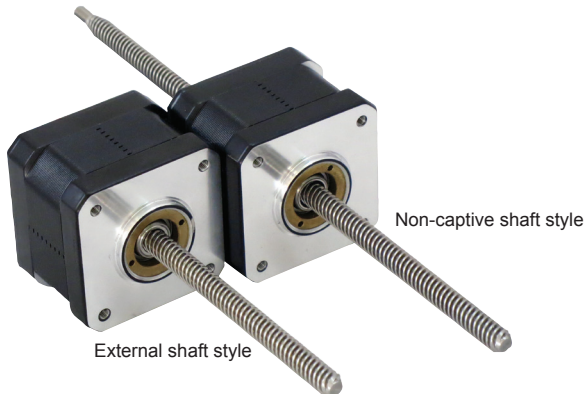


# NEMA17 linear actuator

## 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 17 (1.7"/42.7mm 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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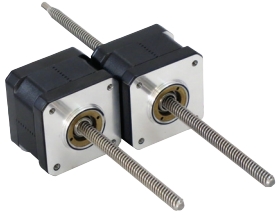
For compact, high performance linear motion systems, combine motors with SEM drives:

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 17



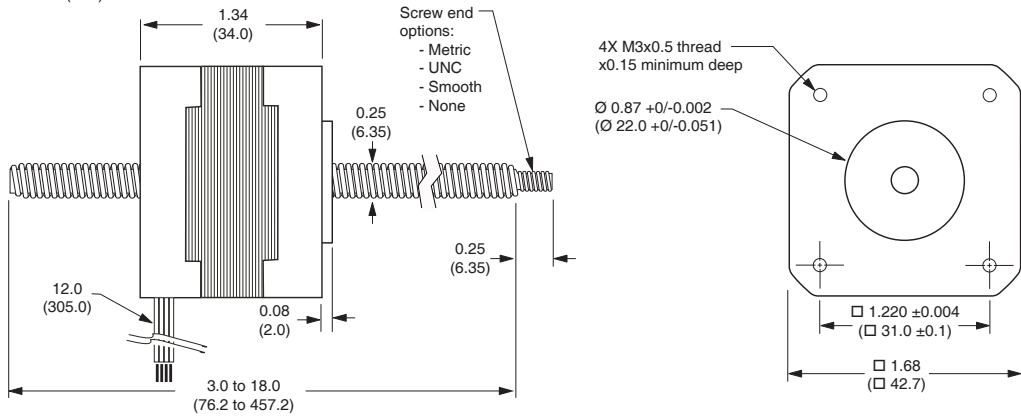
|                                       |   |            | Size 17 |
|---------------------------------------|---|------------|---------|
| Motor                                 | Frame size                              | NEMA       | 17      |
|                                       |   | inches     | 1.7     |
|                                       |   | mm         | 42.7    |
|                                       | 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       | 1.5     |
| Number of leads                       |   |            | 4       |
| Phase resistance                      |   | ohms       | 1.3     |
| Phase inductance                      |   | mH         | 2.1     |
| Weight (without screw)                |   | oz/g       | 8/227   |
| 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 17<br>Acme-style lead screw with end finish options | Ø 0.87" /<br>Ø 22.0 mm | NEMA 17<br>1.7" / 42.7 mm | 1.34" /<br>34.0 mm     | 2-phase full coil for bi-polar operation | Flying leads     |

### Size 17 Non-captive shaft

inches (mm)

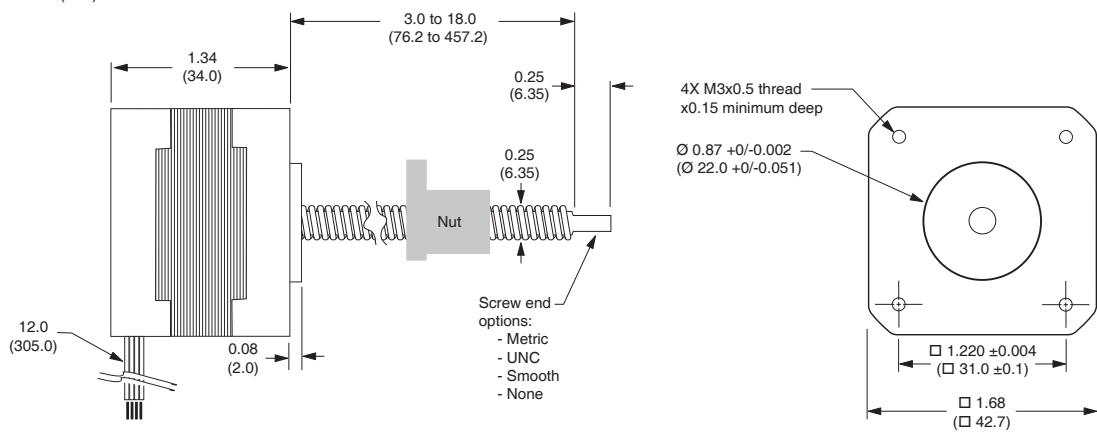


NOTE

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

### Size 17 External shaft

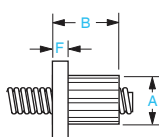
inches (mm)



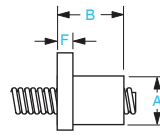
NOTE

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

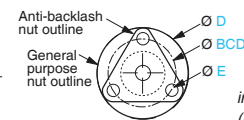
### Nut specifications for external shaft linear actuators



**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               |
|------------------------|-------------|-----------------|------------|--------------|-------------|-------------|---------------------------|
| <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<br>< 0.7 N-cm |

### Lead screw specifications

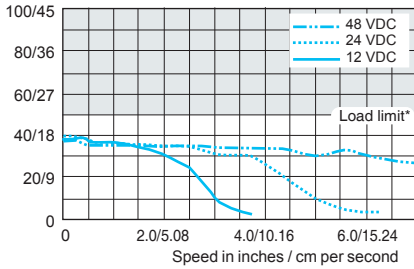
|             |                     | Screw A              | Screw B              | Screw C              |              |   |  |
|-------------|---------------------|----------------------|----------------------|----------------------|--------------|---|--|
| Travel      | Per revolution      | 0.25" / 6.35 mm      | 0.125" / 3.175 mm    | 0.063" / 1.588 mm    | 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 |
|             | Per full step       | 0.00125" / 0.0317 mm | 0.00063" / 0.0158 mm | 0.00031" / 0.0079 mm | Smooth end   | Ø 0.1967" ±0.001<br>Ø 5 mm ±0.003                                 |  |
| Load limit* | Non-captive shaft   | 50 lbs / 22 kg       |                      |                      | None         | —   |  |
|             | 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.

### Size 17 speed-force curves

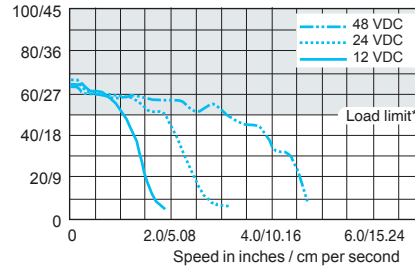
Screw A — 0.25"/6.35 mm travel per revolution

Force in lbs / kg



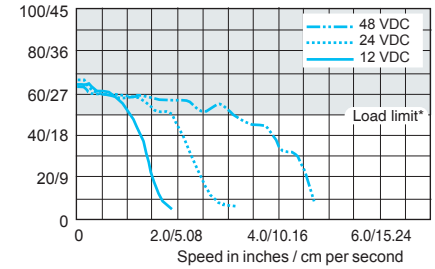
Screw B — 0.125"/3.175 mm travel per revolution

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 17 part numbers

|                             |   |                           |
|-----------------------------|---|---------------------------|
|                             | example part number   | LM17A200A1M060ZT          |
| <b>Motor type</b>           | LM = linear actuator stepper motor  | <b>L</b> M17A200A1M060ZT  |
| <b>Frame size</b>           | 17 = NEMA 17 / 42 mm square flange  | LM <b>17</b> A200A1M060ZT |
| <b>Motor length</b>         | A = single stack  | LM17 <b>A</b> 200A1M060ZT |
| <b>Phase current</b>        | 200 = 1.5 A   | LM17A <b>200</b> A1M060ZT |
| <b>Screw lead</b>           | A = 0.25" / 6.35 mm<br>B = 0.125" / 3.175 mm<br>C = 0.063" / 1.588 mm   | LM17A200 <b>A</b> 1M060ZT |
| <b>Shaft style</b>          | 1 = non-captive shaft<br>3 = external shaft   | LM17A200A <b>1</b> M060ZT |
| <b>Screw end finish</b>     | M = metric<br>U = UNC<br>S = smooth<br>Z = none   | LM17A200A1 <b>M</b> 060ZT |
| <b>Screw length (1) (2)</b> | lengths may vary from:<br>030 = 03.0" / 76 mm minimum<br>180 = 18.0" / 457 mm maximum<br>Note: lengths in even or 0.1" increments | LM17A200A1M <b>060</b> ZT |
| <b>Nut</b>                  | Z = default (non-captive shaft only)<br>G = general purpose (external shaft only)<br>A = anti-backlash (external shaft only)      | LM17A200A1M060 <b>Z</b> T |
| <b>Screw coating</b>        | T = Teflon®<br>Z = none   | LM17A200A1M060Z <b>T</b>  |

(1) To calculate screw length for non-captive shaft linear motors: screw length = [mounting surface plate thickness] + 1.4" / 36 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]

### Schneider Electric Motion USA

370 North Main Street  
Marlborough, CT 06447 – U.S.A.

www.motion.schneider-electric.com

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