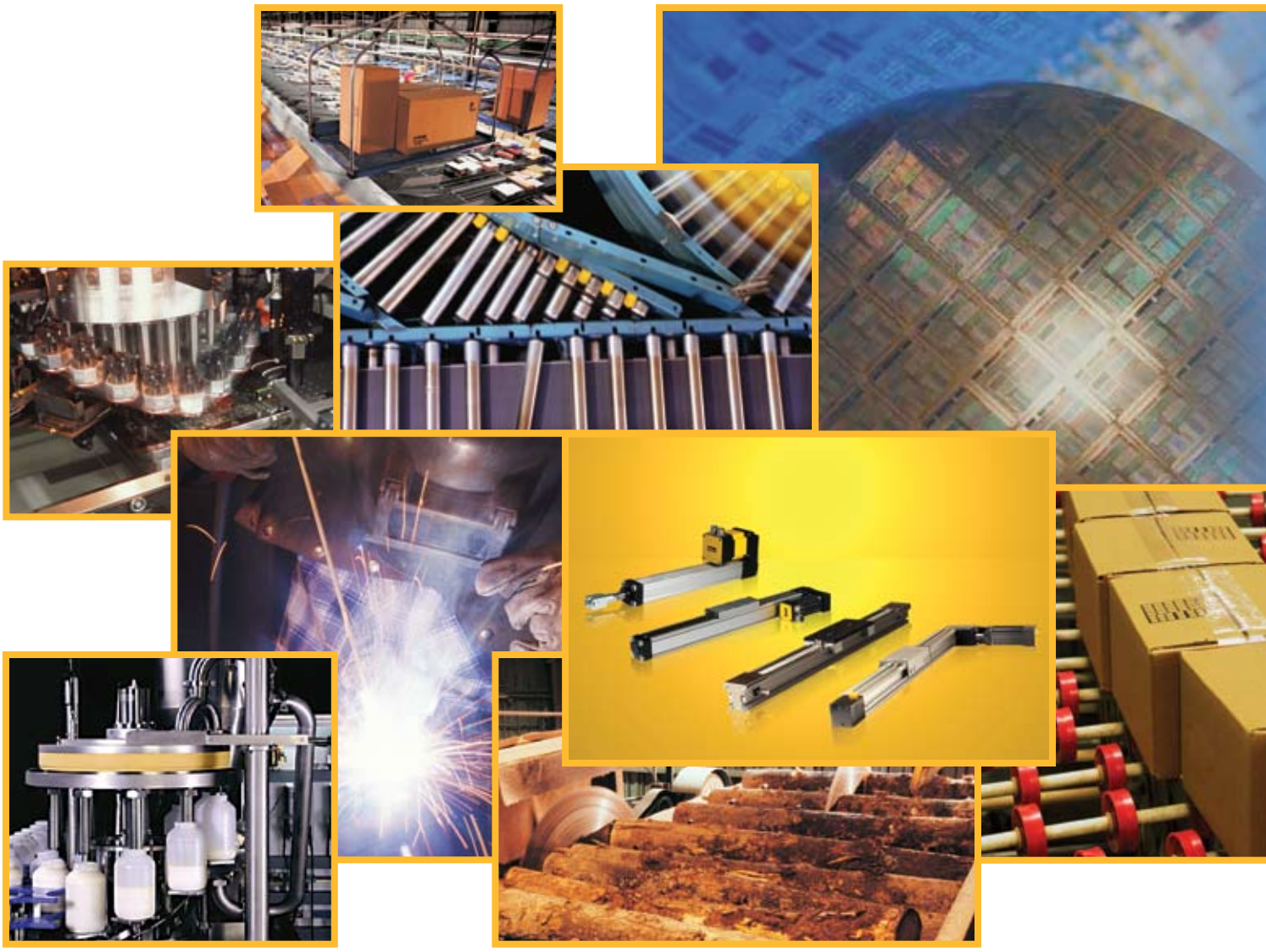
Electromechanical Actuator Products

Catalog AU03-1894-2/US



Parker Hannifin Corporation

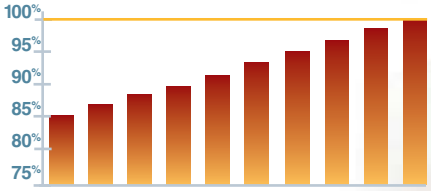
Parker world headquarters in Cleveland, Ohio USA

A global Fortune 300 company with sales of $9 billion and more than 400,000 customers in 46 countries, Parker Hannifin is the world's leading supplier of motion control components and system solutions serving the industrial, mobile, and aerospace markets. Parker is the only manufacturer offering customers a choice of hydraulic, pneumatic, electromechanical, or computer motion control.

Total Systems Solutions

Parker's team of highly qualified applications engineers, product development engineers, and system specialists can turn electromechanical, structural extrusion and pneumatic products into an integrated system solution. And our Selectable Levels of Integration™ provides the components, subsystems and controlled motion systems to suit any level of integration you may choose.

Parker's highly trained field sales force, strategically located throughout the world, provides knowledgeable assistance within hours. Linked by global communication systems, these experts will work together with a local Parker distributor on any product application to fulfill your needs.



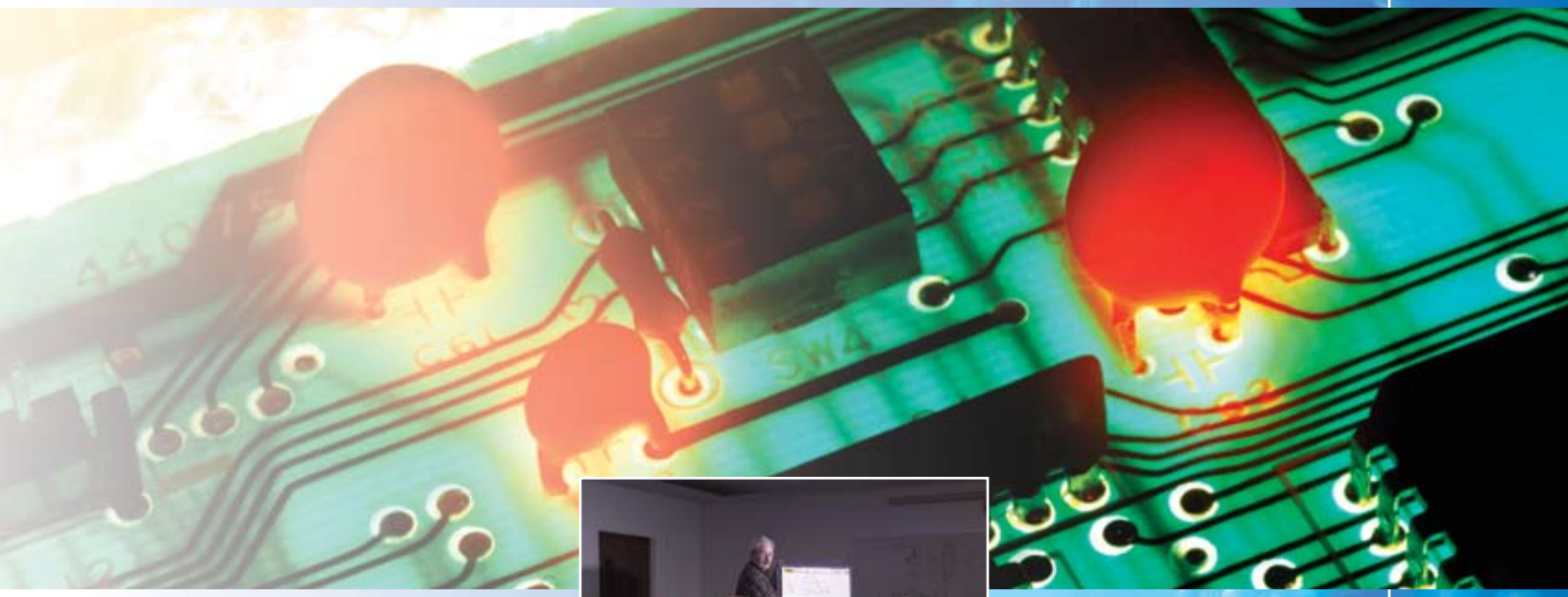
Parker consistently raises the bar for its manufacturing plants and distributors, measuring its on-time delivery percentage to customer request date.

Put Parker's industry-leading response and delivery to the test when you contact Parker or one of its Automation Technology Centers, ATCs. ATCs are Parker distribution partners who specialize in the application of Parker's electromechanical technology products. With degreed engineers on staff, Parker's ATC network has the expertise to provide complete motion control solutions, from human machine interface to integrated control products and mechanical actuator systems.

Parker AUTOMATION Technology Center

Parker

Electromechanical Actuator Products



Training

Parker's best-in-class technology training includes hands-on classes, web-based training, and comprehensive texts for employees, distributors, and customers. Parker also provides computer-based training, exams, drafting and simulation software, and trainer stands.

24/7 Emergency Breakdown Referrals

The Parker product information center is available any time of the day or night at 1-800-C-Parker. Our operators will connect you with on-call representatives who will quickly identify replacement parts or services for all motion technologies. Talk to a real person!

Electromechanical Actuator Products

Actuator Division

Parker Hannifin's Actuator Division provides a comprehensive range of electromechanical actuator products and integrated product solutions for a wide range of industrial markets and applications. Headquartered in Wadsworth, Ohio, the Actuator Division is committed to providing the highest level of customer service, the right products for your needs, and the highest level of product availability from our plants and service centers across North America.

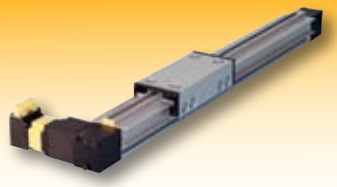
Rodless Actuators

New LCB Series Rodless Actuator

- High-speed Belt and pulley drive
- 100% duty cycle slider bearing carriage
- Pages 70-90

ER Series Rodless Actuator

- Ball screw, lead screw or belt and pulley drive
- Sealed internal bearing carriage
- Pages 30-51



ERV Series Rodless Actuator

- Belt and pulley drive
- High-load external bearing carriage
- Pages 54-67

Electric Cylinders

ET Series Electric Cylinder

- Ball screw and lead screw drive
- Thrust force to 10,000 lbf (44kN)
- Pages 2-27

ETR Series Electric Cylinder

- High-load roller screw drive
- Thrust force to 22,000 lbf (80kN)
- Overview on page 102 or request Catalog 1898

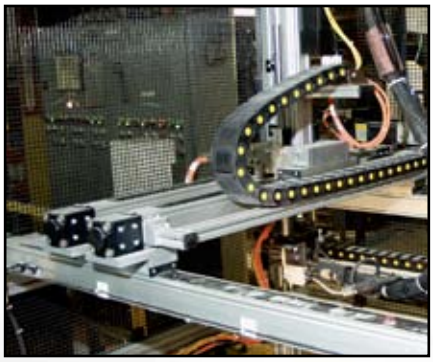
ISO 9000:2001 Quality System

Actuator Division's quality system conforms to ISO 9000:2001 specifications and resides through the process, from order entry to final testing and shipment. Each actuator is cycle tested in a dedicated test cell prior to shipment. With more than a decade of experience in this technology, Actuator Division understands our customers' needs for project quality and performance.

Electromechanical Actuator Products

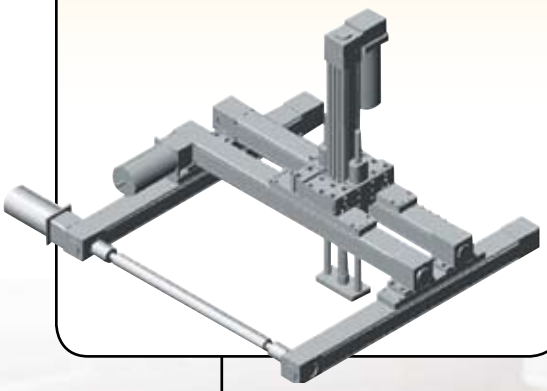
Custom Applications

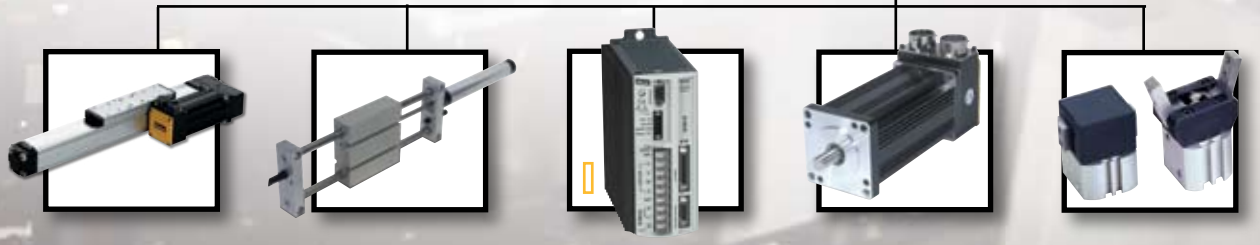
A growing number of customers have special applications requiring component or system performance that is not easily met with standard products or configurations. Actuator Division is well established as a provider of engineering and application expertise in the field of factory automation, and can design, build and test a cost-effective custom system.



Multi-Axis Motion Systems

Parker brings together pneumatic, electromechanical and structural components to form economical and customized multi-axis motion systems. Create simple two or three-axis motions, add one or more axes of pneumatic motion, or produce coordinated motion with Parker end effector products.



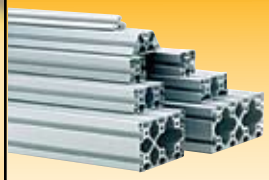


Service and Support

Actuator Division offers unrivaled application support through our Applications Engineering Team. Staffed by degreed engineers, the Applications Team is ready to assist in the sizing and selection of actuator products, as well as provide post-sales support. Call us at 866-PARK ACT (727-5228) for assistance.

Electromechanical Actuator Products

Complementary Products



Structural Aluminum

- Custom fit with standardized modular frames
- No painting, welding or drilling

Servo Motors

- Industry's broadest range
- Industry leading delivery
- CE compliant

Servo Drives

- Maximum power and performance in compact package
- Designs that ease integration and start-up

Pneumatic Actuators

- Pneumatic cylinders, slides and rotary actuators available in a variety of shapes and sizes
- Meet ISO, NFPA standards

Parker's Automation Group

is home to a range of complementary products, including:

- Electric motors, drives and controllers
- HMI technology and software
- Precision mechanics
- Pneumatic control and air preparation products
- Pneumatic cylinders and actuators
- Structural aluminum framework and assemblies

www.parkermotion.com

Innovative Solutions, new products, online 3-D CAD and much more

Parker's extensive web site is your on-line resource for electromechanical technology. It is the industry's most comprehensive site and includes product information, downloadable 3-D CAD drawings, catalogs, contact information, training materials and product selection software. The user-friendly interface allows you to search by general product families, specific product type, or keywords.

Online CAD Files

WARNING - USER RESPONSIBILITY

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker-Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

OFFER OF SALE

The items described in this document are hereby offered for sale by Parker-Hannifin Corporation, its subsidiaries or its authorized distributor. This offer and its accepteance are governed by the provisions stated in the detailed "Offer of Sale" elsewhere in this document.

Rotary to Linear Conversion

Linear motion systems driven by rotating electric motors commonly employ one of three rotary-to-linear conversion systems: ball screw, Acme screw or belt drive.

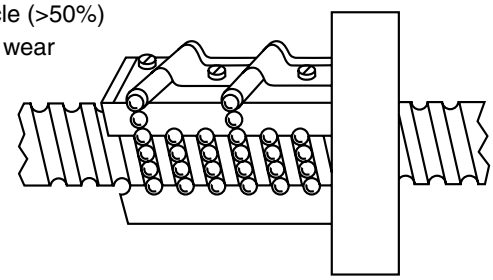
Lead Screws

Screw-drive mechanisms, whether Acme screw or ball screw, provide high thrust (to thousands of pounds) but are often limited by critical speed, maximum recirculation speed of ball nut circuits, or sliding friction of Acme nut systems.

Ball Screw

The majority of linear motion applications convert motor torque to linear thrust using ball screws due to their ability to convert more than 90% of the motor's torque to thrust. As seen below, the ball nut uses one or more circuits of recirculating steel balls which roll between the nut and ball screw threads. Ball screws provide an effective solution when the application requires:

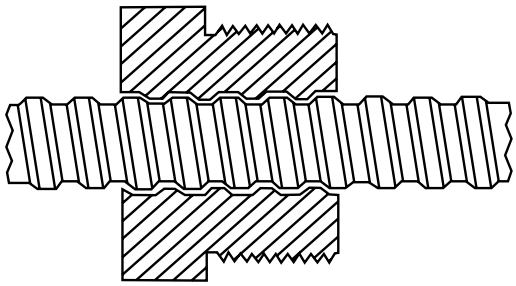
- High efficiency, low friction
- High duty cycle (>50%)
- Long life, low wear



Acme Screw

The Acme screw uses a plastic or bronze solid nut that slides along the threads of the screw, much like an ordinary nut and bolt. Since there are no rolling elements between the nut and the lead screw, Acme screws yield only 30-50% of the motor's energy to driving the load. The remaining energy is lost to friction and dissipated as heat. This heat generation limits the duty cycle to less than 50%. A great benefit of the Acme screw is its ability to hold a vertical load in a power-off situation. The Acme screw is a good choice for applications requiring:

- Low speeds
- Low duty cycles (50%)
- The ability to hold position while motor power is off



Leadscrew Comparison

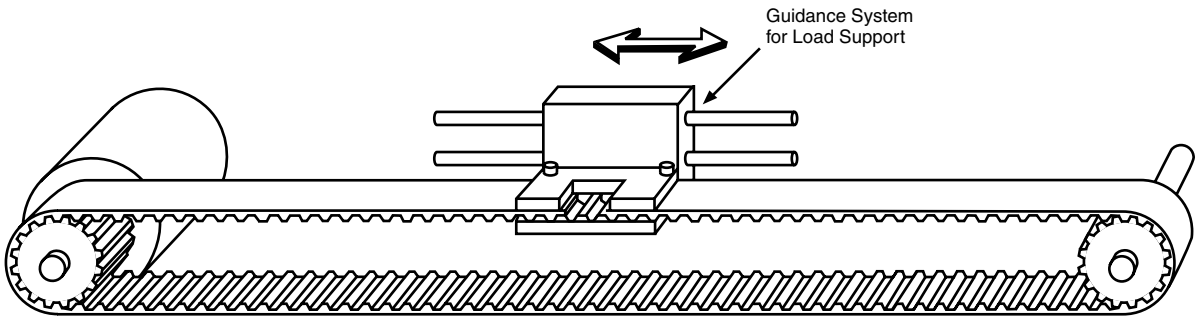
Considerations	Acme Screw	Ball Screw	Comments
Audible noise	Quiet operation	Noisy	Acme screws are quieter, while one can hear the ball bearings recirculating within a ballscrew. In any case, the motor sound is typically the most audible part of the cylinder assembly.
Back-driving loads	Self-locking	Easily backdrives	When vibration is apparent in a system, an Acme may backdrive. Ball screws may require a brake.
Backlash	Increases with wear	Constant throughout life of screw	Due to high friction, Acme screws wear sooner, and therefore, the backlash increases over the life of the leadscrew.
Duty cycle rating	Low/Medium (<60%)	High (100%)	Because excessive heat can deform the screw, Acmes are limited to 60%. The high efficiency of ball screws allows for 100%.
Efficiency rating	Low: Plastic nut (45%) Bronze nut (35%)	High (90%)	Acme screw ratings are lower due to sliding friction while ball screws are higher due to rolling contact.
Life (mechanical wear)	Shorter life due to high friction	Longer	Acme screw life is load dependent and is rated in travel distance. The higher the load, the shorter the travel life. (See life expectancy charts for ballscrews)
Smoothness of operation	Smooth operation at lower speeds	Smooth operation at all speeds	Ball screws are generally smoother at all operating speeds.
Speeds	Low	All	Ball screws operate well at all speeds, while Acme screws are best suited for lower speed applications.

Timing Belt

Belt drive systems offer many of the benefits of ball screws, yet have fewer moving parts, and do not have the critical speed limits of leadscrew-driven systems. They generally provide greater linear motion from the same motor movement, resulting in higher travel speeds with minimal component wear. In contrast, this design results in lower repeatability and accuracy. Thrust capability is also less compared to screw-drive systems due to the tensile strength limitation of the transport belt.

A toothed belt passes around a pulley in each end of the actuator and is attached to the carriage to pull it back and forth along the length of travel. The carriage is supported by a linear bearing system to provide load carrying capacity. The belt is reinforced with steel tensile elements to provide strength and minimize belt stretch. Timing belt systems are a good solution for applications requiring:

- High speeds
- Low thrusts
- High efficiency
- High duty cycle



Gear Drive

Actuator Division also manufactures a gear drive option for both the ET and ER/ERV series actuators.

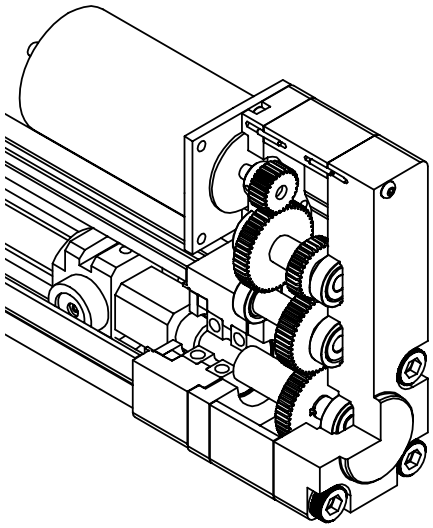
Today's high energy motors can produce large torques while operating at high speeds. At times, this can put a mechanical strain or create resolution problems on all the devices that are trying to utilize this power. Gear Drive Series is the solution to link your motor to these demanding applications. The Spur Gear Drive can reduce your speed while multiplying the torque output to properly harness all of your motor's power. The Gear Drive generally proves very useful when large inertias must be moved because the inertia of the load reflected back to the motor through the gearing is divided by the square of the gear ratio. In this manner, large inertial loads can be moved while maintaining a good load-inertia to rotor-inertia ratio (Typically 20:1 for servo motors and 10:1 for steppers).

Think about using Spur Gear Drives in applications requiring dynamic braking and zero back driving. Because of the high kinetic forces generated, gearing and other machine elements may be damaged if not selected and applied properly. It is important to remember that the Gear Drive is positioned between the inertial load and the motor's rotor. Both the inertia of the motor's rotor and the external inertial load can subject the Gear Drive components to dynamic braking.

The resistance to back driving manifests itself as a locking effect. The amount of resistance to back driving increases with the number of stages of gearing. The Gear Drive has a 4 stage Spur Gear that offers considerable resistance to back driving.

Gear Drive Systems are a good solution for applications requiring:

- High speeds (7500 RPM)
- High duty cycle
- Torque multiplier
- Inertial matching
- High efficiency (90%)
- Smooth operation



Actuator Precision

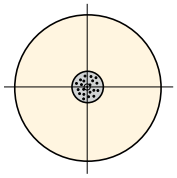
Parameter	Definition	Factors
Absolute Accuracy	The maximum error between expected and actual position.	• Accuracy of the motor/drive system • Lead screw pitch error (lead accuracy) • System backlash (drive train, leadscrew and nut assembly)
Repeatability	The ability of a positioning system to return to a location during operation when approaching from the same direction, *at the same speed and deceleration rate.*	• Angular repeatability of the motor/drive system • System friction • Changes in load, speed and deceleration
Resolution	The smallest positioning increment achievable. In digitral control systems, resolution is the smallest specifiable position increment.	• Angular resolution of the motor/drive system • Drive train reduction • Leadscrew pitch
Backlash	The amount of play (lost motion) between a set of moveable parts.	• Leadscrew wear • Drive train wear • Spaces between moving parts

Accuracy and Repeatability

A linear system repeatedly moves toward an expected position. How successful it is in reaching the position and in reaching it over a number of tries is illustrated below.

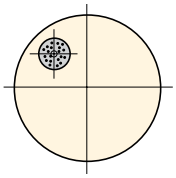
System 1 is both accurate and repeatable. The end positions are tightly grouped together and are close to the expected position.

Degree of Accuracy High
Degree of Repeatability High



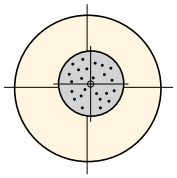
System 3 is inaccurate but repeatable. The end positions are tightly grouped around a point, but are not close to the expected position.

Degree of Accuracy Low
Degree of Repeatability High



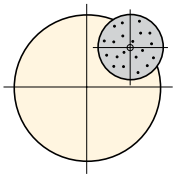
System 2 is accurate but not repeatable. The end positions are not tightly grouped together but are relatively close to the expected position.

Degree of Accuracy High
Degree of Repeatability Low



System 4 is neither accurate nor repeatable. The end positions are not tightly grouped and are not close to the expected position.

Degree of Accuracy Low
Degree of Repeatability Low



Backlash

The clearance between elements in a drive train or lead screw assembly which produces a mechanical "dead band" or "dead space" when changing directions is known as the backlash in a system.

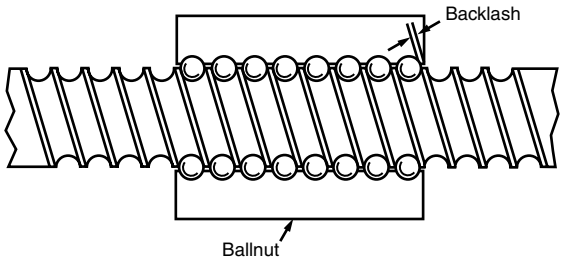
In most mechanical systems, some degree of backlash is necessary to reduce friction and wear. Usually 0.006 - 0.008" is attributed to the lead screw/nut assembly. For ball screws, backlash will remain constant throughout the life of the actuator, while acme screws will increase backlash with wear.

Reducing the Effects of Backlash

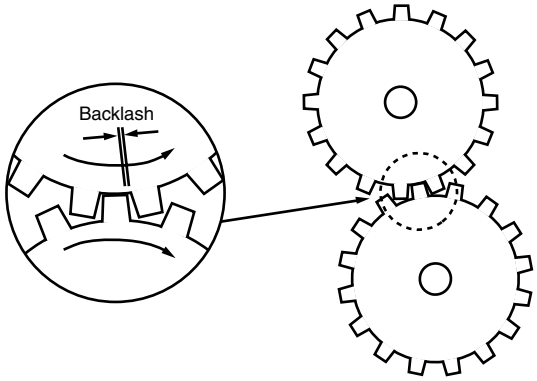
1. Approach a stop position from the same direction.
2. Apply a constant linear force on the cylinder thrust tube or carriage. This is done automaticaly for cylinders used in vertical orientations with a backdriving load.
3. For programmable positioning devices, it is possible to program out backlash by specifying a small incremental move (enough to take out the backlash) prior to making your normal moves in a particular direction.
4. Use a preloaded nut on a lead screw to counteract the backlash. *Contact Actuator Division about the precision ground screw option which reduces backlash in the drive nut.*
5. An inline actuator with the motor directly coupled to the lead screw has less backlash than parallel or reverse parallel units which utilize a gear train or drive belt/pulley.

Primary Sources of Backlash

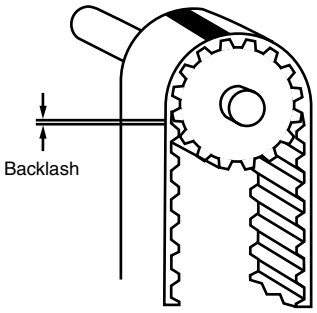
Drive Nut/Lead Screw Assembly



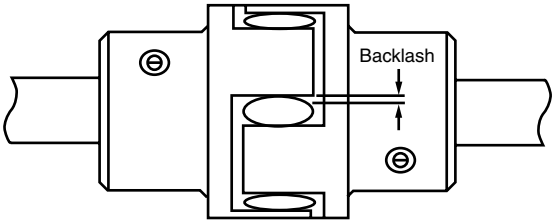
Drive Train (Gears, Timing Belt/Pulley)



Timing Belt/Pulley



Coupling



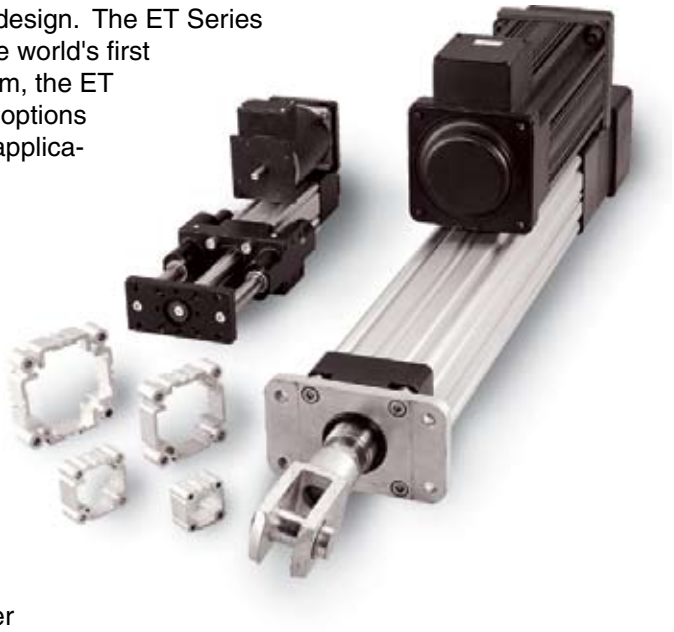
ET Series Electric Cylinders

Contents

Parker Hannifin Corporation
Actuator Division
Wadsworth, Ohio USA
Phone: 1-866-PARK-ACT
email: actuatorsales@parker.com
website: www.parker.com/actuator

The ET Series Electric Cylinder

The automation industry demands flexibility and durable design. The ET Series Electric Cylinder serves both demands. Introduced as the world's first complete stepper and servo driven electric cylinder system, the ET Series combines an unparalleled design with a variety of options that make it easy to integrate into both new and existing applications.



Produced to hard metric ISO standards, the ET Series can mount into existing fluidpower cylinder applications, adding infinite programmability to the durability and long life expected of hydraulic and pneumatic cylinders. Its modular design includes nine different actuator mounting styles in addition to available custom mounting. The ET Series' range of five profile sizes present the user with the flexibility to configure the actuator to the application.

Combined with a Parker Hannifin motor and control system, the ET Series arrives at the customer's dock complete and ready to mount. Backed by an industry-leading 2 year warranty and Parker Hannifin's worldwide customer support network, the ET Series is a global automation solution.

ET Markets and Applications

With thousands of axes installed worldwide, the ET series electric cylinder has proven to be a robust and reliable solution for numerous motion control applications across many markets and industries. Listed below are some examples of where and how the ET series electric cylinder has been successfully applied.

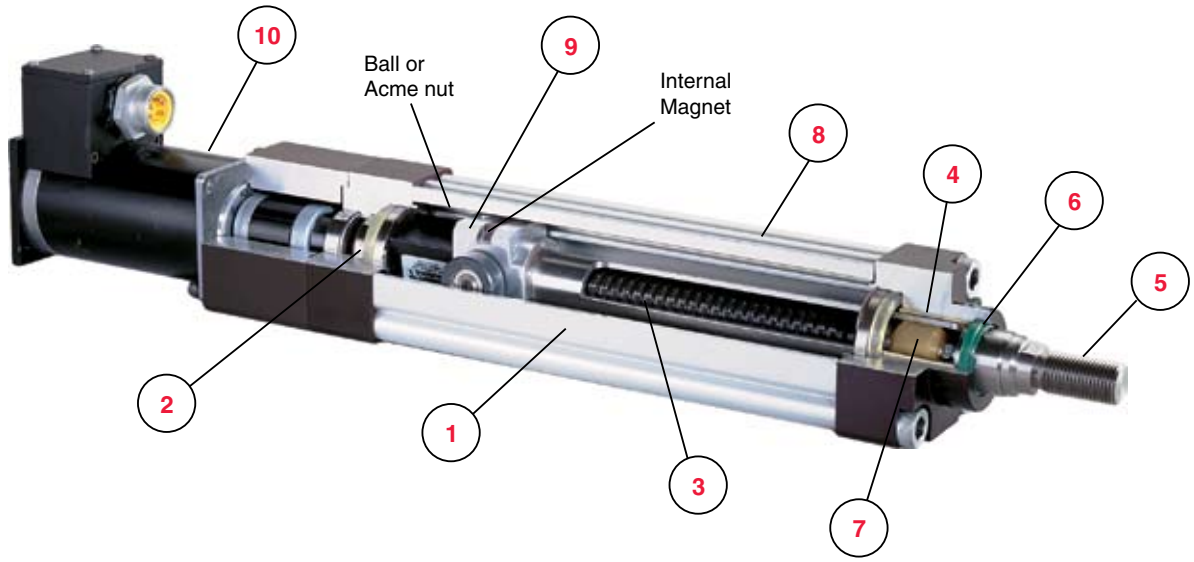
Markets and Industries Served

Automotive	Transportation	Machine Tool
Tire & Rubber	Wood & Lumber	Aerospace
Packaging	Conveyor	Military
Food & Beverage	Medical	Semiconductor
Glass / Fiber	Recreation / Amusement Park	Plastics
Computer / Electronics	Pharmaceutical	Factory Automation

Application Examples

Force / Position Control	Discrete / Multi-Point Positioning	Reach In & Retract	Complex Motion Control
Assembly Presses	Vertical Stackers / Elevator Lift	Inspection / Measurement	Flight / Motion Simulation
Weld Gun Actuation	Door & Hatch Closures	Labeling / Marking	Flying Die Cut-to-Length
Parts Clamping	Lane Diverters	Parts Load / Unload	Mechanical Cam Replacement
Tube Bending	Mold Toggle	Tool Change	Web Edge Guiding
Joining / Fastening	Backstop / Blade positioning	Z-Axis Pick & Place	Contoured Glue Dispensing
Molding / Forming / Stamping	Volumetric Dispensing / Filling	Automated Assembly	Servo Valve Control
Compression Packing	Medical Bed Actuation	Hydraulic & Pneumatic Replacement	Web Tension Control

Construction
Inline Motor Mounting Shown



1 Five Profile Sizes (32, 50, 80, 100, 125)

With thrust capacity ranging from 135 lbf to 10,000 lbf, the ET series electric cylinder is designed to fit a wide range of applications.

2 High Capacity Thrust Bearings

Dual angular contact thrust bearings are pre-loaded to eliminate axial play and provide high thrust capacity.

3 Precision Ball or Acme Screw Drive

High efficiency, precision rolled ball screws allow for continuous duty operation and long, reliable life.

Quality acme screws are less efficient than ball screws and are are well suited for failsafe (self-locking) vertical loads and lower duty cycles.

4 Long Length Rod Bearing

The extra long rod bearing design reduces bearing pressure allowing higher side load capacity and life.

5 Precision Stainless Steel Rod

The cylinder rod is ground and polished stainless steel which provides long life and corrosion resistance.

6 Combination Lip & Wiper Seal

The lip and wiper seal keeps contaiminants out and lubricating grease in, increasing actuator life.

7 Screw Shaft Nose Bearing

The substantial support provided by the screw nose bearing eliminates whipping, vibration, and run out.

8 Extruded Limit Sensor Grooves

Sensor grooves are incorporated into the anodized extrusion body design allowing for easy placement and adjustment. An internal magnet is used as a target for the external Hall effect or reed sensors.

9 Precision Anti-Rotation Bearing Carriage

The anti-rotation bearing carriage rigidy supports the screw while eliminating rod play and prolonging screw life.

10 Parker Motor/Gearbox Mounting Options

The ET electric cylinder can be supplied with a number of different Parker stepper or servo motors as well as precision gearboxes for increased mechanical resolution.

11 Parallel Motor Mount with Timing Belt

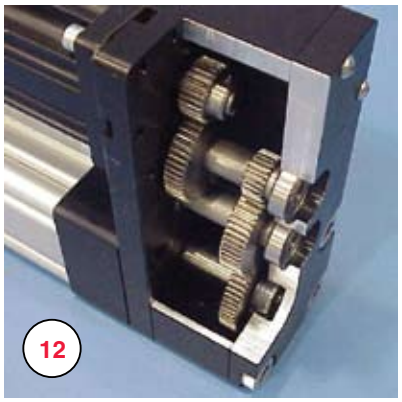
Motor mount can be wrapped or rotated in all directions to optimize overall envelope dimension.

12 Parallel Motor Mount with Gear Drive

Optional gear drive parallel mount allows for higher thrust capacity and reduction ratios than the timing belt drive.

Parallel Motor Mounting with Timing Belt

Parallel Motor Mounting with Gear Drive



ET Specifications

ET-Screw Overview	Units	ET032				ET050				ET080			
		A08	A04	B08	B02	A05	B05	B02	B01	A04	B04	B02	B01
Performance Limits													
Max Thrust Fx	lbf (N)	135 (600)				720 (3200)				1600 (7120)			
Max Speed	in/s	15.6	31.2	15.6	50.0	25.0	15.8	39.6	60.0	31.2	12.5	25.0	50.0
Max Speed	mm/s	396	792	396	1270	635	401	1006	1524	792	317	635	1270
Max Acceleration	in/s^2 (m/s^2)	386 (9.8)				386 (9.8)				386 (9.8)			
Max Travel	in (mm)	59.0 (1000)				59.0 (1500)				59.0 (1500)			
System Characteristics													
Screw Lead	in/rev	0.125	0.250	0.125	0.500	0.200	0.200	0.500	1.000	0.250	0.250	0.500	1.000
Efficiency - inline [1]	%	48%	63%	90%	90%	44%	90%	90%	90%	38%	90%	90%	90%
Max Breakaway Torque	oz-in	45	52	39	50	53	47	49	60	200	136	140	148
Repeatability [2] - inline / parallel	in	±0.001 / ±0.006				±0.001 / ±0.006				±0.001 / ±0.006			
System Backlash [3,4]	in	—	—	0.003	0.003	—	0.005	0.005	0.005	-	0.007	0.007	0.007
Reflected Rotational Inertia													
Base Inline Unit Inertia, 100mm travel	oz-in^2	0.03	0.03	0.04	0.25	0.20	0.33	0.33	0.63	2.0	2.8	3.0	3.0
Base Parallel Unit Inertia, 100mm travel	oz-in^2	0.04	0.04	0.04	0.26	0.21	0.34	0.34	0.64	2.1	2.8	3.1	3.1
Additional Inertia per 100mm travel	oz-in^2/ 100mm	0.02	0.02	0.02	0.09	0.11	0.17	0.17	0.20	0.9	1.2	1.2	1.2
Weight & Inertia Data													
Base Unit Weight, 100mm travel	lb (kg)	2.86 (1.3)				5.06 (2.3)				15.0 (6.8)			
Additional Travel Weight	lb (kg) / 100mm	0.66 (0.33)				1.32 (0.66)				2.2 (1.0)			

1. Parallel driven unit efficiency = inline efficiency x 0.9
2. Repeatability is unidirectional achieved under ideal conditions and slow speeds. Actual repeatability may vary with the application
3. ACME screw backlash will increase over time due to the nature of the friction bearing. Initial values <0.009”
4. Zero-backlash, pre-loaded ball screws are available as a special option. Thrust capacityand life may be derated with preloaded option.

Critical Speeds

Model	Lead	Critical Speed: mm/s (in/s) vs. Stroke: mm							
		50 - 200	300	450	600	750	1000	1250	1500
ET032	A08	396 (15.6)	325 (12.7)	165 (6.5)	100 (3.9)	70 (2.7)	50 (1.9)	—	—
	A04	792 (31.2)	651 (25.6)	331 (13.0)	200 (7.8)	139 (5.4)	100 (3.9)	—	-—
	B08	423 (16.6)	339 (13.3)	174 (6.8)	106 (4.1)	74 (2.9)	54 (2.1)	-—	-—
	B02	1270 (50)	1270 (50)	779 (30.6)	480 (18.8)	325 (12.7)	225 (8.8)	-—	-—
ET050	A05	635 (25.0)	634 (24.9)	332 (13.0)	204 (8.0)	138 (5.4)	88 (3.4)	66 (2.6)	48 (1.9)
	B05	403 (15.8)	403 (15.8)	403 (15.8)	257 (10.1)	175 (6.8)	113 (4.4)	87 (3.4)	64 (2.5)
	B02	1006 (39.6)	1006 (39.6)	1006 (39.6)	642 (25.2)	438 (17.2)	282 (11.1)	219 (8.6)	157 (6.1)
	B01	1524 (60.0)	1524 (60.0)	1524 (60.0)	1524 (60.0)	876 (34.4)	563 (22.1)	438 (17.2)	305 (12.0)
ET080	A04	792 (31.2)	792 (31.2)	674 (26.5)	426 (16.7)	293 (11.5)	178 (7.0)	125 (4.9)	91 (3.5)
	B04	318 (12.5)	318 (12.5)	318 (12.5)	318 (12.5)	318 (12.5)	203 (8.0)	144 (5.6)	106 (4.1)
	B02	635 (25.0)	635 (25.0)	635 (25.0)	635 (25.0)	635 (25.0)	393 (15.5)	282 (11.1)	206 (8.1)
	B01	1270 (50.0)	1270 (50.0)	1270 (50.0)	1270 (50.0)	1270 (50.0)	785 (30.9)	565 (22.2)	414 (16.2)

ET Specifications

ET-Screw Overview	Units	ET100				ET125			
		A04	B04	B02	B53	M05	M10	M20	M50
Thrust & Speed Limits									
Max Thrust Fx	lbf (N)	5300 (23500)				10000 (44500)			
Max Speed	in/s	15.6	31.2	15.6	50.0	25.0	15.8	39.6	60.0
Max Speed	mm/s	396	792	396	1270	635	401	1006	1524
Max Acceleration	in/s^2 (m/s^2)	386 (9.8)				386 (9.8)			
Max Travel	in (mm)	59.0 (1500)				59.0 (1500)			
System Characteristics									
Screw Lead	in/rev	0.250	0.250	0.500	1.875	5mm	10mm	20mm	50mm
Efficiency - inline [1]	%	30%	90%	90%	90%	90%	90%	90%	90%
Max Breakaway Torque	oz-in	385	350	375	390	370	375	380	400
Repeatability [2] - inline / parallel	in	±0.001 / ±0.006				±0.001 / ±0.006			
System Backlash [3,4]	in	-	-	0.008	0.008	-	0.005	0.005	0.005
Reflected Rotational Inertia									
Base Inline Unit Inertia, 100mm travel	$oz-in^2$	35.3	34.7	39.0	40.2	38.0	45.1	46.4	53.0
Base Parallel Unit Inertia, 100mm travel	$oz-in^2$	37.4	36.7	41.0	42.2	40.2	48.7	51.1	58.5
Additional Inertia per 100mm travel	$oz-in^2$/ 100mm	8.6	8.2	8.0	8.0	8.2	8.1	8.1	8.1
Weight & Inertia Data									
Base Unit Weight, 100mm travel	lb (kg)	31.5 (14.3)				62.0 (28.2)			
Additional Travel Weight per 100mm travel	lb (kg) / 100mm	4.4 (2.0)				9.24 (4.4)			

1. Parallel driven unit efficiency = inline efficiency x 0.9
2. Repeatability is unidirectional achieved under ideal conditions and slow speeds. Actual repeatability may vary with the application
3. ACME screw backlash will increase over time due to the nature of the friction bearing. Initial values <0.009”
4. Zero-backlash, pre-loaded ball screws are available as a special option. Thrust capacity and life may be derated with preloaded option.

Critical Speeds

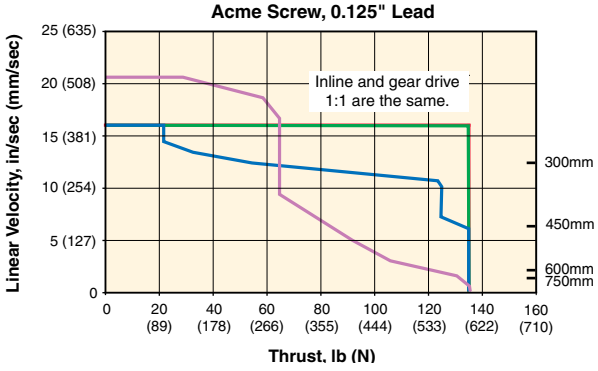
Model	Lead	Critical Speed: mm/s (in/s) vs. Stroke: mm							
		50 - 200	300	450	600	750	1000	1250	1500
ET100	A04	792 (31.2)	792 (31.2)	792 (31.2)	694 (27.3)	482 (18.9)	295 (11.6)	199 (7.8)	143 (5.6)
	B04	212 (8.3)	212 (8.3)	212 (8.3)	212 (8.3)	212 (8.3)	212 (8.3)	212 (8.3)	155 (6.1)
	B02	423 (16.7)	423 (16.7)	423 (16.7)	423 (16.7)	423 (16.7)	423 (16.7)	351 (13.8)	257 (10.1)
	B53	1588 (62.5)	1588 (62.5)	1588 (62.5)	1588 (62.5)	1588 (62.5)	1588 (62.5)	1305 (51.3)	957 (37.6)
ET125	M05	200 (7.9)	200 (7.9)	200 (7.9)	197 (7.7)	137 (5.4)	85 (3.3)	57 (2.2)	41 (1.6)
	M10	400 (15.7)	400 (15.7)	400 (15.7)	374 (14.7)	264 (10.4)	164 (6.4)	112 (4.4)	81 (3.2)
	M20	533 (20.9)	533 (20.9)	533 (20.9)	533 (20.9)	522 (20.5)	326 (12.8)	223 (8.7)	162 (6.3)
	M50	1333 (52.5)	1333 (52.5)	1333 (52.5)	1333 (52.5)	1233 (48.5)	781 (30.7)	538 (21.1)	393 (15.4)

Operating Temperature Range

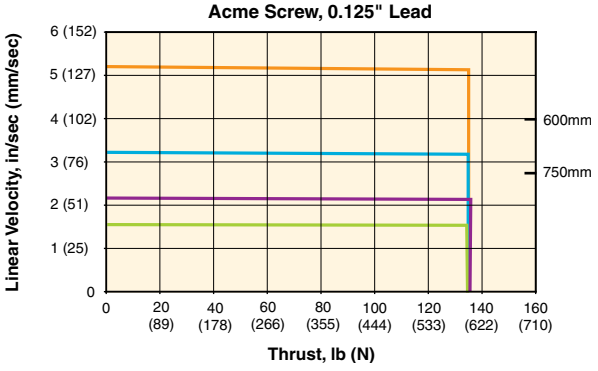
0°C to 60°C (32°F to 140°F)

ET Performance Curves

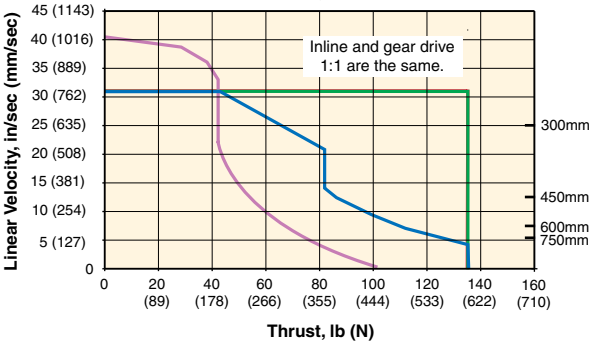
ET032-A08**
Acme Screw, 0.125" Lead



ET032-A08**
Acme Screw, 0.125" Lead



ET032A04**
Acme Screw, 0.250" Lead



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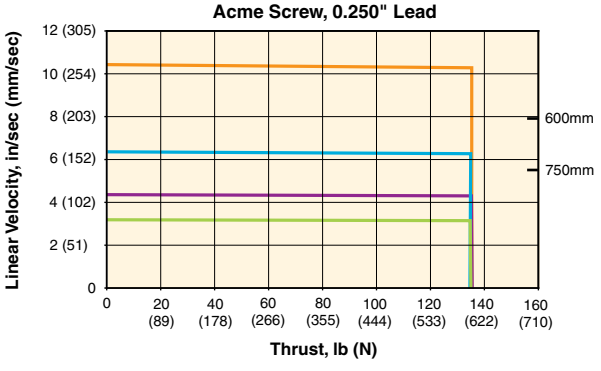
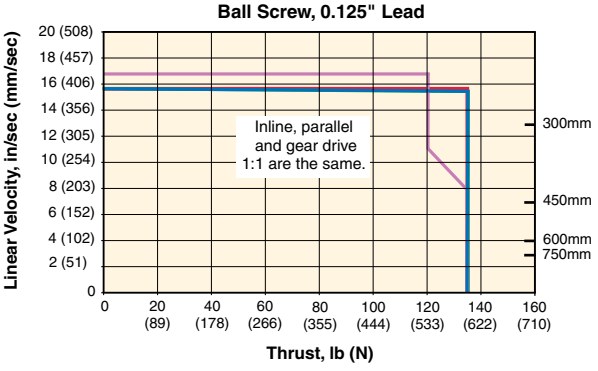
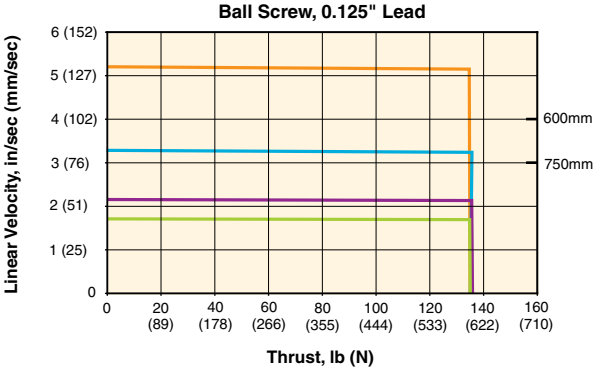
Acme Screw, 0.250" Lead



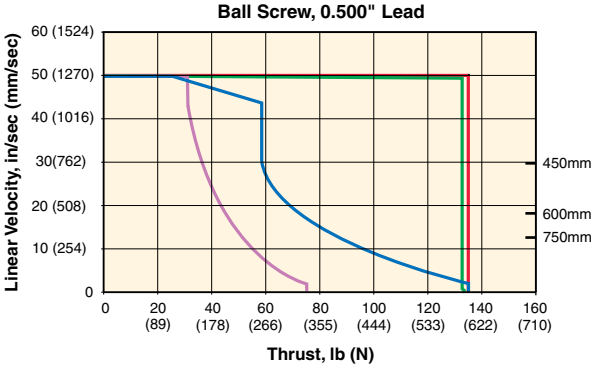
ET032B08**
Ball Screw, 0.125" Lead



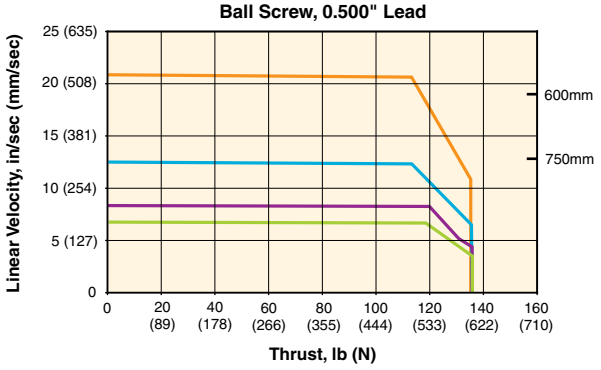
ET032B08**
Ball Screw, 0.125" Lead



ET032-B02**
Ball Screw, 0.500" Lead



ET032B02**
Ball Screw, 0.500" Lead

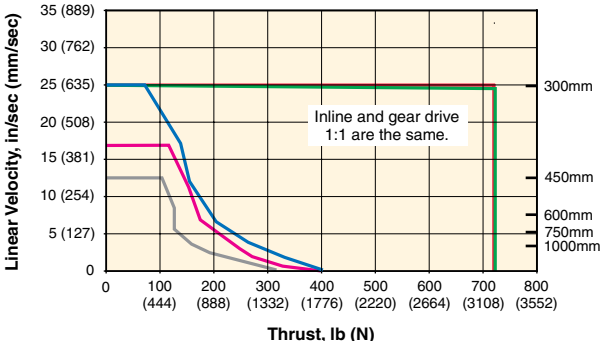


Inline Mount	Parallel Mount	
Direct Drive	Timing Belt	Gear Drive
1:1	1:1	1:1.5	1:1

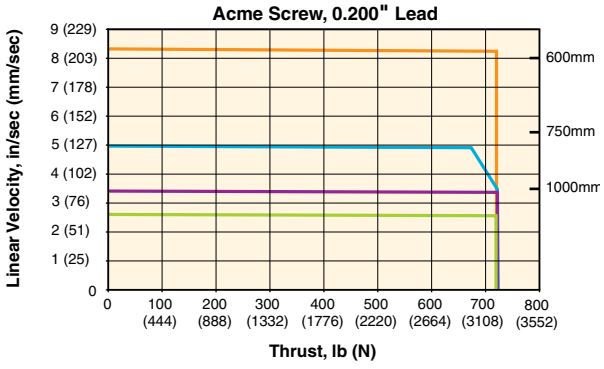
Maximum velocity is limited for longer stroke lengths. Reference stroke limits on right edge of graphs.

Parallel Mount			
Gear Drive			
3:1	5:1	7.5:1	9.5:1

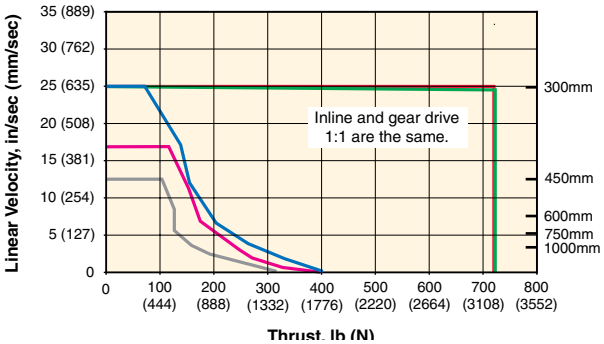
ET050A05**
Acme Screw, 0.200" Lead



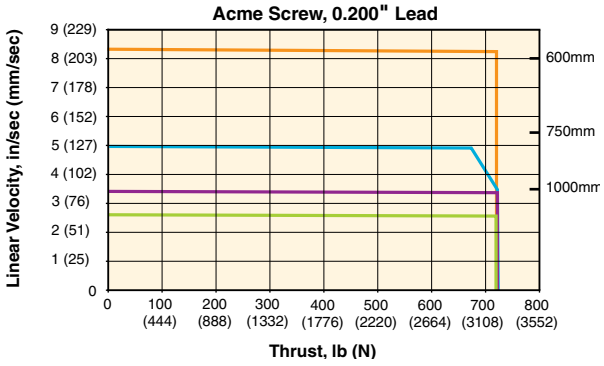
ET050A05**
Acme Screw, 0.200" Lead



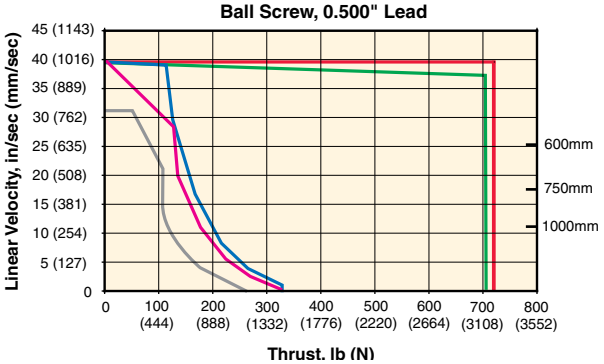
ET050A05**
Acme Screw, 0.200" Lead



ET050A05**
Acme Screw, 0.200" Lead



ET050B02**
Ball Screw, 0.500" Lead



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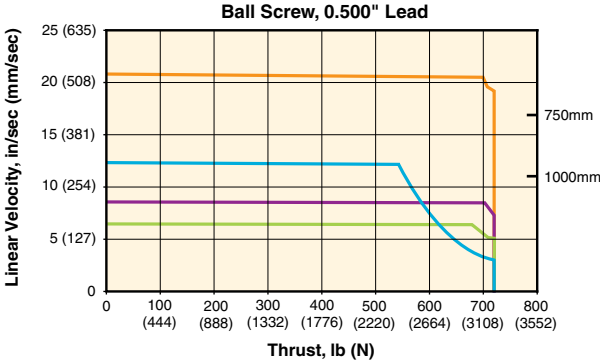
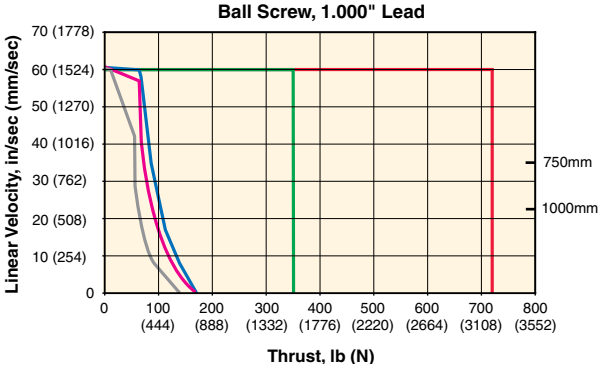
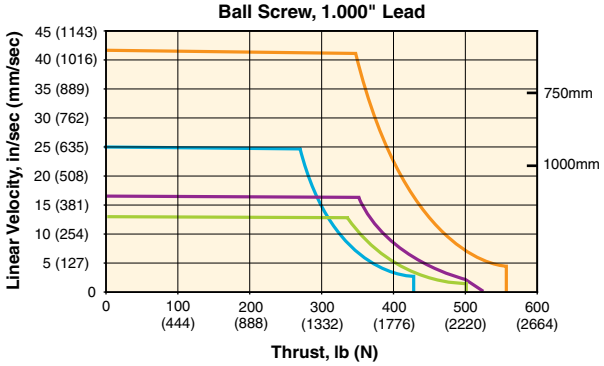
Ball Screw, 0.500" Lead



ET050B01**
Ball Screw, 1.000" Lead



ET050B01**
Ball Screw, 1.000" Lead

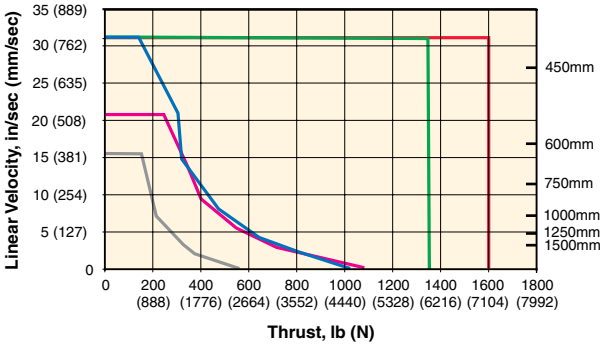


Inline Mount	Parallel Mount		
Direct Drive	Timing Belt		Gear Drive
1:1	1:1	1.5:1	2:1	1:1

Maximum velocity is limited for longer stroke lengths. Reference stroke limits on right edge of graphs.

Parallel Mount			
Gear Drive			
3:1	5:1	7.5:1	9.5:1

ET080A04**
Acme Screw, 0.250" Lead



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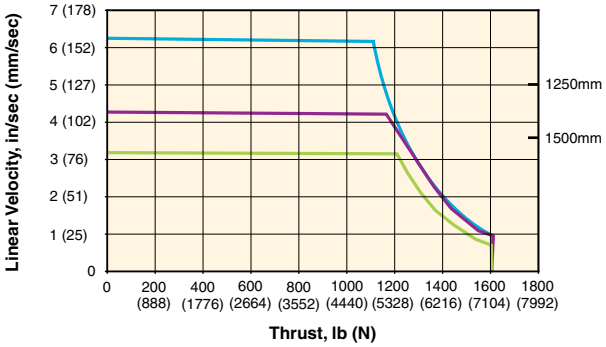
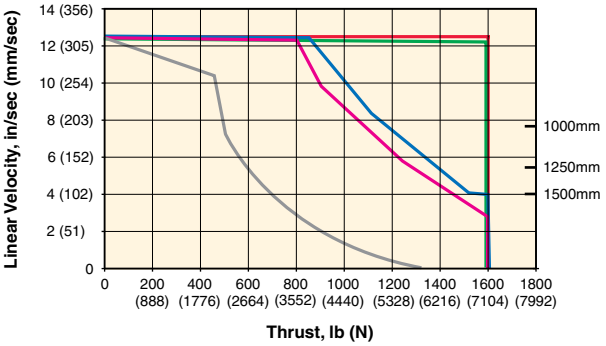
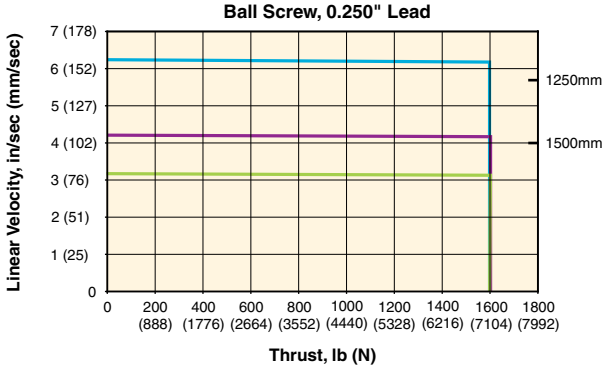
Acme Screw, 0.250" Lead



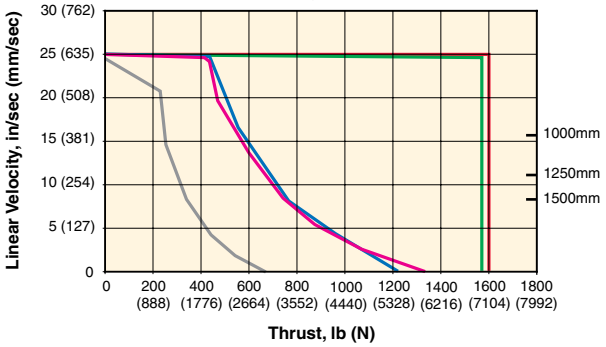
ET080B04**
Ball Screw, 0.250" Lead



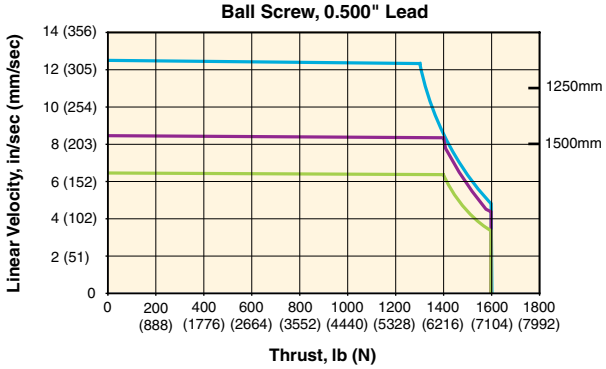
ET080B04**
Ball Screw, 0.250" Lead



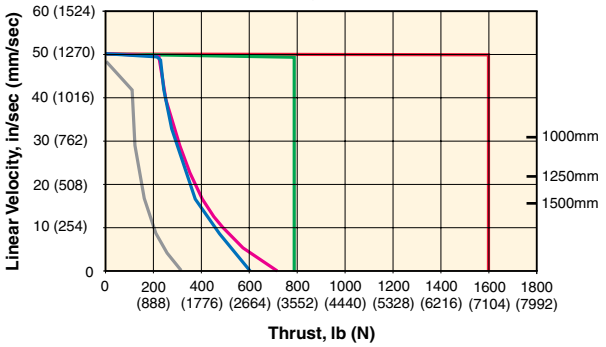
ET080B02**
Ball Screw, 0.500" Lead



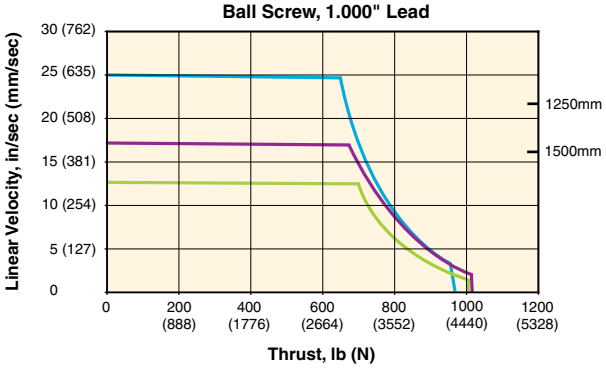
ET080B02**
Ball Screw, 0.500" Lead



ET080B01**
Ball Screw, 1.000" Lead



ET080B01**
Ball Screw, 1.000" Lead

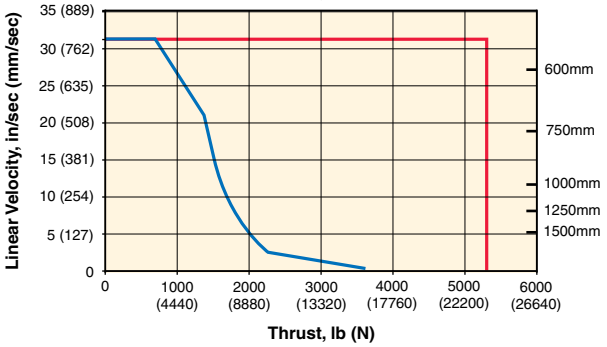


Inline Mount	Parallel Mount		
Direct Drive	Timing Belt		Gear Drive
1:1	1:1	1.5:1	2:1	1:1

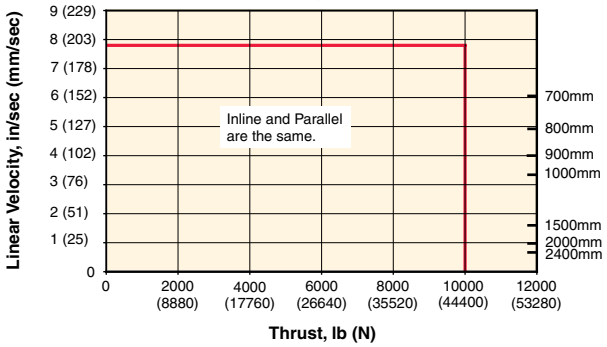
Maximum velocity is limited for longer stroke lengths. Reference stroke limits on right edge of graphs.

Parallel Mount		
Gear Drive		
5:1	7.5:1	10:1

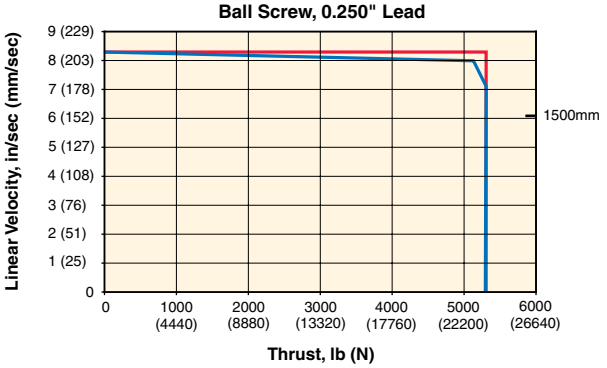
ET100A04**
Acme Screw, 0.250" Lead



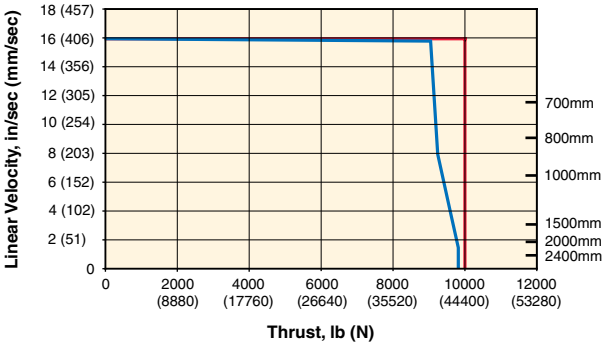
ET125M05**
Ball Screw, 5mm Lead



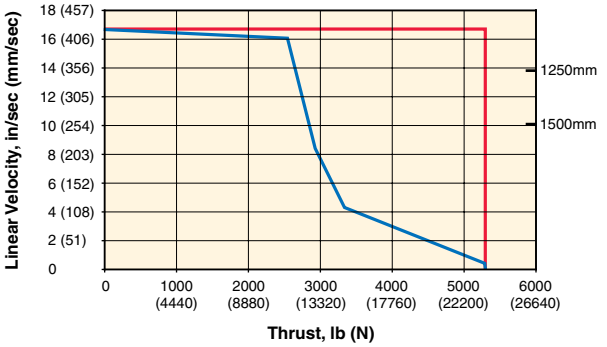
ET100B04**
Ball Screw, 0.250" Lead



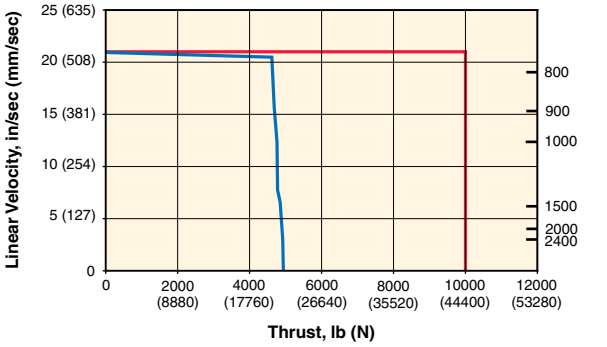
ET125M10**
Ball Screw, 10mm Lead



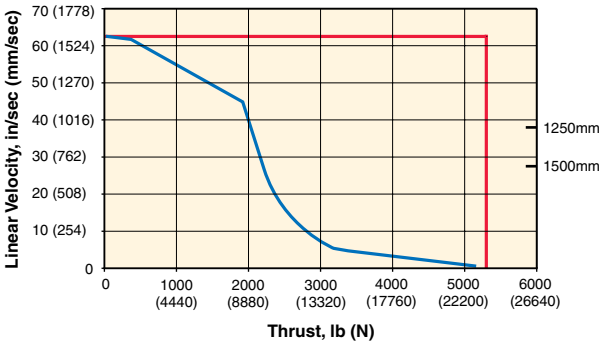
ET100B02**
Ball Screw, 0.500" Lead



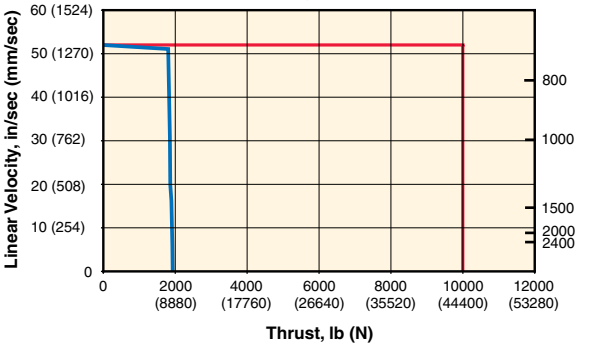
ET125M20**
Ball Screw, 20mm Lead



ET100B53**
Ball Screw, 1.875" Lead



ET125M50**
Ballscrew, 50mm Lead



Inline Mount	Parallel Mount
Direct Drive	Timing Belt
1:1	1:1

Maximum velocity is limited for longer stroke lengths. Reference stroke limits on right edge of graphs.

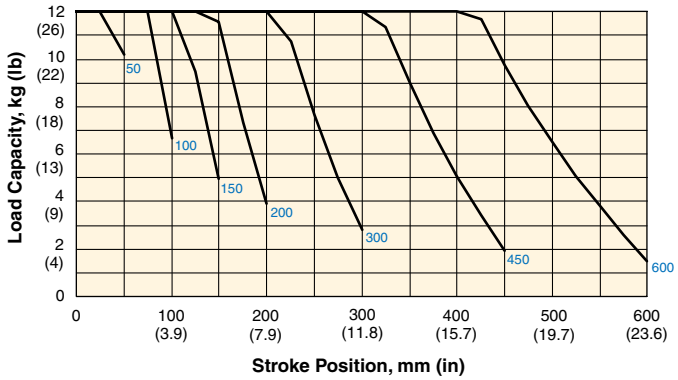
Rod Side Loading

The ET Series Electric Cylinder incorporates a generous rod bearing and a unique triple bearing anti-rotate assembly. However, care should be taken to limit the amount of side loading exerted on the cylinder rod. The charts below show basic load data for various stroke lengths of cylinders. Note that the load capacity increases as the available stroke increases due to greater bearing separation. For greater load capacity for a given application, a cylinder can be specified with a longer stroke, then "shortstroked" in the application.

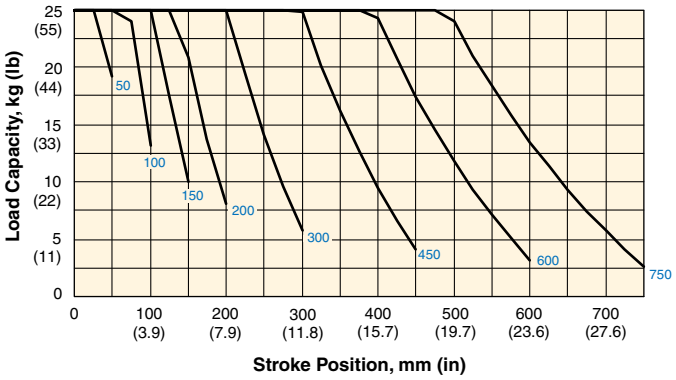
For example, an ET32 with 450 mm of stroke has a maximum load capacity of 2 kg at full extension. An ET32 with 600 mm of available stroke, used in the same application, but only stroked to 450 mm would have a maximum side load capacity of 9.5 kg.

Note: If an application requires more side load than an ET cylinder allows, an optional Linear Rod Guide Module can be specified.

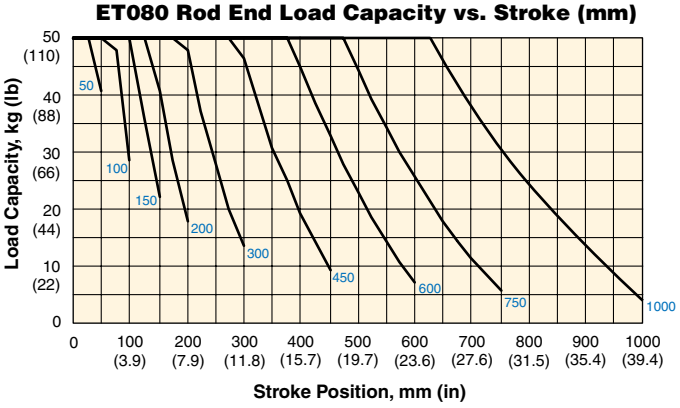
ET032 Rod End Load Capacity vs. Stroke (mm)



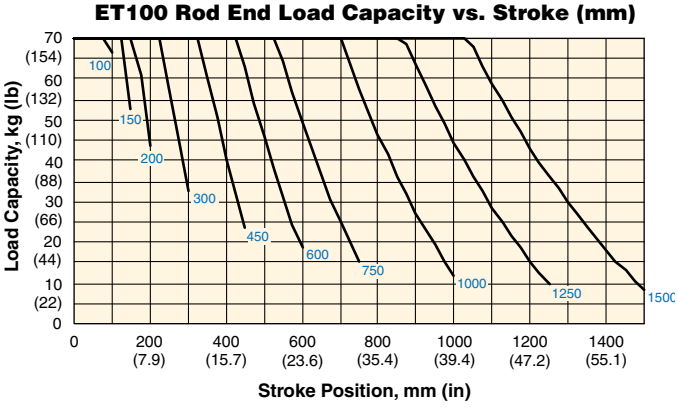
ET050 Rod End Load Capacity vs. Stroke (mm)



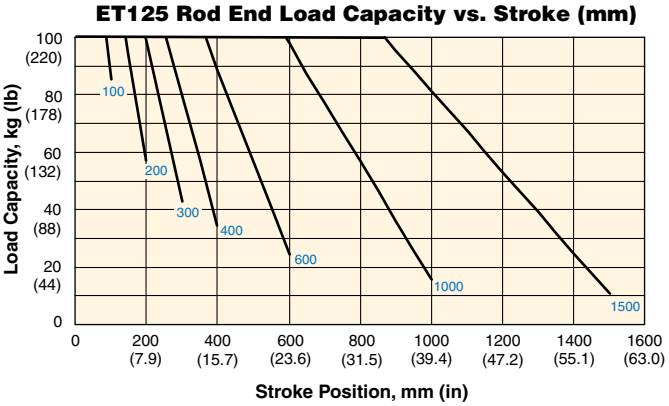
ET080 Rod End Load Capacity vs. Stroke (mm)



ET100 Rod End Load Capacity vs. Stroke (mm)



ET125 Rod End Load Capacity vs. Stroke (mm)



To use charts:

1. Find the chart and curve for the chosen model number and maximum stroke (stroke length of each curve is shown in blue text).
2. Find the corresponding maximum rod load permissible at the desired stroke distance as measured from full retraction.
3. Rod side load is assumed to be perpendicularly applied directly at the rod end.

Important: Load data is applicable for cylinders with side load applied in plane parallel to bottom tapped holes in cylinder. This ensures internal double support rollers on screw carriage are properly loaded. (Internal rollers are located on sides of cylinder with reference to the switch groove on top of the cylinder. ET100 and ET125 have switch grooves on all 4 sides.)

Lead Screw Life Expectancy

Acme Screw Life: As a result of the high friction inherent to acme screws, life expectancy is unpredictable. Load, duty cycle, speed, temp, and lubrication all affect the amount of heat generated and thread wear by the acme nut which ultimately determines the life of the mechanism. Acme screws typically have lower life expectancies than ball screws and should only be used in low duty cycle applications.

Ball Screw Life: Ball screws are high efficiency mechanisms that utilize a rolling friction, ball bearing nut to translate rotary motion and torque to linear motion and thrust. Life expectancy can be predicted by comparing the effective load to the screw's basic dynamic load rating. Basic dynamic load rating is the load at which a screw has a 90% probability of achieving 1,000,000 revs of life before metal fatigue develops – L10 life.

To Use Charts:

1 Determine required life in millions of inches of travel. Life is determined by multiplying the total stroke in inches by the total number of strokes required for the designed life of the equipment.

2 Calculate the equivalent load L_m.

$$L_m = \sqrt{\frac{\%_1 (L_1)^2 + \%_2 (L_2)^2 + \%_3 (L_3)^2 + \%_n (L_n)^2}{100}}$$

Where: L_m = equivalent load
L_n = each increment of load
$\%_n$ = percent of stroke at load L_n

For example:
L1 = 150# %1 = 30%
L2 = 225# %2 = 45%
L3 = 725# %3 = 25%

$$L_m = \sqrt{\frac{30\ (150)2 + 45\ (225)2 + 25\ (725)2}{100}}$$

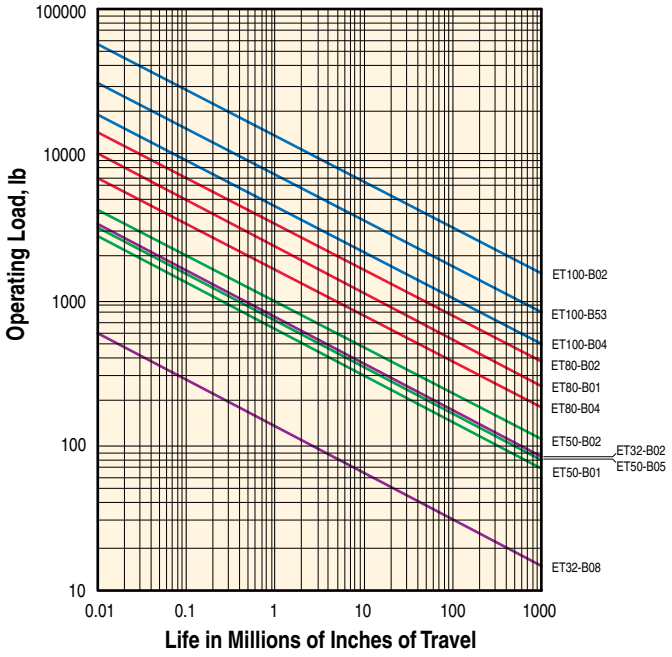
L_m = 466 lbs

3 Find the point at which load and life intersect.

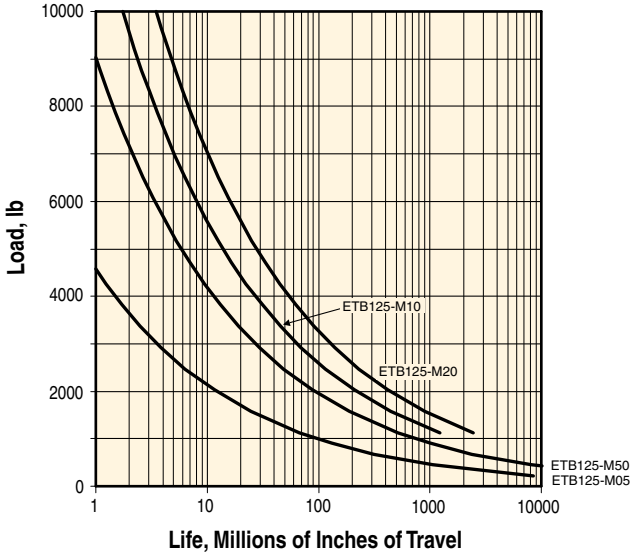
4 Select actuator screw combination to the right of or above the point of intersection.

For more detailed information and examples on calculating screw life, reference the ET technical manual.

Life Expectancy (inch)
ETB32 - ETB100



Life Expectancy (inch)
ETB125



Linear Rod Guide Module

Rod End Code R

Some applications may require guided rod movement or may experience side loads exerted on the cylinder rod. The Linear Rod Guide Module is a simple, bolt-on accessory that will support significant side loads and extend the life of the cylinder rod bearing.

Notes:

1) Please consider switch groove mounting orientation when using linear rod guide module and parallel style motor mounting.
2) Not compatible with B, G, J, or N mounting options.
3) Not available with ET125 units.

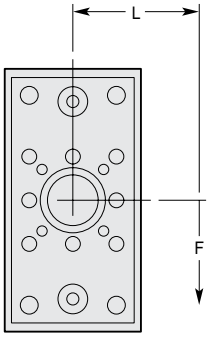
Features

- Anti-rotation is achieved by two stainless steel guide rods. The linear rod is attached to the end plate by a self-aligning coupling.
- Four linear ball bearings running on fixed guide rods provide accuracy, stability and rigidity.
- The units provide high resistance to torque loading and greatly increase cylinder side load bearing capacity.
- The cast aluminum body is a compact and light weight design and provides mounting in vertical or horizontal positions. The front flange plate incorporates several threaded and drilled holes for easy connection to customer tooling.

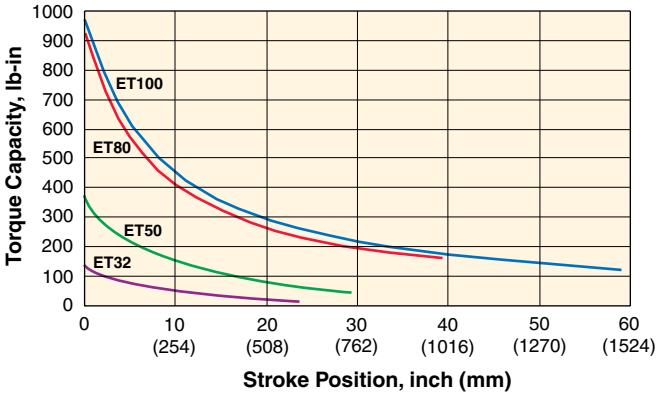
Permissible Torque

Use the following formula to calculate the moment loading of the rod guide.

C(lb-in) = F(lb) x L(in)



Linear Guide Module Torque Capacity



To use chart:

1. Vertical axis indicates maximum torque capacity for specified conditions.
2. For greater torque capacity, either reduce stroke distance or use larger size actuator.

Ordering Information

Cylinder	Rod Guide Part Number
ET032	32-2800R-****
ET050	50-2800R-****
ET080	80-2800R-****
ET100	100-2800R-****

**** = stroke in mm, i.e. 50-2800R-0200 for 200mm stroke length. Specify same stroke as ordered on the matching ET cylinder.

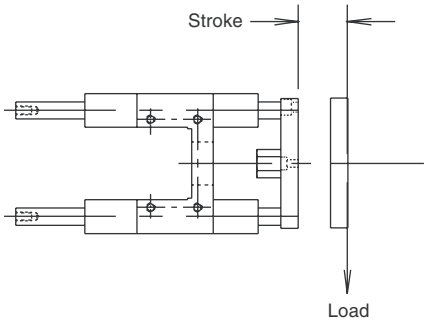
NOTE:

To order Linear Rod Guide Module mounted to cylinder, specify “R” for Cylinder Rod End in Model Code.

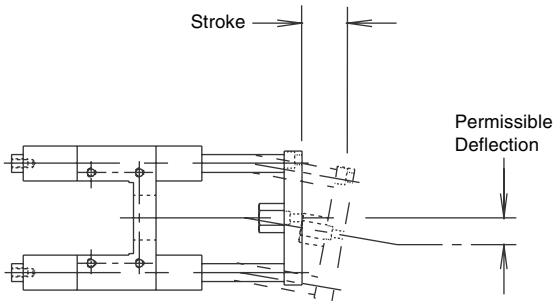
Linear Rod Guide Module
Attached to an ET032 Cylinder

Linear Rod Guide Module

Load Capacity



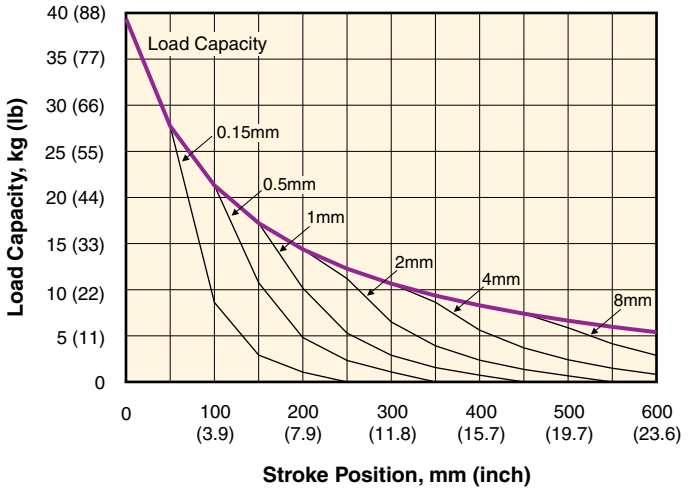
Maximum Deflection
Graphs established at given stroke



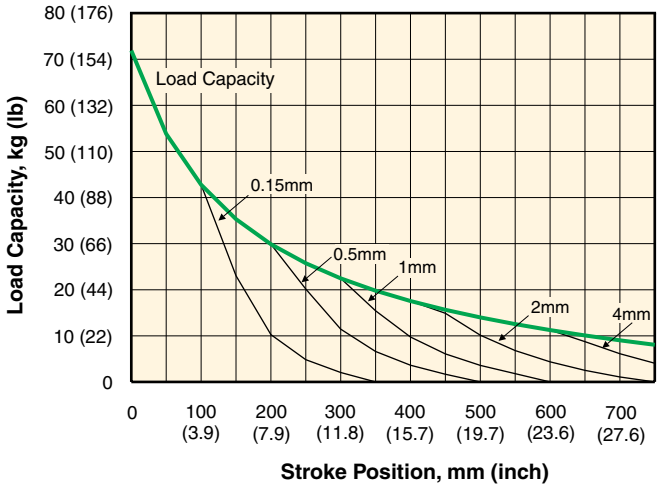
The linear rod guide module load and deflection ratings are in the charts below. All load capacities are based on one million meters of travel. To use charts:

1. For given size module, determine permissible deflection for application, based on stroke distance.
2. Maximum load capacity is indicated by upper curve.
3. Deflections are shown on lower curves.

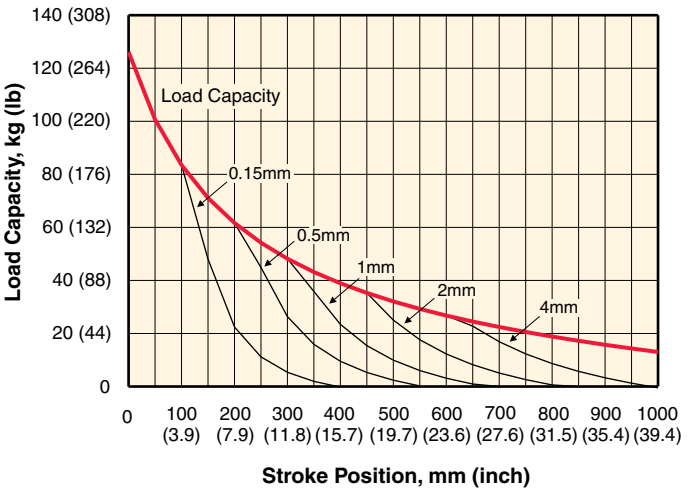
ET32 Rod Guide Module
Load Capacity vs Stroke Position



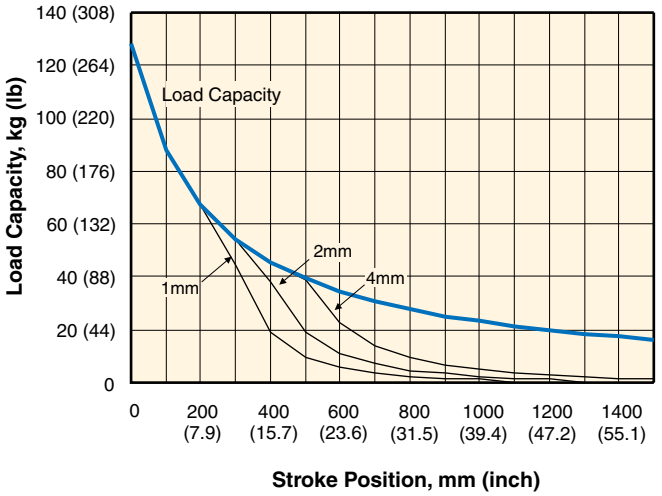
ET50 Rod Guide Module
Load Capacity vs Stroke Position



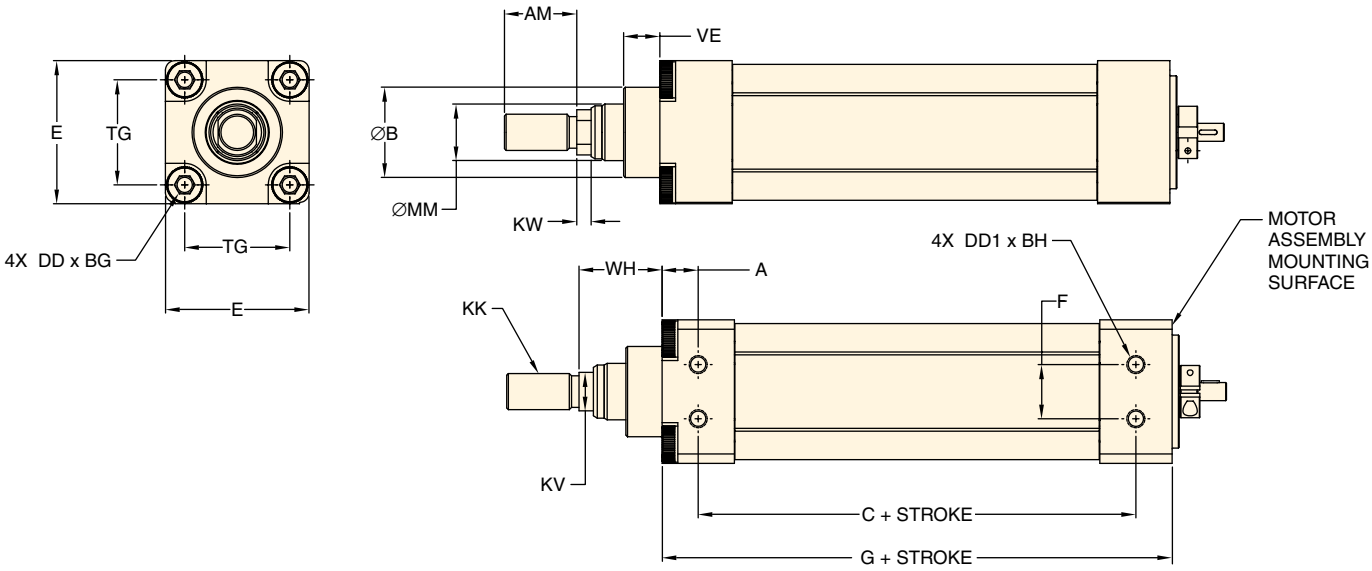
ET80 Rod Guide Module
Load Capacity vs Stroke Position



ET100 Rod Guide Module
Load Capacity vs Stroke Position



ET Basic Dimensions



Basic Dimensions

Model	A	AM	ØB	BG	BH	DD	DD1	E	F	KK	KV A/F	KW	ØMM	TG	VE	WH
ET032	14.0 (0.55)	22.1 (0.87)	30.0 (1.18)	16.0 (0.63)	9.0 (0.35)	M6x1	M6x1	46.5 (1.83)	16.0 (0.63)	M10x1.25	10.0 (0.39)	4.8 (0.19)	18.0 (0.71)	32.5 (1.28)	13.0 (0.51)	25.9 (1.02)
ET050	16.0 (0.63)	32.0 (1.26)	40.0 (1.57)	16.0 (0.63)	12.7 (0.50)	M8 x1.25	M8x1.25	63.5 (2.50)	24.0 (0.94)	M16x1.5	17.0 (0.67)	6.4 (0.25)	25.0 (0.98)	46.5 (1.83)	16.0 (0.63)	37.0 (1.46)
ET080	21.0 (0.83)	40.0 (1.57)	50.0 (1.97)	16.0 (0.63)	17.5 (0.69)	M10x1.5	M10x1.5	95.2 (3.75)	30.0 (1.18)	M20x1.5	22.0 (0.87)	9.9 (0.39)	35.0 (1.38)	72.0 (2.83)	20.0 (0.79)	46.5 (1.83)
ET100	27.5 (1.08)	53.8 (2.12)	65.0 (2.56)	16.0 (0.63)	24.0 (0.94)	M10x1.5	M12x1.75	114.3 (4.50)	50.0 (1.97)	M27x2.0	27.0 (1.06)	13.0 (0.51)	50.0 (1.97)	89.0 (3.50)	20.0 (0.79)	51.1 (2.01)
ET125	37.0 (1.46)	71.5 (2.81)	90.0 (3.54)	11.0 (0.43)	24.0 (0.94)	M12x1.5	M16x2.0	140.0 (5.51)	64.0 (2.52)	M36x2.0	41.0 (1.61)	13.0 (0.51)	70.0 (2.75)	110.0 (4.33)	25.4 (1.00)	73 (2.87)

Stroke Chart (Add Stroke Length to Dimension)

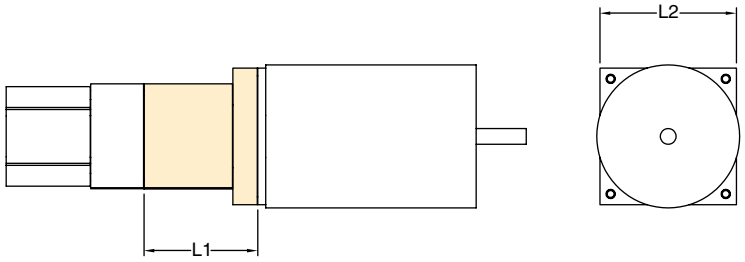
Model	Screw	C	G	SA*	X1*	GF*	XD*
ET032	B08	67.9 (2.67)	96.1 (3.78)	180.0 (7.11)	108.0 (4.25)	162.0 (6.40)	181.0 (7.11)
	B02	109.3 (4.30)	137.5 (5.41)	222.0 (8.74)	149.0 (5.87)	204.0 (8.03)	222.0 (8.74)
	A08	58.5 (2.30)	86.7 (3.41)	171.0 (6.74)	98.0 (3.88)	153.0 (6.03)	171.0 (6.74)
	A04	58.5 (2.30)	86.7 (3.41)	171.0 (6.74)	98.0 (3.88)	153.0 (6.03)	222.0
ET050	B05	93.7 (3.69)	126.0 (4.96)	229.0 (9.03)	147.0 (5.78)	206.0 (8.13)	229.0 (9.03)
	B02	93.7 (3.69)	126.0 (4.96)	229.0 (9.03)	147.0 (5.78)	206.0 (8.13)	229.0 (9.03)
	B01	93.7 (3.69)	126.0 (4.96)	229.0 (9.03)	147.0 (5.78)	206.0 (8.13)	229.0 (9.03)
	A05	75.7 (2.98)	107.9 (4.25)	211.0 (8.32)	129.0 (5.07)	188.0 (7.42)	211.0 (8.32)
ET080	B04	126.8 (4.99)	170.3 (6.71)	308.0 (12.13)	192.0 (7.57)	277.0 (10.91)	308.0 (12.14)
	B02	146.1 (5.75)	189.6 (7.47)	327.0 (12.88)	212.0 (8.33)	297.0 (11.68)	328.0 (12.90)
	B01	143.3 (5.64)	186.8 (7.36)	325.0 (12.78)	209.0 (8.22)	294.0 (11.56)	325.0 (12.79)
	A04	111.6 (4.39)	155.1 (6.11)	293.0 (11.53)	177.0 (6.97)	262.0 (10.32)	293.0 (11.54)
ET100	B04	218.1 (8.59)	276.8 (10.90)	434.0 (17.09)	296.5 (11.67)	407.0 (16.03)	444.0 (17.48)
	B02	277.5 (10.93)	336.3 (13.24)	493.0 (19.43)	356.0 (14.01)	466.0 (18.37)	504.0 (19.82)
	B53	292.5 (11.52)	351.3 (13.83)	509.0 (20.03)	371.0 (14.61)	482.0 (18.97)	519.0 (20.42)
	A04	201.3 (7.93)	260.1 (10.24)	417.0 (16.44)	280.0 (11.02)	390.0 (15.38)	427.0 (16.83)
ET125	M05	207.0 (8.15)	461.5 (18.17)	495.0 (19.49)	316.5 (12.46)	484.8 (19.09)	550.8 (21.69)
	M10	240.0 (9.45)	494.5 (19.47)	528.0 (20.79)	349.5 (13.76)	517.8 (20.39)	583.8 (22.98)
	M20	233.0 (9.17)	487.5 (19.19)	521.2 (20.52)	342.5 (13.48)	510.8 (20.11)	576.8 (22.71)
	M50	260.0 (10.24)	514.5 (20.26)	548.1 (21.58)	369.5 (14.55)	537.8 (21.17)	603.8 (23.77)

* Dimensions shown on mounting options pages.

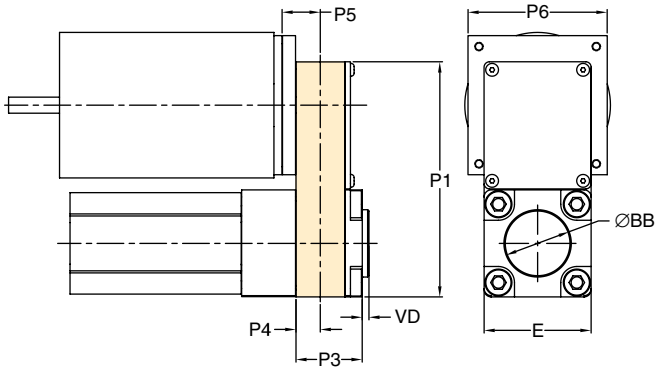
Motor Mounting

Inline (Direct Drive)

Dimensions L1 and L2 are dependent on drive motor dimensions. Consult factory.



Parallel (Timing Belt)

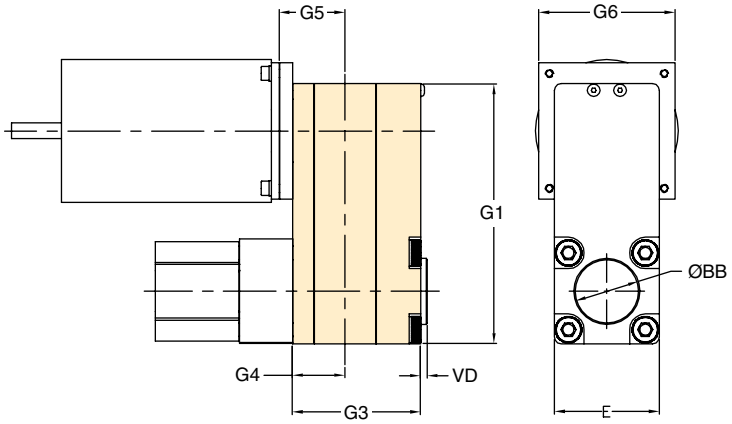


Common Dimensions

Size	ØBB	P1	P3	P4	VD	E
32	30.0 (1.18)	106.4 (4.19)	36.4 (1.43)	14.0 (0.55)	4.0 (0.16)	46.5 (1.83)
50	40.0 (1.57)	139.5 (5.49)	39.3 (1.55)	14.4 (0.57)	4.0 (0.16)	63.5 (2.50)
80	45.0 (1.77)	191.3 (7.53)	55.6 (2.19)	21.1 (0.83)	5.0 (0.20)	95.2 (3.75)
100	55.0 (2.17)	254.0 (10.0)	75.5 (2.97)	31.0 (1.22)	4.0 (0.16)	114.3 (4.50)
125	90.0 (3.54)	334.5 (13.17)	127.1 (5.00)	40.0 (1.57)	7.0 (0.28)	139.7 (5.50)

Dimensions P5 and P6 are dependent on drive motor dimensions. Consult factory.

Parallel (Gear Drive)



Common Dimensions

Size	ØBB	G1	G3	G4	VD	E
32	30.0 (1.18)	125.5 (4.94)	53.3 (2.10)	24.3 (0.96)	4.0 (0.16)	46.5 (1.83)
50	40.0 (1.57)	157.5 (6.20)	77.5 (3.05)	31.6 (1.24)	4.0 (0.16)	63.5 (2.50)
80	45.0 (1.77)	207.2 (8.16)	76.0 (2.99)	38.0 (1.50)	5.0 (0.20)	95.2 (3.75)

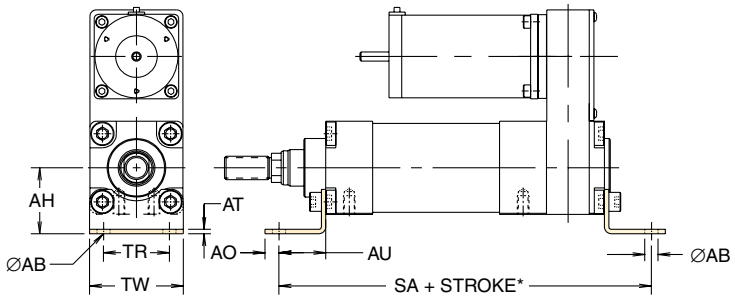
Dimensions G5 and G6 are dependent on drive motor dimensions. Consult factory.

Visit www.parker.com/actuator for 3D models.

Foot Mounting (MS1)

Cylinder Mounting Code B

Parallel Motor Mounting only

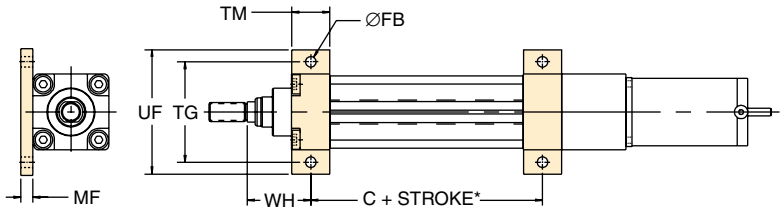


Cylinder	AH	AT	TR CRS	ØAB	AO	AU	TW
ET032	32.0 (1.26)	3.0 (0.12)	31.7/32.2 (1.25/1.27)	7.0 (0.28)	7.2 (0.28)	24.0 (0.94)	46.5 (1.83)
ET050	45.0 (1.77)	3.0 (0.12)	44.7/45.3 (1.76/1.78)	9.0 (0.35)	9.5 (0.37)	32.0 (1.26)	64.0 (2.52)
ET080	63.0 (2.48)	4.0 (0.16)	62.7/63.3 (2.47/2.49)	12.0 (0.47)	16.5 (0.65)	41.0 (1.61)	96.0 (3.78)
ET100	71.0 (2.80)	4.0 (0.16)	74.7/75.3 (2.94/2.96)	14.0 (0.55)	19.0 (0.75)	41.0 (1.61)	113.0 (4.45)
ET125	90.0 (3.54)	8.3 (0.33)	90.4 (3.56)	17.0 (0.67)	25.0 (0.98)	45.0 (1.77)	140.0 (5.51)

Side Lug Mounting

Cylinder Mounting Code G

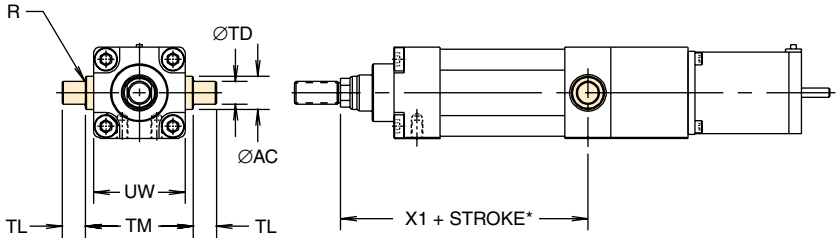
Not available with Q or M motor mounting.



Cylinder	TG	UF	FB	TM	MF	WH
ET032	62.0 (2.44)	78.0 (3.07)	6.7 (0.266)	25.4 (1.00)	8.0 (0.315)	40.0 (1.57)
ET050	84.0 (3.31)	104.0 (4.09)	8.7 (0.344)	31.8 (1.25)	10.0 (0.394)	53.0 (2.09)
ET080	120.0 (4.72)	144.0 (5.65)	11.0 (0.433)	38.1 (1.50)	12.0 (0.472)	67.0 (2.64)
ET100	150.0 (5.91)	185.0 (7.28)	12.8 (0.50)	57.2 (2.25)	12.0 (0.472)	78.0 (3.09)
ET125	175.0 (6.89)	210.0 (8.27)	17.0 (0.67)	69.9 (2.75)	20.0 (0.79)	110.0 (4.33)

Trunnion Mount (MT4)

Cylinder Mounting Code D



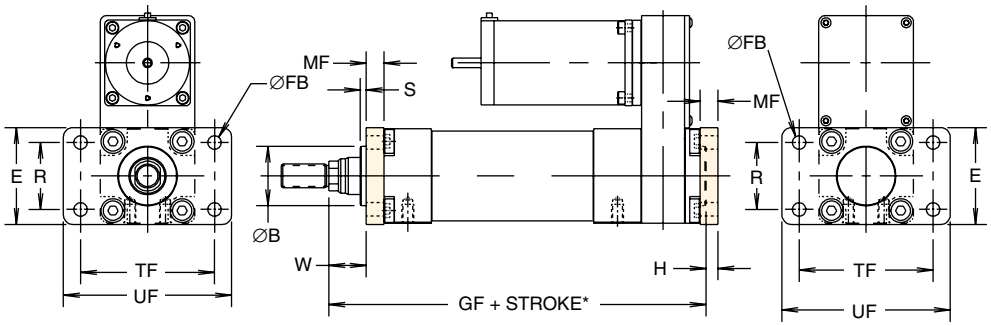
Cylinder	UW	ØTD	R	TL	TM	ØAC
ET032	46.5 (1.83)	12.0 (0.47)	0.8 (0.03)	12.0 (0.47)	50.0 (1.97)	18.0 (0.71)
ET050	63.5 (2.50)	16.0 (0.63)	0.8 (0.03)	16.0 (0.63)	75.0 (2.95)	25.0 (0.98)
ET080	95.3 (3.75)	20.0 (0.79)	0.8 (0.03)	20.0 (0.79)	110.0 (4.33)	30.0 (1.18)
ET100	114.3 (4.50)	25.0 (0.98)	1.6 (0.06)	25.0 (0.98)	132.0 (5.20)	40.0 (1.57)
ET125	139.7 (5.50)	32.0 (1.26)	2.0 (0.08)	32.0 (1.26)	149.7 (5.89)	45.0 (1.77)

* See stroke chart on page 14.

Front & Rear Flange Mounting (MF1 & MF2)

Cylinder Mounting Codes J, H, N

Inline Mounting not available with Rear Flange



Cylinder	UF	E	TF	∅FB	R	W	MF	H	∅B	S
ET032	80.0 (3.15)	47.0 (1.85)	63.7/64.3 (2.51/2.53)	7.0/7.2 (0.27/0.28)	31.7/32.2 (1.25/1.27)	16.0 (0.63)	9.88/10.12 (0.39/0.40)	6.0 (0.24)	30.0 (1.18)	3.0 (0.12)
ET050	113.0 (4.45)	65.0 (2.56)	89.6/90.4 (3.53/3.56)	9.0/9.2 (0.35/0.39)	44.7/45.3 (1.76/1.78)	25.0 (0.98)	11.88/12.12 (0.47/0.48)	8.0 (0.32)	40.0 (1.58)	4.0 (0.16)
ET080	153.0 (6.02)	97.0 (3.82)	125.5/126.5 (4.94/4.98)	12.0/12.2 (0.47/0.48)	62.7/63.3 (2.47/2.49)	30.0 (1.18)	15.88/16.12 (0.62/0.63)	11.0 (0.43)	50.0 (1.97)	4.0 (0.16)
ET100	186.0 (7.32)	111.0 (4.37)	149.5/150.5 (5.89/5.93)	14.0/14.2 (0.55/0.56)	74.7/75.3 (2.94/2.96)	35.0 (1.38)	15.88/16.12 (0.62/0.63)	12.0 (0.47)	65.0 (2.56)	4.0 (0.16)
ET125	220.0 (8.68)	139.5 (5.49)	179.9/180.1 (7.08/7.09)	16.9/17.1 (0.66/0.67)	89.9/90.1 (3.54/3.55)	53.0 (2.09)	19.9/20.1 (0.78/0.79)	13.0 (0.51)	90.0 (3.54)	5.4 (0.21)

Rear Eye Mounting (MP4)

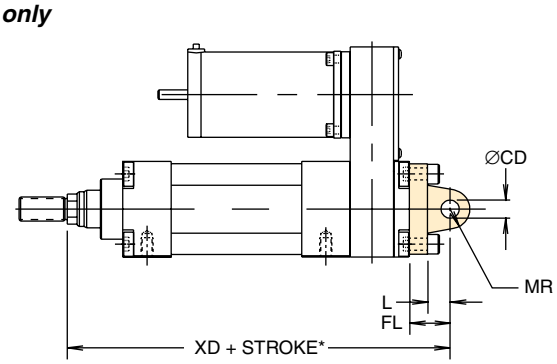
Cylinder Mounting Code E

Parallel Motor Mounting only

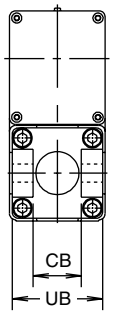
Rear Clevis (MP2-R)

Cylinder Mounting Code C

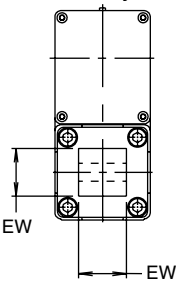
Parallel Motor Mounting only



Rear Clevis



Rear Eye



Cylinder	EW	øCD	MR	FL	L	CB Rear Only	UB
ET032	25.3/25.8 (0.99/1.02)	10.0 (0.39)	10.0 (0.39)	22.0 (0.87)	12.0 (0.47)	26.0 (1.02)	44.4/45.0 (1.75/1.77)
ET050	31.3/31.8 (1.23/1.25)	12.0 (0.47)	13.0 (0.51)	27.0 (1.06)	15.0 (0.59)	32.0 (1.26)	59.2/60.0 (2.33/2.36)
ET080	49.7/49.8 (1.96/1.96)	16.0 (0.63)	20.0 (0.79)	36.0 (1.42)	20.0 (0.79)	50.0 (1.97)	89.4/90.0 (3.52/3.54)
ET100	59.3/59.8 (2.33/2.35)	20.0 (0.79)	22.0 (0.87)	41.0 (1.61)	25.0 (0.98)	60.0 (2.36)	109.0/110.0 (4.29/4.33)
ET125	29.6/30.0 (1.17/1.18)	20.0 (0.79)	29.0 (1.14)	73.0 (2.87)	32.0 (1.26)	30.0 (1.18)	60.0 (2.36)

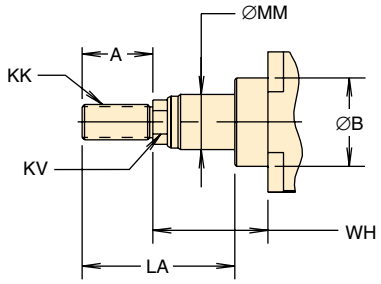
* See stroke chart on page 14.

ET Rod End Options

Male

Rod End Code M (Metric)

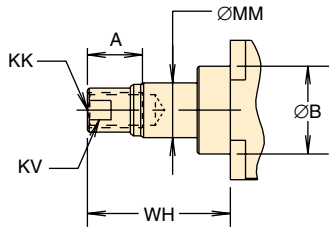
Rod End Code K (inch)



Cylinder	A	øB	KK (Metric)	KK (Inch)	KV	LA	ØMM	WH
ET032	22.0 (0.87)	30.0 (1.18)	M10 x 1.25	7/16-20	10.0 (0.39)	35.0 (1.38)	18.0 (0.71)	26.0 (1.02)
ET050	32.0 (1.26)	40.0 (1.57)	M16 x 1.5	5/8-18	17.0 (0.67)	53.0 (2.09)	25.0 (0.98)	37.0 (1.46)
ET080	40.0 (1.57)	50.0 (1.97)	M20 x 1.5	3/4-16	22.0 (0.87)	66.0 (2.60)	35.0 (1.38)	46.0 (1.81)
ET100	54.0 (2.13)	65.0 (2.56)	M27 x 2.0	1-14	27.0 (1.06)	85.0 (3.35)	50.0 (1.97)	51.0 (2.01)
ET125	71.5 (2.81)	90.0 (3.54)	M36 x 2.0	$1^{3}/_{8}$-12	41.0 (1.61)	119.1 (4.69)	70.0 (2.76)	73.0 (2.87)

Female

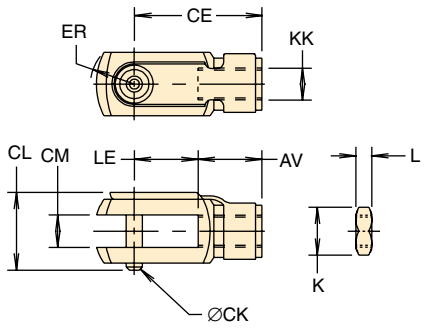
Rod End Code F (Metric)



Cylinder	A	ØB	KK	KV	ØMM	WH
ET032	15.0 (0.59)	30.0 (1.18)	M10 x 1.25	12.0 (0.47)	18.0 (0.71)	32.0 (1.26)
ET050	25.0 (0.98)	40.0 (1.57)	M16 x 1.5	20.0 (0.79)	25.0 (0.98)	50.0 (1.96)
ET080	30.0 (1.18)	50.0 (1.97)	M20 x 1.5	26.0 (1.02)	35.0 (1.38)	59.0 (2.32)
ET100	40.0 (1.57)	65.0 (2.56)	M27 x 2	37.0 (1.46)	50.0 (1.97)	73.0 (2.87)
ET125	50.3 (1.98)	90.0 (3.54)	M36 x 2.0	55.0 (2.17)	70.0 (2.76)	104.5 (4.11)

Rod Clevis

Rod End Code C

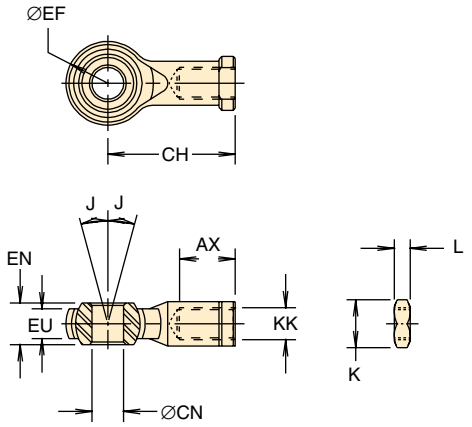


Cylinder	KK	CL	CM	LE	CE	AV	ER	ØCK	K (A/F)	L
ET032	M10 x 1.25	26.0 (1.02)	10.2 +0.13, -0.05	20.0 (0.78)	40.0 (1.57)	20.0 (0.78)	14.0 (0.55)	10.0 +0, -0.1	17.0 (0.67)	6.0 (0.24)
ET050	M16 x 1.5	39.0 (1.54)	16.2 +0.13, -0.05	32.0 (1.26)	64.0 (2.52)	32.0 (1.26)	22.0 (0.87)	16.0 +0, -0.2	24.0 (0.94)	8.0 (0.31)
ET080	M20 x 1.5	52.5 (2.07)	20.1 +0.02, -0.0	40.0 (1.57)	80.0 (3.15)	40.0 (1.57)	30.0 (1.18)	20.0 +0, -0.2	30.0 (1.18)	9.0 (0.35)
ET100	M27 x 2.0	63.0 (2.48)	30.0 +0.6, -0.2	54.0 (2.13)	110.0 (4.33)	56,0 (2.20)	35.0 (1.38)	30.0 +0, -0.2	41.0 (1.61)	12.0 (0.47)
ET125	M36 x 2.0	70.0 (2.76)	35.0 (1.38)	72.0 (2.83)	144.0 (5.67)	72.0 (2.83)	57.0 (2.24)	35.0 (1.38)	55.0 (2.17)	18.0 (0.71)

Rod End Options

Spherical Rod Eye

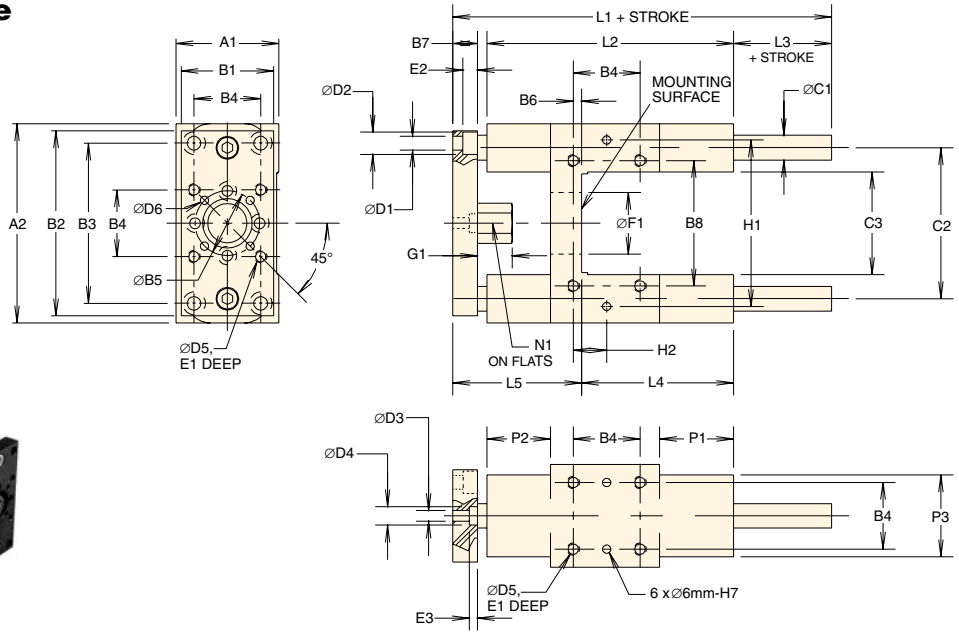
Rod End Code S



Cylinder	ØCN	EN	EU	AX	CH	ØEF	KK	J°	K (A/F)	L
ET032	10.0 (0.39)	14.0 (0.55)	10.5 (0.41)	20.0 (0.79)	43.0 (1.69)	29.0 (1.14)	M10 x 1.25	13	17.0 (0.66)	6.0 (0.24)
ET050	16.0 (0.63)	21.0 (0.83)	15.0 (0.59)	28.0 (1.10)	64.0 (2.52)	42.0 (1.65)	M16 x 1.5	15	24.0 (0.94)	8.0 (0.31)
ET080	20.0 (0.79)	25.0 (0.98)	18.0 (0.71)	33.0 (1.30)	77.0 (3.03)	50.0 (1.97)	M20 x 1.5	14	30.0 (1.18)	9.0 (0.35)
ET100	30.0 (1.18)	37.0 (1.46)	25.0 (0.98)	51.0 (2.00)	110.0 (4.33)	70.0 (2.76)	M27 x 2.0	15	41.0 (1.61)	12.0 (0.47)
ET125	35.0 (1.38)	43.0 (1.69)	28.0 (1.10)	56.0 (2.20)	125.0 (4.92)	80.0 (3.15)	M36 x 2.0	16	55.0 (2.17)	18.0 (0.71)

Linear Rod Guide Module

Rod End Code R



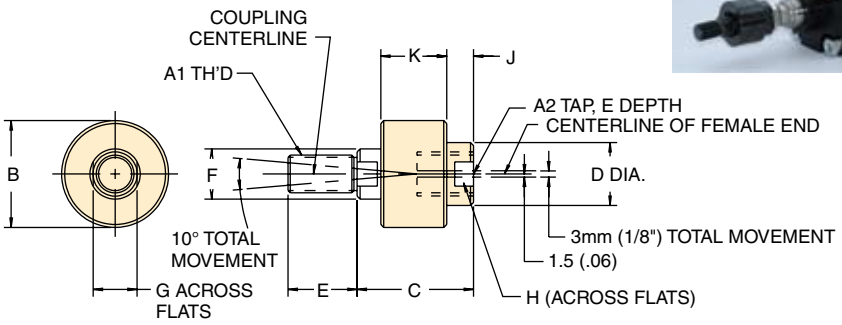
Cylinder	A1	A2	B1	B2	B3	B4	ØB5	B6	B7	B8	ØC1	C2	C3	ØD1	ØD2	ØD3	ØD4	ØD5	ØD6
ET032	50	97	44.4	92	78.0	32.5	31.5	4	12	61	12.0	73.5	50	6.6	11	5.2	9	M6x1.00	4
ET050	70	137	63	132	100	46.5	50	19	15	85	20	103.5	70	9	14	6.4	11	M8x1.25	4
ET080	105	189	101.6	180	130	72	76	21	20	130	25	147	105	11	17	8.4	14	M10x1.50	6
ET100	130	213	120	200	150	89	76	24.5	20	150	25	171.5	130	11	17	8.4	14	M10x1.50	6

Cylinder	E1	E2	E3	ØF1	G1	H1	H2	L1	L2	L3	L4	L5	N1	P1	P2	P3	Basic Unit, kg (lb)	Extra per 100mm Stroke, kg (lb)
ET032	12	7	4	30	17	81	16	152	120	17	71	64	17	36	31.0	40	0.97 (2.14)	0.175 (0.39)
ET050	16	9	9	40	27	119	23	193	150	25	79	89	24	42	44	50	2.56 (5.64)	0.495 (1.09)
ET080	20	11	5	45	32	166	36	253	200	30	113	110	30	50	52	70	6.53 (14.4)	0.770 (1.70)
ET100	20	11	5	55	55	190	45	273	220	30	128	138	30	49	51	70	8.76 (19.32)	0.770 (1.70)

Linear Alignment Coupler

Order separately from table below.

- Prevents binding and reduces side loads induced by misalignment
- Increases cylinder life by reducing wear on rod and screw bearings
- Simplifies cylinder installation and reduces assembly costs
- Metric and Imperial thread type available

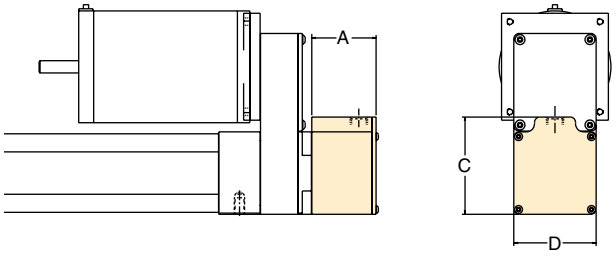


Model	Coupler Part No.	A1 Thd.	A2 Thd.	B	C	D	E	F	G	H	J	K
ET032	LC32-1010	M10 x 1.25	M10 x1.25	40.0 (1.56)	51.0 (2.00)	19.0 (0.75)	19.0 (0.75)	16.0 (0.63)	13.0 (0.50)	16.0 (0.63)	13.0 (0.50)	26.0 (1.03)
	1347570044	7/16-20	7/16-20									
ET050	LC50-1616	M16 x1.50	M16 x1.50	54.0 (2.13)	59.0 (2.31)	32.0 (1.25)	29.0 (1.13)	25.0 (1.00)	22.0 (0.88)	29.0 (1.13)	14.0 (0.53)	33.0 (1.31)
	1347570063	5/8-18	5/8-18									
ET080	LC80-2020	M20 x 1.50	M20 x1.50	54.0 (2.13)	59.0 (2.31)	32.0 (1.25)	29.0 (1.13)	25.0 (1.00)	22.0 (0.88)	29.0 (1.13)	14.0 (0.53)	33.0 (1.31)
	1347570075	3/4-16	3/4-16									
ET100	LC100-2727	M27 x 2.0	M27 x 2.0	89.0 (3.50)	102.0 (4.00)	51.0 (2.00)	51.0 (2.00)	38.0 (1.50)	32.0 (1.25)	43.0 (1.69)	19.0 (0.75)	64.0 (2.50)
	1337390100	1-14	1-14									
ET125	LC125-3636	M36 x 2.0	M36 x 2.0	101.6 (4.0)	111.3 (4.38)	57.2 (2.25)	57.2 (2.25)	44.5 (1.75)	38.1 (1.50)	49.3 (1.94)	22.1 (0.87)	69.9 (2.75)
	1337390125AAD	$1^3/_8$-12	$1^3/_8$-12									

Brake

A brake option is available on ET electric cylinders to prevent back driving of the cylinder rod when power is removed from the motor. The brake is a spring loaded, friction disc type that requires a separate power signal (24 VDC or 115 VAC) to the solenoid that releases the brake.

The brake option attaches directly to the rear of the ball or Acme screw, preventing movement of the cylinder rod for static conditions. Options which mount to the rear of the actuator are not available with the brake option.



Actuator	Screw	Lead (in)	Holding Force N (lb)
ET032	B02	0.500	600 N (135 lb)
	B08	0.125	600 N (135 lb)
	A04	0.250	600 N (135 lb)
	A08	0.125	600 N (135 lb)
ET050	B01	1.000	735 N (165 lb)
	B02	0.500	1560 N (350 lb)
	B05	0.200	3200 N (720 lb)
	A05	0.200	3200 N (720 lb)
ET080	B01	1.000	2560 N (575 lb)
	B02	0.500	5120 N (1150 lb)
	B04	0.250	7120 N (1600 lb)
	A04	0.250	7120 N (1600 lb)
ET100	B53	1.875	2670 N (600 lb)
	B02	0.500	10350 N (2325 lb)
	B04	0.250	20700 N (4650 lb)
	A04	0.250	20700 N (4650 lb)

Cylinder	A	C	D
ET032	43.4 (1.71)	50.0 (1.97)	63.5 (2.50)
ET050	55.0 (2.18)	75.0 (2.95)	63.5 (2.50)
ET080	76.0 (3.00)	95.3 (3.75)	95.3 (3.75)
ET100***	82.6 (3.25)	136.7 (5.38)	127.0 (5.00)

Preloaded Ball Screws

The introduction of a second ball nut, preloaded against the first ball nut, eliminates backlash in the ball screw. This option is available on all ball screw-actuator combinations. *This option will increase overall actuator length.*

Precision Ground Ball Screws

Substituting a precision ground ball screw for the standard rolled ball screw improves lead error and overall system accuracy.

Bellows (Rod Boot) Option

Protect the stainless steel thrust tube with a hypalon/polyester rod boot, or bellows. The bellows option is tied on both ends and shields the thrust tube from splatter. Special bellows installations are available for weld splatter.

Extended and Non-Standard Stroke Lengths

Where high linear speed is not crucial to the performance of the system, it may be possible to extend the standard length of any size actuator. Screw critical speed is a function of the diameter of the screw and the distance between its bearing supports. Additionally, non-standard or intermediate stroke lengths are available. Consult the factory for any special stroke needs.

Special Lubricants

The Actuator Division has provided special lubrication for drive screws and thrust tubes as specified by the customer. Non-silicon based greases are available for clean room and vacuum-rated applications.

Breather Tube Option

The aluminum actuator housing is an ideal platform for the installation of air fittings. Breather tubes may be fitted to either create positive pressurization (air purge) or create a vacuum to minimize particle contamination.

Special Rod Seals

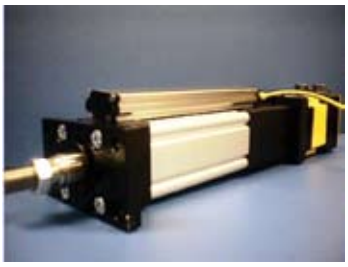
Substances in the application environment or the environment itself may unfavorably react with the combination lip and wiper seal on the thrust tube (rod). Special materials are available to suit most applications.

High and Low Temperature Modifications

Aluminum and steel have different thermal expansion coefficients. It may be necessary to modify the fit tolerances on certain parts to accommodate extreme temperatures. Contact the factory if the application environment exceeds the recommended temperature range.

External Linear Potentiometer

Attached to the cylinder by a standard bracket mount, the external linear potentiometer can accommodate stroke lengths from 100 to 1400mm. Repeatability is 0.01% of full stroke. Available in 4-20mA or 0-10 VDC, the enclosure has an IP67 rating and is designed to meet CE requirements.



Double Stack Angular Contact Bearings

Available with sizes 50 and 80 actuators. The standard 50 has a maximum thrust rating of 720 pounds of thrust and the 80 1600 pounds of thrust. By using a double stack of angular contact bearings, the 50 series will provide 900 pounds of thrust and the 80 series will provide 2500 pounds of thrust.

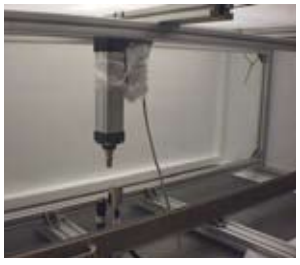
IP65 Rating

The IP65 version is particularly suitable for washdown, external and contaminated environments in which the standard version could suffer long-term deterioration.

- Available for four sizes (32, 50, 80 & 100)
- Epoxy-coated cylinder body
- High performance dual position rod seal
- Optional metal scraper seal
- All external hardware in stainless steel
- Optional stainless steel rod ends and cylinder mountings
- Uses existing home and limit sensors
- Parallel or in-line motor mounting options retained
- Stroke length up to 1500mm
- Ballscrew pitches from 5-40mm/rev
- Thrust forces in excess of 20,000 N (4496 lbf)
- Speeds up to 2m/s
- High mechanical efficiency, typically 90%
- Some cylinder mountings not available with IP65 mounting. Consult factory.

Clean Room Requirements

Clean room applications often require modifications to actuators to make the products permissible in clean room environments. Special lubricants, bearing materials, seals, motors and couplers may be required to prepare an actuator for clean room environments. Parker has tested the ET for clean room rating. Based off the actuator and the drive mechanics, Parker can provide 1000 to 10 clean rating. Please consult Actuator Division Application Engineering Department for further information.



Position Sensing Devices

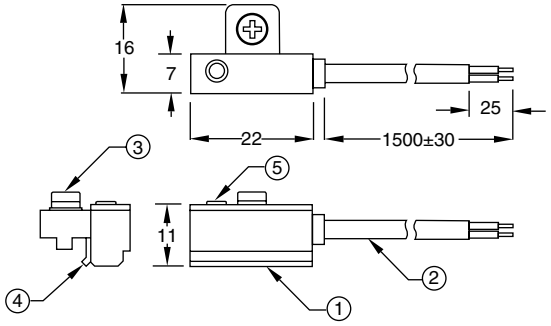
ET Series actuators are equipped with permanent nitrile barium magnets on the bearing carriage. These magnets serve to activate available Hall Effect sensors or reed switches. ET Series actuators include dual sensor/switch mounting grooves on one side of the actuator (see figure 1). The ETB100 has grooves on all sides.

Sensors must be ordered separately.

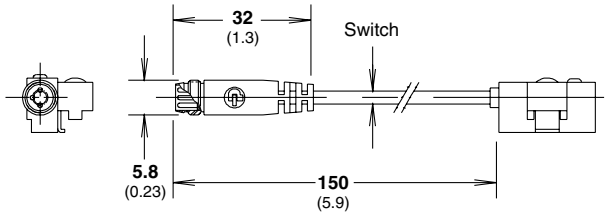
Comparing Sensors and Switches

Hall Effect	Reed
NO or NC	NO or NC
Fully adjustable travel	Fully adjustable travel
Solid state electronics	Mechanical reed
LED indicator	LED indicator
5-24 VDC	5-24VDC or 85-150 VAC
PNP and NPN	Low Amp and High Amp
Medium cost	Lowest cost
Long life	Medium life

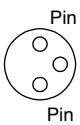
Dimensions



1. Housing material: plastic
2. Cable type: ∅3.3mm, 3C wire, 24AWG
3. Clamp screw: M3x8mm, stainless steel
4. Adjustable clamp: stainless steel
5. LED color when activated: red
6. IP67 and CE certified



Cable Connection



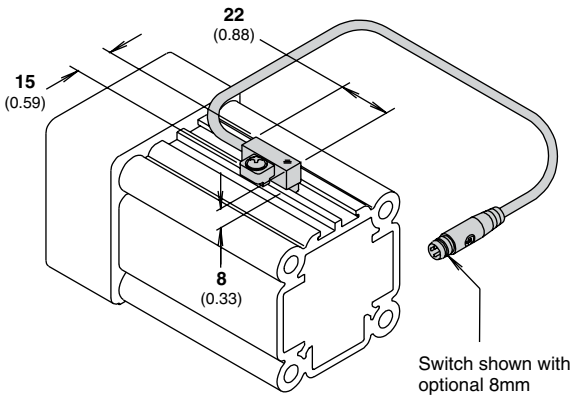


Figure 1

Switch shown with optional 8mm miniature 3-pin circular plug with universal snap-in/ locking device. Flying lead also available.

Hall Effect Sensors

Part No.	Type	LED Color	Logic	Cable/ Connector
SMH-1P	N.O.	Green	PNP	1.5m black with leads
SMH-1N	N.O.	Red	NPN	
SMC-1P	N.C.	Yellow	PNP	
SMC-1N	N.C.	White/Red	NPN	
SMH-1PC	N.O.	Green	PNP	150mm black with connector*
SMH-1NC	N.O.	Red	NPN	
SMC-1PC	N.C.	Yellow	PNP	
SMC-1NC	N.C.	White/Red	NPN	

* Order cable separately.

Reed Switches

Part No.	Type	LED	Current Rating	Cable/ Connector
SMR-1	N.O.	Green	High	1.5m gray with leads
SMR-1L	N.O.	Red	Low	
SMD-1L	N.C.	Yellow	Low	
SMR-1C	N.O.	Green	High	150mm gray with connector*
SMR-1LC	N.O.	Red	Low	
SMD-1LC	N.C.	Yellow	Low	

* Order cable separately.

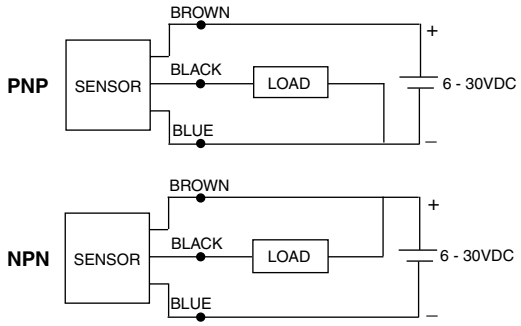
Connector Option

A mating cable/connector is available for sensors with the connector option. Hall Effect sensors use all three wires while reed switches use only blue and brown.

Part No.	Description
B8786	5m (16 ft.) polyurethane covered cable/connector

Hall Effect Sensors

Two types of Hall effect sensors are available for use with ET Series actuators. The normally open sensor is typically used for mid-position sensing, such as homing applications. The normally closed sensor is generally used to indicate over-travel at the end of the stroke, and is used in a safety circuit to prevent damage to components caused by over-travel.



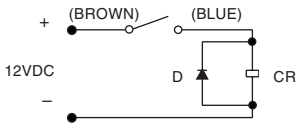
Note: End of travel sensors do not reduce available stroke.

ZETA6104 controls use NPN sensors for Home and End-of-Travel.

Reed Switches

Reed switches are available in a normally open or normally closed configuration. The low amp switch is suitable for connection to PLCs or other low current devices. The high amp switch can be used to drive sequencers, relays, coils, or other devices directly. Not compatible with TTL level I.O. Logic (switch will work with TTL level if wired backwards but LED will not light).

DC Operation



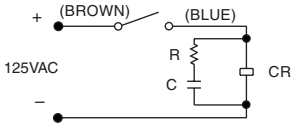
Required for proper operation 24VDC.

Put Diode parallel to load (CR) with polarity as shown.

D: Diode: select a Diode with the breakdown voltage and current rating according to the load.

CR: Relay coil (under 0.5 W coil rating)

AC Operation



Recommended for longer switch life 125VAC.

Put resistor and capacitor parallel to load (CR).

CR: Relay coil (under 2 W coil ratings)

R: Resistor under 1 K Ohm

C: Capacitor 0.1 µF

Hall Effect Specifications

	Solid State
Type	Solid State Type (PNP or NPN)
Switching Logic	Normally Open or Normally Closed
Supply Voltage Range	5 - 24 VDC
Switch Current	150 mA max
Current Consumption	7 mA at 12 VDC, 14 mA at 24 VDC
Switching Response	500 Hz Maximum
Residual Voltage	0.8 V Maximum (150 mA)
Leakage Current	10 uA Maximum
Insulation Resistance	100 M Ohm min.
Min. LED Current	1mA
Operating Temperature	-10° to 85°C (14° to 185°F)***
Lead Termination	1500 mm (60 in) or 150mm (6 in) w/connector
Industrial Protection	IP67
Shock Resistance	50 g's, 490 m/sec^2

Notes:

* Polarity is restricted for DC operation:
(+) to Brown (-) to Blue
If these connections are reversed for TTL levels the contacts will close, but the LED will not light.

** Due to minimum current requirement, LED will not display when used with all Gemini 6K and 6K products.

*** Exceeds temperature range for ET Series mechanical components.

Reed Switch Specifications

	Low Amp	High Amp
Switching Logic	Normally Open (NO) Normally Closed (NC)	Normally Open (NO)
Voltage Rating	85-125 VAC (NO) 6-24 VDC* (NO) 6-24 VAC, 6-24 VDC* (NC)	85-125 VAC 6-24 VDC*
Power Rating	Resistive 10 Watts (NO) Inductive 5 Watts (NO) 3 Watts (NC)	Resistive load 10 Watts Inductive load 5 Watts
Switching Current Range	Resistive load: 5-40 mA (NO) 5-25 mA (NC) Inductive load 5-25 mA	Resistive load 30-300 mA Inductive load 30-100 mA
Min. LED Current	5 mA	18mA**
Switching Response	300 Hz (NO) 200 Hz (NC)	300 Hz max
Breakdown Voltage	200 VDC	
Contact Resistance	100 M Ohm min.	
Operating Temp.	-10° to 85°C (14° to 185°F)***	
Lead Termination	1500 mm (60 in) or 150mm (6 in) with connector	
Industrial Protection	IP67	
Shock Resistance	30 g's, 300 m/sec^2	

ET Ordering Information

ET	050	B01	P	A	A04
Series	Profile Size	Drive Type	Motor Mounting Style	Drive Ratio	Gearbox

Continued on next page

Code	Profile Size	Code	Drive Type
032	32mm	B02	Ball Screw, 0.500 in. Lead
		B08	Ball Screw, 0.125 in. Lead
		A04	Acme Screw, 0.250 in. Lead
		A08	Acme Screw, 0.125 in. Lead
050	50mm	B01	Ball Screw, 1.000 in. Lead
		B02	Ball Screw, 0.500 in. Lead
		B05	Ball Screw, 0.200 in. Lead
		A05	Acme Screw, 0.200 in. Lead
080	80mm	B01	Ball Screw, 1.000 in. Lead
		B02	Ball Screw, 0.500 in. Lead
		B04	Ball Screw, 0.250 in. Lead
		A04	Acme Screw, 0.250 in. Lead
100	100mm	B53	Ball Screw, 1.875 in. Lead
		B02	Ball Screw, 0.500 in. Lead
		B04	Ball Screw, 0.250 in. Lead
		A04	Acme Screw, 0.250 in. Lead
125	125mm	M50	Ball Screw, 50mm Lead
		M20	Ball Screw, 20mm Lead
		M10	Ball Screw, 10mm Lead
		M05	Ball Screw, 5mm Lead

Code	Gearbox Option [1]
A	PX23
B	PS60 – Shaft Horizontal
C	PS60 - Shart Vertical
D	PX34
E	PS90 - Shaft Horizontal
F	PS90 - Shaft Vertical
G	PX115
H	PS115 - Shaft Horizontal
J	PS115 - Shaft Vertical
K	PX56
L	PS142 - Shaft Horizontal
M	PS142 - Shaft Vertical
P	PV23FE
Q	PV34FE
0	No Gearbox

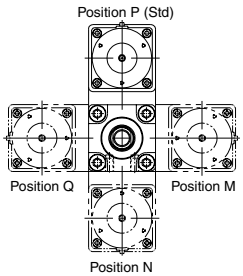
Code	Gearbox Ratio
00	Flange Only [2]
03	3:1
04	4:1
05	5:1
07	7:1
10	10:1
15	15:1
20	20:1
25	25:1
30	30:1
40	40:1 (PS only)
50	50:1
70	70:1
A0	100:1

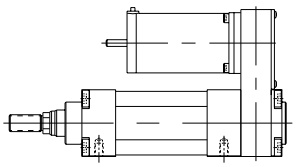
1 Not all motor/gearbox options physically fit on all cylinder sizes and mounting styles. Reference mounting matrix to determine suitable combinations. PS precision gearboxes are oil filled. Shaft orientation is required to insure proper oil fill levels.
2 When combined with Gearbox Option "0" (no gearbox), this option is direct mount with no flange included.

Code	Drive Ratio
A	1:1 Inline 1:1 Timing Belt (Parallel)
Z	1:1.5 Timing Belt (32 Parallel)
B	1.5:1 Timing Belt (50, 80 Parallel)
D	2:1 Timing Belt (50, 80 Parallel)
K	1:1 Gear Drive (32, 50, 80 Parallel)
E	3:1 Gear Drive (32, 50, 80 Parallel)
F	5:1 Gear Drive (32, 50, 80 Parallel)
G	7.5:1 Gear Drive (32, 50, 80 Parallel)
H	9.5:1 Gear Drive (32, 50 Parallel) 10:1 Gear Drive (80 Parallel)

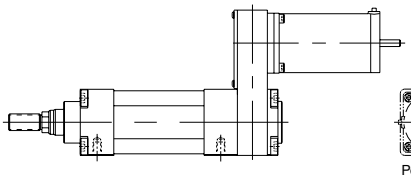
Code	Motor Mounting Style
L	Inline
P	Parallel, Position P [3]
M	Parallel, Position M
N	Parallel, Position N
Q	Parallel, Position Q
R	Reverse Parallel, Position R
S	Reverse Parallel, Position S
T	Reverse Parallel, Position T
V	Reverse Parallel, Position V

3 For ET032, ET050 and ET080, switch mounting groove access will be obstructed. The cylinder body can be rotated in 90° increments to remedy this. However, at 90° and 270°, the load capacity of the rod is reduced by half due to roller bearing orientation. At 180° the side load is unchanged.

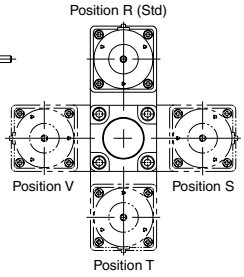




Parallel Mounting Positions (as viewed from the rod end)



Reverse Parallel Mounting Positions (as viewed from the shaft end)



F13	F	M	A	N	0750	A
Motor	Cylinder Mounting	Rod End	Body Orientation	Brake Option	Standard Stroke	Design Level

Code	Cylinder Mounting
F	Bottom Tap (Std)
B	Foot Mount [4]
C	Rear Clevis [4]
D	Trunnion
E	Rear Eye [4]
G	Foot Side Lug [5]
H	Rear Flange [4]
J	Front Flange
N	Front and Rear Flange [4]

Code	Brake Option [8]
N	No Brake
E	115VAC w/3.5m Flying Leads [4]
F	24VDC w/3.5m Flying Leads [4]
G	115VAC w/3-Pin Connector and 4m Mating Cable [4]
H	24VDC w/3-Pin Connector and 4m Mating Cable [4]

Code	Standard Stroke [9]
0050	50mm (1.97 in.)
0100	100mm (3.94 in.)
0150	150mm (5.91 in.)
0200	200mm (7.87 in.)
0300	300mm (11.81 in.)
0450	450mm (17.72 in.)
0600	600mm (23.62 in.)
0750	750mm (29.53 in.)
1000	1000mm (39.37 in.)
1250	1250mm (49.21 in.)
1500	1500mm (59.05 in.)
xxxx	Non-standard Stroke [10]

Code	Body Orientation [7]
A	3 O'clock (obstructed by M)
B	6 O'clock (obstructed by N)
C	9 O'clock (obstructed by Q)
D	12 O'clock (obstructed by P)

Code	Rod End
M	Metric Male (Std)
K	Imperial Male
C	Metric Clevis
F	Metric Female
S	Spherical Rod Eye
R	Linear Rod Guide Module [6]

Code	Motor Option [1]
A	S57, ES2x - Round Shaft
B	S83, ES3x - Round Shaft
C	HV34, LV34 - Shaft Flat
D	HV23, LV23 - Shaft Flat
E	SM23x***-T*** (x = 1, 2, 3)
F	BE23***-K***
G	BE34***-K***
H	SMN0602***-K***
J	SMN0822***-K***
K	SMN1002***-K***
L	SMN1152***-K***
M	SMN1422***-K***
N	MPP092****-K***
P	MP100****-K***
Q	MPP115****-K***
R	MPP142x***-K*** (x = 2, 4, 6)
S	MPP1428***-K***
T	MPP190****-K***

Code	Motor Model [3]
00	Motor Flange only
01-99	Reference Motor Section for Specific Models (01-99)

Maximum Standard Stroke Length (Consult factory for longer lengths)

	ET032	ET050	ET080	ET100	ET125
No Rod Guide	750mm	1000mm	1500mm	1500mm	1500mm
w/Rod Guide	600mm	750mm	1000mm	1500mm	N/A

1 Not all motor/gearbox options physically fit on all cylinder sizes and mounting styles. Reference mounting matrix to determine suitable combinations. PS precision gearboxes are oil filled. Shaft orientation is required to insure proper oil fill levels.

3 Reference Motor Section for motor compatibility and coding.

4 Parallel motor mounting only.

5 Not compatible with M, N or Q motor mounting styles.

6 May obstruct switch grooves with body orientation A & C. Not compatible with G, J, D, B or N cylinder mounting. Rod Guide may limit maximum stroke length. Not available on ET125.

7 Some parallel motor mounting styles obstruct access to limit switch grooves. Body orientation as viewed from rod end can be changed to avoid obstruction.

8 Not compatible with cylinder mounting options B, C, E, H, N.

9 All screws have a critical speed limit that will cause damage to the actuator if exceeded. Consult factory or catalog for maximum speeds. Stroke is measured bumper to bumper.

10 Non-standard stroke lengths available in increments of 1mm.

ET Application Fax Form

Fax completed form to (330) 334-3335 or email to actuatorsales@parker.com

Contact Information:

Name _____ Phone _____

Company _____ email _____

City, State, Zip _____

Application Sketch

NOTES:

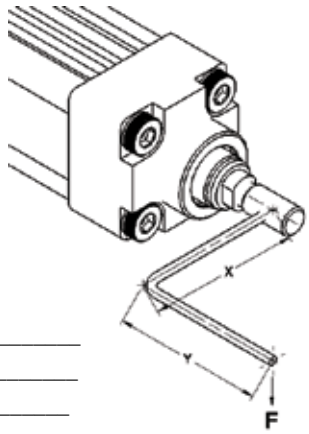
Please include the critical dimensions in your sketch.

In order to achieve the best solution, it is important that you provide as much information as possible.

Motion Profile

Moves	Distance (Stroke)	Time	Thrust or Load	Dwell
First Motion				
Second Motion				
Third Motion				
Fourth Motion				

Max. Rod Side Load



a. X distance _____

b. Y distance _____

c. Force _____

Environmental Requirements

1. Operating Temperature

Max _____ Min _____

2. Comtanimation (check one)

☐ Particle ☐ Liquid

Type: _____

3. Special Considerations _____

_____

_____

Application Requirements:

1. Overall Stroke (add 25mm per end minimum) _____

2. Cylinder Orientation (check one)

☐ Horizontal

☐ Angle: Degrees _____ ☐ Shaft Up ☐ Shaft Down

☐ Vertical: ☐ Shaft Up ☐ Shaft Down

3. Load/Tooling Weight _____

4. Repeatability Requirements _____

☐ Unidirectional ☐ Bidirectional

5. Is the load externally guided? (check one)

☐ Yes ☐ No

If yes, how? _____

6. Life Requirements (cycles, distance or years)

Hours per day _____ Days per year _____

7. Type of Screw

☐ Acme ☐ Ball Screw

8. Special Considerations _____

_____

_____

_____

_____

Please attach another sheet if more room is needed.

Cylinder Requirements

1. Rod End (check one)

☐ Metric Male (std)

☐ Metric Female

☐ Metric Clevis

☐ Spherical Rod Eye

☐ Linear Rod Guide

☐ Imperial Male

☐ Other _____

2. Mounting Style (check one) — * = Parallel Motor Mount only

☐ Bottom Tap (std)

☐ Foot Mount*

☐ Trunnion

☐ Front Flange

☐ Rear Flange*

☐ Foot Side Lug

☐ Rear Eye*

☐ Rear Clevis*

☐ Other _____

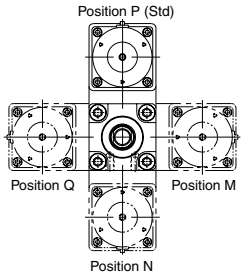
3. Motor Mounting (check one)

☐ Inline Mount

☐ Parallel Mount Position _____

Parallel mounts can limit the actuator's total thrust capacity.

Parallel mount is also available in Reverse Parallel configuration. See catalog page 24.



Motor, Drive and Control Options:

1. Motor Options (check all that apply)

☐ Stepper ☐ Servo

☐ Parker Supplied ☐ Customer Supplied (provide print)

☐ Gearhead

2. Other Options (check one)

☐ Drive ☐ Drive/Controller ☐ Controller

3. Available Line Voltage _____

4. Switches/Sensors (quantity)

End of Travel _____ Home _____

5. Brake Option (check one)

☐ Actuator* ☐ Motor ☐ None

*With parallel motor mount only

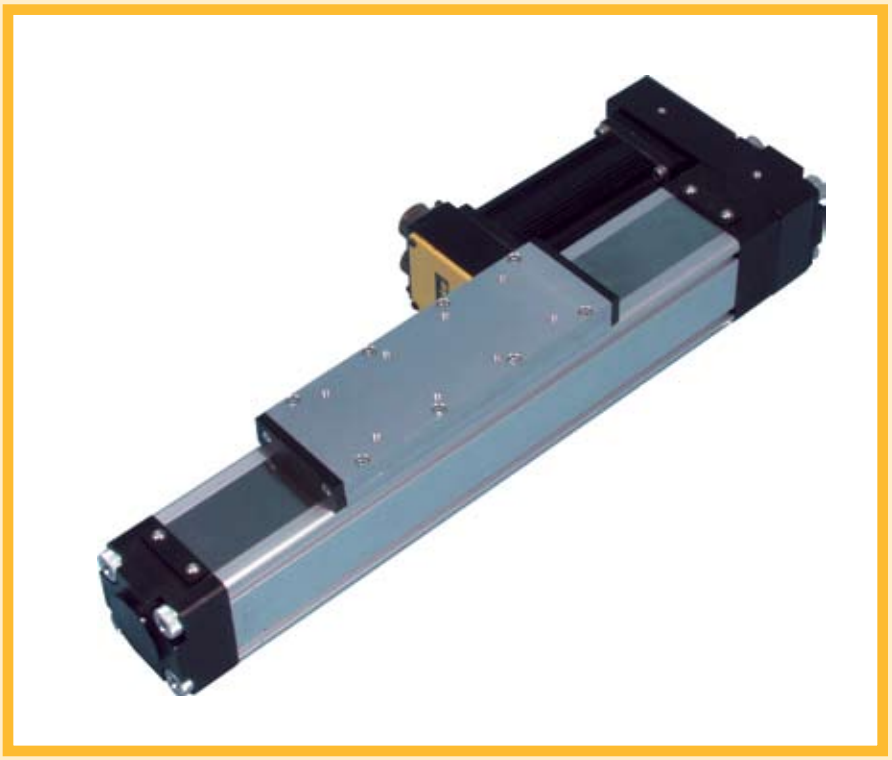
6. Special Options _____

_____

_____

_____

ER Series Rodless Actuators



Contents

Parker Hannifin Corporation
Actuator Division
Wadsworth, Ohio USA
Phone: 1-866-PARK-ACT
email: actuatorsales@parker.com
website: www.parker.com/actuator

ER Series Rodless Actuator

Automated linear motion can have a variety of requirements. Increasingly, programmability, high repeatability, and simplicity of design are among them. The ER Series from Parker Hannifin's Actuator Division was designed to provide a solution to a variety of linear motion applications by offering a low cost, modular design electric rodless actuator. The ER Series is available in three profile sizes as a belt-driven, Acme screw-driven or ball screw-driven unit. The load-bearing carriage is supported either by precision roller bearing wheels or an internally mounted square rail. Combined with a Parker Hannifin stepper or servo motor system, the ER Series offers full programmability and high resolution and repeatability. Backed by an industry-leading 2-year standard warranty and worldwide application support, the ER Series is the ideal solution to many linear motion applications.

ER Markets and Applications

With thousands of axes installed worldwide, the ER series rodless actuator has proven to be a robust and reliable solution for numerous motion control applications across many markets and industries. Listed below are some examples of where and how the ER series rodless actuator has been successfully applied.

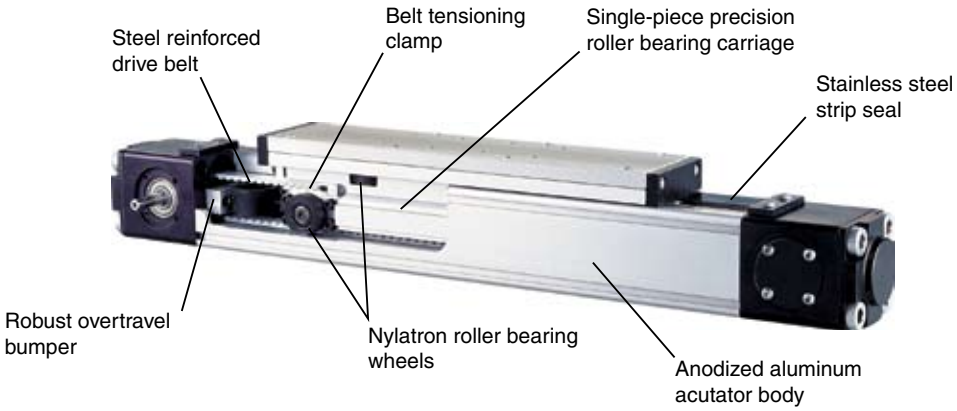
Markets and Industries Served

Automotive	Life Sciences	Machine Tool
Tire & Rubber	Medical	Wood & Lumber
Packaging	Conveyor	Research & Testing
Glass / Fiber	Transportation	Food & Beverage
Computer / Electronics	Pharmacuetical	Aerospace
Textile	Semiconductor	Factory Automation

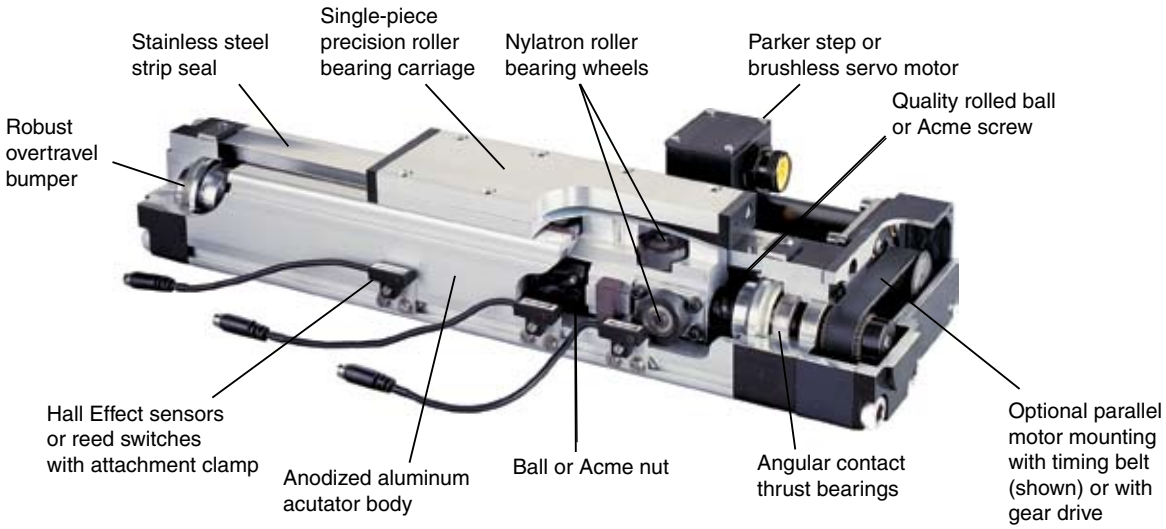
Application Examples

Discrete / Multi-Point Positioning	Small Area Gantry	Opposing Carriage	Complex Motion Control
Vertical Stackers / Elevator Lift	Pick & Place	Door & Hatch Closures	Flying Cut-to-Length
Scanning / Inspection	Contoured Glue Dispensing	Joining / Inserting	Crosscutting / Slitting
Lane Diverters	Part Load & Unload	Clamping / Gripping	Mechanical Cam Replacement
Backstop Index	Profile Engraving / Etching	Stretching	High Speed Winding Traverse
Pneumatic Replacement	Storage & Retrieval	Automated Pull Test	Web Tension Control

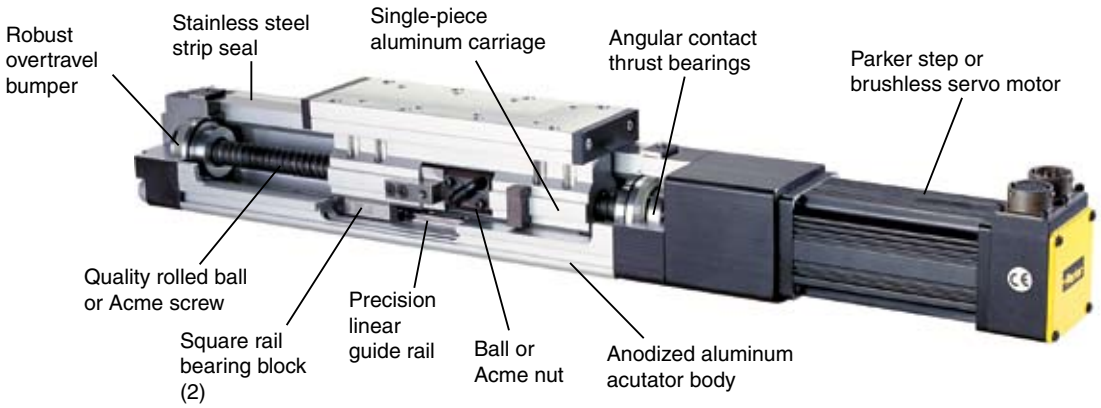
Roller Bearing Carriage with Belt Drive



Roller Bearing Carriage with Screw Drive



Square Rail Bearing Carriage with Screw Drive



Make your ER Selection based on what your application demands . . .

Belt-Drive or Screw-Drive?

Belt Drive Systems offer…

Feature	Advantage	Benefit
Steel-reinforced belt drive	Higher Speeds	Greater throughput
Quality low-cost design	Low cost positioning system	Lower total system cost
Simple, modular construction	Field serviceable	Shorter downtimes

Screw Drive Systems offer…

Feature	Advantage	Benefit
Acme or ball screw drive	Higher thrust capability	Greater thrust in a smaller package
Quality rolled ball screws, milled Acme screws	Greater accuracy, repeatability	More precise positioning system, better machine performance
Self-locking Acme screws	Ideal for vertical applications	Greater machine safety
High efficiency ball screw assemblies	Higher duty cycle, greater system efficiency	Better throughput, longer cycle times

Roller Bearing or Square Rail Bearing?

Roller Bearing Systems provide…

Feature	Advantage	Benefit
Precision ball bearing wheels	High efficiency, durable load support	Longer product life
	Rolling friction rather than sliding	High duty cycles, longer product life
	High speed capability	Higher throughput
Nylatron wheel covers	Low wheel wear	Longer carriage and actuator life

Square Rail Systems provide…

Feature	Advantage	Benefit
Precision linear guide bearing (square rail)	Greater direct loading capacity	Ideal for heavier duty applications, longer life
	Increased moment loading capacity	Allows for greater variety of more complex loading scenarios
	High speed, smooth motion	Higher throughput, solid feel
	Improved carriage stiffness	Reduced carriage play

ER Screw Drive Overview

ER-Screw Overview	Units	ER032			ER050				ER080			
		A08	A04	B08	A05	B05	B02	B01	A04	B04	B02	B01
Performance Limits												
Max Thrust Fx	lbf (N)	135 (600)			720 (3200)				1600 (7120)			
Max Speed	in/s	15.6	31.2	15.6	25.0	15.8	39.6	60.0	31.2	12.5	25.0	50.0
Max Speed	mm/s	396	792	396	635	401	1006	1524	792	317	635	1270
Max Acceleration	in/s² (m/s²)	386 (9.8)			386 (9.8)				386 (9.8)			
Max Travel	in (mm)	39.2 (1000)			59.0 (1500)				59.0 (1500)			
System Characteristics												
Screw Lead	in/rev	0.125	0.250	0.125	0.200	0.200	0.500	1.000	0.250	0.250	0.500	1.000
Efficiency [1] - inline	%	48%	63%	90%	44%	90%	90%	90%	38%	90%	90%	90%
Max Breakaway Torque	oz-in	41	43	39	65	48	55	62	168	140	159	183
Repeatability [2] - inline / parallel	in	±0.001 / ±0.006			±0.001 / ±0.006				±0.001 / ±0.006			
System Backlash [3,4]	in	—	—	0.003	—	0.003	0.003	0.003	—	0.003	0.003	0.003
Reflected Rotational Inertia												
Base Inline Unit Inertia, 50mm travel	oz-in²	0.136	0.157	0.136	0.766	0.766	0.970	1.697	6.73	6.73	7.31	9.63
Base Parallel Unit Inertia, 50mm travel	oz-in²	0.141	0.163	0.141	0.787	0.787	0.991	1.918	7.47	7.47	8.05	10.37
Additional Inertia per 100mm travel	oz-in²/ 100mm	0.027	0.027	0.027	0.219	0.219	0.219	0.219	1.44	1.44	1.44	1.44
Bearing Carriage Load Capacity		**Roller Bearing**	**Square Rail**		**Roller Bearing**	**Square Rail**			**Roller Bearing**	**Square Rail**		
Normal Load Fz	lbf (N)	50 (222)	250 (1112)		100 (445)	500 (2224)			150 (667)	1000 (4448)		
Side Load Fy	lbf (N)	16 (71)	250 (1112)		30 (133)	500 (2224)			50 (222)	1000 (4448)		
Pitch Moment My	ft-lbf (Nm)	15 (20)	67 (90)		29 (39)	119 (161)			53 (72)	283 (209)		
Roll Moment Mx	ft-lbf (Nm)	4 (5)	10 (14)		10 (14)	21 (28)			24 (33)	61 (83)		
Yaw Moment Mz	ft-lbf (Nm)	7 (9)	35 (48)		15 (20)	62 (84)			23 (31)	94 (127)		
Weight & Inertia Data		**Roller Bearing**	**Square Rail**		**Roller Bearing**	**Square Rail**			**Roller Bearing**	**Square Rail**		
Base Unit Weight, 50mm travel	lb (kg)	4.82 (2.18)	5.19 (2.35)		10.35 (4.68)	9.16 (4.15)			27.03 (12.23)	25.15 (11.41)		
Carriage Weight	lb (kg)	1.29 (0.58)	1.41 (0.64)		3.65 (1.65)	2.17 (0.98)			9.28 (4.20)	6.49 (2.94)		
Additional Travel Weight	lb (kg) / 100mm	0.50 (0.23)	0.57 (0.26)		1.13 (0.51)	1.15 (0.52)			2.64 (1.20)	2.98 (1.35)		

1. Parallel driven unit efficiency = inline efficiency x 0.9
2. Repeatability is unidirectional achieved under ideal conditions and slow speeds. Actual repeatability may vary with the application.
3. ACME screw backlash will increase over time due to the nature of the friction bearing. Initial values <0.009".
4. Zero-backlash, pre-loaded ball screws are available as a special option. Thrust capacity may be derated with preloaded option.

NOTE: *ER parallel mounting limits available output thrust. Reference ET force-speed curves for thrust performance with parallel mounting.*

Model	Critical Speed: mm/s (in/s) vs. Stroke: mm							
	50 - 200	300	450	600	750	1000	1250	1500
ER032A08	396 (15.6)	325 (12.7)	165 (6.5)	100 (3.9)	70 (2.7)	50 (1.9)	—	—
ER032A04	792 (31.2)	651 (25.6)	331 (13.0)	200 (7.8)	139 (5.4)	100 (3.9)	—	—
ER032B08	423 (16.6)	339 (13.3)	174 (6.8)	106 (4.1)	74 (2.9)	54 (2.1)	—	—
ER050A05	635 (25.0)	634 (24.9)	332 (13.0)	204 (8.0)	138 (5.4)	88 (3.4)	66 (2.6)	48 (1.9)
ER050B05	403 (15.8)	403 (15.8)	403 (15.8)	257 (10.1)	175 (6.8)	113 (4.4)	87 (3.4)	64 (2.5)
ER050B02	1006 (39.6)	1006 (39.6)	1006 (39.6)	642 (25.2)	438 (17.2)	282 (11.1)	219 (8.6)	157 (6.1)
ER050B01	1524 (60.0)	1524 (60.0)	1524 (60.0)	1524 (60.0)	876 (34.4)	563 (22.1)	438 (17.2)	305 (12.0)
ER080A04	792 (31.2)	792 (31.2)	674 (26.5)	426 (16.7)	293 (11.5)	178 (7.0)	125 (4.9)	91 (3.5)
ER080B04	318 (12.5)	318 (12.5)	318 (12.5)	318 (12.5)	318 (12.5)	203 (8.0)	144 (5.6)	106 (4.1)
ER080B02	635 (25.0)	635 (25.0)	635 (25.0)	635 (25.0)	635 (25.0)	393 (15.5)	282 (11.1)	206 (8.1)
ER080B01	1270 (50.0)	1270 (50.0)	1270 (50.0)	1270 (50.0)	1270 (50.0)	785 (30.9)	565 (22.2)	414 (16.2)

ER Belt Drive Overview

ER-Belt Overview	Units	ER032	ER050	ER080
Performance Limits				
Max Thrust (Belt Traction Force) Fx	lbf (N)	30 (134)	60 (267)	95 (400)
Max Speed	in/s (m/s)	140 (3.5)	200 (5.0)	200 (5.0)
Max Acceleration	in/s² (m/s²)	386 (9.8)	386 (9.8)	386 (9.8)
Max Travel	in (mm)	179 (4550)	179 (4550)	101 (2575)
System Characteristics				
Pulley Lead (travel distance per rev)	mm/rev	70	100	150
Pulley Diameter	in (mm)	0.887 (22.28)	1.253 (31.83)	1.880 (47.75)
Pulley Tooth Count	# Teeth	14	20	30
Efficiency [1] - inline	%	90%	90%	90%
Max Breakaway Torque	oz-in	45	94	141
Repeatability [2] - inline / parallel	in	±0.004 / ±0.008	±0.004 / ±0.008	±0.004 / ±0.008
System Backlash	in	0.004	0.004	0.004
Reflected Rotational Inertia				
Base Unit Inertia, 50mm travel	oz-in²	3.87	16.20	113.08
Additional Inertia per 100mm travel	oz-in²/100mm	0.02	0.03	0.05
Bearing Carriage Load Capacity		**Roller Bearing**	**Roller Bearing**	**Roller Bearing**
Normal Load Fz	lbf (N)	50 (222)	100 (445)	150 (667)
Side Load Fy	lbf (N)	16 (71)	30 (133)	50 (222)
Pitch Moment My	ft-lbf (Nm)	15 (20)	29 (39)	53 (72)
Roll Moment Mx	ft-lbf (Nm)	4 (5)	10 (14)	24 (33)
Yaw Moment Mz	ft-lbf (Nm)	7 (9)	15 (20)	23 (31)
Weight & Inertia Data				
Base Unit Weight, 50mm travel	lb (kg)	4.52 (2.05)	10.17 (4.60)	26.41 (11.95)
Carriage Weight	lb (kg)	2.18 (0.99)	3.32 (1.50)	8.84 (4.00)
Additional Travel Weight	lb (kg) / 100mm	0.43 (0.20)	0.98 (0.45)	2.15 (0.98)

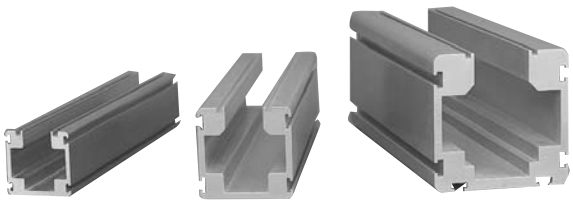
1. Parallel driven unit efficiency = inline efficiency x 0.9.
2. Repeatability is unidirectional achieved under ideal conditions and slow speeds. Actual repeatability may vary with the application.

Operating Temperature Range

0°C to 60°C (32°F to 140°F)

Extrusion Profiles

The ER Series lightweight aluminum extrusion body is available in three profile sizes to meet a broad range of application demands. The actuator body is designed with T-slots for easy access and adjustment of limit and home switches.



32mm 50mm 80mm

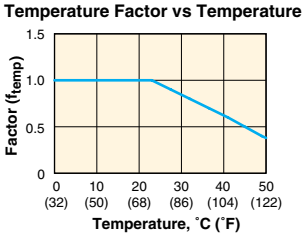
Roller Bearing Carriage Load Ratings

The ER series roller bearing carriage was designed with carriage life of 100,000,000 inches (2,540 km) when fully loaded. Certain factors, such as speed, temperature, and compound moment loading reduce the load capacity of the roller bearing carriage. Speed dependant de-ratings are already factored into the graphs below, but ambient temperature and compound loading must be examined as well.

The graphs below provide a "rough cut" evaluation of the loading capacities of the roller bearing carriage. *The ER technical manual should be referenced for a more information on calculating and analyzing carriage loading.*

Temperature Factor:

Use the graph below to determine the temperature de-rating factor. This ftemp should be multiplied by the values in the curves to determine de-rated load capacity due to temperature.

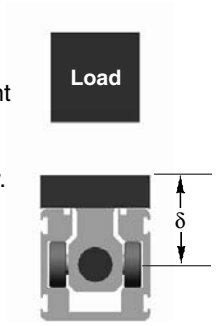


Compound Loading:

The roller bearings responsible for Yaw moments are independent of those designed to support Pitch & Roll moments. Thus, Yaw-Pitch and Yaw-Roll combinations are considered single-acting and can be analyzed separately. Pitch-Roll combinations, however, are considered compound moment loads and require the values shown to be de-rated. Use the right vertical axis (Compound Moment Load) on the graphs to analyze compound moment loads.

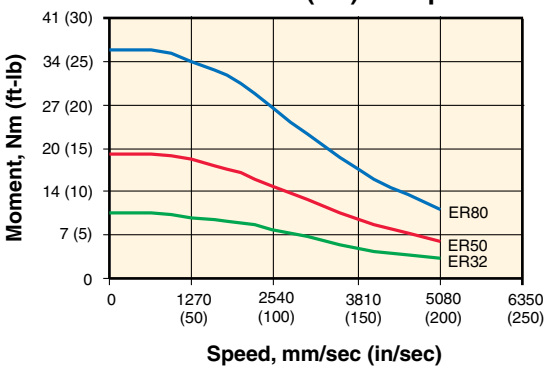
Pitch Moment

When determining the pitch moment arm, it is necessary to consider the distance from the top of the load attachment plate to the center of the carriage bearings. This distance (δ) is given in the table below.

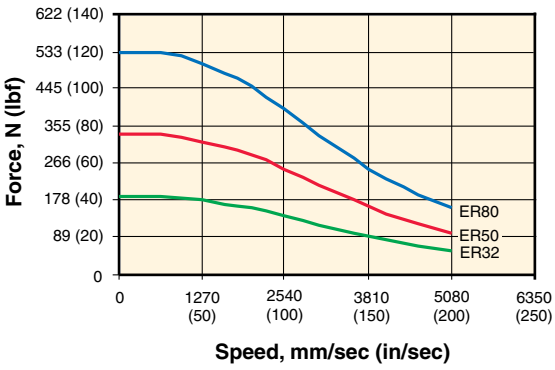


Profile	δ (in)	δ (mm)
ER32	1.53	38.8
ER50	1.98	50.3
ER80	2.85	72.4

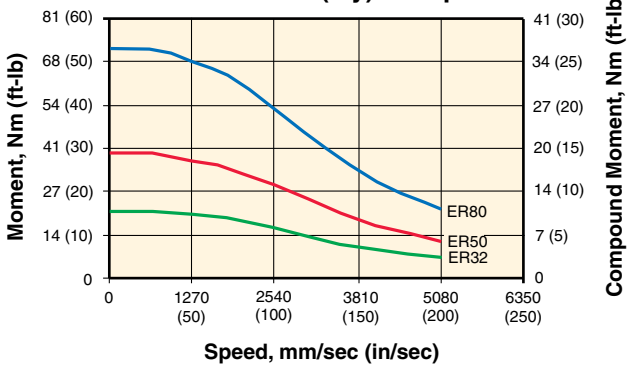
Yaw Moment (Mz) vs. Speed



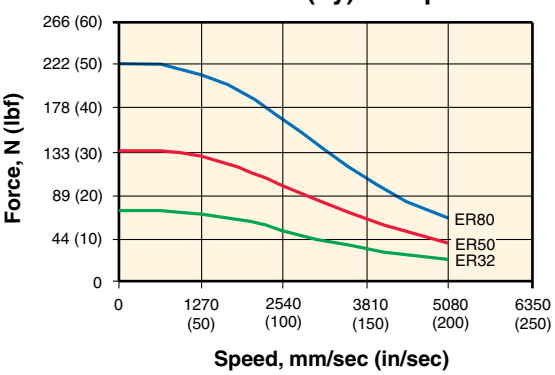
Normal Load (Fz) vs. Speed



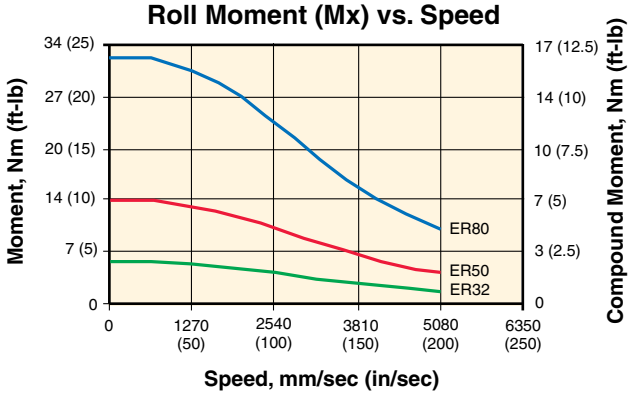
Pitch Moment (My) vs. Speed



Side Load (Fy) vs. Speed



Roll Moment (Mx) vs. Speed



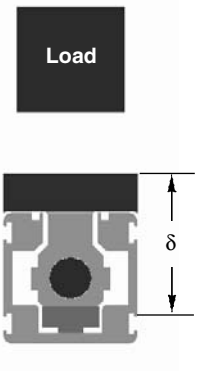
Square Rail Carriage Load Ratings

The ER Series square rail carriage option is available on screw driven models only. The square rail carriage provides higher load carrying capacity than the standard roller bearing carriage. Also, unlike the roller bearing carriage, the square rail carriage load capacity remains constant throughout the ER screw driven series max speed range and ambient temperature rating.

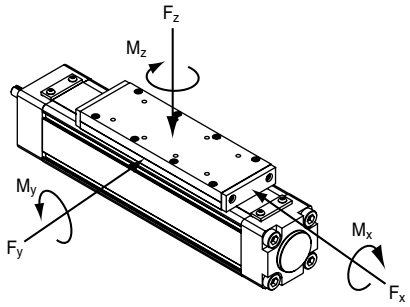
Refer to the graphs below to determine expected square rail bearing carriage life. The ER technical manual should be referenced for more detailed information on calculating and analyzing moment loads.

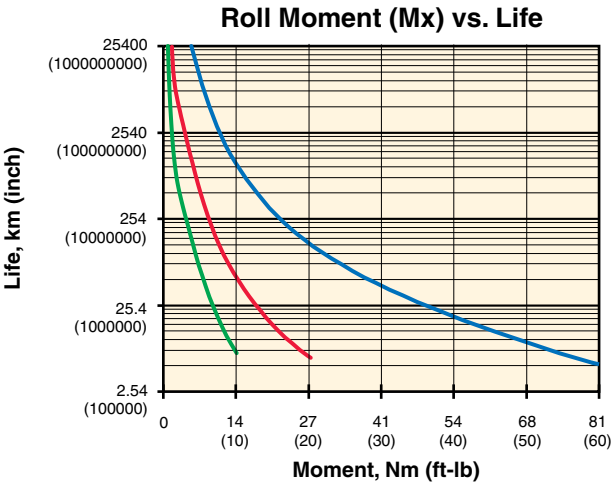
Pitch Moment

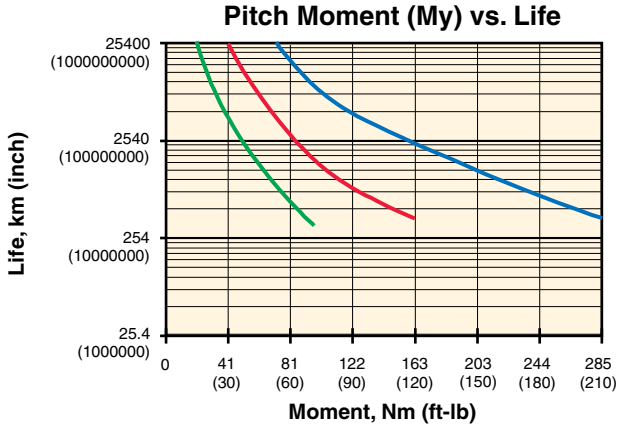
When determining the pitch moment arm, it is necessary to consider the distance from the top of the load attachment plate to the center of the carriage bearings. This distance (δ) is given in the table below.

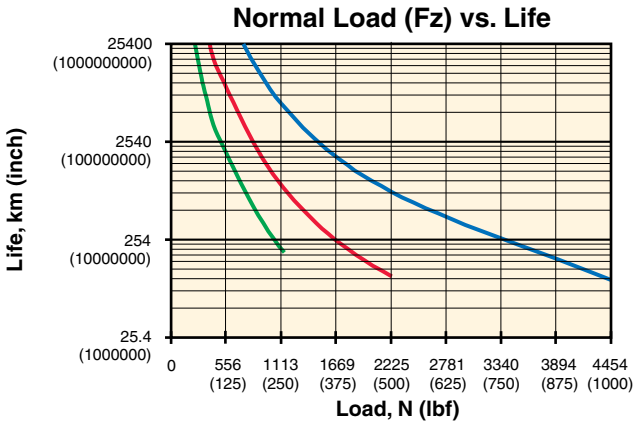


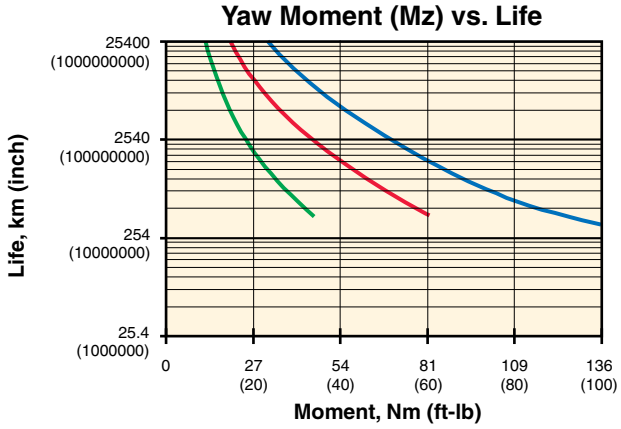
Profile	δ (in)	δ (mm)
ER32	1.90	48.3
ER50	2.50	63.5
ER80	3.50	88.9

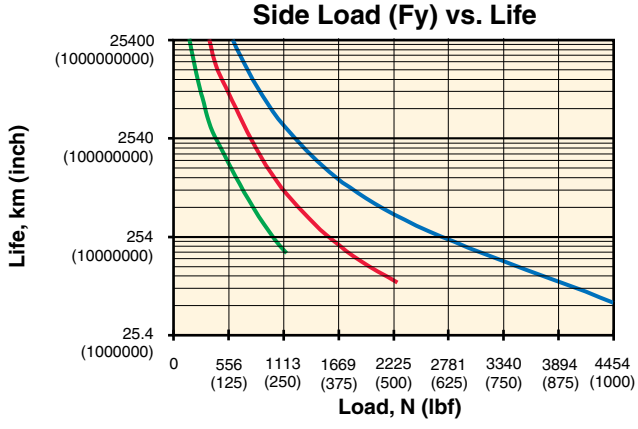












ER32 ER50 ER80

Lead Screw Life Expectancy

Acme Screw Life: As a result of the high friction inherent to acme screws, life expectancy is unpredictable. Load, duty cycle, speed, temp, and lubrication all affect the amount of heat generated and thread wear by the acme nut which ultimately determines the life of the mechanism. Acme screws typically have lower life expectancies than ball screws and should only be used in low duty cycle applications.

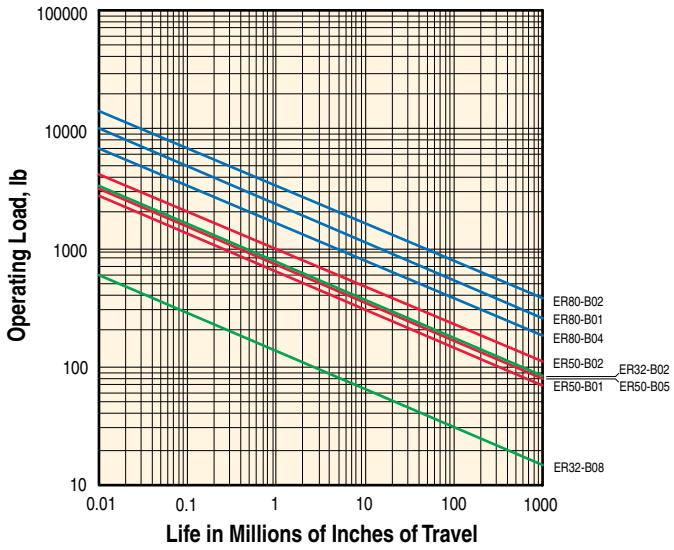
Ball Screw Life: Ball screws are high efficiency mechanisms that utilize a rolling friction, ball bearing nut to translate rotary motion and torque to linear motion and thrust. Life expectancy can be predicted by comparing the effective load to the screw's basic dynamic load rating. Basic dynamic load rating is the load at which a screw has a 90% probability of achieving 1,000,000 revs of life before metal fatigue develops – L10 life.

Calculate the effective load required by the application with the following formula and use the chart to determine life expectancy.

$$L_m = \sqrt{\frac{\%_1 (L_1)^2 + \%_2 (L_2)^2 + \%_3 (L_3)^2 + \%_n (L_n)^2}{100}}$$

Where: L_m = equivalent load
L_n = each increment of load
$\%_n$ = percent of stroke at load L_n

ER Life Expectancy (inch)

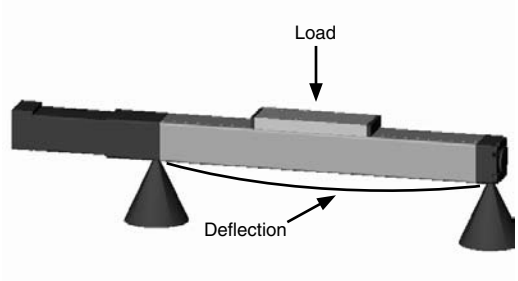


For more detailed information and examples on calculating screw life, reference the ER technical manual.

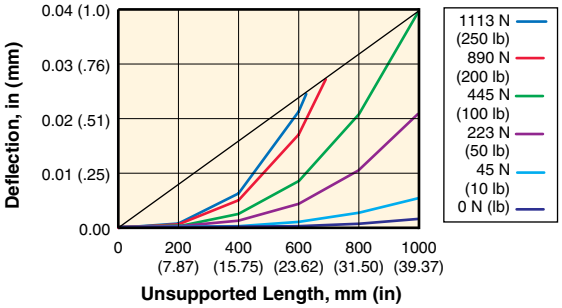
Deflection

Curves depict values for upright mounting only.

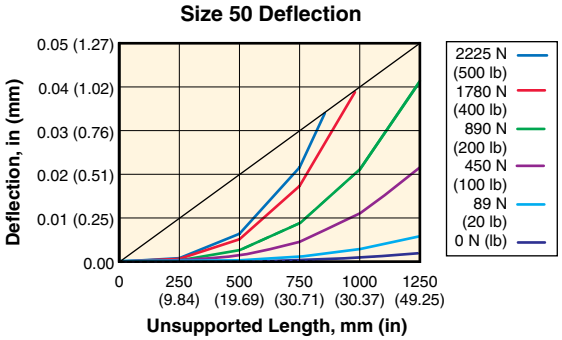
Deflection formulas and additional specifications are available in the ER technical manual.



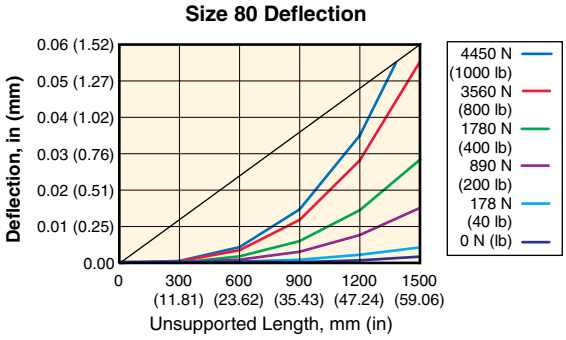
Size 32 Deflection



Size 50 Deflection

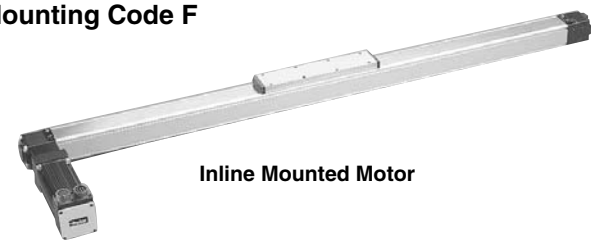


Size 80 Deflection

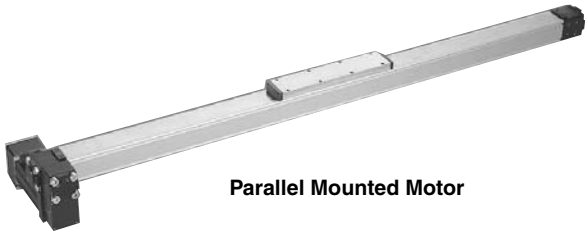


Note: *Diagonal line represents maximum deflection.*

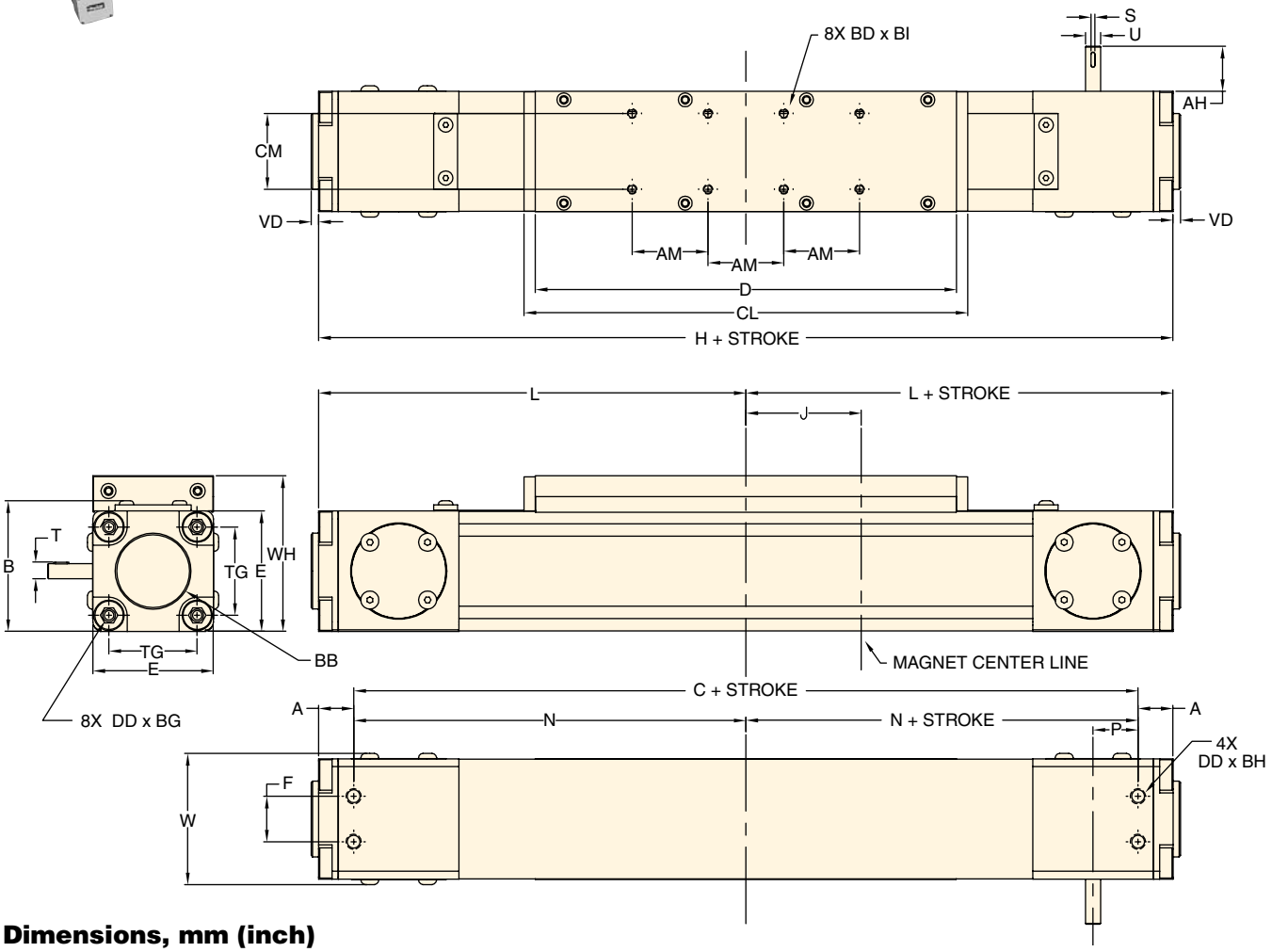
Belt Drive Actuator
Standard Bottom Tap Mount (MS4)
Mounting Code F



Inline Mounted Motor



Parallel Mounted Motor



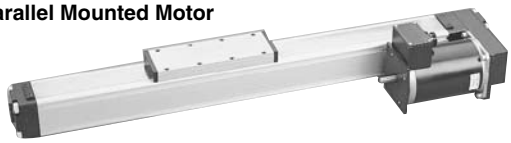
Dimensions, mm (inch)

Model	A	AH	AM	B	∅BB	BD x BI	C	CL	CM	D	DD x BG	DD x BH
ER32	14.4 (0.57)	18.7 (0.74)	28.0 (1.102)	51.9 (2.04)	29.9 (1.179)	M4x0.7 x 8	364.2 (14.34)	222.1 (8.75)	28.0 (1.102)	210.1 (8.27)	M6x1.0 x 16	M6x1.0 x 8.8
ER50	18.4 (0.73)	23.7 (0.94)	40.0 (1.575)	68.9 (2.71)	40.0 (1.575)	M5x0.8 x 10	413.8 (16.29)	234.1 (9.22)	40.0 (1.575)	222.1 (8.75)	M8x1.25 x 18	M8x1.25 x 12
ER80	25.4 (1.00)	28.7 (1.13)	40.0 (1.575)	100.6 (3.96)	45.0 (1.77)	M8x1.25 x 16	538.6 (21.21)	282.1 (11.11)	40.0 (1.575)	270.1 (10.64)	M10x1.5 x 18	M10x1.5 x 17

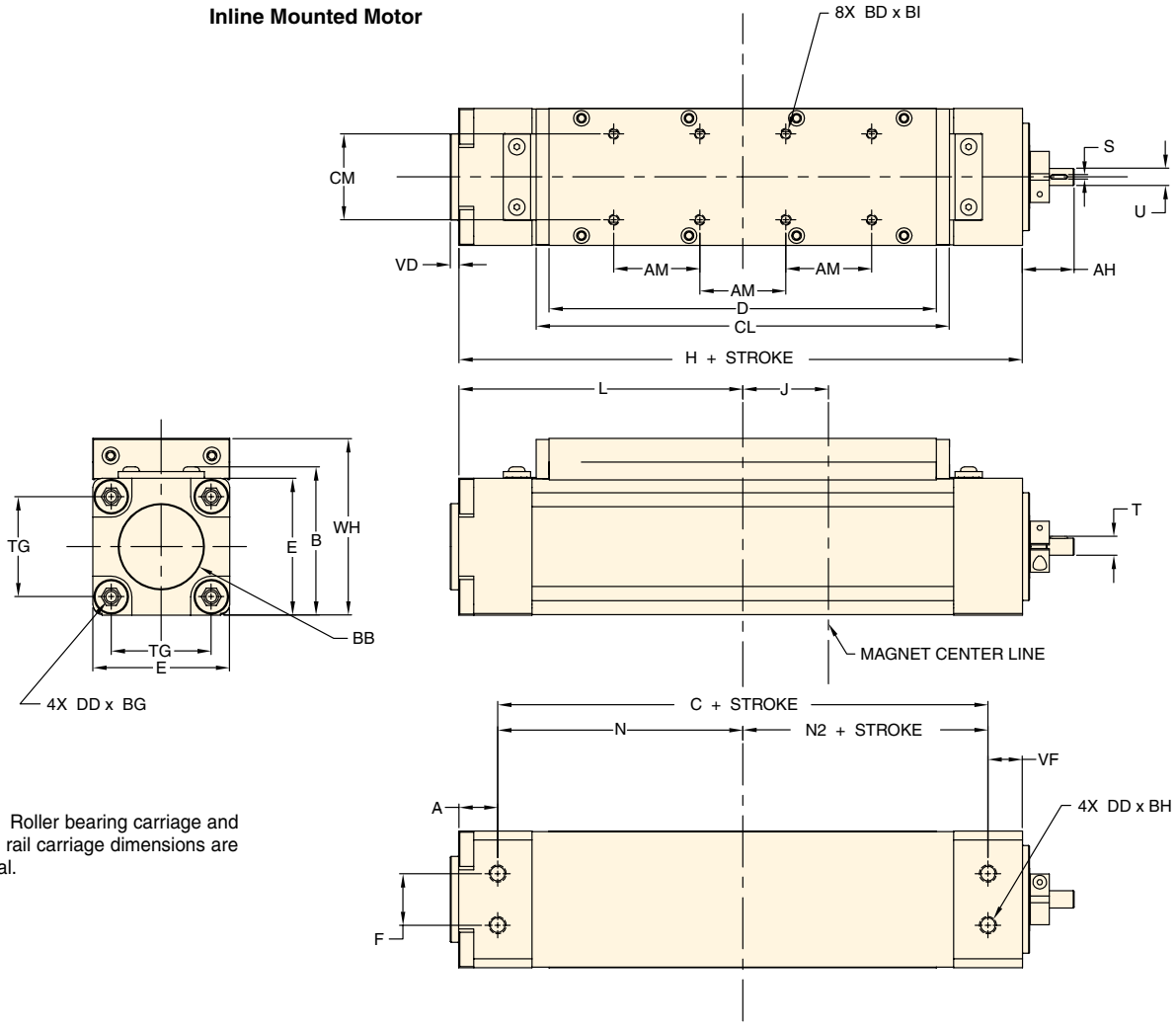
Model	E	F	H	J	L	N	P	S	T	TG	U	VD	W	WH
ER32	46.5 (1.83)	16.0 (0.63)	393.0 (15.47)	63.6 (2.50)	196.5 (7.74)	182.1 (7.17)	17.2 (0.68)	M2x8	8.7 (0.34)	32.5 (1.28)	8.0 (0.314)	4.0 (0.16)	49.9 (1.97)	62.0 (2.44)
ER50	63.5 (2.50)	24.0 (0.95)	450.6 (17.74)	60.9 (2.40)	225.3 (8.87)	206.9 (8.15)	23.7 (0.94)	M2x8	8.7 (0.34)	46.5 (1.83)	8.0 (0.314)	4.0 (0.16)	69.2 (2.72)	82.0 (3.23)
ER80	95.3 (3.75)	30.0 (1.18)	589.5 (23.21)	50.0 (1.97)	294.7 (11.80)	269.3 (10.60)	35.6 (1.40)	M5x14	16.0 (0.63)	72.0 (2.83)	14.0 (0.55)	5.0 (0.20)	101.3 (3.99)	120.0 (4.72)

Screw Drive Actuator
Standard Bottom Tap Mount (MS4)
Mounting Code F

Parallel Mounted Motor



Inline Mounted Motor



NOTE: Roller bearing carriage and square rail carriage dimensions are identical.

Dimensions, mm (inch)

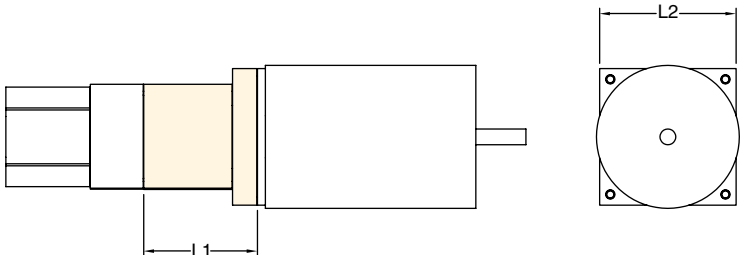
Model	A	AH	AM	B	∅BB	BD x BI	C	CL	CM	D	DD x BG	DD x BH
ER32	14.0 (0.55)	18.2 (0.72)	28.0 (1.102)	51.8 (2.04)	29.9 (1.18)	M4x0.7 x 8	212.1 (8.35)	180.1 (7.09)	28.0 (1.102)	168.1 (6.62)	M6x1.0 x 16	M6x1.0 x 8.8
ER50	18.0 (0.71)	24.1 (0.95)	40.0 (1.575)	68.9 (2.71)	40.0 (1.57)	M5x0.8 x 10	228.1 (8.98)	192.1 (7.56)	40.0 (1.575)	180.1 (7.09)	M8x1.25 x 18	M8x1.25 x 12
ER80	16.6 (0.65)	32.0 (1.26)	40.0 (1.575)	100.6 (3.96)	45.0 (1.77)	M8x1.25 x 16	287.6 (11.32)	240.1 (9.45)	40.0 (1.575)	228.1 (8.98)	M10x1.5 x 18	M10x1.5 x 17

Model	E	F	H	J	L	N	N2	S	T	TG	U	VD	VF	WH
ER32	46.5 (1.83)	16.0 (0.63)	240.1 (9.45)	42.6 (1.68)	120.1 (4.73)	106.1 (4.18)	106.1 (4.18)	M2x6	6.8 (0.27)	32.5 (1.28)	6.0 (0.24)	4.0 (0.16)	14.0 (0.55)	62.0 (2.44)
ER50	63.5 (2.50)	24.0 (0.95)	262.1 (10.32)	39.9 (1.57)	132.1 (5.20)	114.0 (4.48)	114.0 (4.49)	M2x8	8.8 (0.35)	46.5 (1.83)	8.0 (0.31)	4.0 (0.16)	16.0 (0.63)	82.0 (3.23)
ER80	95.3 (3.75)	30.0 (1.18)	326.7 (12.86)	50.0 (1.97)	159.6 (6.29)	143.1 (5.63)	144.6 (5.69)	M5x14	16.0 (0.63)	72.0 (2.83)	14.0 (0.55)	5.0 (0.20)	22.5 (0.89)	120.0 (4.72)

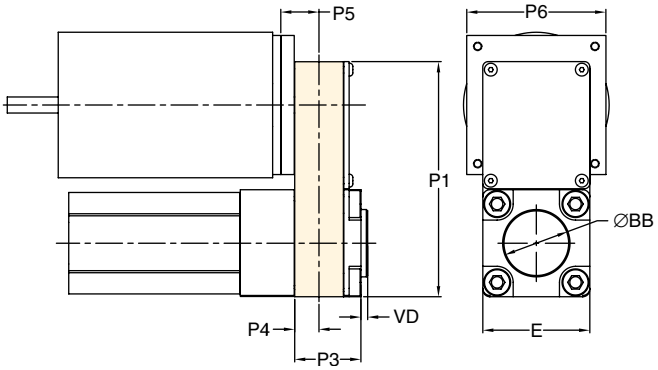
Motor Mounting

Inline (Direct Drive)

Dimensions L1 and L2 are dependent on drive motor dimensions. Consult factory.



Parallel (Timing Belt)

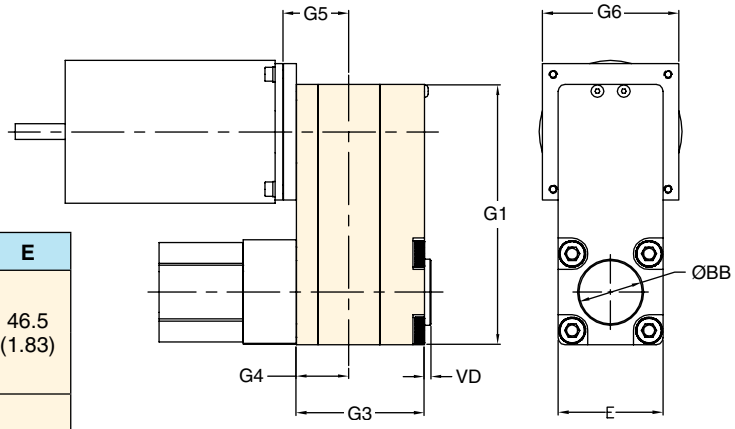


Common Dimensions

Size	Drive	ØBB	P1	P3	P4	VD	E
32	Screw	30.0 (1.18)	106.4 (4.19)	36.4 (1.43)	14.0 (0.55)	4.0 (0.16)	46.5 (1.83)
	Belt	30.0 (1.18)	106.4 (4.19)	36.4 (1.43)	30.3 (1.19)	4.0 (0.16)	
50	Screw	40.0 (1.57)	139.5 (5.49)	39.3 (1.55)	14.4 (0.57)	4.0 (0.16)	63.5 (2.50)
	Belt	40.0 (1.57)	139.5 (5.49)	39.3 (1.55)	34.7 (1.37)	4.0 (0.16)	
80	Screw	45.0 (1.77)	191.3 (7.53)	55.6 (2.19)	21.1 (0.83)	5.0 (0.20)	95.2 (3.75)
	Belt	45.0 (1.77)	191.3 (7.53)	55.6 (2.19)	45.4 (1.79)	5.0 (0.20)	

Dimensions P5 and P6 are dependent on drive motor dimensions. Consult factory.

Parallel (Gear Drive)



Common Dimensions

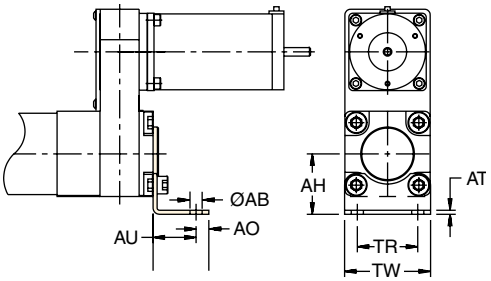
Size	Drive	ØBB	G1	G3	G4	VD	E
32	Screw	30.0 (1.18)	125.5 (4.94)	53.3 (2.10)	24.3 (0.96)	4.0 (0.16)	46.5 (1.83)
	Belt	30.0 (1.18)	125.5 (4.94)	53.3 (2.10)	40.6 (1.60)	4.0 (0.16)	
50	Screw	40.0 (1.57)	157.5 (6.20)	77.5 (3.05)	31.6 (1.24)	4.0 (0.16)	63.5 (2.50)
	Belt	40.0 (1.57)	157.5 (6.20)	77.5 (3.05)	51.7 (2.04)	4.0 (0.16)	
80	Screw	45.0 (1.77)	207.2 (8.16)	76.0 (2.99)	38.0 (1.50)	5.0 (0.20)	95.2 (3.75)
	Belt	45.0 (1.77)	207.2 (8.16)	76.0 (2.99)	62.4 (2.46)	5.0 (0.20)	

Dimensions G5 and G6 are dependent on drive motor dimensions. Consult factory.

Visit www.parker.com/actuator for 3D models.

Foot Mounting (MS1)

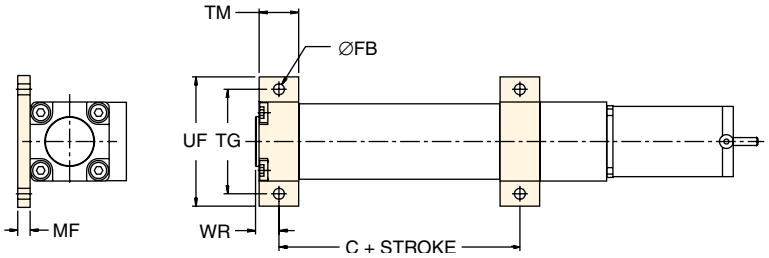
Mounting Code B



Model	AH	AO	AT	AU	TR	TW	ØAB
ER32	32.0 (1.26)	7.2 (0.28)	3.0 (0.12)	24.0 (0.94)	32.0 (1.26)	46.5 (1.83)	7.0 (0.28)
ER50	45.0 (1.77)	9.5 (0.37)	3.0 (0.12)	32.0 (1.26)	45.0 (1.77)	64.0 (2.52)	9.0 (0.35)
ER80	63.0 (2.48)	16.5 (0.65)	4.0 (0.16)	41.0 (1.61)	63.0 (2.48)	96.0 (3.78)	12.0 (0.47)

Side Lug Mounting

Mounting Code G



Screw Drive

Model	C	ØFB	MF	TG	TM	UF	WR
ER32	212.1 (8.35)	6.7 (0.27)	8.0 (0.32)	62.0 (2.44)	25.4 (1.00)	78.0 (3.07)	18.0 (0.71)
ER50	228.1 (8.98)	8.7 (0.34)	10.0 (0.39)	84.0 (3.31)	31.8 (1.25)	104.0 (4.09)	22.0 (0.87)
ER80	287.6 (11.32)	11.0 (0.43)	12.0 (0.47)	120.0 (4.72)	38.1 (1.50)	144.0 (5.65)	21.6 (0.85)

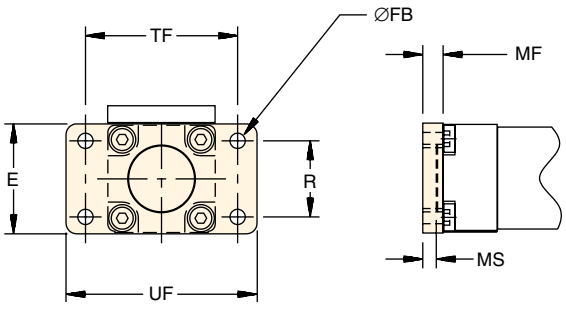
Belt Drive

Model	C	ØFB	MF	TG	TM	UF	WR
ER32	364.2 (14.34)	6.7 (0.27)	8.0 (0.32)	62.0 (2.44)	25.4 (1.00)	78.0 (3.07)	18.0 (0.71)
ER50	413.8 (16.29)	8.7 (0.34)	10.0 (0.39)	84.0 (3.31)	31.8 (1.25)	104.0 (4.09)	22.0 (0.87)
ER80	538.6 (21.21)	11.0 (0.43)	12.0 (0.47)	120.0 (4.72)	38.1 (1.50)	144.0 (5.65)	21.6 (0.85)

Flange Mounting (MF1 or MF2)

Mounting Code J (Front)
Mounting Code H (Rear)
Mounting Code N (Front & Rear)

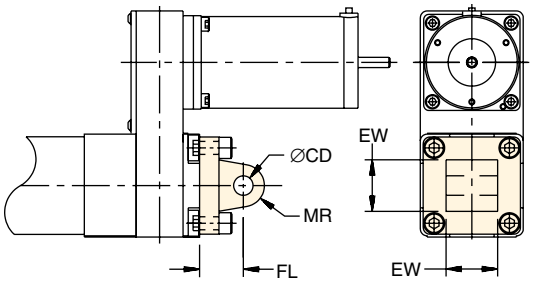
NOTE: When using this option, it is important that both ends of the actuator are supported.



Model	E	ØFB	MF	MS	R	TF	UF
ER32	47.0 (1.85)	7.0 (0.28)	10.0 (0.39)	6.0 (0.24)	32.0 (1.26)	64.0 (2.52)	80.0 (3.15)
ER50	65.0 (2.56)	9.0 (0.35)	12.0 (0.47)	8.0 (0.32)	45.0 (1.77)	90.0 (3.54)	113.0 (4.49)
ER80	97.0 (3.82)	12.0 (0.47)	16.0 (0.63)	11.0 (0.43)	63.0 (2.48)	126.0 (4.96)	153.0 (6.02)

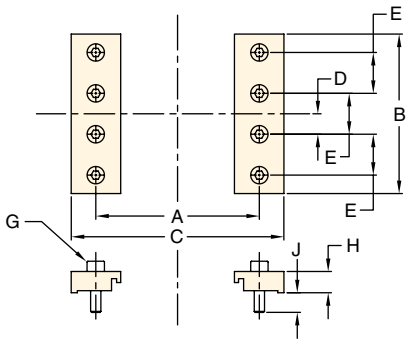
Rear Eye Mounting (MP4)

Mounting Code E



Model	∅CD	EW	FL	MR
ER32	10.0 (0.39)	25.4 (1.00)	22.0 (0.87)	10.0 (0.39)
ER50	12.0 (0.47)	31.5 (1.24)	27.0 (1.06)	13.0 (0.51)
ER80	16.0 (0.63)	49.8 (1.96)	36.0 (1.42)	20.0 (0.79)

Extended Toe Clamp



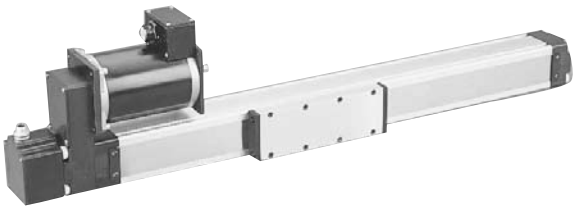
Unit Size	Model Code	# of Holes	A	B	C	D	E	G	H	J Size
ER32	TPEM-TC-03-1	1	76.0 (2.99)	18.0 (0.71)	56.0 (2.02)	0 (0)	—	M4 x 0.7 x 14	7.0 (0.28)	7.0 (0.28)
	TPEM-TC-03-2	2	76.0 (2.99)	38.0 (1.50)	56.0 (2.02)	10.0 (0.39)	20.0 (0.79)			
	TPEM-TC-03-3	3	76.0 (2.99)	58.0 (2.28)	56.0 (2.02)	10.0 (0.39)	20.0 (0.79)			
	TPEM-TC-03-4	4	76.0 (2.99)	78.0 (3.07)	56.0 (2.02)	10.0 (0.39)	20.0 (0.79)			
ER50	TPEM-TC-05-1	1	104.0 (4.09)	18.0 (0.71)	80.0 (3.15)	0 (0)	—	M5 x 0.8 x 20	10.4 (0.41)	9.6 (0.38)
	TPEM-TC-05-2	2	104.0 (4.09)	38.0 (1.50)	80.0 (3.15)	10.0 (0.39)	20.0 (0.79)			
	TPEM-TC-05-3	3	104.0 (4.09)	58.0 (2.28)	80.0 (3.15)	10.0 (0.39)	20.0 (0.79)			
	TPEM-TC-05-4	4	104.0 (4.09)	78.0 (3.07)	80.0 (3.15)	10.0 (0.39)	20.0 (0.79)			
ER80	TPEM-TC-08-1	1	153.0 (6.02)	18.0 (0.71)	120.0 (4.72)	0 (0)	—	M6 x 1.0 x 30	18.0 (0.71)	12.0 (0.47)
	TPEM-TC-08-2	2	153.0 (6.02)	38.0 (1.50)	120.0 (4.72)	10.0 (0.39)	20.0 (0.79)			
	TPEM-TC-08-3	3	153.0 (6.02)	58.0 (2.28)	120.0 (4.72)	10.0 (0.39)	20.0 (0.79)			
	TPEM-TC-08-4	4	153.0 (6.02)	78.0 (3.07)	120.0 (4.72)	10.0 (0.39)	20.0 (0.79)			

Brake Option

A brake option is available to prevent back driving of the carriage when power is removed from the motor. The brake is a spring loaded, friction disc type that requires a separate power signal (24 VDC or 115 VAC) to the solenoid that releases the brake. The brake option attaches directly to the rear of the ball or Acme screw, preventing movement of the cylinder rod or bearing carriage for static conditions.

Options which mount to the rear of the actuator are not available with the brake option. The brake should be used as a static brake only. It is not intended for dynamic braking.

For details, see ET section.



Preloaded Ball Screws

The introduction of a second ball nut, preloaded against the first ball nut, eliminates backlash in the ball screw. This option is available on all ball screw-actuator combinations.

Precision Ground Ball Screws

Substituting a precision ground ball screw for the standard rolled ball screw improves lead error and overall system accuracy.

Extended and Non-Standard Stroke Lengths

Where high linear speed is not crucial to the performance of the system, it may be possible to extend the standard length of any size actuator. Screw critical speed is a function of the diameter of the screw and the distance between its bearing supports.

Additionally, non-standard or intermediate stroke lengths are available for a nominal charge. Consult the factory for any special stroke needs.

Shortened, Extended and Dual Carriages

Non-standard carriage lengths and dual carriages are available for special applications. Consult factory for your special carriage needs.

Breather Tube Option

The aluminum actuator housing is an ideal platform for the installation of air fittings. Breather tubes may be fitted to either create positive pressurization (air purge) or create a vacuum to minimize particle contamination.

High and Low Temperature Modifications

Aluminum and steel have different thermal expansion coefficients. It may be necessary to modify the fit tolerances on certain parts to accommodate extreme temperatures. Contact the factory if the application environment exceeds the recommended operating temperature range.

External Linear Potentiometer

Attached to the actuator by a standard bracket mount, the external linear potentiometer can accommodate stroke lengths from 153 to 3356 mm. Repeatability is 0.01% of full stroke. Available in 4-20mA or 0-10 VDC, the enclosure has an IP67 rating and is designed to meet CE requirements.

Special Lubricants

The Actuator Division has provided special lubrication for drive screws and thrust tubes as specified by the customer. Non-silicon based greases are available for clean room and vacuum-rated applications.

Washdown Applications

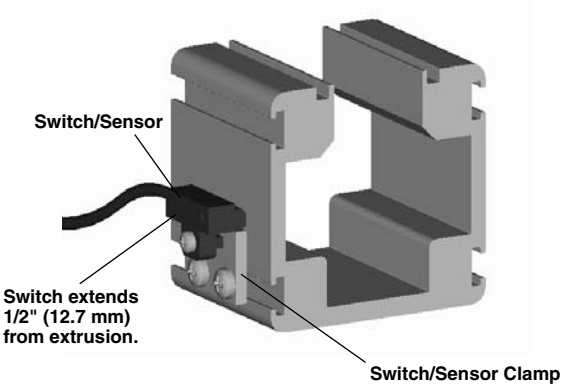
- Special Coatings
- Stainless Steel Components
- FDA Approved for Food Applications

Have any other special needs?
Please consult the factory.

Position Sensing Devices

ER Series actuator products are equipped with permanent nitrile barium magnets on both sides of the bearing carriage. These magnets serve to activate Hall Effect sensors or reed switches.

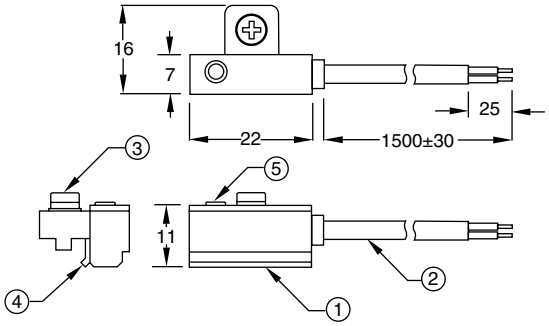
When attached to available sensor/switch clamps, sensors and switches may be mounted to T-slots in the ER Series actuator body (see illustration). The clamp positions the switch/sensor at the thinnest section of the extrusion wall, through which the magnetic target is sensed.



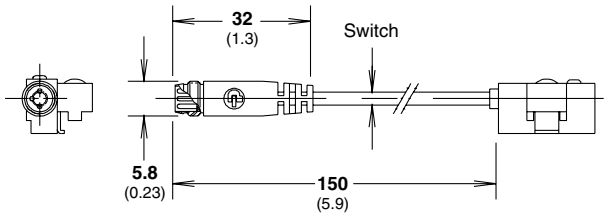
Comparing Sensors and Switches

Hall Effect	Reed
NO or NC	NO or NC
Fully adjustable travel	Fully adjustable travel
Solid state electronics	Mechanical reed
LED indicator	LED indicator
5-24 VDC	5-24VDC or 85-150 VAC
PNP and NPN	Low Amp and High Amp
Medium cost	Lowest cost
Long life	Medium life

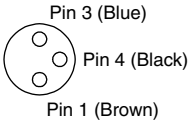
Dimensions



1. Housing material: plastic
2. Cable type: ∅3.3mm, 3C wire, 24AWG
3. Clamp screw: M3x8mm, stainless steel
4. Adjustable clamp: stainless steel
5. LED color when activated: red
6. IP67 and CE certified



Cable Connection



Hall Effect Sensors with Clamp

Part No.**	Type	LED Color	Logic	Cable/ Connector
SMHnn-1P	N.O.	Green	PNP	1.5m black with leads
SMHnn-1N	N.O.	Red	NPN	
SMCnn-1P	N.C.	Yellow	PNP	
SMCnn-1N	N.C.	White/Red	NPN	
SMHnn-1PC	N.O.	Green	PNP	150mm black with connector*
SMHnn-1NC	N.O.	Red	NPN	
SMCnn-1PC	N.C.	Yellow	PNP	
SMCnn-1NC	N.C.	White/Red	NPN	

* Order cable separately below.
** Replace nn with 32 for ER032, 50 for ER050, 80 for ER080.

Reed Switches with Clamp

Part No.*	Type	LED	Current Rating	Cable/ Connector
SMRnn-1	N.O.	Green	High	1.5m gray with leads
SMRnn-1L	N.O.	Red	Low	
SMDnn-1L	N.C.	Yellow	Low	
SMRnn-1C	N.O.	Green	High	150mm gray with connector*
SMRnn-1LC	N.O.	Red	Low	
SMDnn-1LC	N.C.	Yellow	Low	

* Order cable separately below.
** Replace nn with 32 for ER032, 50 for ER050, 80 for ER080.

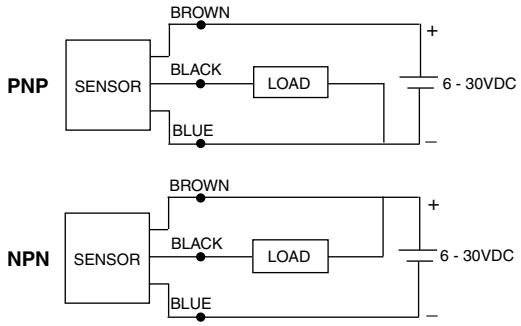
Connector Option

A mating cable/connector is available for sensors with the connector option. Hall Effect sensors use all three wires while reed switches use only blue and brown.

Part No.	Description
B8786	5m (16 ft.) polyurethane covered cable/connector

Hall Effect Sensors

Two types of Hall effect sensors are available for use with ER Series actuators. The normally open sensor is typically used for mid-position sensing, such as homing applications. The normally closed sensor is generally used to indicate over-travel at the end of the stroke, and is used in a safety circuit to prevent damage to components caused by over-travel.



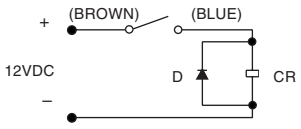
Note: End of travel sensors do not reduce available stroke.

ZETA6104 controls use NPN sensors for Home and End-of-Travel.

Reed Switches

Reed switches are available in a normally open or normally closed configuration. The low amp switch is suitable for connection to PLCs or other low current devices. The high amp switch can be used to drive sequencers, relays, coils, or other devices directly. Not compatible with TTL level I.O. Logic (switch will work with TTL level if wired backwards but LED will not light).

DC Operation



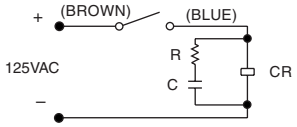
Required for proper operation 24VDC.

Put Diode parallel to load (CR) with polarity as shown.

D: Diode: select a Diode with the breakdown voltage and current rating according to the load.

CR: Relay coil (under 0.5 W coil rating)

AC Operation



Recommended for longer switch life 125VAC.

Put resistor and capacitor parallel to load (CR).

CR: Relay coil (under 2 W coil ratings)

R: Resistor under 1 K Ohm

C: Capacitor 0.1 µF

Hall Effect Specifications

	Solid State
Type	Solid State Type (PNP or NPN)
Switching Logic	Normally Open or Normally Closed
Supply Voltage Range	5 - 24 VDC
Switch Current	150 mA max
Current Consumption	7 mA at 12 VDC, 14 mA at 24 VDC
Switching Response	500 Hz Maximum
Residual Voltage	0.8 V Maximum (150 mA)
Leakage Current	10 uA Maximum
Insulation Resistance	100 M Ohm min.
Min. LED Current	1mA
Operating Temperature	-10° to 85°C (14° to 185°F)***
Lead Termination	1500 mm (60 in) or 150mm (6 in) w/connector
Industrial Protection	IP67
Shock Resistance	50 g's, 490 m/sec^2

Notes:

* Polarity is restricted for DC operation:
(+) to Brown (-) to Blue
If these connections are reversed for TTL levels the contacts will close, but the LED will not light.

** Due to minimum current requirement, LED will not display when used with all Gemini 6K and 6K products.

*** Exceeds temperature range for ER Series mechanical components.

Reed Switch Specifications

	Low Amp	High Amp
Switching Logic	Normally Open (NO) Normally Closed (NC)	Normally Open (NO)
Voltage Rating	85-125 VAC (NO) 6-24 VDC* (NO) 6-24 VAC, 6-24 VDC* (NC)	85-125 VAC 6-24 VDC*
Power Rating	Resistive: 10 Watts (NO) Inductive: 5 Watts (NO) 3 Watts (NC)	Resistive load 10 Watts Inductive load 5 Watts
Switching Current Range	Resistive load: 5-40 mA (NO) 5-25 mA (NC) Inductive load 5-25 mA	Resistive load 30-300 mA Inductive load 30-100 mA
Min. LED Current	5 mA	18mA**
Switching Response	300 Hz (NO) 200 Hz (NC)	300 Hz max
Breakdown Voltage	200 VDC	
Contact Resistance	100 M Ohm min.	
Operating Temp.	-10° to 85°C (14° to 185°F)***	
Lead Termination	1500 mm (60 in) or 150mm (6 in) with connector	
Industrial Protection	IP67	
Shock Resistance	30 g's, 300 m/sec^2	

ER Ordering Information – Belt

ER	080	BLT	R	A	D25
Series	Profile Size	Drive Type	Motor Mounting Style	Drive Ratio	Gearbox

Continued on next page

Code	Profile Size
032	32mm
050	50mm
080	80mm

Code	Drive Type
BLT	Belt Drive

Code	Motor Mounting Style	
R	Direct Drive Right	
L	Direct Drive Left	
M	Parallel Over Right with Timing Belt or Gear Drive	
N	Parallel Under Right with Timing Belt or Gear Drive	
S	Parallel Over Left with Timing Belt or Gear Drive	
T	Parallel Under Left with Timing Belt or Gear Drive	
V	Reverse Parallel Over Right with Timing Belt or Gear Drive	
W	Reverse Parallel Under Right with Timing Belt or Gear Drive	
Y	Reverse Parallel Over Left with Timing Belt or Gear Drive	
Z	Reverse Parallel Under Left with Timing Belt or Gear Drive	
J	Reverse Parallel Rear Right with Timing Belt or Gear Drive	
K	Reverse Parallel Rear Left with Timing Belt or Gear Drive	

Code	Drive Ratio
A	1:1 Inline Direct Drive 1:1 Timing Belt (Parallel)
Z	1:1.5 Timing Belt (32 Parallel)
B	1.5:1 Timing Belt (50, 80 Parallel)
D	2:1 Timing Belt (50, 80 Parallel)
K	1:1 Gear Drive (32, 50, 80 Parallel)
E	3:1 Gear Drive (32, 50, 80 Parallel)
F	5:1 Gear Drive (32, 50, 80 Parallel)
G	7.5:1 Gear Drive (32, 50, 80 Parallel)
H	9.5:1 Gear Drive (32, 50 Parallel) 10:1 Gear Drive (80 Parallel)

Code	Gearbox Option [1]
0	No Gearbox
A	PX23
B	PS60 – Shaft Horizontal
C	PS60 - Shart Vertical
D	PX34
E	PS90 - Shaft Horizontal
F	PS90 - Shaft Vertical
G	PX115
P	PV 23FE
Q	PV34FE

Code	Gearbox Ratio
00	Flange Only [2]
03	3:1
04	4:1
05	5:1
07	7:1
10	10:1
15	15:1
20	20:1
25	25:1
30	30:1
40	40:1 (PS only)
50	50:1
70	70:1
A0	100:1

1 Not all motor/gearbox options physically fit on all cylinder sizes and mounting styles. Reference mounting matrix to determine suitable combinations. PS precision gearboxes are oil filled. Shaft orientation is required to insure proper oil fill levels.
2 When combined with Gearbox Option “0” (no gearbox), this option is direct mount with no flange included.

ER Ordering Information – Belt

J13	F	S	R	N	1250	A
Motor	Actuator Mounting	Carriage Style	Carriage Bearing	Brake Option	Standard Stroke	Design Level

Code	Actuator Mounting
F	Bottom Tap (Std)
B	Foot Mount [4]
E	Rear Eye [4]
J	Front Flange

Code	Brake Option [5]
N	No Brake
E	115VAC w/Flying Leads [4]
F	24VDC w/Flying Leads [4]
G	115VAC w/Connector [4]
H	24VDC w/Connector [4]

Code	Carriage Style
S	Standard

Code	Carriage Bearing
R	Roller Bearing Carriage

Code	Standard Stroke [6]
0050	50mm (1.97 in.)
0100	100mm (3.94 in.)
0150	150mm (5.91 in.)
0200	200mm (7.87 in.)
0300	300mm (11.81 in.)
0450	450mm (17.72 in.)
0600	600mm (23.62 in.)
0750	750mm (29.53 in.)
1000	1000mm (39.37 in.)
1250	1250mm (49.21 in.)
1500	1500mm (59.05 in.)
xxxx	Non-standard Stroke [7]

Code	Motor Option [1]
A	S57, ES2x - Round Shaft
B	S83, ES3x - Round Shaft
C	HV34, LV34 - Shaft Flat
D	HV23, LV23 - Shaft Flat
E	SM23x***-T*** (x = 1, 2, 3)
F	BE23***-K***
G	BE34***-K***
H	SMN0602***-K***
J	SMN0822***-K***
K	SMN1002***-K***
L	SMN1152***-K***
M	SMN1422***-K***
N	MPP092****-K***
P	MP100****-K***
Q	MPP115****-K***
R	MPP142x***-K*** (x = 2, 4, 6)
S	MPP1428***-K***

Code	Motor Model [3]
00	Motor Flange only
01-99	Reference Motor Section for Specific Models (01-99)

Maximum Standard Stroke Length*

ER032	ER050	ER080
4550mm	4550mm	2575mm

*Longer strokes may be available with splice. Consult factory.

1 Not all motor/gearbox options physically fit on all cylinder sizes and mounting styles. Reference mounting matrix to determine suitable combinations. PS precision gearboxes are oil filled. Shaft orientation is required to insure proper oil fill levels.

3 Reference Motor Model tables for specific motor part numbers.

4 Parallel mounting only.

5 Not compatible with actuator mounting option B.

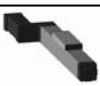
6 Stroke is measured bumper to bumper.

7 Non-standard stroke lengths available in increments of 1mm.

ER	050	B05	M	A	000
Series	Profile Size	Drive Type	Motor Mounting Style	Drive Ratio	Gearbox Option

Continued on next page

Code	Profile Size	Code	Drive Type
032	32mm	B08	Ball Screw, 0.125 in. Lead
		A04	Acme Screw, 0.250 in. Lead
		A08	Acme Screw, 0.125 in. Lead
050	50mm	B01	Ball Screw, 1.000 in. Lead
		B02	Ball Screw, 0.500 in. Lead
		B05	Ball Screw, 0.200 in. Lead
		A05	Acme Screw, 0.200 in. Lead
080	80mm	B01	Ball Screw, 1.000 in. Lead
		B02	Ball Screw, 0.500 in. Lead
		B04	Ball Screw, 0.250 in. Lead
		A04	Acme Screw, 0.250 in. Lead

Code	Motor Mounting Style	
L	Inline	
M	Parallel, Position M	
N	Parallel, Position N	
Q	Parallel, Position Q	
R	Reverse Parallel, Position R	
S	Reverse Parallel, Position S	
T	Reverse Parallel, Position T	
V	Reverse Parallel, Position V	

Code	Drive Ratio
A	1:1 Inline 1:1 Timing Belt (Parallel)
Z	1:1.5 Timing Belt (32 Parallel)
B	1.5:1 Timing Belt (50, 80 Parallel)
D	2:1 Timing Belt (50, 80 Parallel)
K	1:1 Gear Drive (32, 50, 80 Parallel)
E	3:1 Gear Drive (32, 50, 80 Parallel)
F	5:1 Gear Drive (32, 50, 80 Parallel)
G	7.5:1 Gear Drive (32, 50, 80 Parallel)
H	9.5:1 Gear Drive (32, 50 Parallel) 10:1 Gear Drive (80 Parallel)

Code	Gearbox Option [1]
0	No Gearbox
A	PX23
B	PS60 – Shaft Horizontal
C	PS60 - Shart Vertical
D	PX34
E	PS90 - Shaft Horizontal
F	PS90 - Shaft Vertical
G	PX115
P	PV23FE
Q	PV34FE

Code	Gearbox Ratio
00	Flange Only [2]
03	3:1
04	4:1
05	5:1
07	7:1
10	10:1
15	15:1
20	20:1
25	25:1
30	30:1
40	40:1 (PS only)
50	50:1
70	70:1
A0	100:1

1 Not all motor/gearbox options physically fit on all cylinder sizes and mounting styles. Reference mounting matrix to determine suitable combinations. PS precision gearboxes are oil filled. Shaft orientation is required to insure proper oil fill levels.
2 When combined with Gearbox Option “0” (no gearbox), this option is direct mount with no flange included.

ER Ordering Information – Screw

G16	F	S	R	N	1250	A
Motor Option	Actuator Mounting	Carriage Style	Carriage Bearing	Brake Option	Standard Stroke	Design Level

Code	Actuator Mounting
F	Bottom Tap (Std)
B	Foot Mount [4]
E	Rear Eye [4]
G	Foot Side Lug [5]
H	Rear Flange [4]
J	Front Flange
N	Front and Rear Flange [4]

Code	Brake Option [6]
N	No Brake
E	115VAC w/Flying Leads [4]
F	24VDC w/Flying Leads [4]
G	115VAC w/Connector [4]
H	24VDC w/Connector [4]

Code	Carriage Bearing
R	Roller Bearing Carriage
S	Square Rail Bearing Carriage

Code	Carriage Style
S	Standard

Code	Standard Stroke [7]
0050	50mm (1.97 in.)
0100	100mm (3.94 in.)
0150	150mm (5.91 in.)
0200	200mm (7.87 in.)
0300	300mm (11.81 in.)
0450	450mm (17.72 in.)
0600	600mm (23.62 in.)
0750	750mm (29.53 in.)
1000	1000mm (39.37 in.)
1250	1250mm (49.21 in.)
1500	1500mm (59.05 in.)
xxxx	Non-standard Stroke [8]

Code	Motor Option [1]
A	S57, ES2x - Round Shaft
B	S83, ES3x - Round Shaft
C	HV34, LV34 - Shaft Flat
D	HV23, LV23 - Shaft Flat
E	SM23x***-T*** (x = 1, 2, 3)
F	BE23***-K***
G	BE34***-K***
H	SMN0602***-K***
J	SMN0822***-K***
K	SMN1002***-K***
L	SMN1152***-K***
M	SMN1422***-K***
N	MPP092****-K***
P	MP100****-K***
Q	MPP115****-K***
R	MPP142x***-K*** (x = 2, 4, 6)
S	MPP1428***-K***

Code	Motor Model [3]
00	Motor Flange only
01-99	Reference Motor Section for Specific Models (01-99)

Maximum Standard Stroke Length

(Consult factory for longer lengths)

ER032	ER050	ER080
1000mm	1500mm	1500mm

1 Not all motor/gearbox options physically fit on all cylinder sizes and mounting styles. Reference mounting matrix to determine suitable combinations. PS precision gearboxes are oil filled. Shaft orientation is required to insure proper oil fill levels.

3 Reference Motor Model tables for specific motor part numbers.

4 Parallel mounting only.

5 Not compatible with M, N or Q motor mounting styles.

6 Not compatible with cylinder mounting options B, C, E, H, N.

7 All screws have a critical speed limit that will cause damage to the actuator if exceeded. Consult factory or catalog for maximum speeds. Stroke is measured bumper to bumper.

8 Non-standard stroke lengths available in increments of 1mm.

ER Application Fax Form

Fax completed form to (330) 334-3335 or email to actuatorsales@parker.com

Contact Information:

Name _____ Phone _____

Company _____ email _____

City, State, Zip _____

Application Sketch

NOTES:

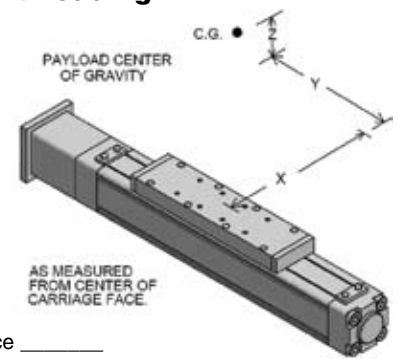
Please include the critical dimensions in your sketch.

In order to achieve the best solution, it is important that you provide as much information as possible.

Motion Profile

Moves	Distance (Stroke)	Time	Thrust or Load	Dwell
First Motion				
Second Motion				
Third Motion				
Fourth Motion				

Moment Loading



X distance _____

Y distance _____

Z distance _____

Environmental Requirements

1. Operating Temperature

Max _____ Min _____

2. Comtanimation (check one)

☐ Particle ☐ Liquid

Type: _____

3. Special Considerations _____

_____

_____

Application Requirements:

1. Overall Stroke (add 25mm per end minimum) _____

2. Cylinder Orientation (check one)

☐ Horizontal ☐ Inverted ☐ Side Mount

☐ Vertical ☐ Angle: Degrees _____

3. Load/Tooling Weight _____

4. Repeatability Requirements _____

☐ Unidirectional ☐ Bidirectional

5. Is the load externally guided? (check one)

☐ Yes ☐ No

If yes, how? _____

6. Is the actuator body supported? (check one)

☐ Yes ☐ No

If yes, how? _____

7. Life Requirements (cycles, distance or years)

Hours per day _____ Days per year _____

8. Special Considerations _____

_____

_____

_____

_____

Please attach another sheet if more room is needed.

Actuator Type and Mounting

1. Drive Type (check one)

☐ Belt ☐ Screw

2. Mounting Style (check one)

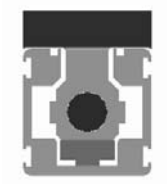
☐ Bottom Tap (std) ☐ Foot Mount* ☐ Rear Eye

☐ Front Flange ☐ Rear Flange ☐ Foot Side Lug (screw drive only)

3. Carriage Bearing Style (check one)

☐ Roller (std)

☐ Square Rail (screw drive only)



4. Motor Mount (check one)

Screw Drive:

☐ Inline

☐ Parallel

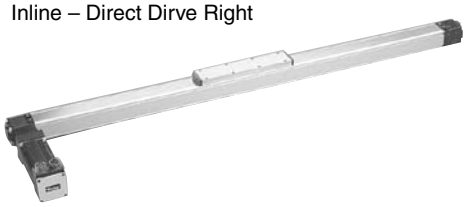
Option (see catalog page 48) _____

Parallel mounts can limit the actuator's total thrust capacity.

Belt Drive:

☐ Inline – Direct Drive Left (Pictured)

☐ Inline – Direct Dirve Right



☐ Parallel

Option (see catalog page 46) _____

Motor, Drive and Control Options:

1. Motor Options (check all that apply)

☐ Stepper ☐ Servo

☐ Parker Supplied ☐ Customer Supplied (provide print)

☐ Gearhead

2. Other Options (check one)

☐ Drive ☐ Drive/Controller ☐ Controller

3. Available Line Voltage _____

4. Switches/Sensors (quantity)

End of Travel _____ Home _____

5. Brake Option (check one)

☐ Actuator* ☐ Motor ☐ None

*With parallel motor mount only

6. Special Options _____

_____

_____

_____

ERV Series Rodless Actuators

ERV Series

Contents

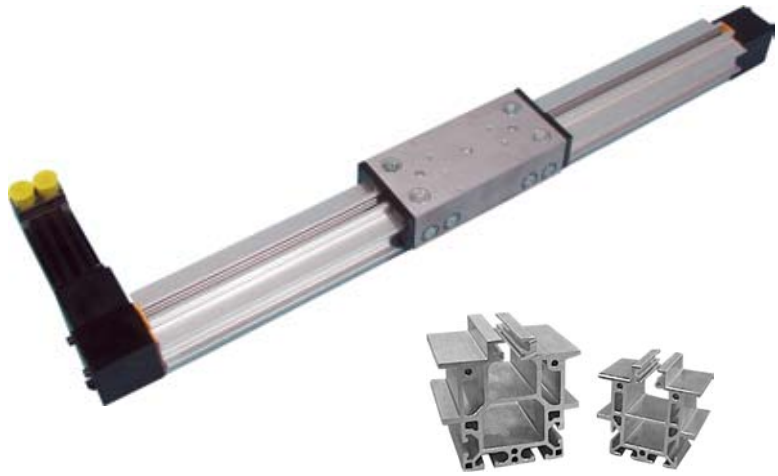
Parker Hannifin Corporation
Actuator Division
Wadsworth, Ohio USA
Phone: 1-866-PARK-ACT
email: actuatorsales@parker.com
website: www.parker.com/actuator

The ERV Series

Expanding on the ER, the ERV was designed with an external carriage containing outboard roller bearing support for higher loads. The actuator is designed to directly interface with our structural framing, providing a simple and cost effective solution for single or multiple-axis systems.

The ERV design means . . . .

- High loading to 3590 N
- High speeds to 5m/sec
- High thrust to 808 N
- Multi-axis connectivity for Gantry systems
- Strokes to 6 meters for single extrusion, spliced units for longer strokes.
- Internal belt drive
- Extrusion body cylinder with additional center web for rigidity and axial stiffness.



The ERV multiple design options can be matched to your application demands.

- 2 profile sizes (56 and 80mm)
- Polyurethane steel reinforced drive belt
- Standard and extended carriages for high loads
- Ready to mount stepper or brushless servo motors.

ERV Markets and Applications

With thousands of axes installed worldwide, the ERV series rodless actuator has proven to be a robust and reliable solution for numerous motion control applications across many markets and industries. Listed below are some examples of where and how the ERV series rodless actuator has been successfully applied.

Markets and Industries Served

Automotive	Life Sciences	Machine Tool
Tire & Rubber	Medical	Wood & Lumber
Packaging	Conveyor	Research & Testing
Food & Beverage	Transportation	Aerospace
Computer / Electronics	Pharmaceutical	Glass / Fiber
Textile	Semiconductor	Factory Automation

Application Examples

Discrete / Multi-Point Positioning	Small Area Gantry	Large Area Gantry	Complex Motion Control
Vertical Stackers / Elevator Lift	Pick & Place	Walking Beam	Flying Cut-to-Length
Scanning / Inspection	Contoured Glue Dispensing	Palletizing / Depalletizing	Crosscutting / Slitting
Transfer Unit	Part Load & Unload	Material Handling	Mechanical Cam Replacement
Lane Diverter	Profile Engraving / Etching	Storage & Retrieval	Profile Contouring
Backstop Index	Automated Assembly	Parts Transfer	High Speed Winding Traverse

ERV Specifications

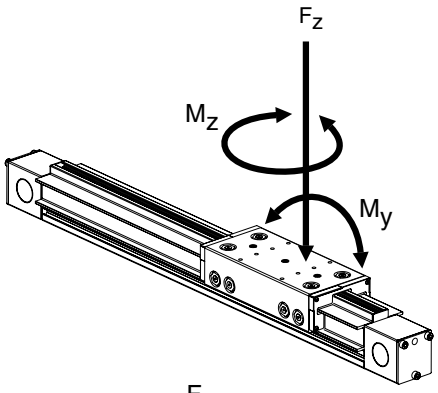
ERV-Belt Overview	Units	ERV5		ERV8	
		Standard Carriage	Extended Carriage	Standard Carriage	Extended Carriage
Performance Limits					
Max Thrust (Belt Traction Force) Fx[4]	lbf (N)	132 (587)	132 (587)	182 (808)	182 (808)
Max Speed	in/s (m/s)	200 (5.0)	200 (5.0)	200 (5.0)	200 (5.0)
Max Acceleration	in/s^2 (m/s^2)	386 (9.8)	386 (9.8)	386 (9.8)	386 (9.8)
Max Travel with bumpers	in (mm)	235 (5970)	228 (5800)	233 (5920)	227 (5785)
Max Travel without bumpers	in (mm)	238 (6050)	232 (5900)	237 (6035)	232 (5900)
System Characteristics					
Pulley Lead (travel distance per rev)	mm/rev	100	100	150	150
Pulley Diameter	in (mm)	1.253 (31.83)	1.253 (31.83)	1.880 (47.75)	1.880 (47.75)
Pulley Tooth Count	# Teeth	20	20	30	30
Efficiency [1] - inline	%	90%	90%	90%	90%
Max Breakaway Torque	oz-in	96	107	177	186
Repeatability [2] - inline / parallel	in	±0.004 / ±0.008	±0.004 / ±0.008	±0.004 / ±0.008	±0.004 / ±0.008
System Backlash	in	0.004	0.004	0.004	0.004
Reflected Rotational Inertia					
Base Unit Inertia, 100mm travel	oz-in^2	20.71	29.36	118.79	129.44
Additional Inertia per 100mm travel	oz-in^2/100mm	0.03	0.03	0.05	0.05
Bearing Carriage Load Capacity[3]					
Normal Load Fz	lbf (N)	253 (1126)	430 (1915)	474 (2112)	807 (3590)
Side Load Fy	lbf (N)	126 (563)	215 (957)	237 (1056)	403 (1795)
Pitch Moment My	ft-lbf (Nm)	39 (53)	145 (197)	109 (148)	311 (422)
Roll Moment Mx	ft-lbf (Nm)	40 (54)	67 (91)	96 (130)	163 (222)
Yaw Moment Mz	ft-lbf (Nm)	32 (43)	103 (140)	78 (106)	215 (292)
Weight & Inertia Data					
Base Unit Weight, Zero Stroke	lb (kg)	10.2 (4.65)	13.4 (6.08)	17.5 (7.96)	22.1 (10)
Carriage Weight	lb (kg)	2.99 (1.36)	5.0 (2.27)	4.82 (2.19)	7.39 (3.35)
Additional Travel Weight	lb (kg) / 100mm	1.0 (0.45)	1.0 (0.45)	1.55 (0.70)	1.55 (0.70)

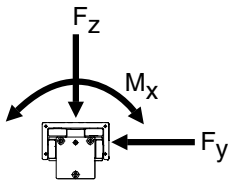
1. Parallel driven unit efficiency = inline efficiency x 0.9
2. Repeatability is unidirectional achieved under ideal conditions and slow speeds. Actual repeatability may vary with the application.
3. Load Capacities shown are based on 1 billion inches of expected travel life @ 1 m/s.
4. Traction Force is speed dependent. The values shown are based on 0.5 m/s speed.

Operating Temperature Range

0° to 60°C (32° to 140°F)

ERV5 Loading





Graph Legend

1m/s 2m/s 3m/s 4m/s 5m/s

Static Moment Loads

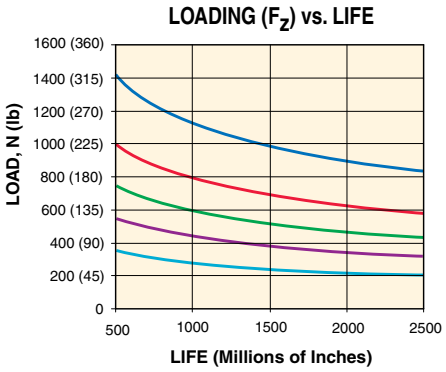
Determine which moment loads are induced by the static load. Locate the center of gravity of the load and the length of the moment arm.

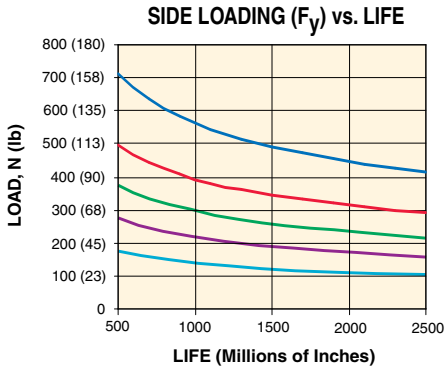
Moment Arm Lengths

Determine the moment arm lengths associated with each moment load by measuring the distance from the center of the load to the center of the carriage in each moment load direction.

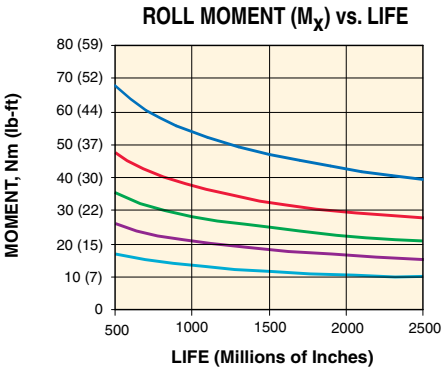
Pitch Moment

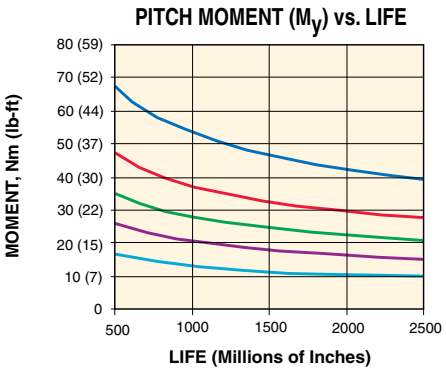
When determining the pitch moment arm, it is necessary to consider the distance from the top of the load attachment plate to the center of the carriage bearings. For the ERV5 Series, this distance is 40mm.

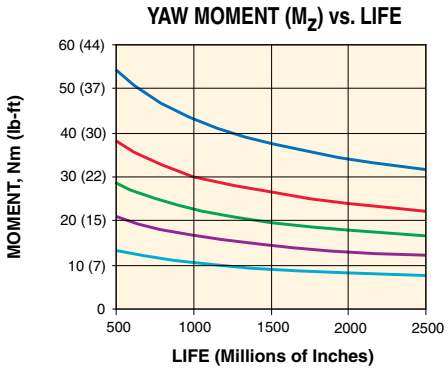




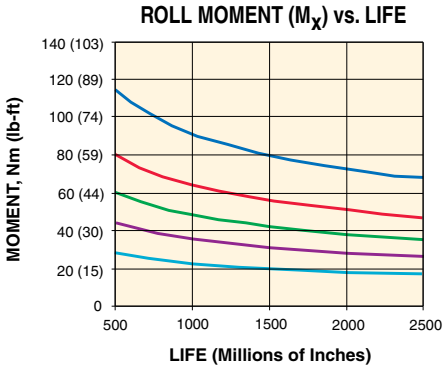
Standard Carriage

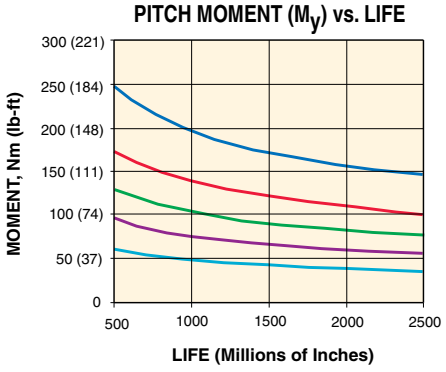


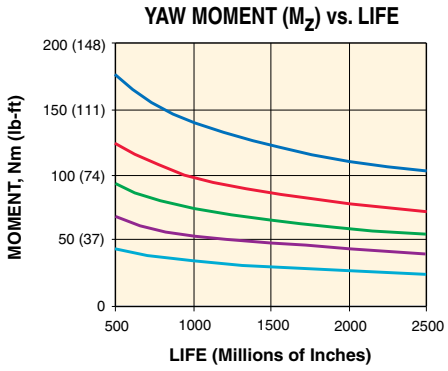




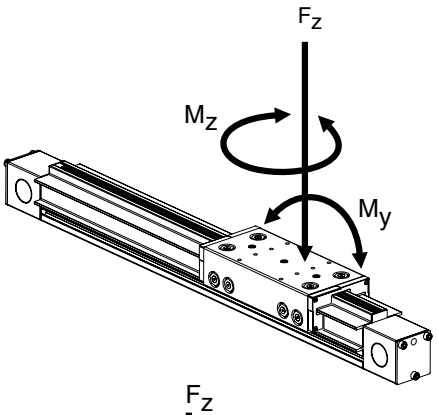
Extended Carriage

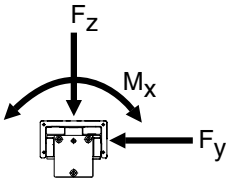






ERV8 Loading





Graph Legend

1m/s 2m/s 3m/s 4m/s 5m/s

Static Moment Loads

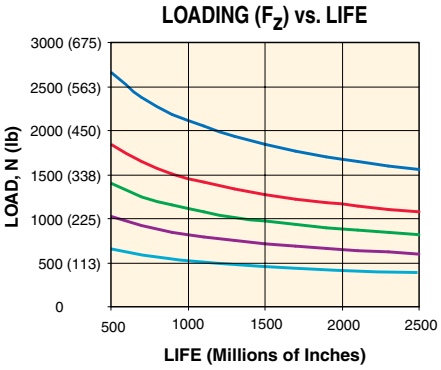
Determine which moment loads are induced by the static load. Locate the center of gravity of the load and the length of the moment arm.

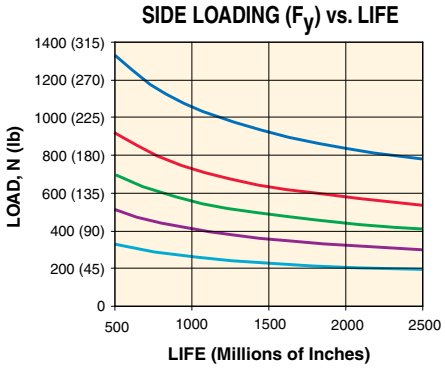
Moment Arm Lengths

Determine the moment arm lengths associated with each moment load by measuring the distance from the center of the load to the center of the carriage in each moment load direction.

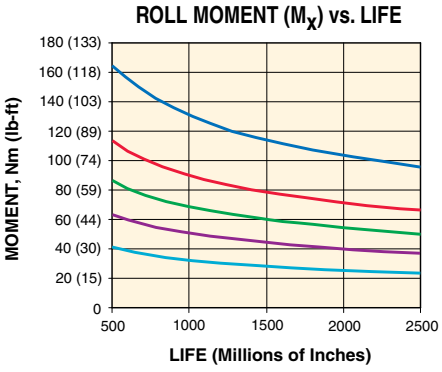
Pitch Moment

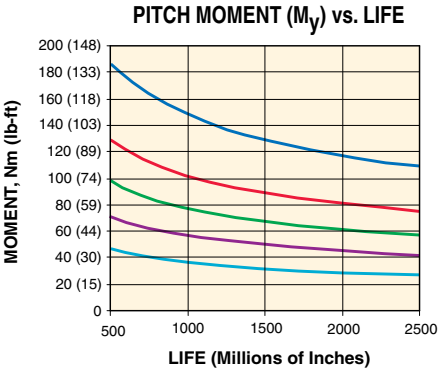
When determining the pitch moment arm, it is necessary to consider the distance from the top of the load attachment plate to the center of the carriage bearings. For the ERV8 Series, this distance is 47mm.

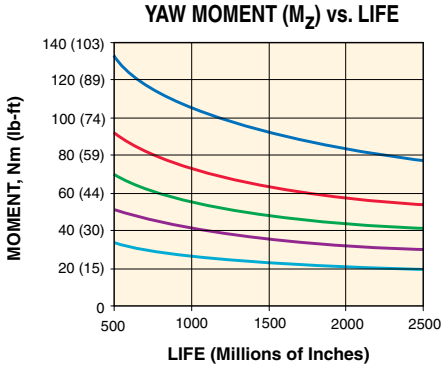




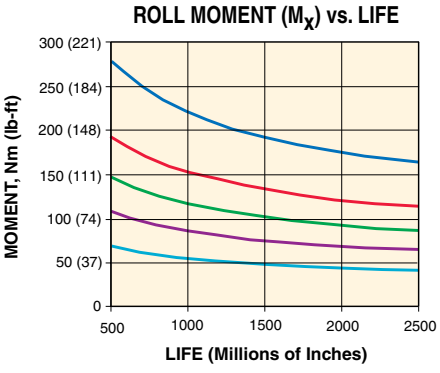
Standard Carriage

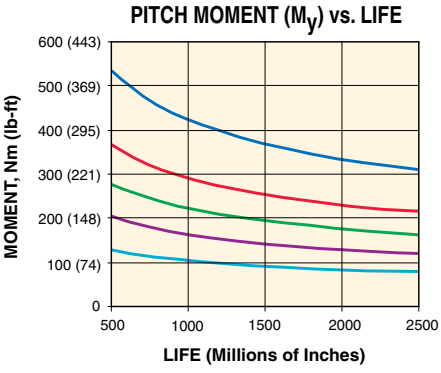


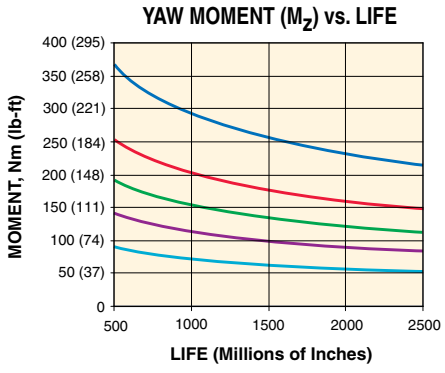




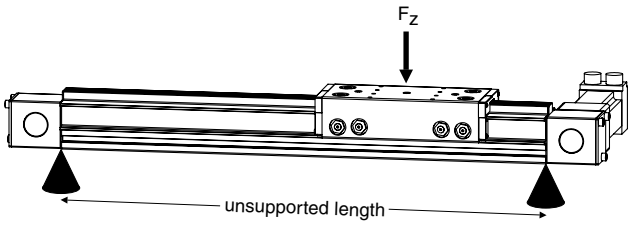
Extended Carriage



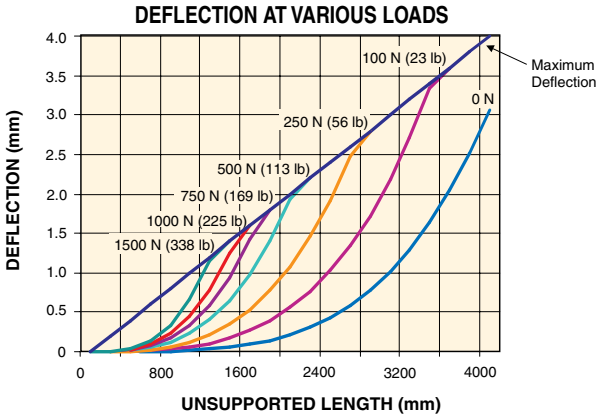




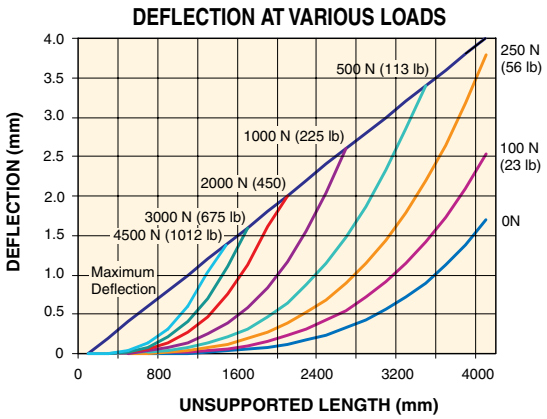
Deflection



ERV5

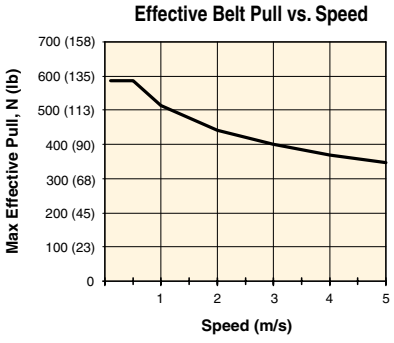


ERV8

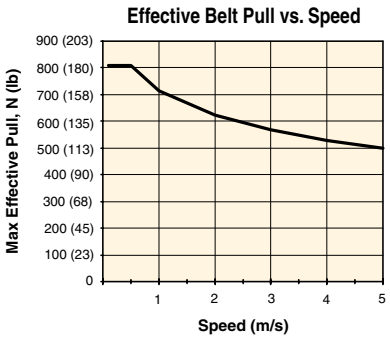


Effective Belt Pull

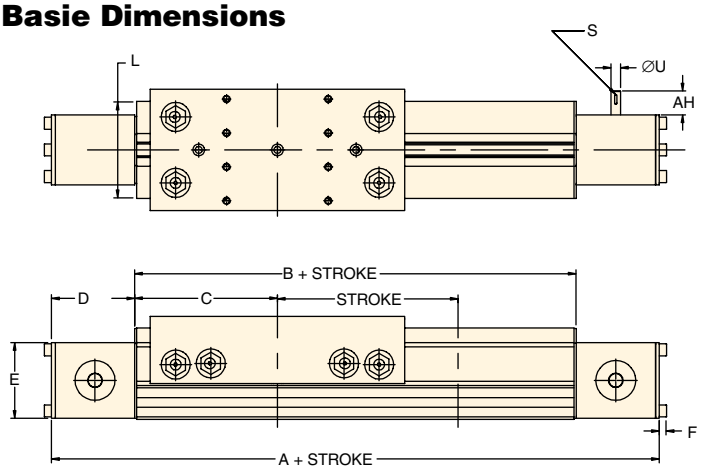
ERV5

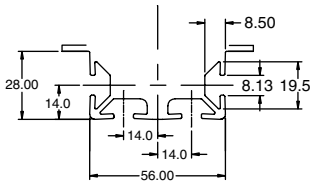


ERV8

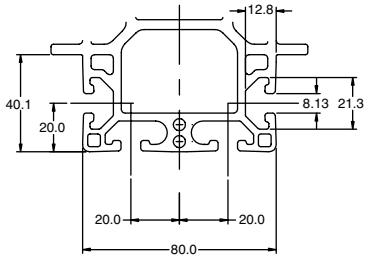


Basie Dimensions





MOUNTING DETAIL 56



MOUNTING DETAIL 80

Size	Carriage	Option	A	B*	C
5	Standard	w/o bumpers	369.8	232.5	116.2
		w/ bumpers	470.8	333.5	166.7
	Extended	w/o bumpers	509.8	372.5	186.2
		w/ bumpers	610.8	473.5	236.7
8	Standard	w/o bumpers	473.8	272.5	136.2
		w/ bumpers	586.8	386.0	193.0
	Extended	w/o bumpers	598.8	397.5	198.7
		w/ bumpers	711.8	511.0	255.5

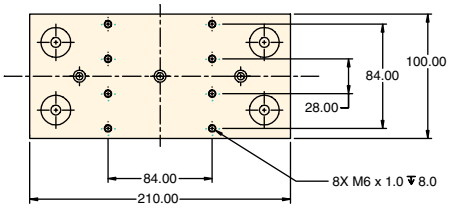
*Dimension is referenced from hard stop to hard stop.

NOTE:
Felt wipers do not increase A, B or C dimensions.

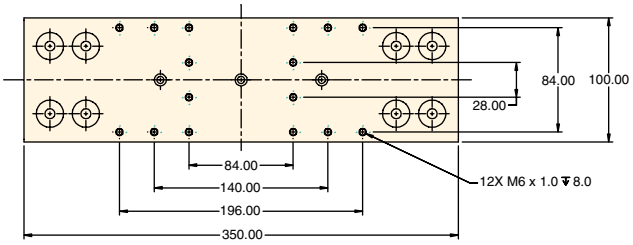
Size	D	E	F	G	H	J	K	L	U	AH	S
5	68.7	62.5	6.0	85.0	55.5	58.0	100.0	80.0	7.96	19.7	M2 X 6
8	100.7	84.0	6.0	110.0	67.5	80.0	130.0	106.0	13.95	32.0	M5 X 9

Carriage Mounting Detail

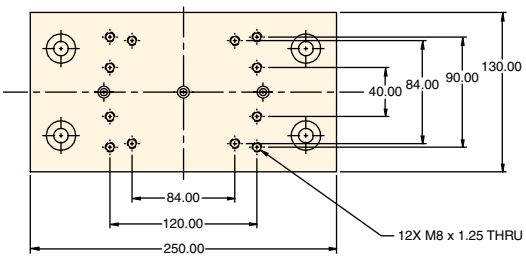
ERV5 Standard Carriage



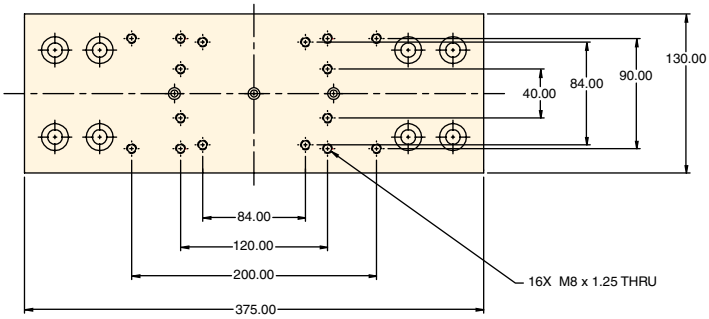
ERV5 Extended Carriage



ERV8 Standard Carriage



ERV8 Extended Carriage



ERV Series

Carriage Style (S, L)

Standard carriage

Extended carriage

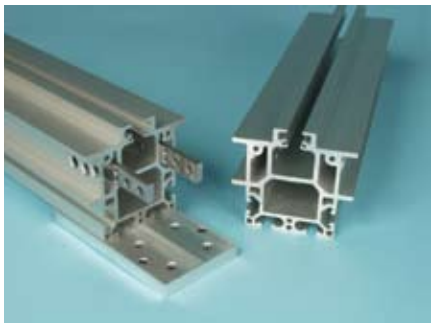
(Shown with Wipers)

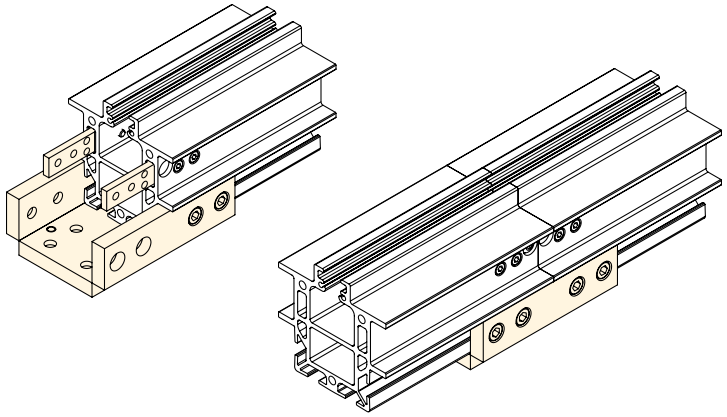
Carriage Features

- Bearing Wheels
  - 12 wheels for standard carriage
  - 24 wheels for extended carriage
- Eccentric Pre-loaded wheels
- Concentric Wheel
- 2 options for carriage loading,
  - Positive (Toward Actuator)
  - Negative (Away from Actuator).
- Magnet for Limit and Home Switches.

Spliced Units

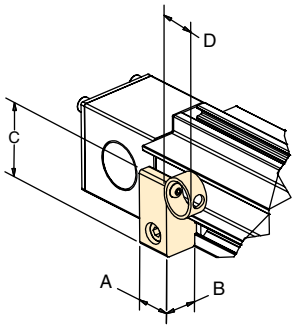
Standard units are available in lengths up to 20 feet.
For additional length, spliced units are available.





Bumpers (B)

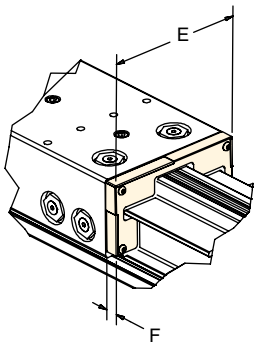
Optional bumpers are designed to prevent over-travel and can be adjusted along the full length of travel. The bumpers are fixed to the actuator extrusion via a standard T-slot (M8 SHCS and T-nut).



Model	A	B	C	D
ERV5	25.4	23.9	52.5	25.1
ERV8	25.4	30.3	71	31.1

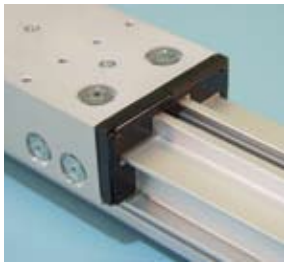
Felt Wiper (W)

Although not 100% sealed, the felt wiper option is designed to wipe contaminants away from entering the carriage assembly.

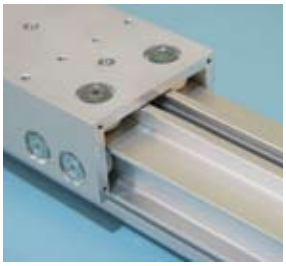


Model	E	F
ERV5	99	9.5
ERV8	129	9.5

Carriage with Wiper



Carriage without Wiper



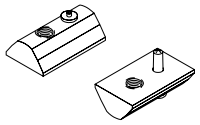
Machined Gussets

Machined gussets provide a high strength, accurate right angle connection for ERV5 profiles. The mounting surfaces are milled perpendicular.

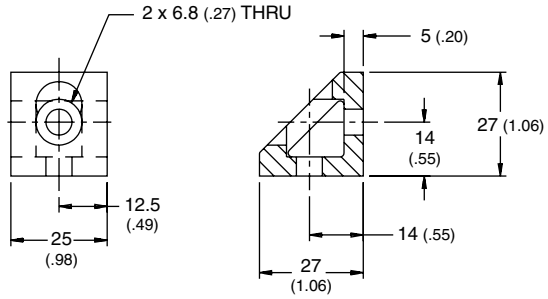
Material: 6063-T6 Aluminum alloy, clear anodized
Machining: None

Model	Gusset Part Number	Recommended Fasteners
ERV5	20-2828M	(2) 24-112-6 BHSCS and (2) 20-099 Drop-in T-Nuts
	20-2856M	(4) 24-112-6 BHSCS and (4) 20-099 Drop-in T-Nuts
ERV8	20-4040M	(2) 20-118-8 BHSCS and (2) 20-098 Drop-in T-Nuts
	20-4080M	(4) 20-118-8 BHSCS and (4) 20-098 Drop-in T-Nuts

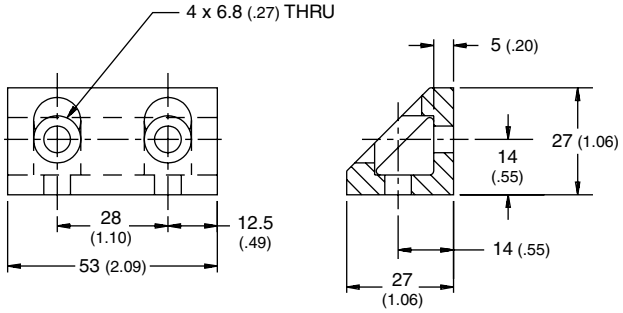
Drop-In T-Nuts



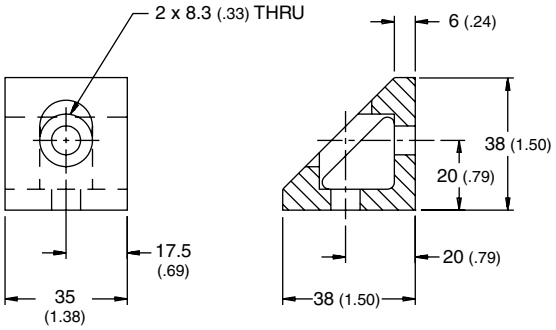
20-2828M Dimensions



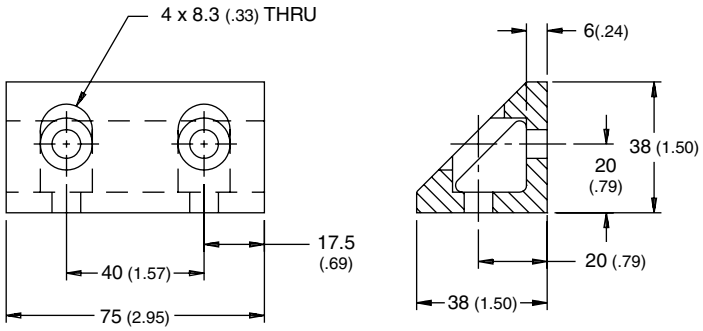
20-2856M Dimensions



20-4040M Dimensions



20-4080M Dimensions

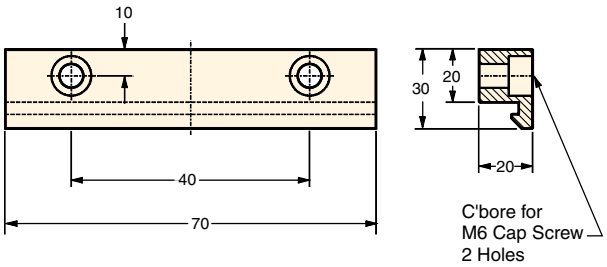


Toe Clamp

For attachment of ERV8 profiles to each other, to a structural profile or a mounting surface. Must be used in pairs. Requires M6 socket head cap screws.

Part Number 500-000900

Dimensions



M6 Socket Head Cap Screws

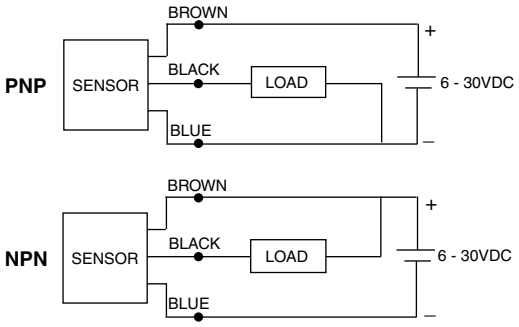
Length (mm)	Part Number
10	24-310-6
12	24-312-6
14	24-314-6
16	24-316-6
20	24-320-6
25	24-325-6
27	24-327-6
30	24-330-6
33	24-333-6
35	24-335-6
40	24-340-6
45	24-345-6
50	24-350-6
80	24-380-6
90	24-390-6
100	24-3100-6

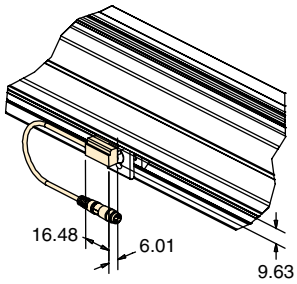
Sensors

Two types of Hall effect sensors are available for use with ERV Series actuators. The normally open sensor is typically used for mid-position sensing, such as homing applications. The normally closed sensor is generally used to indicate over-travel at the end of the stroke, and is used in a safety circuit to prevent damage to components caused by over-travel.

Hall Effect Specifications

	Solid State
Type	Solid State Type (PNP or NPN)
Switching Logic	Normally Open or Normally Closed
Supply Voltage Range	5 - 24 VDC
Switch Current	150 mA max
Current Consumption	7 mA at 12 VDC, 14 mA at 24 VDC
Switching Response	500 Hz Maximum
Residual Voltage	0.8 V Maximum (150 mA)
Leakage Current	10 uA Maximum
Insulation Resistance	100 M Ohm min.
Min. LED Current	1mA
Operating Temperature	-10° to 85°C (14° to 185°F)**
Lead Termination	1500 mm (60 in) or 150mm (6 in) w/connector
Industrial Protection	IP67
Shock Resistance	50 g's, 490 m/sec^2



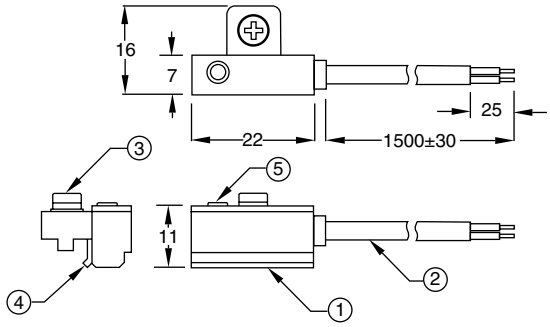


Hall Effect Sensors with Clamp

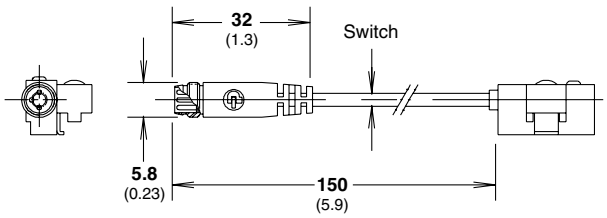
Part No.**	Type	LED Color	Logic	Cable/Connector
SMHnn-1P	N.O.	Green	PNP	1.5m Black with Leads
SMHnn-1N	N.O.	Red	NPN	
SMCnn-1P	N.C.	Yellow	PNP	
SMCnn-1N	N.C.	White/Red	NPN	
SMHnn-1PC	N.O.	Green	PNP	150mm Black with Connector*
SMHnn-1NC	N.O.	Red	NPN	
SMCnn-1PC	N.C.	Yellow	PNP	
SMCnn-1NC	N.C.	White/Red	NPN	

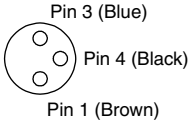
* Mating sensor cable assembly **B8786** purchased separately.
** nn = V5 to fit ERV5 or V8 to fit ERV8

Dimensions



1. Housing material: plastic
2. Cable type: ∅3.3mm, 3C wire, 24AWG
3. Clamp screw: M3x8mm, stainless steel
4. Adjustable clamp: stainless steel
5. LED color when activated: red
6. IP67 and CE certified





ERV Ordering Information

ERV	5	BLT	R	A	D25
Series	Profile Size	Drive Type	Motor Mounting Style	Drive Ratio	Gearbox

Continued on next page

Code	Profile Size
5	56mm
8	80mm

Code	Drive Type
BLT	Belt Drive

Code	Motor Mounting Style	
R	Direct Drive Right	
L	Direct Drive Left	
M	Parallel Over Right with Timing Belt or Gear Drive	
N	Parallel Under Right with Timing Belt or Gear Drive	
S	Parallel Over Left with Timing Belt or Gear Drive	
T	Parallel Under Left with Timing Belt or Gear Drive	
V	Reverse Parallel Over Right with Timing Belt or Gear Drive	
W	Reverse Parallel Under Right with Timing Belt or Gear Drive	
Y	Reverse Parallel Over Left with Timing Belt or Gear Drive	
Z	Reverse Parallel Under Left with Timing Belt or Gear Drive	
J	Reverse Parallel Rear Right with Timing Belt or Gear Drive	
K	Reverse Parallel Rear Left with Timing Belt or Gear Drive	

Code	Gearbox Option [1]
0	No Gearbox
A	PX23
B	PS60 – Shaft Horizontal
C	PS60 - Shart Vertical
D	PX34
E	PS90 - Shaft Horizontal
F	PS90 - Shaft Vertical
G	PX115
P	PV23FE
Q	PV34FE

Code	Gearbox Ratio
00	Flange Only [2]
03	3:1
04	4:1
05	5:1
07	7:1
10	10:1
15	15:1
20	20:1
25	25:1
30	30:1
40	40:1 (PS only)
50	50:1
70	70:1
A0	100:1

Code	Drive Ratio
A	1:1 Inline 1:1 Timing Belt (Parallel)
B	1.5:1 Timing Belt (Parallel)
D	2:1 Timing Belt (Parallel)
K	1:1 Gear Drive (Parallel)
E	3:1 Gear Drive (Parallel)
F	5:1 Gear Drive (Parallel)
G	7.5:1 Gear Drive (Parallel)
H	9.5:1 Gear Drive (ERV5 Parallel) 10:1 Gear Drive (ERV8 Parallel)

1 Not all motor/gearbox options physically fit on all cylinder sizes and mounting styles. Reference mounting matrix to determine suitable combinations. PS precision gearboxes are oil filled. Shaft orientation is required to insure proper oil fill levels.
2 When combined with Gearbox Option "0" (no gearbox), this option is direct mount with no flange included.

J13	L	P	Y	N	N	0750	A
Motor	Carriage Style	Normal Carriage Loading	Carriage Options	Options	Brake Option	Stroke	Design Level

Code	Carriage Style
S	Standard
L	Extended

Code	Normal Carriage Loading
P	Positive (Toward Actuator)
G	Negative (Away from Actuator)

Code	Carriage Options
W	Wipers
B	Bumpers
Y	Wipers and Bumpers
N	None

Code	Options
N	None
X	Dust Shield (Consult Factory)

Code	Brake Option [7]
N	No Brake
E	115VAC w/Flying Leads [4]
F	24VDC w/Flying Leads [4]
G	115VAC w/Connector [4]
H	24VDC w/Connector [4]

Code	Standard Stroke [5]
xxxx	Standard increments of 1mm. See table for maximum travel lengths.

Code	Motor Option [1]
A	S57, ES2x - Round Shaft
B	S83, ES3x - Round Shaft
C	HV34, LV34 - Shaft Flat
D	HV23, LV23 - Shaft Flat
E	SM23x***-T*** (x = 1, 2, 3)
F	BE23***-K***
G	BE34***-K***
H	SMN0602***-K***
J	SMN0822***-K***
K	SMN1002***-K***
L	SMN1152***-K***
M	SMN1422***-K***
N	MPP092****-K***
P	MP100****-K***
Q	MPP115****-K***
R	MPP142x***-K*** (x = 2, 4, 6)
S	MPP1428***-K***

Code	Motor Model [3]
00	Motor Flange only
01-99	Reference Motor Section for Specific Models (01-99)

Maximum Standard Stroke Length

(Consult factory for longer lengths)

Model	Standard Carriage	Extended Carriage
ERV5 - No Bumpers	6050mm	5900mm
ERV5 - With Bumpers	5970mm	5800mm
ERV8 - No Bumpers	6025mm	5900mm
ERV8 - With Bumpers	5920mm	5785mm

1 Not all motor/gearbox options physically fit on all cylinder sizes and mounting styles. Reference mounting matrix to determine suitable combinations. PS precision gearboxes are oil filled. Shaft orientation is required to insure proper oil fill levels.

3 Reference Motor Section for motor compatibility and coding.

4 Parallel mounting only.

5 Non-standard stroke lengths available in increments of 1mm.

ERV Application Fax Form

Fax completed form to (330) 334-3335 or email to actuatorsales@parker.com

Contact Information:

Name _____ Phone _____

Company _____ email _____

City, State, Zip _____

Application Sketch

NOTES:

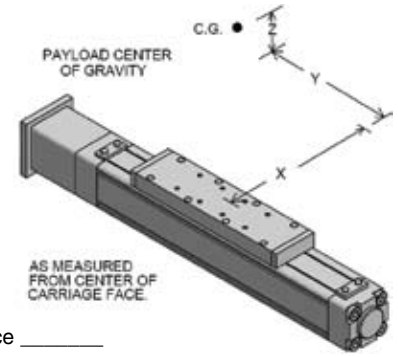
Please include the critical dimensions in your sketch.

In order to achieve the best solution, it is important that you provide as much information as possible.

Motion Profile

Moves	Distance (Stroke)	Time	Thrust or Load	Dwell
First Motion				
Second Motion				
Third Motion				
Fourth Motion				

Moment Loading



X distance _____

Y distance _____

Z distance _____

Environmental Requirements

1. Operating Temperature

Max _____ Min _____

2. Comtanimation (check one)

☐ Particle ☐ Liquid

Type: _____

3. Special Considerations _____

_____

_____

Application Requirements:

1. Overall Stroke (add 25mm per end minimum) _____

2. Cylinder Orientation (check one)

☐ Horizontal ☐ Inverted ☐ Side Mount

☐ Vertical ☐ Angle: Degree _____

3. Load/Tooling Weight _____

4. Repeatability Requirements _____

☐ Unidirectional ☐ Bidirectional

5. Is the load externally guided? (check one)

☐ Yes ☐ No

If yes, how? _____

6. Is the actuator body supported? (check one)

☐ Yes ☐ No

If yes, how? _____

7. Life Requirements (cycles, distance or years)

Hours per day _____ Days per year _____

8. Special Considerations _____

_____

_____

_____

Please attach another sheet if more room is needed.

Actuator Type and Mounting

1. Carriage Type (check one)

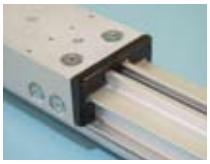
☐ Standard

☐ Extended

☐ No Preference

2. Carriage Options (check one)

☐ Wipers



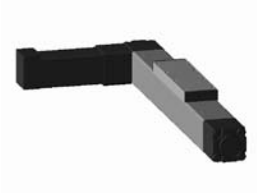
☐ Bumpers

☐ Wipers & Bumpers

3. Motor Mount (check one)

☐ Inline – Direct Drive Left (shown)

☐ Inline – Direct Drive Right

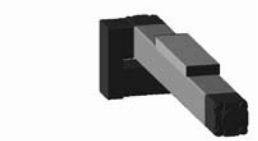


☐ Parallel Over Right

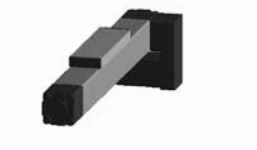
☐ Parallel Over Left

Parallel mounts can limit the actuator's total thrust capacity.

☐ Parallel Under Right



☐ Parallel Under Left



☐ Other Parallel Option (select from catalog page 64) _____

Motor, Drive and Control Options:

1. Motor Options (check all that apply)

☐ Stepper ☐ Servo

☐ Parker Supplied ☐ Customer Supplied (provide print)

☐ Gearhead

2. Other Options (check one)

☐ Drive ☐ Drive/Controller ☐ Controller

3. Available Line Voltage _____

4. Switches/Sensors (quantity)

End of Travel _____ Home _____

5. Brake Option (check one)

☐ Motor ☐ None

6. Special Options _____

_____

_____

_____

_____

ERV Series

LCB Compact Linear Actuator

Contents

Parker Hannifin Corporation
Actuator Division
Wadsworth, Ohio USA
Phone: 1-866-PARK-ACT
email: actuatorsales@parker.com
website: www.parker.com/actuator

The LCB Series

The LCB series of linear actuators incorporates a low friction, dry running sliding bearing carriage that provides long and reliable travel life even at 100% duty cycle. The low mass of the carriage and steel reinforced timing belt design allows for very high acceleration and velocity. With accelerations exceeding 2G's and speeds up to 8 m/s, the LCB can achieve comparable throughput to linear motors at a fraction of the cost.

The simple, cost effective design of the LCB is also well suited for replacing pneumatic actuators in applications requiring a higher level of performance and control. Combined with Parker motors and controls, the LCB offers a fully programmable, high performance solution at a great value.

The LCB design means . . . .

- Increased throughput – 100% Duty Cycle Operation
- High acceleration (20 m/s^2) and velocity (8 m/s)
- Two profile sizes (LCB040 & LCB060)
- Dry running, low friction bearings provide long, reliable life
- Lower noise generated during operation compared to other bearing type
- High static load capacity - Well suited to withstand pressing forces at standstill
- Short, medium, and long carriages available to optimize moment load capacity

LCB Markets and Applications

The LCB series rodless actuator has proven to be a robust and reliable solution for numerous motion control applications across many markets and industries. Listed below are some examples of where and how the LCB series rodless actuator has been successfully applied.

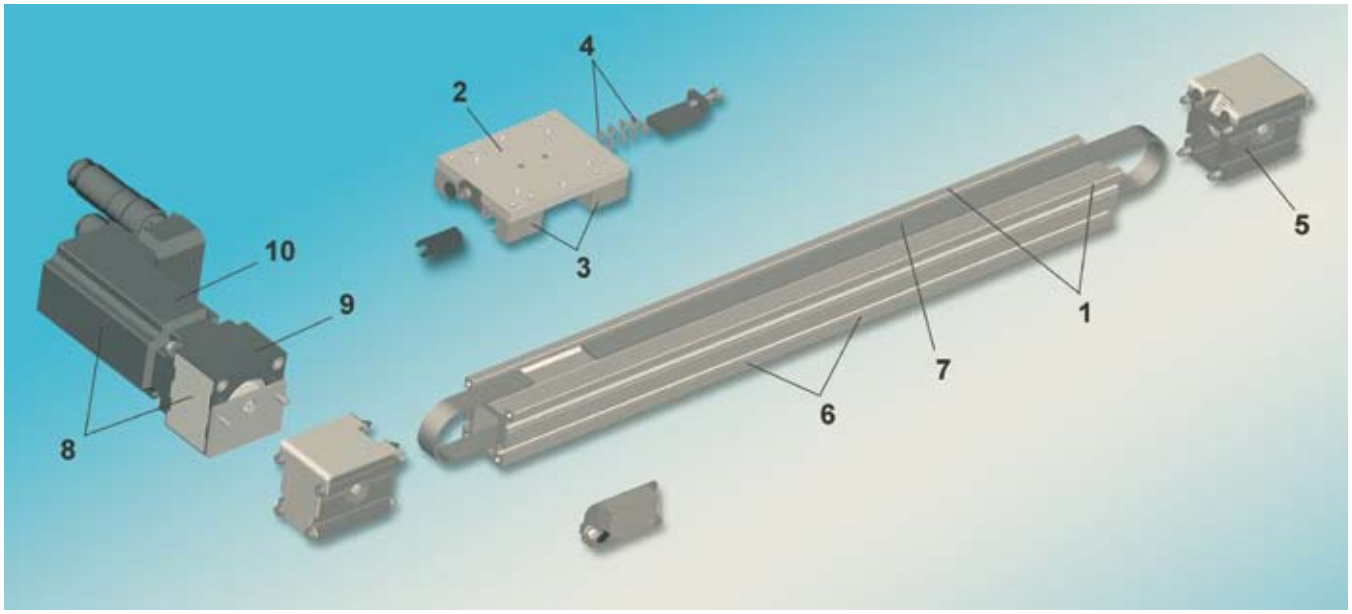
Markets and Industries Served

Packaging	Life Sciences	Pharmaceutical
Food & Beverage	Medical	Research & Testing
Automotive	Conveyor	Semiconductor
Tire & Rubber	Computer / Electronics	Factory Automation

Application Examples

Discrete / Multi-Point Positioning	Small Area Gantry	Complex Motion Control
Vertical Stackers / Elevator Lift	Pick & Place	Flying Cut-to-Length
Backstop Index	Contoured Glue Dispensing	Crosscutting / Slitting
Transfer Unit	Part Load & Unload	Profile Contouring
Scanning / Inspection	Labeling / Wrapping	High Speed Winding Traverse
Pneumatic Rodless Replacement	Storage & Retrieval	Linear Motor Alternative

Construction



1 Guide

The external sliding guide is incorporated as part of the aluminum profile. It is unnecessary to adjust two separate guiding rails. The guide is maintenance free with integrated dry-film lubricant.

2 Sliding Carriage

The sliding carriage is available in three lengths. With a longer sliding carriage, there is greater distance between the sliding blocks. This improves the load capacity with respect to yaw and pitch moments.

3 Sliding Blocks

Low friction sliding blocks provide smooth motion throughout travel. Sliding blocks can be easily changed within 2 minutes without detensioning the timing belt.

4 Spacer Plates

The timing belt of the LCB040 is tensioned directly at the sliding carriage by means of spacer plates.

5 Tensioning Station

On the LCB060, the timing belt is tensioned via tensioning screws at the tensioning station.

6 Profile

The profile is available in two sizes and resistant to flexing. The closed profile provides high torsional stiffness. Profiles are dirt tolerant, chemically and mechanically robust. The compact design means minimum installation space is required.

7 Timing Belt Drive

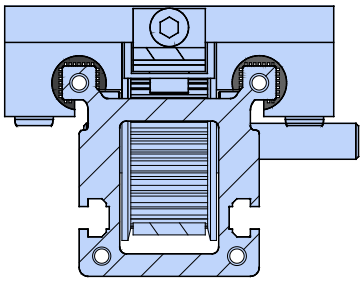
High stiffness and accuracy are provided by the generously-dimensioned timing belt.

8 Drive Options

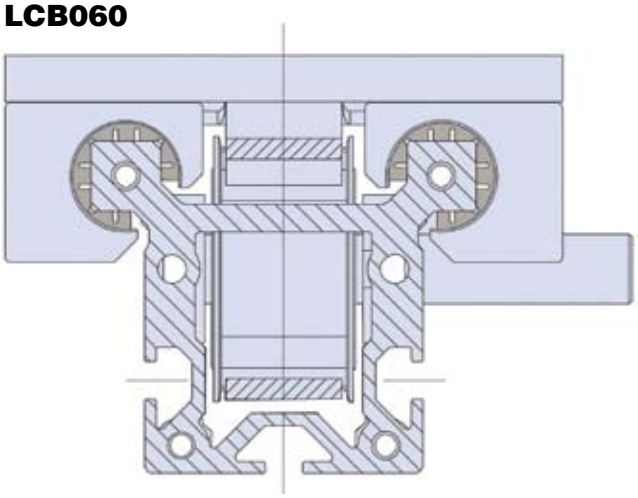
- Linear actuator with free shaft end
- Coupling (9) & gearbox
- Coupling, gearbox & motor
- Coupling & direct drive motor (10)

LCB Series

LCB040

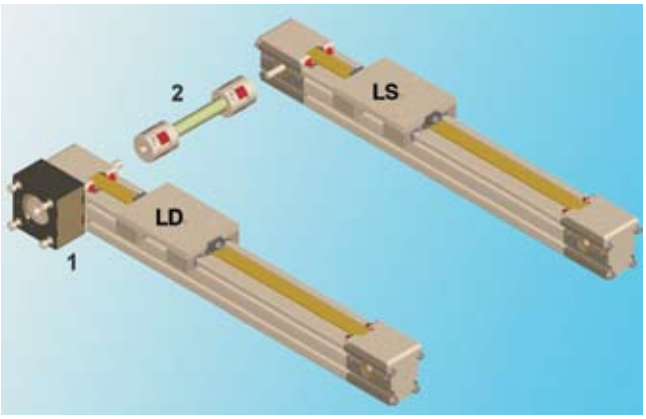


LCB060

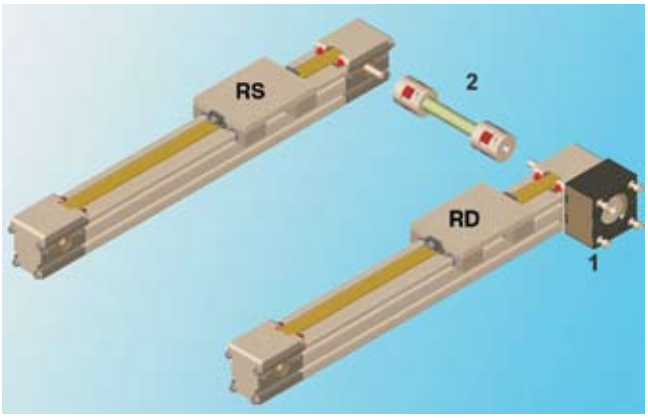


Dual Axis Actuators

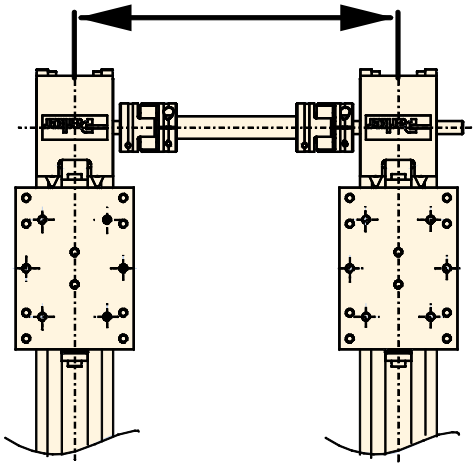
For a dual-axis actuator with the drive on the left side, you need two LCB basic units: 1) the left unit with drive option LDN and 2) the right unit with drive option LSN.



For a dual-axis actuator with the driveon the right side, you need two LCB basic units: 1) the right unit with drive option RDN and 2) the left unit with drive option RSN.



Center Distance
(from center line to center line)



For a dual-axis actuator, two LCB basic units and a shaft corresponding to the desired center-distance are required. Parker will deliver the two basic units (with mounted couplings – if this was ordered) and a separate shaft kit. See page 88 for shaft kit ordering.

LCB Specifications

LCB Overview	Units	LCB040	LCB060
Performance Limits			
Max Thrust (Belt Traction Force) F_x	lbf (N)	36 (160)	126 (560)
Max Normal Load F_z	lbf (N)	13 (60)	66 (295)
Max Speed	in/s (m/s)	315 (8.0)	315 (8.0)
Max Acceleration	in/s² (m/s²)	787 (20)	787 (20)
Max Travel	in (mm)	78 (2.0)	216 (5.5)
System Characteristics			
Pulley Lead (travel distance per rev)	mm/rev	125	170
Pulley Diameter	in (mm)	1.567 (39.79)	2.130 (54.11)
Pulley Tooth Count	# Teeth	25	17
Efficiency	%	90%	90%
Repeatability [1]	in (mm)	±0.008 (±0.2)	±0.008 (±0.2)
Reflected Rotational Inertia			
Short Carriage, 1m travel	oz-in² (kg-cm²)	13.3 (2.44)	80.9 (14.8)
Medium Carriage, 1m travel	oz-in² (kg-cm²)	14.8 (2.72)	86.2 (15.8)
Long Carriage, 1m travel	oz-in² (kg-cm²)	16.4 (3.00)	91.2 (16.7)
Additional Inertia per 1m travel	oz-in² (kg-cm²) / m	2.0 (0.37)	27.3 (5.00)
Unit weight, Zero Stroke			
Short Carriage, S	lb (kg)	3.24 (1.47)	9.55 (4.33)
Medium Carriage, M	lb (kg)	3.66 (1.66)	10.38 (4.71)
Long Carriage, L	lb (kg)	4.08 (1.85)	11.24 (5.10)
Additional Travel Weight	lb (kg) / m	5.39 (2.45)	11.46 (5.21)
Carriage Weight			
Short Carriage, S	lb (kg)	0.86 (0.39)	3.11 (1.41)
Medium Carriage, M	lb (kg)	1.01 (0.46)	3.37 (1.53)
Long Carriage, L	lb (kg)	1.17 (0.53)	3.66 (1.66)

1. Repeatability is unidirectional, achieved under ideal conditions and slow speeds. Actual repeatability may vary with the application.

Operating Temperature Range

0° to 60°C (32° to 140°F)

Available Stroke Lengths

Stroke	250	300	350	400	450	500	600	700	800	900	1000	1250	1500	1750	2000
LCB040	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
LCB060	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Stroke	**2250**	**2500**	**2750**	**3000**	**3250**	**3500**	**3750**	**4000**	**4250**	**4500**	**4750**	**5000**	**5250**	**5500**	
LCB060	x	x	x	x	x	x	x	x	x	x	x	x	x	x	

LCB040 Life vs. Load

The diagrams are valid solely for guidance and under ideal operating conditions.

The diagrams are based on a trapezoidal motion sequence with 3 identically long sections for acceleration, constant travel and deceleration.

The diagrams are based on defined payloads of 1 kg. Shown are the respective mass centroids with their typical load arms.

Actuator Life

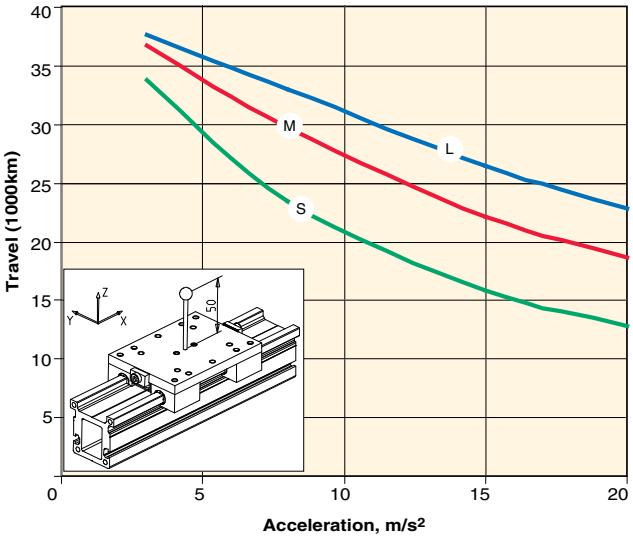
Naturally, the sliding guiding has already a slight play under new condition, so that the guiding does not jam and the sliding carriage moves smoothly. The play is measured as a gap for each slide and is approx. 0.1 to 0.2mm in normal direction and at the sides.

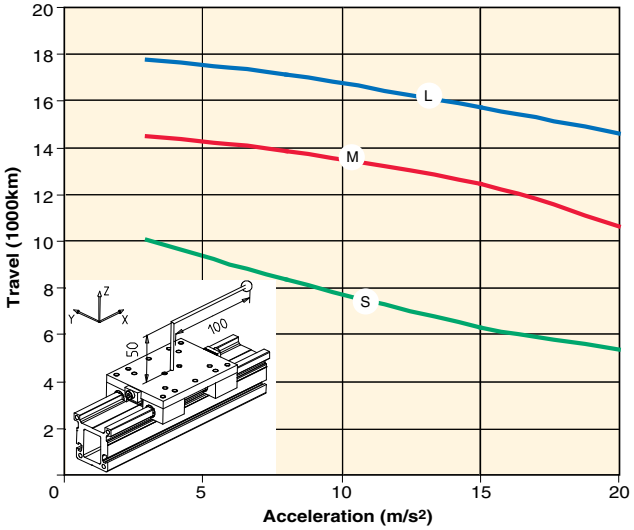
During the operation, the play increases according to the loads shown in the diagrams.

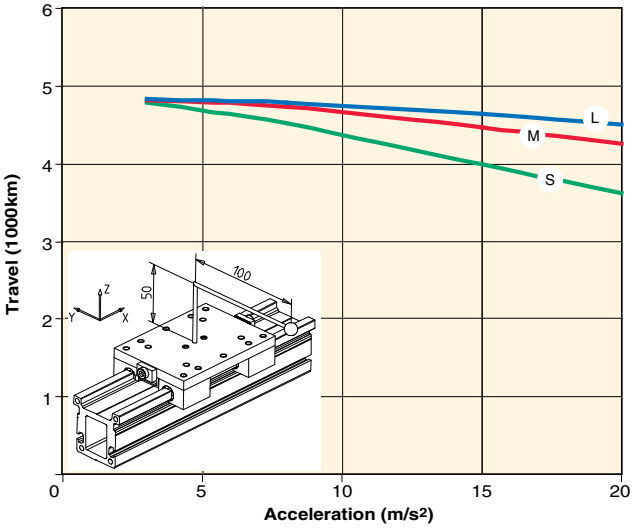
If a certain state of wear is reached (the wear limit is 0.5mm for the LCB040), the slides can be exchanged easily within a few minutes. After the exchange, a new lifetime cycle begins according to the diagrams.

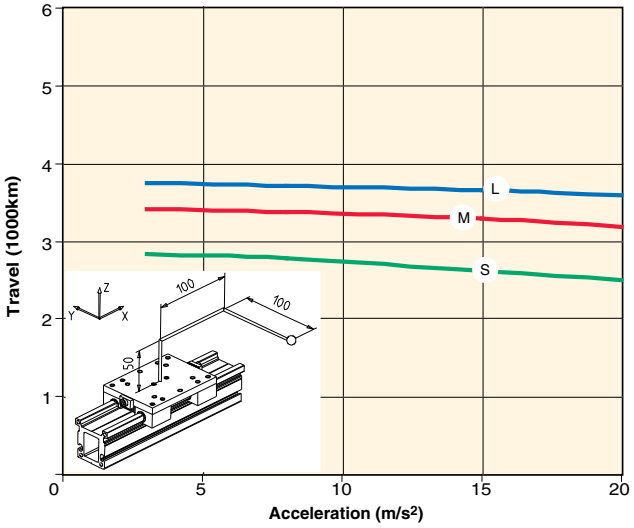
Using the Diagrams

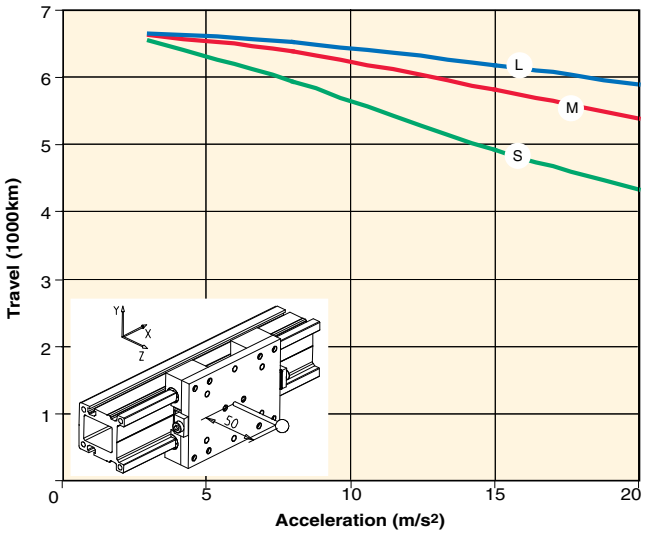
Life is shown for each length of carriage: short (S), medium (M) and long (L). The diagrams can be interpolated with respect to lifetime and extrapolated with respect to load. (for example: halved operational performance results in halved wear, doubled load will result in halved mileage in km).

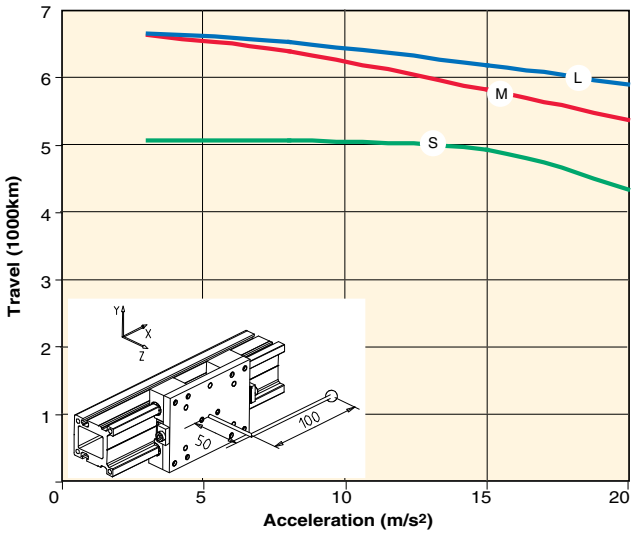


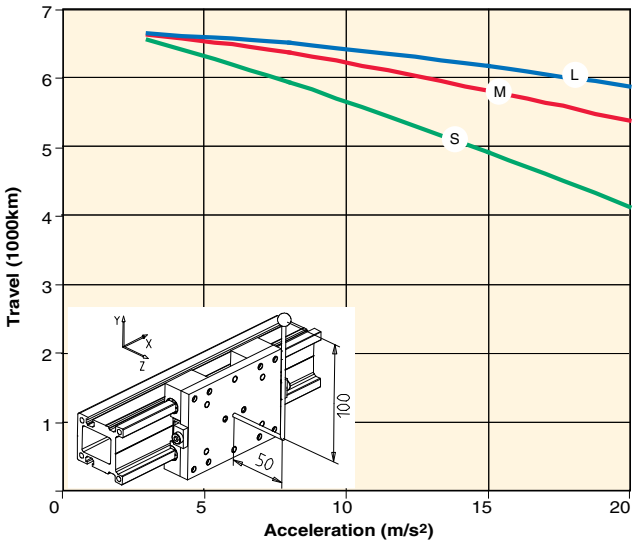


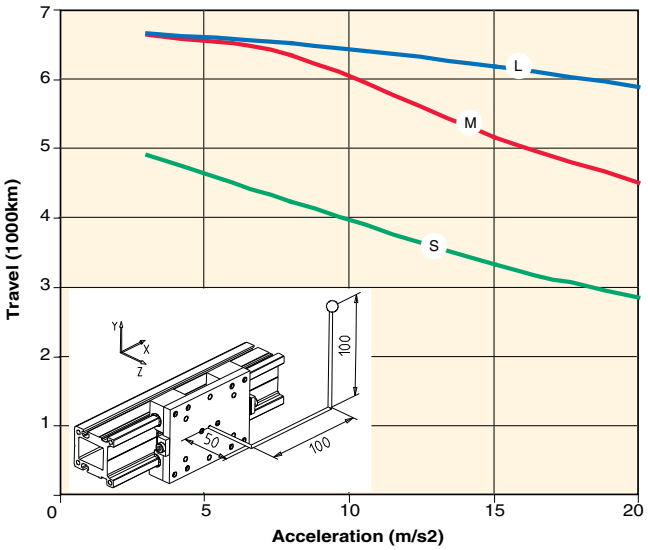


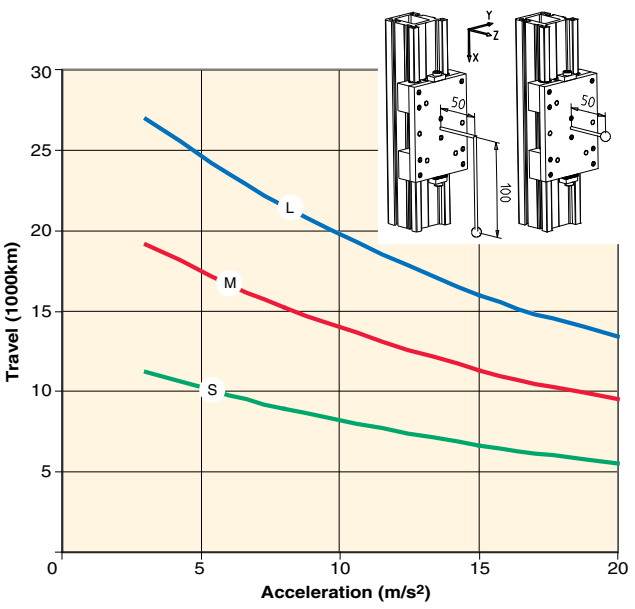


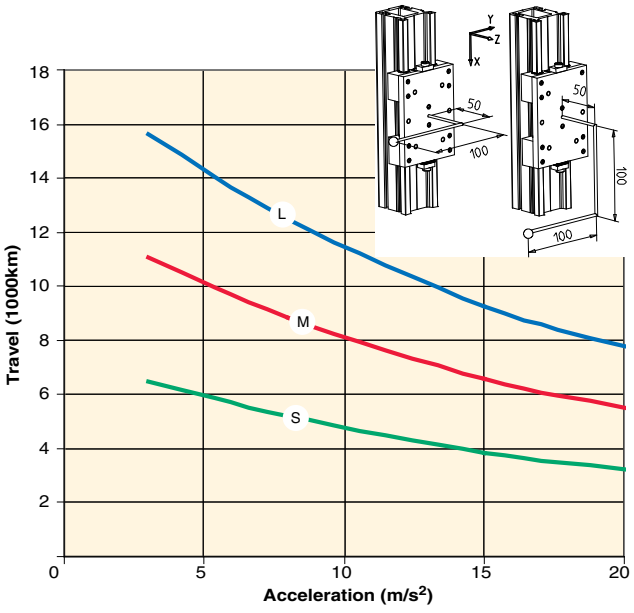

Travel (1000km)
Acceleration (m/s²)
L
M
S
50


Travel (1000km)
Acceleration (m/s²)
L
M
S
50
100


Travel (1000km)
Acceleration (m/s²)
L
M
S
50
100


Travel (1000km)
Acceleration (m/s2)
L
M
S
50
100
100


Travel (1000km)
Acceleration (m/s²)
L
M
S
50
50
100


Travel (1000km)
Acceleration (m/s²)
L
M
S
50
50
100
100

LCB Series

LCB060 Life vs. Load

The diagrams are valid solely for guidance and under ideal operating conditions.

The diagrams are based on a trapezoidal motion sequence with 3 identically long sections for acceleration, constant travel and deceleration.

The diagrams are based on defined payloads of 5 kgs.

Shown are the respective mass centroids with their typical load arms.

Actuator Life

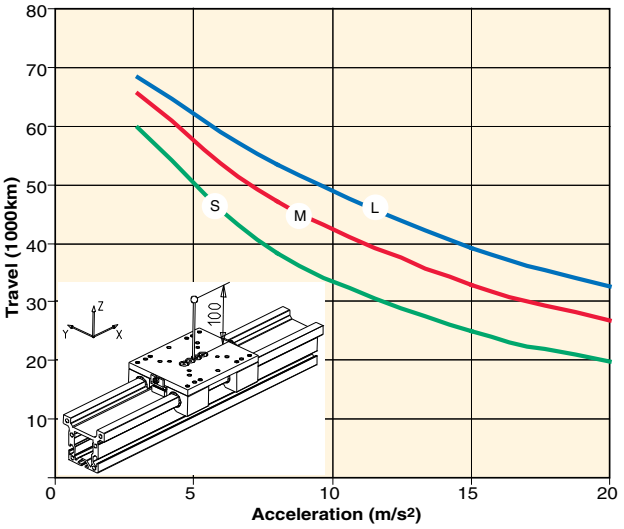
Naturally, the sliding guiding has already a slight play under new condition, so that the guiding does not jam and the sliding carriage moves smoothly. The play is measured as a gap for each slide and is approx. 0.1 to 0.2mm in normal direction and at the sides.

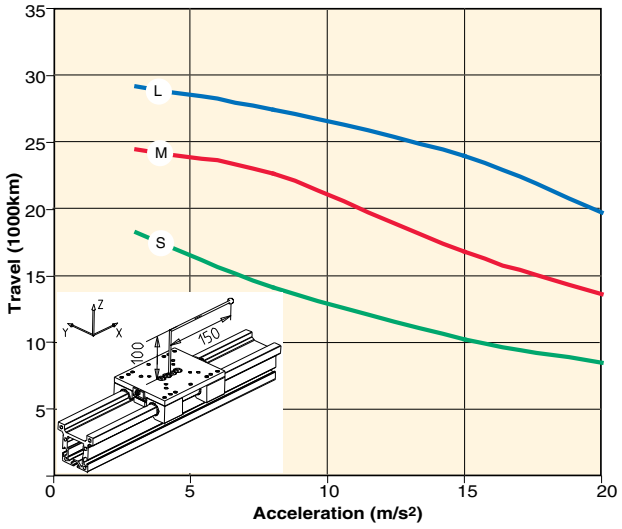
During the operation, the play increases according to the loads shown in the diagrams.

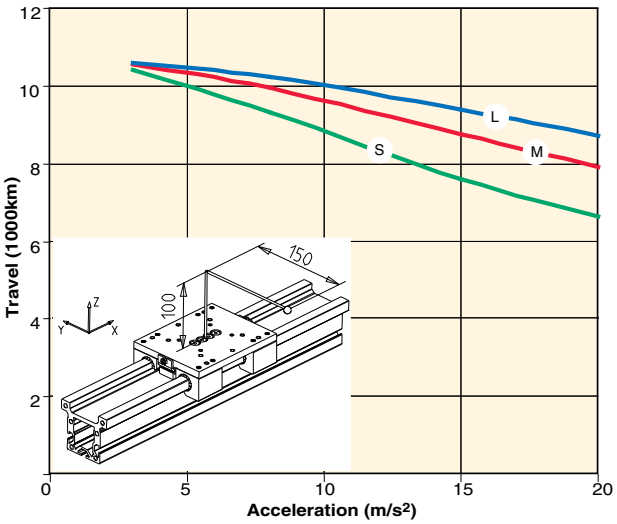
If a certain state of wear is reached, at the lastest however at the wear limit (1.0mm for the LCB060), the slides can be exchanged easily within a few minutes. After the exchange, a new lifetime cycle begins according to the diagrams.

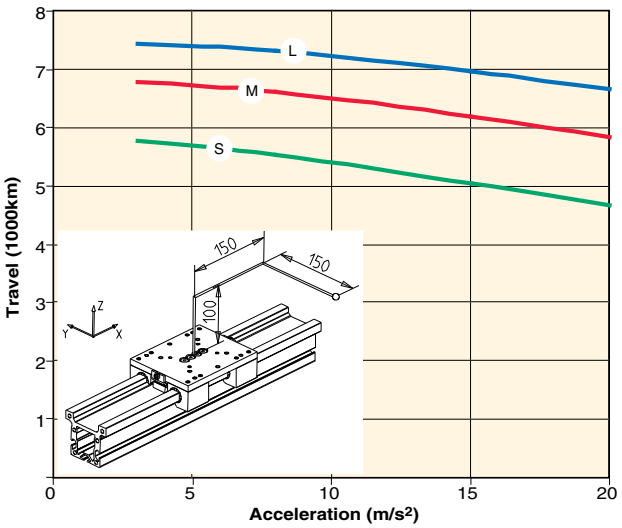
Using the Diagrams

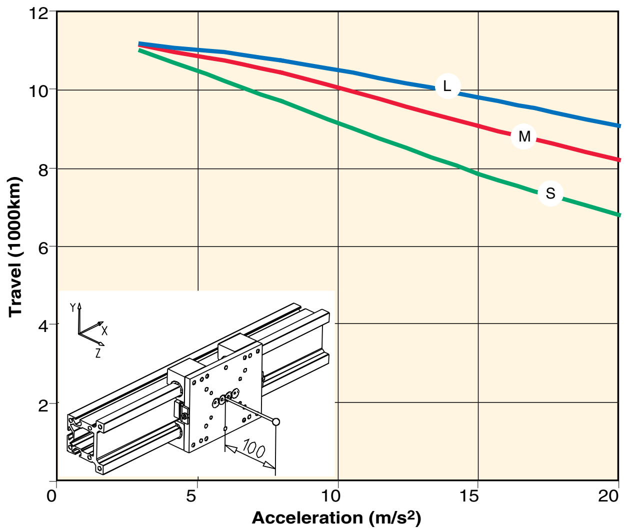
Life is shown for each length of carriage: short (S), medium (M) and long (L). The diagrams can be interpolated with respect to lifetime and extrapolated with respect to load. (for example: halved operational performance results in halved wear, doubled load will result in halved mileage in km).

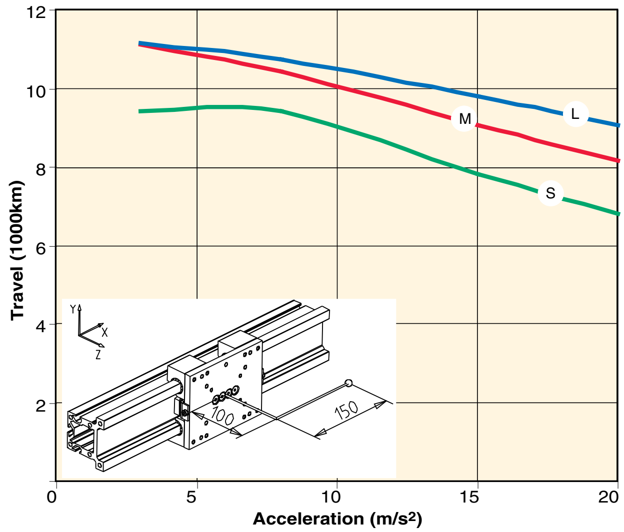


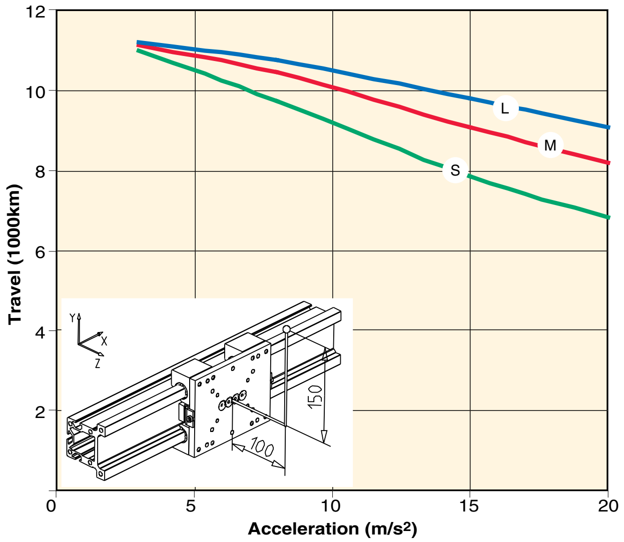


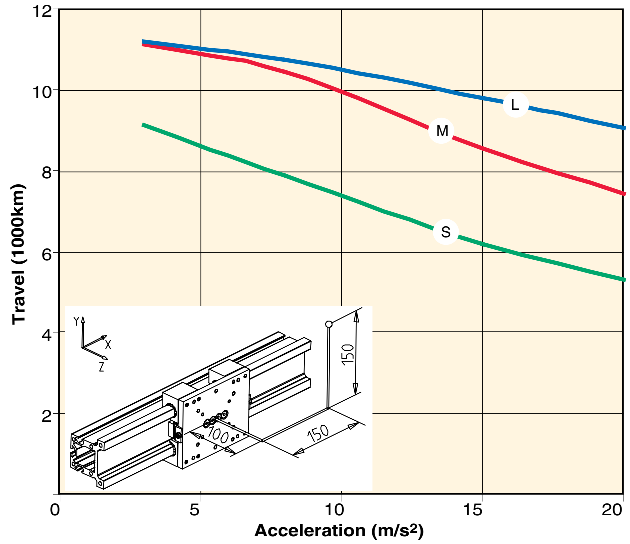


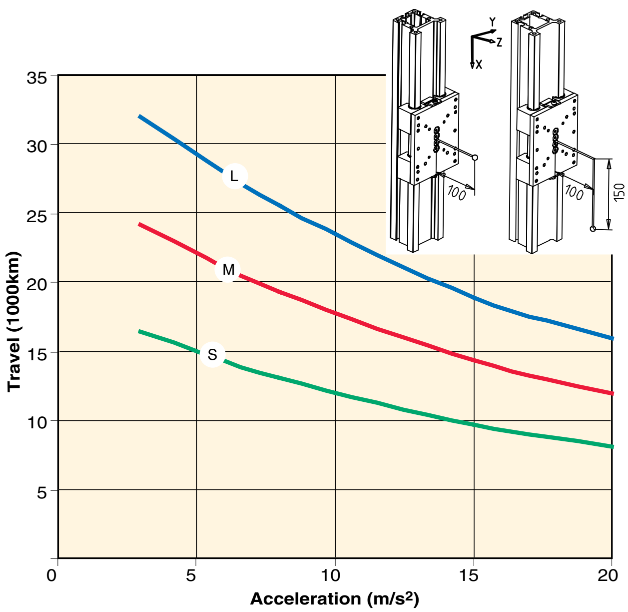


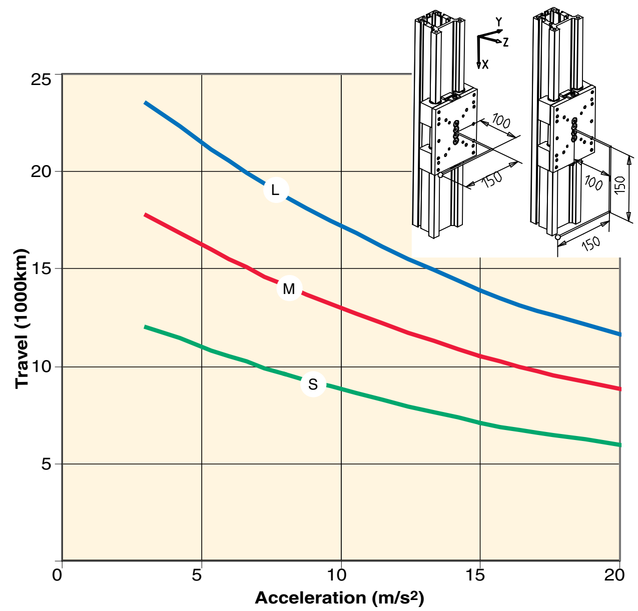

Travel (1000km)
Acceleration (m/s²)
L
M
S
100


Travel (1000km)
Acceleration (m/s²)
L
M
S
100
150


Travel (1000km)
Acceleration (m/s²)
L
M
S
100
150


Travel (1000km)
Acceleration (m/s²)
L
M
S
100
150
150

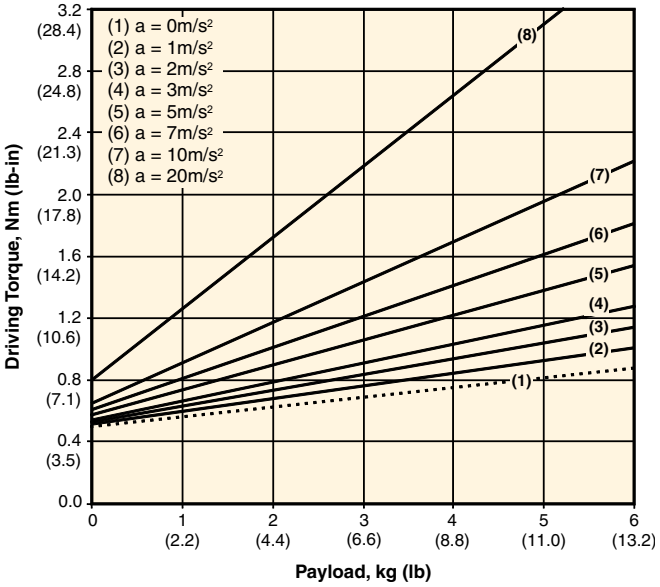

Travel (1000km)
Acceleration (m/s²)
L
M
S
100
100
150


Travel (1000km)
Acceleration (m/s²)
L
M
S
100
150
100
150
150

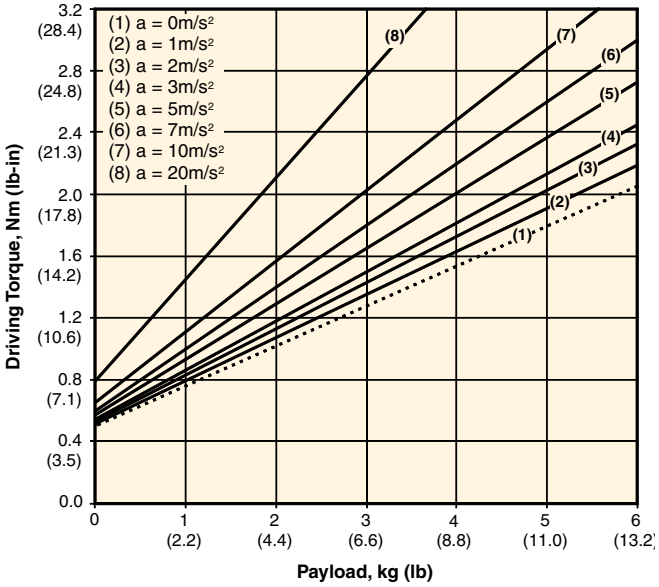
LCB Drive Torque Requirements

The graphs include both acceleration and friction forces.

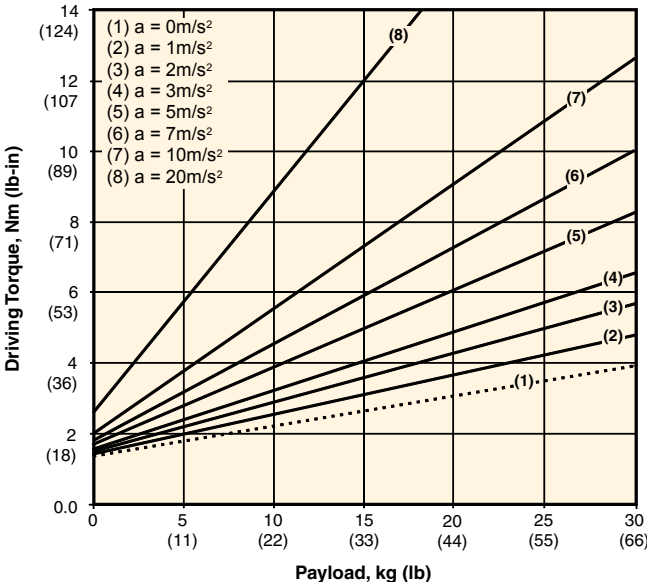
LCB040 – Horizontal Mounting Position



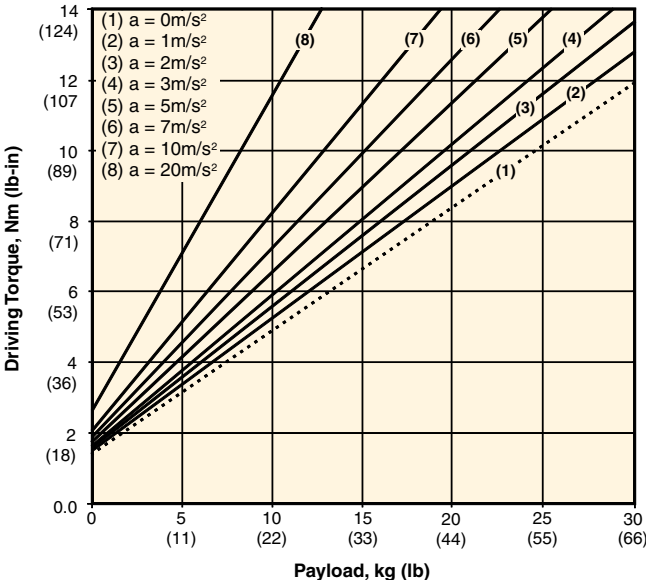
LCB040 – Vertical Mounting Position



LCB060 – Horizontal Mounting Position



LCB060 – Vertical Mounting Position



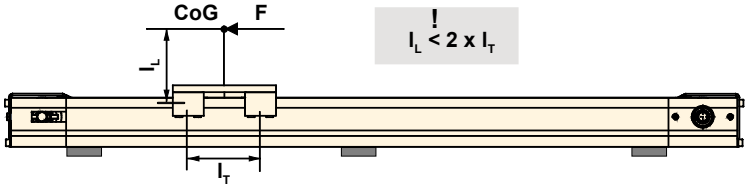
Location of Mass Barycenter or Point of Force Application

2:1 Rule

Drawing shows example of the pitch moment. Also valid for roll and yaw moments respectively.

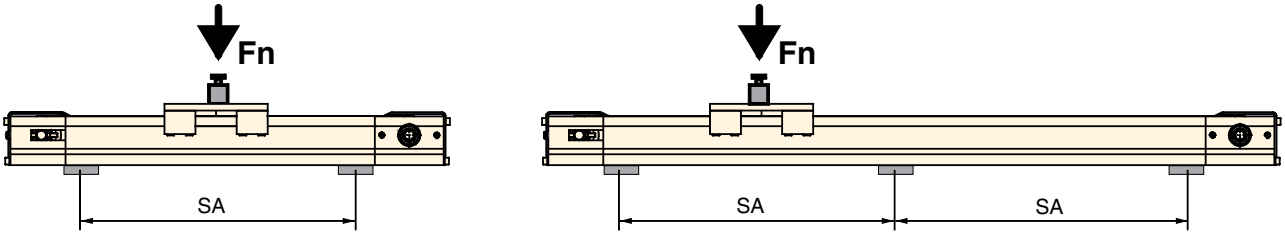
l_L = Load lever

l_T = Support Lever

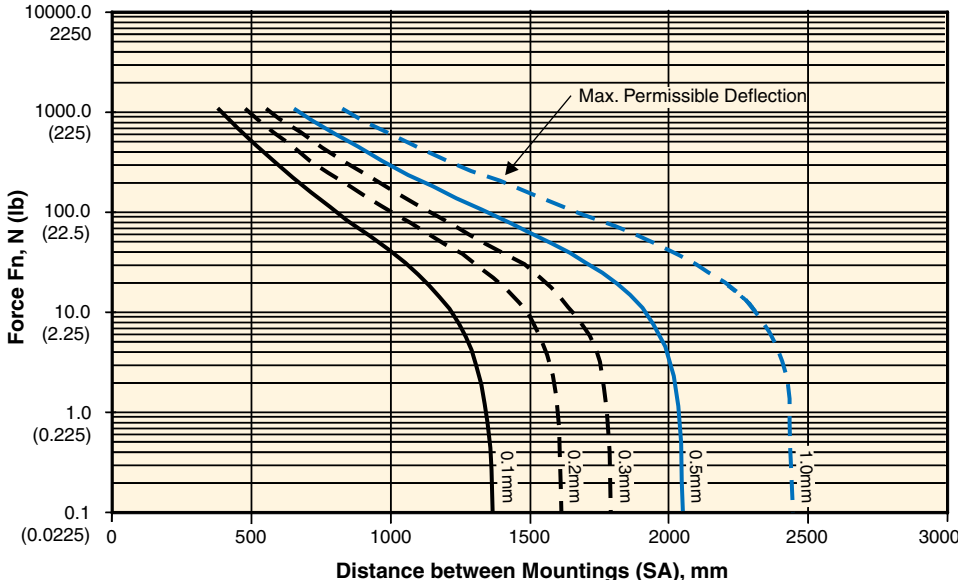


Deflection

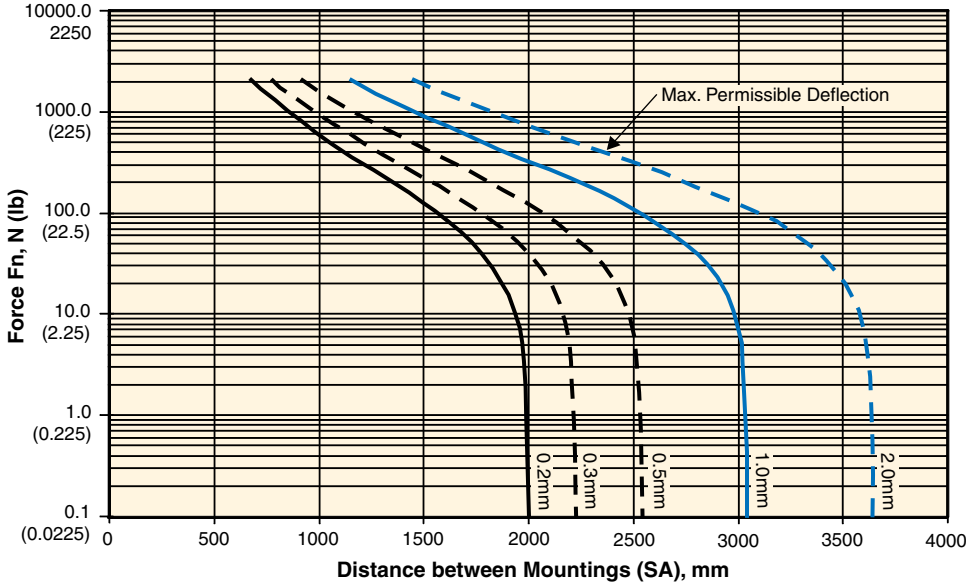
Graphs show deflection vs. distance between mountings and load.



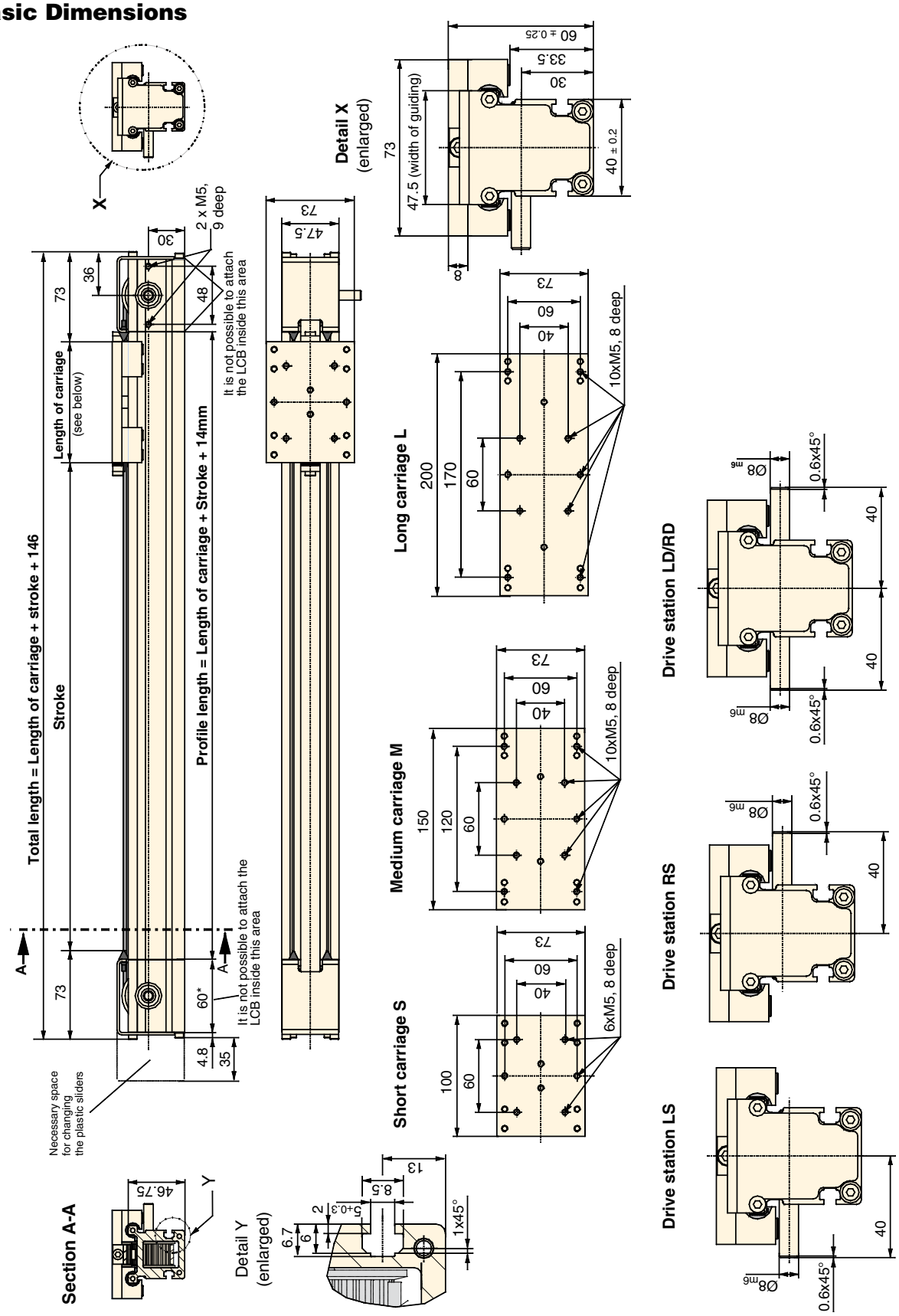
LCB040



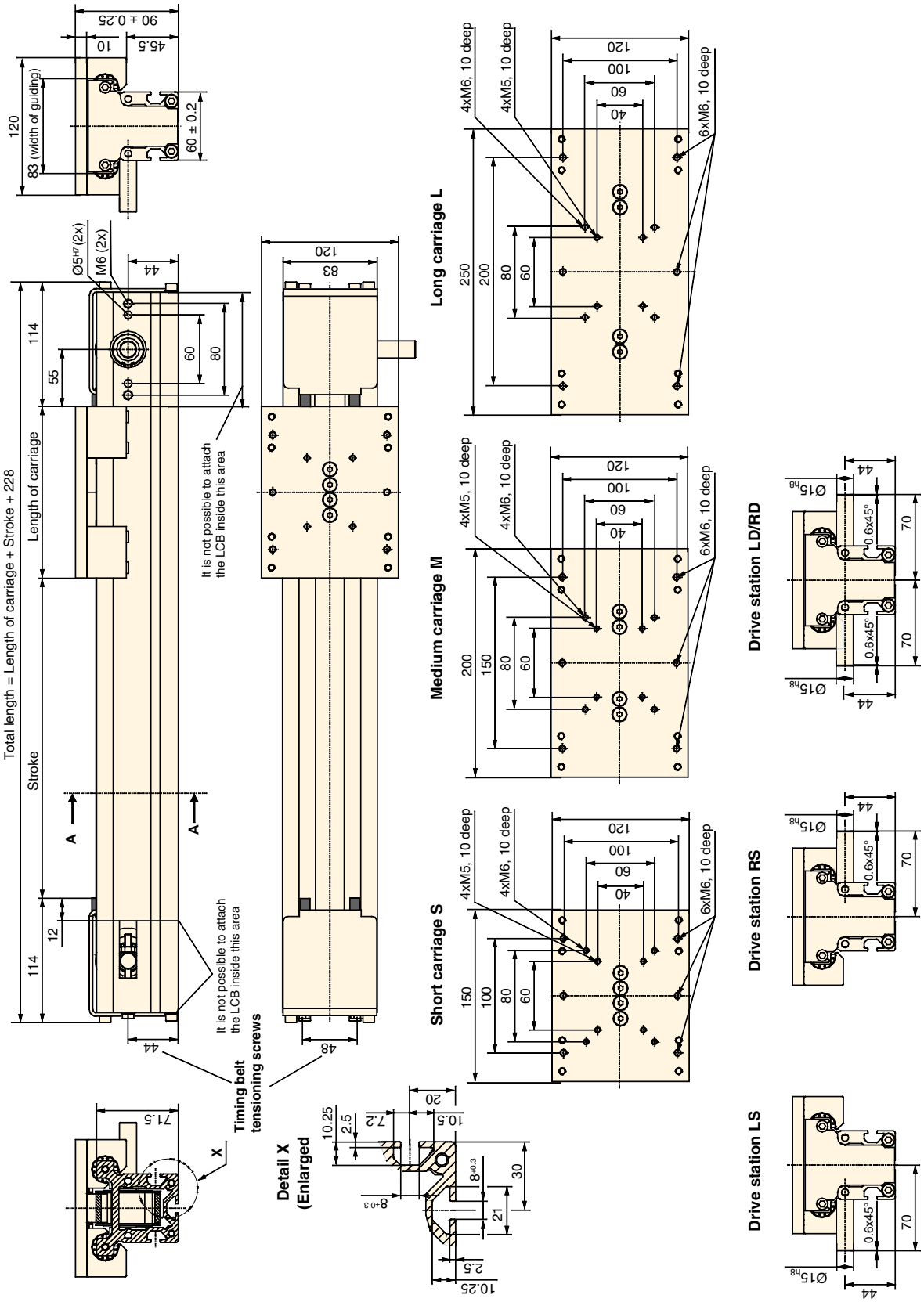
LCB060



LCB040 Basic Dimensions

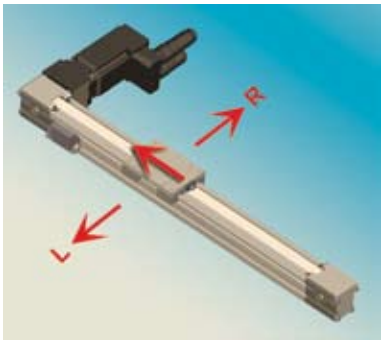


LCB060 Basic Dimensions



Drive Orientation (R, L)

Right/left indication looking from load attachment plate to drive module.

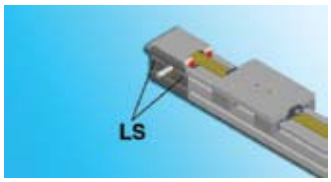


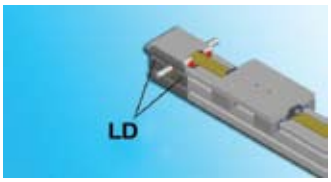
Drive Shaft (S, D)

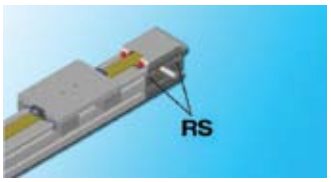
Double shaft (D) models have an additional shaft on the opposite side of the coupling. This is used to attach the shaft for dual-axis actuators.

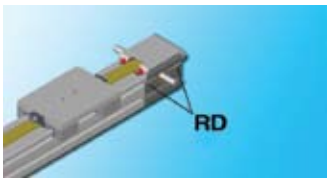
With Free Drive Shaft

The threads to attach the coupling are on the side defined under "Drive Orientation".



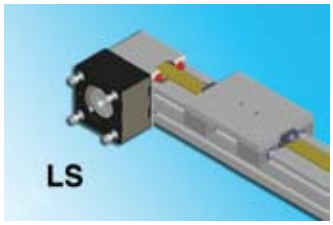


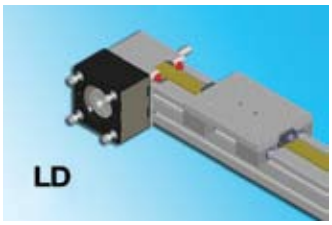


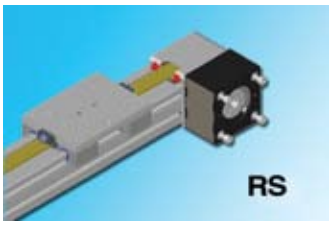


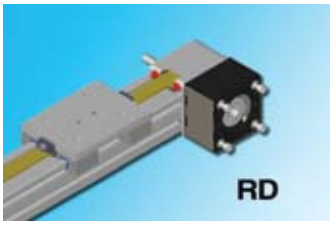
With Attached Coupling Kit

The coupling kit is always mounted in the factory.



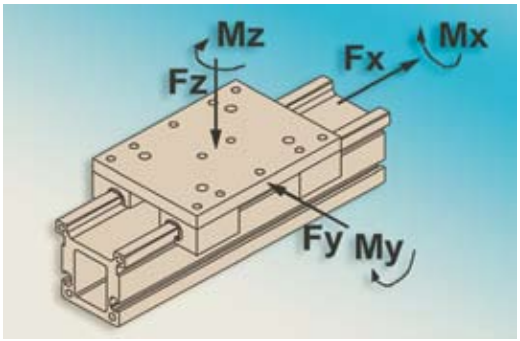






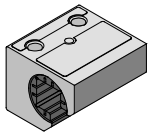
Carriage Length (S, M, L)

All sliding carriages have 4 sliding blocks. On a longer sliding carriage, the load bearing capacity for yaw and pitch moments (My and Mz) is greater.



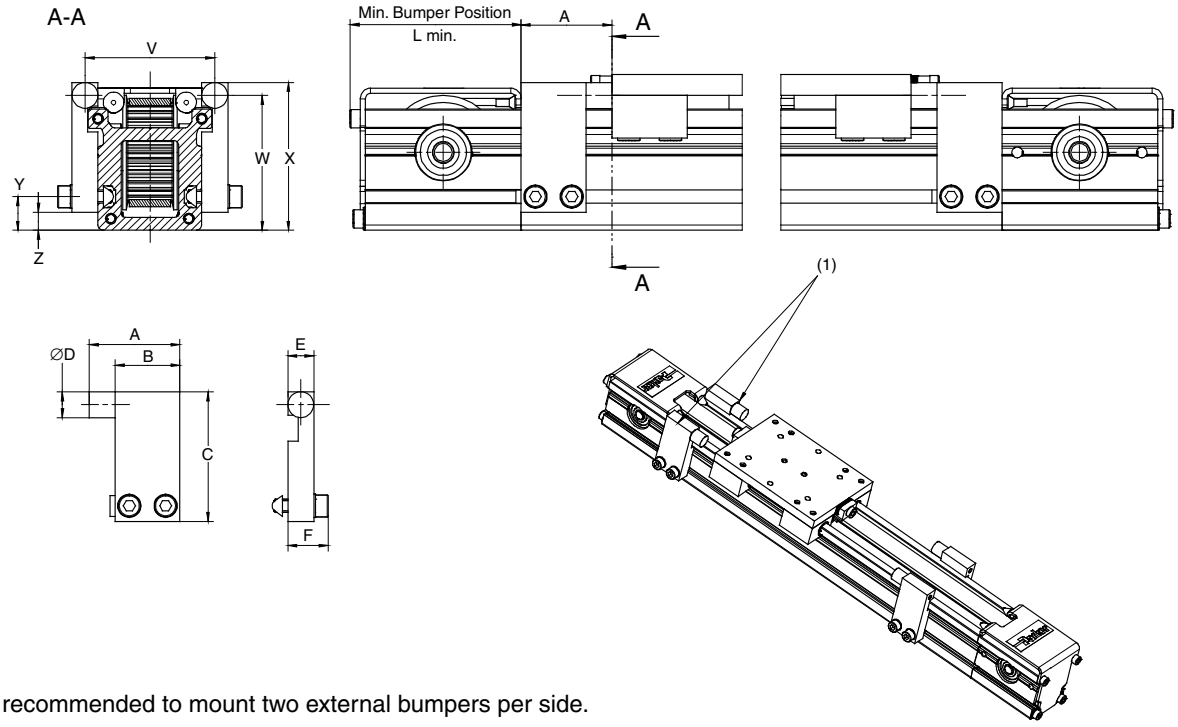
Sliding Blocks

The sliding block is a wearing part. Four (4) pieces are required per linear actuator.



Actuator	Block Part No.
LCB040	127-004016
LCB060	127-006014

External Bumpers



1) It is recommended to mount two external bumpers per side.

Actuator Model	Part Number	Part Number Stainless
LCB040	510-001445	510-001495
LCB060	510-001645	510-001695

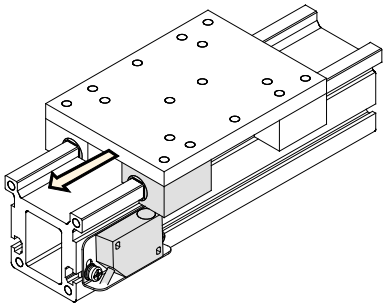
Dimensions

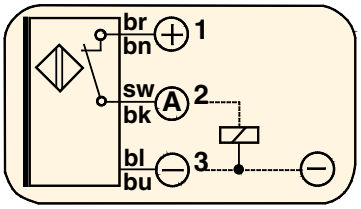
Actuator Model	L Min	A	B	C	ÆD	E	F	V	W	X	Y	Z
LCB040	66	35	25	50	10	10	15.6	50	52	57	13	7
LCB060	97	55	40	85	15	20	26.7	80	82.5	90	20	5

Electrical Limit Switches

Specifications

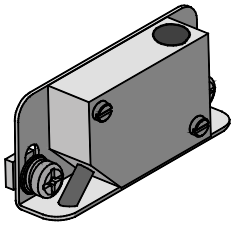
Electrical Characteristics	
Rated Voltage	24VDC
Voltage Range	10...35VDC
Supply Current	< 15mA
Maximum Load Current	300mA
Residual Voltage	< 2.5VDC
Max. Switching Frequency	2 kHz
Connecting Cables	3 x 0.25mm2
Technical Data	
Switching Distance	2mm / 4mm ± 10%
Switch Hysteresis	> 1%...< 15%
Repeatability	0.01mm
Temperature Drift	< 10%
Ambient Temperature	-25°C to +70°C
Protection Class	IP67
Cable Length	6m

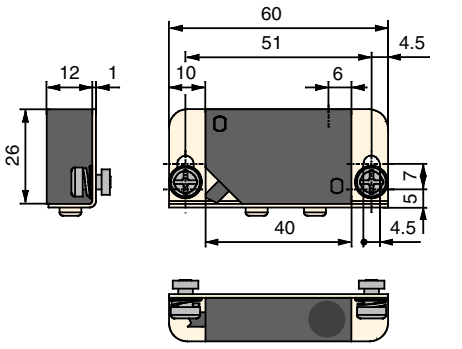




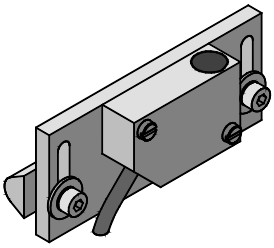
1 PNP normally closed contact
2 Load
3 Load

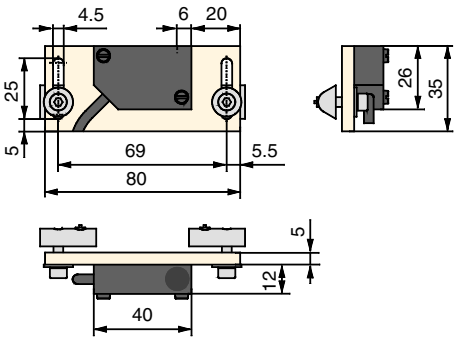
LCB040





LCB060





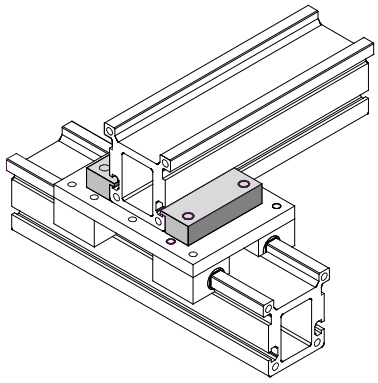
Ordering Information

Type	Description	Part Number
LCB040	NPN normally closed contact with 6m cable and fixing material	510-001435
	NPN normally open contact with 6m cable and fixing material	510-001436
	PNP notmally closed contact with 6m cable and fixing material	510-001437
	PNP normally open contact with 6m cable and fixing material	510-001438
LCB060	NPN normally closed contact with 6m cable and fixing material	510-001635
	NPN normally open contact with 6m cable and fixing material	510-001636
	PNP notmally closed contact with 6m cable and fixing material	510-001637
	PNP normally open contact with 6m cable and fixing material	510-001638

Clamping Profiles

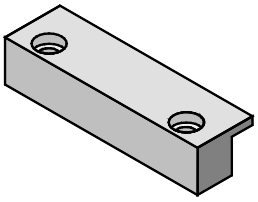
The toe clamps are used in conjunction with the standard load attachment plate to rapidly install and attach various conbinations of linear actuators. Two coamping profiles are needed to mount an LCB on a flange plate.

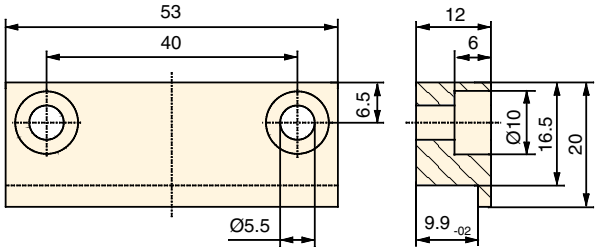
The clamping profiles may not be used in the range of the drive or of the clamping station.



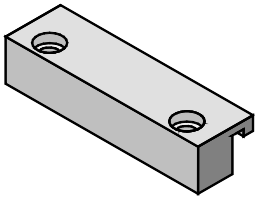
Actuator	Part Number
LCB040	500-000910
LCB060	500-000905

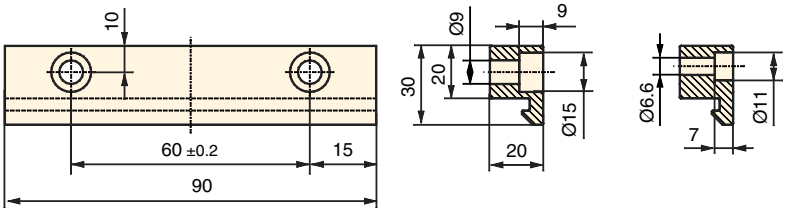
LCB040





LCB060





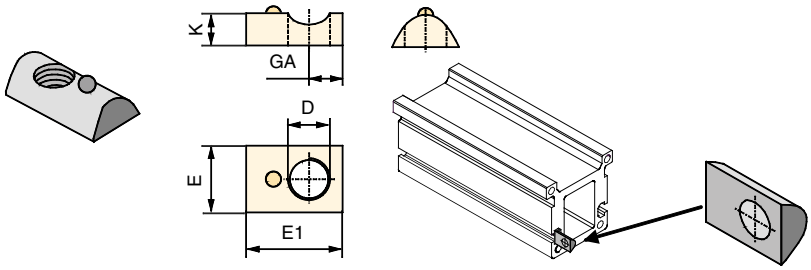
T-Nuts and Bolts

The T-nuts and bolts are used to attach external components to the T-slots of the profile.

Actuator	Description		D	E	i1	K	GA	L	Part Number
LCB040	T-Nut		M4	8	11.5	4	4	—	127-004020
			M5	8	11.5	4	4	—	127-004021
	Square Nut*	DIN 562-M4	M4	7	—	2.2	—	—	135-700001
		DIN 562-M5	M5	8	—	2.7	—	—	135-700003
	Hexagon Nut*	DIN 934-M4	M4	7	—	2.9	—	—	135-700600
		DIN 934-M5	M5	8	—	3.7	—	—	135-700700
LCB060	T-Bolt	DIN 787 M8x8x25	M8	13	13	6	—	25	131-700001
		DIN 787 M8x8x32	M8	13	13	6	—	32	131-700002
		DIN787 M8x8x40	M8	13	13	6	—	40	131-700003
	T-Nut		M4	13.7	22	7	7.5	—	127-006015
			M5	13.7	22	7	7.5	—	127-006016
			M6	13.8	23	7.3	5.5	—	400-000033
			M8	13.8	23	7.3	7.5	—	400-000034

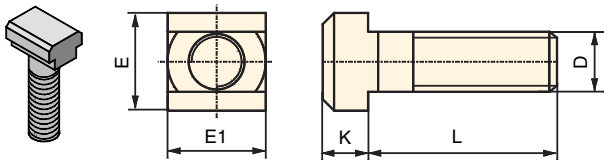
* Square and hexagon nuts should only be used for lightly-loaded attachments.

T-Nuts



T-Slot Bolts and Nuts

DIN 562 DIN 934



DIN 787

LCB Ordering Information

LCB	040	R	S	P04	F13	L	0750	A
Series	Profile Size	Drive Orientation	Drive Shaft	Gearbox	Motor	Carriage Style	Stroke	Design Level

Code	Profile Size
040	56mm
060	80mm

Code	Drive Orientation
R	Drive Shaft Right
L	Drive Shaft Left

Code	Drive Shaft
S	Single Shaft
D	Double Shaft

Code	Gearbox Option [1]
0	No Gearbox
A	PX23
D	PX34
P	PV23FE
Q	PV34FE

Code	Gearbox Ratio
00	Flange Only [2]
03	3:1
04	4:1
05	5:1
07	7:1
10	10:1
15	15:1
20	20:1
25	25:1
30	30:1
40	40:1 (PS only)
50	50:1
70	70:1
A0	100:1

Code	Motor Option [1]
A	S57, ES2x - Round Shaft
B	S83, ES3x - Round Shaft
C	HV34, LV34 - Shaft Flat
D	HV23, LV23 - Shaft Flat
E	SM23x***-T*** (x = 1, 2, 3)
F	BE23***-K***
G	BE34***-K***
H	SMN0602***-K***
J	SMN0822***-K***
K	SMN1002***-K***
L	SMN1152***-K***
N	MPP092****-K***
P	MP100****-K***
Q	MPP115****-K***

Code	Motor Model [3]
00	Motor Flange only
01-99	Reference Motor Section for Specific Models (01-99)

Code	Carriage Style
S	Short Sliding Carriage
M	Medium Sliding Carriage
L	Long Sliding Carriage

Code	Standard Stroke [4]
xxxx	See table on page 73 for available travel lengths.

1 Not all motor/gearbox options physically fit on all cylinder sizes and mounting styles. Reference mounting matrix to determine suitable combinations.
2 When combined with Gearbox Option "0" (no gearbox), this option is direct mount with no flange included.
3 Reference Motor Section for motor compatibility and coding.
4 Stroke is measured bumper to bumper.

Maximum Standard Stroke Length
(Consult factory for longer lengths)

Model	Maximum Travel
LCB040	2000mm
LCB060	5500mm

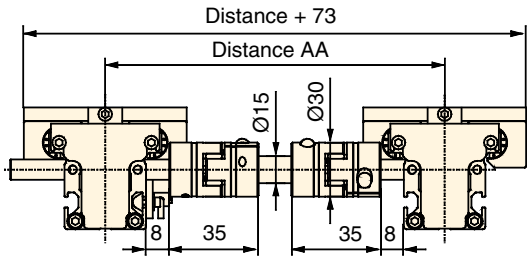
LCB	040	W	0750
Series	Profile Size	Connecting Shaft	Center Distance

Code	Profile Size
040	56mm
060	80mm

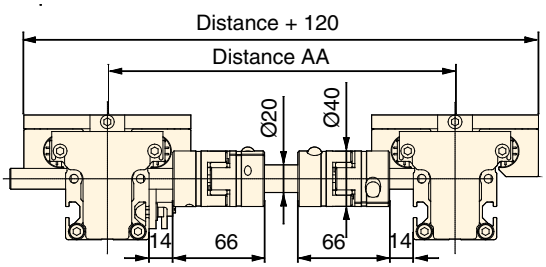
Code	Center Distance
xxxx	Distance from center line to center line in mm.

Dual-Axis Actuator Dimensions

LCB040



LCB060



Center Distances (mm)

Center Distance	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850
LCB040	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
LCB060	—	—	x	x	x	x	x	x	x	x	x	x	x	x	x
Center Distance	**900**	**950**	**1000**	**1050**	**1100**	**1150**	**1200**	**1250**	**1300**	**1350**	**1400**	**1450**	**1500**		
LCB040	x	x	x	—	—	—	—	—	—	—	—	—	—		
LCB060	x	x	x	x	x	x	x	x	x	x	x	x	x		

LCB Application Fax Form

Fax completed form to (330) 334-3335 or email to actuatorsales@parker.com

Contact Information:

Name _____ Phone _____

Company _____ email _____

City, State, Zip _____

Application Sketch

NOTES:

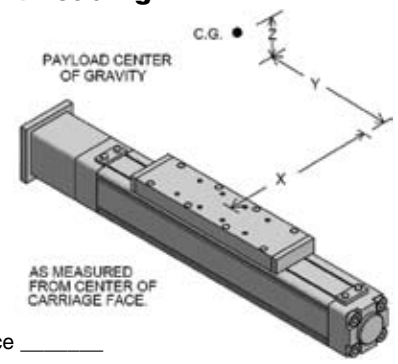
Please include the critical dimensions in your sketch.

In order to achieve the best solution, it is important that you provide as much information as possible.

Motion Profile

Moves	Distance (Stroke)	Time	Thrust or Load	Dwell
First Motion				
Second Motion				
Third Motion				
Fourth Motion				

Moment Loading



X distance _____

Y distance _____

Z distance _____

Environmental Requirements

1. Operating Temperature

Max _____ Min _____

2. Comtanimation (check one)

☐ Particle ☐ Liquid

Type: _____

3. Special Considerations _____

_____

_____

Application Requirements:

1. Overall Stroke (add 25mm per end minimum) _____

2. Cylinder Orientation (check one)

☐ Horizontal ☐ Inverted ☐ Side Mount

☐ Vertical ☐ Angle: Degree _____

3. Load/Tooling Weight _____

4. Repeatability Requirements _____

☐ Unidirectional ☐ Bidirectional

5. Is the load externally guided? (check one)

☐ Yes ☐ No

If yes, how? _____

6. Is the actuator body supported? (check one)

☐ Yes ☐ No

If yes, how? _____

7. Life Requirements (cycles, distance or years)

Hours per day _____ Days per year _____

8. Special Considerations _____

_____

_____

_____

Please attach another sheet if more room is needed.

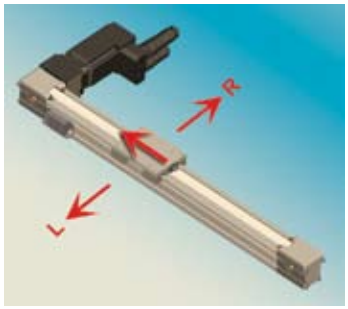
LCB Series

LCB Application Fax Form

Actuator Type and Mounting

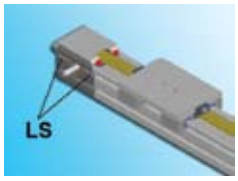
1. Drive Orientation (check one)

☐ Drive Shaft Right
☐ Drive Shaft Left

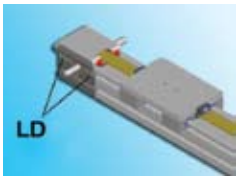


2. Drive Shaft (check one)

☐ Single Shaft



☐ Double Shaft



3. Carriage Style (check one): See

☐ Short Carriage ☐ Medium Carriage ☐ Long Carriage

Motor, Drive and Control Options:

1. Motor Options (check all that apply)

☐ Stepper ☐ Servo
☐ Parker Supplied ☐ Customer Supplied (provide print)
☐ Gearhead

2. Other Options (check one)

☐ Drive ☐ Drive/Controller ☐ Controller

3. Available Line Voltage _____

4. Switches/Sensors (quantity)

End of Travel _____ Home _____

5. Brake Option (check one)

☐ Motor ☐ None

6. Special Options _____

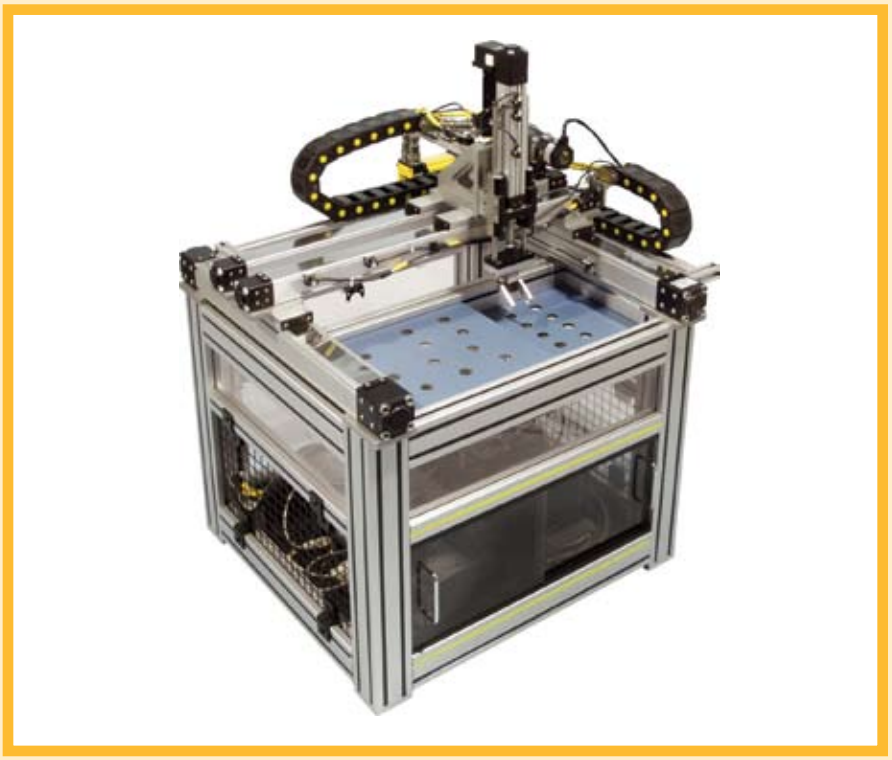
_____

_____

_____

_____

Multi-Axis Systems



Contents

Systems

Parker Hannifin Corporation
Actuator Division
Wadsworth, Ohio USA
Phone: 1-866-PARK-ACT
email: actuatorsales@parker.com
website: www.parker.com/actuator

Multi-Axis Solutions from the Actuator Division

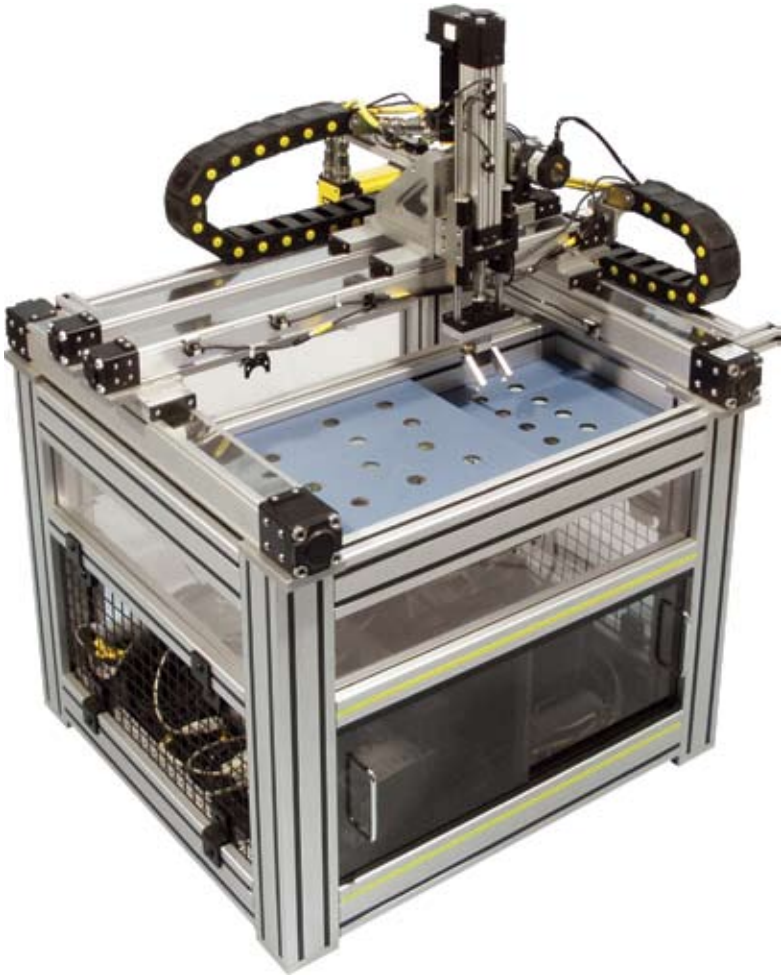
Using Parker Electric Cylinders, Rodless Actuators and Structural Aluminum Framework

Many applications require multi-axis integration rather than a single axis solution. With their modular design, both ET Series Electric Cylinders and ER, ERV and LCB Series Rodless Actuators are well suited to multi-axis connection. The Actuator Division is ready to provide a multi-axis solution to your application by providing the connection hardware in addition to standard and modified actuator products to make integration of the system into the application simple and reliable.

Multi-Axis Features:

- Transition kits for connecting ER Series Rodless Actuators
- Transition kits to connect ET Series Linear Actuators to ER Series Rodless Actuators
- Non-driven Idler Units to provide additional bearing support
- Outrigger bearing units to control deflection and provide additional loading capacity
- Link-shafts to connect belt-driven actuators to a single motor/gearbox

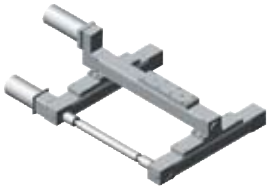
Sample System



Statement of the System Provider: The Actuator Division provides multi-axis actuator systems as unassembled kits, unless agreed to otherwise, with the understanding that the end user is responsible for final field assembly and electronic integration. Each kit will include re-assembly instructions in the form of mechanical assembly drawings.

Using the ET, ER, ERV and LCB actuators as building blocks, Parker can create economical and customized cartesian systems. These work cell-level robotic solutions are ideal for pick-and-place and dispensing applications. Beyond the base system, Parker can integrate pneumatic axes, grippers, vacuum cups, custom structures and guarding.

- Standard or custom configurations available
- Economical robotic solution
- Optional hardware:
  - Cable management
  - Machine base and guarding
  - Pneumatic actuators
  - Vacuum cups and generators



System 1
XX'-Y

A dual actuator X-axis supports a single Y-axis actuator. The dual X-axis may be belt-driven with a linked drive shaft, dual screw drive or driven by one actuator, while the other actuator serves as a non-driven idler.

System 2
XX'-YY'

A dual actuator X-axis supports dual Y-axis actuators. Better suited to large or cumbersome loads.

System 3
X-Z

A single actuator X-axis supports a single Z-axis. The Z-axis may be electromechanical or pneumatic.

System 4
XX'-Z

A dual actuator X-axis suports a single Z-axis. Offers increased rigidity for pick and place applications.

System 5
XX'-Y-Z

A Z-axis is added to System 1. The third axis may be electromechanical or pneumatic and may carry Parker end effector hardware.

System 6
XX'-YY'-Z

A Z-axis is added to System 2. The third axis may be electromechanical or pneumatic and may carry Parker end effector hardware.

Application Considerations for Multi-Axis Systems:

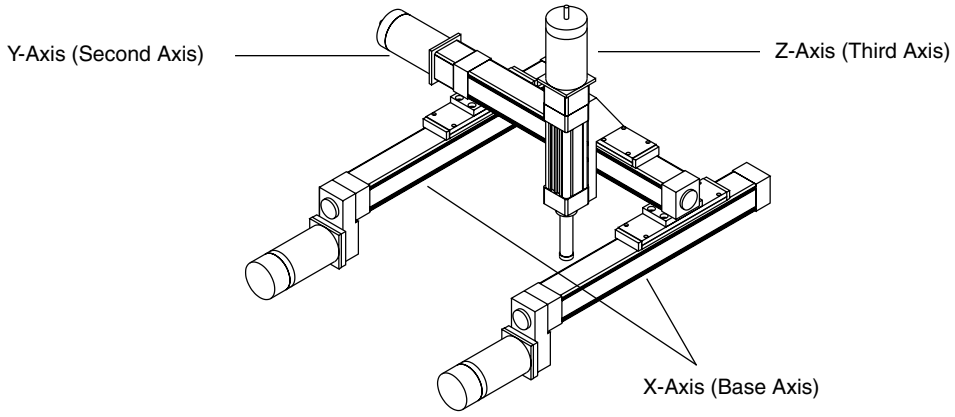
1. Number of Axes of Motion

It is important to understand the operating environment of the motion system and the most cost effective quantity and placement of motion components. It is equally important when ordering to understand the orientation of systems as specified by the Actuator Division.

The X, or Base Axis. The axis which provides the base for all other axes of motion is referred to as the x-axis in all System Type considerations. Regardless of whether the base axis rests on a horizontal or on a vertical surface, the most heavily loaded axis shall be called the x-axis.

The Second Axis. When placed on a base axis and traveling in the same plane, the second axis is referred to as the y-axis. When placed on a base axis and traveling in the plane perpendicular to the base axis plane, the second axis becomes the z-axis, as in System Types 3 and 4. The second axis may be mounted upright, inverted or on its side.

The Third Axis. The third axis is referred to as the z-axis when traveling perpendicular to the plane of the base x-axis and second y-axis.



2. Orientation of the Load

Does the load need to be free from any interference from the motion components?
The ET Series Electric Cylinder is non-intrusive and allows the load to travel free from interference when mounted to the rod end. The ER Series Rodless Actuator may or may not create interference, depending on load orientation and placement of the actuator.

Does the load need to be free of vibration or any other movement while being positioned?
Depending on the size and center of gravity of the load, any movement may induce a response to acceleration and deceleration from the load. This means that the load may not come completely to rest for several seconds, even though the motion system has stopped. The introduction of parallel bearing systems, as in the X-X' and Y-Y' dual axis configurations, serves to minimize this effect. For ET Series Electric Cylinders, adding a Linear Rod Guide Module option minimizes rod end movement and increases side load capacity (see ET Rod Options).

Does the load need to be free of deflection?
Again, depending on the size and center of gravity of the load, any acceleration or deceleration may cause the load bearing carriage to deflect and thereby cause the load to leave its "at rest" position. The introduction of parallel bearing systems, as in the X-X' and Y-Y' dual axis configuration usually eliminates this problem. Rod side load curves for the ET Series Electric Cylinder are located on page 10, while deflection curves for the Linear Rod Guide Module option may be found on page 13. Consult the factory for ER Series carriage deflection information.

3. Motion Profile Consideration

What is the speed requirement of the application?
Higher speed motion typically requires belt drive actuators. In general, any speed over 20 in/sec may exceed the capabilities of a screw drive system. Higher accelerations may also make non-driven idler units ineffective, as the non-driven units will tend to lag behind the driven axis and cause the system to bind.

What is the repeatability and accuracy requirement of the motion profile?
Screw drive systems offer repeatability values 10 times smaller than those of belt drive systems. Linear accuracy values are comparable for both systems, with the exception of precision ground ball screws.

4. Dual Drive Actuators

If the dual axis option has been selected for balanced load support, there are three basic options.

Idler Separation
In most cases, the idler separation from the drive axis should not exceed the length of a single bearing carriage. As a general rule, any separation greater than 10 inches (254 mm) may present a problem. The idler separation problem resides in the case of the idler bearing axis lagging behind the drive bearing axis upon acceleration and deceleration, or lagging due to misalignment or friction. If the attachment between the two axes is not rigid, the lagging may become more pronounced. Any idler bearing application is best discussed with the Applications Department.

Linked Belt Drive (Link Shafts)
Linked belt drive parallel axes are simple and cost-effective. In this case, a link shaft is coupled between the output shaft of the drive axis and the input shaft of a driven axis. Depending on the parallel axis separation, the link shaft may or may not require additional bearing support. Link shafts are speed limited, which is dependent upon axis separation.

5. Environmental Considerations

Environmental conditions can affect the performance and life expectancy of an electromechanical system. Extreme temperatures may compromise the functionality of actuators with aluminum housings and steel drive screws, bearings and fasteners. Particulate matter and other debris can damage the actuator drive system if not accounted for. In many cases, it may be advantageous to invert one or more actuators to shield the carriage from airborne matter. Positive actuator body pressurization also serves to minimize damage. Considerations are discussed in detail in both the ET and ER sections or consult the factory with any environmental concerns.

Application Consideration Summary

Application Consideration	Potential Issues	System Solutions
Overhung Load	Carriage deflection, oscillatory response from acceleration forces	Dual axis bearing, both driven or one driven, one idler
Speeds Below 500 mm/sec (20 in/sec)	Low speed smoothness	Screw drive actuator for smoothness
Speeds Above 500 mm/sec (20 in/sec)	Screw whipping (critical speed), screw noise, reduced screw life	Belt drive actuator for high speeds (to 200 inches)
Travel Beyond 1500 mm (59 in)	Low critical speed for screw drives	Belt drive actuator for long travel
Dual drive actuator separation greater than 10 inches	Idler unit lagging driven unit	Dual drive screw or linked belt drives
Repeatability less than 0.004 in	Beyond capabilities of belt drive actuator	Screw drive actuator for repeatability
Airborne particles and other debris	May damage drive train or bearings	Invert actuator, positively pressurize the cylinder body
Load-Motor Inertia Matching	Little mechanical advantage with belt drive, more advantage with screw drive	Consider inline gearbox reducer or timing belt reduction

Systems Ordering Procedure

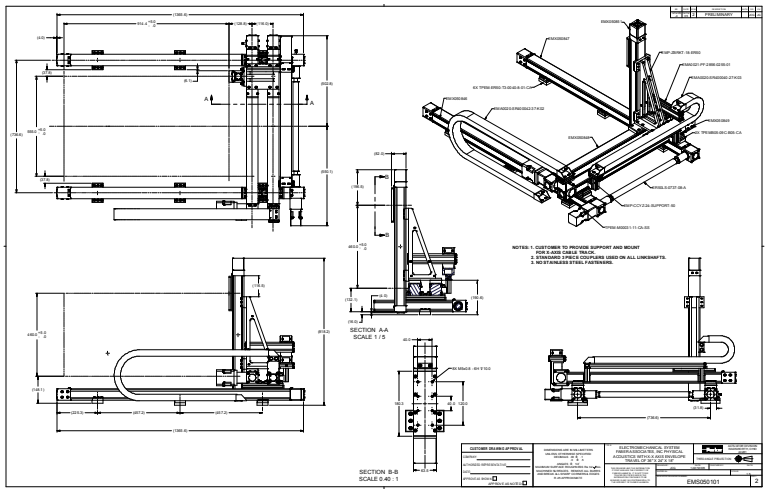
Actuator Division uses several quality verification steps to guaranty that a system will arrive at the customer with an accurate and complete component set.

The first step is a hard quote from the EM Applications Department. The basic information for the hard quote comes from several different sources such as:

- Budgetary Quoting Software
- Multi-Axis Systems Application Fax Page
- Customer Fax

The Customer verifies the quote content.

The verified hard quote is then used by Actuator Division's Engineering Department to prepare the Customer Sign-off Print. *This is the second and probably one of the most important quality checks.*



For every new system that is ordered, a System Print is developed by Actuator Division.

- This print details the various components to be incorporated as well as basic system orientations and dimensions.
- This print is used by the Customer to verify that the system is dimensionally acceptable for their application.

After the print is verified by the Customer, a signed-off copy is returned to Actuator Division for the development of the production bill of materials.

Typical Lead Time for a system from this point is 4 to 6 weeks. This lead time depends on the complexity of the system and the level of integration that is requested of Actuator Division. Please consult Actuator Division Electromechanical Applications Engineering for a specific application lead time.

After the Bill of Materials is produced the production of the system falls into Actuator Division's standard quality system and its associated quality checks.

Actuator and System Prints

At the time of this publication Actuator Division uses Inventor Release 10 as their CAD/CAM interface. Actuator Division is capable of generating most of the generic file formats (DXF, IGS, SAT, STP, PDF, etc.)

Connection Kits

With each type of system, there are standardized kits for each connection required. Certain applications may require custom kits due to application envelope or loading. The Actuator Division will submit the standard kits for each application, and will design custom hardware as the application demands.

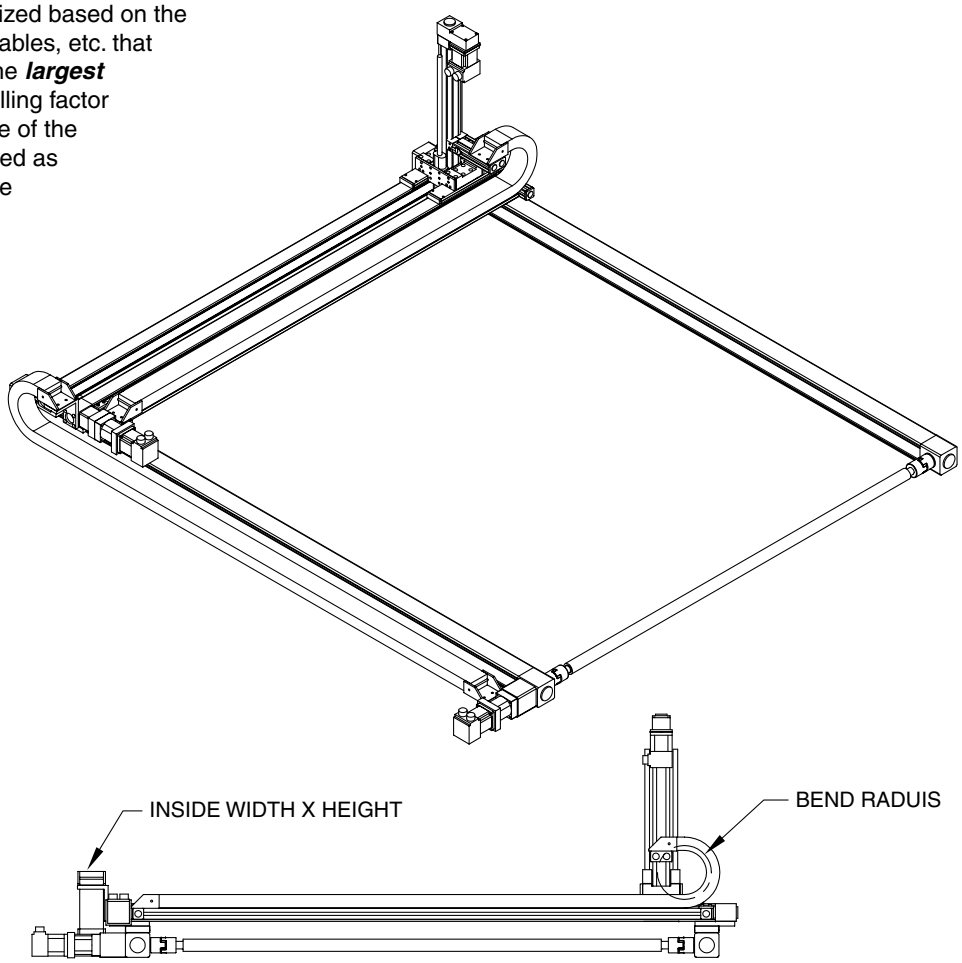
System Accessories

Upon request, the Actuator Division can include the following system accessories:

- Cable Carriers and Supports
- Special Motor, Brake and Limit Switch/Sensor Cabling
- Structural Framework and Related Accessories (See following pages)
- System Safety Guarding
- Custom Mounting Hardware for Customer Supplied Accessories

Cable Carrier Assemblies

Please note that cable carriers are sized based on the electrical cables, air hoses, sensor cables, etc. that pass through them. The cable with the ***largest minimum bend radius*** is the controlling factor along with the cross sectional volume of the cables. The cable carrier is then sized as the next larger standard radius for the cable track.



Developing Multi-Axis Applications

Consult the Application Considerations in this section. We have included a Multi-Axis Application Worksheet at the end of this section. Use this as a guide and also as a fax form when contacting the Actuator Division or your local Automation Technology Center.

Fax: (330) 334-3335
Attention: Electromechanical Application Dept.

System Application Fax Form

Fax completed form to (330) 334-3335 or email to actuatorsales@parker.com

Contact Information:

Name _____ Phone _____

Company _____ email _____

City, State, Zip _____

Application Sketch

NOTES:

Please include the critical dimensions in your sketch.

In order to achieve the best solution, it is important that you provide as much information as possible.

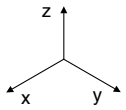
Motion Profile

Move*	Axis of Motion	Distance (Stroke)	Time**	Thrust of Load	Dwell

NOTES:

* Please indicate any moves that can be done simultaneously.

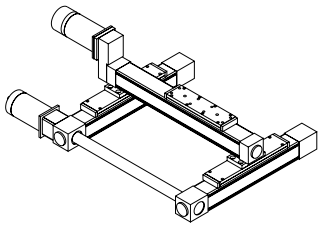
** If individual move times are not important, enter "x" and enter the total cycle time here _____.



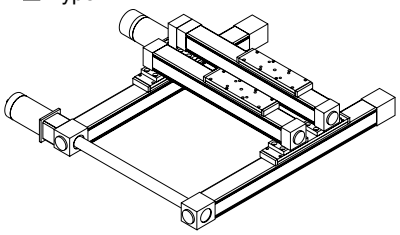
System Configuration

(Check the figure that resembles your system)

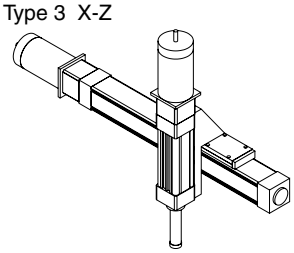
☐ Type 1 X-X'-Y



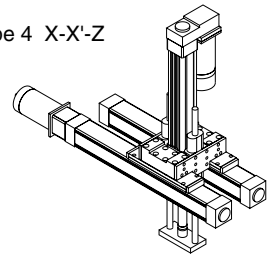
☐ Type 2 X-X'-Y-Y'



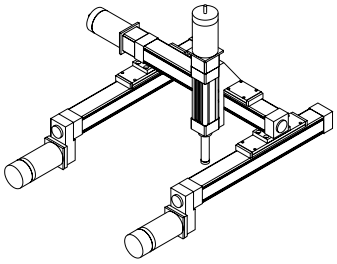
☐ Type 3 X-Z



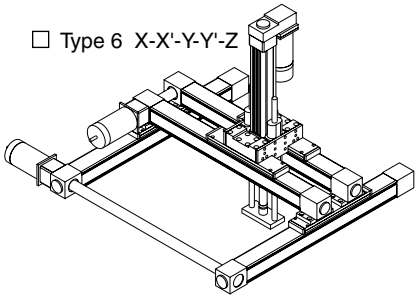
☐ Type 4 X-X'-Z



☐ Type 5 X-X'-Y-Z



☐ Type 6 X-X'-Y-Y'-Z



☐ Other (Provide sketch)

System Application Fax Form

Please note the following:

a. The X and Y axes must be the same series of actuators.

b. Idlers can only be used when actuators are less than 12" apart.

c. A bearing block will be used when actuators are greater than 36" apart.

Application Requirements:

1. Stroke Length: X _____ Y _____ Z _____

2. X and/or Y axis:

☐ ER ☐ ERV

3. IPS Framework needed? ☐ Yes ☐ No

If yes, please describe your working envelope: Height _____ Length _____ Width _____

4. Load/Tooling Weight _____

5. Repeatability Requirements _____

☐ Unidirectional ☐ Bidirectional

6. Life Requirements (cycles, distance or years)

Hours per day _____ Days per year _____

7. Special Considerations _____

_____

_____

_____

Please attach another sheet if more room is needed.

Motor Mounting Options (check all that apply)

Please note that parallel mounts can limit the actuator's total thrust capacity.

1. Z-axis:

☐ Inline Mount ☐ Parallel Mount ☐ Reverse

2. Y-axis:

☐ Direct Drive ☐ Parallel Mount ☐ Reverse ☐ Best Way

3. X-axis:

☐ Direct Drive ☐ Parallel Mount ☐ Reverse ☐ Best Way

Motor, Drive and Control Options:

1. Motor Options (check all that apply)

☐ Stepper ☐ Servo

☐ Parker Supplied ☐ Customer Supplied (provide print)

☐ Gearhead(s) if needed:

☐ Parker Supplied ☐ Customer Supplied

2. Other Options (check one)

☐ Drive ☐ Controller

3. Available Line Voltage _____

4. Switches/Sensors (quantity)

End of Travel _____ Home _____

5. Brake Option (check one)

☐ Actuator * ☐ Motor ☐ None

*With parallel motor mount only

6. Cable Track: ☐ Yes ☐ No

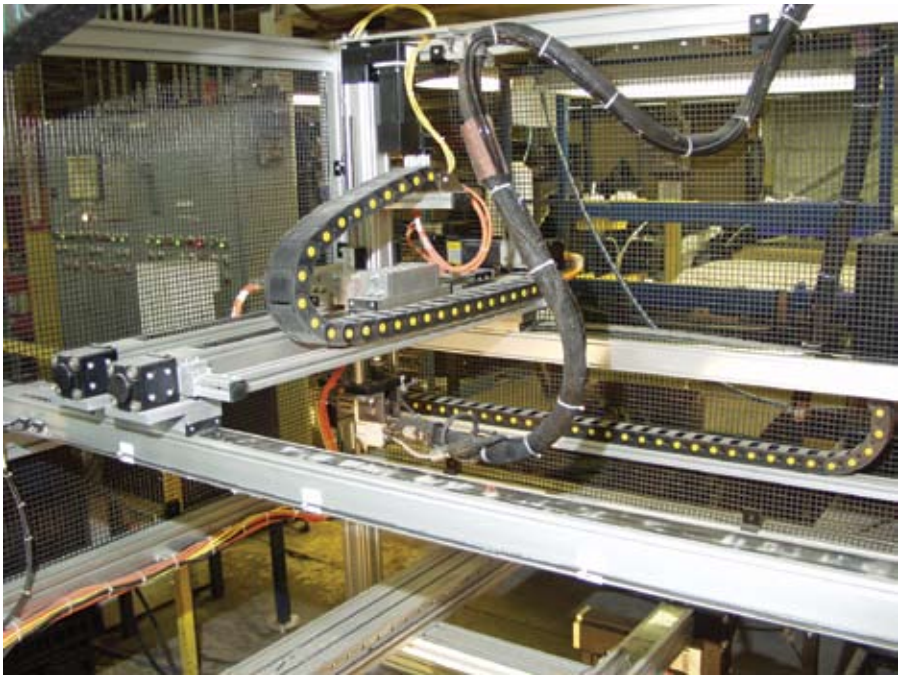
7. Special Options _____

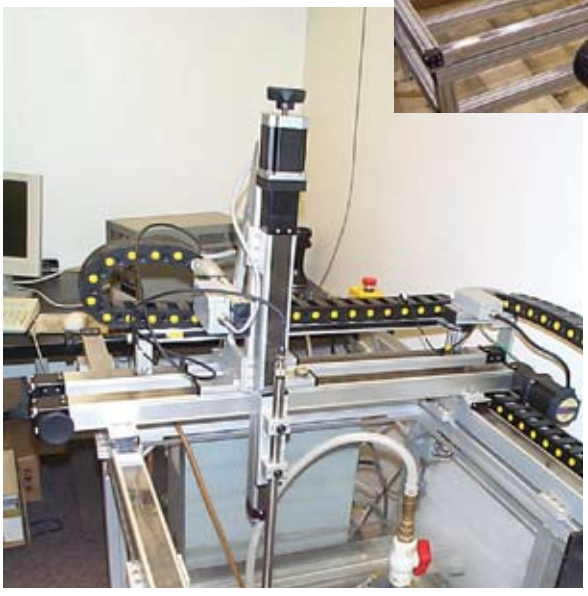
_____

_____

_____

Systems





Complementary Products

Contents

Parker Hannifin Corporation
Actuator Division
Wadsworth, Ohio USA
Phone: 1-866-PARK-ACT
email: actuatorsales@parker.com
website: www.parker.com/actuator

ETR Series Electric Cylinders

The new ETR Series features a high-performance roller screw drive for high-thrust applications that demand performance and longevity. High-performance tapered roller thrust bearings ensure long life.

- Stainless steel thrust tube
- Internal tie rods permit high thrusts
- Anti-rotate guide bearing
- Tapered roller thrust bearings
- CAD drawings available

For more information, visit www.parker.com/actuator.

Series	ETR50	ETR80	ETR100	ETR125
Max thrust N (lbf)	6,500 (1,460)	18,000 (4,045)	45,200 (10,110)	100,000 (22,470)
Max velocity m/sec (in/sec)	1.2 (47)	0.93 (24)	1.3 (50)	0.97 (25)
Rated acceleration (g's)	0.9	1.1	2.2	2.2
Max travel (m)	0.8	0.8	1.0	1.0
Repeatability (mm)	±0.025	±0.025	±0.025	±0.025

LR Series Linear Actuators

Linear Roller (LR) Series products provide a high level of accuracy, load-bearing strength and flexibility in a modular, low-cost package. These products utilize standard components and can adapt to a wide range of applications.

The modular design allows for easy assembly, fast engineering and a flexible platform capable of meeting even the most demanding application.

- Custom carriage options
- Easy mounting to AC motors
- Instant motor/gearbox approval
- Ideal for material handling, gantry systems, visual inspection, and assembly and transfer lines

For more information, visit www.parker.com/actuator.

Series	LR 6	LR 14	LR14HD	LR25
Max carriage load, N (lb)	649 (146)	2669 (600)	3350 (753)	11,552 (2597)
Max travel w/o splice (mm)	5900	5850	5840	5680
Min travel (mm)	300	250	240	80
Max drive torque, reversing unit 40 (Nm)	20	20	20	20
Max drive torque, reversing unit 80 (Nm)	37	37	37	37
Max speed (m/s)	5	5	5	5
Max acceleration at no load (m/s^2)	10	10	10	10
Repeatability (mm)	±0.10	±0.10	±0.10	±0.10

Stand Alone and Bus-Based Controllers

Parker motion controllers are powerful multi-axis designs that have the processing power to coordinate multiple axes of motion. Parker controllers have advanced features built in, such as kinematics transformation for the control of robots and other non-linear functions. Each Parker controller comes with free libraries for Visual Basic® and C++®.

For more information, visit www.parkermotion.com.

Servo Drives

Parker drives are digital designs that deliver a maximum amount of power output and performance in minimal package size.

These drives have industry leading power density and smart digital designs with features to ease integration and start-up.

Output power levels range from 50W - 20kW to match your application requirements. Control level is also selectable between Drive only, Drive/Indexer and Drive/Controller depending on your application requirements.

Drive/Indexer and Drive/Controller versions can also be configured with Profibus, CANopen, and DeviceNet interfaces for seamless integration into any control system.

For more information, visit www.parkermotion.com.

Stepper Drives

Known for robust design and exceptional quality, Parker's microstepping drives offer high performance and value all in one package. Anti-resonant technology developed by Parker and high selectable resolutions (up to 128,000 steps/rev) allow for very smooth operation at all speeds. Drive families are optimized to work with either VAC or VDC input power with output current ratings up to 12 Amps. Simple positional indexing or full blown motion control can also be achieved with drive/indexer and drive/controller options.

For more information, visit www.parkermotion.com.

Servo & Stepper Motors

Parker offers a complete line of rotary and linear servo motor products designed to meet the demands of a broad range of applications in both the industrial and high tech marketplaces. With both ironcore and ironless technologies, Parker offers industry leading linear motor solutions that can achieve the highest performance and throughput requirements. Parker's comprehensive line of rotary servo motors range from 40mm frame sizes up to 270mm.

Parker also offers an extensive line of rotary gearmotors, frameless kit motors, cost effective stepper motors, and customized solutions such as stainless steel, food grade motors.

For more information, visit www.parkermotion.com.

Precision Gearheads

Parker precision gearheads incorporate a helical planetary design resulting in higher torque output, quieter operation, and lower backlash. Standard inline and right angle gearheads are available with frame sizes ranging from 40mm to 300mm and nominal output torques up to 40,000 in-lbs. Custom gearhead solutions prepped for special environments such as cleanroom, vacuum, and washdown can be engineered to meet your application requirements.

For more information, visit www.parkermotion.com.

Operator Interface

Parker HMI incorporates Windows®-based software into rugged touchscreen computers to ease the development of the user interface without sacrificing the benefits of open architecture.

Parker HMI also incorporates multiple connection options to easily tie the machine into higher level IT/IS systems.

For more information, visit www.parkermotion.com.

Pneumatic Cylinders

Parker pneumatic cylinders are engineered to meet ISO, NFPA and other standards, and they come in a variety of shapes (compact, round body and tie rod) and sizes (6-200 mm, 5/16" to 14" bores).

Whether you need to move a load fast or slow, in a straight line or through an arc, or even sense the load's position, Parker has a cylinder for your application.

Pneumatic guided cylinders are available in four unique designs with multiple configurations suitable for any application. Cylinder bore sizes range from 16 to 100 mm and are available in both metric and imperial designs.

Parker guided cylinders feature a patented alignment coupler which allows the piston rod to self-center providing millions of trouble-free cycles.

For more information, visit www.parker.com/actuator.

Rotary Actuators

Parker is the industry leader in Pneumatic Rotary Actuators with output torques from 1 to 10,000 in-lbs at 100 PSI. Configurations include rack and pinion and vane and are available in both metric and imperial designs.

Rotary actuators are suitable for lubricated and non-lubricated service and will produce millions of trouble-free cycles making them suitable for a wide range of pneumatic applications.

For more information, visit www.parker.com/actuator.

Grippers

Parker's grippers are designed to incorporate high grip force to weight ratio, making them ideal for end of arm tooling and high-speed applications.

Grippers are available in parallel, angular and three jaw configuration with grip forces to 3,000 lbs and feature single acting, double acting, spring assist or spring return options.

For more information, visit www.parker.com/actuator.

Vacuum Products

To complement its pneumatic product offerings, Parker has a complete line of vacuum generators and cups. Integrated sensors provide feedback for improved system response time. Additionally, emergency stop systems hold parts during electrical power loss to prevent product/machine damage. Parker's space saving manifold systems and extensive cup availability provide unlimited automation solutions.

For more information, visit www.parker.com/pneumatics.

Industrial Profile Systems

Parker Industrial Profile Systems (IPS) structural automation products offer unique benefits over traditional methods of structural fabrication. All systems and assemblies are pre-engineered to customer requirements, yet offer extreme flexibility as needs change.

Profiles and accessories are available in metric or inch-based designs.

Benefits

- Extremely short turnaround time from design to completion
- No welding, grinding, cleaning, painting or distortions
- Lower cost through the elimination of costly traditional manufacturingprocesses
- Flexibility to reconfigure as requirements change

Profiles

Parker Industrial Profile Systems has one of the most comprehensive product offerings in the industry.

- More than 130 individual high-strength aluminum profiles
- Metric- and inch-based profiles and accessories
- Metric sizes range from 20 mm to 160 mm
- Inch sizes range from 1” to 6”
- Extensive range of smooth, grooveless profiles
- Provide attractive and robust structures

Linear Motion

- Roller bearing systems
- Extrusion-based linear actuators
- Delrin and UHMW slide bearings

Fasteners and Accessories

- Unique T-slot design for reliable connection and easy modification
- Metric and Inchbased hardware available
- Complete line of accessories

Typical Applications

- Enclosures and guarding
- Machine bases and frames
- Work stations and tables
- Material handling systems

For more information, visit www.parker.com/industrialprofile.

Motors

Contents

Parker Hannifin Corporation
Actuator Division
Wadsworth, Ohio USA
Phone: 1-866-PARK-ACT
email: actuatorsales@parker.com
website: www.parker.com/actuator

Motor Compatibility Chart

Table 1

Parker Gearbox/Motor Options		ET032 / ER032								ET050 / ER050 / ERV5								
		Inline	Parallel							Inline	Parallel							
		Direct	Timing Belt		Geardrive					Direct	Timing Belt			Geardrive				
		A	A	Z	K	E	F	G	H	A	A	B	D	K	E	F	G	H
		1:1	1:1	1:1.5	1:1	3:1	5:1	7.5:1	9.5:1	1:1	1:1	1.5:1	2:1	1:1	3:1	5:1	7.5:1	9.5:1
Gearbox Options	**Gearbox Code**																	
PX23	A	X	X							X	X			X				
PS60 shaft horizontal	B									X				X				
PS60 shaft vertical	C									X				X				
PX34	D									X	X			X				
PS90 shaft horizontal	E																	
PS90 shaft vertical	F																	
PX115	G																	
PS115 shaft horizontal	H																	
PS115 shaft vertical	J																	
PX56	K																	
PS142 shaft horizontal	L																	
PS142 shaft vertical	M																	
PV23FE	P	X	X							X	X			X				
PV34FE	Q									X	X			X				
Stepper Motor Options	**Motor Code**																	
S57, ES2x stepper - round shaft	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S83, ES3x stepper - round shaft	B									X	X	X		X	X	X	X	X
HV34, LV34 stepper - shaft flat	C									X	X			X				
HV23, LV23 stepper - shaft flat	D	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Servo Motor Options	**Motor Code**																	
SM23x**-T*** (x=1,2,3)	E	X	X	X						X	X	X	X	X	X	X	X	X
BE23***-K***	F	X	X	X						X	X	X	X	X	X	X	X	X
BE34**-K***	G									X	X			X				
SMN060***-K***	H									X	X	X						
SMN082***-K***	J									X	X			X				
SMN100***-K***	K																	
SMN115****-K***	L																	
SMN142****-K***	M																	
MPP092****-K***	N									X				X				
MPP100****-K***	P																	
MPP115****-K***	Q																	
MPP142x***-K*** (x=2,4,6)	R																	
MPP1428***-K***	S																	
MPP190****-K***	T																	

Parker Actuator Division offers a broad array of Parker motors and gearboxes for easy configuration with our electromechanical products. When configured in the part number, these motors and/or gearboxes will be mounted to the actuator at the factory and shipped as a complete package. This service not only saves our customers time and money, but it provides peace of mind that all components are properly mounted and that the actuator is ready for installation as soon as it arrives.

- Table #1 & Table #2 show the compatible gearbox/actuator combinations and motor/actuator combinations
- Table#3 shows compatible motor/gearbox combinations

Example 1: Motor mounting directly to actuator – no gearbox

1) Find actuator mounting configuration (inline, parallel, timing belt, gear drive) on Table #1 or Table #2.
2) Follow column down to determine compatible motors.

Example 2: Motor & gearbox mounting to actuator

1) Find actuator mounting configuration (inline, parallel, timing belt, gear drive) on Table #1 or Table #2.
2) Follow column down to determine compatible gearboxes.
3) Use Table #3 to determine compatible motors with gearbox.

Visit **www.parkermotion.com** for complete motor specifications.

Table 2

Parker Gearbox/Motor Options		ET080 / ER080 / ERV8									ET100		ET125		LCB	
		Inline	Parallel								Inline	Parallel	Inline	Parallel	040	060
		Direct	Timing Belt			Geardrive					Direct	Timing Belt	Direct	Timing Belt	Inline Direct	Inline Direct
		A	A	B	D	K	E	F	G	H	A	A	A	A		
		1:1	1:1	1.5:1	2:1	1:1	3:1	5:1	7.5:1	10:1	1:1	1:1	1:1	1:1		
Gearbox Options	**Gearbox Code**															
PX23	A	X				X									X	X
PS60 shaft horizontal	B	X														
PS60 shaft vertical	C	X														
PX34	D	X	X			X					X					X
PS90 shaft horizontal	E	X	X								X	X				
PS90 shaft vertical	F	X	X								X	X				
PX115	G	X									X	X	X	X		
PS115 shaft horizontal	H										X	X	X	X		
PS115 shaft vertical	J										X	X	X	X		
PX56	K										X	X	X	X		
PS142 shaft horizontal	L												X	X		
PS142 shaft vertical	M												X	X		
PV23FE	P	X				X									X	X
PV34FE	Q	X	X			X					X					X
Stepper Motor Options	**Motor Code**															
S57, ES2x stepper - round shaft	A														X	
S83, ES3x stepper - round shaft	B	X	X	X	X	X	X	X	X	X					X	X
HV34, LV34 stepper - shaft flat	C	X	X	X	X	X	X	X	X	X					X	X
HV23, LV23 stepper - shaft flat	D														X	
Servo Motor Options	**Motor Code**															
SM23x**-T*** (x=1,2,3)	E														X	
BE23***-K***	F														X	
BE34**-K***	G	X	X	X	X	X	X	X	X	X	X				X	X
SMN060***-K***	H														X	
SMN082***-K***	J	X				X	X	X	X	X	X				X	X
SMN100***-K***	K	X	X	X							X					X
SMN115****-K***	L	X									X	X	X	X		X
SMN142****-K***	M	X									X	X	X	X		
MPP092****-K***	N	X	X	X		X	X		X	X	X				X	X
MPP100****-K***	P	X	X	X							X					X
MPP115****-K***	Q	X									X	X	X	X		X
MPP142x***-K*** (x=2,4,6)	R	X									X	X	X	X		
MPP1428***-K***	S	X									X	X	X	X		
MPP190****-K***	T										X		X	X		

Table 3

Gearbox Options	Gearbox Code	Applicable Motor Code in Combination with Gearbox
PX23	A	Stepper Motors A,D Servo Motors E, F, H
PS60	B, C	
PV23FFE	P	
PX34	D	Stepper Motors B, C Servo Motors G, J, K, N, P
PS90	E, F	
PV34FE	Q	
PX115	G	Servo Motors K, L, M, P, Q
PS115	H, J	
PX56	K	Servo Motors L, M, Q, R, S
PS142	L	

Parker offers a complete line of rotary and linear servo motor products that meet a broad range of applications in both the industrial and high tech marketplaces. The motors listed below are a “best fit” selection of this wide range of motors and are optimally suited to provide the highest level of performance achievable with our electromechanical products. Complete specifications of these and other Parker motors can be found at **www.parkermotion.com.**

Motor Series	Motor Type	Design Type	Cont Torque Tc (lb-in)	Inertia	Feedback Options	Frame Size	Brake Option	IP Rating	Max Speed	Certification	Winding (VDC)
SM	Brushless Servo	Slotless	1.7 to 10.1	High	Encoder, Resolver, Smart Encoder	NEMA 23	No	64	6500 to 7500	CE	170, 340
BE	Brushless Servo	Bridged Stator	3.6 to 43.3	Low	Encoder, Resolver, Smart Encoder	NEMA 23 NEMA 34	34 only	40	5000	CE	170, 340
SMN	Brushless Servo	Segmented Lamination	11.9 to 128.7	Medium	Encoder, Resolver, Multi-turn Absolute (SinCos)	60mm to 142mm	All	64	4500 to 7500	CE, UL	340, 680
MPP	Brushless Servo	Segmented Lamination	13.8 to 552.5	Low	Encoder, Resolver, Smart Encoder, Single-turn Absolute (EnDat), Multi-turn Absolute (EnDat)	92mm to 190mm	All	64	1700 to 5000	CE, UL	340, 650

SM Series High-Performance Slotless Design

The SM Series brushless servo motors feature a slotless stator design. This design eliminates all detent torque in the motor allowing the SM series motors to provide extremly smooth motion, especially at low speeds. The slotless design also creates a higher rotor inertia which allows for better stability and control of larger inertia payloads.

SM23x**-T*** (x=1,2,3)	
Motor Code	**Description**
E00	Prepped for SM23x**-T*** (x=1,2,3) motor
E01	SM233BE-TTQN - Encoder - TQ connector
E02	SM233BR-TMSN - Resolver - MS connector
E03	SM233AE-TGSN - Encoder - GS connector
E10	SM231AE-TPSN - 1000 line encoder
E11	SM231AQ-TPSN - Smart encoder
E12	SM231BE-TPSN - 1000 line encoder
E13	SM232AE-TPSN - 1000 line encoder
E14	SM232AQ-TPSN - Smart encoder
E15	SM232BE-TPSN - 1000 line encoder
E16	SM233AE-TPSN - 1000 line encoder
E17	SM233AQ-TPSN - Smart encoder
E18	SM233BE-TPSN - 1000 line encoder

Visit **www.parkermotion.com** for complete motor specifications.

BE Series High-Torque, Low-Cost Design

The BE series brushless servo motors produce high continuous stall torque in a cost-reduced package. The increased torque of the BE series is the result of an increased number of magnetic poles on the rotor. Traditional motors in these frame sizes have 4 magnetic poles on the rotor, while the BE series utilizes 8 magnetic poles.

The cost reduction of the BE series is achieved from its open lamination design. Unlike traditional servo motors, the BE series does not have a metal housing. Instead, the laminations of the motor stator are shaped into the body of the motor which reduces both material and assembly costs.

BE23***-K***	
Motor Code	**Description**
F00	Prepped for BE23***-K*** motor
F01	BE230DJ-KPSN - 2000 line encoder
F02	BE230FJ-KPSN - 2000 line encoder
F03	BE230GJ-KPSN - 2000 line encoder
F04	BE231DJ-KPSN - 2000 line encoder
F05	BE231FJ-KPSN - 2000 line encoder
F06	BE231GJ-KPSN - 2000 line encoder
F07	BE232DJ-KPSN - 2000 line encoder
F08	BE232FJ-KPSN - 2000 line encoder
F09	BE232GJ-KPSN - 2000 line encoder
F10	BE233DJ-KPSN - 2000 line encoder
F11	BE233FJ-KPSN - 2000 line encoder
F12	BE233GJ-KPSN - 2000 line encoder
F13	BE230DQ-KPSN - Smart encoder
F14	BE230FQ-KPSN - Smart encoder
F15	BE231DQ-KPSN - Smart encoder
F16	BE231FQ-KPSN - Smart encoder
F17	BE232DQ-KPSN - Smart encoder
F18	BE232FQ-KPSN - Smart encoder
F19	BE233DQ-KPSN - Smart encoder
F20	BE233FQ-KPSN - Smart encoder
F21	BE230DR-KPSN - Resolver
F22	BE230FR-KPSN - Resolver
F23	BE231DR-KPSN - Resolver
F24	BE231FR-KPSN - Resolver
F25	BE232DR-KPSN - Resolver
F26	BE232FR-KPSN - Resolver
F27	BE233DR-KPSN - Resolver
F28	BE233FR-KPSN - Resolver

BE34***-K***	
Motor Code	**Description**
G00	Prepped for BE34***-K*** motor
G01	BE341FJ-KPSN -2000 line encoder
G02	BE341JJ-KPSN -2000 line encoder
G03	BE342HJ-KPSN -2000 line encoder
G04	BE342KJ-KPSN -2000 line encoder
G05	BE343JJ-KPSN -2000 line encoder
G06	BE343LJ-KPSN -2000 line encoder
G07	BE344JJ-KPSN -2000 line encoder
G08	BE344LJ-KPSN -2000 line encoder
G09	BE341FQ-KPSN -Smart encoder
G10	BE341JQ-KPSN -Smart encoder
G11	BE342HQ-KPSN -Smart encoder
G12	BE342KQ-KPSN -Smart encoder
G13	BE343JQ-KPSN -Smart encoder
G14	BE343LQ-KPSN -Smart encoder
G15	BE344JQ-KPSN -Smart encoder
G16	BE344LQ-KPSN -Smart encoder
G17	BE341FR-KPSN -Resolver
G18	BE341JR-KPSN -Resolver
G19	BE342HR-KPSN -Resolver
G20	BE342KR-KPSN -Resolver
G21	BE343JR-KPSN -Resolver
G22	BE343LR-KPSN -Resolver
G23	BE344JR-KPSN -Resolver
G24	BE344LR-KPSN -Resolver
G25	BE341FJ-KPSB -2000 line encoder + brake
G26	BE341JJ-KPSB -2000 line encoder + brake
G27	BE342HJ-KPSB -2000 line encoder + brake
G28	BE342KJ-KPSB -2000 line encoder + brake
G29	BE343JJ-KPSB -2000 line encoder + brake
G30	BE343LJ-KPSB -2000 line encoder + brake
G31	BE344JJ-KPSB -2000 line encoder + brake
G32	BE344LJ-KPSB -2000 line encoder + brake
G33	BE341FQ-KPSB -Smart encoder + brake
G34	BE341JQ-KPSB -Smart encoder + brake
G35	BE342HQ-KPSB -Smart encoder + brake
G36	BE342KQ-KPSB -Smart encoder + brake
G37	BE343JQ-KPSB -Smart encoder + brake
G38	BE343LQ-KPSB -Smart encoder + brake
G39	BE344JQ-KPSB -Smart encoder + brake
G40	BE344LQ-KPSB -Smart encoder + brake
G41	BE341FR-KPSB -Resolver + brake
G42	BE341JR-KPSB -Resolver + brake
G43	BE342HR-KPSB -Resolver + brake
G44	BE342KR-KPSB -Resolver + brake
G45	BE343JR-KPSB -Resolver + brake
G46	BE343LR-KPSB -Resolver + brake
G47	BE344JR-KPSB -Resolver + brake
G48	BE344LR-KPSB -Resolver + brake

Visit **www.parkermotion.com** for complete motor specifications.

SMN Series High-Torque, Compact Design

Parker's SMN Series of brushless servo motors combinees a high-performance segemented stator with competitive pricing for todays demanding motion control applications. The modern 8-pole segmented stator produces extremly high torques in a compact package. The SMN otor family is offered in frame sizes from 60mm to 142mm and is available with numerous feedback options.

SMN1002***-K***	
Motor Code	**Description**
K00	Prepped for SMN1002***-K*** / M105***-K*** motor
K01	SMN1002S41-KPSN - Resolver
K02	SMN1002P41-KPSN - Resolver
K03	SMN1002S2F-KPSN - 2048 line encoder
K04	SMN1002P2F-KPSN - 2048 line encoder
K05	SMN1002S5D-KPSN - SinCos absolute encoder
K06	SMN1002P5D-KPSN - SinCos absolute encoder
K07	SMN1002S41-KPSB - Resolver + brake
K08	SMN1002P41-KPSB - Resolver + brake
K09	SMN1002S2F-KPSB - 2048 line encoder + brake
K10	SMN1002P2F-KPSB - 2048 line encoder + brake
K11	SMN1002S5D-KPSB - SinCos absolute encoder + brake
K12	SMN1002P5D-KPSB - SinCos absolute encoder + brake

SMN0602***-K***	
Motor Code	**Description**
H00	Prepped for SMN0602***-K*** motor
H01	SMN0602T41-KPSN - Resolver
H02	SMN0602Z41-KPSN - Resolver
H03	SMN0602T2F-KPSN - 2048 line encoder
H04	SMN0602Z2F-KPSN - 2048 line encoder
H05	SMN0602T5D-KPSN - SinCos absolute encoder
H06	SMN0602Z5D-KPSN - SinCos absolute encoder
H07	SMN0602T41-KPSB - Resolver + brake
H08	SMN0602Z41-KPSB - Resolver + brake
H09	SMN0602T2F-KPSB - 2048 line encoder + brake
H10	SMN0602Z2F-KPSB - 2048 line encoder + brake
H11	SMN0602T5D-KPSB - SinCos absolute encoder + brake
H12	SMN0602Z5D-KPSB - SinCos absolute encoder + brake

SMN1152***-K***	
Motor Code	**Description**
L00	Prepped for SMN1152***-K*** motor
L01	SMN1152Q41-KPSN - Resolver
L02	SMN1152T41-KPSN - Resolver
L03	SMN1152Q2F-KPSN - 2048 line encoder
L04	SMN1152T2F-KPSN - 2048 line encoder
L05	SMN1152Q5D-KPSN - SinCos absolute encoder
L06	SMN1152T5D-KPSN - SinCos absolute encoder
L07	SMN1152Q41-KPSB - Resolver + brake
L08	SMN1152T41-KPSB - Resolver + brake
L09	SMN1152Q2F-KPSB - 2048 line encoder + brake
L10	SMN1152T2F-KPSB - 2048 line encoder + brake
L11	SMN1152Q5D-KPSB - SinCos absolute encoder + brake
L12	SMN1152T5D-KPSB - SinCos absolute encoder + brake

SMN0822***-K***	
Motor Code	**Description**
J00	Prepped for SMN0822***-K***
J01	SMN0822S41-KPSN - Resolver
J02	SMN0822V41-KPSN - Resolver
J03	SMN0822S2F-KPSN - 2048 line encoder
J04	SMN0822V2F-KPSN - 2048 line encoder
J05	SMN0822S5D-KPSN - SinCos absolute encoder
J06	SMN0822V5D-KPSN - SinCos absolute encoder
J07	SMN0822S41-KPSB - Resolver + brake
J08	SMN0822V41-KPSB - Resolver + brake
J09	SMN0822S2F-KPSB - 2048 line encoder + brake
J10	SMN0822V2F-KPSB - 2048 line encoder + brake
J11	SMN0822S5D-KPSB - SinCos absolute encoder + brake
J12	SMN0822V5D-KPSB - SinCos absolute encoder + brake

SMN1422***-K***	
Motor Code	**Description**
M00	Prepped for SMN1422***-K*** / M145***-K*** motor
M01	SMN1422S41-KPSN - Resolver
M02	SMN1422P41-KPSN - Resolver
M03	SMN1422S2F-KPSN - 2048 line encoder
M04	SMN1422P2F-KPSN - 2048 line encoder
M05	SMN1422S5D-KPSN - SinCos absolute encoder
M06	SMN1422P5D-KPSN - SinCos absolute encoder
M07	SMN1422S41-KPSB - Resolver + brake
M08	SMN1422P41-KPSB - Resolver + brake
M09	SMN1422S2F-KPSB - 2048 line encoder + brake
M10	SMN1422P2F-KPSB - 2048 line encoder + brake
M11	SMN1422S5D-KPSB - SinCos absolute encoder + brake
M12	SMN1422P5D-KPSB - SinCos absolute encoder + brake

Visit **www.parkermotion.com** for complete motor specifications.

MPP Series - Low Inertia, High-Power

The MPP series of brushless servo motors features a new design that offers lower inertia and higher power, all in a smaller package. These motors are designed tor today's high-performance motion control applications.

The MPP motors feature segmented core technology, which can yield up to 40% higher torque per unit size than conventially wound servo motors. "Potted" stators improve thermal efficiency allowing increased torque at the motor shaft.

MPP092****-K***	
Motor Code	**Description**
N00	Prepped for MPP092****-K*** motor
N01	MPP0921B1E-KPSN - 2000 line encoder
N02	MPP0921C1E-KPSN - 2000 line encoder
N03	MPP0921R1E-KPSN - 2000 line encoder
N04	MPP0922C1E-KPSN - 2000 line encoder
N05	MPP0922D1E-KPSN - 2000 line encoder
N06	MPP0922R1E-KPSN - 2000 line encoder
N07	MPP0923D1E-KPSN - 2000 line encoder
N08	MPP0923R1E-KPSN - 2000 line encoder
N09	MPP0921B41-KPSN - Resolver
N10	MPP0921C41-KPSN - Resolver
N11	MPP0921R41-KPSN - Resolver
N12	MPP0922C41-KPSN - Resolver
N13	MPP0922D41-KPSN - Resolver
N14	MPP0922R41-KPSN - Resolver
N15	MPP0923D41-KPSN - Resolver
N16	MPP0923R41-KPSN - Resolver
N17	MPP0921B6D-KPSN - Multi-turn absolute encoder
N18	MPP0921C6D-KPSN - Multi-turn absolute encoder
N19	MPP0921R6D-KPSN - Multi-turn absolute encoder
N20	MPP0922C6D-KPSN - Multi-turn absolute encoder
N21	MPP0922D6D-KPSN - Multi-turn absolute encoder
N22	MPP0922R6D-KPSN - Multi-turn absolute encoder
N23	MPP0923D6D-KPSN - Multi-turn absolute encoder
N24	MPP0923R6D-KPSN - Multi-turn absolute encoder
N25	MPP0921B3E-KPSN - 2000 line smart encoder
N26	MPP0921C3E-KPSN - 2000 line smart encoder
N27	MPP0922C3E-KPSN - 2000 line smart encoder
N28	MPP0922D3E-KPSN - 2000 line smart encoder
N29	MPP0923D3E-KPSN - 2000 line smart encoder
N30	MPP0921B1E-KPSB - 2000 line encoder + brake
N31	MPP0921C1E-KPSB - 2000 line encoder + brake
N32	MPP0921R1E-KPSB - 2000 line encoder + brake
N33	MPP0922C1E-KPSB - 2000 line encoder + brake
N34	MPP0922D1E-KPSB - 2000 line encoder + brake
N35	MPP0922R1E-KPSB - 2000 line encoder + brake
N36	MPP0923D1E-KPSB - 2000 line encoder + brake
N37	MPP0923R1E-KPSB - 2000 line encoder + brake
N38	MPP0921B41-KPSB - Resolver + brake
N39	MPP0921C41-KPSB - Resolver + brake
N40	MPP0921R41-KPSB - Resolver + brake
N41	MPP0922C41-KPSB - Resolver + brake
N42	MPP0922D41-KPSB - Resolver + brake
N43	MPP0922R41-KPSB - Resolver + brake
N44	MPP0923D41-KPSB - Resolver + brake
N45	MPP0923R41-KPSB - Resolver + brake
N46	MPP0921B6D-KPSB -Multi-turn absolute encoder + brake
N47	MPP0921C6D-KPSB -Multi-turn absolute encoder + brake
N48	MPP0921R6D-KPSB -Multi-turn absolute encoder + brake
N49	MPP0922C6D-KPSB -Multi-turn absolute encoder + brake
N50	MPP0922D6D-KPSB -Multi-turn absolute encoder + brake
N51	MPP0922R6D-KPSB -Multi-turn absolute encoder + brake
N52	MPP0923D6D-KPSB -Multi-turn absolute encoder + brake
N53	MPP0923R6D-KPSB -Multi-turn absolute encoder + brake
N54	MPP0921B3E-KPSB - 2000 line smart encoder + brake
N55	MPP0921C3E-KPSB - 2000 line smart encoder + brake
N56	MPP0922C3E-KPSB - 2000 line smart encoder + brake
N57	MPP0922D3E-KPSB - 2000 line smart encoder + brake
N58	MPP0923D3E-KPSB - 2000 line smart encoder + brake

MPP100****-K***	
Motor Code	**Description**
P00	Prepped for MPP100****-K*** motor
P01	MPP1002D1E-KPSN - 2000 line encoder
P02	MPP1002R1E-KPSN - 2000 line encoder
P03	MPP1003C1E-KPSN - 2000 line encoder
P04	MPP1003D1E-KPSN - 2000 line encoder
P05	MPP1003Q1E-KPSN - 2000 line encoder
P06	MPP1003R1E-KPSN - 2000 line encoder
P07	MPP1002D41-KPSN - Resolver
P08	MPP1002R41-KPSN - Resolver
P09	MPP1003C41-KPSN - Resolver
P10	MPP1003D41-KPSN - Resolver
P11	MPP1003Q41-KPSN - Resolver
P12	MPP1003R41-KPSN - Resolver
P13	MPP1002D6D-KPSN - Multi-turn absolute encoder
P14	MPP1002R6D-KPSN - Multi-turn absolute encoder
P15	MPP1003C6D-KPSN - Multi-turn absolute encoder
P16	MPP1003D6D-KPSN - Multi-turn absolute encoder
P17	MPP1003Q6D-KPSN - Multi-turn absolute encoder
P18	MPP1003R6D-KPSN - Multi-turn absolute encoder
P19	MPP1002D3E-KPSN - 2000 line smart encoder
P20	MPP1003C3E-KPSN - 2000 line smart encoder
P21	MPP1003D3E-KPSN - 2000 line smart encoder
P22	MPP1002D1E-KPSB - 2000 line encoder + brake
P23	MPP1002R1E-KPSB - 2000 line encoder + brake
P24	MPP1003C1E-KPSB - 2000 line encoder + brake
P25	MPP1003D1E-KPSB - 2000 line encoder + brake
P26	MPP1003Q1E-KPSB - 2000 line encoder + brake
P27	MPP1003R1E-KPSB - 2000 line encoder + brake
P28	MPP1002D41-KPSB - Resolver + brake
P29	MPP1002R41-KPSB - Resolver + brake
P30	MPP1003C41-KPSB - Resolver + brake
P31	MPP1003D41-KPSB - Resolver + brake
P32	MPP1003Q41-KPSB - Resolver + brake
P33	MPP1003R41-KPSB - Resolver + brake
P34	MPP1002D6D-KPSB - Mulit-turn absolute encoder + brake
P35	MPP1002R6D-KPSB - Mulit-turn absolute encoder + brake
P36	MPP1003C6D-KPSB - Mulit-turn absolute encoder + brake
P37	MPP1003D6D-KPSB - Mulit-turn absolute encoder + brake
P38	MPP1003Q6D-KPSB - Mulit-turn absolute encoder + brake
P39	MPP1003R6D-KPSB - Mulit-turn absolute encoder + brake
P40	MPP1002D3E-KPSB - 2000 line smart encoder + brake
P41	MPP1003C3E-KPSB - 2000 line smart encoder + brake
P42	MPP1003D3E-KPSB - 2000 line smart encoder + brake

Visit **www.parkermotion.com**
for complete motor specifications.

MPP115****-K***	
Motor Code	Description
Q00	Prepped for MPP115****-K*** motor
Q01	MPP1152C1E-KPSN - 2000 line encoder
Q02	MPP1152D1E-KPSN - 2000 line encoder
Q03	MPP1152R1E-KPSN - 2000 line encoder
Q04	MPP1153B1E-KPSN - 2000 line encoder
Q05	MPP1153C1E-KPSN - 2000 line encoder
Q06	MPP1153P1E-KPSN - 2000 line encoder
Q07	MPP1153R1E-KPSN - 2000 line encoder
Q08	MPP1154A1E-KPSN - 2000 line encoder
Q09	MPP1154B1E-KPSN - 2000 line encoder
Q10	MPP1154P1E-KPSN - 2000 line encoder
Q11	MPP1152C41-KPSN - Resolver
Q12	MPP1152D41-KPSN - Resolver
Q13	MPP1152R41-KPSN - Resolver
Q14	MPP1153B41-KPSN - Resolver
Q15	MPP1153C41-KPSN - Resolver
Q16	MPP1153P41-KPSN - Resolver
Q17	MPP1153R41-KPSN - Resolver
Q18	MPP1154A41-KPSN - Resolver
Q19	MPP1154B41-KPSN - Resolver
Q20	MPP1154P41-KPSN - Resolver
Q21	MPP1152C6D-KPSN - Mulit-tuirn absolute encoder
Q22	MPP1152D6D-KPSN - Mulit-tuirn absolute encoder
Q23	MPP1152R6D-KPSN - Mulit-tuirn absolute encoder
Q24	MPP1153B6D-KPSN - Mulit-tuirn absolute encoder
Q25	MPP1153C6D-KPSN - Mulit-tuirn absolute encoder
Q26	MPP1153P6D-KPSN - Mulit-tuirn absolute encoder
Q27	MPP1153R6D-KPSN - Mulit-tuirn absolute encoder
Q28	MPP1154A6D-KPSN - Mulit-tuirn absolute encoder
Q29	MPP1154B6D-KPSN - Mulit-tuirn absolute encoder
Q30	MPP1154P6D-KPSN - Mulit-tuirn absolute encoder
Q31	MPP1152C3E-KPSN - 2000 line smart encoder
Q32	MPP1152D3E-KPSN - 2000 line smart encoder
Q33	MPP1153B3E-KPSN - 2000 line smart encoder
Q34	MPP1153C3E-KPSN - 2000 line smart encoder
Q35	MPP1154B3E-KPSN - 2000 line smart encoder

MPP115****-K*** cont'd	
Motor Code	Description
Q36	MPP1152C1E-KPSB - 2000 line encoder + brake
Q37	MPP1152D1E-KPSB - 2000 line encoder + brake
Q38	MPP1152R1E-KPSB - 2000 line encoder + brake
Q39	MPP1153B1E-KPSB - 2000 line encoder + brake
Q40	MPP1153C1E-KPSB - 2000 line encoder + brake
Q41	MPP1153P1E-KPSB - 2000 line encoder + brake
Q42	MPP1153R1E-KPSB - 2000 line encoder + brake
Q43	MPP1154A1E-KPSB - 2000 line encoder + brake
Q44	MPP1154B1E-KPSB - 2000 line encoder + brake
Q45	MPP1154P1E-KPSB - 2000 line encoder + brake
Q46	MPP1152C41-KPSB - Resolver + brake
Q47	MPP1152D41-KPSB - Resolver + brake
Q48	MPP1152R41-KPSB - Resolver + brake
Q49	MPP1153B41-KPSB - Resolver + brake
Q50	MPP1153C41-KPSB - Resolver + brake
Q51	MPP1153P41-KPSB - Resolver + brake
Q52	MPP1153R41-KPSB - Resolver + brake
Q53	MPP1154A41-KPSB - Resolver + brake
Q54	MPP1154B41-KPSB - Resolver + brake
Q55	MPP1154P41-KPSB - Resolver + brake
Q56	MPP1152C6D-KPSB - Mulit-turn absolute encoder + brake
Q57	MPP1152D6D-KPSB - Mulit-turn absolute encoder + brake
Q58	MPP1152R6D-KPSB - Mulit-turn absolute encoder + brake
Q59	MPP1153B6D-KPSB - Mulit-turn absolute encoder + brake
Q60	MPP1153C6D-KPSB - Mulit-turn absolute encoder + brake
Q61	MPP1153P6D-KPSB - Mulit-turn absolute encoder + brake
Q62	MPP1153R6D-KPSB - Mulit-turn absolute encoder + brake
Q63	MPP1154A6D-KPSB - Mulit-turn absolute encoder + brake
Q64	MPP1154B6D-KPSB - Mulit-turn absolute encoder + brake
Q65	MPP1154P6D-KPSB - Mulit-turn absolute encoder + brake
Q66	MPP1152C3E-KPSB - 2000 line smart encoder + brake
Q67	MPP1152D3E-KPSB - 2000 line smart encoder + brake
Q68	MPP1153B3E-KPSB - 2000 line smart encoder + brake
Q69	MPP1153C3E-KPSB - 2000 line smart encoder + brake
Q70	MPP1154B3E-KPSB - 2000 line smart encoder + brake

MPP142x***-K*** (x=2,4,6)	
Motor Code	Description
R00	Prepped for MPP142x***-K*** (x=2,4,6) motor
R01	MPP1422C1E-KPSN - 2000 line encoder
R02	MPP1422R1E-KPSN - 2000 line encoder
R03	MPP1424B1E-KPSN - 2000 line encoder
R04	MPP1424C1E-KPSN - 2000 line encoder
R05	MPP1424R1E-KPSN - 2000 line encoder
R06	MPP1426B1E-KPSN - 2000 line encoder
R07	MPP1426P1E-KPSN - 2000 line encoder
R08	MPP1422C41-KPSN - Resolver
R09	MPP1422R41-KPSN - Resolver
R10	MPP1424B41-KPSN - Resolver
R11	MPP1424C41-KPSN - Resolver
R12	MPP1424R41-KPSN - Resolver
R13	MPP1426B41-KPSN - Resolver
R14	MPP1426P41-KPSN - Resolver
R15	MPP1422C6D-KPSN - Mulit-turn absolute encoder
R16	MPP1422R6D-KPSN - Mulit-turn absolute encoder
R17	MPP1424B6D-KPSN - Mulit-turn absolute encoder
R18	MPP1424C6D-KPSN - Mulit-turn absolute encoder
R19	MPP1424R6D-KPSN - Mulit-turn absolute encoder
R20	MPP1426B6D-KPSN - Mulit-turn absolute encoder
R21	MPP1426P6D-KPSN - Mulit-turn absolute encoder
R22	MPP1422C3E-KPSN - 2000 line smart encoder
R23	MPP1424B3E-KPSN - 2000 line smart encoder
R24	MPP1424C3E-KPSN - 2000 line smart encoder

MPP142x***-K*** (x=2,4,6) cont'd	
Motor Code	Description
R25	MPP1426B3E-KPSN - 2000 line smart encoder
R26	MPP1422C1E-KPSB - 2000 line encoder + brake
R27	MPP1422R1E-KPSB - 2000 line encoder + brake
R28	MPP1424B1E-KPSB - 2000 line encoder + brake
R29	MPP1424C1E-KPSB - 2000 line encoder + brake
R30	MPP1424R1E-KPSB - 2000 line encoder + brake
R31	MPP1426B1E-KPSB - 2000 line encoder + brake
R32	MPP1426P1E-KPSB - 2000 line encoder + brake
R33	MPP1422C41-KPSB - Resolver + brake
R34	MPP1422R41-KPSB - Resolver + brake
R35	MPP1424B41-KPSB - Resolver + brake
R36	MPP1424C41-KPSB - Resolver + brake
R37	MPP1424R41-KPSB - Resolver + brake
R38	MPP1426B41-KPSB - Resolver + brake
R39	MPP1426P41-KPSB - Resolver + brake
R40	MPP1422C6D-KPSB - Mulit-turn absolute encoder + brake
R41	MPP1422R6D-KPSB - Mulit-turn absolute encoder + brake
R42	MPP1424B6D-KPSB - Mulit-turn absolute encoder + brake
R43	MPP1424C6D-KPSB - Mulit-turn absolute encoder + brake
R44	MPP1424R6D-KPSB - Mulit-turn absolute encoder + brake
R45	MPP1426B6D-KPSB - Mulit-turn absolute encoder + brake
R46	MPP1426P6D-KPSB - Mulit-turn absolute encoder + brake
R47	MPP1422C3E-KPSB - 2000 line smart encoder + brake
R48	MPP1424B3E-KPSB - 2000 line smart encoder + brake
R49	MPP1424C3E-KPSB - 2000 line smart encoder + brake
R50	MPP1426B3E-KPSB - 2000 line smart encoder + brake

MPP1428***-K***	
Motor Code	**Description**
S00	Prepped for MPP1428***-K***
S01	MPP1428P1E-KPSN - 2000 line encoder
S02	MPP1428Q1E-KPSN - 2000 line encoder
S03	MPP1428P41-KPSN - Resolver
S04	MPP1428Q41-KPSN - Resolver
S05	MPP1428P6D-KPSN - Multi-turn absolute encoder
S06	MPP1428Q6D-KPSN - Multi-turn absolute encoder
S07	MPP1428P1E-KPSB - 2000 line encoder + brake
S08	MPP1428Q1E-KPSB - 2000 line encoder + brake
S09	MPP1428P41-KPSB - Resolver + brake
S10	MPP1428Q41-KPSB - Resolver + brake
S11	MPP1428P6D-KPSB - Multi-turn absolute encoder + brake
S12	MPP1428Q6D-KPSB - Multi-turn absolute encoder + brake

MPP190****-K***	
Motor Code	**Description**
T00	Prepped for MPP190****-K*** motor
T01	MPP1904P1E-KPSN - 2000 line encoder
T02	MPP1906B1E-KPSN - 2000 line encoder
T03	MPP1906P1E-KPSN - 2000 line encoder
T04	MPP1908N1E-KPSN - 2000 line encoder
T05	MPP1908P1E-KPSN - 2000 line encoder
T06	MPP1904P41-KPSN - Resolver
T07	MPP1906B41-KPSN - Resolver
T08	MPP1906P41-KPSN - Resolver
T09	MPP1908N41-KPSN - Resolver
T10	MPP1908P41-KPSN - Resolver
T11	MPP1904P6D-KPSN - Multi-turn absolute encoder
T12	MPP1906B6D-KPSN - Multi-turn absolute encoder
T13	MPP1906P6D-KPSN - Multi-turn absolute encoder
T14	MPP1908N6D-KPSN - Multi-turn absolute encoder
T15	MPP1908P6D-KPSN - Multi-turn absolute encoder
T16	MPP1904P1E-KPSB - 2000 line encoder + brake
T17	MPP1906B1E-KPSB - 2000 line encoder + brake
T18	MPP1906P1E-KPSB - 2000 line encoder + brake
T19	MPP1908N1E-KPSB - 2000 line encoder + brake
T20	MPP1908P1E-KPSB - 2000 line encoder + brake
T21	MPP1904P41-KPSB - Resolver + brake
T22	MPP1906B41-KPSB - Resolver + brake
T23	MPP1906P41-KPSB - Resolver + brake
T24	MPP1908N41-KPSB - Resolver + brake
T25	MPP1908P41-KPSB - Resolver + brake
T26	MPP1904P6D-KPSB - Multi-turn absolute encoder + brake
T27	MPP1906B6D-KPSB - Multi-turn absolute encoder + brake
T28	MPP1906P6D-KPSB - Multi-turn absolute encoder + brake
T29	MPP1908N6D-KPSB - Multi-turn absolute encoder + brake
T30	MPP1908P6D-KPSB - Multi-turn absolute encoder + brake

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ES Series Stepper Motors - Smoothest Velocity Performance

The quality construction of the ES series stepper motor allows for exceptional velocity performance and reliable operation year after year. Also known as the S series and ZETA series of motors, the ES series is optimized for use with drives running on 120VAC input power, such as the ZETA, GT, and E-AC.

S57, ES2x with Round Shaft	
Motor Code	**Description**
A00	Prepped for S57, ES2x stepper motor w/ Round Shaft
A01	S57-51-MO - Double Shaft, 10ft cable
A02	S57-83-MO - Double Shaft, 10ft cable
A03	S57-102-MO - Double Shaft, 10ft cable
A04	S57-5122 - Double Shaft, Conduit Connector
A05	S57-8322 - Double Shaft, Conduit Connector
A06	S57-10222 - Double Shaft, Conduit Connector
A07	S57-5123 - Double Shaft, Brad Harrision Connector*
A08	S57-8323 - Double Shaft, Brad Harrision Connector*
A09	S57-10223 - Double Shaft, Brad Harrision Connector*

* Brad Harrison connector option includes 4m mating cable

S83, ES3x with Round Shaft	
Motor Code	**Description**
B00	Prepped for S83, ES3x stepper motor w/ Round Shaft
B01	S83-62-MO - Double Shaft, 10ft cable
B02	S83-93-MO - Double Shaft, 10ft cable
B03	S83-102-MO - Double Shaft, 10ft cable
B04	S83-6232 - Double Shaft, Conduit Connector
B05	S83-9332 - Double Shaft, Conduit Connector
B06	S83-13532 - Double Shaft, Conduit Connector
B07	S83-6233 - Double Shaft, Brad Harrision Connector*
B08	S83-9333 - Double Shaft, Brad Harrision Connector*
B09	S83-13533 - Double Shaft, Brad Harrision Connector*

* Brad Harrison connector option includes 4m mating cable

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LV & HV Stepper Motors
Optimized Performance for High and Low Voltage Drives

The LV (Low Voltage) and HV (High Voltage) motors provide outstanding perofrmance at a competetive price. The LV motors are rated for use with DC stepper drives up to 80VDC, such as the ViX and E-DC. The HV motors are optimized for use with drives running on 120VAC power, such as the Zeta, GT, and E-AC.

HV23, LV23 with Shaft Flat	
Motor Code	**Description**
D00	Prepped for HV23, LV23 stepper motor w/ Shaft Flat
D10	HV231-02-10 - Double Shaft, 10ft cable
D11	HV232-02-10 - Double Shaft, 10ft cable
D12	HV233-02-10 - Double Shaft, 10ft cable
D13	HV231-01-10 - Single Shaft, 10ft cable
D14	HV232-01-10 - Single Shaft, 10ft cable
D15	HV233-01-10 - Single Shaft, 10ft cable
D16	HV231-02-FL - Double Shaft, 18” flying leads
D17	HV232-02-FL - Double Shaft, 18” flying leads
D18	HV233-02-FL - Double Shaft, 18” flying leads
D19	HV231-01-FL - Single Shaft, 18” flying leads
D20	HV232-01-FL - Single Shaft, 18” flying leads
D21	HV233-01-FL - Single Shaft, 18” flying leads
D30	LV231-02-10 - Double Shaft, 10ft cable
D31	LV232-02-10 - Double Shaft, 10ft cable
D32	LV233-02-10 - Double Shaft, 10ft cable
D33	LV231-01-10 - Single Shaft, 10ft cable
D34	LV232-01-10 - Single Shaft, 10ft cable
D35	LV233-01-10 - Single Shaft, 10ft cable
D36	LV231-02-FL - Double Shaft, 18” flying leads
D37	LV232-02-FL - Double Shaft, 18” flying leads
D38	LV233-02-FL - Double Shaft, 18” flying leads
D39	LV231-01-FL - Single Shaft, 18” flying leads
D40	LV232-01-FL - Single Shaft, 18” flying leads
D41	LV233-01-FL - Single Shaft, 18” flying leads

HV34, LV34 with Shaft Flat	
Motor Code	**Description**
C00	Prepped for HV34, LV34 stepper motor w/ Shaft Flat
C01	HV341-02-10 - Double Shaft, 10ft cable
C02	HV342-02-10 - Double Shaft, 10ft cable
C03	HV343-02-10 - Double Shaft, 10ft cable
C04	HV341-01-10 - Single Shaft, 10ft cable
C05	HV342-01-10 - Single Shaft, 10ft cable
C06	HV343-01-10 - Single Shaft, 10ft cable
C07	HV341-02-FL - Double Shaft, 18” flying leads
C08	HV342-02-FL - Double Shaft, 18” flying leads
C09	HV343-02-FL - Double Shaft, 18” flying leads
C10	HV341-01-FL - Single Shaft, 18” flying leads
C11	HV342-01-FL - Single Shaft, 18” flying leads
C12	HV343-01-FL - Single Shaft, 18” flying leads
C21	LV341-02-10 - Double Shaft, 10ft cable
C22	LV342-02-10 - Double Shaft, 10ft cable
C23	LV343-02-10 - Double Shaft, 10ft cable
C24	LV341-01-10 - Single Shaft, 10ft cable
C25	LV342-01-10 - Single Shaft, 10ft cable
C26	LV343-01-10 - Single Shaft, 10ft cable
C27	LV341-02-FL - Double Shaft, 18” flying leads
C28	LV342-02-FL - Double Shaft, 18” flying leads
C29	LV343-02-FL - Double Shaft, 18” flying leads
C30	LV341-01-FL - Single Shaft, 18” flying leads
C31	LV342-01-FL - Single Shaft, 18” flying leads
C32	LV343-01-FL - Single Shaft, 18” flying leads

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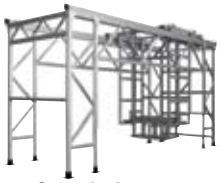

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