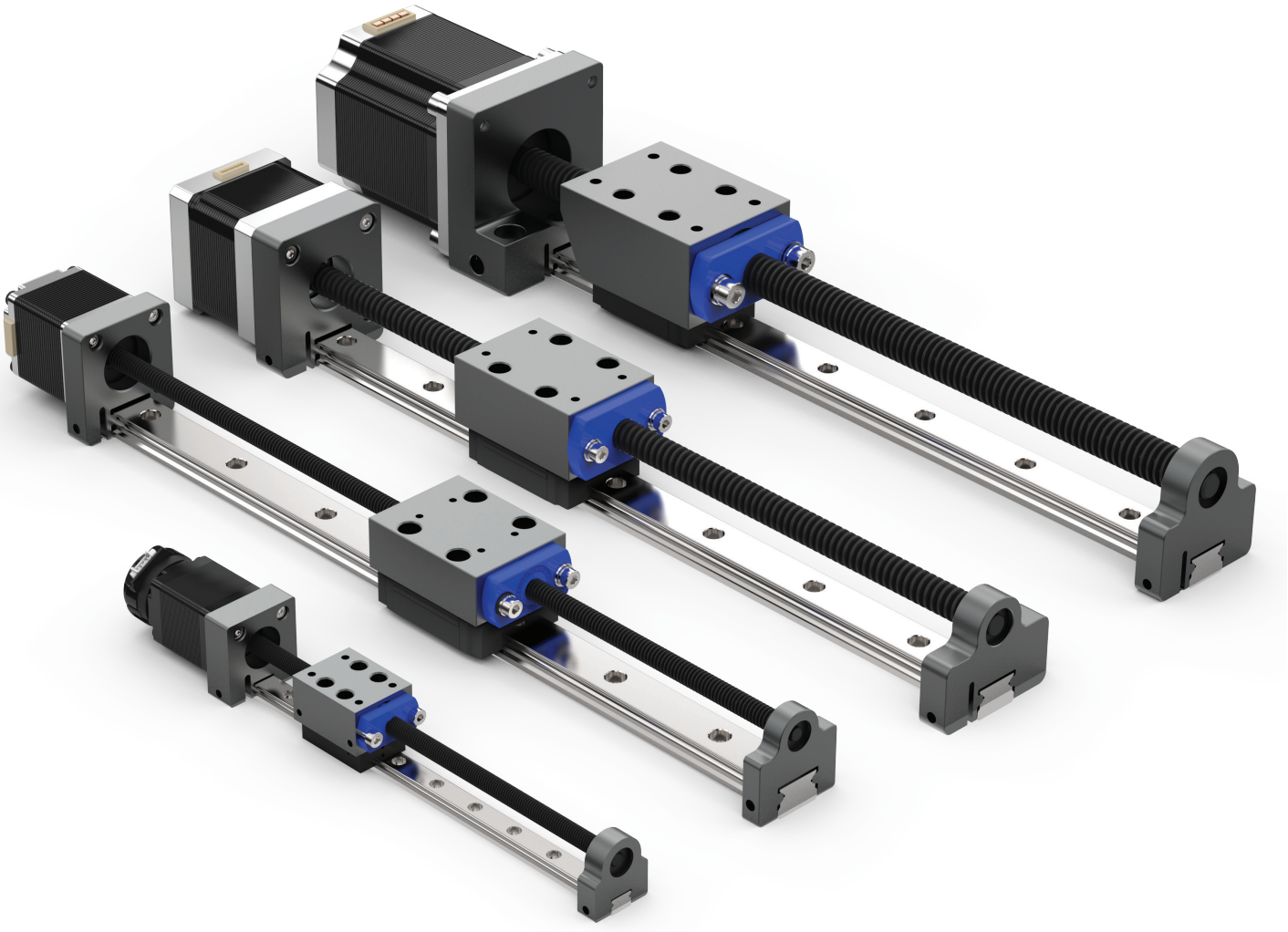
HELIX™
LINEAR TECHNOLOGIES

PRA

PROFILE RAIL LINEAR ACTUATORS



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ISO 9001 : 2015 CERTIFIED

helixlinear.com

Helix Linear Technologies, Inc., Beachwood, Ohio USA

Helix Linear Technologies is the most high-tech lead screw manufacturing facility globally, producing the broadest product line of any lead screw manufacturer. We offer precision rolled, milled, and ground screws in diameters from 1.6 mm to 152.4 mm and leads from .3 mm to 75 mm. When you need Acme, Trapezoidal, or high-helix lead screws with precision low-backlash nuts, or a state-of-the-art anti-backlash design, we deliver the highest quality coupled with exceptional value.

Helix Linear Technologies offers a complete line of nuts in standard, anti-backlash, or custom designs with centralizing threads to match our precision lead screws, making our assemblies the lowest backlash product on the market. Our nuts come in various materials, including Acetal, PEEK, Bronze, Ertalyte, Carbon-Filled HPV, Turcite, Torlon, Vespel, PAI, PVDF, and medical-grade Acetal to fit your specific use and environment.

CULTURE

Our culture is rooted in teamwork and consists of smart, happy, and competitive professionals focused on manufacturing innovative products and delivering precise electromechanical linear motion solutions. We are in the people business, as well as the product business. Our talented employees make and sell our products, and our extraordinary scope of teamwork keeps our company healthy.

OPERATIONS

Our company delivers high-quality products and offers world-class engineering support, solving the most demanding linear motion applications across multiple industries. We manufacture components and subsystem solutions to high volume OEMs and custom machine builders to ensuring their success.

COMPANY

Helix Linear Technologies is a global supplier in the medical device, life science, security, semiconductor, aerospace, electromechanical, and defense industries. Leading the linear motion industry by manufacturing the highest quality linear actuation solutions in the world, we focus on helping our customers be productive and profitable. Our innovative product design solves real-world linear motion issues and builds a foundation for long term success.

HISTORY

Helix Linear Technologies was founded in 2011 to meet the demand for high-quality lead screws in the growing electromechanical actuation industry. Our rapid growth has included the addition of end-to-end linear actuator

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PARTNERS

ASSOCIATION FOR HIGH TECHNOLOGY DISTRIBUTION AHTD

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CERTIFICATIONS

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QUICK SHIP · 24 HR QUOTES · 2D/3D CAD

Helix Profile Rail Linear Actuators feature smooth, clean and quiet linear positioning. The PRA line is built with a 300 series stainless steel precision lead screw coated with the Helix H4X™ PTFE dry lubricant that extends the lead screw nut life by up to 10X. The lead screw assembly incorporates a standard or anti-backlash nut to eliminate axial and radial lash.

The profile rail linear actuator utilizes a precision ground profile rail for guidance to deliver pitch, roll and yaw guidance. These pre-assembled linear actuators offer a turn-key solution for linear motion solutions and quick deliveries.

PROFILE RAIL LINEAR ACTUATOR ORDERING GUIDE

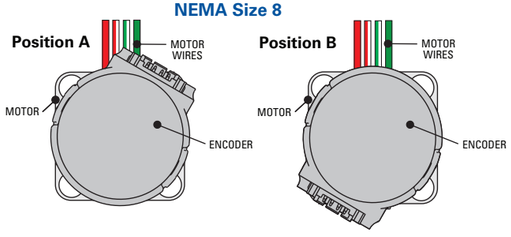
PRA	–	8	S	–	025	N	–	10	–	E200	–	A

Series	Series Model	Motor Length	Lead Code	Nut Style	Series	Encoder	Encoder Position
PRA Profile Rail Linear Actuator	**8** Single Stack Only	**S** Single Stack	See Lead Code Table Pg. 3	**N** Standard Freewheeling Nut	Length (inch) example: **10.00"**	**E 200** 200 CPR	**A**
	11					**E 500** 500 CPR	**B**
	17	**D** Double Stack		**A** Axial Anti-Backlash Nut		**E 1000** 1000 CPR	
	23					**E 2000** 2000 CPR	**0** No Encoder Position
						00 No Encoder	

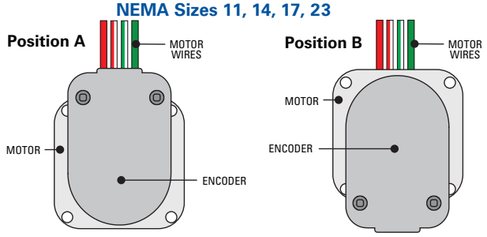
We welcome custom projects. To speak with one of our linear motion project engineers, email us at engineeringhelp@helixlinear.com or call 1-855-435-4958.

ENCODER POSITION DIAGRAM

NEMA Size 8



NEMA Sizes 11, 14, 17, 23



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LEAD SCREW OPTIONS

PRA-8

Screw Diameter	Diameter Code	Lead	Lead Code	Efficiency %	Torque (in-lb)
0.1875	018	0.0240	024	17-29	0.016
0.1875	018	0.0250	025	17-29	0.017
0.1875	018	0.0313	031	24-34	0.018
0.1875	018	0.0394	039	24-39	0.020
0.1875	018	0.0480	048	28-44	0.021
0.1875	018	0.0500	050	29-45	0.022
0.1875	018	0.0625	062	34-51	0.024
0.1875	018	0.0787	078	39-56	0.027
0.1875	018	0.0960	096	43-61	0.029
0.1875	018	0.1000	100	44-62	0.030
0.1875	018	0.1250	125	49-66	0.035
0.1875	018	0.1575	157	54-71	0.040
0.1875	018	0.200	200	58-74	0.048

PRA11

Screw Diameter	Diameter Code	Lead	Lead Code	Efficiency %	Torque (in-lb)
0.250	025	0.0250	025	14-25	0.021
0.250	025	0.0393	039	21-35	0.022
0.250	025	0.0500	050	26-41	0.024
0.250	025	0.0625	062	31-48	0.026
0.250	025	0.0787	078	35-52	0.029
0.250	025	0.1000	100	41-58	0.032
0.250	025	0.1125	125	46-64	0.036
0.250	025	0.2000	200	60-75	0.058
0.250	025	0.2500	250	60-76	0.059
0.250	025	0.3330	333	63-79	0.075
0.250	025	0.5000	500	63-79	0.112
0.250	025	0.7500	750	63-79	0.189
0.250	025	1.000	999	64-80	0.224

PRA17

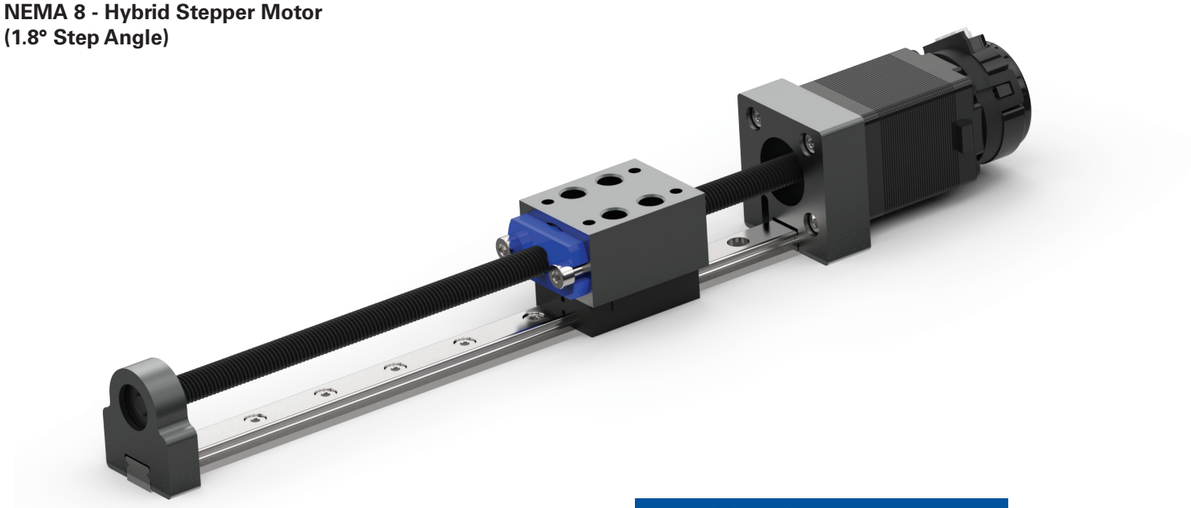
Screw Diameter	Diameter Code	Lead	Lead Code	Efficiency %	Torque (in-lb)
0.375	037	0.050	050	18-31	.033
0.375	037	0.078	078	27-43	.036
0.375	037	0.100	100	33-50	.039
0.375	037	0.157	157	42-59	.050
0.375	037	0.196	196	43-61	.058
0.375	037	0.200	200	48-66	.059
0.375	037	0.250	250	51-68	.067
0.375	037	0.375	375	59-75	.089
0.375	037	0.400	400	61-77	.092
0.375	037	0.472	472	65-81	.103
0.375	037	0.500	500	63-79	.112
0.375	037	0.750	750	63-79	.185
0.375	037	0.984	984	63-79	.201
0.375	037	1.000	999	63-79	.224
0.375	037	1.200	M30	69-86	.244

PRA23

Screw Diameter	Diameter Code	Lead	Lead Code	Efficiency %	Torque (in-lb)
0.500	050	0.0980	098	43-61	.029
0.500	050	0.1000	100	32-40	.044
0.500	050	0.1960	196	45-55	.129
0.500	050	0.2000	200	46-57	.062
0.500	050	0.5000	500	60-75	.119
0.500	050	0.6300	630	60-75	.130
0.500	050	1.0000	999	64-80	.221

PRA 8 Lead Screw Linear Actuator

NEMA 8 - Hybrid Stepper Motor
(1.8° Step Angle)



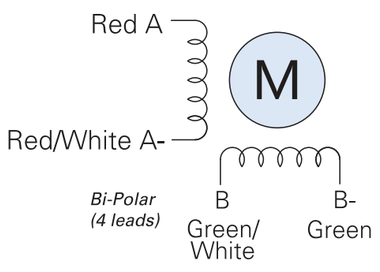
Available Lead Screws

Model	Screw Diameter	Lead	Pitch	Travel Per Step
PRA-8-024	0.1875	0.0240	0.0240	0.0001200
PRA-8-025	0.1875	0.0250	0.0250	0.0001250
PRA-8-031	0.1875	0.0313	0.0313	0.0001565
PRA-8-039	0.1875	0.0394	0.0394	0.0001970
PRA-8-048	0.1875	0.0480	0.0480	0.0002400
PRA-8-050	0.1875	0.0500	0.0500	0.0002500
PRA-8-062	0.1875	0.0625	0.0313	0.0003125
PRA-8-078	0.1875	0.0787	0.0394	0.0003935
PRA-8-096	0.1875	0.0960	0.0480	0.0004800
PRA-8-100	0.1875	0.1000	0.0500	0.0005000
PRA-8-125	0.1875	0.1250	0.0313	0.0006250
PRA-8-157	0.1875	0.1575	0.0394	0.0007875
PRA-8-200	0.1875	0.2000	0.0500	0.0010000

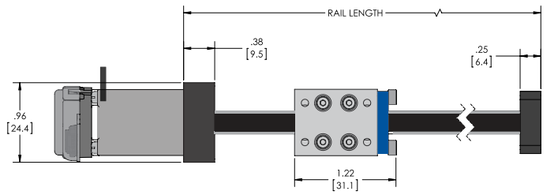
Motor Characteristics

Wiring	Bipolar
Step Angle	1.8
Operating Voltage	5 VDC
Current / Phase	0.24 A
Resistance / Phase	20.4 Ω
Inductance / Phase	5.0 mH
Power Consumption	2.4 W
Temperature Rise	135° F
Weight	1.5 oz (43g)
Insulation Resistance	20 M Ω

Wiring Diagram

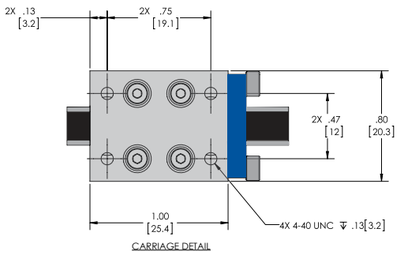


PRA 8 Specifications

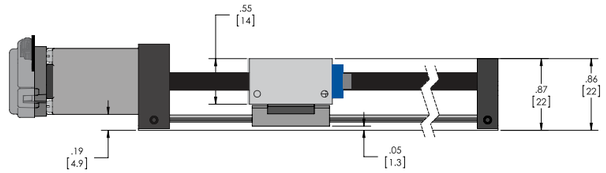


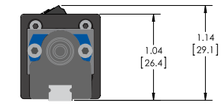
RAIL LENGTH = TRAVEL + 1.9"

RECOMMENDED OVERTRAVEL OF 5mm BE ADDED TO EACH END OF DESIRED STROKE WHEN USING STEPPER MOTOR

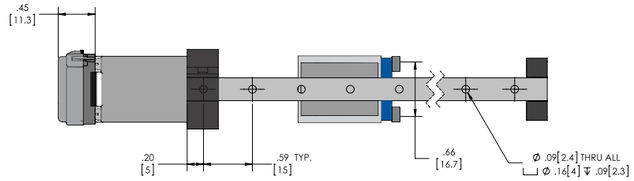


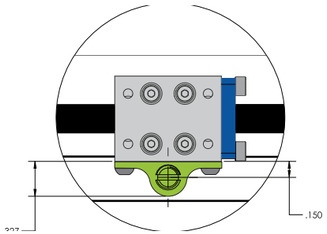
CARRIAGE DETAIL



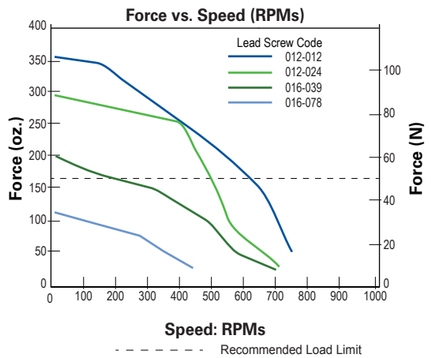


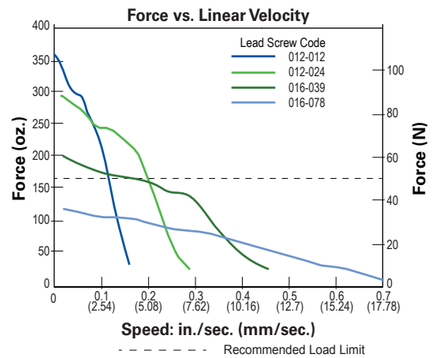
PRA 8 with optional potentiometer





Force/Speed Charts





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PRA 11 Lead Screw Linear Actuator

NEMA 11 - Hybrid Stepper Motor
(1.8° Step Angle)

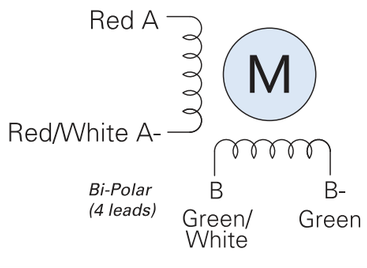
Available Lead Screws

Model	Screw Diameter	Lead	Pitch	Travel Per Step
PRA-11-025	0.250	0.0250	0.0625	0.0001250
PRA-11-039	0.250	0.0393	0.0394	0.0001965
PRA-11-050	0.250	0.0500	0.0500	0.0002500
PRA-11-062	0.250	0.0625	0.0625	0.0003125
PRA-11-078	0.250	0.0787	0.0394	0.0003935
PRA-11-100	0.250	0.1000	0.0500	0.0005000
PRA-11-118	0.250	0.1180	0.0393	0.0005900
PRA-11-200	0.250	0.2000	0.0500	0.0010000
PRA-11-250	0.250	0.2500	0.0625	0.0012500
PRA-11-393	0.250	0.3930	0.0328	0.0019650
PRA-11-500	0.250	0.5000	0.1250	0.0025000
PRA-11-750	0.250	0.7500	0.0625	0.0037500
PRA-11-999	0.250	1.0000	0.1000	0.0050000

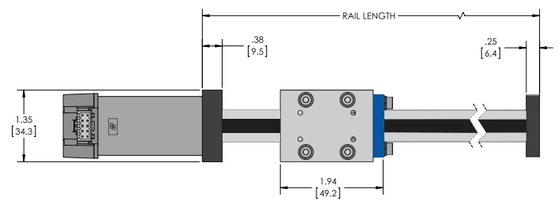
Motor Characteristics

Wiring	Bipolar
Step Angle	1.8°
Operating Voltage	5 VDC
Current / Phase	0.42 A
Resistance / Phase	11.9 Ω
Inductance / Phase	6.7 mH
Power Consumption	4.2 W
Temperature Rise	135° F
Weight	4.2oz (119g)
Insulation Resistance	20 M Ω

Wiring Diagram

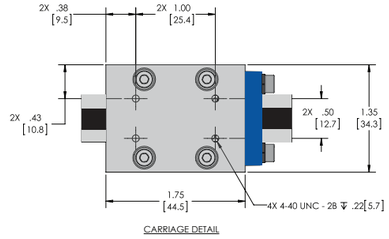


PRA 11 Specifications

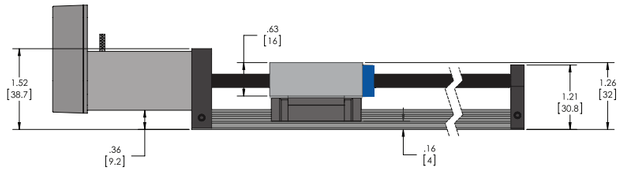


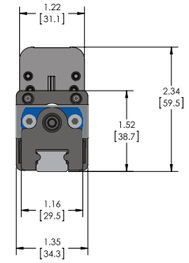
RAIL LENGTH = TRAVEL + 2.6"

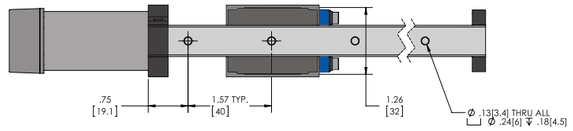
RECOMMENDED OVERTRAVEL OF 10mm BE ADDED TO EACH END
OF DESIRED STROKE WHEN USING STEPPER MOTOR



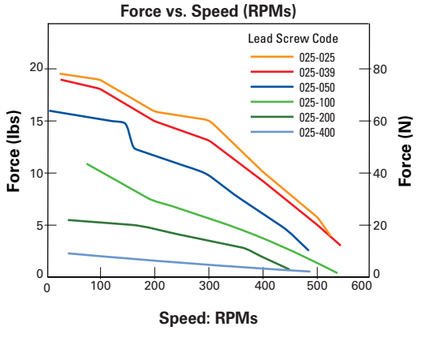
CARRIAGE DETAIL

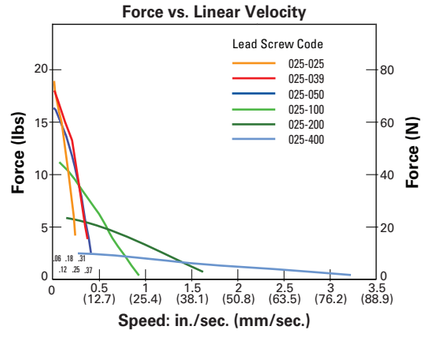






Force/Speed Charts





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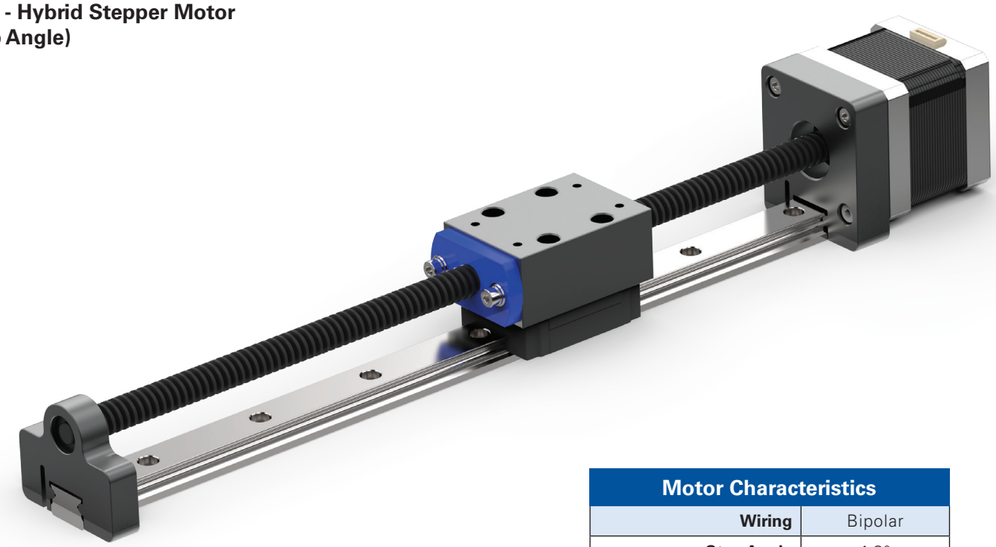
PRA 17 Lead Screw Linear Actuator

NEMA 17 - Hybrid Stepper Motor
(1.8° Step Angle)



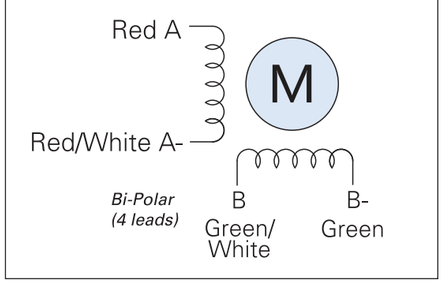
Available Lead Screws

Model	Screw Diameter	Lead	Pitch	Travel Per Step
PRA-17-050	0.375	0.050	0.050	0.000250
PRA-17-078	0.375	0.078	0.078	0.000390
PRA-17-100	0.375	0.100	0.100	0.000500
PRA-17-157	0.375	0.157	0.079	0.000785
PRA-17-196	0.375	0.196	0.039	0.000980
PRA-17-200	0.375	0.200	0.100	0.001000
PRA-17-250	0.375	0.250	0.063	0.001250
PRA-17-375	0.375	0.375	0.094	0.001875
PRA-17-400	0.375	0.400	0.100	0.002000
PRA-17-472	0.375	0.472	0.094	0.002360
PRA-17-500	0.375	0.500	0.125	0.002500
PRA-17-750	0.375	0.750	0.063	0.003750
PRA-17-984	0.375	0.984	0.197	0.004920
PRA-17-999	0.375	1.000	0.200	0.005000
PRA-17-M31	0.375	1.200	0.200	0.006000

Motor Characteristics

Wiring	Bipolar
Step Angle	1.8°
Operating Voltage	2.1 VDC
Current / Phase	1.7A
Resistance / Phase	1.2 Ω
Inductance / Phase	1.8 mH
Power Consumption	7 W
Temperature Rise	135° F
Weight	8.5 oz (241g)
Insulation Resistance	20 M Ω

Wiring Diagram



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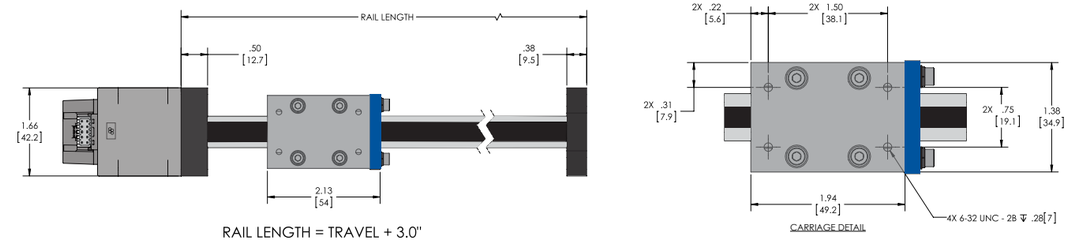
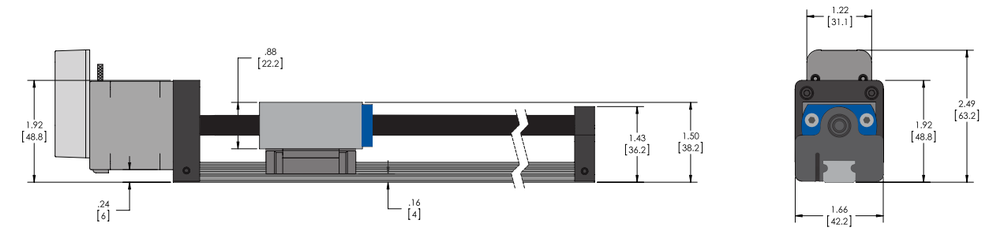
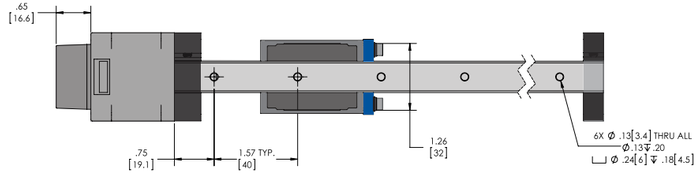
PRA 17 Specifications



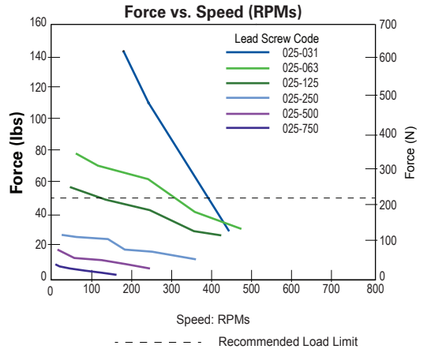
RAIL LENGTH = TRAVEL + 3.0"

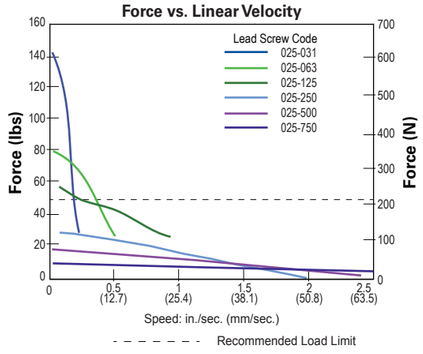
RECOMMENDED OVERTRAVEL OF 10mm BE ADDED TO EACH END OF DESIRED STROKE WHEN USING STEPPER MOTOR





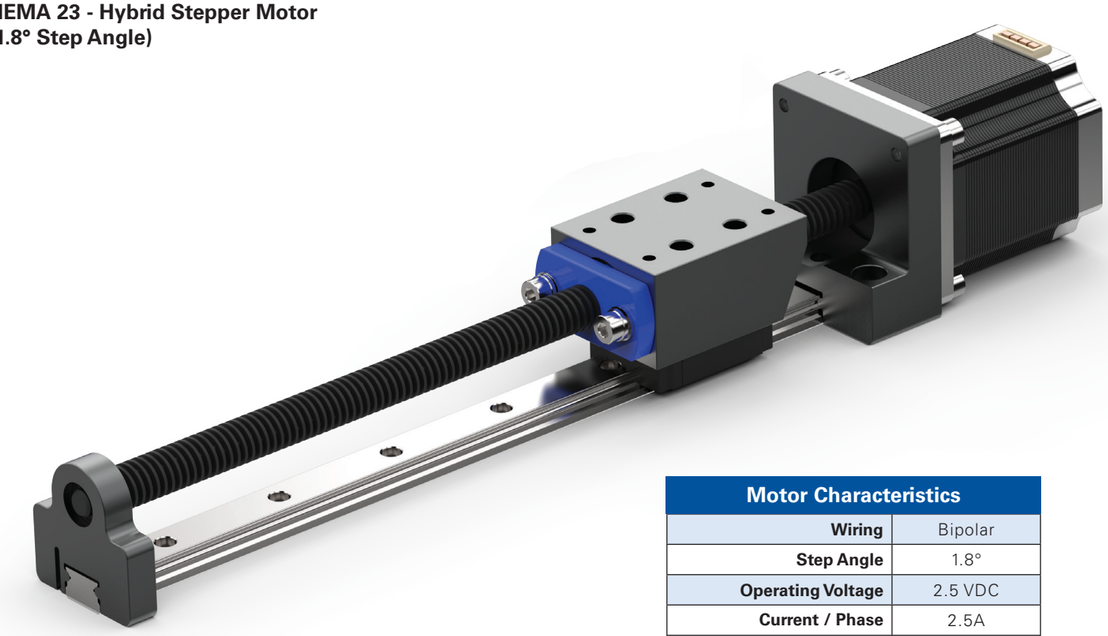
Force/Speed Charts





PRA 23 Lead Screw Linear Actuator

NEMA 23 - Hybrid Stepper Motor
(1.8° Step Angle)

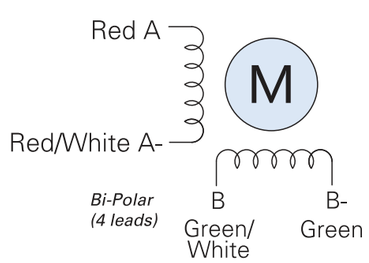


Motor Characteristics	
Wiring	Bipolar
Step Angle	1.8°
Operating Voltage	2.5 VDC
Current / Phase	2.5A
Resistance / Phase	1.0 Ω
Inductance / Phase	2.2 mH
Power Consumption	13 W
Temperature Rise	135° F
Weight	18 oz (511g)
Insulation Resistance	20 M Ω

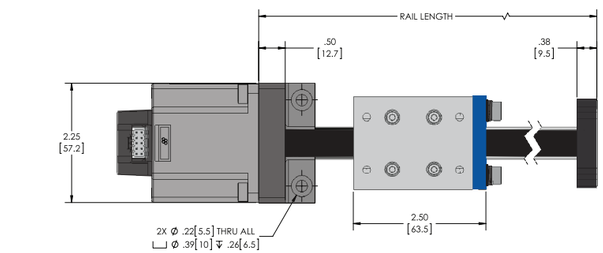
Available Lead Screws

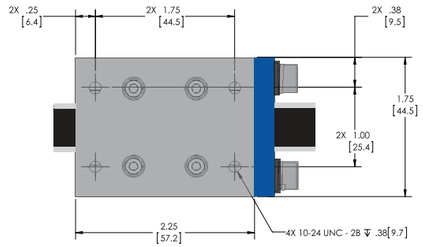
Model	Screw Diameter	Lead	Pitch	Travel Per Step
PRA-23-098	0.500	0.0980	0.0980	0.00049
PRA-23-100	0.500	0.1000	0.1000	0.00050
PRA-23-196	0.500	0.1960	0.0980	0.00098
PRA-23-200	0.500	0.2000	0.1000	0.00100
PRA-23-500	0.500	0.5000	0.1000	0.00250
PRA-23-630	0.500	0.6300	0.1575	0.00315
PRA-23-999	0.500	1.0000	0.1250	0.00500

Wiring Diagram



PRA 23 Specifications

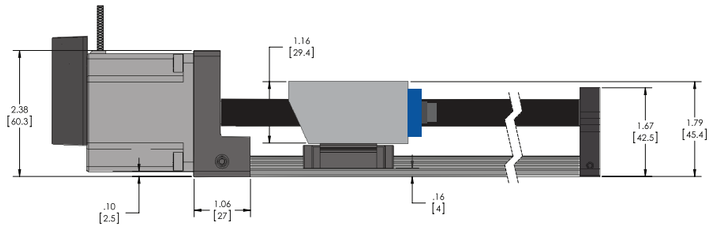


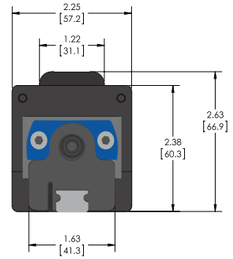


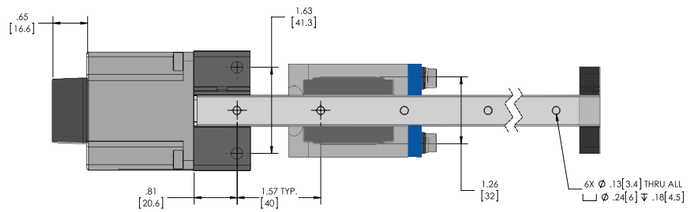
CARRIAGE DETAIL

RAIL LENGTH = TRAVEL + 3.7"

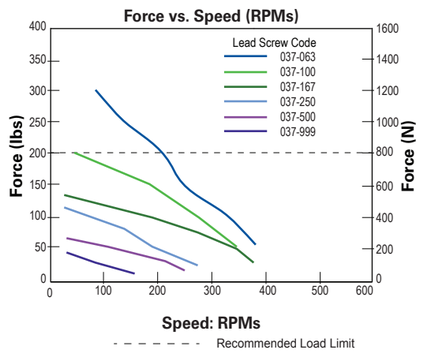
WE RECOMMEND AN OVERTRAVEL OF 10mm BE ADDED TO
EACH END OF YOUR DESIRED STROKE WHEN USING A STEPPER MOTOR

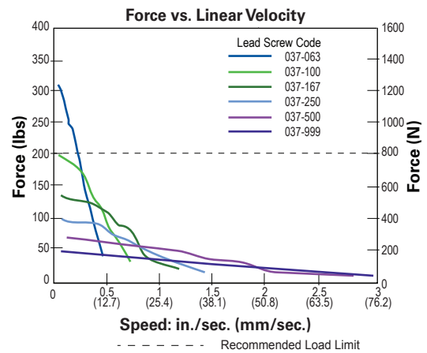






Force/Speed Charts





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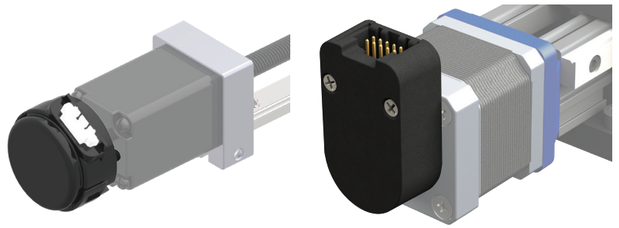
STEPPER MOTOR OPTIONS

- NEMA 8, 11, 17, 23
- Hybrid and bipolar motors
- 1.8° step angle
- Single, double, triple stack motors available
- Lead screws are integrated into the stepper motor to improve performance, reduce vibration and lower cost.

ENCODER OPTIONS

- Optical Rotary Encoders
- 32-5000 CPR available
- 128-20,000 pulses per revolution
- 2-channel quadrature TTL squareware outputs
- 5 pin or 10 pin latching connector



H4X™ PTFE COATING

- Durable- extends nut life 8-10X
- Clean- approved for food grade applications
- Resistant to solvents
- Clean-room approved
- Vacuum Rated Coating 10-6 Torr

SCREW AND NUT OPTIONS

LEAD SCREW OPTIONS

- +/- 0.0003″/ inch lead accuracy (0.0001″/ inch available)
- 3/16″, 1/4″, 3/8″, 1/2″ diameter leads
- 300 stainless steel (alloy or aluminum screws available)
- Self-lubricating PTFE coated screws
- Twin-Lead™ screws with right and left hand threads available

AAB™ AXIAL ANTI-BACKLASH NUTS

- Low and high force springs available
- Self-adjusting anti-backlash design
- Smooth, Clean, Quiet motion
- Excellent repeatability
- Self-lubricating material

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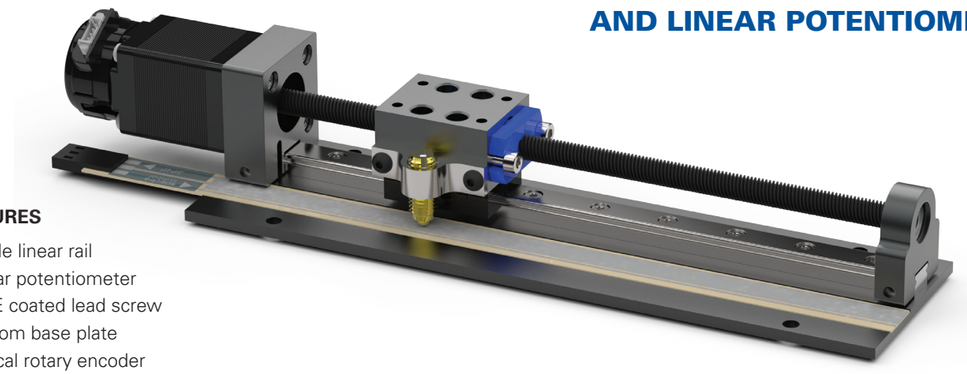
CUSTOM DESIGNS

NEMA 8 HYBRID STEPPER MOTOR AND LINEAR POTENTIOMETER



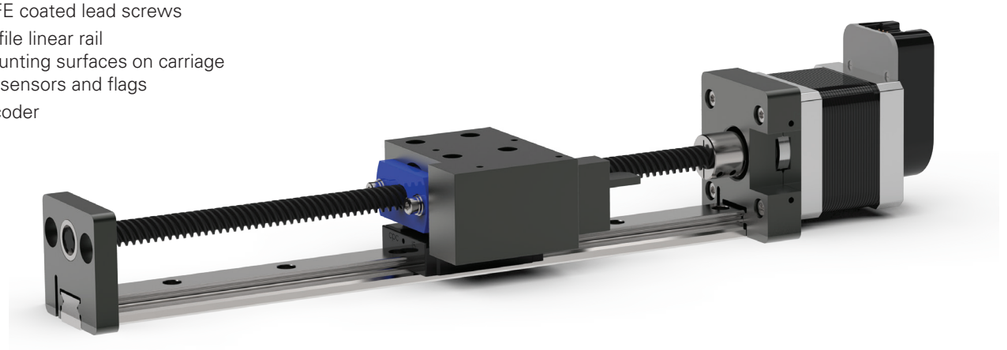
FEATURES

- Profile linear rail
- Linear potentiometer
- PTFE coated lead screw
- Custom base plate
- Optical rotary encoder

NEMA 11 LINEAR ACTUATOR AND OPTICAL ROTARY ENCODER

FEATURES

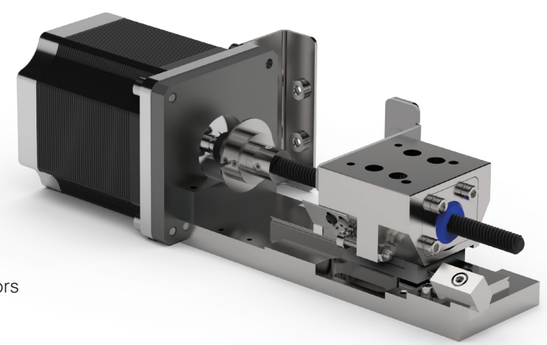
- Custom carriage
- PTFE coated lead screws
- Profile linear rail
- Mounting surfaces on carriage for sensors and flags
- Encoder

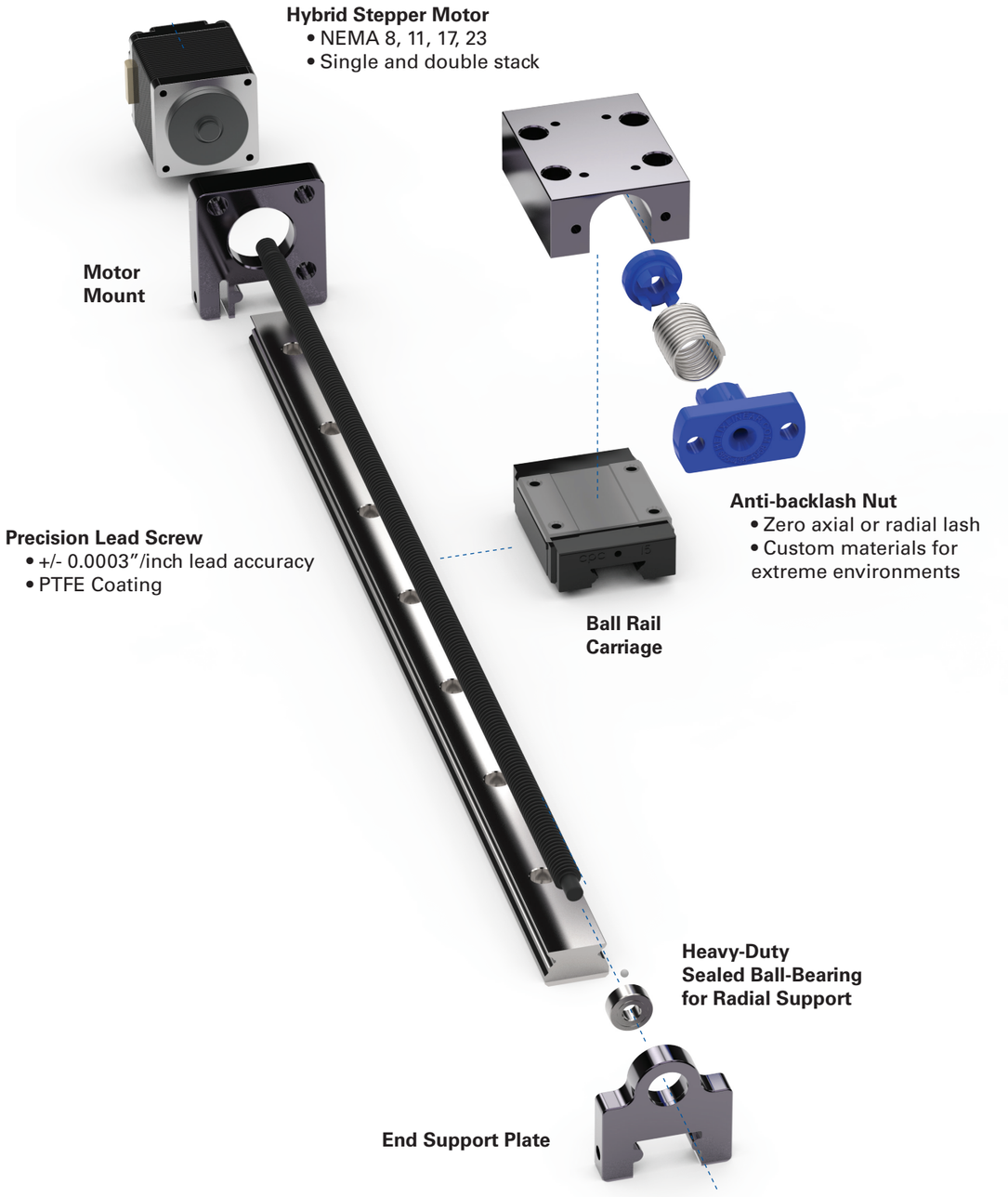


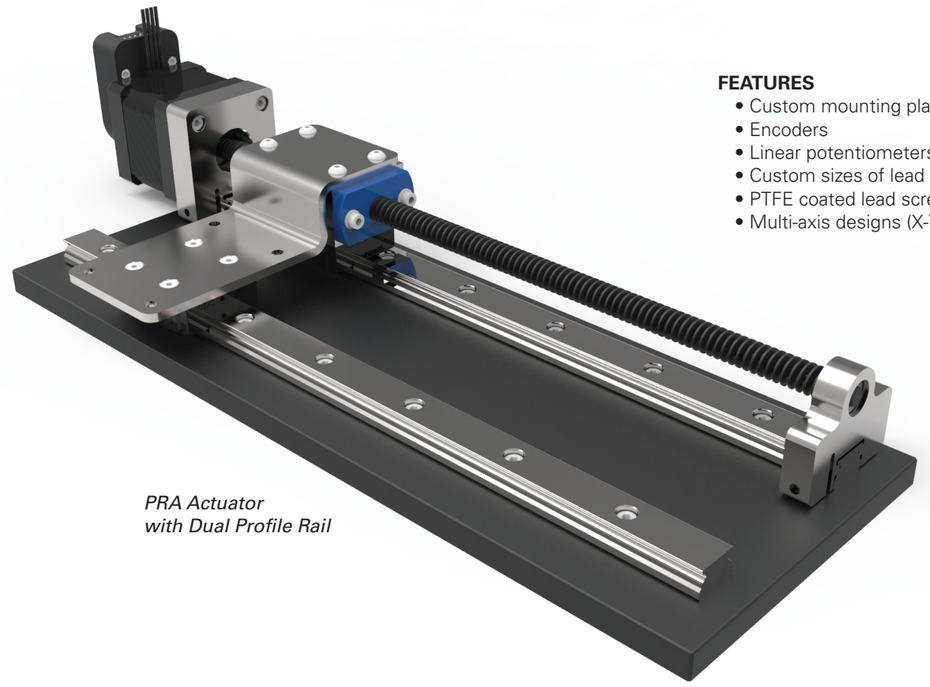
NEMA 17 CUSTOM LINEAR ACTUATOR

FEATURES

- Anti-backlash nut
- Clean room compatible
- Vacuum rated
- Mounting for flags and sensors







PRA Actuator with Dual Profile Rail

FEATURES
- Custom mounting plate
- Encoders
- Linear potentiometers
- Custom sizes of lead screws
- PTFE coated lead screws
- Multi-axis designs (X-Y-Z)

Micro Precision Actuators

FEATURES
- Multi-axis designs (X-Y-Z)
- Hybrid stepper motors; NEMA 11, 17, 23
- PTFE coated lead screws
- Custom motors available

X-Y Configuration

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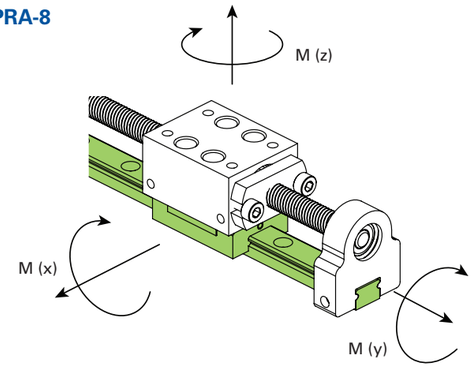
PERFORMANCE CHARTS

BASIC SYSTEM PROPERTIES		
Max Velocity, no lube, continuous motion	m/s	3 (requires lubrication)
Max Velocity, intermittent motion	m/s	5.5 (requires lubrication)
Max Acceleration**	m/s^2	250
Stroke Length (min recommended – max)**	mm	5- 440
Normal Operating Temperatures (min- max)	°C	0°- 80°C
Max Drive (input) Speed	rpm	2000
Standard Lead Screw Accuracy	ISO Class 10 (± .21 mm/300 mm)	
Carriage Weight (including four SHCS)	Kg	0.115

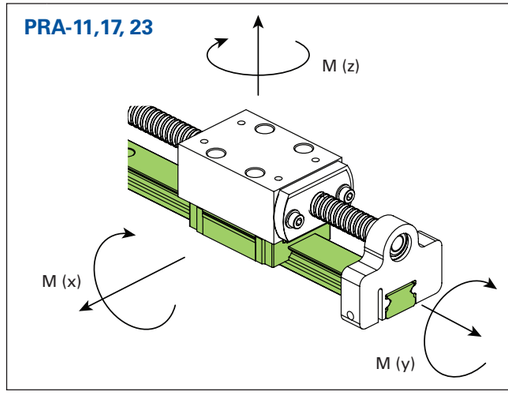
STATIC AND DYNAMIC SYSTEM PROPERTIES			
Max Static Load* (Supported Rail) Carriage Capacity Only	Fx	N	5,590
	Fz (Normal)		5,590
	Fz (Inverted)		5,590
Max Dynamic Load of System* (For PBC supplied motor, refer to charts below)	Fx	N	2,500
	Fz (Normal)		2,500
	Fz (Inverted)		2,500

CARRIAGE LOADS

PRA-8



PRA-11,17, 23

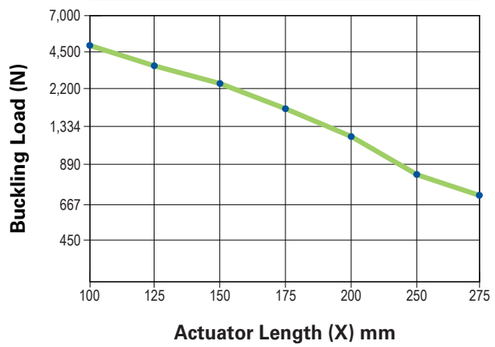


	X	Y	Z	Normal Load
PRA-8	Mx = 29 in./lbs.	My = 46 in./lbs.	Mz = 29 in./lbs.	Fz = 200 lbs. dynamic
				Fz = 323.7 lbs. static
PRA-11, 17, 23	Mx = 239 in./lbs.	My = 386 in./lbs.	Mz = 239 in./lbs.	Fz = 856.5 lbs. dynamic
				Fz = 1256.7 lbs. static

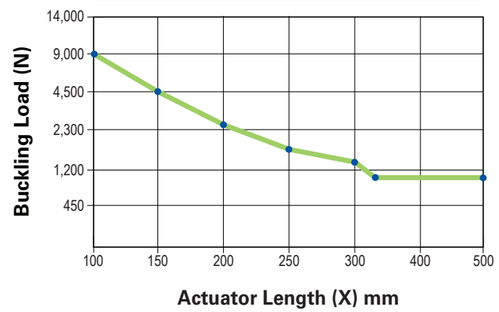
**The above loads are MAX values. Consult our Application Engineers for more information.*

BUCKLING COLUMN LOAD CURVES

PRA-8 (3/16″ diameter screw)



PRA-11 (1/4″ diameter screw)

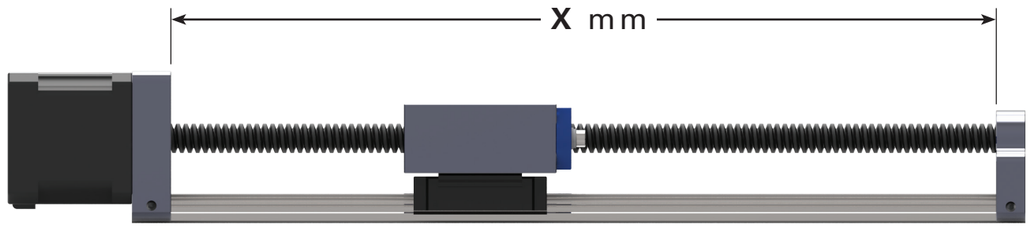


PRA-17 (3/8″ diameter screw)

PRA-23 (1/2″ diameter screw)

ACTUATOR LENGTH

(Distance between motor face and end support)



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LINEAR MOTION APPLICATIONS

High Quality, Precision Linear Motion Solutions

LIFE SCIENCES

- Auto samplers
- Syringe pumps
- Microscopes
- MRI scanners
- CT scanners
- Radiographic machines
- In-vitro diagnostics
- Genomics
- Blood gas chemistry

PRINTING & BINDING

- "Z" axis actuators
- Multi-axis gantries
- 3D printing
- Automation / Material handling
- Additive manufacturing (AD)
- Large format sign printing
- Digital offset printing process
- Folding and sealing equipment
- Thermal CTP systems

SECURITY - MILITARY

- Automated door locking systems
- Pan-tilt-zoom cameras
- Automated gates
- Tactical automated security cameras
- Missile fin actuation
- Tank sighting systems
- Drones and UAVs
- Torpedo fin actuation
- Guided munitions

SEMICONDUCTOR

- Burnishing stages
- Stacking systems
- Vision inspection machines
- X, Y, Z gantries
- Wafer elevators / Wafer handling
- Acoustic microscopes
- Ultrasonic imaging
- Tuning coils
- Vacuum chamber doors

HELIX™ LINEAR TECHNOLOGIES

216-485-2232 | Toll Free: 1-855-435-4958
Email: sales@helixlinear.com
23200 Commerce Park Road
Beachwood, Ohio 44122 USA

helixlinear.com
REV: 0308/21