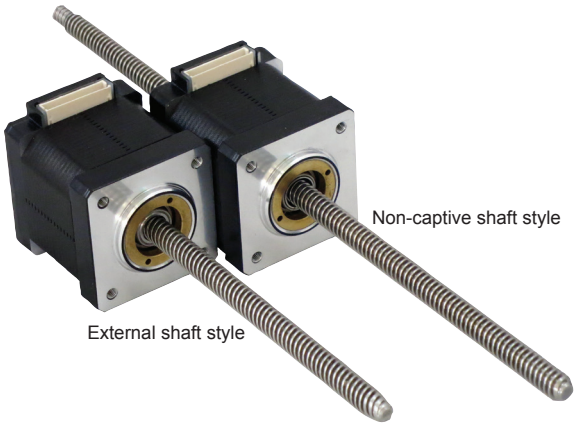
NEMA14 linear actuator

1.8° 2-phase stepper motors



Linear actuator stepper motors deliver long life, high accuracy and unsurpassed repeatability in a package that is extremely compact and low cost. These 1.8° 2-phase linear actuator stepper motors with NEMA 14 (1.4"/35.3 mm square flange) can be operated at very high resolutions, dependent on the stepper motor drive.

Shaft styles

To meet the needs of a wide range of linear motion applications, two (2) linear actuator shaft styles are offered:

Non-captive shaft

A threaded shaft extends through the motor, moving axially as the motor rotates.

External shaft

A threaded shaft, integral to the motor's rotor, rotates to move a nut axially along it. Two nut styles are offered: general purpose and anti-backlash.

Lead screw characteristics

Precision rolled screws are designed specifically for motion control applications, delivering maximum life and quiet operation. Manufactured from premium grade stainless steel, screws are corrosion resistant and non-magnetic. An optional Teflon® coating is available for smooth operation and extended life.

Customization of linear actuators and screws is available for volume opportunities.

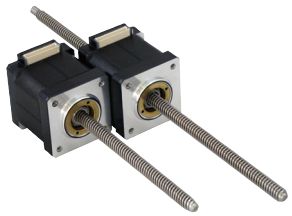
Drive systems

For compact, high performance linear motion systems, combine motors with SEM drives:

MForce – available in 3.0 A and 5.0 A versions, with choices of:
- Motion Control (programmable motion control units, RS-485 or CANopen interface)
- Microstepping (drive-only units programmed via pulse/direction interface)

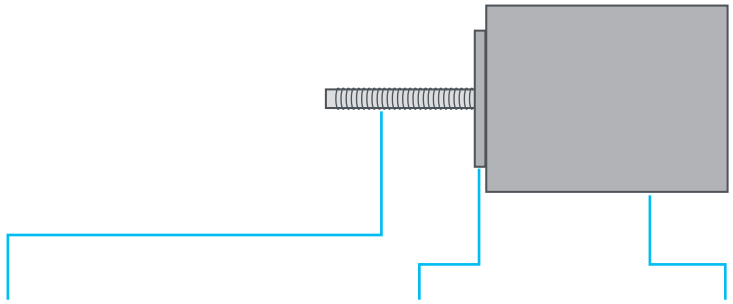
Lexium Motion Module – ultra-compact programmable motion controller, RS-485 or CANopen interface, up to 48 VDC. Offered with starter kits and development boards.

Linear actuator stepper motors
Size 14



			Size 14
Motor	Frame size	NEMA	14
		inches	1.4
		mm	35.3
	Length	stack size	single
Maximum thrust (1)	Non-captive shaft	lbs	50
		kg	22
	External shaft with general purpose nut	lbs	25
		kg	11
	External shaft with anti-backlash nut	lbs	5
		kg	2
Maximum repeatability	Non-captive shaft	inch	0.005
		mm	0.127
	External shaft with general purpose nut	inch	0.005
		mm	0.127
	External shaft with anti-backlash nut	inch	0.0005
		mm	0.0127
Phase current		amps	0.75
Phase resistance		ohms	6.1
Phase inductance		mH	8.3
Weight (without screw)		oz/g	6/190
Step angle α		°	1.8

(1) Performance data for maximum force/load is based on a static load and will vary with a dynamic load.

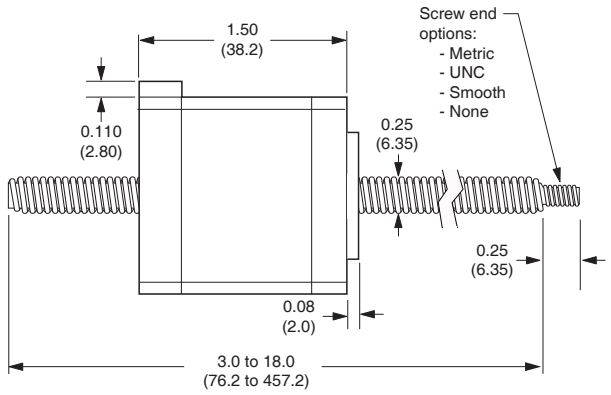


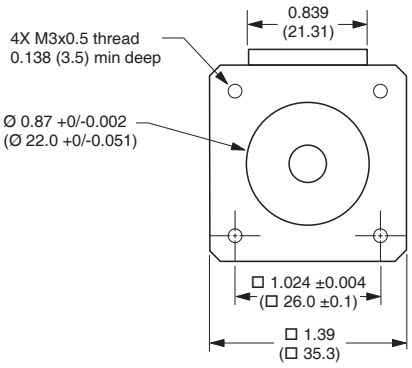
Lead screw		Centering collar	Flange size	Length (without screw)	Winding	Motor connection
Size 14 Acme-style lead screw with end finish options	Ø 0.25" / Ø 2.0 mm	Ø 0.87" / Ø 22.0 mm	NEMA 14 1.4" / 35.3 mm	1.50" / 38.2 mm	2-phase full coil for bi-polar operation	Pluggable connector

Linear actuator stepper motors
Size 14

Size 14 Non-captive shaft

inches (mm)



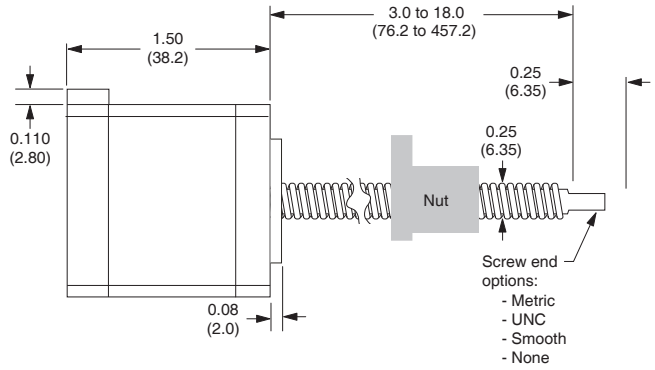


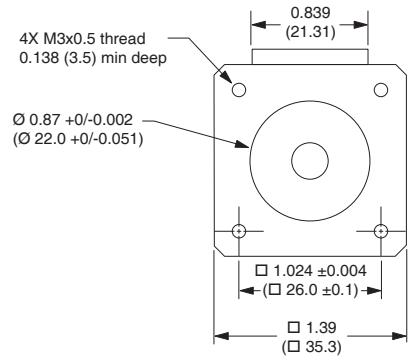
NOTE

Unsupported loads and side loading are not recommended for non-captive shaft linear actuators.

Size 14 External shaft

inches (mm)

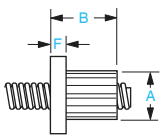




NOTE

Cantilevered loads for external shaft linear actuators MUST BE supported. Side loading is not recommended.

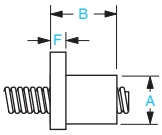
Nut specifications for external shaft linear actuators



General purpose nut

For applications not requiring anti-backlash and wear compensation.

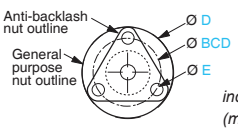
Flange shape: round



Anti-backlash nut

Purpose: backlash free operation for high accuracy and low drag torque.

Flange shape: triangle

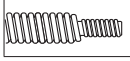
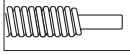
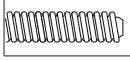


inches (mm)	A	B	D	E	F	BCD	drag torque
General purpose	0.50 (12.7)	0.75 (19.1)	1.0 (25.4)	0.14 (3.6)	0.15 (3.81)	0.75 (19.1)	free wheeling
Anti-backlash	0.50 (12.7)	0.9 (22.86) max	1.0 (25.4)	0.143 (3.63)	0.18 (4.57)	0.75 (19.1)	< 1.0 oz-in < 0.7 N-cm

Lead screw specifications

			Screw A	Screw B	Screw C
Travel	Per revolution		0.25" / 6.35 mm	0.125" / 3.175 mm	0.063" / 1.588 mm
	Per full step		0.00125" / 0.0317 mm	0.00063" / 0.0158 mm	0.00031" / 0.0079 mm
Load limit*	Non-captive shaft		50 lbs / 22 kg		
	External shaft nuts	General purpose	25 lbs / 11 kg		
		Anti-backlash	5 lbs / 2 kg		

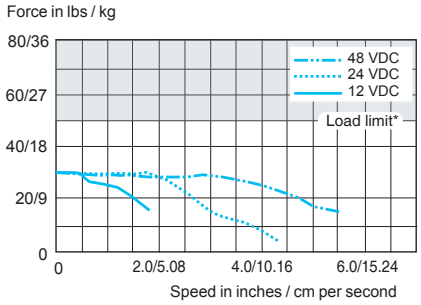
*Performance data for maximum force/load is based on a *static* load and will vary with a *dynamic* load.

Threaded end 	Metric end: M4 x 0.7mm thread to within 0.03"/ 0.76 mm of shoulder	UNC end: #8-32 UNC-2A thread to within 0.03"/ 0.76 mm of shoulder
Smooth end 	Ø 0.1967" ±0.001 Ø 5 mm ±0.003	
None 	—	

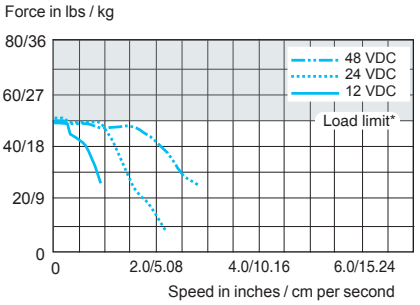
Linear actuator stepper motors
Size 14

Size 14 speed-force curves

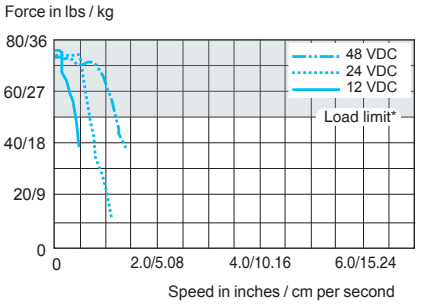
Screw A — 0.25"/6.35 mm travel per revolution



Screw B — 0.125" / 3.175 mm travel per revolution



Screw C — 0.063" / 1.588 mm travel per revolution



**Load limit for non-captive shaft linear actuators is 50 lbs / 22 kg. Load limit for external shaft linear actuators is determined by selected nut.*
NOTE: Above performance data for maximun force/load is based on a static *load and will vary with a* dynamic *load.*

Size 14 part numbers

		example part number	L	M	1	4	A	1	0	0	A	1	M	0	6	0	Z	T
Motor type	**LM** = linear actuator stepper motor		**L**	**M**														
Frame size	**14** = NEMA 14 / 36 mm square flange				**1**	**4**												
Motor length	**A** = single stack						**A**											
Phase current	**100** = 0.75 A							**1**	**0**	**0**								
Screw lead	**A** = 0.25" / 6.35 mm **B** = 0.125" / 3.175 mm **C** = 0.063" / 1.588 mm										**A**							
Shaft style	**1** = non-captive shaft **3** = external shaft											**1**						
Screw end finish	**M** = metric **U** = UNC **S** = smooth **Z** = none												**M**					
Screw length *(1) (2)*	*lengths may vary from:* **030** = 03.0" / 76 mm minimum **180** = 18.0" / 457 mm maximum Note: lengths in even or 0.1" increments													**0**	**6**	**0**		
Nut	**Z** = default (non-captive shaft only) **G** = general purpose (external shaft only) **A** = anti-backlash (external shaft only)																**Z**	
Screw coating	**T** = Teflon® **Z** = none																	**T**

(1) To calculate screw length for non-captive shaft linear motors: screw length = [mounting surface plate thickness] + 1.6" / 41 mm + [desired stroke length]
(2) To calculate screw length for external shaft linear motors: screw length = [desired stroke length] + [nut length] + [mounting surface plate thickness]

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