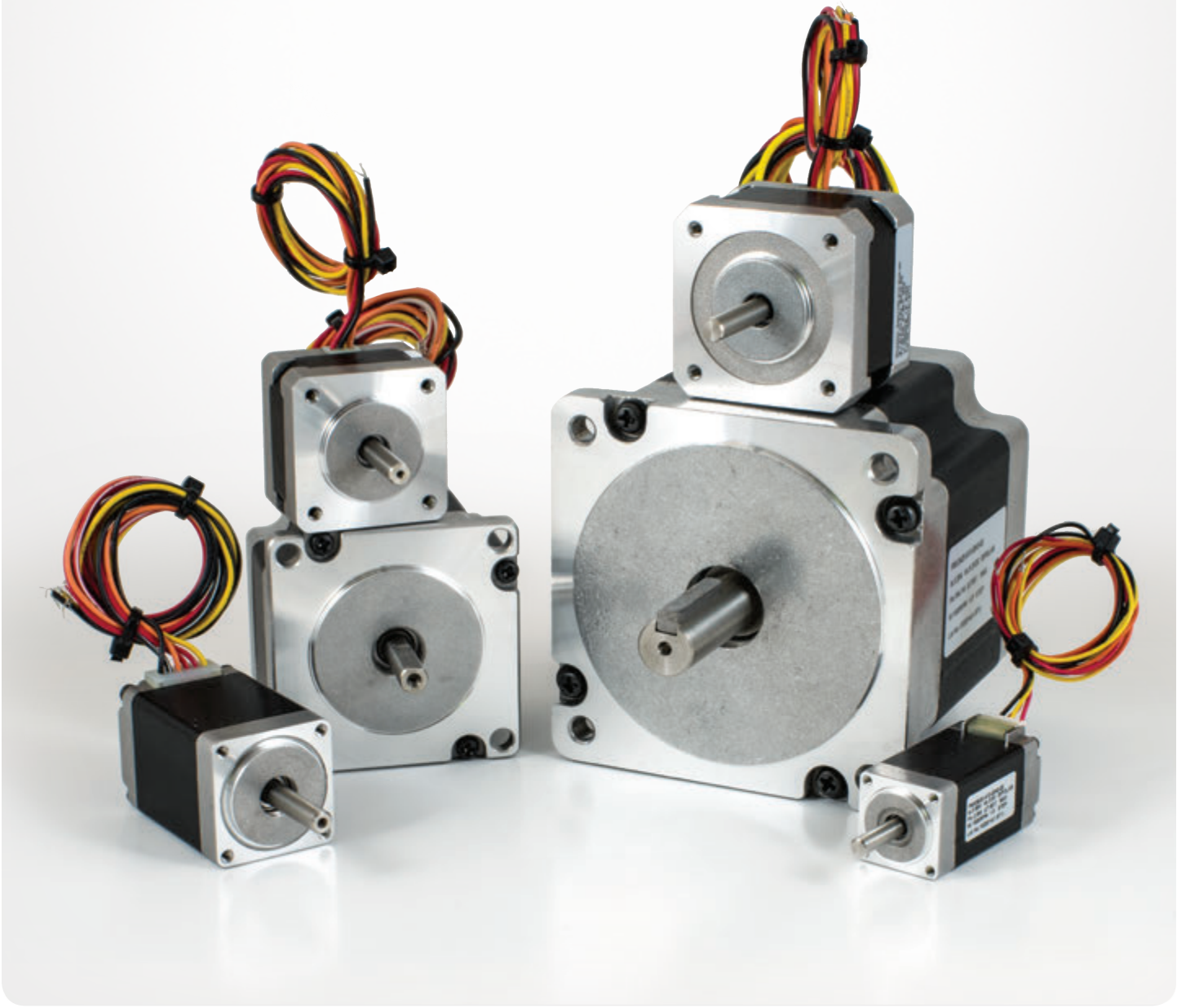
# Kollmorgen PMX™ Series Stepper Motor Selection Guide



with P-Series Stepper Positioning Drives

Celebrating 100 Years of Innovation • 1916-2016 KOLLMORGEN

KOLLMORGEN®

*Because Motion Matters™*

# Kollmorgen: Removing the Barriers of Design, Sourcing, and Time.

## At Kollmorgen, we know that OEM engineers can achieve much more when obstacles aren't in the way.

**Integrating Standard and Custom Products:** The optimal solution is often not clear-cut. Our application expertise allows us to modify standard products or develop totally custom solutions across our whole product portfolio so that designs can take flight.

**Providing Motion Solutions, Not Just Components:** As companies reduce their supplier base and have less engineering manpower, they need a total system supplier with a wide range of integrated solutions. Kollmorgen offers complete solutions as well as motion subsystems that combine programming software, engineering services and best-in-class motion components.

**Global Footprint:** With direct sales, engineering support, manufacturing facilities, and distributors spanning the Americas, Europe, Middle East, and Asia, we're close to OEMs worldwide. Our proximity helps speed delivery and lend support where and when they're needed.

**Financial and Operational Stability:** Kollmorgen is part of Fortive Corporation. A key driver for growth in all Fortive organizations is the principle of "kaizen" – or continuous improvement. Cross-disciplinary teams of exceptional people evaluate processes and develop plans that result in superior performance.

## Kollmorgen: Your partner. In Motion.

KOLLMORGEN®

*Because Motion Matters™*

*PMX Stepper Motor Family*

Though Kollmorgen PMX stepper motors are fully functional with 3rd-party drives, they are best paired with Kollmorgen P-Series stepper drives.

*P-Series Stepper Drives*

**= Optimal Solution**

# Table of Contents



### How To Use This Selection Guide:

This guide covers the technical information required to select and order PMX Series hybrid step motors. Select the proper motor using one of the following procedures:

- If you're already familiar with these motors and the available options, refer to the Model Nomenclature on pg. 52 to verify the part number and corresponding motor options prior to order.
- If you're not familiar with PMX motors and available options: first refer to the Frame Size Overview, pg. 7, and Technical Overview, pg. 8. To further evaluate individual winding specifications refer to the Drawings and Performance Data, using the table of contents above as a reference for each frame size. After all the technical parameters and options are determined, construct a part number using the Model Nomenclature (pg. 52).

### Where To Order:

Kollmorgen utilizes an experienced channel of Authorized High-Tech Distributors (AHTDs) to assist our customers with applications, sizing and selection, ordering, and technical support. Visit our Distributor Locator to find locally available distributors.
www.kollmorgen.com/enus/where-to-buy/

Kollmorgen Customer Service Representatives are also available by phone or e-mail and can assist in selecting and contacting local distributors.

- North America: 1-540-633-3545, support@kollmorgen.com
- Europe/Middle East/Africa: +49 (0) 2102 9394 0, think@kollmorgen.com
- Asia: +86-400 661 2802, sales.china@kollmorgen.com

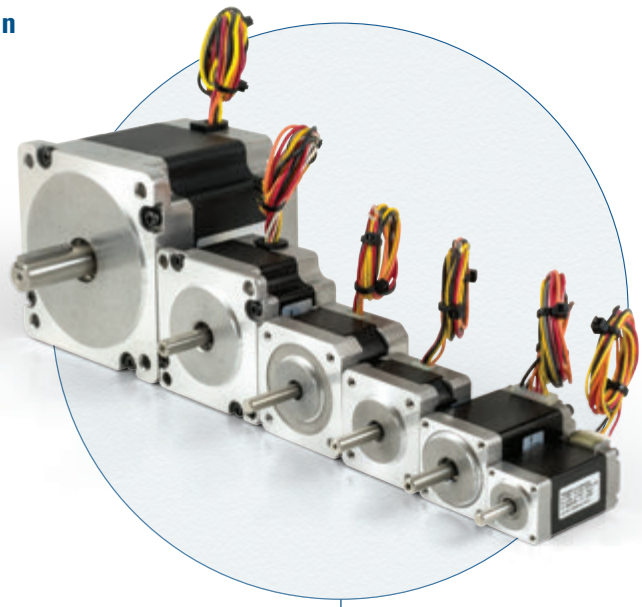
# PMX™ Series Stepper Motor

**Kollmorgen's stepper motors are designed with versatility, ease–of–use, and cost-effectiveness in mind.** They provide high torque in a small package and come in a wide range of standard sizes, constructions, windings and options.

Our high-performance, brushless, maintenance-free stepper motors provide very precise, extremely cost-effective motion control. These hybrid stepper motors inherently move in small, very precise, 0.9°, or 1.8° increments (400 or 200 steps/revolution). This stepping action is simple to control and does not require complicated, expensive feedback devices.

PMX Series motors are commonly built with special modification and value-added features. Custom leads, shafts, and connectors are routinely provided to effectively solve your application needs.

## Kollmorgen's PMX™ stepper motor line delivers breadth and design flexibility at competitive lead times.



Kollmorgen is excited to continue its winning heritage in hybrid stepper motors by introducing the PMX family. Leveraging the best practices from customer preferred products in the POWERMAX and POWERPAC families, the PMX lines will deliver breadth and design flexibility at a very competitive lead time. Look no further for that hybrid stepper motor family with local support that gives you the flexibility you need to succeed.

PMX Series motors include smaller Nema 08, 11, and 14 frame sizes in addition to the traditional Nema 17, 23, and 34 frame sizes. Each frame size is built with high quality construction in an affordable, market competitive solution. Numerous co-engineering options are also available including: customizing shafts, encoders, and mounted spur and planetary gearboxes.

- **Increased Design Flexibility** – six frame sizes (08, 11, 14, 17, 23, 34) each with several stack length and winding options available
- **Minimal Drive Adjustments** – options for 1.8 and 0.9 degree step angles
- **Lower Unit Cost** – PMX motors are priced competitively in today's current stepper market and are the lowest of all Kollmorgen stepper products
- **Quality construction** translates to reliability in the field and a long service life
- **Localized Support** gives you the delivery terms and immediate technical support you need, meaning quicker time to market and less downtime
- **Flexible Manufacturing** enables Kollmorgen to immediately evaluate modifications and co-engineered solutions for rapid prototyping
- **Easy to Apply Worldwide** – CE, RoHS, REACH

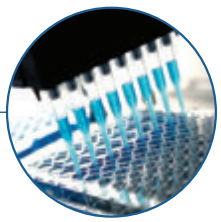
## Many Applications

PMX motors allow Kollmorgen customers to fulfill their automation needs at an affordable cost, enabling higher throughput in a wide variety of equipment. In addition, leveraging Kollmorgen's technical expertise and flexible engineering, the PMX is ready for seamless special and co-engineering options, allowing for swifter and easier integration into both new and existing applications.

Chemical Analyzers

3-D Printers

Tabletop Equipment



Metering Pumps

# PMX™ Modifications and Special Features

## Kollmorgen's flexible manufacturing is shifting the viewpoint on custom motor capabilities.

Kollmorgen offers extensive experience in stepper motor enhancements and value-add stepper motor assemblies. Localized support gives you the technical solutions and delivery terms, leading to swifter prototype evaluation and time to market. Kollmorgen's ability to co-engineer – customize shafts, lead wires, connectors, encoders, gearboxes, etc – provides real flexibility to optimize each motor, making it easier to drop into existing applications with minimal adjustments.

### Shaft Modifications

A variety of motor output shaft modifications can be supplied, allowing swifter integration into drive mechanism.

- Special shaft diameters and shaft lengths
- Special shaft details including: flats, dual flats, slots, and thru holes
- Spline shafts, helical gears, fixed acme lead screws

### Electrical Modifications

Kollmorgen can swiftly evaluation special winding considerations and attempt to match current, resistance, or inductance requirements for swifter control integration.

### Connectors and Cabling

Motors can be supplied with customer-specified connectors for swifter incorporation into existing cabling. Non- standard lead lengths and cable options can also be ordered.

### Encoders

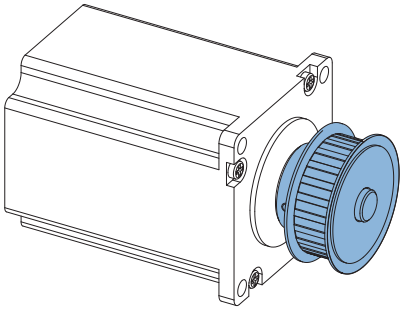
Kollmorgen can supply and mount customer-specified encoders. This includes different encoder types (i.e. incremental, absolute) and line counts.

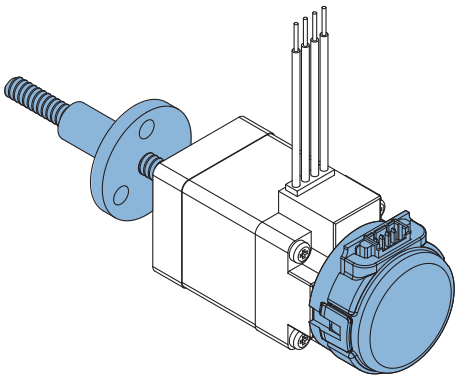
### Gearboxes

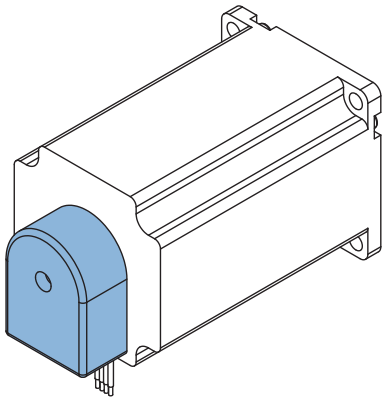
Kollmorgen has immediate spur and planetary gearbox solutions available. These extend the torque range of the motors and ship pre-mounted from the factory for your convenience.

### Complete Sub-Assemblies

Partnering with Kollmorgen for full co-engineering design adds significant value in motion selection. Complete sub-assembly solutions mean less integration and engineering to perform. Sub-assemblies can ship directly from the factory allowing for reduced machine SKU count and swifter production readiness.







To review non-standard capabilities, contact Kollmorgen today at www.kollmorgen.com

# PMX™ Series Technical Overview



## PMX Stepper Motor Frame Size Overview

| | | Series | Stacks | Holding Torque (Motor Mounted) Bipolar oz-in | Holding Torque (Motor Mounted) Bipolar Nm | Length in | Length mm | Features |
|---|---|---|---|---|---|---|---|---|
| **Size 08 PMX Series** |  | 2 Phase, 1.8° Step Motors. Frame size: 0.8 inch, 20 mm | | | | | | |
| | | PMX081 | 1 | 2.50 | 0.018 | 1.18 | 30.0 | • Front shaft flat option<br>• Rear shaft option |
| | | PMX082 | 2 | 4.00 | 0.028 | 1.65 | 42.0 | |
| **Size 11 PMX Series** |  | 2 Phase, 1.8° Step Motors. Frame size: 1.1 inch, 28 mm | | | | | | |
| | | PMX111 | 1 | 10.1 | 0.071 | 1.26 | 32.0 | • Front shaft flat option<br>• Rear shaft option |
| | | PMX112 | 2 | 16.1 | 0.114 | 1.77 | 45.0 | |
| | | PMX113 | 3 | 16.8 | 0.119 | 2.01 | 51.0 | |
| **Size 14 PMX Series** |  | 2 Phase, 1.8° Step Motors. Frame size: 1.4 inch, 35 mm | | | | | | |
| | | PMX141 | 1 | 14.7 | 0.104 | 1.02 | 26.0 | • Front shaft flat option<br>• Rear shaft option<br>• Rear encoder mounting holes |
| | | PMX142 | 2 | 20.1 | 0.142 | 1.10 | 28.0 | |
| | | PMX143 | 3 | 26.4 | 0.186 | 1.42 | 36.0 | |
| **Size 17 PMX Series** |  | 2 Phase, 0.9° or 1.8° Step Motors. Frame size: 1.7 inch, 42 mm | | | | | | |
| | | PMX171 (1.8) | 1 | 28.4 | 0.201 | 1.02 | 26.0 | • Front shaft flat option<br>• Rear shaft option<br>• Integral connector + mating cable option<br>• Bipolar or Unipolar winding available<br>• Rear encoder mounting holes |
| | | PMX172 (1.8) | 2 | 40 | 0.281 | 1.32 | 33.5 | |
| | | PMX173 (1.8) | 3 | 61 | 0.427 | 1.56 | 39.5 | |
| | | PMX174 (1.8) | 4 | 78 | 0.551 | 1.87 | 47.5 | |
| | | PMX171 (1.8) | 5 | 107 | 0.756 | 2.36 | 60.0 | |
| **Size 23 PMX Series** |  | 2 Phase, 0.9° or 1.8° Step Motors. Frame size: 2.2 inch, 57 mm | | | | | | |
| | | PMX231 (1.8) | 1 | 102 | 0.722 | 1.61 | 41.0 | • Front shaft flat option<br>• Front shaft seal option<br>• Bipolar or Unipolar winding available<br>• Rear shaft option<br>• Integral connector + mating cable option<br>• Rear encoder mounting holes |
| | | PMX232 (1.8) | 2 | 208 | 1.47 | 2.20 | 56.0 | |
| | | PMX233 (1.8) | 3 | 337 | 2.38 | 2.99 | 76.0 | |
| | | PMX234 (1.8) | 4 | 378 | 2.67 | 3.35 | 85.0 | |
| **Size 34 PMX Series** |  | 2 Phase, 1.8° Step Motors. Frame size: 3.4 inch, 86 mm | | | | | | |
| | | PMX341 | 1 | 490 | 3.46 | 2.56 | 65.0 | • Front shaft flat option<br>• Front shaft seal option<br>• Rear shaft option |
| | | PMX342 | 2 | 704 | 4.97 | 3.15 | 80.0 | |
| | | PMX343 | 3 | 1285 | 9.07 | 4.65 | 118.0 | |
| | | PM344 | 4 | 1739 | 12.28 | 6.14 | 156.0 | |

# PMX™ Series Technical Overview

## PMX™ Common Ratings and Characteristics

| | PMX08 | PMX11 | PMX14 | PMX17 | | PMX23 | | PMX34 |
|---|---|---|---|---|---|---|---|---|
| Phases | 2 | | | | | | | |
| Full Steps Per Revolution | 200 | 200 | 200 | 200 | 400 | 200 | 400 | 200 |
| Step Size Angle | 1.8˚ | 1.8˚ | 1.8˚ | 1.8˚ | 0.9˚ | 1.8˚ | 0.9˚ | 1.8˚ |
| Step Angle Accuracy | +/- 5.0% | | | | | | | |
| Maximum Case Temperature | 130˚ C | | | | | | | |
| Insulation Class | NEMA Class B, 130˚ C | | | | | | | |
| Insulation Resistance | 100 Megaohms @ 500 Vdc | | | | | | | |
| Ambient Temperature | -20.0 to + 40.0 ˚C | | | | | | | |
| Dielectric Strength | 500 Vac, 1 minute | | | | | | | |

## PMX Shaft Loading

| Motor Frame Size | Max Radial Force at Distance "D" from Mounting Face lb [N] | Dimension "D" inches [mm] | Max Axial Force lb [N] |
|---|---|---|---|
| PMX08 | 3.4 [15] | 0.787 [20.0] | 1.4 [6] |
| PMX11 | 6.3 [28] | | 2.3 [10] |
| PMX14 | 6.3 [28] | | 2.3 [10] |
| PMX17 | 6.3 [28] | | 2.3 [10] |
| PMX23 | 16.9 [75] | | 3.4 [15] |
| PMX34 | 49.5 [220] | | 16.5 [60] |

Notes:
PMX motors do not include captured front bearings. They may be operated up to the maximum radial and axial loads and achieve an L10 life>10,000 hours at speeds up to 3000 RPM. For applications with high radial/axial loading, it is recommended that an alternative Kollmorgen stepper series, with heavy duty, long-life bearings, be evaluated.

## PMX Agency Approval

CE

**CE, Compliance with Directive 2014/30/EU**

**PMX08 – PMX17**
EN 61000-6-3:2007/A1:2011
EN 61000-6-2:2005
EN 55014-2:1997/A2:2008

**PMX23 – PMX34**
EN 61000-6-3:2007/A1:2011
EN 61000-6-2:2005
EN 55014-2:1997/A2:2008
EN 60034-1:2010

RoHS

**RoHS, Compliance with Directive 2011/65/EU**

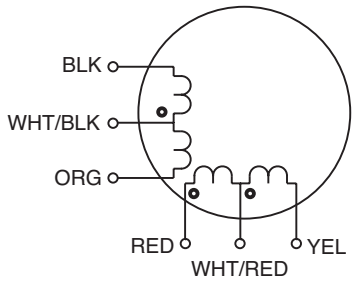
**PMX08 – PMX34**

REACH COMPLIANCE

**PMX08 – PMX34**

# PMX™ Connection Information

## 6-Lead Configuration




### 6-Lead Unipolar Connection

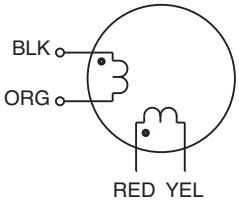
| Driver Connection | Lead Color |
|---|---|
| A | Black (Blk) |
| B | Orange (Org) |
| C | Red |
| D | Yellow (Yel) |
| +V | Wht/Blk |
| +V | Wht/Red |

### Unipolar Full Step Phase Sequence

CCW ↓ ↑ CW

| STEP | A | B | C | D |
|---|---|---|---|---|
| 1 | GND | 0 | GND | 0 |
| 2 | 0 | GND | GND | 0 |
| 3 | 0 | GND | 0 | GND |
| 4 | GND | 0 | 0 | GND |
| 1 | GND | 0 | GND | 0 |

## 4-Lead Configuration




### 4-Lead Bipolar Connection

| Driver Connection | Lead Color |
|---|---|
| A | Black |
| $\overline{A}$ | Orange |
| B | Red |
| $\overline{B}$ | Yellow |

### Bipolar Full Step Phase Sequence

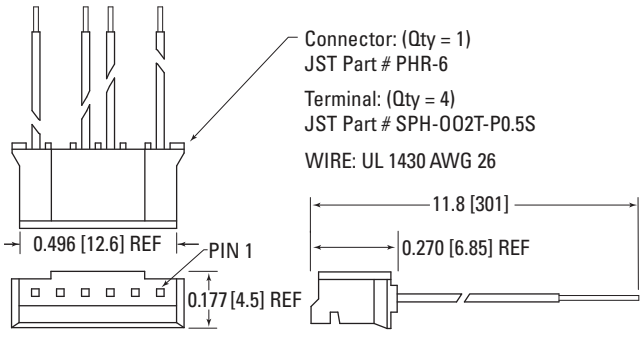
CCW ↓ ↑ CW

| STEP | A | $\overline{A}$ | B | $\overline{B}$ |
|---|---|---|---|---|
| 1 | + | – | – | + |
| 2 | – | + | – | + |
| 3 | – | + | + | – |
| 4 | + | – | + | – |
| 1 | + | – | – | + |

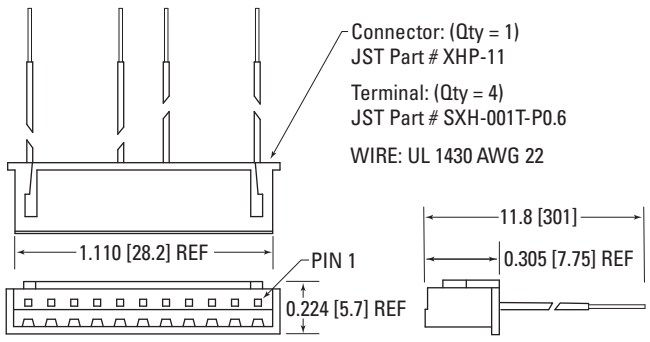
Notes:
1. Indicated direction when viewed from the motor drive shaft end.
2. Because PMX series does not include any 8-lead configurations, Kollmorgen does not differentiate between Bipolar *Parallel* or *Series* within PMX series nomenclature. All 4-lead are simply stated as Bipolar. All Bipolar winding specifications in this guide represent simple 4-lead connection shown above.

## Integral Connector Configurations

PMX17 Cable Assembly




PMX23 Cable Assembly




Notes:
1. A 4-lead Bipolar, 12 inch (300 mm) mating cable assembly is included for all motors ordered with Integral Connector option. The leadwires exiting this cable assembly should be connected same as 4-lead Bipolar shown above.
2. Upon special request, 6-lead Unipolar mating cables are available for Unipolar windings only. Please contact Kollmorgen Customer Support for more information.

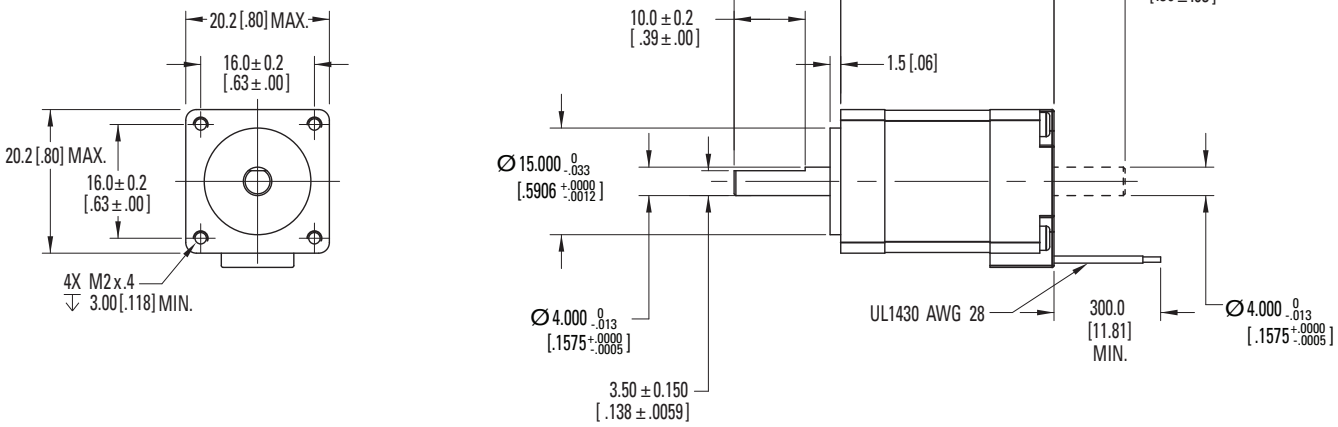
# PMX08 Series Stepper Motors

## PMX08 Standard Options and Specifications

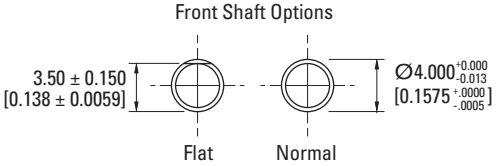
- NEMA Size 08
- Smooth or Flat front shaft flat option
- Single or Rear shaft option
- Bipolar windings

| | |
|---|---|
| Phases | 2 |
| Full Steps Per Revolution | 200 |
| Step Size Angle | 1.8˚ |
| Step Angle Accuracy % | +/- 5.0 |
| Maximum Case Temperature | 130˚ C |
| Insulation Class | NEMA Class B, 130 ˚C |
| Insulation Resistance | 100 Megaohms @ 500 Vdc |
| Ambient Temperature | -20.0 to + 40.0 ˚C |
| Dielectric Strength | 500 Vac, 1 minute |
| Certifications: | CE, RoHS, REACh compliant |

## PMX08 Dimensions




| Model | "A" MAX |
|---|---|
| PMX081 | 30 [1.18] |
| PMX082 | 42 [1.65] |



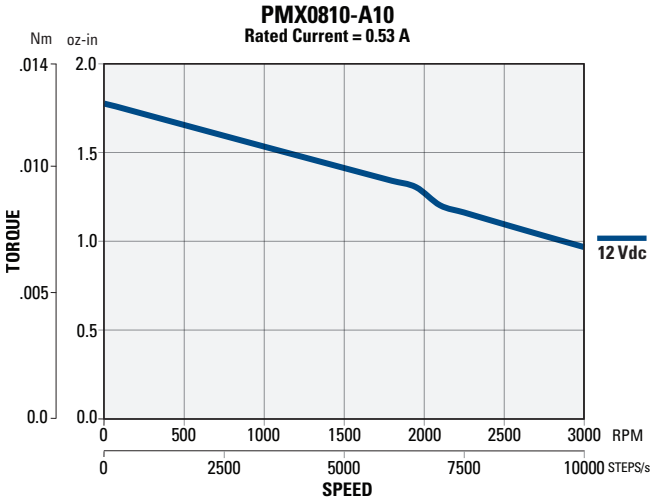

Dimensions in mm [inches]

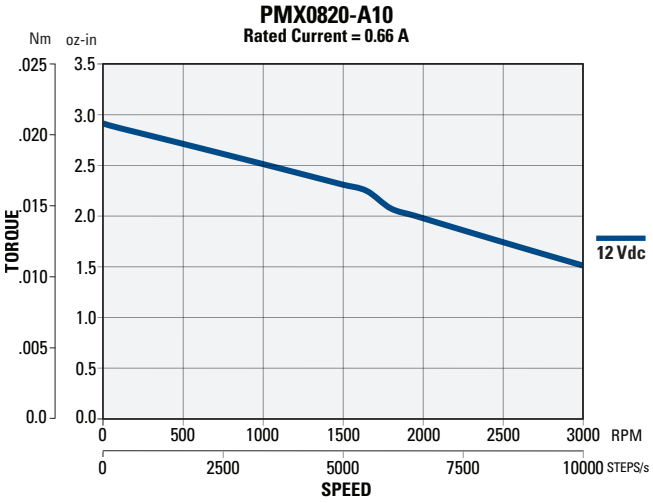
## PMX08 (1.8° Step) Performance Data

| PMX08 | | | Configuration | | Holding Torque (2 phases on) | Rated Current/ Phase | Phase Resistance | Phase Inductance | Thermal Resistance | Rotor Inertia | Weight | Shaft Loading | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Radial Force | Axial Force |
| Stack | Winding | Step | Bipolar | Unipolar | oz-in [Nm] +/-12% | Amps DC | Ohms +/-10% | mH Typical | Mounted °C/Watt | oz-in-s² [kg-m²] | lb [kg] | lb [N] | lb [N] |
| 1 | A | 1 | • | | 2.5 [0.018] | 0.53 | 6.70 | 2.00 | 15.85 | 2.84E-05 [2.01E-07] | 0.1 [0.06] | 4.50 [20.0] | 0.45 [2.0] |
| 2 | A | 1 | • | | 4.0 [0.028] | 0.66 | 5.28 | 1.64 | 12.99 | 5.11E-05 [3.61E-07] | 0.2 [0.08] | 4.50 [20.0] | 0.45 [2.0] |

Notes:
1. All ratings typical and at 40° C unless otherwise noted.
2. Rated current is T = 80° C, ON-PLATE; motor mounted to square aluminum plate heatsink, 2.5X motor diameter, 5mm thick.
3. Small signal inductance as measured with impedance bridge @ 1 KHz, 1 amp.

## PMX08 Series (Bipolar - 1.8° Step) Performance Curves



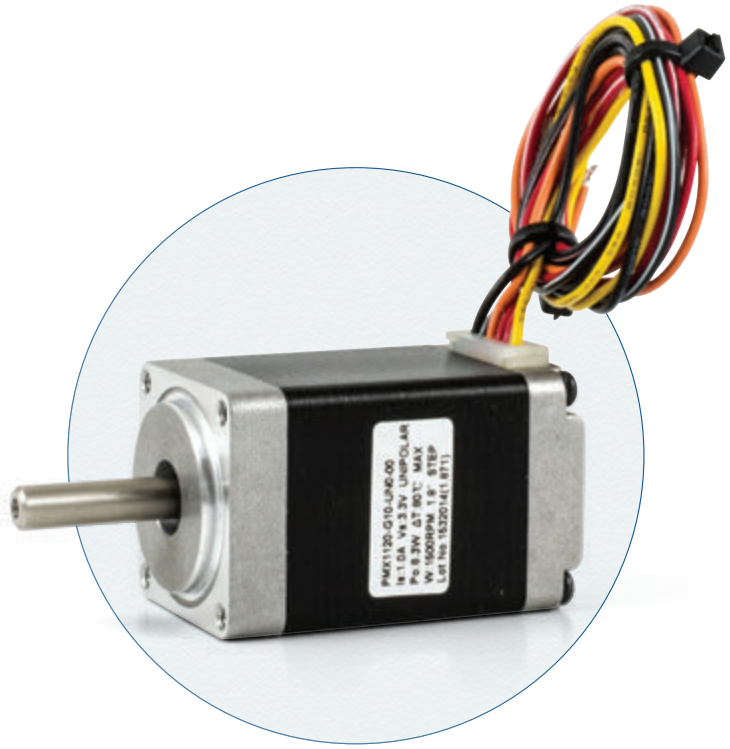




*Complete PMX series model nomenclature can be found on page 52.

# PMX11 Series Stepper Motors

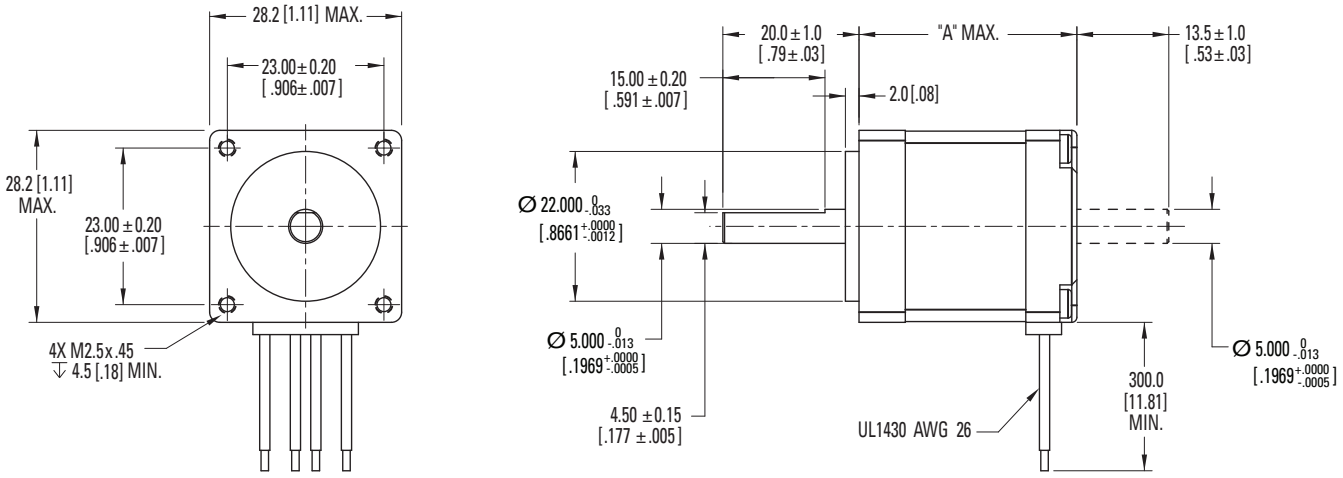
## PMX11 Standard Options and Specifications

- NEMA Size 11
- Front shaft flat option
- Rear shaft option
- Integral connector option
- Bipolar windings

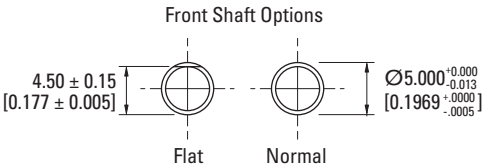


| | |
|---|---|
| Phases | 2 |
| Full Steps Per Revolution | 200 |
| Step Size Angle | 1.8˚ |
| Step Angle Accuracy % | +/- 5.0 |
| Maximum Case Temperature | 130˚ C |
| Insulation Class | NEMA Class B, 130 ˚C |
| Insulation Resistance | 100 Megaohms @ 500 Vdc |
| Ambient Temperature | -20.0 to + 40.0 ˚C |
| Dielectric Strength | 500 Vac, 1 minute |
| Certifications: | CE, RoHS, REACh compliant |

## PMX11 Dimensions




| Model | "A" MAX |
|---|---|
| PMX111 | 32 [1.26] |
| PMX112 | 45 [1.77] |
| PMX113 | 51 [2.01] |




Dimensions in mm [inches]

PMX 11 2 0 – G 1 0 – B N 0 – 00*

- PMX: Motor Series
- 11: Frame Size
- 2: Stack Length
- G: Winding
- 1: Step Angle
- 0: Connection
- N: Front Shaft Opt.
- 0: Rear Shaft Opt.

## PMX11 (1.8° Step) Performance Data

| PMX11 | | | Configuration | | Holding Torque (2 phases on) | Rated Current/ Phase | Phase Resistance | Phase Inductance | Thermal Resistance | Rotor Inertia | Weight | Shaft Loading | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Radial Force | Axial Force |
| Stack | Winding | Step | Bipolar | Unipolar | oz-in [Nm] +/-12% | Amps DC | Ohms +/-10% | mH Typical | Mounted °C/Watt | oz-in-s² [kg-m²] | lb [kg] | lb [N] | lb [N] |
| 1 | A | 1 | • | | 9.9 [0.070] | 1.38 | 1.50 | 0.89 | 11.17 | 1.28E-04 [9.00E-07] | 0.2 [0.11] | 6.30 [28.0] | 2.25 [10.0] |
| 1 | B | 1 | • | | 10.1 [0.071] | 0.70 | 5.41 | 3.57 | | | | | |
| 2 | A | 1 | • | | 16.1 [0.114] | 1.61 | 1.38 | 0.93 | 8.94 | 1.70E-04 [1.20E-06] | 0.3 [0.14] | 6.30 [28.0] | 2.25 [10.0] |
| 2 | B | 1 | • | | 16.1 [0.114] | 0.71 | 6.56 | 4.78 | | | | | |
| 3 | A | 1 | • | | 16.8 [0.119] | 1.53 | 1.61 | 1.20 | 8.35 | 2.56E-04 [1.81E-06] | 0.4 [0.20] | 6.30 [28.0] | 2.25 [10.0] |
| 3 | B | 1 | • | | 16.7 [0.118] | 0.63 | 9.07 | 7.01 | | | | | |

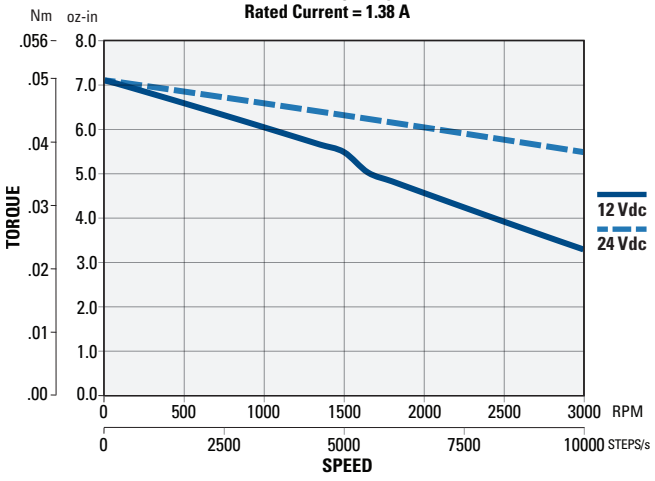
Notes:
1. All ratings typical and at 40° C unless otherwise noted.
2. Rated current is T = 80° C, ON-PLATE; motor mounted to square aluminum plate heatsink, 2.5X motor diameter, 5mm thick.
3. Small signal inductance as measured with impedance bridge @ 1 KHz, 1 amp.

*Complete PMX series model nomenclature can be found on page 52.

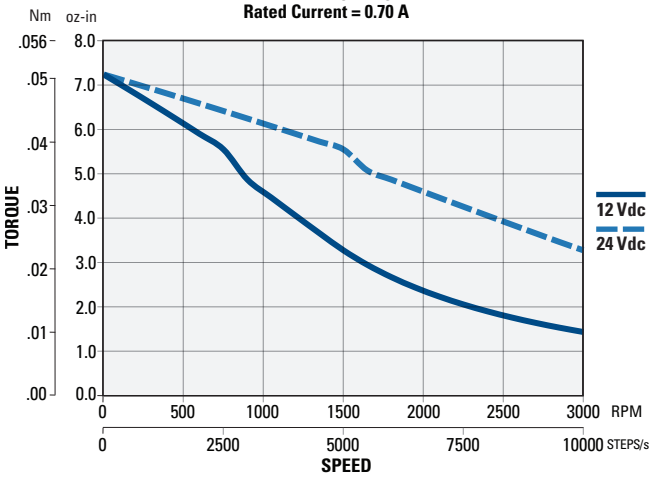
# PMX11 Series Stepper Motors

## PMX11 Series (Bipolar - 1.8° Step) Performance Curves

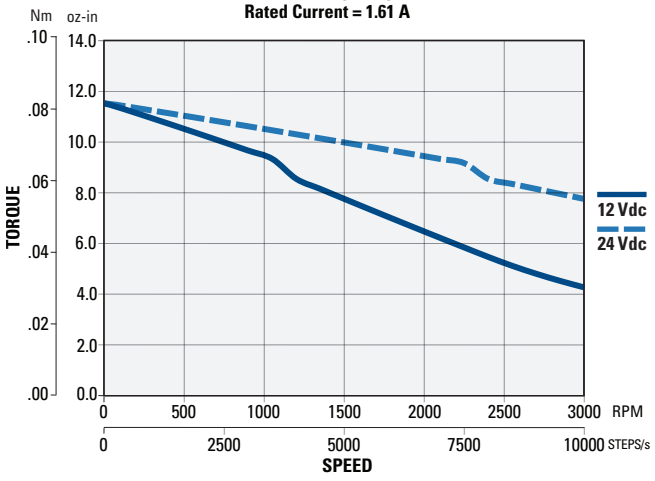
### PMX1110-A10
**Rated Current = 1.38 A**



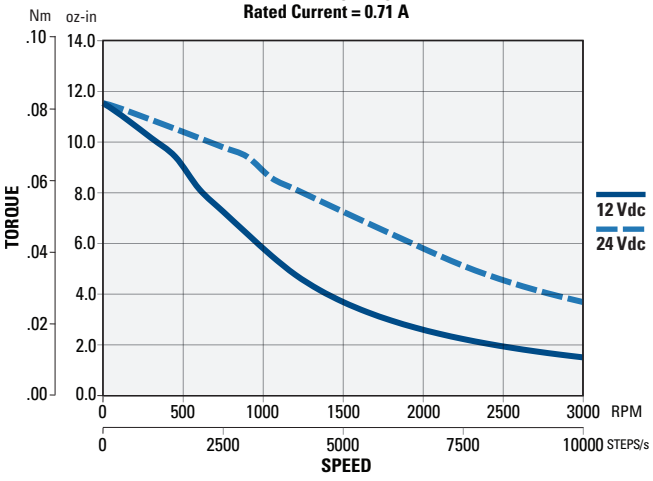

### PMX1110-B10
**Rated Current = 0.70 A**



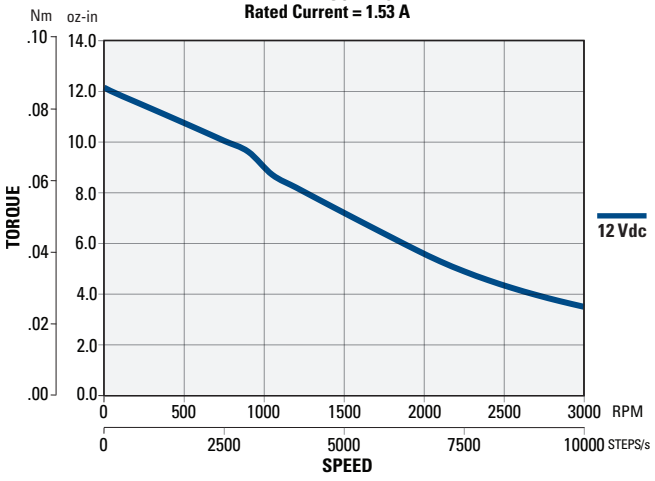

### PMX1120-A10
**Rated Current = 1.61 A**



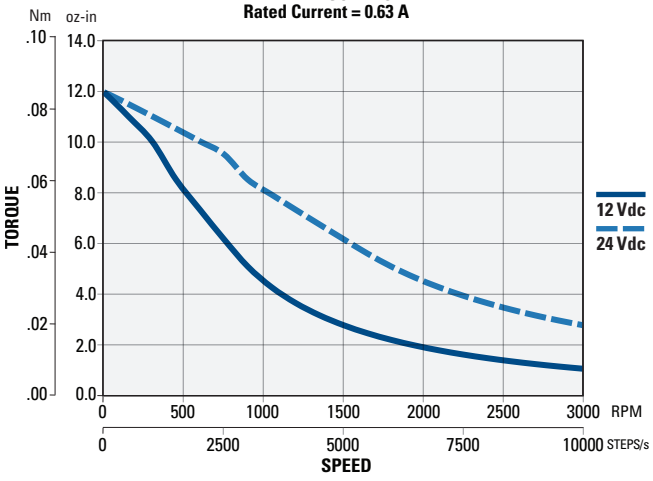

### PMX1120-B10
**Rated Current = 0.71 A**



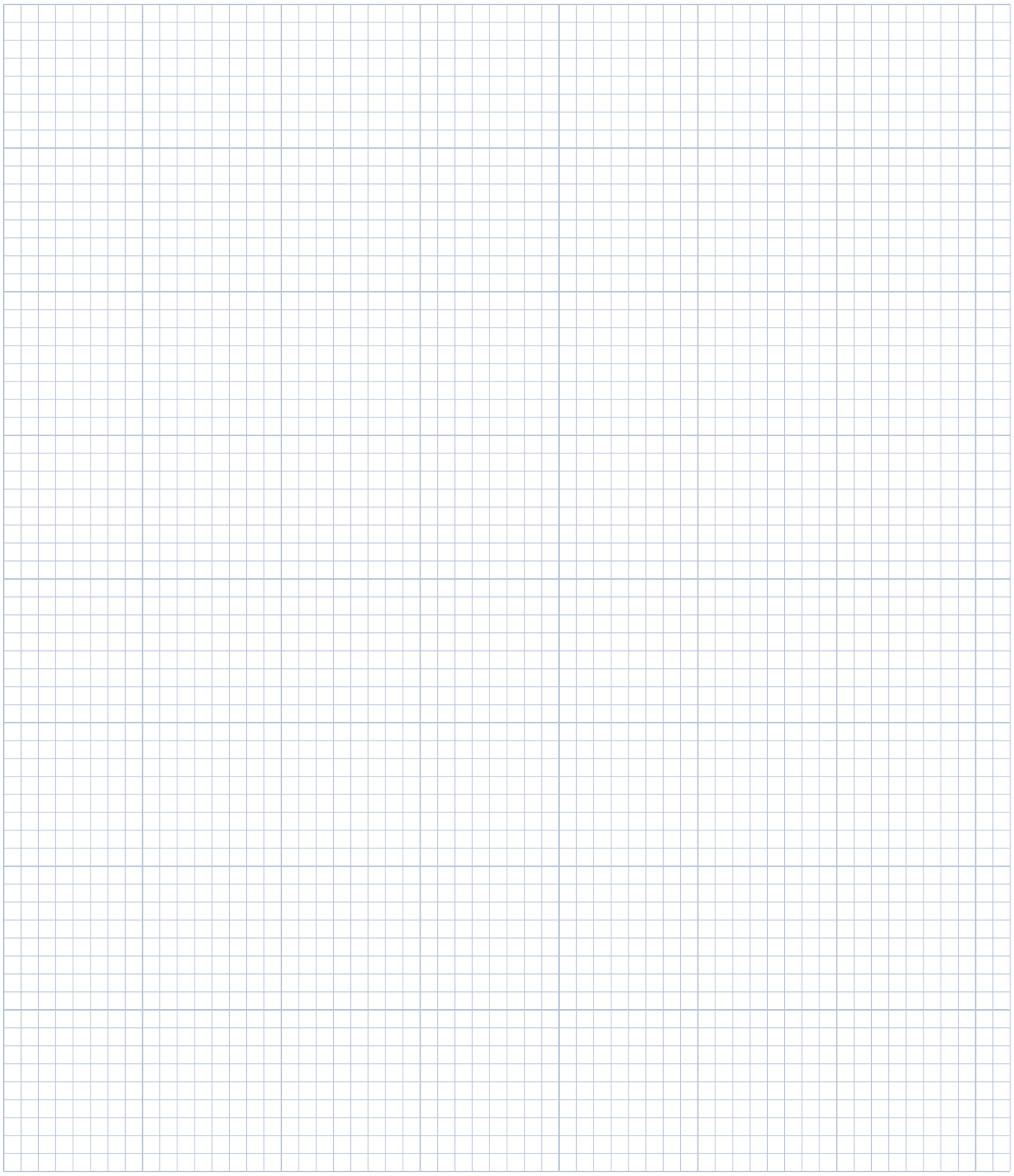

### PMX1130-A10
**Rated Current = 1.53 A**



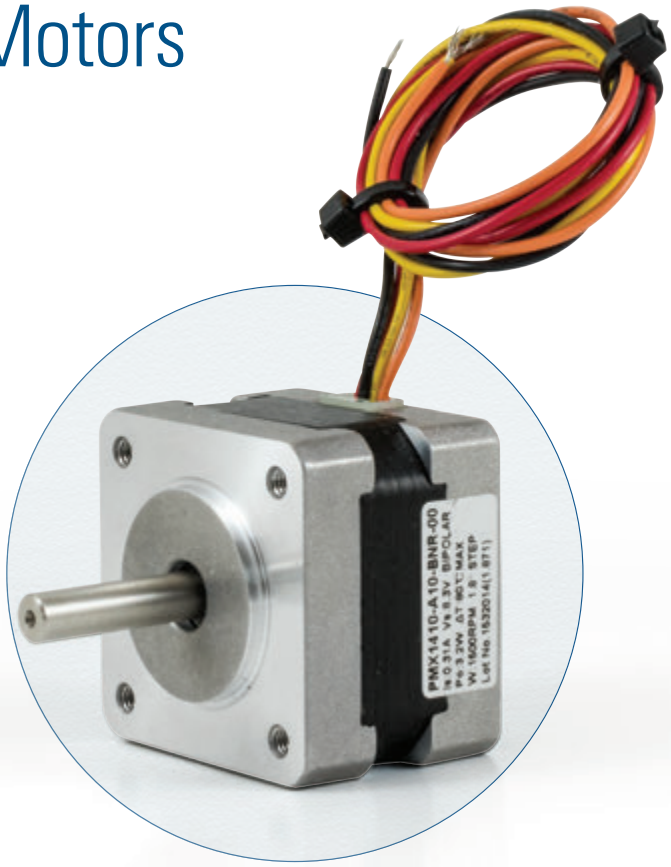

### PMX1130-B10
**Rated Current = 0.63 A**



# Notes



# PMX14 Series Stepper Motors

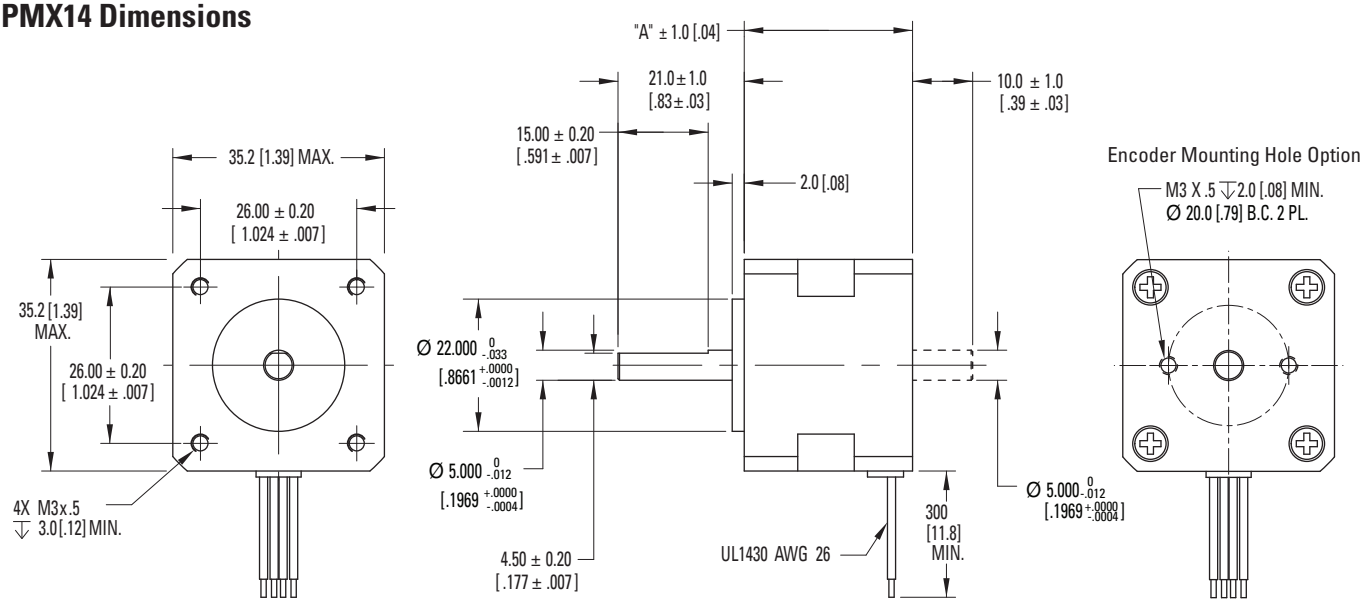


## PMX14 Standard Options and Specifications

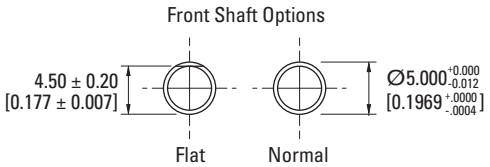
- NEMA Size 14
- Front shaft flat option
- Single, rear shaft, or rear shaft + encoder holes option
- Bipolar windings

| | |
|---|---|
| Phases | 2 |
| Full Steps Per Revolution | 200 |
| Step Size Angle | 1.8˚ |
| Step Angle Accuracy % | +/- 5.0 |
| Maximum Case Temperature | 130˚ C |
| Insulation Class | NEMA Class B, 130 ˚C |
| Insulation Resistance | 100 Megaohms @ 500 Vdc |
| Ambient Temperature | -20.0 to + 40.0 ˚C |
| Dielectric Strength | 500 Vac, 1 minute |
| Certifications: | CE, RoHS, REACh compliant |

## PMX14 Dimensions




| Model | "A" MAX |
|---|---|
| PMX141 | 26 [1.02] |
| PMX142 | 28 [1.10] |
| PMX143 | 36 [1.42] |




Dimensions in mm [inches]

PMX 14 2 0 – A 1 0 – B N 0 – 00*

Motor Series | Frame Size | Stack Length | Winding | Step Angle | Connection | Front Shaft Opt. | Rear Shaft Opt.

## PMX14 (1.8° Step) Performance Data

| PMX14 | | | Configuration | | Holding Torque (2 phases on) | Rated Current/ Phase | Phase Resistance | Phase Inductance | Thermal Resistance | Rotor Inertia | Weight | Shaft Loading | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Radial Force | Axial Force |
| Stack | Winding | Step | Bipolar | Unipolar | oz-in [Nm] +/-12% | Amps DC | Ohms +/-10% | mH Typical | Mounted °C/Watt | oz-in-s² [kg-m²] | lb [kg] | lb [N] | lb [N] |
| 1 | A | 1 | • | | 13.5 [0.095] | 0.31 | 28.61 | 30.62 | 10.81 | 1.420E-04 [1.00E-06] | 0.3 [0.13] | 6.30 [28.0] | 2.25 [10.0] |
| 1 | B | 1 | • | | 14.7 [0.104] | 0.70 | 5.69 | 7.75 | | | | | |
| 2 | A | 1 | • | | 15.8 [0.112] | 0.36 | 22.23 | 14.63 | 10.11 | 1.560E-04 [1.10E-06] | 0.3 [0.14] | 6.30 [28.0] | 2.25 [10.0] |
| 2 | B | 1 | • | | 19.8 [0.140] | 0.74 | 5.43 | 6.56 | | | | | |
| 2 | C | 1 | • | | 20.1 [0.142] | 1.41 | 1.54 | 1.86 | | | | | |
| 3 | A | 1 | • | | 26.3 [0.186] | 1.21 | 2.57 | 4.39 | 8.00 | 1.990E-04 [1.41E-06] | 0.4 [0.18] | 6.30 [28.0] | 2.25 [10.0] |
| 3 | B | 1 | • | | 26.1 [0.184] | 0.82 | 5.49 | 9.30 | | | | | |
| 3 | C | 1 | • | | 26.4 [0.186] | 1.60 | 1.51 | 2.54 | | | | | |

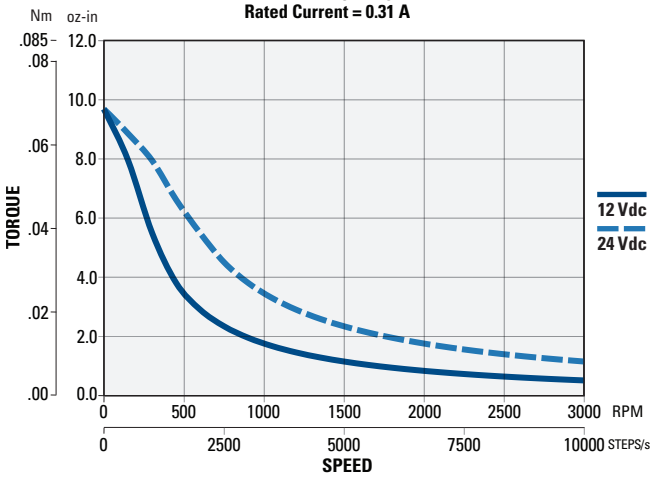
Notes:
1. All ratings typical and at 40° C unless otherwise noted.
2. Rated current is T = 80° C, ON-PLATE; motor mounted to square aluminum plate heatsink, 2.5X motor diameter, 5mm thick.
3. Small signal inductance as measured with impedance bridge @ 1 KHz, 1 amp.

*Complete PMX series model nomenclature can be found on page 52.

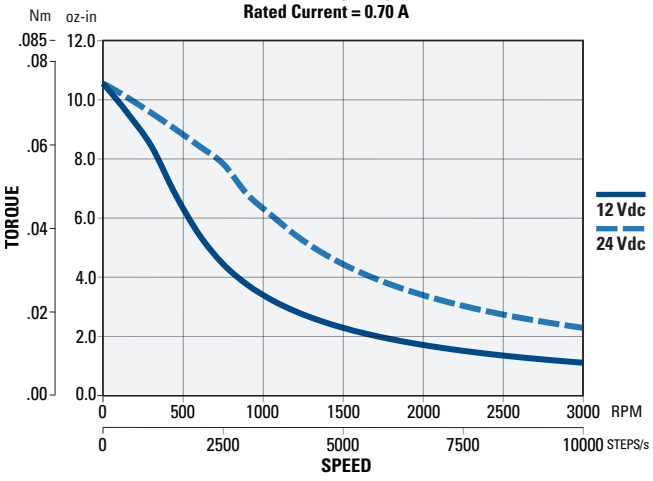
# PMX14 Series Stepper Motors

## PMX14 Series (Bipolar - 1.8° Step) Performance Curves

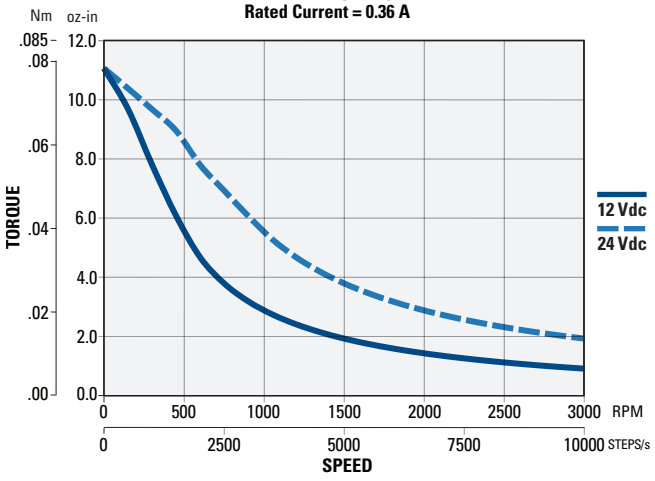
### PMX1410-A10
**Rated Current = 0.31 A**



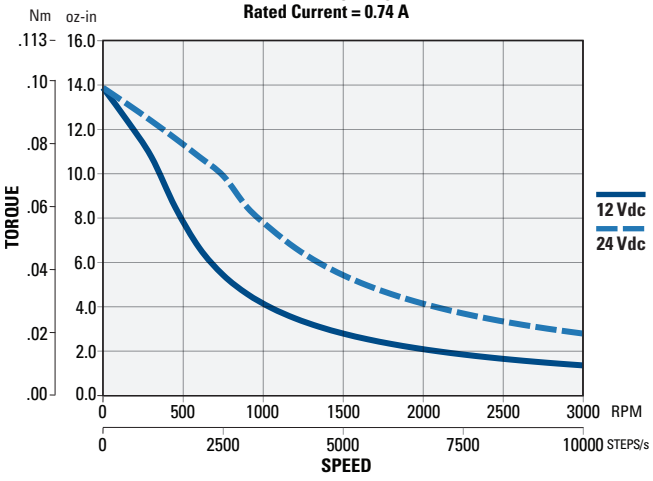

### PMX1410-B10
**Rated Current = 0.70 A**



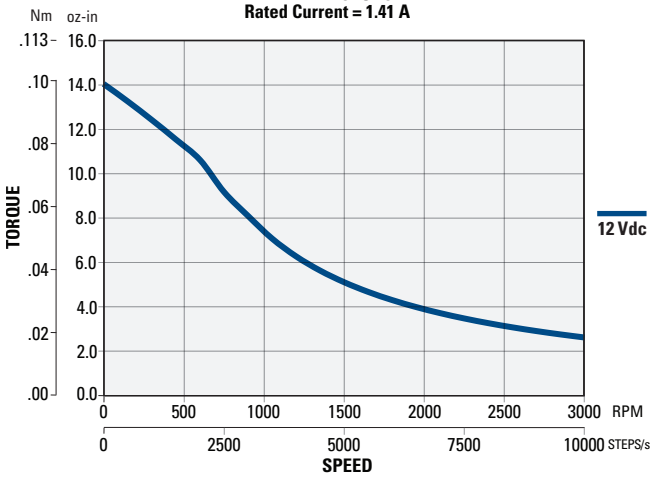

### PMX1420-A10
**Rated Current = 0.36 A**




### PMX1420-B10
**Rated Current = 0.74 A**

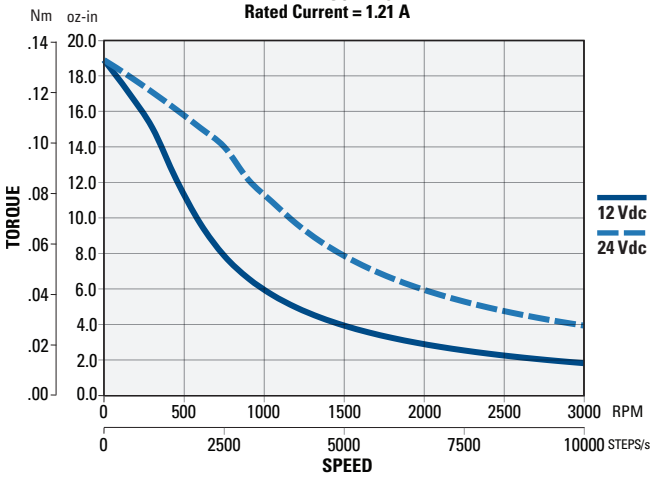



### PMX1420-C10
**Rated Current = 1.41 A**

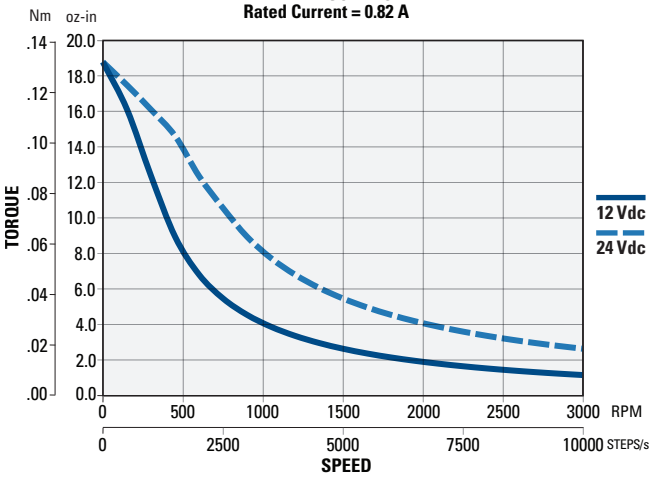


## PMX14 Series (Bipolar - 1.8° Step) Performance Curves

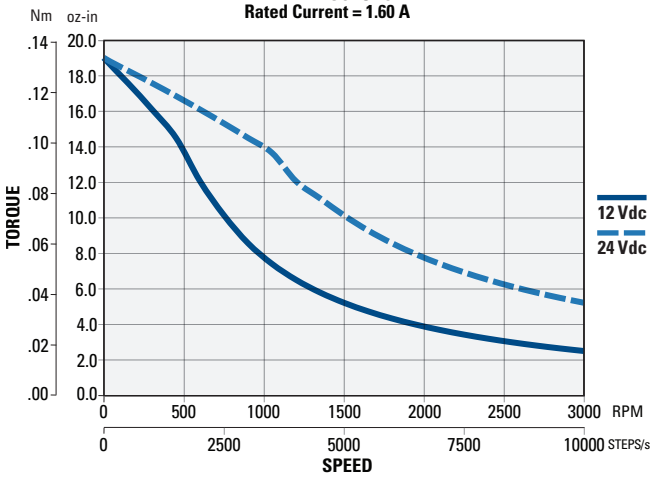
### PMX1430-A10
**Rated Current = 1.21 A**




### PMX1430-B10
**Rated Current = 0.82 A**



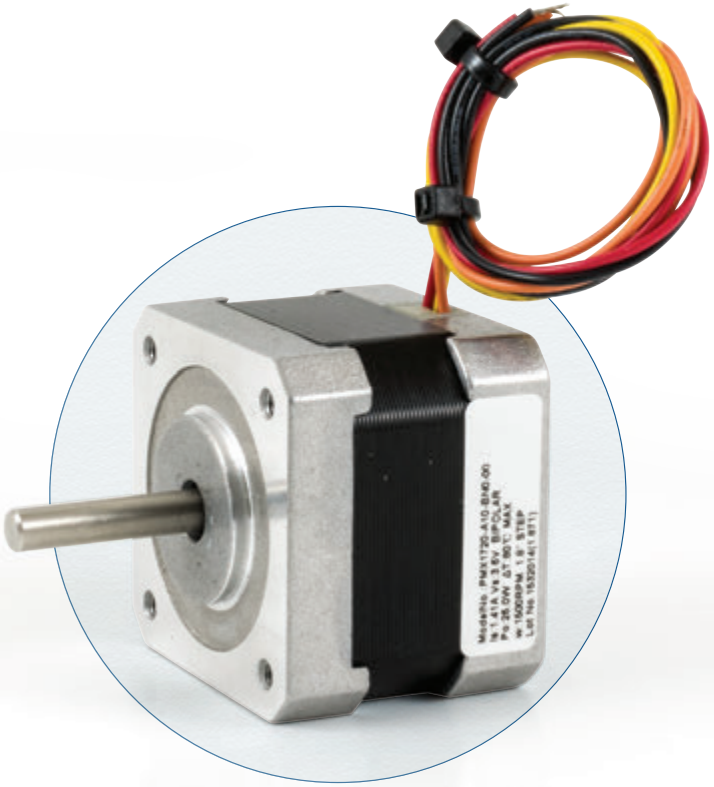

### PMX1430-C10
**Rated Current = 1.60 A**



# PMX17 Series Stepper Motors

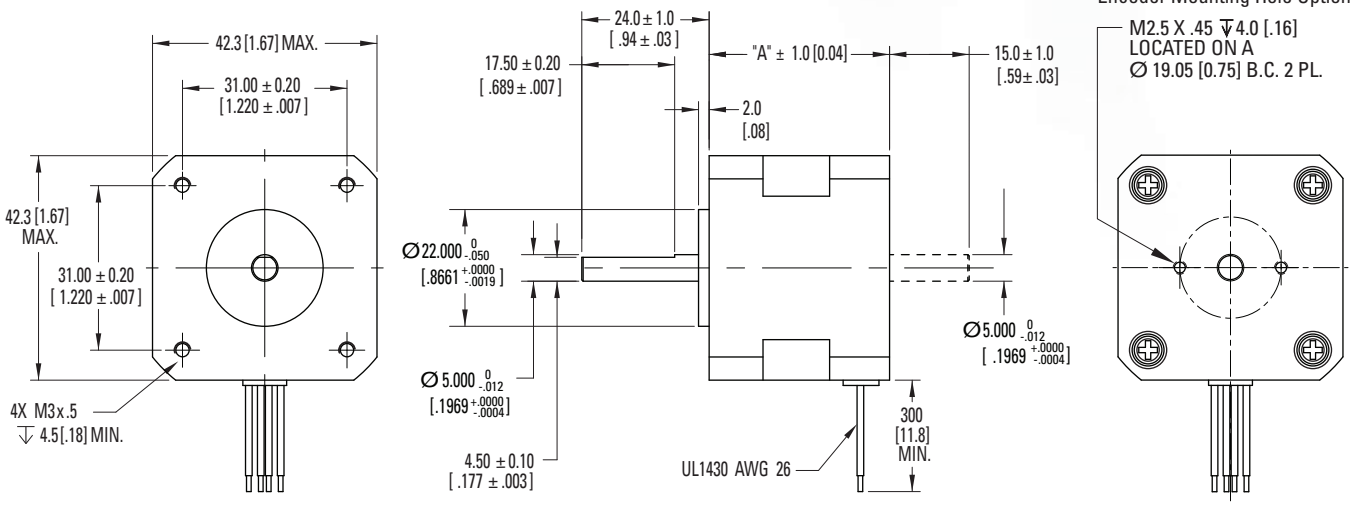
## PMX17 Standard Options and Specifications

- NEMA Size 17
- Front shaft flat option
- Rear shaft option
- Integral connector option
- Rear encoder mounting holes
- Bipolar and Unipolar windings



| | |
|---|---|
| Phases | 2 |
| Full Steps Per Revolution | 200 |
| Step Size Angle | 1.8˚, 0.9˚ |
| Step Angle Accuracy % | +/- 5.0 |
| Maximum Case Temperature | 130˚ C |
| Insulation Class | NEMA Class B, 130 ˚C |
| Insulation Resistance | 100 Megaohms @ 500 Vdc |
| Ambient Temperature | -20.0 to + 40.0 ˚C |
| Dielectric Strength | 500 Vac, 1 minute |
| Certifications: | CE, RoHS, REACh compliant |

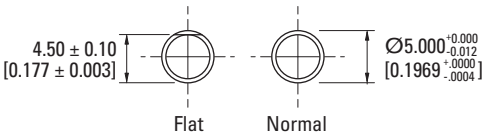
## PMX17 Dimensions



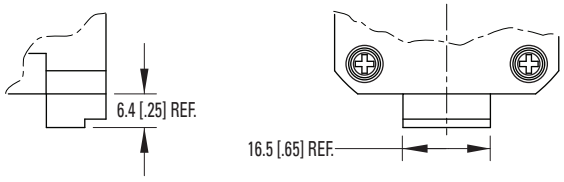

Dimensions in mm [inches]

| Model | "A" MAX |
|---|---|
| PMX171 | 26 [1.02] |
| PMX172 | 33.5 [1.32] |
| PMX173 | 39.5 [1.56] |
| PMX174 | 47.5 [1.87] |
| PMX175 | 60 [2.36] |

Front Shaft Options




Integral Connector Option




A 4-lead Bipolar, 12 inch (300 mm) mating cable assembly is included for all motors ordered with Integral Connector option.

PMX 17 2 0 – A 1 0 – B N 0 – 00*

- PMX: Motor Series
- 17: Frame Size
- 2: Stack Length
- A: Winding
- 1: Step Angle
- B: Connection
- N: Front Shaft Opt.
- 0: Rear Shaft Opt.

## PMX17 (1.8° Step) Performance Data

| PMX17 | | | Configuration | | Holding Torque (2 phases on) | Rated Current/ Phase | Phase Resistance | Phase Inductance | Thermal Resistance | Rotor Inertia | Weight | Shaft Loading | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Radial Force | Axial Force |
| Stack | Winding | Step | Bipolar | Unipolar | oz-in [Nm] +/-12% | Amps DC | Ohms +/-10% | mH Typical | Mounted °C/Watt | oz-in-s² [kg-m²] | lb [kg] | lb [N] | lb [N] |
| 1 | A | 1 | • | | 28.4 [0.201] | 0.39 | 24.80 | 31.09 | 7.98 | 2.84E-04 [2.01E-06] | 0.3 [0.15] | 6.30 [28.0] | 2.25 [10.0] |
| 1 | B | 1 | • | | 27.0 [0.191] | 0.69 | 7.74 | 8.35 | | | | | |
| 2 | A | 1 | • | | 39.2 [0.277] | 1.48 | 2.00 | 2.56 | 7.00 | 4.97E-04 [3.51E-06] | 0.5 [0.22] | 6.30 [28.0] | 2.25 [10.0] |
| 2 | B | 1 | • | | 38.0 [0.268] | 1.00 | 4.25 | 5.13 | | | | | |
| 2 | H | 1 | • | | 39.5 [0.279] | 0.31 | 44.78 | 60.73 | | | | | |
| 2 | H | 1 | | • | 27.9 [0.197] | 0.43 | 22.37 | 15.18 | | | | | |
| 2 | J | 1 | • | | 39.8 [0.281] | 0.74 | 7.76 | 10.65 | | | | | |
| 2 | J | 1 | | • | 28.1 [0.199] | 1.04 | 3.86 | 2.66 | | | | | |
| 3 | A | 1 | • | | 60.2 [0.425] | 1.60 | 1.74 | 3.16 | 6.92 | 7.67E-04 [5.42E-06] | 0.6 [0.28] | 6.30 [28.0] | 2.25 [10.0] |
| 3 | B | 1 | • | | 60.1 [0.424] | 1.52 | 1.92 | 3.48 | | | | | |
| 3 | G | 1 | • | | 58.4 [0.412] | 0.26 | 62.75 | 109.85 | | | | | |
| 3 | G | 1 | | • | 41.3 [0.292] | 0.37 | 31.35 | 27.46 | | | | | |
| 3 | H | 1 | • | | 58.8 [0.415] | 0.55 | 13.92 | 24.74 | | | | | |
| 3 | H | 1 | | • | 41.6 [0.294] | 0.78 | 6.94 | 6.19 | | | | | |
| 3 | J | 1 | • | | 60.5 [0.427] | 0.80 | 6.64 | 12.62 | | | | | |
| 3 | J | 1 | | • | 42.8 [0.302] | 1.14 | 3.30 | 3.16 | | | | | |
| 4 | A | 1 | • | | 76.0 [0.537] | 1.71 | 1.82 | 2.98 | 5.77 | 9.66E-04 [6.82E-06] | 0.8 [0.35] | 6.30 [28.0] | 2.25 [10.0] |
| 4 | B | 1 | • | | 75.7 [0.535] | 2.17 | 1.16 | 1.83 | | | | | |
| 4 | G | 1 | • | | 78.1 [0.552] | 0.30 | 57.16 | 105.47 | | | | | |
| 4 | G | 1 | | • | 55.2 [0.390] | 0.42 | 28.56 | 26.37 | | | | | |
| 4 | H | 1 | • | | 70.7 [0.499] | 0.57 | 15.91 | 22.67 | | | | | |
| 4 | H | 1 | | • | 50.0 [0.353] | 0.80 | 7.93 | 5.67 | | | | | |
| 4 | J | 1 | • | | 70.9 [0.501] | 0.85 | 7.08 | 10.08 | | | | | |
| 4 | J | 1 | | • | 50.1 [0.354] | 1.20 | 3.52 | 2.52 | | | | | |
| 5 | A | 1 | • | | 102.2 [0.722] | 1.02 | 5.87 | 12.28 | 4.78 | 1.45E-03 [1.02E-05] | 1.1 [0.50] | 6.30 [28.0] | 2.25 [10.0] |
| 5 | B | 1 | • | | 103.2 [0.729] | 1.76 | 2.02 | 4.26 | | | | | |
| 5 | G | 1 | • | | 107.1 [0.756] | 0.73 | 11.67 | 27.62 | | | | | |
| 5 | G | 1 | | • | 75.7 [0.535] | 1.03 | 5.81 | 6.90 | | | | | |

Notes:

1. All ratings typical and at 40° C unless otherwise noted.
2. Rated current is T = 80° C, ON-PLATE; motor mounted to square aluminum plate heatsink, 2.5X motor diameter, 5mm thick.
3. Small signal inductance as measured with impedance bridge @ 1 KHz, 1 amp.

*Complete PMX series model nomenclature can be found on page 52.

# PMX17 Series Stepper Motors



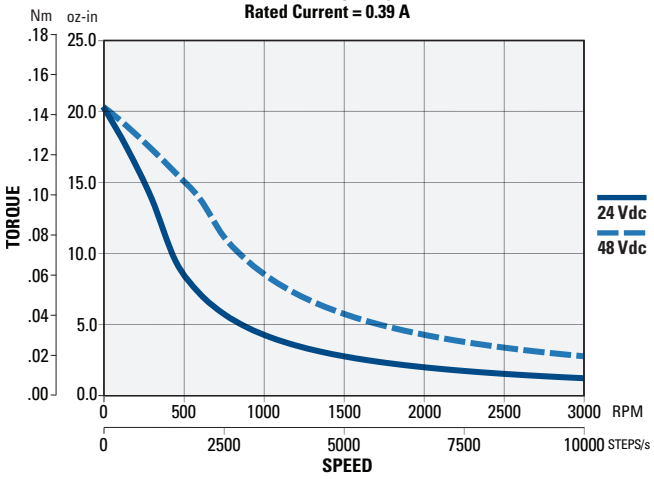
## PMX17 (0.9° Step) Performance Data

| PMX17 | | | Configuration | | Holding Torque (2 phases on) | Rated Current/ Phase | Phase Resistance | Phase Inductance | Thermal Resistance | Rotor Inertia | Weight | Shaft Loading | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Radial Force | Axial Force |
| Stack | Winding | Step | Bipolar | Unipolar | oz-in [Nm] +/-12% | Amps DC | Ohms +/-10% | mH Typical | Mounted °C/Watt | oz-in-s² [kg-m²] | lb [kg] | lb [N] | lb [N] |
| 2 | A | 9 | • | | 38.1 [0.269] | 1.41 | 2.20 | 5.69 | 7.00 | 4.97E-04 [3.51E-06] | 0.5 [0.22] | 6.30 [28.0] | 2.25 [10.0] |
| 2 | B | 9 | • | | 36.0 [0.254] | 1.00 | 4.25 | 9.02 | | | | | |
| 2 | H | 9 | • | | 36.4 [0.257] | 0.44 | 21.49 | 48.70 | | | | | |
| 2 | H | 9 | | • | 25.7 [0.182] | 0.62 | 10.73 | 12.18 | | | | | |
| 3 | A | 9 | • | | 55.9 [0.395] | 1.60 | 1.74 | 4.50 | 6.92 | 7.67E-04 [5.42E-06] | 0.6 [0.28] | 6.30 [28.0] | 2.25 [10.0] |
| 3 | B | 9 | • | | 55.8 [0.394] | 1.52 | 1.92 | 4.96 | | | | | |
| 3 | H | 9 | • | | 56.8 [0.401] | 0.52 | 15.65 | 44.61 | | | | | |
| 3 | H | 9 | | • | 40.2 [0.284] | 0.74 | 7.81 | 11.15 | | | | | |
| 4 | A | 9 | • | | 68.6 [0.484] | 1.67 | 1.91 | 5.99 | 5.77 | 9.66E-04 [6.82E-06] | 0.8 [0.35] | 6.30 [28.0] | 2.25 [10.0] |
| 4 | B | 9 | • | | 67.5 [0.477] | 2.17 | 1.16 | 3.31 | | | | | |
| 4 | G | 9 | • | | 70.2 [0.496] | 0.29 | 61.31 | 177.65 | | | | | |
| 4 | G | 9 | | • | 49.2 [0.348] | 0.41 | 30.64 | 44.41 | | | | | |

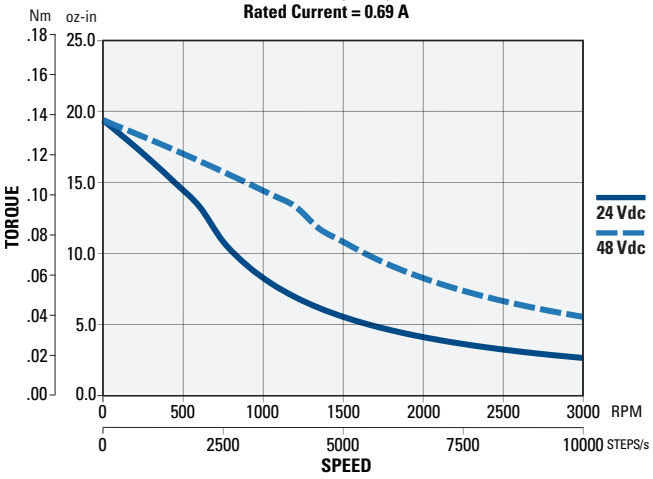
Notes:
1. All ratings typical and at 40° C unless otherwise noted.
2. Rated current is T = 90° C, ON-PLATE; motor mounted to square aluminum plate heatsink, 2.5X motor diameter, 5mm thick.
3. Small signal inductance as measured with impedance bridge @ 1 KHz, 1 amp.
4. Complete PMX series model nomenclature can be found on page 52.

## PMX17 Series (Bipolar - 1.8° Step) Performance Curves

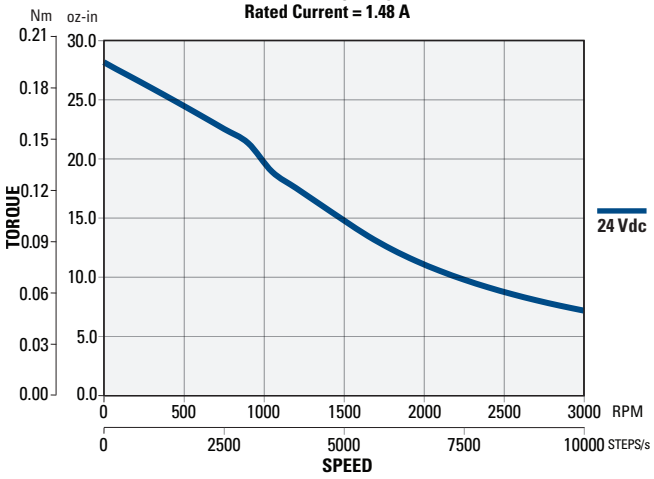
### PMX1710-A10
**Rated Current = 0.39 A**



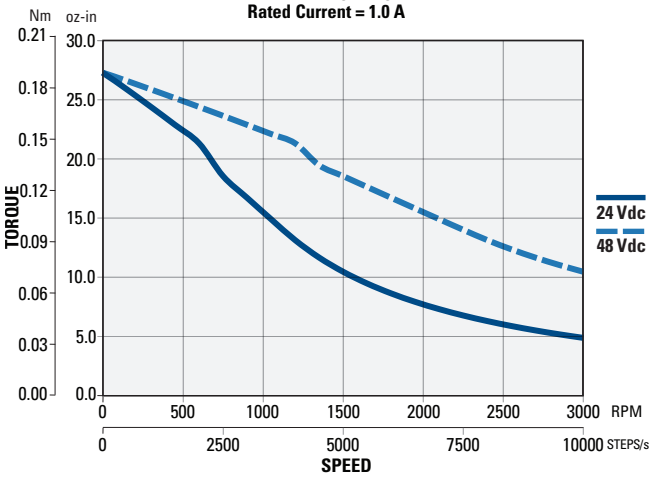

### PMX1710-B10
**Rated Current = 0.69 A**



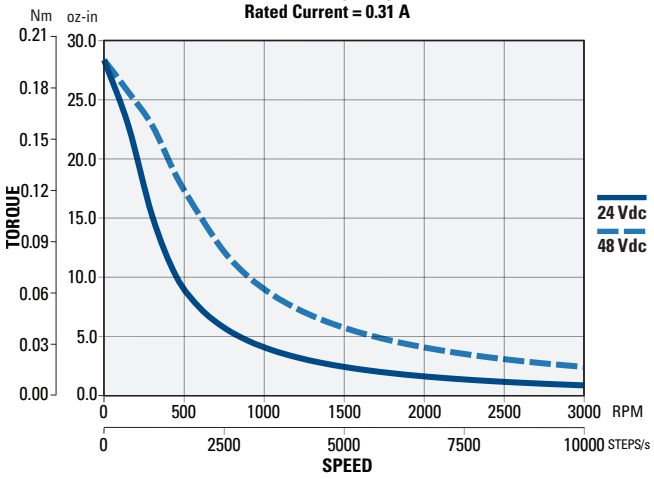

### PMX1720-A10
**Rated Current = 1.48 A**



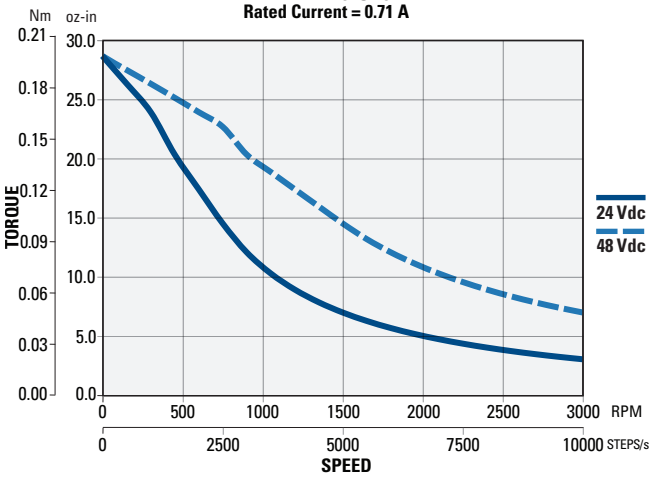

### PMX1720-B10
**Rated Current = 1.0 A**




### PMX1720-H10
**Rated Current = 0.31 A**



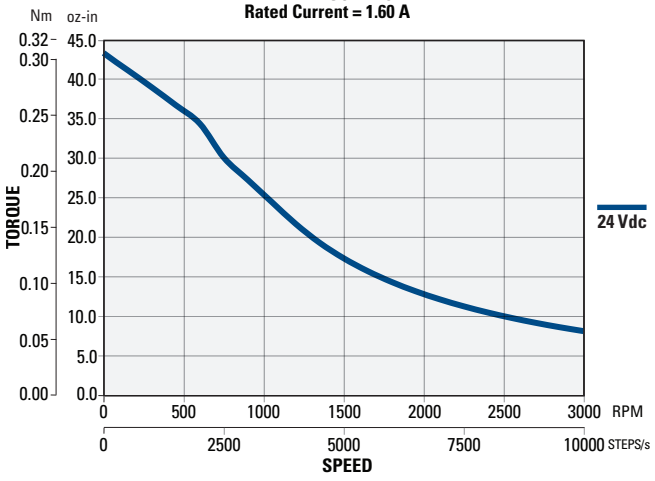

### PMX1720-J10
**Rated Current = 0.71 A**



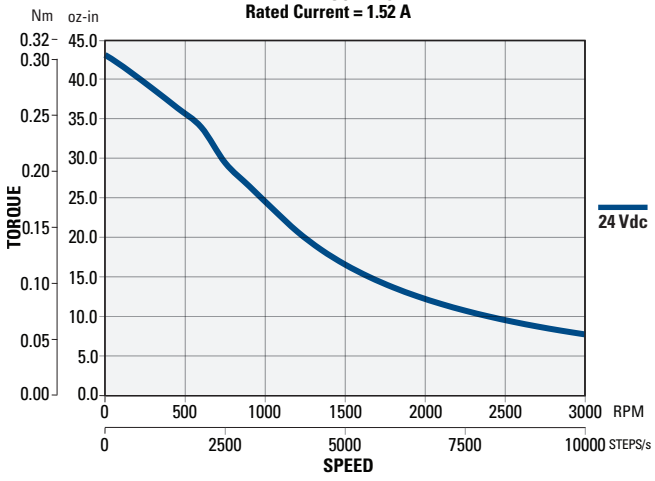
# PMX17 Series Stepper Motors

## PMX17 Series (Bipolar - 1.8° Step) Performance Curves

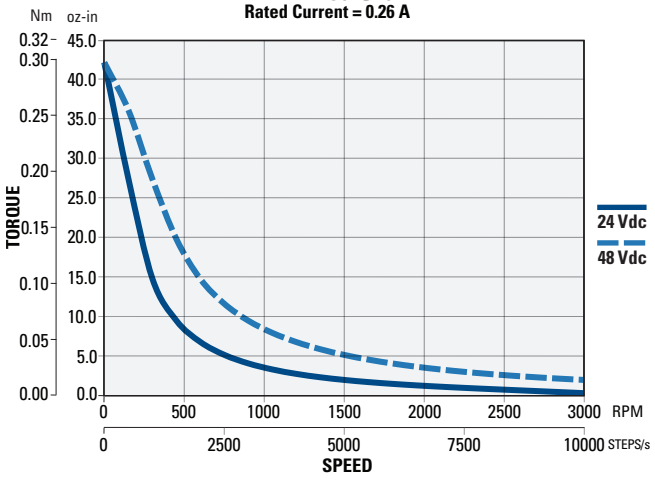
### PMX1730-A10
**Rated Current = 1.60 A**



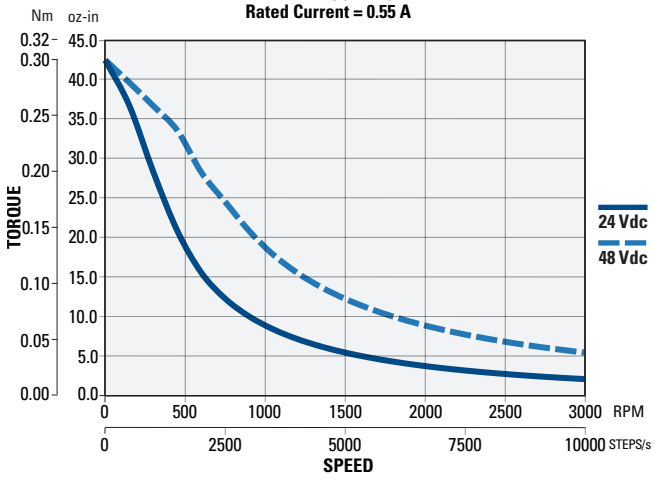

### PMX1730-B10
**Rated Current = 1.52 A**



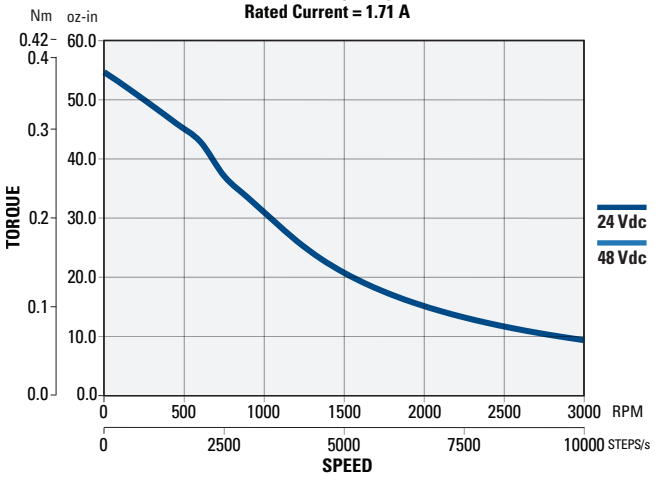

### PMX1730-G10
**Rated Current = 0.26 A**



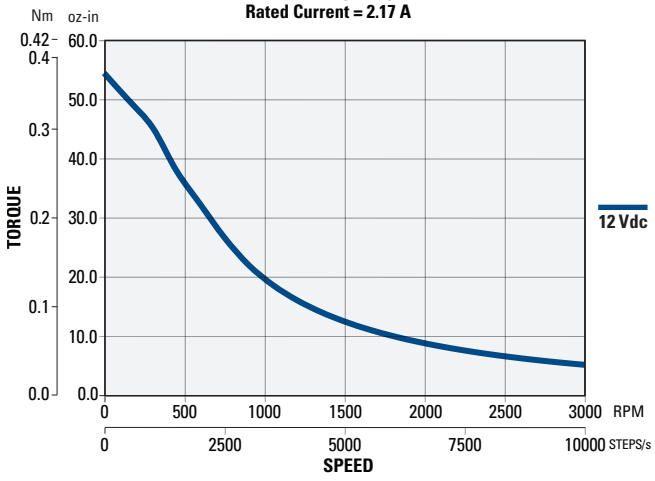

### PMX1730-H10
**Rated Current = 0.55 A**




### PMX1740-A10
**Rated Current = 1.71 A**

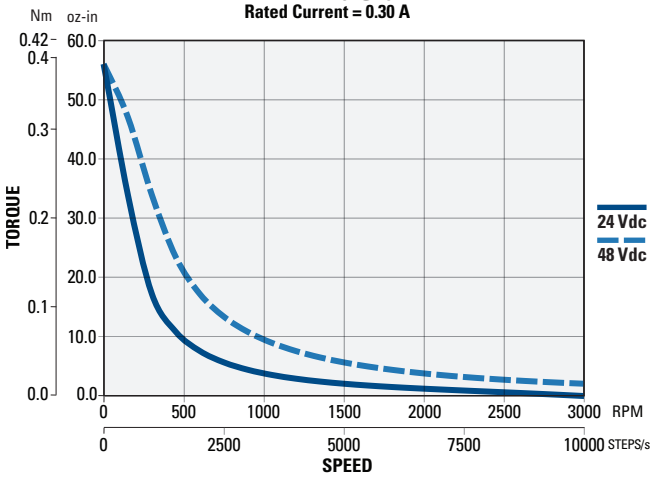



### PMX1740-B10
**Rated Current = 2.17 A**

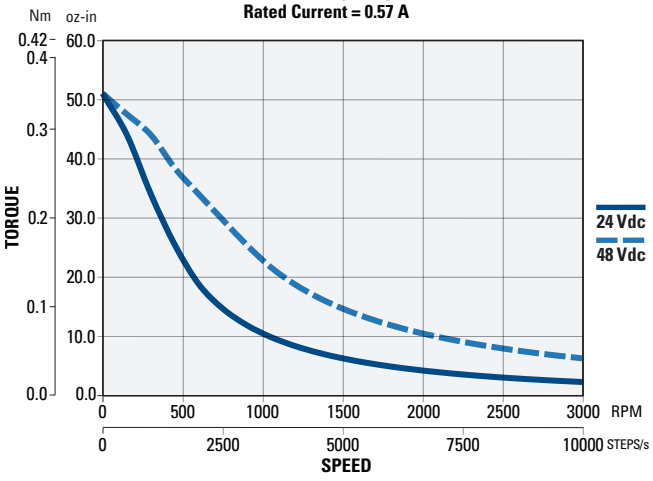


## PMX17 Series (Bipolar - 1.8° Step) Performance Curves

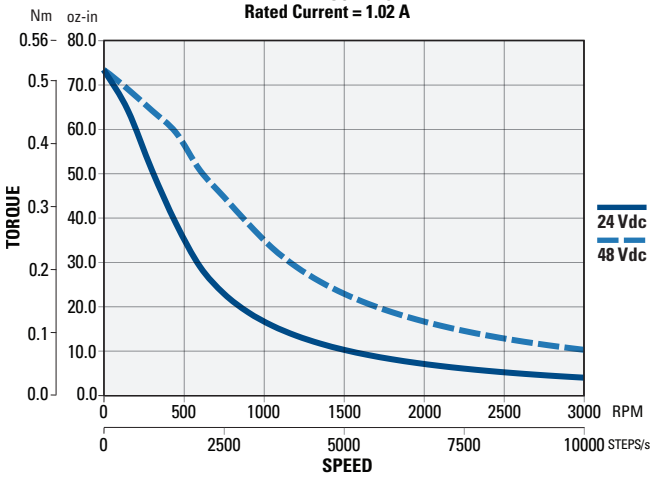
### PMX1740-G10
**Rated Current = 0.30 A**



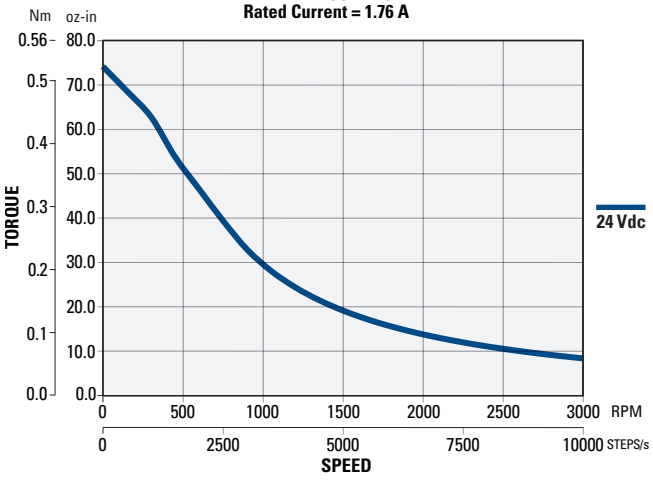

### PMX1740-H10
**Rated Current = 0.57 A**



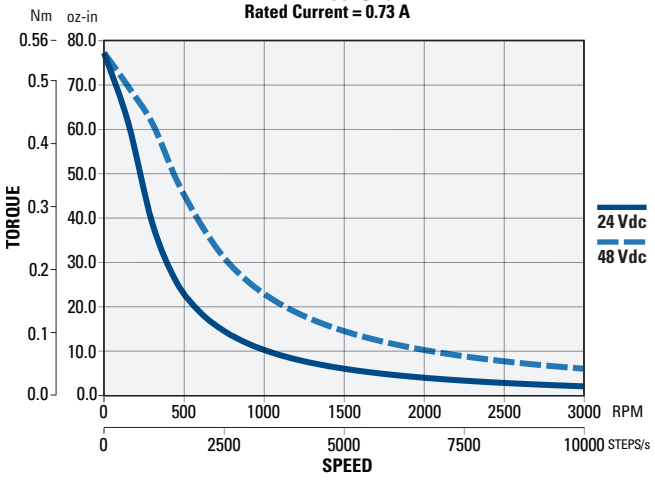

### PMX1750-A10
**Rated Current = 1.02 A**




### PMX1750-B10
**Rated Current = 1.76 A**



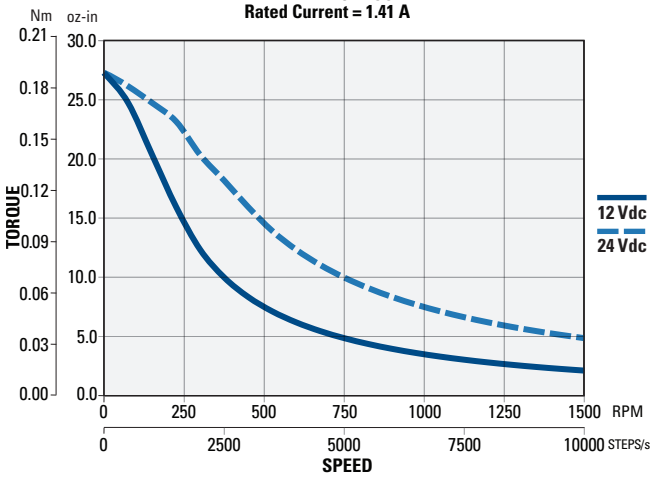

### PMX1750-G10
**Rated Current = 0.73 A**



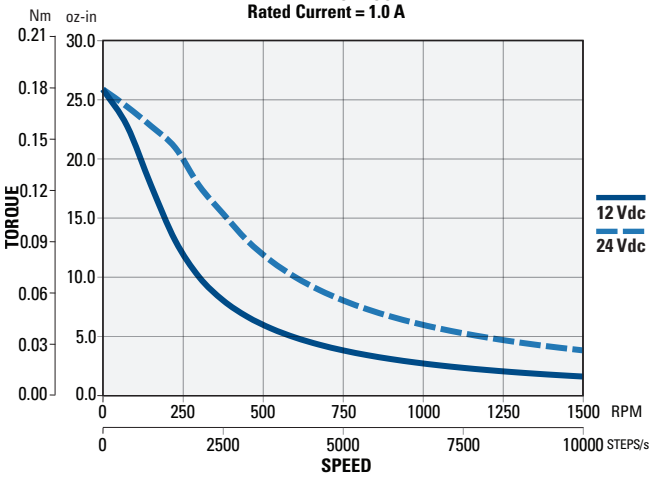
# PMX17 Series Stepper Motors

## PMX17 Series (Bipolar - 0.9° Step) Performance Curves

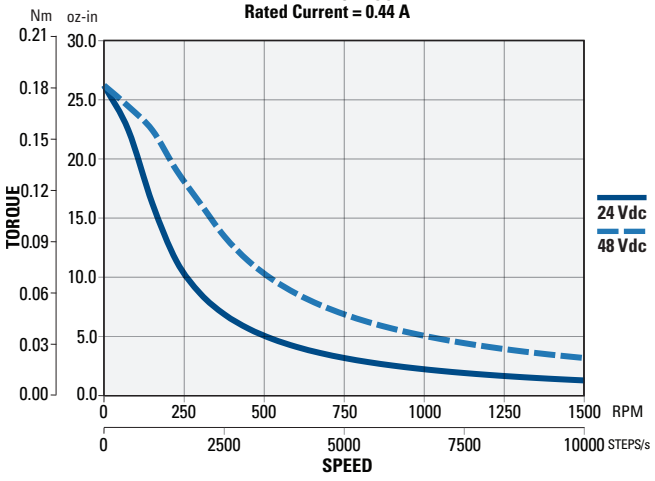
### PMX1720-A90
**Rated Current = 1.41 A**



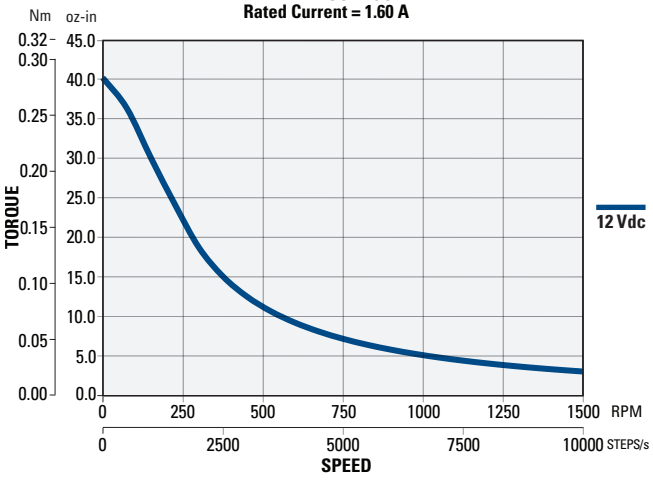

### PMX1720-B90
**Rated Current = 1.0 A**



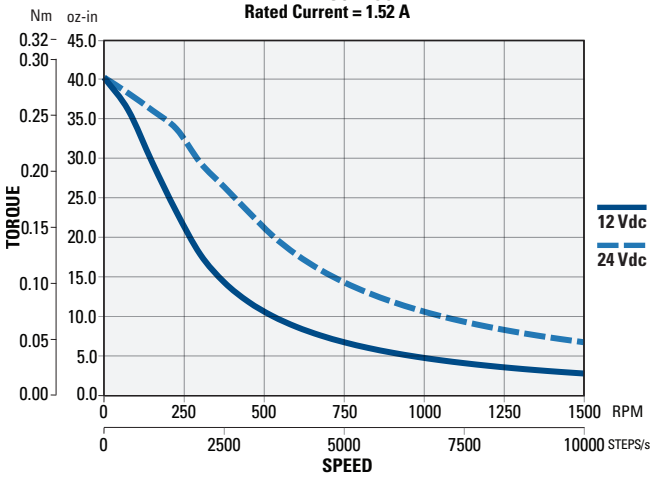

### PMX1720-H90
**Rated Current = 0.44 A**



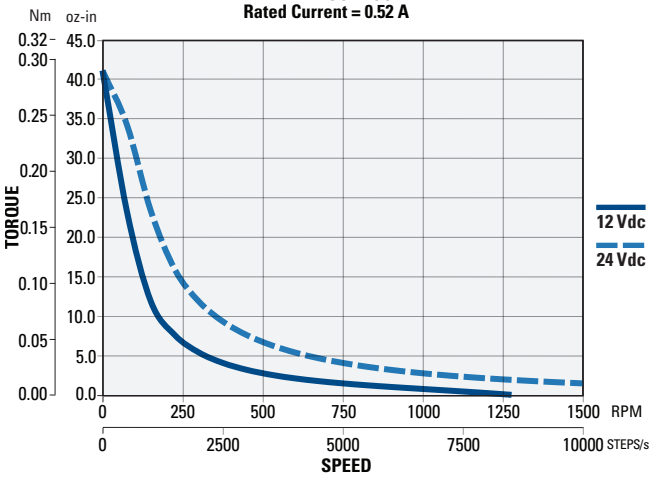

### PMX1730-A90
**Rated Current = 1.60 A**




### PMX1730-B90
**Rated Current = 1.52 A**

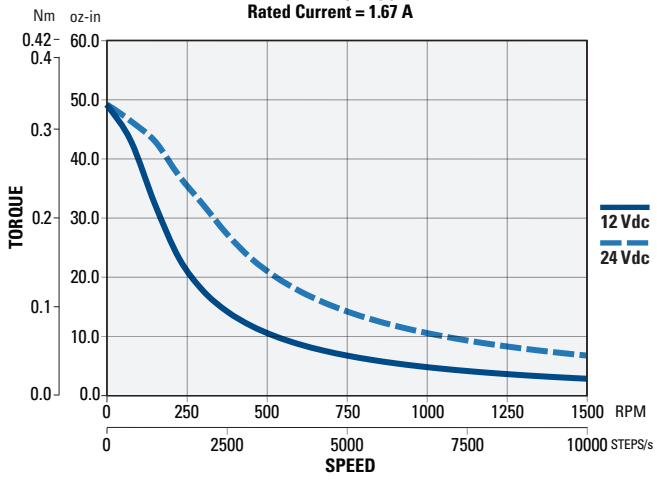



### PMX1730-H90
**Rated Current = 0.52 A**

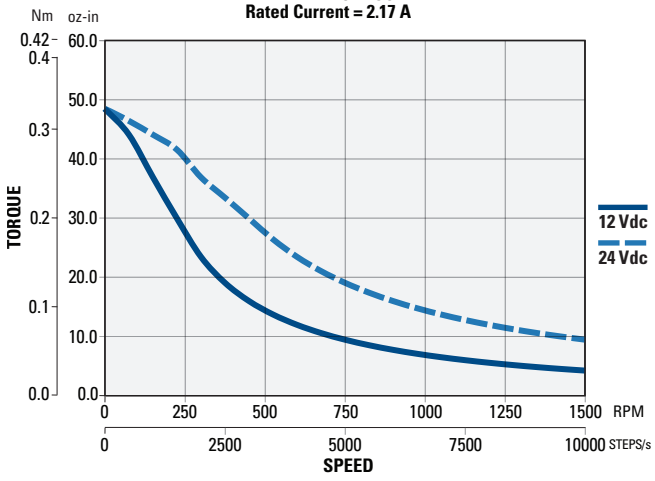


## PMX17 Series (Bipolar - 0.9° Step) Performance Curves

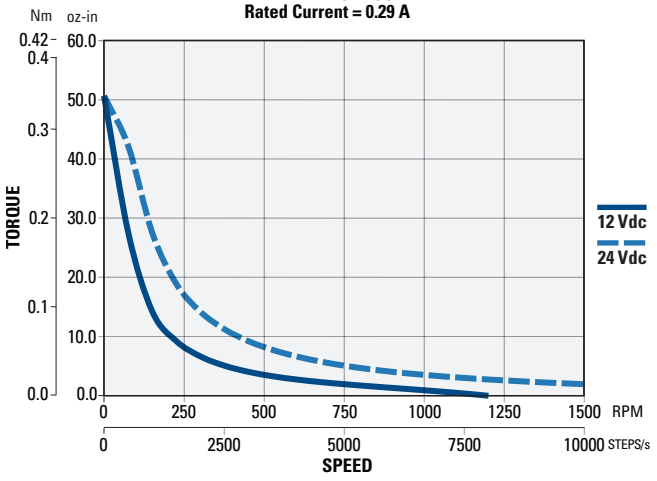
**PMX1740-A90**
**Rated Current = 1.67 A**



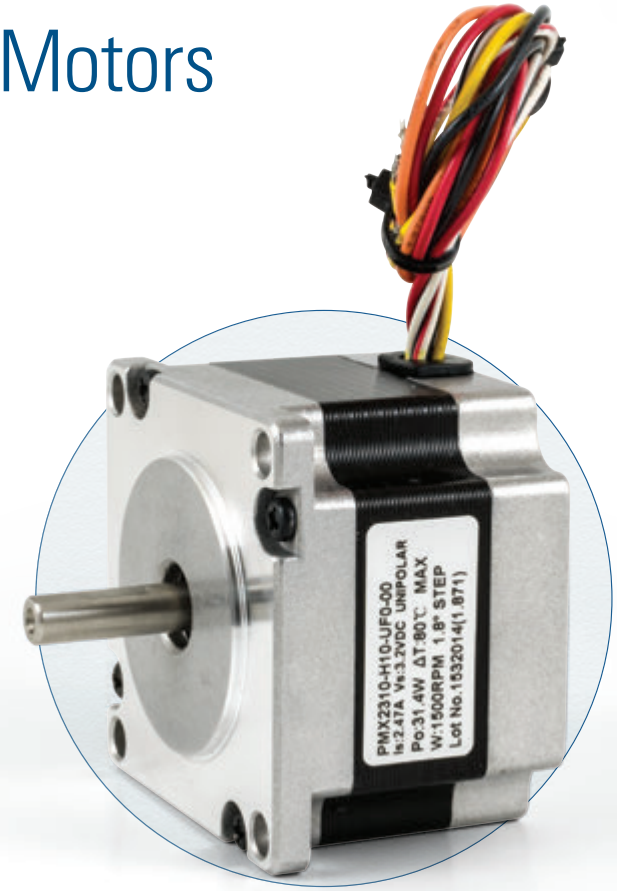

**PMX1740-B90**
**Rated Current = 2.17 A**




**PMX1740-H90**
**Rated Current = 0.29 A**



# PMX23 Series Stepper Motors

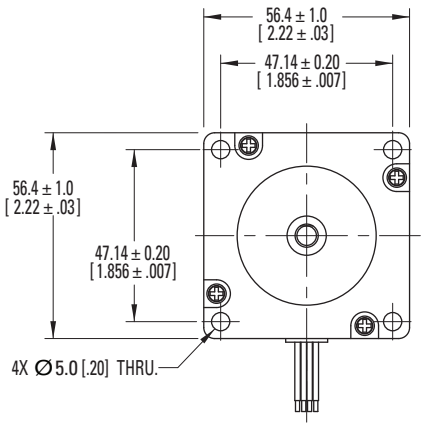


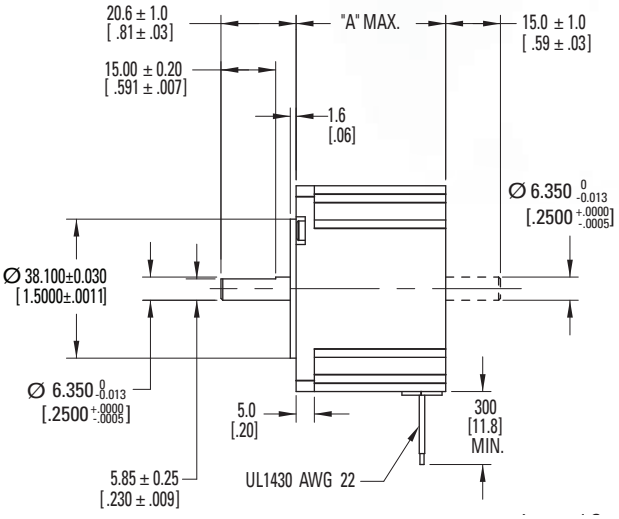

## PMX23 Standard Options and Specifications

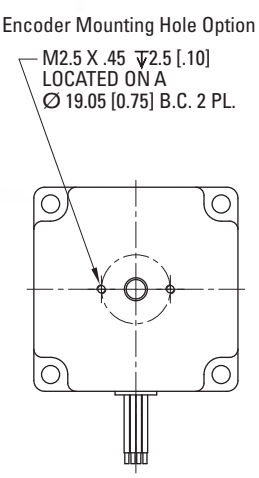
- NEMA Size 23
- Front shaft flat option
- Rear shaft option
- Integral connector option
- Rear encoder mounting holes
- Bipolar and Unipolar windings

| | |
|---|---|
| Phases | 2 |
| Full Steps Per Revolution | 200 |
| Step Size Angle | 1.8˚, 0.9˚ |
| Step Angle Accuracy % | +/- 5.0 |
| Maximum Case Temperature | 130˚ C |
| Insulation Class | NEMA Class B, 130 ˚C |
| Insulation Resistance | 100 Megaohms @ 500 Vdc |
| Ambient Temperature | -20.0 to + 40.0 ˚C |
| Dielectric Strength | 500 Vac, 1 minute |
| Certifications: | CE, RoHS, REACh compliant |

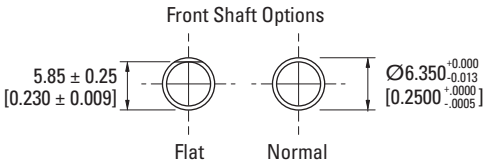
## PMX23 Dimensions




| Model | "A" MAX |
|---|---|
| PMX231 | 41 [1.61] |
| PMX232 | 56 [2.20] |
| PMX233 | 76 [2.99] |
| PMX234 | 85 [3.35] |





A 4-lead Bipolar, 12 inch (300 mm) mating cable assembly is included for all motors ordered with Integral Connector option.

Dimensions in mm [inches]

PMX 23 2 0 – A 1 0 – B N 0 – 00*

Motor Series | Frame Size | Stack Length | Winding | Step Angle | Connection | Front Shaft Opt. | Rear Shaft Opt.

## PMX23 (1.8° Step) Performance Data

| PMX23 | | | Configuration | | Holding Torque (2 phases on) | Rated Current/ Phase | Phase Resistance | Phase Inductance | Thermal Resistance | Rotor Inertia | Weight | Shaft Loading | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Radial Force | Axial Force |
| Stack | Winding | Step | Bipolar | Unipolar | oz-in [Nm] +/-12% | Amps DC | Ohms +/-10% | mH Typical | Mounted °C/Watt | oz-in-s² [kg-m²] | lb [kg] | lb [N] | lb [N] |
| 1 | A | 1 | • | | 100.7 [0.711] | 3.50 | 0.68 | 1.33 | 4.69 | 1.70E-03 [1.20E-05] | 1.0 [0.45] | 16.88 [75.0] | 3.38 [15.0] |
| 1 | B | 1 | • | | 98.9 [0.698] | 0.48 | 34.78 | 59.94 | | | | | |
| 1 | C | 1 | • | | 95.8 [0.676] | 1.27 | 4.94 | 8.93 | | | | | |
| 1 | G | 1 | • | | 100.4 [0.709] | 0.87 | 10.48 | 21.33 | | | | | |
| 1 | G | 1 | | • | 71.0 [0.501] | 1.23 | 5.23 | 5.33 | | | | | |
| 1 | H | 1 | • | | 100.7 [0.711] | 1.75 | 2.62 | 5.33 | | | | | |
| 1 | H | 1 | | • | 71.2 [0.503] | 2.47 | 1.31 | 1.33 | | | | | |
| 1 | J | 1 | • | | 102.3 [0.722] | 2.53 | 1.27 | 2.66 | | | | | |
| 1 | J | 1 | | • | 72.3 [0.511] | 3.58 | 0.63 | 0.67 | | | | | |
| 2 | A | 1 | • | | 205.2 [1.449] | 3.45 | 0.83 | 2.63 | 3.11 | 4.26E-03 [3.01E-05] | 1.5 [0.70] | 16.88 [75.0] | 3.38 [15.0] |
| 2 | B | 1 | • | | 196.5 [1.388] | 0.56 | 30.23 | 88.58 | | | | | |
| 2 | C | 1 | • | | 198.9 [1.405] | 1.24 | 6.20 | 18.73 | | | | | |
| 2 | G | 1 | • | | 199.9 [1.412] | 0.84 | 13.25 | 40.74 | | | | | |
| 2 | G | 1 | | • | 141.4 [0.999] | 1.19 | 6.62 | 10.19 | | | | | |
| 2 | H | 1 | • | | 208.4 [1.472] | 1.76 | 3.06 | 10.53 | | | | | |
| 2 | H | 1 | | • | 147.4 [1.041] | 2.49 | 1.52 | 2.63 | | | | | |
| 2 | J | 1 | • | | 204.3 [1.443] | 2.57 | 1.46 | 4.68 | | | | | |
| 2 | J | 1 | | • | 144.5 [1.020] | 3.63 | 0.72 | 1.17 | | | | | |

Continued on the following page

Notes:
1. All ratings typical and at 40° C unless otherwise noted.
2. Rated current is T = 80° C, ON-PLATE; motor mounted to square aluminum plate heatsink, 2.5X motor diameter, 5mm thick.
3. Small signal inductance as measured with impedance bridge @ 1 KHz, 1 amp.

*Complete PMX series model nomenclature can be found on page 52.

# PMX23 Series Stepper Motors

## PMX23 (1.8° Step) Performance Data (continued)

| PMX23 | | | Configuration | | Holding Torque (2 phases on) | Rated Current/ Phase | Phase Resistance | Phase Inductance | Thermal Resistance | Rotor Inertia | Weight | Shaft Loading | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Radial Force | Axial Force |
| Stack | Winding | Step | Bipolar | Unipolar | oz-in [Nm] +/-12% | Amps DC | Ohms +/-10% | mH Typical | Mounted °C/Watt | oz-in-s² [kg-m²] | lb [kg] | lb [N] | lb [N] |
| 3 | A | 1 | • | | 326.4 [2.305] | 3.23 | 1.14 | 3.75 | 2.70 | 6.82E-03 [4.82E-05] | 2.2 [1.00] | 16.88 [75.0] | 3.38 [15.0] |
| 3 | B | 1 | • | | 336.8 [2.378] | 3.96 | 0.73 | 2.57 | | | | | |
| 3 | G | 1 | • | | 320.2 [2.261] | 0.80 | 16.81 | 53.95 | | | | | |
| 3 | G | 1 | | • | 226.6 [1.600] | 1.14 | 8.39 | 13.47 | | | | | |
| 3 | H | 1 | • | | 326.4 [2.305] | 1.57 | 4.45 | 15.00 | | | | | |
| 3 | H | 1 | | • | 230.8 [1.630] | 2.21 | 2.22 | 3.75 | | | | | |
| 3 | J | 1 | • | | 327.4 [2.312] | 2.40 | 1.92 | 6.44 | | | | | |
| 3 | J | 1 | | • | 231.5 [1.635] | 3.40 | 0.95 | 1.61 | | | | | |
| 4 | A | 1 | • | | 378.4 [2.672] | 3.83 | 0.81 | 3.23 | 2.52 | 7.38E-03 [5.21E-05] | 2.6 [1.20] | 16.88 [75.0] | 3.38 [15.0] |
| 4 | B | 1 | • | | 347.5 [2.454] | 0.75 | 20.81 | 67.27 | | | | | |
| 4 | C | 1 | • | | 349.3 [2.467] | 1.16 | 8.66 | 28.34 | | | | | |
| 4 | D | 1 | • | | 354.0 [2.500] | 0.99 | 11.82 | 40.08 | | | | | |

Notes:
1. All ratings typical and at 40° C unless otherwise noted.
2. Rated current is T = 80° C, ON-PLATE; motor mounted to square aluminum plate heatsink, 2.5X motor diameter, 5mm thick.
3. Small signal inductance as measured with impedance bridge @ 1 KHz, 1 amp.
4. Complete PMX series model nomenclature can be found on page 52.

PMX 23 2 0 – A 1 0 – B N 0 – 00*

Motor Series | Frame Size | Stack Length | Winding | Step Angle | Connection | Front Shaft Opt. | Rear Shaft Opt.

## PMX23 (0.9˚ Step) Performance Data

| PMX23 | | | Configuration | | Holding Torque (2 phases on) | Rated Current/ Phase | Phase Resistance | Phase Inductance | Thermal Resistance | Rotor Inertia | Weight | Shaft Loading | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Radial Force | Axial Force |
| Stack | Winding | Step | Bipolar | Unipolar | oz-in [Nm] +/-12% | Amps DC | Ohms +/-10% | mH Typical | Mounted °C/Watt | oz-in-s² [kg-m²] | lb [kg] | lb [N] | lb [N] |
| 1 | A | 9 | • | | 97.6 [0.689] | 3.37 | 0.74 | 2.66 | 4.69 | 1.70E-03 [1.20E-05] | 1.0 [0.45]] | 16.88 [75.0] | 3.38 [15.0] |
| 1 | B | 9 | • | | 92.5 [0.653] | 0.47 | 35.54 | 106.70 | | | | | |
| 1 | C | 9 | • | | 93.7 [0.662] | 1.26 | 5.05 | 15.89 | | | | | |
| 1 | G | 9 | • | | 97.4 [0.688] | 0.86 | 10.66 | 37.95 | | | | | |
| 1 | G | 9 | | • | 68.1 [0.481] | 1.22 | 5.22 | 9.48 | | | | | |
| 2 | A | 9 | • | | 203.8 [1.439] | 3.24 | 0.93 | 5.15 | 3.11 | 4.26E-03 [3.01E-05] | 1.5 [0.70] | 16.88 [75.0]] | 3.38 [15.0] |
| 2 | B | 9 | • | | 195.1 [1.378] | 0.56 | 29.59 | 124.49 | | | | | |
| 2 | C | 9 | • | | 196.9 [1.390] | 1.25 | 6.07 | 26.32 | | | | | |
| 2 | G | 9 | • | | 204.8 [1.446] | 0.80 | 14.94 | 87.46 | | | | | |
| 2 | G | 9 | | • | 146.8 [1.037] | 1.16 | 7.47 | 21.87 | | | | | |
| 3 | A | 9 | • | | 313.0 [2.210] | 3.26 | 1.06 | 6.67 | 2.70 | 6.82E-03 [4.82E+05] | 2.2 [1.00] | 16.88 [75.0] | 3.38 [15.0] |
| 3 | B | 9 | • | | 304.5 [2.150] | 4.14 | 0.67 | 3.75 | | | | | |
| 3 | G | 9 | • | | 305.4 [2.157] | 0.78 | 17.85 | 106.72 | | | | | |
| 3 | G | 9 | | • | 216.0 [1.525] | 1.10 | 8.92 | 26.68 | | | | | |

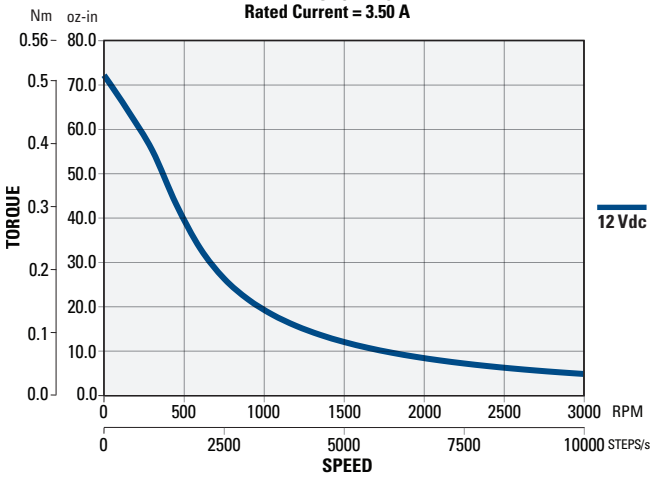
Notes:
1. All ratings typical and at 40° C unless otherwise noted.
2. Rated current is T = 80° C, ON-PLATE; motor mounted to square aluminum plate heatsink, 2.5X motor diameter, 5mm thick.
3. Small signal inductance as measured with impedance bridge @ 1 KHz, 1 amp.

*Complete PMX series model nomenclature can be found on page 52.

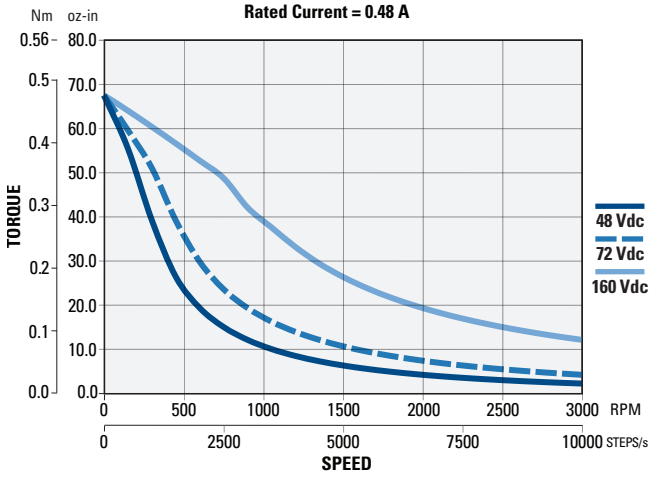
# PMX23 Series Stepper Motors

## PMX23 Series (Bipolar - 1.8° Step) Performance Curves

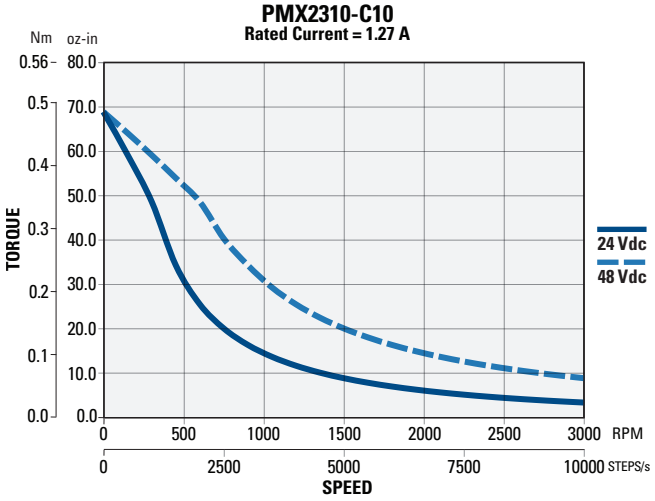
### PMX2310-A10
**Rated Current = 3.50 A**



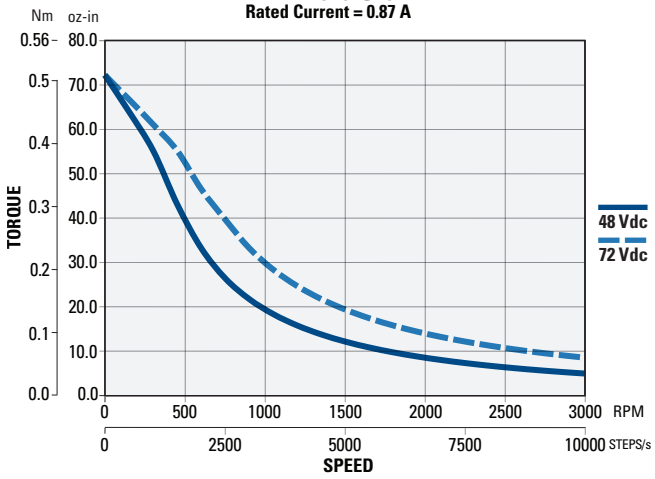

### PMX2310-B10
**Rated Current = 0.48 A**



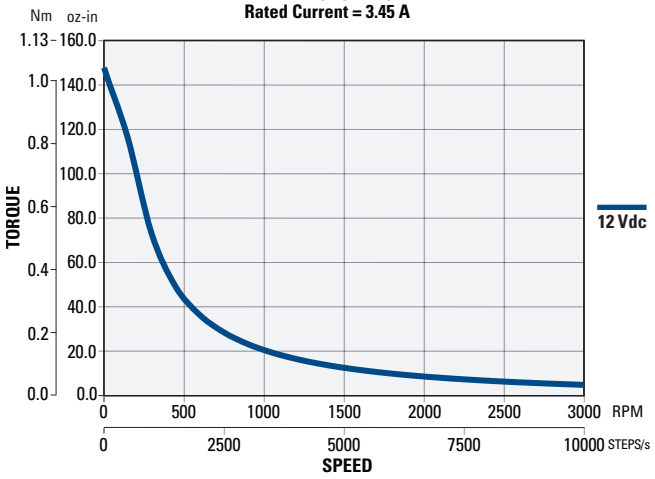

### PMX2310-C10
**Rated Current = 1.27 A**



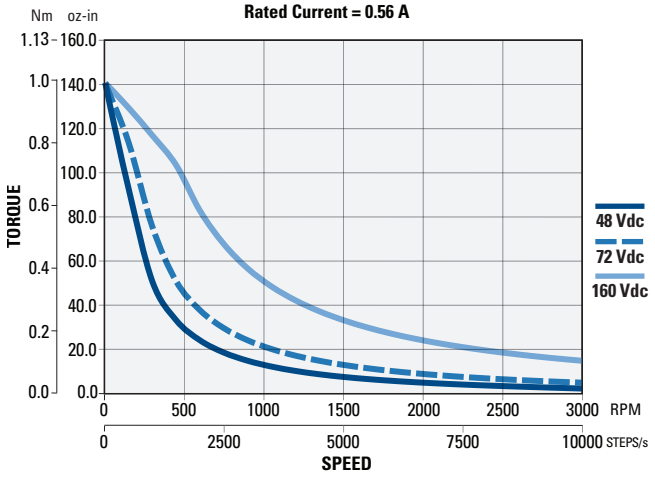

### PMX2310-G10
**Rated Current = 0.87 A**




### PMX2320-A10
**Rated Current = 3.45 A**

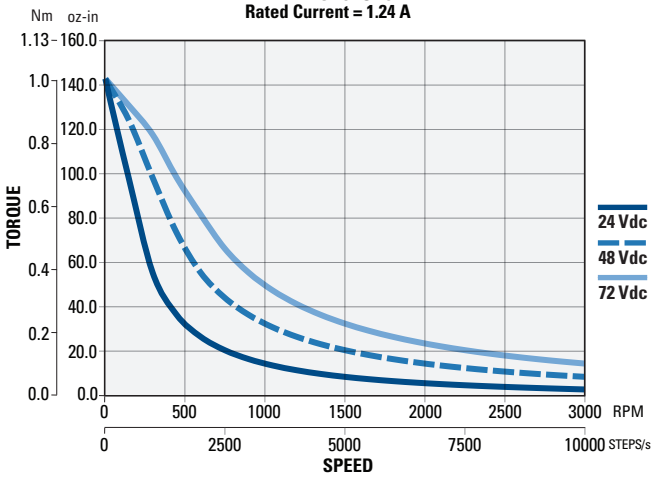



### PMX2320-B10
**Rated Current = 0.56 A**

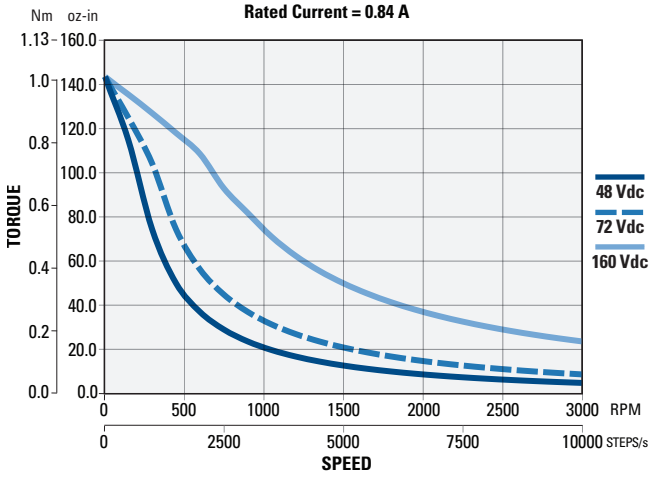


## PMX23 Series (Bipolar - 1.8° Step) Performance Curves

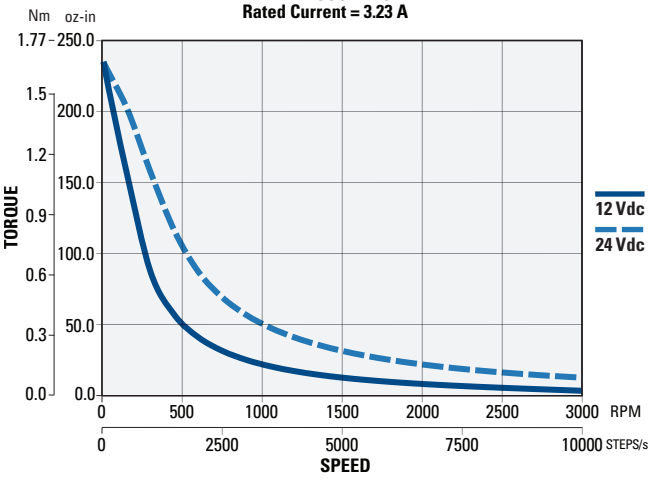
### PMX2320-C10
**Rated Current = 1.24 A**



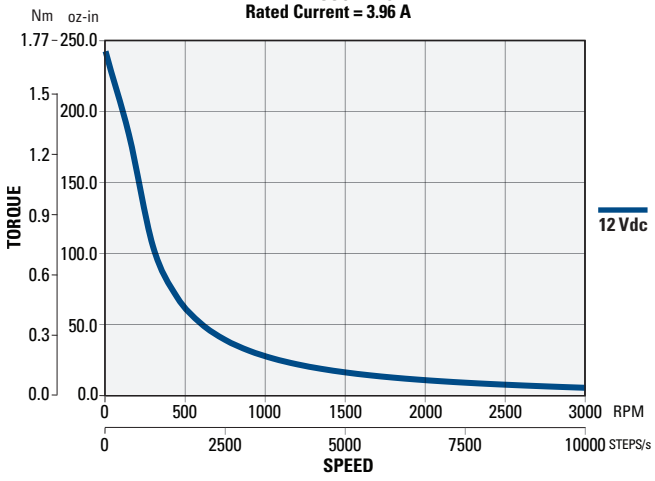

### PMX2320-G10
**Rated Current = 0.84 A**



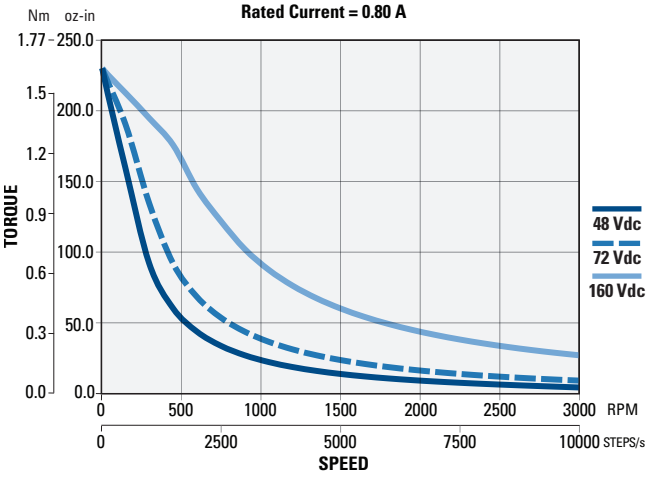

### PMX2330-A10
**Rated Current = 3.23 A**



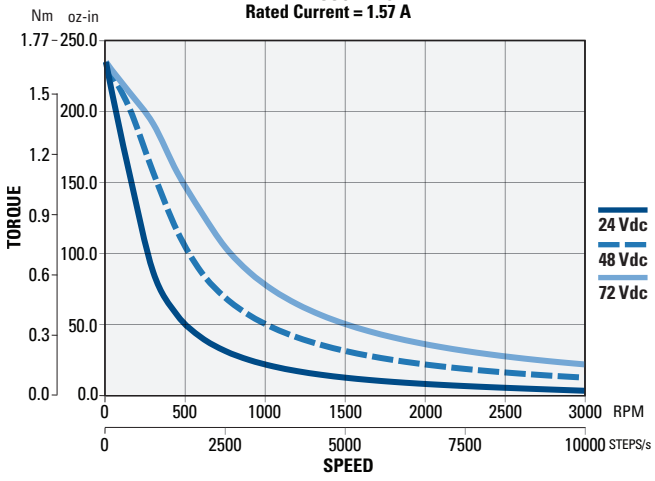

### PMX2330-B10
**Rated Current = 3.96 A**




### PMX2330-G10
**Rated Current = 0.80 A**




### PMX2330-H10
**Rated Current = 1.57 A**

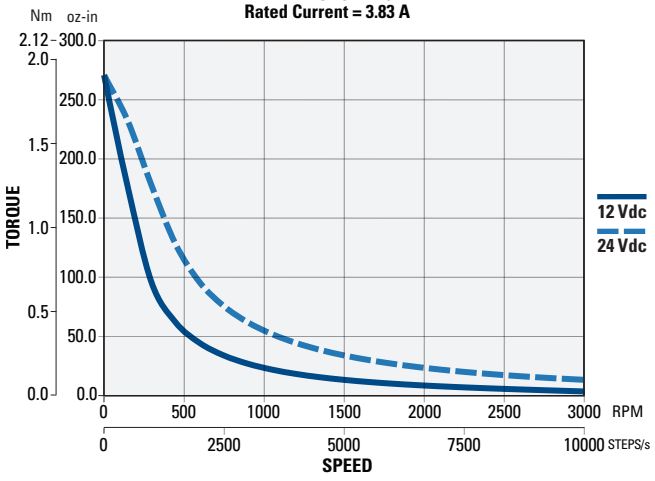


# PMX23 Series Stepper Motors

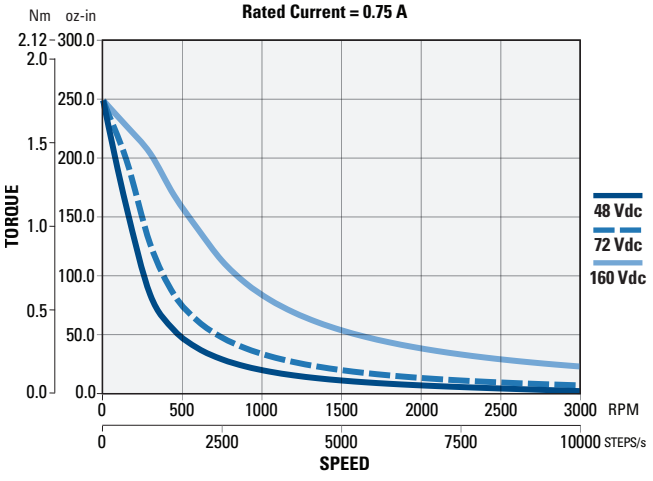


## PMX23 Series (Bipolar - 1.8° Step) Performance Curves

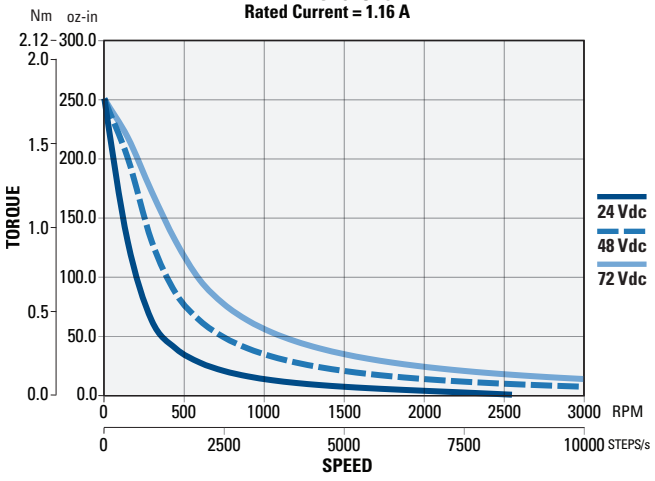
**PMX2340-A10**
**Rated Current = 3.83 A**



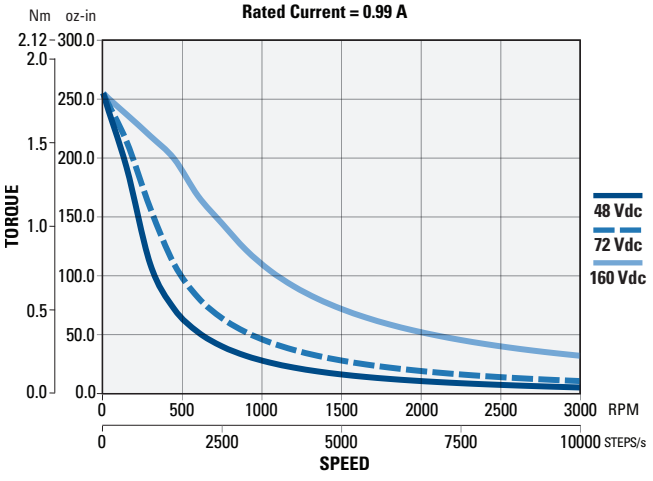

**PMX2340-B10**
**Rated Current = 0.75 A**




**PMX2340-C10**
**Rated Current = 1.16 A**

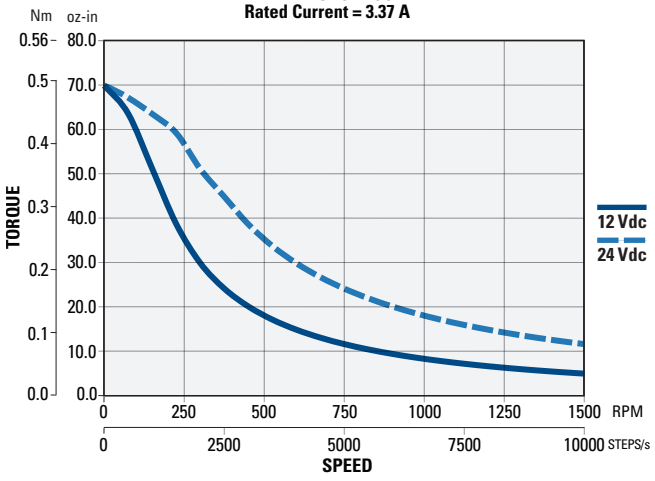



**PMX2340-D10**
**Rated Current = 0.99 A**

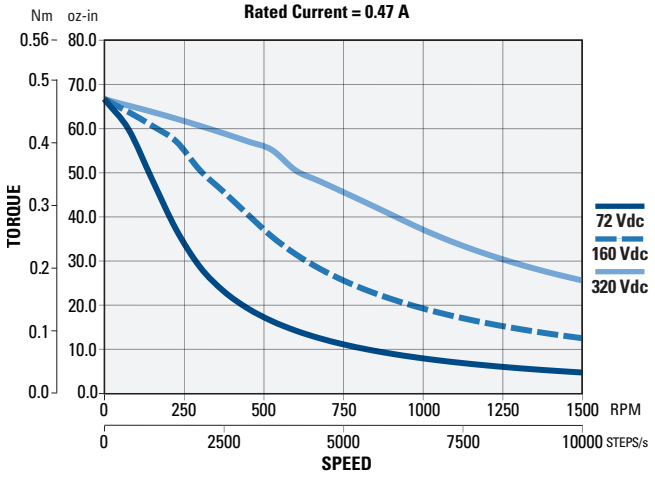


## PMX23 Series (Bipolar - 0.9° Step) Performance Curves

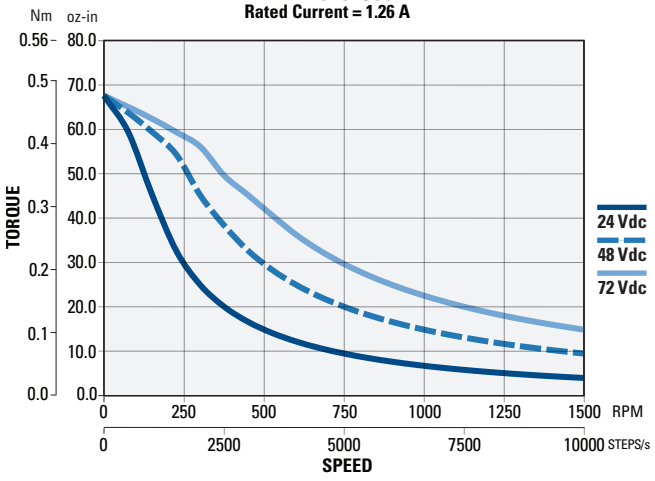
### PMX2310-A90
**Rated Current = 3.37 A**



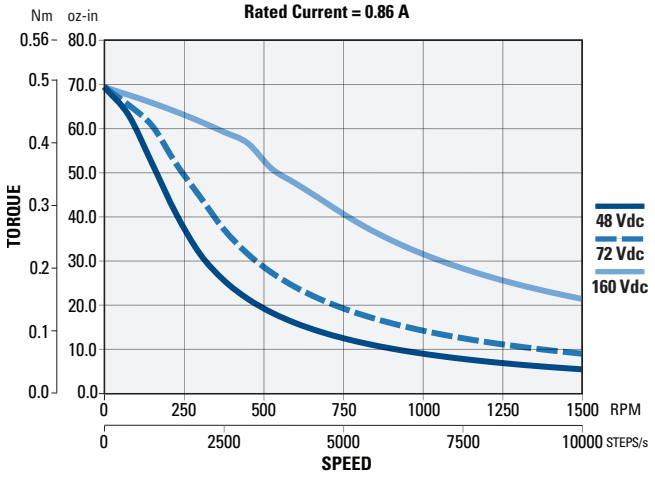

### PMX2310-B90
**Rated Current = 0.47 A**



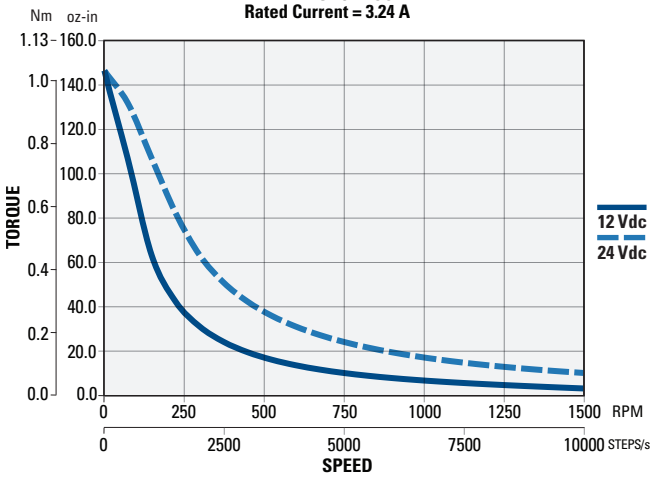

### PMX2310-C90
**Rated Current = 1.26 A**



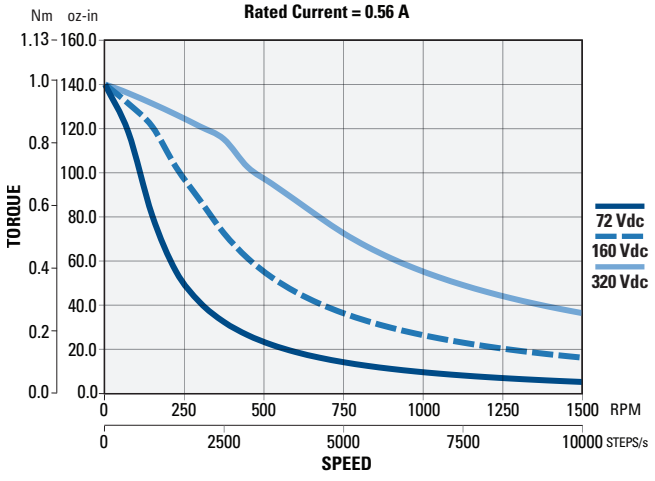

### PMX2310-G90
**Rated Current = 0.86 A**




### PMX2320-A90
**Rated Current = 3.24 A**



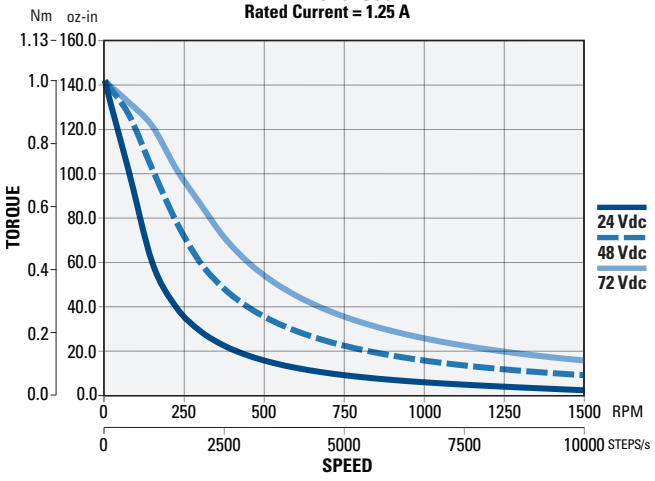

### PMX2320-B90
**Rated Current = 0.56 A**



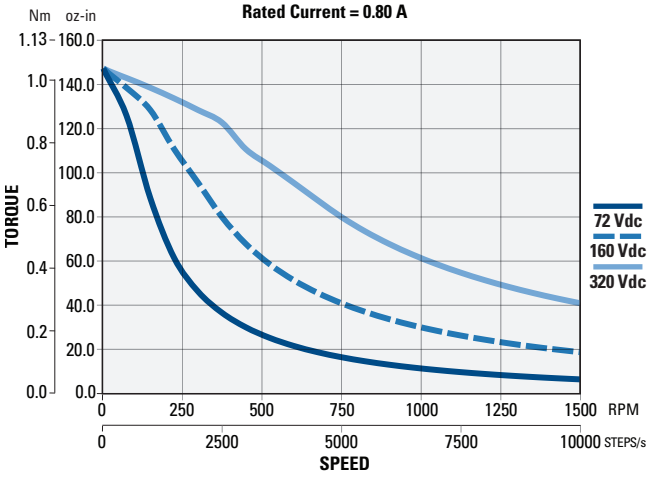
# PMX23 Series Stepper Motors

## PMX23 Series (Bipolar - 0.9° Step) Performance Curves

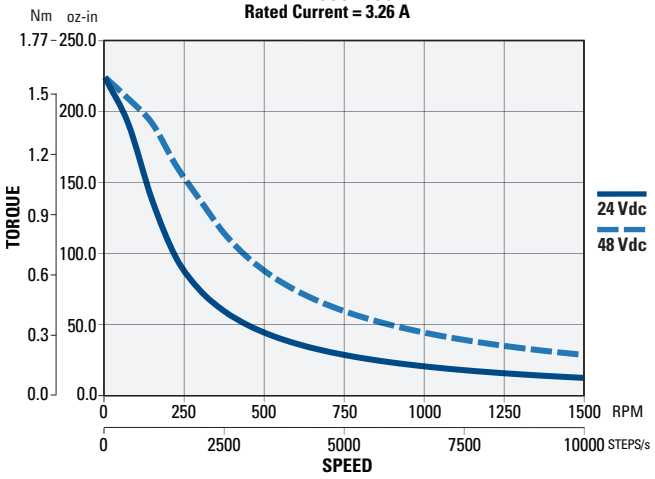
### PMX2320-C90
**Rated Current = 1.25 A**



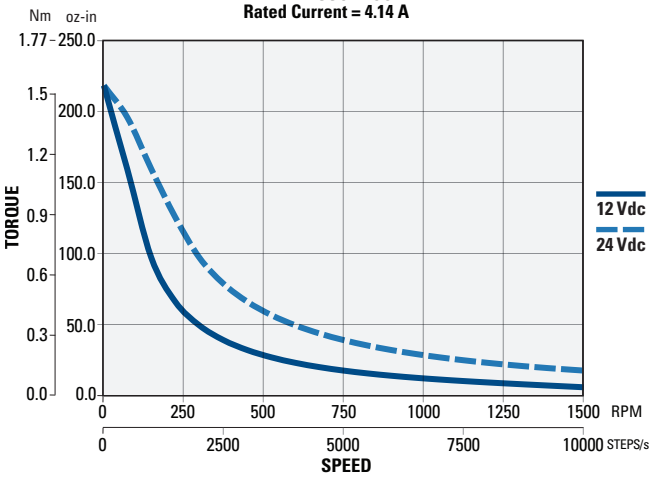

### PMX2320-G90
**Rated Current = 0.80 A**



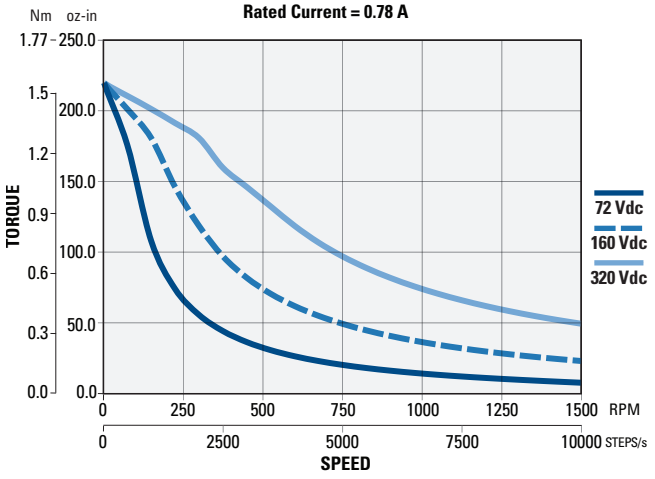

### PMX2330-A90
**Rated Current = 3.26 A**



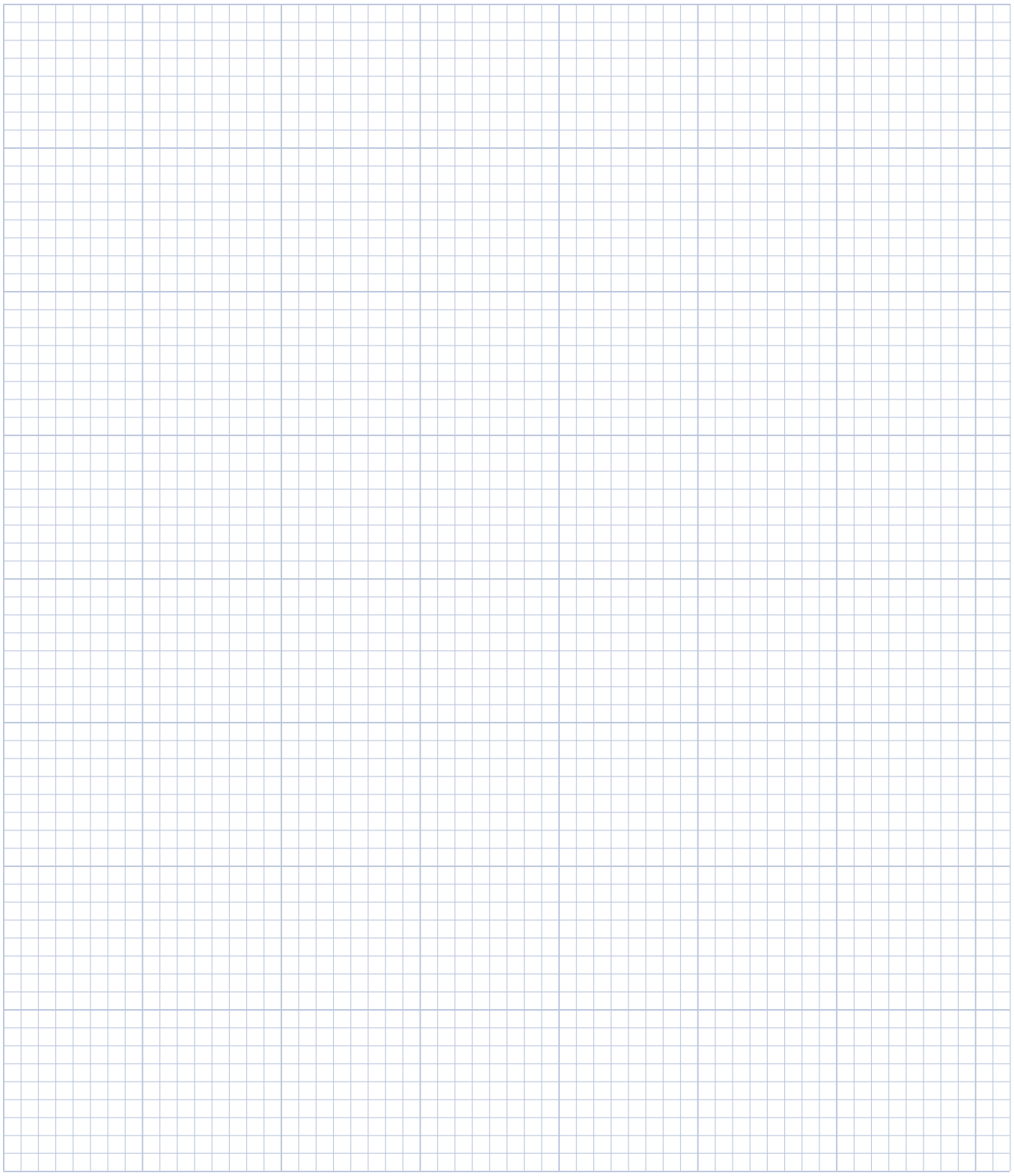

### PMX2330-B90
**Rated Current = 4.14 A**




### PMX2330-G90
**Rated Current = 0.78 A**



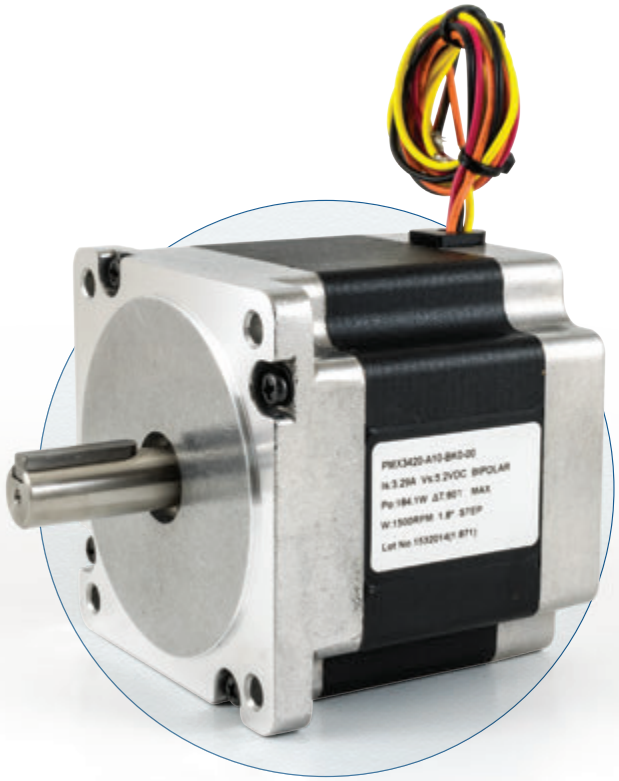
# Notes



# PMX34 Series Stepper Motors

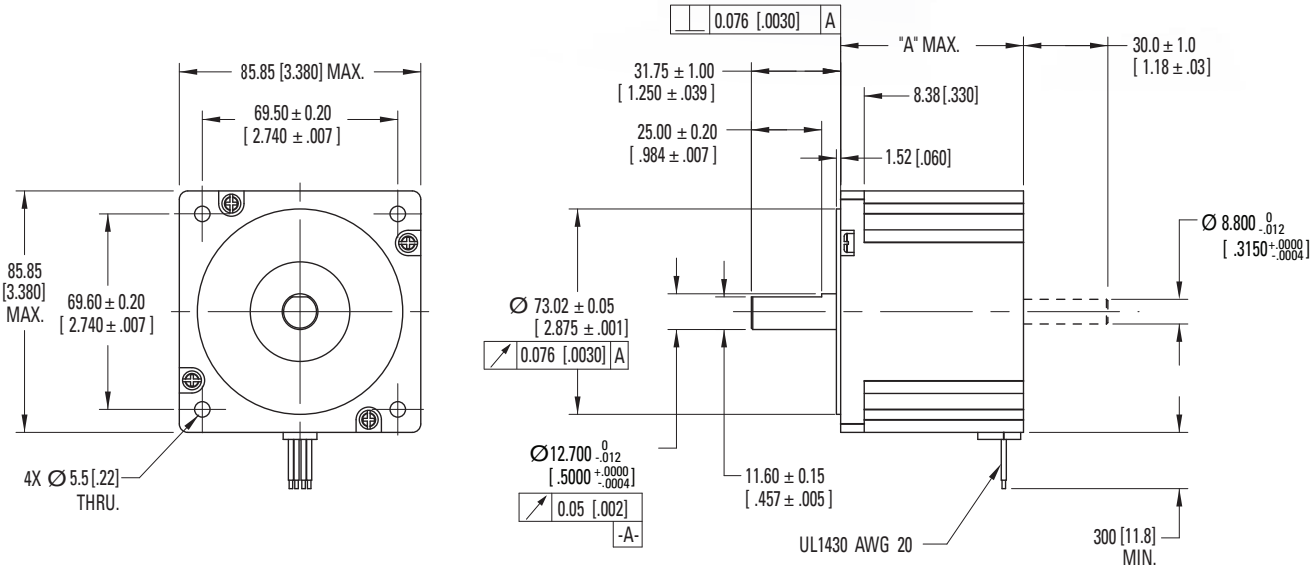
## PMX34 Standard Options and Specifications

- NEMA Size 34
- Front shaft flat option
- Rear shaft option
- Bipolar windings

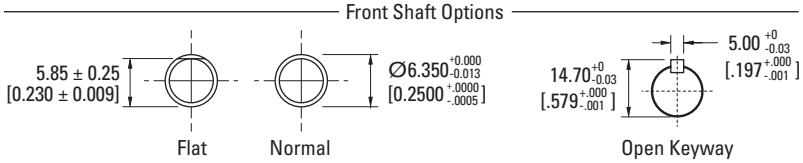


| | |
|---|---|
| Phases | 2 |
| Full Steps Per Revolution | 200 |
| Step Size Angle | 1.8˚ |
| Step Angle Accuracy % | +/- 5.0 |
| Maximum Case Temperature | 130˚ C |
| Insulation Class | NEMA Class B, 130 ˚C |
| Insulation Resistance | 100 Megaohms @ 500 Vdc |
| Ambient Temperature | -20.0 to + 40.0 ˚C |
| Dielectric Strength | 500 Vac, 1 minute |
| Certifications: | CE, RoHS, REACh compliant |

## PMX34 Dimensions




| Model | "A" MAX |
|---|---|
| PMX341 | 65 [2.56] |
| PMX342 | 80 [3.15] |
| PMX343 | 118 [4.65] |
| PMX344 | 156 [6.14] |




Dimensions in mm [inches]

PMX 34 2 0 – A 1 0 – B N 0 – 00*
Motor Series | Frame Size | Stack Length | Winding | Step Angle | Connection | Front Shaft Opt. | Rear Shaft Opt.

## PMX34 (1.8° Step) Performance Data

| PMX34 | | | Configuration | | Holding Torque (2 phases on) | Rated Current/ Phase | Phase Resistance | Phase Inductance | Thermal Resistance | Rotor Inertia | Weight | Shaft Loading | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Radial Force | Axial Force |
| Stack | Winding | Step | Bipolar | Unipolar | oz-in [Nm] +/-12% | Amps DC | Ohms +/-10% | mH Typical | Mounted °C/Watt | oz-in-s² [kg-m²] | lb [kg] | lb [N] | lb [N] |
| 1 | A | 1 | • | | 486.1 [3.433] | 3.61 | 1.15 | 6.46 | 1.98 | 1.42E-02 [1.00E-04] | 3.7 [1.70] | 49.46 [220] | 13.49 [60] |
| 1 | B | 1 | • | | 486.1 [3.433] | 7.22 | 0.31 | 1.62 | | | | | |
| 1 | C | 1 | • | | 483.1 [3.411] | 1.01 | 14.65 | 81.70 | | | | | |
| 1 | D | 1 | • | | 489.5 [3.457] | 2.59 | 2.21 | 12.81 | | | | | |
| 2 | A | 1 | • | | 695.8 [4.913] | 3.26 | 1.51 | 12.71 | 1.83 | 1.99E-02 [1.41E-04] | 5.1 [2.30] | 49.46 [220] | 13.49 [60] |
| 2 | B | 1 | • | | 703.5 [4.968] | 6.40 | 0.41 | 3.41 | | | | | |
| 2 | C | 1 | • | | 685.0 [4.837] | 1.09 | 13.56 | 108.98 | | | | | |
| 2 | D | 1 | • | | 698.9 [4.935] | 2.87 | 1.95 | 16.60 | | | | | |
| 3 | A | 1 | • | | 1238.5 [8.746] | 3.04 | 2.34 | 22.20 | 1.35 | 3.83E-02 [2.70E-04] | 8.4 [3.79] | 49.46 [220] | 13.49 [60] |
| 3 | B | 1 | • | | 1285.4 [9.077] | 6.45 | 0.54 | 5.56 | | | | | |
| 3 | C | 1 | • | | 1223.4 [8.639] | 1.23 | 14.29 | 151.00 | | | | | |
| 3 | D | 1 | • | | 1250.1 [8.828] | 4.80 | 0.95 | 10.58 | | | | | |
| 4 | A | 1 | • | | 1630.7 [11.515] | 2.94 | 3.05 | 33.14 | 1.21 | 5.68E-02 [4.01E-04] | 11.7 [5.29] | 49.46 [220] | 13.49 [60] |
| 4 | B | 1 | • | | 1739.2 [12.281] | 6.00 | 0.75 | 8.94 | | | | | |
| 4 | C | 1 | • | | 1659.0 [11.715] | 1.42 | 12.93 | 148.28 | | | | | |
| 4 | D | 1 | • | | 1689.0 [11.927] | 4.46 | 1.33 | 15.88 | | | | | |

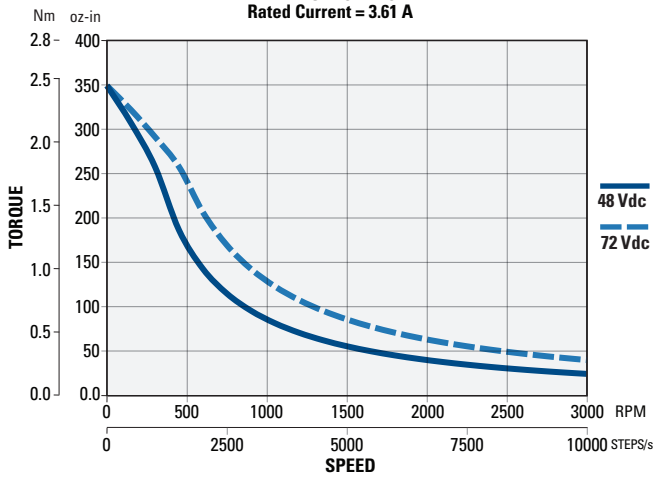
Notes:
1. All ratings typical and at 40° C unless otherwise noted.
2. Rated current is T = 80° C, ON-PLATE; motor mounted to square aluminum plate heatsink, 2.5X motor diameter, 5mm thick.
3. Small signal inductance as measured with impedance bridge @ 1 KHz, 1 amp.

*Complete PMX series model nomenclature can be found on page 52.

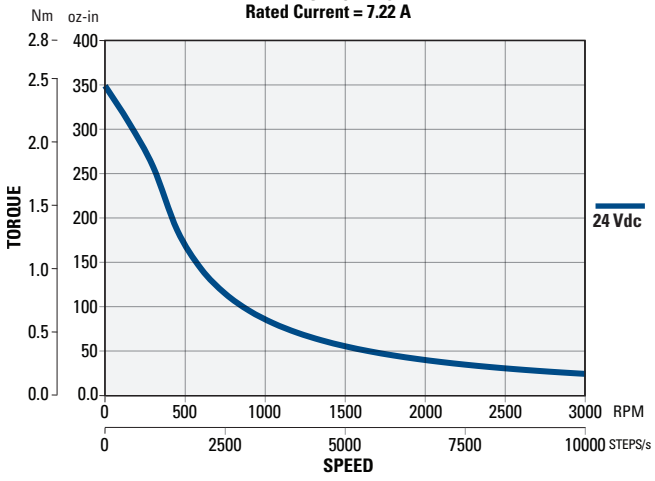
# PMX34 Series Stepper Motors

## PMX34 Series (Bipolar - 1.8° Step) Performance Curves

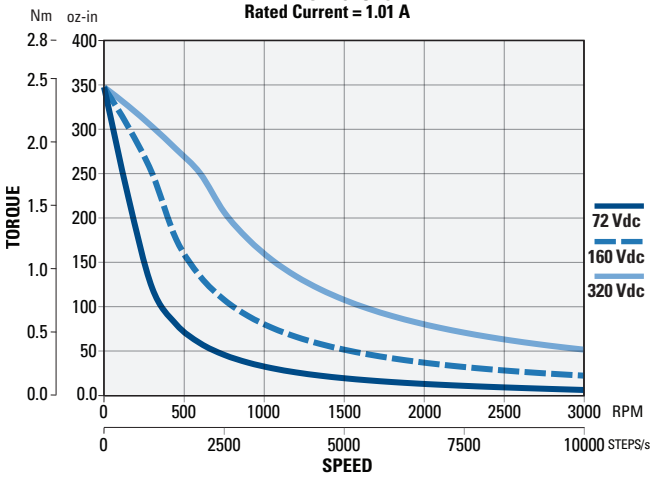
### PMX3410-A10
**Rated Current = 3.61 A**



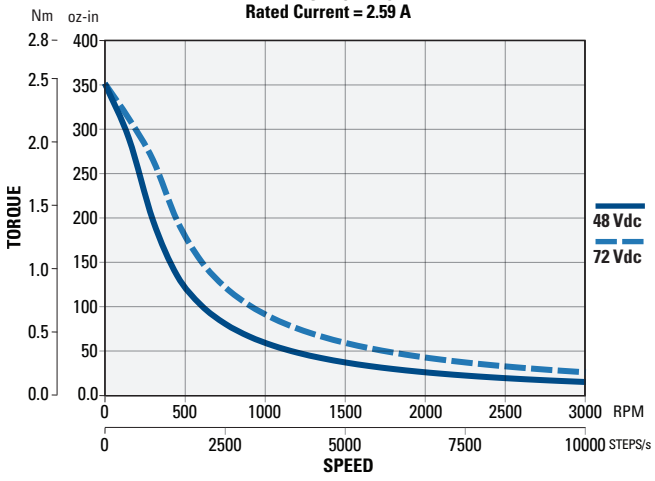

### PMX3410-B10
**Rated Current = 7.22 A**



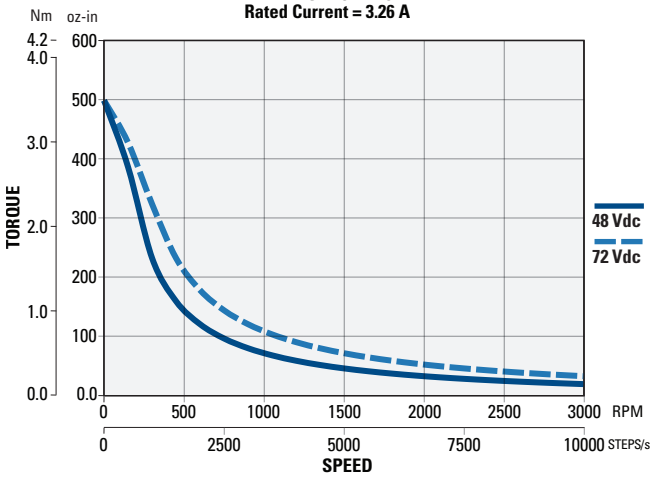

### PMX3410-C10
**Rated Current = 1.01 A**



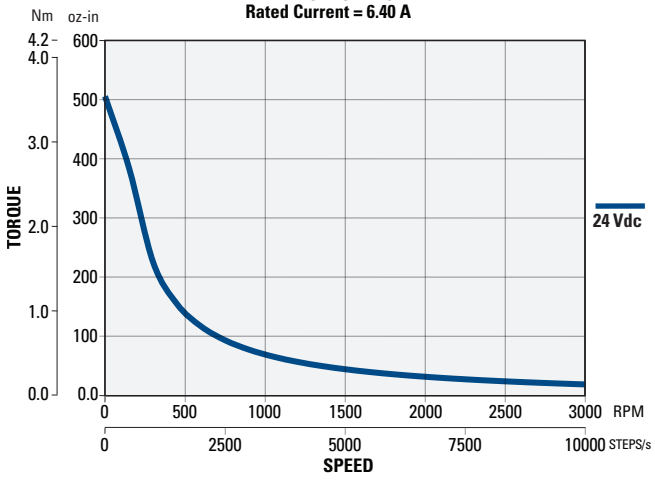

### PMX3410-D10
**Rated Current = 2.59 A**




### PMX3420-A10
**Rated Current = 3.26 A**

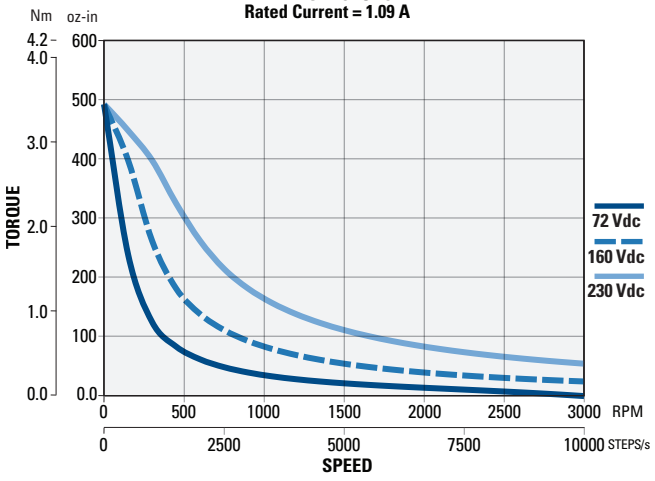



### PMX3420-B10
**Rated Current = 6.40 A**

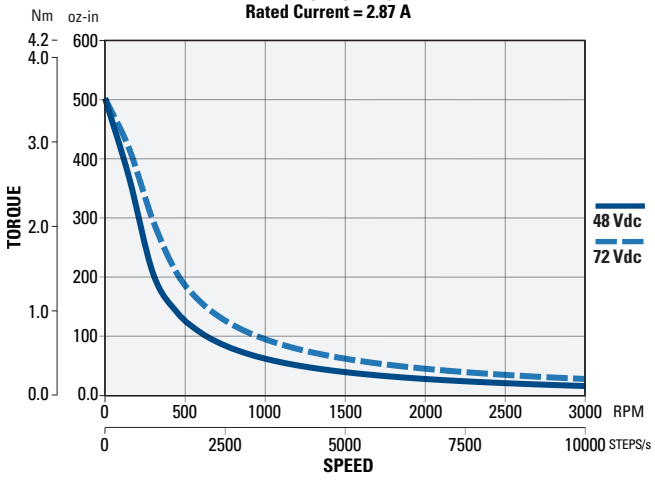


## PMX34 Series (Bipolar - 1.8° Step) Performance Curves

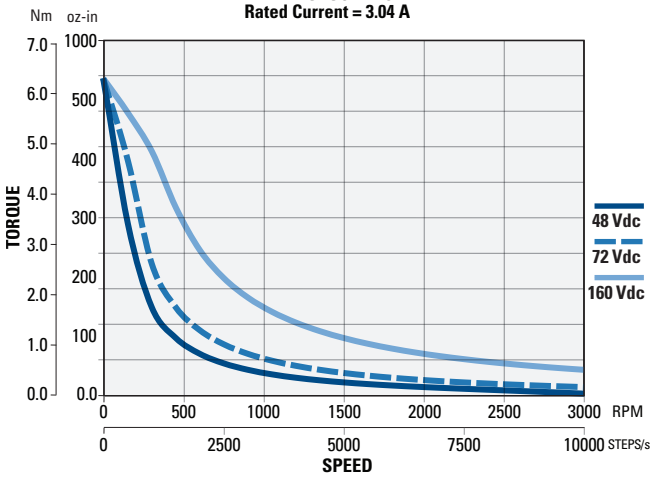
### PMX3420-C10
**Rated Current = 1.09 A**



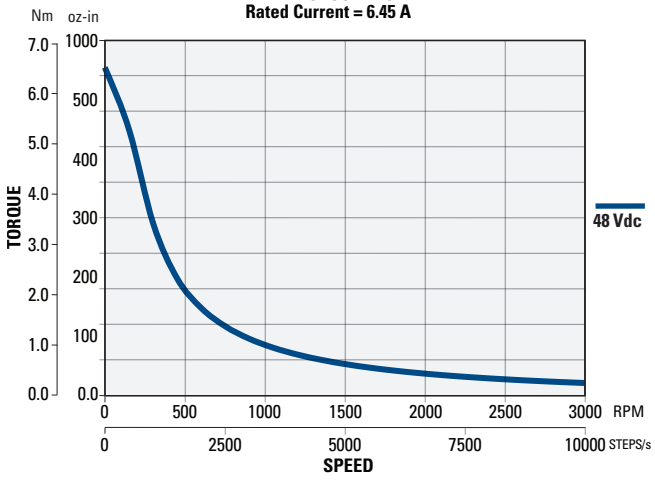

### PMX3420-D10
**Rated Current = 2.87 A**



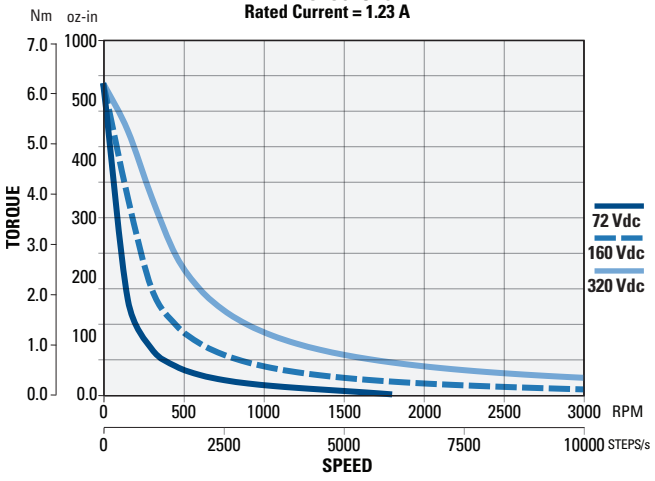

### PMX3430-A10
**Rated Current = 3.04 A**



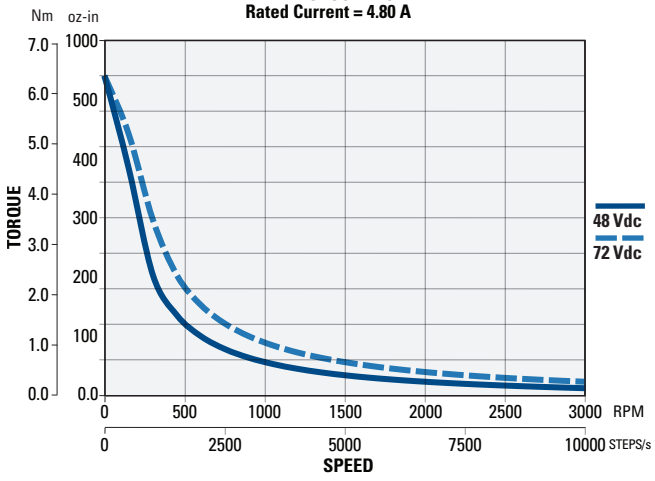

### PMX3430-B10
**Rated Current = 6.45 A**




### PMX3430-C10
**Rated Current = 1.23 A**




### PMX3430-D10
**Rated Current = 4.80 A**

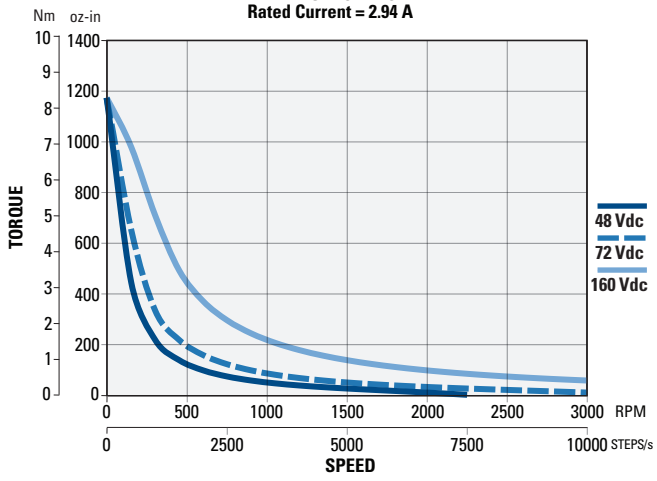


# PMX34 Series Stepper Motors

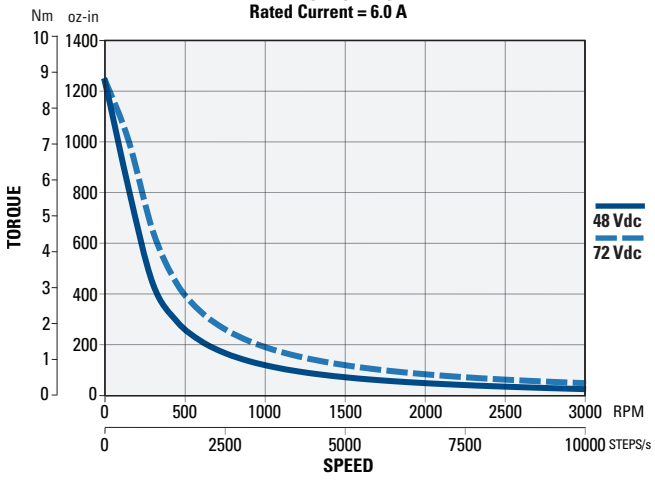


## PMX34 Series (Bipolar - 1.8° Step) Performance Curves

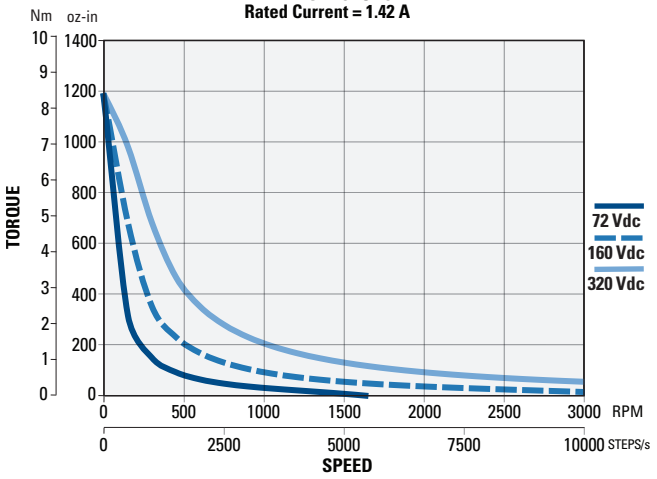
**PMX3440-A10**
**Rated Current = 2.94 A**



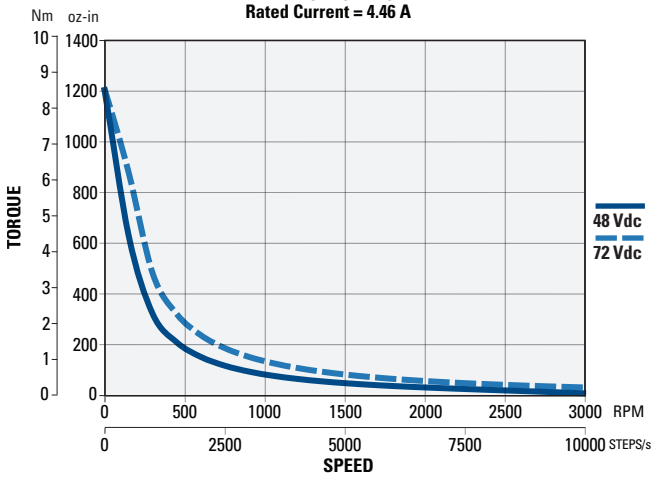

**PMX3440-B10**
**Rated Current = 6.0 A**



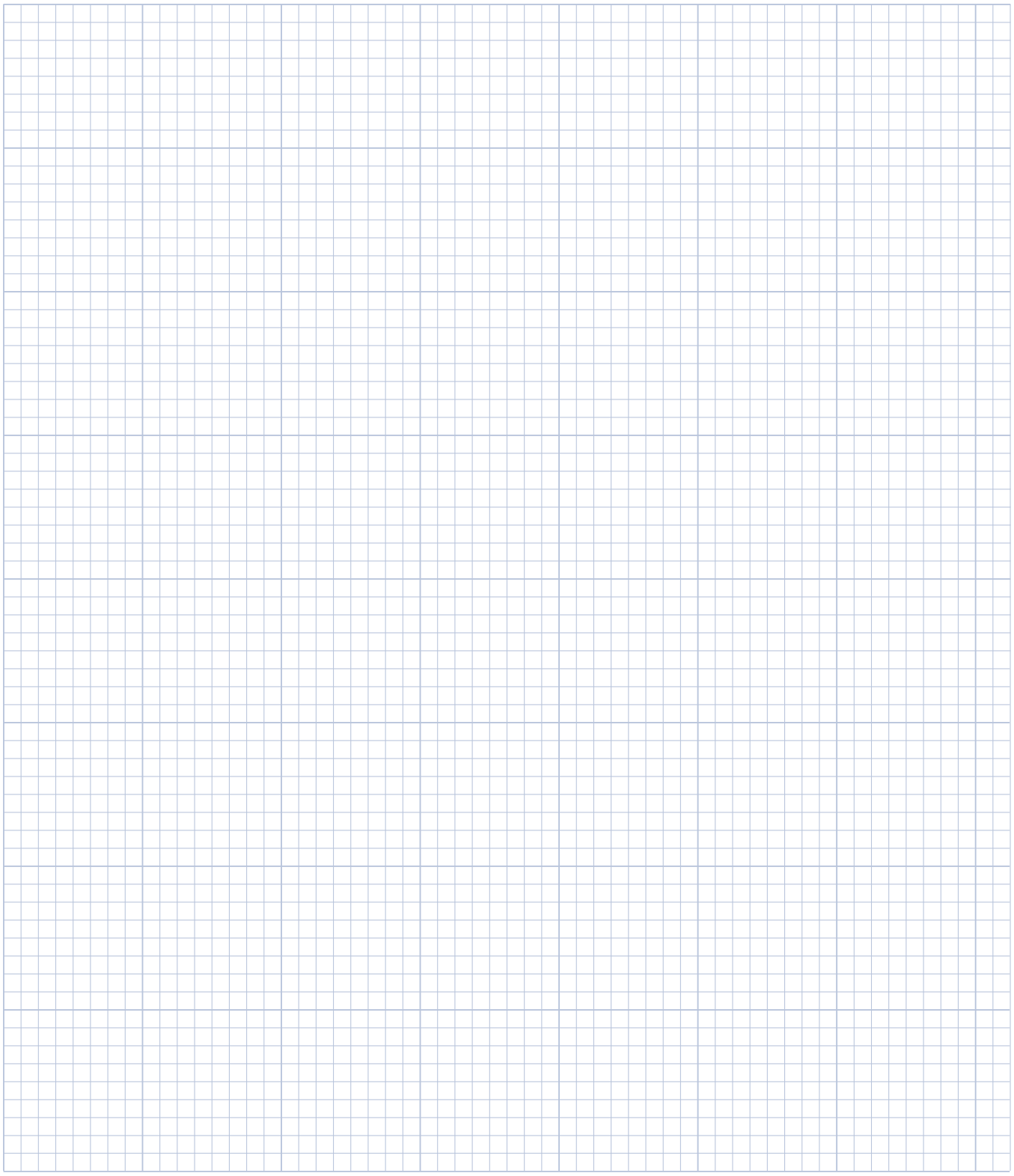

**PMX3440-C10**
**Rated Current = 1.42 A**




**PMX3440-D10**
**Rated Current = 4.46 A**



# Notes

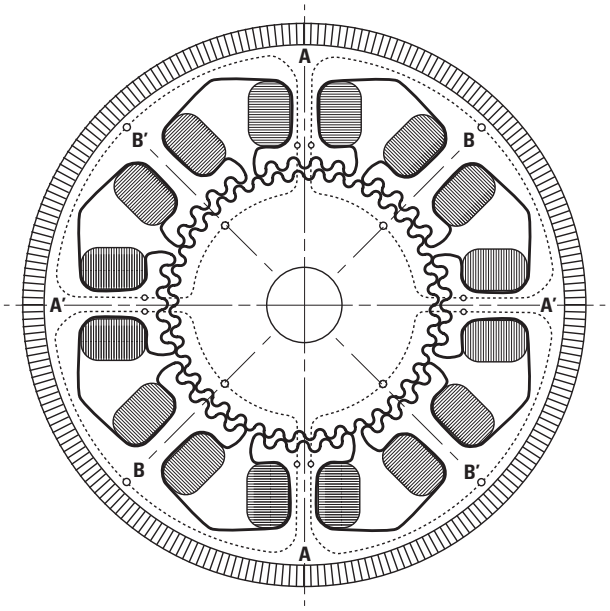


# Stepper Motor General Technical Guide

## Stepper Motor Basics

A Kollmorgen stepper motor is a brushless motor consisting of a rotor and a stator assembly. The illustration shows the internal construction and tooth alignment of the motor. The fine teeth, evenly spaced around the entire diameter, provide the incremental angular rotation that results in mechanical motion.

Kollmorgen Hybrid stepper motors have two windings (two phases) that are energized with DC current. When the current in one winding is reversed, the motor shaft moves one step, or 1.8° (options for 0.9° step angles are also available). By reversing the current in each winding the position and speed of the motor is easily and precisely controlled, making these motors extremely useful for many different motion control applications.



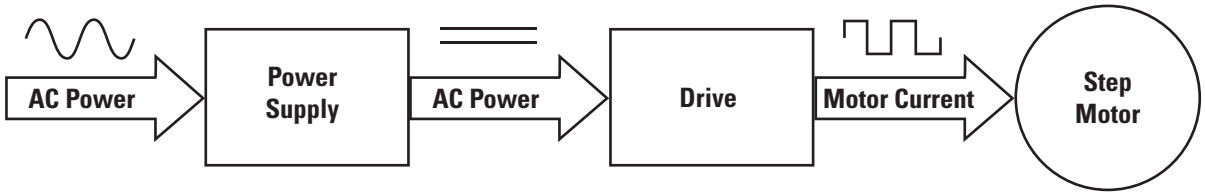

Stepper motor rotor & stator cross section

## Holding Torque

"Holding torque" and the corresponding rated current are leading specifications for selection in the ratings tables for all motors. Holding torque is often used as a figure of merit when comparing motors. It specifies the maximum external torque that can be applied to a stopped motor with rated current applied without causing the motor to rotate continuously. When the motor begins to rotate the torque available is often referred to as "pullout torque". Pullout torque ratings correspond to values shown in Performance speed/torque curves. At starting speeds the pullout torque is typically 20-30% lower than the motor's rated holding torque.

## Drive Selection and Motor Performance

Stepper drives amplify and send DC current and voltage into the motor windings. Kollmorgen stepper motors are used with a variety of drives available from Kollmorgen and other different manufacturers. These drives typically have a broad range of voltage and current ratings. As previously explained, a motor's performance is highly dependent on the current and voltage supplied by a drive. For even finer resolution and smoother operation, micro-stepping drives divide each step into many increments by controlling the magnitude of the current in each winding.




As applied voltage and/or current to the motor is changed, motor performance is altered. A performance speed/torque curve shows the pullout torque, which is directly dependent on the available current from the stepper drive. The torque values are shown along the motor's entire speed range, which is dependent on the available voltage.

## Effects of Available Current

Figure 1 shows the performance of the same motor driven by bipolar stepper drive with different current ratings. In this comparison all drives have the same supply voltage. Note that high speed performance is not appreciably affected by the different current ratings. Low speed running torque, however, varies considerably with changes in the current rating. It is important to understand that when current over the rated current of the motor is applied, the increase in torque will not be proportional to the increased current. Furthermore, applied current levels above rated current will likely result in damage to the motor from demagnetization and/or overheating.

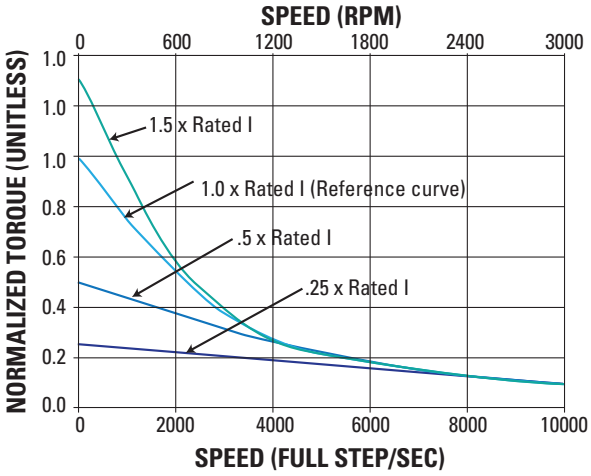



Figure 1

## Effects of Available Voltage

Figure 2 shows the performance of the same motor driven by bipolar stepper drive with different supply voltage ratings. In this comparison all drives have the same current rating. Note that low speed running torque is high and not appreciably affected by supply voltage differences. High speed performance, however, varies considerably with changes in supply voltage. Caution must be exercised when increasing supply voltage. Higher voltages will result in increased motor heating regardless of motor speed.

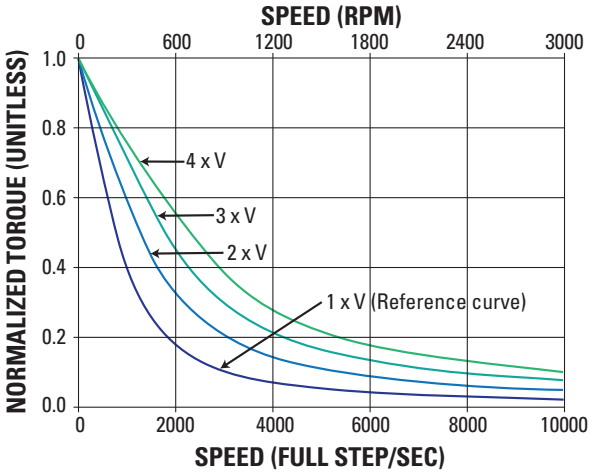



Figure 2

## Effects of Motor Inductance

For a given supply voltage, a low inductance motor will give better performance at high speeds than a high inductance motor, but will operate at a higher temperature. This is true because current will increase faster in a low inductance winding, each time the winding power is switched. High inductance motors yield higher maximum torque and operate cooler, but their top speed is limited and torque falls off more rapidly as speed rises, versus a lower inductance motor.

## Full-Step, Half-Step, and Microstepping

The terms full-step, half-step and "microstep" are commonly used in the discussion of step motors. A 1.8° step motor, for example, has 200 discrete positions in a full 360° revolution. Since 360° divided by 200 equals 1.8°, the motor shaft will advance 1.8° each time the motor is given a digital command to take one step. This is known as a full-step. The term "half-step" indicates a 0.9° step angle (half of a full 1.8° step). This is achieved with a switching technique that alternately applies positive current, no current, and negative current to each winding in succession. The term "microstep" refers to a more sophisticated form of control which goes beyond the simple switching of power between phase A and phase B of the motor windings, and takes control of the amount of current being sent to the individual windings. Microstepping permits the shaft to be positioned at places other than the 1.8° or 0.9° locations provided by the full-step and half-step methods. Microstepping positions occur between these two angular points in the rotation of the rotor. The most commonly used microstep increments are 1/5, 1/10, 1/16, 1/32, 1/125 and 1/250 of a full step. A major benefit of microstepping is that it reduces the amplitude of the resonance that occurs when the motor is operated at its natural frequency or at sub-harmonics of that frequency. The improved step response and reduced amplitude of the natural resonances result from the finer step angle.

# Stepper Positioning Drives

**Kollmorgen's stepper drives are designed with versatility, ease-of-use, and cost-effectiveness in mind.** Choose from a broad range of advanced drives and controls including full, half, and microstepping models in both modular and packaged designs.

Modular drives are open-frame units or have small enclosures, and require an external DC power source. They are generally used where the drive will become an integral part of the user's system or in multiaxis systems utilizing a common power supply.

A packaged drive is a stand-alone unit that operates directly from an AC power source and is packaged in a full enclosure.

# P-Series Drive Features and Benefits



## P5000

**Value DC Input Stepper Drive**

- Wave matching for Kollmorgen motors to provide optimal performance
- All inputs and outputs are optically isolated
- Step and direction inputs or internal velocity controlled oscillator (VCO) dip switch selectable
- DIP switch selectable micro-stepping resolution settings
- Idle current reduction, DIP switch selectable
- Compensation for mid-range instability
- RoHS & CE certified
- UL pending

## P6000


**Full Featured AC Input Stepper Drive**

- No programming required
- Covers full power range of Kollmorgen steppers
- Switch selectable current from 0.2-5.7 Arms, 8.0 A peak
- Switch selectable for many Kollmorgen motor parings
- All inputs and outputs are optically isolated
- Single-ended and differential step and direction
- Enable input
- Switch selectable micro-stepping resolution
- Anti-resonance based on load inertia
- RoHS & CE certified

## P7000

**Full Featured AC or DC Input Stepper Drives with Intelligent Indexing Option (-PN)**

- AC and DC input versions
- Covers full power range of Kollmorgen steppers
- Drives can be configured by either dip switches or P7000 software
- Intelligent indexing option (-PN) provides ability to link motion tasks.
- All inputs and outputs are optically isolated
- Single-ended and differential step and direction
- Enable input
- Switch selectable micro-stepping resolution
- Anti-resonance based on load inertia
- RoHS, CE and UL certified

Budget/Value → Full–Featured

**STEPPER DRIVE PRODUCT OVERVIEW**

| Stepper Drive Model | Modes of Operation* | Input voltage (Vdc) | Input Voltage (Vac) | Output current (Adc) Continuous (Peak) |
|---|---|---|---|---|
| P5000 | S, V | 20 - 75 | n/a | 0.7 - 2.0 (3.5) |
| P6000 | S | n/a | 110-240 +/-10% | 0.3 - 5.7 (8.0) |
| P70530 | S, M | 20 - 75 | n/a | 0 - 5.0 (7.1) |
| P70360 | S, M | n/a | 120/240 | 0 - 2.5 (3.5) |

Modes of Operation: S - Step and Direction; V - Velocity Controlled Oscillator (VCO);
M - Motion Node Indexing

# P5000 Stepper Drive-Controller

## Big Performance, Micro Package.

**Introducing the New Kollmorgen P5000 Stepper Drive.**

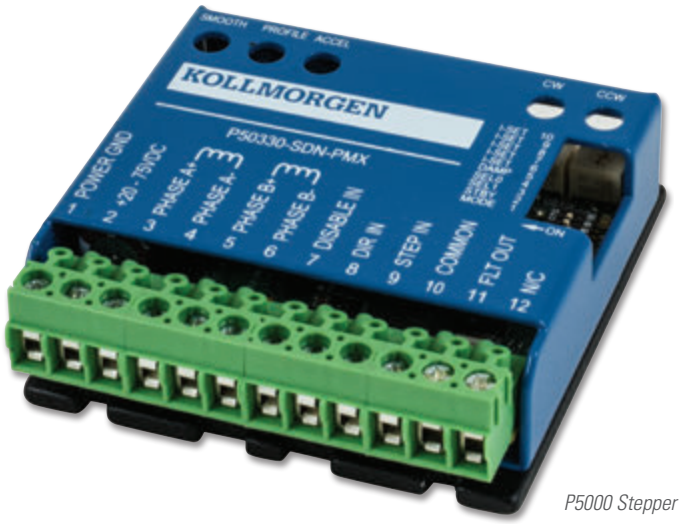
The P5000 is a compact micro-stepping stepper drive optimized for high system performance with Kollmorgen's industry leading POWERMAX II stepper motors. It is an impressive yet simple addition to the Kollmorgen stepper drive family.

**Optimized. Smooth. Compact.**

Pairing a stepper system doesn't get any easier! The P5000 and Kollmorgen stepper motors are meant to be together. With Kollmorgen motor windings optimized for the P5000, all you have to do is set the dip switches for the motor you are paired with and you have a smooth operating system that fully utilizes the potential of your Kollmorgen motor and drive combination!

**Features**

- Current output from 0.7-3.5 Arms peak; DIP switch selectable in 0.2 Amp increments
- Bus Voltage 20-75 Vdc
- Wave matching for Kollmorgen motors to provide optimal performance for the Kollmorgen Stepper Motor Families.
- All Inputs and Outputs are Optically Isolated
- Command Source from External Step and Direction Inputs or Internal Velocity Controlled Oscillator (VCO); DIP switch selectable
- External Single-Ended Step and Direction Command
  - Disable or Fault Reset Input
  - Fault or Enable Output
- VCO Mode
  - CW Limit Input
  - CCW Limit Input
  - Run/Stop Input
  - Run/Stop Output
  - CW Speed trimpot
  - CCW Speed trimpot
  - Accel/Decel trimpot
- DIP switch selectable micro-stepping-resolution settings
- Pulse Multiplier smooths micro-stepping*
- Idle Current Reduction; DIP switch selectable
- Compensation for mid-range instability*
- RoHS & CE certified
- UL pending




*P5000 Stepper Drive*
*(Shown Actual Size)*

*Patents Pending

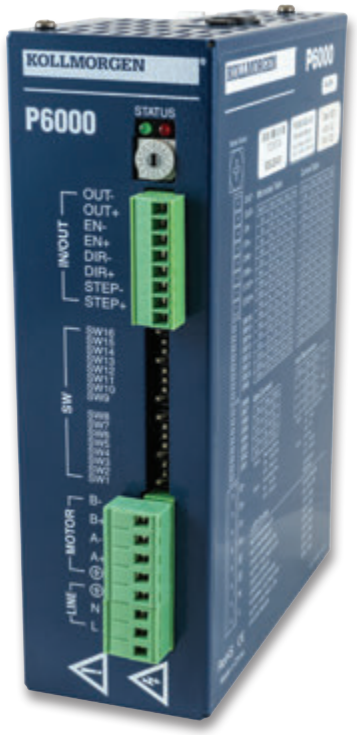
# P6000 Stepper Drive-Controller



## Powerful, Yet Simple.

### Introducing the New Kollmorgen P6000 Stepper Drive.

The P6000 is an AC input micro-stepping drive optimized for pairing with POWERPAC and POWERMAX stepper motors. With the simplicity of dip switches and the optimized performance from the complete system, this stepper solution brings increased machine performance without the associated complexity.




P6000 Stepper Drive

### Powerful. Simple. Optimized.

The P6000 and Kollmorgen POWERPAC and POWERMAX stepper motors are designed to provide the best system solution when paired with one another. The easy dip switch selection matches the P6000 settings with the optimal Kollmorgen stepper motor requirements to provide the best performance and most efficient solution for nearly any application.

### Features

- No programming required!
- Covers full power range of Kollmorgen Stepper Motors
- Switch Selectable Current Output from 0.2-5.7 Arms, 8.0 A peak
- 120/240 VAC Input (160/320 Vdc Bus)
- Kollmorgen Stepper Motor Pairing; Switch Selectable
- All Inputs and Outputs are Optically Isolated
- Single-Ended and Differential Step and Direction or CW/CCW Command; Switch Selectable
- Enable Input
- Fault Output (Sinking or Sourcing)
- Status LEDs for easy troubleshooting
- Switch Selectable Micro-Stepping-Resolution Settings
- Step Smoothing Filter; Switch Selectable
- Idle Current Reduction; Switch Selectable
- Anti-Resonance Based On Load Inertia; Switch Selectable
- Self-Test Conducts Spin Test to Confirm Proper Connection; Switch Selectable
- RoHS & CE Certified

# P7000 Stepper Drive-Controller

P7000 stepper drives offer a unique level of system functionality, smoothness, high-speed performance and innovation unmatched in the industry.

The compact P7000 is designed to power Kollmorgen step motors ranging from NEMA size 17 up to NEMA size 42. Two power configurations are available for operation directly from AC power, or from a DC power supply.

There are two levels of control offered. The basic drive accepts step and direction inputs. P7000 drives are also available with an integrated position controller (-PN option). The drives are configured by either on-board dip switches, or with the P7000 tools software.

## Advanced P7000 Features Make it the Best Choice to Meet Your Application Requirements

### Multistepping™

Also known as auto-smoothing. The P7000 drive accepts full step pulse commands from the indexer and inserts fine micro-steps to smooth coarse low speed motion. This allows you to significantly upgrade machine performance without having to redesign machine control architecture.

### Auto-Tuning

Advanced current auto-tuning techniques provide outstanding low-speed smoothness. The P7000 senses the motor's characteristics and automatically fine tunes itself to meet your high-performance needs. This reduces installation and set-up time.

### Mid-Band Anti-Resonance Control

Reduces negative effects of mechanical resonance, allowing you to get more out of a smaller motor and virtually eliminating nuisance stalls and machine downtime.

### Idle Current Reduction

If you do not require the motor's full torque to hold a load at rest, you can select the right amount of current (torque) to reduce motor heating and power consumption. This increases the life of the system.

### Dynamic Smoothing

Quasi-S-curve algorithm reduces jerk, especially upon acceleration. Increases mechanical life of the machine and reduces energy consumption.

### Intelligent Indexing Option (-PN)

Wizard-like P7000 helps you to develop and link motion tasks such as homing and conditional and unconditional indexing. You can be up-and-running quickly.

### Modbus RTU Compatible

The intelligent indexing option (-PN) supports Modbus RTU to control motion with an external interface device. External interfaces make controlling motion simple for machine operators.

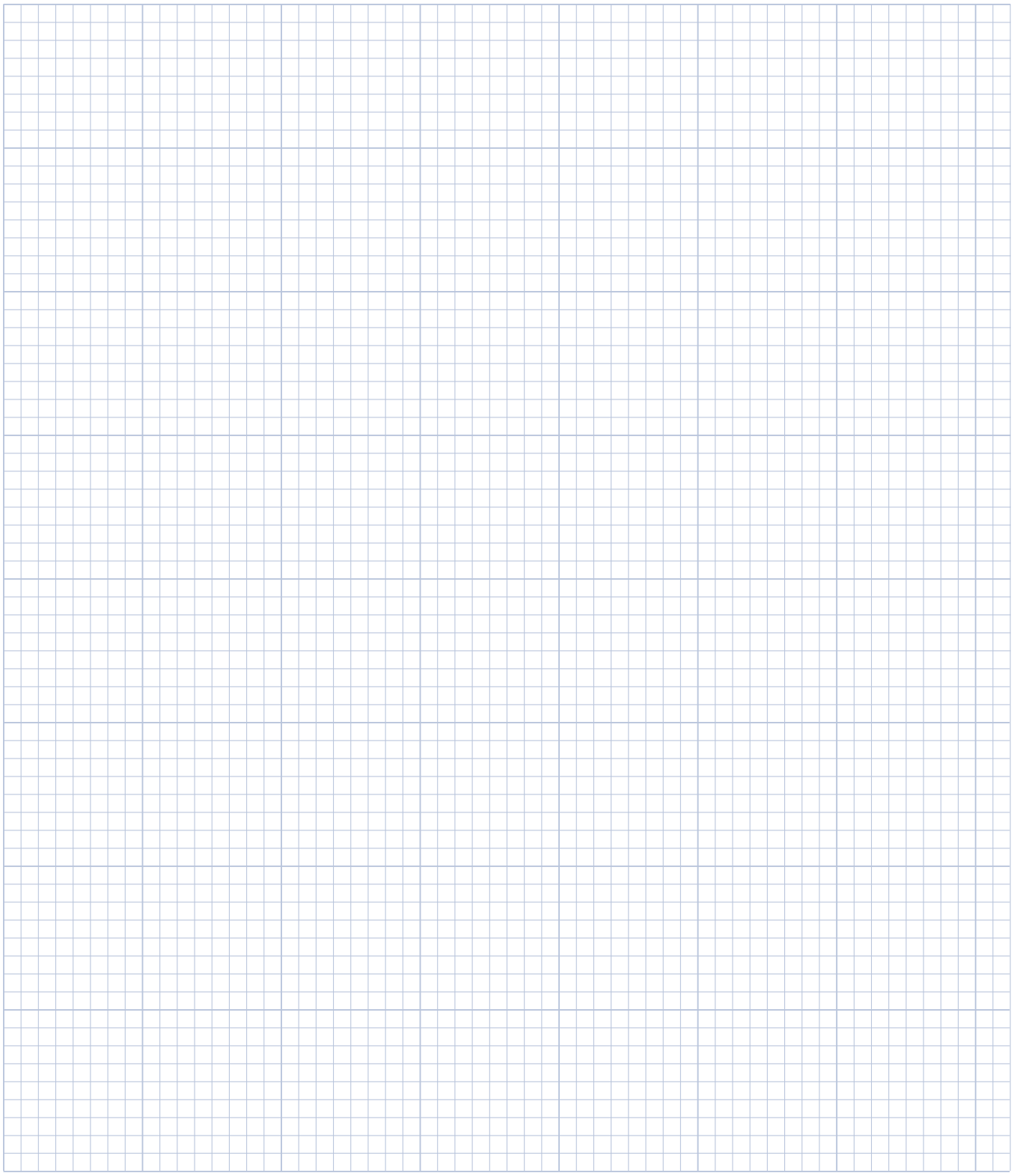
### P7000 Tools

The position node option allows you to configure up to 63 absolute or relative moves. You can specify the moves' distance, acceleration, velocity, and deceleration rates, or simply specify the distance and total time for the move – P7000 will perform the calculations automatically.

| Specifications | Units | P70530 | P70360 |
|---|---|---|---|
| Input voltage range | Volts | 20 - 75 Vdc | 120 or 240 Vac |
| Continuous current | Amps rms | 5 | 2.5 |
| Microstep peak current | Amps peak | 7.1 | 3.5 |

Note: For complete P7000 Series model nomenclature, refer to page 134.

# Notes



# Model Nomenclature

## PMX™ Series Stepper Motor

**PMX 11 2 0 – A 1 O – B N 0 – 00**

### Motor Series

### NEMA Motor Frame Size

08, 11, 14, 17, 23, 34

### Rotor Stack Length

| | |
|---|---|
| 1 = 1 stack | All PMX series motors |
| 2 = 2 stacks | All PMX series motors |
| 3 = 3 stacks | PMX11, -17, -23, -34 |
| 4 = 4 stacks | PMX17, -23, -34 |
| 5 = 5 stacks | PMX17 |

### Motor Winding

| | |
|---|---|
| A, B, C, D | Bipolar windings |
| G, H, J | Unipolar or Bipolar windings |

### Step Angle

| | |
|---|---|
| 1 = 1.8° | All PMX series motors |
| 9 = 0.9° | PMX17, PMX23 |

### Rear Shaft Option

| | |
|---|---|
| O = No rear shaft | All PMX series motors |
| R = Rear shaft | All PMX series motors |
| H = Rear shaft + encoder mounting holes | PMX14, -17, -23 |

### Front Shaft Option

| | |
|---|---|
| N = Normal/Smooth front shaft | All PMX |
| F = Flat front shaft | All PMX |
| K = Open keyway | PMX34 |

### Connection/Hookup Option

| | |
|---|---|
| B = 4 lead Bipolar | All PMX |
| U = 6 lead Unipolar | PMX17, -23 |
| X = Integrated Connector | PMX17, -23 |

# Stepper Motor Application Worksheet

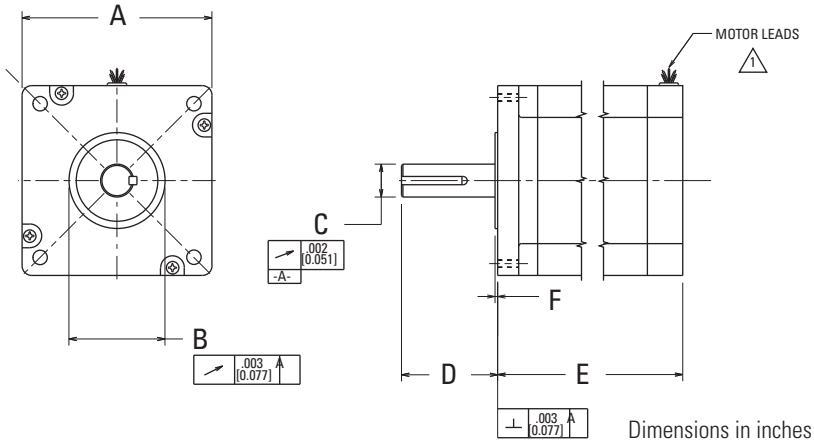


Company_____ Date_____

## MOTOR

circle or specify
Note: All motors are 1.8°, 2 Phase.

B - Pilot Diameter
A - Flange Width
E - Max Motor Length
F - Pilot Depth




Dimensions in inches [mm]

• **STANDARD AND SPECIAL FEATURES**
Motor model number from catalog:

_____

Circle whether you want standard or special features. If special, indi cate details. Note that special features may result in increased price or leadtime.

• **FRONT SHAFT** (standard) (special)

**D** shaft length_____±_____ (±.015)*

**C** shaft dia._____±_____(+.0000/-.0005)*

run out ⚠ _____(.002 std. ext.)*

— **Straight Key** per electric motor standards (standard option) (special)

Key: width_____ height_____

length_____ other_____

— **Flat** See Fig. 1 (standard option) (special)

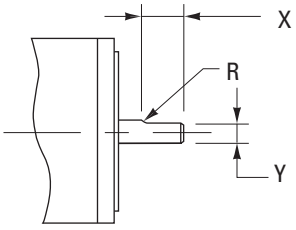
Min. usable length X_____

Dim. over flat Y_____±_____(±.005)*

Corner radius R allowed_____(±.060)*

Other_____

FIGURE 1




• **REAR END BELL** (standard) (special)

mtg. hole B.C._____±_____(±.010)*

mtg. holes_____

hole pattern_____

other_____

• **REAR SHAFT** (standard) (special)

shaft length_____±_____(±.040)*

shaft dia._____±_____(+.0000/-.0005)*

run out ⚠_____(.002)*

other_____

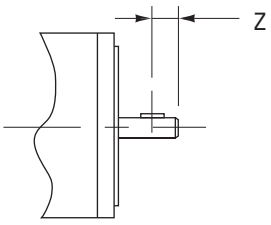
— **Woodruff** Key See Fig. 2 (standard option) (special)

ANSI std. key no._____(Example 303)

Key location Z_____±_____(±.020)*

Other_____

FIGURE 2




Notes:
⚠ NEMA standard for shaft run out is .002" + .001" for each additional inch of extension past the standard length.
* Example of typical tolerance

**About Kollmorgen**

Kollmorgen is a leading provider of motion systems and components for machine builders. Through world-class knowledge in motion, industry-leading quality and deep expertise in linking and integrating standard and custom products, Kollmorgen delivers breakthrough solutions that are unmatched in performance, reliability and ease-of-use, giving machine builders an irrefutable marketplace advantage.

**For assistance with your application needs in North America, contact us at: 540-633-3545, support@kollmorgen.com or visit www.kollmorgen.com for a global contact list.**


KOLLMORGEN®

*Because Motion Matters™*


Kollmorgen
203A West Rock Road
Radford, VA 24141 USA
Phone: 1-540-633-3545
Fax: 1-540-639-4162

Kollmorgen Europe GmbH
Pempelfurtstraße 1
40880 Ratingen
Germany
Phone: +49 (0) 2102 9394 0
Fax: +49 (0) 2102 9394 3155

Kollmorgen Asia
Rm 202, Building 3, Lane 168
Lin Hong Road
Changning District, Shanghai 200335, China
Phone: +86 400 661 2802

Kollmorgen Aerospace and Defense
501 West Main Street
Radford, VA 24141 USA
Phone: 1-540-731-5668
Fax: 1-540-731-5679