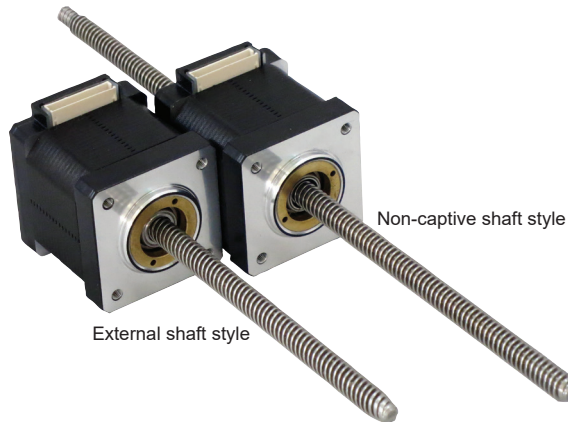


# NEMA14 linear actuator

## 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.

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### Shaft styles

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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.

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### Lead screw characteristics

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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.

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### Drive systems

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

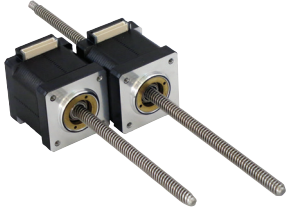
MForce – available in 3.0 A and 5.0 A versions, with choices of:

- Motion Control (programmable motion control units, RS-485 or CANopen interface)
- Microstepping (drive-only units programmed via pulse/direction interface)

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

## Overview

# Linear actuator stepper motors Size 14

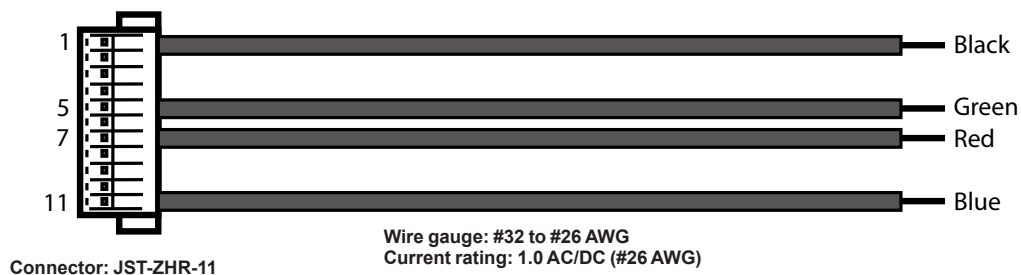


			Size 14
Motor	Frame size	NEMA	14
		inches	1.4
		mm	35.3
	Length	stack size	single
Maximum thrust (1)	Non-captive shaft	lbs	50
		kg	22
	External shaft with general purpose nut	lbs	25
		kg	11
External shaft with anti-backlash nut	lbs	5	
	kg	2	
Maximum repeatability	Non-captive shaft	inch	0.005
		mm	0.127
	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 $\alpha$		°	1.8

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

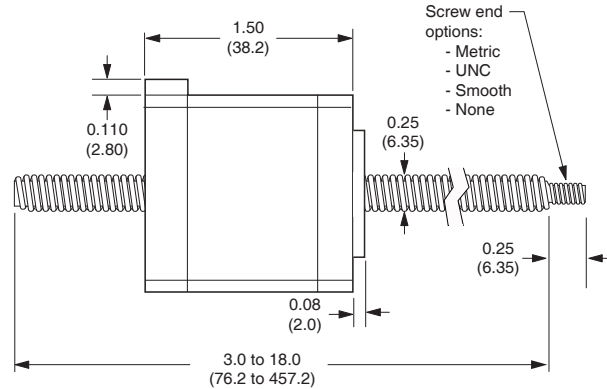
Lead screw	Centering collar	Flange size	Length (without screw)	Winding	Motor connection	
Size 14 Acme-style lead screw with end finish options	Ø 0.25" / Ø 2.0 mm	Ø 0.87" / Ø 22.0 mm	NEMA 14 1.4" / 35.3 mm	1.50" / 38.2 mm	2-phase full coil for bi-polar operation	Pluggable connector

## Cabling



### Size 14 Non-captive shaft

inches (mm)



Screw end options:  
 - Metric  
 - UNC  
 - Smooth  
 - None

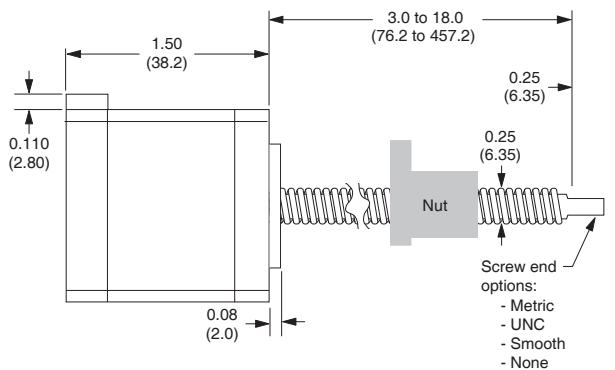
4X M3x0.5 thread  
 0.138 (3.5) min deep  
 Ø 0.87 +0/-0.002  
 (Ø 22.0 +0/-0.051)

NOTE

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

### Size 14 External shaft

inches (mm)



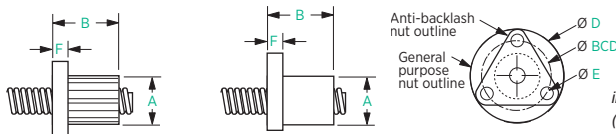
Screw end options:  
 - Metric  
 - UNC  
 - Smooth  
 - None

4X M3x0.5 thread  
 0.138 (3.5) min deep  
 Ø 0.87 +0/-0.002  
 (Ø 22.0 +0/-0.051)

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
<b>General purpose</b>	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
<b>Anti-backlash</b>	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

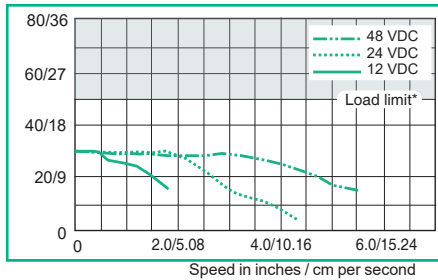
		Screw A	Screw B	Screw C
Travel	Per revolution	0.25" / 6.35 mm	0.125" / 3.175 mm	0.063" / 1.588 mm
	Per full step	0.00125" / 0.0317 mm	0.00063" / 0.0158 mm	0.00031" / 0.0079 mm
Load limit*	Non-captive shaft	50 lbs / 22 kg		
	External shaft nuts	General purpose	25 lbs / 11 kg	
		Anti-backlash	5 lbs / 2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

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	—	

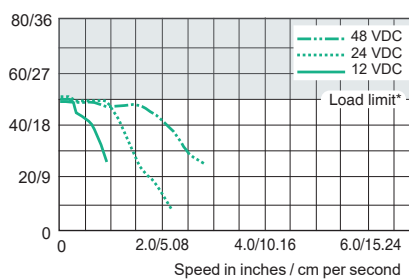
\*Performance data for maximum force/load is based on a static load and will vary with a dynamic load.

### Size 14 speed-force curves

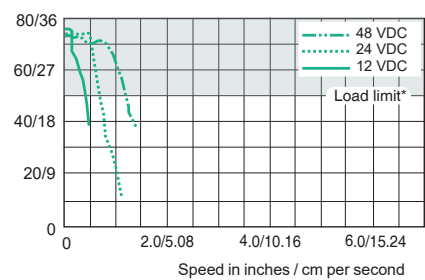
Screw A — 0.25"/6.35 mm travel per revolution  
Force in lbs / kg



Screw B — 0.125"/3.175 mm travel per revolution  
Force in lbs / kg



Screw C — 0.063"/1.588 mm travel per revolution  
Force in lbs / kg



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

### Size 14 part numbers

	example part number	LM14A100A1M060ZT
<b>Motor type</b>	LM = linear actuator stepper motor	<b>L</b> M14A100A1M060ZT
<b>Frame size</b>	14 = NEMA 14 / 36 mm square flange	LM <b>14</b> A100A1M060ZT
<b>Motor length</b>	A = single stack	LM14 <b>A</b> 100A1M060ZT
<b>Phase current</b>	100 = 0.75 A	LM14A1 <b>00</b> A1M060ZT
<b>Screw lead</b>	A = 0.25" / 6.35 mm B = 0.125" / 3.175 mm C = 0.063" / 1.588 mm	LM14A100 <b>A</b> 1M060ZT
<b>Shaft style</b>	1 = non-captive shaft 3 = external shaft	LM14A100A1 <b>1</b> M060ZT
<b>Screw end finish</b>	M = metric U = UNC S = smooth Z = none	LM14A100A1M <b>0</b> 60ZT
<b>Screw length (1) (2)</b>	lengths may vary from: 030 = 03.0" / 76 mm minimum 180 = 18.0" / 457 mm maximum Note: lengths in even or 0.1" increments	LM14A100A1M0 <b>60</b> ZT
<b>Nut</b>	Z = default (non-captive shaft only) G = general purpose (external shaft only) A = anti-backlash (external shaft only)	LM14A100A1M060 <b>Z</b> T
<b>Screw coating</b>	T = Teflon® Z = none	LM14A100A1M060Z <b>T</b>

(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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