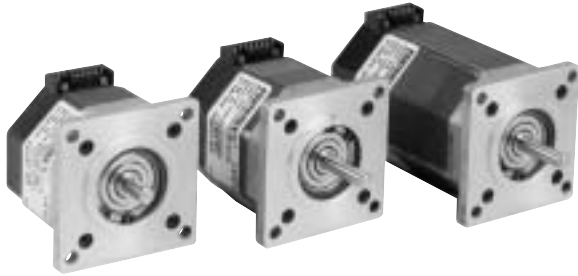
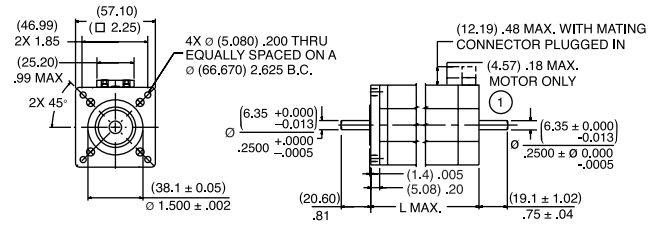


# PACIFIC SCIENTIFIC POWERMAX II MOTORS



## MOTOR DIMENSIONS

(mm) in

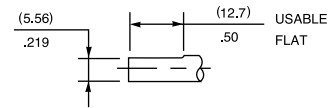


① Optional rear shaft extension available as shown. Same diameter as front shaft extension.

Connector Motor Model	Length	
	mm	in
P2H	40.7	1.60
P or M21	52.3	2.06
P or M22	78.7	3.10

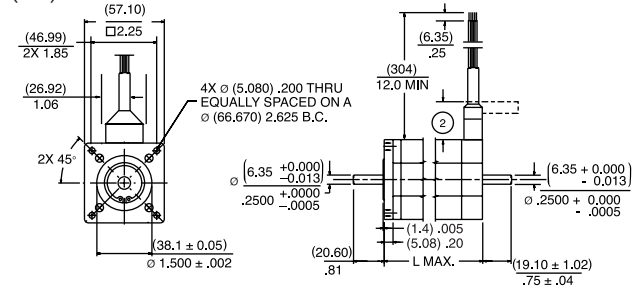
## Standard Shaft Options

1. Shaft modifications also available. Contact factory.
2. Optional flat available on front shaft as shown.



## FLYING LEAD MOTOR

(mm) in



② Flexible rubber boot may be bent as shown. Normal height 1.0 inch (25.4)

Flying Lead Motor Model	Length	
	mm	in
P2H	40.7	1.60
P or M21	52.4	2.06
P or M22	78.8	3.10

## Features

Two year warranty

Polymer encapsulated stator

Polymer end bell with threaded inserts

Largest available shaft diameter on a NEMA 23 stepper

Oversized 30 mm bearings

Optional Sigmax® technology

Optional low inertia rotor

Precision ground rotor OD and honed stator ID for concentric air gap in an economical motor design

Exposed laminations aids thermal dissipation

## Benefits

High quality, dependable operation

Exceptional thermal dissipation

End bell runs cooler, provides greater flexibility in mounting encoder and brake options

Withstands high radial and axial loads. Supports numerous shaft modifications

Increases bearing fatigue life (L<sub>10</sub>), extends motor life, reduces downtime

Increases available torque

Produces the highest acceleration rate possible

High quality performance in an economical motor design

Improved heat dissipation extends motor life, reduces downtime

# PACIFIC SCIENTIFIC POWERMAX II MOTORS

## RATINGS AND CHARACTERISTICS SEE SYSTEM RECOMMENDATIONS AND DATA ON PAGE 87.

Motor parameters and winding data.

Typical Leadwire Motor Model Number	Connection <sup>①</sup>			Holding Torque <sup>②</sup> (2 phases on) oz-in (N-m) ±10%	Rated Current/Phase <sup>③</sup> (amps DC)	Phase Resistance (ohms) ±10%	Phase Inductance <sup>④</sup> (mH) Typical	Detent Torque oz-in (N-m)	Thermal Resistance <sup>⑤</sup> (°C/watt)	Rotor Inertia oz-in-S <sup>2</sup> (kgm <sup>2</sup> x 10 <sup>-3</sup> )	Net Weight kg (lbs)
	Parallel	Series	Unipolar								
<b>STANDARD P2H SERIES 1/2 ROTOR STACK</b>											
P2HNRFH-LNN-NS-00	●			59 (0.42)	5.2	0.22	0.5	2.5 (0.018)	6.6	0.0010 (0.007)	0.45 (1.0)
P2HNRFB-LNN-NS-00		●		59 (0.42)	2.6	0.90	1.9				
P2HNRFB-LNN-NS-00			●	42 (0.29)	3.68	0.44	0.5				
P2HNRFB-LNN-NS-00	●			59 (0.42)	2.6	0.76	1.9				
P2HNRFB-LNN-NS-00		●		59 (0.42)	1.3	3.04	7.6				
P2HNRFB-LNN-NS-00			●	42 (0.29)	1.84	1.52	1.9				
<b>SIGMAX<sup>®</sup> M21 SERIES 1 ROTOR STACK</b>											
M21NRFA-LNN-NS-00	●			142 (1.00)	5.6	0.23	0.7	9.4 (0.066)	5.5	0.0017 (0.012)	0.68 (1.5)
M21NRFB-LNN-NS-00		●		142 (1.00)	2.8	0.92	2.8				
M21NRFB-LNN-NS-00			●	100 (0.71)	4.0	0.46	0.7				
M21NRFB-LNN-NS-00	●			137 (0.97)	4.6	0.32	1.0				
M21NRFB-LNN-NS-00		●		137 (0.97)	2.3	1.28	4.0				
M21NRFB-LNN-NS-00			●	97 (0.68)	3.3	0.64	1.0				
<b>STANDARD P21 SERIES 1 ROTOR STACK</b>											
P21NRFA-LNN-NS-00	●			114 (0.81)	5.6	0.23	0.8	4 (0.028)	5.5	0.0017 (0.012)	0.68 (1.5)
P21NRFB-LNN-NS-00		●		114 (0.81)	2.8	0.92	3.2				
P21NRFB-LNN-NS-00			●	81 (0.57)	4.0	0.46	0.8				
P21NRFB-LNN-NS-00	●			111 (0.79)	4.6	0.32	1.1				
P21NRFB-LNN-NS-00		●		111 (0.79)	2.3	1.28	4.4				
P21NRFB-LNN-NS-00			●	79 (0.55)	3.3	0.64	1.1				
<b>SIGMAX<sup>®</sup> M22 SERIES 2 ROTOR STACK</b>											
M22NRFA-LNN-NS-00	●			230 (1.62)	6.5	0.21	0.7	17 (0.12)	4.5	0.0036 (0.025)	1.13 (2.5)
M22NRFB-LNN-NS-00		●		230 (1.62)	3.3	0.84	2.8				
M22NRFB-LNN-NS-00			●	163 (1.15)	4.6	0.42	0.7				
M22NRFB-LNN-NS-00	●			253 (1.79)	4.6	0.38	1.7				
M22NRFB-LNN-NS-00		●		253 (1.79)	2.3	1.52	6.8				
M22NRFB-LNN-NS-00			●	179 (1.26)	3.3	0.76	1.7				
<b>STANDARD P22 SERIES 2 ROTOR STACK</b>											
P22NRFH-LNN-NS-00	●			197 (1.39)	6.5	0.21	0.8	7 (0.049)	4.5	0.0036 (0.025)	1.13 (2.5)
P22NRFB-LNN-NS-00		●		197 (1.39)	3.3	0.84	3.2				
P22NRFB-LNN-NS-00			●	139 (0.98)	4.6	0.42	0.8				
P22NRFB-LNN-NS-00	●			214 (1.51)	4.6	0.38	2.1				
P22NRFB-LNN-NS-00		●		214 (1.51)	2.3	1.52	8.4				
P22NRFB-LNN-NS-00			●	151 (1.07)	3.3	0.76	2.1				

All ratings typical and at 25°C unless otherwise noted.

- ① Refer to Selection Guide for more information.
- ② With rated current applied.

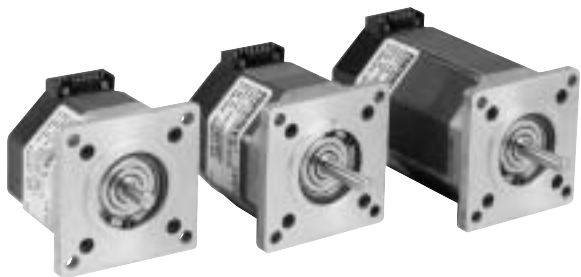
- ③ Windings at 130°C and motor in still air at 40°C (without heat sink). Operation of these motors above rated current may cause demagnetization. Contact factory.
- ④ Small signal inductance as measured with impedance bridge at 1kHz, 1 amp.
- ⑤ Thermal resistance measured with motor hanging in still air (unmounted).



### MOTIONEERING<sup>®</sup> CD-ROM

For more detailed product and selection information, see the MOTIONEERING CD-ROM inside the back cover of this catalog or visit our website at [www.DanaherMotion.com](http://www.DanaherMotion.com).

## POWERMAX II STEPPER SYSTEMS



The performance information shown in the torque/speed curves that follow show the POWERMAX II family of NEMA 23 step motors with windings, connections and current levels selected for maximum performance with the drives shown on this page. For additional assistance in sizing or selecting the stepper system appropriate for your application, contact Danaher Motion Customer Support at 815-226-2222.

## POWERMAX II STEPPER SYSTEMS

**6210/6215 Microstepping Drives** SEE PAGE 74

- 24-40 VDC input
- Step/direction input or oscillator models
- Current selectable from 1 to 3.5 amps peak
- Microstepping - 4 step sizes

**6410/6415 Microstepping Drives** SEE PAGE 72

- 24-75 VDC input
- Step/direction input or oscillator models
- Current selectable from 0.625 to 7.1 amps peak
- Selectable step sizes, binary or decimal, full to 1/250 or 1/256

# POWERMAX II STEPPER SYSTEMS

