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EL120

ATEX Rated Explosion-Proof Linear Actuators

Perfect for valve control or other hazardous environment applications, the EL120 is a high performance electric actuator offered as a direct replacement for hydraulics. EL120 actuators feature longer life, linear speeds up to 37 inches per second, closed loop feedback, 90% efficiency and 100% duty cycle.

For gas turbines with variable guide vanes, EL120 actuators provide precise positioning and feedback for fine tuning injector airflow to effectively manage CO and NOx emissions. In Oil & Gas applications, the EL120 is well suited for position-based drilling choke valves.

CE 2813

II 2G
Ex d IIB+H2 T4 Gb
SIRA 15ATEX1010X

C SA US 163694
Class I Division 1
Groups B, C, D, T4

EL120 explosion-proof actuators meet ATEX requirements for use in potentially explosive atmospheres and are in conformity with the EU ATEX Directive 2014/34/EU. Additionally, these actuators are rated for Class 1, Division 1, Groups B, C, D, and T4 hazardous environments.

The EL Series integrates a highly efficient planetary roller screw mechanism with a high torque servomotor in a single self-contained package. This highly robust design is engineered to provide reliable and precise operation over thousands of hours, handling heavy loads—even under very arduous conditions.

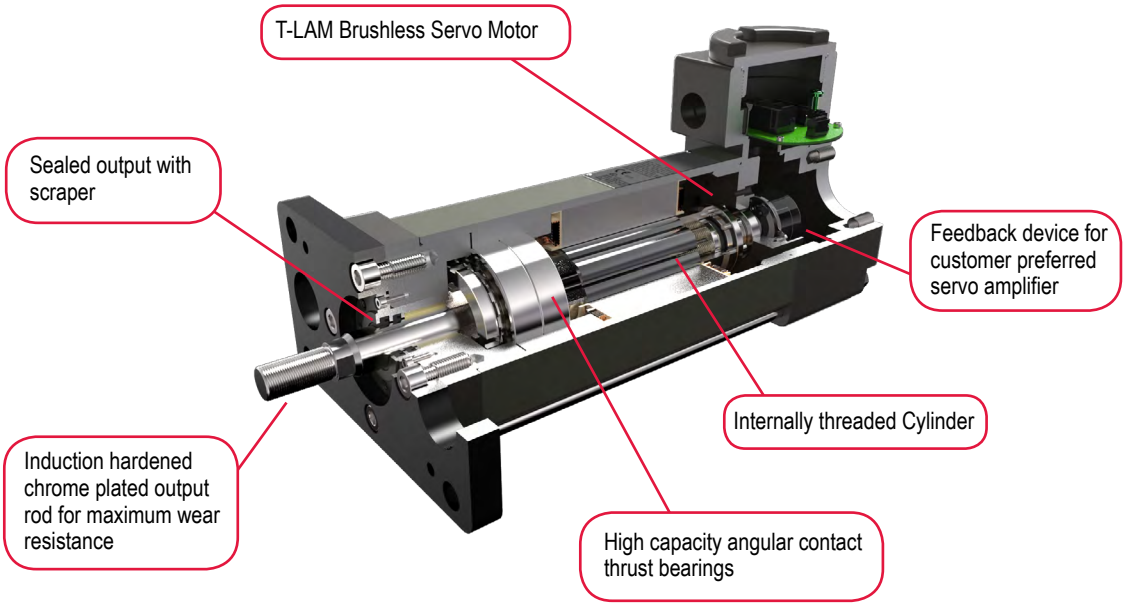
The EL120 Actuator is compatible with nearly any manufacturer's servo amplifier.

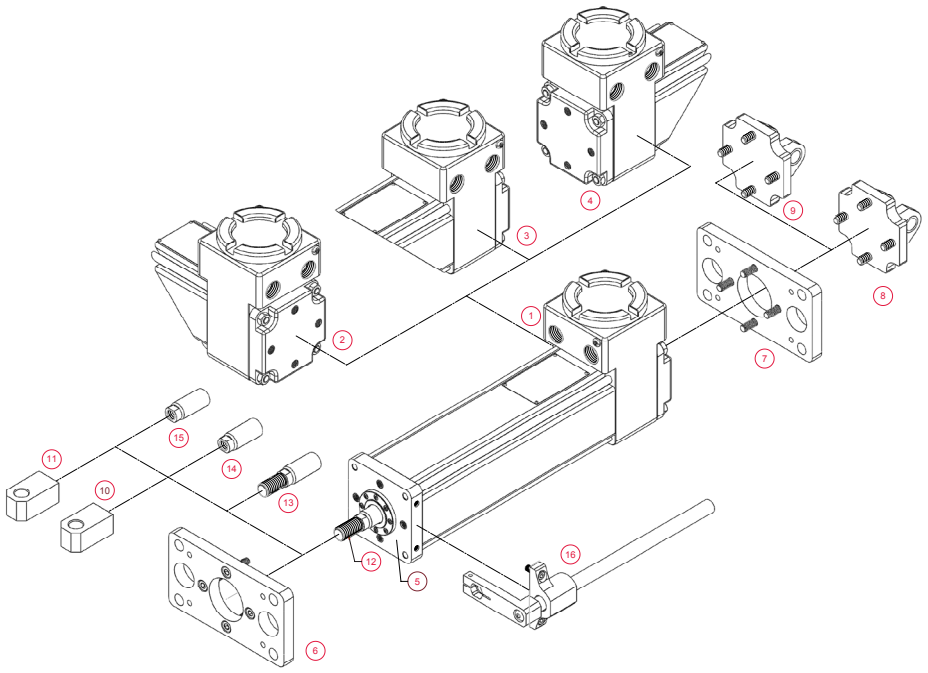
Features
Forces up to 4000 lbs
Speeds up to 37.5 ips
Strokes up to 18 inches
8 pole brushless motors
Feedback configurations for nearly any servo amplifier
Several mounting configurations
Windings available from 24 VDC to 460 Vrms
CSA Class I, Div 1 Group B, C, D, and T4 hazardous environment rating
ATEX, Ex d II B +H2 T4 Gb IP66S, Type 4
IECEx CSA 14.0014
Completely sealed motor assures trouble-free operation

Technical Characteristics	
Frame Sizes in (mm)	4.7 (120)
Screw Leads in (mm)	0.1 (2.54), 0.2 (5.08), 0.5 (12.7), 0.8 (20.3)
Standard Stroke Lengths in (mm)	4 (100), 6 (150), 8 (200), 10 (250), 12 (300), 18 (450)
Force Range	up to 4081 lbf-in (18 kN)
Maximum Speed	up to 37.5 in/sec (953 mm/s)

Operating Conditions and Usage		
Accuracy:		
Screw Lead Error	in/ft (µm / 300 mm)	0.001 (25)
Screw Travel Variations	in/ft (µm / 300 mm)	0.0012 (30)
Screw Lead Backlash	in (mm)	0.004 maximum
Ambient Conditions:		
Ambient Temperature	°C	-29 to 93
Storage Temperature	°C	-54 to 93
IP Rating		IP66S
Rel. Humidity	%	5 to 100 at 60° C
Vibration		3.5 grms, 5 to 520 hz

Product Features





1- Two 0.75 in NPT Ports, Front Facing (as viewed from rod end) 2 - Two 0.75 in NPT Ports, Back Facing (as viewed from rod end)
3 - Two 0.75 in NPT Ports, Right Facing (as viewed from rod end) 4 - Two 0.75 in NPT Ports, Left Facing (as viewed from rod end)
5 - Threaded Front & Rear Face, Metric and Threaded Front & Rear Face, English 6 - Standard Front Flange 7 - Standard Rear Flange 8 - Metric Rear Clevis
9 - English Rear Clevis 10 - Metric Rear Eye 11 - English Rear Eye 12 - Male, US Standard Thread 13 - Male, Metric Thread 14 - Female, US Standard Thread
15 - Female, Metric Thread 16 - External anti-rotate assembly

Industries and Applications

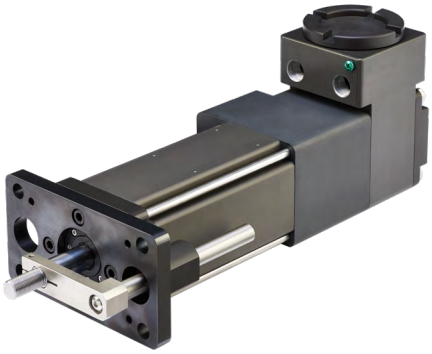
Process Control
- Valve control
- Damper control
- Turbine control
- Choke valves
- Fuel control
- Plunger pumps

Automotive
- Paint booths
- Fuel control
- Engine test stands

Defense
- Weapons room

Material Handling
- Printing presses

The EL Series of explosion proof actuators is ideal for valve control, as well as many other applications in hazardous environments. These all-electric actuators easily outperform hydraulics and other competing technologies offering long life, high speeds, closed loop feedback, 90% efficiency and 100% duty cycle.



Notes

Mechanical Specifications

Motor Stacks		1 Stack				2 Stack				3 Stack		
Screw Lead Designator		**01**	**02**	**05**	**08**	**01**	**02**	**05**	**08**	**02**	**05**	**08**
Screw Lead	in	0.1	0.2	0.5	0.75	0.1	0.2	0.5	0.75	0.2	0.5	0.75
	mm	2.54	5.08	12.7	19.05	2.54	5.08	12.7	19.05	5.08	12.7	19.05
Continuous Force** *(Motor Limited)*	lbf	2,984	1,748	839	559	NA	2,865	1,375	917	4,081	1,959	1,306
	N	13,272	7,776	3,733	2,488	NA	12,744	6,117	4,078	18,152	8,713	5,809
Max Velocity	in/sec	5	10	25	37.5	5	10	25	37.5	10	25	37.5
	mm/sec	127	254	635	953	127	254	635	953	254	635	953
Friction Torque	in-lbf	2.7				3.0				3.5		
	N-m	0.31				0.34				0.40		
Friction Torque *(preloaded screw)*	in-lbf	7.2				7.5				8.0		
	N-m	0.82				0.85				0.91		
Back Drive Force [1]	lbf	380	150	60	50	380	150	60	50	150	60	50
	N	1700	670	270	220	1700	670	270	220	670	270	220
Min Stroke	in	4				NA	6			8		
	mm	100				NA	150			200		
Max Stroke	in	18			12	NA	18		12	18		12
	mm	450			300	NA	450		300	450		300
C_a (Dynamic Load Rating)	lbf	7900	8300	7030	6335	7900	8300	7030	6335	8300	7030	6335
	N	35,141	36,920	31,271	28,179	35,141	36,920	31,271	28,179	36,920	31,271	28,179
Inertia *(zero stroke)*	lb-in-s^2	0.01132				0.01232				0.01332		
	Kg-m^2	0.000012790				0.00001392				0.00001505		
Inertia *(per inch of stroke)*	lb-in-s^2/in	0.0005640										
	Kg-m^2/in	0.0000006372										
Weight *(zero stroke)*	lb	8.0				11.3				14.6		
	Kg	3.63				5.13				6.62		
Weight Adder *(per inch of stroke)*	lb/in	2.0										
	Kg/mm	0.91										

* Please note that stroke mm are Nominal dimensions.
** Force ratings at 25°C.
*** Inertia +/-5%
[1] Back drive force is a nominal value only. Operating conditions can cause wide variations in back drive force. Exlar cannot assure that an actuator will or will not back drive.

DEFINITIONS:

Continuous Force: The linear force produced by the actuator at continuous motor torque.

Max Velocity: The linear velocity that the actuator will achieve at rated motor rpm.

Friction Torque (standard screw): Amount of torque required to move the actuator when not coupled to a load.

Friction Torque (preloaded screw): Amount of torque required to move the actuator when not coupled to a load.

Back Drive Force: Amount of axial force applied to the rod end of the actuator that will produce motion with no power applied to the actuator.

Min Stroke: Shortest available stroke length.

Max Stroke: Longest available stroke length.

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

Inertia (zero stroke): Base inertia of an actuator with zero available stroke length.

Inertia Adder (per inch of stroke): Inertia per inch of stroke that must be added to the base (zero stroke) inertia to determine the total actuator inertia.

Weight (zero stroke): Base weight of an actuator with zero available stroke length.

Weight Adder (per inch of stroke): Weight adder per inch of stroke that must be added to the base (zero stroke) weight to determine the total actuator weight.

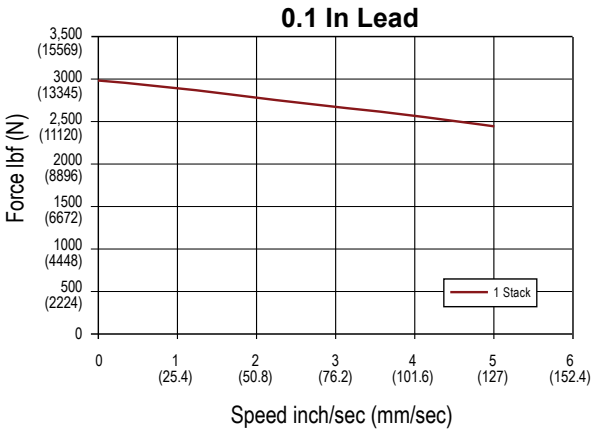
Electrical Specifications

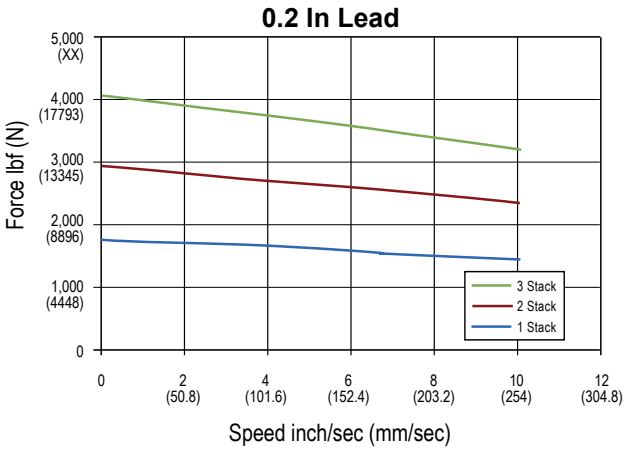
Motor Stator		118	138	158	168	238	258	268	338	358	368
Bus Voltage	Vrms	115	230	400	460	230	400	460	230	400	460
Speed @ Bus Voltage	rpm	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
RMS SINUSOIDAL COMMUTATION DATA											
Continuous Motor Torque	lbf-in	74.1	74.1	74.3	74.1	123.6	121.4	123.6	172.3	168.9	176.9
	N-m	8.37	8.37	8.39	8.37	13.96	13.72	13.96	19.46	19.09	19.98
Peak Motor Torque	lbf-in	148.20	148.20	148.60	148.10	247.20	242.80	247.20	344.50	337.80	353.70
	N-m	16.74	16.74	16.79	16.74	27.93	27.43	27.93	38.93	38.17	39.96
Torque Constant (Kt)	lbf-in	4.30	8.70	15.70	17.30	8.70	15.80	17.30	8.50	15.80	17.50
	N-m/A	0.49	1.00	1.80	2.00	1.00	1.80	2.00	1.00	1.80	2.00
Continuous Current Rating	A	19.10	9.50	5.30	4.80	15.90	8.60	8.00	22.70	11.90	11.30
Peak Current Rating	A	38.20	19.10	10.60	9.50	31.80	17.10	15.90	45.40	23.80	22.50
O-PEAK SINUSOIDAL COMMUTATION											
Continuous Motor Torque	lbf-in	74.1	74.1	74.3	74.1	123.6	121.4	123.6	172.3	168.9	176.9
	N-m	8.37	8.37	8.39	8.37	13.96	13.72	13.96	19.46	19.09	19.98
Peak Motor Torque	lbf-in	148.20	148.20	148.60	148.10	247.20	242.80	247.20	344.50	337.80	353.70
	N-m	16.74	16.74	16.79	16.74	27.93	27.43	27.93	38.93	38.17	39.96
Torque Constant (Kt)	lbf-in/A	3.10	6.10	11.10	12.30	6.10	11.20	12.30	6.00	11.20	12.40
	N-m/A	0.35	0.70	1.30	1.40	0.70	1.30	1.40	0.70	1.30	1.40
Continuous Current Rating	A	27.00	13.50	7.50	6.70	22.50	12.10	11.30	32.10	16.90	15.90
Peak Current Rating	A	54.00	27.00	15.00	13.50	45.00	24.20	22.50	64.20	33.70	31.90
MOTOR DATA											
Voltage Constant @ 25°C (Ke)	Vrms	29.6	59.2	106.9	118.5	59.2	108.2	118.5	58.0	108.2	119.8
	Krpm	41.9	83.8	151.2	167.6	83.8	153.0	167.6	82.0	153.0	169.4
Pole Configuration		8	8	8	8	8	8	8	8	8	8
Resistance (L-L)	Ohms	0.20	0.80	2.60	3.21	0.34	1.17	1.35	0.20	0.72	0.81
Inductance (L-L)	mH	3.30	11.90	42.40	48.30	5.90	21.10	25.30	3.70	11.60	17.10
Brake Inertia	lbf-in-sec^2	0.00146									
	kg-cm^2	1.66									
Brake Current @24 VDC +/- 10%	A	1.0									
Brake Holding Torque - Dry	lbf-in	177									
	Nm/A	20									
Brake Engage/Disengage Time	ms	13/50									
Mechanical Time Constant (tm)	ms	0.79	0.79	0.79	0.79	0.60	0.63	0.60	0.54	0.56	0.51
Electrical Time Constant (te)	ms	16.26	14.88	16.34	15.06	17.60	18.06	18.72	18.51	16.06	21.16
Friction Torque	lbf-in	1.43	1.43	1.43	1.43	1.81	1.81	1.81	2.32	2.32	2.32
	N-m	0.16	0.16	0.16	0.16	0.20	0.20	0.20	0.26	0.26	0.26
Insulation Class		180(H)									
Ambient Temperature Rating		-29°C to 93°C									
Insulation System Voltage Rating		T4, 135°C Maximum Allowable Surface Temperature									

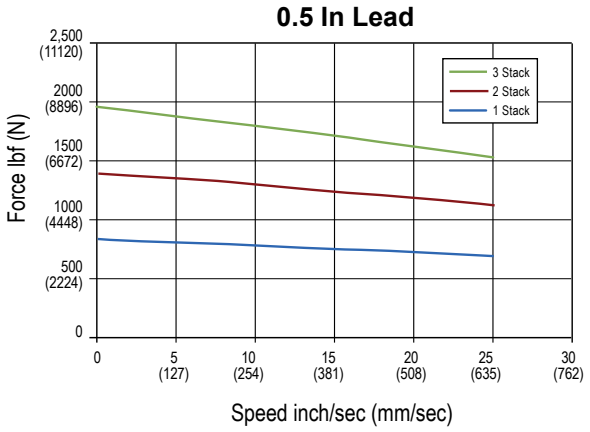
Test data derived using NEMA recommended aluminum heatsink 12" x 12" x 1/2" at 25°C ambient.

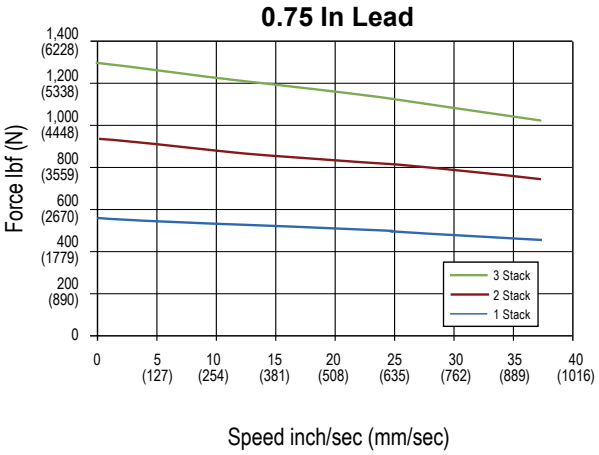
Speed vs. Force Curves

The speed vs. force curves (below) represent approximate continuous thrust ratings at the indicated linear speed. Different types of servo amplifiers offer varying motor torque and, thus, varying actuator thrust. These values are at constant velocity and do not account for motor torque required for acceleration.









Estimated Service Life

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 are expected to meet or exceed. For higher than 90% reliability, multiply the result by the following factors: 95% x 0.62; 96% x 0.53; 97% x 0.44; 98% x 0.33; 99% x 0.21. This is not a guarantee; these charts should be used for estimation purposes only.

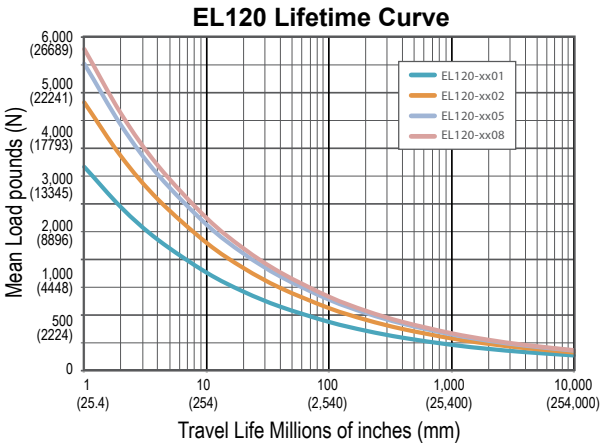
The underlying formula that defines this value is:

Travel life in millions of inches, where:

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

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

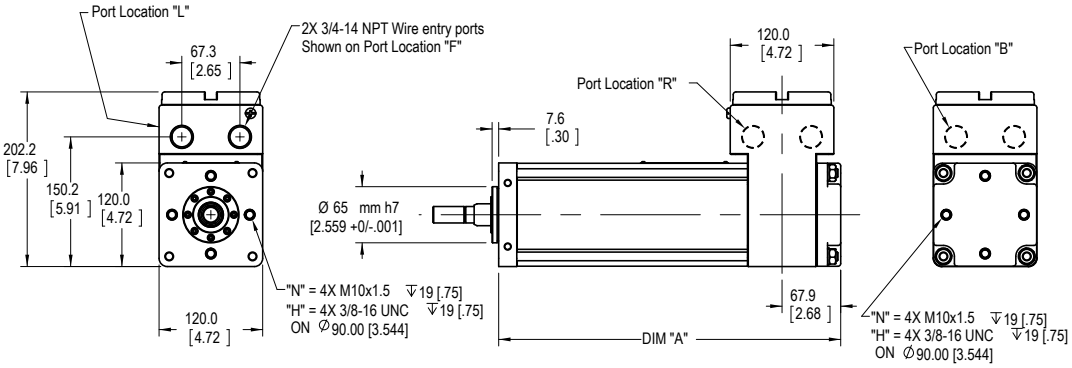
All curves represent properly lubricated and maintained actuators. Ratings may vary, depending on the application.



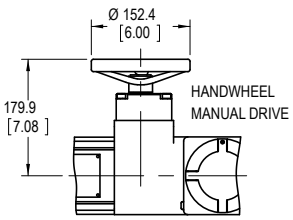
Dimensions

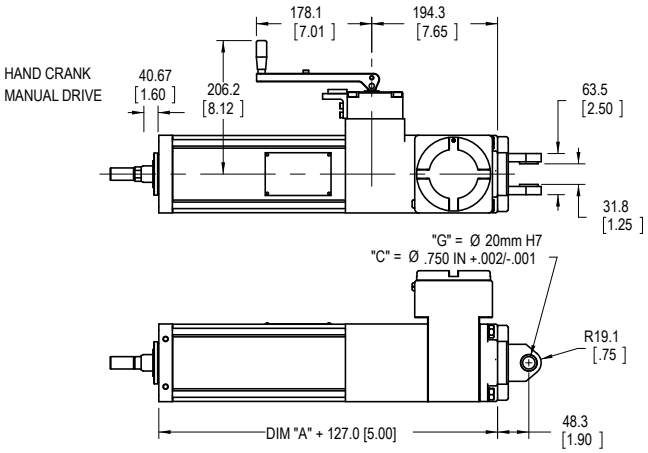
Base Actuator

All dimensions shown in mm (inches)

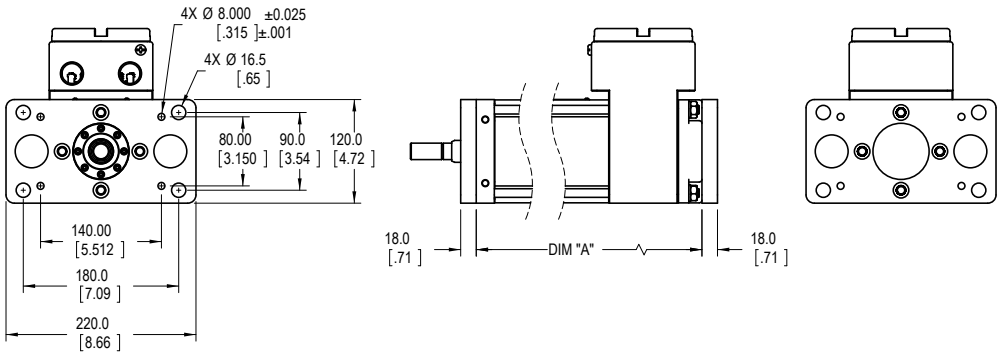


Clevis Mount and Manual Drive Options





Front and Rear Flange Mount

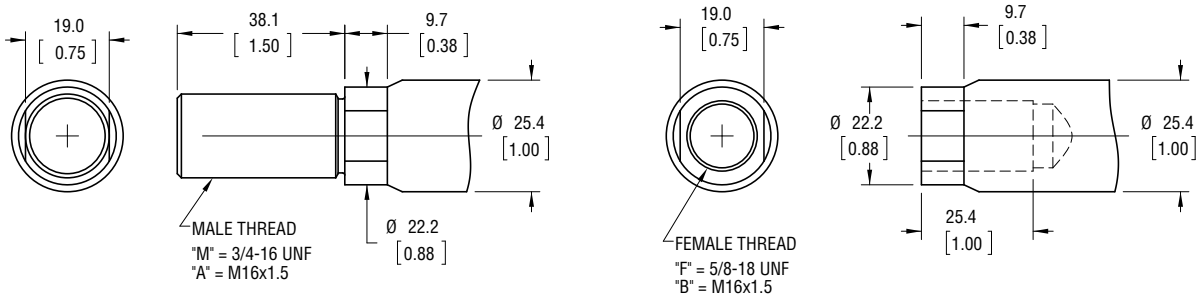


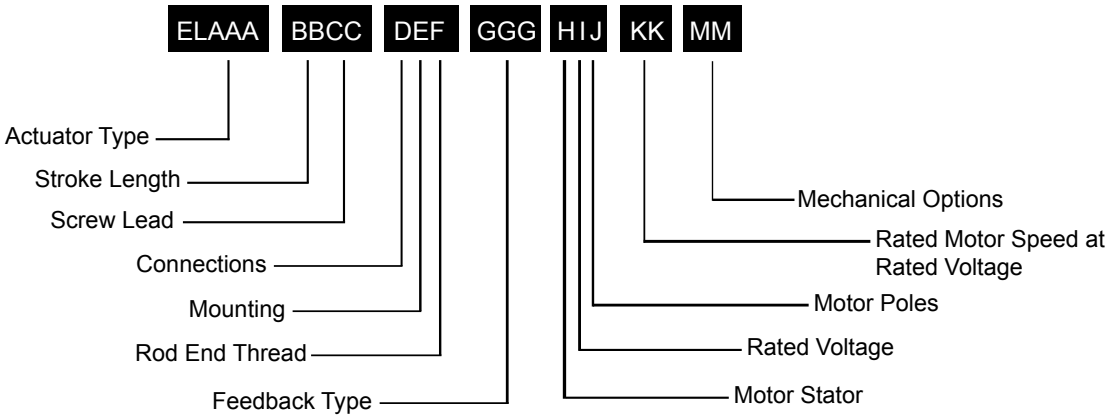
Dim	4 in (102 mm) Stroke in (mm)	6 in (152 mm) Stroke in (mm)	8 in (203 mm) Stroke in (mm)	10 in (254 mm) Stroke in (mm)	12 in (305 mm) Stroke in (mm)	18 in (457 mm) Stroke in (mm)
A	345 (13.6)	396 (15.6)	447 (17.6)	498 (19.6)	549 (21.6)	701 (27.6)

Note: Add 1.63 Inches (41.4 mm) to Dims "A" if ordering a brake without a manual drive.

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 End Options





EL = Model Series
EL = Explosion proof linear actuator

AAA = Frame Size
120 = 120 mm

BB = Stroke Length
04 = 4 in
06 = 6 in
08 = 8 in
10 = 10 in
12 = 12 in
18 = 18 in

CC = Screw Lead (linear travel per screw revolution)
01 = 0.1 in/rev (2.54 mm/rev)
02 = 0.2 in/rev (5.08 mm/rev)
05 = 0.5 in/rev (12.7 mm/rev)
08 = 0.8 in/rev (20.3 mm/rev)

D = Connections
F = Two 0.75 in NPT Ports, Front Facing (as viewed from rod end)
B = Two 0.75 in NPT Ports, Back Facing (as viewed from rod end)
R = Two 0.75 in NPT Ports, Right Facing (as viewed from rod end)
L= Two 0.75 in NPT Ports, Left Facing (as viewed from rod end)

E = Mounting
N = Threaded Front & Rear Face, Metric
H = Threaded Front & Rear Face, English
F = Standard Front Flange
R = Standard Rear Flange
G = Metric Rear Clevis
C = English Rear Clevis
J = Metric Rear Eye
K = English Rear Eye

F = Rod End Thread
M = Male, US Standard Thread
A = Male, Metric Thread
F = Female, US Standard Thread
B = Female, Metric Thread

GGG = Feedback Type
See page 89 for detailed information

H = Motor Stator
1 = 1 stack motor
2 = 2 stack motor
3 = 3 stack motor

I = Rated Voltage
1 = 115 Volt RMS
3 = 230 Volt RMS
5 = 400 Volt RMS
6 = 460 Volt RMS

J = Motor Poles
8 = 8 pole motor

KK = Rated Motor Speed at Rated Voltage
30 = 3000 RPM

MM = Mechanical Option [1]
AR = External anti-rotate assembly
RB = Rear brake

NOTES:
1. For extended temperature operation consult factory for model number.

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