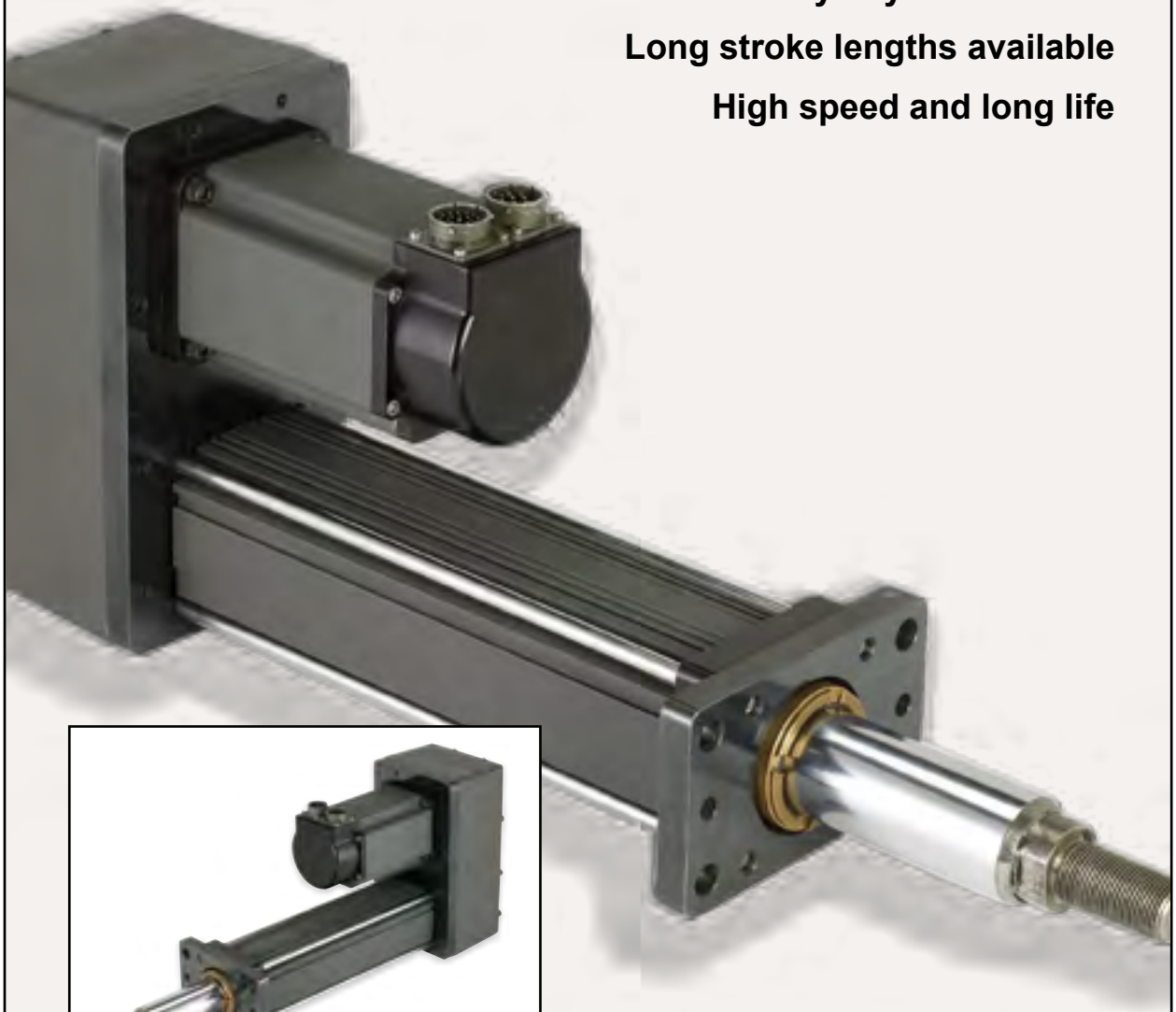
FT SERIES

HIGH FORCE ROLLER SCREW ACTUATOR

Mount virtually any servo motor

Long stroke lengths available

High speed and long life



Motors shown in drawings are for illustrative purposes only and are not included with FT Actuators.

FT Series

Linear Actuators

High Performance

As with all Exlar roller screw products, the FT Series actuators deliver heavy load capacity, high speed capabilities, and exceptionally long life when compared to other linear actuator technologies.

Other comparably-sized screw actuator products on the market, specifically ball screw and acme screw actuators, have relatively low load capacities, short working lives and limited speed capabilities. At equivalent sizes, under moderate to heavy loads, it is reasonable to project that FT units will deliver up to 15 times the working life of those other methods. For OEM designers, this often means much more power and durability can be achieved from a much smaller footprint when Exlar FT units are used.

Contamination Protection

The FT Series design has all the contamination-isolation advantages of hydraulic cylinders without the limited load, life, and speed of designs built around ball or acme screws. The bearing and roller screw components in the Exlar FT Series force tubes are mounted within the sealed housing. This prevents abrasive particles and other contaminants from entering the actuator's critical mechanisms, and assures trouble-free operation even in the most severe environments.

FT Series actuators are provided with standard grease lubrication. Custom provisions can be made for oil filled lubrication.

Feature	Standard	Optional
Long Strokes	6 inch, 12 inch, 18 inch, 24 inch, 36 inch, and 48 inch	Intermediate Lengths up to 96 inch
Pre-Loaded Follower	No	Yes
External Limit Switches	No	One, Two or Three Adjustable Switches
Multiple Actuator Mountings	Side Mount, Side Lug, Extended Tie Rods, Rear Clevis, Front Flange, Side Trunnion, Rear Flange, Front/Rear Flange	Specials Available
Multiple Motor Mounting Configurations	Inline Direct Drive, Parallel 1:1 Drive, Parallel, 2:1 Reduction	Specials Available

Engineered Compatibility

Exlar has removed much of the end-user-engineering burden by designing the FT series to be compatible with a wide variety of standard motors. Motor mounting, actuator mounting, and gearing configurations are available to meet nearly any application's requirements.

Exlar FT Series force tube actuators use a planetary roller screw mounted inside a telescoping tube mechanism. The follower is attached to the moveable force tube, which then extends and retracts as the screw rotates. An external motor (supplied by Exlar or the customer) provides the rotational force.

Technical Characteristics	
Frame Sizes - in (mm)	3.5 (90), 4.8 (120), 6.0 (150), 8.0 (200)
Screw Leads - in (mm)	0.2 (5), 0.25 (6), 0.4 (10), 0.5 (12), 0.8 (20), 1.2 (30)
Standard Stroke Lengths in (mm)	6 (150)*, 12 (300), 18 (450), 24 (600), 36 (900), 48 (1200)
Force Range	up to 40,000 lbf (178 kN)
Maximum Speed	up to 60 in/sec (1524 mm/s)

*Not on FT60 or FT80

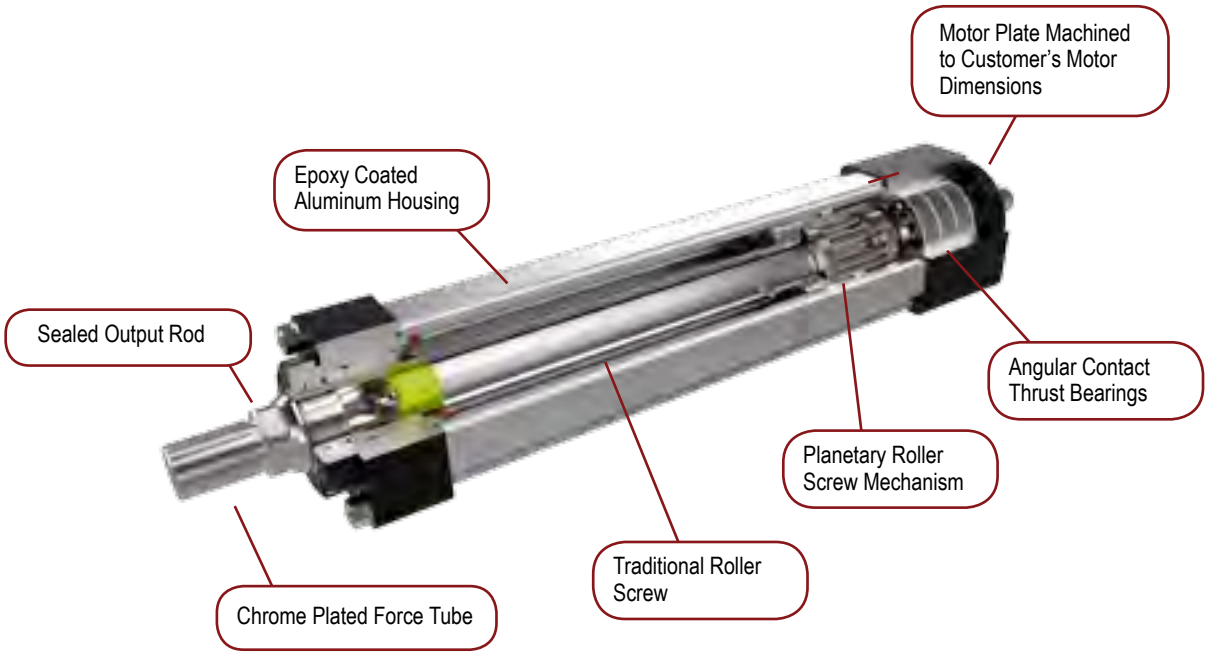
Operating Conditions and Usage		
Accuracy:		
Screw Lead Accuracy	in/ft (mm/300 mm)	0.001 (0.025)
Screw Lead Variation	in (mm)	0.0012 (0.030)
Actuator Backlash*	in (mm)	0.002 (0.06)
Friction Torque Values	lbf-in (Nm)	FT35: 7.0 (0.79) FT45: 11.00 (1.24) FT60: 14.0 (1.58) FT80: 35.0 (3.95)
Efficiency:		
Motor Inline	%	80
Motor Parallel	%	80
Ambient Conditions:		
Standard Ambient Temperature	°C	0 to 65
Extended Ambient Temperature***	°C	-30 to 65
Storage Temperature	°C	-40 to 85
IP Rating**		IP65

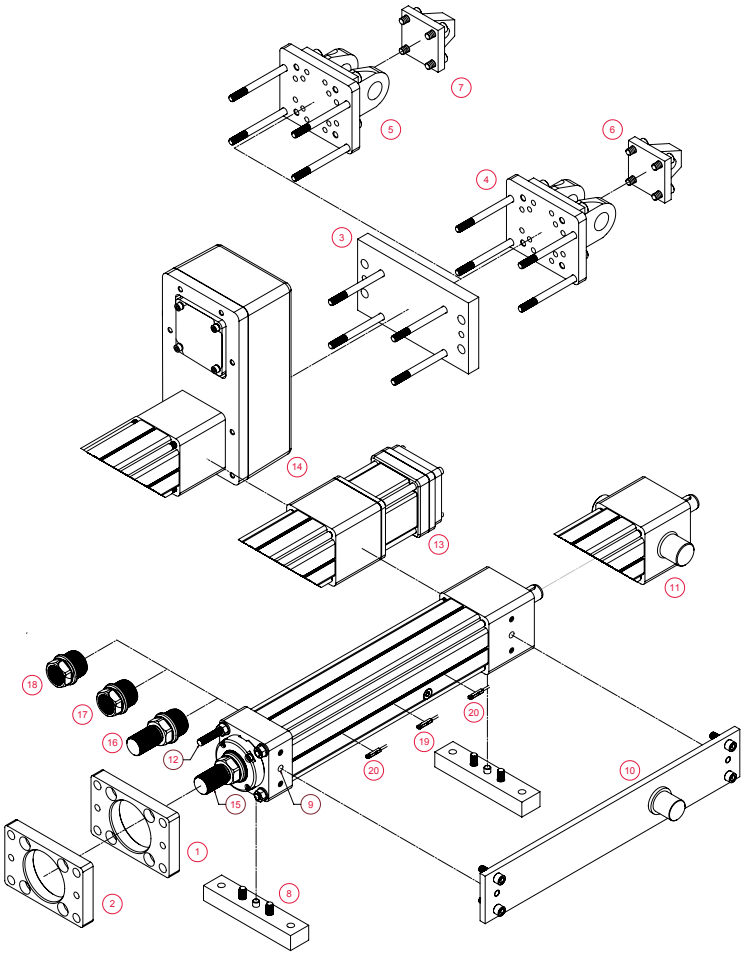
* System backlash will be different with various types of motor mounting arrangements and couplings. Please discuss your particular configuration with your local sales representative.

** For IP65S sealing of unit with motor mounted, please contact your local sales representative.

*** Consult Exlar for extended temperature operation.

Product Features





1 - Front/rear flange, English and front flange, English
2 - Front flange, metric
3 - Front/rear flange, English* and rear flange, English
4 - Rear clevis, English
5 - Rear clevis, metric
6 - Rear eye English
7- Rear eye, metric
9 - Side mount*, double side mount, metric side mount*, and metric double side mount
10 - Side trunnion and metric side trunnion
11 - Rear trunnion and metric rear trunnion
12 - Extended tie rods and metric extended tie rods
13 - Inline direct drive
14 - Parallel, 1:1 belt reduction
Parallel, 2:1 belt reduction
15 - Male, US standard thread and male, US standard thread SS
16 - Male, metric thread and male metric thread SS
17 - Female, US standard thread and female, US standard thread SS
18 - Female, metric thread and female, metric thread SS
19 - External limit switch - N.O., PNP or NPN
20 - External limit switch - N.C., PNP or NPN

*Consult Factory

Industries and Applications

Hydraulic cylinder replacement
Ball screw replacement
Pneumatic cylinder replacement

Automotive
- Lift station
- Automated assembly
- Riveting / fastening / joining
- Pressing

Sawmill/Forestry
- Saw positioning
- Fence positioning

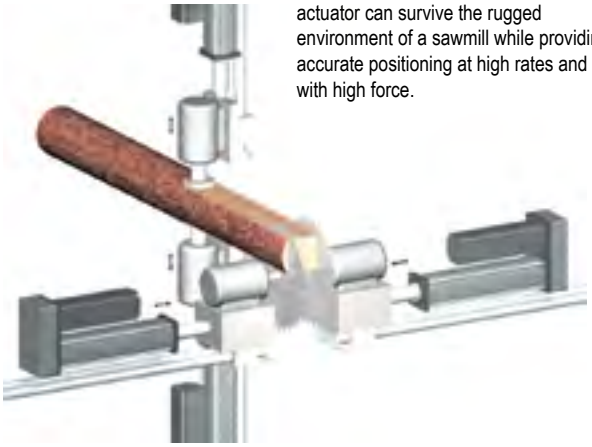
Process Control
- Conveyor diverters / gates
- Precision valve control
- Tension control

Machining
- Automated flexible fixturing
- Machine tool
- Parts clamping
- Precision grinders

Entertainment / Simulation
- Action simulators
- Ride automation

Material Handling
- Stamping
- Indexing stages
- Product sorting
- Material cutting
- Web guidance
- Wire winding
- Pressing
- Tube bending

Test
- Test stands



The robust design of the FT series actuator can survive the rugged environment of a sawmill while providing accurate positioning at high rates and with high force.

With their high thrust capability, compact size and smooth controlled motion, FT Series actuators are an ideal replacement for hydraulics or pneumatics on injection mold toggles. Control improvements from an electromechanical servo system offer less abuse of valuable molds and more consistent performance.

Motors shown in drawings are for illustrative purposes only and are not included with FT Actuators.

Mechanical Specifications

FT35

		High Capacity			Standard Capacity		
		05	10	20	05	10	20
Screw Lead	in	0.197	0.394	0.787	0.197	0.394	0.787
	mm	5	10	20	5	10	20
Maximum Force[2]	lbf	5,000	5,000	5,000	5,000	5,000	5,000
	kN	22.2	22.2	22.2	22.2	22.2	22.2
Life at Maximum Force	in x 10^6	15.4	24.6	56.7	8.88	14.15	32.05
	km	392	626	1,440	225.6	359.4	814.2
C_a (Dynamic Load Rating)	lbf	21,400	19,850	20,800	17,800	16,500	17,200
	kN	95.2	88.3	92.5	79.2	73.4	76.5
Maximum Input Torque	lbf-in	196	392	783	196	392	783
	Nm	22.1	44.3	88.5	22.1	44.3	88.5
Max Rated RPM @ Input Shaft	RPM	4,500	4,500	4,500	4,500	4,500	4,500
Maximum Linear Speed @ Maximum Rated RPM	in/sec	14.7	29.5	59.3	14.7	29.5	59.3
	mm/sec	373	750	1,500	373	750	1,500

[1] FT35 actuators with high capacity screw option are 20 mm longer. See dimensions page 128.

[2] Maximum allowable actuator-generated force that can be applied routinely. Exceeding this force may result in permanent damage to the actuator. For high force, short stroke applications, consult factory.

Weights kg (lbs)

Base Actuator Weight	Stroke Length	6 Inch	12 Inch	18 Inch	24 Inch	36 Inch	48 Inch
	lb	30	35	40	45	55	65
	kg	14	16	18	21	25	30

Adder for Inline (excluding motor)	Adder for Parallel Drive (excluding motor)	Adder for Front Flange	Adder for Rear Flange	Adder for Rear Clevis	Adder for Rear Eye	Adder for Front/ Rear Angle Mounts	Adder for Two Trunnions	Adder for Two Foot Mounts
8 (3.6)	16 (7.3)	5.4 (2.5)	7.4 (3.4)	3.0 (1.4)	NA	NA	19.5 (8.9)	3.3 (1.5)

FT35 Reflective Inertias	5 mm Lead	10 mm Lead	20 mm Lead	
NMT Unit - J (0)	0.0004087	0.0004121	0.0004259	kg-m² (at input shaft)
NMT Unit - J (Stroke)	0.0000159	0.0000162	0.0000171	kg-m²/inch of stroke
Inline w/ Coupler - J (0)	0.0005127	0.0005161	0.0005299	
Inline w/ Coupler - J (Stroke)	0.0000159	0.0000162	0.0000171	
Parallel 1:1 - J (0)	0.0011042	0.0011855	0.0014480	kg-m² (at motor shaft)
Parallel 1:1 - J (Stroke)	0.0000159	0.0000162	0.0000171	kg-m²/inch of stroke
Parallel 2:1 - J (0)	0.0014029	0.0014038	0.0015345	
Parallel 2:1 - J (Stroke)	0.0000040	0.0000040	0.0000043	

*Pulleys for parallel mount match actuator max performance ratings

Standard Inline Coupling Inertia	
	Inertia
FT35	0.000104 kg-m² (0.000920 lbf-in s²)

Pulley inertias reflected at motor including typical pulleys, belt and standard bushings. Because of differences in belt and pulley selection due to particular motor choices, please contact your local sales representative if these values are critical to your application.

Intermediate and custom stroke lengths are available. Intermediate leads may also be available. Belt and pulley inertia varies with ratio and motor selection. Please contact your local sales representative.

*See definitions on page 124

FT45

		High Capacity		Standard Capacity	
		05	10	05	10
Screw Lead	in	0.197	0.394	0.197	0.394
	mm	5	10	5	10
Maximum Force[2]	lbf	10,000	10,000	10,000	10,000
	kN	44.5	44.5	44.5	44.5
Life at Maximum Force	in x 10^6	9.81	19.14	5.67	11.06
	km	249.2	486.3	144.0	280.9
C_a (Dynamic Load Rating)	lbf	36,800	36,500	30,650	30,400
	kN	163.7	162.4	136.3	135.2
Maximum Input Torque	lbf-in	392	783	392	783
	Nm	44.1	88.2	44.1	88.2
Max Rated RPM @ Input Shaft	RPM	3,500	3,500	3,500	3,500
Maximum Linear Speed @ Maximum Rated RPM	in/sec	11.5	23.0	11.5	23.0
	mm/sec	292	583	292	583

Weights kg (lbs)

Base Actuator Weight	Stroke Length	6 Inch	12 Inch	18 Inch	24 Inch	36 Inch	48 Inch
	lb	57	68	79	90	112	135
	kg	26	31	36	41	51	61

Adder for Inline (excluding motor)	Adder for Parallel Drive (excluding motor)	Adder for Front Flange	Adder for Rear Flange	Adder for Rear Clevis	Adder for Rear Eye	Adder for Front/ Rear Angle Mounts	Adder for Two Trunnions	Adder for Two Foot Mounts
7.1 (3.2)	42.5 (19.3)	6.1 (2.8)	17.4 (7.9)	18.9 (8.6)	19.8 (9)	NA	17.2 (7.8)	10.4 (4.7)

FT45 Reflective Inertias	5 mm Lead	10 mm Lead	
NMT Unit - J (0) NMT Unit - J (Stroke)	0.002463 0.000045	0.002474 0.000046	kg-m² (at input shaft) kg-m²/inch of stroke
Inline w/ Coupler - J (0) Inline w/ Coupler - J (Stroke)	0.002571 0.000045	0.002581 0.000046	kg-m² (at motor shaft) kg-m²/inch of stroke
Parallel 1:1 - J (0) Parallel 1:1 - J (Stroke)	0.006911 0.000045	0.006921 0.000046	
Parallel 2:1 - J (0) Parallel 2:1 - J (Stroke)	0.003466 0.000011	0.003469 0.000011	

*Pulleys for parallel mount match actuator max performance ratings

Standard Inline Coupling Inertia	
	Inertia
FT45	0.00010743 kg-m² (0.000951 lbf-in s²)

Pulley inertias reflected at motor including typical pulleys, belt and standard bushings. Because of differences in belt and pulley selection due to particular motor choices, please contact your local sales representative if these values are critical to your application.

*See definitions on page 124

FT60

		High Capacity			Standard Capacity		
		06	12	30	06	12	30
Screw Lead	in	0.236	0.472	1.181	0.236	0.472	1.181
	mm	6	12	30	6	12	30
Maximum Force[2]	lbf	20,000	20,000	20,000	20,000	20,000	20,000
	kN	89.0	89.0	89.0	89.0	89.0	89.0
Life at Maximum Force	in x 10^6	5.7	7.3	38.6	4.1	5.2	10.7
	km	145.8	184.7	981.1	104.8	133.1	271.9
C_a (Dynamic Load Rating)	lbf	57,933	49,750	63,958	51,900	44,600	41,700
	kN	257.7	221.3	284.5	230.9	198.4	185.5
Maximum Input Torque	lbf-in	940	1880	4699	940	1880	4699
	Nm	106	212	531	106	212	531
Max Rated RPM @ Input Shaft	RPM	2,000	2,000	2,000	2,000	2,000	2,000
Maximum Linear Speed @ Maximum Rated RPM	in/sec	7.9	15.8	39.0	7.9	15.8	39.0
	mm/sec	201	401	1000	201	401	1000

Intermediate and custom stroke lengths are also available. Intermediate leads may also be available. Belt and pulley inertia varies with ratio and motor selection.

* Maximum allowable actuator-generated force that can be applied routinely. Exceeding this force may result in permanent damage to the actuator. For high force, short stroke applications, consult factory.

Weights kg (lbs)

Base Actuator Weight	Stroke Length	12 inch	24 inch	36 Inch	48 Inch
	lb	100	130	160	190
	kg	45	59	72	86

Adder for Inline (excluding motor)	Adder for Parallel Drive (excluding motor)	Adder for Front Flange	Adder for Rear Flange	Adder for Rear Clevis	Adder for Rear Eye	Adder for Front/ Rear Angle Mounts	Adder for Two Trunnions	Adder for Two Foot Mounts
20.4 (9.3)	39.1 (17.7)	13.4 (6.1)	15.9 (7.2)	11.1 (5)	NA	NA	44.3 (20.1)	10.4 (4.7)

FT60 Reflective Inertias	6 mm Lead	12 mm Lead	30 mm Lead	
NMT Unit - J (0) NMT Unit - J (Stroke)	0.0078464 0.0002539	0.0078709 0.0002547	0.0080424 0.0002600	kg-m² (at input shaft) kg-m²/inch of stroke
Inline w/ Coupler - J (0) Inline w/ Coupler - J (Stroke)	0.0081764 0.0002539	0.0082009 0.0002547	0.0083724 0.0002600	
Parallel 1:1 - J (0) Parallel 1:1 - J (Stroke)	0.0129357 0.0002539	0.0146113 0.0002547	0.0312682 0.0002600	kg-m² (at motor shaft) kg-m²/inch of stroke
Parallel 2:1 - J (0) Parallel 2:1 - J (Stroke)	0.0049158 0.0000635	0.0057202 0.0000637	0.0214777 0.0000650	

*Pulleys for parallel mount match actuator max performance ratings

Standard Inline Coupling Inertia	
	Inertia
FT60	0.000330 kg-m² (0.002921 lbf-in s²)

Pulley inertias reflected at motor including typical pulleys, belt and standard bushings. Because of differences in belt and pulley selection due to particular motor choices, please contact your local sales representative if these values are critical to your application.

*See definitions on page 124

FT80

		High Capacity			Standard Capacity		
		06	12	30	06	12	30
Screw Lead	in	0.236	0.472	1.181	0.236	0.472	1.181
	mm	6	12	30	6	12	30
Maximum Force[2]	lbf	40,000	40,000	40,000	40,000	40,000	40,000
	kN	177.9	177.9	177.9	177.9	177.9	177.9
Life at Maximum Force	in x 10^6	3.1	4.4	16.3	1.94	2.55	5.00
	km	78.7	111.4	414.3	49.3	64.9	127
C_a (Dynamic Load Rating)	lbf	94,330	84,079	95,971	80,700	70,200	64,700
	kN	419.6	374	426.9	359	312.2	287.8
Maximum Input Torque	lbf-in	1,880	3,760	9,399	1,880	3,760	9,399
	Nm	212	425	1,062	212	425	1,062
Max Rated RPM @ Input Shaft	RPM	1,750	1,750	1,750	1,750	1,750	1,750
Maximum Linear Speed @ Maximum Rated RPM	in/sec	6.9	13.8	34.4	6.9	13.8	34.4
	mm/sec	175	351	875	175	351	875

Intermediate and custom stroke lengths are also available. Intermediate leads may also be available. Belt and pulley inertia varies with ratio and motor selection. Please contact your local sales representative.

* Maximum allowable actuator-generated force that can be applied routinely. Exceeding this force may result in permanent damage to the actuator. For high force, short stroke applications, consult factory.

Weights kg (lbs)

Base Actuator Weight	Stroke Length	12 Inch	24 Inch	36 Inch	48 Inch
	lb	190	265	340	415
	kg	86	120	153	187

Adder for Inline (excluding motor)	Adder for Parallel Drive (excluding motor)	Adder for Front Flange	Adder for Rear Flange	Adder for Rear Clevis	Adder for Rear Eye	Adder for Front/ Rear Angle Mounts	Adder for Two Trunnions	Adder for Two Foot Mounts
54.9 (24.9)	79.1 (35.9)	28.5 (17.5)	NA	NA	NA	NA	NA	34.8 (15.8)

FT80 Reflective Inertias	6 mm Lead	12 mm Lead	30 mm Lead	
NMT Unit - J (0) NMT Unit - J (Stroke)	0.0302504 0.0008022	0.0303275 0.0008035	0.0308673 0.0008124	kg-m² (at input shaft) kg-m²/inch of stroke
Inline w/ Coupler - J (0) Inline w/ Coupler - J (Stroke)	0.0314604 0.0008022	0.0315375 0.0008035	0.0320773 0.0008124	kg-m² (at motor shaft) kg-m²/inch of stroke
Parallel 1:1 - J (0) Parallel 1:1 - J (Stroke)	0.0721056 0.0008022	0.0535533 0.0008035	0.1342578 0.0008124	
Parallel 2:1 - J (0) Parallel 2:1 - J (Stroke)	0.0198765 0.0002006	0.0270490 0.0002009	0.0753395 0.0002031	

*Pulleys for parallel mount match actuator max performance ratings

Standard Inline Coupling Inertia	
	Inertia
FT80	0.0001210 kg-m² (0.010709 lbf-in s²)

Pulley inertias reflected at motor including typical pulleys, belt and standard bushings. Because of differences in belt and pulley selection due to particular motor choices, please contact your local sales representative if these values are critical to your application.

*See definitions on page 124

DEFINITIONS:

Maximum Force: Calculated Cubic Mean Load for the application should not exceed this value. (Values are derived from the design capacity of the FT Series actuator and should not be exceeded or relied upon for continuous operation.)

Life at Maximum Force: Estimated life that can be expected from the actuator when running at Maximum Force for intermittent periods of time. (Theoretical calculation based on the Dynamic Load Rating of the actuator and using the Maximum Force rating as the Cubic Mean Load.)

C_a (Dynamic Load Rating): A design constant used when calculating the estimated travel life of the roller screw.

Maximum Input Torque: The torque required at the screw to produce the Maximum Force rating. Exceeding this value can cause permanent damage to the actuator.

Maximum Rated RPM: The maximum allowable rotational screw speed determined by either screw length limitations or the rotational speed limit of the roller screw nut.

Maximum Linear Speed: The linear speed achieved by the actuator when Maximum Rated RPM is applied to the roller screw input shaft.

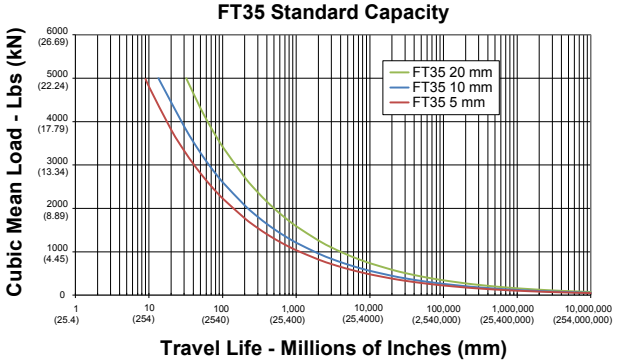
FT Series Accessories

Limit Switches (if required in addition to L1, L2, L3 option in actuator model)			
FT35, FT60, FT80			
Option	**Quantity**	**Part Number**	**Description**
L1	1	14453	Normally Closed PNP Limit Switch (10-30 VDC, 1m. 3 wire embedded cable)
L2	2	14453	Normally Closed PNP Limit Switch (10-30 VDC, 1m. 3 wire embedded cable)
L3	3	14453	Normally Closed PNP Limit Switch (10-30 VDC, 1m. 3 wire embedded cable)
L4			NA
L5			NA
L6			NA
FT45			
L1	1	43403	Normally Open PNP Limit Switch (10-30 VDC, 1m. 3 wire embedded cable)
L2	2	43404	Normally Closed PNP Limit Switch (10-30 VDC, 1m. 3 wire embedded cable)
L3	1 2	43403 43404	Normally Open PNP Limit Switch (10-30 VDC, 1m. 3 wire embedded cable) Normally Closed PNP Limit Switch (10-30 VDC, 1m. 3 wire embedded cable)
L4	1	67634	Normally Open NPN Limit Switch (10-30 VDC, 1m. 3 wire embedded cable)
L5	2	67635	Normally Closed NPN Limit Switch (10-30 VDC, 1m. 3 wire embedded cable)
L6	1 2	67634 67635	Normally Open NPN Limit Switch (10-30 VDC, 1m. 3 wire embedded cable) Normally Closed NPN Limit Switch (10-30 VDC, 1m. 3 wire embedded cable)

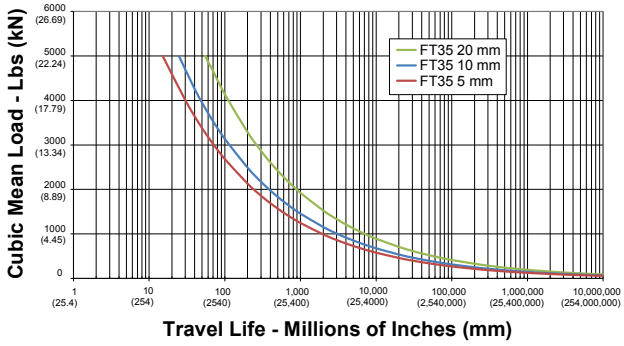
Consult your local sales representative to discuss maximum stroke length allowable with your final configuration.
Some accessories are available in stainless steel. Consult Exlar for availability and lead time.
*This option restricts max. load to 6.0 KN (1350 lbf) for K60, 8.9 KN (2000 lbf) for K75 and 9.3 KN (2100 lbf) for K90.

Estimated Service Life

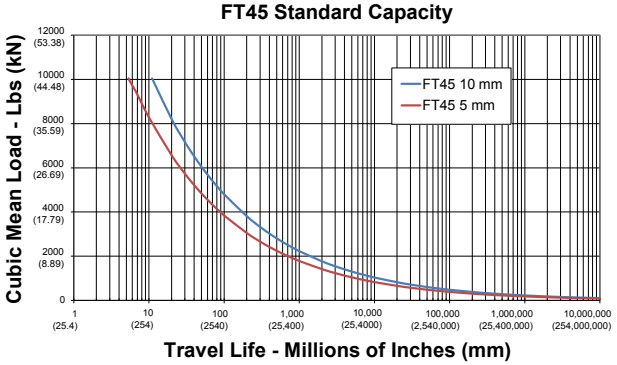
FT35 Standard Capacity



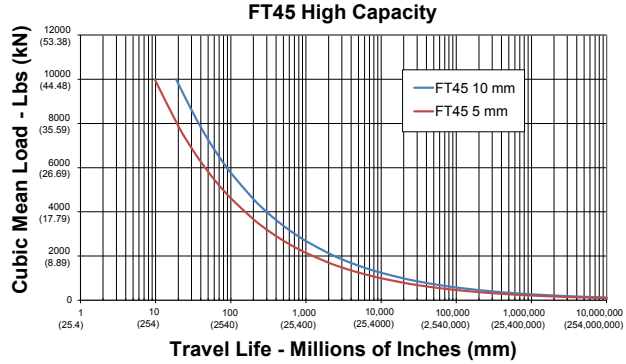
FT35 High Capacity



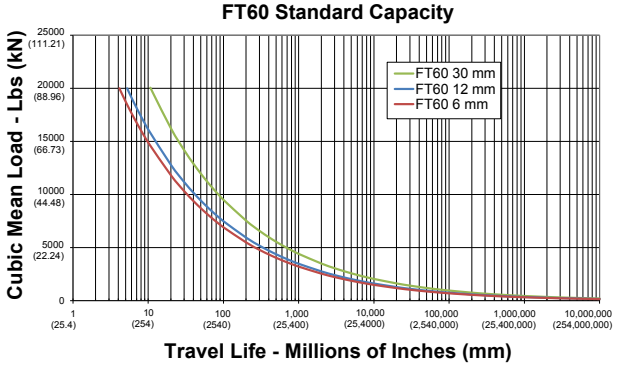
FT45 Standard Capacity



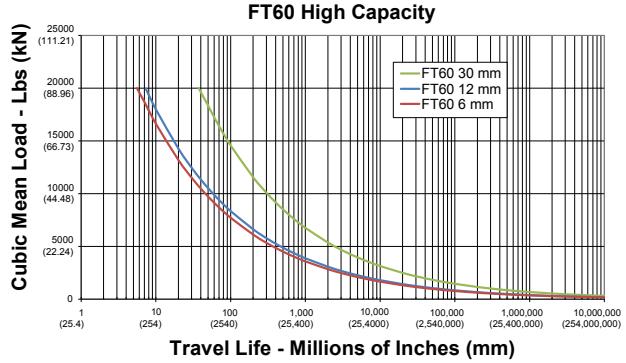
FT45 High Capacity



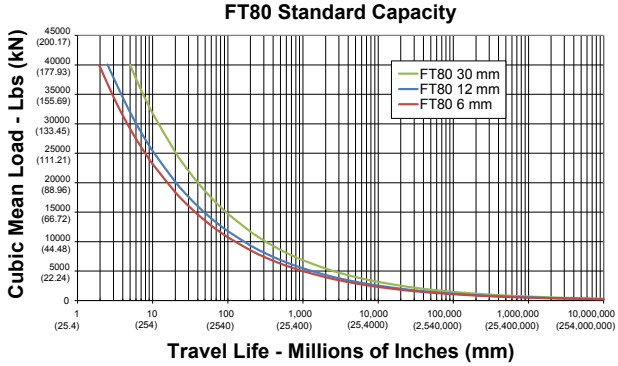
FT60 Standard Capacity



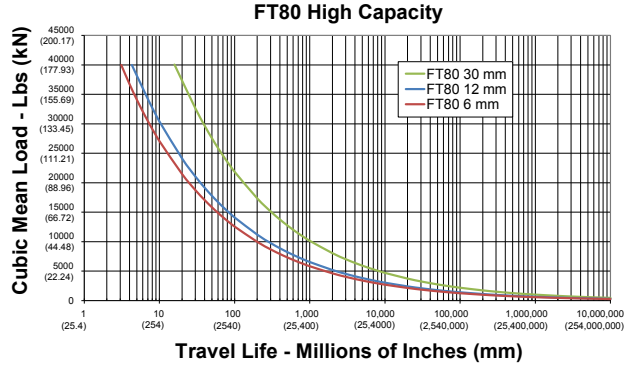
FT60 High Capacity



FT80 Standard Capacity



FT80 High Capacity



Service Life Estimate Assumptions:

- Sufficient quality and quantity of lubrication is maintained throughout service life (please refer to engineering reference on page 212 for lubrication interval estimates.)
- Bearing and screw temperature between 20° C and 40° C
- No mechanical hard stops (external or internal) or impact loads
- No external side loads
- Does not apply to short stroke, high frequency applications such as fatigue testing or short stroke, high force applications such as pressing. (For information on calculating estimating life for unique applications please refer to the engineering reference on page 212.

The L_{10} expected life of a roller screw linear actuator is expressed as the linear travel distance that 90% of properly maintained roller screws manufactured are expected to meet or exceed. This is not a guarantee and these charts should be used for estimation purposes only.

The underlying formula that defines this value is:
Travel life in millions of inches, where:

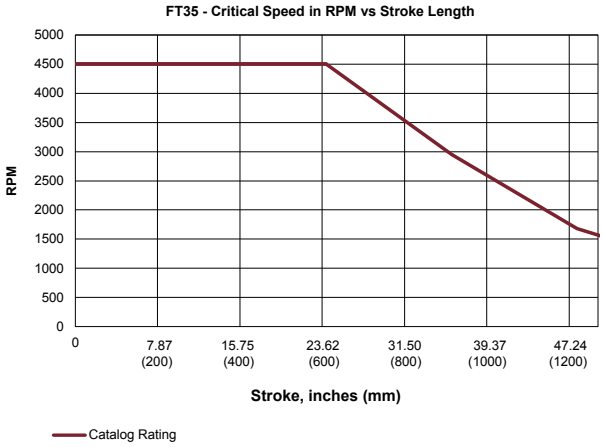
C_a = Dynamic load rating (lbf)
F_{cml} = Cubic mean applied load (lbf)
ℓ = Roller screw lead (inches)

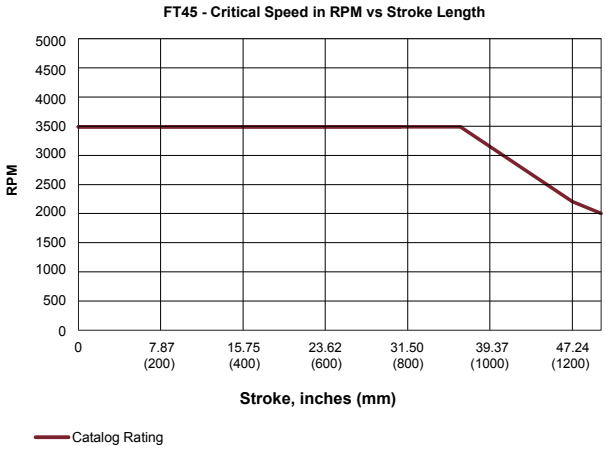
$$L_{10} = \left(\frac{C_a}{F_{cml}} \right)^3 x \ell$$

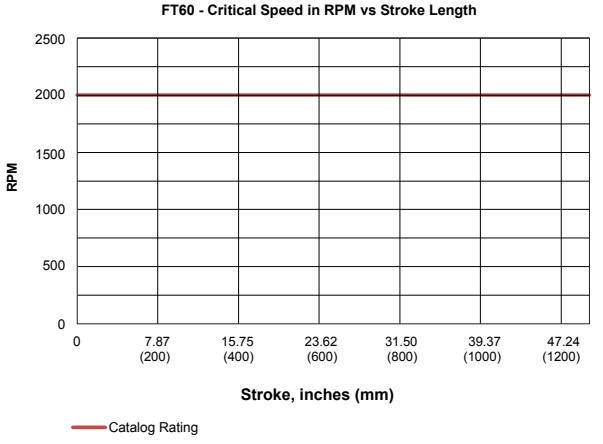
For additional details on calculating estimated service life, please refer to the Engineering Reference, page 212.

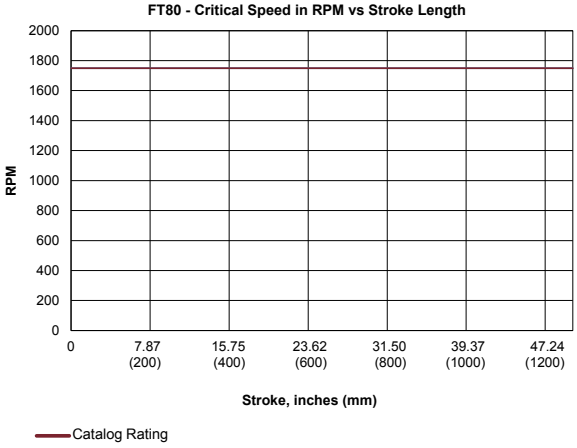
Data Curves

Critical Speed vs Stroke Length:



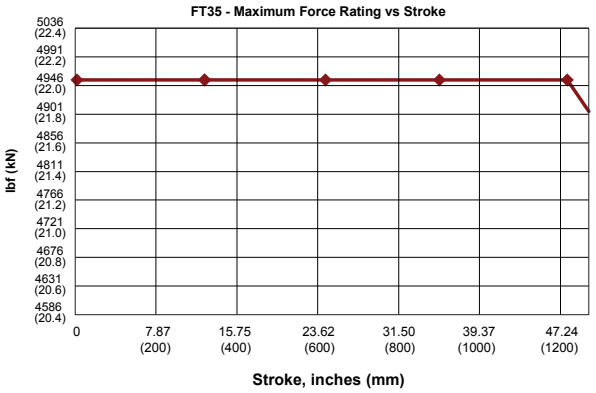


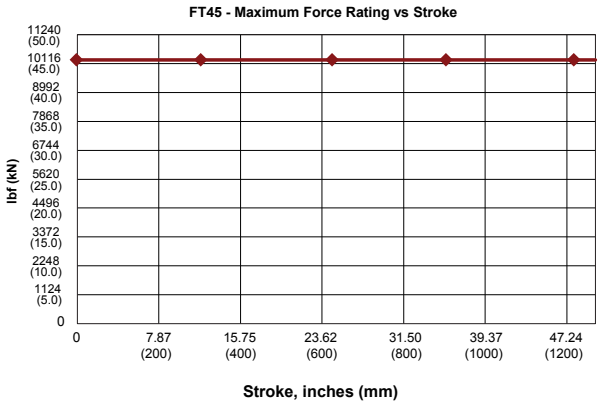


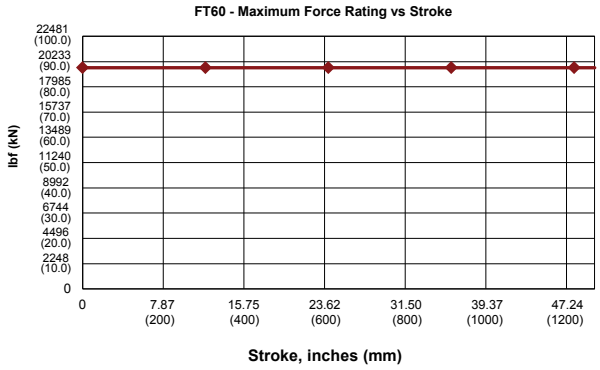


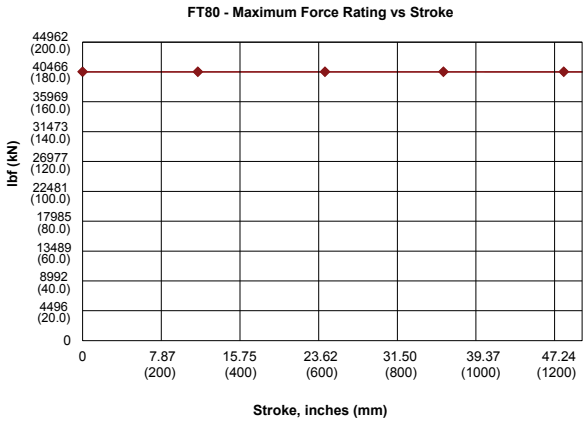
* With longer stroke length actuators, the rated speed of the actuator is determined by the critical speed

Maximum Force Rating





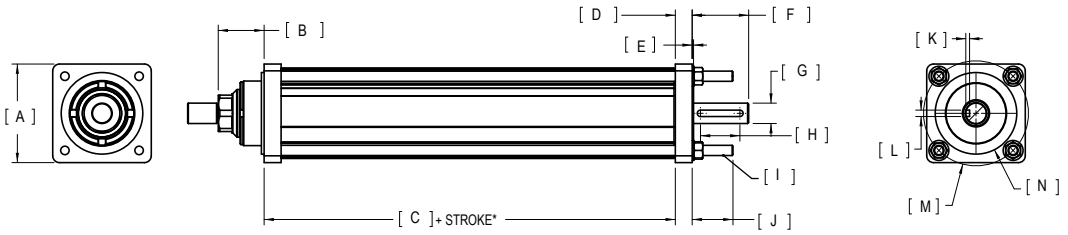




* With longer stroke length actuators, the rated speed of the actuator is determined by the critical speed

Dimensions

Base Actuator (FT35, FT60, FT80)

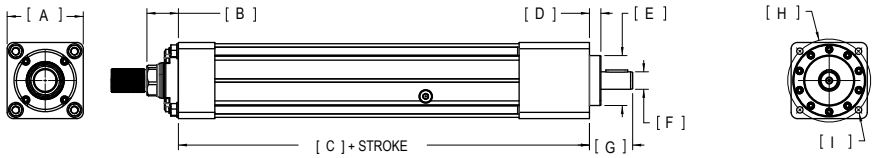


		FT35	FT60	FT80
A	in	□ 3.63	□ 6.38	□ 8.50
	mm	92.1	161.9	215.9
B	in	1.69	2.25	3.03
	mm	42.9	57.1	77.0
C	in	9.1*	15.3	19.8
	mm	232*	389	503
D	in	0.62	0.83	0.90
	mm	15.7	21.1	22.9
E	in	0.05	0.10	0.10
	mm	1.3	2.5	2.5
F	in	2.08	2.41	3.34
	mm	52.8	61.2	84.7
G	in	Ø 0.748 +0.00/-0.0005	Ø 1.378 +0.00/-0.0006	Ø 2.362 +0.00/-0.0005
	mm	19.0 +0.00/-0.013	35.0 +0.00/-0.016	60.0 +0.00/-0.013
H	in	1.45	1.60	1.48
	mm	36.8	40.5	37.5

		FT35	FT60	FT80
I	in	3/8- 16 UNC - 2A	9/16 - 12 UNC - 2A	3/4- 10 UNC - 2A
	mm	M8 x 1.25 6g	M14 x 2.0 6g	M20 x 2.5 6g
J	in	1.50	2.0	2.0
	mm	38.1	50.7	50.7
K	in	0.138 +0.004/-0.00	0.197 +0.008/-0.00	0.278 +0.005/-0.00
	mm	3.5 +0.1 0.0	5.0 +0.2 -0.0	7.0 +0.1 -0.0
L	in	0.236 -0.00/-0.002	0.3937 +0.0006/-0.0020	0.709 -0.001/-0.002
	mm	6.0 -0.012/-0.042	10.0 -0.015/-0.051	18.0 -0.018/-0.061
M	in	Ø 3.860 BC	Ø 6.79 BC	Ø 9.33 BC
	mm	98.0	172.4	237.0
N	in	Ø 3.00	Ø 5.00	Ø 6.75
	mm	76.2	127.0	171.5

*Add 20 mm if choosing high capacity option for the FT35

Base Actuator (FT45)

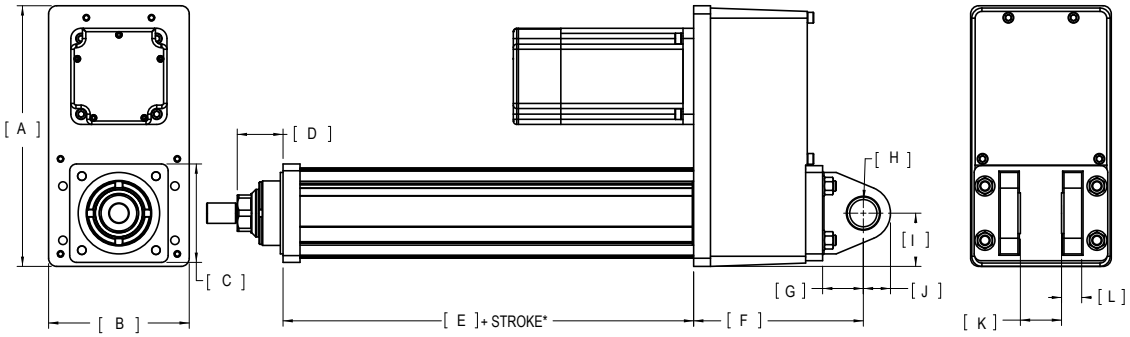


		FT45
A	in	□ 4.80
	mm	122.0
B	in	1.99
	mm	50.5
C	in	13.9
	mm	354
D	in	0.72
	mm	18.3
E	in	Ø 3.15
	mm	80.00

		FT45
F	in	Ø 1.102 +0.00/-0.0005
	mm	28.0 +0.00/-0.013
G	in	2.73
	mm	69.3
H	in	Ø 5.236 BC
	mm	133.0
I	in	4X M12X1.75 - 6H ↓ 1.0
	mm	26

Pre-sale drawings and models are representative and are subject to change. Certified drawings and models are available for a fee. Consult your local Exlar representative for details.

Clevis Mount



		FT35	FT45 (Option C)	FT45 (Option G)	FT60
A	in	9.60	14.55	14.55	15.55
	mm	243.8	369.5	369.5	395.0
B	in	5.18	7.48	7.48	8.53
	mm	131.6	190.0	190.0	216.7
C	in	□ 3.63	□ 4.80	□ 4.80	□ 6.38
	mm	92.1	122.0	122.0	161.9
D	in	1.69	1.99	1.99	2.25
	mm	42.9	50.5	50.0	57.1
E	in	9.1*	13.9	13.9	15.3
	mm	232*	354	354	368
F	in	6.3	9.0	7.9	9.0
	mm	159	229	201	229
G	in	1.50	2.12	1.26	2.5
	mm	38.1	53.8	32.0	63.5
H	in	Ø 1.000** +0.002 / -0.001	Ø 1.378 ±0.001	Ø 0.787 H9	Ø 1.750*** +0.002 / -0.001
	mm	25.4 +0.05 / -0.03	35.0 ±0.03	20.00 H9	44.45 +0.05 / -0.03
I	in	2.0	3.1	3.1	3.43
	mm	50	78	78	87.1
J	in	1.00	1.4	0.6	2.13
	mm	25.4	35	15	54.0
K	in	0.74	1.0	0.6	2.51
	mm	19	25	15	63.9
L	in	1.52	2.03	1.18	1.25
	mm	38.5	51.6	30.0	31.8

Parallel motor mount shown.

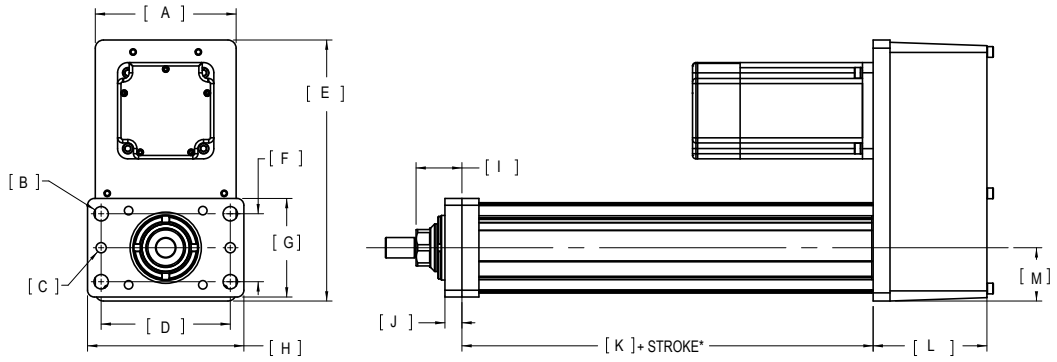
*Add 20 mm if choosing high capacity option for the FT35.

** If "G" metric clevis option, Ø 27 mm + 0.00 / - 0.06

*** If "G" metric clevis option, Ø 45 mm + 0.00 / - 0.08

Pre-sale drawings and models are representative and are subject to change. Certified drawings and models are available for a fee. Consult your local Exlar representative for details.

Front Flange

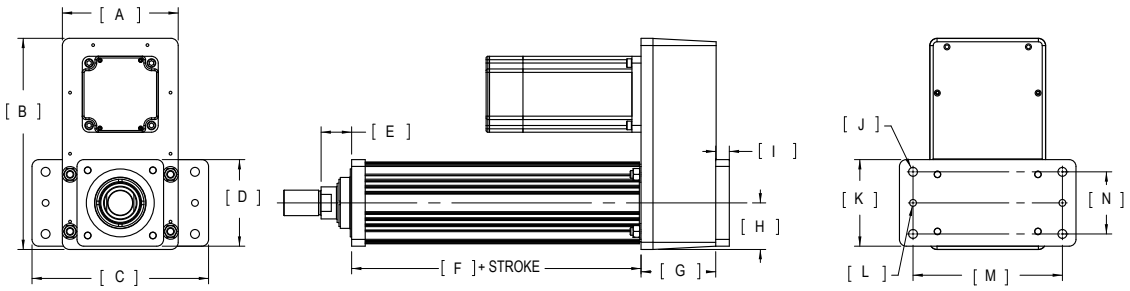


		FT35	FT45	FT60	FT80
A	in	5.18	7.48	6.82	8.77
	mm	131.6	190.0	173.2	222.8
B	in	Ø 0.53	Ø 0.69	Ø 0.66	Ø 0.78
	mm	13.5	17.5	16.7	19.8
C	in	Ø 0.375 +0.001 / -0.000	Ø 0.500 +0.001 / -0.000	Ø 0.501 +0.001 / -0.000	Ø 0.625 +0.001 / -0.000
	mm	9.53 +0.03 / 0.00	12.70 +0.03 / 0.00	12.7 +0.03 / 0.00	15.9 +0.025 / 0.000
D	in	4.75	6.38	8.32	10.75
	mm	120.7	161.9	211.2	273.1
E	in	9.6	14.55	14.32	17.33
	mm	243.8	369.5	363.7	440.2
F	in	2.50	3.82	4.57	6.00
	mm	63.5	97.0	116.2	152.4
G	in	3.63	5.00	6.38	8.50
	mm	92.1	127.0	161.9	215.9
H	in	5.8	7.63	10.00	12.75
	mm	146	193.7	254.0	323.9
I	in	1.69	1.99	2.25	3.03
	mm	42.9	50.5	57.1	77.0
J	in	0.63	1.00	1.00	1.25
	mm	15.9	25.4	25.4	31.8
K	in	9.1*	13.9	15.3	19.8
	mm	232*	354	388	503
L	in	4.19	5.26	4.6	6.43
	mm	106.3	133.7	116	163.3
M	in	1.96	3.05	3.19	4.40
	mm	49.8	77.5	81.0	111.8

*Add 20 mm if choosing high capacity option for the FT35.

Pre-sale drawings and models are representative and are subject to change. Certified drawings and models are available for a fee. Consult your local Exlar representative for details.

Rear Flange (FT35, FT60)

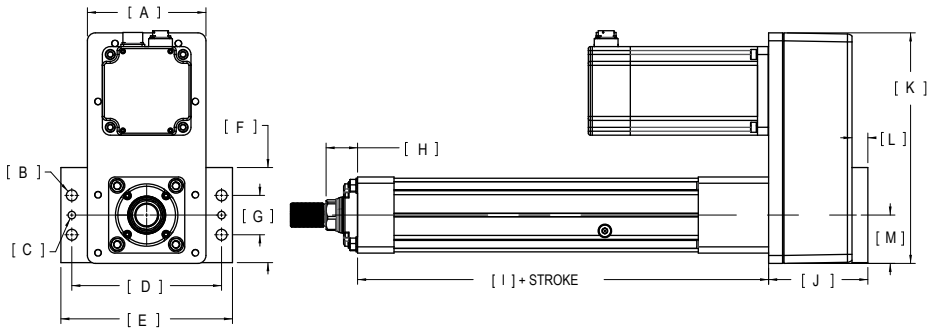


		FT35	FT60
A	in	5.18	8.53
	mm	131.6	216.7
B	in	9.60	15.55
	mm	243.8	395.0
C	in	9.00	13.00
	mm	228.6	330.2
D	in	□ 3.63	□ 6.38
	mm	92.1	161.9
E	in	1.69	2.25
	mm	42.9	57.1
F	in	9.1*	15.3
	mm	232*	388
G	in	4.13	5.50
	mm	104.8	139.7

*Add 20 mm if choosing high capacity option for the FT35

		FT35	FT60
H	in	1.96	3.43
	mm	49.8	87.1
I	in	0.63	1.00
	mm	15.9	25.4
J	in	Ø 0.53	Ø 0.66
	mm	13.5	16.7
K	in	3.5	6.38
	mm	88.9	161.9
L	in	Ø 0.375 +0.001/-0.000	Ø 0.501 +0.001/-0.000
	mm	Ø 9.53 +0.03/-0.00	12.7 +0.03/0.00
M	in	6.5	11.00
	mm	165.1	279.4
N	in	2.50	4.58
	mm	63.5	116.2

Rear Flange (FT45)

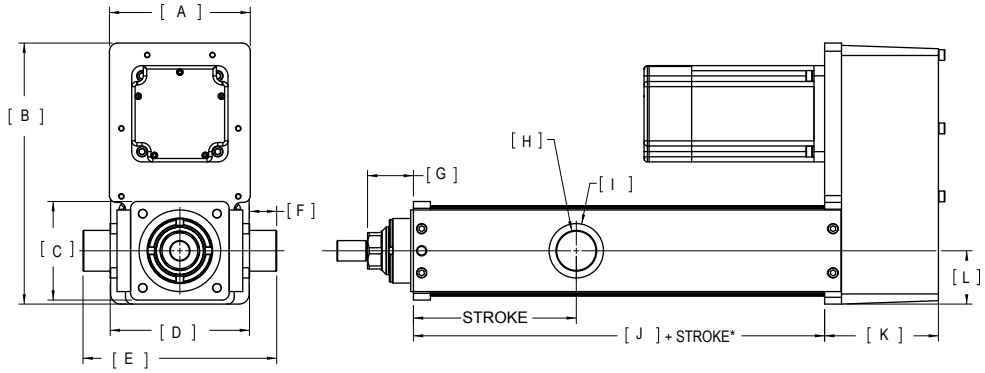


	A	B	C	D	E	F	G
in	7.48	Ø 0.69	Ø 0.472 +0.001/-0.00	9.45	10.83	6.00	2.48
mm	190.0	17.5	12.00 +0.03/0.00	240.0	275.0	152.4	63.1

	H	I	J	K	L	M
in	1.99	13.9	6.26	14.55	1.00	3.05
mm	50.5	354	159.0	369.5	25.4	77.5

Pre-sale drawings and models are representative and are subject to change. Certified drawings and models are available for a fee. Consult your local Exlar representative for details.

Trunnion Mount (FT35, FT60)

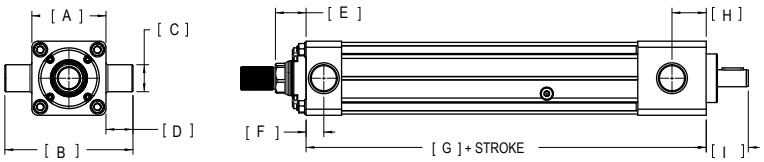


		FT35	FT60
A	in	5.18	6.82
	mm	131.6	173.2
B	in	9.60	14.32
	mm	243.8	363.7
C	in	□ 3.63	□ 6.38
	mm	92.1	161.9
D	in	5.12	8.13
	mm	130.1	206.4
E	in	7.12	12.13
	mm	180.9	308.0
F	in	1.00	2.00
	mm	25.4	50.8

*Add 20 mm if choosing high capacity option. for the FT35.
** If "Q" metric side trunnion option, Ø 35 mm h7
*** If "Q" metric side trunnion option, Ø 60 mm h9

		FT35	FT60
G	in	1.69	2.25
	mm	42.9	57.1
H	in	Ø 1.500** ±0.001	Ø 2.500*** ±0.001
	mm	38.1 ±0.03	63.50 ±0.03
I	in	Ø 2.00	Ø 3.50
	mm	50.8	88.9
J	in	9.1*	15.3
	mm	232*	388
K	in	4.19	4.57
	mm	106.3	116.1
L	in	1.96	3.19
	mm	49.8	81.0

Trunnion Mount (FT45)



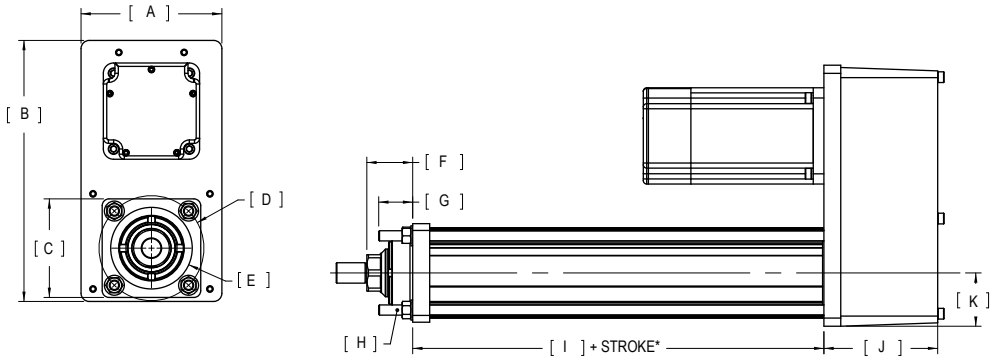
		Imperial (A or 2)	Metric (V or P)
A	in	□ 4.80	□ 4.80
	mm	122.0	122.0
B	in	8.30	7.95
	mm	210.9	202.0
C	in	Ø 1.750 +0.000/-0.002	Ø 1.969 +0.000/-0.002
	mm	44.45 0.00/-0.05	50.00 0.00/-0.05
D	in	1.75	1.57
	mm	44.5	40.00
E	in	1.99	1.99
	mm	50.5	50.5

*Front trunnion mount stroke length limited to 18 inches or less.

		Imperial (A or 2)	Metric (V or P)
F	in	1.15	1.15
	mm	29.2	29.2
G	in	13.9	13.9
	mm	354	354
H	in	2.22	2.22
	mm	56.4	56.4
I	in	2.73	2.73
	mm	69.3	69.3

Pre-sale drawings and models are representative and are subject to change. Certified drawings and models are available for a fee. Consult your local Exlar representative for details.

Extended Tie Rod Mount (FT35, FT60, FT80)

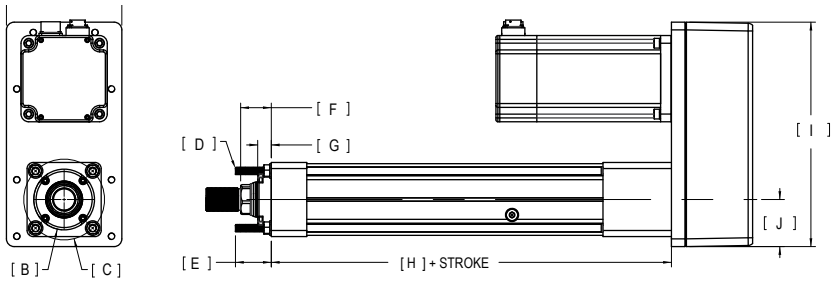


		FT35	FT60	FT80
A	in	5.18	6.82	8.77
	mm	131.6	173.2	222.8
B	in	9.60	14.32	17.33
	mm	243.8	363.7	440.2
C	in	□ 3.63	□ 6.38	□ 8.50
	mm	92.1	161.9	215.9
D	in	Ø 3.86 BC	Ø 6.79 BC	Ø 9.33 BC
	mm	98.0	172.4	237.0
E	in	Ø 3.000 +0.000/-0.002	Ø 5.000 +0.000/-0.002	Ø 6.75 +0.000/-0.002
	mm	76.20 0.00/-0.05	127.0 0.00/-0.05	171.45 0.00/-0.05
F	in	1.69	2.25	3.03
	mm	42.9	57.1	77.0

		FT35	FT60	FT80
G	in	1.25	2.00	3.50
	mm	31.8	50.8	88.9
H	in	3/8-16 UNC-2A	9/16-12 UNC-2A	3/4-10 UNC-2A
	mm	M8 x 1.25 6g	M14 x 2.0 6g	M20 x 2.5 6g
I	in	9.1*	15.3	19.8
	mm	232*	388	503
J	in	4.19	4.57	6.43
	mm	106.3	116.1	163.3
K	in	1.96	3.19	4.40
	mm	49.8	81.0	111.8

*Add 20 mm if choosing high capacity option for the FT35

Extended Tie Rod Mount (FT45)

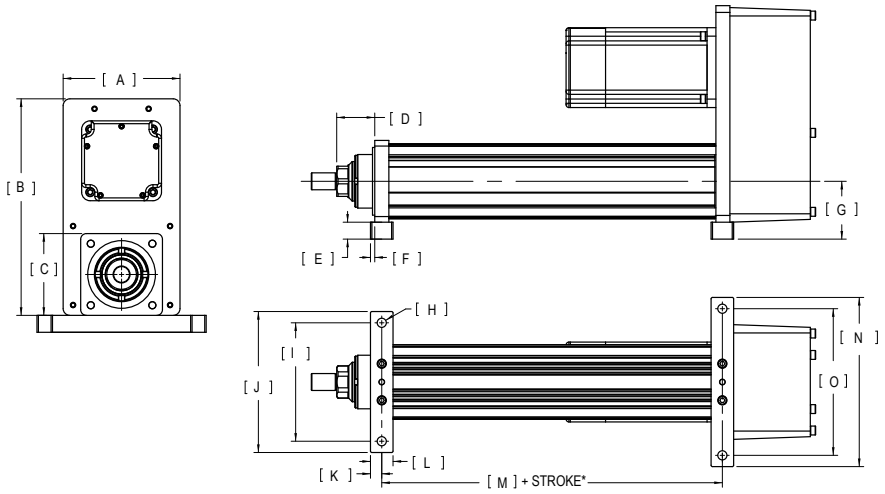


	A	B	C	D	E
in	7.48	Ø 3.937	Ø 5.236 BC	1/2-13 UNC	2.3
mm	190.0	100.00	133.00	M12 x 1.75 6g	59

	F	G	H	I	J
in	1.99	0.88	13.9	14.55	3.05
mm	50.5	22.4	354	369.5	77.5

Pre-sale drawings and models are representative and are subject to change. Certified drawings and models are available for a fee. Consult your local Exlar representative for details.

Side Lug Mount (FT35, FT60, FT80)



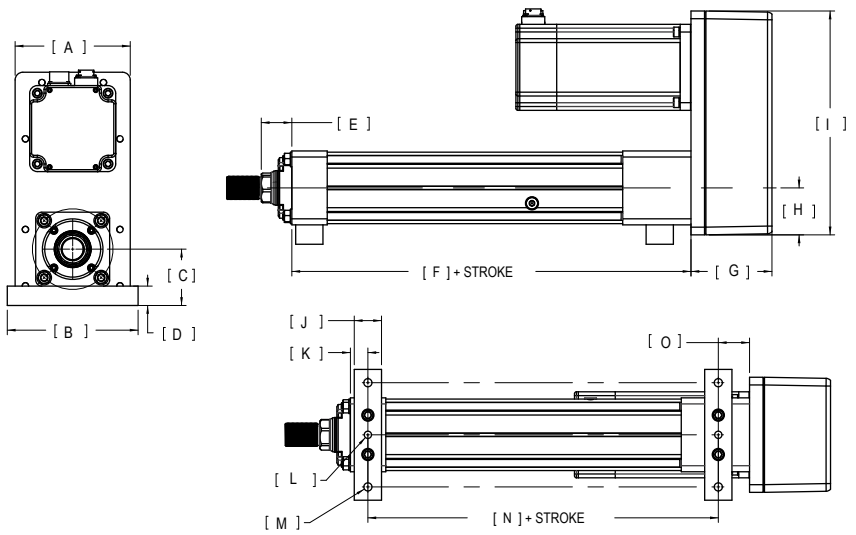
		FT35	FT60	FT80
A	in	5.18	6.82	8.77
	mm	131.6	173.2	222.8
B	in	9.60	14.32	17.33
	mm	243.8	363.7	440.2
C	in	□ 3.63	□ 6.38	□ 8.50
	mm	92.1	161.9	215.9
D	in	1.69	2.25	3.03
	mm	42.9	57.1	77.0
E	in	0.75	1.0	2.00
	mm	19.1	25.4	50.8
F	in	0.19	0.50	0.50
	mm	4.8	12.7	12.7
G	in	2.56	4.19	6.25
	mm	65.1	106.4	158.75

*Add 20 mm if choosing high capacity option for the FT35.

		FT35	FT60	FT80
H	in	Ø 0.41	Ø 0.53	Ø 0.78
	mm	10.3	13.5	19.8
I	in	5.25	8.50	12.75
	mm	133.4	215.9	323.9
J	in	6.25	10.00	10.75
	mm	158.8	254.0	273.1
K	in	0.50	1.00	1.25
	mm	12.7	25.4	31.8
L	in	1.00	2.00	2.50
	mm	25.4	50.8	63.5
M	in	9.1*	15.3	19.6
	mm	232*	388	498
N	in	7.50	10.00	12.75
	mm	190.5	254.0	323.9
O	in	6.5	8.50	10.75
	mm	165.1	215.9	273.1

Pre-sale drawings and models are representative and are subject to change. Certified drawings and models are available for a fee. Consult your local Exlar representative for details.

Side Lug Mount (FT45)

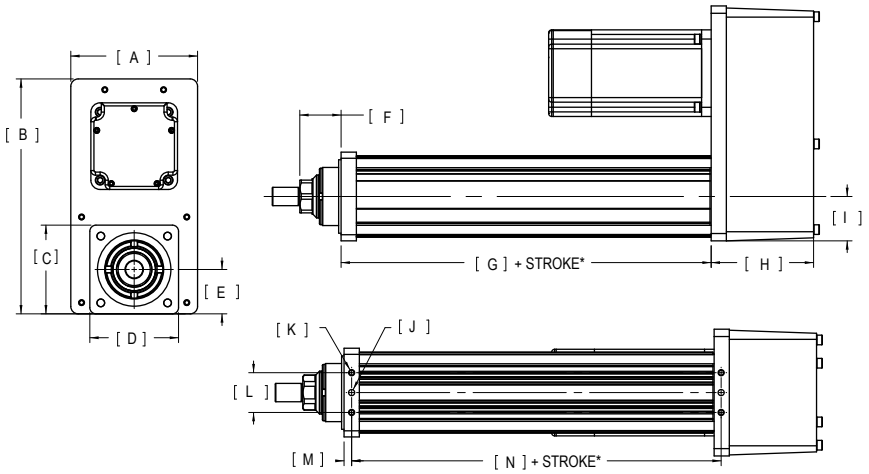


		FT45
A	in	7.48
	mm	190.0
B	in	8.50
	mm	215.9
C	in	3.66
	mm	93.0
D	in	1.26
	mm	32.0
E	in	1.99
	mm	50.5
F	in	13.9
	mm	354
G	in	5.26
	mm	133.6

		FT45
H	in	3.05
	mm	77.5
I	in	14.55
	mm	369.5
J	in	1.77
	mm	45.0
K	in	1.14
	mm	28.9
L	in	Ø 0.472 +0.001/0.000
	mm	12.0 +0.03/0.00
M	in	Ø 0.53
	mm	13.5
N	in	10.77
	mm	273.6
O	in	2.03
	mm	51.6

Pre-sale drawings and models are representative and are subject to change. Certified drawings and models are available for a fee. Consult your local Exlar representative for details.

Side Mount



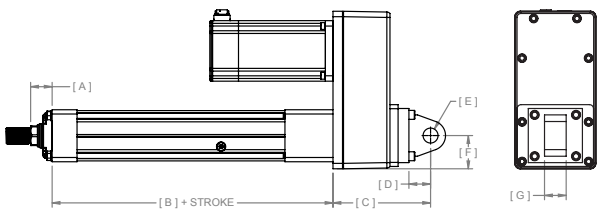
*Add 20 mm if choosing high capacity option.

		FT35	FT60	FT80
A	in	5.18	6.82	8.77
	mm	131.6	173.2	222.8
B	in	9.60	14.32	17.38
	mm	243.8	363.7	440.2
C	in	□ 3.63	□ 6.38	□ 8.50
	mm	92.1	161.9	215.9
D	in	□ 3.63	□ 6.38	□ 8.50
	mm	92.1	161.9	215.9
E	in	1.81	NA	NA
	mm	46.0	NA	NA
F	in	1.69	2.25	3.03
	mm	42.9	57.1	77.0
G	in	9.1*	15.3	19.8
	mm	232*	388	503

*Add 20 mm if choosing high capacity option for the FT35.
[1] If "J" or "K" metric side mount options, M6 x 1.0 ↧ 9 mm with Ø 6 mm M7 ↧ 9 mm dowel hole
[2] If "J" or "K" metric side mount options, M12 x 1.75 ↧ 19 mm with Ø 12 mm M7 ↧ 12 mm Dowel Hole
[3] If "J" or "K" metric side mount options, M16 x 2.0 ↧ 16 mm with Ø 12 mm M7 ↧ 12 mm dowel hole

		FT35	FT60	FT80
H	in	4.19	4.57	6.43
	mm	106.3	116.1	163.5
I	in	1.81	3.19	4.25
	mm	46.1	81.0	108.0
J		Ø 0.2500↓0.400[1] +0.0000/ -0.0005	Ø 0.5000↓1.00[2] +0.0000/ -0.0005	Ø 0.6250↓1.375[3] +0.0000/ -0.0005
K		1/4-20 UNC- 2B ↓ .63[1]	1/2-13 UNC-2B ↓ 1.13[2]	5/8-11 UNC- 2B ↓ 1.25[3]
L	in	1.63	2.50	4.00
	mm	41.3	63.5	101.6
M	in	0.31	0.50	0.75
	mm	8	12.7	19.1
N	in	9.1*	15.3	19.6
	mm	232*	388	498

Rear Eye Mount

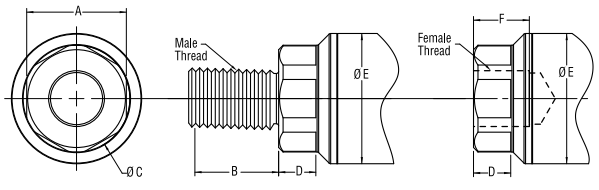


		FT45 (Option Y)	FT45 (Option W)
A	in (mm)	1.99 (50.5)	1.99 (50.5)
B	in (mm)	13.9 (354)	13.9 (354)
C	in (mm)	9.01 (228.9)	7.90 (200.7)
D	in (mm)	2.00 (50.8)	1.26 (32.0)
E	in (mm)	1.378 ± 0.001 (35.0 ±0.03)	0.787 H9 (20.00 H9)
F	in (mm)	3.07 (77.9)	3.07 (77.9)
G	in (mm)	2.00 (50.8)	1.18 (30.0)

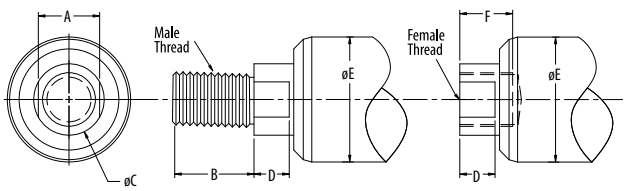
Pre-sale drawings and models are representative and are subject to change. Certified drawings and models are available for a fee. Consult your local Exlar representative for details.

Rod Ends

FT35, FT45, FT60



FT80

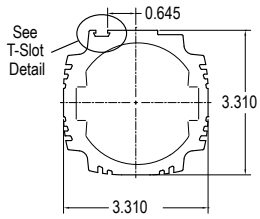


	A	B	ØC	D	ØE	F	Male U.S.	Male Metric	Female U.S.	Female Metric
FT35	1.34 (34)	1.125 (28.6)	1.434 (36.4)	0.50 (12.7)	1.750 (44.5)	0.750 (19.1)	3/4-16 UNF-2A	M16x1.5 6g	3/4-16 UNF-2B	M16x1.5 6h
FT45	1.81 (46.0)	2.25 (57.2)	2.0 (50.8)	0.63 (15.9)	2.250 (57.2)	1.50 (38.1)	1 1/2-12 UN-2A	M36x3 6g	1 1/2-12 UN-2B	M36x3 6h
FT60	2.36 (60.0)	2.750 (69.9)	2.360 (59.9)	0.750 (19.1)	3.000 (76.2)	2.000 (50.8)	1 7/8-12 UN-2A	M42x4.5 6g	1 7/8-12 UN-2B	M42x4.5 6h

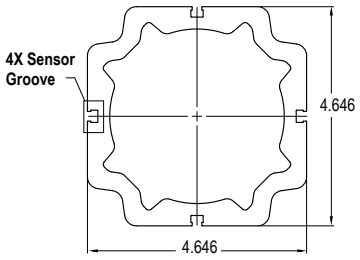
	A	B	ØC	D	ØE	F	MaleU.S.	Male Metric	Female U.S.	Female Metric
FT80	2.75 (69.9)	4.019 (102.1)	3.143 (79.8)	1.000 (25.4)	4.000 (101.6)	2.250 (57.2)	2 1/2-12 UN-2A	M56x5.5 6g	2 1/2-12 UN-2B	M56x5.5 6h

Dimensions shown in inches (mm)

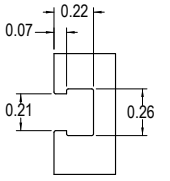
Case Dimensions



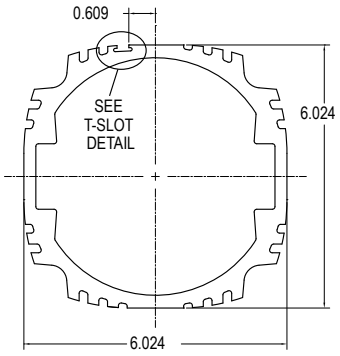
FT35



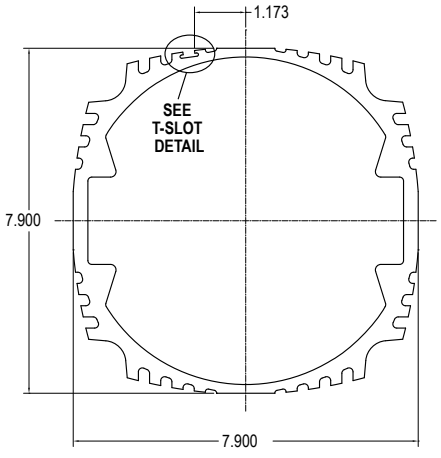
FT45



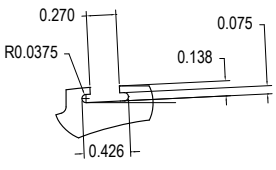
Detail 4X Sensor Groove



FT60



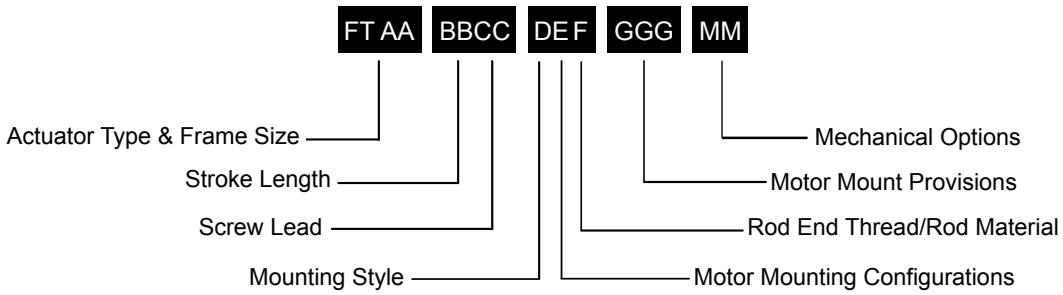
FT80



T-Slot Detail

Pre-sale drawings and models are representative and are subject to change. Certified drawings and models are available for a fee. Consult your local Exlar representative for details.

FT Series Ordering Guide



Commonly Ordered Options Shown in BOLD

AA = FT Frame Size
35 = 3.5 inch (90 mm)
45 = 4.8 inch (122 mm)
60 = 6.0 inch (150 mm)
80 = 8.0 inch (200 mm)

BB = Stroke Length
06 = 6 inch (152 mm) FT35, FT45
12 = 12 inch (305 mm) FT35, 45, 60, 80
18 = 18 inch (457 mm) FT35, 45
24 = 24 inch (610 mm) FT35, 45, 60, 80
36 = 36 inch (914 mm) FT35, 45, 60, 80
48 = 48 inch (1219 mm) FT35, 45, 60, 80

CC = Screw Lead
05 = 0.2 inch, FT35, 45
06 = 0.23 inch, FT60, 80
10 = 0.39 inch, FT35, 45
12 = 0.47 inch, FT60, 80
20 = 0.79 inch, FT35
30 = 1.18 inch, FT60, 80

D = Mounting Style [1]
N = None
F = Front flange, English
Z = Front flange, Metric, FT45
R = Rear flange, English [4, 5]
C = Rear clevis, English [4, 5]
G = Rear clevis, Metric [4, 5]
Y = Rear eye, English [4], FT45
W = Rear eye, Metric [4], FT45
L = Side lugs
D = Double side mount, English
K = Double side mount, Metric
T = Side trunnion mount, English [5, 6] FT35, 60, 80
Q = Side trunnion mount, Metric [5, 6] FT35, 60, 80
2 = Rear trunnion mount, English, FT45
P = Rear trunnion mount, Metric, FT45
E = Extended tie rods, English
M = Extended tie rods, Metric

E = Motor Mounting Configurations [3]
N = None
I = Inline direct drive (includes Exlar standard coupling)
P = Parallel, 1:1 belt reduction
Q = Parallel, 2:1 belt reduction

F = Rod End
M = Male, US standard thread
A = Male, metric thread
F = Female, US standard thread
B = Female, metric thread
W = Male, US standard thread SS, rod end only
R = Male metric thread SS, rod end only
V = Female, US standard thread SS, rod end only
L = Female, metric thread SS, rod end only

GGG = Motor Mount Provisions [3,4]
See page 206 for Motor Mount Code.

MM = Mechanical Options [2]
XT = High capacity roller screw

Limit Switches
(adjustable position throughout stroke)
L1 = One N.O., PNP (FT35, 45, 60, 80)
L2 = Two N.C., PNP (FT35, 45, 60 80)
L3 = One N.O., PNP & Two N.C., PNP (FT35, 45, 60, 80)
L4 = One N.O., NPN (FT45)
L5 = Two N.C., NPN (FT45)
L6 = One N.O., NPN & Two N.C., NPN (FT45)

*See Page 124 for Limit Switch details

Please provide a drawing of motor dimensions with all orders to insure proper mounting compatibility.

For options or specials not listed above or for extended temperature operation, please contact Exlar

NOTES:
1. Mounting face size, shaft length and other details of particular motors may require special adapters or provisions for mounting. Always discuss your motor selection with your local sales representative.
2. For extended temperature operation consult factory for model number.
3. MAX Std. motor size: FT35: 5.6 inch/142 mm, FT45: 7.1 inch/180 mm, FT60: 7.9 inch/200 mm, FT80: 8.5 inch/215 mm
   For oversized motors, contact your local sales representative.
4. Not available with inline motor mount, contact your local sales representative.
5. Application details must be approved for use with an FT80.
6. IP65 environmental sealing option not available.

Contact your local sales representative regarding all special actuator components.