



UG Series

SIMO[®] Linear Motion Platform



**Simultaneous
Integral
Milling
Operation**

Linear Motion Solutions

Synchronized Cutters Eliminate
Built-In Extrusion Variances

Flexibility: Consistent Geometry
Creates an Interchangeable Platform

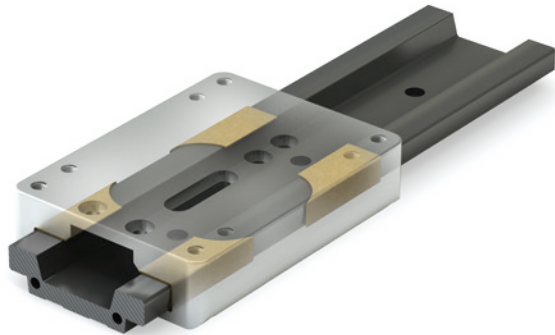
Versatility: Self-Lubricating,
High Speed, and Rigid Precision



Configure Online at
pbclinear.com

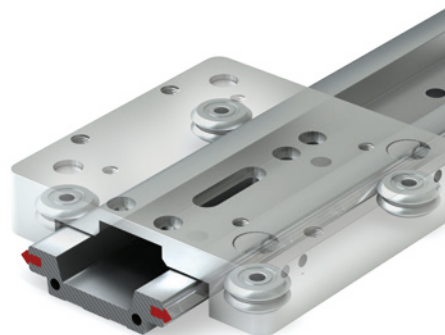
1-800-962-8979

Bearing System Options • Machined Precision at Extrusion Prices



Gliding Surface Technology Plain Bearing (with FrelonGold)

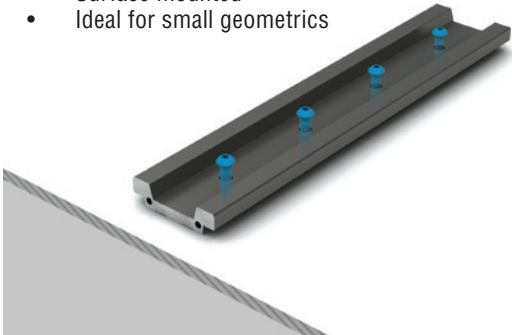
- LOW COST
- Excels in environments from contamination to clean rooms
- Self-lubricating and maintenance free
- Vibration damping
- Suitable for extremely short stroke



Uniform Rail Dimensions

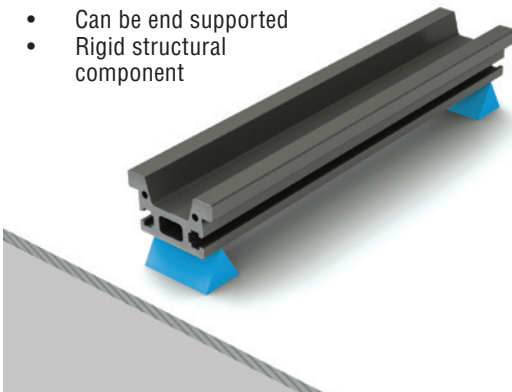
UGA – Low Profile Rail

- Surface mounted
- Ideal for small geometrics



UGT – Tall Rail

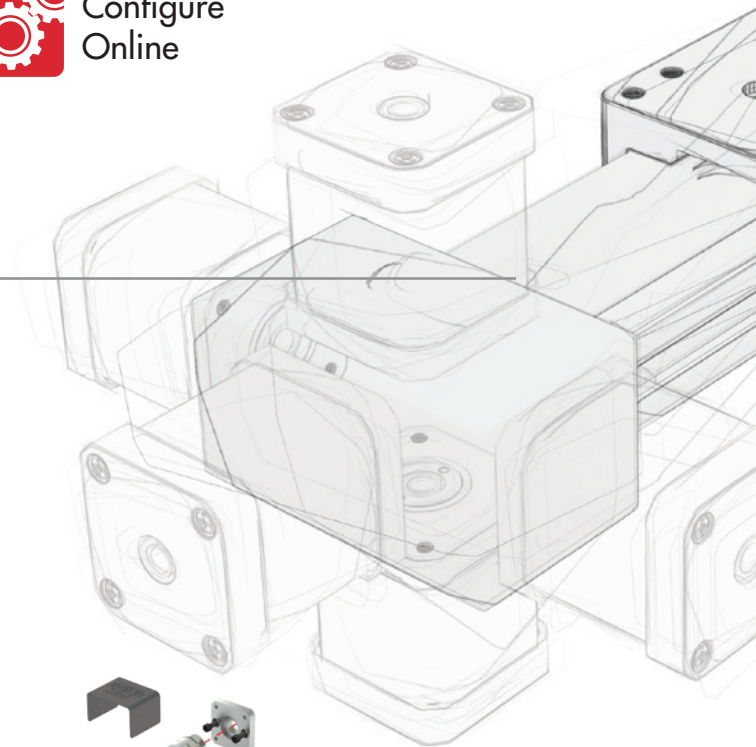
- Can be end supported
- Rigid structural component



The SIMO® Series Linear Motion Platform

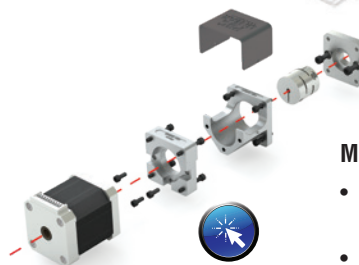


Configure
Online



Motor Mount

- Drive the SIMO Series with a stepper, servo, or smart motor, etc.
- One-piece main frame holds shaft-to-shaft centerline



[Motor Mount Info](#)

Cam Roller Technology

V-Guide Roller Bearings

- HIGH SPEED
- Increased cantilevered loads
- Stainless steel raceways resist corrosion
- V-wheel bearings handle contamination

Profile Rail Technology

Profile Rail Guides

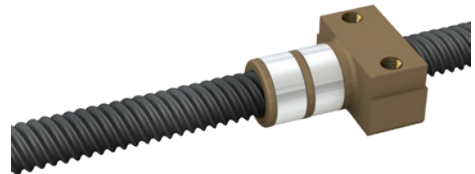
- HIGH RIGIDITY & PRECISION
- Rigid, preloaded, ball bearing blocks
- Increased cantilevered loads

Consult
factory for
PRT
versions

Drive Options

Lead Screw – Low Cost

- Standard fixed or anti-backlash nut options
- Good rigidity and vibration dampening
- Self-lubricating and maintenance free



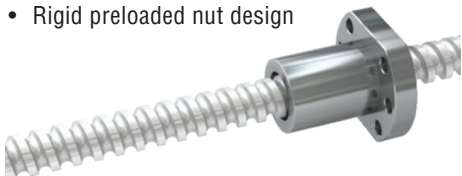
Belt Drive – High Speed

- Good for long stroke applications
- Tolerates contaminated environments



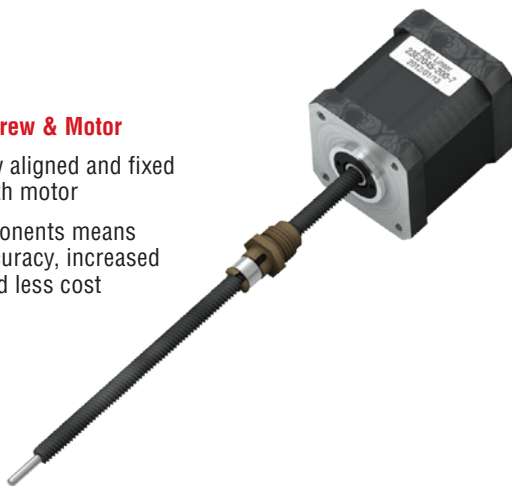
Ball Screw – High Rigidity and Precision

- Multiple accuracy classes available
- Rigid preloaded nut design

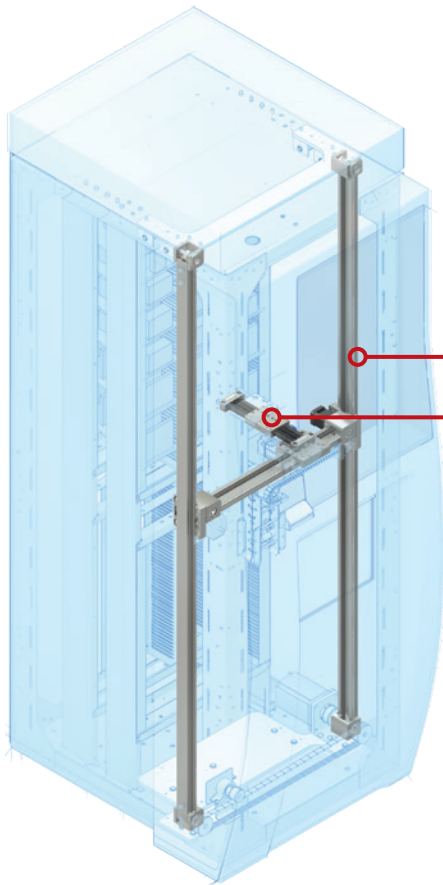


Integrated Screw & Motor

- Lead screw aligned and fixed directly with motor
- Less components means greater accuracy, increased rigidity, and less cost



Applications

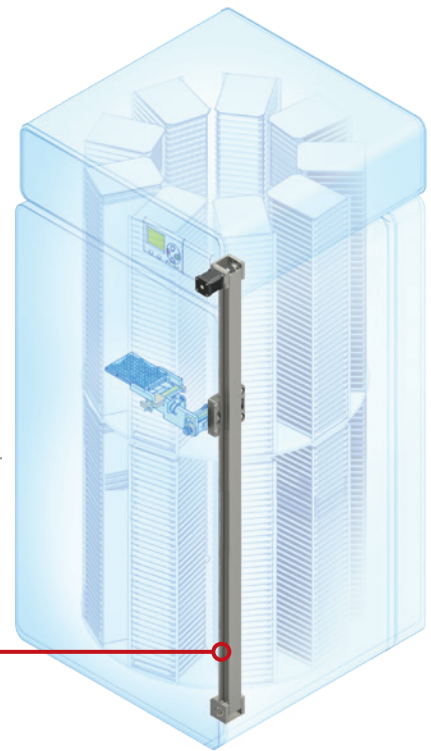


KIOSK & AUTOMATED RETAIL

The SIMO Series tall rail (UGT) works well as a structural support – shown here in the X and Y axis in an automated dispensing application. The low profile (UGA) SIMO Series – shown in the Z axis – is ideal for fitting into tight spaces.

The tall rail (UGT) can be used as a structural support

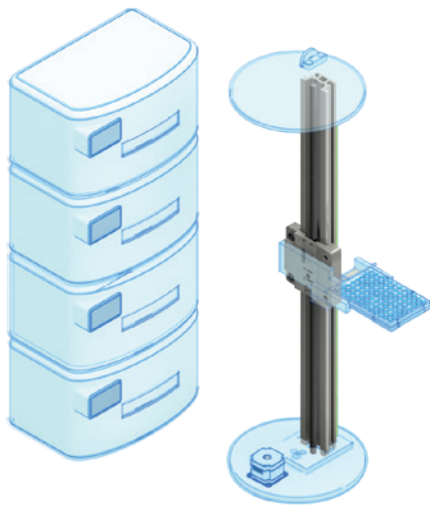
The low profile rail (UGA) fits into small spaces



CARTESIAN ROBOTICS

SIMO Series' single- and multi-axis solutions provide the accuracy and consistency that pick and place applications require.

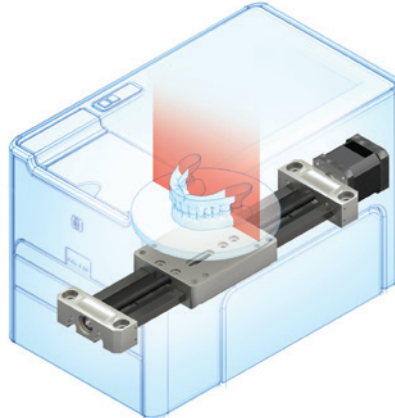
V-Guide bearings provide high speed performance and quick change of direction capabilities



POLAR ROBOT

The SIMO Series can be used in vertically or horizontally oriented applications. The polar robot shown here provides repeatable motion and high accuracy.

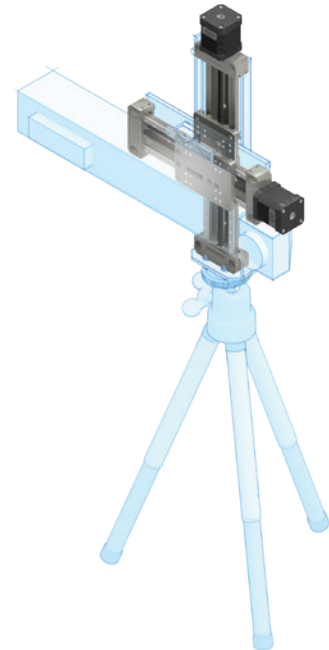
V-Guide bearings provide smooth travel and the tall rail (UGT) provides structural support



SCANNING EQUIPMENT

High precision and smooth operation are required when designing linear motion for laboratory scanning equipment. The plain bearing system utilizes FrelonGOLD® – a self-lubricating, maintenance free surface that does not require oil.

Lead screws utilize an engineered high strength polymer, plain style nut that is self-lubricating and maintenance free – providing consistent torque over the length of the stroke



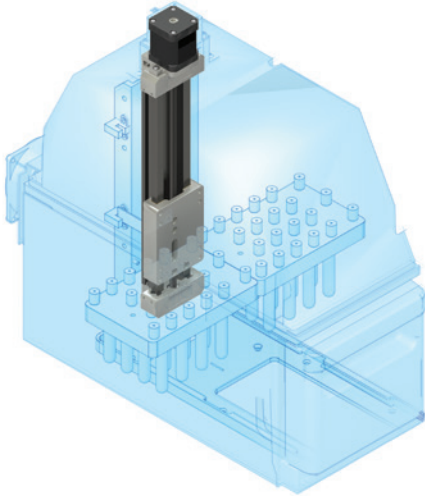
LASER CODING AND BARCODE PRINTING

Inline barcode printers & scanners help industrial automation manufacturers reduce costs and improve quality. The SIMO Series' versatility provides dependable linear motion for even the most demanding coding applications.



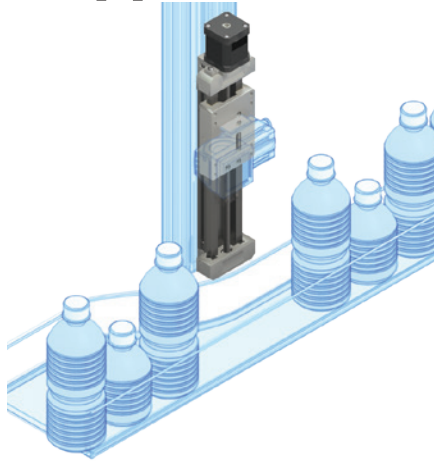
Email an Application Engineer

Applications



MEDICAL AND LABORATORY EQUIPMENT

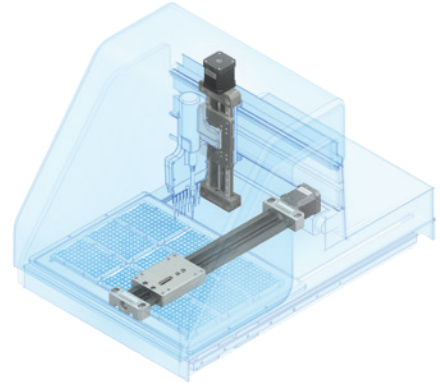
Analyzers that are used in medical testing applications often require high accuracy in a small space with the benefits of choosing rail, bearing type, and drive options, the SIMO Series can be designed for these specific application requirements.



BOTTLING

The SIMO Series is ideal in bottling and food service applications that require repeatable motion and involve various load capacities.

Plain bearings utilize the bonded FrelonGold® self-lubricating maintenance-free surface

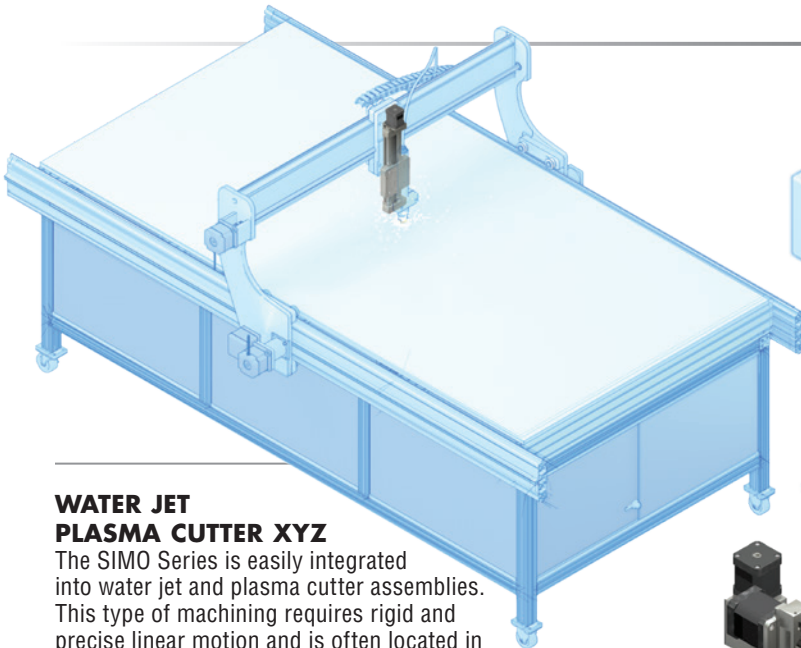


LAB AUTOMATION PETRI CAMERA OPERATION

Combine the SIMO Series bearing options to create the ideal multi-axis solution designed to fit the application.

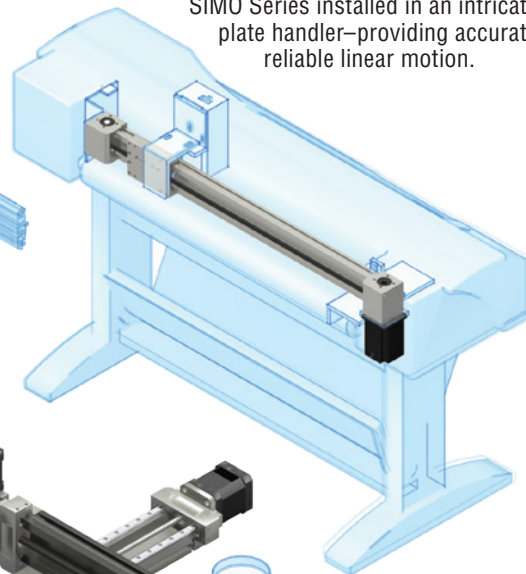
Shown here:

- X-axis: PRT with ball screw for precision, rigidity, and moment load capabilities
- Y-axis: GST with lead screw for repeatability and smooth motion.



WATER JET PLASMA CUTTER XYZ

The SIMO Series is easily integrated into water jet and plasma cutter assemblies. This type of machining requires rigid and precise linear motion and is often located in contaminated, wet, and dirty environments.



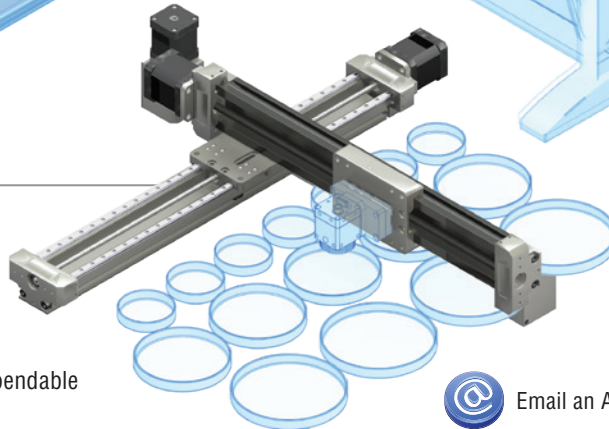
WELL PLATE HANDLING

SIMO Series installed in an intricate well plate handler—providing accurate and reliable linear motion.

COMMERCIAL PRINTING

The SIMO Series is a cost effective solution for printers and scanners. The pre-assembled system reduces set-up time and requires little maintenance.

V-guide bearings provide quiet, smooth, and dependable motion over long strokes



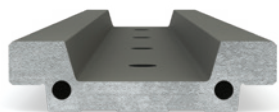
Email an Application Engineer

SIMO® Series *Design It Your Way*

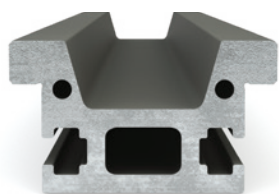
Step 1: Rail

Page 6

Low Profile Rail

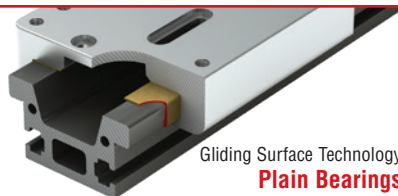


Tall Rail



Step 2: Bearing Type

Page 8



Gliding Surface Technology
Plain Bearings



Cam Roller Technology
V-Guide Bearings



Profile Rail Technology
Profile Rail Guideways

Step 3—
How will
I drive it?

Step 2—
What performance do
I expect
from the
bearing system?

Step 1—
Do I need a low
profile rail
or a structural
support rail?

Step 3: Drive

Page 10

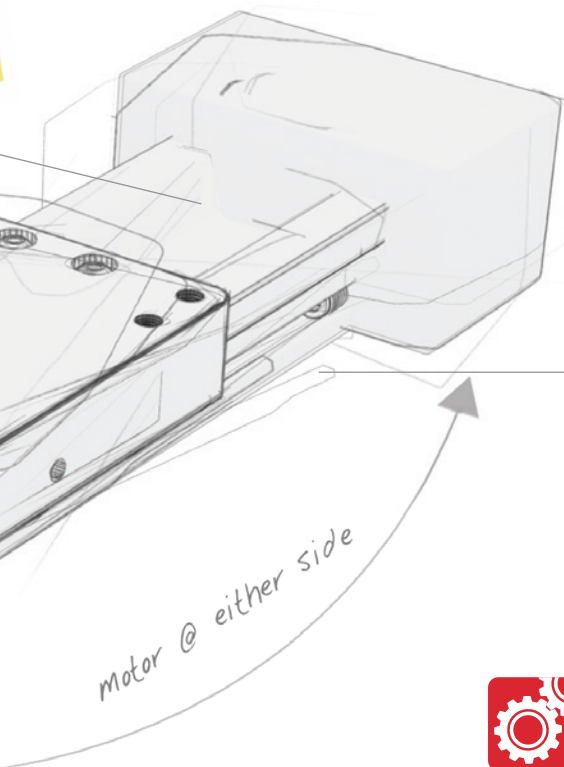
Lead Screw



Ball Screw



Belt



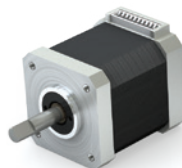
Configure
Online

Step 4: Motor

Page 12

42 mm (NEMA 17)

56 mm (NEMA 23)



Step 5: Accessories

Page 13

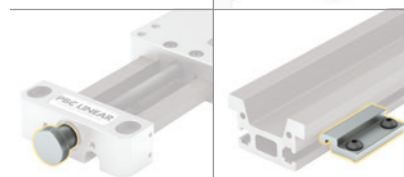
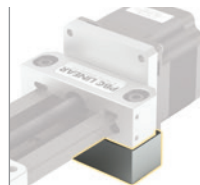
Toe Clamps

Hand Knobs & Brakes

Riser Blocks

Sensor Brackets

XYZ Mounting



Components

Gliding Surface Technology: Plain Bearing	14
Cam Roller Technology: V-Guide Bearings	16
Profile Rail Technology: Profile Rail Guideways	18

Driven Sub-Systems

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Belt Drive System (Horizontal Motor Mount)	24
Belt Drive System (Vertical Motor Mount)	28
Ball Screw System	32

Multi-Axis Mounting 39

Application Data Sheet & Calculations 43-44

Motor Mounts 45-54

User Manual 55

If you are utilizing our digital **SIMO Series** catalog, you can click these icons, throughout the publication, to get more information.
Note: Hyperlinks go to English language website.



Link to product information



Link to the SIMO® process



Email an Application Engineer



Link to product related video

Rail Selection

UGA – LOW PROFILE RAIL

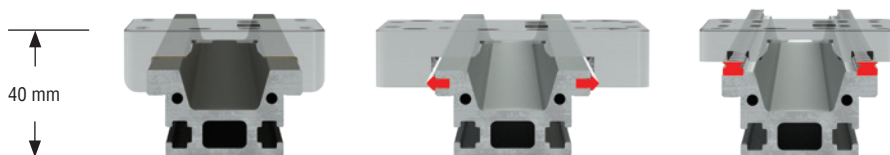
- 24 mm overall height
- Reduced height is ideal for small geometrics
- Best mounted to a base plate or other support
- Can incorporate drive options: lead screw, ball screw, vertical belt

**UNIFORM
DIMENSIONING
PROVIDES
DESIGN FLEXIBILITY**



UGT – TALL RAIL

- 40 mm overall height
- Increased rigidity for unsupported mounting
 - **Can be used as a structural member** – see Maximum Load chart on page 9
 - Saves on the cost of mounting onto another element (extrusion frame, base plate, etc.)
- Can incorporate drive options: lead screw, ball screw, vertical belt, horizontal belt



RAIL MATERIAL – All rails are SIMO® qualified aluminum

Plain Bearing

- Hard anodized
- Best material for FrelonGOLD

V-Guide Bearings

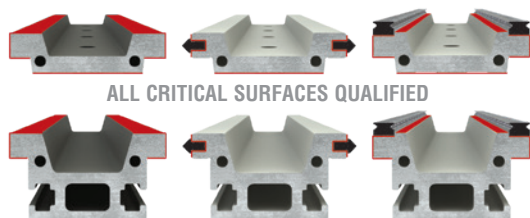
- Clear anodized
- 420 stainless steel race – hardened to RC60 – swaged in

Profile Rail Guideways

- Clear anodized
- Class "N" rails standard

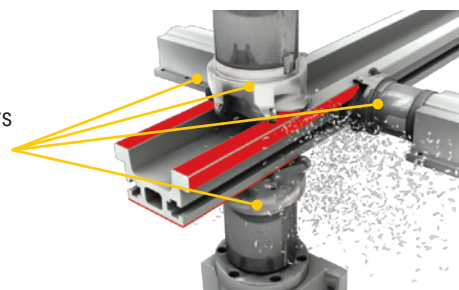
REFERENCE EDGE

- Critical rail edges are machined with the patent pending **SIMO® Process**
 - Reduce bow, twist, and warp
 - Holds tolerances to +/- .0254 mm (.001")
 - Learn more about SIMO tolerances on page 56
- Qualified edges can be used for reference when mounting



ALL CRITICAL SURFACES QUALIFIED

Synchronized Cutters
Eliminate Built-In
Extrusion Variances



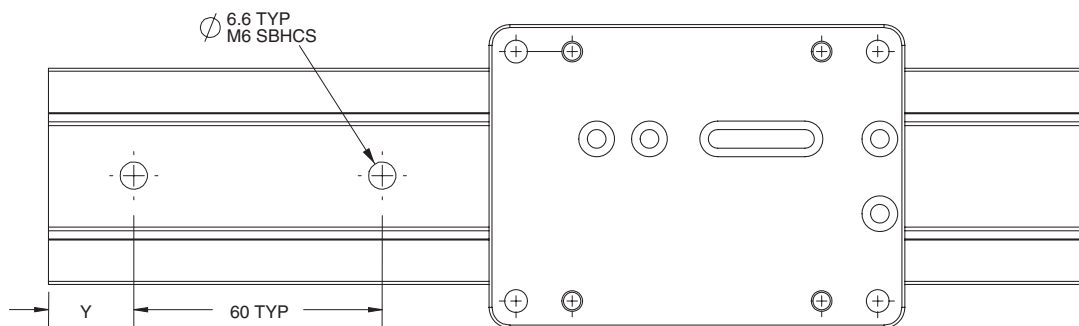
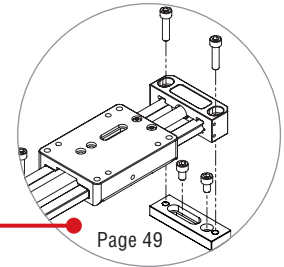
Video Link: [The SIMO Process](#)

Rail Selection

RAIL MOUNTING

UGA – LOW PROFILE RAIL

- 6.6 mm TYP - M6 SBHCS for mounting through rail
- 60 mm TYP spacing between mounting holes
- Customer specifies Y dimension
- End block mounting with lead & ball screw driven systems



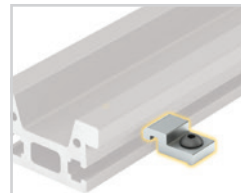
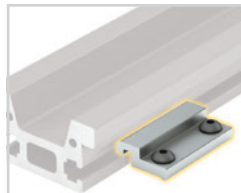
Detailed mounting information on page 56

UGT – TALL RAIL

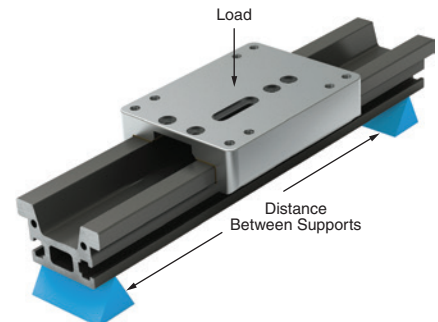
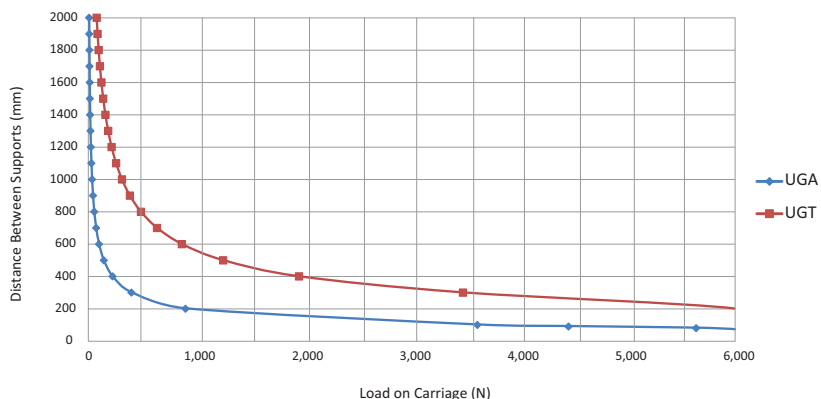
- Secure toe clamp mounting
- Other options, such as t-nuts, are available when rail is used as a structural element



Detailed information on accessories on page 36 and t-nuts on page 37



Maximum Load - Unsupported Rail



Step 1

Step 2

Step 3

Step 4

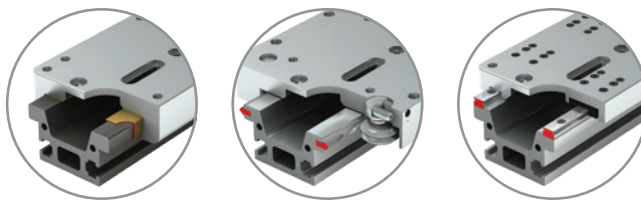
Step 5

Bearing System Options

Three bearing system options are available with SIMO Series:

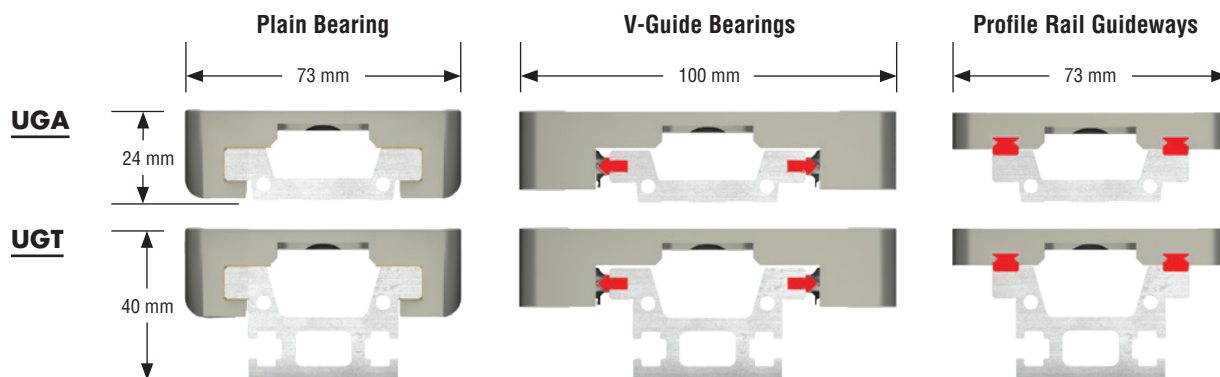
Plain Bearing, V-Guide Bearings and Profile Rail Guideways.

- Choose the bearing system that best supports the application requirements



SIMO SERIES BASE COMBINATIONS

A choice of bearing systems within the same base linear motion platform

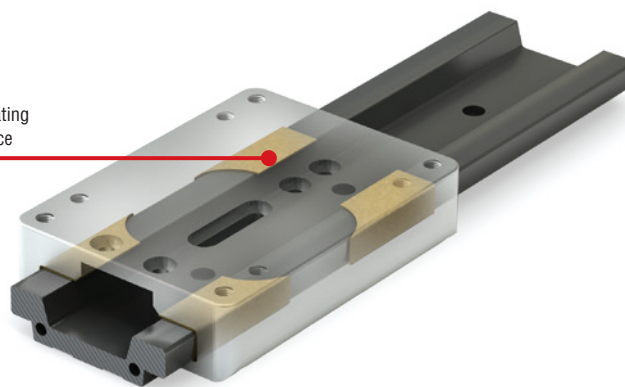


Gliding Surface Technology

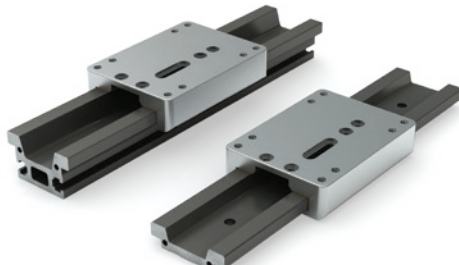
PLAIN BEARING

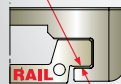
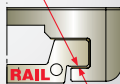
- Low cost
- Utilizes bonded **FrelonGOLD®** bearing surfaces
- Self-lubricating and maintenance free
- No catastrophic failure
- No metal-to-metal contact, vibration damping
- Max speed – 1.53 m/s (300 ft/min) (dry running)
- Wide temperature range
- Resists contamination
- Precision or compensated running clearance

FrelonGold® self-lubricating maintenance-free surface



Full specifications on page 14



Precision Series	Compensated Precision Series
.025 mm - .051 mm Running Clearance (CERAMIC COATED)	.064 mm - .089 mm Running Clearance (CERAMIC COATED)
	

Note: Plain bearings should comply with the 2:1 ratio rule.



Link to 2:1 ratio whitepaper

Bearing System Options

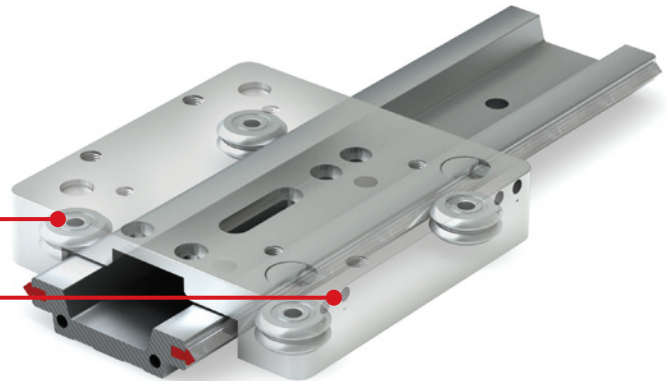
Cam Roller Technology

V-GUIDE BEARINGS

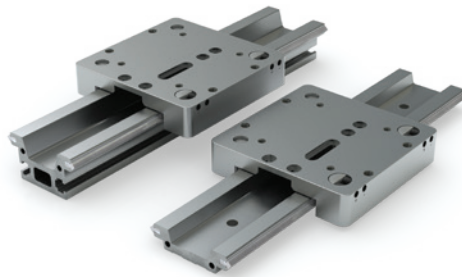
- High speeds – to 5 m/s (984 ft/min)
- Quick change of direction
- Good for cantilevered loads
- Handles contamination
- Built in lubricators standard
- Patented side-adjust preload feature
- 420 stainless steel race – hardened to RC60 – swaged in

Double row V-Guide bearings on a hardened steel raceway

Patent pending side adjustment feature



Video Link: Cam Screw Adjustable Carriages



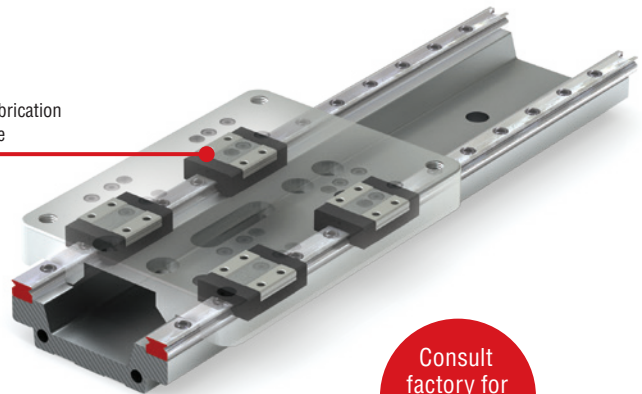
Full specifications on page 18

Profile Rail Technology

PROFILE RAIL GUIDEWAYS

- High precision and high speeds – to 3 m/s (590 ft/min)
- Size: 7 mm recirculating ball bearing blocks
- Increased stiffness and preloaded bearing performance
- Supports cantilevered loads
- Extra long blocks for increased load capacity are available – consult factory

Carriage with internal lubrication for reduced maintenance



Consult factory for PRT versions



Consult Factory • 800-962-8979



Full specifications on page 18

Step 1

Step 2

Step 3

Step 4

Step 5

Drive Type Selection

Three drive types are available with SIMO Series:

Lead Screw, Ball Screw, Belt Drive – Horizontal and Vertical Motor Mount.

- Choose the drive type that best supports the application requirements

LEAD SCREW

- Self-lubricating PTFE coated screw and polymer nut
- Fixed nut or Constant Force™ anti-backlash nut available
- 1, 2, 5, 10, 16 mm leads most common
- Other leads available – consult factory



CONSTANT
Force Technology



Video Link: Screws, Nuts, and Hybrid Linear Actuators



Full specifications on page 20

BALL SCREW

- For applications requiring precise positional accuracy
- Multiple leads available
- Selection of accuracy classes
- Consult factory for options



Consult Factory • 800-962-8979



Full specifications on page 32

Drive Type Selection

Step 1

Step 2

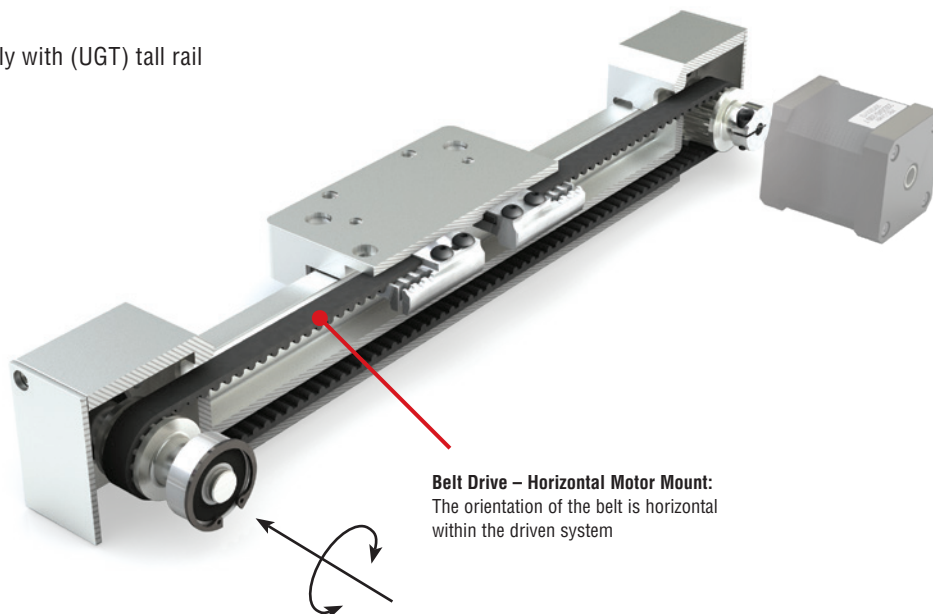
Step 3

Step 4

Step 5

BELT DRIVE HORIZONTAL MOTOR MOUNT

- Ideal for high speed applications
- Horizontal motor mount is available only with (UGT) tall rail



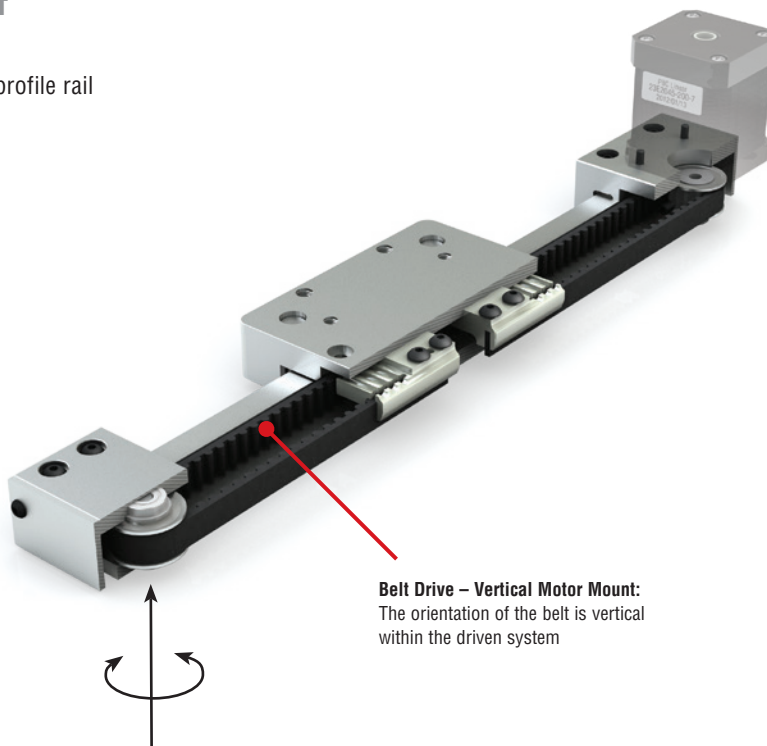
Belt Drive – Horizontal Motor Mount:
The orientation of the belt is horizontal within the driven system



Full specifications on page 24

BELT DRIVE VERTICAL MOTOR MOUNT

- Ideal for high speed applications
- Vertical motor mount is designed for (UGA) low profile rail
- Consult factory for use with (UGT) tall rail



Belt Drive – Vertical Motor Mount:
The orientation of the belt is vertical within the driven system



Full specifications on page 28

Motor Selection

INTEGRATED STEPPER MOTOR

The driven SIMO Series systems are optimized for use with integrated stepper motors.

- 42 mm (NEMA 17)
- 56 mm (NEMA 23)
- Single, double, triple stack
- Performance specifications for each drive type:
 - Lead screw – page 23
 - Belt drive with horizontal motor mount – page 27
 - Belt drive with vertical motor mount – page 31
 - Ball screw – consult factory
- Standard wire connection is onboard plug
- Optional connections – consult factory
- Third party motor mount also available



[Link to Motor Specifications Document](#)



[Detailed information on motors on page 35](#)

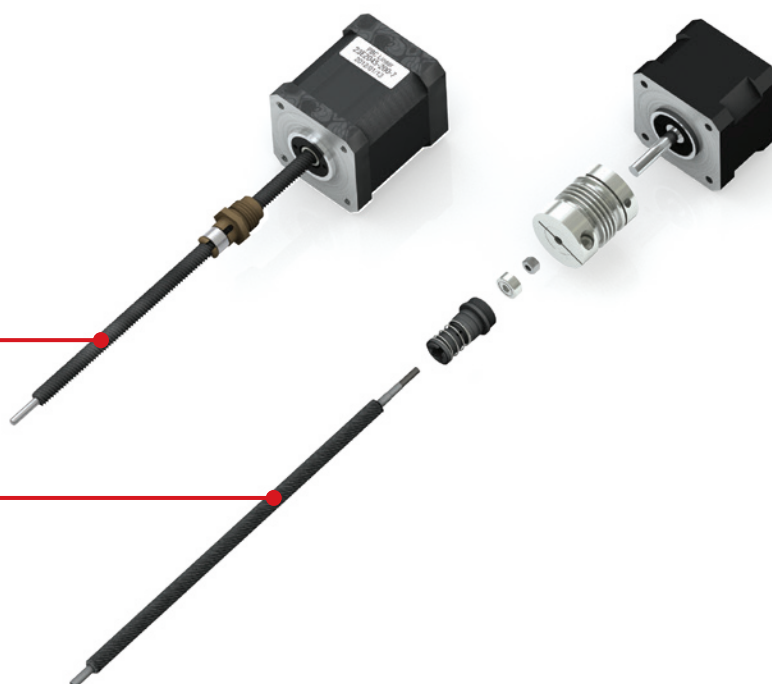
INTEGRATED & TRADITIONAL SCREW MOTOR SETUP

USED WITH LEAD SCREW AND BALL SCREW DRIVEN SYSTEMS

- Integrated lead screw aligned with and fixed directly to motor
- Fewer components
- High accuracy and reliability
- High rigidity
- Great value
- Traditional screw motor setup optional
 - requires motor mount option
 - consult factory

Integrated Screw Motor

Traditional Screw Motor



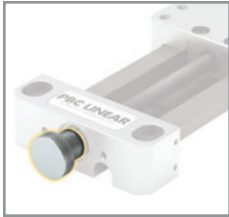
CONSTANT
Force Technology



[Watch the video](#)

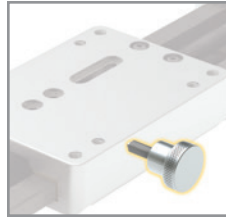
Select Accessories

Choose the accessories to complete your fully optimized SIMO Series system. See page 38 for more information.



HAND KNOB

Hand adjustment knobs are used for manually adjusting screw driven systems



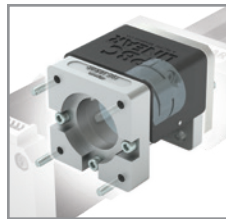
HAND BRAKE

Hand brakes are used to manually lock position in the GST screw driven systems



SENSOR BRACKETS

Sensor brackets accommodate a variety of sensor types

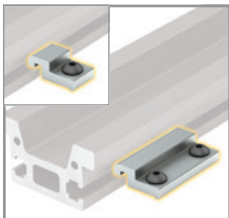


MOTOR MOUNT

Motor mount option for attaching a stepper, servo, or smart motor, etc.

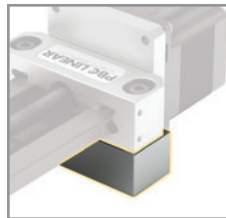


[Link to Motor Mount Specifications](#)



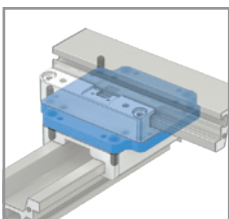
TOE CLAMPS

Large and small toe clamps are available to secure the (UGT) tall rail to the mounting surface



RISER BLOCK

Riser blocks provide clearance for the motor when using the (UGA) low profile rail



MULTI-AXIS MOUNTING PLATES

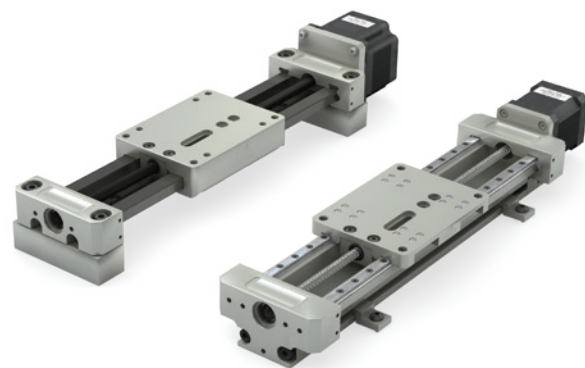
Mounting plates are available to easily configure multi-axis systems

REPLACEMENT LUBRICATION KITS

Replacement lubrication kits are available for GST plain bearing systems and CRT v-wheel bearing systems.

T-NUTS

Roll in t-nut for 5 mm slot with M5 tap
PBC part number 6100443.



[Consult Factory • 800-962-8979](#)



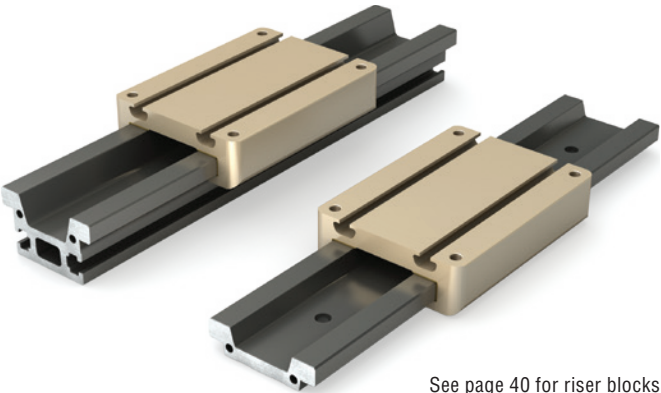
[Detailed information on accessories on page 36](#)

Plain Bearing Rail & Carriage

Gliding Surface Technology

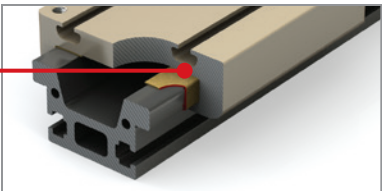
PLAIN BEARING

- Low cost
- Utilizes the bonded FrelonGOLD® self-lubricating maintenance-free bearing surfaces
- Ideal for contaminated environments and clean rooms
- Smooth and quiet operation
- Vibration damping and shock resistant

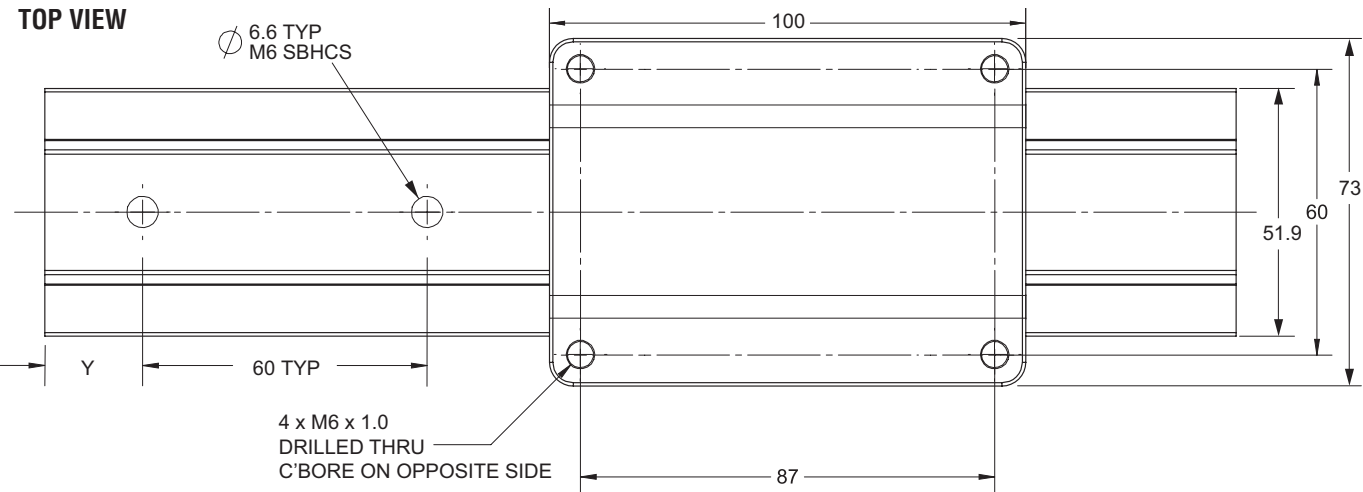


See page 40 for riser blocks and other accessories.

Plain Bearing with FrelonGOLD®



TOP VIEW



Note: No rail mounting holes in tall rail version (UGT). Tall rail version is mounted with toe clamps.
For low profile rail (UGA), specify Y dimension (hole to end) at time of order.



See page 39 for multi-axis mounting brackets



Configure Online

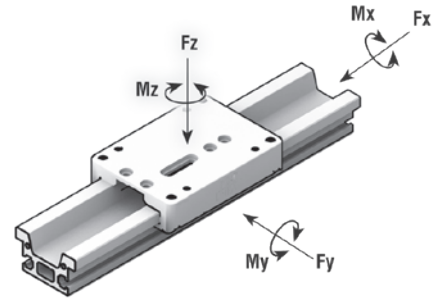
RAIL ORDERING INFORMATION

UG	X	040	R	XXXX	0	X	0
Series	Rail Type	Rail Width	Order Type	Rail Length	Rail Finish	Hole Pattern	Other Options
SIMO Series	A Low Profile T Tall Profile	40 mm	R Rail	2750 mm max	0 GST Hard Anodized Standard	0 60 mm (UGA only – specify Y dimension) 1 No Holes (UGT only)	0 Standard

Ordering example: UGA040R-0280-000; Y = 20 mm. For low profile rail (UGA), specify Y dimension (hole to end) at time of order. This is a SIMO Series, plain bearing – GST gliding surface technology, low profile rail, 280 mm length.

Plain Bearing Rail & Carriage

GST – Plain Bearing			Low Profile	Tall Profile
Size	mm		24 x 73	40 x 73
Max Static Load*	Fy	N	3150	3150
	Fz (Normal)		6000	4710
	Fz (Inverted)		2220	1640
Max Dynamic Load	Fy	N	3150	3150
	Fz (Normal)		6000	4710
	Fz (Inverted)		2220	1640
Max Moments*	Mx	Nm	100	100
	My		130	130
	Mz		120	120
Carriage Bending Moment of Inertia (second moment of area)	Ly	cm ⁴	48.9	48.9
	Lz		51.4	51.4
Inertia of Carriage	Ly	Kg ^m ²	0.000 000 259	0.000 000 259
	Lz		0.000 000 348	0.000 000 348
Coefficient of Friction**	μ		0.125	0.125
Max Velocity, no lube, continuous motion	m/s		1.53	1.53
Max Velocity, intermittent motion or with lube	m/s		4.2	4.2
Normal Operating Temperatures - Minimum	°C		0	0
Normal Operating Temperatures - Maximum	°C		+80	+80
Max Rail Length	mm		2,000	
Carriage Weight	Kg		0.235	0.235
Rail Weight	Kg/m		1.067	1.727



Conversions

newton (N) x 0.2248 = lbs.

newton - meter (N-m) x 8.851 = in.-lbs.

Fz = Axial capacity

Fy = Radial capacity

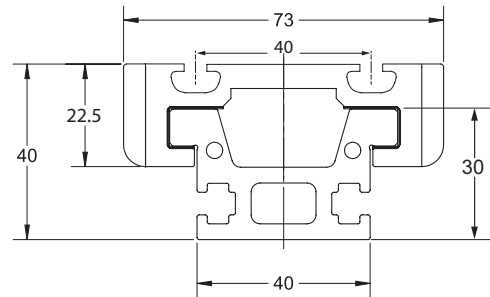
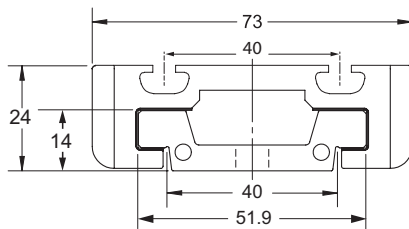
Mx, My, Mz = Moment capacities

* The shown moments and loads are MAX values, please consult our technical department for further information.

** Listed values are for dry application. Adding lubrication can decrease values by up to 50%.

*** Refer to page 45 & 46 for calculations.

CARRIAGE



See page 36 for accessories, t-nuts, and replacement lubrication kits



Configure
Online

CARRIAGE ORDERING INFORMATION

UG	A	040	C	0	X	1	G	X	0
Series	Rail Type	Rail Width	Order Type	Carriage Length	Running Clearance	Height	Bearing Material	Options	Other Options
SIMO Series	A Standard (Used with both low profile & tall rail)	40 mm	C Carriage	0 GST 100 mm Standard	P Precision .025–.051 mm C Compensated .064–.089 mm	1 Standard carriage with t-slots	G FrelonGOLD Standard	0 None 1 Hand Brake 2 Lube Option 3 Both	0 Standard

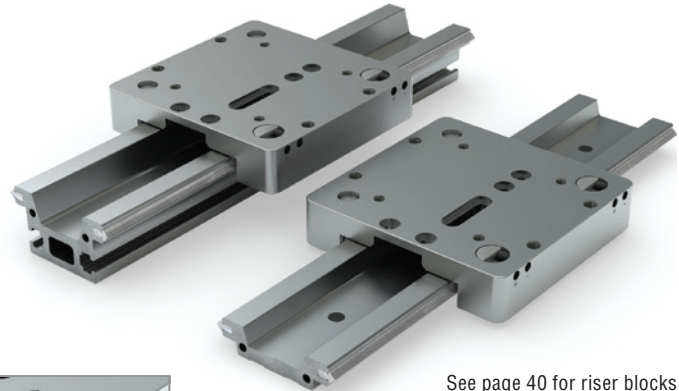
Ordering example: UGA040C-0P1G30. This is a SIMO Series carriage, plain bearing – GST gliding surface technology, precision running clearance, with standard FrelonGOLD, hand brake, and lube option.

V-Guide Bearings Rail & Carriage

Cam Roller Technology

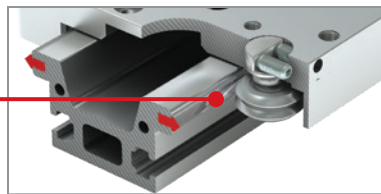
V-GUIDE BEARINGS

- Double row V-Guide roller bearings ride on a hardened stainless steel raceway
- Rollers provide high speed performance and quick change of direction capabilities
- Greater capacity for cantilevered and moment loads
- Patented side-adjustable preload

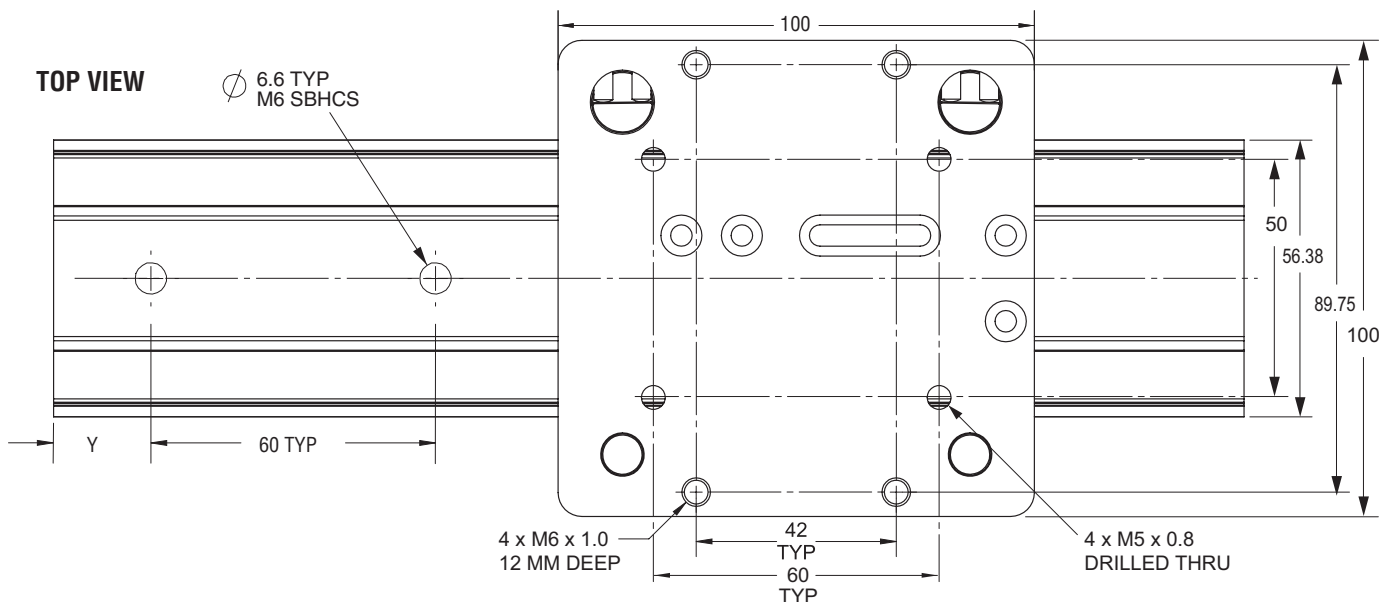


See page 40 for riser blocks and other accessories.

Double Row V-Guide Bearings on a Hardened Stainless Steel Raceway



TOP VIEW



Note: No rail mounting holes in tall rail version (UGT). Tall rail version is mounted with toe clamps.

For low profile rail (UGA), specify Y dimension (hole to end) at time of order.



See page 39 for multi-axis mounting brackets



Configure
Online

RAIL ORDERING INFORMATION

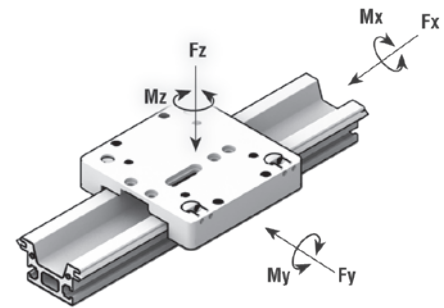
UG	X	040	R	XXXX	2	X	0
Series	Rail Type	Rail Width	Order Type	Rail Length	Rail Finish	Hole Pattern	Other Options
SIMO Series	A Low Profile T Tall Profile	40 mm	R Rail	3600 mm max	2 CRT Clear Anodize Standard	0 60 mm (UGA only – specify Y dimension) 1 No Holes (UGT only)	0 Standard

Ordering example: UGA040R-0280-200; Y = 20 mm. For low profile rail (UGA), specify Y dimension (hole to end) at time of order.

This is a SIMO Series, V-Guide bearing–CRT cam roller technology, low profile rail, 280 mm length, with a hole-to-end (Y) dimension of 20 mm.

V-Guide Bearings Rail & Carriage

CRT – V-Guide Bearings			Low Profile	Tall Profile
Size		mm	24 x 100	40 x 100
Max Static Load*	Fy	N	740	740
	Fz (Normal)		880	880
	Fz (Inverted)		880	880
Max Dynamic Load	Fy	N	740	740
	Fz (Normal)		880	880
	Fz (Inverted)		880	880
Max Moments*	Mx	Nm	15	15
	My		25	25
	Mz		35	35
Carriage Bending Moment of Inertia (second moment of area)	Ly	cm ⁴	102.6	102.6
	Lz		104.4	104.4
Inertia of Carriage	Ly	Kg/m ²	0.000 000 242	0.000 000 242
	Lz		0.000 000 788	0.000 000 788
Coefficient of Friction**		μ	0.02	
Max Velocity, continuous motion		m/s	5 (requires lubrication)	
Max Velocity, intermittent motion		m/s	5.5	5.5
Max Acceleration		m/s ²	50	50
Normal Operating Temperatures - Minimum		°C	0	0
Normal Operating Temperatures - Maximum		°C	+80	+80
Max Rail Length		mm	2,000	
Carriage Weight		Kg	0.355	0.355
Rail Weight		Kg/m	1.305	1.979



Conversions

newton (N) x 0.2248 = lbs.

newton - meter (N-m) x 8.851 = in.-lbs.

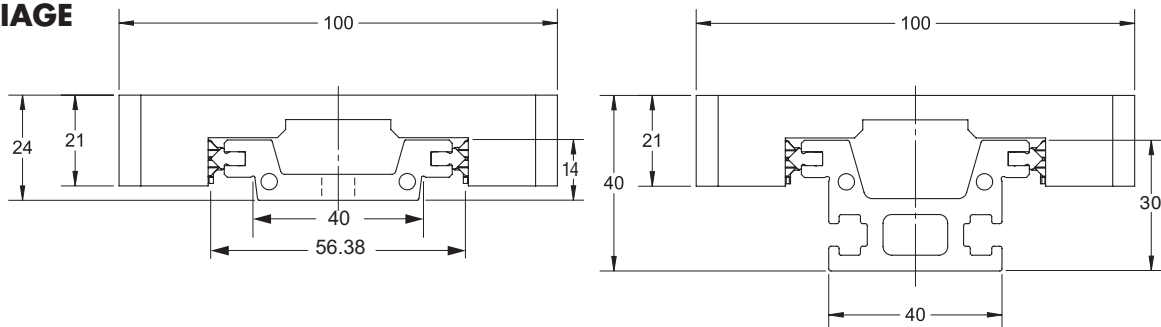
Fz = Axial capacity

Fy = Radial capacity

Mx, My, Mz = Moment capacities

- Lubricate rails with lithium based grease
- * The shown moments and loads are MAX values, please consult our technical department for further information.

CARRIAGE



See page 36 for accessories, t-nuts, and replacement lubrication kits



Configure
Online

CARRIAGE ORDERING INFORMATION

UG	A	040	C	3	A	3	T	X	0
Series	Rail Type	Rail Width	Order Type	Carriage Length	Running Clearance	Height	Bearing Options	Options	Other Options
SIMO Series	A Standard (Used with both low profile & tall rail)	40 mm	C Carriage	3 CRT 100 mm Standard	A Adjustable	3 Standard	T Stainless Steel Sealed	1 Lube Option Standard 0 None (contact factory before ordering)	0 Standard

Ordering example: UGA040C-3A3T10. This is a SIMO Series carriage, V-Guide – CRT cam roller technology, adjustable, with lube option.

Profile Rail Guideways Rail & Carriage

Consult
factory for
PRT
versions

Profile Rail Technology

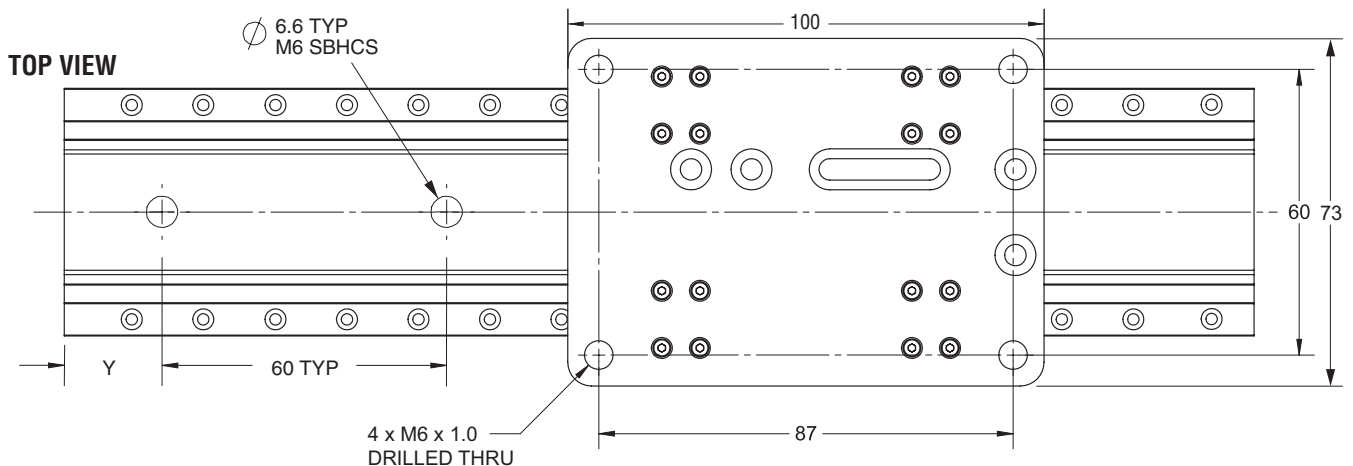
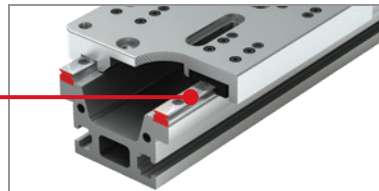
PROFILE RAIL GUIDEWAYS

- Recirculating ball bearing guide blocks ride on standard profile rails
- Preload provides stiffness and rigid performance
- Ideal for applications that require precise positional accuracy
- High load capacity
- Additional bearing block options may be available for increased accuracy and moment loading, etc. – consult factory



See page 40 for riser blocks and other accessories.

Pre-Aligned
Profile Rail Guideways



Note: No rail mounting holes in tall rail version (UGT). Tall rail version is mounted with toe clamps.

For low profile rail (UGA), specify Y dimension (hole to end) at time of order.



See page 39 for multi-axis
mounting brackets



Configure
Online

RAIL ORDERING INFORMATION

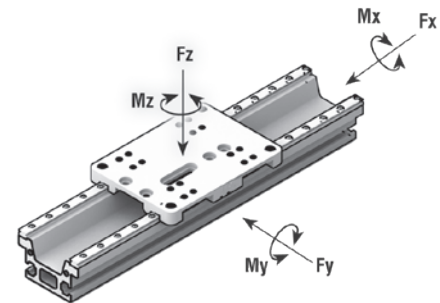
UG	X	040	R	XXXX	3	X	0
Series	Rail Type	Rail Width	Order Type	Rail Length	Rail Finish	Hole Pattern	Other Options
SIMO Series	A Low Profile T Tall Profile	40 mm	R Rail	1000 mm max Consult factory for longer lengths	3 PRT Clear Anodize Standard	0 60 mm (UGA only – specify Y dimension) 1 No Holes (UGT only)	0 Standard

Ordering example: UGA040R-0280-300; Y = 20 mm.

This is a SIMO Series, PRT profile rail technology, low profile rail, 280 mm length, with a hole-to-end (Y) dimension of 20 mm.

Profile Rail Guideways Rail & Carriage

PRT – Profile Rail Guideways			Low Profile	Tall Profile
Size			MN (normal length block)	MN (normal length block)
			24 x 73	40 x 73
Max Static Load*	Fy	N	3150	3150
	Fz (Normal)	N	3910	3910
	Fz (Inverted)	N	not recommended	not recommended
Max Dynamic Load	Fy	N	3150	3150
	Fz (Normal)	N	3910	3910
	Fz (Inverted)	N	not recommended	not recommended
Max Moments*	Mx	Nm	45	45
	My	Nm	80	80
	Mz	Nm	80	80
Carriage Bending Moment of Inertia (second moment of area)	Ly	cm ⁴	27.8	27.8
	Lz	cm ⁴	28.2	28.2
Inertia of Carriage	Ly	Kgm ²	0.000 000 067	0.000 000 067
	Lz	Kgm ²	0.000 000 103	0.000 000 103
Coefficient of Friction μ			0.003	0.003
Drag Force			N	0.1
Max Velocity, continuous motion			m/s	3 (requires lubrication)
Max Velocity, intermittent motion			m/s	3 (requires lubrication)
Max Acceleration			m/s ²	250
Normal Operating Temperatures - Minimum			°C	0
Normal Operating Temperatures - Maximum			°C	+80
Max Rail Length			mm	1,000
Carriage Weight			Kg	0.165
Rail Weight			Kg/m	0.953



Conversions

newton (N) x 0.2248 = lbs.

newton - meter (N-m) x 8.851 = in.-lbs.

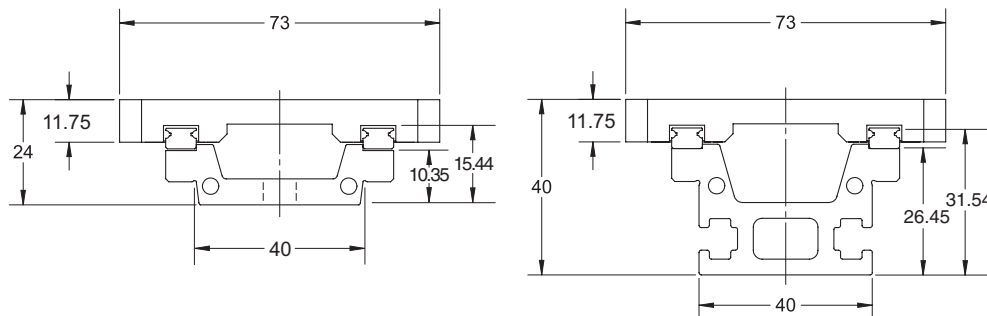
Fz = Axial capacity

Fy = Radial capacity

Mx, My, Mz = Moment capacities

- Recommended: Lubricate rails with synthetic oil CLP or CGLP (based on DIN 51517) or HLP (based on DIN 51524).
- * The shown moments and loads are MAX values, please consult or technical department for further information.

CARRIAGE



See page 36 for accessories, t-nuts, and replacement lubrication kits



Configure
Online

CARRIAGE ORDERING INFORMATION

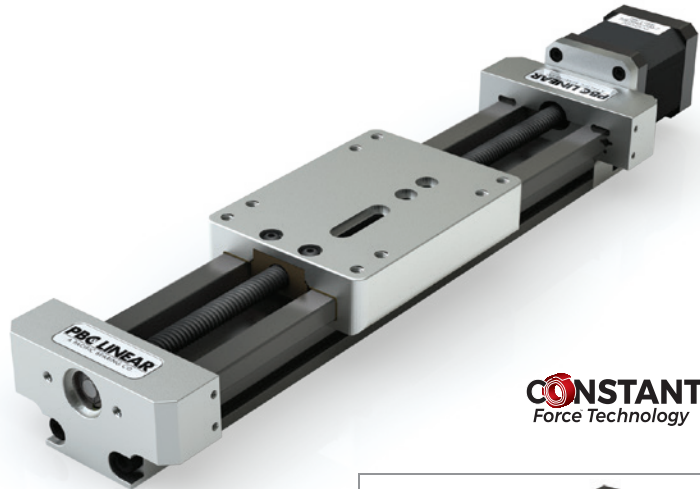
UG	A	040	C	4	S	3	N	0	0
Series	Rail Type	Rail Width	Order Type	Carriage Length	Bearing Block Accuracy Class	Height	Bearing Block	Options	Other Options
SIMO Series	A Standard (Used with both low profile & tall rail)	40 mm	C Carriage	4 PRT 100 mm Standard	S Standard (Class N)	3 Standard	N Normal Length	0 Seals & Lube Standard	0 Standard

Ordering example: UGA040C-4S3N00. This is a SIMO Series carriage, PRT profile rail technology with standard seals and lube option.

Lead Screw Driven System

OVERVIEW

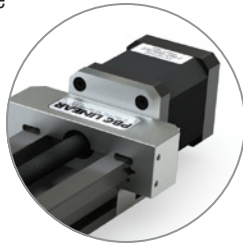
- Utilizes a self-lubricating and maintenance free nut
- Standard fixed nut or Constant Force anti-backlash nut available
- Lead screw material:
 - 10 mm diameter
 - 300 series stainless steel with PTFE coating
 - 1, 2, 5, 10, 16 mm leads most common
 - Other leads available – consult factory
- Ideal for a broad range of applications such as kiosks, assembly, automation, medical, and laboratory



CONSTANT
Force Technology

MOTOR OPTIONS & BENEFITS

- Standard integrated screw stepper motors
 - 42 mm (NEMA 17)
 - 56 mm (NEMA 23)
- Integrated lead screw eliminates components and tolerance stack-ups
- Improves rigidity and performance
- Reduces system cost



Detailed information on motors on page 35

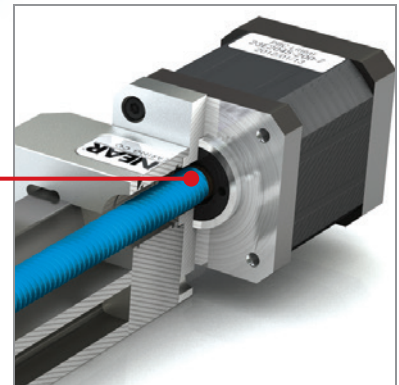
ACCESSORIES

- Hand knobs – for manual positioning or applications that require precision adjustment
- Riser blocks
- Toe clamps and t-nuts
- Brake knobs
- Optional motor mounts

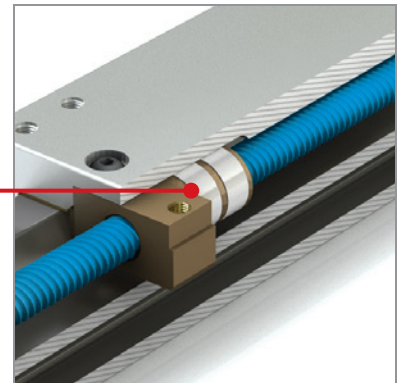


Detailed information on accessories on page 36

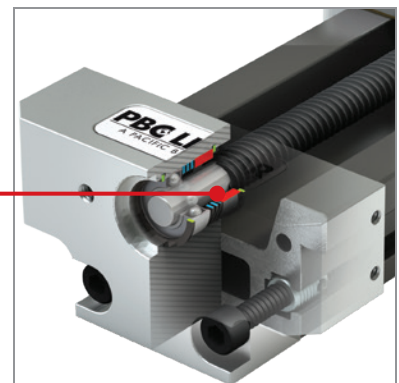
Drive end screw support bearings are integrated into the stepper motor

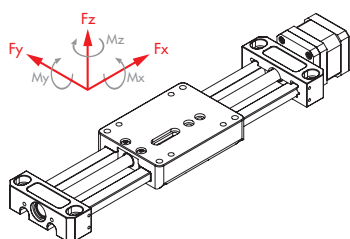


Patent pending Constant Force Technology nuts provide consistent anti-backlash operation

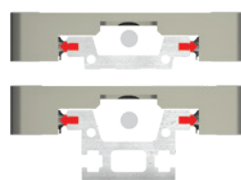


Ball bearings provide idle end screw support

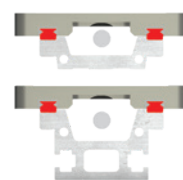




GST: PLAIN BEARING
Low Profile Rail / Tall Rail



CRT: V-GUIDE
Low Profile Rail / Tall Rail



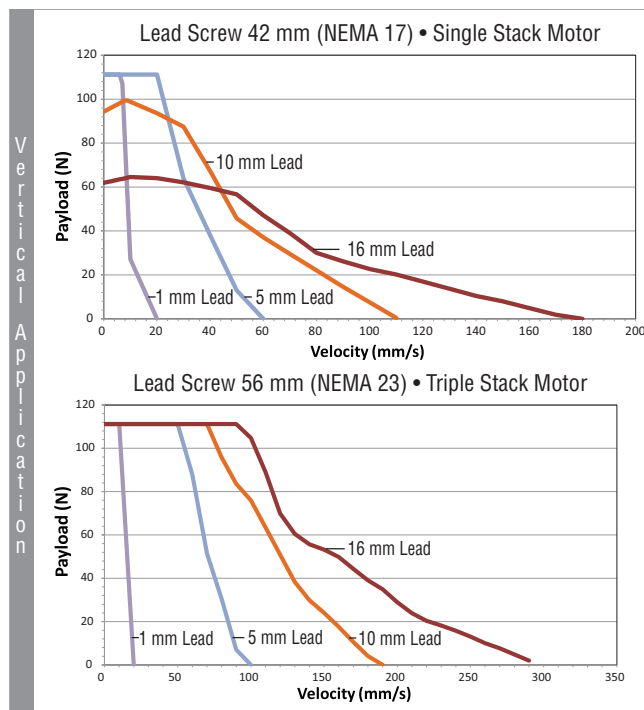
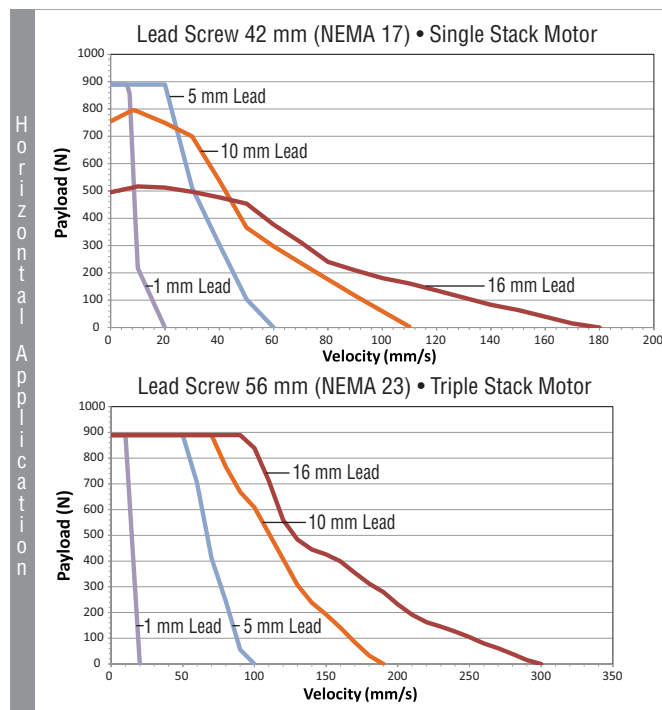
PRT: PROFILE RAILS
Low Profile Rail / Tall Rail

Basic System Properties				
Max Velocity, no lube, continuous motion	m/s	1.5	requires lubrication	
Max Velocity, intermittent motion	m/s	4.2 (with lubrication)	5.5 (requires lubrication)	3 (requires lubrication)
Max Acceleration***	m/s ²	50	50	250
Stroke Length (min recommended – max)***	mm	5 - 1400	5 - 1400	5 - 900
Normal Operating Temperatures (min - max)	°C	0° - 80°		
Max Drive (input) Speed	rpm	3000		
Standard Lead Screw Accuracy		ISO CLASS 10 (± .0007 mm/mm)		
Carriage Weight	Kg	0.235	0.355	0.165
Rail + Screw Weight	Kg/m	1.690 / 2.356	1.909 / 2.578	1.953 / 2.610
System Weight (excluding motor)	Kg	0.41 + (1.69 * length) / 0.5 + (2.356 * length)	0.53 + (1.909 * length) / 0.62 + (2.578 * length)	0.36 + (1.953 * length) / 0.45 + (2.61 * length)
Static & Dynamic System Properties				
Max Static Load*	Fx	N	111.2	
	Fy		3150	740
	Fz (Normal)		6000 / 4710	880
	Fz (Inverted)		2220 / 1640	880
Max Dynamic Load* (For PBC supplied motor, refer to charts below)	Fx	N	111.2	
	Fy		890	740
	Fz (Normal)		890	880
	Fz (Inverted)		890	880
Max Moments*	Mx	Nm	100	15
	My		130	25
	Mz		120	35
				80

* The above moments and loads are MAX values, please consult our technical department for further information. ** Refer to pages 45 & 46 for combined load calculations. ***Increased acceleration may be possible in limited cases. Consult factory if exceeding limit.



[Link to Motor Specifications Document](#)

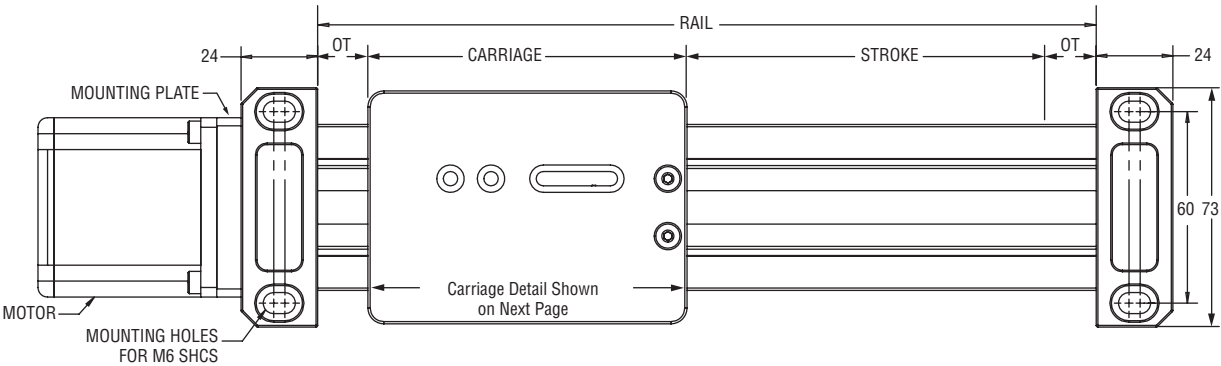


Note: Based on 500 mm stroke, GST version with .125 C.O.F. and .3G acceleration. Based on 24 volt, but higher voltage amplifiers may produce higher speeds.

Lead Screw System

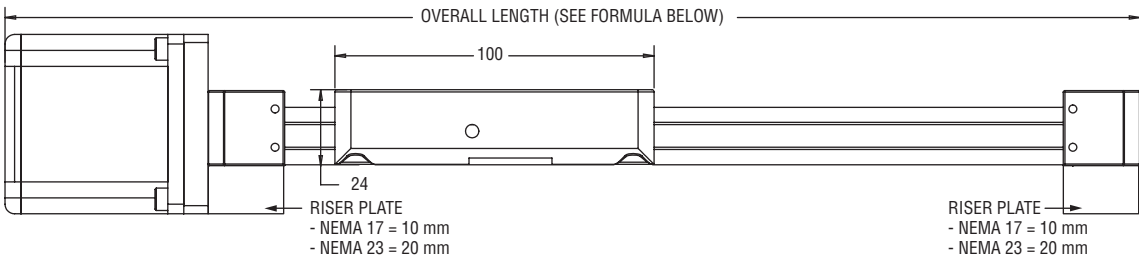
SYSTEM DIMENSIONS

TOP VIEW



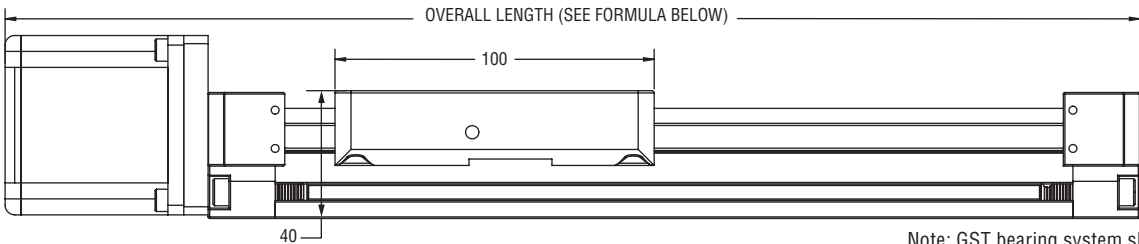
SIDE VIEW

UGA
Low Profile
Rail



SIDE VIEW

UGT
Tall Rail



Note: GST bearing system shown.

MOTOR LENGTHS (PLUS MOUNTING PLATE)

Motor Size	Single Stack	Double Stack	Triple Stack
42 mm (NEMA 17)	40 mm	48 mm	61 mm
56 mm (NEMA 23)	55 mm	77 mm	77 mm

Note: Sizes shown include 7.8 mm width for motor mounting plate.

Required for SIMO Series driven systems:

- Minimum overtravel (OT)
- 10 mm for ≤ 300 mm stroke
 - 25 mm for > 300 mm stroke

OVERALL LENGTH CALCULATION

Over-Travel Drive End = _____ mm

+ Carriage = 100 mm

+ Stroke = _____ mm

+ Over-Travel Idle End = _____ mm

_____ mm

= *Rail = _____ mm

+ End Blocks = _____ mm

+ Motor & Mounting Plate Length = _____ mm

_____ mm

= Overall Length = _____ mm

* Rail dimension is specified at time of order

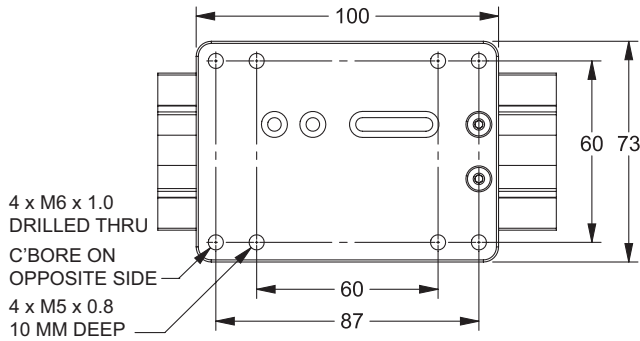


Visit pbclinear.com for complete specifications

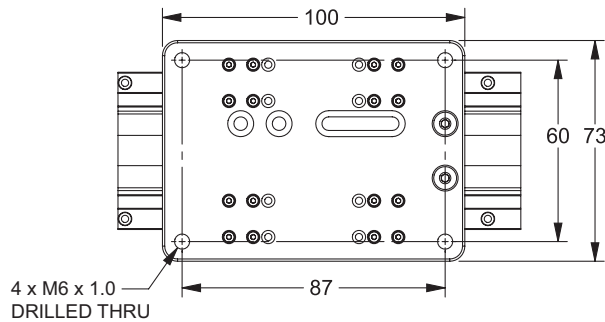
Lead Screw System

CARRIAGE DIMENSIONS TOP VIEW

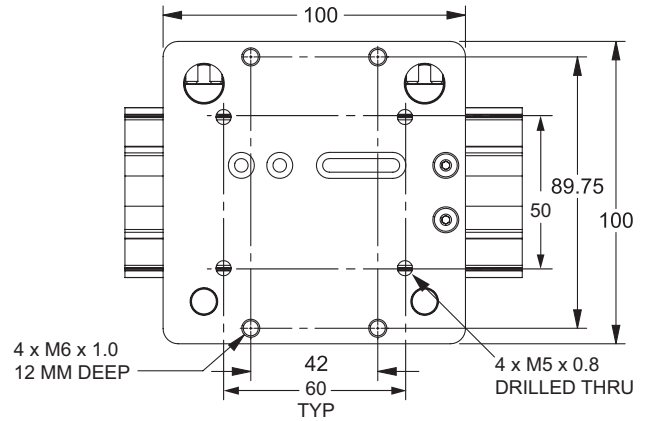
Gliding Surface Technology – Plain Bearing



Profile Rail Technology – Profile Rail Guideways



Cam Roller Technology – V-Guide Bearings



**UNIFORM
DIMENSIONING
PROVIDES
DESIGN FLEXIBILITY**



See page 36 for replacement lubrication kits



Email an Application Engineer



Configure
Online

SYSTEM ORDERING INFORMATION

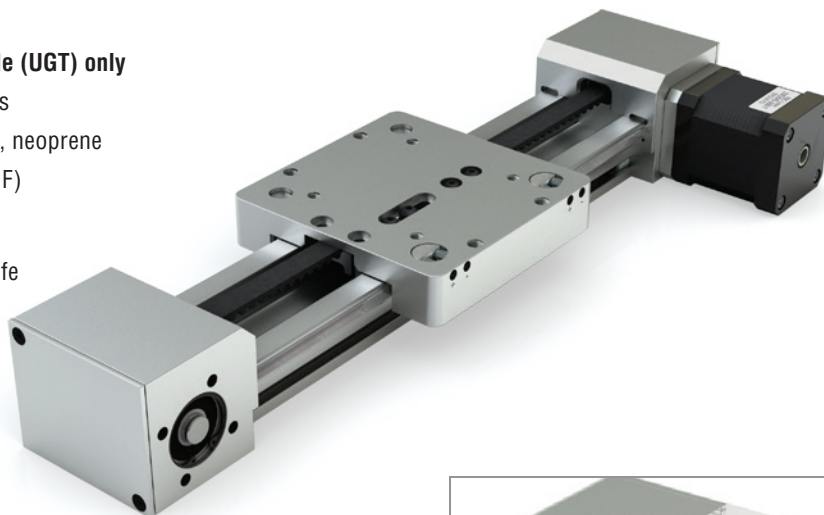
UG	X	040	D	XX	X	XXXX	LS	X	XX	XX	X	1	0
Series	Rail Type	Rail Width	Order Type	Carriage Type	Options	Rail Length	Drive Type	Drive End Option	Motor Option	Lead (mm)	Nut	Accuracy	Other Options
SIMO Series	A Low Profile	40 mm	D Driven	A1 GST with Frelon GOLD	0 None 1 Hand Brake 2 Lube 3 Both	1500 mm max	LS Lead Screw	1 Shaft 2 Knob	00 No Motor / Stub Shaft Only	AF - 16 AJ - 10 AX - 5 AG - 2 AH - 1	1 Standard 2 Anti-Backlash	1 Class 10	0
	B2 V-Guide with Stainless Steel Sealed Rollers & Lubrication			1 Lube (required)	Consult factory for longer lengths	3 PBC Integrated Motor Screw		A1 42 mm (N17) Single Stack A2 42 mm (N17) Double Stack B4 56 mm (N23) Single Stack B5 56 mm (N23) Double Stack B6 56 mm (N23) Triple Stack	Consult factory for other leads				
	C1 Profile Rail with Normal Block			0 Seals & Lube		1000 mm max		For custom options consult an application engineer at PBC Linear, 800-962-8979.					

Ordering example: UGT040D-A10-0900-LS3A1-AF11-0. This is a SIMO Series, plain bearing – GST gliding surface technology, tall profile rail, 900 mm length, lead screw driven, PBC integrated motor screw, 42 mm (NEMA 17) single stack motor, 16 mm lead, standard nut, accuracy class 10.

Belt Drive System Horizontal Motor Mount

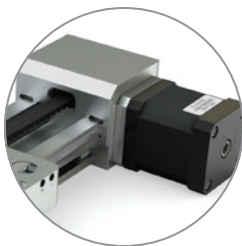
OVERVIEW

- Horizontal motor mount available in the tall profile (UGT) only
- Ideal for higher speed, high duty cycle applications
- Belt material: nylon covered, fiberglass reinforced, neoprene
- Temperature range: 0° C to +80° C (32° F to 176° F)
- Rounded GT®2 tooth design creates better engagement with the pulley resulting in greater torque transfer, reduced vibration, and extended life

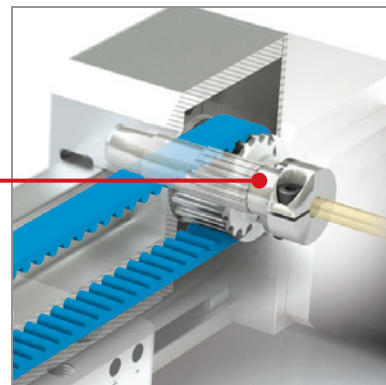


MOTOR OPTIONS & BENEFITS

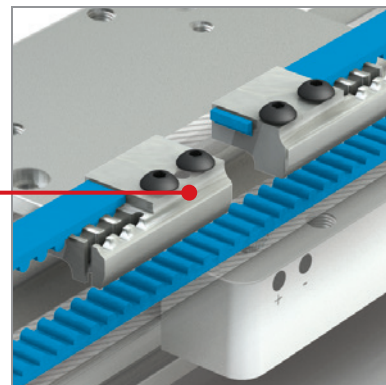
- Standard integrated stepper motors
 - 42 mm (NEMA 17)
 - 56 mm (NEMA 23)
- Split collar connection to integrated pulley
- Integrated shaft reduces pulley runout
- Reduces system cost
- Optional stub shaft and motor adapter plate – consult factory



Split collar drive shaft connects integrated pulley shaft and motor



Independent belt clamps allow for tensioning adjustments



Detailed information on motors on page 35

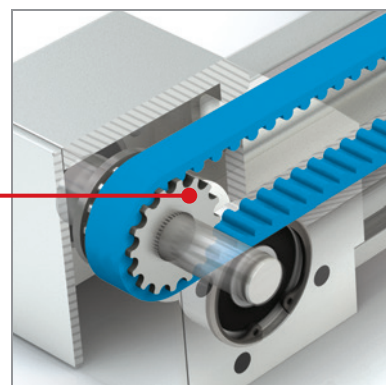
ACCESSORIES

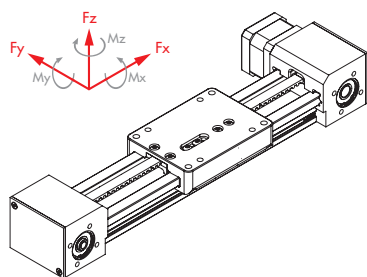
- Sensor brackets
- Toe clamps and t-nuts
- Covers
- Optional motor mounts



Detailed information on accessories on page 36

Idle end pulley incorporates integrated shaft design





**GST
PLAIN BEARING**
Tall Rail Only



**CRT
V-GUIDE**
Tall Rail Only



**PRT
PROFILE RAILS**
Tall Rail Only

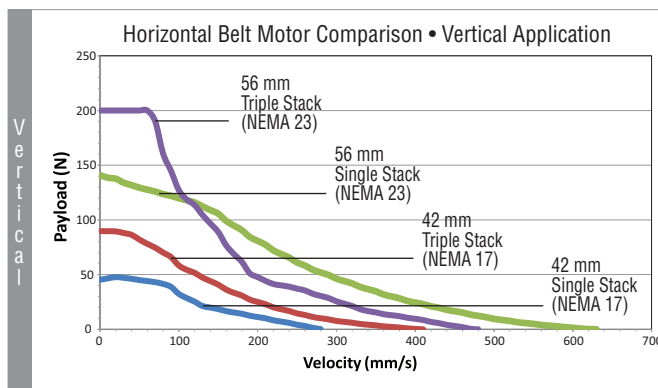
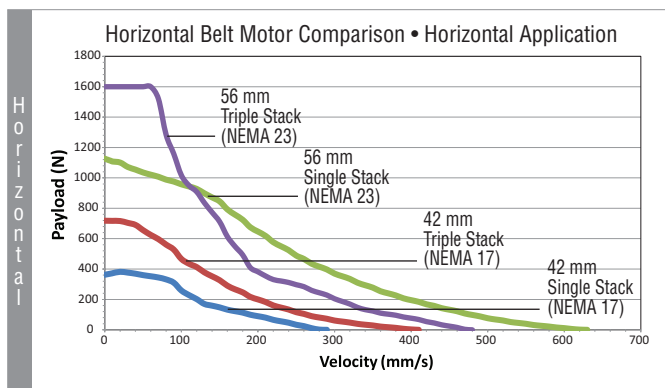
Basic System Properties

Max Velocity, no lube, continuous motion	m/s	1.5	requires lubrication	
Max Velocity, intermittent motion or with lube	m/s	4.2	5.5	3
Max Acceleration ***	m/s ²	50	50	250
Stroke Length (min recommended)	mm	5	5	5
Stroke Length (maximum)	mm	1900	1900	900
Belt Type & Size		GT [®] 2 - 5 mm		
Max Drive (input) Torque	Nm	2.31		
Max Drive (input) Speed	rpm	3000		
Normal Operating Temperatures - Min - Max	°C	0° - 80°		
Carriage Weight	Kg	0.235	0.355	0.165
Rail + Belt Weight	Kg/m	1.73	1.98	1.99
System Weight (excluding motor)	Kg	0.5 + (1.73 * length)	0.62 + (1.98 * length)	0.27 + (1.99 * length)

Static & Dynamic System Properties

Max Static Load*	Fx	N	200	
	Fy		3150	740
	Fz (Normal)		4710	880
	Fz (Inverted)		1640	880
Max Dynamic Load* (For PBC supplied motor, refer to charts below)	Fx	N	200	
	Fy		1600	740
	Fz (Normal)		1600	880
	Fz (Inverted)		1600	880
Max Moments*	Mx	Nm	100	15
	My		130	25
	Mz		120	35
Coefficient of Friction (linear guide)	μ		0.125	0.02

* The above moments and loads are MAX values, please consult or technical department for further information. ** Refer to pages 45 & 46 for combined load calculations. ***Increased acceleration may be possible in limited cases. Consult factory if exceeding limit.



Note: Based on 2 m stroke, .125 C.O.F., and .3G acceleration. Use caution when applying a belt drive in a vertical application. Higher voltage amplifiers may produce higher speeds.

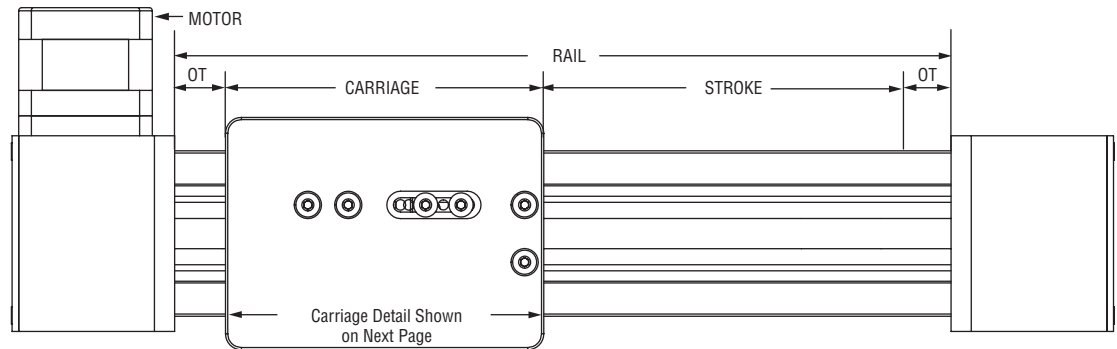


[Link to Motor Specifications Document](#)

Belt Drive System Horizontal Motor Mount

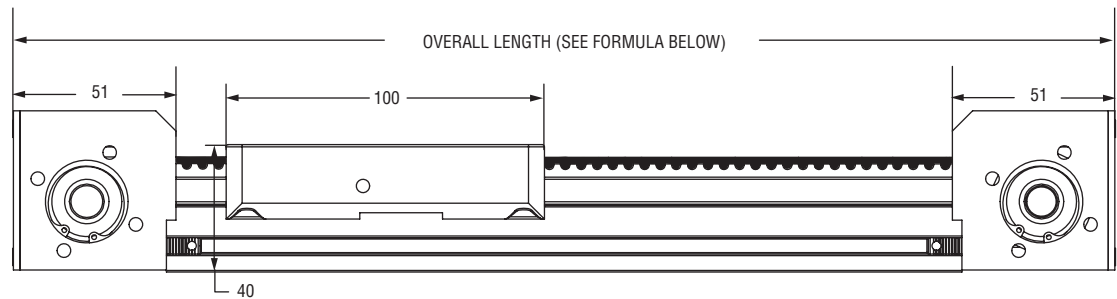
SYSTEM DIMENSIONS

TOP VIEW



SIDE VIEW

UGT
Tall Rail



Note: GST bearing system shown.

Required for SIMO Series driven systems:

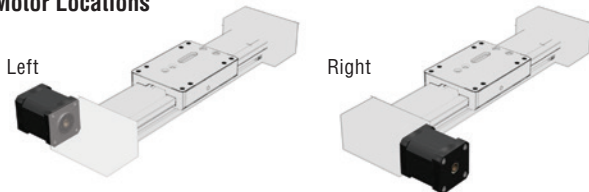
Minimum overtravel (OT)

- 10 mm for ≤ 300 mm stroke
- 25 mm for > 300 mm stroke

MOTOR LENGTHS

Motor Size	Single Stack	Double Stack	Triple Stack
42 mm (NEMA 17)	40 mm	48 mm	61 mm
56 mm (NEMA 23)	55 mm	77 mm	77 mm

Motor Locations



Note: Specify motor location (in part number) for PBC integrated motors.
Contact factory for stub shaft and optional motor mounting plates.

OVERALL LENGTH CALCULATION

Over-Travel Drive End = _____ mm

+ Carriage = 100 mm

+ Stroke = _____ mm

+ Over-Travel Idle End = _____ mm

_____ mm

= *Rail = _____ mm

+ End Blocks = _____ mm

_____ mm

= Overall Length = _____ mm

* Rail dimension is specified at time of order

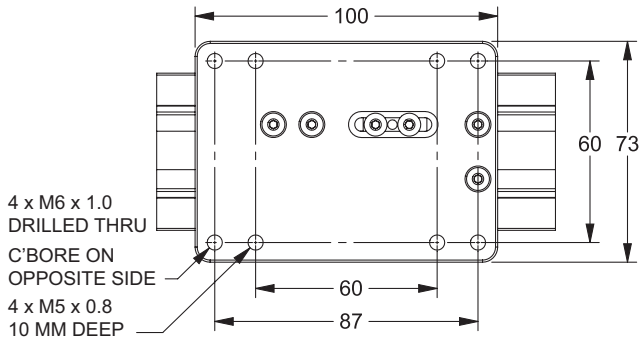


Contact an Application Engineer • 800-962-8979

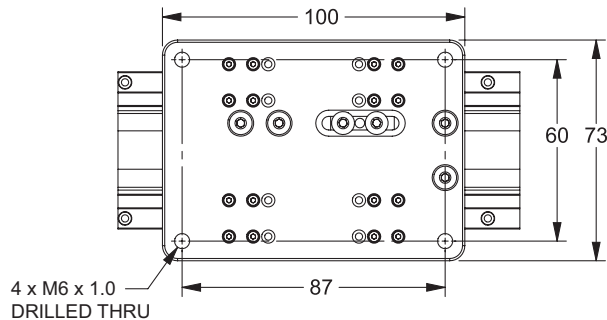
Belt Drive System Horizontal Motor Mount

CARRIAGE DIMENSIONS TOP VIEW

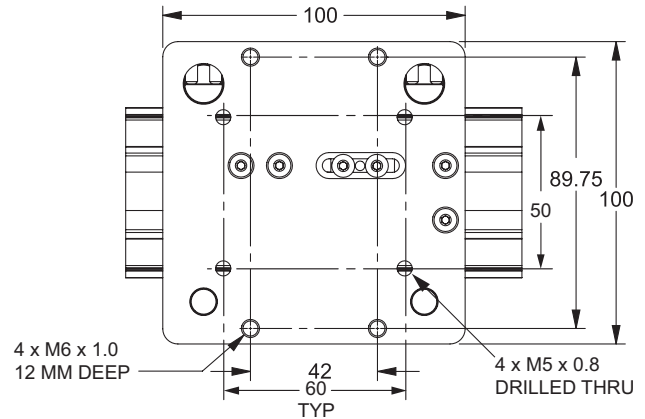
Gliding Surface Technology – Plain Bearing



Profile Rail Technology – Profile Rail Guideways



Cam Roller Technology – V-Guide Bearings



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See page 36 for replacement lubrication kits



Email an Application Engineer



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SYSTEM ORDERING INFORMATION

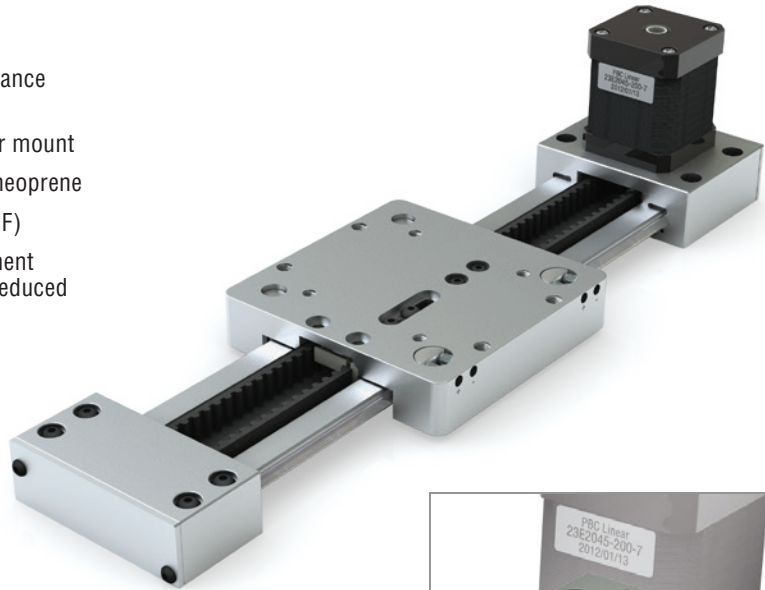
UG	T	040	D	XX	X	XXXX	BD	X	XX	00	X	0	0
Series	Rail Type	Rail Width	Order Type	Carriage Type	Options	Rail Length	Drive Type	Drive End Option	Motor Option	Lead (mm)	Motor Position	Accuracy	Other Options
SIMO Series	T Tall Profile	40 mm	D Driven	A1 GST with Frelon GOLD	0 None 1 Hand Brake 2 Lube 3 Both	2000 mm max Consult factory for longer lengths	BD Belt Drive	1 Standard	00 No Motor / Stub Shaft Only PBC Integrated Motor B4 56 mm (N23) Single Stack B5 56 mm (N23) Double Stack B6 56 mm (N23) Triple Stack 3rd Party Motor Mount 1ZE 40 mm 1ZF 42 mm (N17) 1ZG 56–58 mm (N23) 1ZH 60 mm 1Z0 Blank Plate	00 Not Used	L Left R Right D Dual Stub Shaft	0 Not Used	0
				B2 V-Guide with Stainless Steel Sealed Rollers & Lubrication	1 Lube (required)								
				C1 Profile Rail with Normal Block	0 Seals & Lube	1000 mm max							
For custom options consult an application engineer at PBC Linear, 800-962-8979.													

Ordering example: UGT040D-A10-0900-BD1A1-00L0-0. This is a SIMO Series, plain bearing – GST gliding surface technology, tall profile rail, 900 mm length, belt driven, 42 mm (NEMA 17) single stack motor, positioned on the left.

Belt Drive System Vertical Motor Mount

OVERVIEW

- Vertical motor mount allows for high speed performance in the (UGA) low profile rail
- Consult factory for (UGT) tall rail with vertical motor mount
- Belt material: nylon covered, fiberglass reinforced, neoprene
- Temperature range: 0° C to +80° C (-32° F to +176° F)
- Rounded GT®2 tooth design creates better engagement with the pulley resulting in greater torque transfer, reduced vibration, and extended life

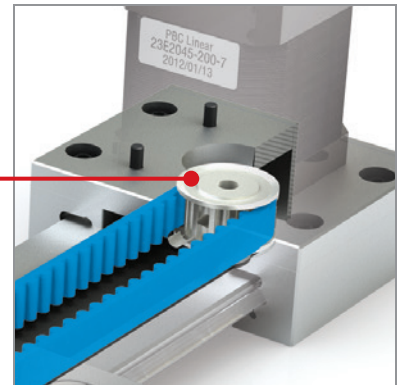


MOTOR OPTIONS & BENEFITS

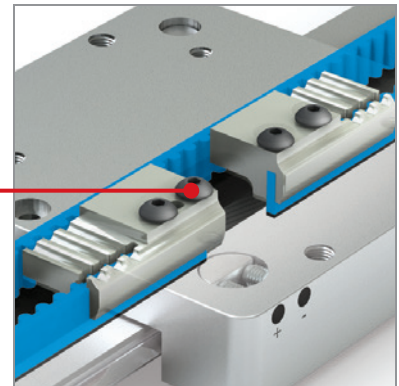
- Standard integrated stepper motors
 - 42 mm (NEMA 17)
 - 56 mm (NEMA 23)
- Integrated drive end pulley eliminates runout
- Reduces system cost
- Optional stub shaft and motor adapter plate – consult factory



Drive end pulley is directly integrated with motor shaft



Independent belt clamps allow for tensioning adjustments



Detailed information on motors on page 35

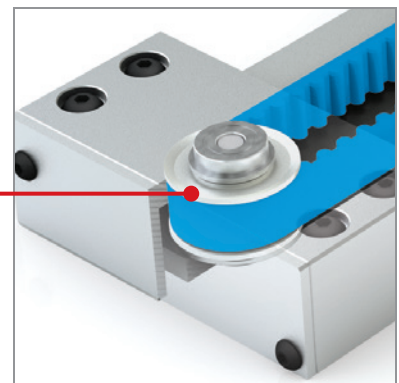
ACCESSORIES

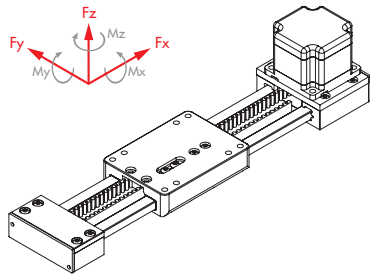
- Riser blocks
- Sensor brackets
- Brake knobs
- Covers



Detailed information on accessories on page 36

Idle end pulley incorporates integrated shaft design





GST PLAIN BEARING

Low Profile Rail
Consult Factory for Tall Rail Options



CRT V-GUIDE

Low Profile Rail
Consult Factory for Tall Rail Options



PRT PROFILE RAILS

Low Profile Rail
Consult Factory for Tall Rail Options

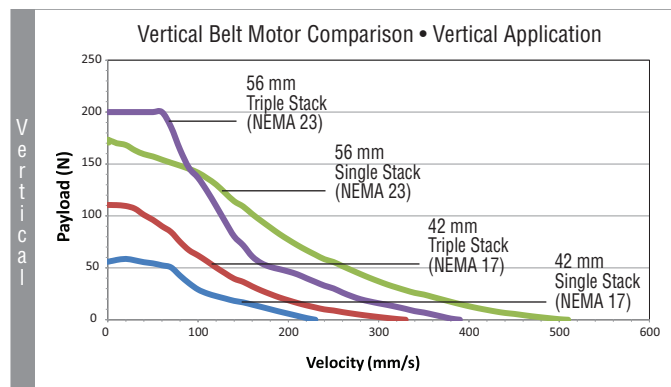
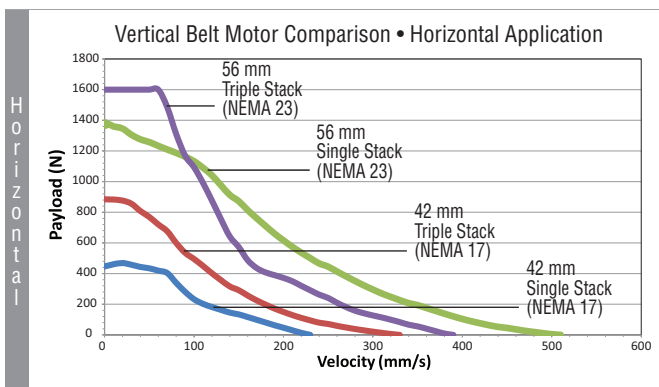
Basic System Properties

Max Velocity, no lube, continuous motion	m/s	1.5	requires lubrication	
Max Velocity, intermittent motion or with lube	m/s	4.2	5.5	3
Max Acceleration ***	m/s ²	50	50	250
Stroke Length (min recommended)	mm	5		
Stroke Length (maximum)	mm	1900	1900	900
Belt Type & Size		GT®2 - 5 mm		
Normal Operating Temperatures - Min - Max	°C	0° - 80°		
Max Drive (input) Torque	Nm	2.31		
Max Drive (input) Speed	rpm	3000		
Carriage Weight	Kg	0.235	0.355	0.165
Rail + Belt Weight	Kg/m	1.0806	1.7496	1.2996
System Weight (excluding motor)	Kg	0.41 + (1.0806 * length)	0.53 + (1.7496 * length)	0.17 + (1.2996 * length)

Static & Dynamic System Properties

Max Static Load*	Fx	N	200	
	Fy		3150	740
	Fz (Normal)		6000	880
	Fz (Inverted)		2220	880
Max Dynamic Load* (For PBC supplied motor, refer to charts below)	Fx	N	200	
	Fy		1600	740
	Fz (Normal)		1600	880
	Fz (Inverted)		1600	880
Max Moments*	Mx	Nm	100	15
	My		130	25
	Mz		120	35
				80
Coefficient of Friction (linear guide)	μ		0.125	0.02
				0.003

* The above moments and loads are MAX values, please consult or technical department for further information. ** Refer to pages 45 & 46 for combined load calculations. ***Increased acceleration may be possible in limited cases. Consult factory if exceeding limit.



Note: Based on 2 m stroke, .125 C.O.F., and .3G acceleration. Use caution when applying a belt drive in a vertical application. Higher voltage amplifiers may produce higher speeds.

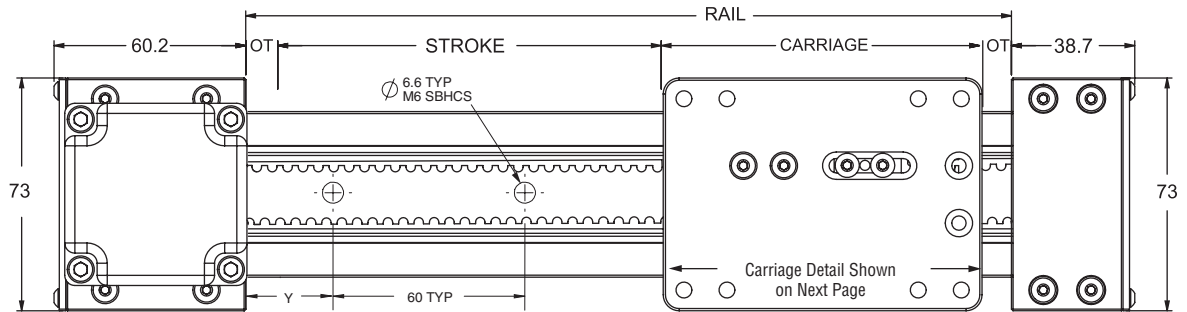


[Link to Motor Specifications Document](#)

Belt Drive System Vertical Motor Mount

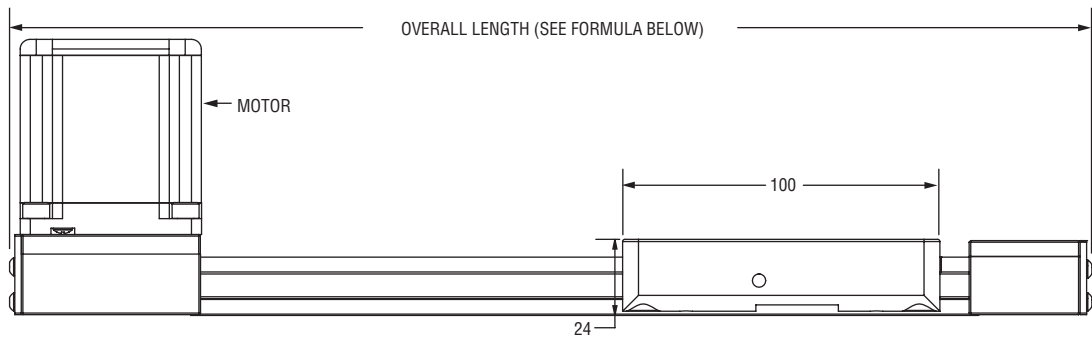
SYSTEM DIMENSIONS

TOP VIEW



SIDE VIEW

UGA
Low Profile
Rail



Note: GST bearing system shown. For low profile rail (UGA), specify Y dimension (hole to end) at time of order. No rail mounting holes in tall rail version (UGT). Tall rail version is mounted with toe clamps. Consult factory for (UGT) tall rail options.

Required for SIMO Series driven systems:

Minimum overtravel (OT)

- 10 mm for ≤ 300 mm stroke
- 25 mm for > 300 mm stroke

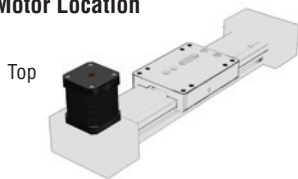


Consult Factory • 800-962-8979

MOTOR LENGTHS

Motor Size	Single Stack	Double Stack	Triple Stack
42 mm (NEMA 17)	40 mm	48 mm	61 mm
56 mm (NEMA 23)	55 mm	77 mm	77 mm

Motor Location



Note: Specify motor location (in part number) for PBC integrated motors. Contact factory for stub shaft and optional motor mounting plates.

OVERALL LENGTH CALCULATION

Over-Travel Drive End = _____ mm

+ Carriage = 100 _____ mm

+ Stroke = _____ mm

+ Over-Travel Idle End = _____ mm

_____ mm

= *Rail = _____ mm

+ End Blocks = _____ mm

_____ mm

= Overall Length = _____ mm

* Rail dimension is specified at time of order

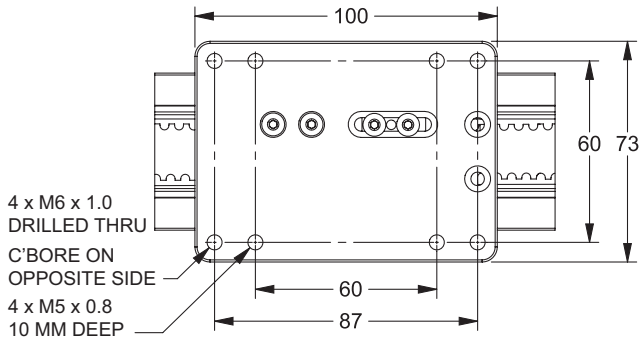


Contact an Application Engineer • 800-962-8979

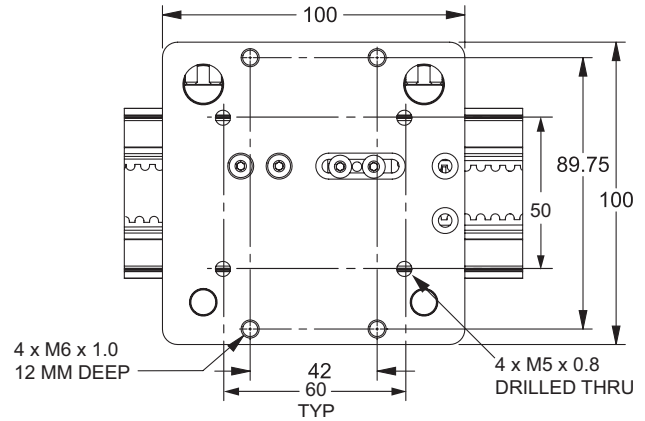
Belt Drive System Vertical Motor Mount

CARRIAGE DIMENSIONS TOP VIEW

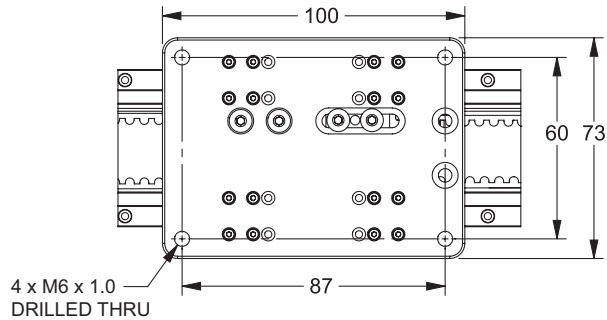
Gliding Surface Technology – Plain Bearing



Cam Roller Technology – V-Guide Bearings



Profile Rail Technology – Profile Rail Guideways



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See page 36 for replacement lubrication kits



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SYSTEM ORDERING INFORMATION

UG	A	040	D	XX	X	XXXX	BD	X	XX	00	X	0	0
Series	Rail Type	Rail Width	Order Type	Carriage Type	Options	Rail Length	Drive Type	Drive End Option	Motor Option	Lead (mm)	Motor Position	Accuracy	Other Options
SIMO Series	A Low Profile Consult factory for tall profile rail options	40 mm	D Driven	A1 GST with Frelon GOLD	0 None 1 Hand Brake 2 Lube 3 Both	2000 mm max Consult factory for longer lengths	BD Belt Drive	1 Standard	00 No Motor / Stub Shaft Only PBC Integrated Motor B4 56 mm (N23) Single Stack B5 56 mm (N23) Double Stack B6 56 mm (N23) Triple Stack 3rd Party Motor Mount 1ZE 40 mm 1ZF 42 mm (N17) 1ZG 56–58 mm (N23) 1ZH 60 mm 1Z0 Blank Plate	00 Not Used	T Top	0 Not Used	0
				B2 V-Guide with Stainless Steel Sealed Rollers & Lubrication	1 Lube (required)								
				C1 Profile Rail with Normal Block	0 Seals & Lube	1000 mm max							
For custom options consult an application engineer at PBC Linear, 800-962-8979.													

Ordering example: UGA040D-A10-0900-BD1A1-00T0-0. This is a SIMO Series, plain bearing – GST gliding surface technology, low profile rail, 900 mm length, belt driven, 42 mm (NEMA 17) single stack motor.

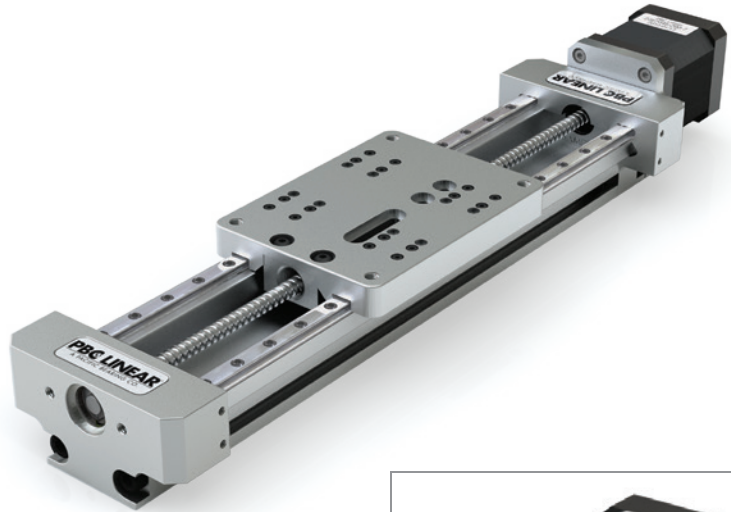
Ball Screw System

OVERVIEW

- Recirculating ball nut provides low friction drive
- Preloaded design for stiffness and rigidity
- Ideal for applications that require precise positional accuracy
- Consult factory with application requirements to optimize integrated screw and nut parameters
- Selection of leads
- Choice of screw accuracy class



Contact an Application Engineer • 800-962-8979



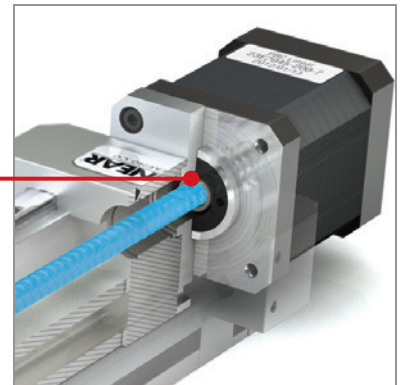
MOTOR OPTIONS & BENEFITS

- Standard integrated stepper motors
 - 42 mm (NEMA 17)
 - 56 mm (NEMA 23)
- Integrated ball screw eliminates component and tolerance stack-ups
- Improves rigidity and performance

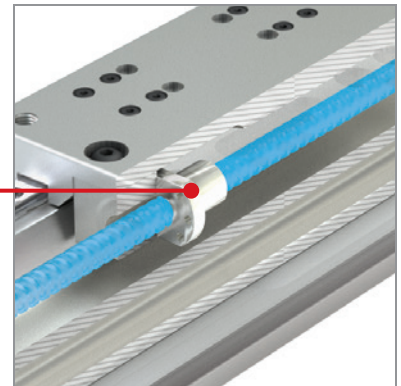


Detailed information on motors on page 35

Drive end screw support bearings are integrated into the stepper motor



Variety of leads, accuracy classes, and nut options are possible



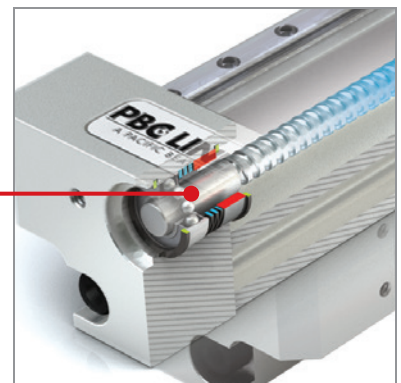
ACCESSORIES

- Hand knobs – for manual positioning or applications that require precision adjustment
- Riser blocks
- Sensor brackets
- Toe clamps and t-nuts
- Brake knobs



Detailed information on accessories on page 36

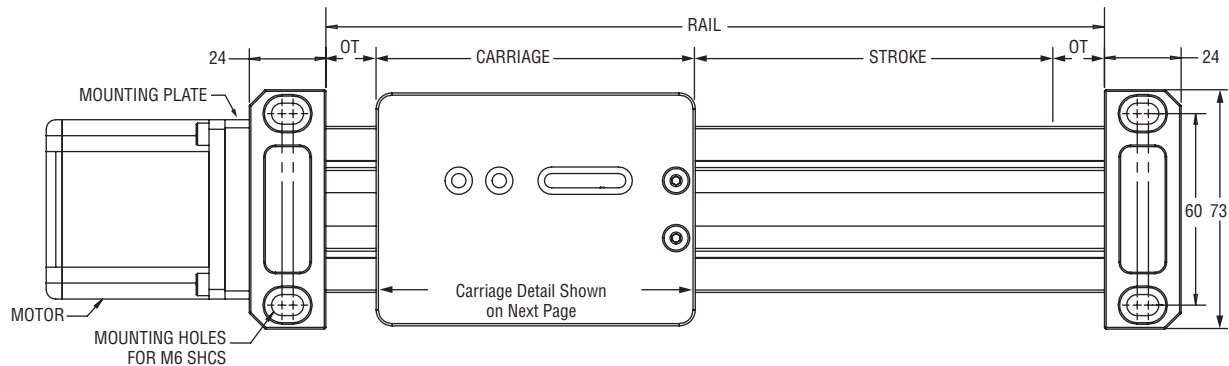
Ball bearings provide idle end screw support



Ball Screw System

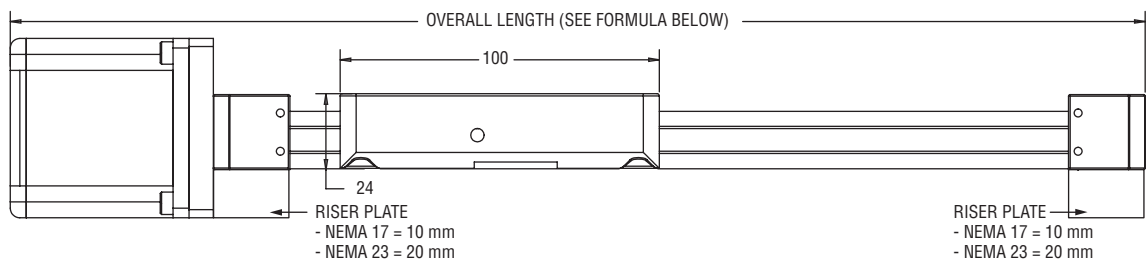
SYSTEM DIMENSIONS

TOP VIEW



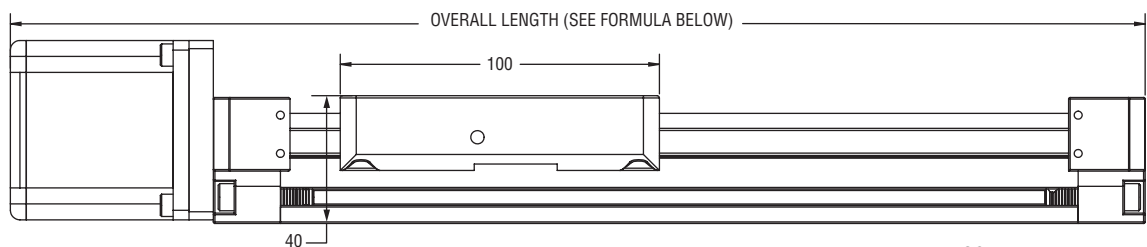
SIDE VIEW

UGA
Low Profile
Rail



SIDE VIEW

UGT
Tall Rail



Note: GST bearing system shown.

MOTOR LENGTHS (PLUS MOUNTING PLATE)

Motor Size	Single Stack	Double Stack	Triple Stack
42 mm (NEMA 17)	40 mm	48 mm	61 mm
56 mm (NEMA 23)	55 mm	77 mm	77 mm

Note: Sizes shown include 7.8 mm width for motor mounting plate.

Required for SIMO Series driven systems:

- Minimum overtravel (OT)
- 10 mm for ≤ 300 mm stroke
 - 25 mm for > 300 mm stroke

OVERALL LENGTH CALCULATION

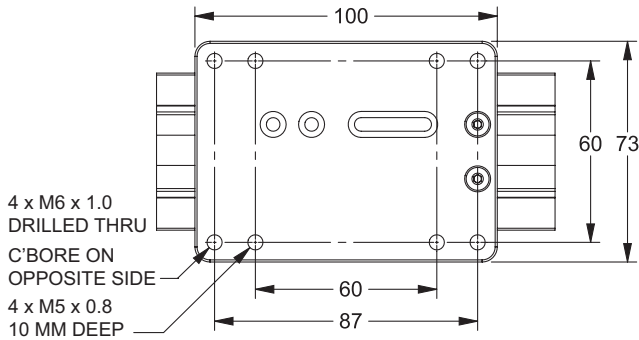
$$\begin{aligned}
 &\text{Over-Travel Drive End} = \underline{\hspace{2cm}} \text{ mm} \\
 &\quad + \text{Carriage} = \underline{100} \text{ mm} \\
 &\quad + \text{Stroke} = \underline{\hspace{2cm}} \text{ mm} \\
 &+ \text{Over-Travel Idle End} = \underline{\hspace{2cm}} \text{ mm} \\
 &\quad = \text{*Rail} = \underline{\hspace{2cm}} \text{ mm} \\
 &\quad + \text{End Blocks} = \underline{\hspace{2cm}} \text{ mm} \\
 &+ \text{Motor \& Mounting Plate Length} = \underline{\hspace{2cm}} \text{ mm} \\
 &\quad = \text{Overall Length} = \underline{\hspace{2cm}} \text{ mm}
 \end{aligned}$$

* Rail dimension is specified at time of order

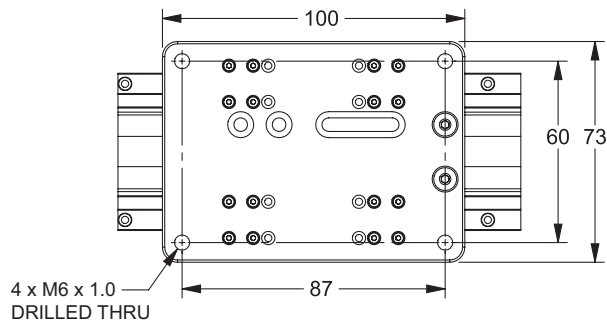
Ball Screw System

CARRIAGE DIMENSIONS TOP VIEW

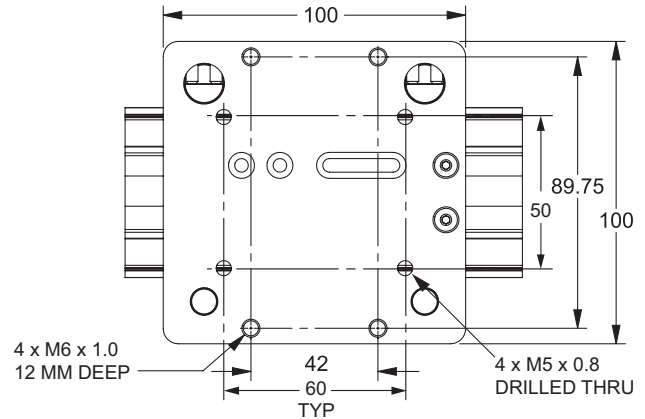
Gliding Surface Technology – Plain Bearing



Profile Rail Technology – Profile Rail Guideways



Cam Roller Technology – V-Guide Bearings



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Note: A range of accuracy class rail and ball screws can be supplied through PBC's unique engineered-to-order process.



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SYSTEM ORDERING INFORMATION

CALL AN APPLICATION ENGINEER BEFORE ORDERING

UG	X	040	D	XX	X	XXXX	BS	X	XX	XX	X	X	0
Series	Rail Type	Rail Width	Order Type	Carriage Type	Options	Rail Length	Drive Type	Drive End Option	Motor Option	Lead (mm)	Nut	Accuracy	Other Options
SIMO Series	A Low Profile	40 mm	D Driven	A1 GST with Frelon GOLD	0 None 1 Hand Brake 2 Lube 3 Both	Consult factory	BS Ball Screw	1 Shaft 2 Knob	00 No Motor / Stub Shaft Only	AF - 16 AJ - 10 AX - 5 AG - 2 AH - 1	1 Standard 2 Anti-Backlash	Consult factory for other leads	0
					3 PBC Integrated Motor Screw			A1 42 mm (N17) Single Stack A2 42 mm (N17) Double Stack A3 42 mm (N17) Triple Stack B4 56 mm (N23) Single Stack B5 56 mm (N23) Double Stack B6 56 mm (N23) Triple Stack					
					1 Shaft			ZZ No Motor / Stub Shaft with Assembled Motor Mount*					
	For custom options consult an application engineer at PBC Linear, 800-962-8979.												
	T Tall Profile			B2 V-Guide with Stainless Steel Sealed Rollers & Lubrication	1 Lube (required)								
				C1 Profile Rail with Normal Block	0 Seals & Lube								

Ordering example: UGT040D-A10-0900-BS3A1-AJ10-0. This is a SIMO Series, plain bearing – GST gliding surface technology, tall profile rail, 900 mm length, ball screw driven, 42 mm (NEMA 17) single stack motor, 10 mm lead. Please call an application engineer at PBC Linear when ordering a ball screw driven system.

* Motor mount is ordered separately. See the SIMO Series Motor Mount catalog for ordering details. Click [here](#) to view it online.

Motors **SIMO** Series

INTEGRATED STEPPER MOTOR

The driven SIMO Series systems are optimized for use with integrated stepper motors.

- 42 mm (NEMA 17)
- 56 mm (NEMA 23)
- Single, double, triple stack
- Performance specifications for each drive type:
 - Lead screw – page 23
 - Belt drive with horizontal motor mount – page 27
 - Belt drive with vertical motor mount – page 31
 - Ball screw – consult factory
- Standard wire connection is onboard plug
- Optional connections – consult factory
- Third party motor mount also available



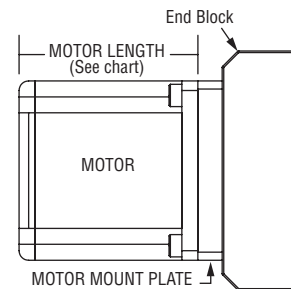
[Link to Motor Specifications Document](#)

MOTOR LENGTHS

Motor Size	Single Stack	Double Stack	Triple Stack
42 mm (NEMA 17)	40 mm	48 mm	61 mm
56 mm (NEMA 23)	55 mm	77 mm	77 mm

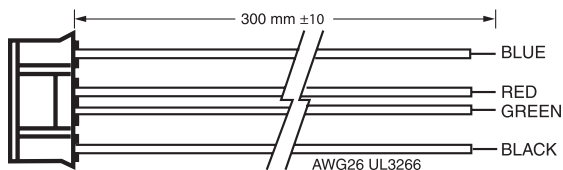
Note: Overall length calculations should include 7.8 mm width for motor mounting plate.

TOP VIEW



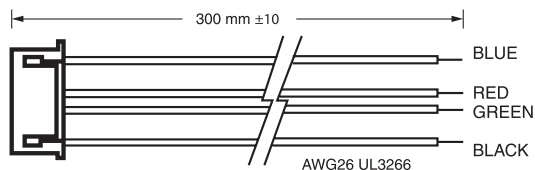
ONBOARD CONNECTOR PLUG OPTIONAL

NEMA 17 Connector
PBC Part Number: 6200490



Housing: JST PHR-6
Terminal: JST SPH-002T-P0.5

NEMA 23 Connector
PBC Part Number: 6200491



Housing: JST XHP-6
Terminal: JST SXH-001T-P0.6

INTEGRATED HYBRID LINEAR ACTUATOR SETUP

- Lead screw aligned and fixed directly with motor
- Fewer components
- Greater accuracy
- More reliable
- Higher rigidity
- Greater value

CONSTANT
Force Technology

USED WITH LEAD SCREW AND BALL SCREW DRIVEN SYSTEMS



[Watch the video](#)

SIMO Series Accessories

HAND KNOB

Hand adjustment knobs are used for manually adjusting screw driven systems

- Ideal for applications such as:
 - Camera or sensor placement, conveyor guide adjustments, jig, fixture, or tool making applications, and more!

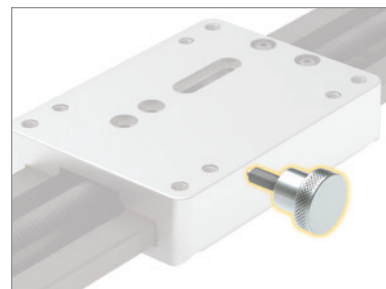


HAND BRAKE

Hand brakes are used to manually lock position in GST screw driven systems

- Ideal for holding position in applications such as:
 - Label dispensing locations, bar code reader or sensor placements, pressure sensitive applications, and more!

Note: This is a friction brake (not a positive lock) and can be overcome if sufficient force is applied.

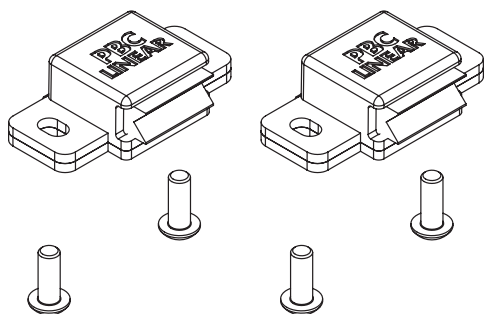


REPLACEMENT LUBRICATION KITS

Used with CRT v-guide bearing systems

Part number: **UGA040A-LHA-KIT**

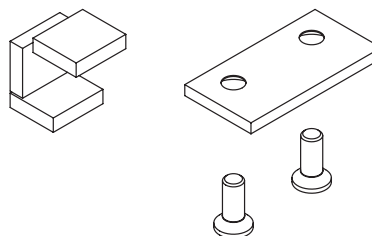
- (2) Lube Holder Asy RRC034 molded/hinged
- (4) BHSCS M3 x 0.5 x 8 mm long



Used with GST plain bearing systems

Part number: **UGA040A-JKM-KIT**

- (2) Felt Strip F1 0.375 x 0.094 'k'
- (2) JKM Plate, UGA040
- (4) SFHCS M3 x 0.5 x 8 mm long



SIMO Series Accessories



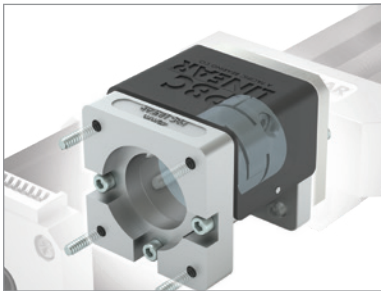
SENSOR MOUNTING

Sensor brackets accommodate a variety of sensor types

- End of travel / overtravel sensors
- Slot type sensors
- Proximity switches
- and more!
- Consult factory for options



Consult Factory • 800-962-8979



MOTOR MOUNT

Motor mount option for attaching a stepper, servo, or smart motor, etc.

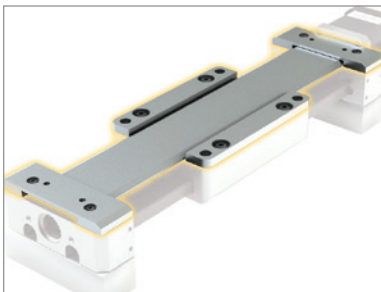
- One-piece main frame holds shaft-to-shaft centerline
- Easily attach with adapter plate and coupler
- Consult a PBC Linear Application Engineer about mounting options for other types of motor and coupler arrangements



[Link to Motor Mount Specifications](#)



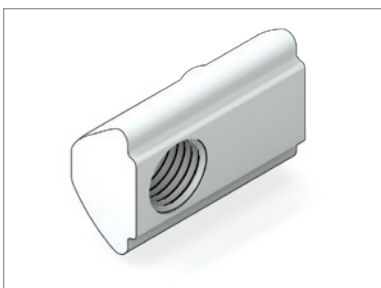
[Email an Application Engineer](#)



SYSTEM COVERS

Covers help keep raceways clear of debris and contamination

- Consult a PBC Linear Application Engineer regarding your specific application to provide protection from corrosive elements in the application environment



T-NUTS

Roll in t-nut for 5 mm slot with M5 tap. PBC part number 6100443.

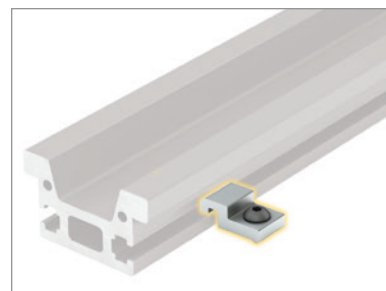
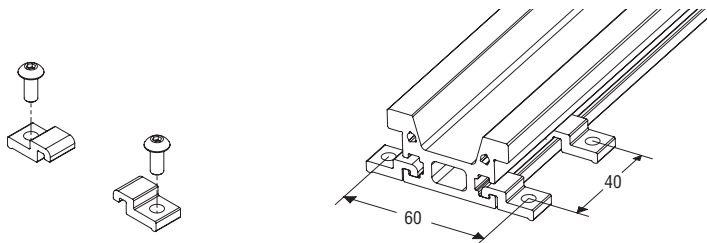
SIMO Series Accessories

SMALL TOE CLAMP

Part number: **UGT040A-TC-1**

Small toe clamps are used to secure the (UGT) tall rail to the mounting surface

- Mounted with one M5 x 0.8 BHCS (not included)
- 40 mm max spacing between clamps

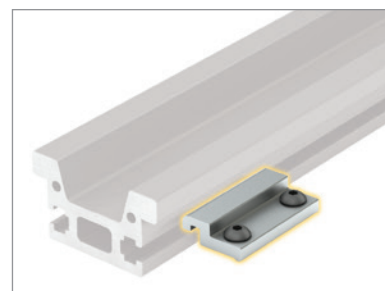
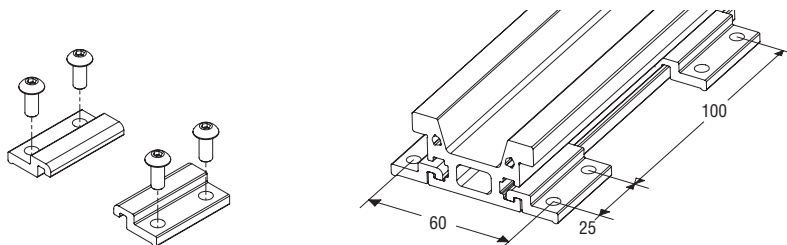


LARGE TOE CLAMP

Part number: **UGT040A-TC-2**

Large toe clamps are used to secure the (UGT) tall rail to the mounting surface

- Mounted with two M5 x 0.8 BHCS (not included)
- 100 mm max spacing between clamps

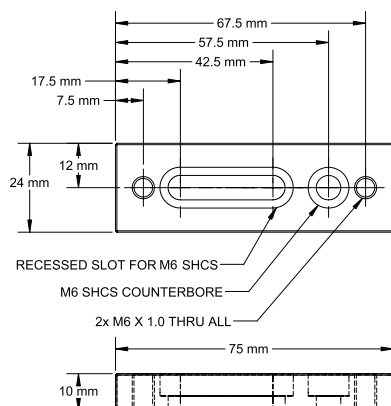


RISER BLOCK

Riser blocks provide clearance for the motor when using the (UGA) low profile rail

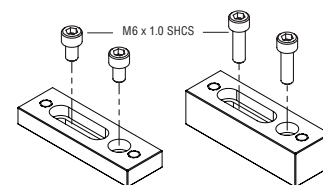
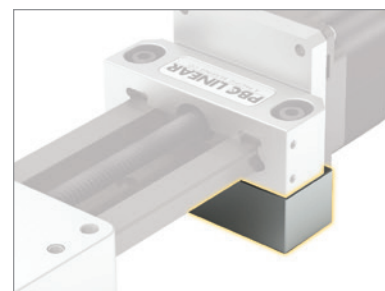
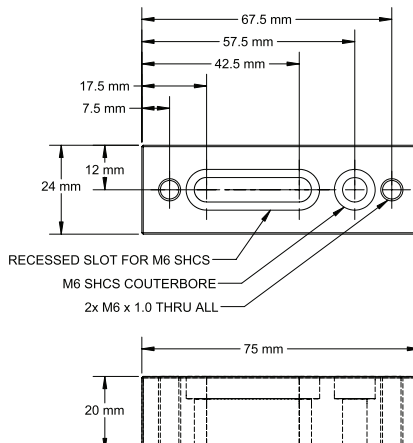
10 mm Height Riser Block Dimensions

Typically used with 42 mm (NEMA 17) motor



20 mm Height Riser Block Dimensions

Typically used with 56 mm (NEMA 23) motor



Part number: **UGA040A-RSRPLT-10**
42 mm (Nema 17)

UGA040A-RSRPLT-20
56 mm (Nema 23)

Multi-Axis Systems Mounting Plates

OPTION 1

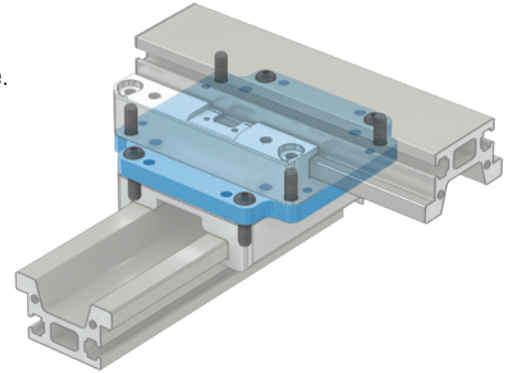
CARRIAGE-TO-CARRIAGE MOUNTING

Design multi-axis systems easily with the versatile carriage to carriage mounting plate.

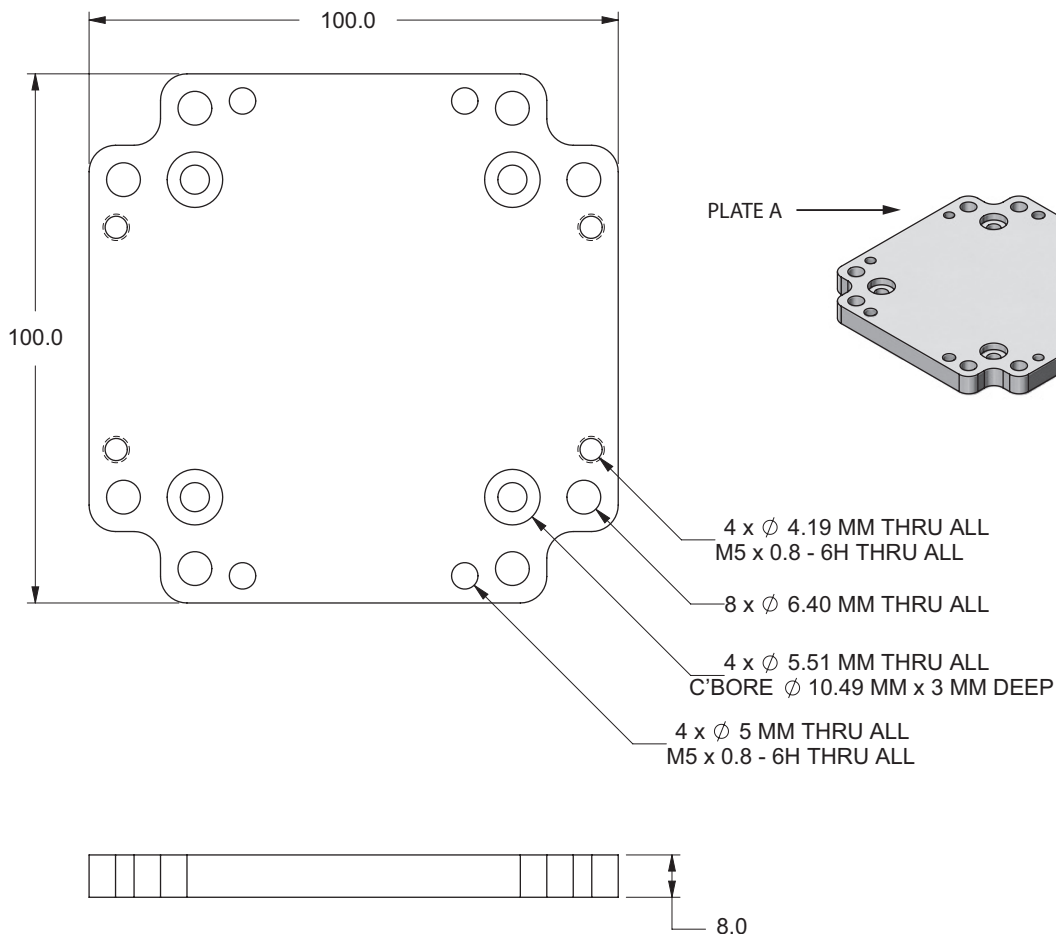
- Attach any combination of SIMO Series bearing type – GST, CRT, PRT
- Units may be comprised of either UGA (low profile) and/or UGT (tall) rails

EASY STEP-BY-STEP MOUNTING PROCESS:

- Step 1:** Attach mounting plate to the base carriage
- Step 2:** Fasten screws (PBC recommends using a low strength thread locker)
- Step 3:** Attach top carriage
- Step 4:** Fasten screws (PBC recommends using a low strength thread locker)



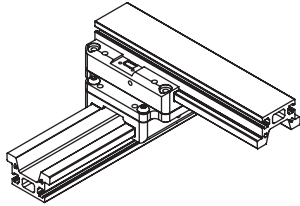
MOUNTING PLATE SPECIFICATIONS CARRIAGE-TO-CARRIAGE



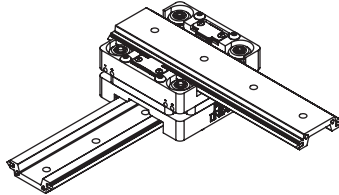
Multi-Axis Systems Mounting Plates

OPTION 1 CARRIAGE-TO-CARRIAGE MOUNTING

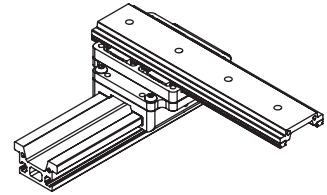
Connect any combination of UGA (low profile) and UGT (tall) rails using the carriage-to-carriage mounting plate.



Two UGT (tall) rails connected with the carriage mounting plate.

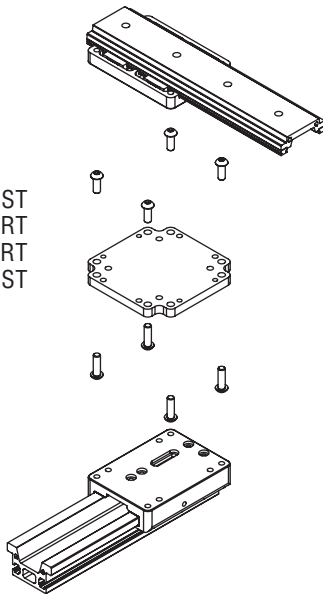


Two UGA (low profile) rails connected with the carriage mounting plate.



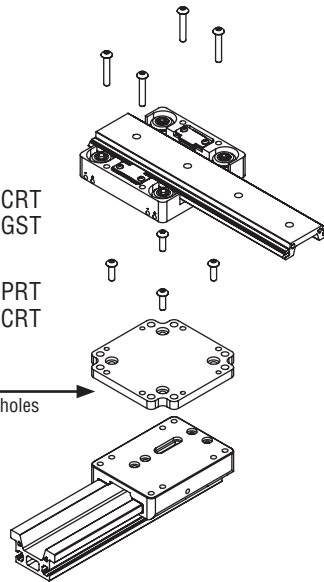
A combination—one UGT (tall) and one UGA (low profile) rail attached with the carriage mounting plate.

Kit #1:
GST to GST
GST to PRT
PRT to PRT
PRT to GST



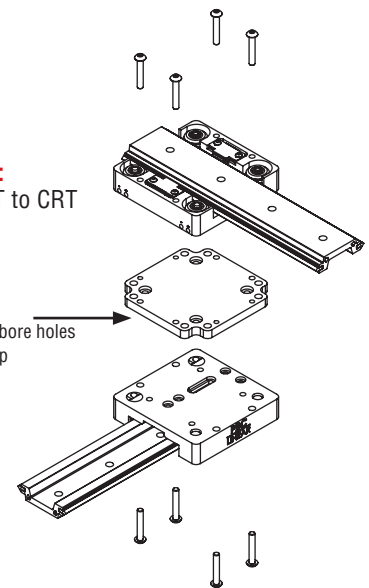
Kit #2:
GST to CRT
CRT to GST
Kit #3:
CRT to PRT
PRT to CRT

Counterbore holes facing up



Kit #4:
CRT to CRT

Counterbore holes facing up



ORDERING INFORMATION CARRIAGE-TO-CARRIAGE MOUNTING

	Base System	Attached To	Parts Included in Kit	Qty	Kit Part Number
1	GST	GST	Plate A (carriage-to-carriage) BHSCS M6 x 20	1	LATA-KIT-038
		PRT		8	
	PRT	GST			
		PRT			
2	GST	CRT	Plate A (carriage-to-carriage) BHSCS M5 x 16	1	LATA-KIT-039
	CRT	GST	BHSCS M5 x 30	4	
3	CRT	PRT	Plate A (carriage-to-carriage) BHSCS M6 x 16	1	LATA-KIT-040
	PRT	CRT	BHSCS M5 x 30	4	
4	CRT	CRT	Plate A (carriage-to-carriage) BHSCS M5 x 30	1	LATA-KIT-041
				8	

Note: GST = Gliding Surface Technology–Plain Bearings; CRT = Cam Roller Technology–V-Guide Bearings; PRT = Profile Rail Technology–Profile Rail Guideways. The carriage-to-carriage mounting plate has counterbores on one side to allow for flush mounting.

Multi-Axis Systems Mounting Plates

OPTION 2

CARRIAGE-TO-RAIL MOUNTING

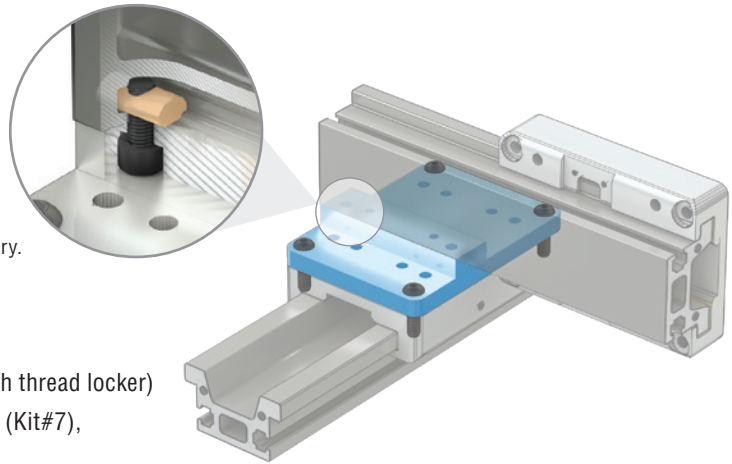
Design complex multi-axis systems easily with the carriage to rail mounting plate.

EASY STEP-BY-STEP MOUNTING PROCESS:

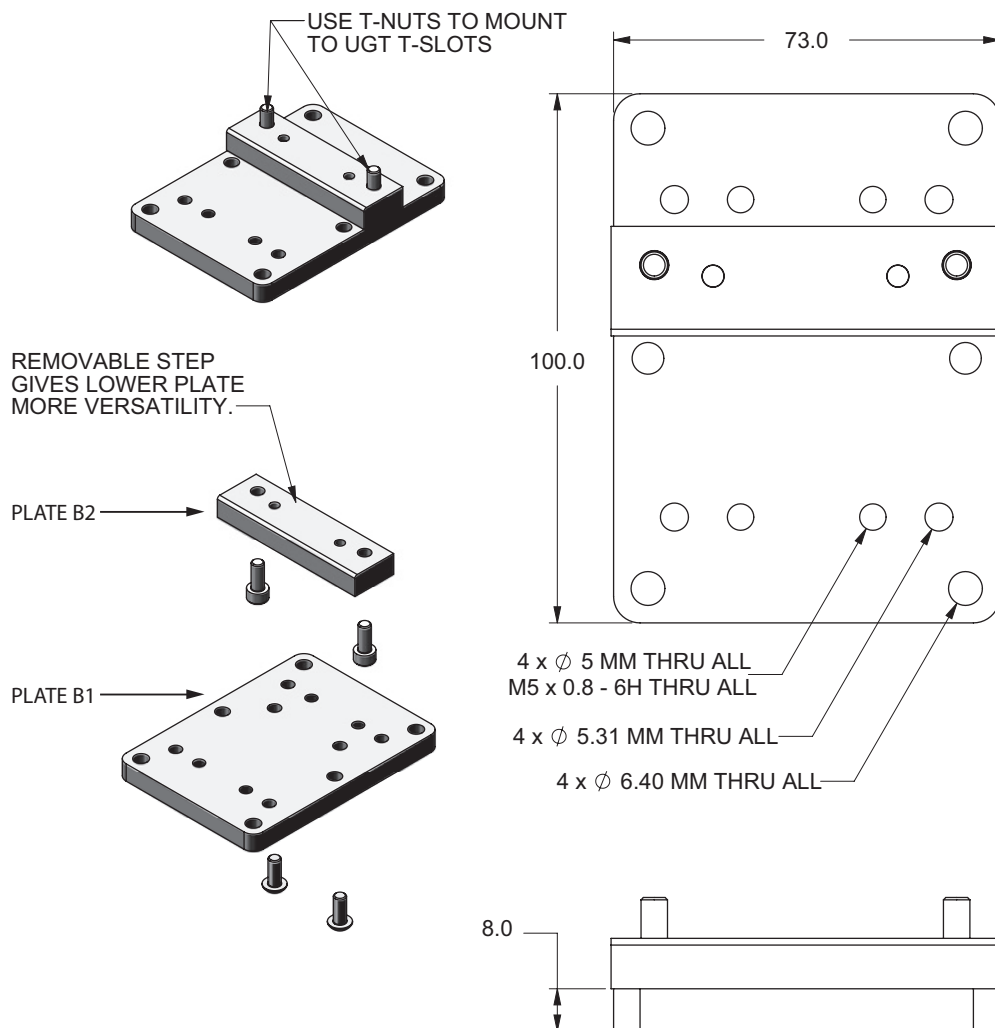
Note: For GST & CRT base-mounted assemblies (Kit #5), attach the top rail to the base carriage using toe clamps – no bracket is necessary.

For side-mounted assemblies (Kit #6), attach plate b to plate a, and position t-nuts in rail prior to the following steps.

- Step 1:** Attach mounting plate to the base carriage
- Step 2:** Fasten screws (PBC recommends using a low strength thread locker)
- Step 3:** Attach top rail, either with t-nuts (Kit #6), toe clamps (Kit#7), or by using the holes in the top rail (Kit #8).
- Step 4:** Fasten screws (PBC recommends using a low strength thread locker)



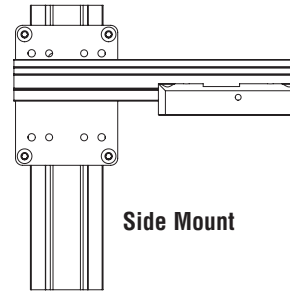
MOUNTING PLATE SPECIFICATIONS CARRIAGE-TO-RAIL



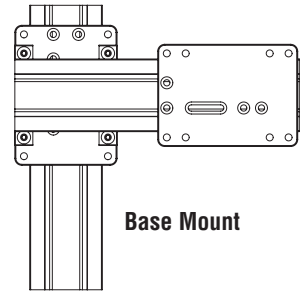
Multi-Axis Systems Mounting Plates

OPTION 2 CARRIAGE-TO-RAIL MOUNTING

Rails can be mounted via side mount or base mount depending on the application requirements.



Side Mount

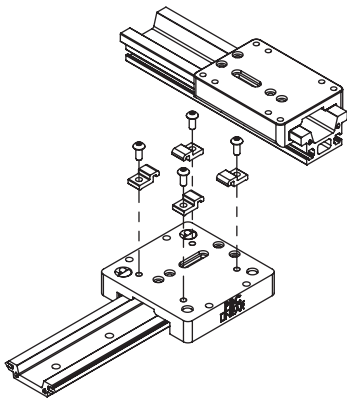


Base Mount

Kit #5:

GST to UGT Rail
CRT to UGT Rail

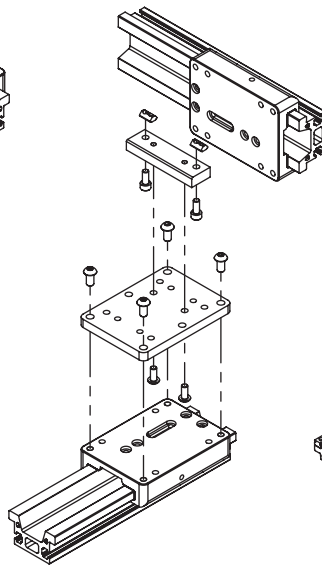
* Base mount with toe clamps



Kit #6:

GST to UGT Rail
CRT to UGT Rail
PRT to UGT Rail

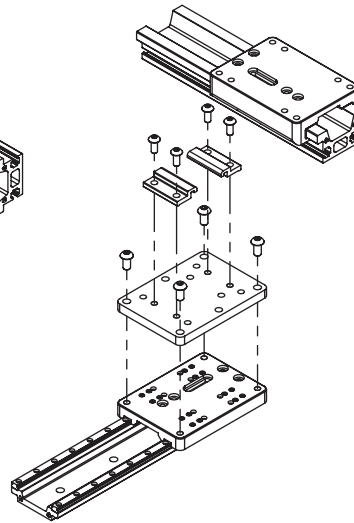
* Side mount with t-nuts



Kit #7:

PRT to UGT Rail

* Base mount with toe clamps

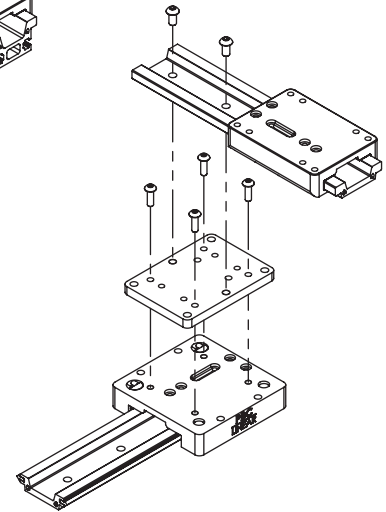


Kit #8:

GST to UGA Rail
CRT to UGA Rail
PRT to UGA Rail

* Base mount with screws

** Not designed for lead screw driven systems



ORDERING INFORMATION CARRIAGE-TO-RAIL MOUNTING

	Base System (UGA or UGT)	Attached To Rail Type	Mount Type	Parts Included in Kit	Qty	Kit Part Number
5	GST	UGT	Base	Small Toe Clamp	4	LATA-KIT-042
	CRT			BHSCS M5 x 16 (4)	4	
6	GST	UGT	Side	Plate B1 (carriage-to-rail)	1	LATA-KIT-043
				Plate B2 (carriage-to-rail)	1	
	CRT			BHSCS M6 x 16 (4)	4	
	PRT			SHCS M5 x 12 T-Nuts M5 BHSCS M5 X 16 (4)	2 2 2	
7	PRT	UGT	Base	Plate B1 (carriage-to-rail)	1	LATA-KIT-044
				Large Toe Clamp BHSCS M5 x 12 BHSCS M6 x 20	2 4 4	
8	GST	UGA	Base	Plate B1 (carriage-to-rail)	1	LATA-KIT-045
	CRT			BHSCS M6 x 16 (4)	4	
	PRT			BHSCS M6 x 12 BHSCS M5 X 16 (4)	2 2	

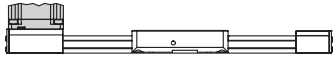
Note: GST = Gliding Surface Technology–Plain Bearings; CRT = Cam Roller Technology–V-Guide Bearings; PRT = Profile Rail Technology–Profile Rail Guideways.
UGA = Low profile rail; UGT = Tall rail.

SIMO Series Application Data Sheet

ACTUATOR ORIENTATION



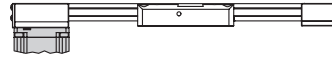
HORIZONTAL



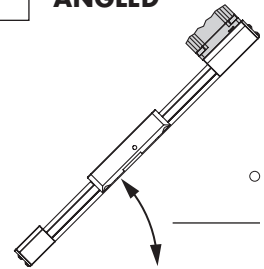
VERTICAL



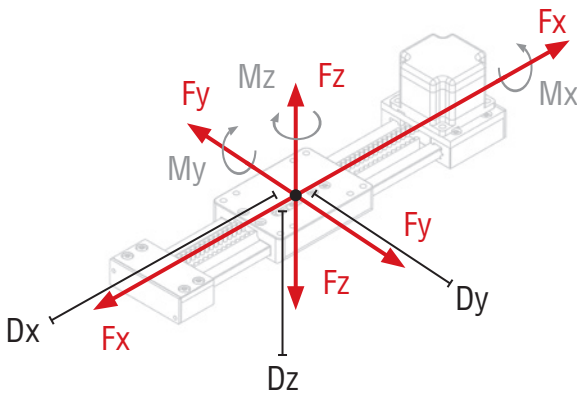
INVERTED



ANGLED



LOAD & LOAD LOCATION



Load Applied

☐ lbs ☐ N

F_{XA} _____

F_{YA} _____

F_{ZA} _____

Moment Applied

☐ in-lbs ☐ N-m

M_{XA} _____

M_{YA} _____

M_{ZA} _____

Distance to Center of Gravity of Load

☐ in ☐ mm

D_x _____

D_y _____

D_z _____

MOTION PROFILE

Stroke Distance _____

☐ in ☐ mm

Move Time _____ (seconds)

Dwell time _____ (seconds)

Number of Cycles _____

☐ per min ☐ per hour

ENVIRONMENT

☐ Clean Room ☐ General Shop

☐ Heavy Industrial ☐ Food/Washdown

☐ High Vibration ☐ Other: _____

BI-DIRECTIONAL REPEATABILITY

☐ > ± 0.127 mm ☐ < ± 0.127 mm (Belt)

☐ < ± 0.1 mm (Lead Screw)

☐ < ± 0.02 mm (Anti-Backlash Lead Screw Nut)

☐ Other: _____

GENERAL APPLICATION DESCRIPTION

Date: _____

Name: _____

Company: _____

Company Website: _____

Phone: _____

Email: _____

FAX TO: 815-389-5790

EMAIL TO: application.engineering@pbcllinear.com

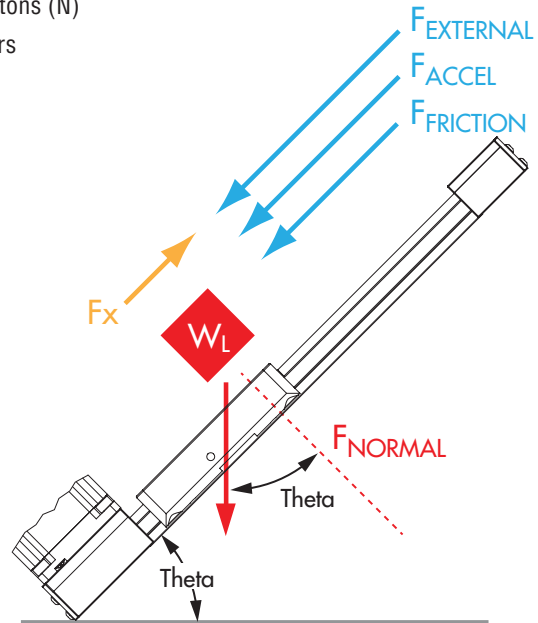
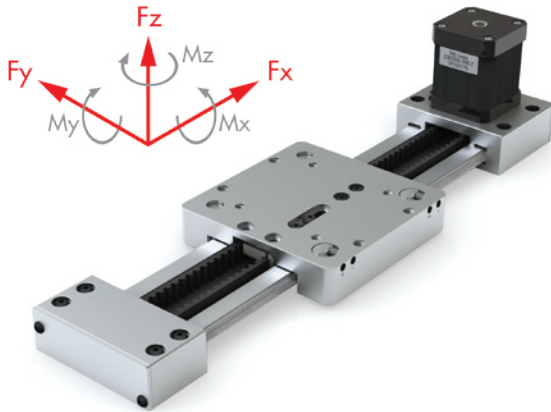
Linear Motion Solutions • pbcllinear.com

SIMO Series Load Calculations

Inserting the values entered on page 45 and static maximum values from your selected configuration, use the formula below to verify acceptable loading conditions for your application.

Calculation Factors:

- F_{ZA} and F_{YA} are the radial and axial results of applied external forces in newtons (N)
- M_{XA} , M_{YA} and M_{ZA} are the external moments being applied in newton-meters
- F_y , F_z , M_x , M_z are the load ratings for various directions and moments
- Z is the relative safety factor as applied from the table below



Single Load Force Calculations:

$$\frac{F_{ZA}}{F_Z} < \frac{1}{Z} \quad \frac{F_{YA}}{F_y} < \frac{1}{Z} \quad \frac{M_{XA}}{M_x} < \frac{1}{Z} \quad \frac{M_{YA}}{M_y} < \frac{1}{Z} \quad \frac{M_{ZA}}{M_z} < \frac{1}{Z}$$

Multiple Load Force Calculation:

$$\frac{F_{ZA}}{F_Z} + \frac{F_{YA}}{F_y} + \frac{M_{XA}}{M_x} + \frac{M_{YA}}{M_y} + \frac{M_{ZA}}{M_z} < \frac{1}{Z}$$

Safety Factor:

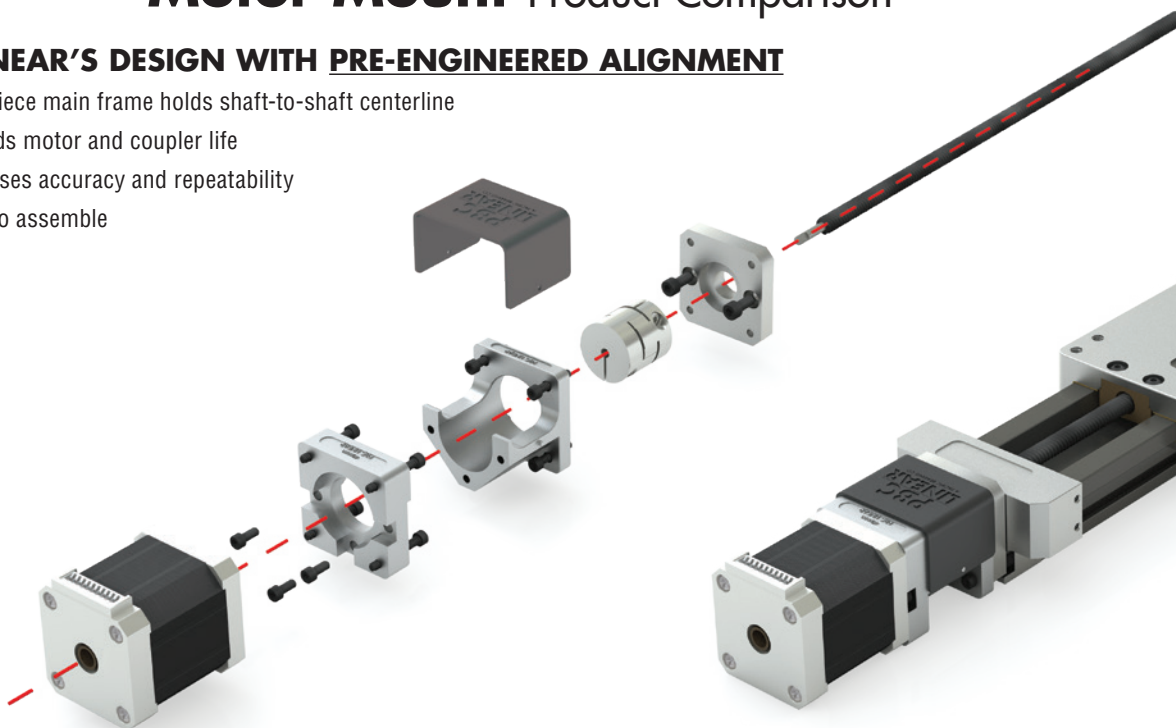
- Use the “Z” Safety Factor to adjust for dynamic forces and conditions particular to the application.

Application Condition	Z Safety Factor
Consistently smooth motion with low frequency of travel reversal, slow speed (<30% max.), no shock load or vibration, no elastic yield or deformation, clean environment	1.0 – 1.5
Normal assembly or shop floor conditions, moderate speed (30% max. to 75% max.), normal shock or vibration conditions	1.5 – 2.0
Frequent reversal of travel, high speeds (>75% max.), shock loads and/or vibration present, high elastic yield or deformation, heavy dirt and dust in environment	2.0 – 3.5

Motor Mount Product Comparison

PBC LINEAR'S DESIGN WITH PRE-ENGINEERED ALIGNMENT

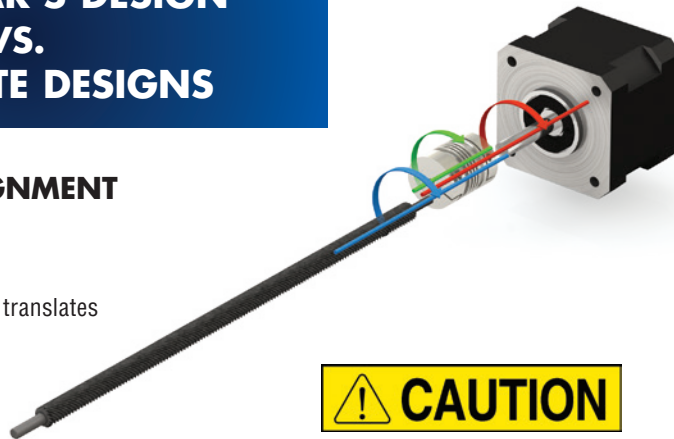
- One-piece main frame holds shaft-to-shaft centerline
- Extends motor and coupler life
- Increases accuracy and repeatability
- Easy to assemble



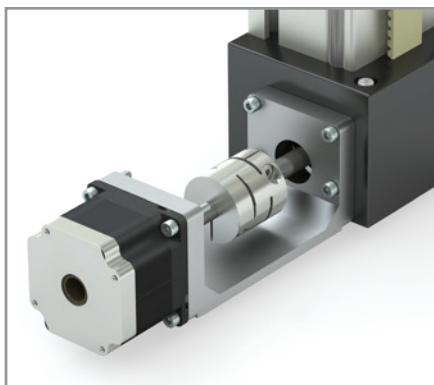
PBC LINEAR'S DESIGN VS. ALTERNATE DESIGNS

PROBLEMATIC DESIGNS CAUSE MIS-ALIGNMENT

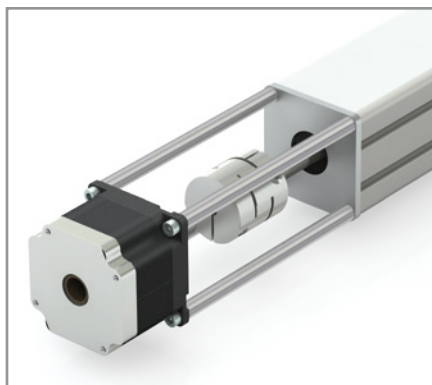
- Mis-alignment between motor shaft, coupler, and screw shortens life and affects motion quality
- Mis-alignment results in camming or lobbing motion that translates to inconsistent linear movement
- Difficult to align and prone to deflection
- Over-torque of coupler causes accuracy loss



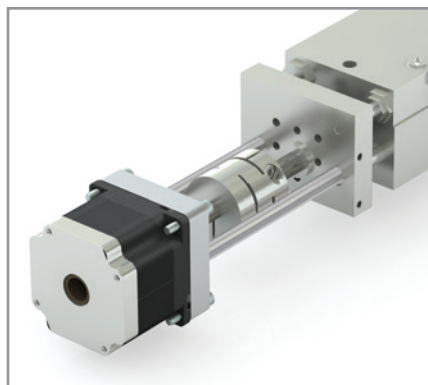
PROBLEM #1: DEFLECTION




PROBLEM #2: TWIST



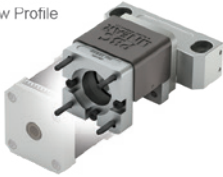
PROBLEM #3: OFF CENTERLINE



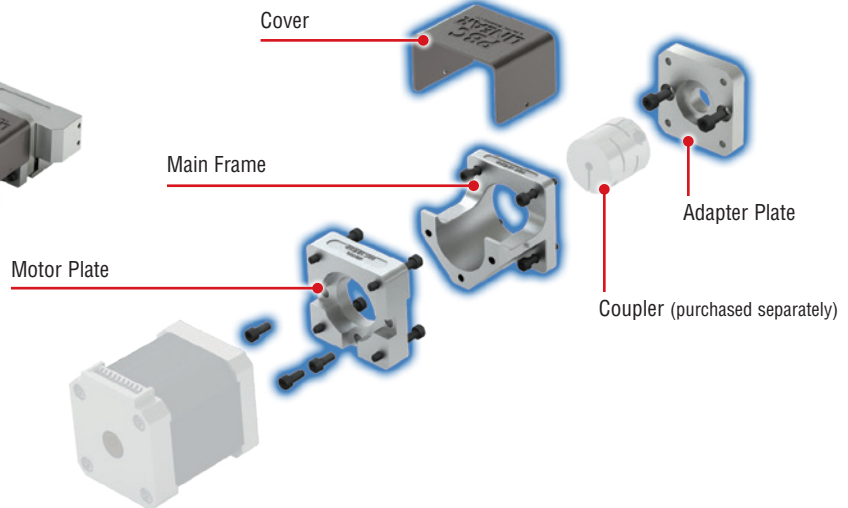
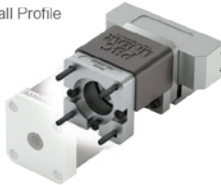
Lead Screw or Ball Screw Driven System

Screw Driven SIMO Series System Lead Screw or Ball Screw UGA (low profile) or UGT (tall profile)	Motor Size	Part Number	Recommended Coupler Ordered Separately or Customer Supplied	Included with Motor Mount Purchase
	40 mm	UGA040A-3PMM-SE	R + W EKL5 Maximum coupler dimensions: 25 mm O.D. x 26 mm length	(1) Adapter plate with 2 SBHCS (Socket Button Head Cap Screw) (1) Main frame with 4 SBHCS (1) Motor plate with 3 SBHCS for attaching to frame* (1) Cover (plastic) * Customer supplies motor screws
	42 mm NEMA 17	UGA040A-3PMM-SF		
	56 mm - 58 mm NEMA 23	UGA040A-3PMM-SG		
	60 mm	UGA040A-3PMM-SH		
	Blank Plate (customer machined)	UGA040A-3PMM-S0		

UGA
Low Profile



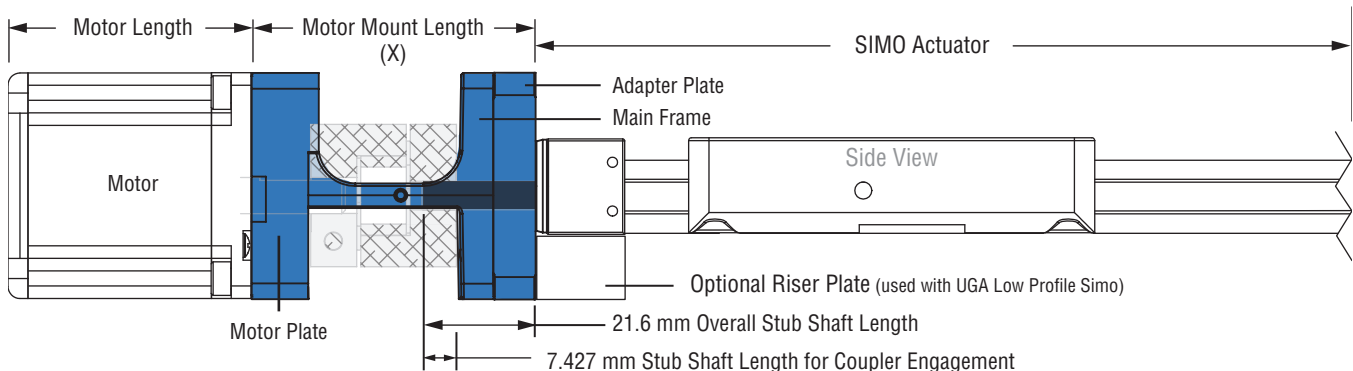
UGT
Tall Profile



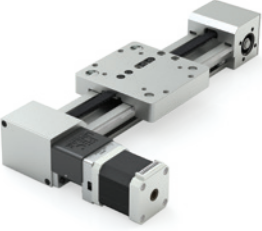
- Pre-engineered to hold centerlines
- 5 mm stub shaft diameter

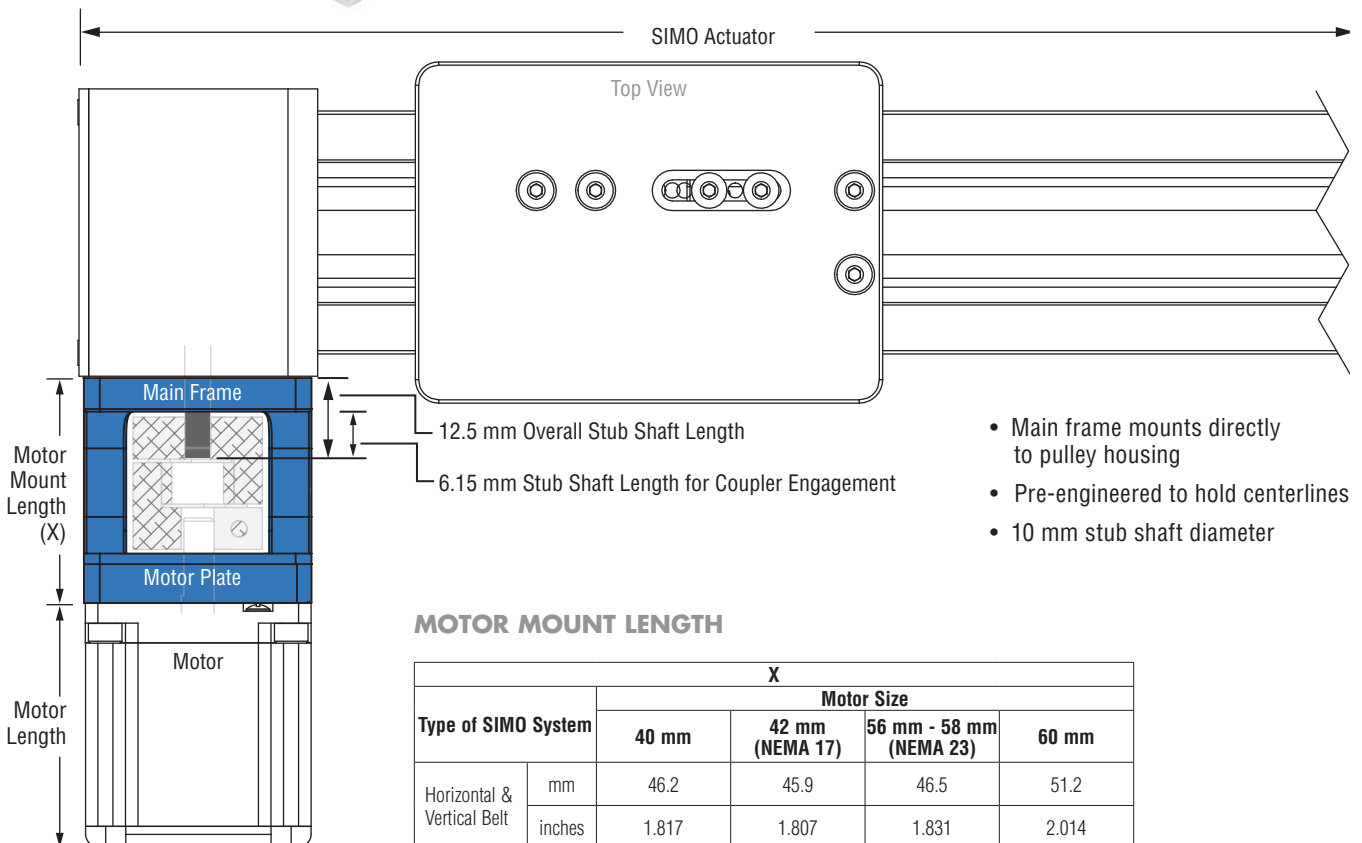
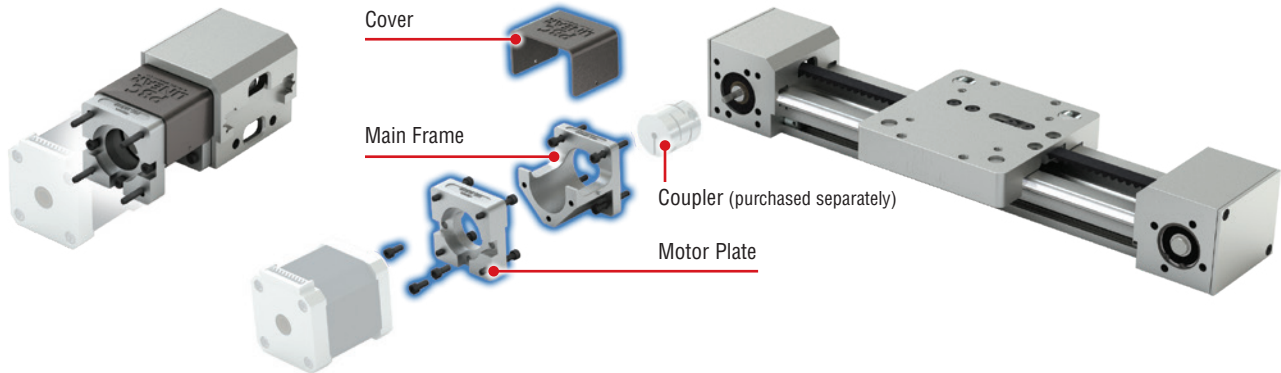
MOTOR MOUNT LENGTH

		X			
		Motor Size			
Type of SIMO System		40 mm	42 mm (NEMA 17)	56 mm - 58 mm (NEMA 23)	60 mm
Screw Driven	mm	54.0	53.7	54.3	59.0
	inches	2.125	2.115	2.139	2.322

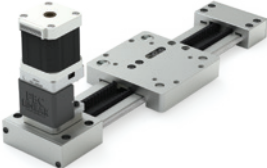


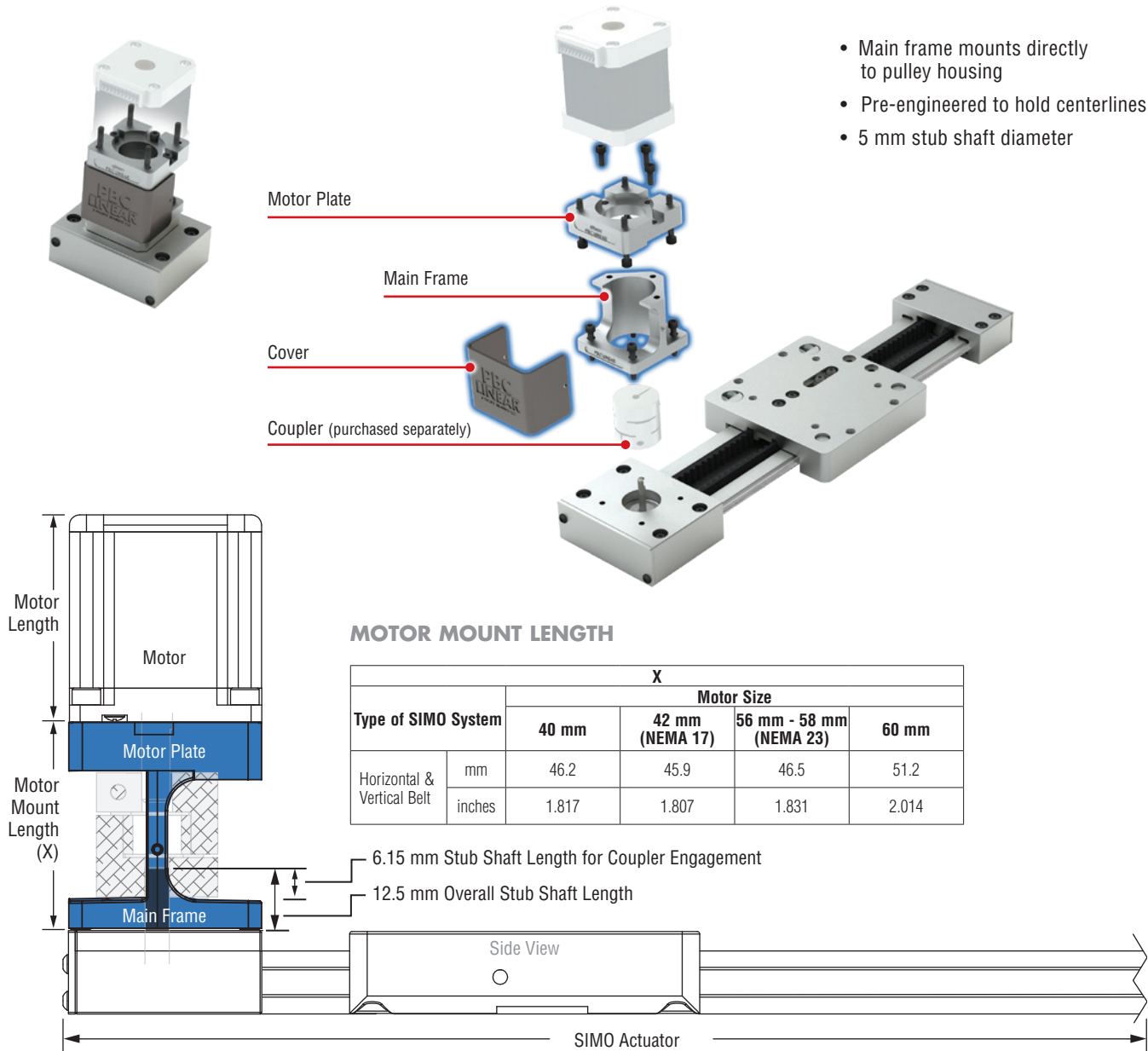
Horizontal Belt Driven System

Belt Driven SIMO Series System	Motor Size	Part Number	Recommended Coupler Ordered Separately or Customer Supplied	Included with Motor Mount Purchase
Horizontal Belt UGT Tall Profile 	40 mm	UGA040A-3PMM-HE	R + W EKL5 Maximum coupler dimensions: 25 mm O.D. x 26 mm length	(1) Main frame with 4 SBHCS (Socket Button Head Cap Screw) (1) Motor plate with 3 SBHCS for attaching to frame* (1) Cover (plastic) * Customer supplies motor screws
	42 mm NEMA 17	UGA040A-3PMM-HF		
	56 mm - 58 mm NEMA 23	UGA040A-3PMM-HG		
	60 mm	UGA040A-3PMM-HH		
	Blank Plate (customer machined)	UGA040A-3PMM-H0		



Vertical Belt Driven System

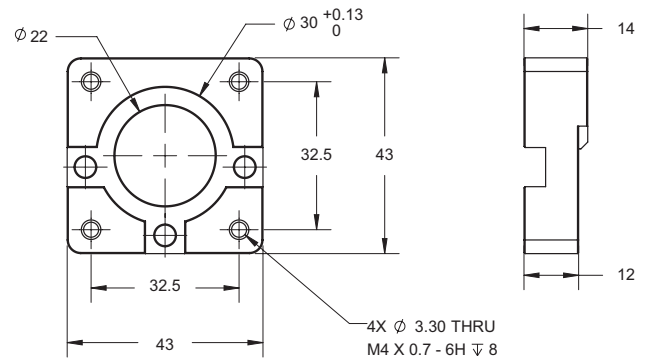
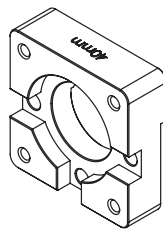
Belt Driven SIMO Series System	Motor Size	Part Number	Recommended Coupler Ordered Separately or Customer Supplied	Included with Motor Mount Purchase
Vertical Belt UGA Low Profile <div>  </div>	40 mm	UGA040A-3PMM-VE	R + W EKL5 Maximum coupler dimensions: 25 mm O.D. x 26 mm length	(1) Main frame with 4 SBHCS (Socket Button Head Cap Screw) (1) Motor plate with 3 SBHCS for attaching to frame* (1) Cover (plastic) * Customer supplies motor screws
	42 mm NEMA 17	UGA040A-3PMM-VF		
	56 mm - 58 mm NEMA 23	UGA040A-3PMM-VG		
	60 mm	UGA040A-3PMM-VH		
	Blank Plate (customer machined)	UGA040A-3PMM-V0		



Motor Plate Dimensions

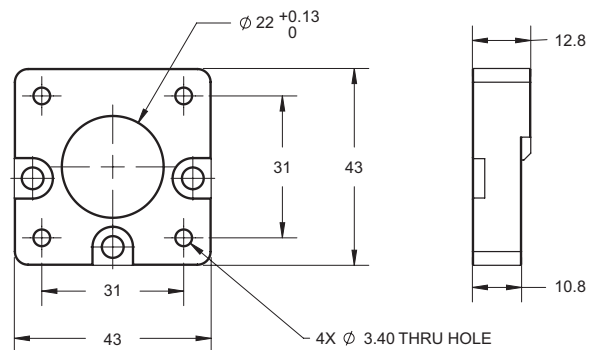
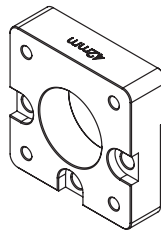
MOTOR SIZE: 40 MM

- Material: Anodized aluminum



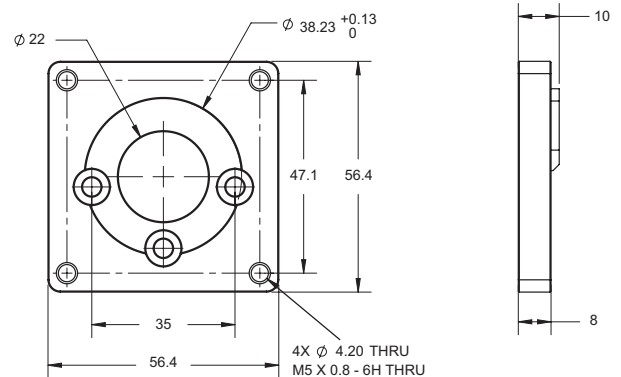
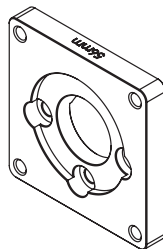
MOTOR SIZE: 42 MM (NEMA 17)

- Material: Anodized aluminum



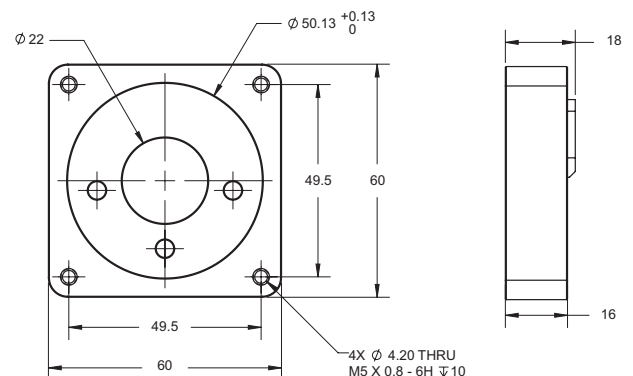
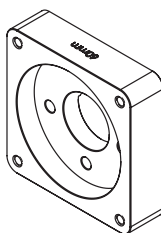
MOTOR SIZE: 56 MM – 58 MM (NEMA 23)

- Material: Anodized aluminum



MOTOR SIZE: 60 MM

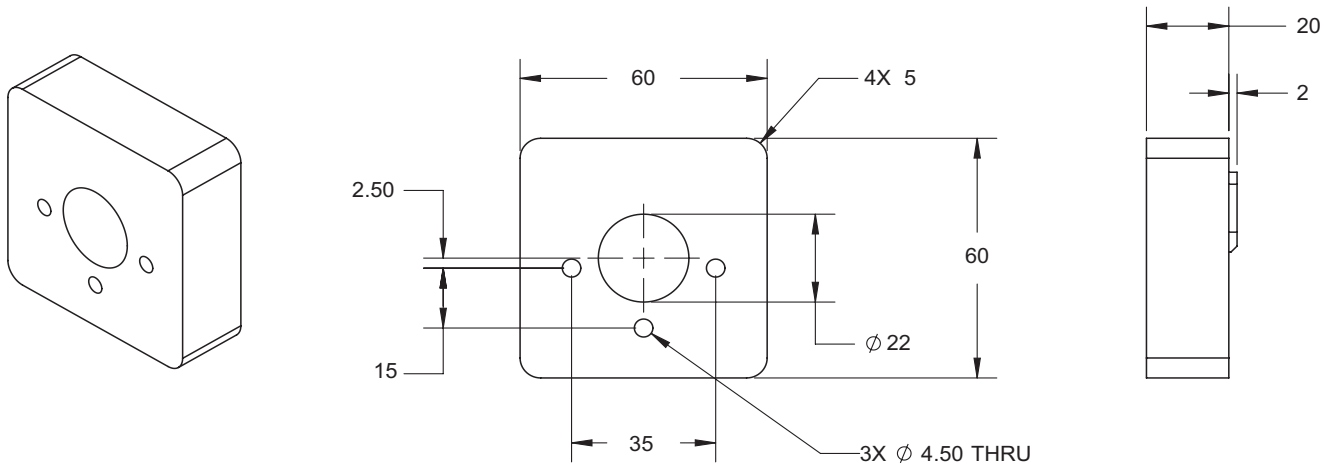
- Material: Anodized aluminum



Blank Plate & Main Frame Dimensions

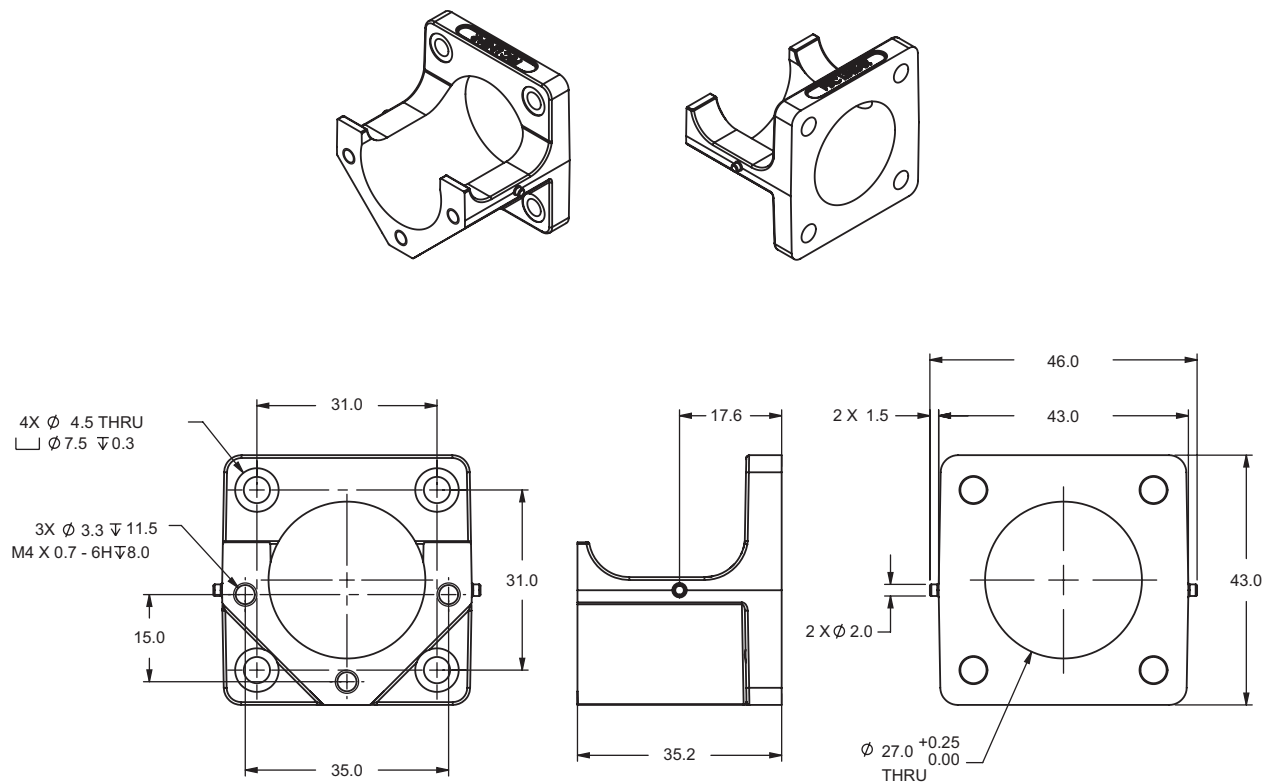
BLANK PLATE

- Intended use: To give customers the ability to machine the plate to match non-standard motor configurations
- Material: Anodized aluminum
- Tip: It is best to clamp on center hole when machining hole pattern for motor attachment.



MAIN FRAME

- Material: Die cast aluminum, clear chromate



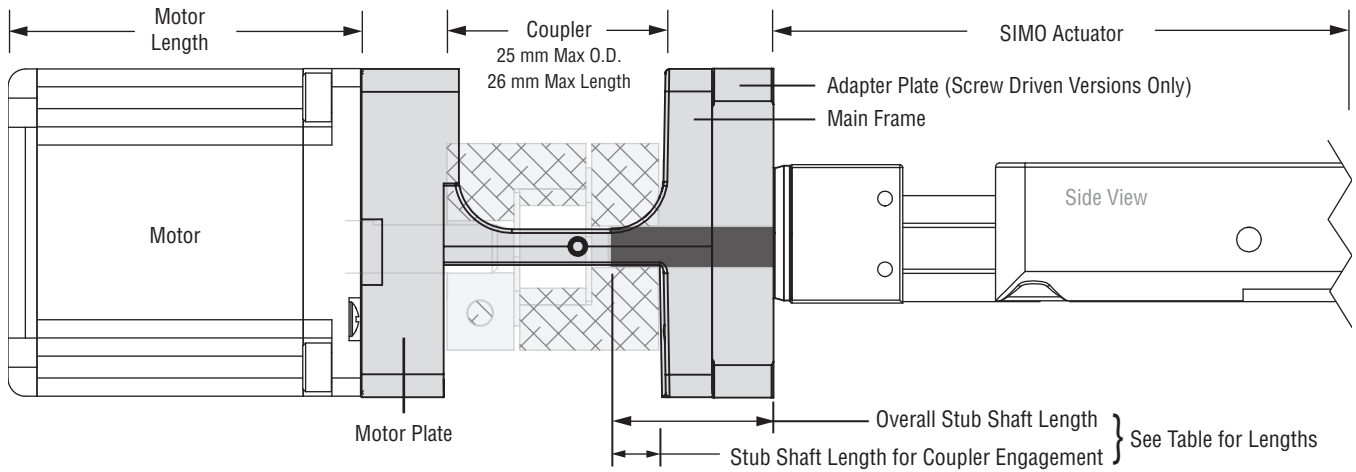
Design Considerations

COUPLER

- Simo Series motor mounts are designed to work optimally with the R+W EKL5 coupler
- Other couplers can be used under the following conditions:
 - Maximum O.D. = 25 mm
 - Maximum length = 26 mm
 - Coupler should be sized per the Simo Series actuator. See the Simo Series catalog for specifications or click [here](#) to view it online.

CAUTION

Verify coupler bore diameters and depths will accept both actuator stub shaft and motor shaft.



STUB SHAFT DIMENSIONS

Type of SIMO System	Screw Driven	Horizontal Belt	Vertical Belt
Stub Shaft Diameter	5 mm	10 mm	5 mm
Overall Stub Shaft Length	21.6 mm	12.5 mm	12.5 mm
Stub Shaft Length for Coupler Engagement	7.427 mm	6.15 mm	6.15 mm

Assembly Procedure • Screw Driven System

SIMO SERIES UGA/UGT WITH LEAD SCREW

Components:

- Base actuator unit
- Motor (customer supplied)
- Motor Mount Kit
 - Adapter Plate
 - Motor Plate
 - Main Frame
 - Cover
- Coupler (customer supplied)

Fasteners: (9) M4 x 12 mm SBHCS (supplied by PBC Linear),
(4) Customer supplied motor fasteners (See Table 2)

Tools Required: Hex Key (See Table 1)

Suggested Thread Locker: Blue Loctite® 242 or equivalent

TABLE 1

Hex Key Size Needed:

M3 SHCS	= 2.5 mm Driver
M4 SBHCS	= 2.5 mm Driver
M5 SHCS	= 4 mm Driver

TABLE 2

Customer Supplied Fasteners:

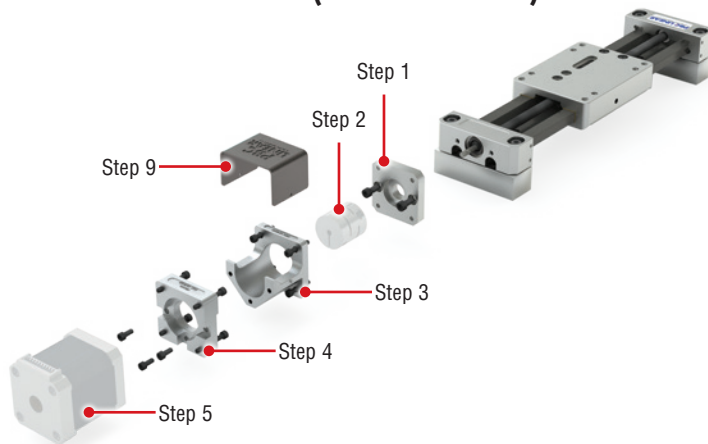
NEMA 17 Motor	= M3 x 0.5 SHCS
NEMA 23 Motor	= M5 x 0.8 SHCS
60 mm Servo Motor	= M5 x 0.8 SHCS

TABLE 3

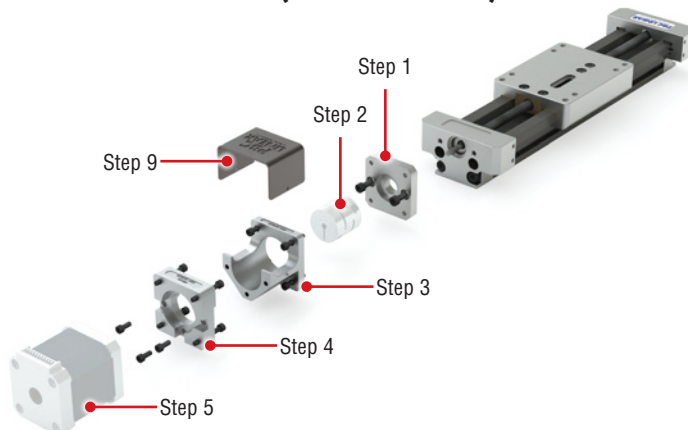
Fastener Torque Values:

M3 SHCS	= 8-10 in/lb	[1.0-1.2 Nm]
M4 SBHCS	= 17-21 in/lb	[2.0-2.4 Nm]
M5 SHCS	= 37-45 in/lb	[4.2-5.1 Nm]

SIMO SERIES – UGA (LOW PROFILE)



SIMO SERIES – UGT (TALL PROFILE)



ASSEMBLY STEPS

1. Install lead screw adapter plate to actuator end cap using hex key and (2) M4 x 12 mm SBHCS. Apply blue Loctite® 242 or equivalent threadlocker and torque to 17-21 in/lb [2.0-2.4 Nm] (See Table 3).
2. Slide coupling onto shaft and leave loose.
3. Install main frame to lead screw adapter plate using (4) M4 x 12 mm SBHCS. Snug fasteners, but do not tighten.
4. Install motor plate to main frame using (3) M4 x 12 mm SBHCS. Apply blue Loctite® 242 or equivalent threadlocker and torque to 17-21 in/lb [2.0-2.4 Nm] (See Table 3).
5. Install motor to motor plate with customer supplied fasteners (See Table 2) and install shaft into coupling. Snug fasteners, but do not tighten.
6. Manually move carriage plate to align coupler and motor.
7. Check for proper shaft engagement on both sides (per coupler manufacturer specs).
8. Once system is aligned, final torque all fasteners appropriately (See Table 3).
9. Install cover on pins in casting (snaps in place).

Assembly Procedure • Horizontal Belt Driven System

SIMO SERIES UGT WITH HORIZONTAL BELT

Components:

- Base actuator unit
- Motor (customer supplied)
- Motor Mount Kit
 - Motor Plate
 - Main Frame
 - Cover
- Coupler (customer supplied)

Fasteners: (7) M4 x 12 mm SBHCS (supplied by PBC Linear),
(4) Customer supplied motor fasteners (See Table 2)

Tools Required: Hex Key (See Table 1)

Suggested Thread Locker: Blue Loctite® 242 or equivalent

TABLE 1

Hex Key Size Needed:

M3 SHCS	= 2.5 mm Driver
M4 SBHCS	= 2.5 mm Driver
M5 SHCS	= 4 mm Driver

TABLE 2

Customer Supplied Fasteners:

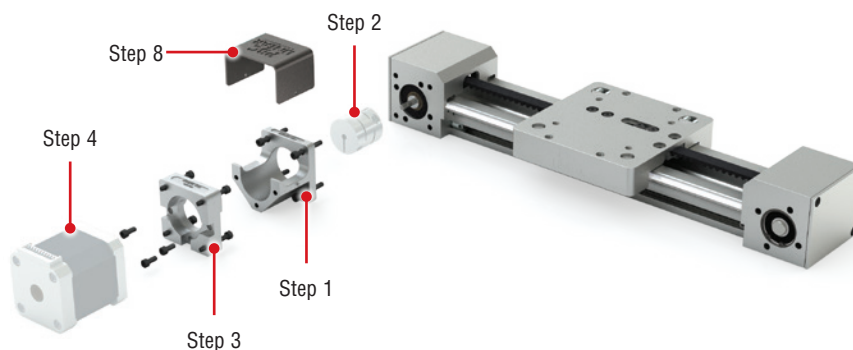
NEMA 17 Motor	= M3 x 0.5 SHCS
NEMA 23 Motor	= M5 x 0.8 SHCS
60 mm Servo Motor	= M5 x 0.8 SHCS

TABLE 3

Fastener Torque Values:

M3 SHCS	= 8-10 in/lb	[1.0-1.2 Nm]
M4 SBHCS	= 17-21 in/lb	[2.0-2.4 Nm]
M5 SHCS	= 37-45 in/lb	[4.2-5.1 Nm]

SIMO SERIES – UGT (TALL PROFILE)



ASSEMBLY STEPS

1. Install main frame to pulley housing using hex key and (4) M4 x 12 mm SBHCS. Snug fasteners, but do not tighten.
2. Slide coupling onto shaft and leave loose.
3. Install motor plate to main frame using (3) M4 x 12 mm SBHCS. Apply blue Loctite® 242 or equivalent threadlocker and torque to 17-21 in/lb [2.0-2.4 Nm] (See Table 3).
4. Install motor to motor plate with customer supplied fasteners (See Table 2) and install shaft into coupler. Snug fasteners, but do not tighten.
5. Manually move carriage plate to align coupler and motor.
6. Check for proper shaft engagement on both sides (per coupler manufacturer specs).
7. Once system is aligned, final torque all fasteners appropriately (See Table 3).
8. Install cover on pins in casting (snaps in place).

Assembly Procedure • Vertical Belt Driven System

SIMO SERIES UGA WITH VERTICAL BELT

Components:

- Base actuator unit
- Motor (customer supplied)
- Motor Mount Kit
 - Motor Plate
 - Main Frame
 - Cover
- Coupler (customer supplied)

Fasteners: (7) M4 x 12 mm SBHCS (supplied by PBC Linear),
(4) Customer supplied motor fasteners (See Table 2)

Tools Required: Hex Key (See Table 1)

Suggested Thread Locker: Blue Loctite® 242 or equivalent

TABLE 1

Hex Key Size Needed:

M3 SHCS	= 2.5 mm Driver
M4 SBHCS	= 2.5 mm Driver
M5 SHCS	= 4 mm Driver

TABLE 2

Customer Supplied Fasteners:

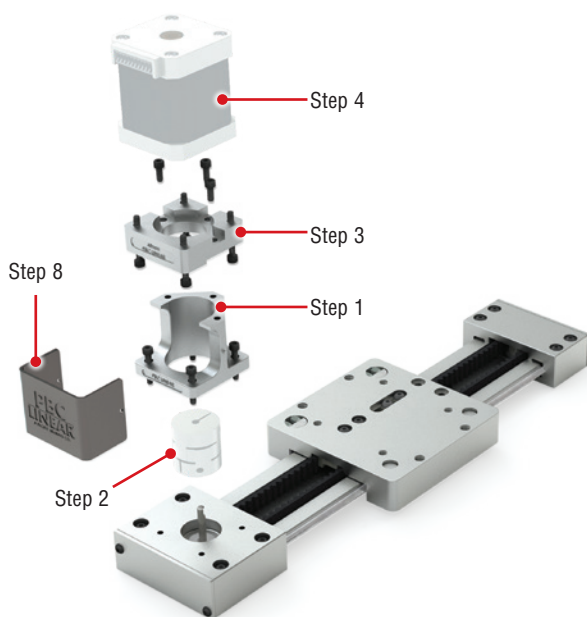
NEMA 17 Motor	= M3 x 0.5 SHCS
NEMA 23 Motor	= M5 x 0.8 SHCS
60 mm Servo Motor	= M5 x 0.8 SHCS

TABLE 3

Fastener Torque Values:

M3 SHCS	= 8-10 in/lb	[1.0-1.2 Nm]
M4 SBHCS	= 17-21 in/lb	[2.0-2.4 Nm]
M5 SHCS	= 37-45 in/lb	[4.2-5.1 Nm]

SIMO SERIES – UGA (LOW PROFILE)



ASSEMBLY STEPS

1. Install main frame to pulley housing using hex key and (4) M4 x 12 mm SBHCS. Snug fasteners, but do not tighten.
2. Slide coupling onto shaft and leave loose.
3. Install motor plate to main frame using (3) M4 x 12 mm SBHCS. Apply blue Loctite® 242 or equivalent threadlocker and torque to 17-21 in/lb [2.0-2.4 Nm] (See Table 3).
4. Install motor to motor plate with customer supplied fasteners (See Table 2) and install shaft into coupling. Snug fasteners, but do not tighten.
5. Manually move carriage plate to align coupler and motor.
6. Check for proper shaft engagement on both sides (per coupler manufacturer specs).
7. Once system is aligned, final torque all fasteners appropriately (See Table 3).
8. Install cover on pins in casting (snaps in place).

User Manual

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TIPS FOR SAFE INSTALLATION AND OPERATION

- Only qualified personnel should transport, assemble, operate, and maintain this equipment.
- Always wear appropriate personal protection equipment, such as safety glasses and hearing protection.
- Read and observe the installation, operating, and safety instructions provided by the manufacturer. Incorrect handling and operation may result in damage to equipment and personal injury.
- Comply with all installation specifications and requirements to ensure proper setup.
- Provide a flat and stable mounting surface.
- Be sure sufficient space is provided to permit full carriage travel with no hard stops.
- Be sure power is OFF before performing actuator maintenance.
- The unit should be checked regularly for worn or damaged components. Follow recommended service intervals and replace defective parts immediately. Always replace parts with the same make and model as the original.
- Be aware that most actuator configurations are not self-braking. A load can move if the drive force is disconnected, or if drive train components (motors, pulleys, belts) are detached. This is particularly true for vertical applications. The load should be secured prior to service. Consider installing an electromechanical power-off brake in vertical configurations to prevent potential damage or personal injury.
- Actuators should be wiped down occasionally to keep them clean. Use fluids sparingly, and be sure none seeps inside. Do not use strong or harsh cleaning agents.
- Always test run actuators after maintenance work is completed.
- Do not back-drive the lead screw by moving the carriage by hand. See “Manual Movement of Carriage” in the Installation section for the proper procedure.

User Manual Lead Screw UGA: Mounting with Riser Plates

MOUNTING WITH RISER PLATES

PBC Linear recommends using low strength threadlocker on mounting screws.

Be sure power is OFF before performing actuator maintenance.

1. Establish the location where the two riser plates will be installed.
2. Drill and tap two M6 x 1.0 threaded holes in the mounting surface for each riser plate (see illustrations below). Drill to a depth appropriate for the application.
3. Attach each riser plate to the mounting surface with two M6 x 1.0 SHCS and torque to 6.5-8.0 N-m/57-70 in-lbs. **Fastener length to be determined by installer, as appropriate for the application.**
4. Attach the actuator to each riser plate with two M6 x 1.0 x 25mm SHCS and torque to 6.5-8.0 N-m/57-70 in-lbs.

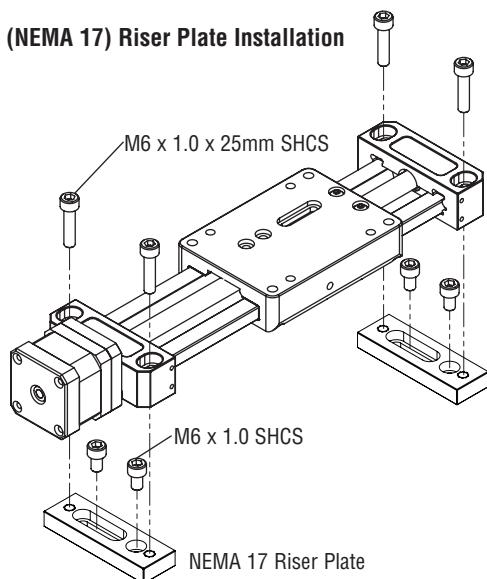
TOOLS REQUIRED

5 mm hex wrench

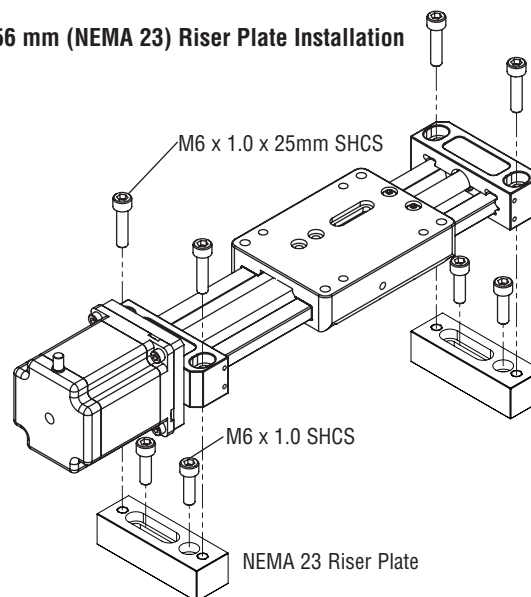
PARTS LIST

Riser Plates
M6 x 1.0 x 25mm SHCS
M6 x 1.0 SHCS

42 mm (NEMA 17) Riser Plate Installation

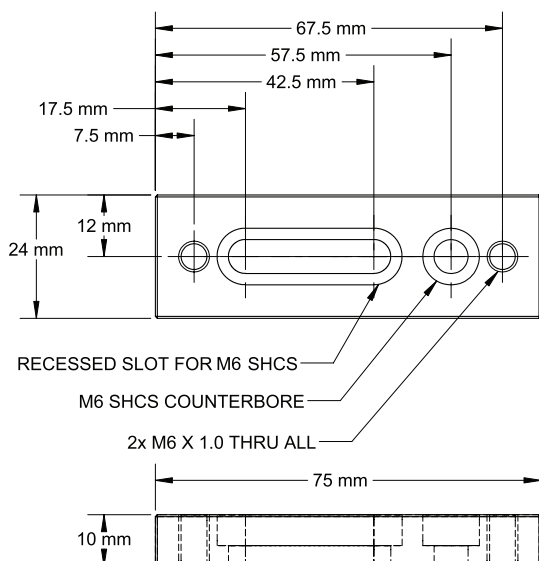


56 mm (NEMA 23) Riser Plate Installation



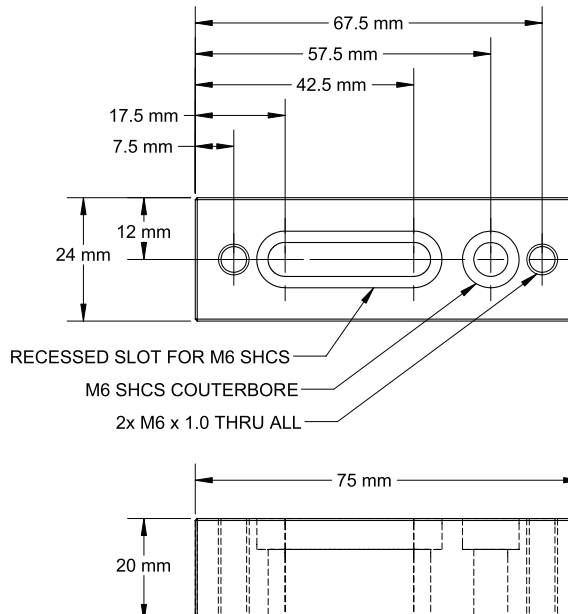
10 mm Height Riser Block Dimensions

Typically used with 40-42 mm (NEMA 17) motors



20 mm Height Riser Block Dimensions

Typically used with 56-60 mm (NEMA 23) motors



User Manual Lead Screw UGA: Mounting with End Blocks

MOUNTING WITH END BLOCKS

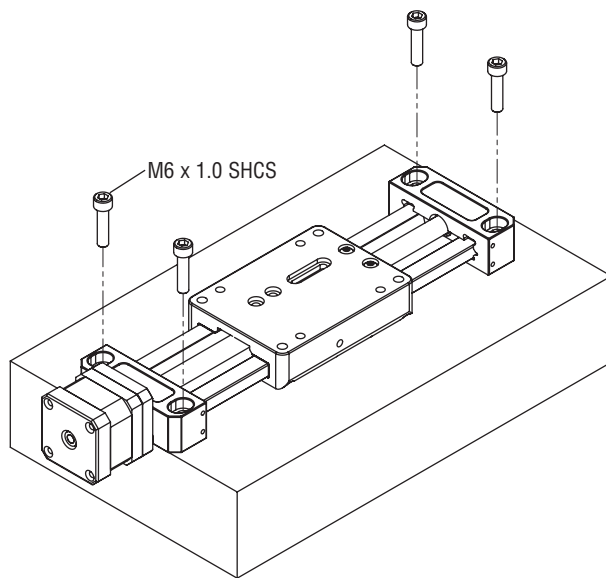
PBC Linear recommends using low strength threadlocker on mounting screws.

Be sure power is OFF before performing actuator maintenance.

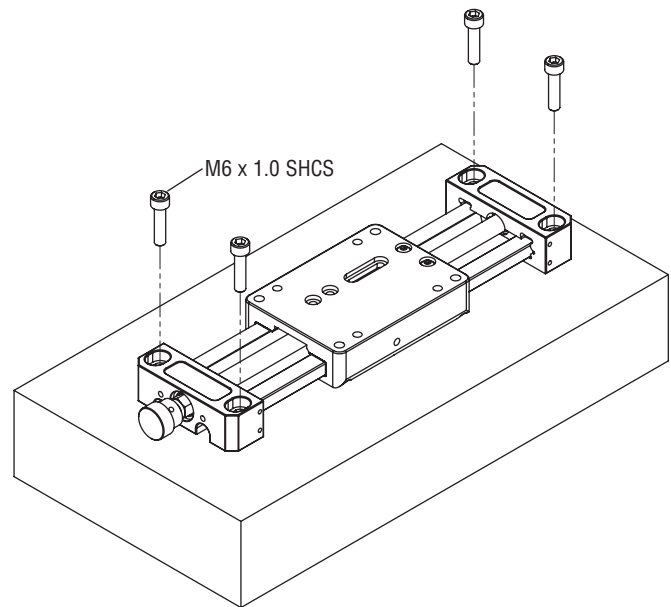
1. Establish the location where the actuator will be installed.
2. Drill and tap two M6 x 1.0 threaded holes in the mounting surface for each end block (see illustrations below). Drill to a depth appropriate for the application.
3. Attach each end block to the mounting surface with two M6 x 1.0 SHCS and torque to 6.5-8.0 N-m/57-70 in-lbs. Fastener length to be determined by installer, as appropriate for the application.

TOOLS REQUIRED
5 mm hex wrench

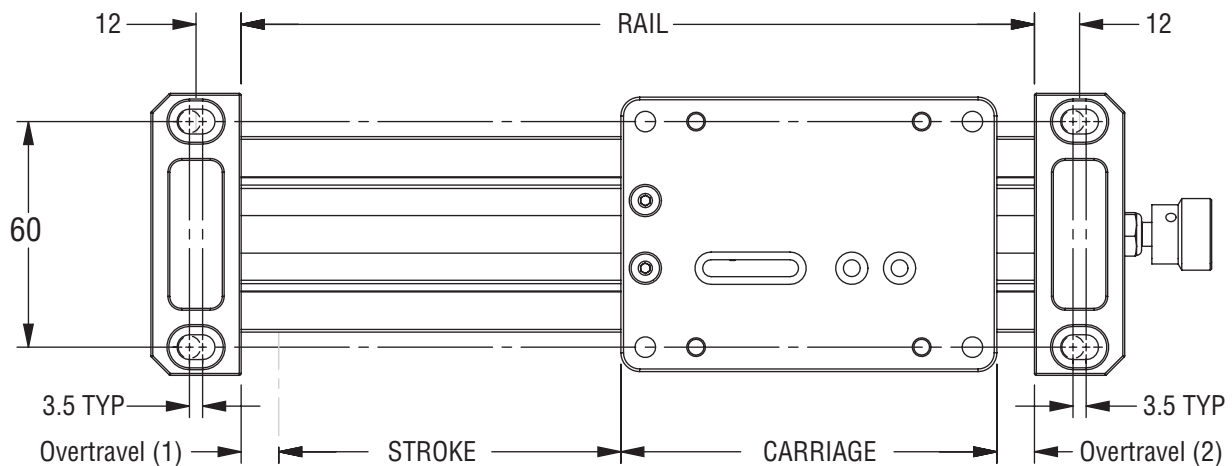
PARTS LIST
M6 x 1.0 SHCS



Motor must hang free of mounting surface to facilitate a flush mount without riser plates



Actuator equipped with hand knob or shaft will be flush with mounting surface



Mounting Pattern

(60 mm) by (Rail) + 24 mm

OR

(60 mm) by (Carriage + Stroke + OT(1) + OT(2) + 24 mm)

User Manual Vertical Belt UGA: Extrusion Mount

VERTICAL BELT UGA: EXTRUSION MOUNT

PBC Linear recommends using low strength threadlocker on mounting screws.

Be sure power is OFF before performing actuator maintenance.

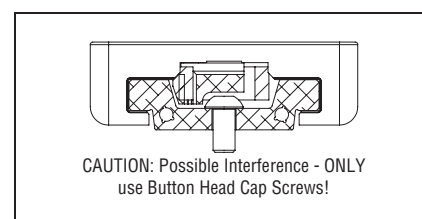
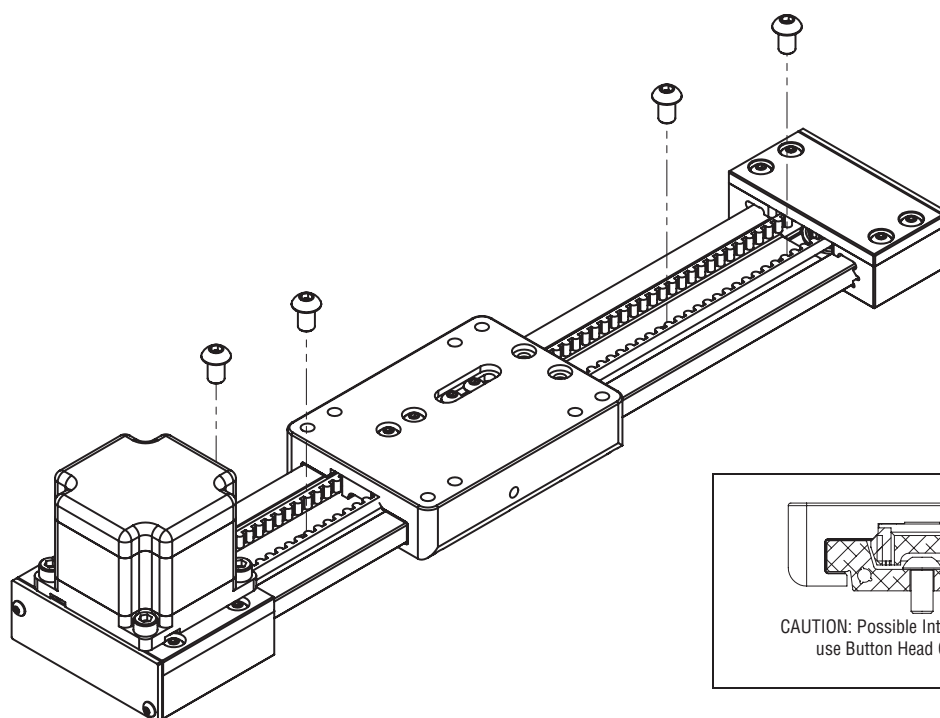
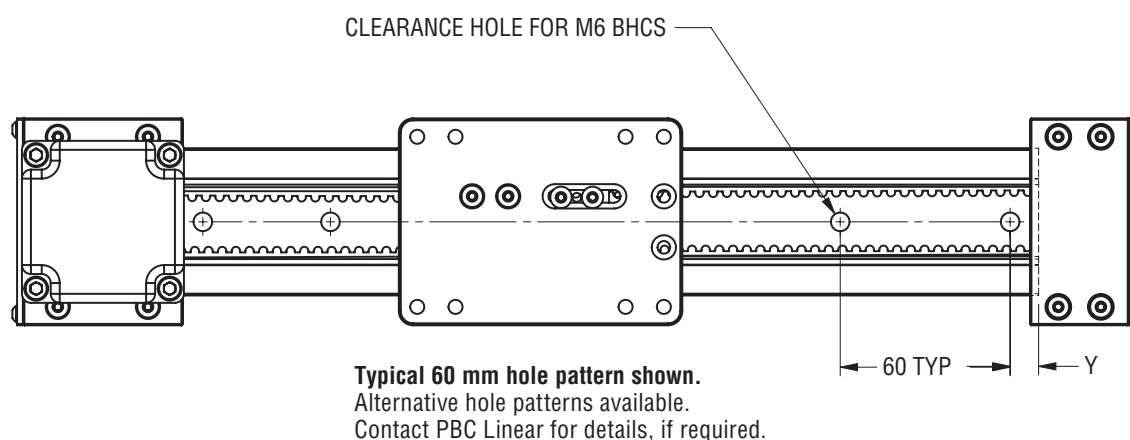
1. Establish the location where the actuator will be installed.
2. Drill and tap M6 x 1.0 threaded holes in the mounting surface using typical hole pattern shown below or applicable alternative. Drill to a depth appropriate for the application.
3. Attach the actuator to the mounting surface with M6 x 1.0 BHCS and torque to 10 N-m/88.5 in-lbs. **Fastener length to be determined by installer, as appropriate for the application.**

TOOLS REQUIRED

4 mm hex wrench

PARTS LIST

M6 x 1.0 BHCS



User Manual UGT: Mounting with Toe Clamps

TOE CLAMP INSTALLATION

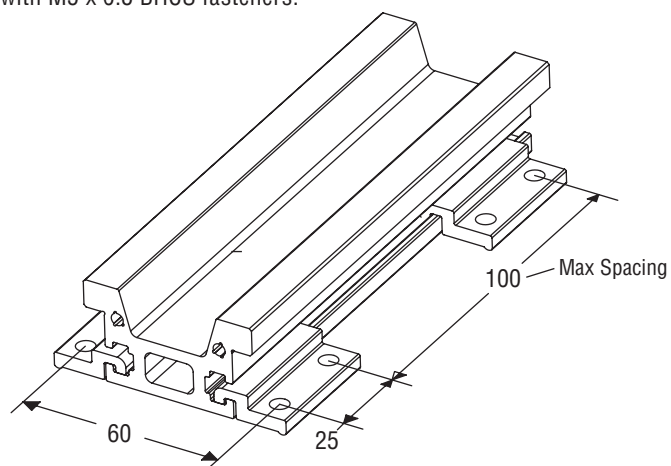
PBC Linear recommends using low strength threadlocker on mounting screws.

Be sure power is OFF before performing maintenance.

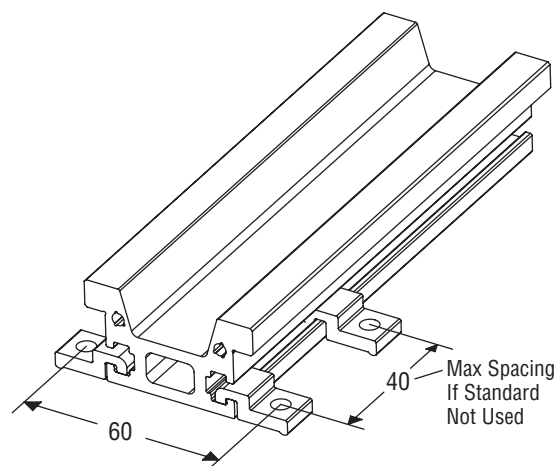
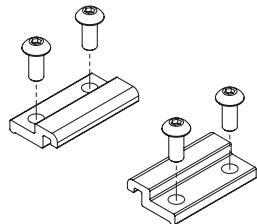
1. Establish the location where the actuator and toe clamps will be installed.
2. Drill and tap an M5 x 0.8 threaded hole in the mounting surface for each single toe clamp, or two M5 x 0.8 threaded holes for each double. See illustrations below.
3. Position toe clamps on the actuator as show in the illustrations below, then install with M5 x 0.8 BHCS fasteners.

TOOLS REQUIRED
3 mm hex wrench

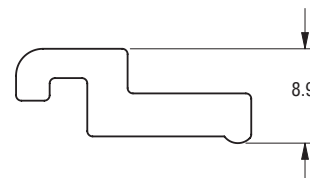
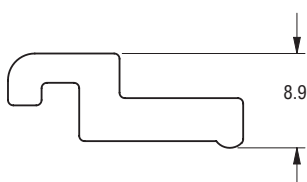
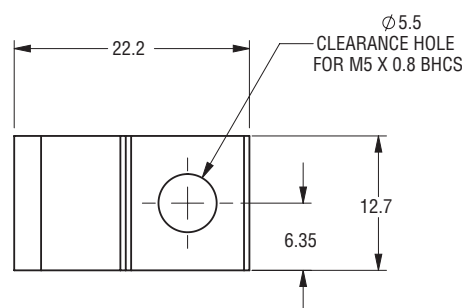
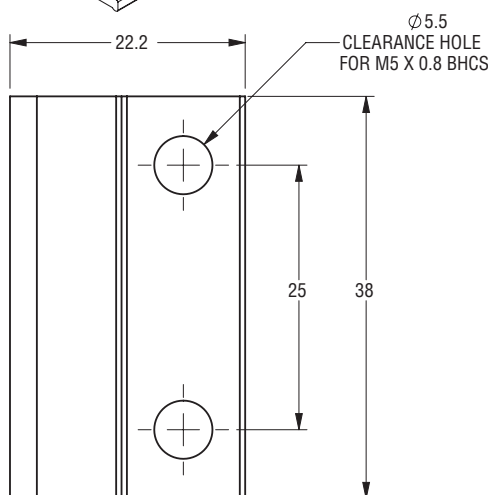
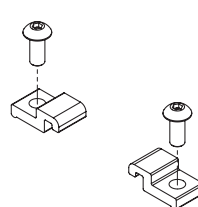
PARTS LIST
M5 x 0.8 BHCS



**STANDARD
Double Toe Clamp**



**OPTIONAL
Single Toe Clamp**
Used when space is limited
Also used to clamp the rail onto a standard carriage for XY systems



User Manual Initial Lubrication

INITIAL LUBRICATION DURING INSTALLATION (CRT, PRT, BALL SCREW)

Some PBC Linear systems are shipped with a preservative lubrication applied to the raceways. If so, additional lubrication should be applied during installation. Proper lubrication dissipates heat, increases service life, and reduces friction, wear, and corrosion. Recommended lubricants are listed where applicable, but there are some lubricants which **SHOULD NOT** be used on any SIMO configuration.

DO NOT USE: WD40; motor oil; oils with additives; moly or other filled greases; PTFE sprays, oils, or greases; or sprays containing fluorocarbons or silicone.

Plain Bearing Lubrication (GST - Gliding Surface Technology)

The GST plain bearing utilizes bonded FrelonGOLD®, self-lubricating, maintenance-free bearing surfaces. If desired, adding lubrication will increase life, lessen noise, and lower the coefficient of friction. Oil or grease can be brushed on the raceway, or a lubrication storage system can be added via the optional “JKM” lube kit for GST carriages (Part# UGA040A-JKM-KIT).

IMPORTANT: Oil is recommended for saturating the felt strips in the “JKM” lube kit. If grease is used on bearing surfaces, the felt strip **MUST** be removed or the grease will cause the strip to act as a brake! **DO NOT** disassemble a driven system. **DO** contact a PBC Linear application engineer for guidance regarding felt strip removal.

Recommended Lubricants: way lube oils, lightweight oils, 3-IN-ONE® oils, and lightweight petroleum-based greases.

Proceed as follows:

- Wipe or brush a thin layer of lubricant along the entire length of the guide rail raceways.
- Move the carriage back and forth at least four times to thoroughly distribute lubricant.

V-Guide Bearing Lubrication (CRT - Cam Roller Technology)

The inside of the V-Wheels are sealed for life and require no lubrication during normal operation. The outer race should be routinely inspected for damage and wear. **Note:** Do not attempt to disassemble V-Wheels.

The V-Guide stainless steel raceways are lubricated by oil-filled, porous polymer lubricators mounted in the carriage. This advanced polymer provides better performance and longer life than similar wiper/lubricators equipped with oil saturated felt. **Note:** These lubricators may emit a squealing or chirping sound when replacement is necessary.

Additional lubrication will increase life, lessen noise, and lower the coefficient of friction.

Recommended Grease: Synthetic oil based lithium-soap grease with an ISO VG32-100 viscosity.

Recommended Oil: Synthetic oil CLP or CGLP based on DIN 51517, or HLP based on DIN51524.

Viscosity range should be ISO VG32-100.

Proceed as follows:

- Wipe or brush a thin layer of lubricant along the entire length of the V-Guide raceways.
- Move the carriage back and forth at least four times to thoroughly distribute lubricant.

Profile Rail Lubrication (PRT - Profile Rail Technology)

Profile Rail recirculating ball bearing guide blocks are prelubricated for immediate use when new. If required, lubrication can be reapplied through the injection holes on either end of the guide blocks using a special injector available from PBC Linear.

Lubricating the profile rail raceways will increase life, lessen noise, and lower the coefficient of friction.

Recommended Grease: Synthetic oil based lithium-soap grease with an ISO VG32-100 viscosity.

Recommended Oil: Synthetic oil CLP or CGLP based on DIN 51517, or HLP based on DIN51524.

Viscosity range should be ISO VG32-100.

Proceed as follows:

- Wipe or brush a thin layer of lubricant along the entire length of the profile rail raceways.
- Move the carriage back and forth at least four times to thoroughly distribute lubricant.

Ball Screw

Recommended Grease: Synthetic oil based lithium-soap grease with an ISO VG32-100 viscosity.

Recommended Oil: Synthetic oil CLP or CGLP based on DIN 51517, or HLP based on DIN51524.

Viscosity range should be ISO VG32-100.

User Manual Relubrication

RELUBRICATION

Linear guide raceways should be relubricated periodically with oil or grease. Recommended lubricants are listed where applicable, but there are some lubricants which **SHOULD NOT** be used on any SIMO configuration.

DO NOT USE: WD40; motor oil; oils with additives; moly or other filled greases; PTFE sprays, oils, or greases; or sprays containing fluorocarbons or silicone.

The relubrication interval is dependent on many operating and environmental conditions, such as load, stroke, velocity, acceleration, lubrication type, mounting position/orientation, UV exposure, temperature, and humidity. The actual lubrication interval should be determined by tests conducted under actual application conditions.

While the actual relubrication intervals are application specific and determined only through testing, the following “first check” guidelines can typically be used as a starting reference point under “normal” conditions:

Relubrication every 1000 km; 50000 cycles; or six months (whichever occurs first)

Extended Lubrication Interval

If your actuator is equipped with the optional “JKM” lube kit (GST), oil-filled wipers (CRT), or “EZ” lube system (PRT), you can extend the first check to:

Relubrication every 2500 km; 100000 cycles; or one year (whichever comes first)

EXTREME APPLICATIONS

Unusually demanding circumstances (high speeds, extreme temperatures, shock, vibration, contamination, submersion) will require more frequent relubrication intervals.

RECOMMENDED LUBRICANTS

Plain Bearing (GST - Gliding Surface Technology)

Recommended Lubricants: way lube oils, lightweight oils, 3-IN-ONE® oils, and lightweight petroleum-based greases.

V-Guide Bearing (CRT - Cam Roller Technology)

Recommended Grease: Synthetic oil based lithium-soap grease with an ISO VG32-100 viscosity.

Recommended Oil: Synthetic oil CLP or CGLP based on DIN 51517, or HLP based on DIN51524.

Viscosity range should be ISO VG32-100.

Profile Rail (PRT - Profile Rail Technology)

Recommended Grease: Synthetic oil based lithium-soap grease with an ISO VG32-100 viscosity.

Recommended Oil: Synthetic oil CLP or CGLP based on DIN 51517, or HLP based on DIN51524.

Viscosity range should be ISO VG32-100.

Lead Screw

The PTFE coated lead screw and polymer nut require no lubrication during normal operation, but should be routinely inspected for damage and wear. In certain applications, however, an external lubricant may be desirable. Contact a PBC Linear applications engineer for guidance regarding additional lubrication.

Ball Screw

Recommended Grease: Synthetic oil based lithium-soap grease with an ISO VG32-100 viscosity.

Recommended Oil: Synthetic oil CLP or CGLP based on DIN 51517, or HLP based on DIN51524.

Viscosity range should be ISO VG32-100.

User Manual Horizontal and Vertical Belt Tension Adjustment

HORIZONTAL AND VERTICAL BELT TENSION ADJUSTMENT

PBC Linear recommends using low strength threadlocker on mounting screws.

Be sure power is OFF before performing maintenance.

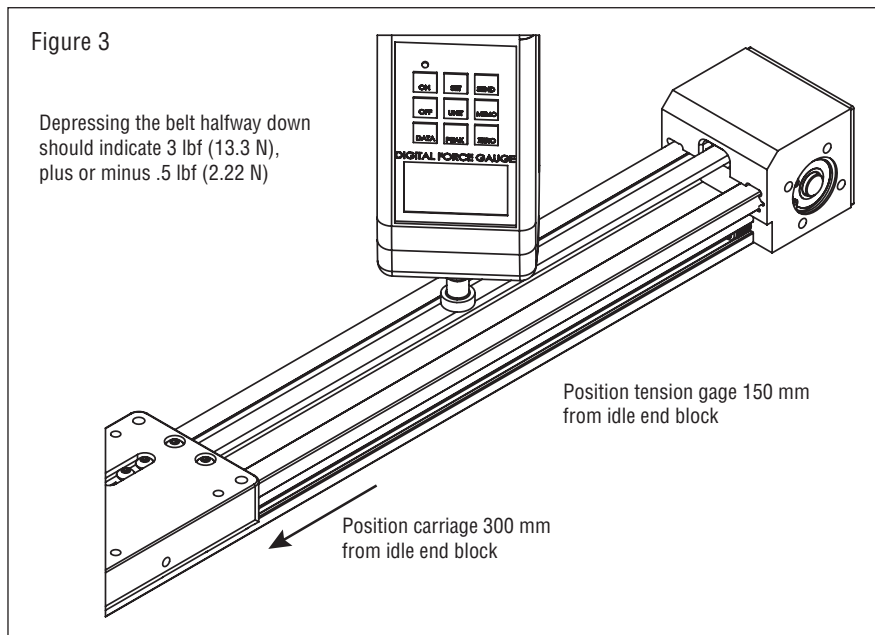
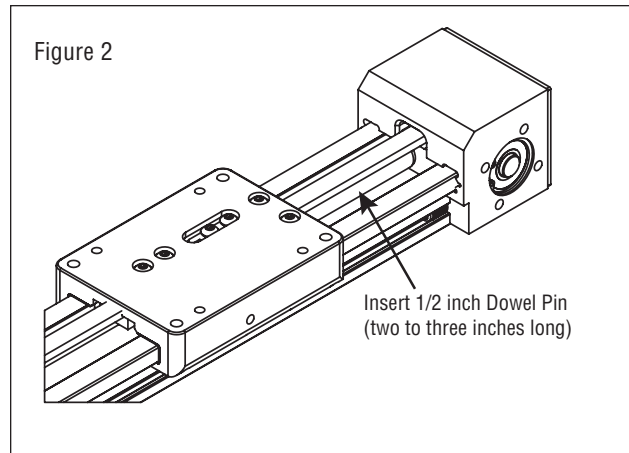
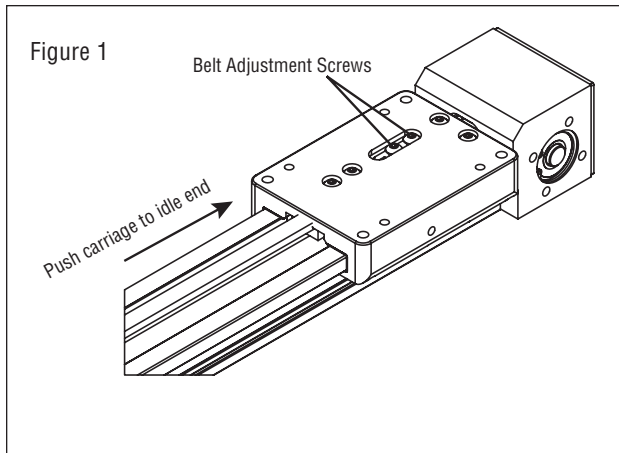
1. Push the carriage to the idle end of the assembly (see Figure 1).
2. Using a 2.5 mm hex wrench, loosen both belt adjustment screws slightly (see Figure 1). There should be some tension to prevent the belt from detaching.
3. Place a half inch diameter dowel pin, two to three inches long, between the carriage and the idle end block (see Figure 2).
4. While pushing the carriage against the dowel pin to keep the belt taut, tighten both belt adjustment screws.
5. Back the carriage up 300 mm from the idle end block (see Figure 3).
6. Depress the belt with a tension gage positioned centrally between the carriage and the idle end block (see Figure 3).
7. Pushing the belt halfway down should indicate 3 lbf (13.3 N), plus or minus .5 lbf (2.22 N).
8. If the tension is incorrect, repeat the above procedure, either increasing or decreasing the tension as required to reach 3 lbf (13.3 N), plus or minus .5 lbf (2.22 N).

TOOLS REQUIRED

2.5 mm hex wrench
Tension Gage

PARTS LIST

1/2 inch Dowel Pin
(two to three inches long)



User Manual Horizontal Belt Replacement

HORIZONTAL BELT REPLACEMENT

PBC Linear recommends using low strength threadlocker on mounting screws.

Be sure power is OFF before performing maintenance.

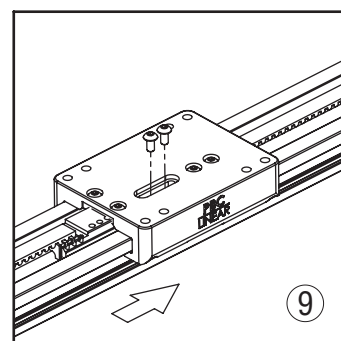
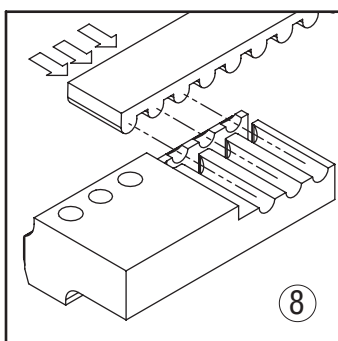
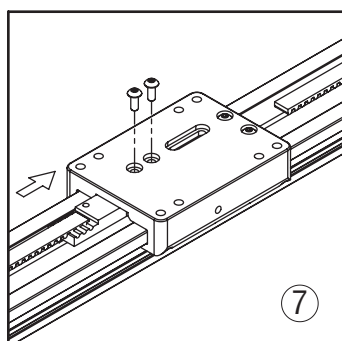
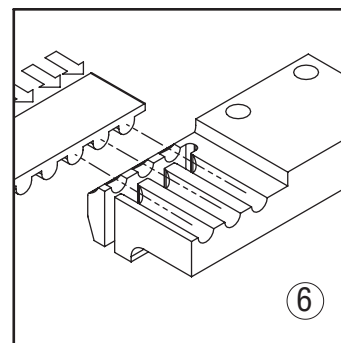
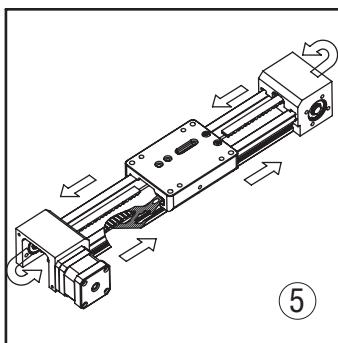
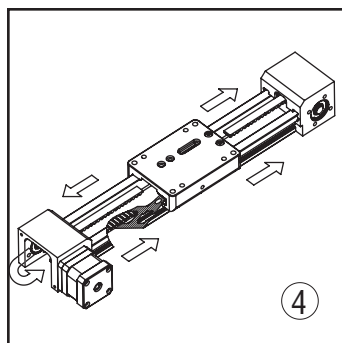
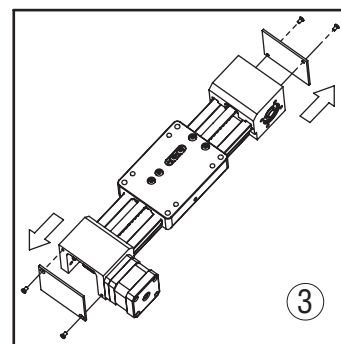
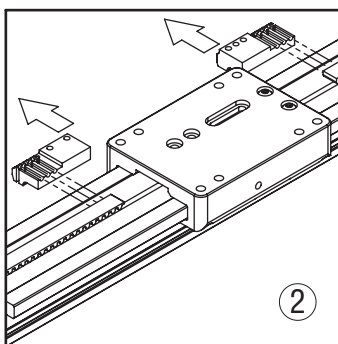
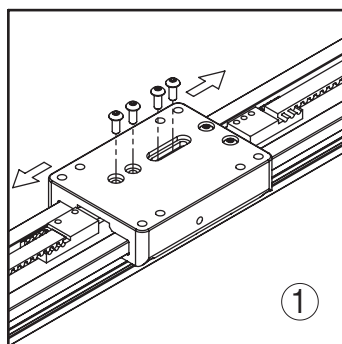
1. Remove four M4 button head cap screws securing the pulley clamps, then pull both clamps from beneath the carriage.
2. Remove both pulley clamps from the belt.
3. Remove the actuator end plates, if applicable.
4. Pull the belt around the pulley through the drive end block, then around the pulley through the idle end block, then pull it free of the actuator.
5. Feed the new belt through the actuator as show in the illustration. Be sure not to miss a tooth when wrapping the belt around the pulleys!
6. Insert the new belt end into the fixed pulley clamp. Be sure that all belt teeth engage the clamp.
7. Slide the fixed pulley clamp under the carriage, then fully tighten the two M4 x 0.7 button head cap screws that secure it in place.
8. Insert the other end of the belt into the adjustable pulley clamp. Be sure that all belt teeth engage the clamp.
9. Slide the adjustable pulley clamp under the carriage. Insert, but do not fully tighten the two button head cap screws. Follow the "Horizontal Belt Tension Adjustment" procedure on the previous page to set belt tension.

TOOLS REQUIRED

2.5 mm hex wrench

PARTS LIST

Pulley Belt
M4 x 0.7 BHCS



User Manual Vertical Belt Replacement

VERTICAL BELT REPLACEMENT

PBC Linear recommends using low strength threadlocker on mounting screws.

Be sure power is OFF before performing maintenance.

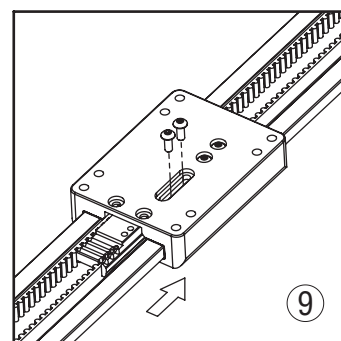
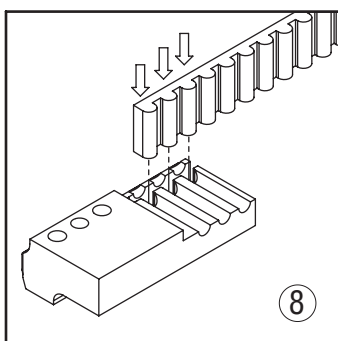
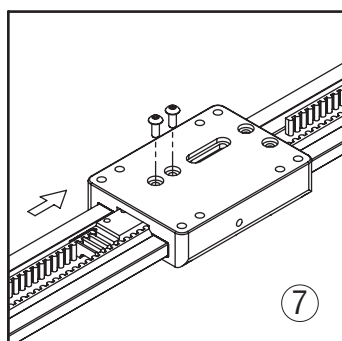
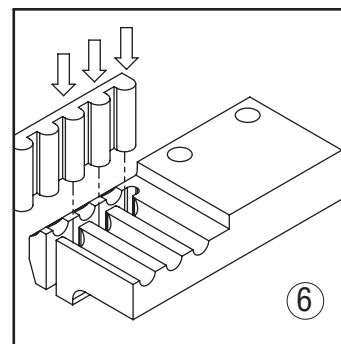
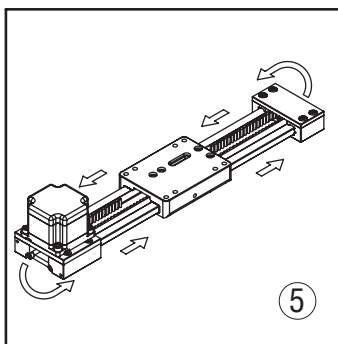
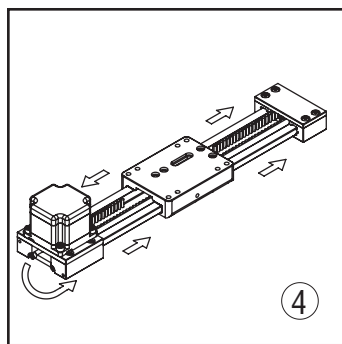
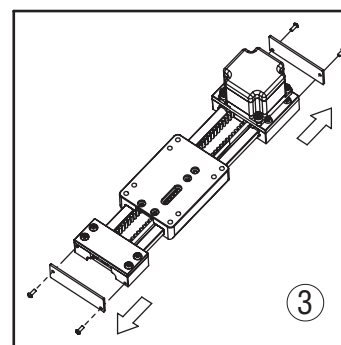
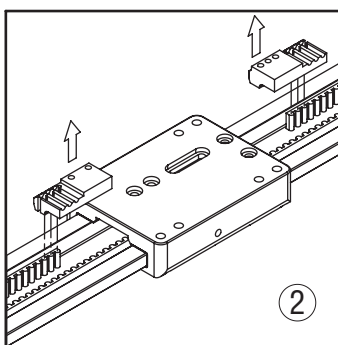
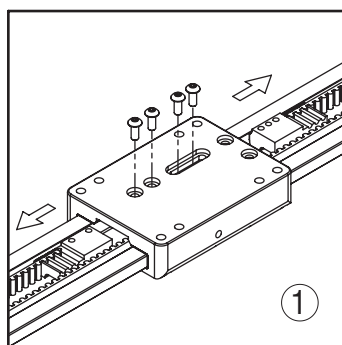
1. Remove four M4 button head cap screws securing the pulley clamps, then pull both clamps from beneath the carriage.
2. Remove both pulley clamps from the belt.
3. Remove the actuator end plates, if applicable.
4. Pull the belt around the pulley through the drive end block, then around the pulley through the idle end block, then pull it free of the actuator.
5. Feed the new belt through the actuator as show in the illustration. Be sure not to miss a tooth when wrapping the belt around the pulleys!
6. Insert the new belt end into the fixed pulley clamp. Be sure that all belt teeth engage the clamp.
7. Slide the fixed pulley clamp under the carriage, then fully tighten the two M4 x 0.7 button head cap screws that secure it in place.
8. Insert the other end of the belt into the adjustable pulley clamp. Be sure that all belt teeth engage the clamp.
9. Slide the adjustable pulley clamp under the carriage. Insert, but do not fully tighten the two button head cap screws. Follow the "Vertical Belt Tension Adjustment" procedure on the previous page to set belt tension.

TOOLS REQUIRED

2.5 mm hex wrench

PARTS LIST

Pulley Belt
M4 x 0.7 BHCS



Simultaneous Integral Milling Operation **SIMO**®



PBC Linear has revolutionized traditional machining with the patent pending SIMO® (Simultaneous Integral Milling Operation). The SIMO process uses synchronized cutters, eliminating built-in extrusion variances by machining all critical edges concurrently in one pass. This ensures tight tolerances, limited variance and a remarkably straight and repeatable surface at negligible additional cost!

PATENT PENDING MACHINING PROCESS



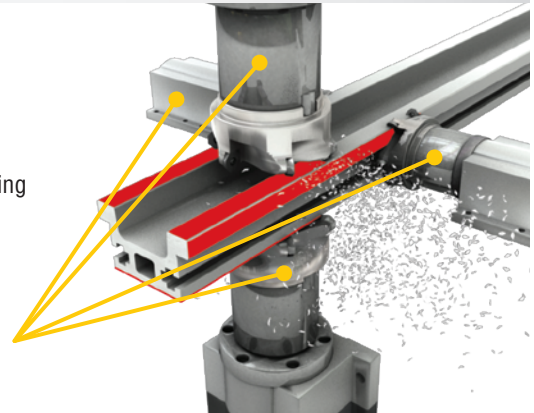
MACHINED PRECISION AT EXTRUSION PRICES

- Rigid, accurate, repeatable
- Low cost
- Machined rail edges can be used as a reference when mounting



[Link to the SIMO process video](#)

Synchronized Cutters
Eliminate Built-In
Extrusion Variances



Standard Aluminum Extrusion

Straightness (Camber)

.0125 in/ft (1 mm/m)

Twist

1/2° per ft (1.5° per m)

Flatness

.004 in (.10 mm)

⇒ **6 TIMES BETTER** ⇒

⇒ **2 TIMES BETTER** ⇒

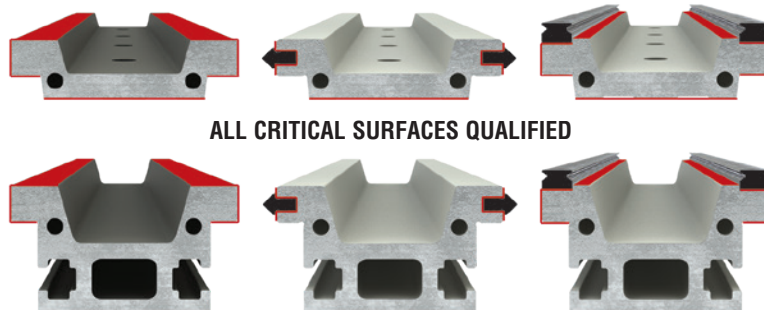
⇒ **2 TIMES BETTER** ⇒

SIMO

± .002 in/ft (.166 mm/m)

< 1/4° per ft (.82° per m)

.002 in (.0508 mm)



ALL CRITICAL SURFACES QUALIFIED



Engineering Your Linear Motion Solutions



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