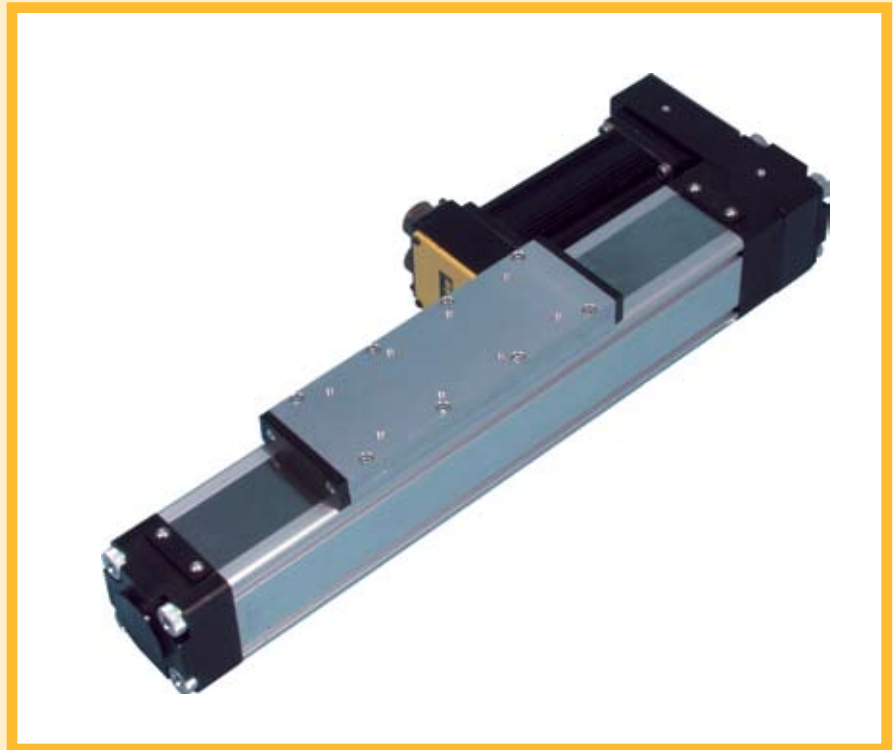


ER Series Rodless Actuators



ER Series

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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.

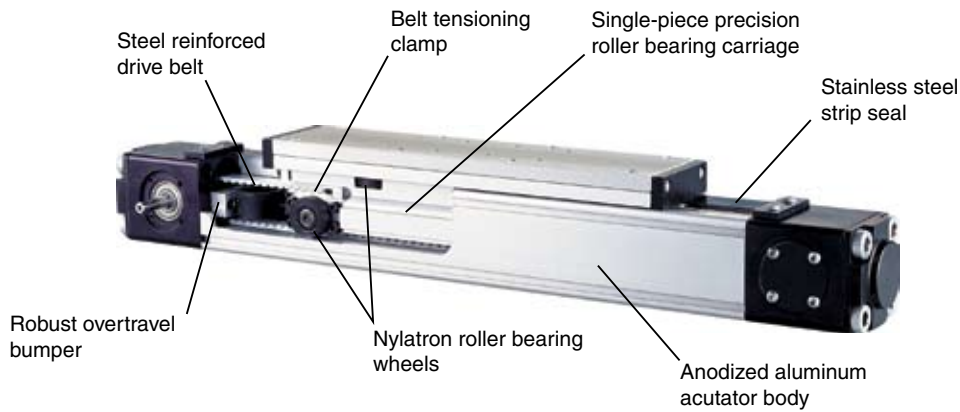
Markets and Industries Served

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

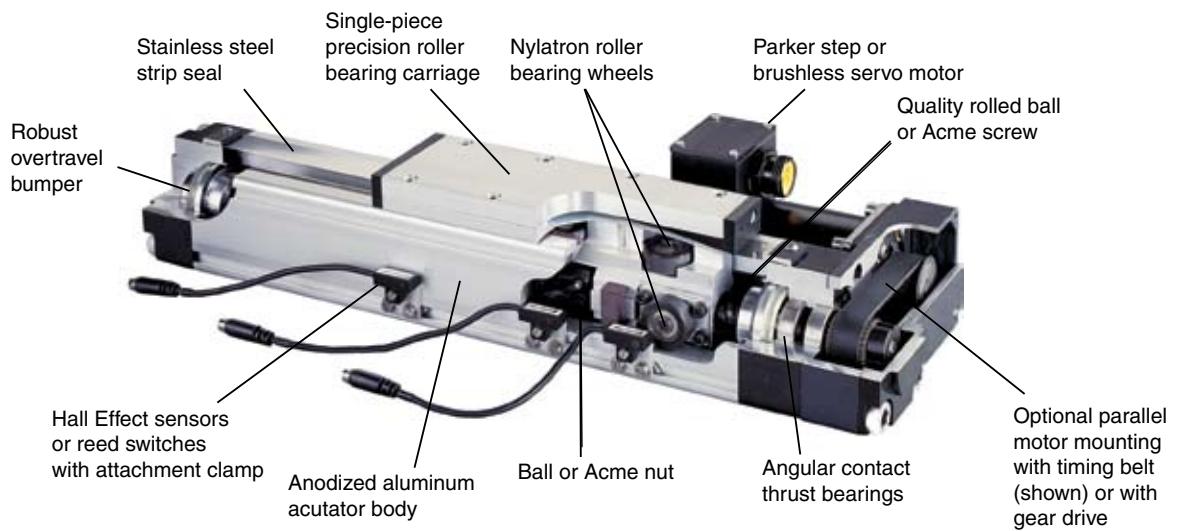
Application Examples

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

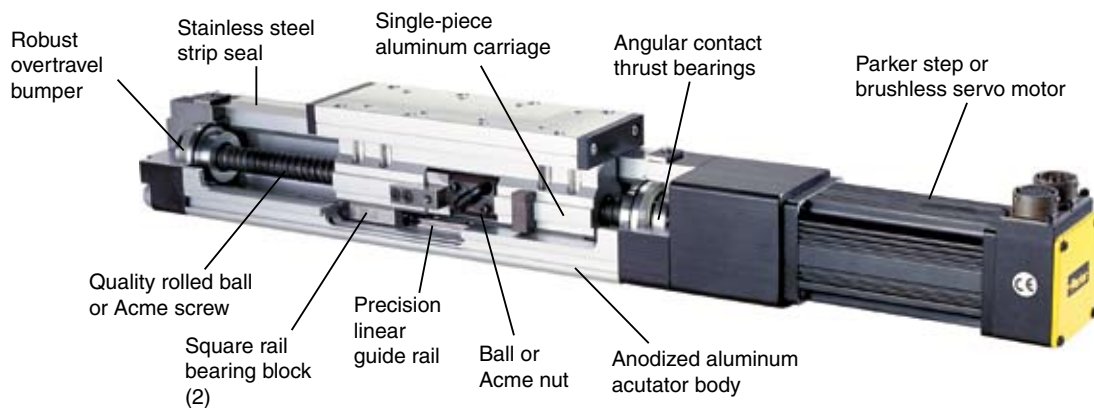
Roller Bearing Carriage with Belt Drive



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/s ² (m/s ²)	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-in ²	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-in ²	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-in ² /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		Roller Bearing	Square Rail
Normal Load Fz	lbf (N)	50 (222)	250 (1112)		100 (445)	500 (2224)		150 (667)	1000 (4448)		150 (667)	1000 (4448)
Side Load Fy	lbf (N)	16 (71)	250 (1112)		30 (133)	500 (2224)		50 (222)	1000 (4448)		50 (222)	1000 (4448)
Pitch Moment My	ft-lbf (Nm)	15 (20)	67 (90)		29 (39)	119 (161)		53 (72)	283 (209)		53 (72)	283 (209)
Roll Moment Mx	ft-lbf (Nm)	4 (5)	10 (14)		10 (14)	21 (28)		24 (33)	61 (83)		24 (33)	61 (83)
Yaw Moment Mz	ft-lbf (Nm)	7 (9)	35 (48)		15 (20)	62 (84)		23 (31)	94 (127)		23 (31)	94 (127)
Weight & Inertia Data												
		Roller Bearing	Square Rail		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)		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)		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)		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/s ² (m/s ²)	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-in ²	3.87	16.20	113.08
Additional Inertia per 100mm travel	oz-in ² /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.

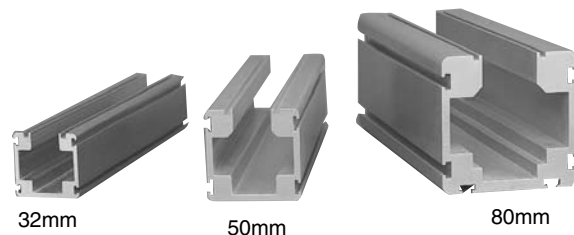
2. Repeatability is unidirectional achieved under ideal conditions and slow speeds. Actual repeatability may vary with the application.

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.



Roller Bearing Carriage Load Ratings

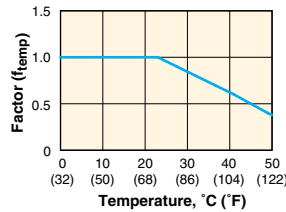
The ER series roller bearing carriage was designed with carriage life of 100,000,000 inches (2,540 km) when fully loaded. Certain factors, such as speed, temperature, and compound moment loading reduce the load capacity of the roller bearing carriage. Speed dependant de-ratings are already factored into 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 temp should be multiplied by the values in the curves to determine de-rated load capacity due to temperature.

Temperature Factor vs Temperature

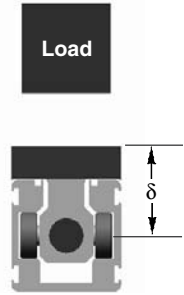


Compound Loading:

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.

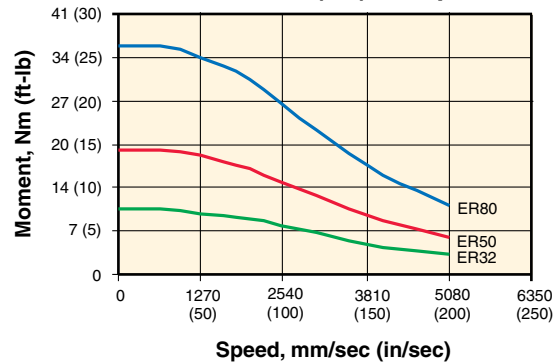
Pitch Moment

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.

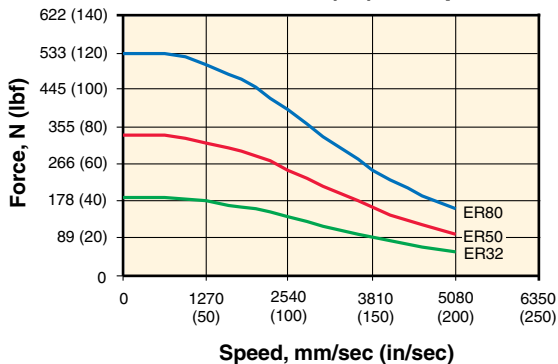


Profile	δ (in)	δ (mm)
ER32	1.53	38.8
ER50	1.98	50.3
ER80	2.85	72.4

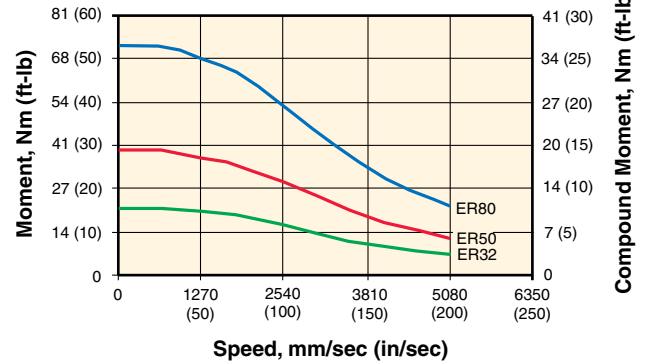
Yaw Moment (Mz) vs. Speed



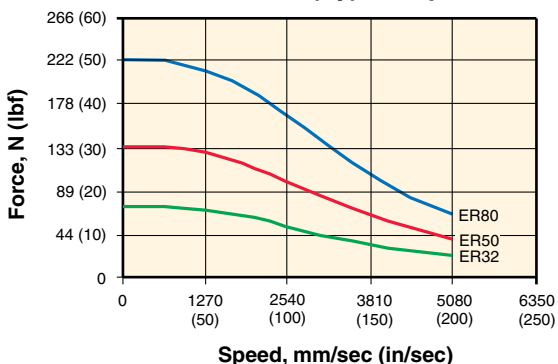
Normal Load (Fz) vs. Speed



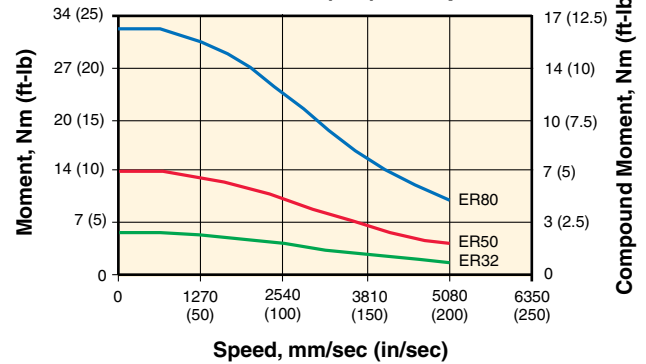
Pitch Moment (My) vs. Speed



Side Load (Fy) vs. Speed



Roll Moment (Mx) vs. Speed



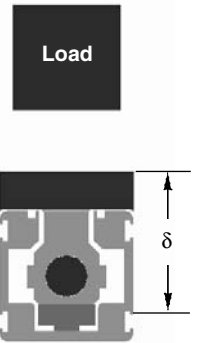
Square Rail Carriage Load Ratings

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.

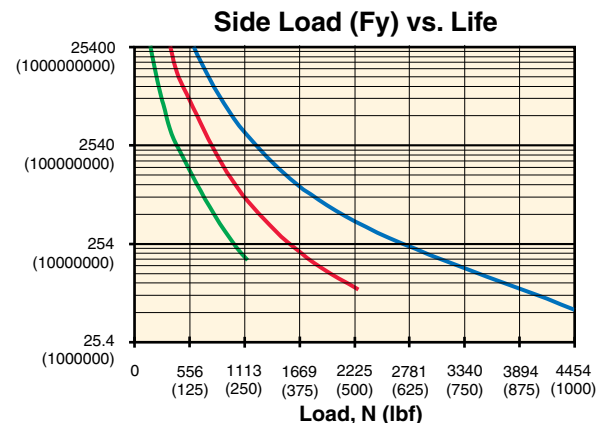
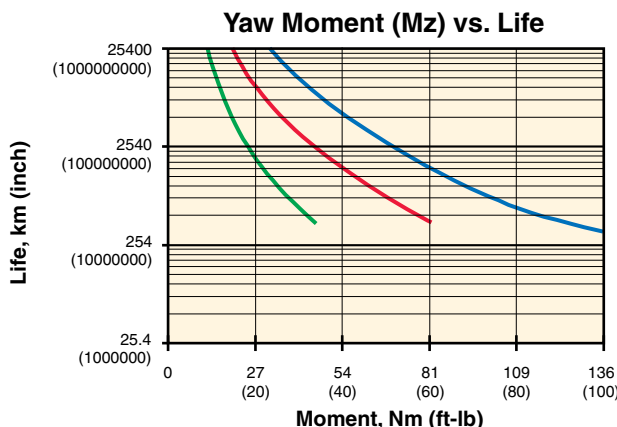
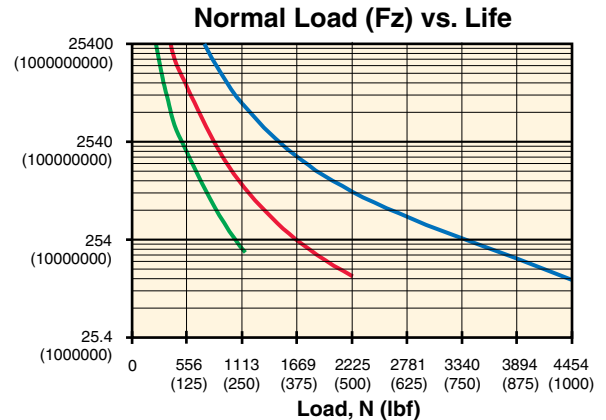
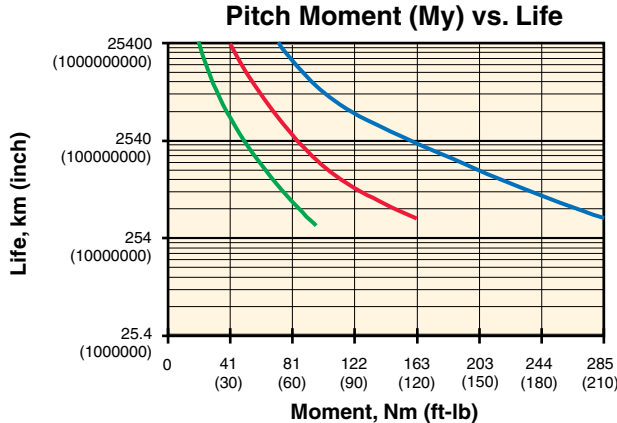
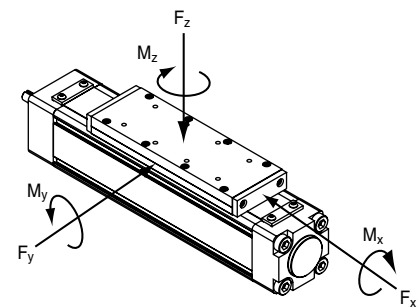
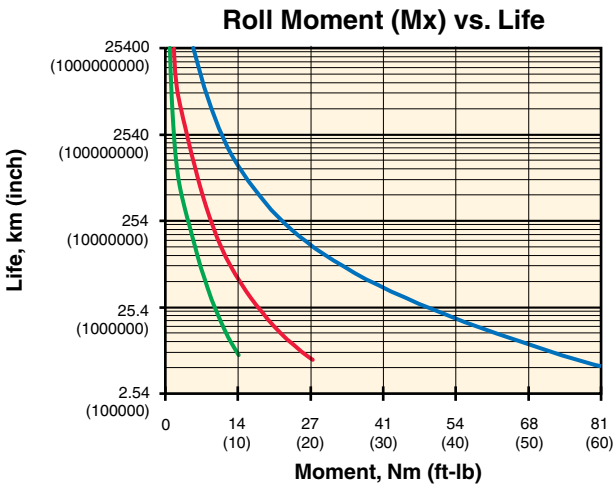
Refer to the graphs below to determine expected square rail bearing carriage life. The ER technical manual should be referenced for more detailed information on calculating and analyzing moment loads.

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.

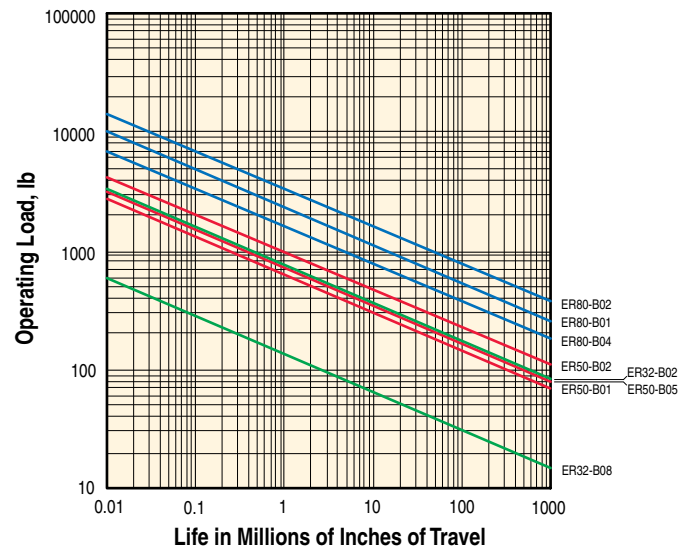
Ball Screw Life: Ball screws are high efficiency mechanisms that utilize a rolling friction, ball bearing nut to translate rotary motion and torque to linear motion and thrust. Life expectancy can be predicted by comparing the effective load to the screw's basic dynamic load rating. Basic dynamic load 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)



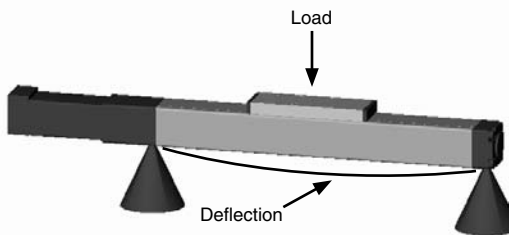
ER Series

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

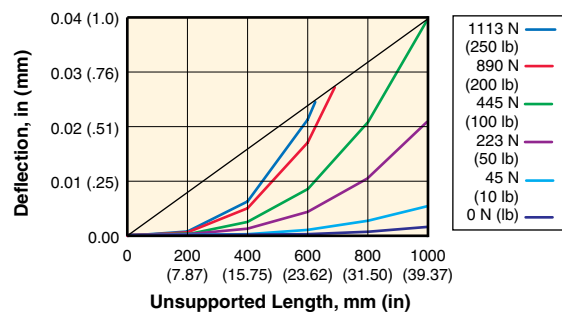
Deflection

Curves depict values for upright mounting only.

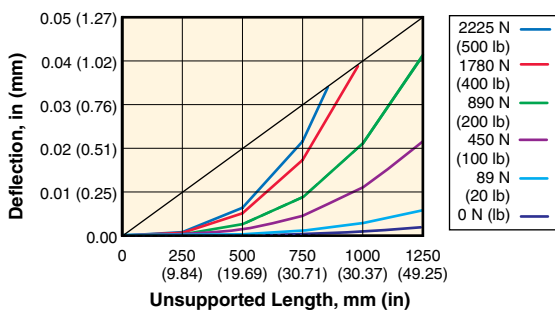
Deflection formulas and additional specifications are available in the ER technical manual.



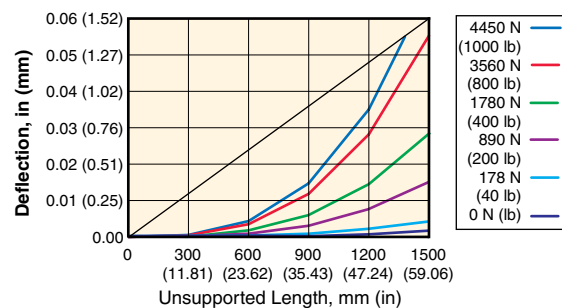
Size 32 Deflection



Size 50 Deflection



Size 80 Deflection

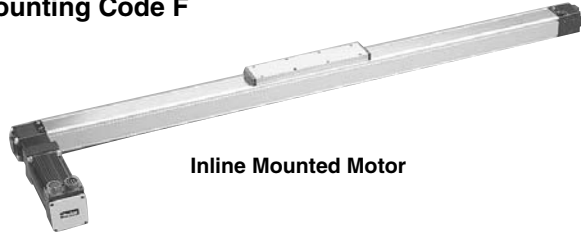


Note: Diagonal line represents maximum deflection.

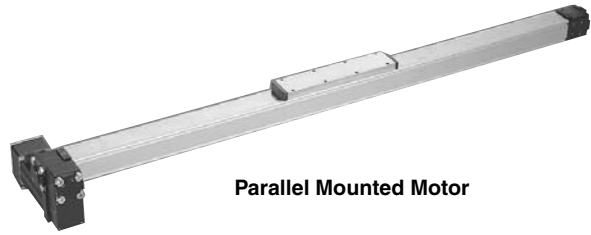
ER Basic Dimensions – Belt Drive



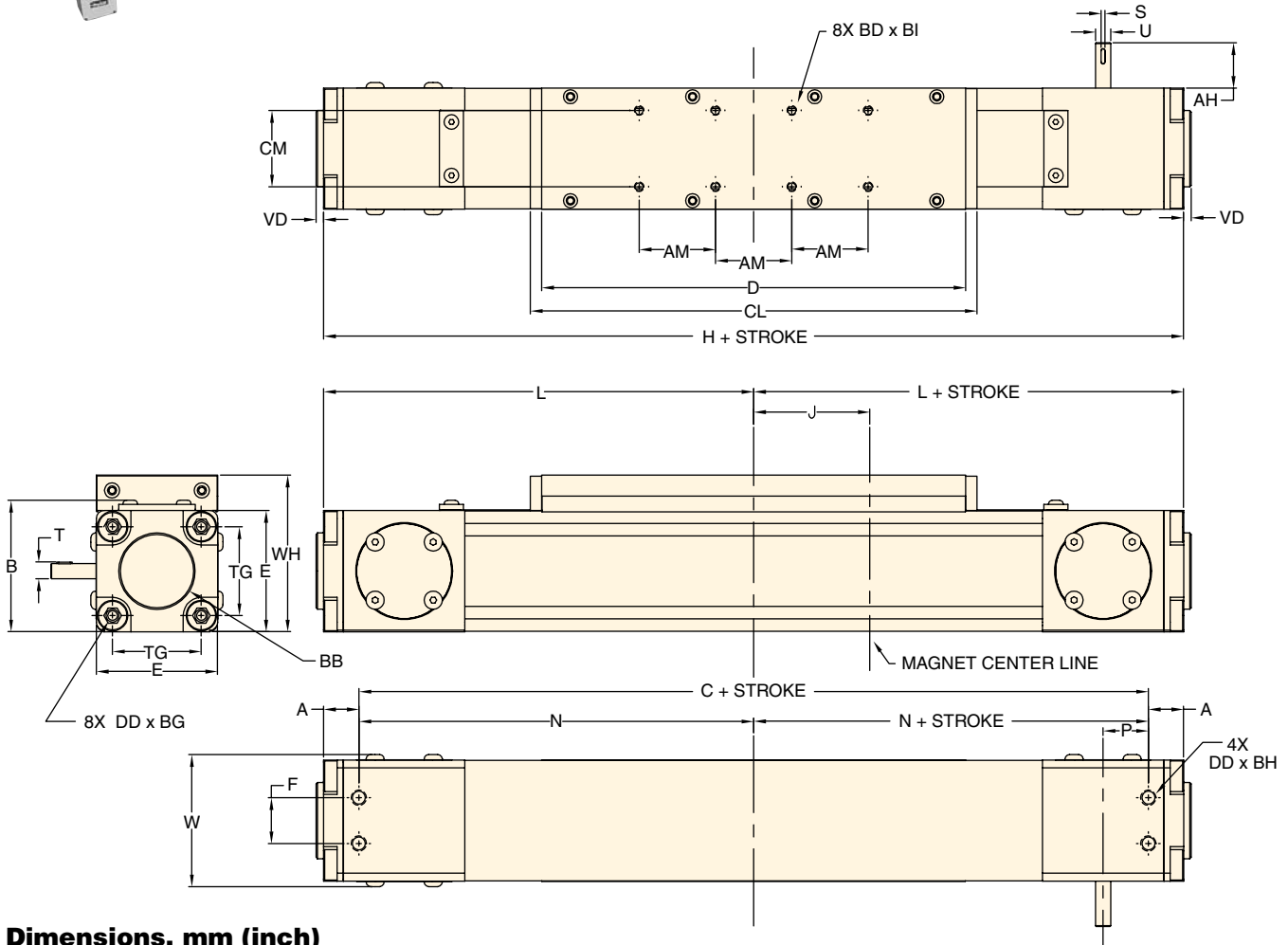
Belt Drive Actuator Standard Bottom Tap Mount (MS4) Mounting Code F



Inline Mounted Motor



Parallel Mounted Motor

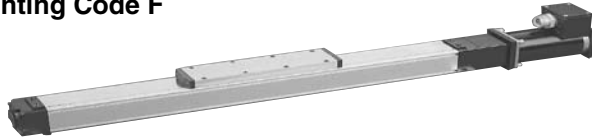


Dimensions, mm (inch)

Model	A	AH	AM	B	ØBB	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

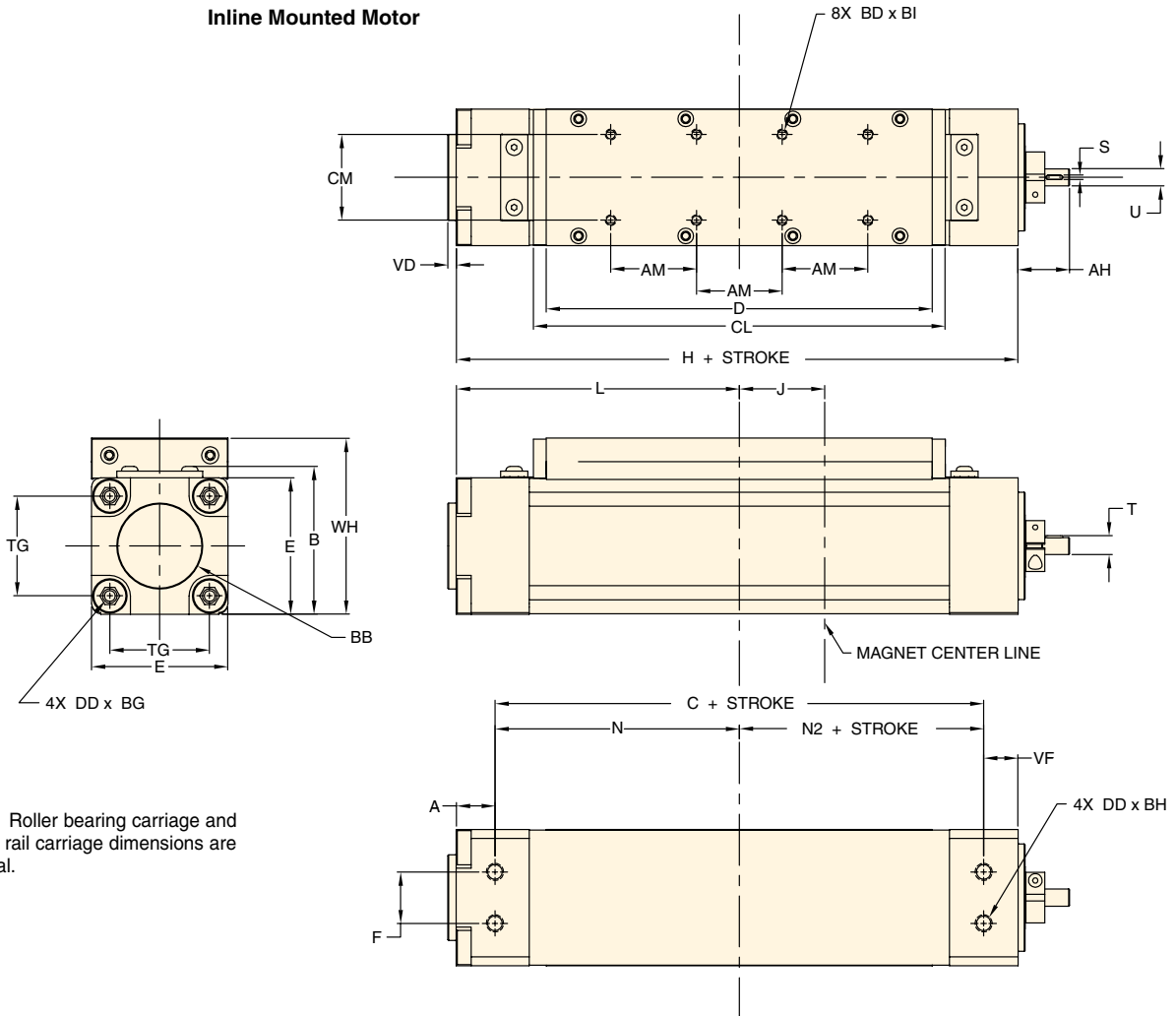
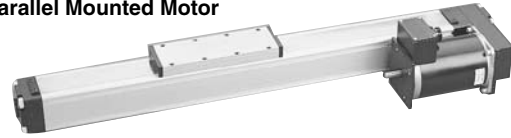
Model	E	F	H	J	L	N	P	S	T	TG	U	VD	W	WH
ER32	46.5 (1.83)	16.0 (0.63)	393.0 (15.47)	63.6 (2.50)	196.5 (7.74)	182.1 (7.17)	17.2 (0.68)	M2x8	8.7 (0.34)	32.5 (1.28)	8.0 (0.314)	4.0 (0.16)	49.9 (1.97)	62.0 (2.44)
ER50	63.5 (2.50)	24.0 (0.95)	450.6 (17.74)	60.9 (2.40)	225.3 (8.87)	206.9 (8.15)	23.7 (0.94)	M2x8	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



Inline Mounted Motor

Parallel Mounted Motor



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

Dimensions, mm (inch)

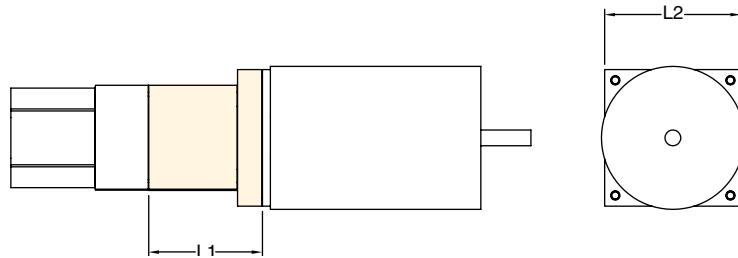
Model	A	AH	AM	B	ØBB	BD x BI	C	CL	CM	D	DD x BG	DD x BH
ER32	14.0 (0.55)	18.2 (0.72)	28.0 (1.102)	51.8 (2.04)	29.9 (1.18)	M4x0.7 x 8	212.1 (8.35)	180.1 (7.09)	28.0 (1.102)	168.1 (6.62)	M6x1.0 x 16	M6x1.0 x 8.8
ER50	18.0 (0.71)	24.1 (0.95)	40.0 (1.575)	68.9 (2.71)	40.0 (1.57)	M5x0.8 x 10	228.1 (8.98)	192.1 (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)

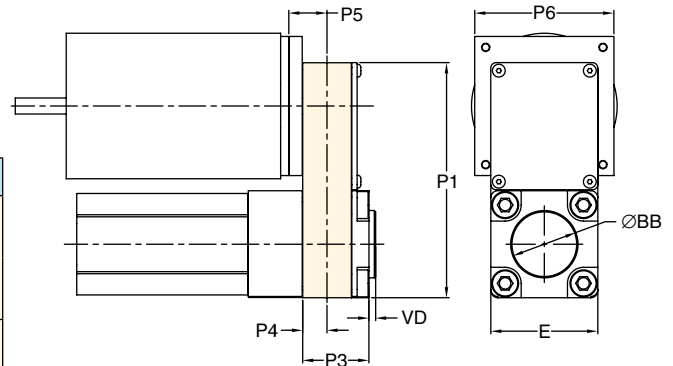
Dimensions L1 and L2 are dependent on drive motor dimensions. Consult factory.



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)	

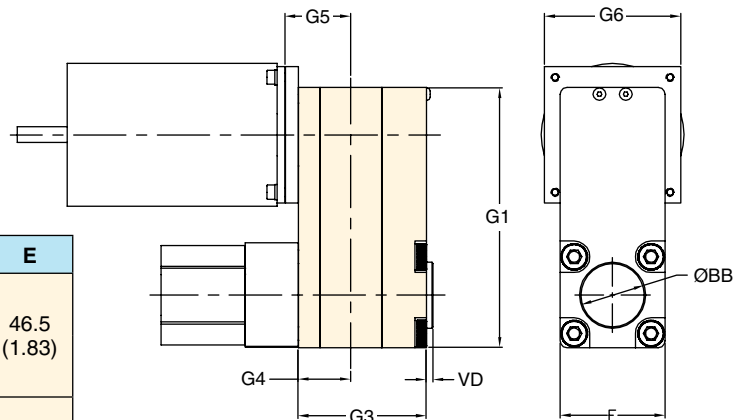


Dimensions P5 and P6 are dependent on drive motor dimensions. Consult factory.

Parallel (Gear Drive)

Common Dimensions

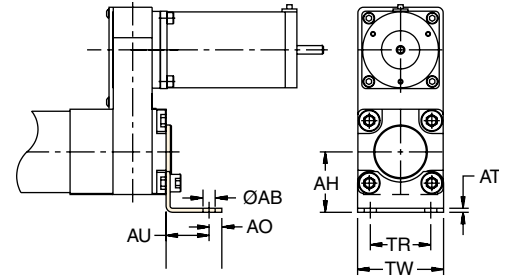
Size	Drive	ØBB	G1	G3	G4	VD	E
32	Screw	30.0 (1.18)	125.5 (4.94)	53.3 (2.10)	24.3 (0.96)	4.0 (0.16)	46.5 (1.83)
	Belt	30.0 (1.18)	125.5 (4.94)	53.3 (2.10)	40.6 (1.60)	4.0 (0.16)	
50	Screw	40.0 (1.57)	157.5 (6.20)	77.5 (3.05)	31.6 (1.24)	4.0 (0.16)	63.5 (2.50)
	Belt	40.0 (1.57)	157.5 (6.20)	77.5 (3.05)	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.

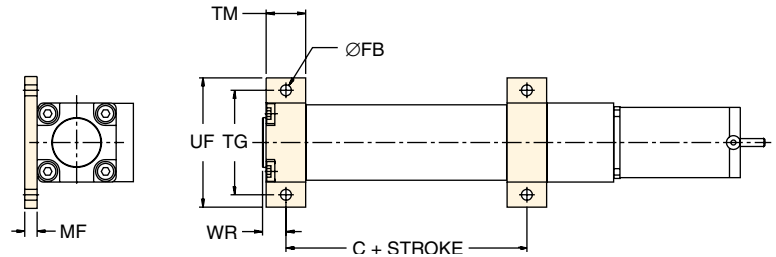
Visit www.parker.com/actuator for 3D models.

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



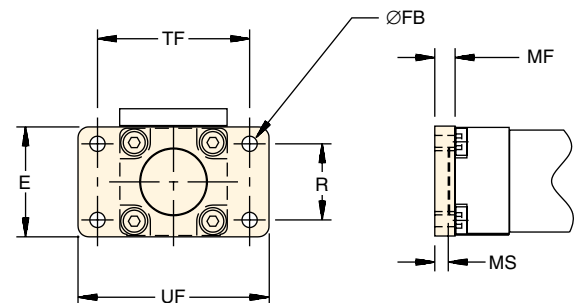
Screw Drive

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)



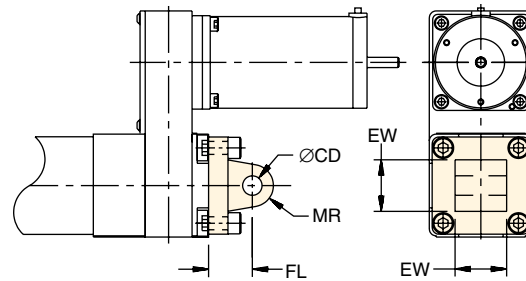
NOTE: When using this option, it is important that both ends of the actuator are supported.

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)

ER Actuator Mounting Options

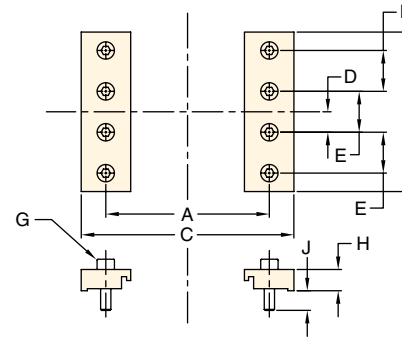


Rear Eye Mounting (MP4) Mounting Code E



Model	ØCD	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



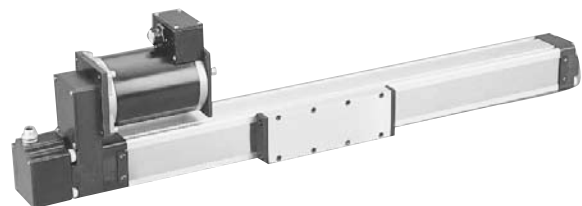
Unit Size	Model Code	# of Holes	A	B	C	D	E	G	H	J Size
ER32	TPEM-TC-03-1	1	76.0 (2.99)	18.0 (0.71)	56.0 (2.02)	0 (0)	—	M4 x 0.7 x 14	7.0 (0.28)	7.0 (0.28)
	TPEM-TC-03-2	2	76.0 (2.99)	38.0 (1.50)	56.0 (2.02)	10.0 (0.39)	20.0 (0.79)			
	TPEM-TC-03-3	3	76.0 (2.99)	58.0 (2.28)	56.0 (2.02)	10.0 (0.39)	20.0 (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

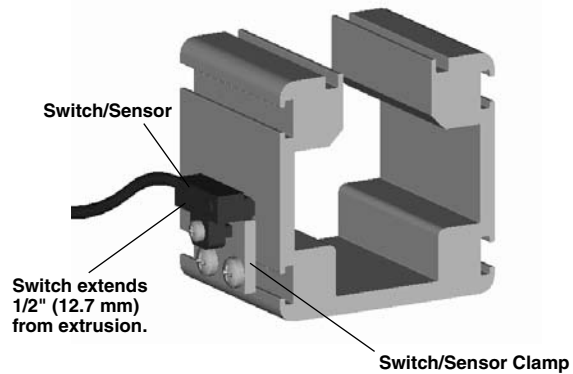
- Special Coatings
- Stainless Steel Components
- FDA Approved for Food Applications

*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.

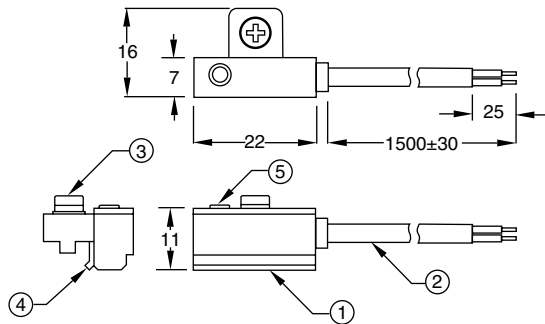
When attached to available sensor/switch clamps, sensors and switches may be mounted to T-slots in the ER Series actuator body (see illustration). The clamp positions the switch/sensor at the thinnest section of the extrusion wall, through which the magnetic target is sensed.



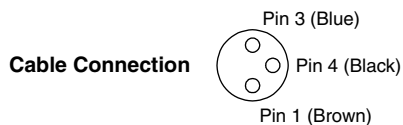
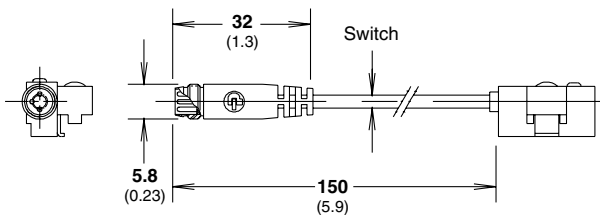
Comparing Sensors and Switches

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



- Housing material: plastic
- Cable type: \varnothing 3.3mm, 3C wire, 24AWG
- Clamp screw: M3x8mm, stainless steel
- Adjustable clamp: stainless steel
- LED color when activated: red
- IP67 and CE certified



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.

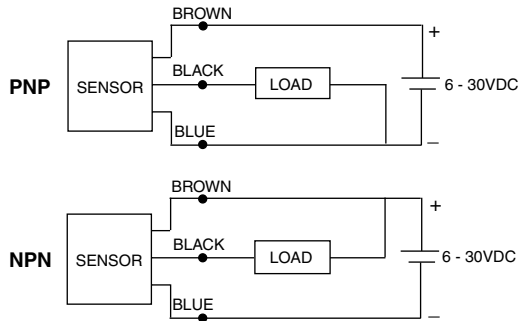
Connector Option

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.

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

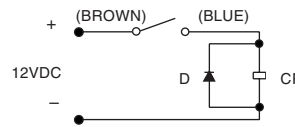
Notes:

- * 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 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



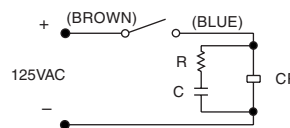
Required for proper operation 24VDC.

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

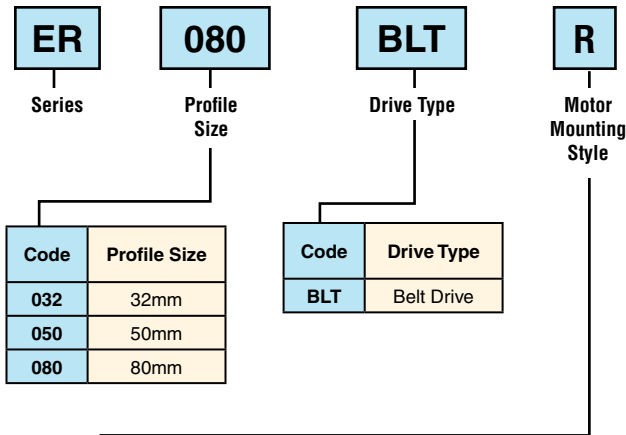
Reed Switch Specifications

	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



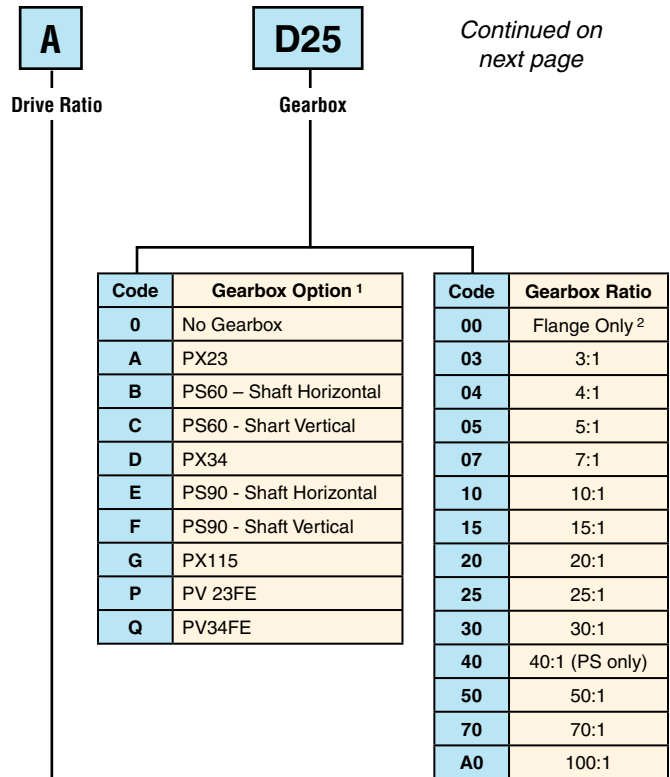
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Code	Profile Size
032	32mm
050	50mm
080	80mm

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	



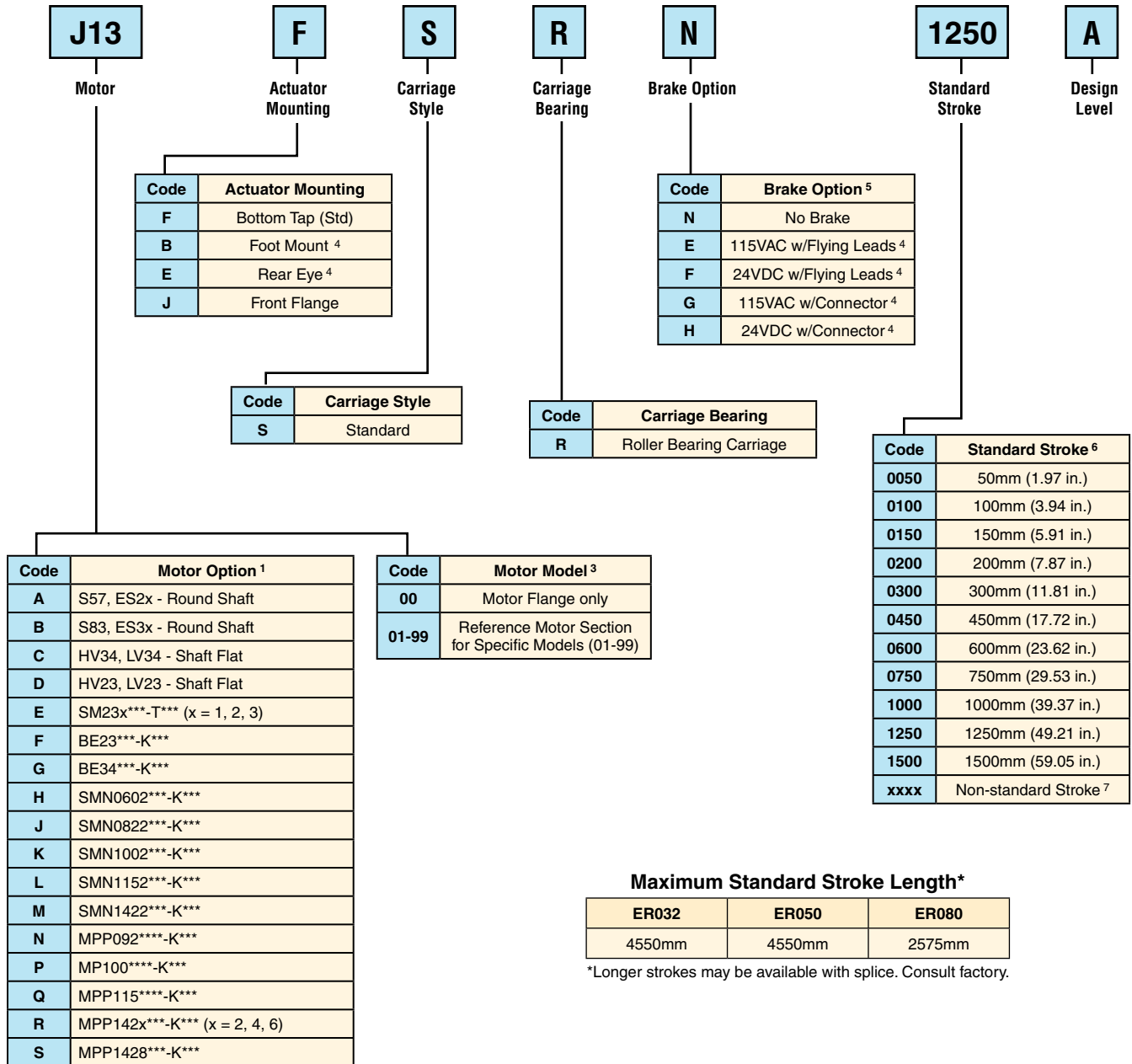
Code	Gearbox Option ¹
0	No Gearbox
A	PX23
B	PS60 – Shaft Horizontal
C	PS60 - Shaft Vertical
D	PX34
E	PS90 - Shaft Horizontal
F	PS90 - Shaft Vertical
G	PX115
P	PV 23FE
Q	PV34FE

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

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)

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.



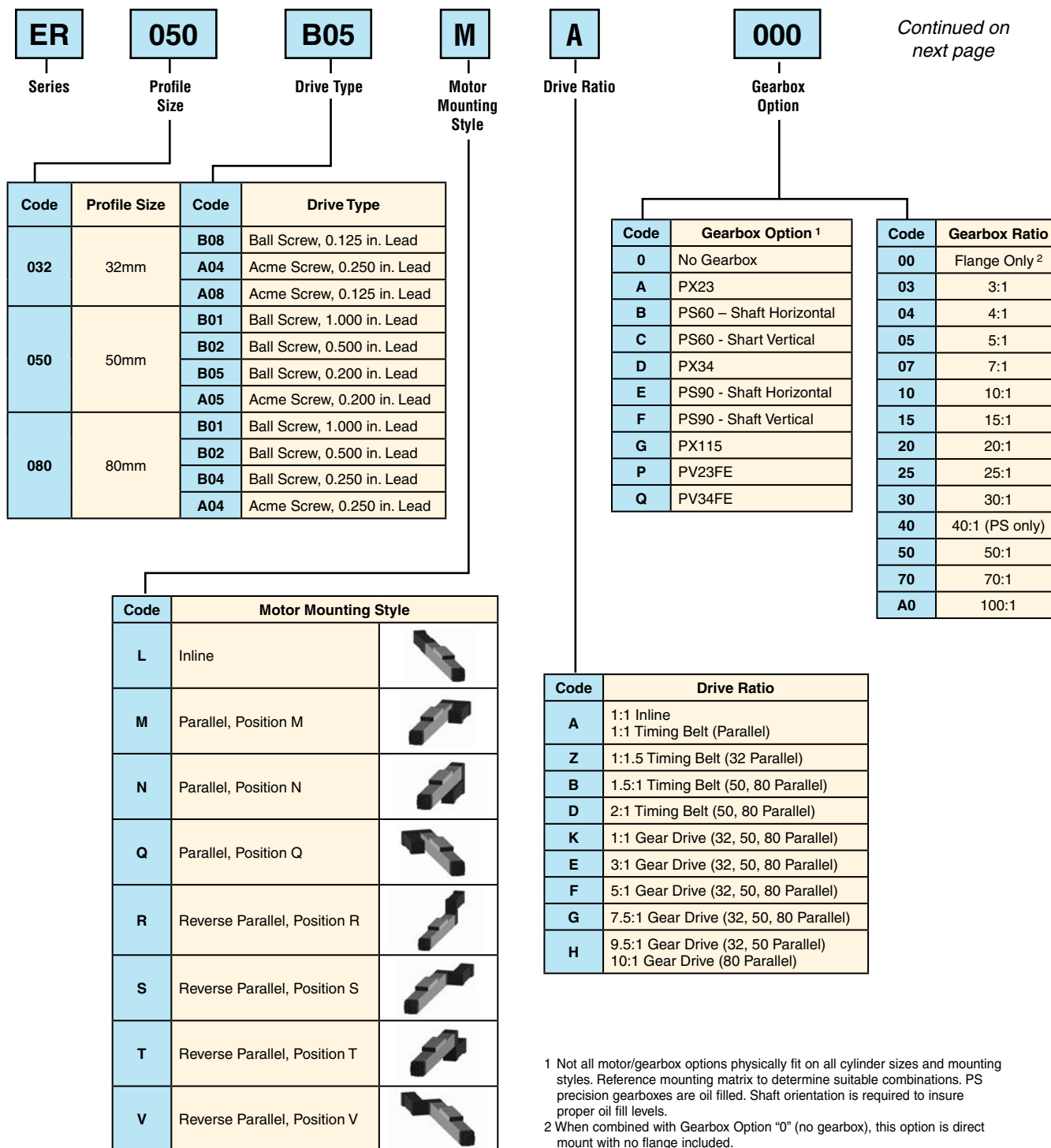
*Longer strokes may be available with splice. Consult factory.

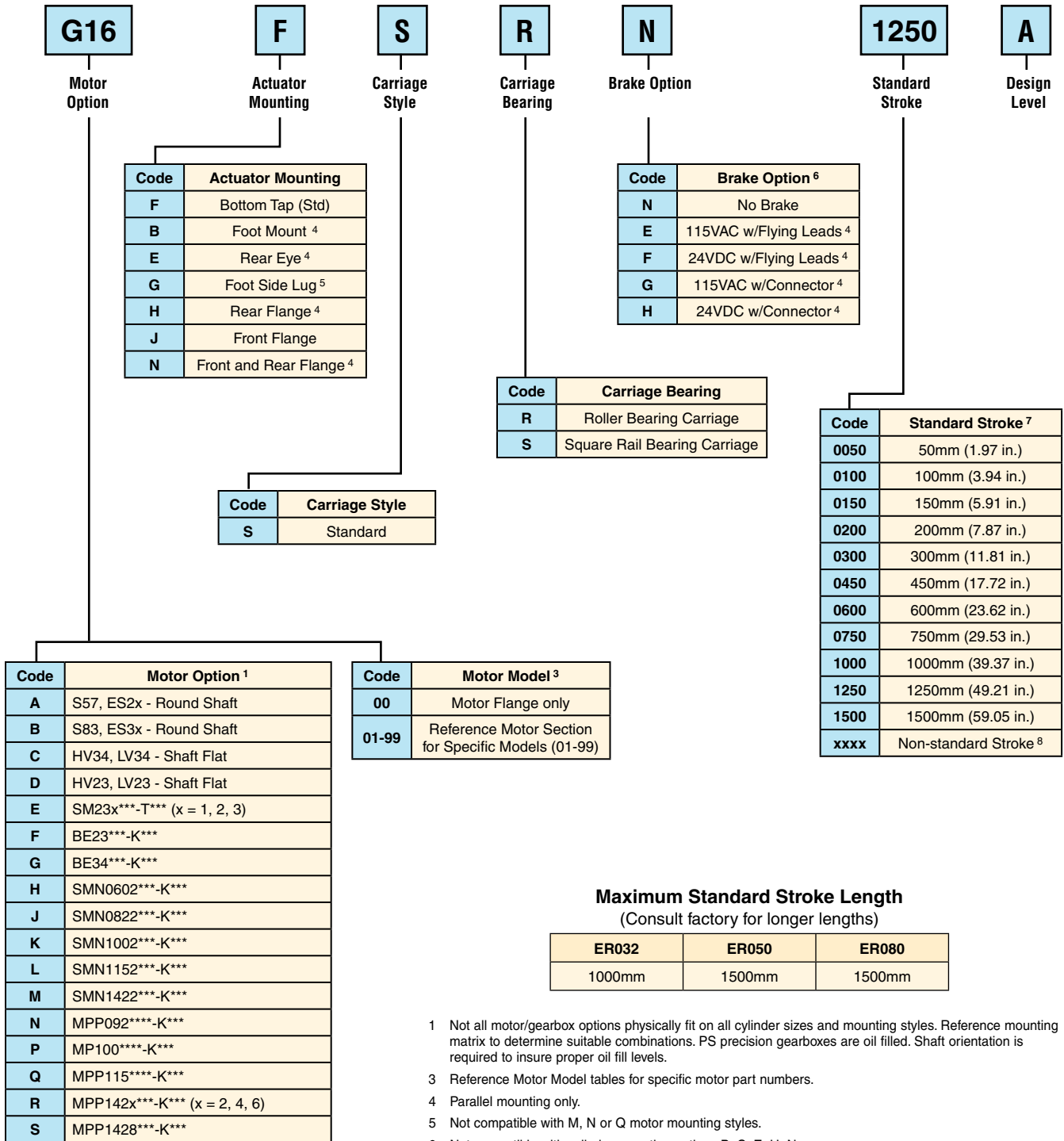
- 1 Not all motor/gearbox options physically fit on all cylinder sizes and mounting styles. Reference mounting matrix to determine suitable combinations. PS precision gearboxes are oil filled. Shaft orientation is required to insure proper oil fill levels.
- 3 Reference Motor Model tables for specific 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 Ordering Information – Screw



Continued on next page





- 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.
- Reference Motor Model tables for specific motor part numbers.
- Parallel mounting only.
- Not compatible with M, N or Q motor mounting styles.
- Not compatible with cylinder mounting options B, C, E, H, N.
- 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.
- 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:

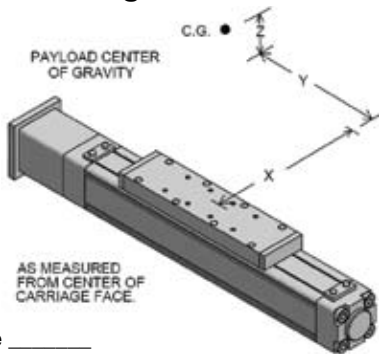
Please include the critical dimensions in your sketch.

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 _____

Application Requirements:

- Overall Stroke** (add 25mm per end minimum) _____
- Cylinder Orientation** (check one)
 - Horizontal Inverted Side Mount
 - Vertical Angle: Degrees _____
- Load/Tooling Weight** _____
- Repeatability Requirements** _____
 - Unidirectional Bidirectional
- Is the load externally guided?** (check one)
 - Yes No
 - If yes, how? _____
- Is the actuator body supported?** (check one)
 - Yes No
 - If yes, how? _____
- Life Requirements** (cycles, distance or years)
 - Hours per day _____ Days per year _____
- Special Considerations** _____

Environmental Requirements

- Operating Temperature**
 Max _____ Min _____
- Contamination** (check one)
 - Particle Liquid
 - Type: _____
- 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

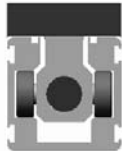


- Foot Side Lug (screw drive only)



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) _____



Belt Drive:

- Inline – Direct Drive Left (Pictured)

- Inline – Direct Drive Right



- Parallel

Option (see catalog page 46) _____



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

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 _____

