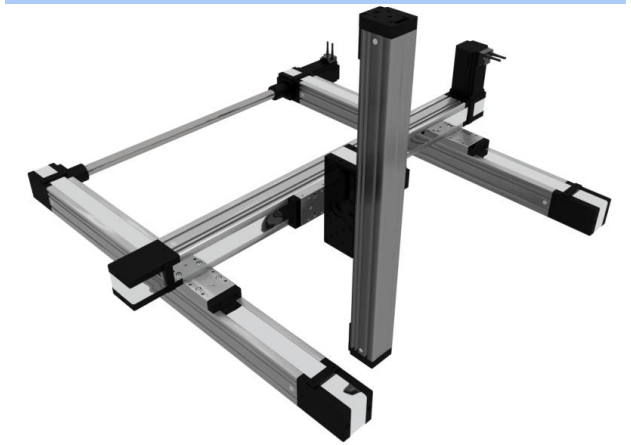
Unimotion, Toyo, Moteck, TiMOTION, Progressive Automations

Stage-Type Actuators
Ball Screw and Belt



Unimotion, Toyo

Cartesian Systems

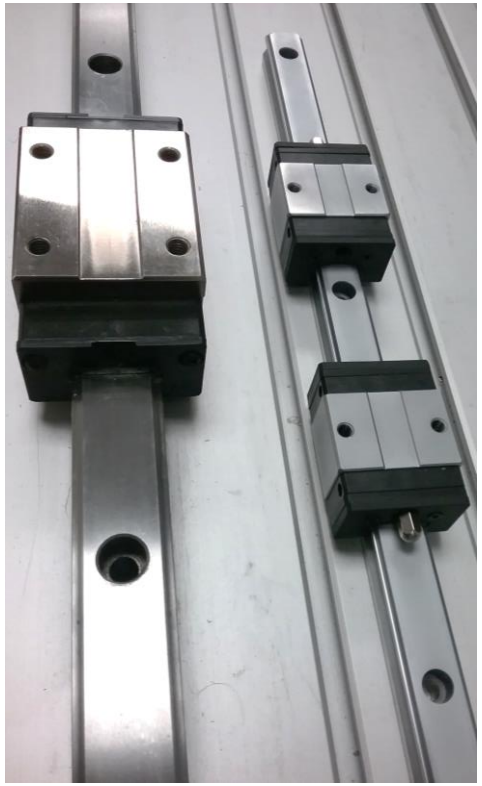


Unimotion, Toyo

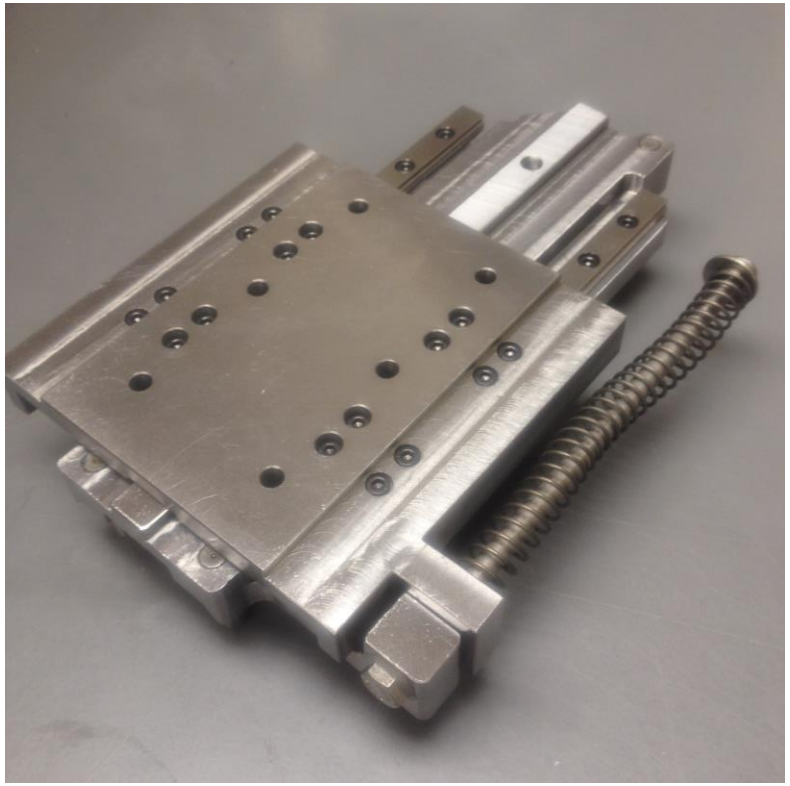
Engineering Services

- Product selection
- Installation and assembly
- Design and consultation
- Reverse engineering
- CAD and print creation

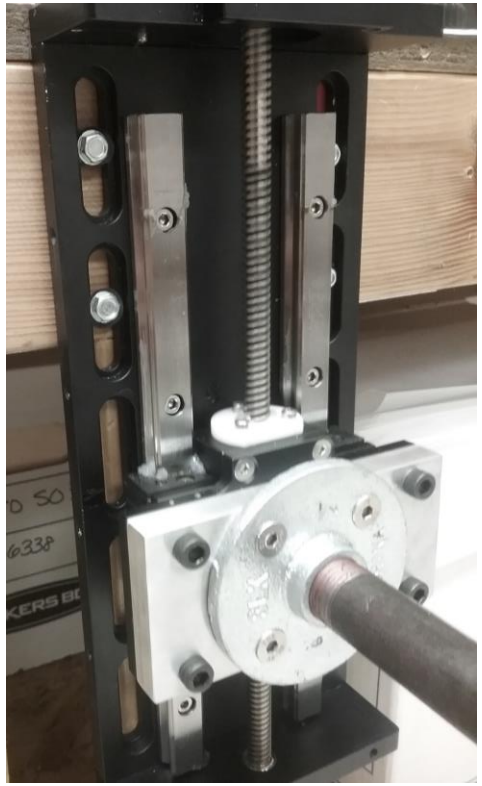
Customization



Two of our plating options:
Nickel (left), TDC (right)



Spring guide assembly reverse engineered and replicated by ATU



Low-cost actuator and load test

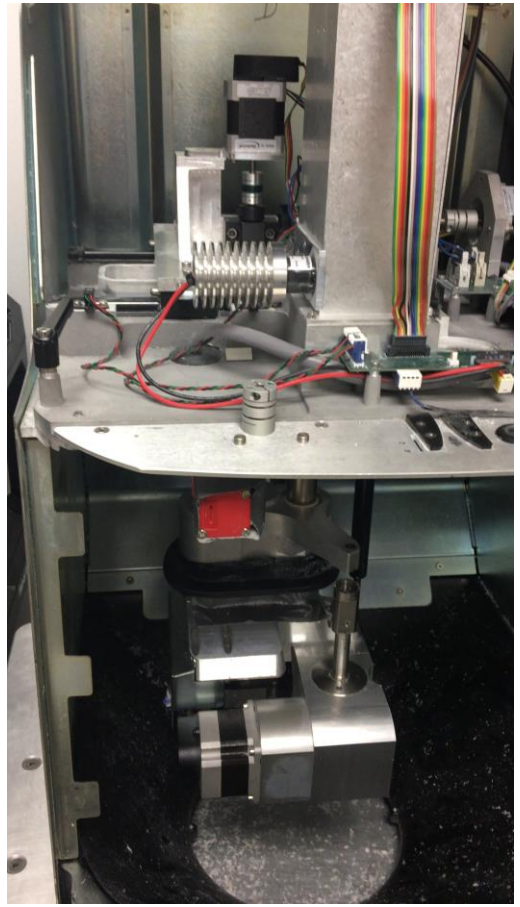
Case Study: Tabletop Lens Grinder (1/2)

- OEM design; ATU supplies lead screws, end supports, linear guides
- Z axis lead screw produces excess noise
- **ATU contracted to provide engineering services**

Left: Lens grinding machine. Right: Video demonstrating Z axis noise.

Case Study: Tabletop Lens Grinder (2/2)

- ATU engineering successfully troubleshoots sources of noise
  - Larger motor needed
  - Coupling with elastomeric center layer dampens resonance
- Machines sent into the field without needing to revise timeline



Video of Z axis lead screw fitted with new coupling, making expected operating noise.

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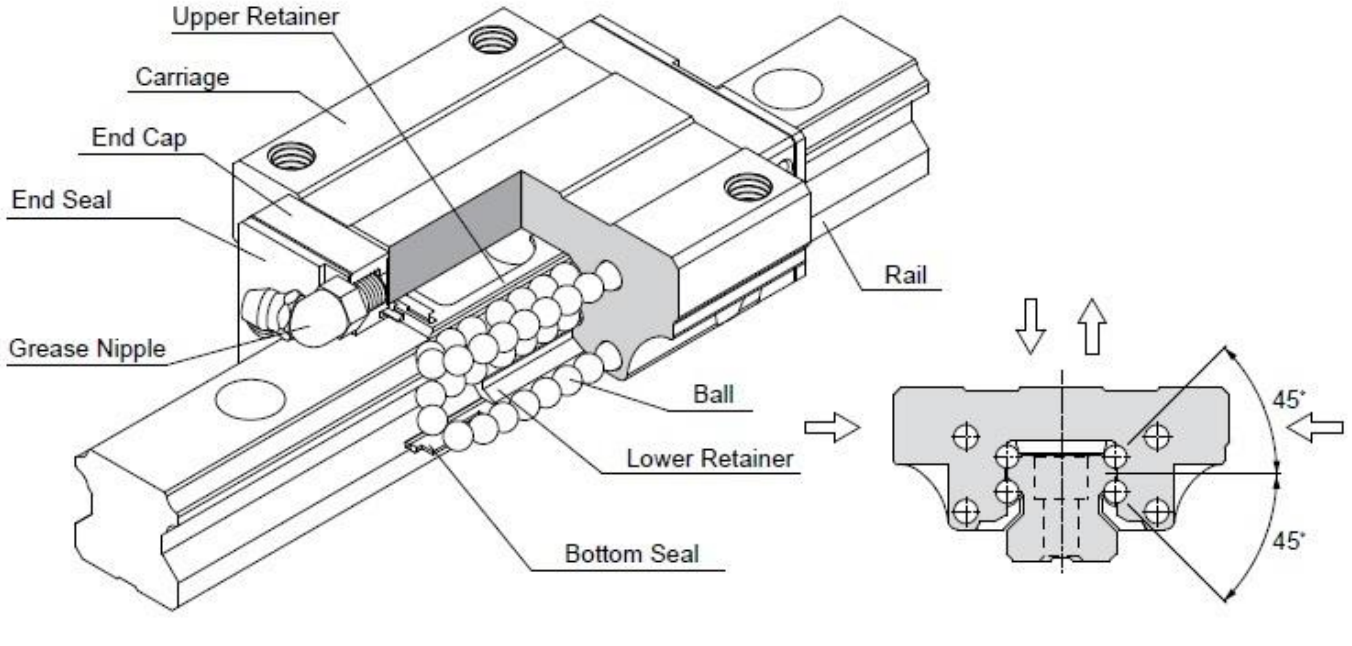
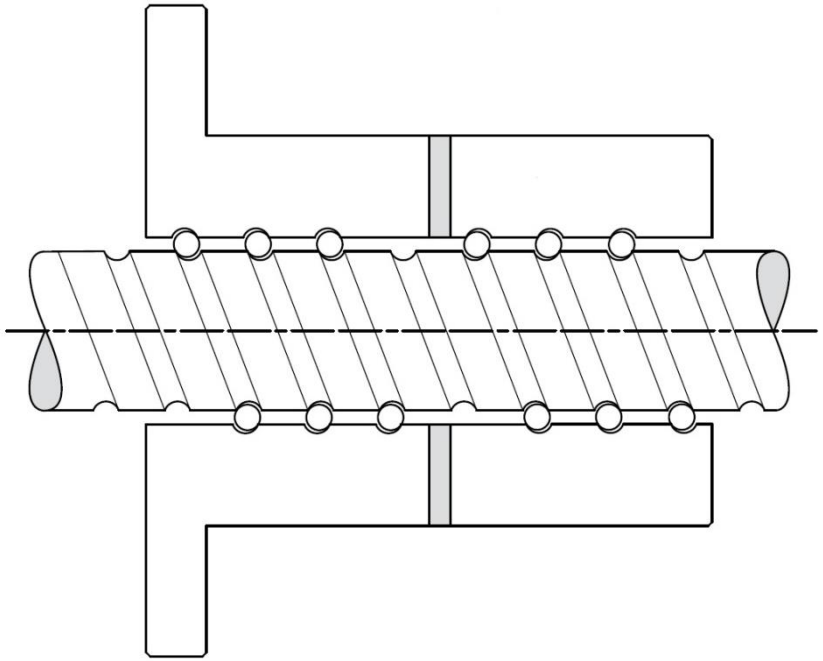
intro to product selection
+ products, brands, and strategy

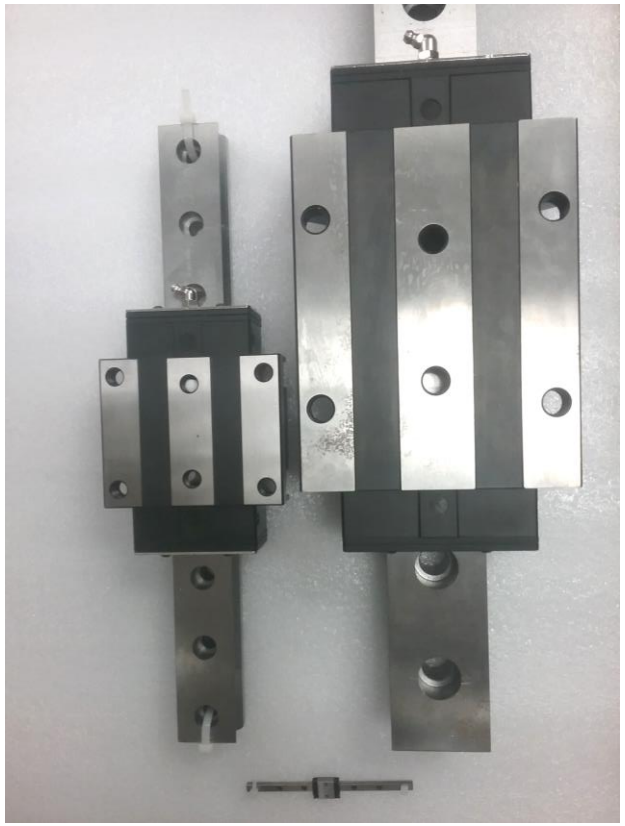
PRIMARY PRODUCTS & PARTNERS

Why Rolling Element Technology?





Linear Guides: Sizes and Capabilities



ATU linear guides in size 35 (left), 55 (right), and 7 (bottom).

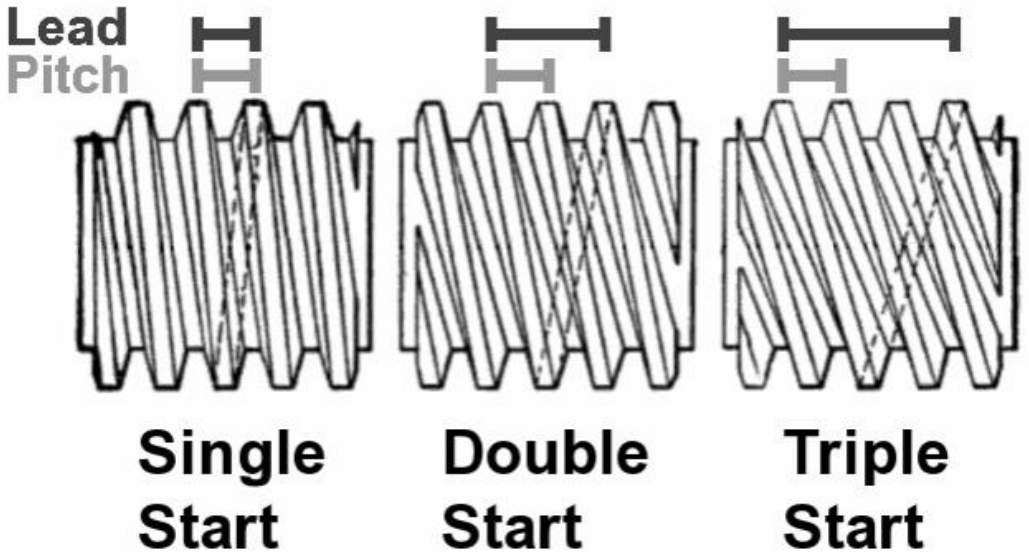
Four MSA35E carriages could carry even the heaviest fire truck. MSC7M guides could be used by jewelers.

Choosing Linear Guides

Size 7 rail		Size 65 rail
Standard length carriage	← Load capacity →	Extra-Long carriage
Ball bearings		Roller bearings
Non-chain	← Noise →	Chain
Light/clearance preload	← Positioning →	Heavy preload
Normal accuracy		‘Ultra Precision’ Accuracy
Standard seals	← Seals →	Extra seals

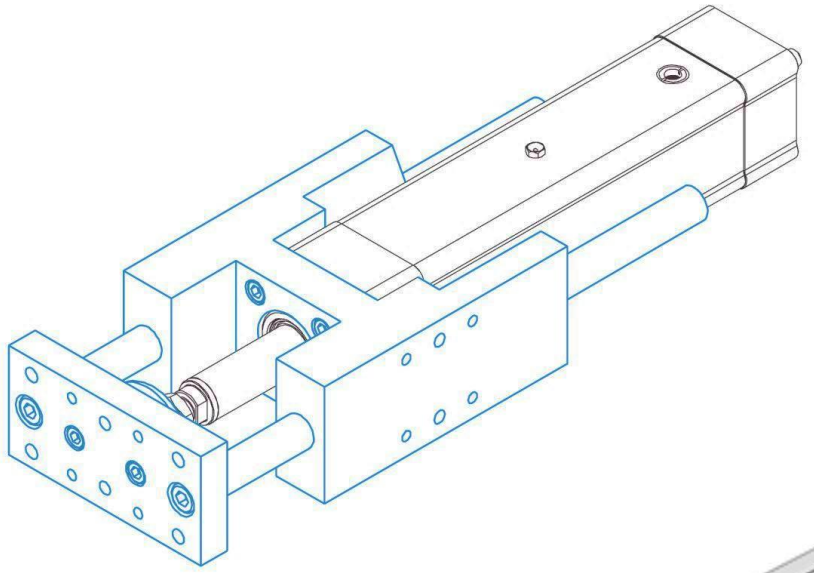
Choosing Ball Screws

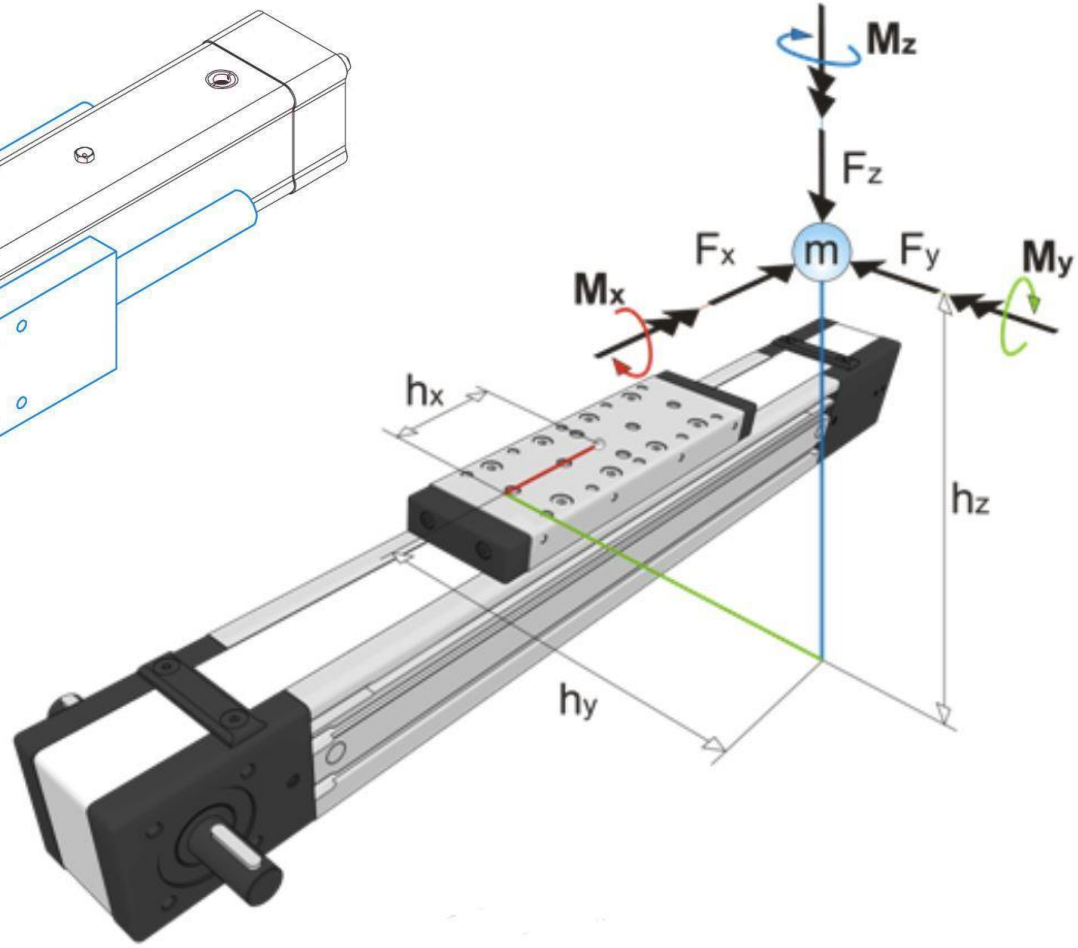
- **Lead** translates between motor and linear speed
- **OAL** can influence max linear speed
- **Load requirements**
- **Accuracy –** Rolled or ground manufacture



Choosing Actuators

- Motion profile
- Load, load placement
- Actuator orientation
- Environment
- Rod-type: Mounting and guiding





PMI
OME

Linear Guides

Strategy

- PMI – Premiere Line
  - → Machine tool quality
- OME – Value Line Series
  - → Competitive OEM opportunities

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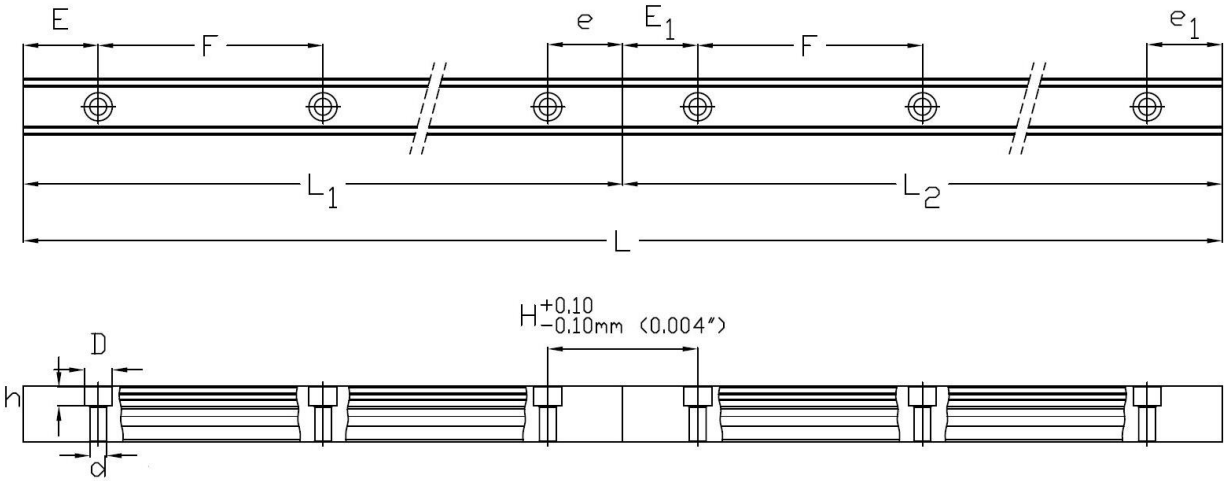
Linear Guide Custom Options



Butt jointed rails over max length are a custom option with approval print.

Popular seal options: Double seals (left), rail tape (center), tapped rail (right).

Waterjet cutouts for aerospace application.

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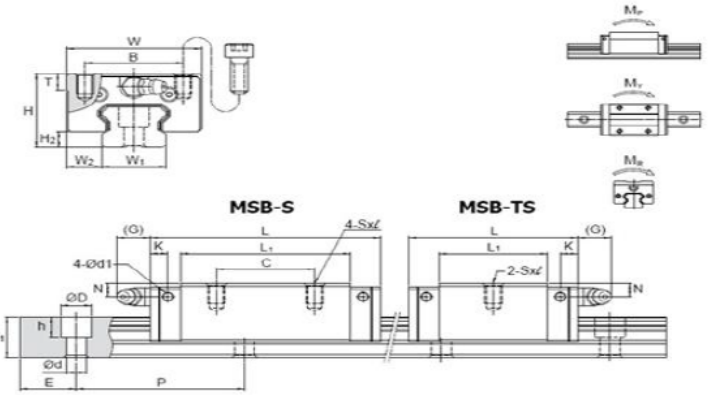
Series and Applications

- **MSA** – standard
- **MSB** – compact
- **MSC/MSD** – miniature and mini wide
- Roller bearings (MSR)
- Ball chain (SME)
- Wide rail (MSG)

The ATU Interchange Comparison Sheet highlights differences in dimensions and load capacities.

CARRIAGE DIMENSIONS			
DIMENSIONS (mm)		THK SR35W	PMI MSB 25 S
HEIGHT	H	48	48
WIDTH	W	70	70
LENGTH	L	111	111.4
THREAD	S X l	M8 x 12	M8 x 12
MOMENT	M_P (Nm)	740	930
MOMENT	M_Y (Nm)	454	930
MOMENT	M_R (Nm)	1010	1280
HOLE SPACING	B	50	50
HOLE SPACING	C	50	50
RAIL DIMENSIONS			
WIDTH	W_1	34	34
HEIGHT	H_1	27.5	27.5
HOLE PITCH	P	80	80
C'BORE	D x h x d	14 x 12 x 9	14 x 12 x 9
STATIC CAPACITY	C_0(kN)	77.2	75.5
DYNAMIC CAPACITY	C (kN)	41.7	52

RED & Green Text Highlights Difference Between Compared Items



PMI
TBI

Ball Screws

Strategy

- Precision Ground – PMI
- Rolled – Various suppliers including TBI

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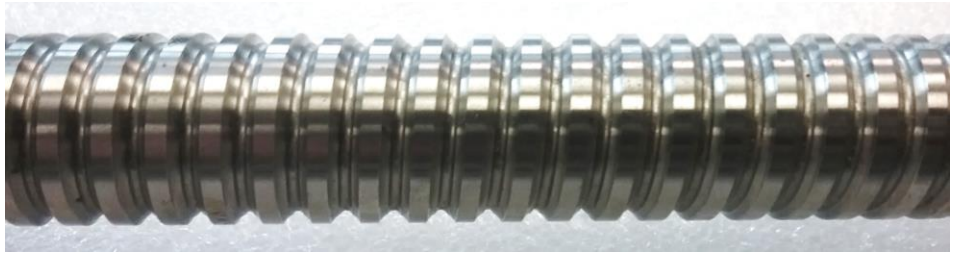
Ball Screw Manufacture Methods

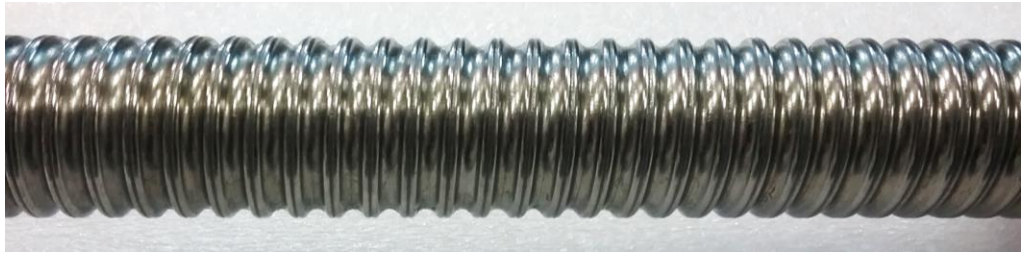
Precision Ground

+ C0-C5 accuracy grades (0.0035-0.018mm lead deviation per 300mm travel)
+ Custom nut options
+ Smooth running with preload
- High demand, long lead times

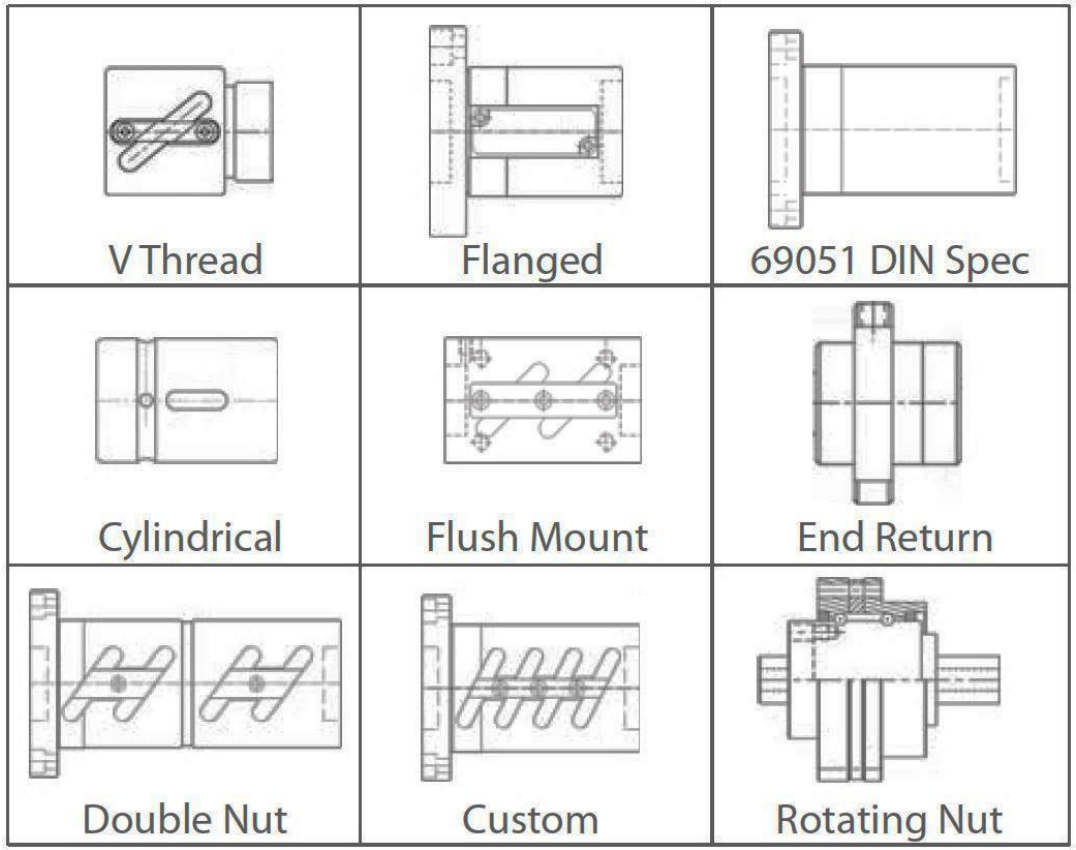


Rolled

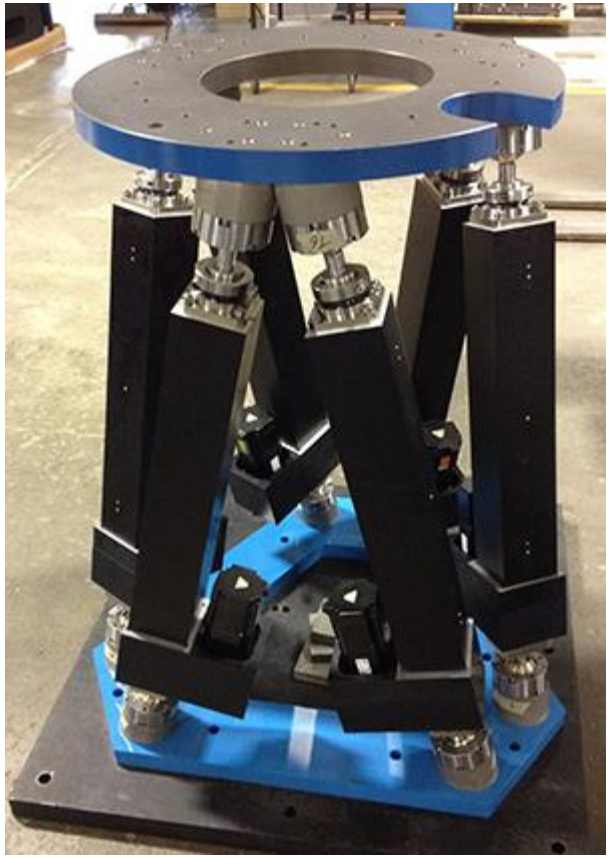
+ C7-C10 accuracy (0.050-0.200mm/300mm)
+ Short lead times
+ Interchangeable nuts
+ Cost effective
- Preload can cause rough travel



Series and Applications



- Range of metric screws
  - OD 06-80mm
  - Lead 01-50mm
- High speeds: High lead series
- Large loads: High load series



Unimotion Toyo

UNIMOTION TOYO

Stage Actuators

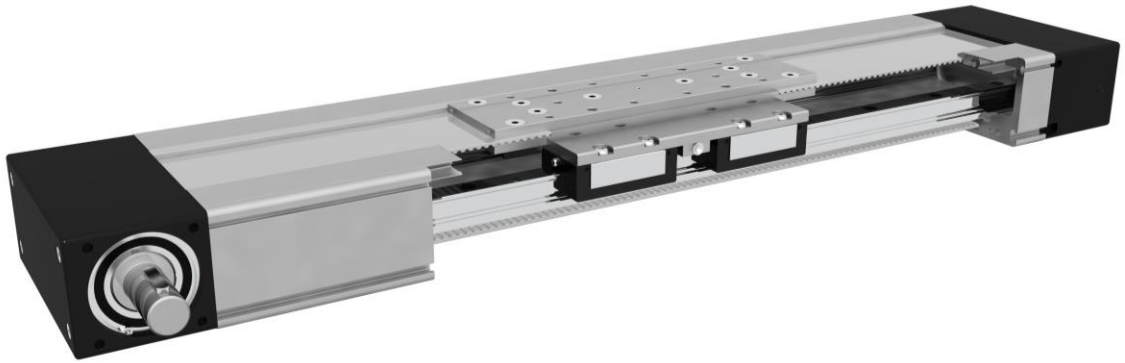
Strategy

- Applications – Long life, high accuracy and precision
- Markets – Industrial, semiconductor, packaging

Which Type of Drive?

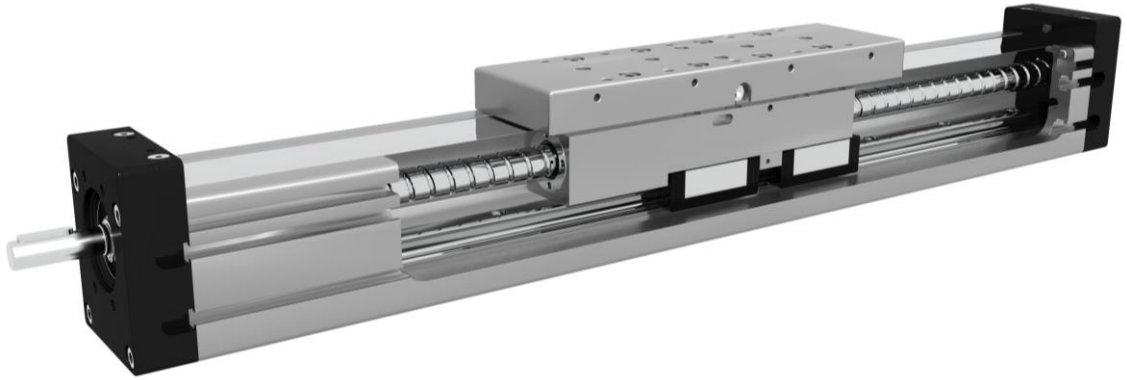
Belt and Pulley Drive

+ Long stroke lengths
+ High speeds
- Lose tension over time
- Thrust loading
- Reducer often needed



Ball Screw Drive

+ High thrust
+ Safest for Z axis
+ Accuracy/precision
- Limited stroke (whipping)



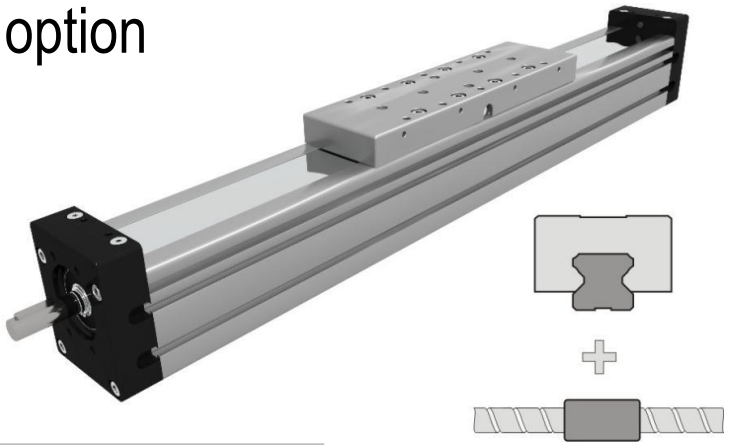
Which Brand? (Single Axis)

Toyo

- Cleanroom options
- Sized to motor
  - Tested and defined load capacity
- Adapter, coupling, sensors included
- LH/RH belt option

Unimotion

- Higher load capacity
- Can size for complex loading
- Sized to mechanics
- Accessories quoted separately
- LH/RH ball screw option



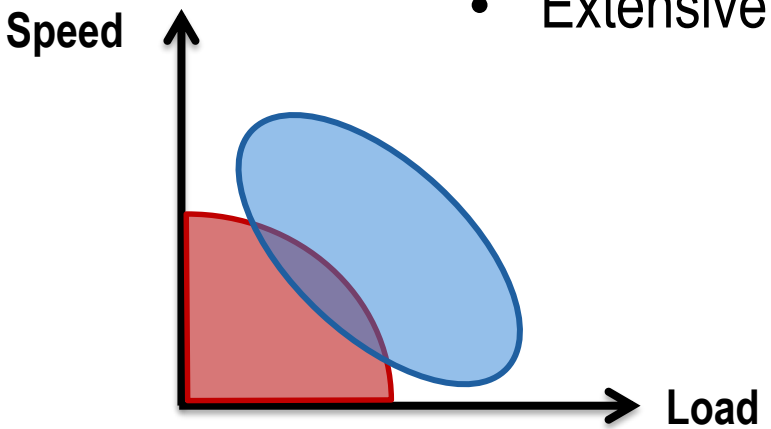
Which Brand? (Multi Axis)

Toyo

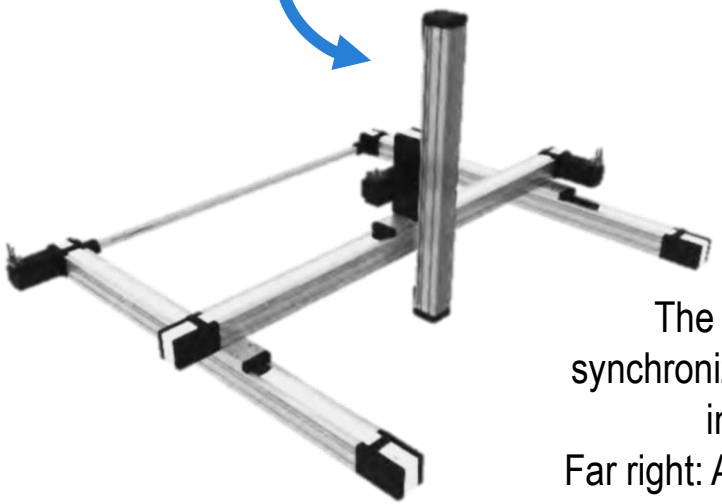
- Includes coupling/motor mount, connection plates, cable tracks, sensors, linear guide(s)
- Preconfigured systems
- Customized systems
  - Print included

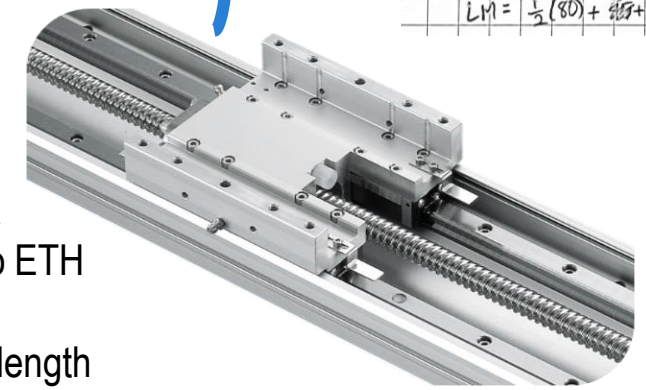
Unimotion

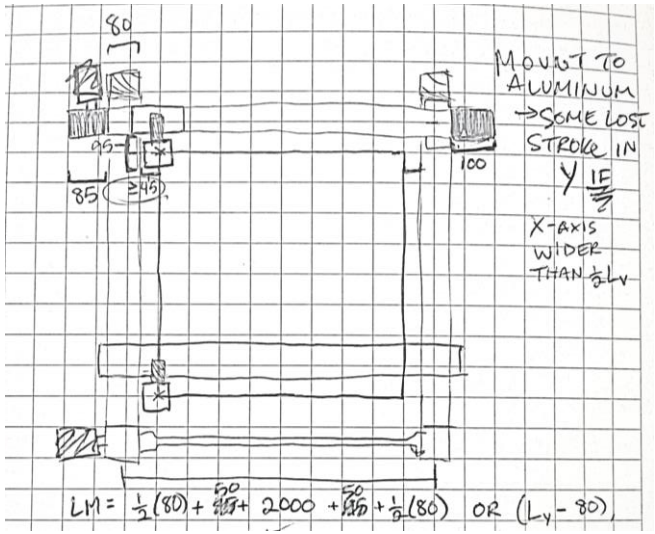
- Large systems (1m+)
- Interchangeability: Flexible multi axis options
- Driven-profile Z axis option
- Extensive accessory options



Multi-Axis Configurations



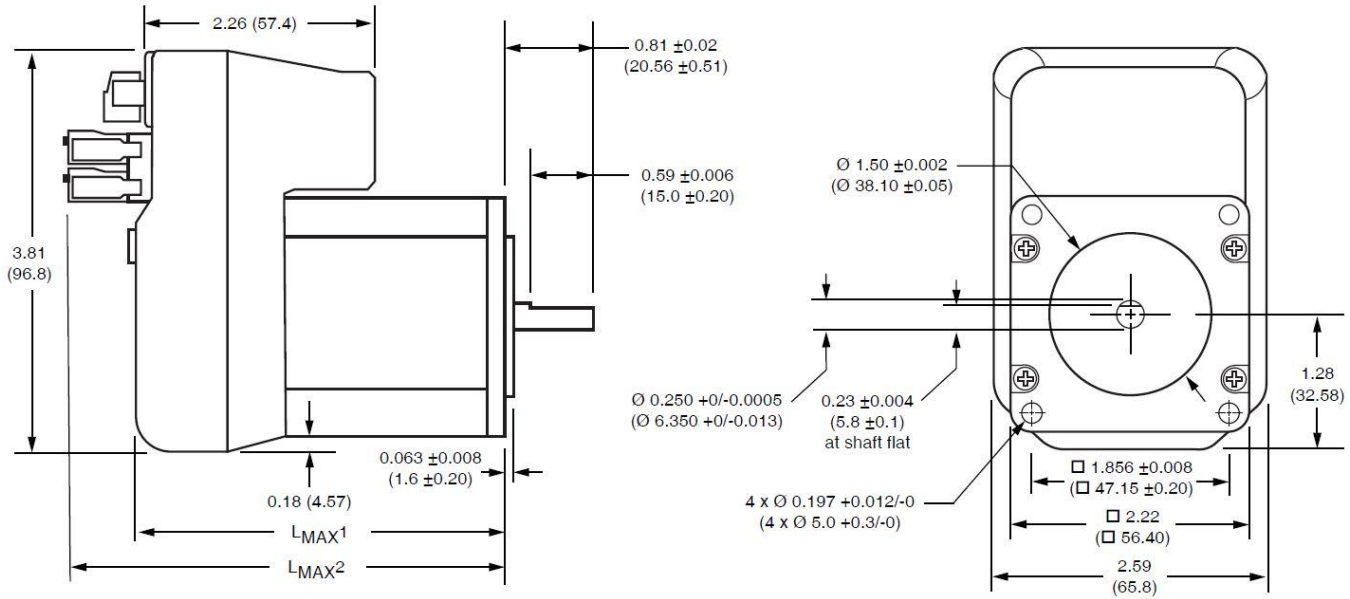




The Unimotion block-driven MTJZ in a synchronized X-X' gantry (left) and the Toyo ETH in a cantilevered system (right).
Far right: A layout drawing to determine the length of a torque tube in an XYZ gantry.

Motor & Accessories

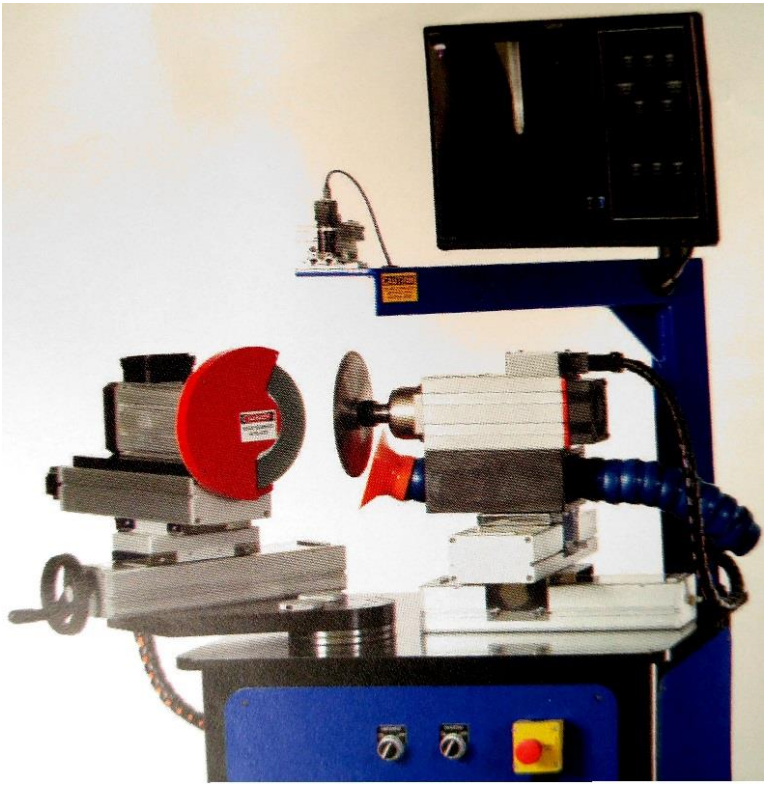
- Mount & coupling made for your motor/gearbox selection



Left: An example of a motor print displaying flange and shaft dimensions.
Above, left: An example of an actuator with motor mount and coupling.
Above, right: Front view showing coupling bore.

Toyo Case Study: Custom XY System

- Tool to refinish grinding wheels
- Two ATU custom XY systems
  1. Positioning XY, non-driven, external hand clamps
  2. Infeed XY, stepper-driven Y, LH screw, ACME screw for no backdrive and low cost
- 3 year warranty, technical support, prints and CAD



Infeed XY (left) and positioning XY (right)

Positioning XY: Print · 3D Model · X Axis QC · Y Axis QC
Infeed XY: Print · 3D Model · X Axis QC · Y Axis QC

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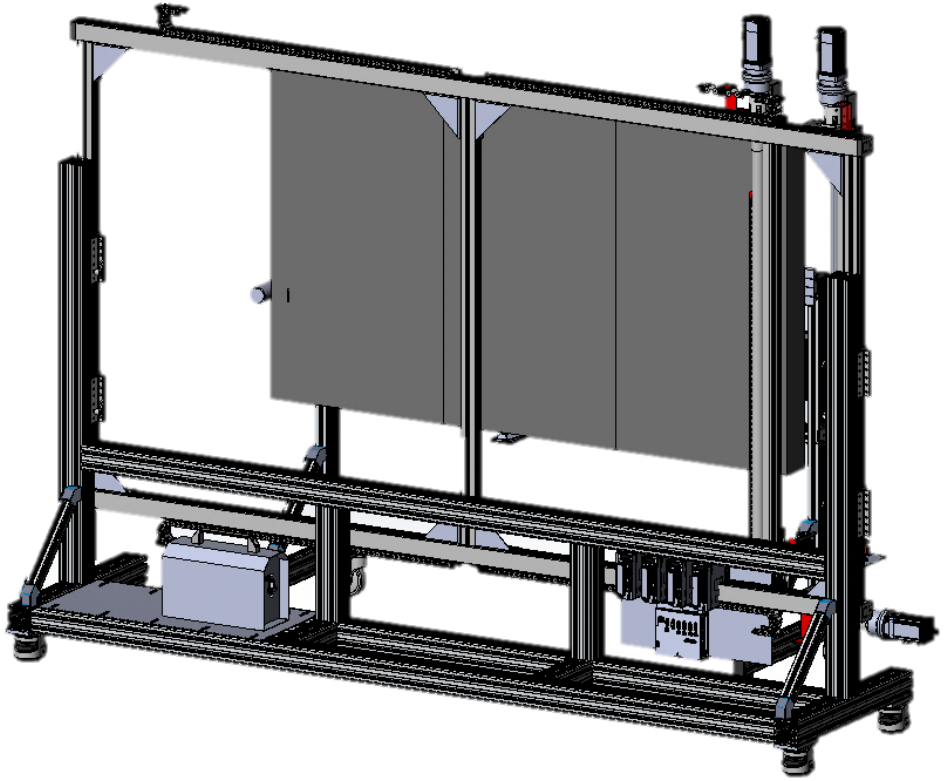
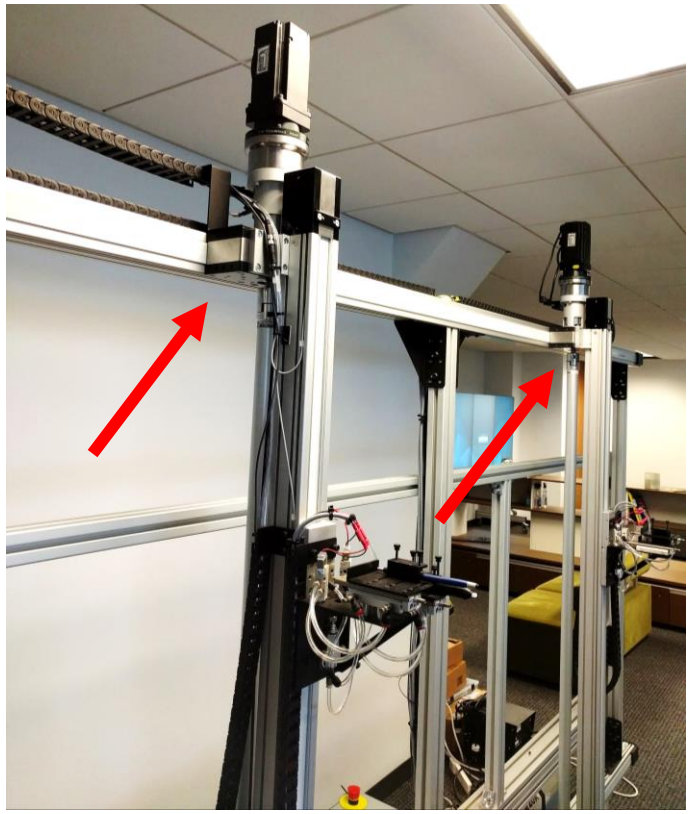
Unimotion Case Study: Touch Screen Wall Gantry

- ATU supplied actuators, servos, and drives
- Full technical support
- Full design process
- Unimotion **MTJZ** critical design element
  - Block-driven Y axes able to move independently





Left: Full assembly in SolidWorks. Right: Delta motors and Unimotion actuators operate the gantry. MTJZ blocks called out by arrows.

Print · 3D Model

Series and Applications

Toyo

- GTH/ETH – ball screw drive stages
- GTY/Y – electric cylinders
- ETB – belt drive stage
- MH/MK – very long belt drive stages
- ECH, ECB – cleanroom versions of ETH/ETB

Unimotion

- MTJ/MRJ – belt, one linear guide/track roller
- MTV – ball screw, one linear guide
- MTJ ECO – stripped-down low-cost MTJ
- MTJZ – carriage-driven MTJ
- CTJ – belt, two linear guides
- CTV – ball screw, two linear guides
- PNCE – electric cylinder

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Electric Cylinder

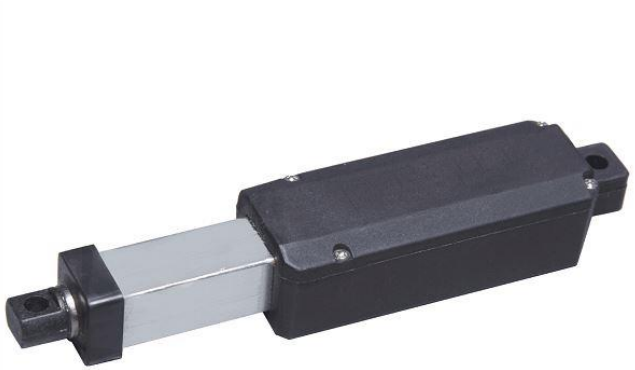
MOTECK ELECTRIC CORP UNIMOTION TOYO TiMOTION

Rod-Type Actuators

Strategy

- Low cost, easy synchronization: Moteck
- High quality, choose own servo: Unimotion
- High volume, custom product: TiMotion
- Built-in guides: Toyo

Variety



Clockwise from top left: Moteck synchronized actuators in a medical furniture application; Unimotion PNCEs; Miniature rod actuator; a customized TiMotion furniture actuator; and a lift table demonstrating the utility of built-in guides.

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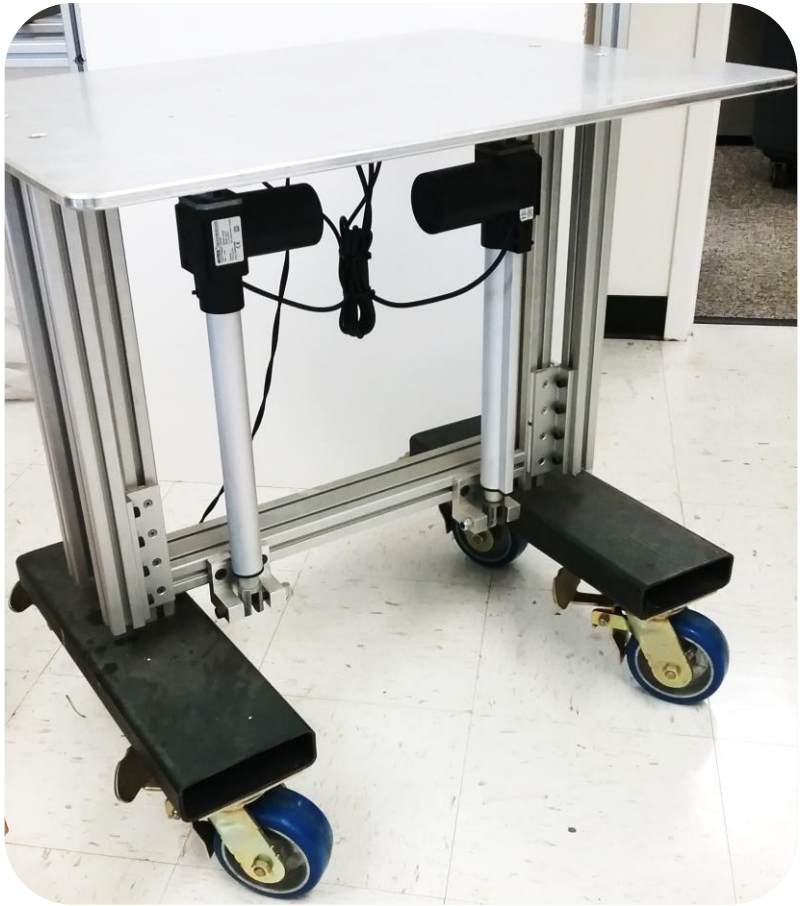
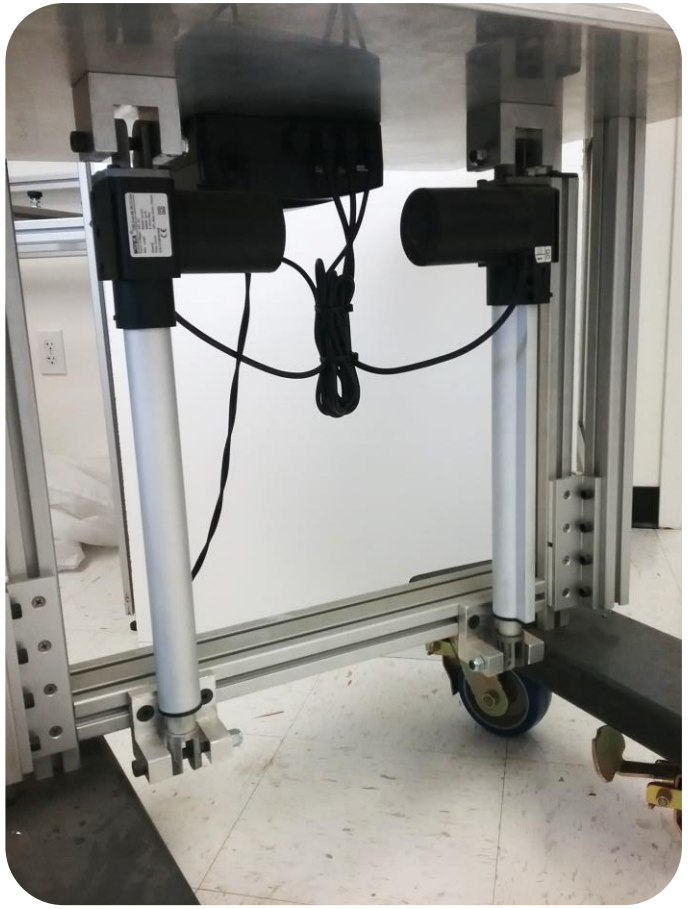
Synchronization

- Available preconfigured options to synchronize 2 or 4 actuators
- Medical, industrial, ergonomics, and furniture applications



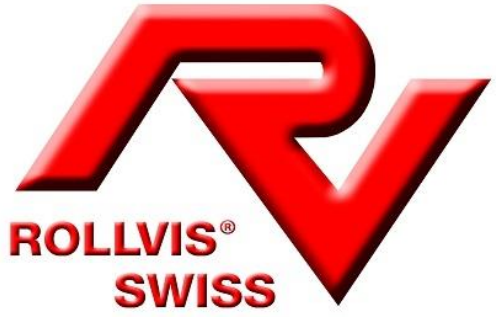


Pictured at right: ATU lift table with two synchronized actuators

Series and Applications

- Moteck LD3, ID10, and FD60
- Unimotion PNCE
- Toyo GTY and CGTY
- TiMotion: Contact us!

Rollvis



Roller Screws

- *1939: CENTURION grinding*
- *1970: ROLLVIS acquires*
- *1993: independent private company*

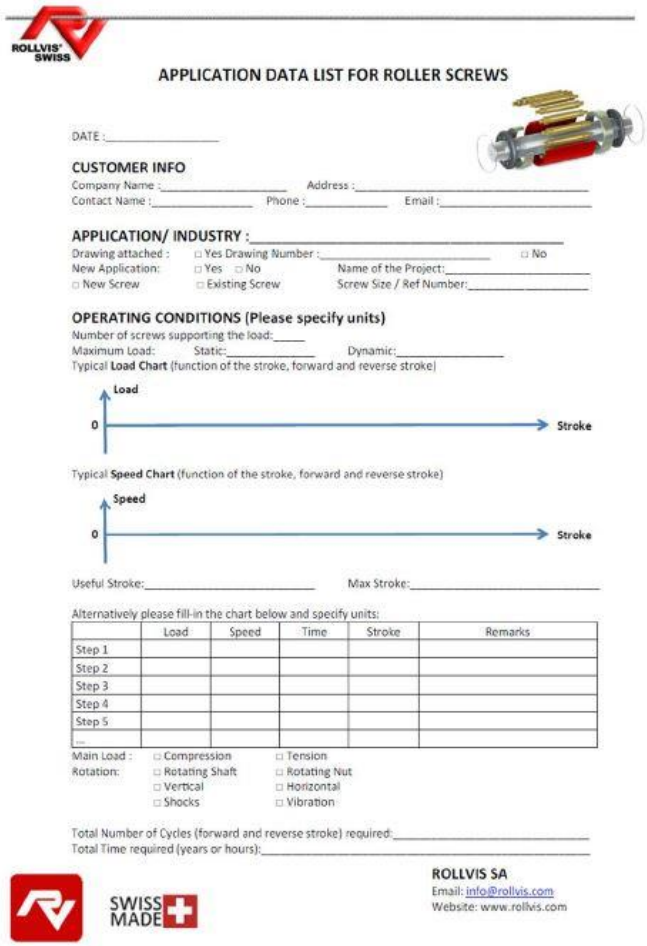
Strategy

- Ultra-high loads and accelerations
- All assemblies custom made
- Defense, aerospace, very large telescopes, *and more*

Series and Applications (1/2)

ODs x leads	
3-210 x 1-50 mm	▪ **RV** – Stable driving torque, high precision/acceleration/capacity/speeds
8-125 x 0.25-5 mm	▪ **RVR** – Extremely high accuracy and capacity; low to medium speeds
8-100 x 1-15 mm	▪ **RVI** – Similar to RV; higher capacities at smaller leads, more compact
8-60 x 0-3 mm	▪ **RVD** – Extra fine leads

Series and Applications (2/2)



ROLLVIS' SWISS

APPLICATION DATA LIST FOR ROLLER SCREWS

DATE :

CUSTOMER INFO
Company Name : Address :
Contact Name : Phone : Email :

APPLICATION/ INDUSTRY :
Drawing attached : □ Yes Drawing Number : □ No
New Application: □ Yes □ No Name of the Project:
□ New Screw □ Existing Screw Screw Size / Ref Number:

OPERATING CONDITIONS (Please specify units)
Number of screws supporting the load:
Maximum Load: Static: Dynamic:
Typical **Load Chart** (function of the stroke, forward and reverse stroke)

Load
0 Stroke

Typical **Speed Chart** (function of the stroke, forward and reverse stroke)

Speed
0 Stroke

Useful Stroke: Max Stroke:

Alternatively please fill-in the chart below and specify units:

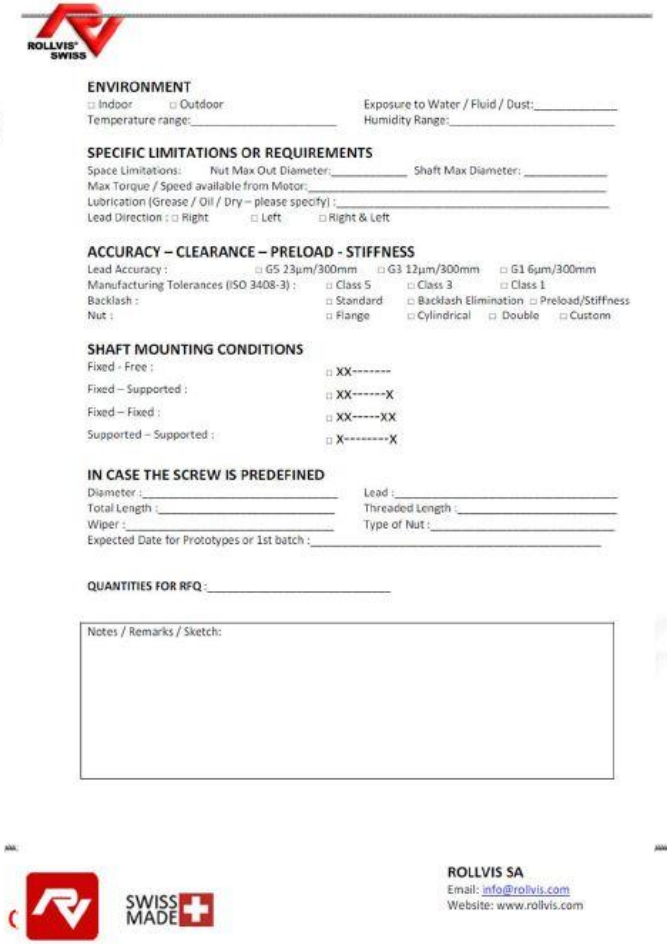
	Load	Speed	Time	Stroke	Remarks
Step 1					
Step 2					
Step 3					
Step 4					
Step 5					
...					

Main Load : □ Compression □ Tension
Rotation: □ Rotating Shaft □ Rotating Nut
□ Vertical □ Horizontal
□ Shocks □ Vibration

Total Number of Cycles (forward and reverse stroke) required:
Total Time required (years or hours):

ROLLVIS SA
Email: info@rollvis.com
Website: www.rollvis.com

SWISS MADE



ROLLVIS' SWISS

ENVIRONMENT
□ Indoor □ Outdoor Exposure to Water / Fluid / Dust:
Temperature range: Humidity Range:

SPECIFIC LIMITATIONS OR REQUIREMENTS
Space Limitations: Nut Max Out Diameter: Shaft Max Diameter:
Max Torque / Speed available from Motor:
Lubrication (Grease / Oil / Dry – please specify) :
Lead Direction : □ Right □ Left □ Right & Left

ACCURACY – CLEARANCE – PRELOAD - STIFFNESS
Lead Accuracy : □ G5 23µm/300mm □ G3 12µm/300mm □ G1 6µm/300mm
Manufacturing Tolerances (ISO 3408-3) : □ Class 5 □ Class 3 □ Class 1
Backlash : □ Standard □ Backlash Elimination □ Preload/Stiffness
Nut : □ Flange □ Cylindrical □ Double □ Custom

SHAFT MOUNTING CONDITIONS
Fixed - Free : □ XX-------
Fixed – Supported : □ XX------X
Fixed – Fixed : □ XX-----XX
Supported – Supported : □ X--------X

IN CASE THE SCREW IS PREDEFINED
Diameter : Lead :
Total Length : Threaded Length :
Wiper : Type of Nut :
Expected Date for Prototypes or 1st batch :

QUANTITIES FOR RFQ :

Notes / Remarks / Sketch:

ROLLVIS SA
Email: info@rollvis.com
Website: www.rollvis.com

SWISS MADE

As much information as possible:

- Application description
- Load cycle and motion profile
- Duty cycle
- Environment
- Limitations
- Accuracy/clearance/preload
- Mounting
- Volume

Lead Screws

Strategy

- Large volume opportunities
- OEM applications
- Low cost

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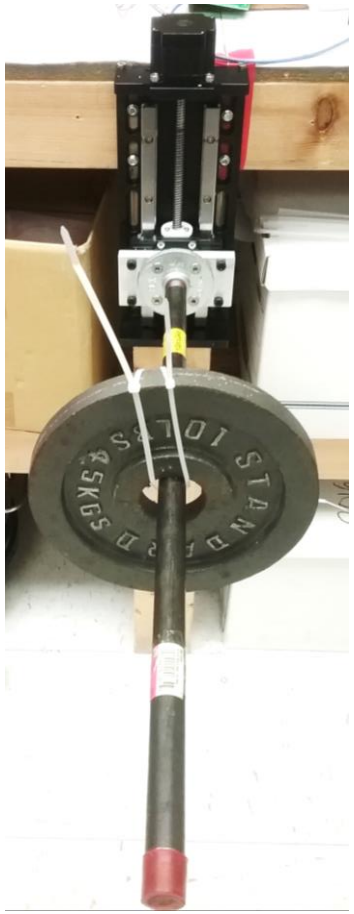
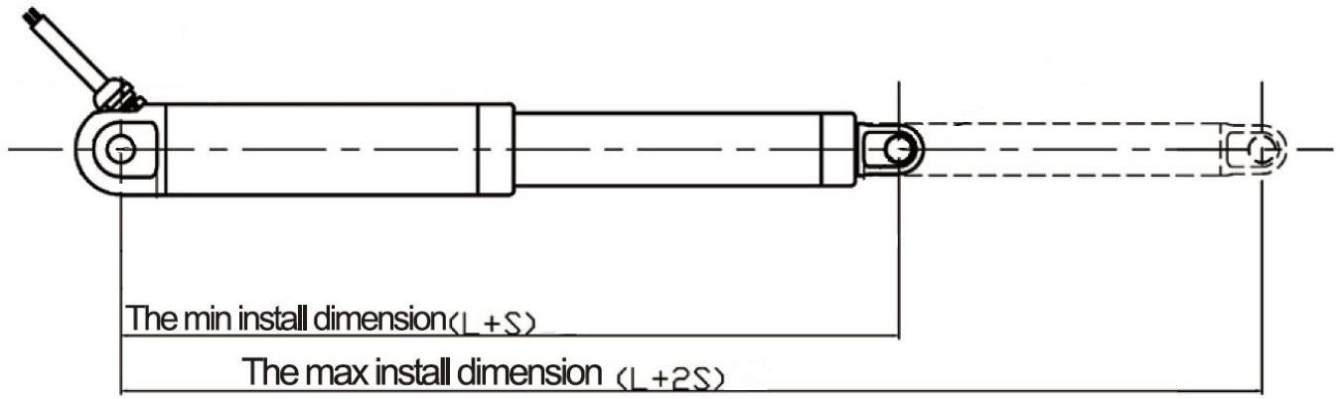
Custom and Self-Locking Applications



Far left: ATU Z axis actuator
Second from left: Custom nut lead screw
Right, top: Anti-backlash lead screw assemblies
Right, bottom: Lead screw assembly

Sizing Rod-Type Actuators

- **Retracted** length + **stroke** = **extended** length
- Design in: Thrust/speed, duty cycle, mounting
- Interchange: What is critical to match?



Rod actuators are sized by retracted length and extended length (retracted length plus stroke).

ACCU TECH USA
Automation and Motion Solutions

Ball screw end supports, RF key fob,
linear guide brakes, & low-cost actuators

SUPPLEMENTAL PRODUCT OFFERINGS

SYK Ball Screw Supports

SYK®

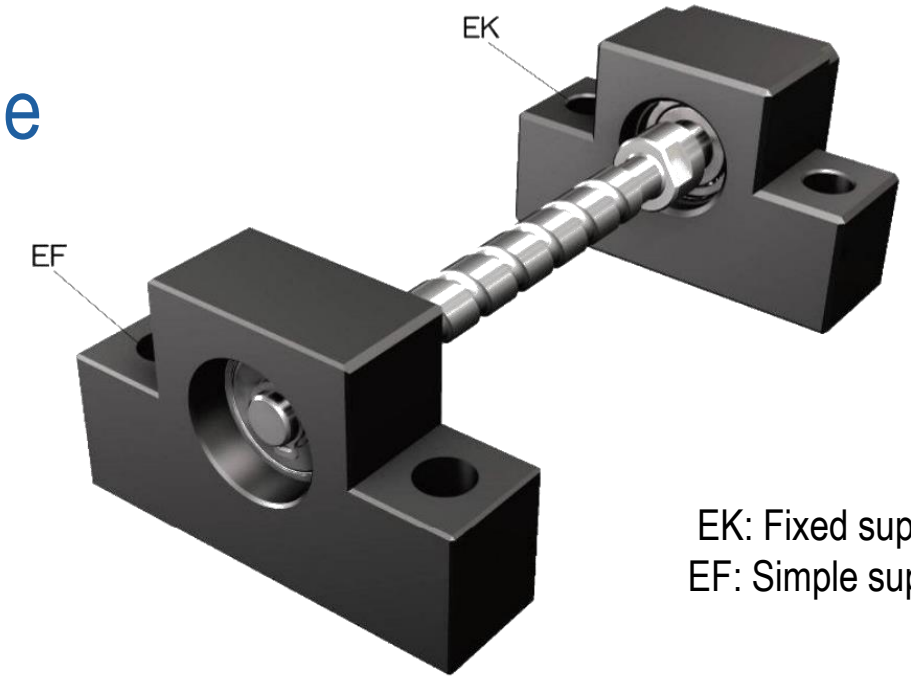
Ball screw with machined end (middle), SYK simple support (left), and SYK fixed support (right)

SYK Ball Screw Supports

- **Fixed** and **simple** supports
- Ball nut brackets
- Black oxide and nickel plating available

Electroless Nickel Plating
(Application : Clean room)

Black Oxide
(Application : General case)



EK: Fixed support
EF: Simple support

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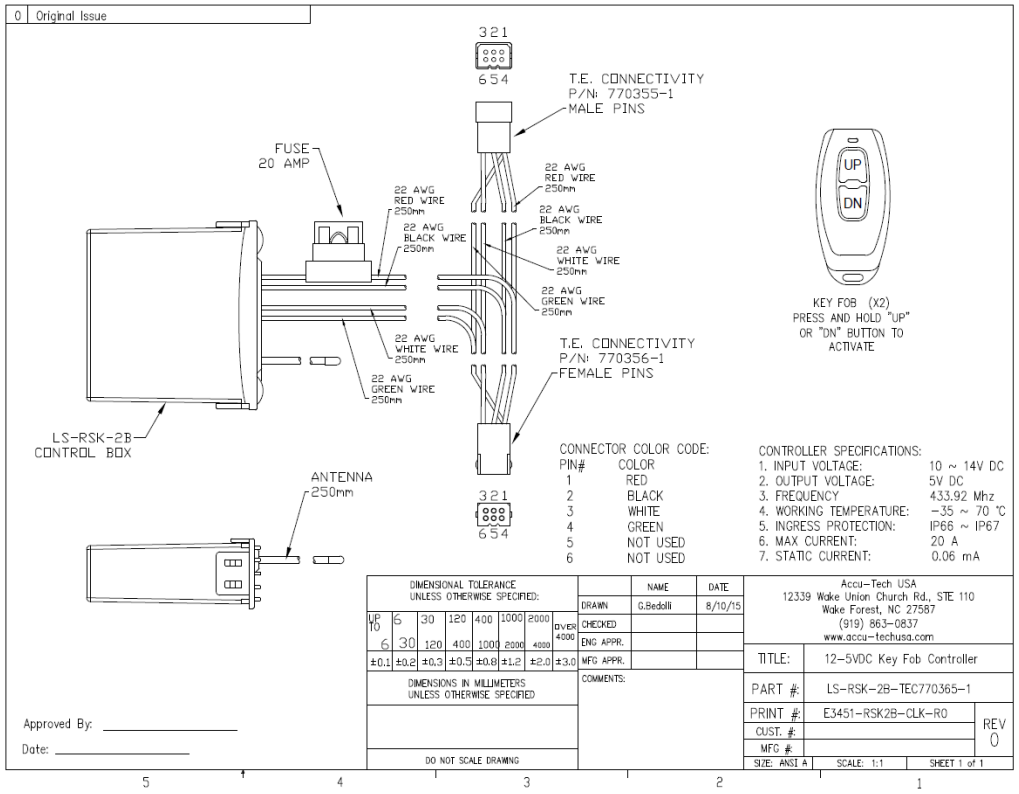
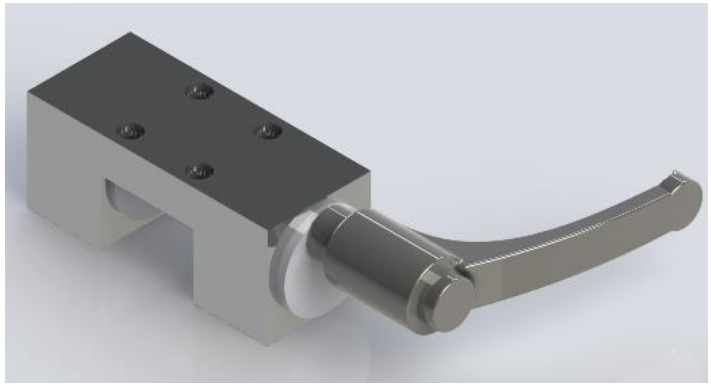
RF Key Fob Controller

Case Study: Mobility Van



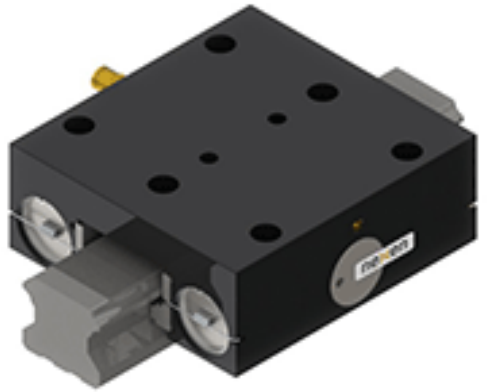
Linear Guide Brakes

Hand Clamp



Hand clamp: solid model (above) and in a custom ATU cartesian system (right)

Pneumatic Rail Brake



ACCU TECH USA
Automation and Motion Solutions

Our NC offices + meet the family + website + contact info

LOCATIONS & RESOURCES

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Automation and Motion Solutions

Wake Forest, NC Office

P 919.863.0837 | sales@accu-techusa.com | www.accu-techusa.com

ACCU TECH USA
Automation and Motion Solutions

Youngsville, NC Shop

ACCU TECH USA
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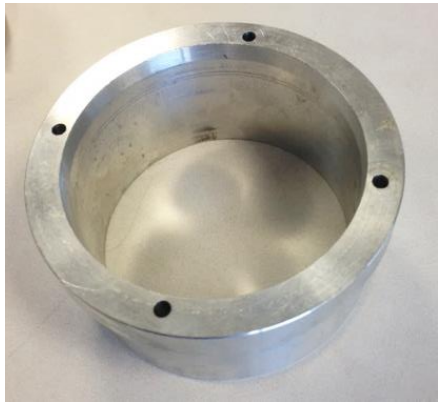
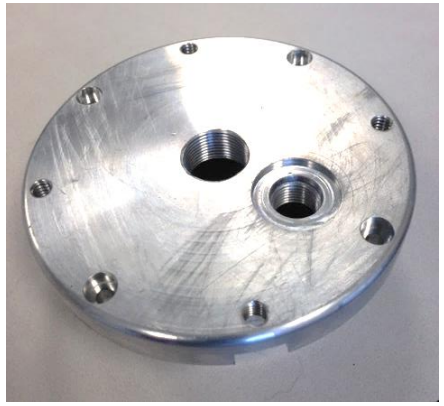
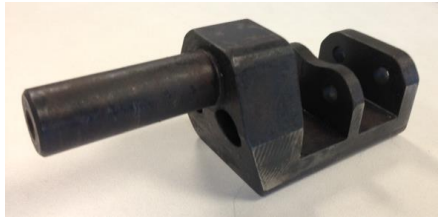
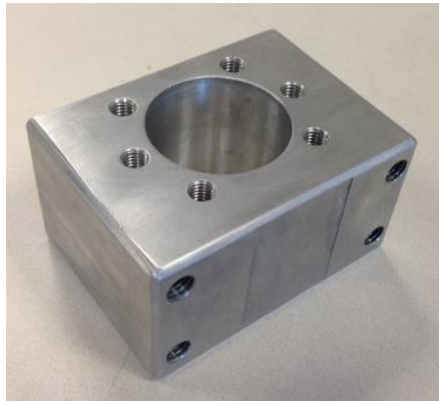
Custom Machining









Custom parts made by Dale in ATU's machine shop

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Automation and Motion Solutions

The Team

Sales

Doug Kiernan

Production

Customer Service

Engineering

Finance

Marketing

Machine Shop

Calvin Sweet

ACCU TECH USA
Automation and Motion Solutions

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Thank you!

ANY QUESTIONS?