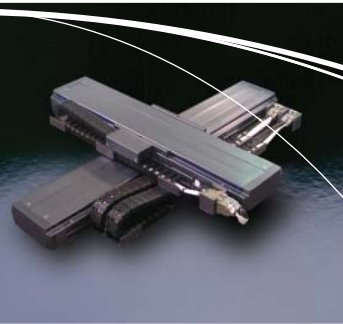


# PRECISION PRODUCTS for the Motion Control Industry



# Parker Hannifin Corporation

A Fortune 300 company with annual sales exceeding \$9 billion and more than 400,000 customers in 46 countries, Parker Hannifin is the world's leading supplier of innovative motion control components and system solutions serving the industrial, mobile, and aerospace markets. We are the only manufacturer offering customers a choice of electromechanical, hydraulic, pneumatic, or computer-controlled motion systems.

## Total System Solutions

Parker's team of highly qualified application engineers, product development engineers, and system specialists can turn pneumatic, structural, and electromechanical products into an integrated system solution. Moreover, our Selectable Levels of Integration™ allows you to choose the appropriate system, subsystem, or component to meet your specific need.



Parker offers complete engineered systems.

## First in Delivery, Distribution, and Support

In today's competitive, fast-moving economy, what good is an application that isn't ready on time? This is especially true when compressed design cycles make the quick delivery of critical components essential. With factories strategically located on five continents, Parker offers an unrivaled delivery record, getting solutions out our door and onto your floor faster than ever.

Parker also has the industry's largest global distribution network, with more than 8,600 distributors worldwide. Each of these locations maintains ample product inventory to keep your downtime to a minimum. And many distributors have in-house design capabilities to support your system and subsystem requirements.

Throughout the design process, Parker's factory-trained electro-mechanical engineers work hand in hand with you and day or night at 1-800-C-Parker. Our operators will connect you with a live, on-call representative who will identify replacement parts or services for all motion technologies.



© Copyright 2006, Parker Hannifin Corporation. All rights reserved.



Parker world headquarters in Cleveland



## Training

Parker's best-in-class technology training includes hands-on classes, Web-based instruction, and comprehensive texts for employees, distributors, and customers. Parker also provides computer-based training, PowerPoint presentations, exams, drafting and simulation software, and trainer stands.

## parkermotion.com

Our award-winning Web site is your single source for

- Product information
- Downloadable catalogs
- Motion-sizing software
- 3D design files
- Training materials
- Product-configuration software
- RFQ capabilities



## 24/7 Emergency Breakdown Support

The Parker product information center is available any time of the day or night at 1-800-C-Parker. Our operators will connect you with a live, on-call representative who will identify replacement parts or services for all motion technologies.

# A SOLUTION FOR EVERY AXIS



As someone looking for a motion control solution, you know there are countless manufacturers out there promising to solve your challenge. So what makes Parker Bayside so special? As part of Parker Hannifin's Electromechanical Automation Division, Parker Bayside is backed by the expertise, drive for innovation and high-quality products and systems of an \$9 billion global presence in the motion control industry.

With a solution for every axis, Parker Bayside is a world-class manufacturer of electronic and mechanical motion control products, including linear and rotary positioning systems, servo motors and drives, gearheads and gearmotors. Our passion for excellence and focus on new technologies give you an unsurpassed level of commitment that means your automation objectives are solved quickly and efficiently. And to ensure your application is operating at 100%, we give you the support of our experienced team of technical professionals, 24/7.

Parker's Electromechanical Automation Division brings together leading brands in industrial and high-tech automation, including not only Bayside, but Acroloop, Compumotor, CTC, Custom Servo Motor and Trilogy. Designed for easy configuration to make a complete motion system — from miniature precision for life sciences to overhead gantries for the factory floor — these best-of-breed individual components are available separately, so you can build a motion system from the ground up, or as a complete motion system to make integration simple, fast and easy. For more details, please visit us at [parkermotion.com](http://parkermotion.com).

Thank you for your interest in Parker Bayside. We look forward to putting you in motion!



# **PARKER BAYSIDE**

DELIVERING HIGHLY ENGINEERED ELECTROMECHANICAL SYSTEMS  
AND COMPONENTS THAT IMPROVE PRECISION, INCREASE PRODUCTIVITY,  
AND CREATE VALUE FOR CUSTOMERS.

# Table of Contents



## Corporate Overview

- 6 Product Line Overview
- 8 Engineered Solutions
- 10 Motion Tools



## Linear & Rotary Positioning Stages

### Linear Positioning Stages

- 16 LM
- 40 Micro
- 52 Ultra

### Vertical Positioning Stages

- 70 ZP200

### Rotary Stages

- 76 Direct Drive
- 82 Worm Drive
- 88 200RT

### Manually Driven Slides & Stages

- 92 Linear Slides
- 102 Bearing Sets
- 108 Linear Positioning Stages
- 126 Rotary Positioning Stages

### Engineered Systems

- 132 Motion System Development

## Frameless Motors & Gearmotors

- 142 Frameless
- 156 GM Servo Gearmotors
- 170 DX Servo Wheel
- 180 Pancake Gearmotor

## Gearheads

### Stealth® Planetary Gearheads

- 188 PS Advanced In-Line
- 196 PX In-Line
- 200 PV Power & Versatility
- 208 RS Advanced Right Angle
- 216 RX Right Angle
- 220 Multi-Drive Right Angle

### NEMA Gearheads

- 228 NE In-Line NEMA
- 232 Specials

# Product Line Overview

## Linear, Vertical & Rotary Positioning Stages

### Linear, Vertical & Rotary Stages

| Product Series       | Feature                                              | Width (mm)           | Travel (mm)      | Length (mm)  | Max. Load (kg) | Actuation                   | Accuracy           | Repeatability        |
|----------------------|------------------------------------------------------|----------------------|------------------|--------------|----------------|-----------------------------|--------------------|----------------------|
| LM                   | Long Travel Precision                                | 100 to 250 (3 sizes) | 200 to 1,400     | 565 to 1,765 | 650            | Ball Screw                  | ±60µm to ±8µm      | ±15µm to ±5µm        |
|                      | Long Travel Precision                                | 100 to 250 (3 sizes) | 200 to 2,000     | 503 to 2,388 | 650            | Linear Motor                | ±20µm to ±3µm      | ±15µm to ±2µm        |
| Micro                | Low Profile High Precision                           | 50 to 150 (4 sizes)  | 25 to 200        | 164 to 538   | 652            | Ball or Lead Screw          | ±23µm to ±8µm      | ±10µm to ±5µm        |
| Ultra                | Side Driven Open or Solid Frame Ultra High Precision | 200 to 600 (4 sizes) | 100 to 500       | 256 to 768   | 2,187          | Ball Screw,                 | ±10µm to ±3µm      | ±5µm to ±3µm         |
|                      |                                                      |                      |                  |              |                | Lead Screw, or Linear Motor | ±10µm to ±1µm      | ±5µm to ±0.5µm       |
| Z Wedge <sup>1</sup> | True Vertical Motion                                 | 100 to 200 (3 sizes) | 10 to 25         | 210 to 265   | 20             | Ball Screw                  | ±7µm to ±5µm       | ±2µm                 |
| ZP200                | 25 mm vertical Travel                                | 200                  | 25               | 200          | 75             | Ball Screw                  |                    |                      |
| Rotary               | Rotary Motion Ultra Precision                        | 100 to 200 (3 sizes) | 360 <sup>0</sup> | 130 to 230   | 250            | Direct Drive                | ±24 to ±12 arc sec | ±8.2 to ±4.1 arc sec |
|                      | Rotary Motion Precision High Load, High Torque       | 100 to 300 (4 sizes) | 360 <sup>0</sup> | 55 to 108    | 1000           | Worm Gear                   | 2 arc min          | 0.2 arc min          |
| 200 RT               | Rotary Motion Precision Low Profile                  | 100 to 300 (5 sizes) | 360 <sup>0</sup> | 46 TO 76.2   | 90             | Worm Drive                  | 2 arc min          | 0.2 arc min          |

### Crossed Roller & Ball Bearing Linear Slides

| Product Series | Feature (mm)            | Width (mm)                      | Travel (kg)       | Max. Load | Material              |
|----------------|-------------------------|---------------------------------|-------------------|-----------|-----------------------|
| SE             | Extended Travel         | 50 to 150 (4 sizes)             | 25 to 400         | 980       | Aluminum or Cast Iron |
| SP             | Limited Travel          | 50 to 150 (4 sizes)             | 25 to 150         | 395       | Aluminum or Cast Iron |
| SC & SK        | Crank & Knob Lead Screw | 50 to 150 (4 sizes)             | 25 to 100         | 395       | Aluminum or Cast Iron |
| SW             | Double "V" Low Profile  | 38 to 100 (3 sizes)             | 25 to 225         | 871       | Aluminum only         |
| 3500           | Miniature ball bearing  | 0.59 to 1.06 (inches) (4 sizes) | 0.5 to 4 (inches) | 30        | Aluminum              |
| 3900 & 4000    | Square profile          | 1.25 to 5 (inches) (8 sizes)    | 12.5 mm - 3       | 95        | Aluminum              |
| 4900           | Heavy duty              | 5 to 6 (inches) (3 sizes)       | 2 to 12 inches    | 140       | Aluminum              |

### Crossed Roller Bearing Sets

| Product Series | Feature        | Roller Diameter (mm) | Length (mm) | Maximum Load (kg) |
|----------------|----------------|----------------------|-------------|-------------------|
| RC             | Crossed Roller | 3 and 6              | 20 to 700   | 2,180             |

### Manual Positioners

| Product Series     | Feature (mm)                | Width (mm)                   | Travel (kg)         | Max. Load | Material |
|--------------------|-----------------------------|------------------------------|---------------------|-----------|----------|
| Drive Mechanisms   | Micrometers, digital        | —                            | —                   | —         | Aluminum |
| Subminiature Stage | Subminiature stages         | 11.2 mm                      | .125 to 0.5         | 12        | Aluminum |
| 3900 Drive         | Square profile              | 1.25 to 5 (inches) (8 sizes) | 12.5 mm -3          | 95        | Aluminum |
| 4000 Drive         | Heavy duty slides           | 5 to 6 (2 sizes)             | 2 to 12 (inches)    | 140       | Aluminum |
| 2500               | Tangent arm                 | 1.75 & 2.62 (2 sizes)        | 360 with 10 degrees | 10        | Aluminum |
| 10000/20000        | low profile worm gear drive | 4.75 inches                  | 360 degrees         | 50        | Aluminum |
| 30000              | Heavy load worm gear drives | 5 to 10 (inches) (8 sizes)   | 360 degrees         | 200       | Aluminum |

### Multi-Axis System 3U Integrated Chassis

| Product Series | Number of Axes | Controller | Amplifier Type | Power /Axis    | Input Voltage  |
|----------------|----------------|------------|----------------|----------------|----------------|
| 3U             | 1 to 4         | 5 Brands   | Linear & PWM   | 144 to 4,800 W | 115 to 230 Vac |

(1) Consult factory

## Frameless Motors & Gearmotors

### Servo Motors

| Product Series | Frame Size   | Windings (Vdc) | Length (mm) | Continuous Torque $T_c$ (Nm) | Maximum Speed (RPM) | Feedback |
|----------------|--------------|----------------|-------------|------------------------------|---------------------|----------|
| Frameless      | 32 to 254 mm | 12 to 600      | 20 to 100   | 0.044 to 58.0                | 30,000              | N/A      |

### Gearmotors

| Product Series                | Configuration | Frame Sizes                   | Cont. Torque (Nm) | Ratios                             | Backlash (arc minutes) | Gear Teeth           | IP Rating | Windings           | Feedback            |
|-------------------------------|---------------|-------------------------------|-------------------|------------------------------------|------------------------|----------------------|-----------|--------------------|---------------------|
| GM                            | In-Line       | 60 to 142 mm<br>NEMA 23 to 56 | 3 to 60           | 5, 7, 10<br>(3 ratios)             | < 10                   | Helical<br>Planetary | IP 65     | 160 Vdc<br>360 Vdc | Encoder<br>Resolver |
| DX<br>Servo Wheel             | In-Line       | 152 & 203 mm<br>Wheel         | 26 to 48          | 20 to 36<br>(4 ratios)             | N/A                    | Planetary            | N/A       | 24 Vdc<br>48 Vdc   | Encoder             |
| GM 50<br>Pancake<br>Gearmotor | In-Line       | 120.65                        | 2.0 to 19.8       | 10.51<br>42.47<br>100.65<br>152.51 | < 30                   | Spur                 | IP65      | 12 VDC<br>24 vdc   | Hall<br>Sensor      |

## Gearheads

### Gearheads

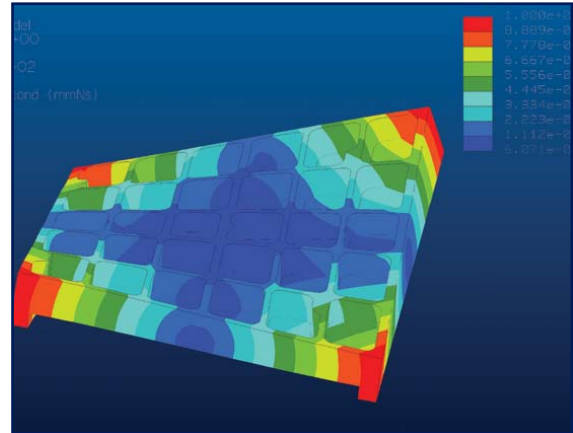
| Product Series  | Gear Teeth                          | Configuration               | Frame Sizes                                | Cont. Torque (Nm) | Ratios                  | Backlash (arc minutes) | IP Rating |
|-----------------|-------------------------------------|-----------------------------|--------------------------------------------|-------------------|-------------------------|------------------------|-----------|
| PS              | Helical<br>Planetary                | In-Line                     | 60 to 300 mm<br>(8 sizes)                  | 5 to 4,181        | 3 to 100<br>(12 ratios) | < 3                    | IP 65     |
| PX              | Helical<br>Planetary                | In-Line                     | 60 to 142 mm<br>NEMA 23 to 56<br>(3 sizes) | 18 to 158         | 3 to 100<br>(11 ratios) | < 8                    | IP 65     |
| PV              | Planetary                           | In-Line                     | 40 to 90 mm<br>(3 sizes)                   | 3.5 to 71         | 3 to 100<br>(16 ratios) | <10                    | IP64      |
| RS              | Helical Planetary<br>/ Spiral Bevel | Right Angle                 | 60 to 300 mm<br>(7 sizes)                  | 11 to 4,181       | 5 to 100<br>(9 ratios)  | < 4                    | IP 65     |
| RX              | Helical Planetary<br>/ Spur Bevel   | Right Angle                 | 60 to 115 mm<br>NEMA 23 to 42<br>(3 sizes) | 7 to 45           | 5 to 100<br>(9 ratios)  | < 14                   | IP 65     |
| RT              | Spiral Bevel<br>/ Helical           | Right Angle<br>Thru Bore    | 90 to 220 mm<br>(5 sizes)                  | 34 to 565         | 3 to 30<br>(5 ratios)   | < 4                    | IP 65     |
| RD              | Spiral Bevel<br>/ Helical           | Right Angle<br>Double Shaft | 90 to 220 mm<br>(5 sizes)                  | 23 to 565         | 1 to 30<br>(7 ratios)   | < 4                    | IP 65     |
| RB              | Spiral Bevel                        | Right Angle                 | 90 to 220 mm<br>(5 sizes)                  | 23 to 565         | 1 to 3<br>(3 ratios)    | < 4                    | IP 65     |
| NE              | Spur                                | In-Line                     | NEMA 23 to 42<br>(3 sizes)                 | 50 to 350         | 3 to 100<br>(9 ratios)  | < 10                   | IP54      |
| NR <sup>1</sup> | Bevel<br>/ Spur                     | Right Angle                 | NEMA 23 to 42<br>(3 sizes)                 | 50 to 350         | 1 to 100<br>(10 ratios) | < 15                   | IP54      |

(1) Consult factory

## Resources & Capabilities

### ● A Commitment to Excellence

Parker Bayside's Engineered Solutions Group is comprised of a uniquely qualified team of application, design and manufacturing engineers who are committed to provide Parker Bayside's customers with innovative, reliable and cost-effective positioning system solutions for their manufacturing processes.



"FEA" Simulation

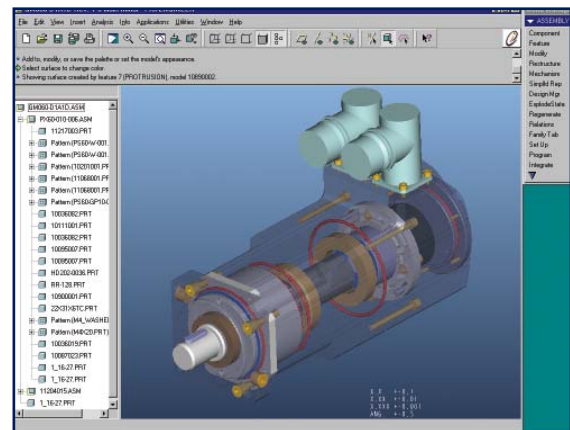
through a rigorous definition of system requirements, which in many cases we assist in developing. As partners, we may conduct various feasibility testing for verification of new ideas to meet challenging environmental conditions such as high vacuum, low magnetic field, tight space, high temperature and ground vibrations. These tests are conducted to assist us in providing you with our best possible recommended solution.

### ● Ideal Infrastructure

Parker Bayside's Engineered Solutions Group is supported by an effective, broad-based, corporate infrastructure. From one location, Parker Bayside designs and manufactures a wide range of motion control products, including linear positioning slides and stages, rails, motors, drives, controllers, gearheads and gearmotors. This capability provides an ideal infrastructure for cost-effective engineered solutions since they can be designed, built and integrated at one location into a single robust system.



Electronic Chassis



Pro / ENGINEER CAD Platform

### ● Professional Capabilities

Parker Bayside's Systems Solution Group strives to become your dependable motion control positioning solution provider, and play a strategic role in achieving your new system development objectives. We follow your needs from the very early stages of conceptual ideas,

### ● Strategic Partnership

Parker Bayside's Engineered Solutions Group has one main objective: to take your manufacturing process needs from concept to successful completion. Through an open channel of communication and joint planning, Parker Bayside's engineers will develop a cost-effective solution that meets or exceeds your expectations. Parker Bayside is looking forward to establishing a long-term strategic relationship with your company and project development team.

# Parker Bayside's Six Step Project Process

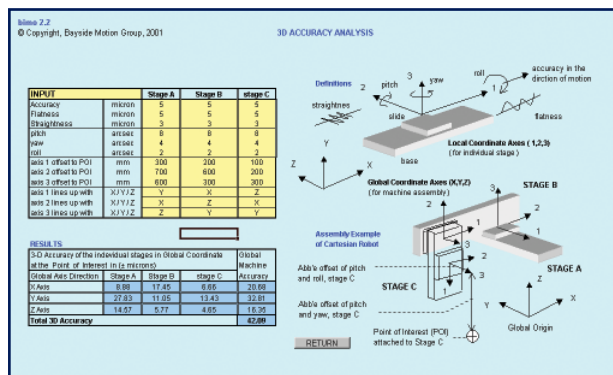
## 1 Understanding the Need

Whether your project is related to building semiconductor wafer processing machines or high-precision general manufacturing equipment, Parker Bayside's first objective is to understand your engineering needs.

Our industry specialists review your positioning specifications for completeness, clarity, consistency and feasibility, as well as the value that each required specification has toward the desired manufacturing process.

## 2 System Analysis

Once an engineered system and its requirements have been reviewed and defined, Parker Bayside's engineering team uses a proprietary software (BIMO) to gain a better qualitative understanding of the proposed system value as well as a quantitative understanding of optimal component sizing.



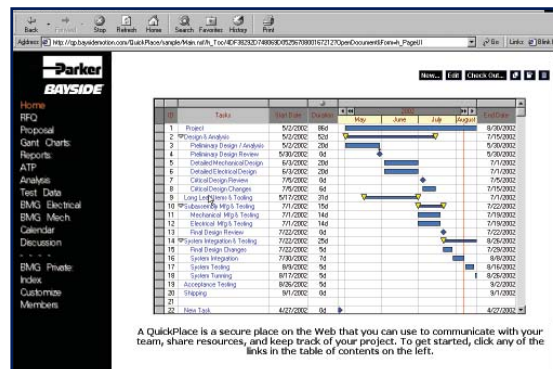
BIMO Analysis Tool

## 3 Solution Proposal

Equipped with an in-depth understanding of the need and a proposed solution, our system application engineers prepare a detailed document that highlights the requirements, cost effectiveness of various solution options, recommended configuration, selected components, price quotation, and delivery schedule.

## 4 Project Management

Each engineered system is assigned and led by a project manager who is responsible for ensuring that the project's process is begun and completed in a smooth, orderly and precise manner. To ensure accurate, up-to-date communication, the Project Manager utilizes a secured, web-based communication tool (QuickPlace) to keep all involved parties apprised of the project progress and details. The detail kept in the QuickPlace includes: Project Members, RFQ, Proposal, ATP, Gantt Charts, Tasks, Reports, System Analysis, Test results, Electrical Engineering, Mechanical Engineering and Discussion History.



View of QuickPlace

## 5 Acceptance Test

The Acceptance Test Procedure (ATP) is a mutually agreed upon document, which outlines the procedures, tools and methods used to verify that all project performances meet desired specifications. The acceptance test procedure is prepared well in advance to allow for the customer representatives to review it prior to their presence in this stage of the project.

## 6 After Sales Support

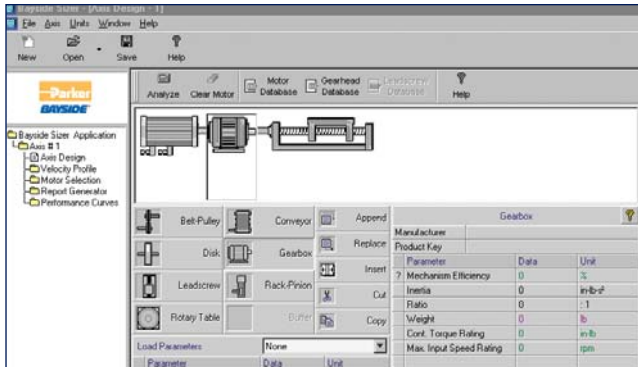
When the engineered system has been accepted by the customer, a Parker Bayside engineer is assigned to follow up the delivery at the customer's site. The engineer inspects the machine and powers it up. Training is also provided to the customer on site to assure proper readiness to start operation and maintain the machine.

Throughout the life cycle of the machine, Parker Bayside continuously monitors the status of the project and provides quick support when needed.



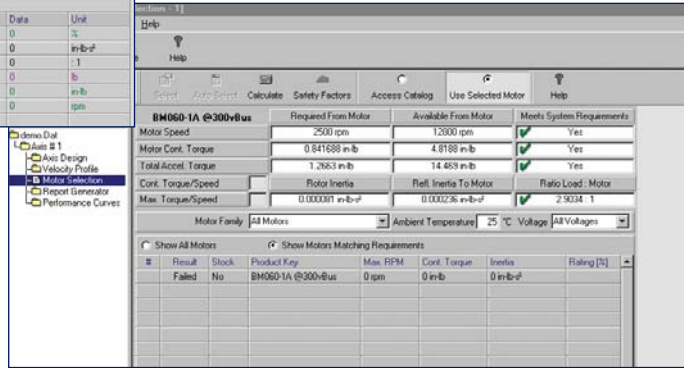
Acceptance Testing

## Motion Workbench



### Axis Design

Selection of components and entry of parameters to build an axis. The selection component will appear on screen as a graphical symbol.



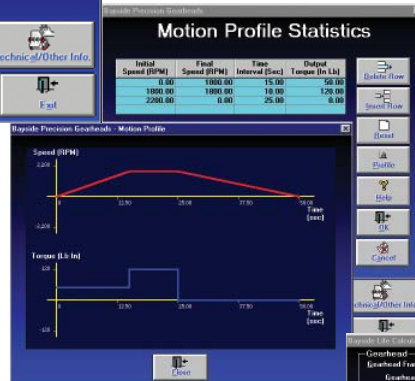
### Motor Selection

Selects motor that meets system requirements and generates report with performance curve.

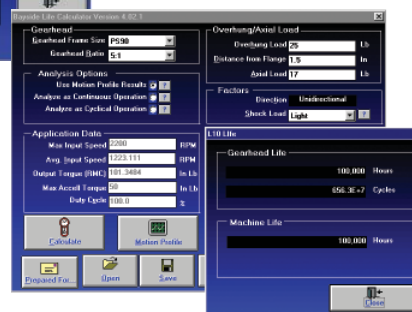
## Life Estimator



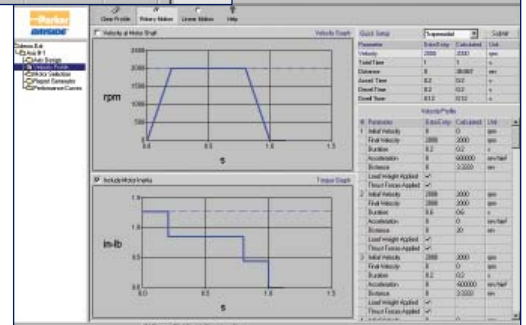
Entry of application data for speed, torque, duty cycle loads and shock.



**Profile** - Entry of data for a specific velocity profile for each selections of accel, decel and dwell. It is also shown graphically.



**L10 Life** - Creates detailed application report and gearhead life.



### Velocity Profile

Entry of data for a specific velocity profile. As data is entered for accel, decel and dwell, the profile is graphically shown.

# BIMO

(Parker Bayside Integrated Motion Optimizer)

bimo 2.2  
© Copyright, Bayside Motion Group, 2001

### SETTLING TIME ANALYSIS

**system requirements**

| unit | input |
|------|-------|
| hz   | 30    |
| -    | 0.1   |
| -    | 0.06  |
| kg   | 10    |
| N    | 20    |
| N    | 20    |
| %CV  | 0.01  |
| mm   | 0.001 |

**chart scale factors**

| unit | input |
|------|-------|
| N    | 0.1   |
| mm   | 1     |
| mm/s | 1     |

**settling time and distance**

| unit | results  |
|------|----------|
| sec  | 0.2868   |
| mm   | 428.6815 |
| sec  | 0.2868   |

**integration stability**

| unit | results |
|------|---------|
| sec  | 0.00013 |
| sec  | 0.00067 |

**estimated machine requirements**

| unit | results |
|------|---------|
| db   | 18.42   |
| N/mm | 3344.01 |
| hz   | 92.08   |

(assume 60 db/dec at resonance)

**motor requirements**

| unit | results |
|------|---------|
| N    | 63.61   |
| N    | 248.55  |
| N    | 0.07    |

RETURN

The dynamics and settling analysis assists in selecting the required motor forces needed to drive the stage in a motion profile, which is determined at the kinematic analysis phase.

bimo 2.2  
© Copyright, Bayside Motion Group, 2001

### MOTOR / AMPLIFIER SIZING

**force requirements**

| unit | transfer value |
|------|----------------|
| N    | 63.61          |
| N    | 248.55         |

(note: without coil mass and attraction)

**input company / motor selection**

| company | select model |
|---------|--------------|
| TRILOGY | IL-12-030-A1 |
| TRILOGY | IL-12-050-A1 |

**motor specifications**

| company / motor model | catalog      | specifications | valid options |
|-----------------------|--------------|----------------|---------------|
| TRILOGY               | IL-12-030-A1 | IL-06-075-A1   |               |
|                       |              | IL-06-075-A4   |               |
|                       |              | IL-06-100-A1   |               |
|                       |              | IL-06-100-A4   |               |
|                       |              | IL-12-050-A1   |               |
|                       |              | IL-12-050-A2   |               |
|                       |              | IL-12-050-A4   |               |
|                       |              | IL-12-075-A1   |               |
|                       |              | IL-12-075-A2   |               |
|                       |              | IL-12-075-A4   |               |
|                       |              | IL-12-100-A2   |               |
|                       |              | IL-12-100-A4   |               |
|                       |              | IL-18-030-A1   |               |

**motor temperature**

| unit | results |
|------|---------|
| C    | 76.11   |

**safety margins**

| unit | results |
|------|---------|
| %    | 19.48   |
| %    | -3.44   |
| %    | 41.45   |

**company:** TRILOGY **initial velocity:** 1500 mm/sec  
**crash velocity:** 54.01226 mm/sec  
**energy to absorbed:** 0.014587 joule

**motor:** IL-12-030-A4

**amplifier requirements**

| unit | results |
|------|---------|
| Amps | 7.57    |
| Amps | 29.59   |
| V    | 40.78   |

RETURN

The linear motor and amplifier analysis selects the motor that meets the force requirements obtained from the dynamic analysis.

The 3-dimensional accuracy analysis determines the effects of sensor stages parameters, assembly configuration and Abbe offsets on the overall accuracy of the machine.

bimo 2.2  
© Copyright, Bayside Motion Group, 2001

### 3D ACCURACY ANALYSIS

**INPUT**

|                      | Stage A | Stage B | stage C |
|----------------------|---------|---------|---------|
| Accuracy             | micron  | 5       | 5       |
| Flatness             | micron  | 5       | 5       |
| Straightness         | micron  | 3       | 3       |
| pitch                | arcsec  | 8       | 8       |
| yaw                  | arcsec  | 4       | 4       |
| roll                 | arcsec  | 2       | 2       |
| axis 1 offset to POI | mm      | 300     | 200     |
| axis 2 offset to POI | mm      | 700     | 600     |
| axis 3 offset to POI | mm      | 600     | 300     |
| axis 1 lines up with | X/Y/Z   | Y       | X       |
| axis 2 lines up with | X/Y/Z   | X       | Z       |
| axis 3 lines up with | X/Y/Z   | Z       | Y       |

**RESULTS**

| 3-D Accuracy of the individual stages in Global Coordinate at the Point of Interest in (z microns) | Global Machine Accuracy |
|----------------------------------------------------------------------------------------------------|-------------------------|
| Global Axis Direction                                                                              |                         |
| X Axis                                                                                             | 8.88                    |
| Y Axis                                                                                             | 27.83                   |
| Z Axis                                                                                             | 14.57                   |
| Total 3D Accuracy                                                                                  | 42.09                   |

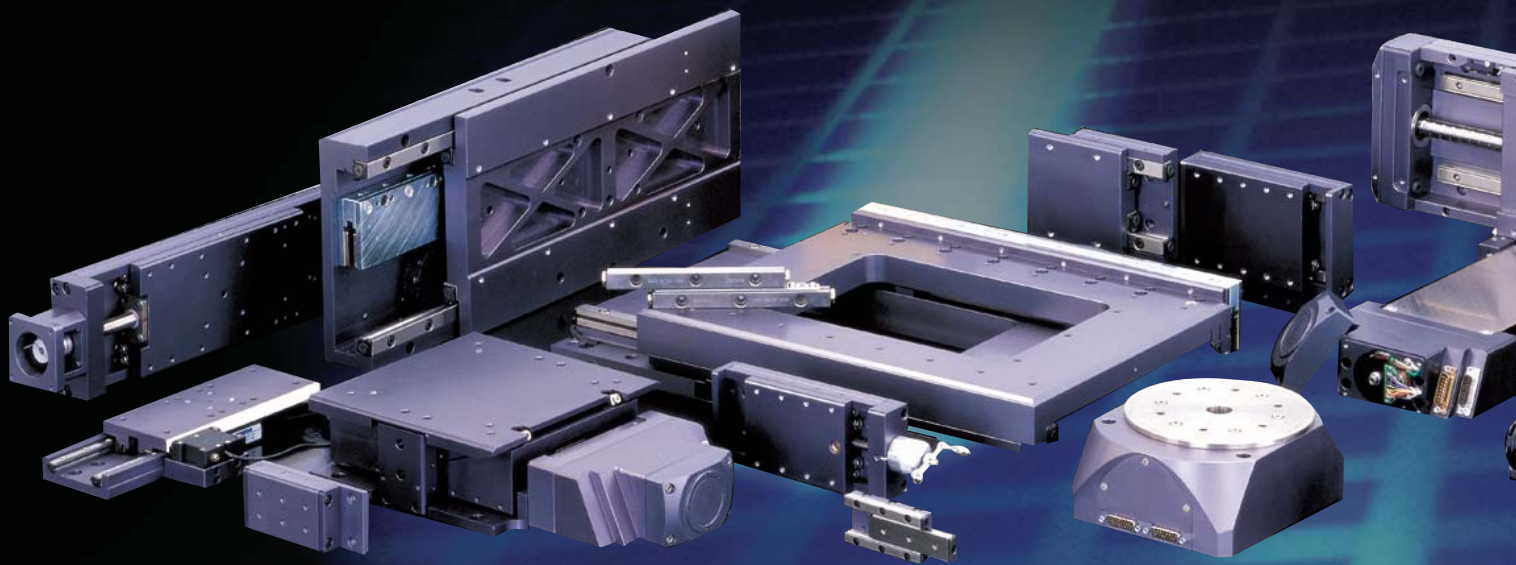
**Assembly Example of Cartesian Robot**

Abb'e offset of pitch and roll, stage C

Abb'e offset of pitch and yaw, stage C

Point of Interest (POI) attached to Stage C

RETURN



# POSITIONING STAGES AND SYSTEMS

DEVELOPING HIGHLY ENGINEERED LINEAR POSITIONING SYSTEMS THAT IMPROVE PRECISION,  
INCREASE PRODUCTIVITY AND CREATE VALUE FOR CUSTOMERS

## Linear and Rotary Positioning Stages

### Linear Positioning Stages

- 16 LM
- 40 Micro
- 52 Ultra

### Vertical Positioning Stages

- 66 ZP200

### Rotary Stages

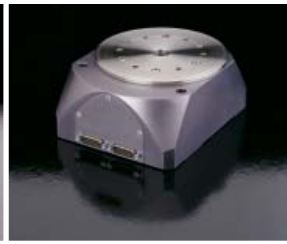
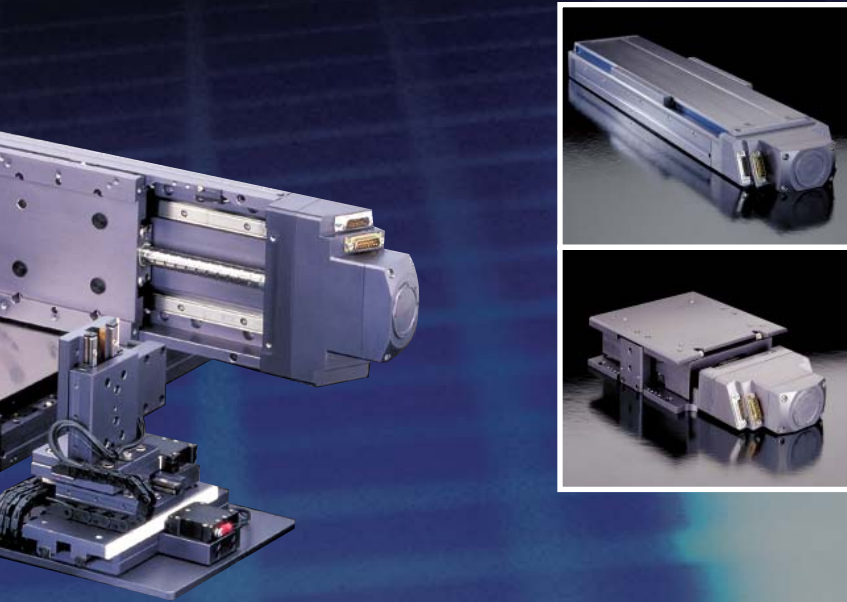
- 76 Direct Drive
- 92 Worm Drive
- 88 200 RT

### Manually Driven Slides & Stages

- 92 Linear Slides
- 102 Bearing Sets
- 108 Linear Positioning Stages
- 126 Rotary Positioning Stages

### Engineered Systems

- 132 Motion System Development





## XYZ Systems for Thin Film Precision Inspection Equipment

### APPLICATION CHALLENGE

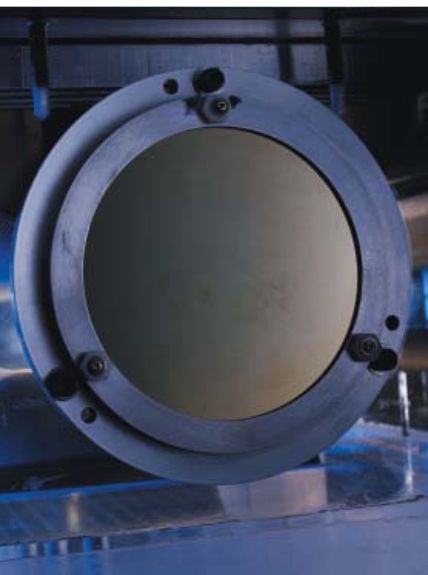
The customer, ThermoNoran, manufactured precision thin film inspection equipment used for inspecting wafers in the semiconductor industry. They required an XYZ motion platform to inspect the thickness and identify any irregularities of the thin film substrates being placed on wafers. To stay at the forefront of their industry, they needed better constant velocity and higher throughput. In addition, they needed to process 300mm wafers in their 200mm footprint.

### Smoothness and Constant Velocity for Scanning Axis.

The customer used lead screw stages with recirculating ball bearings for moving the scanning equipment. The stage they were using could not supply the required smoothness and constant velocity. The linear ball guides caused Z-axis jitter when operated at the required velocity and the lead screw limited the velocity capability.

### Accuracy, Repeatability and Resolution of Overall System.

The customer required an accuracy and repeatability better than 2 microns and a resolution better than 4 microns from the XYZ motion system.



## XYZ Systems for Automated Testing Equipment for MEMS

### APPLICATION CHALLENGE

In the future, the telecommunications market is going to demand transmission rates in the magnitude of terabits per second. Fiber optics manufacturers need to move from first-generation switching, where the core processing is done electronically (O-E-O), to next-generation switches, where the light signal is redirected optically, greatly increasing transmission rates while eliminating expensive electronics. At the heart of these all-optical systems are Micro-Electro-Mechanical Systems (MEMS), which consist of a system of tilting mirror arrays.

A manufacturer of optical switches used in the fiber optics industry was looking for ways to automate their process of checking the position and control of the MEMS used in their switches. Currently the process is being performed manually, in what can best be described as a laboratory environment. In order to meet the future demand for this cutting-edge technology, the process needed to be automated in order to increase throughput. Some of the requirements required for a system would be:

1. Smooth motion
2. No servo dither at desired position
3. Sub-micron resolution
4. Small operating envelope



## X-Y Scanning Application

### APPLICATION CHALLENGE

A customer was manufacturing an optical visual system that was to take dimensional measurements of a read-write head used in the semiconductor industry. The system was using step motors and controls to make small incremental movements, where an operator was to read the display and take measurements used to accept or reject the heads.

What was required of the positioning stage was 1 micron of accuracy over the full travel of the stage, and the ability to provide a resolution of 0.1 microns. The stage the customer was using was not able to provide the proper level of accuracy or provide the required resolution needed to make the incremental readings.

## PARKER BAYSIDE SOLUTION

**X Axis: (1) LM Positioning Stage with Ball Screw Drive and Integral Motor.**

**Y Axis: (1) High Accuracy Ultra Linear Motor Stage with Crossed Roller Bearings and Ironless Linear Motor.**

**Z Axis: (1) Z-Wedge Stage with a Ball Screw Drive and Integral Motor.**

The LM Positioning Stage (X Axis) is used for stepping motion where its high dynamic stiffness improves the systems settling capability. It featured an integrated motor, built directly onto the ball screw shaft, eliminating compliance between the screw and motor.

The High Accuracy Linear Motor Stage (Y Axis) provided the extremely smooth, uniform motion required. The stage prevented Z Axis jitter, while supporting a high constant velocity and accurate straightness/flatness specifications. Constant velocity was tested at 0.03% uniformity.

The Z-Wedge Stage (also featuring an integrated theta) provided vertical motion (Z-Axis) and excellent position repeatability and stability in a compact package.

The integrated motors reduced overall system size while maximizing dynamic stiffness.



## PARKER BAYSIDE SOLUTION

### X and Y Axis Linear Motor Stages for Laser Scribing

Parker Bayside is designing custom stages for the Laser scribing for large format substrates. Meeting the high throughput motion demands requires the use of linear motors, precision recirculating linear bearings and a flexure that provide exceptional stiffness with least jitter during constant velocity. A precision enclosed linear encoder mounted down the center right beside the linear motor reduces the affect of angular errors and achieves the highest stiffness. The linear encoder resolution was resolved to 1um to achieve the customer's constant velocity specifications.

The technology built into Parker Bayside's custom stages mounted on a granite base combines the benefits of high resolution motion with ability to achieve high speeds, high accelerations and least jitter. The weldment base structure and granite isolation was designed so that it transmits no floor vibrations that will affect the process during motion. The bridge structure was designed for ease of adjustment in the field of the bridge orthogonality to travel direction.



## PARKER BAYSIDE SOLUTION

### (2 ) Ultra 300mm lead screw stages

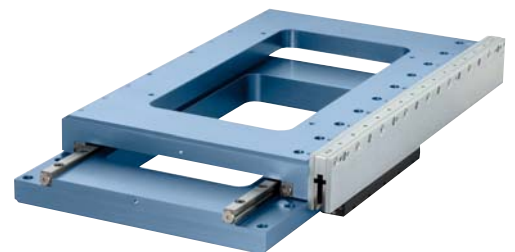
Two 300 mm Ultra lead screw stages were mounted in an X-Y configuration to provide the platform for the optical vision system. Non-contact optical encoders were used on the stage, which were certified to 1 micron total error and allowed for moves of 0.1 micron increments.

The Ultra stages feature crossed roller bearings, which provide repeatable, low-friction linear motion.

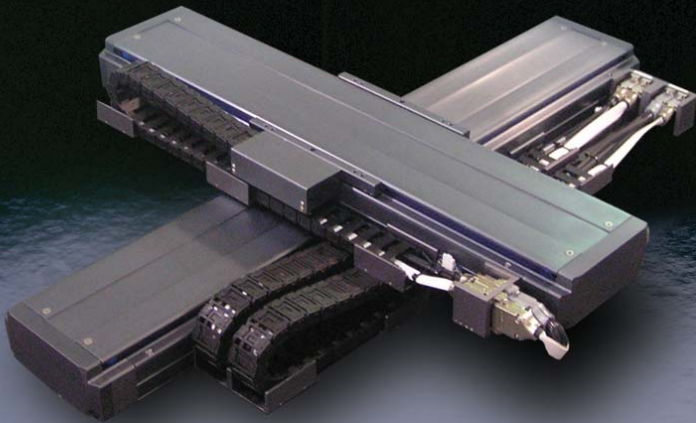
As opposed to a ball screw, where ball bearings are continuously coming in and out of pre-load, the advantage provided by the lead screw was smooth motion and high stiffness.

This solution can be used in test and measurement applications in the following industries:

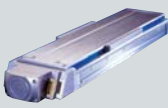
1. Electronics 2. Medical 3. Semiconductor



# LM Series: Linear Module



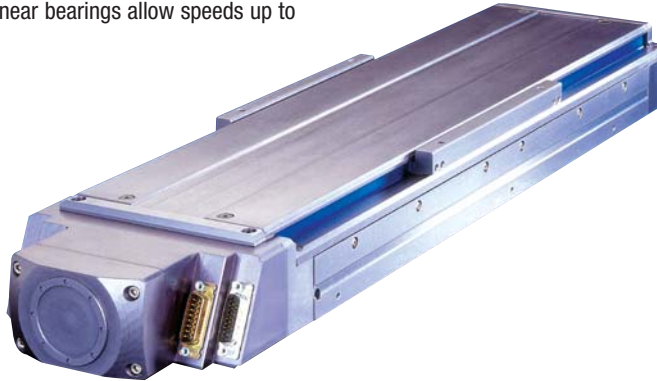
**Direct Drive Model**  
**Flanged Mount Model**  
**Linear Motor Drive Model**



# LM Series: Overview

## LM Direct Drive Model

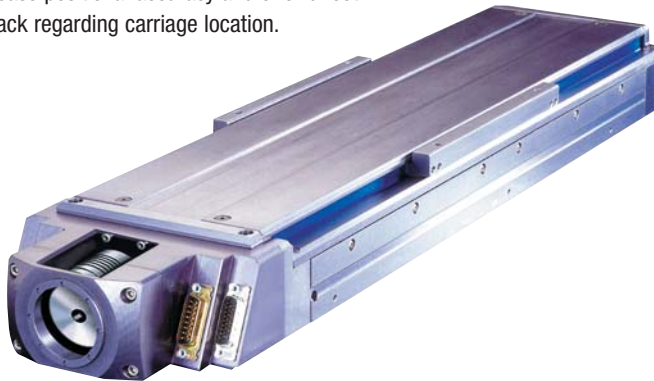
Features a revolutionary integral brushless DC motor and encoder design. This feature allows for a more compact overall package and improved system performance by eliminating backlash and wind-up. The high-performance ball screw and linear bearings allow speeds up to 1,300mm / sec.



- ▶ Integrated Brushless DC motor
- ▶ Rugged Compact Packaging
- ▶ Improved Dynamic Performance
- ▶ Pre-wired Linear or Rotary Encoders
- ▶ Pre-wired Limit Switches
- ▶ Complete Shielded Design
- ▶ All Elements Internally Located
- ▶ Lowest Profile in the Industry
- ▶ Integrated Brake

## LM Flanged Mount Model

Ideal for easy mounting to any servo or step motor. For vertically mounted applications, we offer the option of a shaft brake mounted to the ball screw. Linear encoders are also available to increase positional accuracy and offer direct positional feedback regarding carriage location.



- ▶ Flange Face to Mount NEMA 23 & 34, size 60 & 90mm Motors
- ▶ Pre-wired Limit Switches
- ▶ Pre-wired Linear Encoders
- ▶ Complete Shielded Design
- ▶ Integrated Brake

## LM Linear Motor Drive Model

Designed with an iron-based, brushless linear motor, the LM Linear Motor provides accelerations up to 4g's, with velocities to 3,000mm / sec. Recirculating linear guides provide exceptional load carrying capabilities. An integral, precision, non-contact linear encoder provides position feedback with high repeatability.



- ▶ Iron Core Linear Motor
- ▶ Peak Force 340 N for High Acceleration
- ▶ Pre-wired Integrated Cable Carrier
- ▶ Pre-wired Linear Encoder Internally Located
- ▶ Complete Shielded Design
- ▶ Pre-wired Limit Switches

# High Speeds, Long Travels

All LM Stages feature a compact, low-profile, totally enclosed aluminum alloy construction for high strength in a lightweight package. The stages are rugged enough for the toughest packaging and automotive requirements, yet accurate enough for precise semiconductor, electronics assembly, and indexing applications. LM stages provide state-of-the-art performance and efficiency at an exceptional value.

### A Stage and Motor all-in-one

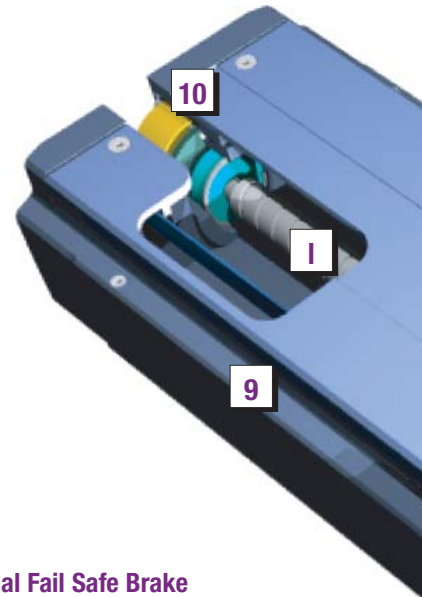
The **LM Direct Drive** is unique because the brushless servomotor is built directly onto the ball screw. This decreases overall length, while providing superior dynamic performance over conventional mounting methods. Eliminating the motor mounting and flexible coupling increases positioning accuracy and repeatability, providing greater reliability. A rotary encoder is also directly mounted to the ball screw, eliminating any build-up of errors.

### When to Use:

- ▶ High speed
- ▶ Long travels
- ▶ Low profile
- ▶ Compact
- ▶ Precision
- ▶ Fast move and settle
- ▶ High-duty cycle

### Applications:

- ▶ Material Handling
- ▶ Packaging
- ▶ Paper Converting
- ▶ Robotics
- ▶ Semiconductor



10

#### Optional Fail Safe Brake

Integrated into stage, ideal for vertical applications

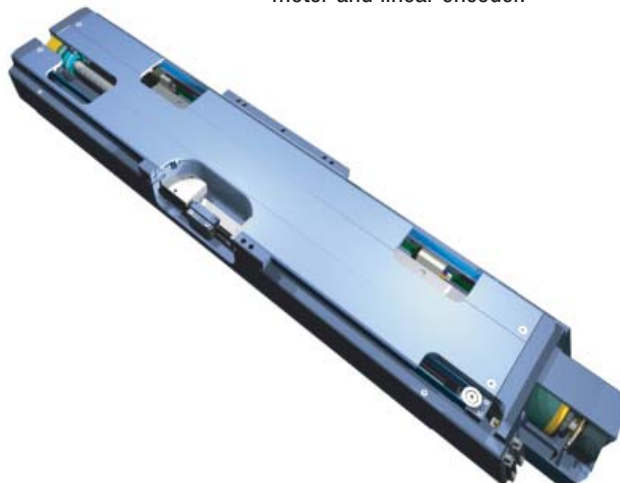
9

#### Low-Profile, Lightweight Aluminum Construction

fits into compact areas

### LM Linear Motor

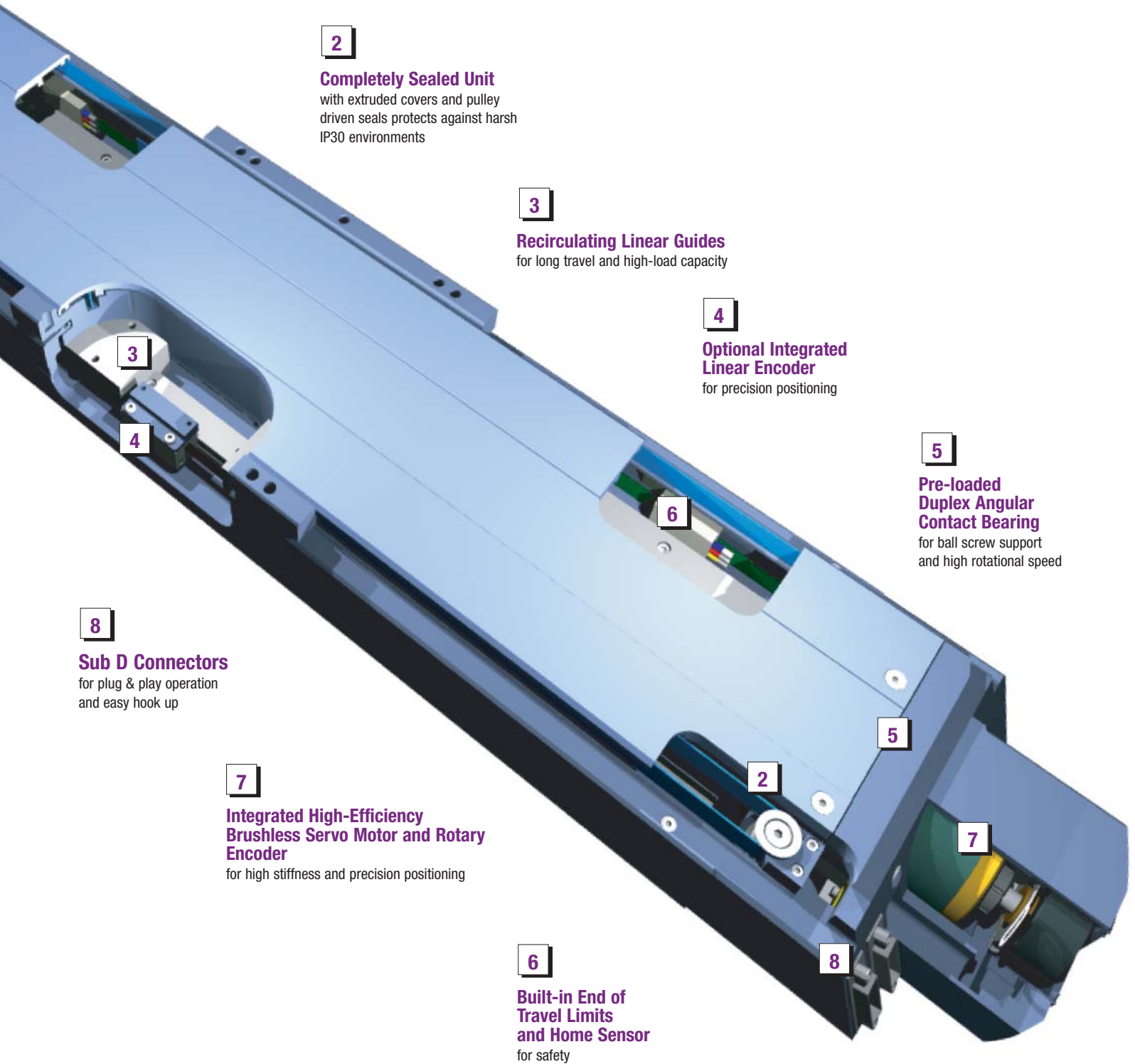
- ▶ With integrated brushless linear motor and linear encoder.



### LM Flange Mount

- ▶ For externally mounted servo or stepper motors.





1

**Precision Ball Screw**  
in 5, 10, and 16mm leads for  
high-speed operation

2

**Completely Sealed Unit**  
with extruded covers and pulley  
driven seals protects against harsh  
IP30 environments

3

**Recirculating Linear Guides**  
for long travel and high-load capacity

4

**Optional Integrated  
Linear Encoder**  
for precision positioning

5

**Pre-loaded  
Duplex Angular  
Contact Bearing**  
for ball screw support  
and high rotational speed

8

**Sub D Connectors**  
for plug & play operation  
and easy hook up

7

**Integrated High-Efficiency  
Brushless Servo Motor and Rotary  
Encoder**  
for high stiffness and precision positioning

2

6

**Built-in End of  
Travel Limits  
and Home Sensor**  
for safety

8

## Performance Specifications

| Model No.   | Travel |       | Maximum Velocity <sup>(1)</sup> |          | Maximum Load |       | Maximum Axial Load |       | Maximum Acceleration <sup>(1)</sup> |                        |
|-------------|--------|-------|---------------------------------|----------|--------------|-------|--------------------|-------|-------------------------------------|------------------------|
|             | (mm)   | (in)  | (mm/sec)                        | (in/sec) | (kgf)        | (lbf) | (kgf)              | (lbf) | (m/sec <sup>2</sup> )               | (in/sec <sup>2</sup> ) |
| LM100D-0050 | 50     | 1.97  | 1,000                           | 39       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100D-0100 | 100    | 3.94  | 1,000                           | 39       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100D-0150 | 150    | 5.91  | 1,000                           | 39       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100D-0200 | 200    | 7.87  | 1,000                           | 39       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100D-0250 | 250    | 9.84  | 1,000                           | 39       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100D-0300 | 300    | 11.81 | 1,000                           | 39       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100D-0350 | 350    | 13.78 | 860                             | 34       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100D-0400 | 400    | 15.75 | 720                             | 28       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100D-0450 | 450    | 17.72 | 610                             | 24       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100D-0500 | 500    | 19.69 | 525                             | 21       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100D-0550 | 550    | 21.65 | 455                             | 18       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100D-0600 | 600    | 23.62 | 395                             | 16       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |

## Accuracy Specifications

| Model No.   | Straightness/Flatness <sup>(2)</sup> |        | Accuracy <sup>(2, 3)</sup> |        | Repeatability <sup>(2)</sup> |          |
|-------------|--------------------------------------|--------|----------------------------|--------|------------------------------|----------|
|             | (microns)                            | (in)   | (microns)                  | (in)   | (microns)                    | (in)     |
| LM100D-0050 | 6                                    | 0.0002 | 12                         | 0.0005 | ± 4                          | ± 0.0002 |
| LM100D-0100 | 8                                    | 0.0003 | 12                         | 0.0005 | ± 4                          | ± 0.0002 |
| LM100D-0150 | 11                                   | 0.0004 | 14                         | 0.0006 | ± 4                          | ± 0.0002 |
| LM100D-0200 | 14                                   | 0.0006 | 18                         | 0.0007 | ± 4                          | ± 0.0002 |
| LM100D-0250 | 16                                   | 0.0006 | 22                         | 0.0009 | ± 4                          | ± 0.0002 |
| LM100D-0300 | 18                                   | 0.0007 | 27                         | 0.0011 | ± 4                          | ± 0.0002 |
| LM100D-0350 | 20                                   | 0.0008 | 30                         | 0.0012 | ± 4                          | ± 0.0002 |
| LM100D-0400 | 22                                   | 0.0009 | 36                         | 0.0014 | ± 4                          | ± 0.0002 |
| LM100D-0450 | 23                                   | 0.0009 | 40                         | 0.0016 | ± 4                          | ± 0.0002 |
| LM100D-0500 | 25                                   | 0.0010 | 43                         | 0.0017 | ± 4                          | ± 0.0002 |
| LM100D-0550 | 26                                   | 0.0010 | 47                         | 0.0019 | ± 4                          | ± 0.0002 |
| LM100D-0600 | 29                                   | 0.0011 | 51                         | 0.0020 | ± 4                          | ± 0.0002 |

(1) Based on 10mm lead ball screw.

(2) Specifications are based on the stage mounted to a flat granite surface and measured at 25mm above the center of the stage.

(3) Higher precision available please consult factory.

Note: Cable Options - All LM D products are available with standard motor and encoder cables.

## Inertia

| Model No.  | Screw Inertia             |                           |
|------------|---------------------------|---------------------------|
|            | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) |
| LM100D-050 | 0.03600                   | 0.00050                   |
| LM150D-100 | 0.04332                   | 0.00060                   |
| LM100D-150 | 0.05064                   | 0.00070                   |
| LM100D-200 | 0.05797                   | 0.00080                   |
| LM100D-250 | 0.06529                   | 0.00091                   |
| LM100D-300 | 0.07262                   | 0.00101                   |
| LM100D-350 | 0.07994                   | 0.00111                   |
| LM100D-400 | 0.08726                   | 0.00121                   |
| LM100D-450 | 0.09459                   | 0.00131                   |
| LM100D-500 | 0.10100                   | 0.00140                   |
| LM100D-550 | 0.10926                   | 0.00152                   |
| LM100D-600 | 0.11659                   | 0.00162                   |

## Brake

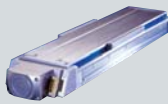
**Fail Safe Brake:**  
24 Vdc, 0.2 amps

## Motor Specifications

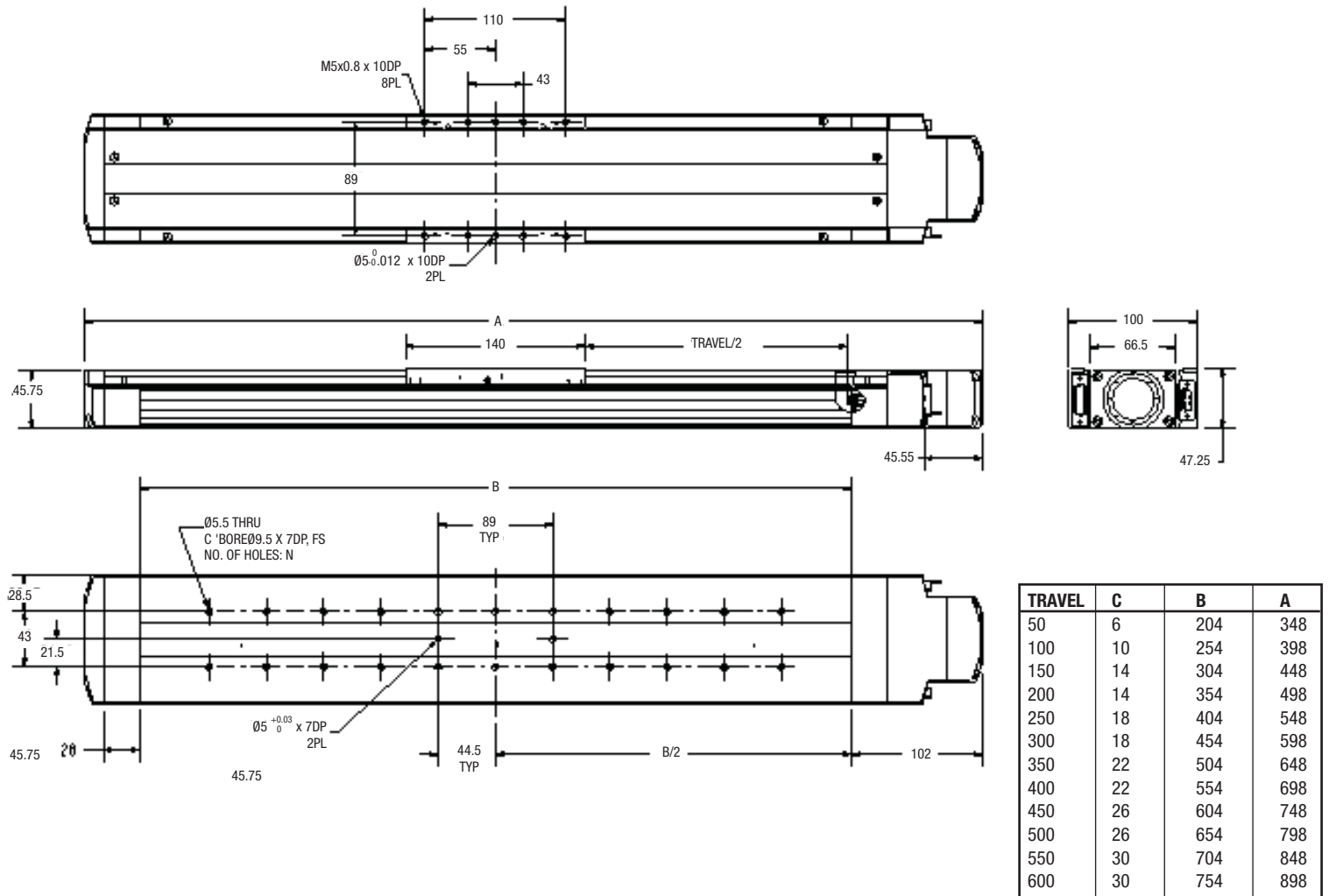
| K032 Frameless Motor with:             |                                 |       |
|----------------------------------------|---------------------------------|-------|
| Voltage (bus)                          | 160V                            | 300V  |
| K <sub>E</sub> (V/kRPM)                | 11.47                           | 23.15 |
| K <sub>T</sub> (Nm/amp)<br>(oz in/amp) | 0.11                            | 0.221 |
|                                        | 31.7                            | 62.4  |
| R <sub>L-L</sub> (ohms)                | 16.5                            | 66    |
| L <sub>L-L</sub> (mH)                  | 8.11                            | 33    |
| Pole                                   | 4                               | 4     |
| Rotor Inertia                          | 0.00871 gm cm sec <sup>2</sup>  |       |
|                                        | 0.000121 oz in sec <sup>2</sup> |       |

## Rotary Encoder Specifications

|                          |                                                                                       |
|--------------------------|---------------------------------------------------------------------------------------|
| <b>Resolution:</b>       | 2,000 Line                                                                            |
| <b>Electrical Input:</b> | 5 Vdc, 125mA maximum                                                                  |
| <b>Encoder Output:</b>   | Dual channel quadrature<br>Differential, TTL compatible<br>Frequency Response 125 KHz |



## Dimensions



| Model No.   | Travel |       | A                      |       | B                   |       | C  |
|-------------|--------|-------|------------------------|-------|---------------------|-------|----|
|             | (mm)   | (in)  | Overall Length<br>(mm) | (in)  | Base Length<br>(mm) | (in)  |    |
| LM100D-0050 | 50     | 1.97  | 348                    | 13.70 | 204                 | 8.03  | 6  |
| LM100D-0100 | 100    | 3.94  | 398                    | 15.67 | 254                 | 10.00 | 10 |
| LM100D-0150 | 150    | 5.91  | 448                    | 17.64 | 304                 | 11.97 | 14 |
| LM100D-0200 | 200    | 7.87  | 498                    | 19.61 | 354                 | 13.94 | 14 |
| LM100D-0250 | 250    | 9.84  | 548                    | 21.57 | 404                 | 15.91 | 18 |
| LM100D-0300 | 300    | 11.81 | 598                    | 23.54 | 454                 | 17.87 | 18 |
| LM100D-0350 | 350    | 13.78 | 648                    | 25.51 | 504                 | 19.84 | 22 |
| LM100D-0400 | 400    | 15.75 | 698                    | 27.48 | 554                 | 21.81 | 22 |
| LM100D-0450 | 450    | 17.72 | 748                    | 29.45 | 604                 | 23.78 | 26 |
| LM100D-0500 | 500    | 19.69 | 798                    | 31.42 | 654                 | 25.75 | 26 |
| LM100D-0550 | 550    | 21.65 | 848                    | 33.39 | 704                 | 27.72 | 30 |
| LM100D-0600 | 600    | 23.62 | 898                    | 35.35 | 754                 | 29.69 | 30 |

## Performance Specifications

| Model No.   | Travel |       | Maximum Velocity <sup>(1)</sup> |          | Maximum Load |       | Maximum Axial Load |       | Maximum Acceleration <sup>(1)</sup> |                        |
|-------------|--------|-------|---------------------------------|----------|--------------|-------|--------------------|-------|-------------------------------------|------------------------|
|             | (mm)   | (in)  | (mm/sec)                        | (in/sec) | (kgf)        | (lbf) | (kgf)              | (lbf) | (m/sec <sup>2</sup> )               | (in/sec <sup>2</sup> ) |
| LM100F-0050 | 50     | 1.97  | 1,000                           | 39       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100F-0100 | 100    | 3.94  | 1,000                           | 39       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100F-0150 | 150    | 5.91  | 1,000                           | 39       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100F-0200 | 200    | 7.87  | 1,000                           | 39       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100F-0250 | 250    | 9.84  | 1,000                           | 39       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100F-0300 | 300    | 11.81 | 1,000                           | 39       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100F-0350 | 350    | 13.78 | 860                             | 34       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100F-0400 | 400    | 15.75 | 720                             | 28       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100F-0450 | 450    | 17.72 | 610                             | 24       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100F-0500 | 500    | 19.69 | 525                             | 21       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100F-0550 | 550    | 21.65 | 455                             | 18       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |
| LM100F-0600 | 600    | 23.62 | 395                             | 16       | 170          | 375   | 90                 | 198   | 20                                  | 787                    |

## Accuracy Specifications

| Model No.   | Straightness/Flatness <sup>(2)</sup> |        | Accuracy <sup>(2,3)</sup> |        | Repeatability <sup>(2)</sup> |          |
|-------------|--------------------------------------|--------|---------------------------|--------|------------------------------|----------|
|             | (microns)                            | (in)   | (microns)                 | (in)   | (microns)                    | (in)     |
| LM100F-0050 | 6                                    | 0.0002 | 12                        | 0.0005 | ± 4                          | ± 0.0002 |
| LM100F-0100 | 8                                    | 0.0003 | 12                        | 0.0005 | ± 4                          | ± 0.0002 |
| LM100F-0150 | 11                                   | 0.0004 | 14                        | 0.0006 | ± 4                          | ± 0.0002 |
| LM100F-0200 | 14                                   | 0.0006 | 18                        | 0.0007 | ± 4                          | ± 0.0002 |
| LM100F-0250 | 16                                   | 0.0006 | 22                        | 0.0009 | ± 4                          | ± 0.0002 |
| LM100F-0300 | 18                                   | 0.0007 | 27                        | 0.0011 | ± 4                          | ± 0.0002 |
| LM100F-0350 | 20                                   | 0.0008 | 30                        | 0.0012 | ± 4                          | ± 0.0002 |
| LM100F-0400 | 22                                   | 0.0009 | 36                        | 0.0014 | ± 4                          | ± 0.0002 |
| LM100F-0450 | 23                                   | 0.0009 | 40                        | 0.0016 | ± 4                          | ± 0.0002 |
| LM100F-0500 | 25                                   | 0.0010 | 43                        | 0.0017 | ± 4                          | ± 0.0002 |
| LM100F-0550 | 26                                   | 0.0010 | 47                        | 0.0019 | ± 4                          | ± 0.0002 |
| LM100F-0600 | 29                                   | 0.0011 | 51                        | 0.0020 | ± 4                          | ± 0.0002 |

(1) Based on 10mm lead ball screw.

(2) Specifications are based on the stage mounted to a flat granite surface and measured at 25mm above the center of the stage.

(3) Higher precision available please consult factory.

Note: Cable Options - All LM F products are available with standard motor and encoder cables.

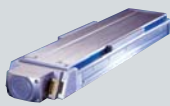
## Inertia

| Model No.   | Coupling Inertia          |                           | Screw Inertia             |                           |
|-------------|---------------------------|---------------------------|---------------------------|---------------------------|
|             | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) |
| LM100F-0050 | 0.0255                    | 0.000354                  | 0.03506                   | 0.00050                   |
| LM100F-0100 | 0.0255                    | 0.000354                  | 0.04238                   | 0.00060                   |
| LM100F-0150 | 0.0255                    | 0.000354                  | 0.04970                   | 0.00070                   |
| LM100F-0200 | 0.0255                    | 0.000354                  | 0.05703                   | 0.00080                   |
| LM100F-0250 | 0.0255                    | 0.000354                  | 0.06444                   | 0.00091                   |
| LM100F-0300 | 0.0255                    | 0.000354                  | 0.07168                   | 0.00101                   |
| LM100F-0350 | 0.0255                    | 0.000354                  | 0.07900                   | 0.00111                   |
| LM100F-0400 | 0.0255                    | 0.000354                  | 0.08632                   | 0.00121                   |
| LM100F-0450 | 0.0255                    | 0.000354                  | 0.09365                   | 0.00131                   |
| LM100F-0500 | 0.0255                    | 0.000354                  | 0.10100                   | 0.00140                   |
| LM100F-0550 | 0.0255                    | 0.000354                  | 0.10832                   | 0.0152                    |
| LM100F-0600 | 0.0255                    | 0.000354                  | 0.11565                   | 0.00162                   |

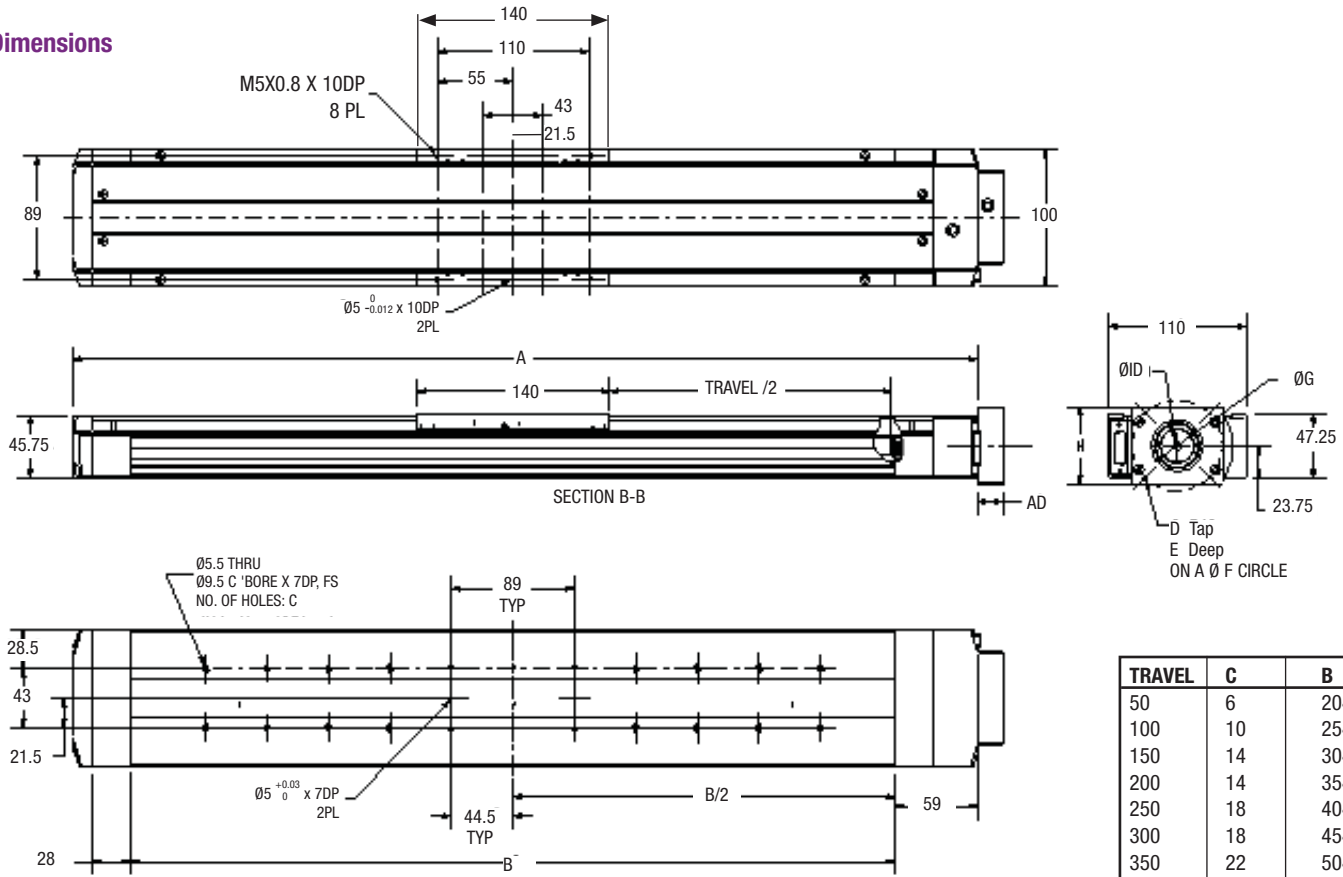
## Brake

## Fail Safe Brake:

24 Vdc, 0.2 amps



## Dimensions



\*AD DIMENSION DEPENDS ON MOTOR SELECTION

| TRAVEL | C  | B   | A   |
|--------|----|-----|-----|
| 50     | 6  | 204 | 305 |
| 100    | 10 | 254 | 355 |
| 150    | 14 | 304 | 405 |
| 200    | 14 | 354 | 455 |
| 250    | 18 | 404 | 505 |
| 300    | 18 | 454 | 555 |
| 350    | 22 | 504 | 605 |
| 400    | 22 | 554 | 655 |
| 450    | 26 | 604 | 705 |
| 500    | 26 | 654 | 755 |
| 550    | 30 | 704 | 805 |
| 600    | 30 | 754 | 855 |

| Model No.   | Travel |       | A                      |       | B                   |       | C  |
|-------------|--------|-------|------------------------|-------|---------------------|-------|----|
|             | (mm)   | (in)  | Overall Length<br>(mm) | (in)  | Base Length<br>(mm) | (in)  |    |
| LM100F-0050 | 50     | 1.97  | 305                    | 12.01 | 204                 | 8.03  | 6  |
| LM100F-0100 | 100    | 3.94  | 355                    | 13.98 | 254                 | 10.00 | 10 |
| LM100F-0150 | 150    | 5.91  | 405                    | 15.94 | 304                 | 11.97 | 14 |
| LM100F-0200 | 200    | 7.87  | 455                    | 17.91 | 354                 | 13.94 | 14 |
| LM100F-0250 | 250    | 9.84  | 505                    | 19.88 | 404                 | 15.91 | 18 |
| LM100F-0300 | 300    | 11.81 | 555                    | 21.85 | 454                 | 17.87 | 18 |
| LM100F-0350 | 350    | 13.78 | 605                    | 23.82 | 504                 | 19.84 | 22 |
| LM100F-0400 | 400    | 15.75 | 655                    | 25.79 | 554                 | 21.81 | 22 |
| LM100F-0450 | 450    | 17.72 | 705                    | 27.76 | 604                 | 23.78 | 26 |
| LM100F-0500 | 500    | 19.69 | 755                    | 29.72 | 654                 | 25.75 | 26 |
| LM100F-0550 | 550    | 21.65 | 805                    | 31.69 | 704                 | 27.72 | 30 |
| LM100F-0600 | 600    | 23.62 | 855                    | 33.66 | 754                 | 29.69 | 30 |

## Coupling

| Motor Mounting | Coupling I.D. |       |
|----------------|---------------|-------|
|                | (mm)          | (in)  |
| NEMA 23        | 6.35          | 0.25  |
| NEMA 34        | 9.52          | 0.375 |
| NEMA 34        | 12.7          | 0.5   |

| Motor   | D      | E    |       | F      |       | G      |       | AD   |       |
|---------|--------|------|-------|--------|-------|--------|-------|------|-------|
|         |        | (mm) | (in)  | (mm)   | (in)  | (mm)   | (in)  | (mm) | (in)  |
| NEMA 23 | M4X0.7 | 8.5  | 0.335 | 66.675 | 2.625 | 38.1   | 1.5   | 19   | 0.748 |
| NEMA 34 | M5X0.8 | 10   | 0.394 | 98.425 | 3.875 | 73.025 | 2.875 | 25   | 0.984 |
| BM60    | M5X0.8 | 10   | 0.394 | 70     | 2.756 | 50     | 1.969 | 19   | 0.748 |
| BM90    | M6X1.0 | 12   | 0.472 | 100    | 3.937 | 80     | 3.15  | 25   | 0.984 |

## Motor Specifications

| K044 Frameless Motor with: |                                                                |      |
|----------------------------|----------------------------------------------------------------|------|
| Voltage                    | 160V                                                           | 300V |
| $K_{EL-L}$ (V/kRPM)        | 23.5                                                           | 46.9 |
| $K_{TL-L}$ (Nm/amp)        | 0.22                                                           | 0.45 |
| (oz in/amp)                | 31.7                                                           | 62.4 |
| $R_{L-L}$ (ohms)           | 7.7                                                            | 30.8 |
| $L_{L-L}$ (mH)             | 8                                                              | 32   |
| Pole                       | 6                                                              | 6    |
| Rotor Inertia              | 0.044 gm cm sec <sup>2</sup><br>0.00061 oz in sec <sup>2</sup> |      |

## Rotary Encoder Specifications

|                          |                                                                                       |
|--------------------------|---------------------------------------------------------------------------------------|
| <b>Resolution:</b>       | 2,000 Line                                                                            |
| <b>Electrical Input:</b> | 5 Vdc, 60 ma maximum                                                                  |
| <b>Encoder Output:</b>   | Dual channel quadrature<br>Differential, TTL compatible<br>Frequency Response 500 KHz |

## Brake

|                             |             |             |  |
|-----------------------------|-------------|-------------|--|
| <b>Fail Safe Brake:</b>     |             |             |  |
| 24 Vdc, 0.2 amps            |             |             |  |
| <b>Brake Holding Force:</b> |             |             |  |
| Lead (mm)                   | Force (kgf) | Force (lbf) |  |
| 5                           | 38          | 86          |  |
| 10                          | 19          | 43          |  |
| 16                          | 12          | 27          |  |

## Inertia

| Model No.   | Screw Inertia             |                           |
|-------------|---------------------------|---------------------------|
|             | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) |
| LM150D-200  | 0.2057                    | 0.0029                    |
| LM150D-300  | 0.2582                    | 0.0036                    |
| LM150D-400  | 0.3108                    | 0.0043                    |
| LM150D-500  | 0.3634                    | 0.0051                    |
| LM150D-600  | 0.4159                    | 0.0058                    |
| LM150D-700  | 0.4685                    | 0.0065                    |
| LM150D-800  | 0.5210                    | 0.0072                    |
| LM150D-900  | 0.5736                    | 0.0080                    |
| LM150D-1000 | 0.6261                    | 0.0087                    |
| LM150D-1200 | 0.7312                    | 0.0102                    |
| LM150D-1400 | 0.8363                    | 0.0116                    |

## Performance Specifications

| Model No.   | Travel |       | Maximum Velocity <sup>(1)</sup> |          | Maximum Load |       | Maximum Axial Load |       | Maximum Acceleration <sup>(1)</sup> |                        |
|-------------|--------|-------|---------------------------------|----------|--------------|-------|--------------------|-------|-------------------------------------|------------------------|
|             | (mm)   | (in)  | (mm/sec)                        | (in/sec) | (kgf)        | (lbf) | (kgf)              | (lbf) | (m/sec <sup>2</sup> )               | (in/sec <sup>2</sup> ) |
| LM150D-200  | 200    | 7.87  | 1,300                           | 51       | 650          | 1,434 | 209                | 460   | 29                                  | 1,142                  |
| LM150D-300  | 300    | 11.81 | 1,300                           | 51       | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150D-400  | 400    | 15.74 | 1,300                           | 51       | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150D-500  | 500    | 19.69 | 1,190                           | 46.9     | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150D-600  | 600    | 23.62 | 900                             | 35.4     | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150D-700  | 700    | 27.56 | 700                             | 27.6     | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150D-800  | 800    | 31.49 | 560                             | 22.1     | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150D-900  | 900    | 35.43 | 460                             | 18.1     | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150D-1000 | 1,000  | 39.37 | 385                             | 15.2     | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150D-1200 | 1,200  | 47.24 | 280                             | 11.5     | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150D-1400 | 1,400  | 55.12 | 215                             | 8.5      | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |

## Accuracy Specifications

| Model No.   | Straightness/Flatness <sup>(2)</sup> |        | Accuracy <sup>(2, 3)</sup> |        | Repeatability <sup>(2)</sup> |          |
|-------------|--------------------------------------|--------|----------------------------|--------|------------------------------|----------|
|             | (microns)                            | (in)   | (microns)                  | (in)   | (microns)                    | (in)     |
| LM150D-200  | 15                                   | 0.0006 | 15                         | 0.0006 | ± 5                          | ± 0.0002 |
| LM150D-300  | 18                                   | 0.0007 | 30                         | 0.0012 | ± 5                          | ± 0.0002 |
| LM150D-400  | 22                                   | 0.0008 | 32                         | 0.0013 | ± 5                          | ± 0.0002 |
| LM150D-500  | 25                                   | 0.0010 | 54                         | 0.0021 | ± 5                          | ± 0.0002 |
| LM150D-600  | 27                                   | 0.0011 | 57                         | 0.0022 | ± 5                          | ± 0.0002 |
| LM150D-700  | 30                                   | 0.0012 | 66                         | 0.0026 | ± 5                          | ± 0.0002 |
| LM150D-800  | 32                                   | 0.0012 | 76                         | 0.0030 | ± 5                          | ± 0.0002 |
| LM150D-900  | 34                                   | 0.0013 | 90                         | 0.0035 | ± 5                          | ± 0.0002 |
| LM150D-1000 | 48                                   | 0.0019 | 100                        | 0.0039 | ± 5                          | ± 0.0002 |
| LM150D-1200 | 72                                   | 0.0028 | 120                        | 0.0047 | ± 5                          | ± 0.0002 |
| LM150D-1400 | 94                                   | 0.0037 | 140                        | 0.0055 | ± 5                          | ± 0.0002 |

(1) Based on 16mm lead ball screw.

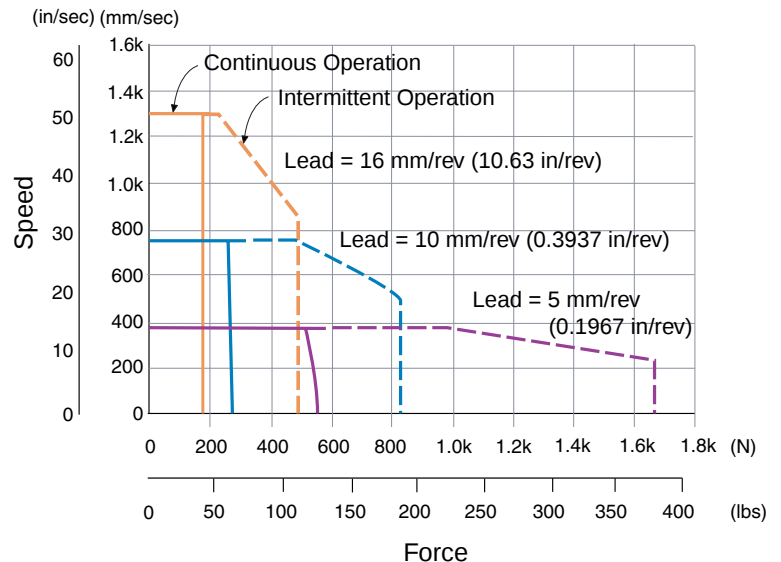
(2) Specifications are based on the stage mounted to a flat granite surface and measured at 25mm above the center of the stage.

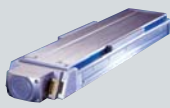
(3) Higher precision available please consult factory.

Note: Cable Options - All LM D products are available with standard motor and encoder cables.

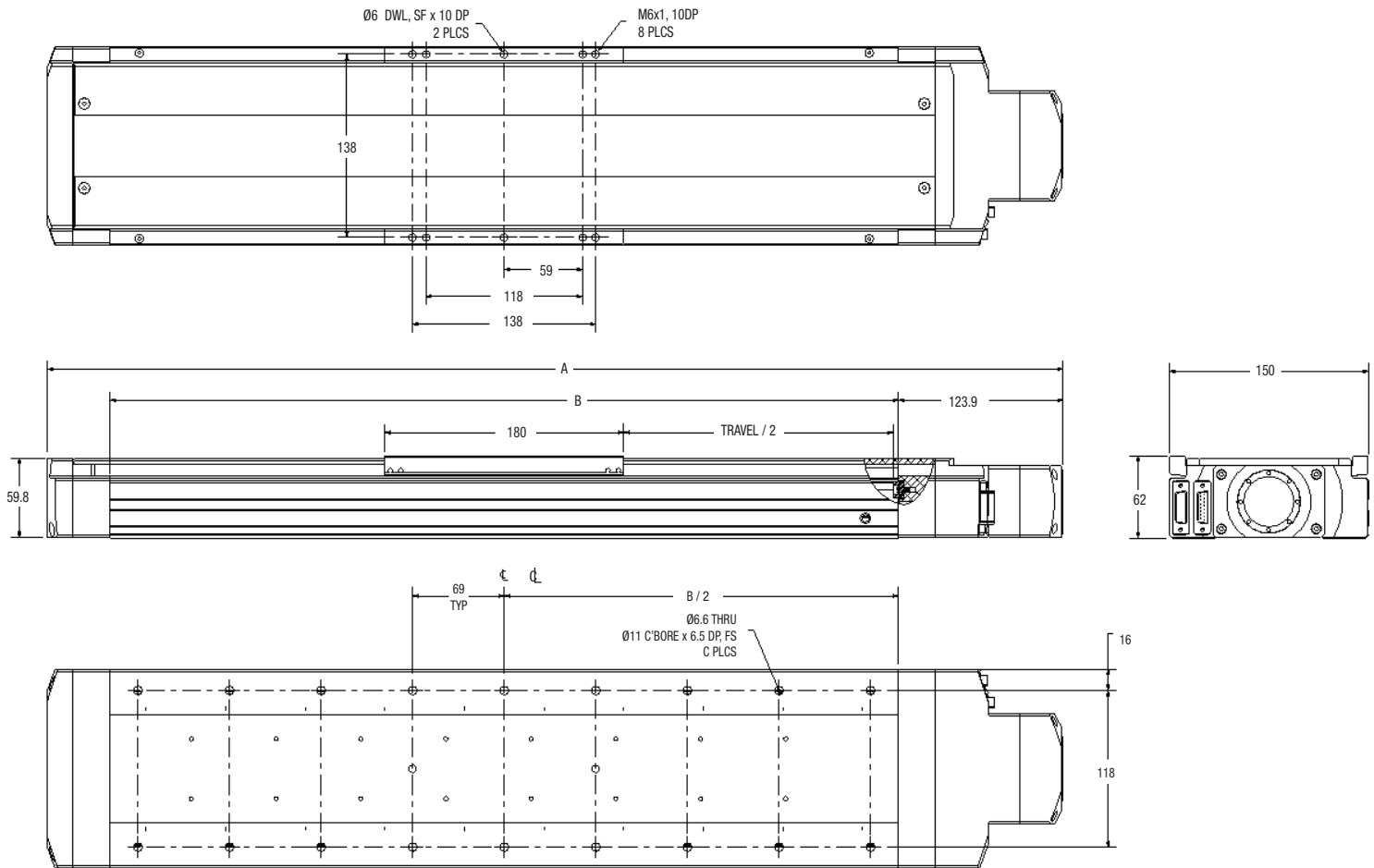
## LM Direct Drive Speed vs. Force Analysis

(Maximum velocity may be limited by ball screw. See Performance Specifications above.)





## Dimensions



| Model No.   | Travel |       | A<br>Overall Length |       | B<br>Base Length |       | C<br># of Holes | Stage Weight |       | Moving Slide Weight |       |
|-------------|--------|-------|---------------------|-------|------------------|-------|-----------------|--------------|-------|---------------------|-------|
|             | (mm)   | (in)  | (mm)                | (in)  | (mm)             | (in)  |                 | (kgf)        | (lbf) | (kgf)               | (lbf) |
| LM150D-200  | 200    | 7.87  | 565                 | 22.24 | 394              | 15.51 | 10              | 7.85         | 17.3  | 1.92                | 4.24  |
| LM150D-300  | 300    | 11.81 | 665                 | 26.18 | 494              | 19.45 | 14              | 9.39         | 20.7  | 1.92                | 4.24  |
| LM150D-400  | 400    | 15.75 | 765                 | 30.11 | 594              | 23.39 | 18              | 10.88        | 24.0  | 1.92                | 4.24  |
| LM150D-500  | 500    | 19.69 | 865                 | 34.05 | 694              | 27.32 | 18              | 12.38        | 27.3  | 1.92                | 4.24  |
| LM150D-600  | 600    | 23.62 | 965                 | 37.99 | 794              | 31.26 | 22              | 13.92        | 30.7  | 1.92                | 4.24  |
| LM150D-700  | 700    | 27.56 | 1,065               | 41.93 | 894              | 35.20 | 26              | 15.42        | 34.0  | 1.92                | 4.24  |
| LM150D-800  | 800    | 31.50 | 1,165               | 45.86 | 994              | 39.13 | 26              | 16.92        | 37.3  | 1.92                | 4.24  |
| LM150D-900  | 900    | 35.43 | 1,265               | 49.80 | 1,094            | 43.07 | 30              | 18.46        | 40.7  | 1.92                | 4.24  |
| LM150D-1000 | 1,000  | 39.37 | 1,365               | 53.74 | 1,194            | 47.01 | 34              | 19.95        | 44.0  | 1.92                | 4.24  |
| LM150D-1200 | 1,200  | 47.24 | 1,565               | 61.61 | 1,394            | 54.88 | 38              | 22.99        | 50.7  | 1.92                | 4.24  |
| LM150D-1400 | 1,400  | 55.12 | 1,765               | 69.48 | 1,594            | 62.76 | 46              | 25.99        | 57.3  | 1.92                | 4.24  |

## Performance Specifications

| Model No.   | Travel |       | Maximum Velocity <sup>(1)</sup> |          | Maximum Load |       | Maximum Axial Load |       | Maximum Acceleration <sup>(1)</sup> |                        |
|-------------|--------|-------|---------------------------------|----------|--------------|-------|--------------------|-------|-------------------------------------|------------------------|
|             | (mm)   | (in)  | (mm/sec)                        | (in/sec) | (kgf)        | (lbf) | (kgf)              | (lbf) | (m/sec <sup>2</sup> )               | (in/sec <sup>2</sup> ) |
| LM150F-200  | 200    | 7.87  | 1,300                           | 51       | 650          | 1,434 | 209                | 460   | 29                                  | 1,142                  |
| LM150F-300  | 300    | 11.81 | 1,300                           | 51       | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150F-400  | 400    | 15.74 | 1,300                           | 51       | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150F-500  | 500    | 19.69 | 1,190                           | 46.9     | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150F-600  | 600    | 23.62 | 900                             | 35.4     | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150F-700  | 700    | 27.56 | 700                             | 27.6     | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150F-800  | 800    | 31.49 | 560                             | 22.1     | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150F-900  | 900    | 35.43 | 460                             | 18.1     | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150F-1000 | 1,000  | 39.37 | 385                             | 15.2     | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150F-1200 | 1,200  | 47.24 | 280                             | 11.0     | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |
| LM150F-1400 | 1,400  | 55.12 | 215                             | 8.5      | 650          | 1,433 | 209                | 460   | 29                                  | 1,142                  |

## Accuracy Specifications

| Model No.   | Straightness/Flatness <sup>(2)</sup> |        | Accuracy <sup>(2, 3)</sup> |        | Repeatability <sup>(2)</sup> |          |
|-------------|--------------------------------------|--------|----------------------------|--------|------------------------------|----------|
|             | (microns)                            | (in)   | (microns)                  | (in)   | (microns)                    | (in)     |
| LM150F-200  | 15                                   | 0.0006 | 15                         | 0.0006 | ± 5                          | ± 0.0002 |
| LM150F-300  | 18                                   | 0.0007 | 30                         | 0.0012 | ± 5                          | ± 0.0002 |
| LM150F-400  | 22                                   | 0.0008 | 32                         | 0.0013 | ± 5                          | ± 0.0002 |
| LM150F-500  | 25                                   | 0.0010 | 54                         | 0.0021 | ± 5                          | ± 0.0002 |
| LM150F-600  | 27                                   | 0.0011 | 57                         | 0.0022 | ± 5                          | ± 0.0002 |
| LM150F-700  | 30                                   | 0.0012 | 66                         | 0.0026 | ± 5                          | ± 0.0002 |
| LM150F-800  | 32                                   | 0.0012 | 76                         | 0.0030 | ± 5                          | ± 0.0002 |
| LM150F-900  | 34                                   | 0.0013 | 90                         | 0.0035 | ± 5                          | ± 0.0002 |
| LM150F-1000 | 36                                   | 0.0014 | 100                        | 0.0039 | ± 5                          | ± 0.0002 |
| LM150F-1200 | 39                                   | 0.0015 | 120                        | 0.0047 | ± 5                          | ± 0.0002 |
| LM150F-1400 | 42                                   | 0.0017 | 140                        | 0.0055 | ± 5                          | ± 0.0002 |

(1) Based on 16mm lead ball screw.

(2) Specifications are based on the stage mounted to a flat granite surface and measured at 25mm above the center of the stage.

(3) Higher precision available please consult factory.

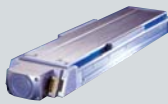
Note: Cable Options - All LM F products are available with standard motor and encoder cables.

## Inertia

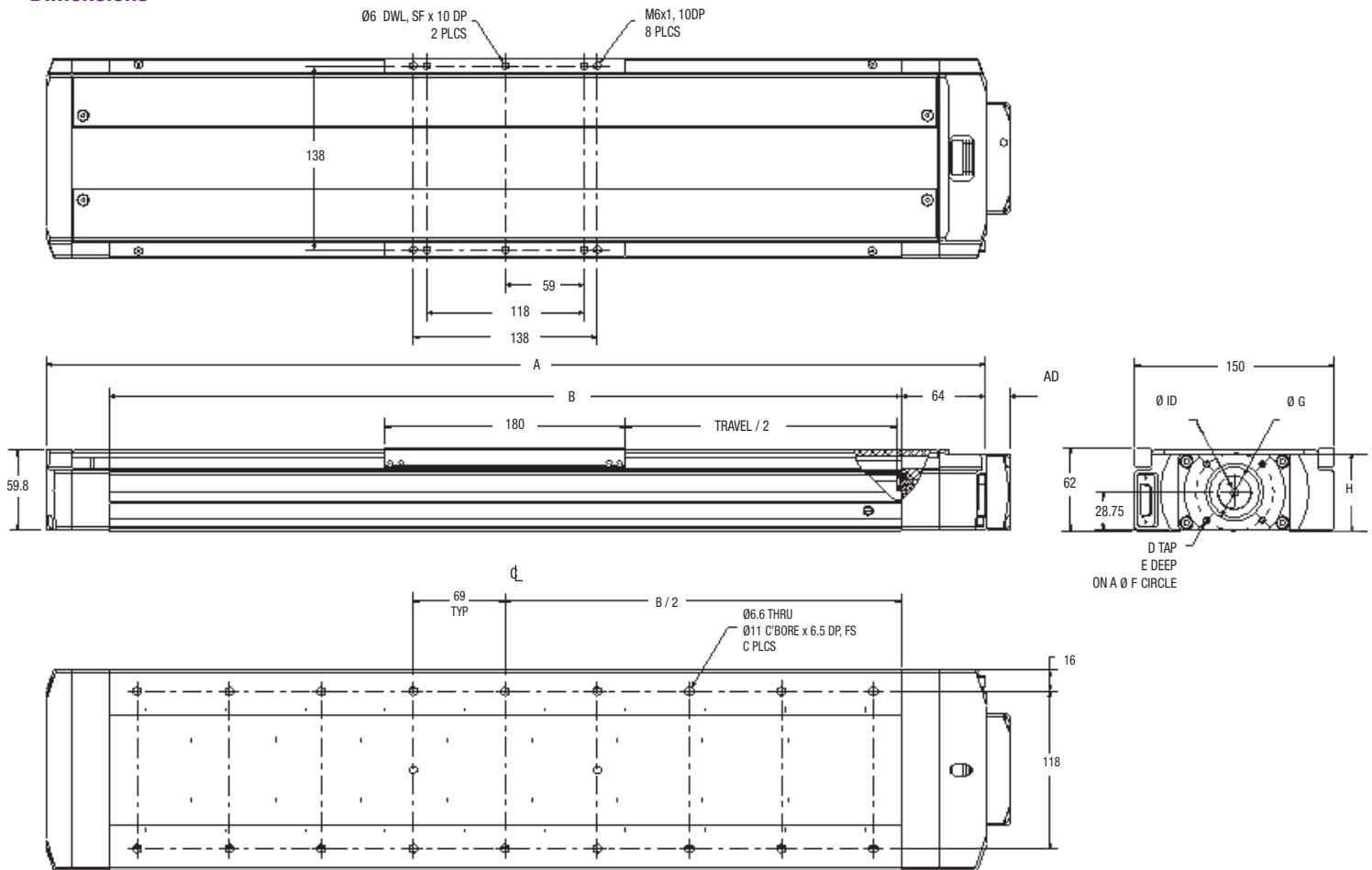
| Model No.   | Coupling Inertia          |                           | Screw Inertia             |                           |
|-------------|---------------------------|---------------------------|---------------------------|---------------------------|
|             | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) |
| LM150F-200  | 0.0999                    | 0.00139                   | 0.1656                    | 0.0023                    |
| LM150F-300  | 0.0999                    | 0.00139                   | 0.2159                    | 0.0030                    |
| LM150F-400  | 0.0999                    | 0.00139                   | 0.2663                    | 0.0037                    |
| LM150F-500  | 0.0999                    | 0.00139                   | 0.3239                    | 0.0045                    |
| LM150F-600  | 0.0999                    | 0.00139                   | 0.3743                    | 0.0052                    |
| LM150F-500  | 0.0999                    | 0.00139                   | 0.4247                    | 0.0059                    |
| LM150F-800  | 0.0999                    | 0.00139                   | 0.4751                    | 0.0066                    |
| LM150F-500  | 0.0999                    | 0.00139                   | 0.5327                    | 0.0074                    |
| LM150F-1000 | 0.0999                    | 0.00139                   | 0.5830                    | 0.0081                    |
| LM150F-1200 | 0.0999                    | 0.00139                   | 0.6910                    | 0.0096                    |
| LM150F-1400 | 0.0999                    | 0.00139                   | 0.7918                    | 0.0110                    |

## Brake

|                             |                |       |
|-----------------------------|----------------|-------|
| <b>Fail Safe Brake:</b>     |                |       |
| 24 Vdc, 0.2 amps            |                |       |
| <b>Brake Holding Force:</b> |                |       |
| Lead<br>(mm)                | Force<br>(kgf) | (lbf) |
| 5                           | 38             | 86    |
| 10                          | 19             | 43    |
| 16                          | 12             | 27    |



## Dimensions



| Model No.   | Travel |       | A<br>Overall Length |       | B<br>Base Length |       | C<br># of Holes | Stage Weight |       | Moving Slide Weight |       |
|-------------|--------|-------|---------------------|-------|------------------|-------|-----------------|--------------|-------|---------------------|-------|
|             | (mm)   | (in)  | (mm)                | (in)  | (mm)             | (in)  |                 | (kgf)        | (lbf) | (kgf)               | (lbf) |
| LM150F-200  | 200    | 7.87  | 505                 | 19.88 | 394              | 15.51 | 10              | 7.57         | 16.7  | 1.92                | 4.24  |
| LM150F-300  | 300    | 11.81 | 605                 | 23.82 | 494              | 19.45 | 14              | 9.07         | 20.0  | 1.92                | 4.24  |
| LM150F-400  | 400    | 15.75 | 705                 | 27.76 | 594              | 23.39 | 18              | 10.57        | 23.3  | 1.92                | 4.24  |
| LM150F-500  | 500    | 19.69 | 805                 | 31.69 | 694              | 27.32 | 18              | 12.11        | 26.7  | 1.92                | 4.24  |
| LM150F-600  | 600    | 23.62 | 905                 | 35.63 | 794              | 31.26 | 22              | 13.61        | 30.0  | 1.92                | 4.24  |
| LM150F-700  | 700    | 27.56 | 1,005               | 39.57 | 894              | 35.20 | 26              | 15.10        | 33.3  | 1.92                | 4.24  |
| LM150F-800  | 800    | 31.50 | 1,105               | 43.50 | 994              | 39.13 | 26              | 16.64        | 36.7  | 1.92                | 4.24  |
| LM150F-900  | 900    | 35.43 | 1,205               | 47.44 | 1,094            | 43.07 | 30              | 18.14        | 40.0  | 1.92                | 4.24  |
| LM150F-1000 | 1,000  | 39.37 | 1,305               | 51.38 | 1,194            | 47.01 | 34              | 19.64        | 43.3  | 1.92                | 4.24  |
| LM150F-1200 | 1,200  | 47.24 | 1,505               | 59.25 | 1,394            | 54.88 | 38              | 22.68        | 50.0  | 1.92                | 4.24  |
| LM150F-1400 | 1,400  | 55.12 | 1,705               | 67.13 | 1,594            | 62.76 | 46              | 25.71        | 56.7  | 1.92                | 4.24  |

## Coupling

| Motor Mounting | Coupling I.D. |       |
|----------------|---------------|-------|
|                | (mm)          | (in)  |
| NEMA 23        | 6.35          | 0.25  |
|                | 9.52          | 0.375 |
| NEMA 34        | 9.52          | 0.375 |
|                | 12.7          | 0.5   |

| Motor   | D       | E    |       | F      |       | G      |       | H     |       | AD   |       |
|---------|---------|------|-------|--------|-------|--------|-------|-------|-------|------|-------|
|         |         | (mm) | (in)  | (mm)   | (in)  | (mm)   | (in)  | (mm)  | (in)  | (mm) | (in)  |
| NEMA 23 | M4X 0.7 | 8.5  | 0.335 | 66.675 | 2.625 | 38.1   | 1.5   | 56.50 | 2.224 | 19   | 0.748 |
| NEMA 34 | M5X0.8  | 10   | 0.394 | 98.425 | 3.875 | 73.025 | 2.875 | 79.15 | 3.116 | 25   | 0.984 |
| BM60    | M5x0.8  | 10   | 0.394 | 70     | 2.756 | 50     | 1.969 | 60.00 | 2.362 | 19   | 0.748 |
| BM90    | M6x1.0  | 12   | 0.472 | 100    | 3.937 | 80     | 3.15  | 83.15 | 3.274 | 25   | 0.984 |

## Performance Specifications

| Model No. | Maximum Velocity |          | Maximum Acceleration <sup>(1)</sup> |                        | Maximum Load <sup>(2)</sup> |       |
|-----------|------------------|----------|-------------------------------------|------------------------|-----------------------------|-------|
|           | (mm/sec)         | (in/sec) | (m/sec <sup>2</sup> )               | (in/sec <sup>2</sup> ) | (kgf)                       | (lbf) |
| LM150L    | 3,000            | 118      | 29                                  | 1,142                  | 497                         | 1,096 |

| Model No. | Continuous Force |       |             |       | Peak Force  |       |             |       |
|-----------|------------------|-------|-------------|-------|-------------|-------|-------------|-------|
|           | Single Coil      |       | Double Coil |       | Single Coil |       | Double Coil |       |
|           | (N)              | (lbf) | (N)         | (lbf) | (N)         | (lbf) | (N)         | (lbf) |
| LM150L    | 57               | 12.8  | 104         | 23.4  | 170         | 38.2  | 340         | 76.4  |

## Accuracy Specifications

| Model No.   | Straightness/Flatness <sup>(3)</sup> |        | Accuracy <sup>(3, 4)</sup> |        | Repeatability <sup>(3, 4)</sup> |           |
|-------------|--------------------------------------|--------|----------------------------|--------|---------------------------------|-----------|
|             | (microns)                            | (in)   | (microns)                  | (in)   | (microns)                       | (in)      |
| LM150L-200  | 15                                   | 0.0006 | 10                         | 0.0004 | ± 2                             | ± 0.00008 |
| LM150L-300  | 18                                   | 0.0007 | 10                         | 0.0004 | ± 2                             | ± 0.00008 |
| LM150L-400  | 22                                   | 0.0009 | 10                         | 0.0004 | ± 2                             | ± 0.00008 |
| LM150L-500  | 25                                   | 0.0010 | 12                         | 0.0005 | ± 2                             | ± 0.00008 |
| LM150L-600  | 27                                   | 0.0011 | 12                         | 0.0005 | ± 2                             | ± 0.00008 |
| LM150L-700  | 30                                   | 0.0012 | 16                         | 0.0006 | ± 2                             | ± 0.00008 |
| LM150L-800  | 32                                   | 0.0012 | 18                         | 0.0007 | ± 2                             | ± 0.00008 |
| LM150L-900  | 34                                   | 0.0013 | 22                         | 0.0009 | ± 2                             | ± 0.00008 |
| LM150L-1000 | 48                                   | 0.0019 | 34                         | 0.0013 | ± 2                             | ± 0.00008 |
| LM150L-1200 | 72                                   | 0.0028 | 42                         | 0.0017 | ± 2                             | ± 0.00008 |
| LM150L-1400 | 94                                   | 0.0037 | 54                         | 0.0021 | ± 2                             | ± 0.00008 |
| LM150L-1600 | 112                                  | 0.0044 | 60                         | 0.0024 | ± 2                             | ± 0.00008 |
| LM150L-1800 | 120                                  | 0.0047 | 76                         | 0.0030 | ± 2                             | ± 0.00008 |
| LM150L-2000 | 130                                  | 0.0051 | 90                         | 0.0035 | ± 2                             | ± 0.00008 |

## Motor Specifications

| Rated Performance                             |       | Units                               | Single Coil                   | Double Coil  |
|-----------------------------------------------|-------|-------------------------------------|-------------------------------|--------------|
| Peak Force                                    | $F_p$ | N<br>lbf                            | 170<br>38                     | 340<br>76    |
| Continuous Force                              | $F_c$ | N<br>lbf                            | 57<br>13                      | 104<br>23    |
| Peak Current                                  | $I_p$ | $A_{rms}$                           | 13.7                          | 13.7         |
| Continuous Current @ $t_{max}$ <sup>(1)</sup> | $I_c$ | $A_{rms}$                           | 3.4                           |              |
| Resistance @25°C ± 10%                        | $R_m$ | ohms L-L                            | 1.1                           | 2.1          |
| Inductance ± 20%                              | L     | mH <sub>L-L</sub>                   | 3.0                           | 6.1          |
| Back EMF Constant @25°C ± 10%                 | $K_E$ | Vpeak/m/sec L-L<br>Vpeak/in/sec L-L | 12.6<br>0.32                  | 25.2<br>0.64 |
| Max Continuous Dissipation                    | $P_c$ | W                                   | 30                            | 51           |
| Force Constant @25°C ± 10%                    | $K_F$ | N/ $A_{rms}$<br>lbf/ $A_{rms}$      | 15.4<br>3.5                   | 30.9<br>6.9  |
| Motor Constant                                | $K_m$ | N/ W<br>lbf/ W                      | $\sqrt{10.3}$<br>$\sqrt{2.3}$ | 14.6<br>3.3  |
| Magnet Pole Pitch (360 elec.deg.)             | mm    |                                     | 32                            | 32           |

(1) Maximum Acceleration is dependent on load and friction.  
Motor peak force up to 340N (76.4 lbf)

(2) Maximum load is on a complete system basis.  
Bearing static / dynamic capacity is significantly higher.

(3) Specifications are based on the stage mounted to a flat granite surface and measured at 25mm above the center of the stage.

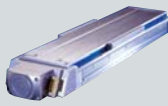
(4) Based on a closed loop system with a 1μm linear encoder, utilizing a 2 point slope correction

Note: Cable Options - All LM Linear Motor products are available with standard motor and encoder cables.

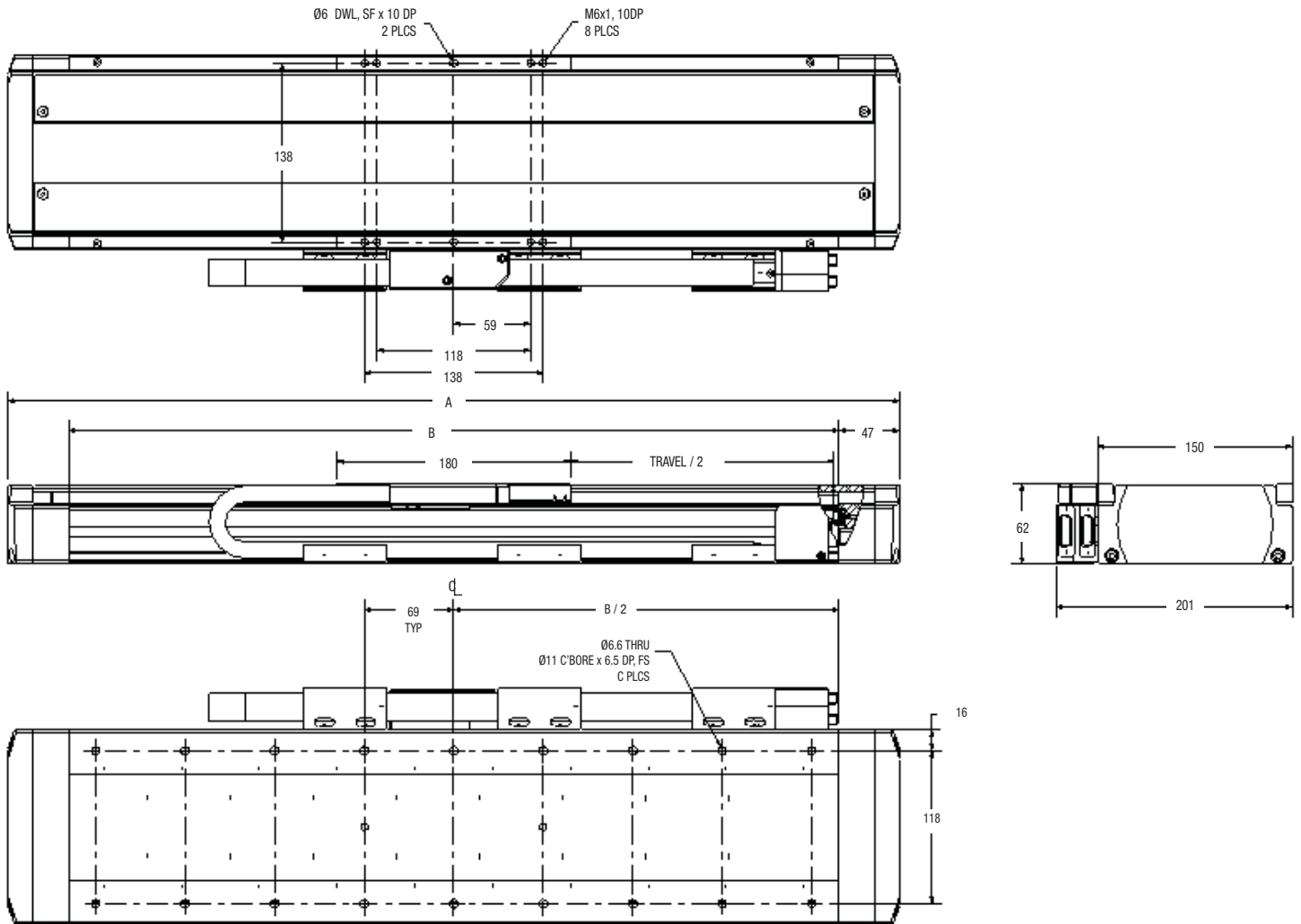
## Linear Encoder Specifications

|                          |                                                         |
|--------------------------|---------------------------------------------------------|
| <b>Resolution:</b>       | 0.1μm, 0.5μm, 1.0μm, & 5.0μm                            |
| <b>Electrical Input:</b> | 5 Vdc, 120 ma typical<br>5 Vdc, 250 ma for 0.1μm only   |
| <b>Encoder Output:</b>   | Dual channel quadrature<br>Differential, TTL compatible |

(1)  $t_{max}$  = 130 °C coil temperature



## Dimensions



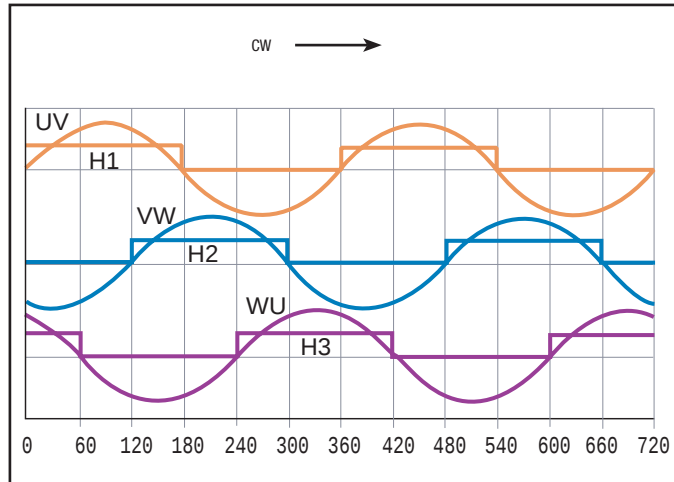
| Model No.   | Travel |       | A              |       |             |       | B           |       |             |       | C           |             |
|-------------|--------|-------|----------------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------------|
|             |        |       | Overall Length |       |             |       | Base Length |       |             |       | # of Holes  |             |
|             | (mm)   | (in)  | Single Coil    |       | Double Coil |       | Single Coil |       | Double Coil |       | Single Coil | Double Coil |
|             |        |       | (mm)           | (in)  | (mm)        | (in)  | (mm)        | (in)  | (mm)        | (in)  | Coil        | Coil        |
| LM150L-200  | 200    | 7.87  | 488            | 19.21 | 578         | 22.76 | 394         | 15.51 | 484         | 19.06 | 10          | 14          |
| LM150L-300  | 300    | 11.81 | 588            | 23.15 | 678         | 26.69 | 494         | 19.45 | 584         | 22.99 | 14          | 18          |
| LM150L-400  | 400    | 15.75 | 688            | 27.09 | 778         | 30.63 | 594         | 23.39 | 684         | 26.93 | 18          | 18          |
| LM150L-500  | 500    | 19.69 | 788            | 31.02 | 878         | 34.57 | 694         | 27.32 | 784         | 30.87 | 18          | 22          |
| LM150L-600  | 600    | 23.62 | 888            | 34.96 | 978         | 38.50 | 794         | 31.26 | 884         | 34.80 | 22          | 26          |
| LM150L-700  | 700    | 27.56 | 988            | 38.90 | 1,078       | 42.44 | 894         | 35.20 | 984         | 38.74 | 26          | 26          |
| LM150L-800  | 800    | 31.50 | 1,088          | 42.83 | 1,178       | 46.38 | 994         | 39.13 | 1,084       | 42.68 | 26          | 30          |
| LM150L-900  | 900    | 35.43 | 1,188          | 46.77 | 1,278       | 50.31 | 1,094       | 43.07 | 1,184       | 46.61 | 30          | 34          |
| LM150L-1000 | 1,000  | 39.37 | 1,288          | 50.71 | 1,378       | 54.25 | 1,194       | 47.01 | 1,284       | 50.55 | 34          | 38          |
| LM150L-1200 | 1,200  | 47.24 | 1,488          | 58.58 | 1,578       | 62.13 | 1,394       | 54.88 | 1,484       | 58.43 | 38          | 42          |
| LM150L-1400 | 1,400  | 55.12 | 1,688          | 66.46 | 1,778       | 70.00 | 1,594       | 62.76 | 1,684       | 66.30 | 46          | 50          |
| LM150L-1600 | 1,600  | 62.99 | 1,888          | 74.33 | 1,978       | 77.87 | 1,794       | 70.63 | 1,884       | 74.17 | 50          | 54          |
| LM150L-1800 | 1,800  | 70.87 | 2,088          | 82.20 | 2,178       | 85.75 | 1,994       | 78.50 | 2,084       | 82.05 | 58          | 58          |
| LM150L-2000 | 2,000  | 78.74 | 2,288          | 90.08 | 2,378       | 93.62 | 2,194       | 86.38 | 2,284       | 89.92 | 62          | 66          |

## Weights

| Model No.   | Stage Weight |       |             |       | Moving Slide Weight |       |             |       |
|-------------|--------------|-------|-------------|-------|---------------------|-------|-------------|-------|
|             | Single Coil  |       | Double Coil |       | Single Coil         |       | Double Coil |       |
|             | (kgf)        | (lbf) | (kgf)       | (lbf) | (kgf)               | (lbf) | (kgf)       | (lbf) |
| LM150L-200  | 9.26         | 20.4  | 9.75        | 21.5  | 2.38                | 5.24  | 2.87        | 6.34  |
| LM150L-300  | 10.07        | 22.2  | 10.56       | 23.3  | 2.38                | 5.24  | 2.87        | 6.34  |
| LM150L-400  | 10.88        | 24    | 11.37       | 25.1  | 2.38                | 5.24  | 2.87        | 6.34  |
| LM150L-500  | 11.7         | 25.8  | 12.19       | 26.9  | 2.38                | 5.24  | 2.87        | 6.34  |
| LM150L-600  | 12.51        | 27.6  | 13.0        | 28.7  | 2.38                | 5.24  | 2.87        | 6.34  |
| LM150L-700  | 13.32        | 29.4  | 13.81       | 30.5  | 2.38                | 5.24  | 2.87        | 6.34  |
| LM150L-800  | 14.13        | 31.2  | 14.62       | 32.3  | 2.38                | 5.24  | 2.87        | 6.34  |
| LM150L-900  | 14.94        | 32.9  | 15.43       | 34.0  | 2.38                | 5.24  | 2.87        | 6.34  |
| LM150L-1000 | 15.75        | 34.7  | 16.24       | 35.8  | 2.38                | 5.24  | 2.87        | 6.34  |
| LM150L-1200 | 17.37        | 38.3  | 17.86       | 39.4  | 2.38                | 5.24  | 2.87        | 6.34  |
| LM150L-1400 | 18.99        | 41.9  | 19.48       | 43.0  | 2.38                | 5.24  | 2.87        | 6.34  |
| LM150L-1600 | 20.61        | 45.5  | 21.1        | 46.6  | 2.38                | 5.24  | 2.87        | 6.34  |
| LM150L-1800 | 22.24        | 49    | 22.73       | 50.1  | 2.38                | 5.24  | 2.87        | 6.34  |
| LM150L-2000 | 23.86        | 52.6  | 24.35       | 53.7  | 2.38                | 5.24  | 2.87        | 6.34  |

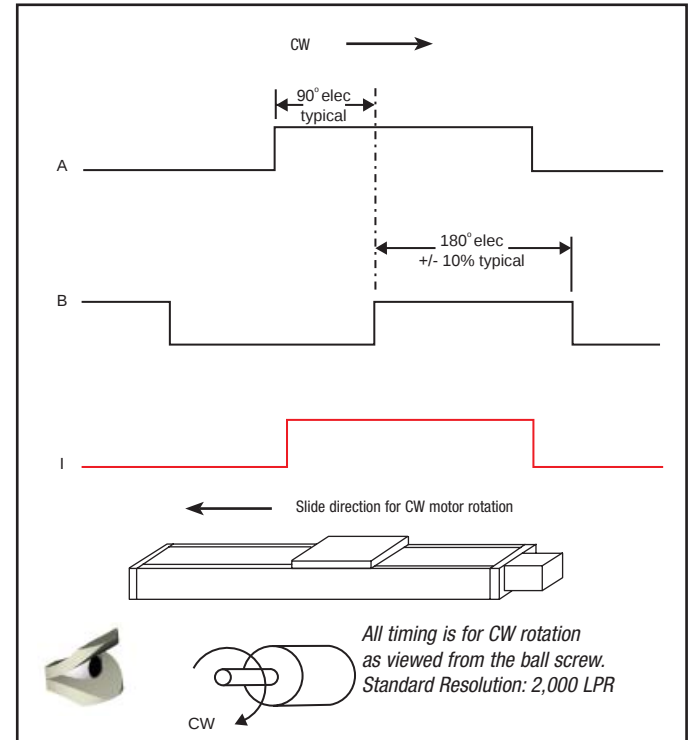
## Motor Signal Timing

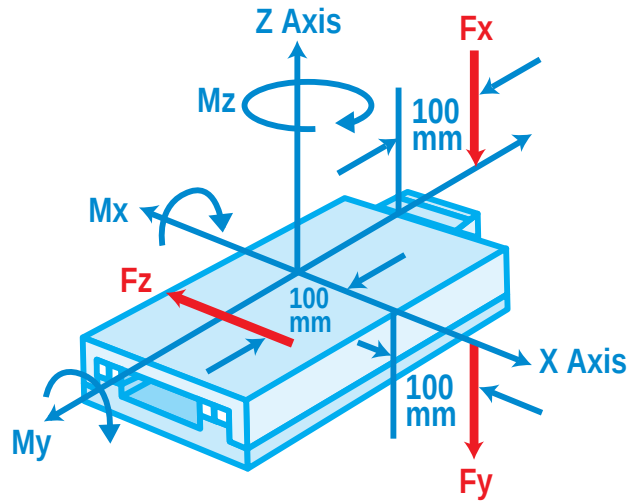
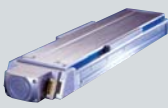
at motor connector direction same as encoder timing



**Note:** also applies to linear motor stage direction as shown in encoder timing diagram

## Encoder Timing





**F<sub>x</sub>** is the load applied in the Z Axis direction, 100mm off end, causing M<sub>x</sub> rotation around the X Axis.

**F<sub>y</sub>** is the load applied in the Z Axis direction, 100mm off side, causing M<sub>y</sub> rotation around the Y Axis.

**F<sub>z</sub>** is the load applied around the Z Axis at a 100mm radius from the center, causing M<sub>z</sub> rotation around the Z Axis.

## Moment Loading

| Model No. | F(M <sub>x</sub> )<br>(Load applied at 100mm off end) |       | F(M <sub>y</sub> )<br>(Load applied at 100mm off side) |       | F(M <sub>z</sub> )<br>(Load applied at 100mm off center) |       |
|-----------|-------------------------------------------------------|-------|--------------------------------------------------------|-------|----------------------------------------------------------|-------|
|           | (kg)                                                  | (lb)  | (kg)                                                   | (lb)  | (kg)                                                     | (lb)  |
| LM150     | 780                                                   | 1,720 | 856                                                    | 1,888 | 628                                                      | 1,385 |

## Performance Specifications

| Model No.   | Travel |       | Maximum Velocity <sup>(1)</sup> |          | Maximum Load |       | Maximum Axial Load |       | Maximum Acceleration <sup>(1)</sup> |                        |
|-------------|--------|-------|---------------------------------|----------|--------------|-------|--------------------|-------|-------------------------------------|------------------------|
|             | (mm)   | (in)  | (mm/sec)                        | (in/sec) | (kgf)        | (lbf) | (kgf)              | (lbf) | (m/sec <sup>2</sup> )               | (in/sec <sup>2</sup> ) |
| LM250D-200  | 200    | 7.87  | 1,300                           | 51       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250D-300  | 300    | 11.81 | 1,300                           | 51       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250D-400  | 400    | 15.74 | 1,300                           | 51       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250D-500  | 500    | 19.69 | 1,300                           | 51       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250D-600  | 600    | 23.62 | 1,200                           | 47       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250D-700  | 700    | 27.56 | 1,200                           | 47       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250D-800  | 800    | 31.49 | 1000                            | 39       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250D-900  | 900    | 35.43 | 1000                            | 39       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250D-1000 | 1,000  | 39.37 | 1000                            | 39       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250D-1200 | 1,200  | 47.24 | 900                             | 35       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250D-1400 | 1,400  | 55.12 | 725                             | 28       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |

## Accuracy Specifications

| Model No.   | Straightness/Flatness <sup>(2)</sup> |        | Accuracy <sup>(2, 3)</sup> |        | Repeatability <sup>(2)</sup> |          |
|-------------|--------------------------------------|--------|----------------------------|--------|------------------------------|----------|
|             | (microns)                            | (in)   | (microns)                  | (in)   | (microns)                    | (in)     |
| LM250D-200  | 15                                   | 0.0006 | 15                         | 0.0006 | ± 5                          | ± 0.0002 |
| LM250D-300  | 18                                   | 0.0007 | 30                         | 0.0012 | ± 5                          | ± 0.0002 |
| LM250D-400  | 22                                   | 0.0008 | 32                         | 0.0013 | ± 5                          | ± 0.0002 |
| LM250D-500  | 25                                   | 0.0010 | 54                         | 0.0021 | ± 5                          | ± 0.0002 |
| LM250D-600  | 27                                   | 0.0011 | 57                         | 0.0022 | ± 5                          | ± 0.0002 |
| LM250D-700  | 30                                   | 0.0012 | 66                         | 0.0026 | ± 5                          | ± 0.0002 |
| LM250D-800  | 32                                   | 0.0012 | 76                         | 0.0030 | ± 5                          | ± 0.0002 |
| LM250D-900  | 34                                   | 0.0013 | 90                         | 0.0035 | ± 5                          | ± 0.0002 |
| LM250D-1000 | 36                                   | 0.0014 | 100                        | 0.0039 | ± 5                          | ± 0.0002 |
| LM250D-1200 | 39                                   | 0.0015 | 120                        | 0.0047 | ± 5                          | ± 0.0002 |
| LM250D-1400 | 42                                   | 0.0017 | 140                        | 0.0055 | ± 5                          | ± 0.0002 |

(1) Based on 32mm lead ball screw.

(2) Specifications are based on the stage mounted to a flat granite surface and measured at 25mm above the center of the stage with 2 point slope correction.

(3) Higher precision available, please consult factory.

Note: Cable Options - All LM D products are available with standard motor and encoder cables.

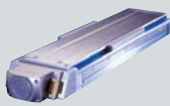
## Inertia

| Model No.   | Screw Inertia             |                           |
|-------------|---------------------------|---------------------------|
|             | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) |
| LM250D-200  | 4.68690                   | 0.06504                   |
| LM250D-300  | 5.41445                   | 0.07513                   |
| LM250D-400  | 6.14200                   | 0.08523                   |
| LM250D-500  | 6.86956                   | 0.09532                   |
| LM250D-600  | 7.59711                   | 0.10542                   |
| LM250D-700  | 8.32466                   | 0.11551                   |
| LM250D-800  | 9.05221                   | 0.12561                   |
| LM250D-900  | 9.77977                   | 0.13570                   |
| LM250D-1000 | 10.50732                  | 0.14580                   |
| LM250D-1200 | 11.96243                  | 0.16599                   |
| LM250D-1400 | 13.41753                  | 0.18618                   |

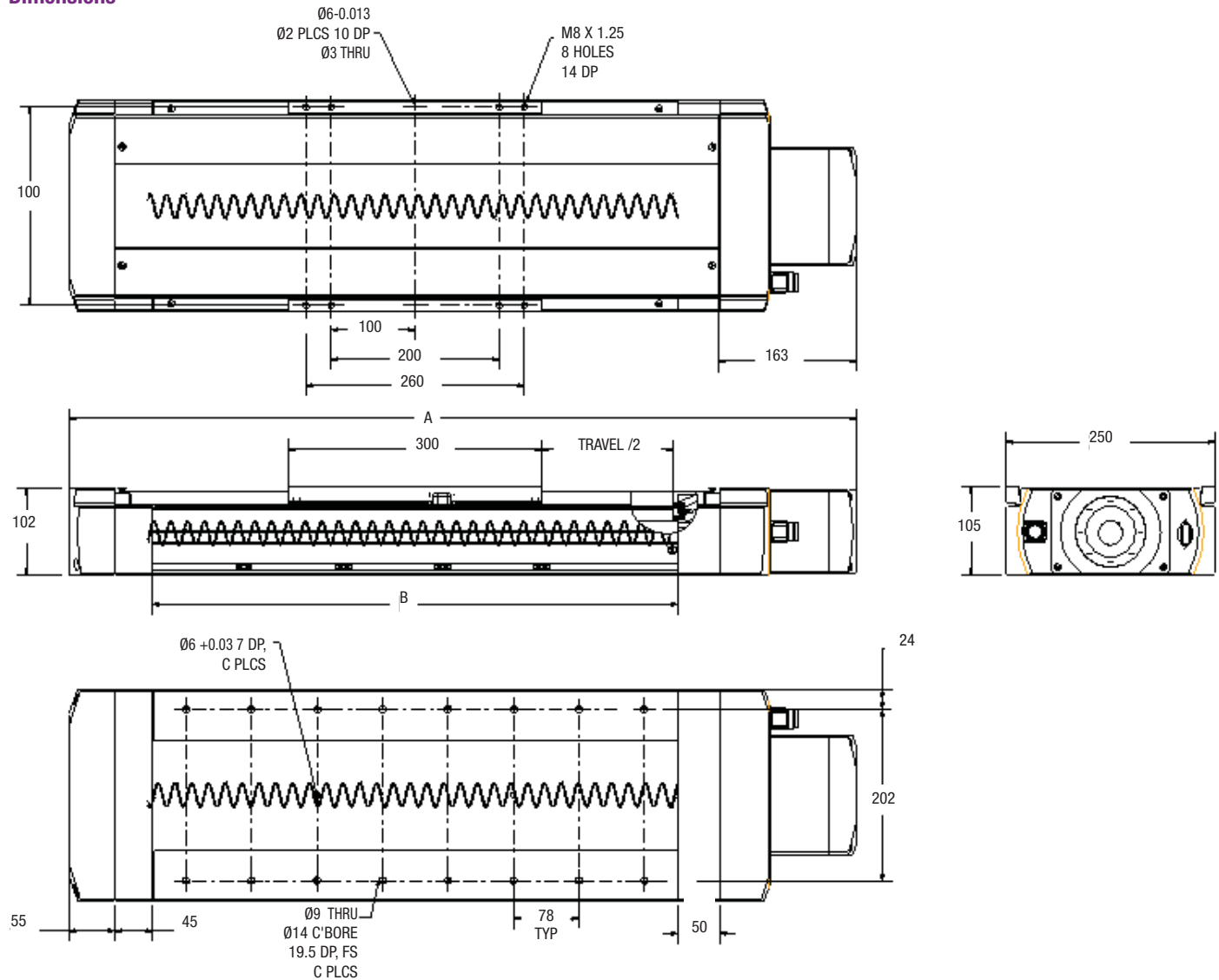
## Brake

Fail Safe Brake:

24 Vdc, 0.72 amps



## Dimensions



| Model No.   | Travel |       | A<br>Overall Length |        | B<br>Base Length |       | C<br># of Holes |
|-------------|--------|-------|---------------------|--------|------------------|-------|-----------------|
|             | (mm)   | (in)  | (mm)                | (in)   | (mm)             | (in)  |                 |
| LM250D-200  | 200    | 7.87  | 838                 | 32.99  | 525              | 20.67 | 12              |
| LM250D-300  | 300    | 11.81 | 938                 | 36.93  | 625              | 24.61 | 16              |
| LM250D-400  | 400    | 15.74 | 1038                | 40.87  | 725              | 28.54 | 20              |
| LM250D-500  | 500    | 19.69 | 1138                | 44.80  | 825              | 32.48 | 20              |
| LM250D-600  | 600    | 23.62 | 1238                | 48.74  | 925              | 36.42 | 24              |
| LM250D-700  | 700    | 27.56 | 1338                | 52.68  | 1025             | 40.35 | 24              |
| LM250D-800  | 800    | 31.49 | 1438                | 56.61  | 1125             | 44.29 | 28              |
| LM250D-900  | 900    | 35.43 | 1538                | 60.55  | 1225             | 48.23 | 32              |
| LM250D-1000 | 1,000  | 39.37 | 1638                | 64.49  | 1325             | 52.17 | 32              |
| LM250D-1200 | 1,200  | 47.24 | 1838                | 72.36  | 1525             | 60.04 | 40              |
| LM250D-1400 | 1,400  | 55.12 | 2038                | 80.24  | 1725             | 67.91 | 44              |
| LM250D-1600 | 1,600  | 62.99 | 2238                | 88.11  | 1925             | 75.79 | 48              |
| LM250D-1800 | 1,800  | 70.87 | 2438                | 95.98  | 2125             | 83.66 | 52              |
| LM250D-2000 | 2,000  | 78.74 | 2638                | 103.86 | 2325             | 91.54 | 60              |

## Performance Specifications

| Model No.   | Travel |       | Maximum Velocity <sup>(1)</sup> |          | Maximum Load |       | Maximum Axial Load |       | Maximum Acceleration <sup>(1)</sup> |                        |
|-------------|--------|-------|---------------------------------|----------|--------------|-------|--------------------|-------|-------------------------------------|------------------------|
|             | (mm)   | (in)  | (mm/sec)                        | (in/sec) | (kgf)        | (lbf) | (kgf)              | (lbf) | (m/sec <sup>2</sup> )               | (in/sec <sup>2</sup> ) |
| LM250F-200  | 200    | 7.87  | 1,300                           | 51       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250F-300  | 300    | 11.81 | 1,300                           | 51       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250F-400  | 400    | 15.74 | 1,300                           | 51       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250F-500  | 500    | 19.69 | 1,300                           | 51       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250F-600  | 600    | 23.62 | 1,200                           | 47       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250F-700  | 700    | 27.56 | 1,200                           | 47       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250F-800  | 800    | 31.49 | 1000                            | 39       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250F-900  | 900    | 35.43 | 1000                            | 39       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250F-1000 | 1,000  | 39.37 | 1000                            | 39       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250F-1200 | 1,200  | 47.24 | 900                             | 35       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250F-1400 | 1,400  | 55.12 | 725                             | 28       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |

## Accuracy Specifications

| Model No.   | Straightness/Flatness <sup>(2)</sup> |        | Accuracy <sup>(2, 3)</sup> |        | Repeatability <sup>(2)</sup> |          |
|-------------|--------------------------------------|--------|----------------------------|--------|------------------------------|----------|
|             | (microns)                            | (in)   | (microns)                  | (in)   | (microns)                    | (in)     |
| LM250F-200  | 15                                   | 0.0006 | 15                         | 0.0006 | ± 5                          | ± 0.0002 |
| LM250F-300  | 18                                   | 0.0007 | 30                         | 0.0012 | ± 5                          | ± 0.0002 |
| LM250F-400  | 22                                   | 0.0008 | 32                         | 0.0013 | ± 5                          | ± 0.0002 |
| LM250F-500  | 25                                   | 0.0010 | 54                         | 0.0021 | ± 5                          | ± 0.0002 |
| LM250F-600  | 27                                   | 0.0011 | 57                         | 0.0022 | ± 5                          | ± 0.0002 |
| LM250F-700  | 30                                   | 0.0012 | 66                         | 0.0026 | ± 5                          | ± 0.0002 |
| LM250F-800  | 32                                   | 0.0012 | 76                         | 0.0030 | ± 5                          | ± 0.0002 |
| LM250F-900  | 34                                   | 0.0013 | 90                         | 0.0035 | ± 5                          | ± 0.0002 |
| LM250F-1000 | 36                                   | 0.0014 | 100                        | 0.0039 | ± 5                          | ± 0.0002 |
| LM250F-1200 | 39                                   | 0.0015 | 120                        | 0.0047 | ± 5                          | ± 0.0002 |
| LM250F-1400 | 42                                   | 0.0017 | 140                        | 0.0055 | ± 5                          | ± 0.0002 |

(1) Based on 32mm lead ball screw.

(2) Specifications are based on the stage mounted to a flat granite surface and measured at 25mm above the center of the stage with 2 point slope correction.

(3) Higher precision available please consult factory.

Note: Cable Options - All LM D products are available with standard motor and encoder cables.

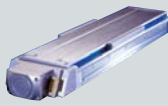
## Inertia

| Model No.   | Screw Inertia             |                           |
|-------------|---------------------------|---------------------------|
|             | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) |
| LM250F-200  | 4.68690                   | 0.06504                   |
| LM250F-300  | 5.41445                   | 0.07513                   |
| LM250F-400  | 6.14200                   | 0.08523                   |
| LM250F-500  | 6.86956                   | 0.09532                   |
| LM250F-600  | 7.59711                   | 0.10542                   |
| LM250F-700  | 8.32466                   | 0.11551                   |
| LM250F-800  | 9.05221                   | 0.12561                   |
| LM250F-900  | 9.77977                   | 0.13570                   |
| LM250F-1000 | 10.50732                  | 0.14580                   |
| LM250F-1200 | 11.96243                  | 0.16599                   |
| LM250F-1400 | 13.41753                  | 0.18618                   |

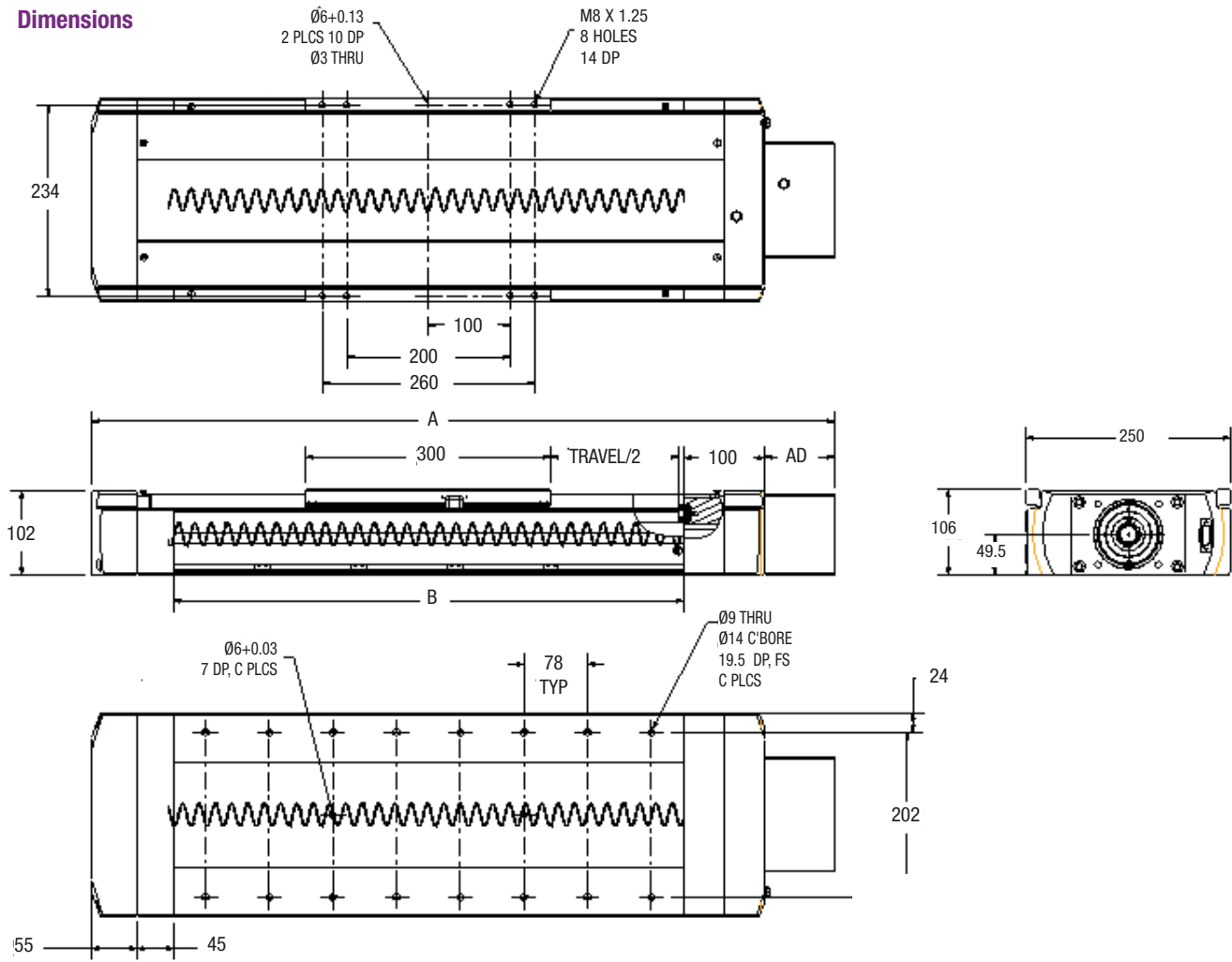
## Brake

## Fail Safe Brake:

24 Vdc, 0.72 amps



## Dimensions



| Model No.   | Travel |       | A<br>Overall Length |       | B<br>Base Length |       | C<br># of Holes |
|-------------|--------|-------|---------------------|-------|------------------|-------|-----------------|
|             | (mm)   | (in)  | (mm)                | (in)  | (mm)             | (in)  |                 |
| LM250F-200  | 200    | 7.87  | 725                 | 28.54 | 525              | 20.67 | 12              |
| LM250F-300  | 300    | 11.81 | 825                 | 32.48 | 625              | 24.61 | 16              |
| LM250F-400  | 400    | 15.75 | 925                 | 36.42 | 725              | 28.54 | 20              |
| LM250F-500  | 500    | 19.69 | 1025                | 40.35 | 825              | 32.48 | 20              |
| LM250F-600  | 600    | 23.62 | 1125                | 44.29 | 925              | 36.42 | 24              |
| LM250F-700  | 700    | 27.56 | 1225                | 48.23 | 1025             | 40.35 | 24              |
| LM250F-800  | 800    | 31.50 | 1325                | 52.17 | 1125             | 44.29 | 28              |
| LM250F-900  | 900    | 35.43 | 1425                | 56.10 | 1225             | 48.23 | 32              |
| LM250F-1000 | 1,000  | 39.37 | 1525                | 60.04 | 1325             | 52.17 | 32              |
| LM250F-1200 | 1,200  | 47.24 | 1725                | 67.91 | 1525             | 60.04 | 40              |
| LM250F-1400 | 1,400  | 55.12 | 1925                | 75.79 | 1725             | 67.91 | 44              |
| LM250F-1600 | 1,600  | 62.99 | 2125                | 83.66 | 1925             | 75.79 | 48              |
| LM250F-1800 | 1,800  | 70.87 | 2325                | 91.54 | 2125             | 83.66 | 52              |
| LM250F-2000 | 2,000  | 78.74 | 2525                | 99.41 | 2325             | 91.54 | 60              |

## Performance Specifications

| Model No.   | Travel |       | Maximum Velocity <sup>(1)</sup> |          | Maximum Load |       | Maximum Axial Load |       | Maximum Acceleration <sup>(1)</sup> |                        |
|-------------|--------|-------|---------------------------------|----------|--------------|-------|--------------------|-------|-------------------------------------|------------------------|
|             | (mm)   | (in)  | (mm/sec)                        | (in/sec) | (kgf)        | (lbf) | (kgf)              | (lbf) | (m/sec <sup>2</sup> )               | (in/sec <sup>2</sup> ) |
| LM250L-200  | 200    | 7.87  | 1,300                           | 51       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250L-300  | 300    | 11.81 | 1,300                           | 51       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250L-400  | 400    | 15.74 | 1,300                           | 51       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250L-500  | 500    | 19.69 | 1,300                           | 51       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250L-600  | 600    | 23.62 | 1,200                           | 47       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250L-700  | 700    | 27.56 | 1,200                           | 47       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250L-800  | 800    | 31.49 | 1000                            | 39       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250L-900  | 900    | 35.43 | 1000                            | 39       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250L-1000 | 1,000  | 39.37 | 1000                            | 39       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250L-1200 | 1,200  | 47.24 | 900                             | 35       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |
| LM250L-1400 | 1,400  | 55.12 | 725                             | 28       | 1,600        | 3,500 | 500                | 1100  | 20                                  | 393                    |

## Accuracy Specifications

| Model No.   | Straightness/Flatness <sup>(2)</sup> |        | Accuracy <sup>(2,3)</sup> |        | Repeatability <sup>(2)</sup> |          |
|-------------|--------------------------------------|--------|---------------------------|--------|------------------------------|----------|
|             | (microns)                            | (in)   | (microns)                 | (in)   | (microns)                    | (in)     |
| LM250L-200  | 15                                   | 0.0006 | 15                        | 0.0006 | ± 5                          | ± 0.0002 |
| LM250L-300  | 18                                   | 0.0007 | 30                        | 0.0012 | ± 5                          | ± 0.0002 |
| LM250L-400  | 22                                   | 0.0008 | 32                        | 0.0013 | ± 5                          | ± 0.0002 |
| LM250L-500  | 25                                   | 0.0010 | 54                        | 0.0021 | ± 5                          | ± 0.0002 |
| LM250L-600  | 27                                   | 0.0011 | 57                        | 0.0022 | ± 5                          | ± 0.0002 |
| LM250L-700  | 30                                   | 0.0012 | 66                        | 0.0026 | ± 5                          | ± 0.0002 |
| LM250L-800  | 32                                   | 0.0012 | 76                        | 0.0030 | ± 5                          | ± 0.0002 |
| LM250L-900  | 34                                   | 0.0013 | 90                        | 0.0035 | ± 5                          | ± 0.0002 |
| LM250L-1000 | 36                                   | 0.0014 | 100                       | 0.0039 | ± 5                          | ± 0.0002 |
| LM250L-1200 | 39                                   | 0.0015 | 120                       | 0.0047 | ± 5                          | ± 0.0002 |
| LM250L-1400 | 42                                   | 0.0017 | 140                       | 0.0055 | ± 5                          | ± 0.0002 |

(1) Based on 32mm lead ball screw.

(2) Specifications are based on the stage mounted to a flat granite surface and measured at 25mm above the center of the stage with 2 point slope correction.

(3) Higher precision available, please consult factory.

Note: Cable Options - All LM D products are available with standard motor and encoder cables.

## Inertia

| Model No.   | Screw Inertia             |                           |
|-------------|---------------------------|---------------------------|
|             | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) |
| LM250L-200  | 4.68690                   | 0.06504                   |
| LM250L-300  | 5.41445                   | 0.07513                   |
| LM250L-400  | 6.14200                   | 0.08523                   |
| LM250L-500  | 6.86956                   | 0.09532                   |
| LM250L-600  | 7.59711                   | 0.10542                   |
| LM250L-700  | 8.32466                   | 0.11551                   |
| LM250L-800  | 9.05221                   | 0.12561                   |
| LM250L-900  | 9.77977                   | 0.13570                   |
| LM250L-1000 | 10.50732                  | 0.14580                   |
| LM250L-1200 | 11.96243                  | 0.16599                   |
| LM250L-1400 | 13.41753                  | 0.18618                   |

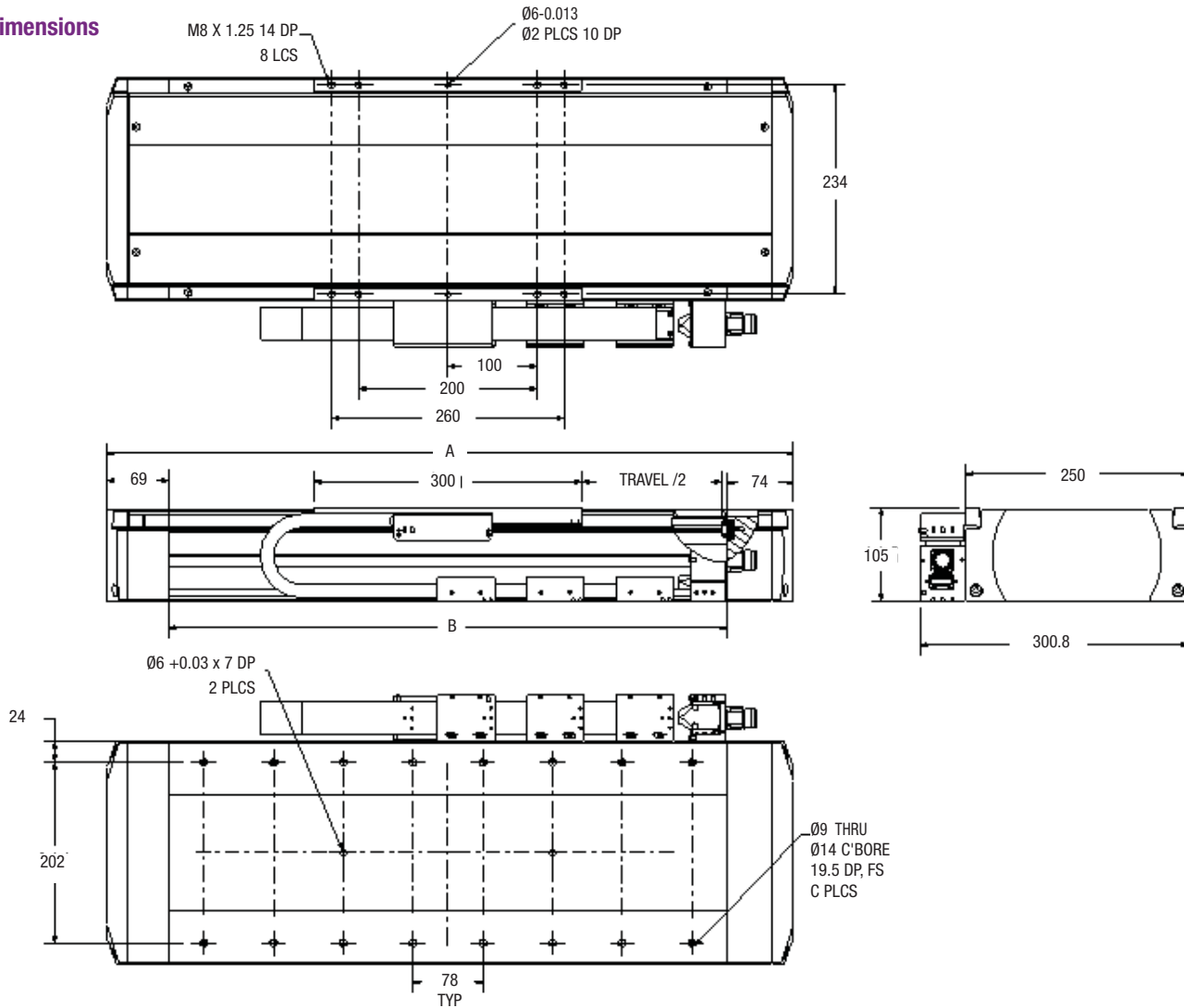
## Brake

Fail Safe Brake:

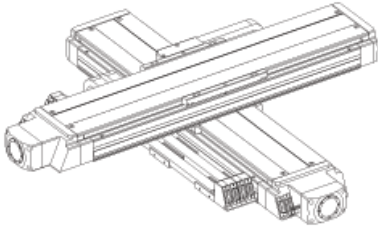
24 Vdc, 0.72 amps



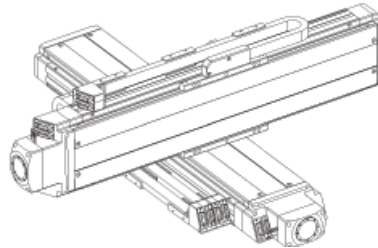
## Dimensions



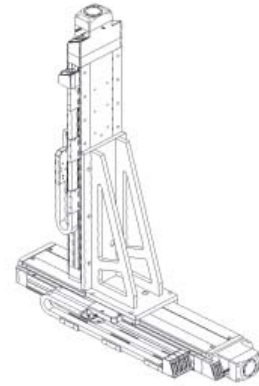
| Model No.   | Travel |       | A<br>Overall Length |       |             |        | B<br>Base Length |       |             |       | C<br># of Holes |             |
|-------------|--------|-------|---------------------|-------|-------------|--------|------------------|-------|-------------|-------|-----------------|-------------|
|             |        |       | Single Coil         |       | Double Coil |        | Single Coil      |       | Double Coil |       | Single Coil     | Double Coil |
|             | (mm)   | (in)  | (mm)                | (in)  | (mm)        | (in)   | (mm)             | (in)  | (mm)        | (in)  |                 |             |
| LM250L-200  | 200    | 7.87  | 668                 | 26.30 | 768         | 30.24  | 525              | 20.67 | 625         | 24.61 | 12              | 16          |
| LM250L-300  | 300    | 11.81 | 768                 | 30.24 | 868         | 34.17  | 625              | 24.61 | 725         | 28.54 | 16              | 20          |
| LM250L-400  | 400    | 15.75 | 868                 | 34.17 | 968         | 38.11  | 725              | 28.54 | 825         | 32.48 | 20              | 20          |
| LM250L-500  | 500    | 19.69 | 968                 | 38.11 | 1068        | 42.05  | 825              | 32.48 | 925         | 36.42 | 20              | 24          |
| LM250L-600  | 600    | 23.62 | 1068                | 42.05 | 1168        | 45.98  | 925              | 36.42 | 1025        | 40.35 | 24              | 24          |
| LM250L-700  | 700    | 27.56 | 1168                | 45.98 | 1,268       | 49.92  | 1025             | 40.35 | 1125        | 44.29 | 24              | 28          |
| LM250L-800  | 800    | 31.50 | 1,268               | 49.92 | 1,368       | 53.86  | 1125             | 44.29 | 1,225       | 48.23 | 28              | 32          |
| LM250L-900  | 900    | 35.43 | 1,368               | 53.86 | 1,468       | 57.80  | 1,225            | 48.23 | 1,325       | 52.17 | 32              | 32          |
| LM250L-1000 | 1,000  | 39.37 | 1,468               | 57.80 | 1,568       | 61.73  | 1,325            | 52.17 | 1,425       | 56.10 | 32              | 36          |
| LM250L-1200 | 1,200  | 47.24 | 1,668               | 65.67 | 1,768       | 69.61  | 1,525            | 60.04 | 1,625       | 63.98 | 40              | 40          |
| LM250L-1400 | 1,400  | 55.12 | 1,868               | 73.54 | 1,968       | 77.48  | 1,725            | 67.91 | 1,825       | 71.85 | 44              | 48          |
| LM250L-1600 | 1,600  | 62.99 | 2,068               | 81.42 | 2,168       | 85.35  | 1,925            | 75.79 | 2,025       | 79.72 | 48              | 52          |
| LM250L-1800 | 1,800  | 70.87 | 2,268               | 89.29 | 2,368       | 93.23  | 2,125            | 83.66 | 2,225       | 87.60 | 52              | 56          |
| LM250L-2000 | 2,000  | 78.74 | 2,468               | 97.17 | 2,568       | 101.10 | 2,325            | 91.54 | 2,425       | 95.47 | 60              | 60          |

**Suggested Orientations:**

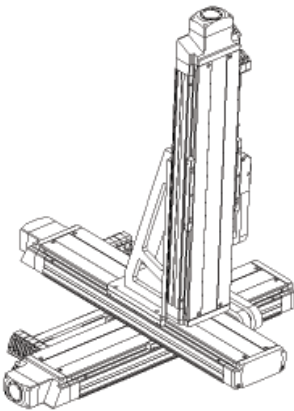
Option 1



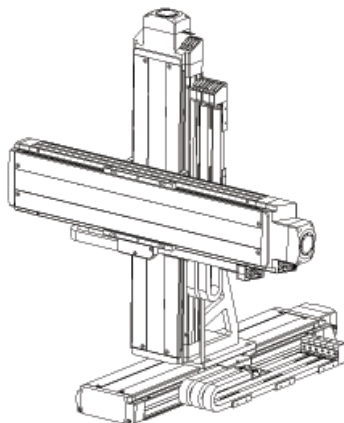
Option 2



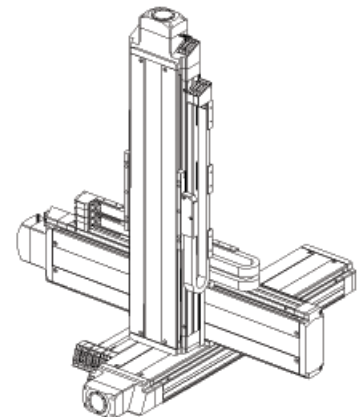
Option 3



Option 4



Option 5



Option 6

**Options****Multi-Axis Configurations**

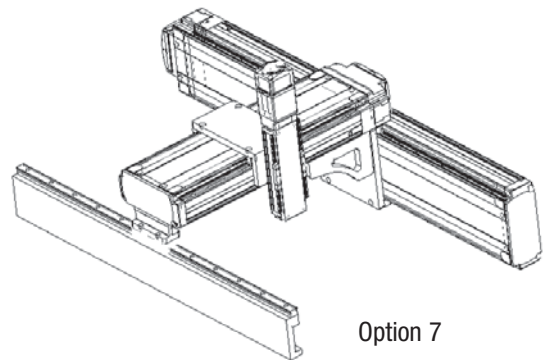
Various multi-axis configurations with brackets are available (see examples).

**Calibration Option**

Parker Bayside provides laser calibration to optimize your stage for the most demanding applications.

**Cables**

Power and sensor cables for the LM are available. Options include cables with connectors to Parker Bayside's i-Drive digital amplifier or with flying leads for hook up to any servo amplifier. Custom motor files can be supplied to drive the LM with non-Parker Bayside amplifiers.



Option 7

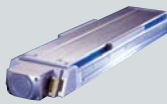
**Mating Power Cable**

| Part Number | Length  | Used With    |
|-------------|---------|--------------|
| 10963204    | 3 meter | Flying Leads |
| 10963205    | 8 meter | Flying Leads |

**Mating Sensor Cable**

| Part Number             | Length  | Used With            |
|-------------------------|---------|----------------------|
| 10963194                | 3 meter | Flying Leads         |
| 10963201                | 3 meter | i-Drive              |
| 10963202                | 8 meter | Flying Leads         |
| 10963203                | 8 meter | i-Drive              |
| 12602001 <sup>(1)</sup> | —       | i-Drive / Controller |

(1) NOTE: When an external controller is used in a closed loop mode an additional sensor cable, part number 12602001, is required.



Catalog  
Configuration  
Numbering:

|           |            |          |   |             |   |          |           |          |          |           |          |          |   |            |
|-----------|------------|----------|---|-------------|---|----------|-----------|----------|----------|-----------|----------|----------|---|------------|
| <b>LM</b> | <b>150</b> | <b>D</b> | - | <b>0300</b> | - | <b>D</b> | <b>10</b> | <b>L</b> | <b>N</b> | <b>05</b> | <b>E</b> | <b>V</b> | - | <b>XXX</b> |
| <b>A</b>  | <b>B</b>   | <b>C</b> |   | <b>D</b>    |   | <b>E</b> | <b>F</b>  | <b>G</b> | <b>H</b> | <b>I</b>  | <b>J</b> | <b>K</b> |   | <b>L</b>   |

|           |                     |
|-----------|---------------------|
| <b>A</b>  | <b>STAGE SERIES</b> |
| <b>LM</b> | LM Series           |

|            |                              |
|------------|------------------------------|
| <b>B</b>   | <b>METRIC WIDTH OF STAGE</b> |
| <b>100</b> | 100 mm (4in) (2)             |
| <b>150</b> | 150 mm (6in)                 |
| <b>250</b> | 250 mm (10in) (1)            |

|          |                     |
|----------|---------------------|
| <b>C</b> | <b>DRIVE TYPE</b>   |
| <b>D</b> | Motor, Direct Drive |
| <b>F</b> | Flange Mount        |
| <b>L</b> | Motor, Linear (3)   |

| <b>D</b> | <b>TRAVEL</b> | <b>100<br/>(mm)</b> | <b>Width<br/>150<br/>(mm)</b> | <b>250<br/>(mm)</b> |
|----------|---------------|---------------------|-------------------------------|---------------------|
|          | <b>0050</b>   | 50                  | —                             | —                   |
|          | <b>0100</b>   | 100                 | —                             | —                   |
|          | <b>0150</b>   | 150                 | —                             | —                   |
|          | <b>0200</b>   | 200                 | 200                           | 200                 |
|          | <b>0250</b>   | 250                 | —                             | —                   |
|          | <b>0300</b>   | 300                 | 300                           | 300                 |
|          | <b>0350</b>   | 350                 | —                             | —                   |
|          | <b>0400</b>   | 400                 | 400                           | 400                 |
|          | <b>0450</b>   | 450                 | —                             | —                   |
|          | <b>0500</b>   | 500                 | 500                           | 500                 |
|          | <b>0550</b>   | 550                 | —                             | —                   |
|          | <b>0600</b>   | 600                 | 600                           | 600                 |
|          | <b>0700</b>   | —                   | 700                           | 700                 |
|          | <b>0800</b>   | —                   | 800                           | 800                 |
|          | <b>0900</b>   | —                   | 900                           | 900                 |
|          | <b>1000</b>   | —                   | 1,000                         | 1,000               |
|          | <b>1200</b>   | —                   | 1,200                         | 1,200               |
|          | <b>1400</b>   | —                   | 1,400                         | 1,400               |
|          | <b>1600</b>   | —                   | 1,600 (6)                     | 1,600 (6)           |
|          | <b>1800</b>   | —                   | 1,800 (6)                     | 1,800 (6)           |
|          | <b>2000</b>   | —                   | 2,000 (6)                     | 2,000 (6)           |

|          |                                                 |
|----------|-------------------------------------------------|
| <b>E</b> | <b>MOTOR TYPE</b>                               |
| <b>D</b> | Motor, Rotary Direct Drive<br>(160V, 2,000 LPR) |
| <b>E</b> | Motor, Rotary Direct Drive<br>(300V, 2000 LPR)  |
| <b>I</b> | Motor, Linear, Ironcore (3)                     |
| <b>X</b> | See how to order step 3                         |

|           |                             |
|-----------|-----------------------------|
| <b>F</b>  | <b>DRIVE VARIATIONS</b>     |
|           | <b>Ball Screw Options</b>   |
| <b>05</b> | 5 mm Lead (7)               |
| <b>10</b> | 10 mm Lead (7)              |
| <b>16</b> | 16 mm Lead (7)              |
|           | <b>Linear Motor Options</b> |
| <b>03</b> | Single Coil (6)             |
| <b>06</b> | Double Coil (6)             |

|          |                                                     |
|----------|-----------------------------------------------------|
| <b>G</b> | <b>HOME &amp; LIMIT</b>                             |
| <b>N</b> | None                                                |
| <b>L</b> | NPN Normally Closed<br>(+5~24Vdc, Sinking 20mA Max) |

|          |                            |
|----------|----------------------------|
| <b>H</b> | <b>BRAKE</b>               |
| <b>B</b> | Fail Safe Brake Option (7) |
| <b>N</b> | None                       |

| <b>I</b>  | <b>ENCODER, LINEAR</b> | <b>Max Speed</b> |
|-----------|------------------------|------------------|
| <b>00</b> | None (7)               | —                |
| <b>01</b> | 0.1 $\mu$ m            | 0.7m/sec         |
| <b>05</b> | 0.5 $\mu$ m            | 3 m/sec          |
| <b>10</b> | 1 $\mu$ m              | 3 m/sec          |
| <b>50</b> | 5 $\mu$ m              | 3 m/sec          |

|          |                    |
|----------|--------------------|
| <b>J</b> | <b>PROTECTION</b>  |
| <b>C</b> | Extruded Cover (8) |
| <b>E</b> | Fully Enclosed (8) |

|          |                        |
|----------|------------------------|
| <b>K</b> | <b>ENVIRONMENT</b>     |
| <b>C</b> | 10,000 Class Cleanroom |
| <b>S</b> | Standard               |

|            |                |
|------------|----------------|
| <b>L</b>   | <b>SPECIAL</b> |
| <b>XXX</b> | Factory Issued |

## NOTES:

- (1) 250 available 2nd Quarter 2003
- (2) 100 available 3rd Quarter 2003
- (3) Not available on LM100 models
- (4) Only available for choice D in section C
- (5) Only available for choice F in section C
- (6) Only available for choice L in section C
- (7) Not available for choice L in section C
- (8) Not available for travels greater than 1200 mm

## How to Order

1. Select options to create catalog configuration number: this is a reference number.
2. When placing an order, Parker Bayside will issue the unique part number for your configuration.
3. Specify motor, make and model for mounting kit.

LM Stages are supported by a worldwide network of offices and local distributors. Call 1-800-305-4555 for application engineering assistance or for the name of your local distributor. Information can also be obtained at [www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com).

Specifications are subject to change without notice.

# Micro Series: Crossed Roller Precision Stages



**M050 Model**

**M075 Model**

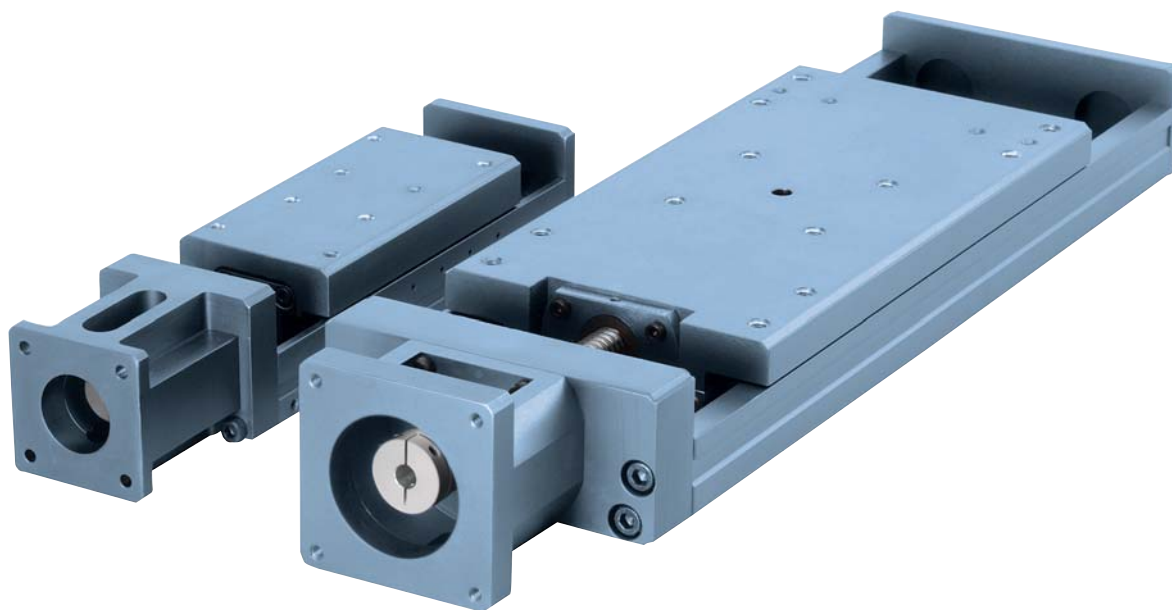
**M100 Model**

**M150 Model**



# Micro Series: Overview

Micro positioning stages feature a low-profile design for space-sensitive applications and precision crossed roller bearings for high accuracies and exceptional repeatability. The stages come ready to mount to standard servomotors. Available in a variety of widths, travels, materials and ball screw or lead screw, Micro positioning stages offer system design flexibility, while providing superior performance.



## M050

50mm wide

Maximum travel 100mm

Maximum load capacity 117kg

Standard NEMA 17 motor mounting and coupling

## M075

75mm wide

Maximum travel 150mm

Maximum load capacity 339kg

Standard NEMA 17 motor mounting and coupling

## M100

100mm wide

Maximum travel 150mm

Maximum load capacity 489kg

Standard NEMA 23 or mounting and coupling

## M150

150mm wide

Maximum travel 200mm

Maximum load capacity 652kg

Standard NEMA 23 or mounting and coupling

## Precision Drive Screws

Micro Series Ball Screw-Stages use a C3 class precision ground ball screw. The ball nut is a single-piece construction that uses ball compression to eliminate axial play and establish a preload. The Micro Series ball screw provides for very high axial loads and high duty-cycle capability. Micro Series Lead Screw Stages use a precision ground "V" thread screw, using a self-adjusting nut with a multi-flexured, self-aligning housing. This reduces the effects of lead screw errors and allows for uniform torque and smooth motion. The Micro Series lead screw provides for constant velocity without vibration or ripple.

### When to Use:

- ▶ High precision
- ▶ Compact design
- ▶ Constant velocity
- ▶ Short travel
- ▶ High axial load
- ▶ High-duty cycle
- ▶ Rugged for high vibration and temperature

### Applications:

- ▶ Custom tool manufacturing
- ▶ Disk drive assembly and testing
- ▶ Electronics inspection
- ▶ Injection molding
- ▶ Non-destructive testing
- ▶ Small parts gauging
- ▶ Tool grinding

3

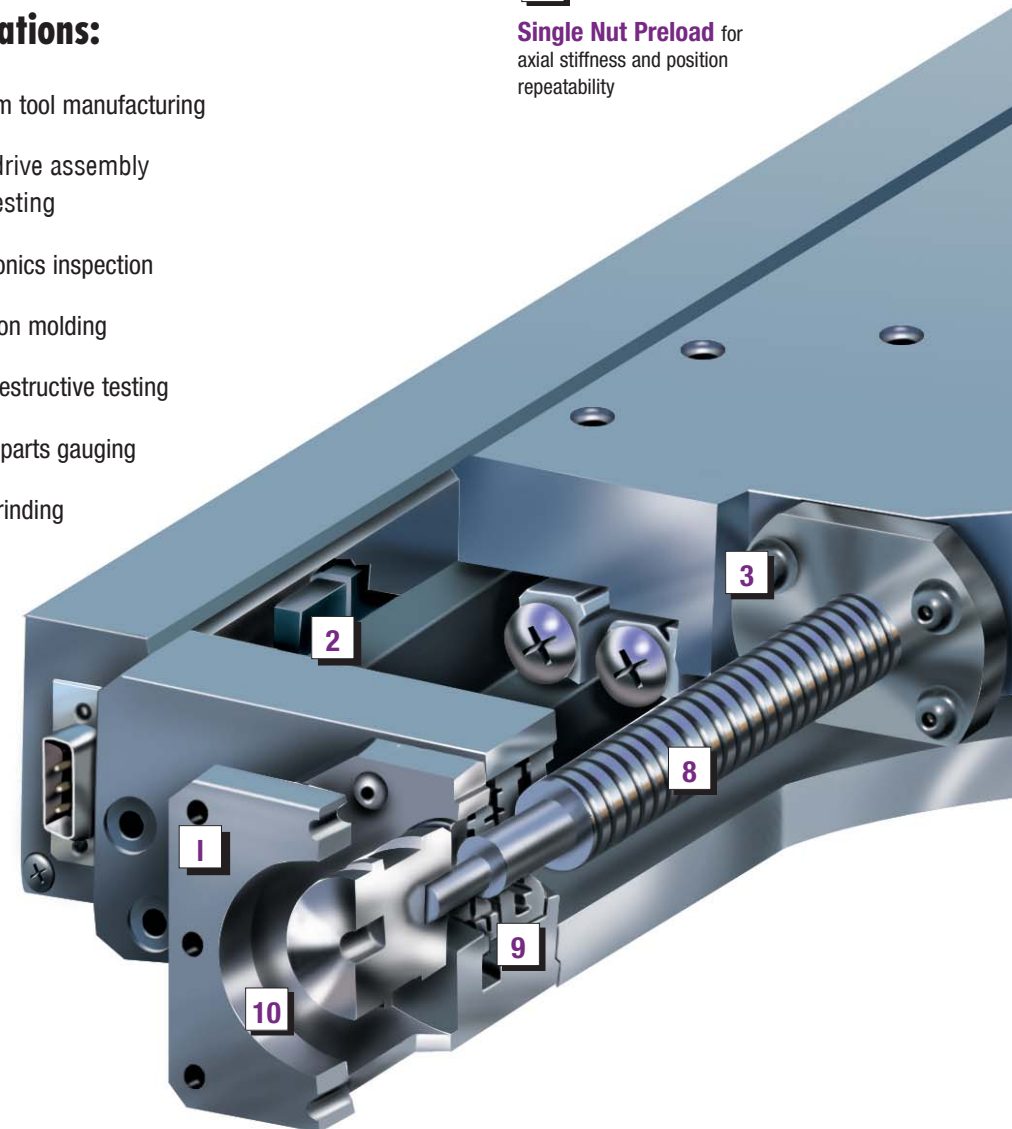
**Single Nut Preload** for axial stiffness and position repeatability

1

**Ready To Mount** for easy installation of any servo or step motor

2

**Optional Home and Travel Limits** for safety



10

**Servo Flex Coupling** for easy motor alignment without wind-up

9

**ABEC 7 Preloaded Angular Contact Bearings** for high loads and spindle stiffness



4

**Optional Bellows  
Waycover** for protection  
from dust and dirt

4

5

5

**Aluminum Construction**  
for precision applications  
requiring lightweight staging  
with high accuracy, or

**Cast Iron Construction**  
for rugged applications with  
high vibration or varying  
temperature environments

7

6

6

**Optional Linear Encoder**  
for direct position feedback

8

**C3 Class Precision Ground Ball  
Screw or Ground "V" Thread  
Screw**  
for high positioning accuracy

7

**Precision Crossed  
Roller Bearings**  
for high loads, low friction  
and straight line accuracy

## Performance Specifications

| Model No. | Travel Range |              | Maximum Velocity          |            |                           |            | Maximum Load |       | Maximum Axial Load |       |            |       |
|-----------|--------------|--------------|---------------------------|------------|---------------------------|------------|--------------|-------|--------------------|-------|------------|-------|
|           | (mm)         | (in)         | Lead Screw <sup>(1)</sup> |            | Ball Screw <sup>(2)</sup> |            | (kgf)        | (lbf) | Lead Screw         |       | Ball Screw |       |
|           |              |              | (mm / sec)                | (in / sec) | (mm / sec)                | (in / sec) |              |       | (kgf)              | (lbf) | (kgf)      | (lbf) |
| M050      | 25 to 100    | 0.98 to 3.93 | 12                        | 0.5        | —                         | —          | 117          | 260   | 2.3                | 5.2   | —          | —     |
| M075      | 50 to 150    | 1.96 to 5.90 | 12                        | 0.5        | 25                        | 1          | 339          | 750   | 2.3                | 5.2   | 4.5        | 10.1  |
| M100      | 25 to 150    | 0.98 to 5.90 | 75                        | 3.0        | 150                       | 6          | 489          | 1,080 | 4.5                | 10.1  | 31.7       | 71.3  |
| M150      | 50 to 200    | 1.96 to 7.87 | 100                       | 4.0        | 300                       | 12         | 652          | 1,710 | 11.3               | 25.4  | 54.5       | 122.5 |

Accuracy Specifications<sup>(3)</sup>

| Model No. | Straightness/Flatness |           | Pitch & Yaw      |           | Accuracy <sup>(4)</sup> |           | Repeatability <sup>(4)</sup> |          |
|-----------|-----------------------|-----------|------------------|-----------|-------------------------|-----------|------------------------------|----------|
|           | (microns/25mm)        | (in / in) | (arc sec / 25mm) | (in / in) | (microns)               | (in / in) | (microns)                    | (in)     |
| M050      | ±2.50                 | ±0.00010  | ±3.0             | ±0.00011  | ±6.0                    | ±0.0002   | ±1                           | ±0.00004 |
| M075      | ±2.50                 | ±0.00010  | ±3.0             | ±0.00011  | ±6.0                    | ±0.0002   | ±1                           | ±0.00004 |
| M100      | ±2.50                 | ±0.00010  | ±2.5             | ±0.00010  | ±6.5                    | ±0.0001   | ±1                           | ±0.00004 |
| M150      | ±1.25                 | ±0.00005  | ±2.0             | ±0.00007  | ±6.5                    | ±0.0001   | ±2                           | ±0.00008 |

## Screw Inertia

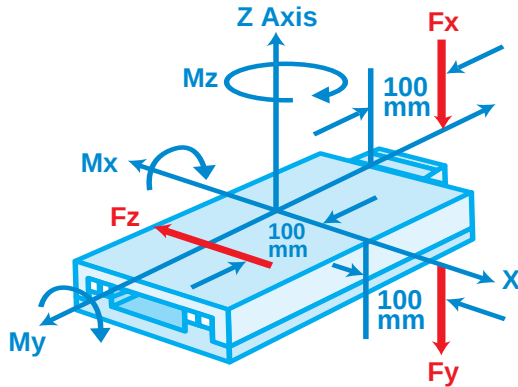
| Model No. | Lead Screw                |                           | Ball Screw                |                           | Coupling Inertia          |                           | Moving Slide Weight |      |           |       |
|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------|------|-----------|-------|
|           | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) | Aluminum            |      | Cast Iron |       |
|           |                           |                           |                           |                           |                           |                           | (kg)                | (lb) | (kg)      | (lb)  |
| M050-025  | 0.00039                   | 0.000006                  | —                         | —                         | 0.0112                    | 0.00016                   | 0.39                | 0.86 | 1.1       | 2.42  |
| M050-050  | 0.00065                   | 0.000009                  | —                         | —                         | 0.0112                    | 0.00016                   | 0.50                | 1.10 | 1.3       | 2.86  |
| M050-100  | 0.00077                   | 0.000011                  | —                         | —                         | 0.0112                    | 0.00016                   | 0.77                | 1.70 | 2.0       | 4.40  |
| M075-050  | 0.0033                    | 0.000046                  | 0.0049                    | 0.00007                   | 0.0112                    | 0.00016                   | 0.68                | 1.50 | 1.76      | 3.87  |
| M075-100  | 0.0048                    | 0.000067                  | 0.0049                    | 0.00007                   | 0.0112                    | 0.00016                   | 1.04                | 2.29 | 2.70      | 5.94  |
| M075-150  | 0.0066                    | 0.000091                  | 0.0073                    | 0.0001                    | 0.0112                    | 0.00016                   | 1.45                | 3.19 | 3.76      | 8.27  |
| M100-025  | 0.0017                    | 0.000023                  | 0.0166                    | 0.00023                   | 0.0112                    | 0.00016                   | 0.95                | 2.09 | 2.46      | 5.41  |
| M100-050  | 0.0021                    | 0.000029                  | 0.0196                    | 0.00027                   | 0.0112                    | 0.00016                   | 1.25                | 2.75 | 3.24      | 7.12  |
| M100-075  | 0.0025                    | 0.000034                  | 0.0279                    | 0.00039                   | 0.0112                    | 0.00016                   | 1.50                | 3.30 | 3.89      | 8.55  |
| M100-100  | 0.0025                    | 0.000034                  | 0.0279                    | 0.00039                   | 0.0112                    | 0.00016                   | 1.75                | 3.85 | 4.54      | 9.98  |
| M100-150  | 0.0037                    | 0.000052                  | 0.0299                    | 0.00042                   | 0.0112                    | 0.00016                   | 2.00                | 4.40 | 5.19      | 11.41 |
| M150-050  | 0.028                     | 0.00039                   | 0.095                     | 0.0013                    | 0.0112                    | 0.00016                   | 1.55                | 3.41 | 4.02      | 8.847 |
| M150-100  | 0.032                     | 0.00045                   | 0.095                     | 0.0013                    | 0.0112                    | 0.00016                   | 1.55                | 3.41 | 4.02      | 8.84  |
| M150-150  | 0.048                     | 0.00067                   | 0.135                     | 0.0019                    | 0.0112                    | 0.00016                   | 2.98                | 6.55 | 7.73      | 17.00 |
| M150-200  | 0.080                     | 0.00111                   | 0.240                     | 0.0033                    | 0.0112                    | 0.00016                   | 2.98                | 6.55 | 7.73      | 17.00 |

(1) Based on 0.2in Lead Screw.

(2) Based on 10mm Ball Screw.

(3) Accuracy is based on stage mounted to a flat granite surface and measured at 25mm above the center of the stage.

(4) Accuracy and repeatability are based on open loop lead accuracy and can be enhanced with encoder feedback. Accuracy shown is over full range of travel.



**F<sub>x</sub>** is the load applied in the Z Axis direction, 100mm off end, causing M<sub>x</sub> rotation around the X Axis.

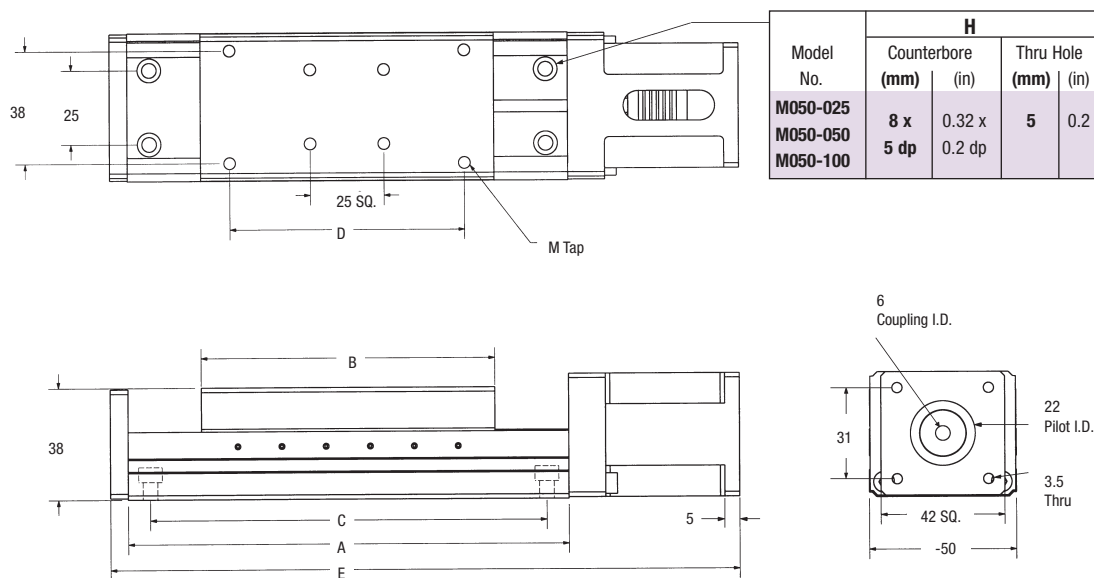
**F<sub>y</sub>** is the load applied in the Z Axis direction, 100mm off side, causing M<sub>y</sub> rotation around the Y Axis.

**F<sub>z</sub>** is the load applied around the Z Axis at a 100mm radius from the center, causing M<sub>z</sub> rotation around the Z Axis.

## Moment Loading

| Model No. | F(M <sub>x</sub> )<br>(Load applied at 100mm off end) |      | F(M <sub>y</sub> )<br>(Load applied at 100mm off side) |      | F(M <sub>z</sub> )<br>(Load applied at 100mm off center) |      |
|-----------|-------------------------------------------------------|------|--------------------------------------------------------|------|----------------------------------------------------------|------|
|           | (kg)                                                  | (lb) | (kg)                                                   | (lb) | (kg)                                                     | (lb) |
| M050-025  | 4                                                     | 9    | 3                                                      | 6    | 1                                                        | 3    |
| M050-050  | 6                                                     | 13   | 3                                                      | 8    | 2                                                        | 4    |
| M050-100  | 9                                                     | 21   | 4                                                      | 10   | 2                                                        | 5    |
| M075-050  | 24                                                    | 52   | 6                                                      | 36   | 8                                                        | 18   |
| M075-100  | 32                                                    | 70   | 19                                                     | 41   | 9                                                        | 21   |
| M075-150  | 40                                                    | 89   | 20                                                     | 45   | 10                                                       | 22   |
| M100-025  | 42                                                    | 92   | 23                                                     | 50   | 11                                                       | 25   |
| M100-050  | 45                                                    | 100  | 23                                                     | 51   | 12                                                       | 26   |
| M100-075  | 51                                                    | 113  | 24                                                     | 53   | 12                                                       | 26   |
| M100-100  | 55                                                    | 121  | 24                                                     | 53   | 12                                                       | 27   |
| M100-150  | 65                                                    | 142  | 25                                                     | 56   | 13                                                       | 28   |
| M150-050  | 168                                                   | 369  | 97                                                     | 213  | 48                                                       | 107  |
| M150-100  | 132                                                   | 290  | 77                                                     | 170  | 39                                                       | 85   |
| M150-150  | 240                                                   | 528  | 105                                                    | 231  | 53                                                       | 116  |
| M150-200  | 204                                                   | 449  | 90                                                     | 198  | 45                                                       | 99   |

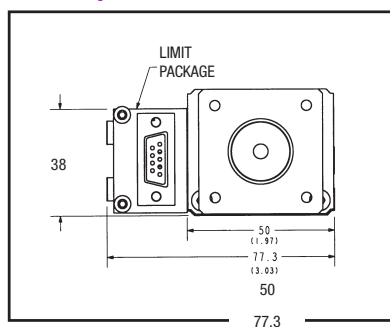
## Dimensions



| Model No. | Travel |      | A    |      | B    |      | C    |      | D    |      |
|-----------|--------|------|------|------|------|------|------|------|------|------|
|           | (mm)   | (in) | (mm) | (in) | (mm) | (in) | (mm) | (in) | (mm) | (in) |
| M050-025  | 25     | 0.98 | 100  | 3.94 | 75   | 2.95 | 80   | 3.14 | 50   | 1.97 |
| M050-050  | 50     | 1.97 | 150  | 5.91 | 100  | 3.94 | 135  | 5.31 | 80   | 3.15 |
| M050-100  | 100    | 3.94 | 250  | 9.84 | 150  | 5.91 | 240  | 9.44 | 135  | 5.31 |

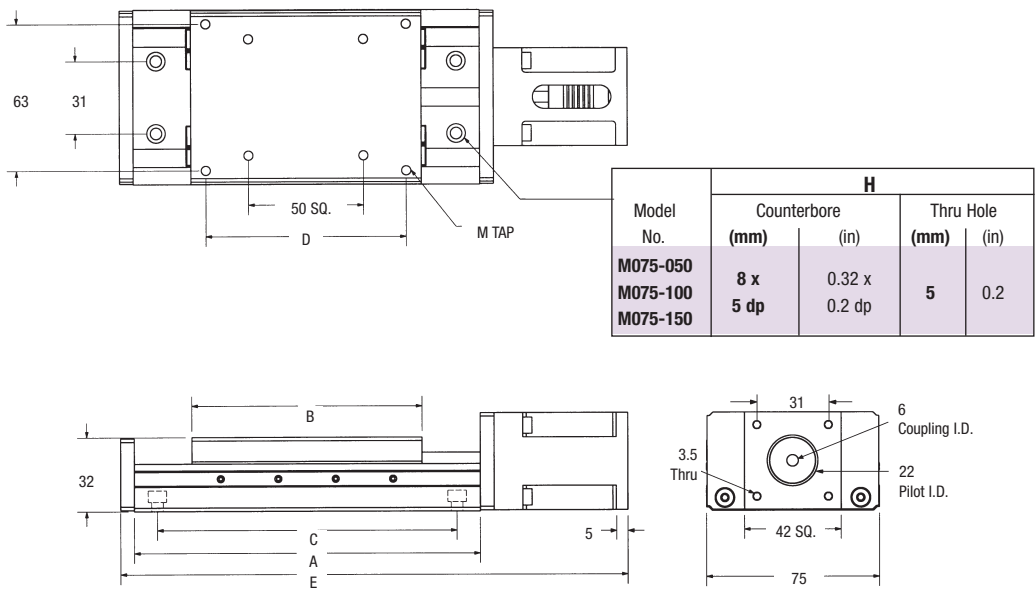
| Model No. | E    |       | M Tap  | Stage Weight |      | Maximum Load |      |
|-----------|------|-------|--------|--------------|------|--------------|------|
|           | (mm) | (in)  |        | (kg)         | (lb) | (kg)         | (lb) |
| M050-025  | 164  | 6.45  | M4x0.7 | 0.90         | 1.98 | 58           | 130  |
| M050-050  | 214  | 8.42  | M4x0.7 | 1.14         | 2.51 | 72           | 160  |
| M050-100  | 314  | 12.36 | M4x0.7 | 1.59         | 3.51 | 117          | 260  |

## M050 Options





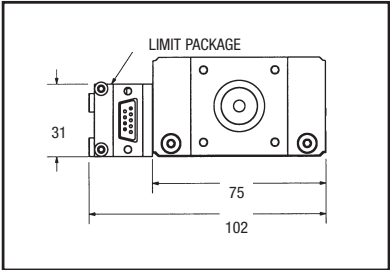
Dimensions



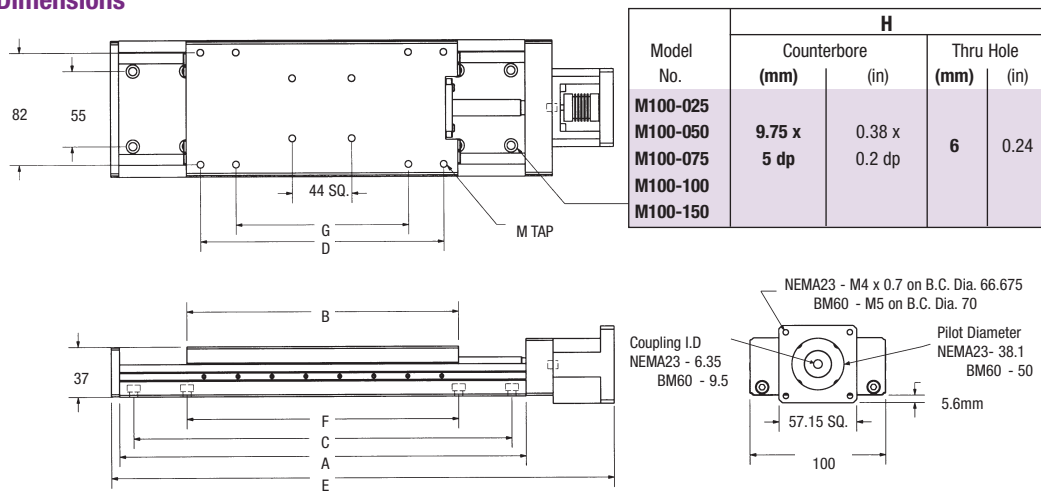
| Model No. | Travel |      | A                     |       |                    |       | B    |      | C    |       |
|-----------|--------|------|-----------------------|-------|--------------------|-------|------|------|------|-------|
|           | (mm)   | (in) | Without Waycover (mm) | (in)  | With Waycover (mm) | (in)  | (mm) | (in) | (mm) | (in)  |
| M075-050  | 50     | 1.97 | 150                   | 5.91  | 180                | 7.09  | 100  | 3.94 | 130  | 5.12  |
| M075-100  | 100    | 3.94 | 250                   | 9.84  | 300                | 11.81 | 150  | 5.91 | 225  | 8.86  |
| M075-150  | 150    | 5.91 | 350                   | 13.78 | 400                | 15.75 | 200  | 7.87 | 300  | 11.81 |

| Model No. | D    |      | E    |       | M     | Stage Weight |      | Maximum Load |      |
|-----------|------|------|------|-------|-------|--------------|------|--------------|------|
|           | (mm) | (in) | (mm) | (in)  |       | (kg)         | (lb) | (kg)         | (lb) |
| M075-050  | 87   | 3.43 | 220  | 8.66  | M4x.7 | 1.59         | 3.51 | 190          | 420  |
| M075-100  | 138  | 5.43 | 320  | 12.60 | M4x.7 | 2.05         | 4.52 | 258          | 570  |
| M075-150  | 188  | 7.40 | 420  | 16.53 | M4x.7 | 2.50         | 5.51 | 339          | 750  |

M075 Options



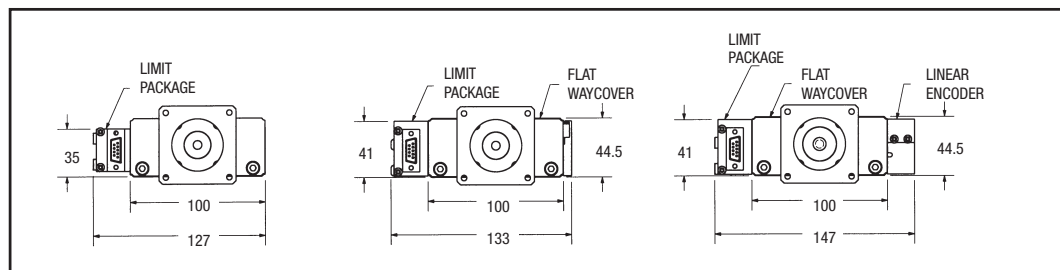
## Dimensions



| Model No. | Travel |      | A                |       |               |       | B    |      | C                |       |               |       | D    |      |
|-----------|--------|------|------------------|-------|---------------|-------|------|------|------------------|-------|---------------|-------|------|------|
|           | (mm)   | (in) | Without Waycover |       | With Waycover |       | (mm) | (in) | Without Waycover |       | With Waycover |       | (mm) | (in) |
| M100-025  | 25     | 0.98 | 150              | 5.91  | 175           | 6.89  | 125  | 4.92 | 127              | 4.99  | 127           | 4.99  | —    | —    |
| M100-050  | 50     | 1.97 | 200              | 7.87  | 230           | 9.05  | 150  | 5.91 | 178              | 7.00  | 178           | 7.00  | —    | —    |
| M100-075  | 75     | 2.95 | 250              | 9.84  | 280           | 11.02 | 175  | 6.89 | 229              | 9.01  | 229           | 9.01  | —    | —    |
| M100-100  | 100    | 3.94 | 300              | 11.81 | 350           | 13.78 | 200  | 7.87 | 279              | 10.98 | 279           | 10.98 | 179  | 7.05 |
| M100-150  | 150    | 5.91 | 400              | 15.75 | 450           | 17.72 | 250  | 9.84 | 381              | 14.99 | 431           | 16.97 | 229  | 9.02 |

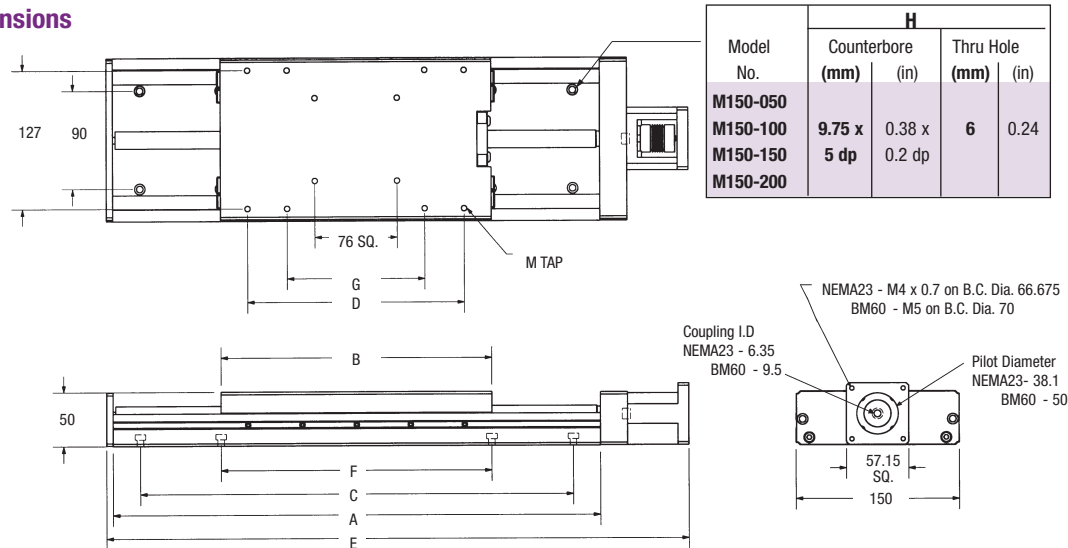
| Model No. | E    |      | F                |       |               |       | G    |      | M      | Stage Weight |      | Maximum Load |      |
|-----------|------|------|------------------|-------|---------------|-------|------|------|--------|--------------|------|--------------|------|
|           | (mm) | (in) | Without Waycover |       | With Waycover |       | (mm) | (in) | Tap    | (kg)         | (lb) | (kg)         | (lb) |
| M100-025  | 221  | 8.7  | —                | —     | —             | —     | 100  | 3.94 | M5x0.8 | 1.90         | 4.19 | 298          | 660  |
| M100-050  | 266  | 10.5 | —                | —     | —             | —     | 127  | 4.99 | M5x0.8 | 2.25         | 4.96 | 326          | 720  |
| M100-075  | 321  | 12.6 | 179              | 7.05  | 179           | 7.05  | 150  | 5.91 | M5x0.8 | 2.93         | 6.46 | 353          | 780  |
| M100-100  | 371  | 14.6 | 200              | 7.87  | 200           | 7.87  | 127  | 4.99 | M5x0.8 | 3.40         | 7.50 | 353          | 780  |
| M100-150  | 471  | 18.4 | 330              | 12.99 | 370           | 14.57 | 127  | 4.99 | M5x0.8 | 4.48         | 9.88 | 489          | 1080 |

## M100 Options





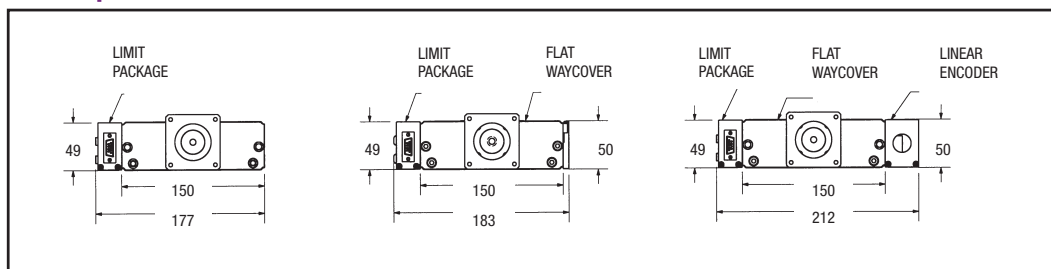
## Dimensions

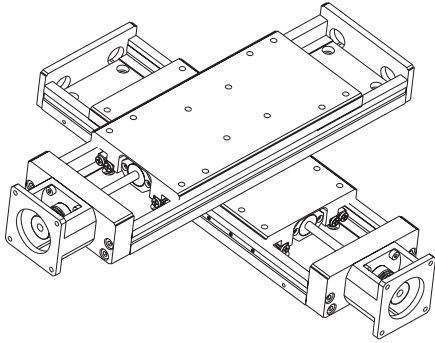


| Model No. | Travel |      | A                |       |               |       | B    |      | C    |       | D    |      |
|-----------|--------|------|------------------|-------|---------------|-------|------|------|------|-------|------|------|
|           | (mm)   | (in) | Without Waycover |       | With Waycover |       | (mm) | (in) | (mm) | (in)  | (mm) | (in) |
| M150-050  | 50     | 1.97 | 200              | 7.87  | 250           | 9.84  | 150  | 5.91 | 150  | 5.91  | —    | —    |
| M150-100  | 100    | 3.94 | 250              | 9.84  | 300           | 11.81 | 150  | 5.91 | 200  | 7.87  | —    | —    |
| M150-150  | 150    | 5.91 | 400              | 15.75 | 450           | 17.72 | 250  | 9.84 | 350  | 13.78 | 200  | 7.87 |
| M150-200  | 200    | 7.87 | 450              | 17.72 | 500           | 19.68 | 250  | 9.84 | 400  | 15.75 | 200  | 7.87 |

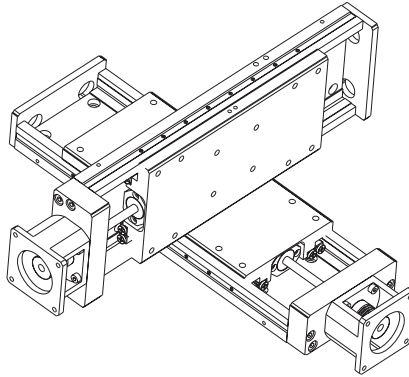
| Model No. | E    |      | F    |      | G    |      | M        | Stage Weight |       | Maximum Load |       |
|-----------|------|------|------|------|------|------|----------|--------------|-------|--------------|-------|
|           | (mm) | (in) | (mm) | (in) | (mm) | (in) |          | (kg)         | (lb)  | (kg)         | (lb)  |
| M150-050  | 228  | 8.98 | —    | —    | —    | —    | M5 x 0.8 | 4.00         | 8.82  | 407          | 900   |
| M150-100  | 338  | 13.3 | —    | —    | —    | —    | M5 x 0.8 | 5.00         | 11.03 | 570          | 1,260 |
| M150-150  | 488  | 19.2 | 250  | 9.84 | 127  | 4.99 | M5 x 0.8 | 7.90         | 17.42 | 652          | 1,440 |
| M150-200  | 538  | 21.2 | 250  | 9.84 | 127  | 4.99 | M5 x 0.8 | 8.99         | 19.82 | 774          | 1,710 |

## M150 Options

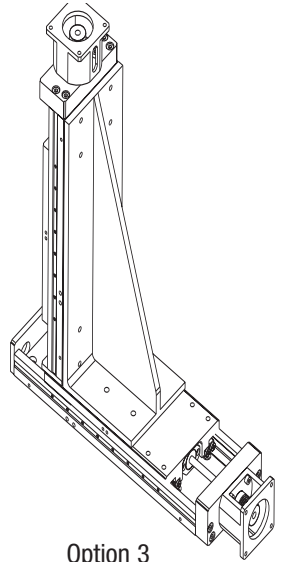


**Suggested Orientations:**

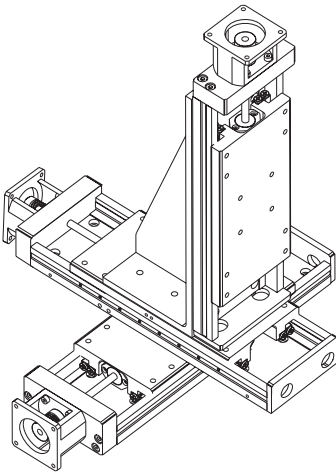
Option 1



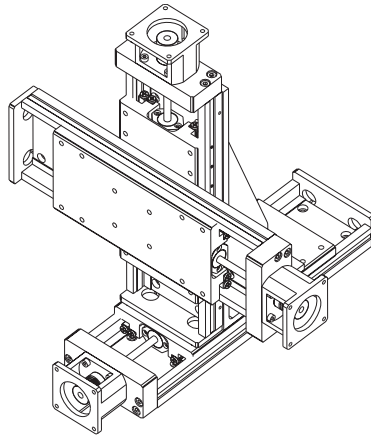
Option 2



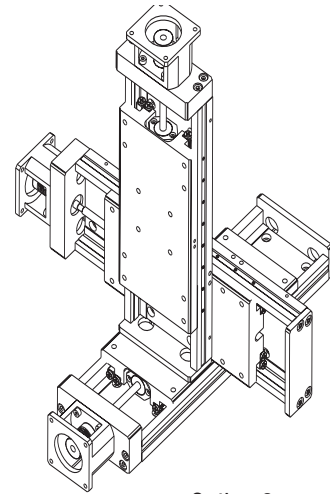
Option 3



Option 4



Option 5



Option 6

**Options:****Multi-Axis Configurations**

Various multi-axis configurations with brackets are available (see examples).

**Calibration Option**

Parker Bayside provides laser calibrated and / or matched roller options to optimize your stage for the most demanding applications.

**P.A.C.T.**

Prevents crossed roller bearing creep in vertical and / or high-speed applications.

**Special Environment Option**

Parker Bayside can prepare your stage for a variety of environments including:

- ▶ Vacuum
- ▶ Clean Room
- ▶ Radiation
- ▶ Food Grade

**Special Lubricants**

Dry lubricant suitable for environments that need a dry, permanent lubrication (e.g. vacuum-rated applications).



Order Numbering  
Example:

|          |            |          |          |          |          |          |          |          |
|----------|------------|----------|----------|----------|----------|----------|----------|----------|
| <b>M</b> | <b>100</b> | <b>A</b> | <b>3</b> | <b>6</b> | <b>4</b> | <b>2</b> | <b>A</b> | <b>3</b> |
| <b>A</b> | <b>B</b>   | <b>C</b> | <b>D</b> | <b>E</b> | <b>F</b> | <b>G</b> | <b>H</b> | <b>I</b> |

|          |                     |
|----------|---------------------|
| <b>A</b> | <b>STAGE SERIES</b> |
| <b>M</b> | Micro Series        |

|            |                              |
|------------|------------------------------|
| <b>B</b>   | <b>METRIC WIDTH OG STAGE</b> |
| <b>050</b> | 50 mm                        |
| <b>075</b> | 75 mm                        |
| <b>100</b> | 100 mm                       |
| <b>150</b> | 150 mm                       |

|          |                 |
|----------|-----------------|
| <b>C</b> | <b>MATERIAL</b> |
| <b>A</b> | Aluminum        |
| <b>C</b> | Cast Iron       |

| <b>D</b> | <b>TRAVEL</b> | <b>Width</b>        |                     |                     |                     |
|----------|---------------|---------------------|---------------------|---------------------|---------------------|
|          |               | <b>050<br/>(mm)</b> | <b>075<br/>(mm)</b> | <b>100<br/>(mm)</b> | <b>150<br/>(mm)</b> |
| <b>1</b> |               | 25                  | —                   | 25                  | —                   |
| <b>2</b> |               | 50                  | 50                  | 50                  | 50                  |
| <b>3</b> |               | —                   | —                   | 75                  | —                   |
| <b>4</b> |               | 100                 | 100                 | 100                 | 100                 |
| <b>5</b> |               | —                   | 150                 | 150                 | 150                 |
| <b>6</b> |               | —                   | —                   | —                   | 200                 |

E

| DRIVE VARIATIONS          |          |          |        |        |
|---------------------------|----------|----------|--------|--------|
|                           | 050      | 075      | 100    | 150    |
| Lead Screw Options (Lead) |          |          |        |        |
| 1                         | 0.025 in | 0.025 in | —      | —      |
| 2                         | —        | —        | 0.1 in | 0.1 in |
| 3                         | —        | —        | 0.2 in | 0.2 in |
| 4                         | 1 mm     | 1 mm     | 1 mm   | 1 mm   |
|                           |          |          |        |        |
| Ball Screw Options (Lead) |          |          |        |        |
| 5                         | —        | 2.5 mm   | —      | —      |
| 6                         | —        | —        | 10 mm  | 10 mm  |
| 7                         | —        | —        | 2 mm   | 3 mm   |
| 8                         | —        | —        | —      | 5 mm   |

|          |                                     |
|----------|-------------------------------------|
| <b>F</b> | <b>LIMITS &amp; BELLOWS (1, 2)</b>  |
| <b>1</b> | None                                |
| <b>2</b> | None with Bellows                   |
| <b>3</b> | End of Travel                       |
| <b>4</b> | End of Travel with Bellows          |
| <b>5</b> | End of Travel and Home              |
| <b>6</b> | End of Travel and Home with Bellows |

|          |                           |              |            |            |            |
|----------|---------------------------|--------------|------------|------------|------------|
| <b>G</b> | <b>LINEAR ENCODER (2)</b> | <b>Width</b> |            |            |            |
|          |                           | <b>050</b>   | <b>075</b> | <b>100</b> | <b>150</b> |
| <b>1</b> |                           | None         | None       | None       | None       |
| <b>2</b> |                           | —            | —          | 0.1 µm     | 0.1 µm     |
| <b>3</b> |                           | —            | 0.5 µm     | 0.5 µm     | 0.5 µm     |

|          |                         |
|----------|-------------------------|
| <b>H</b> | <b>MOTOR MOUNTING</b>   |
| <b>X</b> | See how to order step 2 |

|          |                                                    |
|----------|----------------------------------------------------|
| <b>I</b> | <b>PACT / ENVIRONMENT</b>                          |
| <b>1</b> | None (Standard)                                    |
| <b>2</b> | Standard with PACT (1)                             |
| <b>3</b> | Clean Room (Anodized)(Class 10,000)                |
| <b>4</b> | Clean Room (Anodized)(Class 10,000)<br>w/ PACT (1) |
| <b>5</b> | Vacuum (No Finish)                                 |

## NOTES:

- (1) Not available on M050.
- (2) End-of-Travel and Home Limits integral to linear encoder will be provided, when a linear encoder is selected.

## How to Order

1. Pick features and options above.
2. Specify motor, make and model for mounting kit.

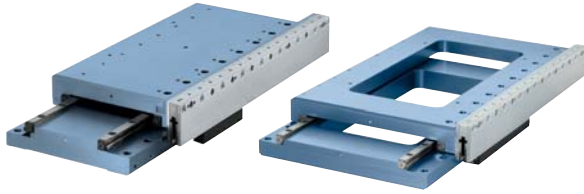
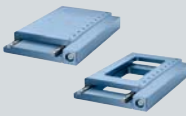
Micro positioning stages are supported by a worldwide network of offices and local distributors. Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor. Information can also be obtained at [www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com).

Specifications are subject to change without notice.

# Ultra Series: Crossed Roller Ultra Precision Stages

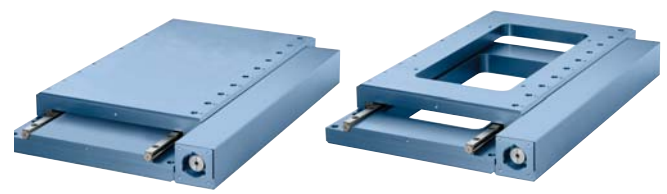


Linear Motor Driven  
Screw-Driven



**Linear Motor Ultra Stages** utilize a non-contact optical linear encoder, integrated directly into the stage footprint. The encoder tape scale is mounted upside-down and referenced directly off the bearing surface, eliminating any Abbe error and protecting it from any debris. The encoder read head is mounted inside the stationary base, eliminating moving wires.

- ▶ Sub-micron accuracy
- ▶ 0.5 micron repeatability
- ▶ Travels from 100mm to 500mm
- ▶ Patented AutoFlex Preload
- ▶ Built-in encoder and limits
- ▶ Optional open frame construction



**Screw-driven Ultra Stages** are ideal for easy mounting to any servo or step motor. For increasing positional accuracy, optional linear encoders are offered.

- ▶ Variety of ball screw and lead screw pitches
- ▶ Travels from 100 to 500mm
- ▶ 2 micron repeatability
- ▶ Optional linear encoder for direct position feedback
- ▶ Optional open frame construction
- ▶ Available in closed and open frame design

#### U200

Closed frame design  
200mm wide  
Maximum travel 400mm  
Maximum load capacity 1,859kg  
Maximum velocity to 1,500mm / sec

#### U200

Available in closed frame design  
200mm wide  
Maximum travel 400mm  
Maximum load capacity 1,859kg  
NEMA 23 or 60mm BM Servo motor mounting

#### U300

Available in closed-and open-frame design  
300mm wide  
Maximum travel 500mm  
Maximum load capacity 2,187kg  
Maximum velocity to 1,500mm/sec

#### U300

Available in closed and open frame design  
300mm wide  
Maximum travel 500mm  
Maximum load capacity 2,187kg  
NEMA 23 or 60mm BM Servo motor mounting

#### U400

Available in closed and open frame design  
400mm wide  
Maximum travel 500mm  
Maximum load capacity 2,187kg  
Maximum velocity to 1,500mm / sec

#### U400

Available in closed and open frame design  
400mm wide  
Maximum travel 500mm  
Maximum load capacity 2,187kg  
NEMA 23 or 60mm BM Servo motor mounting

#### U600

Available in open frame design  
600mm wide  
Maximum travel 500mm  
Maximum load capacity 2,187kg  
Maximum velocity to 1,500mm / sec

#### U600

Available in open frame design  
600mm wide  
Maximum travel 500mm  
Maximum load capacity 2,187kg  
NEMA 23 or 60mm BM Servo motor mounting

# Ultra Precision

### • Linear Motor Driven Ultra Stages

Linear Motor Ultra Stages can achieve sub-micron accuracy with position repeatability of + 1 encoder count. Featuring Parker Bayside's patented AutoFlex Preload, Linear Motor Ultra Stages provide exceptional smoothness of motion for constant velocity requirements in scanning applications. The AutoFlex preload provides a unique thermal compensation method, eliminating any effects of expansion/contraction on bearing performance. The brushless linear motor is mounted inverted, with the ironless coil attached to the stationary base, eliminating moving wires.

### • Screw-Driven Ultra Stages

Traditional Ultra Stages are provided with either a ball screw or lead screw mounted alongside the stage. This stage configuration allows easy mounting of any step or servo motor with a flexible coupling. The ball screw version provides high speed and high force for dynamic move-and-settle applications. The lead screw version provides exceptional smoothness for slow-speed scanning. Both the lead screw and ball screw models are available with linear encoders, providing high positional accuracy and repeatability.

## When to Use:

- ▶ High precision sub micron
- ▶ Precise repeatability
- ▶ Open or closed frame
- ▶ Thermal compensation
- ▶ Smooth motion

## Applications:

- ▶ Electronics
- ▶ Semiconductor
- ▶ Automation
- ▶ Medical
- ▶ Flat panel

2

### Optional Open Frame

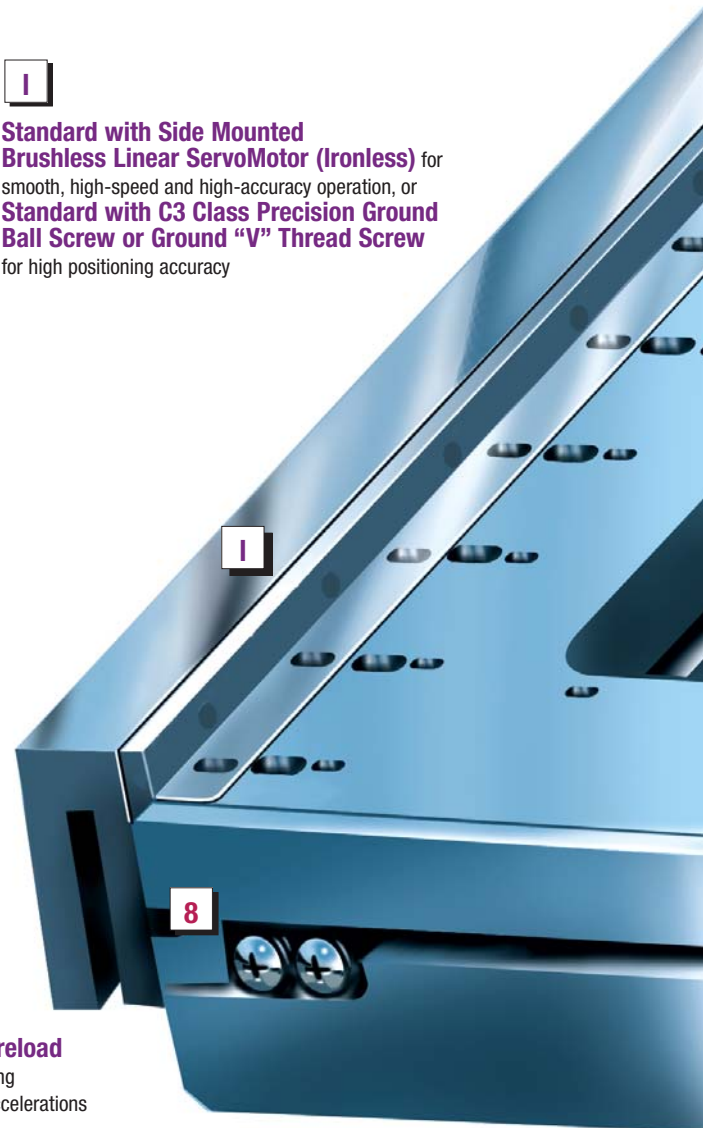
for through-stage lighting or inspection

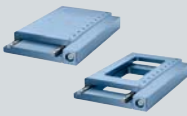
1

**Standard with Side Mounted Brushless Linear ServoMotor (Ironless)** for smooth, high-speed and high-accuracy operation, or **Standard with C3 Class Precision Ground Ball Screw or Ground "V" Thread Screw** for high positioning accuracy

8

**Patented AutoFlex™ Preload**  
for optimum performance during thermal expansion and high accelerations





3

**Rugged Aluminum Construction** for high accuracy and stiffness

4

**No Moving Wires**  
yields highest constant velocity and stage reliability

5

**Optional Hollow Rollers** for air bearing-type smoothness

3

4

2

6

5

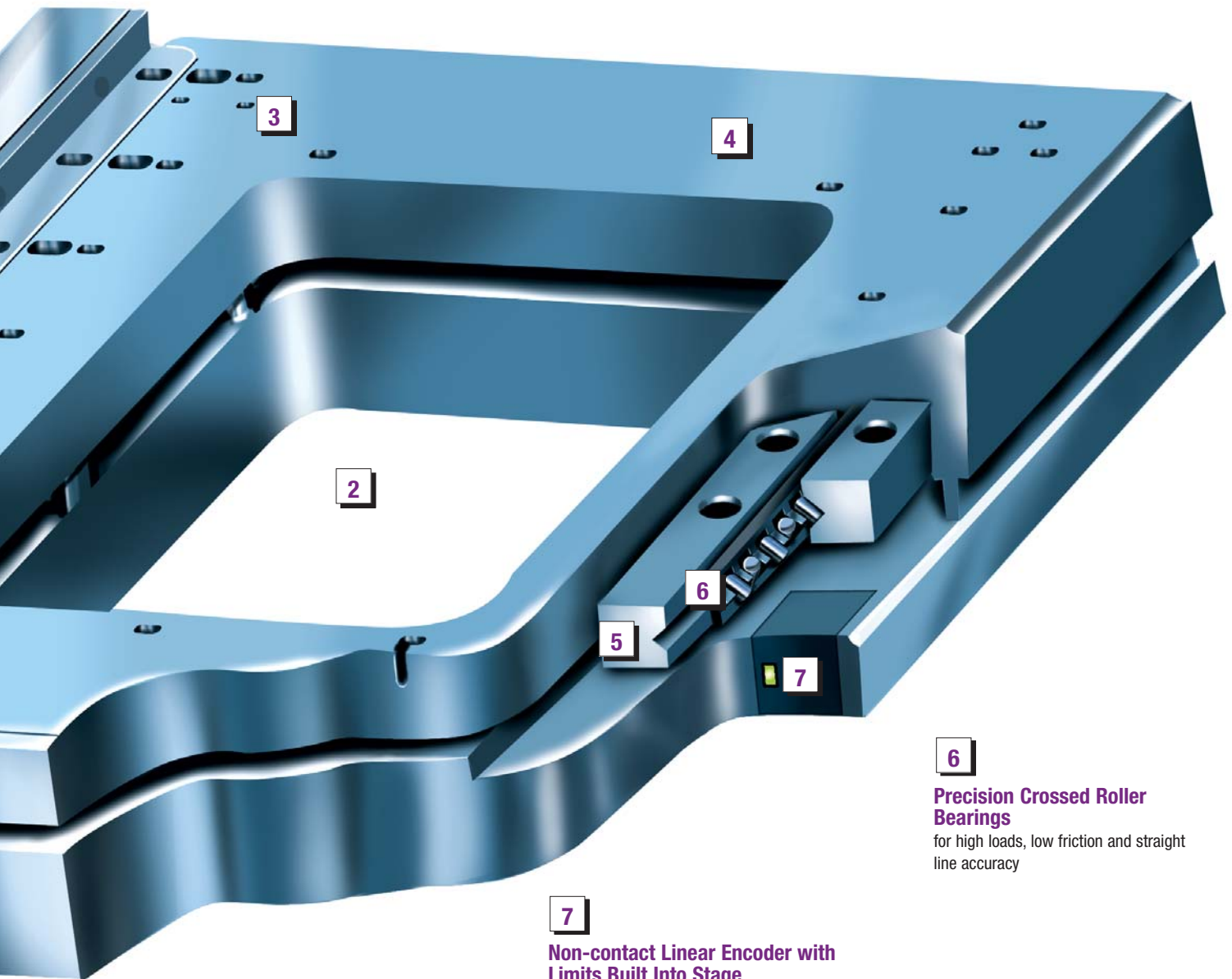
7

6

**Precision Crossed Roller Bearings**  
for high loads, low friction and straight line accuracy

7

**Non-contact Linear Encoder with Limits Built Into Stage**  
for position feedback



Performance and Accuracy Specifications<sup>(1)</sup>

| Model No. | Travel Range |                | Maximum Velocity <sup>(1)</sup> |          | Maximum Acceleration <sup>(1A)</sup> |
|-----------|--------------|----------------|---------------------------------|----------|--------------------------------------|
|           | (mm)         | (in)           | (mm/sec)                        | (in/sec) |                                      |
| U200      | 100 to 400   | 3.94 to 15.75  | 1,500                           | 59.1     | 2                                    |
| U300      | 200 to 500   | 7.87 to 19.69  | 1,500                           | 59.1     | 2                                    |
| U400      | 300 to 500   | 11.81 to 19.69 | 1,500                           | 59.1     | 2                                    |
| U600      | 500          | 19.69          | 1,500                           | 59.1     | 2                                    |

| Model No. | Straightness / Flatness<br>(microns/25mm) | Pitch & Yaw<br>(arc sec/25mm) | Accuracy <sup>(2)</sup><br>(microns) | Repeatability <sup>(2)</sup><br>(microns) |
|-----------|-------------------------------------------|-------------------------------|--------------------------------------|-------------------------------------------|
| U200      | ±1.25                                     | ±2.0                          | ±2                                   | ± 0.5                                     |
| U300      | ±1.25                                     | ±2.0                          | ±2                                   | ± 0.5                                     |
| U400      | ±1.25                                     | ±3.0                          | ±2                                   | ± 0.5                                     |
| U600      | ±1.25                                     | ±3.0                          | ±2                                   | ± 0.5                                     |

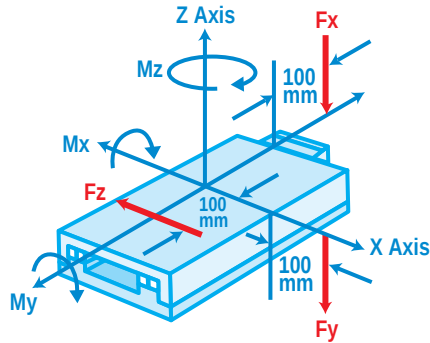
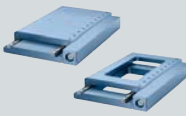
## Linear Motor Specifications

| All Linear Motor Ultra Series come with a brushless, ironless DC linear servomotor. The standard motors provided yield performance based on the moving mass and the customer load. For additional motor sizes to increase stage performance, please contact the factory. |            |               | Motors for<br>U200-100<br>U200-200<br>U200-300 | Motors for<br>U200-400<br>All U300 Series | Motors for<br>All U400 Series<br>All U600 Series |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------|------------------------------------------------|-------------------------------------------|--------------------------------------------------|
| Specification                                                                                                                                                                                                                                                            | Symbol     | Unit          |                                                |                                           |                                                  |
| Peak Force                                                                                                                                                                                                                                                               | $F_p$      | N             | 120                                            | 240                                       | 400                                              |
|                                                                                                                                                                                                                                                                          |            | lb            | 27.0                                           | 54.0                                      | 90                                               |
| Continuous Force                                                                                                                                                                                                                                                         | $F_c$      | N             | 38                                             | 76                                        | 122                                              |
|                                                                                                                                                                                                                                                                          |            | lb            | 9                                              | 17                                        | 28                                               |
| Motor Constant                                                                                                                                                                                                                                                           | $K_m$      | $N/\sqrt{W}$  | 4.7                                            | 6.6                                       | 9.5                                              |
|                                                                                                                                                                                                                                                                          |            | $lb/\sqrt{W}$ | 1.05                                           | 1.48                                      | 2.14                                             |
| Max Continuous Dissipation                                                                                                                                                                                                                                               | $P_c$      | W             | 65                                             | 131                                       | 167                                              |
| Peak Current                                                                                                                                                                                                                                                             | $I_p$      | amps RMS      | 7.1                                            | 7.1                                       | 7.0                                              |
| Continuous Current                                                                                                                                                                                                                                                       | $I_c$      | amps RMS      | 2.3                                            | 2.3                                       | 2.1                                              |
| Resistance                                                                                                                                                                                                                                                               | $R_{L-L}$  | ohms          | 6.1                                            | 12.2                                      | 17.2                                             |
| Inductance                                                                                                                                                                                                                                                               | $L_{L-L}$  | mH            | 1.3                                            | 2.6                                       | 6.0                                              |
| Back EMF Constant                                                                                                                                                                                                                                                        | $K_{EL-L}$ | Vpeak/mm/sec  | 13.7                                           | 27.5                                      | 46.5                                             |
|                                                                                                                                                                                                                                                                          |            | Vpeak/in/sec  | 0.35                                           | 0.70                                      | 1.18                                             |
| Force Constant                                                                                                                                                                                                                                                           | $K_f$      | N/amps        | 16.8                                           | 33.7                                      | 57                                               |
|                                                                                                                                                                                                                                                                          |            | lb/Arms       | 3.8                                            | 7.6                                       | 12.8                                             |

(1) Maximum velocity is based on motor size and encoder resolution.

(1A) Maximum acceleration is load and motor size dependent. Actual acceleration may vary.

(2) Accuracy is based on a stage mounted to a flat granite surface and measured at 25mm above the center of the stage. Varies based on encoder length. Repeatability is based on encoder resolution selected and above specification is for 0.1μ resolution.



**F<sub>x</sub>** is the load applied in the Z Axis direction, 100mm off end, causing M<sub>x</sub> rotation around the X Axis.

**F<sub>y</sub>** is the load applied in the Z Axis direction, 100mm off side, causing M<sub>y</sub> rotation around the Y Axis.

**F<sub>z</sub>** is the load applied around the Z Axis at a 100mm radius from the center, causing M<sub>z</sub> rotation around the Z Axis.

## Moment Loading<sup>(3)</sup>

| Model No. | F(M <sub>x</sub> )<br>(Load applied at 100mm off end) |        | F(M <sub>y</sub> )<br>(Load applied at 100mm off side) |         | F(M <sub>z</sub> )<br>(Load applied at 100mm off center) |        |
|-----------|-------------------------------------------------------|--------|--------------------------------------------------------|---------|----------------------------------------------------------|--------|
|           | (kg)                                                  | (lb)   | (kg)                                                   | (lb)    | (kg)                                                     | (lb)   |
| U200-100  | 101                                                   | 222.67 | 231                                                    | 509.27  | 51                                                       | 112.44 |
| U200-200  | 108                                                   | 238.10 | 313                                                    | 690.05  | 54                                                       | 119.05 |
| U200-300  | 112                                                   | 246.92 | 394                                                    | 868.62  | 56                                                       | 123.46 |
| U200-400  | 115                                                   | 253.53 | 476                                                    | 1049.40 | 58                                                       | 127.87 |
| U300-200  | 108                                                   | 238.10 | 398                                                    | 877.44  | 54                                                       | 119.05 |
| U300-300  | 112                                                   | 246.92 | 502                                                    | 1106.72 | 56                                                       | 123.46 |
| U300-400  | 115                                                   | 253.53 | 606                                                    | 1336.00 | 58                                                       | 127.87 |
| U300-500  | 117                                                   | 257.94 | 710                                                    | 1565.28 | 59                                                       | 130.07 |
| U400-300  | 112                                                   | 246.92 | 564                                                    | 1243.41 | 56                                                       | 123.46 |
| U400-400  | 115                                                   | 253.53 | 681                                                    | 1501.35 | 58                                                       | 127.87 |
| U400-500  | 117                                                   | 257.94 | 798                                                    | 1759.29 | 59                                                       | 130.07 |
| U600-500  | 117                                                   | 257.94 | 785                                                    | 1730.63 | 59                                                       | 130.07 |

## Linear Encoder Specifications

All Linear Motor Ultra Series are provided with a non-contact, optical linear encoder. Each encoder has two (2) magnetic travel limits and one (1) optical home reference built in. Available resolutions are: 0.1 micron, 0.5 micron, 1 micron, 5 microns.

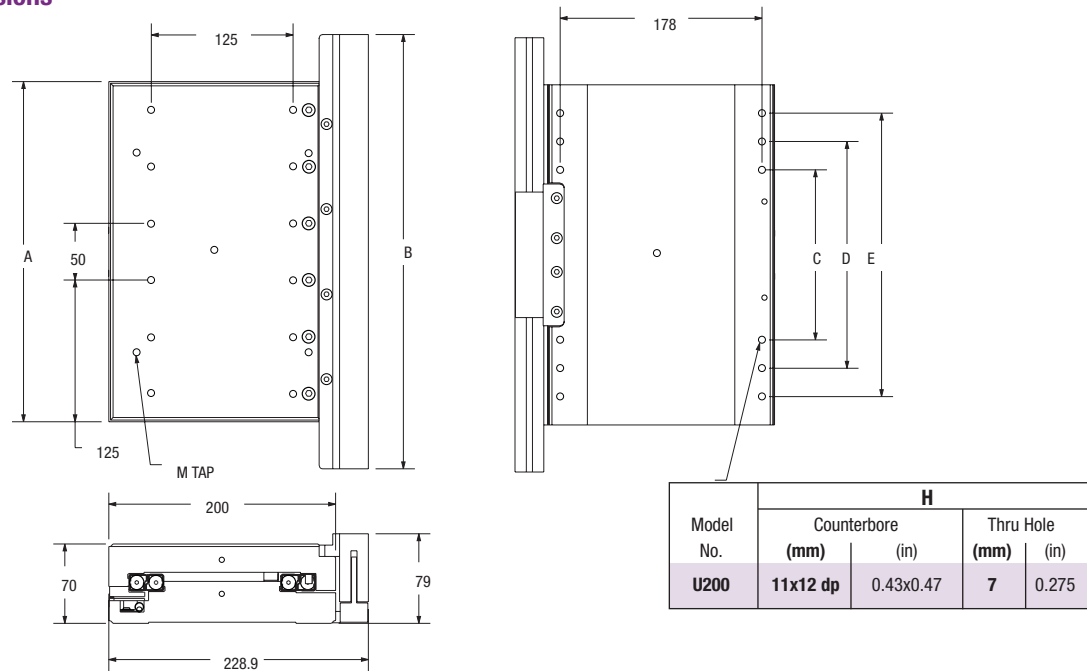
|                              |                                      |
|------------------------------|--------------------------------------|
| Encoder Power Supply         | 5 Vdc ± 5%                           |
| Operating Temperature        | 0 °C to 55 °C<br>32 °F to 131.0 °F   |
| Output Signal <sup>(4)</sup> | Square wave differential line driver |
| Limit Signal                 | Magnetic, Normally Closed Sourcing   |
| Home Signal                  | Optical Reference                    |

(3) Maximum and moment loads are based on bearing capacity. Loading will effect acceleration and velocity capability.

Specifications are subject to change without notice. Accuracy can be enhanced with mapping.

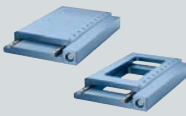
(4) Optional analog output head is available for use with external multipliers. Tape scale pitch is 20 microns. Please contact factory.

## Dimensions

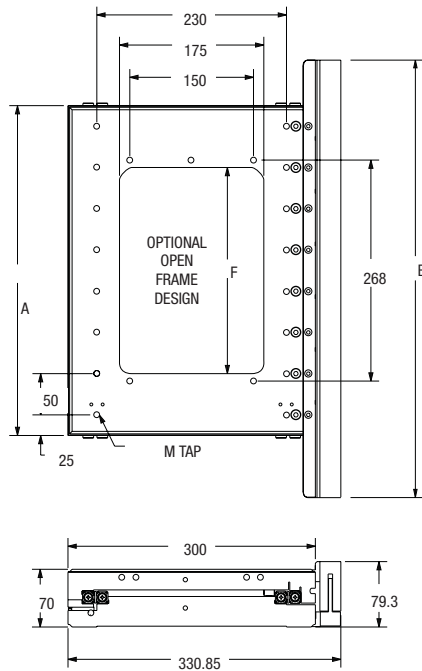


| Model No. | Travel |       | A    |       | B    |       | C    |      | D    |       |
|-----------|--------|-------|------|-------|------|-------|------|------|------|-------|
|           | (mm)   | (in)  | (mm) | (in)  | (mm) | (in)  | (mm) | (in) | (mm) | (in)  |
| U200-100  | 100    | 3.94  | 200  | 7.87  | 256  | 10.08 | 150  | 5.91 | —    | —     |
| U200-200  | 200    | 7.87  | 300  | 11.81 | 384  | 15.12 | 150  | 5.91 | —    | —     |
| U200-300  | 300    | 11.81 | 400  | 15.75 | 448  | 17.64 | 150  | 5.91 | —    | —     |
| U200-400  | 400    | 15.75 | 500  | 19.69 | 640  | 25.20 | 150  | 5.91 | 300  | 11.81 |

| Model No. | E    |       | M<br>Tap | Load Capacity |       | Stage Weight |       | Moving Slide Weight |       |
|-----------|------|-------|----------|---------------|-------|--------------|-------|---------------------|-------|
|           | (mm) | (in)  |          | (kg)          | (lb)  | (kg)         | (lb)  | (kg)                | (lb)  |
| U200-100  | —    | —     | M6 x 1   | 875           | 1,929 | 11.39        | 25.11 | 6.8                 | 14.99 |
| U200-200  | 275  | 10.83 | M6 x 1   | 1,203         | 2,652 | 16.68        | 36.77 | 9.9                 | 21.83 |
| U200-300  | 375  | 14.76 | M6 x 1   | 1,531         | 3,375 | 21.56        | 47.53 | 12.58               | 27.73 |
| U200-400  | 475  | 18.70 | M6 x 1   | 1,859         | 4,098 | 27.68        | 61.02 | 16.35               | 36.05 |



## Dimensions



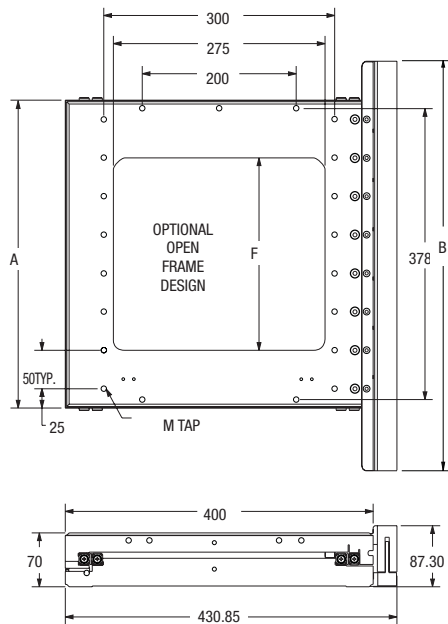
| Model No. | H           |           |           |       |
|-----------|-------------|-----------|-----------|-------|
|           | Counterbore |           | Thru Hole |       |
|           | (mm)        | (in)      | (mm)      | (in)  |
| U300      | 11x12 dp    | 0.43x0.47 | 7         | 0.275 |

| Model No. | Travel |       | A    |       | B    |       | C    |      | D    |       |
|-----------|--------|-------|------|-------|------|-------|------|------|------|-------|
|           | (mm)   | (in)  | (mm) | (in)  | (mm) | (in)  | (mm) | (in) | (mm) | (in)  |
| U300-200  | 200    | 7.87  | 300  | 11.81 | 448  | 17.64 | 150  | 5.91 | —    | —     |
| U300-300  | 300    | 11.81 | 400  | 15.75 | 576  | 22.68 | 150  | 5.91 | 200  | 7.87  |
| U300-400  | 400    | 15.75 | 500  | 19.69 | 640  | 25.20 | 200  | 7.87 | 350  | 13.78 |
| U300-500  | 500    | 19.69 | 600  | 23.62 | 768  | 30.24 | 200  | 7.87 | 400  | 15.75 |

| Model No. | E    |       | F    |       | M<br>Tap | Load Capacity |       |
|-----------|------|-------|------|-------|----------|---------------|-------|
|           | (mm) | (in)  | (mm) | (in)  |          | (kg)          | (lb)  |
| U300-200  | 275  | 10.83 | 150  | 5.91  | M6 x 1   | 1,203         | 2,652 |
| U300-300  | 375  | 14.76 | 250  | 9.84  | M6 x 1   | 1,531         | 3,375 |
| U300-400  | 475  | 18.70 | 350  | 13.78 | M6 x 1   | 1,859         | 4,098 |
| U300-500  | 575  | 22.64 | 450  | 17.72 | M6 x 1   | 2,187         | 4,822 |

| Model No. | Moving Slide Weight |       |        |       | Stage Weight |       |        |       |
|-----------|---------------------|-------|--------|-------|--------------|-------|--------|-------|
|           | Open                |       | Closed |       | Open         |       | Closed |       |
|           | (kg)                | (lb)  | (kg)   | (lb)  | (kg)         | (lb)  | (kg)   | (lb)  |
| U300-200  | 8.62                | 19.00 | 12.75  | 28.11 | 13.31        | 29.34 | 22.93  | 50.55 |
| U300-300  | 11.26               | 24.82 | 16.78  | 36.99 | 17.37        | 38.29 | 30.24  | 66.67 |
| U300-400  | 13.19               | 29.58 | 20.07  | 44.25 | 20.74        | 45.72 | 36.79  | 81.11 |
| U300-500  | 15.84               | 34.92 | 24.12  | 53.18 | 24.80        | 54.67 | 44.11  | 97.25 |

## Dimensions

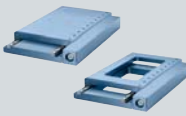


| Model No. | H           |           |           |       |
|-----------|-------------|-----------|-----------|-------|
|           | Counterbore |           | Thru Hole |       |
|           | (mm)        | (in)      | (mm)      | (in)  |
| U400      | 11x12 dp    | 0.43x0.47 | 7         | 0.275 |

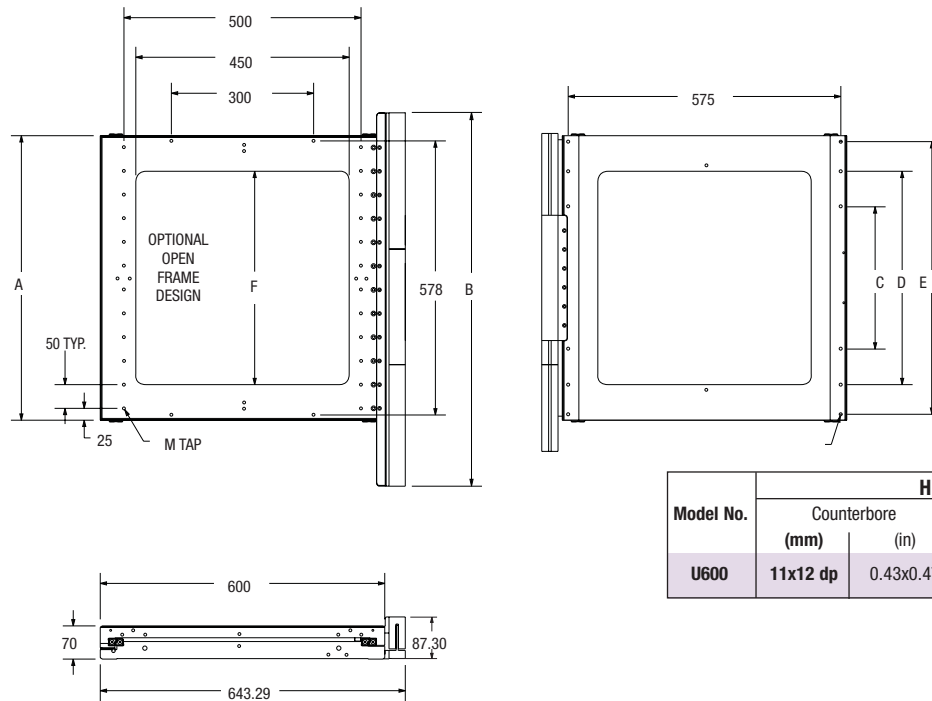
| Model No. | Travel |       | A    |       | B    |       | C    |      | D    |       |
|-----------|--------|-------|------|-------|------|-------|------|------|------|-------|
|           | (mm)   | (in)  | (mm) | (in)  | (mm) | (in)  | (mm) | (in) | (mm) | (in)  |
| U400-300  | 300    | 11.81 | 400  | 15.75 | 576  | 22.68 | 200  | 7.87 | —    | —     |
| U400-400  | 400    | 15.75 | 500  | 19.69 | 640  | 25.20 | 200  | 7.87 | 350  | 13.78 |
| U400-500  | 500    | 19.69 | 600  | 23.62 | 768  | 30.24 | 200  | 7.87 | 400  | 15.75 |

| Model No. | E    |       | F    |       | M<br>Tap | Load Capacity |       |
|-----------|------|-------|------|-------|----------|---------------|-------|
|           | (mm) | (in)  | (mm) | (in)  |          | (kg)          | (lb)  |
| U400-300  | 375  | 14.76 | 250  | 9.84  | M6 x 1   | 1,531         | 3,375 |
| U400-400  | 475  | 18.70 | 350  | 13.78 | M6 x 1   | 1,859         | 4,098 |
| U400-500  | 575  | 22.64 | 450  | 17.72 | M6 x 1   | 2,187         | 4,821 |

| Model No. | Moving Slide Weight |       |        |       | Stage Weight |       |        |        |
|-----------|---------------------|-------|--------|-------|--------------|-------|--------|--------|
|           | Open                |       | Closed |       | Open         |       | Closed |        |
|           | (kg)                | (lb)  | (kg)   | (lb)  | (kg)         | (lb)  | (kg)   | (lb)   |
| U400-300  | 12.88               | 28.40 | 20.12  | 44.36 | 20.76        | 45.77 | 38.00  | 83.77  |
| U400-400  | 15.31               | 33.75 | 33.75  | 53.75 | 25.00        | 55.12 | 46.60  | 102.73 |
| U400-500  | 18.36               | 40.48 | 40.48  | 64.44 | 30.05        | 66.25 | 56.25  | 124.01 |



## Dimensions



| Model No. | Travel |       | A    |       | B    |       | C    |       | D    |       |
|-----------|--------|-------|------|-------|------|-------|------|-------|------|-------|
|           | (mm)   | (in)  | (mm) | (in)  | (mm) | (in)  | (mm) | (in)  | (mm) | (in)  |
| U600-500  | 500    | 19.69 | 600  | 23.62 | 768  | 30.24 | 300  | 11.81 | 450  | 17.72 |

| Model No. | E    |       | F    |       | M Tap  | Load Capacity |      |
|-----------|------|-------|------|-------|--------|---------------|------|
|           | (mm) | (in)  | (mm) | (in)  |        | (kg)          | (lb) |
| U600-500  | 575  | 22.64 | 450  | 17.72 | M6 x 1 | 2,187         | 4821 |

| Model No. | Moving Slide Weight |       | Stage Weight |       |
|-----------|---------------------|-------|--------------|-------|
|           | (kg)                | (lb)  | (kg)         | (lb)  |
| U600-500  | 22.19               | 48.92 | 38.63        | 85.16 |

## Travel

| Model No. | Travel                |                |
|-----------|-----------------------|----------------|
|           | Maximum Range<br>(mm) | (in)           |
| U200      | 100 to 400            | 3.94 to 15.75  |
| U300      | 200 to 500            | 7.87 to 19.69  |
| U400      | 300 to 500            | 11.81 to 19.69 |
| U600      | 500                   | 19.69          |

## Velocity and Thrust

| Model No. | Velocity                  |            |                           |            | Maximum Thrust |       |            |       |
|-----------|---------------------------|------------|---------------------------|------------|----------------|-------|------------|-------|
|           | Lead Screw <sup>(1)</sup> |            | Ball Screw <sup>(2)</sup> |            | Lead Screw     |       | Ball Screw |       |
|           | (mm / sec)                | (in / sec) | (mm / sec)                | (in / sec) | (kgf)          | (lbf) | (kgf)      | (lbf) |
| U200      | 100                       | 3.94       | 300                       | 11.81      | 11.3           | 24.9  | 90         | 198.4 |
| U300      | 100                       | 3.94       | 300                       | 11.81      | 11.3           | 24.9  | 90         | 198.4 |
| U400      | 100                       | 3.94       | 300                       | 11.81      | 11.3           | 24.9  | 90         | 198.4 |
| U600      | 100                       | 3.94       | 300                       | 11.81      | 11.3           | 24.9  | 90         | 198.4 |

## Accuracy Specifications

| Model No. | Straightness/ Flatness |          | Pitch & Yaw |
|-----------|------------------------|----------|-------------|
|           | (microns / 25mm)       | (in/in)  |             |
| U200      | ±1.25                  | ±0.00005 | ±2.0        |
| U300      | ±1.25                  | ±0.00005 | ±2.0        |
| U400      | ±1.25                  | ±0.00005 | ±3.0        |
| U600      | ±1.25                  | ±0.00005 | ±3.0        |

| Model No. | Accuracy <sup>(3)</sup> |        | Repeatability <sup>(4)</sup> |         |
|-----------|-------------------------|--------|------------------------------|---------|
|           | (microns / 25mm)        | (in)   | (microns)                    | (in)    |
| U200      | ±2.5                    | 0.0001 | ±2.0                         | 0.00008 |
| U300      | ±2.5                    | 0.0001 | ±2.0                         | 0.00008 |
| U400      | ±2.5                    | 0.0001 | ±2.0                         | 0.00008 |
| U600      | ±2.5                    | 0.0001 | ±2.0                         | 0.00008 |

(1) Based on 0.2in Ball Screw.

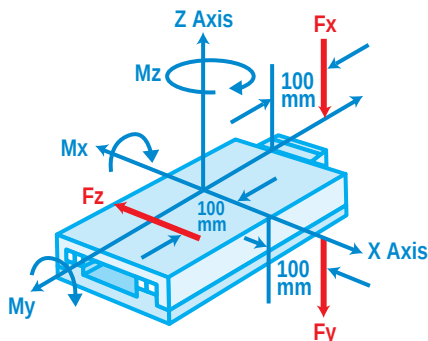
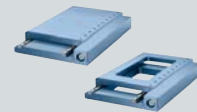
(2) Based on 10mm Lead Screw.

(3) Accuracy is based on a stage mounted to a flat granite surface and measured at 25mm above the center of the stage.

(4) Repeatability is based on encoder resolution selected and above specification is for 0.1μ resolution. Lead accuracy of ball screw (open loop without encoder) is ± 6 μm over travel range.

(5) Maximum and moment loads are based on bearing capacity. Loading will affect acceleration and velocity capability.

Specifications are subject to change without notice.



**F<sub>x</sub>** is the load applied in the Z Axis direction, 100mm off end, causing M<sub>x</sub> rotation around the X Axis.

**F<sub>y</sub>** is the load applied in the Z Axis direction, 100mm off side, causing M<sub>y</sub> rotation around the Y Axis.

**F<sub>z</sub>** is the load applied around the Z Axis at a 100mm radius from the center, causing M<sub>z</sub> rotation around the Z Axis.

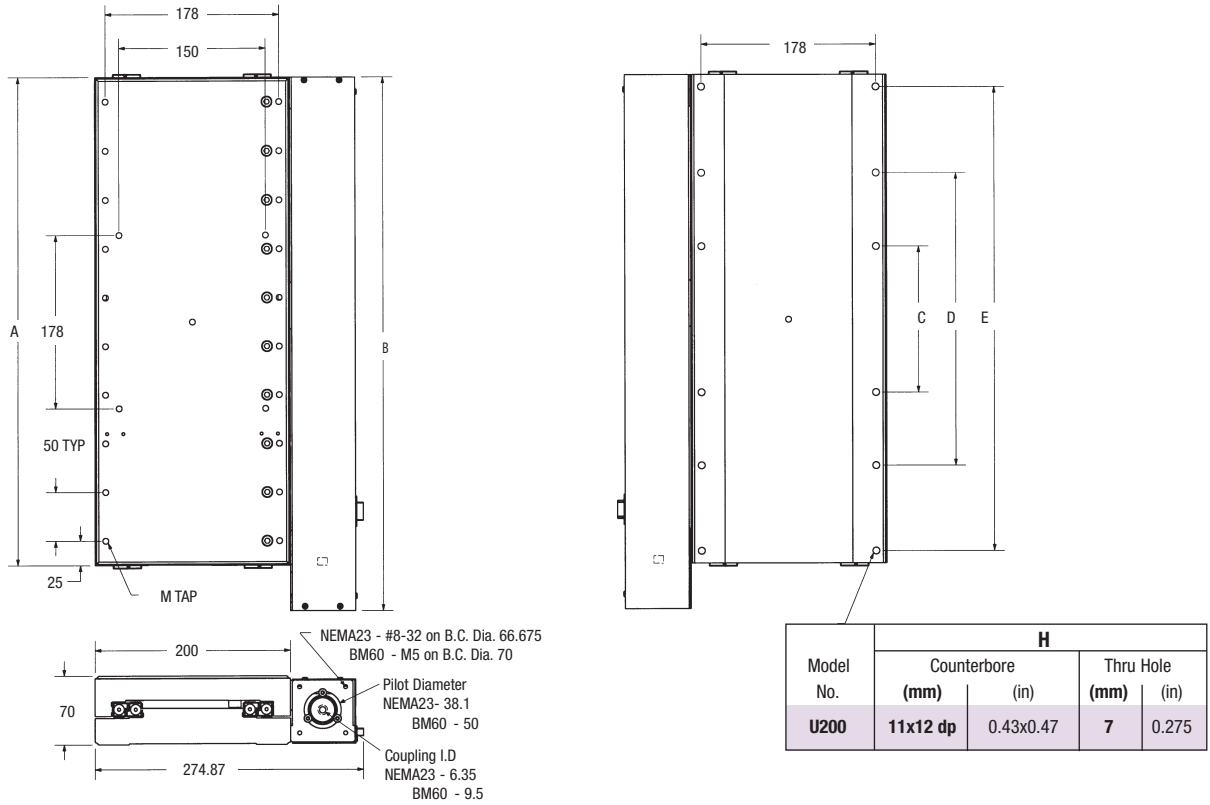
## Moment Loading<sup>(6)</sup>

| Model No. | F(M <sub>x</sub> )<br>(Load applied at 100mm off end) |        | F(M <sub>y</sub> )<br>(Load applied at 100mm off side) |         | F(M <sub>z</sub> )<br>(Load applied at 100mm off center) |        |
|-----------|-------------------------------------------------------|--------|--------------------------------------------------------|---------|----------------------------------------------------------|--------|
|           | (kg)                                                  | (lb)   | (kg)                                                   | (lb)    | (kg)                                                     | (lb)   |
| U200-100  | 101                                                   | 222.67 | 231                                                    | 509.27  | 51                                                       | 112.44 |
| U200-200  | 108                                                   | 238.10 | 313                                                    | 690.05  | 54                                                       | 119.05 |
| U200-300  | 112                                                   | 246.92 | 394                                                    | 868.62  | 56                                                       | 123.46 |
| U200-400  | 115                                                   | 253.53 | 476                                                    | 1049.40 | 58                                                       | 127.87 |
| U300-200  | 108                                                   | 238.10 | 398                                                    | 877.44  | 54                                                       | 119.05 |
| U300-300  | 112                                                   | 246.92 | 502                                                    | 1106.72 | 56                                                       | 123.46 |
| U300-400  | 115                                                   | 253.53 | 606                                                    | 1336.00 | 58                                                       | 127.87 |
| U300-500  | 117                                                   | 257.94 | 710                                                    | 1565.28 | 59                                                       | 130.07 |
| U400-300  | 112                                                   | 246.92 | 564                                                    | 1243.41 | 56                                                       | 123.46 |
| U400-400  | 115                                                   | 253.53 | 681                                                    | 1501.35 | 58                                                       | 127.87 |
| U400-500  | 117                                                   | 257.94 | 798                                                    | 1759.29 | 59                                                       | 130.07 |
| U600-500  | 117                                                   | 257.94 | 785                                                    | 1730.63 | 59                                                       | 130.07 |

## Screw Inertia

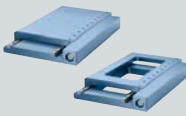
| Model No. | Lead Screw                |                           | Ball Screw                |                           | Coupling Inertia          |                           | Moving Slide Weight |       |       |       |
|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------|-------|-------|-------|
|           | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) | Closed              |       | Open  |       |
|           | (kg)                      | (lb)                      | (kg)                      | (lb)                      | (kg)                      | (lb)                      | (kg)                | (lb)  | (kg)  | (lb)  |
| U200-100  | 0.039                     | 0.00054                   | 0.104                     | 0.0015                    | 0.026                     | 0.00035                   | 4.26                | 9.37  | —     | —     |
| U200-200  | 0.060                     | 0.00083                   | 0.157                     | 0.0022                    | 0.026                     | 0.00035                   | 6.16                | 13.55 | —     | —     |
| U200-300  | 0.081                     | 0.00113                   | 0.209                     | 0.0029                    | 0.026                     | 0.00035                   | 8.11                | 17.84 | —     | —     |
| U200-400  | 0.102                     | 0.00142                   | 0.262                     | 0.0036                    | 0.026                     | 0.00035                   | 10.09               | 22.20 | —     | —     |
| U300-200  | 0.060                     | 0.00083                   | 0.157                     | 0.0022                    | 0.026                     | 0.00035                   | 8.4                 | 18.48 | 4.27  | 9.39  |
| U300-300  | 0.081                     | 0.00113                   | 0.209                     | 0.0029                    | 0.026                     | 0.00035                   | 11.11               | 24.44 | 5.29  | 11.63 |
| U300-400  | 0.102                     | 0.00142                   | 0.261                     | 0.036                     | 0.026                     | 0.00035                   | 13.81               | 30.38 | 6.93  | 15.25 |
| U300-500  | 0.123                     | 0.00171                   | 0.314                     | 0.0044                    | 0.026                     | 0.00035                   | 16.53               | 36.36 | 8.25  | 18.15 |
| U400-300  | 0.081                     | 0.0011                    | 0.209                     | 0.0029                    | 0.026                     | 0.00035                   | 14.11               | 31.04 | 6.87  | 15.11 |
| U400-400  | 0.102                     | 0.0014                    | 0.262                     | 0.0036                    | 0.026                     | 0.00035                   | 17.6                | 38.72 | 8.53  | 18.76 |
| U400-500  | 0.123                     | 0.0017                    | 0.314                     | 0.0044                    | 0.026                     | 0.00035                   | 21.03               | 46.27 | 10.16 | 22.35 |
| U600-500  | 0.123                     | 0.0017                    | 0.314                     | 0.0043                    | 0.026                     | 0.00035                   | —                   | —     | 13.99 | 30.77 |

## Dimensions

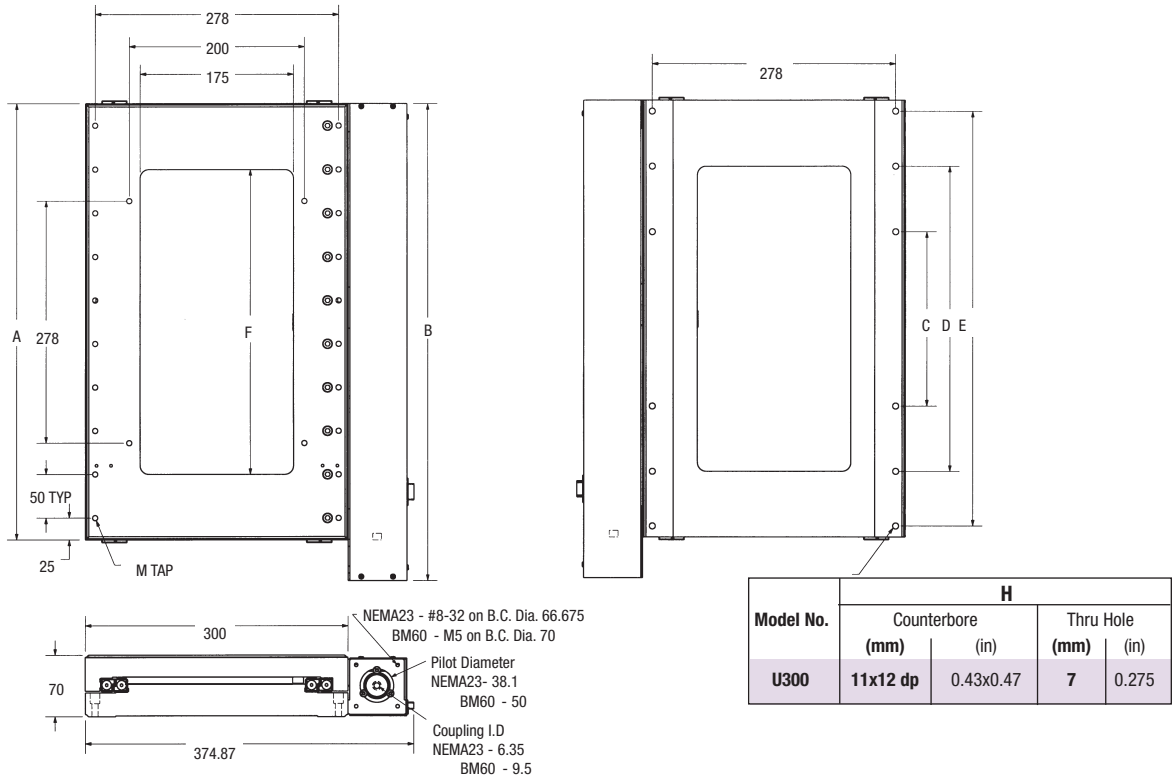


| Model No. | Travel |       | A    |       | B     |       | C    |      | D    |       |
|-----------|--------|-------|------|-------|-------|-------|------|------|------|-------|
|           | (mm)   | (in)  | (mm) | (in)  | (mm)  | (in)  | (mm) | (in) | (mm) | (in)  |
| U200-100  | 100    | 3.94  | 200  | 7.87  | 246   | 9.7   | 150  | 5.9  | —    | —     |
| U200-200  | 200    | 7.87  | 300  | 12.25 | 346.5 | 13.64 | 150  | 5.9  | —    | —     |
| U200-300  | 300    | 11.81 | 400  | 15.75 | 446.5 | 17.59 | 150  | 5.9  | —    | —     |
| U200-400  | 400    | 15.75 | 500  | 19.69 | 546.5 | 21.52 | 150  | 5.9  | 300  | 12.25 |

| Model No. | E    |       | M      | Load Capacity |       | Stage Weight |       | Moving Slide Weight |       |
|-----------|------|-------|--------|---------------|-------|--------------|-------|---------------------|-------|
|           | (mm) | (in)  |        | (kg)          | (lb)  | (kg)         | (lb)  | (kg)                | (lb)  |
| U200-100  | —    | —     | M6 x 1 | 875           | 1,929 | 9.48         | 20.9  | 4.26                | 9.39  |
| U200-200  | 275  | 10.83 | M6 x 1 | 1,203         | 2,652 | 13.72        | 30.25 | 6.16                | 13.58 |
| U200-300  | 375  | 14.76 | M6 x 1 | 1,531         | 3,375 | 18.02        | 39.73 | 8.11                | 17.88 |
| U200-400  | 475  | 18.7  | M6 x 1 | 1,859         | 4,098 | 22.35        | 49.27 | 10.09               | 22.24 |



## Dimensions

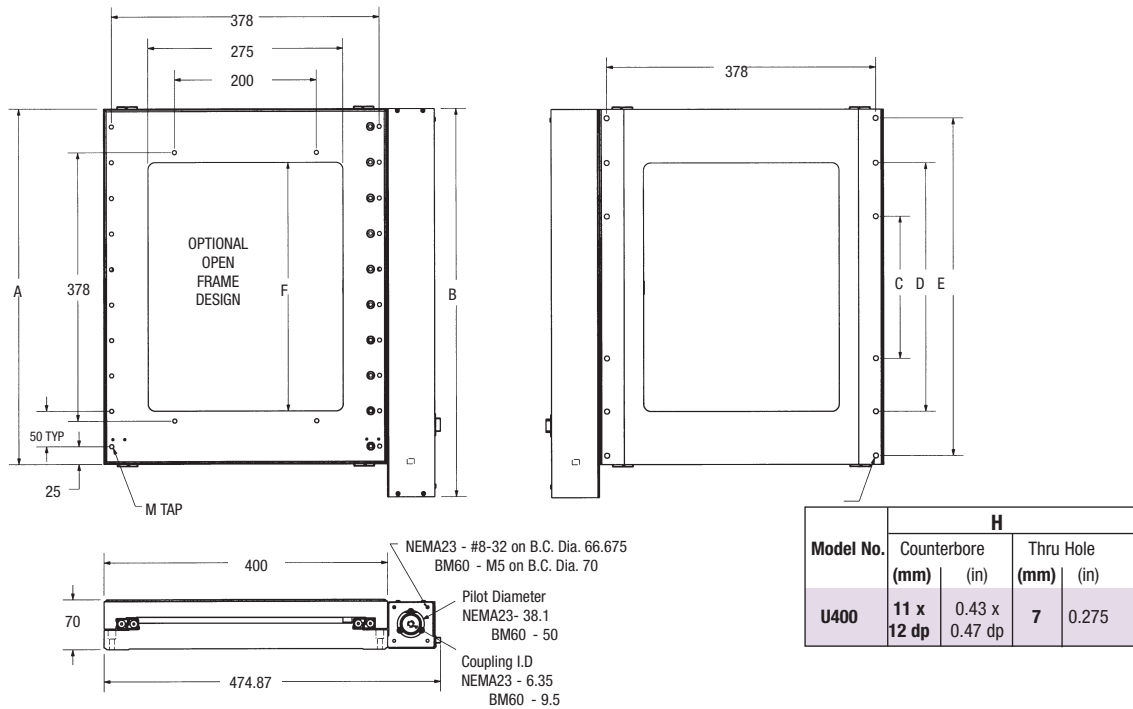


| Model No. | Travel |       | A    |       | B     |      | C    |      | D    |       |
|-----------|--------|-------|------|-------|-------|------|------|------|------|-------|
|           | (mm)   | (in)  | (mm) | (in)  | (mm)  | (in) | (mm) | (in) | (mm) | (in)  |
| U300-200  | 200    | 7.87  | 300  | 12.25 | 346.5 | 13.6 | 150  | 5.9  | —    | —     |
| U300-300  | 300    | 12.25 | 400  | 15.75 | 446.5 | 17.6 | 150  | 5.9  | 200  | 7.87  |
| U300-400  | 400    | 15.75 | 500  | 19.69 | 546.5 | 21.5 | 200  | 7.9  | 350  | 13.78 |
| U300-500  | 500    | 19.69 | 600  | 23.62 | 646.5 | 25.5 | 200  | 7.9  | 400  | 15.75 |

| Model No. | E    |       | F    |       | M<br>Tap | Load Capacity |       |
|-----------|------|-------|------|-------|----------|---------------|-------|
|           | (mm) | (in)  | (mm) | (in)  |          | (kg)          | (lb)  |
| U300-200  | 275  | 10.83 | 150  | 5.9   | M6 x 1   | 1,203         | 2,652 |
| U300-300  | 375  | 14.76 | 250  | 9.84  | M6 x 1   | 1,531         | 3,375 |
| U300-400  | 475  | 18.7  | 350  | 13.78 | M6 x 1   | 1,859         | 4,095 |
| U300-500  | 575  | 22.64 | 450  | 17.72 | M6 x 1   | 2,187         | 4,821 |

| Model No. | Stage Weight |      |        |       | Moving Slide Weight |       |        |      |
|-----------|--------------|------|--------|-------|---------------------|-------|--------|------|
|           | Open         |      | Closed |       | Open                |       | Closed |      |
|           | (kg)         | (lb) | (kg)   | (lb)  | (kg)                | (lb)  | (kg)   | (lb) |
| U300-200  | 9.59         | 21.1 | 19.21  | 42.35 | 4.27                | 9.41  | 8.4    | 18.5 |
| U300-300  | 12.48        | 27.5 | 25.35  | 55.89 | 5.29                | 11.66 | 11.11  | 24.5 |
| U300-400  | 15.41        | 33.9 | 31.46  | 69.36 | 6.93                | 15.28 | 13.81  | 30.4 |
| U300-500  | 18.29        | 40.3 | 37.6   | 82.89 | 8.25                | 18.19 | 16.53  | 36.4 |

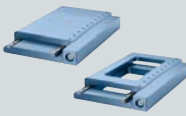
## Dimensions



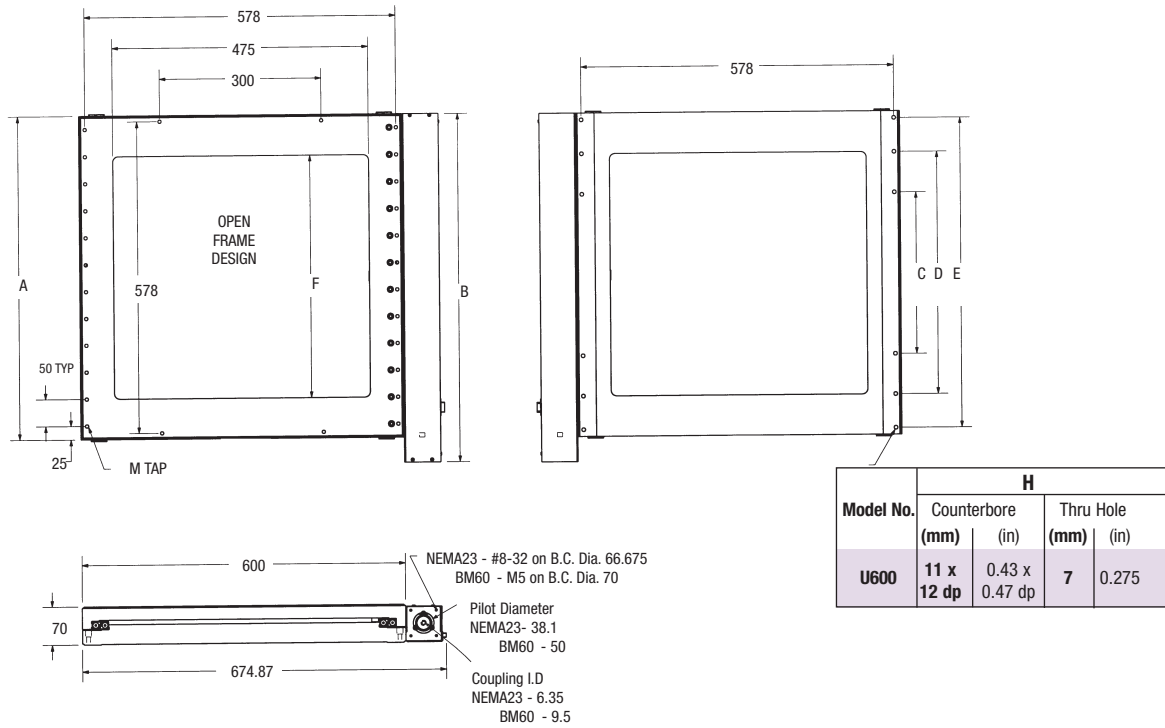
| Model No. | Travel |       | A    |       | B     |       | C    |      | D    |       |
|-----------|--------|-------|------|-------|-------|-------|------|------|------|-------|
|           | (mm)   | (in)  | (mm) | (in)  | (mm)  | (in)  | (mm) | (in) | (mm) | (in)  |
| U400-300  | 300    | 11.81 | 400  | 15.75 | 446.5 | 17.58 | 200  | 7.87 | —    | —     |
| U400-400  | 400    | 15.75 | 500  | 19.69 | 546.5 | 21.52 | 200  | 7.87 | 350  | 13.78 |
| U400-500  | 500    | 19.69 | 600  | 23.62 | 646.5 | 25.45 | 200  | 7.87 | 400  | 15.75 |

| Model No. | E    |       | F    |       | M<br>Tap | Load Capacity |       |
|-----------|------|-------|------|-------|----------|---------------|-------|
|           | (mm) | (in)  | (mm) | (in)  |          | (kg)          | (lb)  |
| U400-300  | 375  | 14.76 | 250  | 9.84  | M6 x 1   | 1,531         | 3,375 |
| U400-400  | 475  | 18.70 | 350  | 13.78 | M6 x 1   | 1,859         | 4,098 |
| U400-500  | 575  | 22.64 | 450  | 17.72 | M6 x 1   | 2,187         | 4,822 |

| Model No. | Stage Weight |       |        |        | Moving Slide Weight |       |        |       |
|-----------|--------------|-------|--------|--------|---------------------|-------|--------|-------|
|           | Open         |       | Closed |        | Open                |       | Closed |       |
|           | (kg)         | (lb)  | (kg)   | (lb)   | (kg)                | (lb)  | (kg)   | (lb)  |
| U400-300  | 15.28        | 33.69 | 32.52  | 71.69  | 6.87                | 15.15 | 14.11  | 31.11 |
| U400-400  | 18.90        | 40.34 | 40.50  | 88.29  | 8.53                | 18.81 | 17.60  | 38.80 |
| U400-500  | 22.68        | 50.00 | 48.88  | 107.76 | 10.16               | 22.40 | 21.03  | 46.36 |



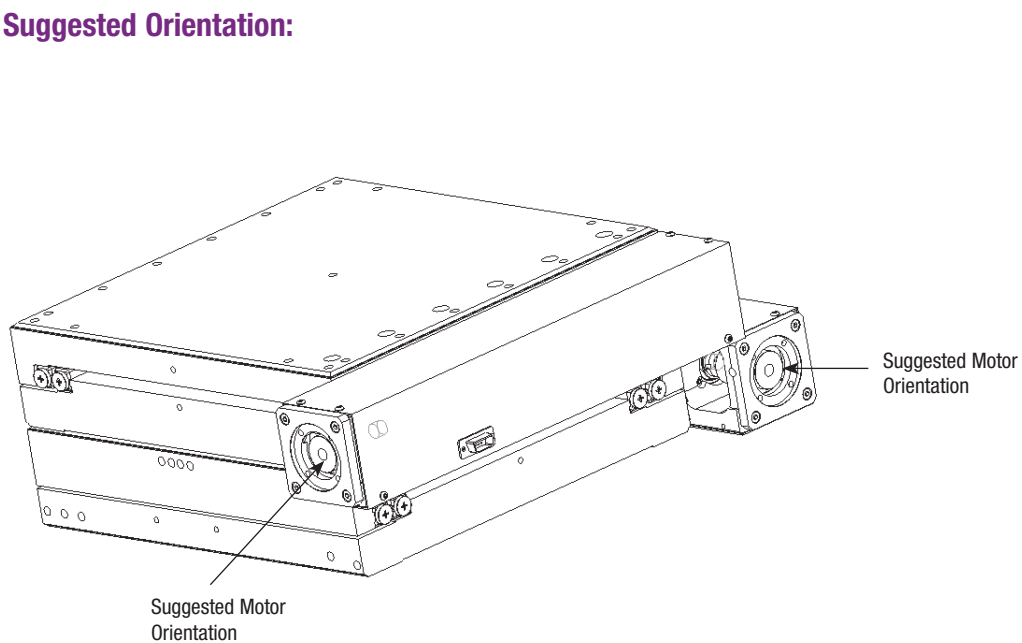
## Dimensions



| Model No. | Travel |       | A    |       | B     |       | C    |       | D    |       |
|-----------|--------|-------|------|-------|-------|-------|------|-------|------|-------|
|           | (mm)   | (in)  | (mm) | (in)  | (mm)  | (in)  | (mm) | (in)  | (mm) | (in)  |
| U600-500  | 500    | 19.69 | 600  | 23.62 | 646.5 | 25.45 | 300  | 11.81 | 450  | 17.72 |

| Model No. | E    |       | F    |       | M<br>Tap | Load Capacity |       |
|-----------|------|-------|------|-------|----------|---------------|-------|
|           | (mm) | (in)  | (mm) | (in)  |          | (kg)          | (lb)  |
| U600-500  | 575  | 22.64 | 450  | 17.72 | M6 x 1   | 2,187         | 4,822 |

| Model No. | Stage Weight |       | Moving Slide Weight |       |
|-----------|--------------|-------|---------------------|-------|
|           | (kg)         | (lb)  | (kg)                | (lb)  |
| U600-500  | 31.41        | 69.25 | 13.99               | 30.84 |

**Suggested Orientation:****Options:****Calibration Option**

Parker Bayside provides laser-calibrated and / or matched roller options to optimize your stage for the most demanding applications.

**P.A.C.T.**

Prevents crossed roller bearing creep in vertical and/or high-speed applications.

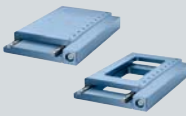
**Special Environment Option**

Parker Bayside can prepare your stage for a variety of environments including:

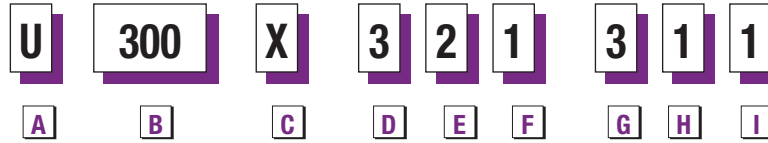
- ▶ Vacuum
- ▶ Clean Room
- ▶ Radiation
- ▶ Food Grade

**Special Lubricants**

Dry lubricant suitable for environments that need a dry, permanent lubrication (e.g. vacuum rated applications).



Ordering  
Numbering  
Example:



| A | STAGE SERIES |
|---|--------------|
| U | Ultra Series |

| B   | METRIC WIDTH OF STAGE |
|-----|-----------------------|
| 200 | 200 mm                |
| 300 | 300 mm                |
| 400 | 400 mm                |
| 600 | 600 mm                |

| C | FRAME |        |        |        |        |
|---|-------|--------|--------|--------|--------|
|   |       | U200   | U300   | U400   | U600   |
|   | X     | Closed | Closed | Closed | Closed |
|   | H     | —      | Open   | Open   | Open   |

| D | TRAVEL | U200   | U300   | U400   | U600   |
|---|--------|--------|--------|--------|--------|
|   | 1      | 100 mm | —      | —      | —      |
|   | 2      | 200 mm | 200 mm | —      | —      |
|   | 3      | 300 mm | 300 mm | 300 mm | —      |
|   | 4      | 400 mm | 400 mm | 400 mm | —      |
|   | 5      | —      | 500 mm | 500 mm | 500 mm |

| E            | DRIVE TYPE         |
|--------------|--------------------|
| Lead Screw   | Lead               |
| 1            | 0.1 in             |
| 2            | 0.2 in             |
| 3            | 1 mm               |
| Ball Screw   |                    |
| 4            | 3 mm               |
| 5            | 5 mm               |
| 6            | 10 mm              |
| Linear Motor |                    |
| 7            | Linear Motor Drive |

| F | LIMITS (1)             |
|---|------------------------|
| 1 | None                   |
| 2 | End of Travel          |
| 3 | End of Travel and Home |

| G | LINEAR ENCODER (1) |
|---|--------------------|
| 1 | None               |
| 2 | 0.1 $\mu$ m        |
| 3 | 0.5 $\mu$ m        |
| 4 | 1.0 $\mu$ m        |
| 5 | 5.0 $\mu$ m        |

| H | MOTOR MOUNTING          |
|---|-------------------------|
| X | See how to order step 2 |

| I | ROLLER CONF. / ENVIRONMENT                        |
|---|---------------------------------------------------|
| 1 | None (Standard)                                   |
| 2 | PACT                                              |
| 3 | Hollow Roller                                     |
| 4 | Hollow Rollers with PACT                          |
| 5 | Clean Room (Class 10,000)                         |
| 6 | Clean Room (Class 10,000) with PACT               |
| 7 | Clean Room (Class 10,000) Hollow Roller           |
| 8 | Clean Room (Class 10,000) Hollow Roller with PACT |
| 9 | Vacuum (No Finish)                                |
| A | Vacuum (No Finish) Hollow Roller                  |

## NOTES:

(1) End-of-Travel and Home Limits integral to linear encoder will be provided, when a linear encoder is selected.

# How to Order

1. Pick features and options above.
2. Specify motor, make and model for mounting kit.

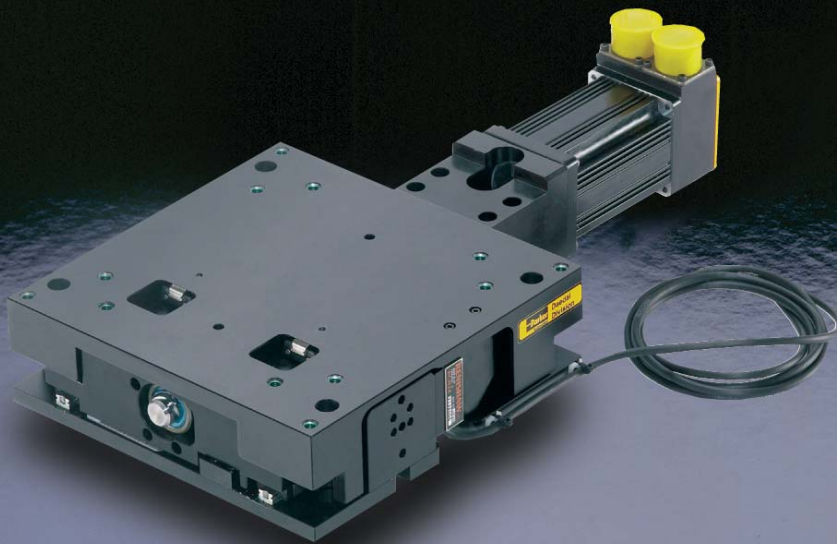
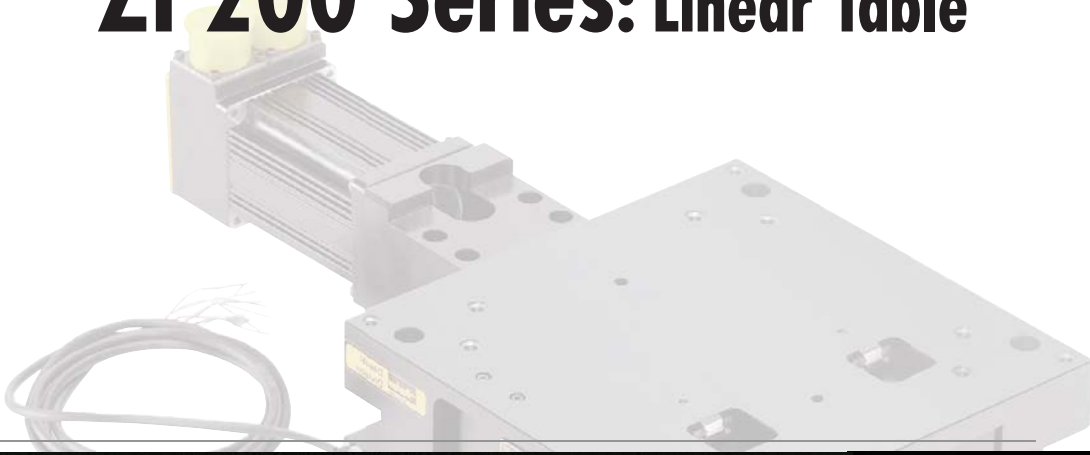
Ultra Stages are supported by a worldwide network of offices and local distributors.

Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor.

Information can also be obtained at [www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com)

Specifications are subject to change without notice.

# ZP200 Series: Linear Table



Square Rail Linear Tables



## ZP200 Series: Overview

### Features

- Precision platform for vertical (Z-axis) positioning
- Continuous duty - High dynamic performance
- Precision straightness ( $\pm 15$  arc sec.) Throughout range of motion
- Precision ground ballscrew drive - 5, 10, or 20 mm lead
- Multi-axis compatibility with many linear motion products
- Laser tested and certified with calibrated lead laser



ZP200 utilized in a laser test set-up

### Quality Design and Construction

The ZP200 Z axis lift table is a stable support platform which provides precise vertical translation and positioning, while maintaining X-Y integrity. Recirculating square rail bearings are incorporated into a unique variation of “wedge” mechanics to enable reliable high dynamic performance without the potential loss of travel encountered with crossed roller bearings. The ZP200 is compatible with many linear motion products for multi-axis systems, and it can be utilized as the system base axis or top axis to fit the motion requirements of the application. Standard mounting holes and dowel pin holes accommodate repeatable mounting.

#### Options:

- Linear encoder option with selectable resolutions of 0.1, 0.5, 1.0  $\mu\text{m}$ .
- Fail-safe brake (field installable - mounts directly to the ballscrew drive).
- Class 10 cleanroom preparation.
- Selectable motor mounting and couplings for SM16 or NEMA 23 servo or stepper motors.
- Easily adjusted travel “limit” and “home” sensors are provided in an enclosed sensor pack.

# Z Wedge Series

## Specifications:

|                                                | Precision                               | Standard               |
|------------------------------------------------|-----------------------------------------|------------------------|
| Travel (Z-axis)                                | 25 mm (limit to limit)                  | 25 mm (limit to limit) |
| Positional Accuracy                            |                                         |                        |
| with no encoder <sup>1,2,7</sup>               | 8 $\mu$ m                               | 20 $\mu$ m             |
| with linear encoder <sup>3,6,7</sup>           | 8 $\mu$ m                               | n/a                    |
| Positional Repeatability                       |                                         |                        |
| with no encoder <sup>1,7</sup>                 | $\pm$ 3 $\mu$ m                         | $\pm$ 10 $\mu$ m       |
| with 1.0 $\mu$ m linear encoder <sup>6,7</sup> | $\pm$ 5 $\mu$ m                         | n/a                    |
| with 0.5 $\mu$ m linear encoder <sup>6,7</sup> | $\pm$ 4 $\mu$ m                         | n/a                    |
| with 0.1 $\mu$ m linear encoder <sup>6,7</sup> | $\pm$ 3 $\mu$ m                         | n/a                    |
| Lift Lead Ratio <sup>4</sup>                   |                                         |                        |
| 5 mm lead ballscrew drive                      | 1.8199 mm/rev                           |                        |
| 10 mm lead ballscrew drive                     | 3.6397 mm/rev                           |                        |
| 20 mm lead ballscrew drive                     | 7.2794 mm/rev                           |                        |
| Lift Velocity                                  |                                         |                        |
| 5 mm lead ballscrew drive                      | 110 mm/sec                              |                        |
| 10 mm lead ballscrew drive                     | 220 mm/sec                              |                        |
| 20 mm lead ballscrew drive                     | 440 mm/sec                              |                        |
| Load Capacity (normal)                         | 15 kg (33 lb)                           | 75 kg (165 lb)         |
| Duty Cycle                                     | 100%                                    |                        |
| Max Acceleration                               | 7.2 m/sec <sup>2</sup>                  |                        |
| Efficiency                                     | 90%                                     |                        |
| Max Breakaway Torque <sup>5</sup>              | 0.15 Nm                                 |                        |
| Max Running Torque <sup>5</sup>                | 0.13 Nm                                 |                        |
| Linear Bearing – Coeff. Of Friction            | 0.01                                    |                        |
| Ballscrew Diameter                             | 16 mm                                   |                        |
| Unit Weight                                    | 5.82 kg                                 |                        |
| Top Plate Weight                               | 2.25 kg                                 |                        |
| Pitch <sup>7,8</sup>                           | $\pm$ 15 Arc Sec.                       | $\pm$ 45 Arc Sec.      |
| Roll <sup>7,8</sup>                            | $\pm$ 15 Arc Sec.                       | $\pm$ 25 Arc Sec.      |
| Input Inertia                                  |                                         |                        |
| 5 mm lead ballscrew drive                      | 2.32x10 <sup>-5</sup> Kg-m <sup>2</sup> |                        |
| 10 mm lead ballscrew drive                     | 2.51x10 <sup>-5</sup> Kg-m <sup>2</sup> |                        |
| 20 mm lead ballscrew drive                     | 3.12x10 <sup>-5</sup> Kg-m <sup>2</sup> |                        |

1 Measured 38mm directly above the true center of the top mounting surface.

2 Measured using calibrated lead value (provided).

3 Slope correction value provided.

4 Lift per 1 motor shaft revolution. Lift lead listed is nominal. All units are provided with calibrated lead value.

5 Torque ratings are measured with unit unloaded, traveling upward.

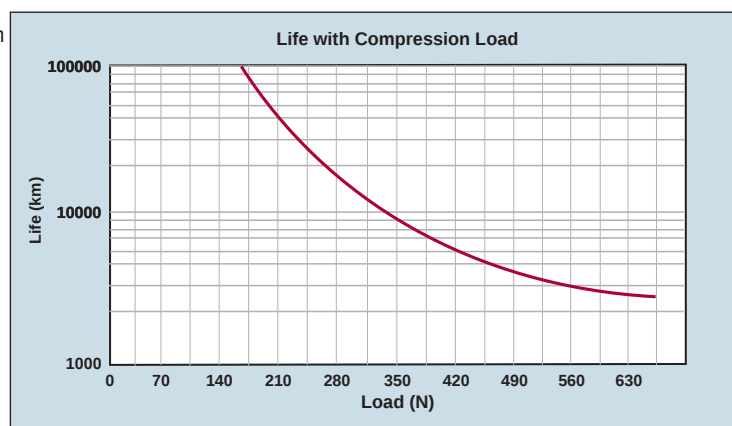
6 Measured directly over encoder on outer edge.

7 Pitch and Roll Specifications are with no load, addition of load increases Pitch and Roll error by 10 Arc seconds per 5 Kg of load assuming the load CG is located in the center of the stage platform. Cantilevered loading increases these errors further.

## Table/Life Load Chart

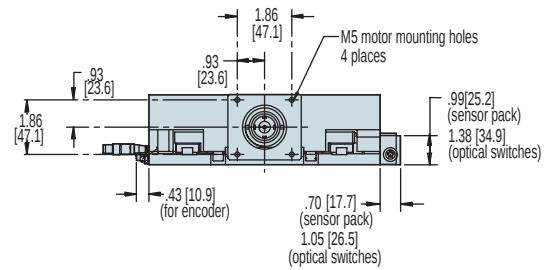
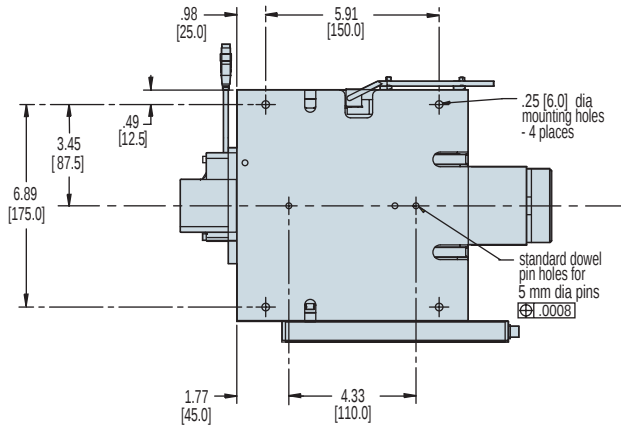
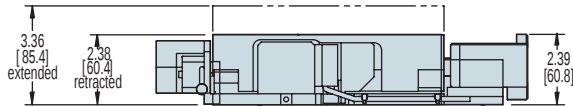
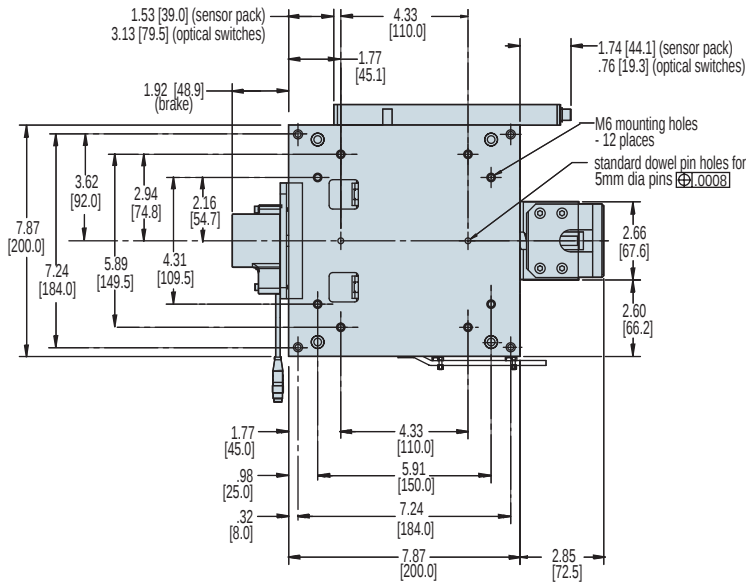
### Compression (normal load)

The graph provides a preliminary evaluation of the support bearing life/load characteristics. The curves show the life/load relationship when the applied load is centered on the carriage, normal (perpendicular) to the carriage mounting surface. For final evaluation of life vs load, including off center, tension, and side loads contact Parker Applications Engineering at 800-245-6903





## Dimensions inch (mm)

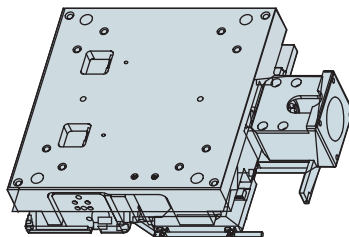


### 100-9274-01 XR Adapter Plate

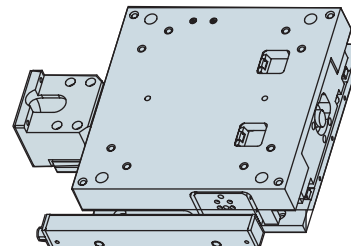
A multi-axis adapter plate is available to mount the ZP200 to an XR/LXR table or, mount an XR/LXR table to the ZP200. This plate is 9.53 mm thick and includes standard dowel pin holes for repeatable alignment.

|            | ZP200 as Base | ZP200 as Top Axis |
|------------|---------------|-------------------|
| 404XR      | Yes           | n/a*              |
| 404LXR     | Yes           | n/a*              |
| 406XR      | Yes           | Yes               |
| 406LXR     | Yes           | Yes               |
| 206 Rotary | Yes           | n/a*              |

\*Not recommended - consult factory.



Encoder



Sensor Pack

# Z Wedge Series

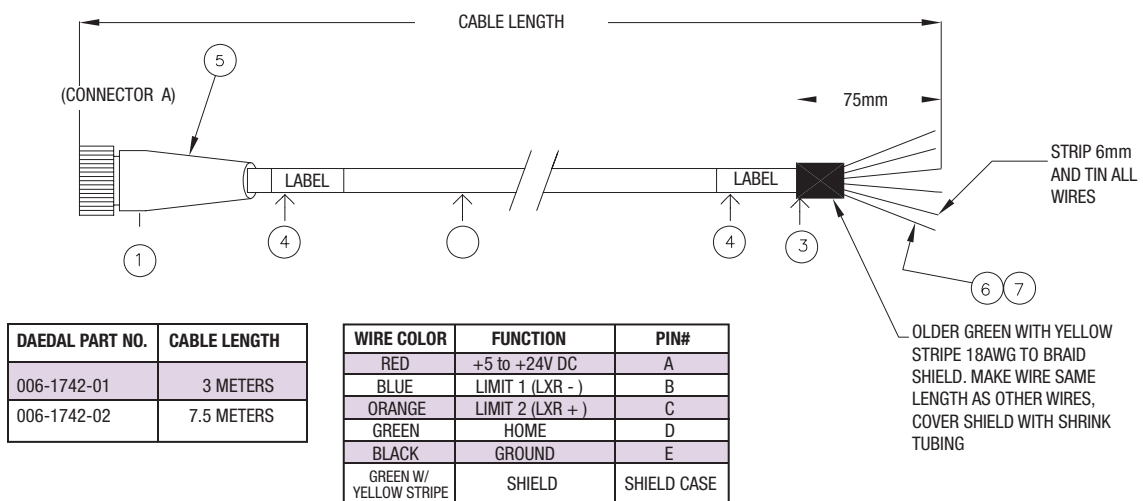
## LIMIT & HOME SENSORS

|                                |                                                                                                                                                                                                                                                                                                                  |       |                               |       |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------------------------|-------|
| Switch Type                    | Proximity                                                                                                                                                                                                                                                                                                        |       |                               |       |
| Input Power                    | 5-30VDC, 20mA                                                                                                                                                                                                                                                                                                    |       |                               |       |
| Output                         | 100mA (max)                                                                                                                                                                                                                                                                                                      |       |                               |       |
| Repeatability                  | +/- 10 microns (unidirectional)                                                                                                                                                                                                                                                                                  |       |                               |       |
| Wire Color Code                | 3 Wire Sensor                                                                                                                                                                                                                                                                                                    |       | 4 Wire Sensor                 |       |
|                                | (+) Supply                                                                                                                                                                                                                                                                                                       | Brown | (+) Supply                    | Brown |
|                                | Output                                                                                                                                                                                                                                                                                                           | Black | (N.O.) Normally Open Output   | Black |
|                                | (-) Supply                                                                                                                                                                                                                                                                                                       | Blue  | (N.C.) Normally Closed Output | White |
|                                |                                                                                                                                                                                                                                                                                                                  |       | (-) Supply                    | Blue  |
| LED Color                      | Yellow                                                                                                                                                                                                                                                                                                           |       |                               |       |
| Sensor Pack Switch Location    | The L11-L14, H11-H14 Limit/Home options are enclosed in a sensor pack that is bolted to the side of the table. These sensors are adjustable along the length of the sensor pack. (Wire terminates in a 5-pin connector; extension cable included)                                                                |       |                               |       |
| N.O./N.C. Options              | Normally Open (N.O.) switches are typically used as home sensors and are typically located between the limit sensors. Normally Closed (N.C.) switches are generally used as defense circuits to prevent damage to components caused by over-travel.                                                              |       |                               |       |
| Sinking/Sourcing Options       | Sinking Switches (a.k.a. NPN): The output lead of this switch provides an electrical path to ground when activated. Sourcing Switches (a.k.a. PNP): The output lead of this switch provides a positive (+) voltage potential relative to ground. Note: refer to the controller's manual for input compatibility. |       |                               |       |
| Temperature Range <sup>1</sup> | +41° F to +158° F                                                                                                                                                                                                                                                                                                |       |                               |       |
| Vacuum Rating                  | 1 x 10 <sup>-3</sup> Torr                                                                                                                                                                                                                                                                                        |       |                               |       |

1. This range represents the maximum allowable temperature. Catalog specifications are guaranteed only at 20o C.

**CAUTION: REVERSING SUPPLY POTENTIAL WILL DESTROY SENSOR**  
 Brown: +5 to +30VDC Supply  
 Blue: Ground Supply  
 Black: Signal Output

## Sensor Pack Cable Wiring Diagram



NOTE: LIMIT 2 IS THE LIMIT SWITCH ON THE CONNECTOR END OF THE SENSOR PACK HOUSING.



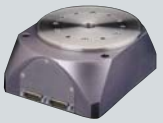
## Order Example

|                                           |       |     |   |   |    |     |     |    |    |    |    |    |    |
|-------------------------------------------|-------|-----|---|---|----|-----|-----|----|----|----|----|----|----|
|                                           | ZP200 | T01 | M | S | D2 | H12 | L12 | C3 | M3 | E3 | B2 | R1 | P1 |
| Model Series .....                        | ZP200 |     |   |   |    |     |     |    |    |    |    |    |    |
| Travel                                    |       |     |   |   |    |     |     |    |    |    |    |    |    |
| 25 mm .....                               |       | T01 |   |   |    |     |     |    |    |    |    |    |    |
| Mounting                                  |       |     |   |   |    |     |     |    |    |    |    |    |    |
| Metric .....                              |       | M   |   |   |    |     |     |    |    |    |    |    |    |
| Grade                                     |       |     |   |   |    |     |     |    |    |    |    |    |    |
| Precision .....                           |       | P   |   |   |    |     |     |    |    |    |    |    |    |
| Standard .....                            |       | S   |   |   |    |     |     |    |    |    |    |    |    |
| Drive Screw                               |       |     |   |   |    |     |     |    |    |    |    |    |    |
| 5 mm lead .....                           |       |     |   |   | D2 |     |     |    |    |    |    |    |    |
| 10 mm lead .....                          |       |     |   |   | D3 |     |     |    |    |    |    |    |    |
| 20 mm lead .....                          |       |     |   |   | D4 |     |     |    |    |    |    |    |    |
| Home Sensor                               |       |     |   |   |    |     |     |    |    |    |    |    |    |
| No sensor .....                           |       | H1  |   |   |    |     |     |    |    |    |    |    |    |
| N.C. current sinking - sensor pack .....  |       | H11 |   |   |    |     |     |    |    |    |    |    |    |
| N.O. current sinking - sensor pack .....  |       | H12 |   |   |    |     |     |    |    |    |    |    |    |
| N.C. current sourcing - sensor pack ..... |       | H13 |   |   |    |     |     |    |    |    |    |    |    |
| N.O. current sourcing - sensor pack ..... |       | H14 |   |   |    |     |     |    |    |    |    |    |    |
| Travel Limit Sensors                      |       |     |   |   |    |     |     |    |    |    |    |    |    |
| No sensor .....                           |       | L1  |   |   |    |     |     |    |    |    |    |    |    |
| N.C. current sinking - sensor pack .....  |       | L11 |   |   |    |     |     |    |    |    |    |    |    |
| N.O. current sinking - sensor pack .....  |       | L12 |   |   |    |     |     |    |    |    |    |    |    |
| N.C. current sourcing - sensor pack ..... |       | L13 |   |   |    |     |     |    |    |    |    |    |    |
| N.O. current sourcing - sensor pack ..... |       | L14 |   |   |    |     |     |    |    |    |    |    |    |
| Coupling                                  |       |     |   |   |    |     |     |    |    |    |    |    |    |
| No coupling .....                         |       | C1  |   |   |    |     |     |    |    |    |    |    |    |
| 0.25" bore Bellows .....                  |       | C3  |   |   |    |     |     |    |    |    |    |    |    |
| 0.38" bore Bellows .....                  |       | C5  |   |   |    |     |     |    |    |    |    |    |    |
| 9.0 mm (0.35") bore Bellows .....         |       | C23 |   |   |    |     |     |    |    |    |    |    |    |
| Motor Mount                               |       |     |   |   |    |     |     |    |    |    |    |    |    |
| No motor mounts .....                     |       | M1  |   |   |    |     |     |    |    |    |    |    |    |
| SM16/BE16 motor .....                     |       | M2  |   |   |    |     |     |    |    |    |    |    |    |
| NEMA 23 and SM23 motors .....             |       | M3  |   |   |    |     |     |    |    |    |    |    |    |
| BE23 motor mount .....                    |       | M61 |   |   |    |     |     |    |    |    |    |    |    |
| Linear Encoder Option                     |       |     |   |   |    |     |     |    |    |    |    |    |    |
| No encoder .....                          |       | E1  |   |   |    |     |     |    |    |    |    |    |    |
| 1.0 micron .....                          |       | E2  |   |   |    |     |     |    |    |    |    |    |    |
| 0.5 micron .....                          |       | E3  |   |   |    |     |     |    |    |    |    |    |    |
| 0.1 micron .....                          |       | E4  |   |   |    |     |     |    |    |    |    |    |    |
| 5.0 micron .....                          |       | E5  |   |   |    |     |     |    |    |    |    |    |    |
| Sine/cosine encoder .....                 |       | E7  |   |   |    |     |     |    |    |    |    |    |    |
| Brake option                              |       |     |   |   |    |     |     |    |    |    |    |    |    |
| No brake .....                            |       | B1  |   |   |    |     |     |    |    |    |    |    |    |
| Shaft brake .....                         |       | B2  |   |   |    |     |     |    |    |    |    |    |    |
| Environmental                             |       |     |   |   |    |     |     |    |    |    |    |    |    |
| Class 1000 .....                          |       | R1  |   |   |    |     |     |    |    |    |    |    |    |
| Class 10 .....                            |       | R2  |   |   |    |     |     |    |    |    |    |    |    |
| Place Holder .....                        |       | P1  |   |   |    |     |     |    |    |    |    |    |    |

# Rotary Series: Direct Drive Precision Stages



Parker Bayside's Direct Drive Rotary Stages feature a robust construction and high performance in a compact package, providing smooth, near-frictionless motion with zero backlash.



## Performance Specifications

| Model No. | Axial Capacity |       | Perpendicular Capacity @ Radius | Continuous Output Torque |         | Peak Output Torque |         | Maximum Output Speed <sup>(1)</sup> |
|-----------|----------------|-------|---------------------------------|--------------------------|---------|--------------------|---------|-------------------------------------|
|           | (kgf)          | (lb)  |                                 | (Nm)                     | (in lb) | (Nm)               | (in lb) |                                     |
| R100D     | 75             | 165.3 | 20kgf @ 50mm                    | 0.65                     | 5.75    | 1.96               | 17.34   | 700                                 |
| R150D     | 150            | 330.6 | 75kgf @ 75mm                    | 4.00                     | 35.4    | 12.00              | 106.2   | 500                                 |
| R200D     | 250            | 551.1 | 150kgf @ 100mm                  | 6.2                      | 54.80   | 18.60              | 164.40  | 300                                 |

| Model No.<br>@ øH | Radial Runout @ øk | Axial Runout of Rotation | Wobble @ Axis | Inertia                   |                           | Stage Weight |       |
|-------------------|--------------------|--------------------------|---------------|---------------------------|---------------------------|--------------|-------|
|                   | (microns)          | (microns)                | (arc sec)     | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) | (kg)         | (lb)  |
| R100D             | 20                 | 18                       | 60            | 14.2                      | 0.197                     | 2.24         | 4.85  |
| R150D             | 26                 | 23                       | 45            | 86.4                      | 1.200                     | 5.8          | 12.79 |
| R200D             | 36                 | 30                       | 30            | 338.0                     | 4.695                     | 10.5         | 23.15 |

## Encoder Data

| Model No.                                       | R100D   | R150D   | R200D   |
|-------------------------------------------------|---------|---------|---------|
| Total Number of counts/rev <sup>(2)</sup>       | 473,600 | 629,760 | 944,000 |
| Frequency at Max Speed <sup>(2)</sup> (MHz)     | 5.5     | 5.2     | 4.7     |
| Resolution after x4 (arc sec)                   | 2.73    | 2.05    | 1.3728  |
| Repeatability after x4 (arc sec) <sup>(3)</sup> | ± 8.4   | ± 6.15  | ± 4.1   |

(1) Maximum speed may be limited by input frequency response of controller or drive.

(2) Post quadrature (includes 10x interpolation and 4x of control).

(3) Typical system repeatability that can be achieved by a closed loop control system.

## Motor Specifications

| Model No. | Voltage Constant<br>K <sub>EL-L</sub><br>(V/kRPM) | Torque Constant<br>K <sub>TL-L</sub> |             | Resistance<br>R <sub>L-L</sub><br>(ohms @ 25°C) | Inductance<br>L <sub>L-L</sub><br>(mH) | Thermal Resistance<br>(°C/W) |
|-----------|---------------------------------------------------|--------------------------------------|-------------|-------------------------------------------------|----------------------------------------|------------------------------|
|           |                                                   | (Nm/amp)                             | (in lb/amp) |                                                 |                                        |                              |
| R100D     | 75                                                | 0.72                                 | 6.37        | 59.9                                            | 50                                     | 2.0                          |
| R150D     | 210                                               | 2                                    | 17.7        | 11.4                                            | 14                                     | 2.0                          |
| R200D     | 325                                               | 3.1                                  | 27.4        | 10.4                                            | 21                                     | 2.0                          |

| Model No. | Rated Voltage<br>(V) | I <sub>cont</sub><br>(amps) | I <sub>peak</sub><br>(amps) | Logic Voltage<br>(V/amp) | Pole Count |
|-----------|----------------------|-----------------------------|-----------------------------|--------------------------|------------|
| R100D     | 300                  | 0.9                         | 2.72                        | 5 V @ 170 ma             | 12         |
| R150D     | 300                  | 2.0                         | 6.0                         | 5 V @ 170 ma             | 20         |
| R200D     | 300                  | 2.0                         | 6.0                         | 5 V @ 170 ma             | 32         |

# Direct Drive Precision Stages

### High Performance in a Compact Package

Parker Bayside's Direct Drive Rotary Stage, featuring an integral brushless DC servomotor, has several distinct advantages over traditional worm gear-driven stages. The elimination of the worm gearing offers the ability to reduce wear with zero backlash while exhibiting near frictionless motion.

Its high positioning accuracy, solely based on the stage's encoder, provides repeatability within + 2 encoder counts, with resolutions ranging to 1.4 arc seconds. The RD Direct Drive features speeds up to 700 RPM with significant torque capability.

### When to Use:

- ▶ Precision rotary motion
- ▶ ZERO backlash
- ▶ Compact
- ▶ Rugged

### Applications:

- ▶ Electronic assembly
- ▶ Fiber Optics
- ▶ Medical
- ▶ Packaging
- ▶ Pharmaceutical
- ▶ Robotics
- ▶ Semiconductor

1

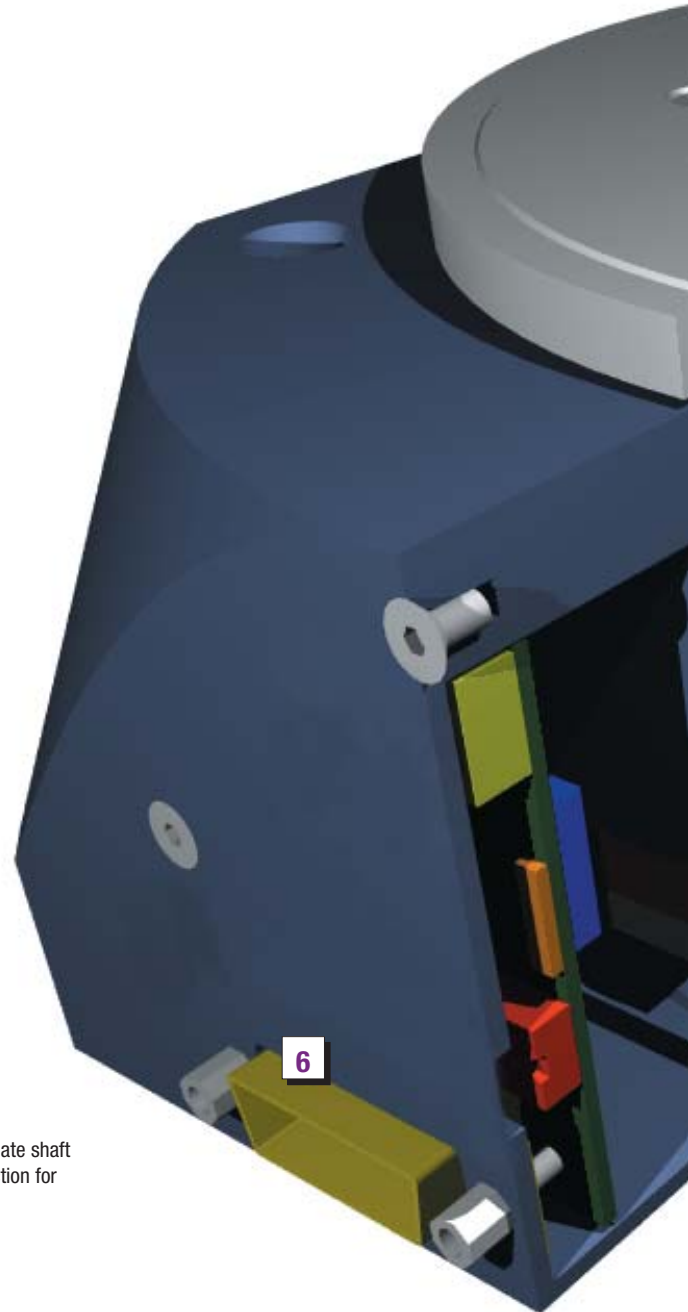
**Robust bearing design**  
for high load capacity

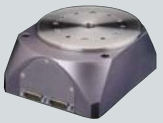
2

#### **Rotor / Shaft**

motor rotor and top plate shaft  
as one piece construction for  
high stiffness

6





3

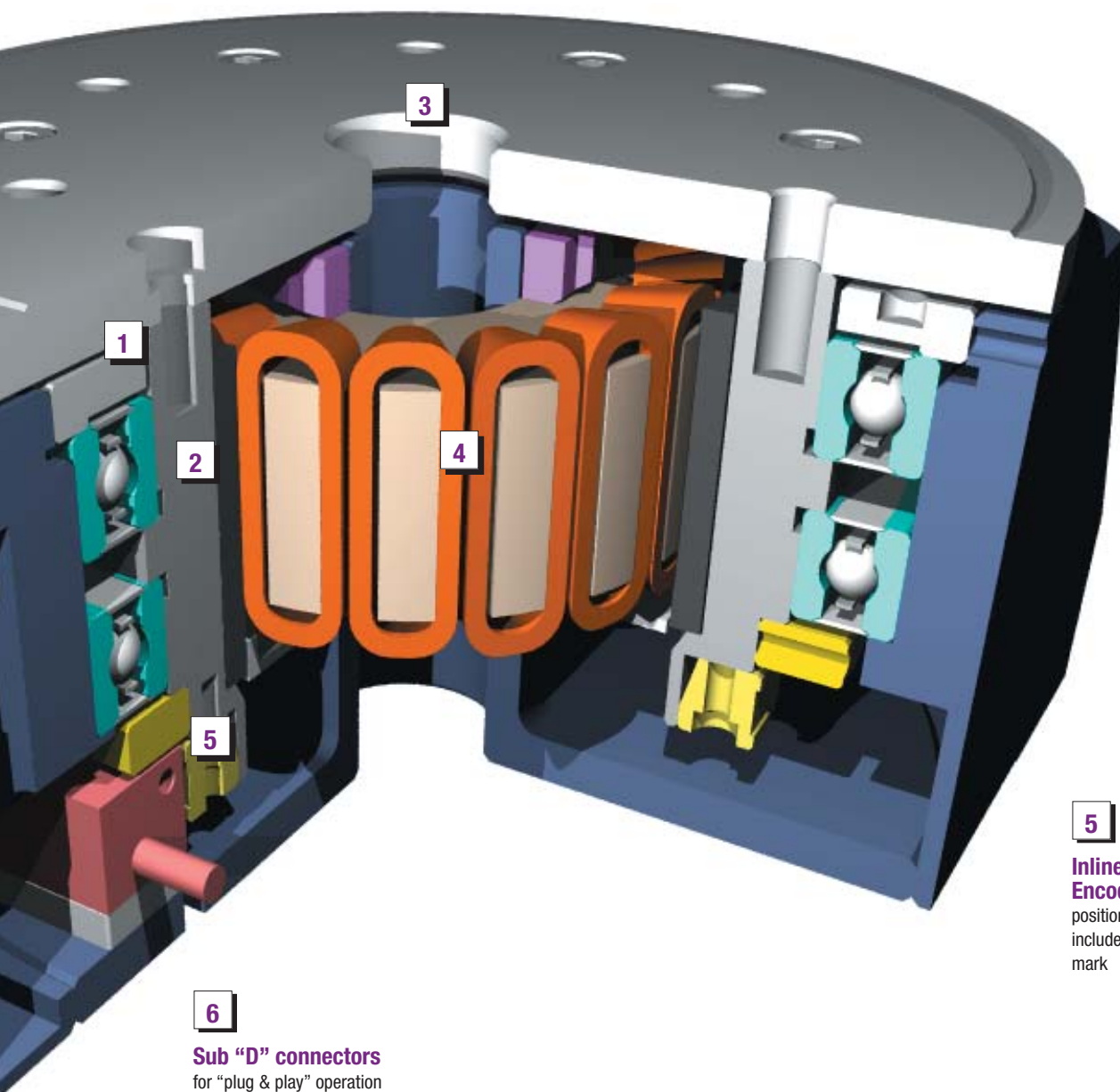
**Stainless Steel Top Plate**

precision ground for accurate mounting

4

**Integrated Brushless Motor**

unique design with high copper slot and rare earth magnet for maximum torque efficiency



5

**Inline Rotary Encoder**

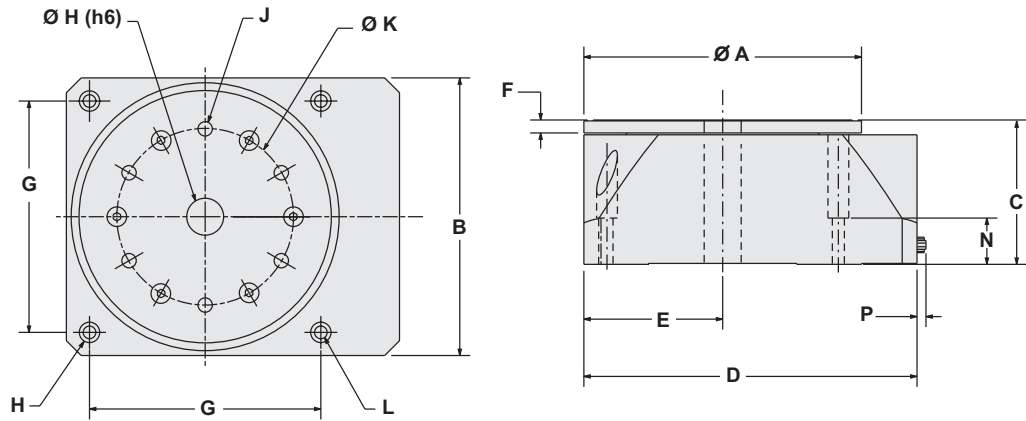
for direct position feedback. Also includes once per rev index mark

6

**Sub "D" connectors**

for "plug & play" operation and easy hook-up.

## Dimensions



| Model No. | A    |      | B    |      | C    |      | D    |      | E    |      | F    |       | G    |      |
|-----------|------|------|------|------|------|------|------|------|------|------|------|-------|------|------|
|           | (mm) | (in) | (mm) | (in) | (mm) | (in) | (mm) | (in) | (mm) | (in) | (mm) | (in)  | (mm) | (in) |
| R100D     | 100  | 3.94 | 100  | 3.94 | 75   | 2.95 | 130  | 5.12 | 50   | 1.96 | 5    | 0.196 | 85   | 3.34 |
| R150D     | 150  | 5.9  | 150  | 5.9  | 78   | 3.07 | 180  | 7.08 | 75   | 2.95 | 7    | 0.275 | 125  | 4.92 |
| R200D     | 200  | 7.87 | 200  | 7.87 | 100  | 3.94 | 230  | 9.05 | 100  | 3.94 | 10   | 0.393 | 160  | 6.29 |

| Model No. | H    |       | J   | K    |      | L    |       | M    |       | N    |       | P    |       |
|-----------|------|-------|-----|------|------|------|-------|------|-------|------|-------|------|-------|
|           | (mm) | (in)  | Tap | (mm) | (in) | (mm) | (in)  | (mm) | (in)  | (mm) | (in)  | (mm) | (in)  |
| R100D     | 20   | 0.787 | M5  | 60   | 2.36 | 5.5  | 0.216 | 9.5  | 0.374 | 25   | 0.984 | 5    | 0.196 |
| R150D     | 20   | 0.787 | M6  | 95   | 3.74 | 6.5  | 0.255 | 11.2 | 0.440 | 25   | 0.984 | 5    | 0.196 |
| R200D     | 30   | 1.18  | M8  | 125  | 4.92 | 8.5  | 0.334 | 14.0 | 0.551 | 25   | 0.984 | 5    | 0.196 |



Order Numbering  
Example:



| A | STAGE SERIES        |
|---|---------------------|
| R | Direct Drive Rotary |

| B   | MODEL  |
|-----|--------|
| 100 | 100 mm |
| 150 | 150 mm |
| 200 | 200 mm |

| C | DRIVE        |
|---|--------------|
| D | Direct Drive |

## Cable Options:

### Mating Power Cable

| Part Number   | Length   | Used With    |
|---------------|----------|--------------|
| 10963018-3000 | 3 meters | Flying Leads |
| 10963018-8000 | 8 meters | Flying Leads |

“Only for use with stage versions without LC display and programmable limits/outputs 5v requirement and Y-cable limits branch of previous cable type”

### Mating Sensor Cable

| Part Number   | Length   | Used With    |
|---------------|----------|--------------|
| 10963241-3000 | 3 meters | Flying Leads |

## How to Order

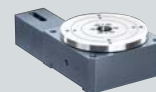
Direct Drive Rotary Stages are supported by a worldwide network of offices and local distributors.  
Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor.  
Information can also be obtained at [www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com).

Specifications are subject to change without notice.

# Rotary Series: Worm Drive Precision Stages



Parker Bayside's Worm Drive Precision Stages feature a unique self-compensating preload to limit backlash, solid or through-bore construction, and built-in limit switches.



## Performance Specifications

| Model No.          | Axial Capacity |       | Perpendicular Capacity |      |         |      |
|--------------------|----------------|-------|------------------------|------|---------|------|
|                    |                |       | @ 25mm                 |      | @ 150mm |      |
|                    | (kg)           | (lb)  | (kgf)                  | (lb) | (kgf)   | (lb) |
| R100M              | 100            | 220   | 22                     | 48   | 7       | 15   |
| R150M              | 400            | 880   | 88                     | 194  | 33      | 73   |
| R200M <sup>4</sup> | 600            | 1,320 | 200                    | 440  | 85      | 187  |
| R300M              | 1,000          | 2,220 | 325                    | 715  | 160     | 352  |

| Model No.          | Worm Gear Ratio | Gearing Backlash <sup>(1)</sup><br>(arc sec) | Peak Output Torque @100RPM Input |         | Peak Output Speed<br>(RPM) | Weight |       | Inertia                   |                           |
|--------------------|-----------------|----------------------------------------------|----------------------------------|---------|----------------------------|--------|-------|---------------------------|---------------------------|
|                    |                 |                                              | (Nm)                             | (in lb) |                            | (kgf)  | (lbf) | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) |
| R100M              | 60:1            | 2                                            | 8                                | 70.8    | 30                         | 2.3    | 5.0   | 0.0057                    | 0.0000784                 |
| R150M              | 72:1            | 2                                            | 25                               | 221     | 30                         | 6.0    | 13.0  | 0.055                     | 0.00076                   |
| R200M <sup>4</sup> | 72:1            | 2                                            | 55                               | 487     | 30                         | 15.0   | 33.0  | 0.148                     | 0.00210                   |
| R300M              | 90:1            | 2                                            | 75                               | 664     | 30                         | 35.0   | 77.0  | 0.368                     | 0.00516                   |

## Accuracy Specifications<sup>(2)</sup>

| Model No.          | Main Bearing Runout | Top to Base Parallelism | Position <sup>(3)</sup> Accuracy | Position <sup>(3)</sup> Repeatability | Input Torque Required |         |
|--------------------|---------------------|-------------------------|----------------------------------|---------------------------------------|-----------------------|---------|
|                    | (microns)           | (microns)               | (arc min)                        | (arc sec)                             | (Nm)                  | (in oz) |
| R100M              | ±5                  | ±12                     | 2                                | 12                                    | 0.07                  | 20      |
| R150M              | ±5                  | ±12                     | 2                                | 12                                    | 0.14                  | 20      |
| R200M <sup>4</sup> | ±7                  | ±17                     | 2                                | 12                                    | 0.14                  | 20      |
| R300M              | ±10                 | ±25                     | 2                                | 12                                    | 0.21                  | 30      |

(1) Gearing backlash is uni-directional.

(2) Accuracy is based on stage mounted to a flat granite surface and measured at 25mm above the center of the stage.

(3) Accuracy and repeatability are based on open loop lead accuracy and can be enhanced with encoder feedback.

(4) See 200 RT Series page 90.

# Worm Drive Precision Stages

The Rotary Stage Series offers an unparalleled combination of high accuracy and high-load capacity.

These rotary stages utilize a precision worm gear with the worm “flexed” against the gear to ensure a proper mesh. This feature provides high repeatability with very smooth operation.

Additionally, the rotary stages incorporate an oversized preloaded crossed roller bearing, offering exceptional stiffness and load capacity.

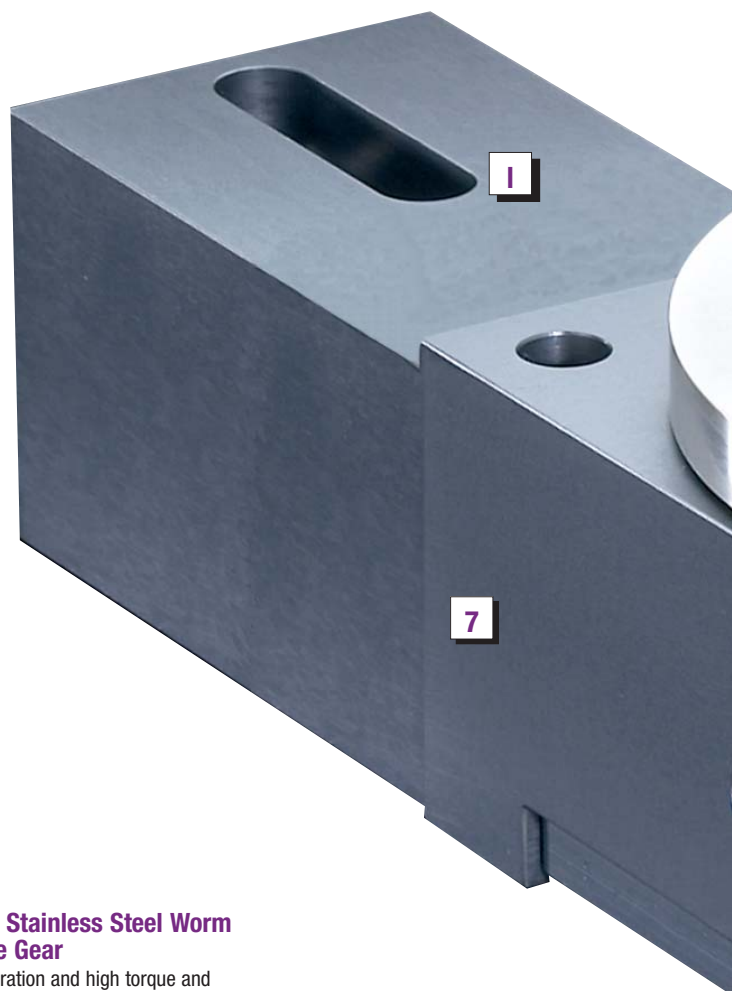
- ▶ Unique self-compensating preload to limit backlash
- ▶ Solid or thru bore construction
- ▶ Robust bearing design for high-load capacity
- ▶ Built-in limit switches
- ▶ Aluminum construction with stainless steel top plate

## When to Use:

- ▶ High accuracy
- ▶ High loads
- ▶ Compact
- ▶ High stiffness

## Applications:

- ▶ Electronic assembly
- ▶ Fiber Optics
- ▶ Medical
- ▶ Packaging
- ▶ Pharmaceutical
- ▶ Robotics
- ▶ Semiconductor



7

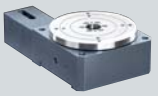
### Heavy Duty Stainless Steel Worm with Bronze Gear

for smooth operation and high torque and **Self-Compensating Preload** for zero backlash

6

### Completely Sealed and Lubricated

for long life even in harsh environments



1

**Motor Mounting and  
Coupling**  
for easy installation

2

**Integral Limit Switches**  
mounted under top plate for safety

3

**Preloaded Crossed  
Roller Bearings**  
for high loads and  
spindle stiffness

2

3

4

5

6

4

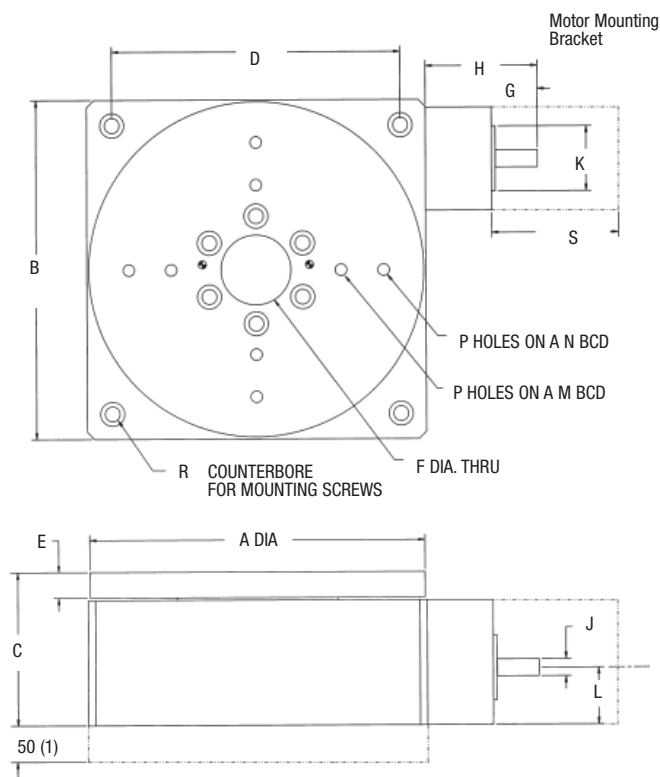
**Stainless Steel Top  
Plate**  
with solid or through  
hole construction

5

**Optional Inline  
Rotary Encoder**  
for direct position feedback

# Rotary Series

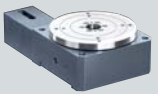
## Dimensions



| Model No. | A     |       | B    |       | C    |      | D    |       | E    |      |
|-----------|-------|-------|------|-------|------|------|------|-------|------|------|
|           | (mm)  | (in)  | (mm) | (in)  | (mm) | (in) | (mm) | (in)  | (mm) | (in) |
| R100M     | 98.5  | 3.88  | 100  | 3.94  | 55   | 2.16 | 85   | 3.35  | 8    | 0.32 |
| R150M     | 147.6 | 5.81  | 150  | 5.90  | 75   | 2.95 | 125  | 4.92  | 11   | 0.43 |
| R200M     | 197.7 | 7.78  | 200  | 7.87  | 90   | 3.54 | 170  | 6.70  | 15   | 0.59 |
| R300M     | 297.7 | 11.72 | 300  | 11.81 | 108  | 4.25 | 270  | 10.63 | 16   | 0.63 |

| Model No. | F    |      | G    |      | H    |      | J    |       | K    |       |
|-----------|------|------|------|------|------|------|------|-------|------|-------|
|           | (mm) | (in) | (mm) | (in) | (mm) | (in) | (mm) | (in)  | (mm) | (in)  |
| R100M     | 12   | 0.47 | 15   | 0.59 | 45   | 1.77 | 5    | 0.197 | 18   | 0.709 |
| R150M     | 25.5 | 1.00 | 27   | 1.06 | 66   | 2.60 | 10   | 0.394 | 38.1 | 1.50  |
| R200M     | 38   | 1.50 | 27   | 1.06 | 66   | 2.60 | 10   | 0.394 | 38.1 | 1.50  |
| R300M     | 51   | 2.00 | 39   | 1.53 | 113  | 4.45 | 12   | 0.472 | 73   | 2.875 |

| Model No. | L    |      | M    |       | N    |       | P         | R      | S    |      | Stage Weight |       |
|-----------|------|------|------|-------|------|-------|-----------|--------|------|------|--------------|-------|
|           | (mm) | (in) | (mm) | (in)  | (mm) | (in)  | Tap       | C'Bore | (mm) | (in) | (kg)         | (lb)  |
| R100M     | 21   | 0.83 | 45   | 1.772 | 75   | 2.953 | M5 x 0.8  | M5     | 38.1 | 1.50 | 1.8          | 3.97  |
| R150M     | 30.1 | 1.18 | 100  | 3.937 | 125  | 4.921 | M6 x 1    | M6     | 60.2 | 2.37 | 5            | 11    |
| R200M     | 33.5 | 1.32 | 100  | 3.937 | 150  | 5.905 | M8 x 1.25 | M8     | 60.2 | 2.37 | 13           | 28.66 |
| R300M     | 44.2 | 1.74 | 150  | 5.905 | 250  | 9.843 | M8 x 1.25 | M8     | 73.1 | 2.88 | 29           | 63.93 |



Order Numbering  
Example:

|          |            |          |          |          |          |          |          |
|----------|------------|----------|----------|----------|----------|----------|----------|
| <b>R</b> | <b>150</b> | <b>M</b> | <b>3</b> | <b>2</b> | <b>2</b> | <b>1</b> | <b>2</b> |
| <b>A</b> | <b>B</b>   | <b>C</b> | <b>D</b> | <b>E</b> | <b>F</b> | <b>G</b> | <b>H</b> |

|          |                         |
|----------|-------------------------|
| <b>A</b> | <b>STAGE SERIES</b>     |
| <b>R</b> | Worm Gear Rotary Series |

|          |                         |
|----------|-------------------------|
| <b>E</b> | <b>MOTOR MOUNTING</b>   |
| <b>X</b> | See how to order step 2 |

|                        |                            |
|------------------------|----------------------------|
| <b>B</b>               | <b>METRIC SQUARE WIDTH</b> |
| <b>100</b>             | 100mm                      |
| <b>150</b>             | 150mm                      |
| <b>200<sup>1</sup></b> | 200mm                      |
| <b>300</b>             | 300mm                      |

|          |                        |
|----------|------------------------|
| <b>F</b> | <b>LIMIT SWITCHES</b>  |
| <b>1</b> | None                   |
| <b>2</b> | End of Travel          |
| <b>3</b> | End of Travel and Home |

|          |                |
|----------|----------------|
| <b>C</b> | <b>DRIVE</b>   |
| <b>M</b> | Separate Motor |

|          |                                       |
|----------|---------------------------------------|
| <b>G</b> | <b>ENCODER IN LINE WITH TOP PLATE</b> |
| <b>1</b> | None                                  |
| <b>3</b> | 2000 LPR                              |

|          |                      |
|----------|----------------------|
| <b>D</b> | <b>GEAR RATIO</b>    |
| <b>2</b> | 60:1 (R100)          |
| <b>3</b> | 72:1 (R150 and R200) |
| <b>4</b> | 90:1 (R300)          |

|          |                    |
|----------|--------------------|
| <b>H</b> | <b>ENVIRONMENT</b> |
| <b>1</b> | Standard           |
| <b>2</b> | Clean Room         |

(1) See page 90 for 200RT series and page 127 for manual driven rotary positioning stages

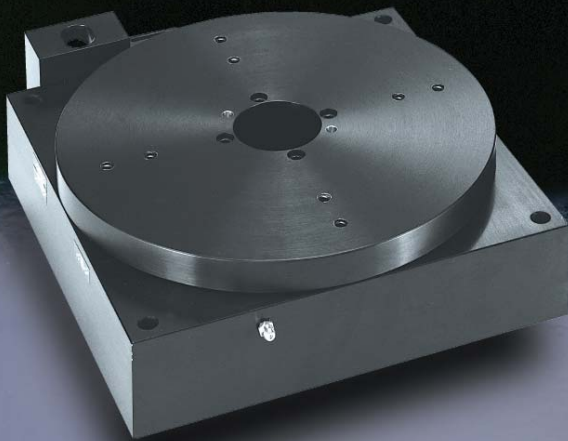
## How to Order

1. Pick features and options above.
2. Specify motor, make and model for mounting kit.

Parker Bayside's Rotary Series is supported by a worldwide network of offices and local distributors. Call **1-800-305-4555** for application engineering assistance and the name of the local distributor or Parker Bayside office nearest you. Visit us online at **www.baysidemotion.com** or **www.parkermotion.com** for product information.

Specifications are subject to change without notice.

# 200 RT Series: Rotary Tables



- High repeatable indexing (12 arc sec.)
- Load capacities to 200 lbs
- 360 degrees travel
- Performance tested worm gear drive
- Selectable table sizes and drive ratio
- Dual race angular contact support bearing



# 200 RT Series: Overview

## Quality Design and Construction

The 200RT Series Rotary Tables are designed for precise motor-driven rotary positioning and indexing. These tables are designed to function independently or in conjunction with linear tables used in high precision and precision automation applications. Their low-profile design minimizes stack height in multi-axis configurations and enables them to fit in many places where other motorized rotary devices cannot.

Models are available in 5, 6, 8, 10, or 12 inch diameters and are offered with four gear ratios making it convenient to match size, speed, and load requirements. They can be selected in either English or Metric mounting. They are

found in virtually all industries where intermittent part indexing, part scanning, skew adjustment, or precise angular alignment is required.

At the heart of these tables is a rugged main support bearing which is comprised of two preloaded angular contact bearing races. It is designed for high load capacity and smooth, flat rotary motion. The drive is a precision worm gear assembly that is preloaded to remove backlash. The top and base are constructed of high quality aluminum with an attractive black anodized finish. The top and bottom mounting surfaces are precision ground to assure flatness.

## 200RT Series Characteristics

| Common Characteristics                    | Units      | Precision    | Standard      |
|-------------------------------------------|------------|--------------|---------------|
| Performance                               |            |              |               |
| Positional Repeatability (unidirectional) | arc min    | 0.2          | 0.5           |
| Duty Cycle                                | %          | 50           | 50            |
| Table Runout (Max.)                       | in (μm)    | ±0.001 (±25) | ±0.003 (±75)  |
| Concentricity                             | in (μm)    | ±0.001 (±25) | ±0.005 (±127) |
| Wobble                                    | arc sec.   | 30           | 60            |
| Input Velocity (Max.)                     | revs./sec. | 15           | 15            |

## Travel Dependent Characteristics

| Table Diameter inches | Drive Ratio | Load Capacity lbs. (kgf) | Prec. | Accuracy Std. arc min | Output Torque in-lb (N-m) | Inertia 10 <sup>-3</sup> oz-in.-sec <sup>2</sup> (10 <sup>-6</sup> kg-m-sec <sup>2</sup> ) | Input Breakaway Torque (max) oz-in (N-m) | Running Torque (max) oz-in (N-m) | Weight Std. Top lb (kgf) | Total lb (kgf) |
|-----------------------|-------------|--------------------------|-------|-----------------------|---------------------------|--------------------------------------------------------------------------------------------|------------------------------------------|----------------------------------|--------------------------|----------------|
| 5.0                   | 180:1       | 25 (11)                  | 3     | 10                    | 25 (2.8)                  | 0.14 (0.102)                                                                               | 22 (0.16)                                | 20 (0.13)                        | 0.67 (0.3)               | 6.0 (2.7)      |
| 5.0                   | 90:1        | 25 (11)                  | 3     | 10                    | 25 (2.8)                  | 0.15 (0.112)                                                                               | 22 (0.16)                                | 20 (0.13)                        | 0.67 (0.3)               | 6.0 (2.7)      |
| 5.0                   | 36:1        | 70 (32)                  | 5     | 12                    | 25 (2.8)                  | 0.24 (0.173)                                                                               | 22 (0.16)                                | 20 (0.13)                        | 0.67 (0.3)               | 6.0 (3.6)      |
| 6.0                   | 180:1       | 150 (68)                 | 3     | 10                    | 40 (4.5)                  | 0.16 (0.112)                                                                               | 22 (0.16)                                | 20 (0.13)                        | 0.91 (0.42)              | 8.0 (2.7)      |
| 6.0                   | 90:1        | 150 (68)                 | 3     | 10                    | 40 (4.5)                  | 0.20 (0.132)                                                                               | 22 (0.16)                                | 20 (0.13)                        | 0.91 (0.42)              | 8.0 (3.6)      |
| 6.0                   | 45:1        | 150 (68)                 | 5     | 12                    | 40 (4.5)                  | 0.29 (0.204)                                                                               | 22 (0.16)                                | 20 (0.13)                        | 0.91 (0.42)              | 8.0 (3.6)      |
| 8.0                   | 180:1       | 150 (68)                 | 3     | 10                    | 40 (4.5)                  | 0.24 (0.163)                                                                               | 28 (0.19)                                | 25 (0.18)                        | 2.23 (1.01)              | 15.0 (6.8)     |
| 8.0                   | 90:1        | 150 (68)                 | 3     | 10                    | 40 (4.5)                  | 0.66 (0.459)                                                                               | 28 (0.19)                                | 25 (0.18)                        | 2.23 (1.01)              | 15.0 (6.8)     |
| 8.0                   | 36:1        | 150 (68)                 | 5     | 12                    | 40 (4.5)                  | 0.90 (0.642)                                                                               | 28 (0.19)                                | 25 (0.18)                        | 2.30 (1.05)              | 15.0 (6.8)     |
| 10.0                  | 180:1       | 200 (90)                 | 3     | 10                    | 190 (21.5)                | 0.74 (0.530)                                                                               | 33 (0.22)                                | 30 (0.21)                        | 5.26 (2.30)              | 29.0 (13.1)    |
| 10.0                  | 90:1        | 200 (90)                 | 3     | 10                    | 190 (21.5)                | 1.02 (0.734)                                                                               | 33 (0.22)                                | 30 (0.21)                        | 5.26 (2.30)              | 29.0 (13.1)    |
| 10.0                  | 45:1        | 200 (90)                 | 5     | 12                    | 190 (21.5)                | 2.13 (1.53)                                                                                | 33 (0.22)                                | 30 (0.21)                        | 5.26 (2.30)              | 29.0 (13.1)    |
| 12.0                  | 180:1       | 200 (90)                 | 3     | 10                    | 190 (21.5)                | 0.99 (0.713)                                                                               | 33 (0.22)                                | 30 (0.21)                        | 7.67 (3.49)              | 32.0 (14.5)    |
| 12.0                  | 90:1        | 200 (90)                 | 3     | 10                    | 190 (21.5)                | 1.59 (1.12)                                                                                | 33 (0.22)                                | 30 (0.21)                        | 7.67 (3.49)              | 32.0 (14.5)    |
| 12.0                  | 45:1        | 200 (90)                 | 5     | 12                    | 190 (21.5)                | 3.83 (2.75)                                                                                | 33 (0.22)                                | 30 (0.21)                        | 7.67 (3.49)              | 32.0 (14.5)    |

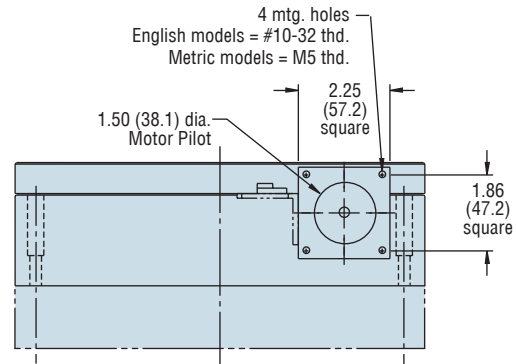
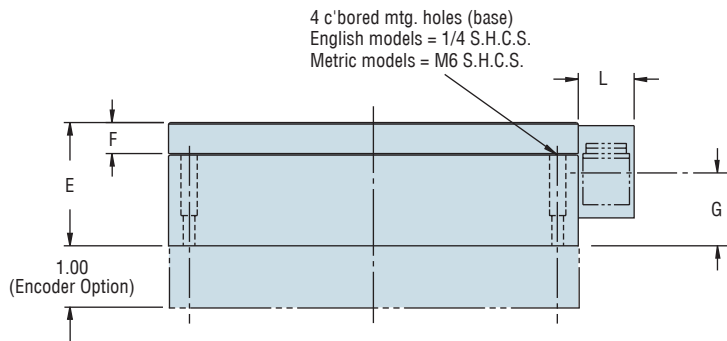
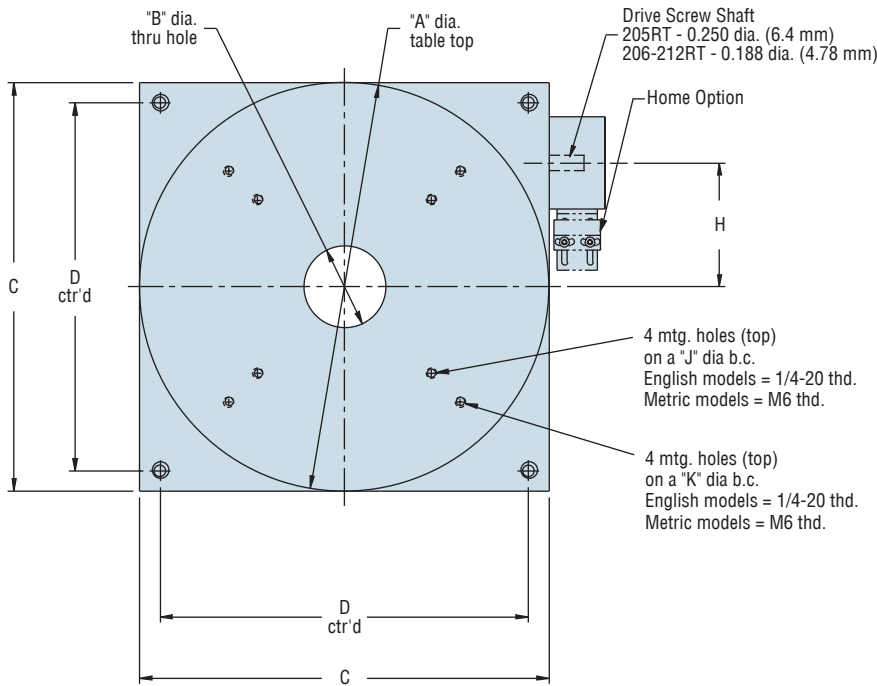
NOTE: For moment load calculations, refer to the technical section of Parker's web site [www.parkermotion.com](http://www.parkermotion.com)

## Rotary Encoder Option:

High resolution, high accuracy ring encoders can be mounted to the base of the rotary table. The encoder is coupled directly to the rotary table top, providing positional feedback with no drive train errors. 314,880 or 3,148,800 post quadrature counts per revolution are available, and an encoder housing is included to enclose and protect the encoder.

# Rotary Series

## Dimensions inch (mm)



## Options:

### Motor Couplings

A wide range of coupling styles and bores are available to match motor requirements. Bellows-style couplings, offering the lowest windup are required for all precision grade tables, while the aluminum and stainless steel helix couplers offer good windup characteristics and high durability at a lower cost.

### Motor Mounts

The motor mount is designed for an industry standard NEMA 23 motor flange and a maximum shaft length of 0.85".

### Home Sensor

The Home sensor provides a fixed reference point to which the table can always return. This is a mechanical reed switch which is mounted the body of the rotary table and is activated by a magnet imbedded on the table top.

### Rotary Encoders

High accuracy rotary encoders can be added for direct positional feedback of the table top position.

### Seals

Custom designed sealed units are offered to prevent excessive wear or internal damage resulting from dust and contaminants.

### Motors, Drives & Controls

Micro-step motors with drives are available for direct mounting to the rotary tables. Motion controllers can also be added to provide systems with seamless connectivity.

**NOTE: Refer to [www.parkermotion.com](http://www.parkermotion.com) or contact a Parker applications engineer for additional detailed information pertaining to any of these options or accessories.**

|         | A     | B     | C     | D   | E         |             | F         |             | G    | H    | J   | K    | L    | M     |
|---------|-------|-------|-------|-----|-----------|-------------|-----------|-------------|------|------|-----|------|------|-------|
|         |       |       |       |     | Std. (T2) | Option (T3) | Std. (T2) | Option (T3) |      |      |     |      |      |       |
| English | 5.0   | 1.0   | 5.0   | 4.0 | 1.8       | 2.42        | 0.38      | 1.00        | 1.11 | 1.66 | 3.0 | 4.0  | 1.38 | 0.188 |
|         | 6.0   | 1.75  | 6.0   | 5.0 | 2.0       | 2.62        | 0.38      | 1.00        | 1.23 | 2.04 | 4.0 | 5.0  | 1.38 | 0.250 |
|         | 8.0   | 1.75* | 8.0   | 6.0 | 2.5       | 3.00        | 0.50      | 1.00        | 1.57 | 2.04 | 4.0 | 6.0  | 1.38 | 0.250 |
|         | 10.0  | 2.0   | 10.0  | 9.0 | 3.0       | 3.25        | 0.75      | 1.00        | 1.81 | 3.03 | 6.0 | 8.0  | 1.38 | 0.250 |
|         | 12.0  | 2.0   | 10.0  | 9.0 | 3.0       | 3.25        | 0.75      | 1.00        | 1.81 | 3.03 | 8.0 | 10.0 | 2.38 | 0.250 |
| Metric  | 127.0 | 25.4  | 127.0 | 100 | 46.0      | 61.5        | 9.6       | 25.4        | 28.1 | 42.1 | 75  | 100  | 35   | 4.76  |
|         | 152.4 | 44.5  | 152.4 | 125 | 50.8      | 66.5        | 9.6       | 25.4        | 31.4 | 51.8 | 100 | 125  | 35   | 6.35  |
|         | 202.4 | 44.5* | 203.2 | 175 | 63.5      | 76.2        | 12.7      | 25.4        | 39.8 | 51.8 | 100 | 150  | 35   | 6.35  |
|         | 254.0 | 50.8  | 254.0 | 225 | 76.2      | 82.6        | 19.0      | 25.4        | 45.9 | 76.9 | 150 | 200  | 35   | 6.35  |
|         | 304.8 | 50.8  | 254.0 | 225 | 76.2      | 82.6        | 19.0      | 25.4        | 45.9 | 76.9 | 200 | 250  | 60.4 | 6.35  |

\*On the 8.0" (203.2) diameter table with 36:1 ratio, this dimension is 1.0" (25.4).



# Crossed Roller & Ball Bearing Linear Slides: High Precision



Compact Design with  
Smooth Motion



# Crossed Roller & Ball Bearing Linear Slides: overview



- **0.00008 inch straightline accuracy—per inch of travel (0.00025 inches for miniatures)**
- **Nonrecirculating bearing style for smooth, low-friction motion**
- **Hardened and precision ground 440C stainless steel balls and rods**
- **Factory preloaded to precision specifications to eliminate any side play and provide a uniform coefficient of friction**

Parker linear slides are the ideal mechanisms for providing smooth, low-friction linear motion. These linear slides are mechanically simple motion devices comprised of two primary elements: a stationary base, and a moveable top carriage separated by a row of rolling element (non-sliding) bearings. The bearings, located on each side of the base, support the carriage and provide smooth, accurate, low-friction motion. Parker slides are offered with two types of linear bearings: ball bearing and cross roller bearing. The ball bearing offers smooth linear translation at the lowest cost. The cross roller bearing offers greater load carrying capability.

Because these bearing styles employ nonrecirculating rolling elements, there is virtually no mechanical vibration and a very low coefficient of friction. Since there is no sliding contact between the top and bottom members, Parker slides are much more reliable than dovetail slides. They eliminate the wear problems, lubrication requirements, and “stiction” (skipping and jumping caused by the increased force needed to initiate movement) normally associated with the higher-friction slides.

Each linear ball bearing is comprised of a row of hardened steel balls captured between four hardened and ground precision steel rods (two each on the base and top). These linear ball bearing assemblies are factory preloaded to eliminate side play and meet precision specifications.

Parker ball slides are offered in many different sizes and styles. Proper sizing and selection is based on travel, load, size, mounting requirements, and open aperture or solid top construction.



- **Higher normal load and moment load capacity**
- **Nonrecirculating bearing style for smooth motion**
- **0.00008 inch straightline accuracy (per inch of travel)**
- **Factory preload to eliminate any side play and provide a uniform coefficient of friction**

The cross roller slide has nearly twice the load capacity of a ball bearing slide of comparable size. It is similar to the ball bearing slide, having two nonrecirculating bearings to support and guide the moveable top carriage over the stationary base. The cross roller bearing, however, is comprised of two rows of cylindrical rollers instead of balls. Each roller is alternately crisscrossed (at 90°) with the next, and captured between “V” grooved bearing races— one located on the stationary base and one on the moving top carriage. Higher load capacity is achieved as a result of having a larger contact surface (line contact) than the ball bearing type (point contact).

Parker cross roller slides are constructed of corrosion-resistant black anodized aluminum and high carbon steel. These building materials provide optimized stiffness and thermal stability without excessive mass. Base and top mounting surfaces are precision ground to assure flatness and parallelism. Cross roller slides are preloaded during the manufacturing process to eliminate any side play and to provide a uniform coefficient of friction. A variety of modifications to standard models are available to meet custom requirements. Contact our application engineering department with your design specifications.

## Crossed Roller Linear Slides

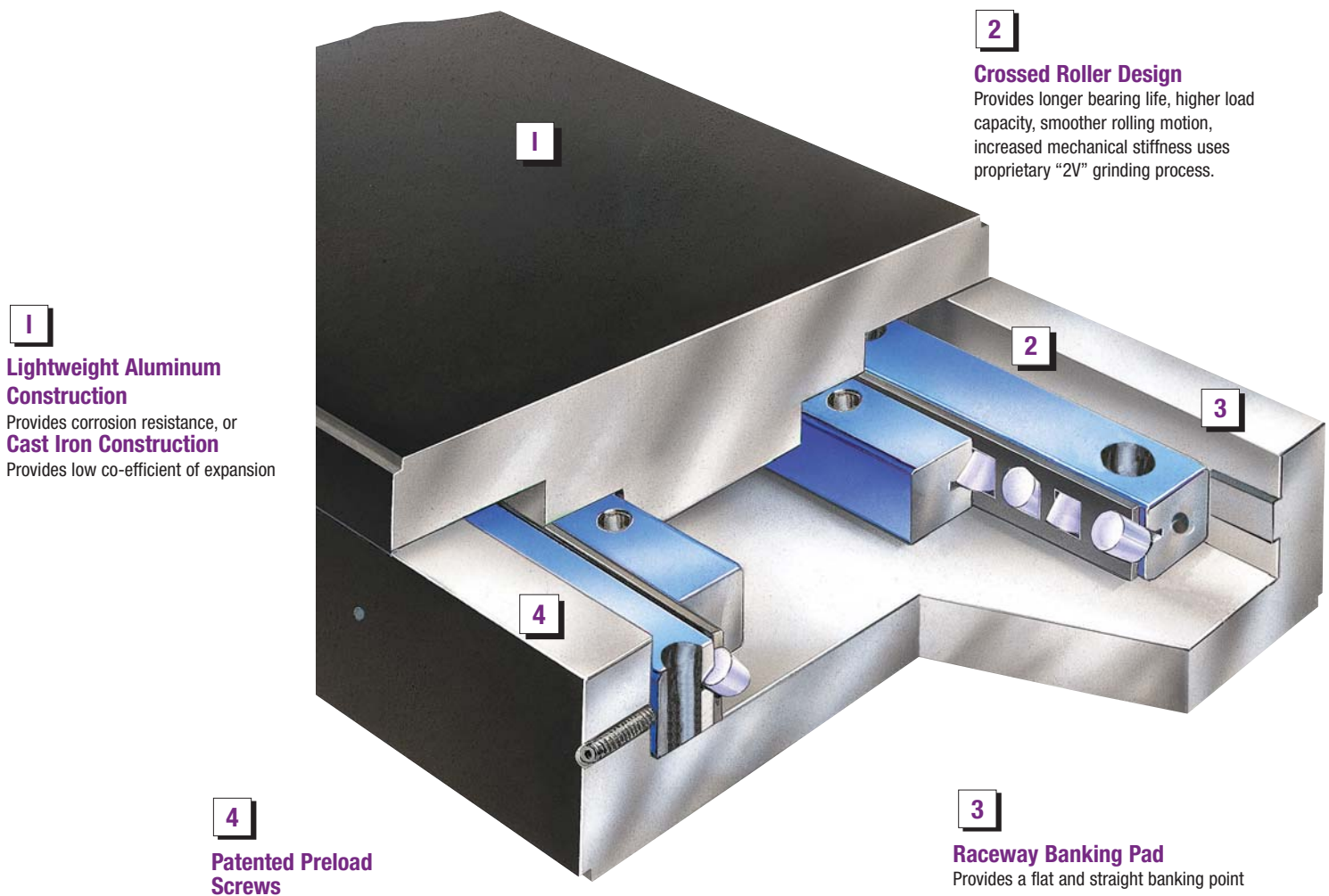
Crossed Roller Linear Slides are the ideal mechanisms for providing precise, low-friction linear motion. Two linear rows of bearings (one located on each side of the base), support the carriage and provide smooth, accurate, linear translation.

### When to Use:

- ▶ Compact
- ▶ High precision
- ▶ Low coefficient of expansion
- ▶ High load capacity
- ▶ Smooth motion
- ▶ No bearing creep
- ▶ Short travel

### Applications:

- ▶ Cleanroom
- ▶ Vacuum environment
- ▶ Electronic Assembly
- ▶ Fiber Optics
- ▶ Medical
- ▶ Pharmaceutical
- ▶ Semiconductor





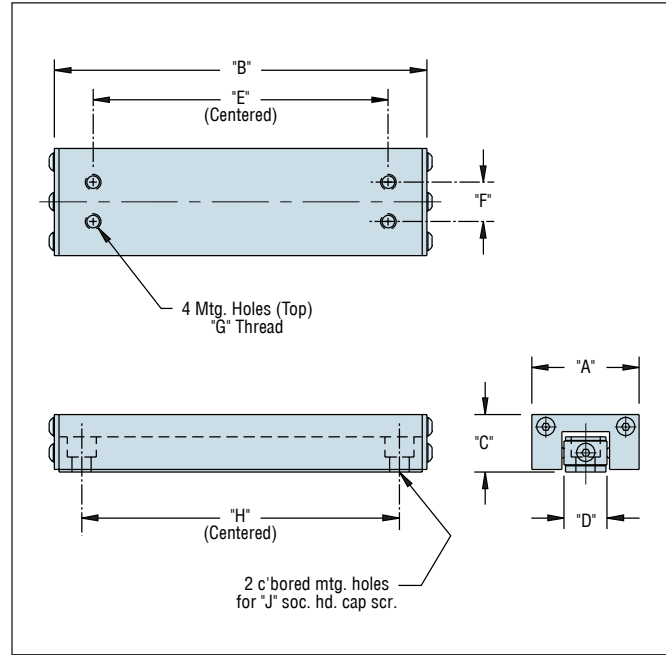
|                              |                                           |
|------------------------------|-------------------------------------------|
| <b>SE Series</b>             | <b>Extended Travel Slides</b>             |
| <b>Width:</b> 50mm to 100mm  | <b>Options</b>                            |
| <b>Travel:</b> 25mm to 400mm | - Clean Room and Vacuum Rated             |
| <b>Loads:</b> Up to 980kg    | - Modifications Available                 |
|                              | - Patented Anti-Creep Technology          |
| <b>SP Series</b>             | <b>Limited Travel Slides</b>              |
| <b>Width:</b> 50mm to 100mm  | <b>Options</b>                            |
| <b>Travel:</b> 25mm to 100mm | - Clean Room and Vacuum Rated             |
| <b>Loads:</b> Up to 395kg    | - Modifications Available                 |
|                              | - Patented Anti-Creep Technology          |
| <b>SC &amp; SK Series</b>    | <b>Crank &amp; Knob Lead Screw Slides</b> |
| <b>Width:</b> 50mm to 100mm  | <b>Options</b>                            |
| <b>Travel:</b> 25mm to 100mm | - Clean Room and Vacuum Rated             |
| <b>Loads:</b> Up to 395kg    | - Modifications Available                 |
|                              | - Crank or Knob Drive Mechanism           |
|                              | - Locking Mechanism                       |
|                              | - Patented Anti-Creep Technology          |
| <b>SW Series</b>             | <b>Double “V” Low Profile Slides</b>      |
| <b>Width:</b> 38mm           | <b>Options</b>                            |
| <b>Travel:</b> 25mm to 150mm | - Clean Room and Vacuum Rated             |
| <b>Loads:</b> Up to 127kg    | - Modifications Available                 |
|                              | - Patented Anti-Creep Technology          |



See [parkermotion.com](http://parkermotion.com) or [baysidemotion.com](http://baysidemotion.com) for specifications.

## 3500 Series Miniature Ball Bearing Slides

These miniature slides are the smallest free-travel linear ball slides offered. They are used extensively in space restricted applications.



### Specifications

Straightline Accuracy: 0.00025 in/in

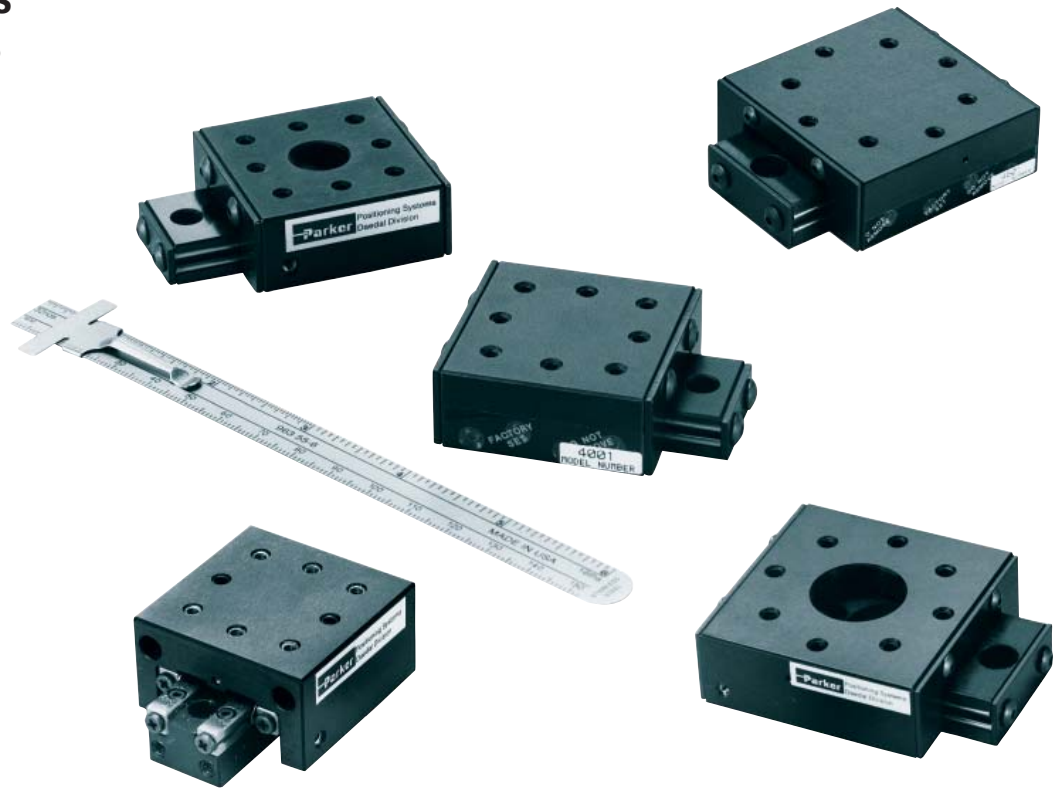
| Model   | Load Capacity* (lbs.) |        |          | Weight (lbs) | A    | B    | C   | D   | E (inches) | F   | G     | H    | J  |
|---------|-----------------------|--------|----------|--------------|------|------|-----|-----|------------|-----|-------|------|----|
|         | Travel (inches)       | Normal | Inverted |              |      |      |     |     |            |     |       |      |    |
| 3505-05 | 0.5                   | 4      | 2        | 0.03         | .59  | 1.12 | .32 | .24 | 0.63       | .22 | #2-56 | 0.75 | #2 |
| 3505-10 | 1.0                   | 8      | 4        | 0.04         | .59  | 2.12 | .32 | .24 | 1.63       | .22 | #2-56 | 1.38 | #2 |
| 3505-20 | 2.0                   | 12     | 6        | 0.06         | .59  | 3.12 | .32 | .24 | 2.63       | .22 | #2-56 | 2.38 | #2 |
| 3505-30 | 3.0                   | 14     | 7        | 0.08         | .59  | 4.12 | .32 | .24 | 3.63       | .22 | #2-56 | 3.38 | #2 |
| 3507-05 | 0.5                   | 8      | 4        | 0.04         | .75  | 1.12 | .40 | .28 | 0.63       | .38 | #2-56 | 0.75 | #2 |
| 3507-10 | 1.0                   | 10     | 5        | 0.06         | .75  | 2.12 | .40 | .28 | 1.63       | .38 | #2-56 | 1.38 | #2 |
| 3507-20 | 2.0                   | 12     | 6        | 0.08         | .75  | 3.12 | .40 | .28 | 2.63       | .38 | #2-56 | 2.38 | #2 |
| 3507-30 | 3.0                   | 14     | 7        | 0.10         | .75  | 4.12 | .40 | .28 | 3.63       | .38 | #2-56 | 3.38 | #2 |
| 3510-05 | 0.5                   | 10     | 5        | 0.10         | 1.00 | 1.68 | .50 | .36 | 1.25       | .44 | #6-32 | 1.25 | #4 |
| 3510-10 | 1.0                   | 12     | 6        | 0.12         | 1.00 | 2.68 | .50 | .36 | 2.25       | .44 | #6-32 | 2.25 | #4 |
| 3510-20 | 2.0                   | 15     | 7        | 0.14         | 1.00 | 3.68 | .50 | .36 | 3.25       | .44 | #6-32 | 3.25 | #4 |
| 3511-07 | 0.75                  | 15     | 8        | 0.08         | 1.06 | 1.68 | .53 | .42 | 1.25       | .44 | #6-32 | 1.13 | #6 |
| 3511-15 | 1.5                   | 18     | 9        | 0.14         | 1.06 | 2.68 | .53 | .42 | 2.25       | .44 | #6-32 | 2.13 | #6 |
| 3511-20 | 2.0                   | 20     | 10       | 0.20         | 1.06 | 3.68 | .53 | .42 | 3.25       | .44 | #6-32 | 3.13 | #6 |
| 3511-30 | 3.0                   | 25     | 13       | 0.26         | 1.06 | 4.56 | .53 | .42 | 4.00       | .44 | #6-32 | 3.25 | #6 |
| 3511-40 | 4.0                   | 30     | 15       | 0.32         | 1.06 | 6.00 | .53 | .42 | 5.50       | .44 | #6-32 | 4.00 | #6 |

\*For moment load ratings, refer to Parker's web site.



## 3900 and 4000 Series Square Profile Slides

These linear ball bearing and cross roller bearing slides are designed with a square face mounting surface and compatible mounting hole arrangements to facilitate easy “stacking” for multi-axis requirements. They are utilized as the primary element for Parker’s single- and multi-axis linear positioners.



### Specifications

Straightline Accuracy: English 0.00008 in/in Metric 2 µm/25 mm

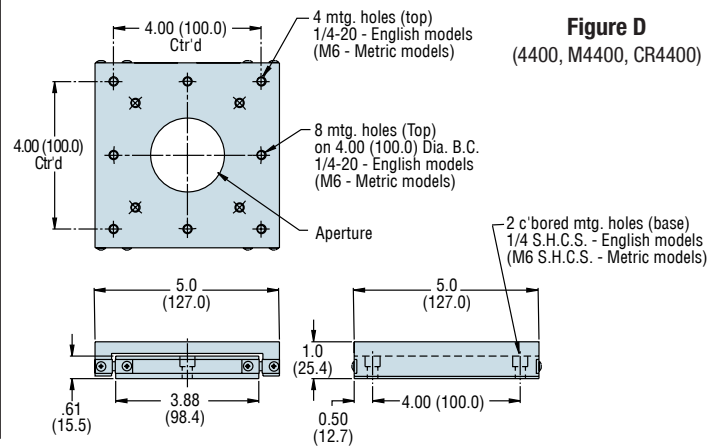
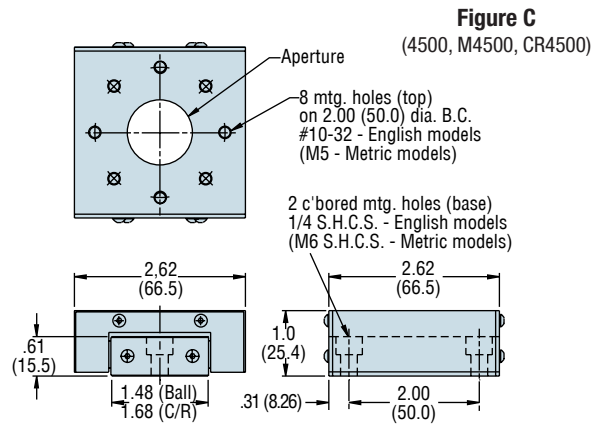
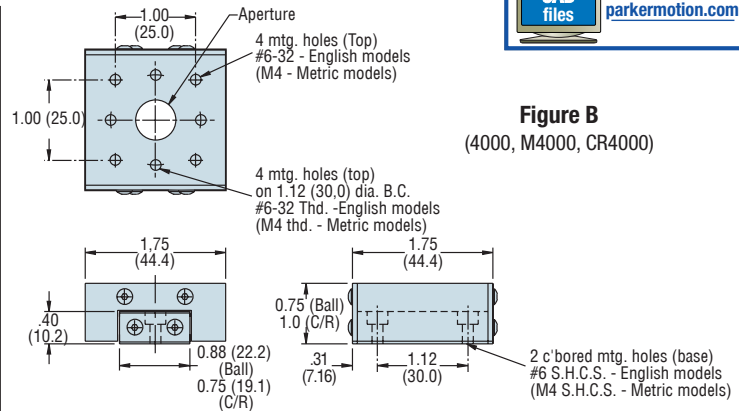
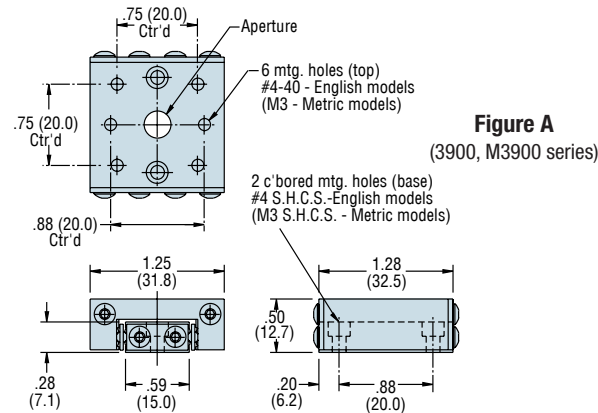
| Ball Bearing |       |         |               |               |          |                   |         |        |
|--------------|-------|---------|---------------|---------------|----------|-------------------|---------|--------|
|              | Model | Travel  | Size-(Square) | Load Capacity |          | Aperture Diameter | Weight  | Figure |
|              |       |         |               | Normal        | Inverted |                   |         |        |
| English      | 3901  | 0.5 in  | 1.25 in       | 6 lb          | 3 lb     | 0.25 in           | 0.10 lb | A      |
|              | 3905  | 0.5 in  | 1.25 in       | 6 lb          | 3 lb     | none              | 0.10 lb | A      |
|              | 4001  | 1.0 in  | 1.75 in       | 25 lb         | 13 lb    | none              | 0.20 lb | B      |
|              | 4005  | 1.0 in  | 1.75 in       | 25 lb         | 13 lb    | 0.50 in           | 0.20 lb | B      |
|              | 4501  | 1.0 in  | 2.62 in       | 40 lb         | 20 lb    | none              | 0.60 lb | C      |
|              | 4505  | 1.0 in  | 2.62 in       | 40 lb         | 20 lb    | 1.00 in           | 0.50 lb | C      |
|              | 4410  | 3.0 in  | 5.00 in       | 95 lb         | 48 lb    | none              | 2.20 lb | D      |
|              | 4450  | 3.0 in  | 5.00 in       | 95 lb         | 48 lb    | 2.00 in           | 1.70 lb | D      |
| Metric       | M3901 | 12.5 mm | 31.8 mm       | 2.7 kg        | 1.4 kg   | 6.2 mm            | 0.05 kg | A      |
|              | M3905 | 12.5 mm | 31.8 mm       | 2.7 kg        | 1.4 kg   | none              | 0.05 kg | A      |
|              | M4001 | 25.0 mm | 44.4 mm       | 11.0 kg       | 6.0 kg   | none              | 0.09 kg | B      |
|              | M4005 | 25.0 mm | 44.4 mm       | 11.0 kg       | 6.0 kg   | 12.7 mm           | 0.09 kg | B      |
|              | M4501 | 25.0 mm | 66.5 mm       | 18.2 kg       | 9.1 kg   | none              | 0.27 kg | C      |
|              | M4505 | 25.0 mm | 66.5 mm       | 18.2 kg       | 9.1 kg   | 25.4 mm           | 0.23 kg | C      |
|              | M4410 | 75.0 mm | 99.0 mm       | 43.2 kg       | 21.8 kg  | none              | 1.00 kg | D      |
|              | M4450 | 75.0 mm | 99.0 mm       | 43.2 kg       | 21.8 kg  | 50.8 mm           | 0.77 kg | D      |

| Cross Roller Bearing |        |        |               |               |          |                   |         |        |
|----------------------|--------|--------|---------------|---------------|----------|-------------------|---------|--------|
|                      | Model  | Travel | Size-(Square) | Load Capacity |          | Aperture Diameter | Weight  | Figure |
|                      |        |        |               | Normal        | Inverted |                   |         |        |
| English              | CR4001 | 1.0 in | 1.75 in       | 50 lb         | 25 lb    | none              | 0.20 lb | B      |
|                      | CR4501 | 1.0 in | 2.62 in       | 88 lb         | 44 lb    | none              | 0.80 lb | C      |
|                      | CR4505 | 1.0 in | 2.62 in       | 88 lb         | 44 lb    | 1.00 in           | 0.70 lb | C      |
|                      | CR4410 | 3.0 in | 5.00 in       | 120 lb        | 60 lb    | none              | 2.20 lb | D      |
|                      | CR4450 | 3.0 in | 5.00 in       | 120 lb        | 60 lb    | 2.00 in           | 1.70 lb | D      |

# Linear Slides

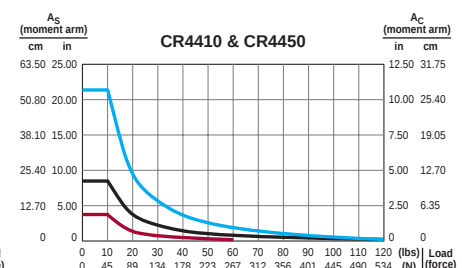
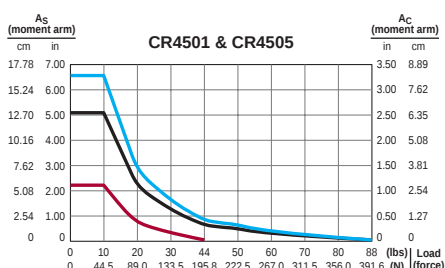
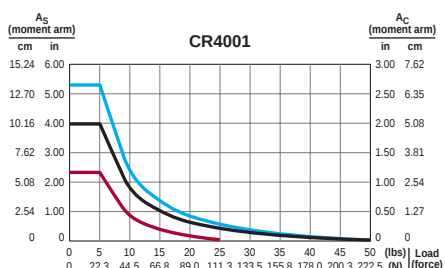
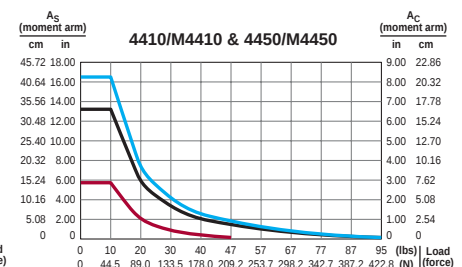
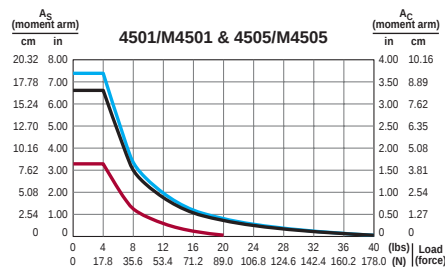
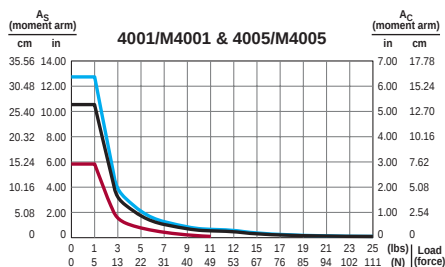
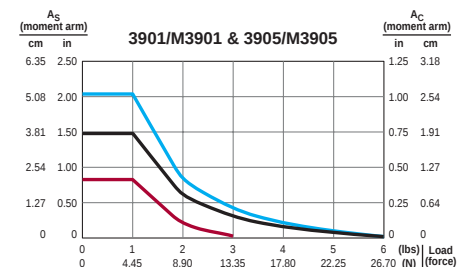
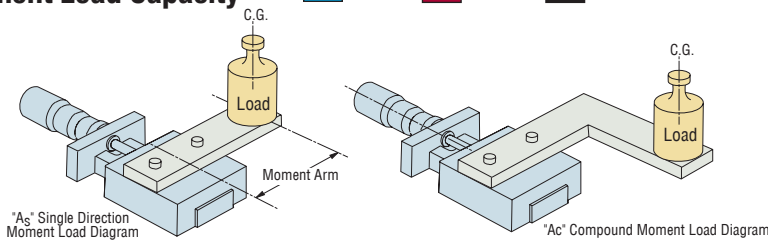
## 3900 and 4000 Series Square Profile Slide Dimensions inches (mm)

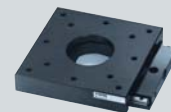
Note: Values shown in parentheses are actual metric dimensions for metric models (not conversions).



## Moment Load Capacity

Yaw Pitch Roll



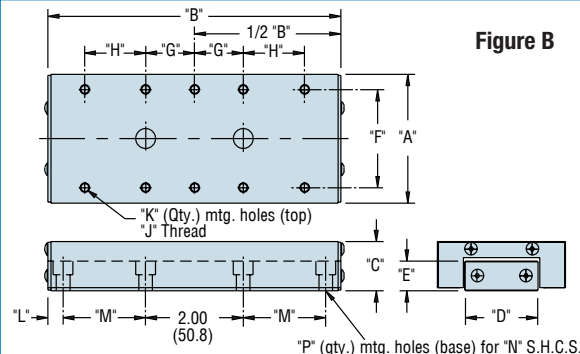
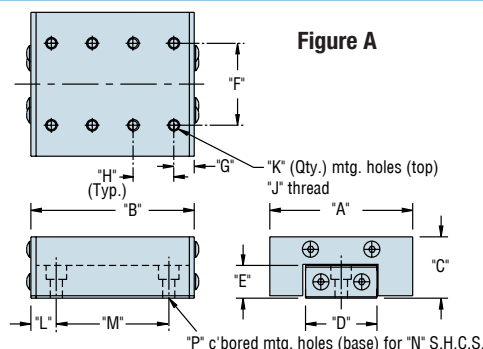


## 4000 Series Extended Travel Slides

These linear ball bearing and cross roller bearing slides have the same cross sectional sizes as the square profile slides, but offer longer travels and heavier load capacity.



Dimensions  
inches (mm)



### Specifications\*

Straightline Accuracy: English 0.00008 in/in Metric 2 µm/25 mm

| Ball Bearing       |           | Load Capacity |             |           |        | Dimensions |      |       |      |      |      |      |      |      |       |    |      |      |       |
|--------------------|-----------|---------------|-------------|-----------|--------|------------|------|-------|------|------|------|------|------|------|-------|----|------|------|-------|
| Model              | Travel in | Normal lb     | Inverted lb | Weight lb | Figure | A          | B    | C     | D    | E    | F    | G    | H    | J    | K     | L  | M    | N    | P     |
| units: inches      |           |               |             |           |        |            |      |       |      |      |      |      |      |      |       |    |      |      |       |
| English            | 4101      | 1.0           | 28          | 14        | 0.2    | A          | 1.75 | 2.00  | 0.75 | 0.88 | 0.40 | 1.00 | 0.25 | 0.50 | 6-32  | 8  | 0.31 | 1.38 | #6 2  |
|                    | 4201      | 2.0           | 40          | 20        | 0.4    | A          | 1.75 | 3.00  | 0.75 | 0.88 | 0.40 | 1.00 | 0.25 | 0.50 | 6-32  | 12 | 0.31 | 2.38 | #6 2  |
|                    | 4301      | 3.0           | 55          | 28        | 0.6    | A          | 1.75 | 4.00  | 0.75 | 0.88 | 0.40 | 1.00 | 0.25 | 0.50 | 6-32  | 16 | 0.31 | 3.38 | #6 2  |
|                    | 4601      | 2.0           | 64          | 32        | 0.9    | B          | 2.62 | 4.00  | 1.00 | 1.48 | 0.61 | 2.00 | 0.50 | —    | 10-32 | 6  | 0.31 | 0.69 | .25 4 |
|                    | 4701      | 3.0           | 95          | 47        | 1.1    | B          | 2.62 | 5.00  | 1.00 | 1.48 | 0.61 | 2.00 | 1.00 | —    | 10-32 | 6  | 0.31 | 1.19 | .25 4 |
|                    | 4801      | 4.0           | 122         | 61        | 1.4    | B          | 2.62 | 6.00  | 1.00 | 1.48 | 0.61 | 2.00 | 0.50 | 1.00 | 10-32 | 10 | 0.31 | 1.69 | .25 4 |
|                    | 4606      | 6.0           | 147         | 74        | 2.3    | A          | 2.62 | 9.00  | 1.00 | 0.94 | 0.69 | 2.00 | 1.50 | 2.00 | 10-32 | 8  | 1.00 | 3.50 | .25 3 |
|                    | 4609      | 9.0           | 184         | 92        | 3.1    | A          | 2.62 | 12.00 | 1.00 | 0.94 | 0.69 | 2.00 | 1.00 | 2.00 | 10-32 | 12 | 1.00 | 5.00 | .25 3 |
|                    | 4612      | 12.0          | 205         | 103       | 3.9    | A          | 2.62 | 15.00 | 1.00 | 0.94 | 0.69 | 2.00 | 1.50 | 2.00 | 10-32 | 14 | 1.00 | 3.25 | .25 5 |
|                    | 4615      | 15.0          | 225         | 113       | 4.7    | A          | 2.62 | 18.00 | 1.00 | 0.94 | 0.69 | 2.00 | 1.00 | 2.00 | 10-32 | 18 | 1.00 | 4.00 | .25 5 |
|                    | 4618      | 18.0          | 250         | 97        | 5.6    | A          | 2.62 | 21.00 | 1.00 | 0.94 | 0.69 | 2.00 | 1.50 | 2.00 | 10-32 | 20 | 1.00 | 4.75 | .25 5 |
|                    | 4621      | 21.0          | 272         | 136       | 6.5    | A          | 2.62 | 24.00 | 1.00 | 0.94 | 0.69 | 2.00 | 1.00 | 2.00 | 10-32 | 24 | 1.00 | 5.50 | .25 5 |
|                    | 4624      | 24.0          | 305         | 153       | 7.3    | A          | 2.62 | 27.00 | 1.00 | 0.94 | 0.69 | 2.00 | 1.50 | 4.00 | 10-32 | 14 | 1.50 | 4.00 | .25 7 |
|                    | 4627      | 27.0          | 330         | 165       | 8.2    | A          | 2.62 | 30.00 | 1.00 | 0.94 | 0.69 | 2.00 | 1.00 | 4.00 | 10-32 | 16 | 1.50 | 4.50 | .25 7 |
|                    | 4630      | 30.0          | 355         | 178       | 8.9    | A          | 2.62 | 33.00 | 1.00 | 0.94 | 0.69 | 2.00 | 0.50 | 4.00 | 10-32 | 18 | 1.50 | 5.00 | .25 7 |
| units: millimeters |           |               |             |           |        |            |      |       |      |      |      |      |      |      |       |    |      |      |       |
| Metric             | M4101     | 25.0          | 13          | 7         | 0.09   | A          | 44.4 | 50.8  | 19.0 | 22.3 | 10.1 | 25.0 | 12.9 | 12.5 | M4    | 6  | 7.8  | 35.0 | M4 2  |
|                    | M4201     | 50.0          | 18          | 9         | 0.18   | A          | 44.4 | 76.2  | 19.0 | 22.3 | 10.1 | 25.0 | 13.1 | 12.5 | M4    | 10 | 8.1  | 60.0 | M4 2  |
|                    | M4301     | 75.0          | 25          | 13        | 0.27   | A          | 44.4 | 101.6 | 19.0 | 22.3 | 10.1 | 25.0 | 13.3 | 12.5 | M4    | 14 | 8.3  | 85.0 | M4 2  |
|                    | M4601     | 50.0          | 29          | 15        | 0.41   | B          | 66.5 | 101.6 | 25.4 | 37.6 | 15.5 | 50.0 | 12.5 | —    | M5    | 6  | 13.3 | 12.5 | M6 4  |
|                    | M4701     | 75.0          | 43          | 22        | 0.50   | B          | 66.5 | 99.0  | 25.4 | 37.6 | 15.5 | 50.0 | 25.0 | —    | M5    | 6  | 13.5 | 25.0 | M6 4  |
|                    | M4801     | 100.0         | 55          | 28        | 0.64   | B          | 66.5 | 152.4 | 25.4 | 37.6 | 15.5 | 50.0 | 12.5 | 25.0 | M5    | 10 | 26.2 | 25.0 | M6 4  |

| Cross Roller Bearing |           | Load Capacity |             |           |        | Dimensions |      |      |      |      |      |      |      |      |       |    |      |      |       |
|----------------------|-----------|---------------|-------------|-----------|--------|------------|------|------|------|------|------|------|------|------|-------|----|------|------|-------|
| Model                | Travel in | Normal lb     | Inverted lb | Weight lb | Figure | A          | B    | C    | D    | E    | F    | G    | H    | J    | K     | L  | M    | N    | P     |
| units: inches        |           |               |             |           |        |            |      |      |      |      |      |      |      |      |       |    |      |      |       |
| English              | CR4101    | 1.0           | 56          | 28        | 0.2    | A          | 1.75 | 2.00 | 1.00 | 0.75 | 0.50 | 1.00 | 0.25 | 0.50 | 6-32  | 8  | 0.31 | 1.38 | #6 2  |
|                      | CR4201    | 2.0           | 60          | 30        | 0.4    | A          | 1.75 | 3.00 | 1.00 | 0.75 | 0.50 | 1.00 | 0.25 | 0.50 | 6-32  | 8  | 0.31 | 2.38 | #6 2  |
|                      | CR4301    | 3.0           | 100         | 50        | 0.6    | A          | 1.75 | 4.00 | 1.00 | 0.75 | 0.50 | 1.00 | 0.25 | 0.50 | 6-32  | 8  | 0.31 | 3.38 | #6 2  |
|                      | CR4601    | 2.0           | 100         | 64        | 0.9    | B          | 2.62 | 4.00 | 1.00 | 1.68 | 0.61 | 2.00 | 0.50 | —    | 10-32 | 6  | 0.31 | 0.69 | .25 4 |
|                      | CR4701    | 3.0           | 190         | 95        | 1.1    | B          | 2.62 | 5.00 | 1.00 | 1.68 | 0.61 | 2.00 | 1.00 | —    | 10-32 | 6  | 0.31 | 1.19 | .25 4 |
|                      | CR4801    | 4.0           | 244         | 122       | 1.4    | B          | 2.62 | 6.00 | 1.00 | 1.68 | 0.61 | 2.00 | 0.50 | 1.00 | 10-32 | 10 | 0.31 | 1.69 | .25 4 |

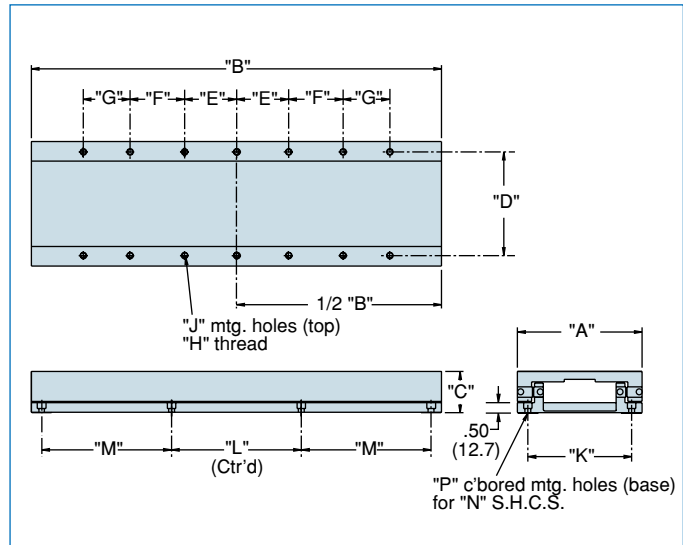
\* For additional specifications, including moment loading capacities and other engineering references, please refer to product information on Parker's web site.

## 4900 Series Heavy Duty Slides

These linear slides are the larger, more rugged versions of Parker's nonrecirculating ball bearing and cross roller bearing slides. A wider footprint combined with larger bearing elements permit precise, effortless, linear translation of payloads as great as 280 pounds.



### Dimensions inches (mm)<sup>†</sup>



<sup>†</sup> Note: Values shown in parentheses are actual metric dimensions for metric models (not conversions).

### Specifications\*

Straightline Accuracy: English 0.00008 in/in Metric 2 µm/25 mm

| Ball Bearing |          | Load Capacity |        |          |        | Dimensions         |       |      |      |      |      |      |        |    |      |      |       |     |   |
|--------------|----------|---------------|--------|----------|--------|--------------------|-------|------|------|------|------|------|--------|----|------|------|-------|-----|---|
|              |          | Travel        | Normal | Inverted | Weight | A                  | B     | C    | D    | E    | F    | G    | H      | J  | K    | L    | M     | N   | P |
|              |          | in            | lb     | lb       | lb     | units: inches      |       |      |      |      |      |      |        |    |      |      |       |     |   |
| English      | 4900-02  | 2.0           | 60     | 30       | 3.0    | 5.00               | 5.00  | 1.75 | 4.00 | 2.00 | —    | —    | .25-20 | 6  | 4.00 | 4.00 | —     | .25 | 4 |
|              | 4900-04  | 4.0           | 100    | 50       | 5.0    | 6.00               | 6.00  | 2.00 | 5.00 | 2.50 | —    | —    | .25-20 | 6  | 5.00 | 5.00 | —     | .25 | 4 |
|              | 4900-06  | 6.0           | 110    | 55       | 7.0    | 6.00               | 9.00  | 2.00 | 5.00 | 2.50 | 1.50 | —    | .25-20 | 10 | 5.00 | 5.00 | 1.50  | .25 | 8 |
|              | 4900-08  | 8.0           | 120    | 60       | 9.0    | 6.00               | 12.00 | 2.00 | 5.00 | 2.50 | 2.50 | —    | .25-20 | 10 | 5.00 | 5.00 | 3.00  | .25 | 8 |
|              | 4900-10  | 10.0          | 130    | 65       | 11.0   | 6.00               | 15.00 | 2.00 | 5.00 | 2.50 | 2.50 | 2.00 | .25-20 | 14 | 5.00 | 6.00 | 4.00  | .25 | 8 |
|              | 4900-12  | 12.0          | 140    | 70       | 13.0   | 6.00               | 18.00 | 2.00 | 5.00 | 2.50 | 5.00 | 1.00 | .25-20 | 14 | 5.00 | 7.00 | 5.00  | .25 | 8 |
|              |          | mm            | kg     | kg       | kg     | units: millimeters |       |      |      |      |      |      |        |    |      |      |       |     |   |
| Metric       | M4900-02 | 50.0          | 27     | 13       | 1.4    | 99.0               | 99.0  | 44.5 | 100  | 50   | —    | —    | M6     | 6  | 100  | 100  | —     | M6  | 4 |
|              | M4900-04 | 100.0         | 45     | 23       | 2.3    | 152.4              | 152.4 | 50.8 | 97   | 62.5 | —    | —    | M6     | 6  | 97   | 97   | —     | M6  | 4 |
|              | M4900-06 | 150.0         | 50     | 25       | 3.0    | 152.4              | 228.6 | 50.8 | 97   | 62.5 | 37.5 | —    | M6     | 10 | 97   | 97   | 37.5  | M6  | 8 |
|              | M4900-08 | 200.0         | 55     | 27       | 4.0    | 152.4              | 304.8 | 50.8 | 97   | 62.5 | 62.5 | —    | M6     | 10 | 97   | 97   | 75.0  | M6  | 8 |
|              | M4900-10 | 250.0         | 59     | 28       | 5.0    | 152.4              | 381.0 | 50.8 | 97   | 62.5 | 62.5 | 50.0 | M6     | 14 | 97   | 150  | 100.0 | M6  | 8 |
|              | M4900-12 | 300.0         | 64     | 32       | 6.0    | 152.4              | 457.2 | 50.8 | 97   | 62.5 | 97.0 | 25.0 | M6     | 14 | 97   | 175  | 97.0  | M6  | 8 |

| Cross Roller Bearing |           | Load Capacity |        |          |        | Dimensions    |       |      |      |      |      |      |        |    |      |      |      |     |   |
|----------------------|-----------|---------------|--------|----------|--------|---------------|-------|------|------|------|------|------|--------|----|------|------|------|-----|---|
|                      |           | Travel        | Normal | Inverted | Weight | A             | B     | C    | D    | E    | F    | G    | H      | J  | K    | L    | M    | N   | P |
|                      |           | in            | lb     | lb       | lb     | units: inches |       |      |      |      |      |      |        |    |      |      |      |     |   |
| English              | CR4900-04 | 4.0           | 200    | 100      | 5.0    | 6.00          | 6.00  | 2.00 | 5.00 | 2.50 | —    | —    | .25-20 | 6  | 5.00 | 5.00 | —    | .25 | 4 |
|                      | CR4900-06 | 6.0           | 220    | 110      | 7.5    | 6.00          | 9.00  | 2.00 | 5.00 | 2.50 | 1.50 | —    | .25-20 | 10 | 5.00 | 5.00 | 1.50 | .25 | 8 |
|                      | CR4900-08 | 8.0           | 240    | 120      | 9.0    | 6.00          | 12.00 | 2.00 | 5.00 | 2.50 | 2.50 | —    | .25-20 | 10 | 5.00 | 5.00 | 3.00 | .25 | 8 |
|                      | CR4900-10 | 10.0          | 260    | 130      | 11.0   | 6.00          | 15.00 | 2.00 | 5.00 | 2.50 | 2.50 | 2.00 | .25-20 | 14 | 5.00 | 6.00 | 4.00 | .25 | 8 |
|                      | CR4900-12 | 12.0          | 280    | 140      | 13.0   | 6.00          | 18.00 | 2.00 | 5.00 | 2.50 | 5.00 | 1.00 | .25-20 | 14 | 5.00 | 7.00 | 5.00 | .25 | 8 |

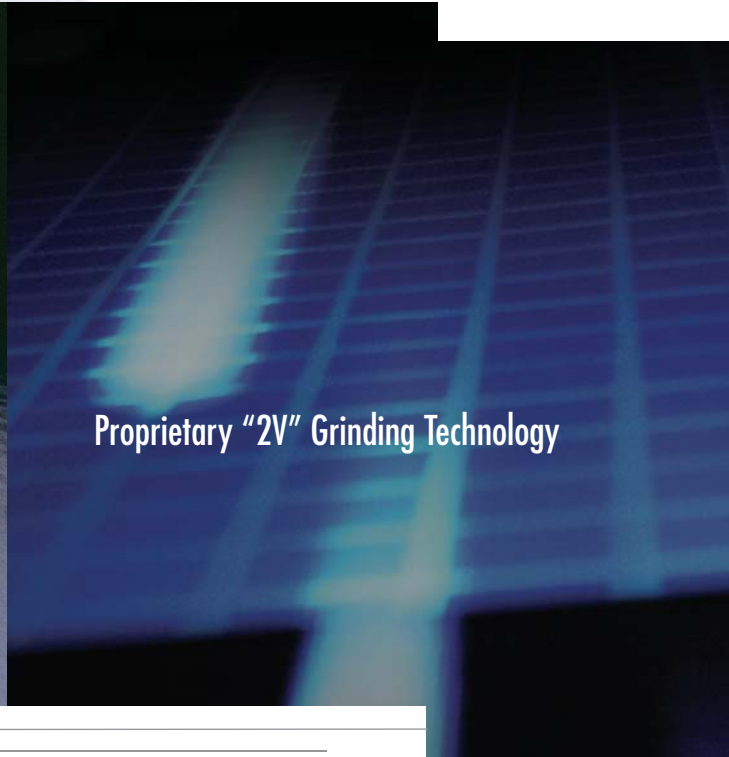
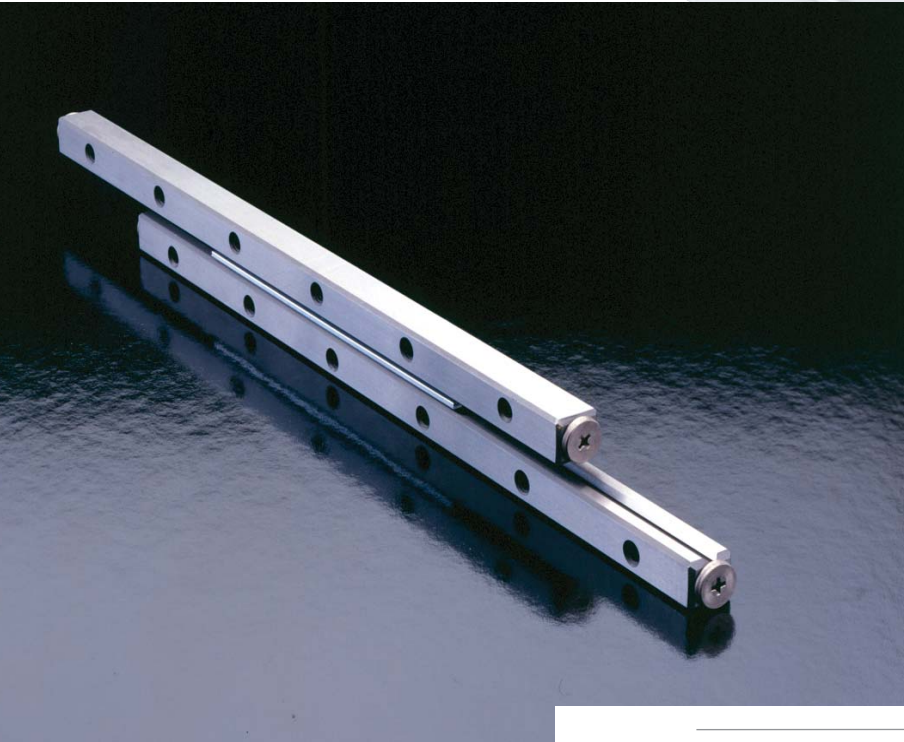
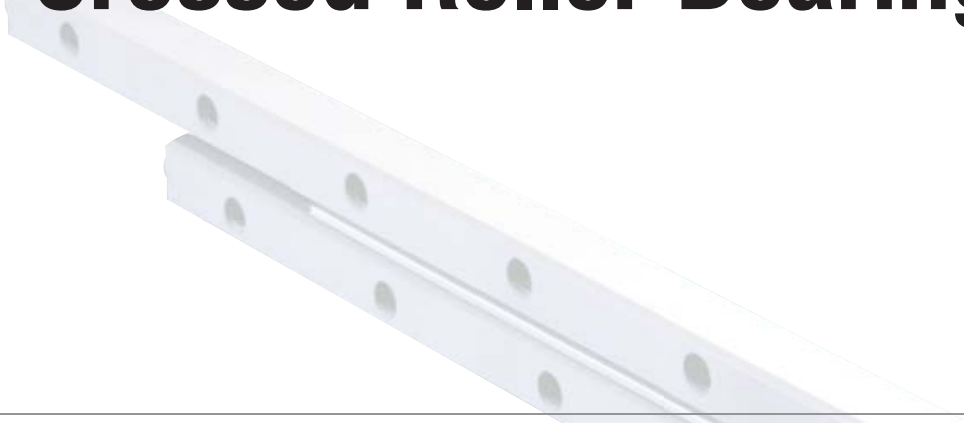
\* For additional specifications, including moment loading capacities and other engineering references, please refer to product information on Parker's web site.



## Linear Slide Selection Guide

| Travel |       | Load Capacity |     | Width |       | Bearing Type | Model     |          | Page Number |
|--------|-------|---------------|-----|-------|-------|--------------|-----------|----------|-------------|
| inches | mm    | lbs           | kg  | in    | mm    |              | English   | Metric   |             |
| 0.50   | 12.7  | 4             | 2   | 0.59  | 15.0  | Ball         | 3505-05   | —        | 96          |
| 0.50   | 12.7  | 6             | 3   | 1.25  | 31.8  | Ball         | 3901      | M3901    | 97          |
| 0.50   | 12.7  | 8             | 4   | 0.75  | 19.1  | Ball         | 3507-05   | —        | 96          |
| 0.50   | 12.7  | 10            | 5   | 1.00  | 25.4  | Ball         | 3510-05   | —        | 96          |
| 0.75   | 19.1  | 15            | 7   | 1.06  | 26.9  | Ball         | 3511-07   | —        | 96          |
| 1.00   | 25.4  | 8             | 4   | 0.59  | 15.0  | Ball         | 3505-10   | —        | 96          |
| 1.00   | 25.4  | 10            | 5   | 0.75  | 19.1  | Ball         | 3507-10   | —        | 96          |
| 1.00   | 25.4  | 12            | 5   | 1.00  | 25.4  | Ball         | 3510-10   | —        | 96          |
| 1.00   | 25.4  | 25            | 11  | 1.75  | 44.5  | Ball         | 4001      | M4001    | 97          |
| 1.00   | 25.4  | 28            | 13  | 1.75  | 44.5  | Ball         | 4101      | M4101    | 97          |
| 1.00   | 25.4  | 40            | 18  | 2.62  | 66.5  | Ball         | 4501      | M4501    | 97          |
| 1.00   | 25.4  | 50            | 23  | 1.75  | 44.5  | Cross Roller | CR4001    | —        | 97          |
| 1.00   | 25.4  | 56            | 25  | 1.75  | 44.5  | Cross Roller | CR4101    | —        | 97          |
| 1.00   | 25.4  | 88            | 40  | 2.62  | 66.5  | Cross Roller | CR4500    | —        | 97          |
| 1.50   | 38.1  | 18            | 8   | 1.06  | 26.9  | Ball         | 3511-15   | —        | 96          |
| 2.00   | 50.8  | 12            | 5   | 0.59  | 15.0  | Ball         | 3505-20   | —        | 96          |
| 2.00   | 50.8  | 12            | 5   | 0.75  | 19.1  | Ball         | 3507-20   | —        | 96          |
| 2.00   | 50.8  | 15            | 7   | 1.00  | 25.4  | Ball         | 3510-20   | —        | 96          |
| 2.00   | 50.8  | 20            | 9   | 1.06  | 26.9  | Ball         | 3511-20   | —        | 96          |
| 2.00   | 50.8  | 40            | 18  | 1.75  | 44.5  | Ball         | 4201      | M4201    | 99          |
| 2.00   | 50.8  | 60            | 27  | 1.75  | 44.5  | Cross Roller | CR4201    | —        | 99          |
| 2.00   | 50.8  | 60            | 27  | 5.00  | 99.0  | Ball         | 4900-02   | M4900-02 | 100         |
| 2.00   | 50.8  | 64            | 29  | 2.62  | 66.5  | Ball         | 4601      | M4601    | 99          |
| 2.00   | 50.8  | 100           | 58  | 2.62  | 66.5  | Cross Roller | CR4601    | —        | 99          |
| 3.00   | 76.2  | 14            | 6   | 0.59  | 15.0  | Ball         | 3505-30   | —        | 96          |
| 3.00   | 76.2  | 14            | 6   | 0.75  | 19.1  | Ball         | 3507-30   | —        | 96          |
| 3.00   | 76.2  | 25            | 11  | 1.06  | 26.9  | Ball         | 3511-30   | —        | 96          |
| 3.00   | 76.2  | 55            | 25  | 1.75  | 44.5  | Ball         | 4301      | M4301    | 99          |
| 3.00   | 76.2  | 95            | 43  | 2.62  | 66.5  | Ball         | 4701      | M4701    | 99          |
| 3.00   | 76.2  | 95            | 43  | 5.00  | 99.0  | Ball         | 4400      | M4400    | 97          |
| 3.00   | 76.2  | 100           | 45  | 1.75  | 44.5  | Cross Roller | CR4301    | —        | 99          |
| 3.00   | 76.2  | 120           | 55  | 5.00  | 99.0  | Cross Roller | CR4400    | —        | 97          |
| 3.00   | 76.2  | 190           | 86  | 2.62  | 66.5  | Cross Roller | CR4701    | —        | 99          |
| 4.00   | 101.6 | 30            | 14  | 1.06  | 26.9  | Ball         | 3511-40   | —        | 96          |
| 4.00   | 101.6 | 100           | 45  | 6.00  | 152.4 | Ball         | 4900-04   | M4900-04 | 100         |
| 4.00   | 101.6 | 122           | 55  | 2.62  | 66.5  | Ball         | 4801      | M4801    | 99          |
| 4.00   | 101.6 | 200           | 91  | 6.00  | 152.4 | Cross Roller | CR4900-04 | —        | 100         |
| 4.00   | 101.6 | 244           | 111 | 2.62  | 66.5  | Cross Roller | CR4801    | —        | 99          |
| 6.00   | 152.4 | 110           | 50  | 6.00  | 152.4 | Ball         | 4900-06   | M4900-06 | 100         |
| 6.00   | 152.4 | 147           | 67  | 2.62  | 66.5  | Ball         | 4606      | —        | 99          |
| 6.00   | 152.4 | 220           | 100 | 6.00  | 152.4 | Cross Roller | CR4900-06 | —        | 100         |
| 8.00   | 203.2 | 120           | 55  | 6.00  | 152.4 | Ball         | 4900-08   | M4900-08 | 100         |
| 8.00   | 203.2 | 240           | 109 | 6.00  | 152.4 | Cross Roller | CR4900-08 | —        | 100         |
| 9.00   | 228.6 | 184           | 84  | 2.62  | 66.5  | Ball         | 4609      | —        | 99          |
| 10.00  | 254.0 | 130           | 59  | 6.00  | 152.4 | Ball         | 4900-10   | M4900-10 | 100         |
| 10.00  | 254.0 | 260           | 118 | 6.00  | 152.4 | Cross Roller | CR4900-10 | —        | 100         |
| 12.00  | 304.8 | 140           | 64  | 6.00  | 152.4 | Ball         | 4900-12   | M4900-12 | 100         |
| 12.00  | 304.8 | 205           | 93  | 2.62  | 66.5  | Ball         | 4612      | —        | 99          |
| 12.00  | 304.8 | 280           | 99  | 6.00  | 152.4 | Cross Roller | CR4900-12 | —        | 100         |
| 15.00  | 381.0 | 225           | 102 | 2.62  | 66.5  | Ball         | 4615      | —        | 99          |
| 18.00  | 457.2 | 250           | 114 | 2.62  | 66.5  | Ball         | 4618      | —        | 99          |
| 21.00  | 533.4 | 272           | 96  | 2.62  | 66.5  | Ball         | 4621      | —        | 99          |
| 24.00  | 609.6 | 305           | 139 | 2.62  | 66.5  | Ball         | 4624      | —        | 99          |
| 27.00  | 685.8 | 330           | 150 | 2.62  | 66.5  | Ball         | 4627      | —        | 99          |
| 30.00  | 762.0 | 355           | 161 | 2.62  | 66.5  | Ball         | 4630      | —        | 99          |

# Crossed Roller Bearings Series:



Proprietary "2V" Grinding Technology



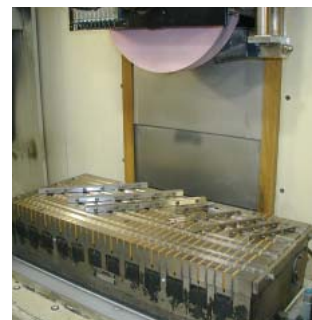
# Crossed Roller Bearing Series: Overview

## Proprietary “2V” Grinding Technology

Parker Bayside uses a proprietary “2V” grinding technology designed to achieve accuracy levels that are twice as high as the industry average. In the first step of the “2V” process, CNC grinders with specially developed wheel media grind the banking reference and mounting surfaces in the same sweep. In the second step, another CNC machine, with a different wheel media, grinds the V-shaped bearing surface in a soft force magnetic chuck and in strict reference to the banking surface. Pre-sized high-precision rollers and custom-designed roller retainer strips complete a bearing system unlike any other in the market.



Step 1 of “2V” grinding process



Step 2 of “2V” grinding process

## When to Use:

- ▶ High Precision
- ▶ Short Travel up to 440mm
- ▶ High Carrying Load
- ▶ Zero Bearing Clearance
- ▶ Clearance

## When to Use: Applications:

- ▶ Electronic Assembly
- ▶ Fiber Optics
- ▶ Medical
- ▶ Pharmaceutical
- ▶ Semiconductor



Cross sectional view of a Crossed Roller Rail showing hardness values

## RC Series

### Sizes

### Raceway Lengths

### Load Carrying Capacity

## Crossed Roller Bearings

3mm and 6mm

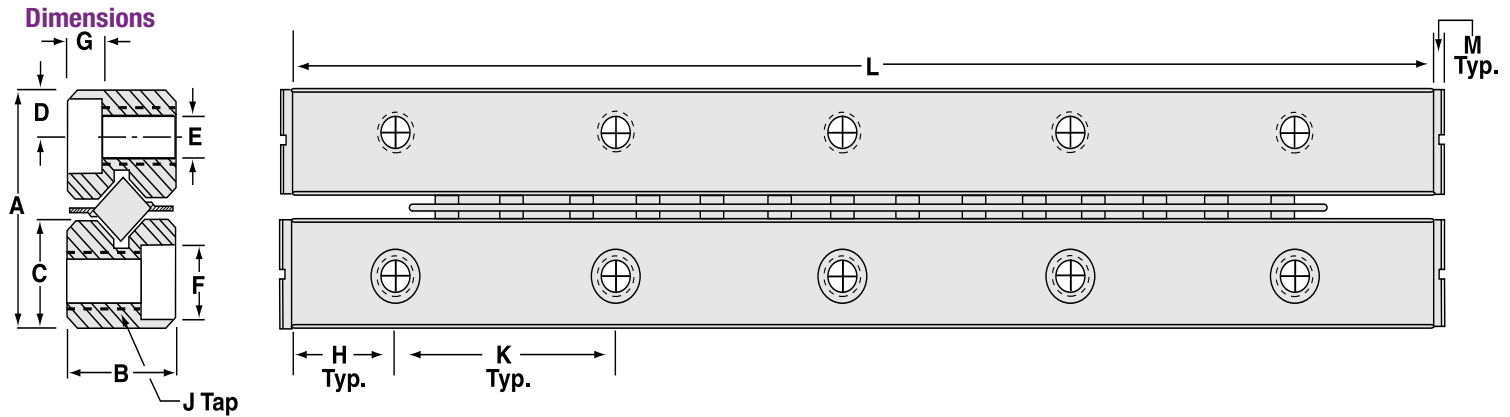
50mm to 700mm

2,180kg (4,806 lb)



# Crossed Roller Bearing Series

## Rail Set



| Part Number | Roller Diameter |      | A    |      | B    |      | C    |       | D    |      | E    |      |
|-------------|-----------------|------|------|------|------|------|------|-------|------|------|------|------|
|             | (mm)            | (in) | (mm) | (in) | (mm) | (in) | (mm) | (in)  | (mm) | (in) | (mm) | (in) |
| RC3         | 3               | 0.12 | 18   | 0.71 | 8    | 0.31 | 8.3  | 0.33  | 3.5  | 0.14 | 3.3  | 0.13 |
| RC6         | 6               | 0.23 | 31   | 1.22 | 15   | 0.59 | 14   | 0.551 | 6.0  | 0.26 | 5.3  | 0.21 |

| Part Number | F    |      | G    |      | H    |       | J  | K    |      | M    |      |
|-------------|------|------|------|------|------|-------|----|------|------|------|------|
|             | (mm) | (in) | (mm) | (in) | (mm) | (in)  |    | (mm) | (in) | (mm) | (in) |
| RC3         | 6    | 0.24 | 3.1  | 0.22 | 12.5 | 0.49  | M4 | 25   | 0.98 | 2    | 0.08 |
| RC6         | 9.5  | 0.37 | 5.2  | 0.2  | 25   | 0.984 | M6 | 50   | 1.97 | 3    | 0.12 |

| Part Number   | Travel |       | L    |       | # Holes in Rail | # Rollers | Max. Load |       |
|---------------|--------|-------|------|-------|-----------------|-----------|-----------|-------|
|               | (mm)   | (in)  | (mm) | (in)  |                 |           | (kg)      | (lb)  |
| RC3□ - 050□08 | 23.9   | 0.94  | 50   | 1.97  | 2               | 8         | 105       | 231   |
| RC3□ - 075□12 | 33.9   | 1.33  | 75   | 2.95  | 3               | 12        | 158       | 348   |
| RC3□ - 100□17 | 33.8   | 1.33  | 100  | 3.94  | 4               | 17        | 210       | 463   |
| RC3□ - 97□22  | 33.8   | 1.33  | 97   | 4.92  | 5               | 22        | 290       | 640   |
| RC3□ - 150□25 | 53.7   | 2.11  | 150  | 5.91  | 6               | 25        | 316       | 697   |
| RC3□ - 175□30 | 53.7   | 2.11  | 175  | 6.89  | 7               | 30        | 395       | 870   |
| RC3□ - 200□35 | 53.6   | 2.11  | 200  | 7.87  | 8               | 35        | 448       | 988   |
| RC3□ - 225□37 | 83.6   | 3.29  | 200  | 7.87  | 9               | 37        | 474       | 1,044 |
| RC3□ - 250□40 | 103.6  | 4.07  | 250  | 9.84  | 10              | 40        | 527       | 1,161 |
| RC3□ - 275□45 | 103.5  | 4.07  | 275  | 10.83 | 11              | 45        | 580       | 1,278 |
| RC3□ - 300□50 | 103.5  | 4.07  | 300  | 11.81 | 12              | 50        | 659       | 1,452 |
| RC6□ - 100□75 | 44.1   | 1.74  | 100  | 3.94  | 2               | 7         | 325       | 717   |
| RC6□ - 150□10 | 72.2   | 2.84  | 150  | 5.91  | 3               | 10        | 545       | 1,202 |
| RC6□ - 200□13 | 100.3  | 3.95  | 200  | 7.87  | 4               | 13        | 655       | 1,444 |
| RC6□ - 250□16 | 100.4  | 5.06  | 250  | 9.84  | 5               | 16        | 870       | 1,918 |
| RC6□ - 300□19 | 156.5  | 6.16  | 300  | 11.81 | 6               | 19        | 980       | 2,160 |
| RC6□ - 350□22 | 184.6  | 7.27  | 350  | 13.78 | 7               | 22        | 1,200     | 2,645 |
| RC6□ - 400□25 | 212.7  | 8.37  | 400  | 15.75 | 8               | 25        | 1,310     | 2,888 |
| RC6□ - 450□29 | 216.8  | 8.54  | 450  | 17.72 | 9               | 29        | 1,520     | 3,351 |
| RC6□ - 500□33 | 220.9  | 8.69  | 500  | 19.69 | 10              | 33        | 1,740     | 3,836 |
| RC6□ - 550□37 | 225    | 8.86  | 550  | 21.65 | 11              | 37        | 1,960     | 4,321 |
| RC6□ - 600□41 | 229.2  | 9.02  | 600  | 23.62 | 12              | 41        | 2,180     | 4,806 |
| RC6□ - 650□37 | 412.8  | 16.25 | 650  | 25.59 | 13              | 37        | 1,960     | 4,321 |
| RC6□ - 700□40 | 440.8  | 17.35 | 700  | 27.56 | 14              | 40        | 2,180     | 4,806 |

(1) Max. Load is based on a set of rails which consist of 4 rails and 2 retainers.

P.A.C.T. is a Patented Anti-Creep Technology that prevents roller migration in vertical and high-speed applications.

This option is available in bearing sizes of 3mm and 6mm. To order P.A.C.T. call out P/N PP-001 as a separate line item on your order.

□ See how to order for options.

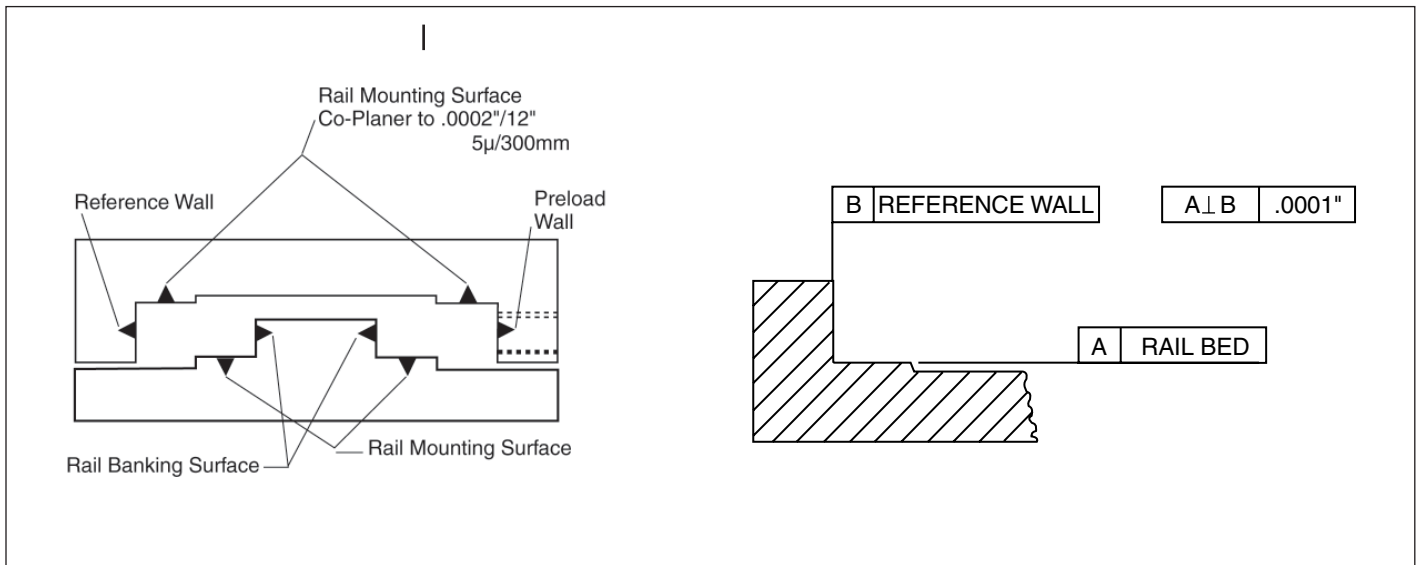


## Crossed Roller Bearing Installation

Crossed Roller Bearings, when properly installed and preloaded, provide repeatable low-friction linear motion while eliminating side play. The opposed axes of the successive rollers create a line contact that allow crossed rollers to be mounted in any attitude. As compared to linear bearings using balls that have a point contact, crossed roller bearing line contacts have the ability to carry heavier loads (up to 10 times higher than ball bearings), obtain higher accuracy / repeatability and provide a smoother rolling motion approaching than that of an air bearing. The Crossed Roller Bearing line contact also eliminates the grooving or wearing problem associated with ball bearing point contact ensuring the integrity of your application over time. The following guidelines will help you install your bearing set.

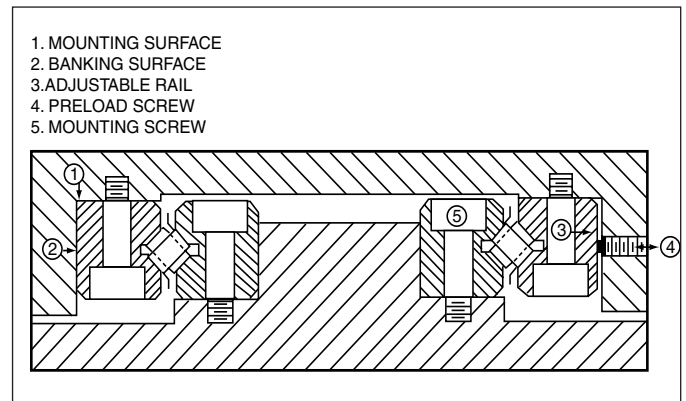
## Mounting Surface of Your Bearing Set

The most important issue in obtaining the highest accuracy and repeatability from your bearing set is the accuracy of its mounting surfaces. Special care should be taken to ensure the accuracy of parallelism and coparallelism of the mounting surfaces and their perpendicularity is to the highest tolerances. To obtain travel accuracy better than  $1 \mu / \text{cm}$  ( $0.0001" / "$ ) your mounting surfaces should be equal or better than the following.



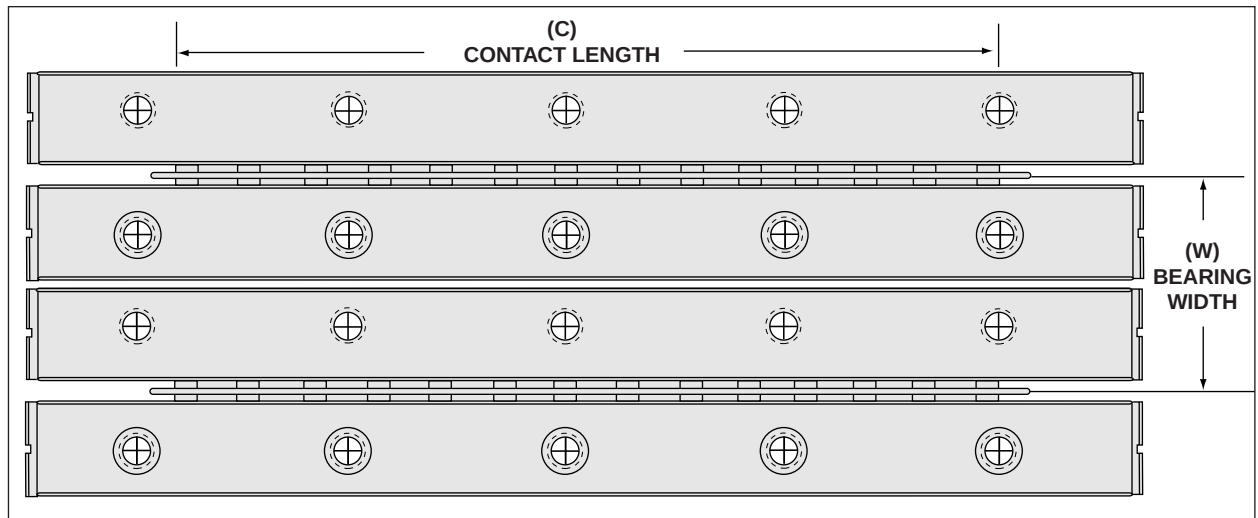
## Preloading Bearings

Bearing preloading is a process of eliminating any side and vertical play while at the same time being careful not to create any friction in your bearing set. The most common method to load your bearings is by applying even amounts of force against an adjustable rail with a set screw in order to obtain a smooth rolling motion and mechanical stiffness. Special care should be taken to ensure that the preload is evenly distributed over the full length of the raceway. This can be accomplished by using a torque wrench or an experienced hand. Depending on the amount of stiffness needed for your application and the rigidity of your mounting structure, preloads can vary from 2% to 25% of the maximum load of the bearing. At right is a common preload method, if your application requires an alternative method contact the factory for application assistance.



### Bearing Spacing

The spacing of your bearing set will have an effect on the stiffness and performance of your assembly. A general rule of thumb is to have the distance of the contact length of your bearings strip set relative to the distance between bearing. While this relationship can vary, ideal conditions should provide for a 1.5 contact length (C) to 1 bearing distance (W).



### Lubrication

The low co-efficient of friction of crossed roller bearings (approx 0.003) means little lubrication is necessary for your bearing set. Lubrication is used more to protect against corrosion than wear. Often a single application of lubricant can last a lifetime. For applications that have special environmental considerations there are a number of alternative lubricants available. Contact the factory for special lubricant recommendations.

### Component set part numbers include the following:

- ▶ **Crossed Roller** Four rails, two roller strips and eight end screws.
- ▶ **Double “V” Crossed Roller** Two rails, one double “V” rail, two roller strips and six end stops.



Order Numbering  
Example:

|           |          |          |            |          |           |          |
|-----------|----------|----------|------------|----------|-----------|----------|
| <b>RC</b> | <b>3</b> | <b>T</b> | <b>200</b> | <b>A</b> | <b>35</b> | <b>1</b> |
| <b>A</b>  | <b>B</b> | <b>C</b> | <b>D</b>   | <b>E</b> | <b>F</b>  | <b>G</b> |

|           |                       |
|-----------|-----------------------|
| <b>A</b>  | <b>BEARING SERIES</b> |
| <b>RC</b> | Crossed Roller        |

|          |                              |
|----------|------------------------------|
| <b>E</b> | <b>RETAINER MATERIAL (1)</b> |
| <b>A</b> | Steel                        |

|          |                         |
|----------|-------------------------|
| <b>B</b> | <b>BEARING SIZE (2)</b> |
| <b>3</b> | 3 mm                    |
| <b>6</b> | 6 mm                    |

|           |                     |
|-----------|---------------------|
| <b>F</b>  | <b>ROLLER COUNT</b> |
| <b>□□</b> | Number of rollers   |

|          |                         |
|----------|-------------------------|
| <b>C</b> | <b>BEARING MATERIAL</b> |
| <b>T</b> | Tool Steel              |
| <b>S</b> | Stainless               |

|          |                |
|----------|----------------|
| <b>G</b> | <b>OPTIONS</b> |
| <b>1</b> | None           |
| <b>2</b> | End Stops      |

|          |                     |
|----------|---------------------|
| <b>D</b> | <b>Rail Length</b>  |
|          | <b>Bearing Size</b> |
|          | 3mm   6mm           |
|          | <b>050   100</b>    |
|          | <b>075   150</b>    |
|          | <b>100   200</b>    |
|          | <b>97   250</b>     |
|          | <b>150   300</b>    |
|          | <b>175   350</b>    |
|          | <b>200   400</b>    |
|          | <b>225   450</b>    |
|          | <b>250   500</b>    |
|          | <b>275   550</b>    |
|          | <b>300   600</b>    |
|          | <b>—   650</b>      |
|          | <b>—   700</b>      |

## NOTES:

- (1) Contact factory for alternative retainers - Al, Brass and Plate
- (2) Available 3 mm only
- (3) Pact (anti-creep) per request

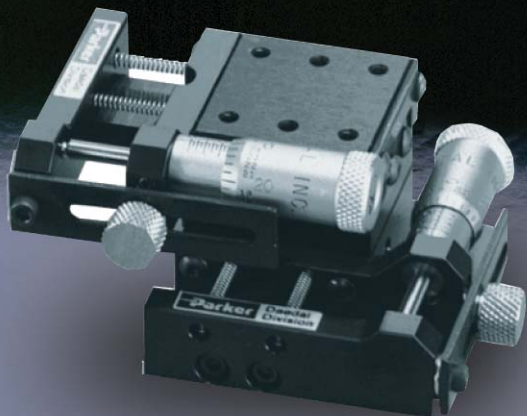
## How to Order

Parker Bayside's Crossed Roller Series is supported by a worldwide network of offices and local distributors. Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor. Information can also be obtained at [www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com).

Specifications are subject to change without notice.

# Linear Positioning Stages:

## Precision manual positioning with high resolution micrometers



- Precision Miniature Manual Positioners
- Digital or Standard Micrometers
- Multiaxis compatible
- Load Capacities over 200 lbs.



# Linear Positioning Stages: Overview

## Features

- Aluminum top and base with precision ground mounting surfaces and black anodize protective finish
- Low friction linear adjustment with no backlash or sideplay
- Factory preloaded to provide dynamic stability and minimum runout
- Locking screw to positively lock stage without affecting position (standard on most models)
- Straightline accuracy of 0.00008 in/in of travel
- Selectable bearing systems: ball bearings for economy and cross roller bearings for greater load capacity
- Selectable drive mechanisms:
  - Micrometer (English or Metric)
  - Fine screw (64 pitch)
  - Differential screw
  - Digital micrometers
- Selectable drive locations: Center drive or Side drive (for space constraints)



Parker precision linear stages provide controlled, precise point-to-point positioning along a linear axis. Stages are comprised of two basic components: a precision Parker linear slide (ball or cross roller), which serves as a linear bearing and guide, and a drive mechanism which accurately moves and positions the slide top along the linear axis.

Four types of drive mechanisms are available: a fine screw, a graduated micrometer, a digital micrometer, and a differential screw. The fine screw is used for fine resolution positioning.

A micrometer is used whenever a position readout is required. The differential screw is used for applications requiring extremely fine resolution positioning.

Positioning stages are available in a straight center-drive configuration or a side-drive configuration. They are offered in English or Metric versions.

## Principles of Operation

The linear positioner operates in a simple manner: a drive screw is attached to the fixed slide base. The end of the drive screw rests against the end of the moveable top. There are two extended springs “pulling” the slide top toward the screw so that the top will always be held firmly against the screw end. When the screw is turned clockwise, it advances and pushes the slide top along the linear axis. When turned counterclockwise, the screw retracts and the slide top follows because of the spring pressure holding the top against the screw end. The result is a very smooth linear motion, accurately controlled by rotation of the drive mechanism.

## Stage Series Selection Guide

| inches | Travel<br>mm | Load Capacity |     | Width |       | Multi-Axis | Series  |        | Page<br>Number |
|--------|--------------|---------------|-----|-------|-------|------------|---------|--------|----------------|
|        |              | lbs           | kg  | in    | mm    |            | English | Metric |                |
| 0.50   | 12.7         | 6             | 3   | 1.25  | 31.8  | yes        | 3900    | M3900  | 112            |
| 0.50   | 12.7         | 25            | 11  | 1.75  | 44.5  | yes        | 4000    | M4000  | 114            |
| 0.50   | 12.7         | 28            | 13  | 1.75  | 44.5  | no         | 4100    | M4100  | 114            |
| 0.50   | 12.7         | 40            | 18  | 1.75  | 44.5  | no         | 4200    | M4100  | 114            |
| 0.50   | 12.7         | 44            | 20  | 2.62  | 66.5  | yes        | 4500    | M4500  | 116            |
| 0.50   | 12.7         | 50            | 23  | 1.75  | 44.5  | yes        | CR4000  | —      | 114            |
| 0.50   | 12.7         | 55            | 25  | 1.75  | 44.5  | no         | 4300    | M4300  | 114            |
| 0.50   | 12.7         | 56            | 25  | 1.75  | 44.5  | no         | CR4100  | —      | 114            |
| 0.50   | 12.7         | 60            | 27  | 1.75  | 44.5  | no         | CR4200  | —      | 114            |
| 0.50   | 12.7         | 64            | 29  | 2.62  | 66.5  | yes        | 4600    | M4600  | 122            |
| 0.50   | 12.7         | 88            | 40  | 2.62  | 66.5  | yes        | CR4500  | —      | 116            |
| 0.50   | 12.7         | 95            | 43  | 2.62  | 66.5  | yes        | 4700    | M4700  | 122            |
| 0.50   | 12.7         | 100           | 45  | 1.75  | 44.5  | no         | CR4300  | —      | 114            |
| 0.50   | 12.7         | 122           | 55  | 2.62  | 66.5  | yes        | 4800    | M4800  | 122            |
| 0.50   | 12.7         | 128           | 58  | 2.62  | 66.5  | no         | CR4600  | —      | 122            |
| 0.50   | 12.7         | 190           | 86  | 2.62  | 66.5  | no         | CR4700  | —      | 122            |
| 0.50   | 12.7         | 248           | 113 | 2.62  | 66.5  | no         | CR4800  | —      | 122            |
| 1.00   | 25.4         | 25            | 11  | 1.75  | 44.5  | yes        | 4000    | M400   | 114            |
| 1.00   | 25.4         | 28            | 13  | 1.75  | 44.5  | no         | 4100    | M4100  | 114            |
| 1.00   | 25.4         | 40            | 18  | 1.75  | 44.5  | no         | 4200    | M4200  | 114            |
| 1.00   | 25.4         | 44            | 20  | 2.62  | 66.5  | yes        | 4500    | M4300  | 116            |
| 1.00   | 25.4         | 55            | 25  | 1.75  | 44.5  | no         | 4300    | —      | 114            |
| 1.00   | 25.4         | 56            | 25  | 1.75  | 44.5  | no         | CR4100  | —      | 114            |
| 1.00   | 25.4         | 60            | 27  | 1.75  | 44.5  | no         | CR4200  | —      | 114            |
| 1.00   | 25.4         | 64            | 29  | 2.62  | 66.5  | yes        | 4600    | M4600  | 122            |
| 1.00   | 25.4         | 88            | 40  | 2.62  | 66.5  | yes        | CR4500  | —      | 116            |
| 1.00   | 25.4         | 95            | 43  | 2.62  | 66.5  | yes        | 4700    | M4700  | 122            |
| 1.00   | 25.4         | 95            | 43  | 5.00  | 127.0 | yes        | 4400    | M4400  | 114            |
| 1.00   | 25.4         | 100           | 45  | 1.75  | 44.5  | no         | CR4300  | —      | 114            |
| 1.00   | 25.4         | 100           | 45  | 6.00  | 124.4 | no         | 4900    | M4900  | 124            |
| 1.00   | 25.4         | 120           | 55  | 5.00  | 127.0 | yes        | CR4400  | —      | 114            |
| 1.00   | 25.4         | 122           | 55  | 2.62  | 66.5  | yes        | 4800    | M4800  | 122            |
| 1.00   | 25.4         | 128           | 58  | 2.62  | 66.5  | no         | CR4600  | —      | 122            |
| 1.00   | 25.4         | 122           | 68  | 6.00  | 124.4 | no         | CR4900  | —      | 124            |
| 1.00   | 25.4         | 190           | 86  | 2.62  | 66.5  | no         | CR4700  | —      | 122            |
| 1.00   | 25.4         | 248           | 113 | 2.62  | 66.5  | no         | CR4800  | —      | 122            |
| 2.00   | 50.8         | 95            | 43  | 5.00  | 127.0 | yes        | 4400    | M4400  | 114            |
| 2.00   | 50.8         | 100           | 45  | 6.00  | 124.4 | no         | 4900    | M4900  | 124            |
| 2.00   | 50.8         | 120           | 55  | 5.00  | 127.0 | yes        | CR4400  | —      | 114            |
| 2.00   | 50.8         | 122           | 68  | 6.00  | 124.4 | no         | CR4900  | —      | 124            |
| 4.00   | 101.6        | 100           | 45  | 6.00  | 124.4 | no         | 4900    | M4900  | 125            |
| 4.00   | 101.6        | 200           | 91  | 6.00  | 124.4 | no         | CR4900  | —      | 125            |
| 6.00   | 124.4        | 110           | 50  | 6.00  | 124.4 | no         | 4900    | M4900  | 125            |
| 6.00   | 124.4        | 220           | 100 | 6.00  | 124.4 | no         | CR4900  | —      | 125            |
| 8.00   | 203.2        | 120           | 55  | 6.00  | 124.4 | no         | 4900    | M4900  | 125            |
| 8.00   | 203.2        | 240           | 109 | 6.00  | 124.4 | no         | CR4900  | —      | 125            |
| 10.00  | 254.0        | 130           | 59  | 6.00  | 124.4 | no         | 4900    | M4900  | 125            |
| 10.00  | 254.0        | 260           | 118 | 6.00  | 124.4 | no         | CR4900  | —      | 125            |
| 12.00  | 304.8        | 112           | 64  | 6.00  | 124.4 | no         | 4900    | M4900  | 125            |
| 12.00  | 304.8        | 280           | 127 | 6.00  | 124.4 | no         | CR4900  | —      | 125            |



## Drive Mechanisms

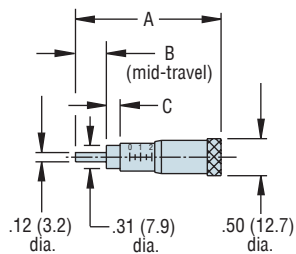
Parker positioning stages are offered with four types of drive mechanisms: graduated micrometer, digital micrometer, fine screw, and differential screw. These drives, shown here, are offered separately for use in any application requiring precisely controlled linear adjustment.



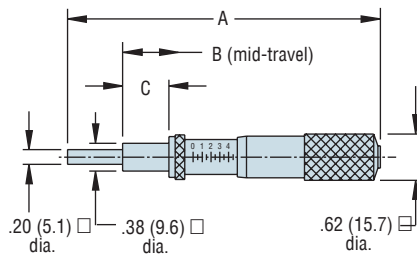
### Graduated Micrometers

#### Model

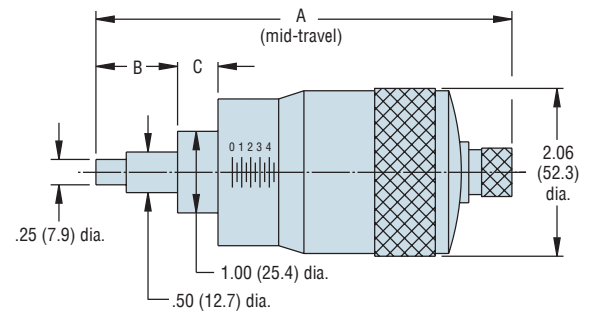
| Number | Fig | Travel  | Graduations | A       | B       | C        |
|--------|-----|---------|-------------|---------|---------|----------|
| 9511E  | A   | 0.50 in | 0.001 in    | 2.00 in | 0.50 in | 0.187 in |
| 9511M  | A   | 13 mm   | 0.01 mm     | 51 mm   | 13 mm   | 4.7 mm   |
| 9512E  | B   | 0.50 in | 0.001 in    | 2.61 in | 0.05 in | 0.375 in |
| 9512M  | B   | 13 mm   | 0.01 mm     | 66 mm   | 13 mm   | 9.5 mm   |
| 9524E  | B   | 1.00 in | 0.001 in    | 4.27 in | 0.75 in | 0.65 in  |
| 9524M  | B   | 25 mm   | 0.01 mm     | 108 mm  | 19 mm   | 15.9 mm  |
| 9526E  | B   | 2.00 in | 0.001 in    | 6.18 in | 1.25 in | 0.625 in |
| 9526M  | B   | 50 mm   | 0.01 mm     | 129 mm  | 32 mm   | 15.9 mm  |
| 9531E  | C   | 1.00 in | 0.0001 in   | 5.12 in | 0.88 in | 0.55 in  |
| 9531M  | C   | 25 mm   | 0.002 mm    | 130 mm  | 22 mm   | 14.2 mm  |
| 9532E  | C   | 2.00 in | 0.0001 in   | 7.13 in | 1.46 in | 0.55 in  |
| 9532M  | C   | 50 mm   | 0.002 mm    | 130 mm  | 37 mm   | 14.2 mm  |



Mini-Micrometer  
Figure A



Standard Micrometer  
Figure B

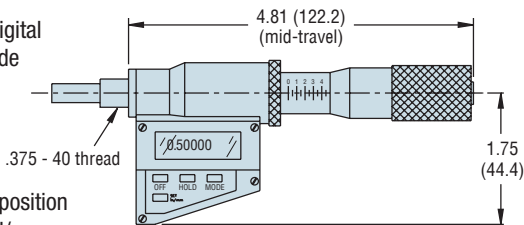


Large Thimble Micrometer  
Figure C

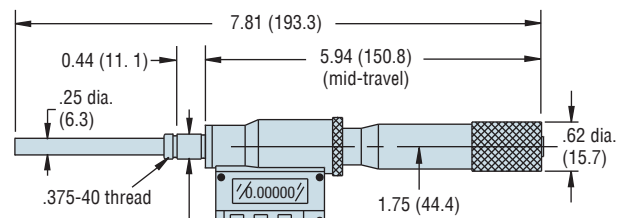
These electronic digital micrometers provide an LCD readout to 0.00005 inch resolution.

Features:

- Zero set at any position
- Incremental and/or absolute positioning
- inch/mm setting



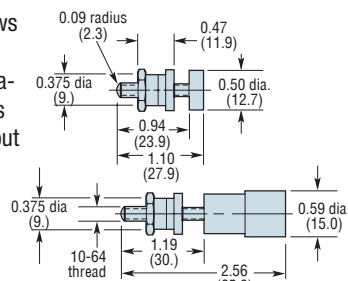
Digital Micrometer  
Model 9551  
1" Travel



Digital Micrometer  
Model 9552  
2" Travel

These steel adjustment screws feature a 64-pitch thread, making them ideal for applications where finer resolution is required, but positional readout is not.

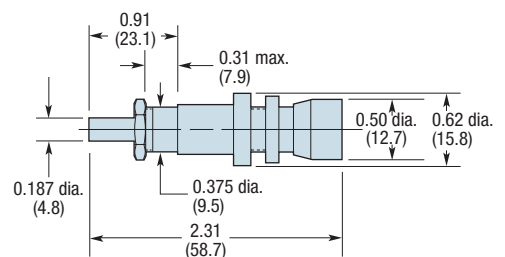
| Model | Range   |
|-------|---------|
| 9570  | 0.75 in |
| 9575  | 0.50 in |



Fine Adjustment Screws  
Models 9570, 9575

The 9560 differential screw offers two linear adjustment ranges in one unit: a coarse adjustment range of 0.31 in (8 mm) with a 48 pitch thread and a fine adjustment range of 0.078 in (2 mm) with a pitch equal to 336 threads per inch.

| Model | Range   |
|-------|---------|
| 9560  | 0.75 in |



Differential Screws  
Models 9560

## 3900 Series (1.25 inches wide) Miniature Stages

The 3900 stages are ideal as single-or multi-axis units in space-restricted applications. These compact positioning stages feature a low-friction linear ball bearing system and two selectable drive mechanisms: a micrometer drive (English or Metric) offers fine adjustment with a graduated position readout; a 64-pitch fine screw drive offers increased sensitivity, for finer resolution control. A positive position lock, included as standard on all units, locks the stage carriage and prevents drift when the stage is idle.

| Specifications                | English                            | Metric                          |
|-------------------------------|------------------------------------|---------------------------------|
| Travel - Maximum (selectable) | 0.5 in                             | 12.5 mm                         |
| Load Capacity:*               |                                    |                                 |
| Normal                        | 6 lb – See table.                  | 3 kg – See table.               |
| Thrust $T_a$                  | 10 lbs                             | 4.5 kgs                         |
| $T_b$                         | 3 lbs                              | 1.4 kgs                         |
| Straightline Accuracy         | 0.00008 in<br>(per inch of travel) | 2 $\mu$ m<br>(per 25 mm travel) |
| Resolution/Graduations:       |                                    |                                 |
| English Micrometer            | 0.001 in                           | n/a                             |
| Metric Micrometer             | n/a                                | 0.01 mm                         |
| Fine Screw                    | 64 pitch                           | 0.4 mm                          |

\* Refer to linear slide component for moment load charts.



### Selection Guide

| Description |         |               |                     |          |                     |           |             | Model Number*       |             |              |              |                   |             |              |              |
|-------------|---------|---------------|---------------------|----------|---------------------|-----------|-------------|---------------------|-------------|--------------|--------------|-------------------|-------------|--------------|--------------|
|             |         |               |                     |          |                     |           |             | Center Drive Models |             |              |              | Side Drive Models |             |              |              |
| Type        | Travel  | Load Capacity | Drive Type (Normal) | Aperture | Linear Slide Number | Brg. Type | Unit Weight | 1 Axis (X)          | 2 Axis (XY) | 3 Axis (XYZ) | 3 Axis (XYZ) | 1 Axis (X)        | 2 Axis (XY) | 3 Axis (XYZ) | 3 Axis (XYZ) |
| English     | 0.50 in | 6 lb          | English Mic         | no       | 3905                | Ball      | 0.16 lb     | 3902                | 3922        | 3932         | 3942         | 3952              | 3972        | 3982         | 3992         |
| English     | 0.50 in | 6 lb          | English Mic         | yes      | 3901                | Ball      | 0.16 lb     | 3906                | 3926        | 3936         | 3946         | 3956              | 3976        | 3986         | 3996         |
| English     | 0.50 in | 6 lb          | Metric Mic          | no       | 3905                | Ball      | 0.16 lb     | 3902M               | 3922M       | 3932M        | 3942M        | 3952M             | 3972M       | 3982M        | 3992M        |
| English     | 0.50 in | 6 lb          | Metric Mic          | yes      | 3901                | Ball      | 0.16 lb     | 3906M               | 3926M       | 3936M        | 3946M        | 3956M             | 3976M       | 3986M        | 3996M        |
| English     | 0.50 in | 6 lb          | Fine Screw          | no       | 3905                | Ball      | 0.16 lb     | 3903                | 3923        | 3933         | 3943         | —                 | —           | —            | —            |
| English     | 0.50 in | 6 lb          | Fine Screw          | yes      | 3901                | Ball      | 0.16 lb     | 3907                | 3927        | 3937         | 3947         | —                 | —           | —            | —            |
| Metric      | 13 mm   | 3 kg          | Metric Mic          | no       | M3905               | Ball      | 0.078 kg    | M3902M              | M3922M      | M3932M       | M3942M       | M3952M            | M3972M      | M3982M       | M3992M       |
| Metric      | 13 mm   | 3 kg          | Metric Mic          | yes      | M3901               | Ball      | 0.078 kg    | M3906M              | M3926M      | M3936M       | M3946M       | M3956M            | M3976M      | M3986M       | M3996M       |
| Metric      | 13 mm   | 3 kg          | Fine Screw          | no       | M3905               | Ball      | 0.078 kg    | M3903               | M3923       | M3933        | M3943        | —                 | —           | —            | —            |
| Metric      | 13 mm   | 3 kg          | Fine Screw          | yes      | M3901               | Ball      | 0.078 kg    | M3907               | M3927       | M3937        | M3947        | —                 | —           | —            | —            |

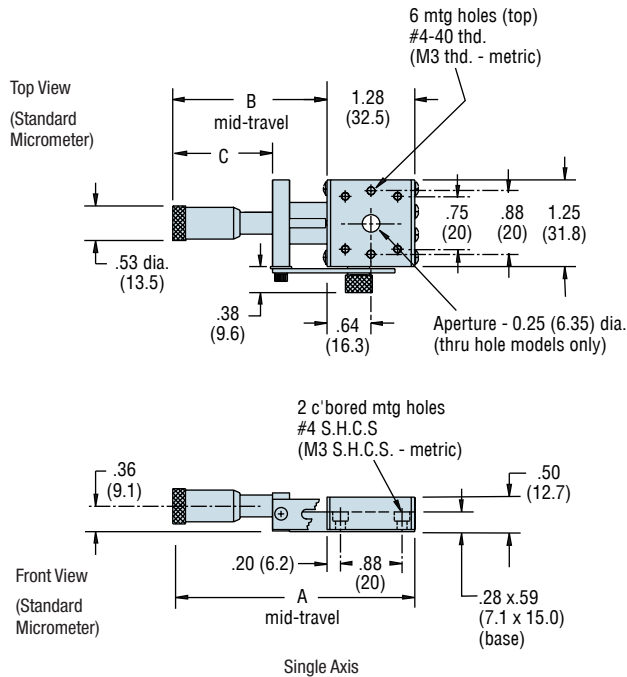
\*Position lock is standard on all models.



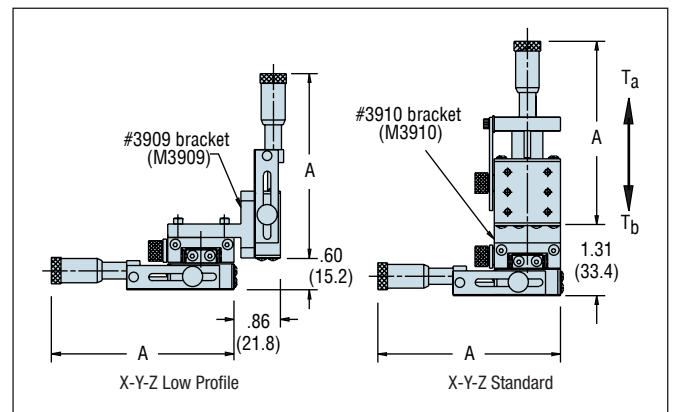
**Figure A Dimensions inches (mm)†**



**Center Drive**



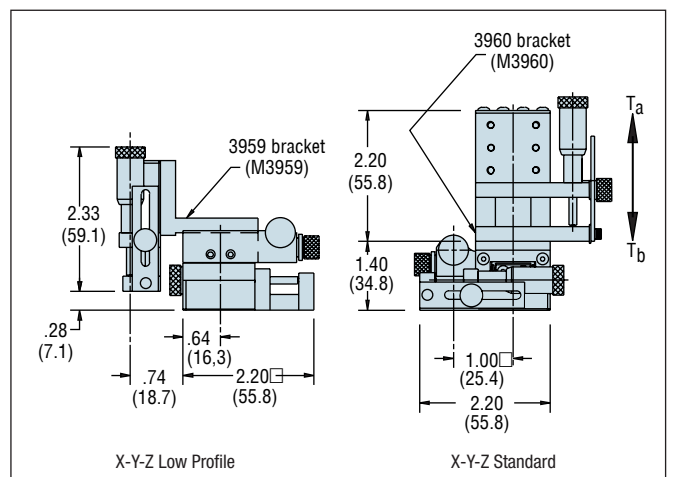
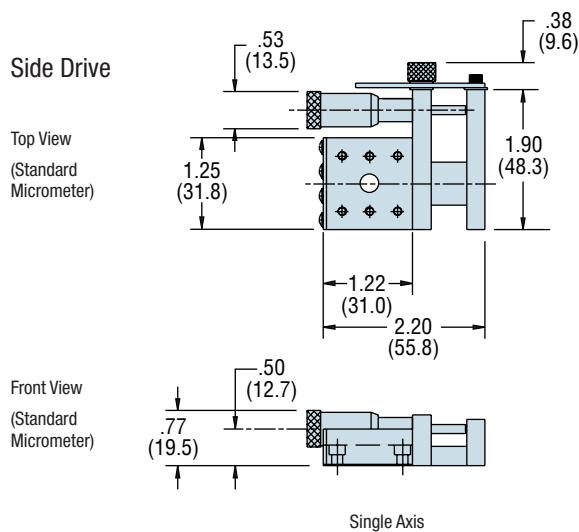
|   | English Mic. (in) | Metric Mic. (mm) | Fine Screw (in) |
|---|-------------------|------------------|-----------------|
| A | 3.35              | 85.0             | 2.30            |
| B | 2.06              | 52.4             | 1.02            |
| C | 1.35              | 34.2             | 0.30            |



† Note: Values shown in parentheses are actual metric dimensions for metric models (not conversions).

**Figure B – Dimensions inches (mm)†**

**Side Drive**



† Note: Values shown in parentheses are actual metric dimensions for metric models (not conversions).

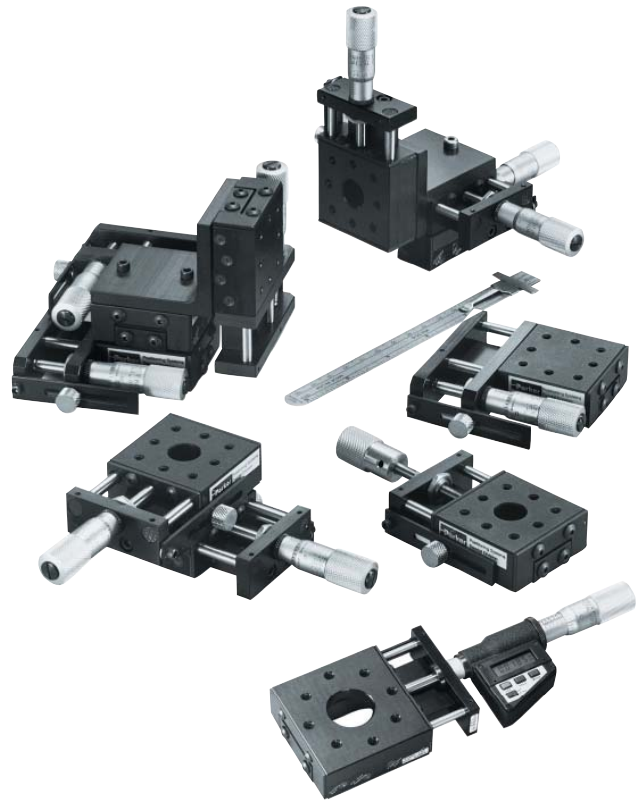
# Linear Positioning Stages

## 4000 Series (1.75 inches wide) Square Face, Multi-Axis Stages

These positioning stages are larger, stronger, and offer more selectable features than the miniature stages. Their square geometry mounting surfaces permit easy “stacking” to form multi-axis units. Features include four drive mechanisms (micrometer, digital micro-meter, fine screw, and differential screw) and two bearing types (ball or cross roller).

| Specifications                | English                            | Metric                          |
|-------------------------------|------------------------------------|---------------------------------|
| Travel - Maximum (selectable) | 1.0 in                             | 25 mm                           |
| Load Capacity:*               |                                    |                                 |
| Normal                        | 50 lb – see table                  | 11 kg – see table               |
| Thrust $T_a$                  | 10 lbs                             | 4.5 kgs                         |
| $T_b$                         | 5 lbs                              | 2.3 kgs                         |
| Straightline Accuracy         | 0.00008 in<br>(per inch of travel) | 2 $\mu$ m<br>(per 25 mm travel) |
| Resolution/Graduations:       |                                    |                                 |
| English Micrometer            | 0.001 in                           | n/a                             |
| Metric Micrometer             | n/a                                | 0.01 mm                         |
| Digital Micrometer            | 0.00005 in                         | n/a                             |
| Fine Screw                    | 64 pitch                           | n/a                             |
| Differential Screw:           |                                    |                                 |
| Coarse Adjustment             | 48 pitch                           | n/a                             |
| Fine Adjustment               | 336 pitch                          | n/a                             |

\* Refer to linear slide component for moment load charts.



### Selection Guide

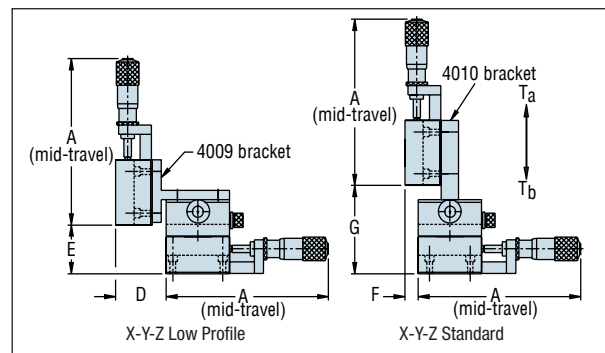
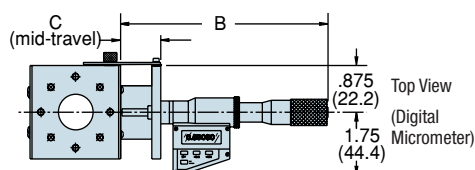
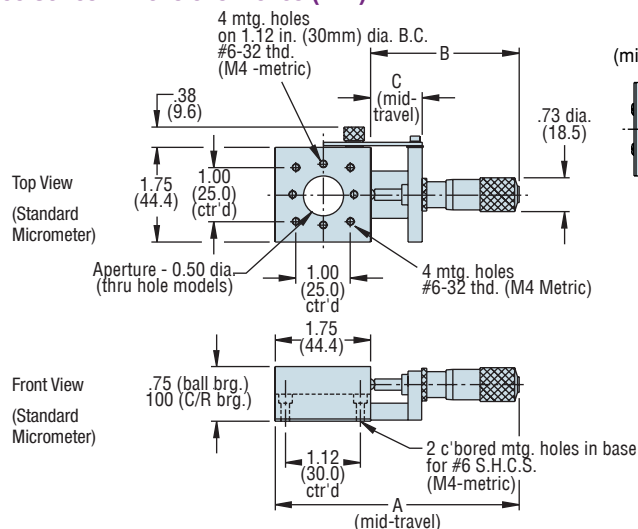
| Description |          |               |                     |          |                     |           |             | Model Number*       |             |              |              |                   |             |              |              |
|-------------|----------|---------------|---------------------|----------|---------------------|-----------|-------------|---------------------|-------------|--------------|--------------|-------------------|-------------|--------------|--------------|
|             |          |               |                     |          |                     |           |             | Center Drive Models |             |              |              | Side Drive Models |             |              |              |
| Type        | Travel   | Load Capacity | Drive Type (Normal) | Aperture | Linear Slide Number | Brg. Type | Unit Weight | 1 Axis (X)          | 2 Axis (XY) | 3 Axis (XYZ) | 3 Axis (XYZ) | 1 Axis (X)        | 2 Axis (XY) | 3 Axis (XYZ) | 3 Axis (XYZ) |
| English     | 0.30* in | 25 lb         | Diff. Screw         | no       | 4001                | Ball      | 0.5 lb      | 4002D               | 4022D       | 4032D        | 4042D        | 4052D             | 4072D       | 4082D        | 4092D        |
| English     | 0.30* in | 25 lb         | Diff. Screw         | yes      | 4005                | Ball      | 0.5 lb      | 4006D               | 4026D       | 4036D        | 4046D        | 4056D             | 4076D       | 4086D        | 4096D        |
| English     | 0.30* in | 50 lb         | Diff. Screw         | no       | CR4001              | C/R       | 0.5 lb      | CR4002D             | CR4022D     | CR4032D      | CR4042D      | CR4052D           | CR4072D     | CR4082D      | CR4092D      |
| English     | 0.50 in  | 25 lb         | English Mic         | no       | 4001                | Ball      | 0.5 lb      | 4002                | 4022        | 4032         | 4042         | 4052              | 4072        | 4082         | 4092         |
| English     | 0.50 in  | 25 lb         | English Mic         | yes      | 4005                | Ball      | 0.5 lb      | 4006                | 4026        | 4036         | 4046         | 4056              | 4076        | 4086         | 4096         |
| English     | 0.50 in  | 25 lb         | Metric Mic          | no       | 4001                | Ball      | 0.5 lb      | 4002M               | 4022M       | 4032M        | 4042M        | 4052M             | 4072M       | 4082M        | 4092M        |
| English     | 0.50 in  | 25 lb         | Metric Mic          | yes      | 4005                | Ball      | 0.5 lb      | 4006M               | 4026M       | 4036M        | 4046M        | 4056M             | 4076M       | 4086M        | 4096M        |
| English     | 0.50 in  | 50 lb         | English Mic         | no       | CR4001              | C/R       | 0.5 lb      | CR4002              | CR4022      | CR4032       | CR4042       | CR4052            | CR4072      | CR4082       | CR4092       |
| English     | 0.50 in  | 50 lb         | Metric Mic          | no       | CR4001              | C/R       | 0.5 lb      | CR4002M             | CR4022M     | CR4032M      | CR4042M      | CR4052M           | CR4072M     | CR4082M      | CR4092M      |
| English     | 0.75 in  | 25 lb         | Fine Screw          | no       | 4001                | Ball      | 0.5 lb      | 4003                | 4023        | 4033         | 4043         | 4053              | 4073        | 4083         | 4093         |
| English     | 0.75 in  | 25 lb         | Fine Screw          | yes      | 4005                | Ball      | 0.5 lb      | 4007                | 4027        | 4037         | 4047         | 4057              | 4077        | 4087         | 4097         |
| English     | 1.00 in  | 25 lb         | English Mic         | no       | 4001                | Ball      | 0.5 lb      | 4004                | 4024        | 4034         | 4044         | 4054              | 4074        | 4084         | 4094         |
| English     | 1.00 in  | 25 lb         | Metric Mic          | no       | 4001                | Ball      | 0.5 lb      | 4004M               | 4024M       | 4034M        | 4044M        | 4054M             | 4074M       | 4084M        | 4094M        |
| English     | 1.00 in  | 25 lb         | Digital Mic         | no       | 4001                | Ball      | 1.0 lb      | 4004-DM             | —           | —            | —            | n/a               | n/a         | n/a          | n/a          |
| English     | 1.00 in  | 25 lb         | Digital Mic         | yes      | 4005                | Ball      | 1.0 lb      | 4008-DM             | —           | —            | —            | n/a               | n/a         | n/a          | n/a          |
| English     | 1.00 in  | 50 lb         | Digital Mic         | no       | CR4001              | C/R       | 1.0 lb      | CR4004-DM           | —           | —            | —            | n/a               | n/a         | n/a          | n/a          |
| Metric      | 13 mm    | 11 kg         | Metric Mic          | yes      | M4001               | Ball      | 0.23 kg     | M4002M              | M4022M      | M4032M       | M4042M       | M4052M            | M4072M      | M4082M       | M4092M       |
| Metric      | 25 mm    | 11 kg         | Digital Mic         | yes      | M4001               | Ball      | 0.45 kg     | M4004-DM            | —           | —            | —            | —                 | —           | —            | —            |
| Metric      | 25 mm    | 11 kg         | Metric Mic          | yes      | M4001               | Ball      | 0.23 kg     | M4004M              | M4024M      | M4034M       | M4044M       | M4054M            | M4074M      | M4084M       | M4094M       |
| Metric      | 13 mm    | 11 kg         | Metric Mic          | no       | M4005               | Ball      | 0.23 kg     | M4006M              | M4026M      | M4036M       | M4046M       | M4056M            | M4076       | M4086M       | M4096M       |
| Metric      | 25 mm    | 11 kg         | Digital Mic         | no       | M4005               | Ball      | 0.45 kg     | M4008-DM            | —           | —            | —            | n/a               | n/a         | n/a          | n/a          |

\* 0.3 in = coarse resolution range; 0.08 in = fine resolution range

\*Position lock is standard on all models.

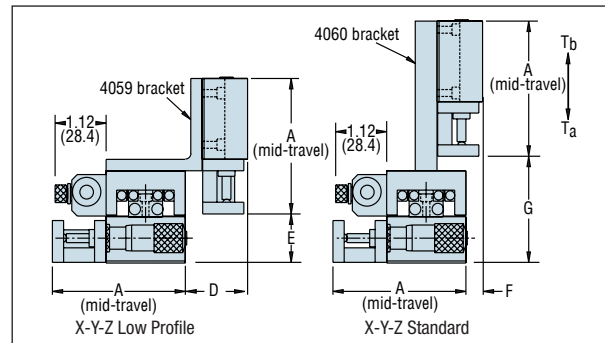
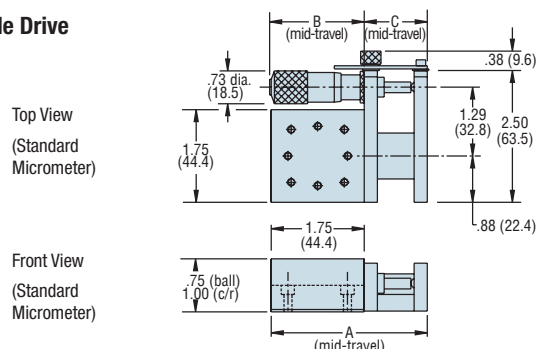


## 4000 Series Dimensions inches (mm)<sup>†</sup>



### Center Drive

### Side Drive



<sup>†</sup> Note: Values shown in parentheses are actual metric dimensions for metric models (not conversions).

### Dimensions

| Model Reference | Center Drive Models |       |       |      |      |      |      |             | Side Drive Models |      |      |      |      |      |      | Model Reference |
|-----------------|---------------------|-------|-------|------|------|------|------|-------------|-------------------|------|------|------|------|------|------|-----------------|
|                 | A                   | B     | C     | D    | E    | F    | G    |             | A                 | B    | C    | D    | E    | F    | G    |                 |
| 4002D           | 4.12                | 2.37  | 0.88  | 1.12 | 0.9  | 0.12 | 1.88 | Inches      | 2.87              | 1.44 | 1.19 | 1.12 | 0.68 | 0.12 | 1.88 | 4052D           |
| 4006D           | 4.12                | 2.37  | 0.88  | 1.12 | 0.9  | 0.12 | 1.88 |             | 2.87              | 1.44 | 1.19 | 1.12 | 0.68 | 0.12 | 1.88 | 4056D           |
| CR4002D         | 4.12                | 2.37  | 0.88  | 1.36 | 1.30 | 0.36 | 2.37 |             | 2.87              | 1.73 | 1.19 | 1.38 | 0.94 | 0.38 | 2.38 | CR4052D         |
| 4002            | 4.37                | 2.68  | 0.90  | 1.12 | 0.9  | 0.12 | 1.88 |             | 2.87              | 1.73 | 1.19 | 1.12 | 0.68 | 0.12 | 1.88 | 4052            |
| 4006            | 4.37                | 2.68  | 0.90  | 1.12 | 0.9  | 0.12 | 1.88 |             | 2.87              | 1.73 | 1.19 | 1.12 | 0.68 | 0.12 | 1.88 | 4056            |
| 4002M           | 4.37                | 2.68  | 0.90  | 1.12 | 0.9  | 0.12 | 1.88 |             | 2.87              | 1.73 | 1.19 | 1.12 | 0.68 | 0.12 | 1.88 | 4052M           |
| 4006M           | 4.37                | 2.68  | 0.90  | 1.12 | 0.9  | 0.12 | 1.88 |             | 2.87              | 1.73 | 1.19 | 1.12 | 0.68 | 0.12 | 1.88 | 4056M           |
| CR4002          | 4.37                | 2.62  | 0.90  | 1.36 | 1.30 | 0.36 | 2.37 |             | 2.87              | 1.73 | 1.19 | 1.38 | 0.94 | 0.38 | 2.38 | CR4052          |
| CR4002M         | 4.37                | 2.62  | 0.90  | 1.36 | 1.30 | 0.36 | 2.37 |             | 2.87              | 1.73 | 1.19 | 1.38 | 0.94 | 0.38 | 2.38 | CR4052M         |
| 4003            | 4.33                | 2.57  | 0.88  | 1.12 | 0.9  | 0.12 | 1.88 |             | 2.87              | 1.62 | 1.19 | 1.12 | 0.68 | 0.12 | 1.88 | 4053            |
| 4007            | 4.33                | 2.57  | 0.88  | 1.12 | 0.9  | 0.12 | 1.88 |             | 2.87              | 1.62 | 1.19 | 1.12 | 0.68 | 0.12 | 1.88 | 4057            |
| 4004            | 6.03                | 4.28  | 1.15  | 1.12 | 0.9  | 0.12 | 2.13 |             | 3.12              | 3.10 | 1.37 | 1.12 | 0.45 | 0.12 | 1.63 | 4054            |
| 4004M           | 6.03                | 4.28  | 1.15  | 1.12 | 0.9  | 0.12 | 2.13 |             | 3.12              | 3.10 | 1.37 | 1.12 | 0.45 | 0.12 | 1.63 | 4054M           |
| 4004-DM         | 7.74                | 5.99  | 1.18  | —    | —    | —    | —    |             | n/a               | n/a  | n/a  | n/a  | n/a  | n/a  | n/a  | n/a             |
| 4008-DM         | 7.74                | 5.99  | 1.18  | —    | —    | —    | —    |             | n/a               | n/a  | n/a  | n/a  | n/a  | n/a  | n/a  | n/a             |
| CR4004-DM       | 7.74                | 5.99  | 1.18  | —    | —    | —    | —    |             | n/a               | n/a  | n/a  | n/a  | n/a  | n/a  | n/a  | n/a             |
| M4002M          | 111                 | 68    | 23    | 28.5 | 22.6 | 3.1  | 47.8 | Millimeters | 72                | 44   | 30   | 33   | 15   | 3.0  | 47.8 | M4052           |
| M4004-DM        | 196.5               | 124.1 | 29.91 | —    | 15.7 | —    | —    |             | n/a               | n/a  | n/a  | n/a  | n/a  | n/a  | n/a  | n/a             |
| M4004M          | 125                 | 109   | 29    | 28.5 | 22.6 | 3.1  | 54.1 |             | 115               | 79   | 36   | 28   | 11   | 3.0  | 47.8 | M4054           |
| M4006M          | 111                 | 68    | 23    | 28.5 | 22.6 | 3.1  | 47.8 |             | 72                | 44   | 30   | 33   | 15   | 3.0  | 47.8 | M4056           |
| M4008-DM        | 196.5               | 124.1 | 29.91 | —    | 15.7 | —    | —    |             | n/a               | n/a  | n/a  | n/a  | n/a  | n/a  | n/a  | n/a             |

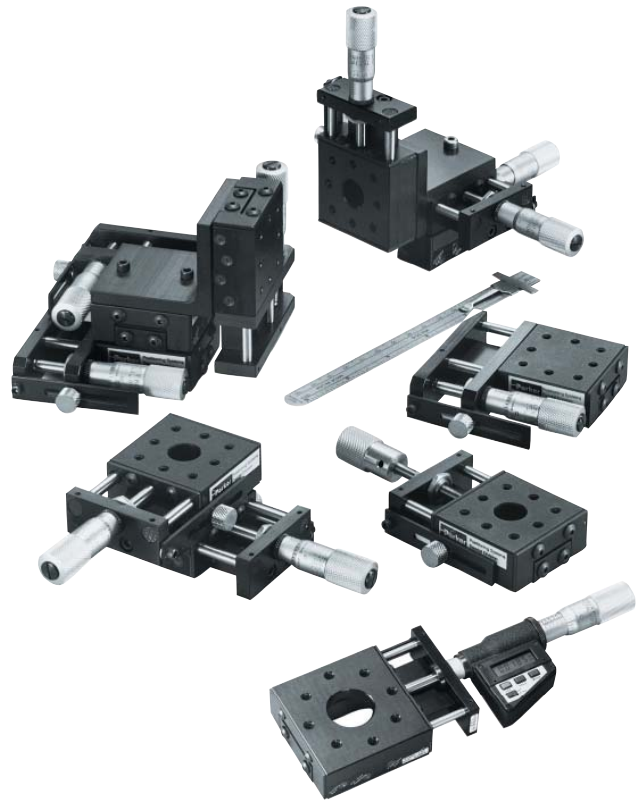
## Linear Positioning Stages

### 4500 Series (2.62 inches wide) Square Face, Multi-Axis Stages

These positioning stages provide a larger mounting surface and greater load capacity than the 4000 Series stages. They are offered in a variety of selections, including English or Metric Style (size and mounting), two bearing types (ball or cross roller), and four drive mechanisms (micrometer, digital micrometer, fine screw, and differential screw). They can be ordered as single- or multi-axis units.

| Specifications                | English                            | Metric                          |
|-------------------------------|------------------------------------|---------------------------------|
| Travel - Maximum (selectable) | 1.0 in                             | 25 mm                           |
| Load Capacity:*               |                                    |                                 |
| Normal                        | 88 lb – See table.                 | 20 kg – See table.              |
| Thrust $T_a$                  | 10 lbs                             | 4.5 kgs                         |
| $T_h$                         | 2 lbs                              | 0.9 kgs                         |
| Straightline Accuracy         | 0.00008 in<br>(per inch of travel) | 2 $\mu$ m<br>(per 25 mm travel) |
| Resolution/Graduations:       |                                    |                                 |
| English Micrometer            | 0.001 in                           | n/a                             |
| Metric Micrometer             | n/a                                | 0.01 mm                         |
| Digital Micrometer            | 0.00005 in                         | 0.001 mm                        |
| Fine Screw                    | 64 pitch                           | n/a                             |
| Differential Screw:           |                                    |                                 |
| Coarse Adjustment             | 48 pitch                           | 0.40 mm                         |
| Fine Adjustment               | 336 pitch                          | 0.08 mm                         |

\* Refer to linear slide component for moment load charts.



#### Selection Guide

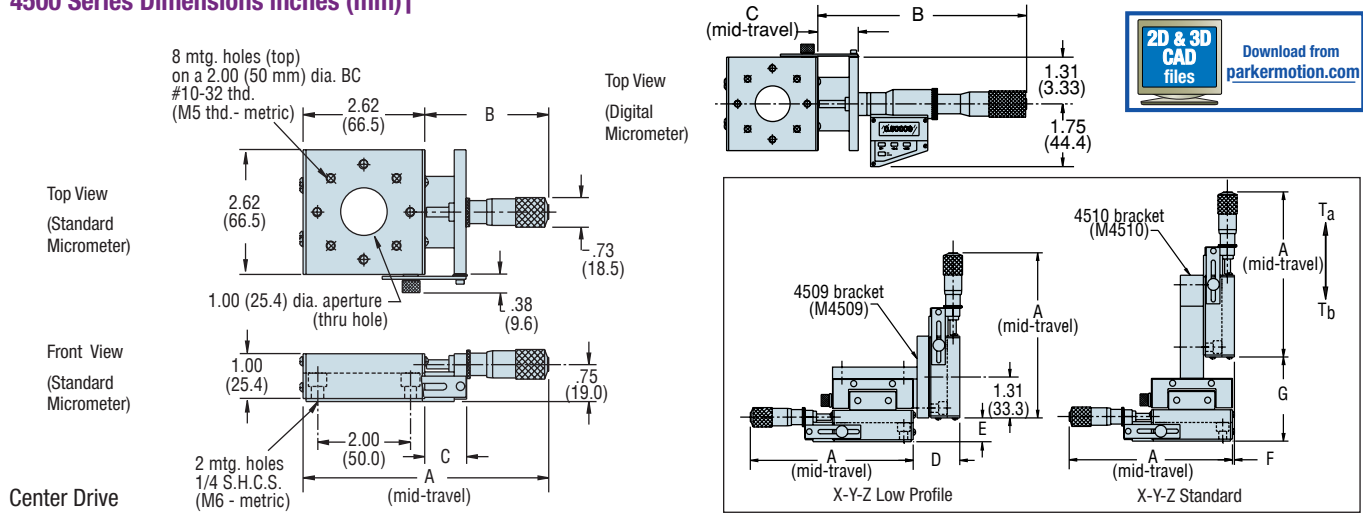
| Description |         |               |                     |          |            |             |                          |                        | Model Number*       |             |              |              |                   |             |              |              |
|-------------|---------|---------------|---------------------|----------|------------|-------------|--------------------------|------------------------|---------------------|-------------|--------------|--------------|-------------------|-------------|--------------|--------------|
|             |         |               |                     |          |            |             |                          |                        | Center Drive Models |             |              |              | Side Drive Models |             |              |              |
| Type        | Travel  | Load Capacity | Drive Type (Normal) | Aperture | Slide Type | Linear Brg. | Unit Weight Center Drive | Unit Weight Side Drive | 1 Axis (X)          | 2 Axis (XY) | 3 Axis (XYZ) | 3 Axis (XYZ) | 1 Axis (X)        | 2 Axis (XY) | 3 Axis (XYZ) | 3 Axis (XYZ) |
| English     | 0.30*in | 44 lb         | Diff. Screw         | no       | 4501       | Ball        | 0.7 lb                   | 0.9 lb                 | 4502D               | 4522D       | 4532D        | 4542D        | 4552D             | 4572D       | 4582D        | 4592D        |
| English     | 0.30*in | 44 lb         | Diff. Screw         | yes      | 4505       | Ball        | 0.7 lb                   | 0.9 lb                 | 4506D               | 4526D       | 4536D        | 4546D        | 4556D             | 4576D       | 4586D        | 4596D        |
| English     | 0.30*in | 88 lb         | Diff. Screw         | no       | CR4501     | C/R         | 0.9 lb                   | 0.9 lb                 | CR4502D             | CR4522D     | CR4532D      | CR4542D      | CR4552D           | CR4572D     | CR4582M      | CR4592D      |
| English     | 0.50 in | 44 lb         | English Mic         | no       | 4501       | Ball        | 0.7 lb                   | 0.9 lb                 | 4502                | 4522        | 4532         | 4542         | 4552              | 4572        | 4582         | 4592         |
| English     | 0.50 in | 44 lb         | English Mic         | yes      | 4505       | Ball        | 0.7 lb                   | 0.9 lb                 | 4506                | 4526        | 4536         | 4546         | 4556              | 4576        | 4586         | 4596         |
| English     | 0.50 in | 44 lb         | Metric Mic          | no       | 4501       | Ball        | 0.7 lb                   | 0.9 lb                 | 4502M               | 4522M       | 4532M        | 4542M        | 4552M             | 4572M       | 4582M        | 4592M        |
| English     | 0.50 in | 44 lb         | Metric Mic          | yes      | 4505       | Ball        | 0.7 lb                   | 0.9 lb                 | 4506M               | 4526M       | 4536M        | 4546M        | 4556M             | 4576M       | 4586M        | 4596M        |
| English     | 0.50 in | 88 lb         | English Mic         | no       | CR4501     | C/R         | 0.9 lb                   | 1.0 lb                 | CR4502              | CR4522      | CR4532       | CR4542       | CR4552            | CR4572      | CR4582       | CR4592       |
| English     | 0.50 in | 88 lb         | English Mic         | yes      | CR4505     | C/R         | 0.9 lb                   | 1.0 lb                 | CR4506              | CR4526      | CR4536       | CR4546       | CR4556            | CR4576      | CR4586       | CR4596       |
| English     | 0.50 in | 88 lb         | Metric Mic          | no       | CR4501     | C/R         | 0.9 lb                   | 1.0 lb                 | CR4502M             | CR4522M     | CR4532M      | CR4542M      | CR4552M           | CR4572M     | CR4582M      | CR4592M      |
| English     | 0.50 in | 88 lb         | Metric Mic          | yes      | CR4505     | C/R         | 0.9 lb                   | 1.0 lb                 | CR4506M             | CR4526M     | CR4536M      | CR4546M      | CR4556M           | CR4576M     | CR4586M      | CR4596M      |
| English     | 0.75 in | 44 lb         | Fine Screw          | no       | 4501       | Ball        | 0.7 lb                   | 0.9 lb                 | 4503                | 4523        | 4533         | 4543         | 4553              | 4573        | 4583         | 4593         |
| English     | 0.75 in | 44 lb         | Fine Screw          | yes      | 4505       | Ball        | 0.7 lb                   | 0.9 lb                 | 4507                | 4527        | 4537         | 4547         | 4557              | 4577        | 4587         | 4597         |
| English     | 1.00 in | 44 lb         | English Mic         | no       | 4501       | Ball        | 0.7 lb                   | 0.9 lb                 | 4504                | 4524        | 4534         | 4544         | 4554              | 4574        | 4584         | 4594         |
| English     | 1.00 in | 44 lb         | Metric Mic          | no       | 4501       | Ball        | 0.7 lb                   | 0.9 lb                 | 4504M               | 4524M       | 4534M        | 4544M        | 4554M             | 4574M       | 4584M        | 4594M        |
| English     | 1.00 in | 44 lb         | Digital Mic         | no       | 4501       | Ball        | 1.6 lb                   | n/a                    | 4504-DM             | —           | —            | —            | n/a               | n/a         | n/a          | n/a          |
| English     | 1.00 in | 44 lb         | Digital Mic         | yes      | 4505       | Ball        | 1.5 lb                   | n/a                    | 4508-DM             | —           | —            | —            | n/a               | n/a         | n/a          | n/a          |
| English     | 1.00 in | 88 lb         | English Mic         | no       | CR4501     | C/R         | 0.9 lb                   | 1.0 lb                 | CR4504              | CR4524      | CR4534       | CR4544       | CR4554            | CR4574      | CR4584       | CR4594       |
| English     | 1.00 in | 88 lb         | Metric Mic          | no       | CR4501     | C/R         | 0.9 lb                   | 1.0 lb                 | CR4504M             | CR4524M     | CR4534M      | CR4544M      | CR4554M           | CR4574M     | CR4584M      | CR4594M      |
| Metric      | 13 mm   | 20 kg         | Metric Mic          | no       | M4501      | Ball        | 0.33 kg                  | 0.42 kg                | M4502M              | M4522M      | M4532M       | M4542M       | M4552M            | M4572M      | M4582M       | M4592M       |
| Metric      | 25 mm   | 20 kg         | Digital Mic         | no       | M4501      | Ball        | 0.63 kg                  | n/a                    | M4504-DM            | —           | —            | —            | —                 | —           | —            | —            |
| Metric      | 25 mm   | 20 kg         | Metric Mic          | no       | M4501      | Ball        | 0.33 kg                  | 0.42 kg                | M4504M              | M4524M      | M4534M       | M4544M       | M4554M            | M4574M      | M4584M       | M4594M       |
| Metric      | 13 mm   | 20 kg         | Metric Mic          | yes      | M4505      | Ball        | 0.33 kg                  | 0.42 kg                | M4506M              | M4526M      | M4536M       | M4546M       | M4556M            | M4576M      | M4586M       | M4596M       |
| Metric      | 25 mm   | 20 kg         | Digital Mic         | yes      | M4505      | Ball        | 0.63 kg                  | n/a                    | M4508-DM            | —           | —            | —            | n/a               | n/a         | n/a          | n/a          |

\* 0.3 in= coarse resolution range; 0.08 in= fine resolution range

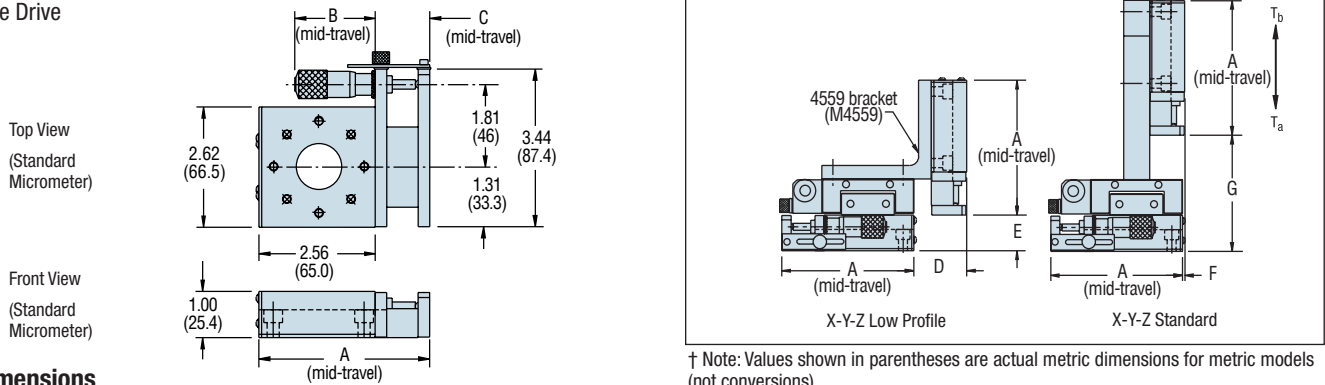
\*Position lock is standard on all models.



## 4500 Series Dimensions inches (mm)†



## Side Drive



## Dimensions

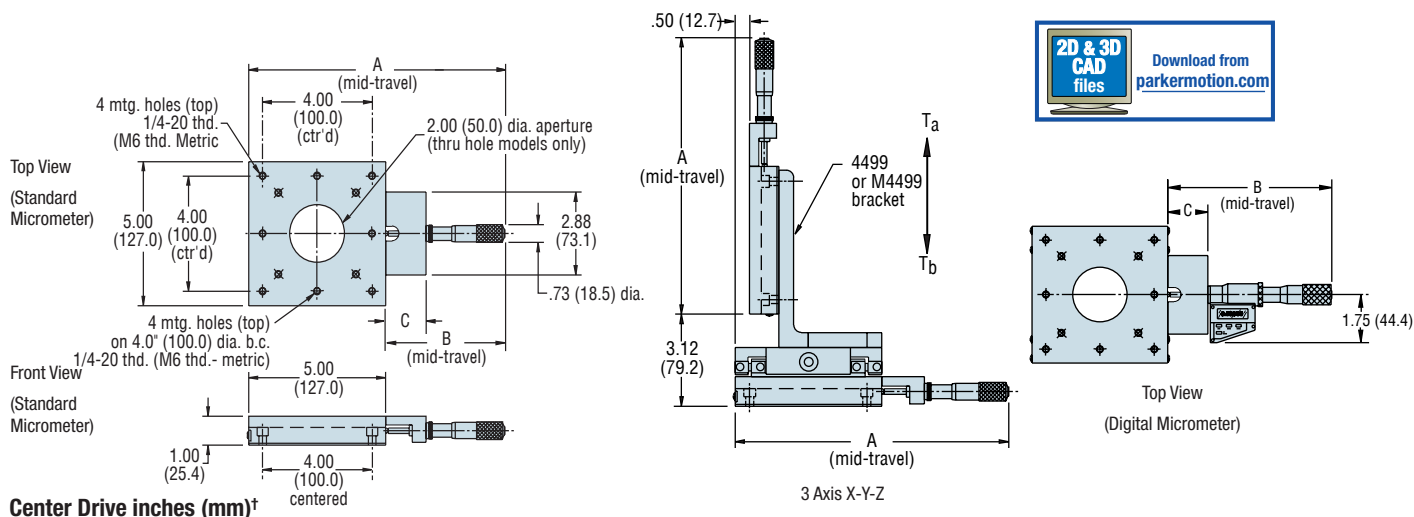
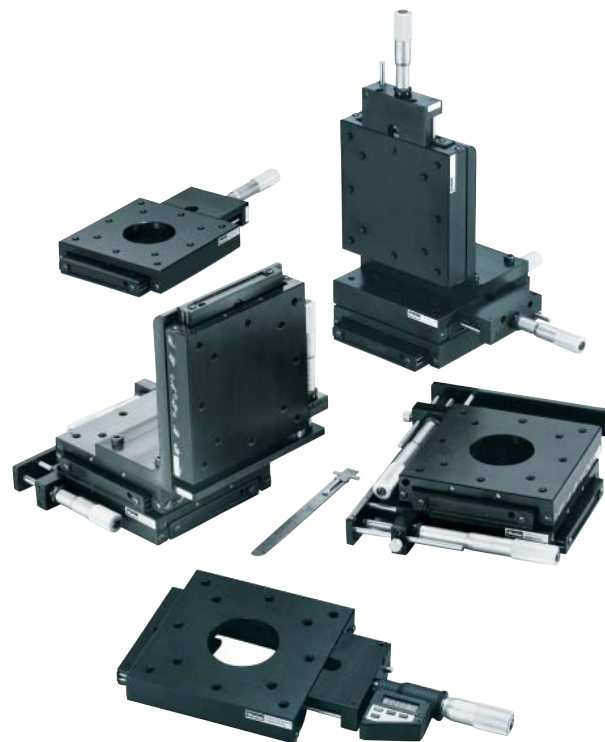
| Model Reference | Center Drive Models |      |      |      |      |     |      |             | Side Drive Models |      |      |      |      |     |      | Model Reference |
|-----------------|---------------------|------|------|------|------|-----|------|-------------|-------------------|------|------|------|------|-----|------|-----------------|
|                 | A                   | B    | C    | D    | E    | F   | G    |             | A                 | B    | C    | D    | E    | F   | G    |                 |
| 4502D           | 5.00                | 2.37 | 0.9  | 1.50 | 1.12 | .06 | 2.70 | Inches      | 3.75              | 1.44 | 1.19 | 1.50 | 1.00 | .06 | 3.25 | 4552D           |
| 4506D           | 5.00                | 2.37 | 0.9  | 1.50 | 1.12 | .06 | 2.70 |             | 3.75              | 1.44 | 1.19 | 1.50 | 1.00 | .06 | 3.25 | 4556D           |
| CR4502D         | 5.00                | 2.37 | 0.9  | 1.50 | 1.12 | .06 | 2.70 |             | 3.75              | 1.44 | 1.19 | 1.50 | 0.94 | .06 | 3.17 | CR4552D         |
| 4502            | 5.25                | 2.62 | 0.9  | 1.50 | 1.12 | .06 | 2.70 |             | 3.75              | 1.73 | 1.19 | 1.50 | 1.00 | .06 | 3.25 | 4552            |
| 4506            | 5.25                | 2.62 | 0.9  | 1.50 | 1.12 | .06 | 2.70 |             | 3.75              | 1.73 | 1.19 | 1.50 | 1.00 | .06 | 3.25 | 4556            |
| 4502M           | 5.25                | 2.62 | 0.9  | 1.50 | 1.12 | .06 | 2.70 |             | 3.75              | 1.73 | 1.19 | 1.50 | 1.00 | .06 | 3.25 | 4552M           |
| 4506M           | 5.25                | 2.62 | 0.9  | 1.50 | 1.12 | .06 | 2.70 |             | 3.75              | 1.73 | 1.19 | 1.50 | 1.00 | .06 | 3.25 | 4556M           |
| CR4502          | 5.25                | 2.62 | 0.9  | 1.50 | 1.12 | .06 | 2.70 |             | 3.75              | 1.73 | 1.19 | 1.50 | 0.94 | .06 | 3.17 | CR4552          |
| CR4506          | 5.25                | 2.62 | 0.9  | 1.50 | 1.12 | .06 | 2.70 |             | 3.75              | 1.73 | 1.19 | 1.50 | 0.94 | .06 | 3.17 | CR4556          |
| CR4502M         | 5.25                | 2.62 | 0.9  | 1.50 | 1.12 | .06 | 2.70 |             | 3.75              | 1.73 | 1.19 | 1.50 | 0.94 | .06 | 3.17 | CR4552M         |
| CR4506M         | 5.25                | 2.62 | 0.9  | 1.50 | 1.12 | .06 | 2.70 |             | 3.75              | 1.73 | 1.19 | 1.50 | 0.94 | .06 | 3.17 | CR4556M         |
| 4503            | 5.12                | 2.50 | 0.9  | 1.50 | 1.12 | .06 | 2.70 |             | 3.75              | 1.44 | 1.19 | 1.50 | 1.00 | .06 | 3.25 | 4553            |
| 4507            | 5.12                | 2.50 | 0.9  | 1.50 | 1.12 | .06 | 2.70 |             | 3.75              | 1.44 | 1.19 | 1.50 | 1.00 | .06 | 3.25 | 4557            |
| 4504            | 6.90                | 4.28 | 1.18 | 1.50 | 1.12 | .06 | 2.70 |             | 4.03              | 3.10 | 1.47 | 1.50 | 1.00 | .06 | 2.12 | 4554            |
| 4504M           | 6.90                | 4.28 | 1.18 | 1.50 | 1.12 | .06 | 2.70 |             | 4.03              | 3.01 | 1.47 | 1.50 | 1.00 | .06 | 2.12 | 4554M           |
| 4504-DM         | 8.62                | 6.00 | 1.18 | —    | —    | —   | —    |             | n/a               | n/a  | n/a  | n/a  | n/a  | n/a | n/a  | n/a             |
| 4508-DM         | 8.62                | 6.00 | 1.18 | —    | —    | —   | —    |             | n/a               | n/a  | n/a  | n/a  | n/a  | n/a | n/a  | n/a             |
| CR4504          | 6.90                | 4.28 | 1.18 | 1.50 | 1.12 | .06 | 2.70 | Millimeters | 4.03              | 3.10 | 1.47 | 1.50 | 1.00 | .06 | 2.12 | CR4554          |
| CR4504M         | 6.90                | 4.28 | 1.18 | 1.50 | 1.12 | .06 | 2.70 |             | 4.03              | 3.01 | 1.47 | 1.50 | 1.00 | .06 | 2.12 | CR4554M         |
| M4502M          | 133                 | 67   | 23   | 38.1 | 28.4 | 1.5 | 68.6 |             | 95                | 44   | 30   | 38.1 | 25.4 | 1.5 | 82.6 | M4552M          |
| M4504-DM        | 219                 | 124  | 30   | —    | —    | —   | —    |             | n/a               | n/a  | n/a  | n/a  | n/a  | n/a | n/a  | n/a             |
| M4504M          | 175                 | 109  | 30   | 38.1 | 28.4 | 1.5 | 68.6 |             | 102               | 79   | 37   | 38.1 | 25.4 | 1.5 | 82.6 | M4554M          |
| M4506M          | 133                 | 67   | 23   | 38.1 | 28.4 | 1.5 | 68.6 |             | 95                | 44   | 30   | 38.1 | 25.4 | 1.5 | 82.6 | M4556M          |
| M4508-DM        | 219                 | 124  | 30   | —    | —    | —   | —    |             | n/a               | n/a  | n/a  | n/a  | n/a  | n/a | n/a  | n/a             |
|                 |                     |      |      |      |      |     |      |             |                   |      |      |      |      |     |      |                 |

## 4400 Series (5.0 inches wide) Square Face, Multi-Axis Stages

The 4400 positioning stage provides a large five-inch-square mounting surface on a relatively low profile (1.0 inch) and can be selected with or without a two-inch-diameter clear aperture. The 4400 series offers a variety of selections, including English or Metric Style (size and mounting), two bearing types (ball or cross roller), and three drive mechanisms (English micrometer, Metric micrometer or digital micrometer). Position locks are also available as a separate option when ordering. Three-axes units can precisely lift payloads weighing up to thirty pounds.

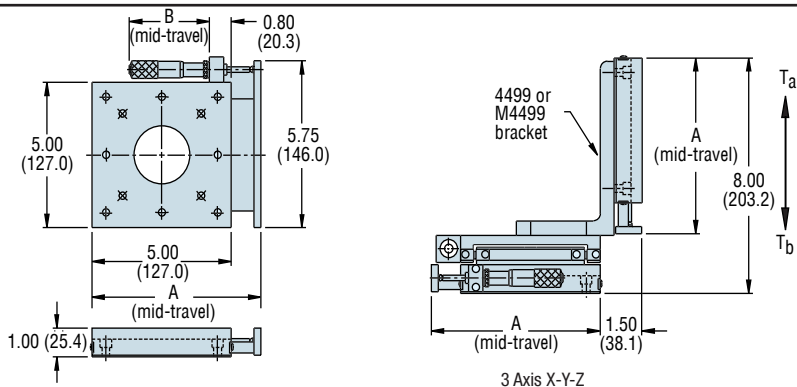
| Specifications                | English                           | Metric                          |
|-------------------------------|-----------------------------------|---------------------------------|
| Travel - Maximum (selectable) | 2.0 in                            | 50 mm                           |
| Load Capacity:*               |                                   |                                 |
| Normal                        | 95 lb – See table.                | 43 kg – See table.              |
| Thrust $T_a$                  | 2.5 lbs                           | 1.1 kgs                         |
| $T_b$                         | 30 lbs                            | 13.5 kgs                        |
| Straightline Accuracy         | 0.0008 in<br>(per inch of travel) | 2 $\mu$ m<br>(per 25 mm travel) |
| Resolution/Graduations:       |                                   |                                 |
| English Micrometer            | 0.001 in                          | n/a                             |
| Metric Micrometer             | n/a                               | 0.01 mm                         |
| Digital Micrometer            | 0.00005 in                        | 0.001 mm                        |

\* Refer to linear slide component for moment load charts.



Center Drive inches (mm)†

Side Drive inches (mm)†



† Note: Values shown in parentheses are actual metric dimensions for metric models (not conversions).



## 4400 Series Model Selection Guide

| Description |        |               |             |          |              |           |          | Center Drive Models |             |              |            |      |      | Side Drive Models |             |              |            |      |  |
|-------------|--------|---------------|-------------|----------|--------------|-----------|----------|---------------------|-------------|--------------|------------|------|------|-------------------|-------------|--------------|------------|------|--|
|             |        |               |             |          |              |           |          | Model Number        |             |              | Dimensions |      |      | Model Number      |             |              | Dimensions |      |  |
| Type        | Travel | Load Capacity | Mic Type    | Aperture | Slide (Ref.) | Brg. Type | Unit Wt. | 1 Axis (X)          | 2 Axis (XY) | 3 Axis (XYZ) | A          | B    | C    | 1 Axis (X)        | 2 Axis (XY) | 3 Axis (XYZ) | A          | B    |  |
| English     | 1.0 in | 95 lb         | English Mic | no       | 4410         | Ball      | 2.7 lb   | 4411                | 4421        | 4431         | 9.28       | 4.28 | 1.47 | 4416              | 4426        | 4436         | 6.0        | 2.88 |  |
| English     | 1.0 in | 95 lb         | English Mic | yes      | 4450         | Ball      | 2.7 lb   | 4451                | 4461        | 4471         | 9.28       | 4.28 | 1.47 | 4456              | 4466        | 4476         | 6.0        | 2.88 |  |
| English     | 1.0 in | 95 lb         | Metric Mic  | no       | 4410         | Ball      | 2.7 lb   | 4413                | 4423        | 4433         | 9.28       | 4.28 | 1.47 | 4418              | 4428        | 4438         | 6.0        | 2.88 |  |
| English     | 1.0 in | 95 lb         | Metric Mic  | yes      | 4450         | Ball      | 2.7 lb   | 4453                | 4463        | 4473         | 9.28       | 4.28 | 1.47 | 4458              | 4468        | 4478         | 6.0        | 2.88 |  |
| English     | 1.0 in | 95 lb         | Digital Mic | no       | 4410         | Ball      | 3.1 lb   | 4410-DM             | —           | —            | 11.28      | 6.28 | 1.47 | —                 | —           | —            | —          | —    |  |
| English     | 1.0 in | 95 lb         | Digital Mic | yes      | 4450         | Ball      | 3.1 lb   | 4450-DM             | —           | —            | 11.28      | 6.28 | 1.47 | —                 | —           | —            | —          | —    |  |
| English     | 1.0 in | 120 lb        | English Mic | no       | CR4410       | C/R       | 2.7 lb   | CR4411              | CR4421      | CR4431       | 9.28       | 4.28 | 1.47 | CR4416            | CR4426      | CR4436       | 6.0        | 2.88 |  |
| English     | 1.0 in | 120 lb        | English Mic | yes      | CR4450       | C/R       | 2.7 lb   | CR4451              | CR4461      | CR4471       | 9.28       | 4.28 | 1.47 | CR4456            | CR4466      | CR4476       | 6.0        | 2.88 |  |
| English     | 1.0 in | 120 lb        | Metric Mic  | no       | CR4410       | C/R       | 2.7 lb   | CR4413              | CR4423      | CR4433       | 9.28       | 4.28 | 1.47 | CR4418            | CR4428      | CR4438       | 6.0        | 2.88 |  |
| English     | 1.0 in | 120 lb        | Metric Mic  | yes      | CR4450       | C/R       | 2.7 lb   | CR4453              | CR4463      | CR4473       | 9.28       | 4.28 | 1.47 | CR4458            | CR4468      | CR4478       | 6.0        | 2.88 |  |
| English     | 1.0 in | 120 lb        | Digital Mic | no       | CR4410       | C/R       | 3.1 lb   | CR4411-DM           | —           | —            | 11.28      | 6.28 | 1.47 | —                 | —           | —            | —          | —    |  |
| English     | 1.0 in | 120 lb        | Digital Mic | yes      | CR4450       | C/R       | 3.1 lb   | CR4451-DM           | —           | —            | 11.28      | 6.28 | 1.47 | —                 | —           | —            | —          | —    |  |
| English     | 2.0 in | 95 lb         | English Mic | no       | 4410         | Ball      | 2.7 lb   | 4412                | 4422        | 4432         | 11.28      | 6.28 | 2.00 | 4417              | 4427        | 4437         | 6.5        | 4.38 |  |
| English     | 2.0 in | 95 lb         | English Mic | yes      | 4450         | Ball      | 2.7 lb   | 4452                | 4462        | 4472         | 11.28      | 6.28 | 2.00 | 4457              | 4467        | 4477         | 6.5        | 4.38 |  |
| English     | 2.0 in | 95 lb         | Metric Mic  | no       | 4410         | Ball      | 2.7 lb   | 4414                | 4424        | 4434         | 11.28      | 6.28 | 2.00 | 4419              | 4429        | 4439         | 6.5        | 4.38 |  |
| English     | 2.0 in | 95 lb         | Metric Mic  | yes      | 4450         | Ball      | 2.7 lb   | 4454                | 4464        | 4474         | 11.28      | 6.28 | 2.00 | 4459              | 4469        | 4479         | 6.5        | 4.38 |  |
| English     | 2.0 in | 95 lb         | Digital Mic | no       | 4410         | Ball      | 3.1 lb   | 4412-DM             | —           | —            | 12.81      | 7.81 | 2.00 | —                 | —           | —            | —          | —    |  |
| English     | 2.0 in | 95 lb         | Digital Mic | yes      | 4450         | Ball      | 3.1 lb   | 4452-DM             | —           | —            | 12.81      | 7.81 | 2.00 | —                 | —           | —            | —          | —    |  |
| English     | 2.0 in | 120 lb        | English Mic | no       | CR4410       | C/R       | 2.7 lb   | CR4412              | CR4422      | CR4432       | 11.28      | 6.28 | 2.00 | CR4417            | CR4427      | CR4437       | 6.5        | 4.38 |  |
| English     | 2.0 in | 120 lb        | English Mic | yes      | CR4450       | C/R       | 2.7 lb   | CR4452              | CR4462      | CR4472       | 11.28      | 6.28 | 2.00 | CR4457            | CR4467      | CR4477       | 6.5        | 4.38 |  |
| English     | 2.0 in | 120 lb        | Metric Mic  | no       | CR4410       | C/R       | 2.7 lb   | CR4414              | CR4424      | CR4434       | 11.28      | 6.28 | 2.00 | CR4419            | CR4429      | CR4439       | 6.5        | 4.38 |  |
| English     | 2.0 in | 120 lb        | Metric Mic  | yes      | CR4450       | C/R       | 3.1 lb   | CR4454              | CR4464      | CR4474       | 11.28      | 6.28 | 2.00 | CR4459            | CR4469      | CR4479       | 6.5        | 4.38 |  |
| English     | 2.0 in | 120 lb        | Digital Mic | no       | CR4410       | C/R       | 3.1 lb   | CR4412-DM           | —           | —            | 12.81      | 7.81 | 2.00 | —                 | —           | —            | —          | —    |  |
| English     | 2.0 in | 120 lb        | Digital Mic | yes      | CR4450       | C/R       | 3.1 lb   | CR4452-DM           | —           | —            | 12.81      | 7.81 | 2.00 | —                 | —           | —            | —          | —    |  |
| Metric      | 25 mm  | 43 kg         | Metric Mic  | no       | 4410         | Ball      | 1.2 kg   | M4413               | M4423       | M4433        | 236        | 109  | 38   | M4418             | M4428       | M4438        | 124        | 73   |  |
| Metric      | 25 mm  | 43 kg         | Metric Mic  | yes      | 4450         | Ball      | 1.2 kg   | M4453               | M4463       | M4473        | 236        | 109  | 38   | M4458             | M4468       | M4478        | 124        | 73   |  |
| Metric      | 50 mm  | 43 kg         | Metric Mic  | no       | 4410         | Ball      | 1.2 kg   | M4414               | M4424       | M4434        | 286        | 131  | 50   | M4419             | M4429       | M4439        | 165        | 111  |  |
| Metric      | 50 mm  | 43 kg         | Metric Mic  | yes      | 4450         | Ball      | 1.2 kg   | M4454               | M4464       | M4474        | 286        | 131  | 50   | M4459             | M4469       | M4479        | 165        | 111  |  |
| Metric      | 25 mm  | 43 kg         | Digital Mic | no       | 4410         | Ball      | 1.4 kg   | M4410-DM            | —           | —            | 286        | 131  | 50   | —                 | —           | —            | —          | —    |  |
| Metric      | 25 mm  | 43 kg         | Digital Mic | yes      | 4450         | Ball      | 1.4 kg   | M4450-DM            | —           | —            | 286        | 131  | 50   | —                 | —           | —            | —          | —    |  |
| Metric      | 50 mm  | 43 kg         | Digital Mic | no       | 4410         | Ball      | 1.4 kg   | M4412-DM            | —           | —            | —          | —    | —    | —                 | —           | —            | —          | —    |  |
| Metric      | 50 mm  | 43 kg         | Digital Mic | yes      | 4450         | Ball      | 1.4 kg   | M4452-DM            | —           | —            | —          | —    | —    | —                 | —           | —            | —          | —    |  |

NOTE: For the optional position lock, add “-L” to the desired part number when ordering.  
Available on all models except the digital micrometer (-DM).

## 4100, 4200, 4300 Series (1.75 inches wide) Extended Length Stages

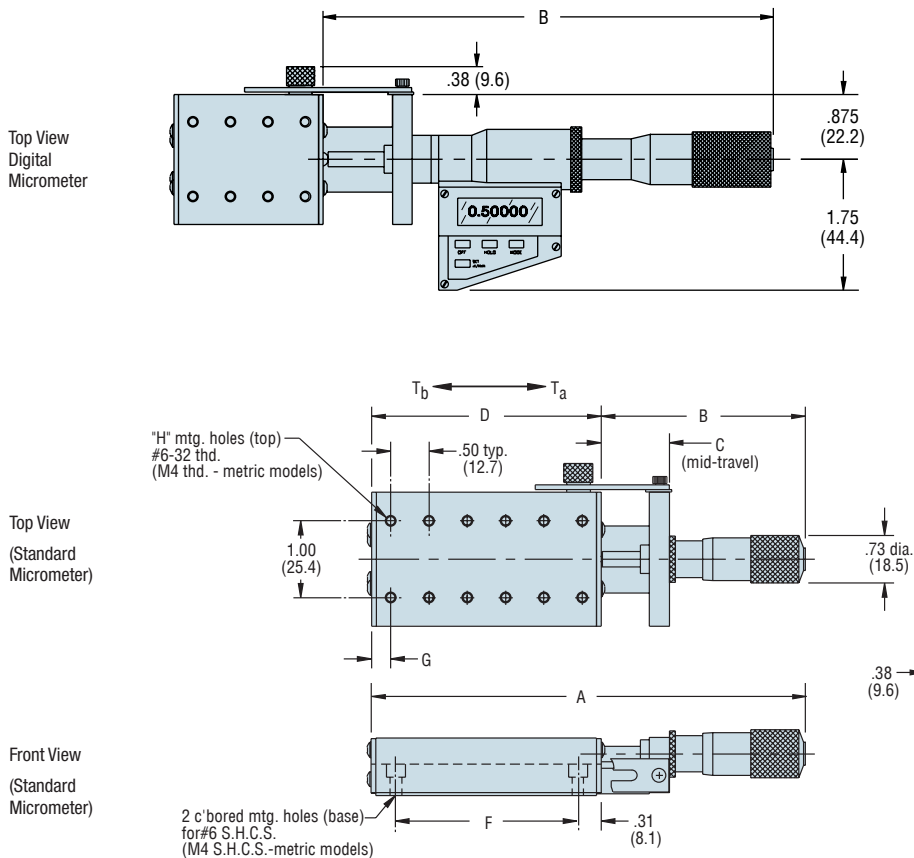
These positioning stages are longer versions of the 4000 series square faced linear positioners. Their extended length permit more rolling elements in the bearing system which provides increased load capacity with the same cross section. Like the 4000 series, they offer three drive mechanisms (micrometer, digital micrometer, and fine screw) and two bearing types (ball or cross roller).

| Specifications                | English                            | Metric                          |
|-------------------------------|------------------------------------|---------------------------------|
| Travel - Maximum (selectable) | 1.0 in                             | 25 mm                           |
| Load Capacity:*               |                                    |                                 |
| Normal                        | 100 lb – See table.                | 25 kg – See table.              |
| Thrust $T_a$                  | 10 lbs                             | 4.5 kgs                         |
| $T_b$                         | 3 lbs                              | 1.4 kgs                         |
| Straightline Accuracy         | 0.00008 in<br>(per inch of travel) | 2 $\mu$ m<br>(per 25 mm travel) |
| Resolution/Graduations:       |                                    |                                 |
| English Micrometer            | 0.001 in                           | n/a                             |
| Metric Micrometer             | n/a                                | 0.01 mm                         |
| Digital Micrometer            | 0.00005 in                         | 0.001 mm                        |
| Fine Screw                    | 64 pitch                           | n/a mm                          |

\* Refer to linear slide component for moment load charts.



### Dimensions inches (mm)†



† Note: Values shown in parentheses are actual metric dimensions for metric models (not conversions).



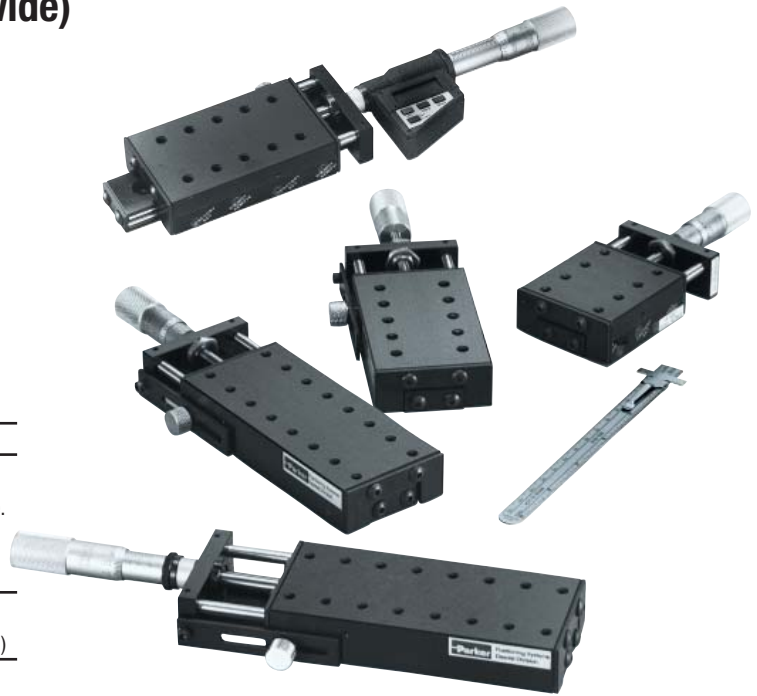
## Model Selection Guide

| Description |         |               |             |                     |              |             | Model Number* | Dimensions |       |      |       |      |      |      |    |             |
|-------------|---------|---------------|-------------|---------------------|--------------|-------------|---------------|------------|-------|------|-------|------|------|------|----|-------------|
| Type        | Travel  | Load Capacity | Drive Type  | Linear Slide Number | Bearing Type | Unit Weight |               | A          | B     | C    | D     | E    | F    | G    | H  |             |
| English     | 0.50 in | 28 lb         | English Mic | 4101                | Ball         | 0.5 lb      | 4102          | 4.62       | 2.62  | 0.93 | 2.0   | 0.75 | 1.38 | 0.25 | 8  | Inches      |
| English     | 0.50 in | 28 lb         | Metric Mic  | 4101                | Ball         | 0.5 lb      | 4102M         | 4.62       | 2.62  | 0.93 | 2.0   | 0.75 | 1.38 | 0.25 | 8  |             |
| English     | 0.50 in | 40 lb         | English Mic | 4201                | Ball         | 0.6 lb      | 4202          | 5.62       | 2.62  | 0.93 | 3.0   | 0.75 | 2.38 | 0.25 | 12 |             |
| English     | 0.50 in | 40 lb         | Metric Mic  | 4201                | Ball         | 0.6 lb      | 4202M         | 5.62       | 2.62  | 0.93 | 3.0   | 0.75 | 2.38 | 0.25 | 12 |             |
| English     | 0.50 in | 55 lb         | English Mic | 4301                | Ball         | 0.8 lb      | 4302          | 6.62       | 2.62  | 0.93 | 4.0   | 0.75 | 3.38 | 0.25 | 16 |             |
| English     | 0.50 in | 55 lb         | Metric Mic  | 4301                | Ball         | 0.8 lb      | 4302M         | 6.62       | 2.62  | 0.93 | 4.0   | 0.75 | 3.38 | 0.25 | 16 |             |
| English     | 0.50 in | 56 lb         | English Mic | CR4101              | C/R          | 0.5 lb      | CR4102        | 4.62       | 2.62  | 0.93 | 2.0   | 1.00 | 1.38 | 0.25 | 8  |             |
| English     | 0.50 in | 56 lb         | Metric Mic  | CR4101              | C/R          | 0.5 lb      | CR4102M       | 4.62       | 2.62  | 0.93 | 2.0   | 1.00 | 1.38 | 0.25 | 8  |             |
| English     | 0.50 in | 60 lb         | English Mic | CR4201              | C/R          | 0.8 lb      | CR4202        | 5.62       | 2.62  | 0.93 | 3.0   | 1.00 | 2.38 | 0.25 | 12 |             |
| English     | 0.50 in | 60 lb         | Metric Mic  | CR4201              | C/R          | 0.8 lb      | CR4202M       | 5.62       | 2.62  | 0.93 | 3.0   | 1.00 | 2.38 | 0.25 | 12 |             |
| English     | 0.50 in | 100 lb        | English Mic | CR4301              | C/R          | 1.0 lb      | CR4302        | 6.62       | 2.62  | 0.93 | 4.0   | 1.00 | 3.38 | 0.25 | 16 |             |
| English     | 0.50 in | 100 lb        | Metric Mic  | CR4301              | C/R          | 1.0 lb      | CR4302M       | 6.62       | 2.62  | 0.93 | 4.0   | 1.00 | 3.38 | 0.25 | 16 |             |
| English     | 0.75 in | 28 lb         | Fine Screw  | 4101                | Ball         | 0.5 lb      | 4103          | 4.50       | 2.50  | 0.88 | 2.0   | 0.75 | 1.38 | 0.25 | 8  |             |
| English     | 0.75 in | 40 lb         | Fine Screw  | 4201                | Ball         | 0.6 lb      | 4203          | 5.50       | 2.50  | 0.88 | 3.0   | 0.75 | 2.38 | 0.25 | 12 |             |
| English     | 0.75 in | 55 lb         | Fine Screw  | 4301                | Ball         | 0.8 lb      | 4303          | 6.50       | 2.50  | 0.88 | 4.0   | 0.75 | 3.38 | 0.25 | 16 |             |
| English     | 0.75 in | 56 lb         | Fine Screw  | CR4101              | C/R          | 0.5 lb      | CR4103        | 4.50       | 2.50  | 0.88 | 2.0   | 1.00 | 1.38 | 0.25 | 8  |             |
| English     | 0.75 in | 60 lb         | Fine Screw  | CR4201              | C/R          | 0.8 lb      | CR4203        | 5.50       | 2.50  | 0.88 | 3.0   | 1.00 | 2.38 | 0.25 | 12 |             |
| English     | 0.75 in | 100 lb        | Fine Screw  | CR4301              | C/R          | 1.0 lb      | CR4303        | 6.50       | 2.50  | 0.88 | 4.0   | 1.00 | 3.38 | 0.25 | 16 |             |
| English     | 1.00 in | 28 lb         | English Mic | 4101                | Ball         | 0.5 lb      | 4104          | 6.28       | 4.28  | 1.18 | 2.0   | 0.75 | 1.38 | 0.25 | 8  |             |
| English     | 1.00 in | 28 lb         | Metric Mic  | 4101                | Ball         | 0.5 lb      | 4104M         | 6.28       | 4.28  | 1.18 | 2.0   | 0.75 | 1.38 | 0.25 | 8  |             |
| English     | 1.00 in | 28 lb         | Digital Mic | 4101                | Ball         | 0.9 lb      | 4104-DM       | 8.0        | 6.0   | 1.18 | 2.0   | 0.75 | 1.38 | 0.25 | 8  |             |
| English     | 1.00 in | 40 lb         | English Mic | 4201                | Ball         | 0.6 lb      | 4204          | 7.28       | 4.28  | 1.18 | 3.0   | 0.75 | 2.38 | 0.25 | 12 |             |
| English     | 1.00 in | 40 lb         | Metric Mic  | 4201                | Ball         | 0.6 lb      | 4204M         | 7.28       | 4.28  | 1.18 | 3.0   | 0.75 | 2.38 | 0.25 | 12 |             |
| English     | 1.00 in | 40 lb         | Digital Mic | 4201                | Ball         | 1.0 lb      | 4204-DM       | 9.0        | 6.0   | 1.18 | 3.0   | 0.75 | 2.38 | 0.25 | 12 |             |
| English     | 1.00 in | 55 lb         | English Mic | 4301                | Ball         | 0.8 lb      | 4304          | 8.28       | 4.28  | 1.18 | 4.0   | 0.75 | 3.38 | 0.25 | 16 |             |
| English     | 1.00 in | 55 lb         | Metric Mic  | 4301                | Ball         | 0.8 lb      | 4304M         | 8.28       | 4.28  | 1.18 | 4.0   | 0.75 | 3.38 | 0.25 | 16 |             |
| English     | 1.00 in | 55 lb         | Digital Mic | 4301                | Ball         | 1.3 lb      | 4304-DM       | 10.0       | 6.0   | 1.18 | 4.0   | 0.75 | 3.38 | 0.25 | 16 |             |
| English     | 1.00 in | 56 lb         | English Mic | CR4101              | C/R          | 0.5 lb      | CR4104        | 6.28       | 4.28  | 1.18 | 2.0   | 1.0  | 1.38 | 0.25 | 8  |             |
| English     | 1.00 in | 56 lb         | Metric Mic  | CR4101              | C/R          | 0.5 lb      | CR4104M       | 6.28       | 4.28  | 1.18 | 2.0   | 1.0  | 1.38 | 0.25 | 8  |             |
| English     | 1.00 in | 56 lb         | Digital Mic | CR4101              | C/R          | 1.0 lb      | CR4104-DM     | 8.0        | 6.0   | 1.18 | 2.0   | 1.0  | 1.38 | 0.25 | 8  |             |
| English     | 1.00 in | 60 lb         | English Mic | CR4201              | C/R          | 0.8 lb      | CR4204        | 7.28       | 4.28  | 1.18 | 3.0   | 1.0  | 2.38 | 0.25 | 12 |             |
| English     | 1.00 in | 60 lb         | Metric Mic  | CR4201              | C/R          | 0.8 lb      | CR4204M       | 7.28       | 4.28  | 1.18 | 3.0   | 1.0  | 2.38 | 0.25 | 12 |             |
| English     | 1.00 in | 60 lb         | Digital Mic | CR4201              | C/R          | 1.1 lb      | CR4204-DM     | 9.0        | 6.0   | 1.18 | 3.0   | 1.0  | 2.38 | 0.25 | 12 |             |
| English     | 1.00 in | 100 lb        | English Mic | CR4301              | C/R          | 1.0 lb      | CR4304        | 8.28       | 4.28  | 1.18 | 4.0   | 1.0  | 3.38 | 0.25 | 16 |             |
| English     | 1.00 in | 100 lb        | Metric Mic  | CR4301              | C/R          | 1.0 lb      | CR4304M       | 8.28       | 4.28  | 1.18 | 4.0   | 1.0  | 3.38 | 0.25 | 16 |             |
| English     | 1.00 in | 100 lb        | Digital Mic | CR4301              | C/R          | 1.3 lb      | CR4304-DM     | 10.0       | 6.0   | 1.18 | 4.0   | 1.0  | 3.38 | 0.25 | 16 |             |
| Metric      | 13 mm   | 13 kg         | Metric Mic  | M4101               | Ball         | 0.2 kg      | M4102M        | 117.3      | 66.5  | 23.6 | 50.8  | 19.0 | 35.0 | 12.9 | 6  | Millimeters |
| Metric      | 13 mm   | 18 kg         | Metric Mic  | M4201               | Ball         | 0.3 kg      | M4202M        | 114.7      | 66.5  | 23.6 | 76.2  | 19.0 | 60.0 | 13.1 | 10 |             |
| Metric      | 13 mm   | 25 kg         | Metric Mic  | M4301               | Ball         | 0.4 kg      | M4302M        | 168.1      | 66.5  | 23.6 | 101.6 | 19.0 | 85.0 | 13.3 | 14 |             |
| Metric      | 25 mm   | 13 kg         | Metric Mic  | M4101               | Ball         | 0.2 kg      | M4104M        | 131.5      | 108.7 | 29.9 | 50.8  | 19.0 | 35.0 | 12.9 | 6  |             |
| Metric      | 25 mm   | 13 kg         | Digital Mic | M4101               | Ball         | 0.4 kg      | M4104-DM      | 202.9      | 124.1 | 29.9 | 50.8  | 19.0 | 35.0 | 12.9 | 6  |             |
| Metric      | 25 mm   | 18 kg         | Metric Mic  | M4201               | Ball         | 0.3 kg      | M4204M        | 184.9      | 108.7 | 29.9 | 76.2  | 19.0 | 60.0 | 13.1 | 10 |             |
| Metric      | 25 mm   | 18 kg         | Digital Mic | M4201               | Ball         | 0.5 kg      | M4204-DM      | 228.3      | 124.1 | 29.9 | 76.2  | 19.0 | 60.0 | 13.1 | 10 |             |
| Metric      | 25 mm   | 25 kg         | Metric Mic  | M4301               | Ball         | 0.4 kg      | M4304M        | 210.3      | 108.7 | 29.9 | 101.6 | 19.0 | 85.0 | 13.3 | 14 |             |
| Metric      | 25 mm   | 25 kg         | Digital Mic | M4301               | Ball         | 0.6 kg      | M4304-DM      | 253.7      | 124.1 | 29.9 | 101.6 | 19.0 | 85.0 | 13.3 | 14 |             |

\*Position lock is standard on all models.

## 4600, 4700, 4800 Series (2.62 inches wide) Extended Length Stages

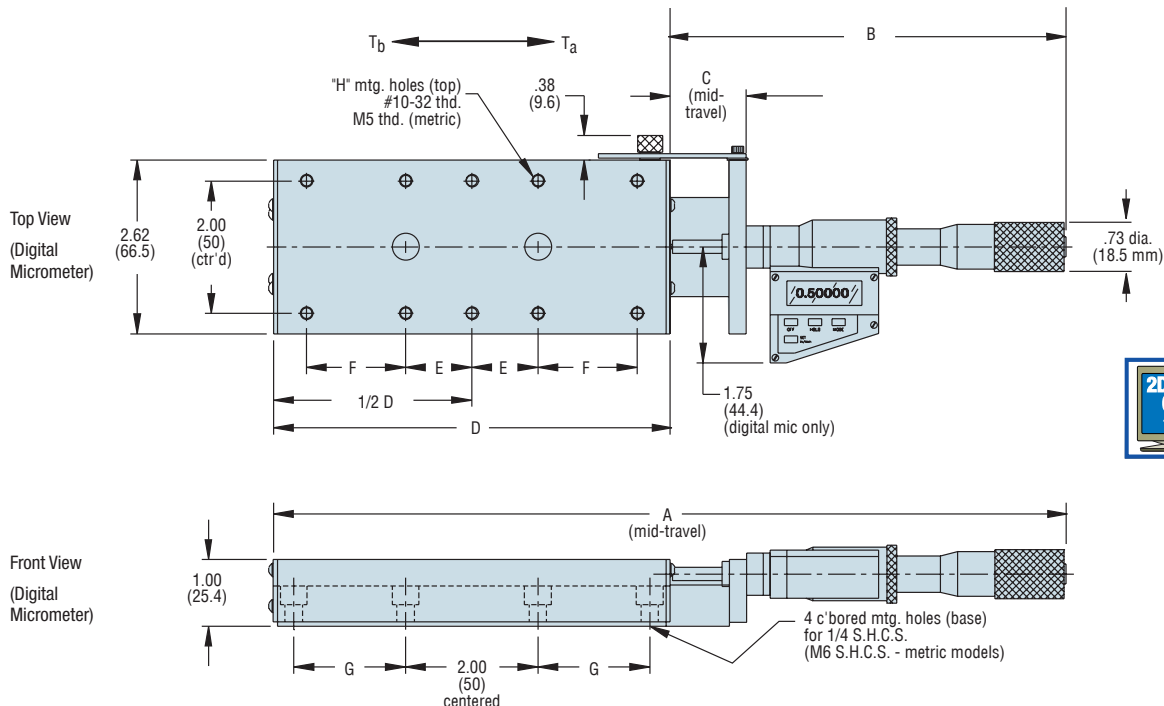
These positioning stages are longer versions of the 4500 series square-faced linear positioners. They offer a larger mounting area, and their extended length permits more rolling elements in the bearing system, which provides increased load capacity with the same cross section (1.00" x 2.62"). They are offered with three drive mechanisms (micrometer, digital micrometer, and fine screw) and two bearing types (ball or cross roller).



| Specifications                | English                            | Metric                          |
|-------------------------------|------------------------------------|---------------------------------|
| Travel - Maximum (selectable) | 1.0 in                             | 25 mm                           |
| Load Capacity:*               |                                    |                                 |
| Normal                        | 248 lb – See table.                | 55 kg – See table.              |
| Thrust $T_a$                  | 10 lbs                             | 4.5 kgs                         |
| $T_b$                         | 5 lbs                              | 2.3 kgs                         |
| Straightline Accuracy         | 0.00008 in<br>(per inch of travel) | 2 $\mu$ m<br>(per 25 mm travel) |
| Resolution/Graduations:       |                                    |                                 |
| English Micrometer            | 0.001 in                           | n/a                             |
| Metric Micrometer             | n/a                                | 0.01 mm                         |
| Digital Micrometer            | 0.00005 in                         | 0.001 mm                        |
| Fine Screw                    | 64 Pitch                           | n/a                             |

\* Refer to linear slide component for moment load charts.

### Dimensions inches (mm)<sup>†</sup>



<sup>†</sup> Note: Values shown in parentheses are actual metric dimensions for metric models (not conversions).



## Model Selection Guide

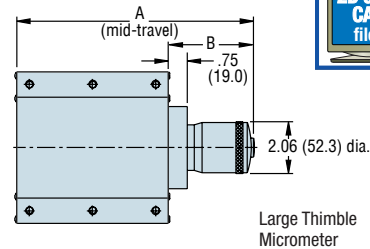
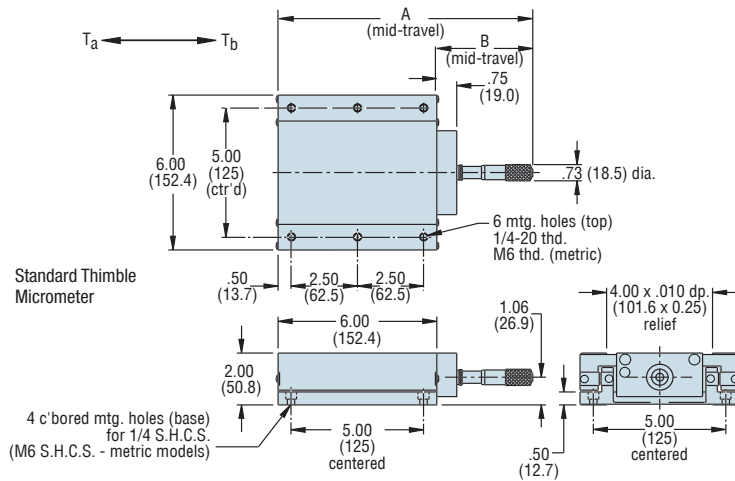
| Description |         |               |                     |                     |           |             | Model Number* | Dimensions |       |      |       |      |      |      |    |             |
|-------------|---------|---------------|---------------------|---------------------|-----------|-------------|---------------|------------|-------|------|-------|------|------|------|----|-------------|
| Type        | Travel  | Load Capacity | Drive Type (Normal) | Linear Slide Number | Brg. Type | Unit Weight |               | A          | B     | C    | D     | E    | F    | G    | H  |             |
| English     | 0.50 in | 64 lb         | English Mic         | 4601                | Ball      | 0.5 lb      | 4602          | 6.62       | 2.62  | 0.93 | 4.0   | 0.5  | —    | 0.69 | 6  | Inches      |
| English     | 0.50 in | 64 lb         | Metric Mic          | 4601                | Ball      | 0.5 lb      | 4602M         | 6.62       | 2.62  | 0.93 | 4.0   | 0.5  | —    | 0.69 | 6  |             |
| English     | 0.50 in | 95 lb         | English Mic         | 4701                | Ball      | 0.6 lb      | 4702          | 7.62       | 2.62  | 0.93 | 5.0   | 1.0  | —    | 1.19 | 6  |             |
| English     | 0.50 in | 95 lb         | Metric Mic          | 4701                | Ball      | 0.6 lb      | 4702M         | 7.62       | 2.62  | 0.93 | 5.0   | 1.0  | —    | 1.19 | 6  |             |
| English     | 0.50 in | 122 lb        | English Mic         | 4801                | Ball      | 0.8 lb      | 4802          | 8.62       | 2.62  | 0.93 | 6.0   | 0.5  | 1.0  | 1.69 | 10 |             |
| English     | 0.50 in | 122 lb        | Metric Mic          | 4801                | Ball      | 0.8 lb      | 4802M         | 8.62       | 2.62  | 0.93 | 6.0   | 0.5  | 1.0  | 1.69 | 10 |             |
| English     | 0.50 in | 128 lb        | English Mic         | CR4601              | C/R       | 1.1 lb      | CR4602        | 6.62       | 2.62  | 0.93 | 4.0   | 0.5  | —    | 0.69 | 6  |             |
| English     | 0.50 in | 128 lb        | Metric Mic          | CR4601              | C/R       | 1.1 lb      | CR4602M       | 6.62       | 2.62  | 0.93 | 4.0   | 0.5  | —    | 0.69 | 6  |             |
| English     | 0.50 in | 190 lb        | English Mic         | CR4701              | C/R       | 1.3 lb      | CR4702        | 7.62       | 2.62  | 0.93 | 5.0   | 1.0  | —    | 1.19 | 6  |             |
| English     | 0.50 in | 190 lb        | Metric Mic          | CR4701              | C/R       | 1.3 lb      | CR4702M       | 7.62       | 2.62  | 0.93 | 5.0   | 1.0  | —    | 1.19 | 6  |             |
| English     | 0.50 in | 248 lb        | English Mic         | CR4801              | C/R       | 1.5 lb      | CR4802        | 8.62       | 2.62  | 0.93 | 6.0   | 0.5  | 1.0  | 1.69 | 10 |             |
| English     | 0.50 in | 248 lb        | Metric Mic          | CR4801              | C/R       | 1.5 lb      | CR4802M       | 8.62       | 2.62  | 0.93 | 6.0   | 0.5  | 1.0  | 1.69 | 10 |             |
| English     | 0.75 in | 64 lb         | Fine Screw          | 4601                | Ball      | 0.5 lb      | 4603          | 6.50       | 2.50  | 0.88 | 4.0   | 0.5  | —    | 0.69 | 6  |             |
| English     | 0.75 in | 95 lb         | Fine Screw          | 4701                | Ball      | 0.6 lb      | 4703          | 7.50       | 2.50  | 0.88 | 5.0   | 1.0  | —    | 1.19 | 6  |             |
| English     | 0.75 in | 122 lb        | Fine Screw          | 4801                | Ball      | 0.8 lb      | 4803          | 8.50       | 2.50  | 0.88 | 6.0   | 0.5  | 1.0  | 1.69 | 10 |             |
| English     | 0.75 in | 128 lb        | Fine Screw          | CR4601              | C/R       | 1.1 lb      | CR4603        | 6.50       | 2.50  | 0.88 | 4.0   | 0.5  | —    | 0.69 | 6  |             |
| English     | 0.75 in | 190 lb        | Fine Screw          | CR4701              | C/R       | 1.3 lb      | CR4703        | 7.50       | 2.50  | 0.88 | 5.0   | 1.0  | —    | 1.19 | 6  |             |
| English     | 0.75 in | 248 lb        | Fine Screw          | CR4801              | C/R       | 1.5 lb      | CR4803        | 8.50       | 2.50  | 0.88 | 6.0   | 0.5  | 1.0  | 1.69 | 10 |             |
| English     | 1.00 in | 64 lb         | English Mic         | 4601                | Ball      | 0.5 lb      | 4604          | 8.28       | 4.28  | 1.18 | 4.0   | 0.5  | —    | 0.69 | 6  |             |
| English     | 1.00 in | 64 lb         | Metric Mic          | 4601                | Ball      | 0.5 lb      | 4604M         | 8.28       | 4.28  | 1.18 | 4.0   | 0.5  | —    | 0.69 | 6  |             |
| English     | 1.00 in | 64 lb         | Digital Mic         | 4601                | Ball      | 1.6 lb      | 4604-DM       | 10.0       | 6.0   | 1.18 | 4.0   | 0.5  | —    | 0.69 | 6  |             |
| English     | 1.00 in | 95 lb         | English Mic         | 4701                | Ball      | 0.6 lb      | 4704          | 9.28       | 4.28  | 1.18 | 5.0   | 1.0  | —    | 1.19 | 6  |             |
| English     | 1.00 in | 95 lb         | Metric Mic          | 4701                | Ball      | 0.6 lb      | 4704M         | 9.28       | 4.28  | 1.18 | 5.0   | 1.0  | —    | 1.19 | 6  |             |
| English     | 1.00 in | 95 lb         | Digital Mic         | 4701                | Ball      | 1.8 lb      | 4704-DM       | 11.0       | 6.0   | 1.18 | 5.0   | 1.0  | —    | 1.19 | 6  |             |
| English     | 1.00 in | 122 lb        | English Mic         | 4801                | Ball      | 0.8 lb      | 4804          | 10.28      | 4.28  | 1.18 | 6.0   | 0.5  | 1.0  | 1.69 | 10 |             |
| English     | 1.00 in | 122 lb        | Metric Mic          | 4801                | Ball      | 0.8 lb      | 4804M         | 10.28      | 4.28  | 1.18 | 6.0   | 0.5  | 1.0  | 1.69 | 10 |             |
| English     | 1.00 in | 122 lb        | Digital Mic         | 4801                | Ball      | 2.0 lb      | 4804-DM       | 12.0       | 6.0   | 1.18 | 6.0   | 0.5  | 1.0  | 1.69 | 10 |             |
| English     | 1.00 in | 128 lb        | English Mic         | CR4601              | C/R       | 1.1 lb      | CR4604        | 8.28       | 4.28  | 1.18 | 4.0   | 0.5  | —    | 0.69 | 6  |             |
| English     | 1.00 in | 128 lb        | Metric Mic          | CR4601              | C/R       | 1.1 lb      | CR4604M       | 8.28       | 4.28  | 1.18 | 4.0   | 0.5  | —    | 0.69 | 6  |             |
| English     | 1.00 in | 128 lb        | Digital Mic         | CR4601              | C/R       | 1.7 lb      | CR4604-DM     | 10.0       | 6.0   | 1.18 | 4.0   | 0.5  | —    | 0.69 | 6  |             |
| English     | 1.00 in | 190 lb        | English Mic         | CR4701              | C/R       | 1.3 lb      | CR4704        | 9.28       | 4.28  | 1.18 | 5.0   | 1.0  | —    | 1.19 | 6  |             |
| English     | 1.00 in | 190 lb        | Metric Mic          | CR4701              | C/R       | 1.3 lb      | CR4704M       | 9.28       | 4.28  | 1.18 | 5.0   | 1.0  | —    | 1.19 | 6  |             |
| English     | 1.00 in | 190 lb        | Digital Mic         | CR4701              | C/R       | 1.9 lb      | CR4704-DM     | 11.0       | 6.0   | 1.18 | 5.0   | 1.0  | —    | 1.19 | 6  |             |
| English     | 1.00 in | 248 lb        | English Mic         | CR4801              | C/R       | 1.5 lb      | CR4804        | 10.28      | 4.28  | 1.18 | 6.0   | 0.5  | 1.0  | 1.69 | 10 |             |
| English     | 1.00 in | 248 lb        | Metric Mic          | CR4801              | C/R       | 1.5 lb      | CR4804M       | 10.28      | 4.28  | 1.18 | 6.0   | 0.5  | 1.0  | 1.69 | 10 |             |
| English     | 1.00 in | 248 lb        | Digital Mic         | CR4801              | C/R       | 2.1 lb      | CR4804-DM     | 12.0       | 6.0   | 1.18 | 6.0   | 0.5  | 1.0  | 1.69 | 10 |             |
| Metric      | 13 mm   | 29 kg         | Metric Mic          | M4601               | Ball      | 0.5 kg      | M4602M        | 168.1      | 66.5  | 23.6 | 101.6 | 12.5 | —    | 12.5 | 6  | Millimeters |
| Metric      | 13 mm   | 43 kg         | Metric Mic          | M4701               | Ball      | 0.6 kg      | M4702M        | 193.5      | 66.5  | 23.6 | 127.0 | 25.0 | —    | 25.0 | 6  |             |
| Metric      | 13 mm   | 55 kg         | Metric Mic          | M4801               | Ball      | 0.7 kg      | M4802M        | 218.9      | 66.5  | 23.6 | 124.4 | 12.5 | 25.0 | 12.5 | 10 |             |
| Metric      | 25 mm   | 29 kg         | Metric Mic          | M4601               | Ball      | 0.5 kg      | M4604M        | 210.3      | 108.7 | 29.9 | 101.6 | 12.5 | —    | 12.5 | 6  |             |
| Metric      | 25 mm   | 29 kg         | Digital Mic         | M4601               | Ball      | 0.7 kg      | M4604-DM      | 253.9      | 124.3 | 29.9 | 101.6 | 12.5 | —    | 12.5 | 6  |             |
| Metric      | 25 mm   | 43 kg         | Metric Mic          | M4701               | Ball      | 0.6 kg      | M4704M        | 235.7      | 108.7 | 29.9 | 127.0 | 25.0 | —    | 25.0 | 6  |             |
| Metric      | 25 mm   | 43 kg         | Digital Mic         | M4701               | Ball      | 0.8 kg      | M4704-DM      | 279.3      | 124.3 | 29.9 | 127.0 | 25.0 | —    | 25.0 | 6  |             |
| Metric      | 25 mm   | 55 kg         | Metric Mic          | M4801               | Ball      | 0.7 kg      | M4804M        | 261.1      | 108.7 | 29.9 | 124.4 | 12.5 | 25.0 | 12.5 | 10 |             |
| Metric      | 25 mm   | 55 kg         | Digital Mic         | M4801               | Ball      | 0.9 kg      | M4804-DM      | 304.7      | 124.3 | 29.9 | 124.4 | 12.5 | 25.0 | 12.5 | 10 |             |

\*Position lock is standard on all models.

## 4900 Series (6.0 inches wide) Micrometer Driven

| Specifications            | English                            | Metric                          |
|---------------------------|------------------------------------|---------------------------------|
| Travel:                   | 1.0 - 2.0 in                       | 25 - 50 mm                      |
| Load Capacity:*           |                                    |                                 |
| Normal                    | 122 lbs*                           | 45 kg*                          |
| Thrust (Standard Thimble) |                                    |                                 |
| $T_a$                     | 30 lbs                             | 22.7 kg                         |
| $T_b$                     | 3 lbs                              | 1.36 kg                         |
| Thrust (Large Thimble)    |                                    |                                 |
| $T_a$                     | 50 lbs                             | 22.7 kg                         |
| $T_b$                     | 3 lbs                              | 1.36 kg                         |
| Straightline Accuracy     | 0.00008 in<br>(per inch of travel) | 2 $\mu$ m<br>(per 25 mm travel) |
| Resolution/Graduations:   |                                    |                                 |
| Standard Thimble          | 0.001 in                           | 0.01 mm                         |
| Large Thimble             | 0.0001 in                          | 0.002 mm                        |

\* Refer to table below for actual value by model.



Note: Values shown in parentheses are actual metric dimensions for metric models (not conversions).

### Selection Guide

| Description |         |                  |             |                 |                        |              |                | Model<br>Number* | Dimensions |       |        |
|-------------|---------|------------------|-------------|-----------------|------------------------|--------------|----------------|------------------|------------|-------|--------|
| Type        | Travel  | Load<br>Capacity | Micrometer  |                 | Linear Slide<br>(Ref.) | Bearing Type | Unit<br>Weight |                  | A          | B     |        |
|             |         |                  | Type        | Thimble<br>Size |                        |              |                |                  |            |       |        |
| English     | 1.00 in | 100 lb           | English Mic | Large           | 4900-04                | Ball         | 7.9 lb         | 4910             | 10.40      | 4.40  | Inches |
| English     | 1.00 in | 100 lb           | English Mic | Standard        | 4900-04                | Ball         | 7.0 lb         | 4914             | 9.62       | 3.62  |        |
| English     | 1.00 in | 100 lb           | Metric Mic  | Large           | 4900-04                | Ball         | 7.9 lb         | 4912             | 10.40      | 4.40  |        |
| English     | 1.00 in | 100 lb           | Metric Mic  | Standard        | 4900-04                | Ball         | 7.0 lb         | 4916             | 9.62       | 3.62  |        |
| English     | 1.00 in | 122 lb           | English Mic | Large           | CR4900-04              | C/R          | 7.9 lb         | CR4910           | 10.40      | 4.40  |        |
| English     | 1.00 in | 122 lb           | English Mic | Standard        | CR4900-04              | C/R          | 7.0 lb         | CR4914           | 9.62       | 3.62  |        |
| English     | 1.00 in | 122 lb           | Metric Mic  | Large           | CR4900-04              | C/R          | 7.9 lb         | CR4912           | 10.40      | 4.40  |        |
| English     | 1.00 in | 122 lb           | Metric Mic  | Standard        | CR4900-04              | C/R          | 7.0 lb         | CR4916           | 9.62       | 3.62  |        |
| English     | 2.00 in | 100 lb           | English Mic | Large           | 4900-04                | Ball         | 7.9 lb         | 4911             | 11.88      | 5.88  |        |
| English     | 2.00 in | 100 lb           | English Mic | Standard        | 4900-04                | Ball         | 7.0 lb         | 4915             | 11.12      | 5.12  |        |
| English     | 2.00 in | 100 lb           | Metric Mic  | Large           | 4900-04                | Ball         | 8.2 lb         | 4913             | 11.88      | 5.88  |        |
| English     | 2.00 in | 100 lb           | Metric Mic  | Standard        | 4900-04                | Ball         | 7.1 lb         | 4917             | 11.12      | 5.12  |        |
| English     | 2.00 in | 122 lb           | English Mic | Large           | CR4900-04              | C/R          | 8.2 lb         | CR4911           | 11.88      | 5.88  |        |
| English     | 2.00 in | 122 lb           | English Mic | Standard        | CR4900-04              | C/R          | 7.1 lb         | CR4915           | 11.12      | 5.12  |        |
| English     | 2.00 in | 122 lb           | Metric Mic  | Large           | CR4900-04              | C/R          | 8.2 lb         | CR4913           | 11.88      | 5.88  |        |
| English     | 2.00 in | 122 lb           | Metric Mic  | Standard        | CR4900-04              | C/R          | 7.1 lb         | CR4917           | 11.12      | 5.12  |        |
| Metric      | 25 mm   | 45 kg            | Metric Mic  | Large           | M4900-04               | Ball         | 7.9 lb         | M4912            | 264.1      | 111.7 | mm     |
| Metric      | 50 mm   | 45 kg            | Metric Mic  | Large           | M4900-04               | Ball         | 8.2 lb         | M4913            | 301.4      | 149   |        |

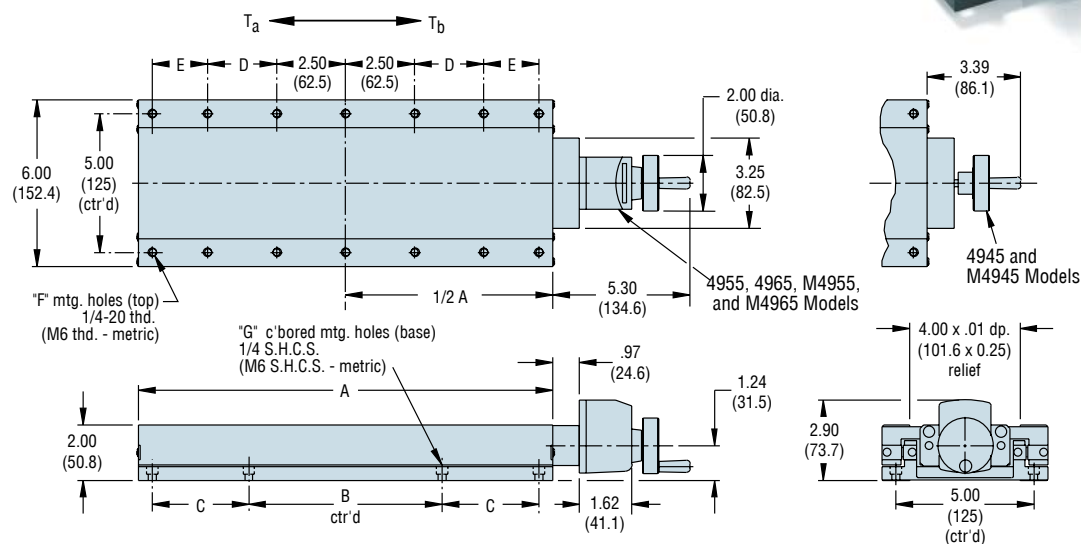
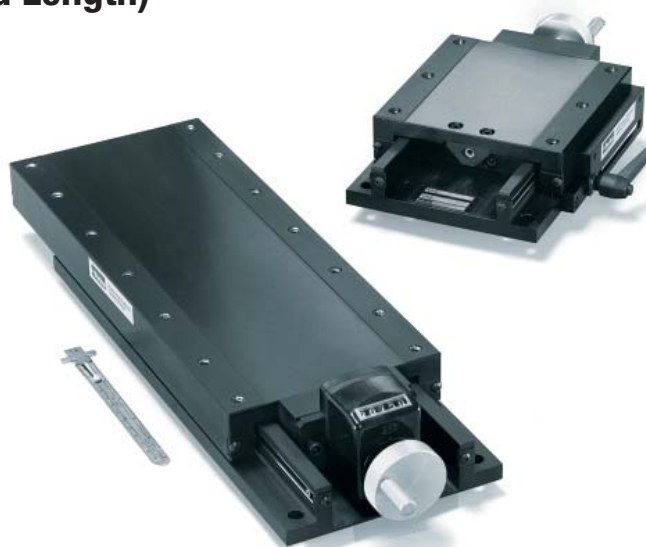
\*For the optional position lock, add "-L" to the desired part number.



## 4900 Series (6.0 inches wide – Extended Length) Leadscrew Driven

| Specifications        | English                            | Metric                          |
|-----------------------|------------------------------------|---------------------------------|
| Travel:               | 4.0 - 12.0 in                      | 100 - 300 mm                    |
| Load Capacity:*       |                                    |                                 |
| Normal                | 280 lbs                            | 127.3 kg                        |
| Thrust                |                                    |                                 |
| $T_a$                 | 30 lbs                             | 13.6 kg                         |
| $T_b$                 | 30 lbs                             | 13.6 kg                         |
| Straightline Accuracy | 0.00008 in<br>(per inch of travel) | 2 $\mu$ m<br>(per 25 mm travel) |
| Readout Graduations   | 0.001 in                           | 0.01 mm                         |

\* Refer to table below for actual value by model.



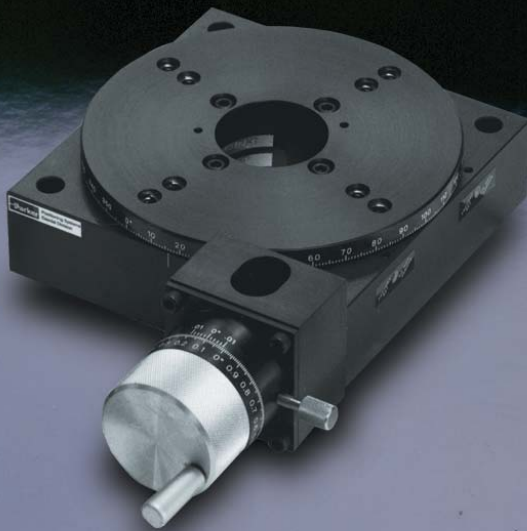
Note: Values shown in parentheses are actual metric dimensions for metric models (not conversions).

### Selection Guide

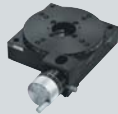
| Description |         |               |              |           |          | Model Number* |                 |           | Dimensions |       |       |       |      |    |   |             |
|-------------|---------|---------------|--------------|-----------|----------|---------------|-----------------|-----------|------------|-------|-------|-------|------|----|---|-------------|
| Type        | Travel  | Load Capacity | Slide (Ref.) | Brg. Type | Unit Wt. | None          | Readout English | Metric    | A          | B     | C     | D     | E    | F  | G |             |
| English     | 4.0 in  | 100 lb        | 4900-04      | Ball      | 4.0 lb   | 4945-04       | 4955-04         | 4965-04   | 6.0        | 5.0   | —     | —     | —    | 6  | 4 | Inches      |
| English     | 4.0 in  | 200 lb        | CR4900-04    | C/R       | 4.0 lb   | CR4945-04     | CR4955-04       | CR4965-04 | 6.0        | 5.0   | —     | —     | —    | 6  | 4 |             |
| English     | 6.0 in  | 100 lb        | 4900-06      | Ball      | 6.0 lb   | 4945-06       | 4955-06         | 4965-06   | 9.0        | 5.0   | 1.5   | 1.5   | —    | 10 | 8 |             |
| English     | 6.0 in  | 220 lb        | CR4900-06    | C/R       | 6.0 lb   | CR4945-06     | CR4955-06       | CR4965-06 | 9.0        | 5.0   | 1.5   | 1.5   | —    | 10 | 8 |             |
| English     | 8.0 in  | 100 lb        | 4900-08      | Ball      | 8.0 lb   | 4945-08       | 4955-08         | 4965-08   | 12.0       | 5.0   | 3.0   | 2.5   | —    | 10 | 8 |             |
| English     | 8.0 in  | 240 lb        | CR4900-08    | C/R       | 8.0 lb   | CR4945-08     | CR4955-08       | CR4965-08 | 12.0       | 5.0   | 3.0   | 2.5   | —    | 10 | 8 |             |
| English     | 10.0 in | 100 lb        | 4900-10      | Ball      | 10.0 lb  | 4945-10       | 4955-10         | 4965-10   | 15.0       | 6.0   | 4.0   | 2.5   | 2.0  | 14 | 8 |             |
| English     | 10.0 in | 260 lb        | CR4900-10    | C/R       | 10.0 lb  | CR4945-10     | CR4955-10       | CR4965-10 | 15.0       | 6.0   | 4.0   | 2.5   | 2.0  | 14 | 8 |             |
| English     | 12.0 in | 122 lb        | 4900-12      | Ball      | 12.0 lb  | 4945-12       | 4955-12         | 4965-12   | 18.0       | 7.0   | 5.0   | 5.0   | 1.0  | 14 | 8 |             |
| English     | 12.0 in | 280 lb        | CR4900-12    | C/R       | 12.0 lb  | CR4945-12     | CR4955-12       | CR4965-12 | 18.0       | 7.0   | 5.0   | 5.0   | 1.0  | 14 | 8 |             |
| Metric      | 100 mm  | 45 kg         | M4900-04     | Ball      | 1.8 kg   | M4945-04      | M4955-04        | M4965-04  | 124.4      | 125.0 | —     | —     | —    | 6  | 4 | Millimeters |
| Metric      | 122 mm  | 45 kg         | M4900-06     | Ball      | 2.7 kg   | M4945-06      | —               | M4965-06  | 228.6      | 125.0 | 37.5  | 37.5  | —    | 10 | 8 |             |
| Metric      | 200 mm  | 45 kg         | M4900-08     | Ball      | 3.6 kg   | M4945-08      | —               | M4965-08  | 304.8      | 125.0 | 75.0  | 62.5  | —    | 10 | 8 |             |
| Metric      | 250 mm  | 45 kg         | M4900-10     | Ball      | 4.5 kg   | M4945-10      | —               | M4965-10  | 381.0      | 122.0 | 100.0 | 62.5  | 50.0 | 14 | 8 |             |
| Metric      | 300 mm  | 45 kg         | M4900-12     | Ball      | 5.4 kg   | M4945-12      | —               | M4965-12  | 457.2      | 175.0 | 125.0 | 125.0 | 25.0 | 14 | 8 |             |

\*For the optional position lock, add "-L" to the desired part number.

# Rotary Positioning Stages: Manual Driven



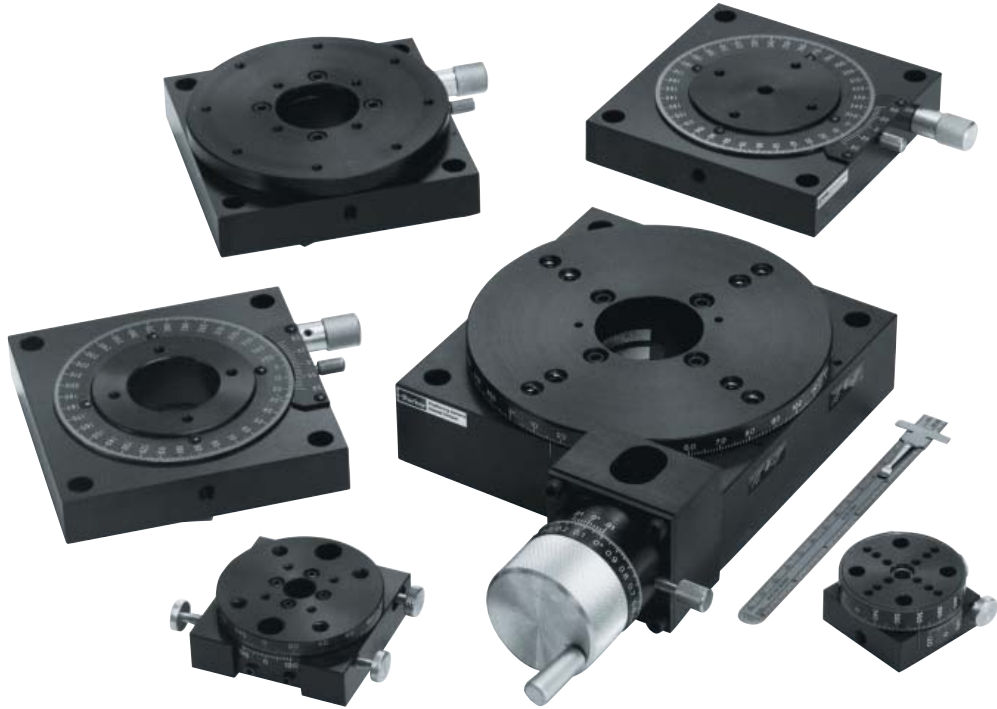
Parker's precision rotary stages are used whenever controlled rotation or precise angular positioning are needed



# Rotary Positioning Stages: Overview

## Features

- Aluminum/steel construction
- Protective black anodize finish
- Low-friction rotary adjustment
- Precise/accurate movement
- Trouble-free operation



Parker manual rotary stages offer controlled rotation with precise angular positioning. Primary components include a stationary base, a main bearing, a drive mechanism and a rotary top (payload platform).

The main bearing, which is housed in the base, is a high-precision, low-friction ball bearing that supports the rotating top. The top is driven by the drive mechanism, which controls the rate of rotation and positional accuracy of the top.

## Drive Mechanisms

### Tangent Arm Drive

The drive mechanism for model 2520, 2525, and 4575 stages is the tangent arm drive. With this drive, angular rotation is controlled by three control knobs. The release knob disengages the shaft from the drive, freeing the table to be rotated continuously by hand to any desired location. The release knob when tightened

will re-engage the drive mechanism and transfer control to an adjustment knob which, when rotated, produces precise angular positioning of the shaft and table top. The locking knob can then be used to positively lock the table at the desired setting.

### Precision Worm Gear Drive

A precision worm gear drive is employed as the drive mechanism for the other Parker stages. A worm wheel (gear), which is attached to the table shaft, meshes with the worm drive, whose shaft extends out of the housing. Controlled rotation of the worm shaft creates precise angular rotation of the worm wheel and table shaft. The worm gear and shaft are matched sets and are preloaded to remove backlash. This type of drive provides high resolution (180:1) and continuous angular positioning over a full 360, degree range.

## Selection Guide

| Model Series                 | Table Diameter                  | Drive Mechanism   | Normal Load                 | Mounting          | Page       |
|------------------------------|---------------------------------|-------------------|-----------------------------|-------------------|------------|
| 2500<br>M2500                | 1.88-2.62 in<br>47.7-66.5 mm    | Tangent Arm Drive | 10 lbs<br>4.5 kgs           | English<br>Metric | 128<br>128 |
| 4575*<br>M4575*              | 2.38 in<br>60.5 mm              | Tangent Arm Drive | 5 lbs<br>2.25 kgs           | English<br>Metric | 131<br>131 |
| 10000-20000<br>M10000-M20000 | 2.75-4.75 in<br>69.8-305.0 mm   | Worm Gear Drive   | 50 lbs<br>22.0 kgs          | English<br>Metric | 129<br>129 |
| 30000<br>M30000              | 5.00-12.00 in<br>127.0-305.0 mm | Worm Gear Drive   | 25-200 lbs<br>11.5-90.0 kgs | English<br>Metric | 130<br>130 |

\*Models 4575 and M4575 are combination rotary and linear stages which also provide 0.50 in (12.7 mm) of linear travel.

## 2500 Series Tangent Arm Drive Miniature Stage

Series 2500 rotary stages are tangential drive units that offer low-friction rotary positioning, quick manual table top rotation, precise angular adjustment at any selected position, and positive locking. These miniature units have a preloaded angular contact ball bearing system that provides smooth, continuous rotary movement.

Models 2525/M2525 and 2535/M2535 include a dial and vernier for direct position readout (readable to six arc-minutes).

These stages can be mounted in a horizontal or vertical position, and can be combined with compatible linear stages for linear-rotary applications.

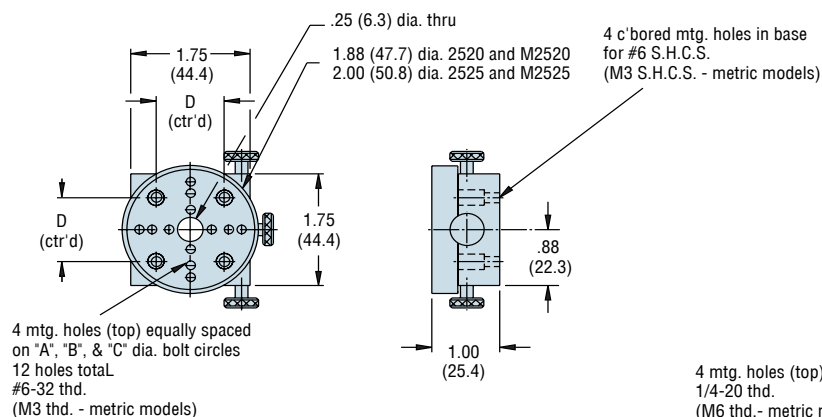


| Specifications | English                                       | Metric       |
|----------------|-----------------------------------------------|--------------|
| Load Capacity: |                                               |              |
| Normal         | 10 lb                                         | 4.5 kg       |
| Moment         | See note.                                     | See note.    |
| Range          | 360°(free rotation)<br>10° (fine positioning) |              |
| Weight         | 1.0 - 1.8 lbs                                 | 0.5 - 0.8 kg |
| Resolution     | 6 arc-min (vernier readout)                   |              |

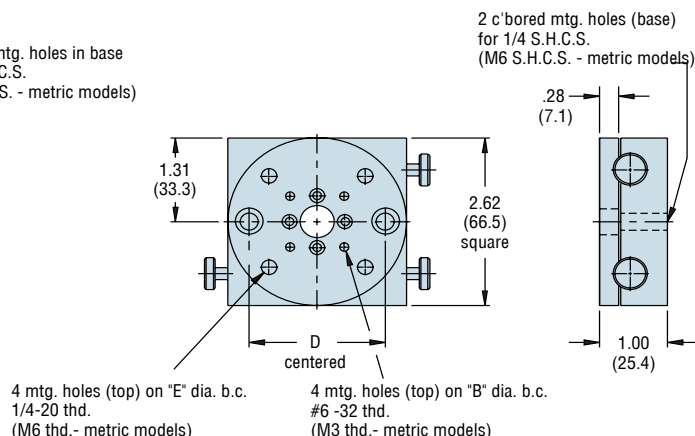
NOTE: For moment loads refer to [www.parkermotion.com](http://www.parkermotion.com)



### Dimensions inches (mm)<sup>†</sup>



Models 2520, 2525 and M2520, M2525



Models 2530, 2535 and M2530, M2535

<sup>†</sup> Note: Values shown in parentheses are actual metric dimensions for metric models (not conversions).

### Selection Guide

|         | Model | Diameter | Vernier Readout | Thru Hole Diameter | Weight | A        | B        | C       | D       | E       |
|---------|-------|----------|-----------------|--------------------|--------|----------|----------|---------|---------|---------|
| English | 2520  | 1.88 in  | No              | 0.25 in            | 1.0 lb | 0.625 in | 1.125 in | 1.5 in  | 1.0 in  | —       |
|         | 2525  | 2.00 in  | Yes             | 0.25 in            | 1.0 lb | 0.625 in | 1.125 in | 1.5 in  | 1.0 in  | —       |
|         | 2530  | 2.62 in  | No              | 0.50 in            | 1.8 lb | —        | 1.125 in | —       | 2.0 in  | 2.0 in  |
|         | 2535  | 2.62 in  | Yes             | 0.50 in            | 1.8 lb | —        | 1.125 in | —       | 2.0 in  | 2.0 in  |
| Metric  | M2520 | 47.7 mm  | No              | 6.3 mm             | 0.5 kg | 15.0 mm  | 25.0 mm  | 35.0 mm | 25.0 mm | —       |
|         | M2525 | 50.8 mm  | Yes             | 6.3 mm             | 0.5 kg | 15.0 mm  | 25.0 mm  | 35.0 mm | 25.0 mm | —       |
|         | M2530 | 66.5 mm  | No              | 12.7 mm            | 0.8 kg | —        | 25.0 mm  | —       | 50.0 mm | 50.0 mm |
|         | M2535 | 66.5 mm  | Yes             | 12.7 mm            | 0.8 kg | —        | 25.0 mm  | —       | 50.0 mm | 50.0 mm |



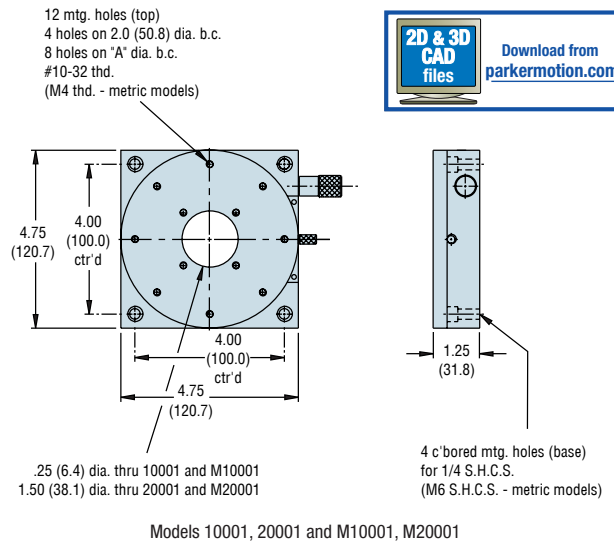
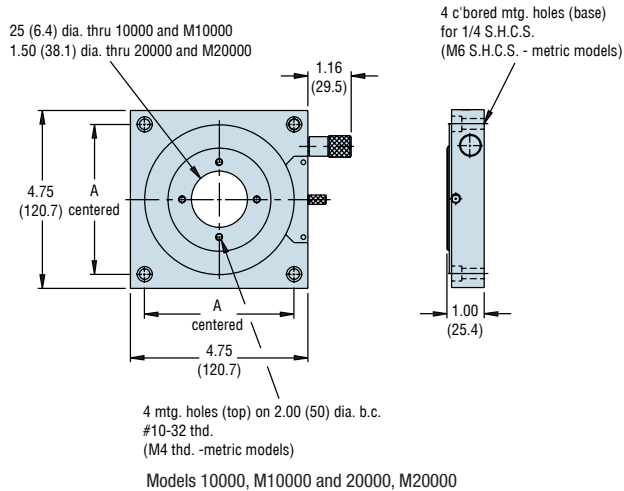
# 10000/20000 Low-Profile Stage – Worm Gear Drive

The 10000/M10000 and 20000/M20000 series rotary position- ing stages provide smooth, continuous adjustment over a full 360° travel range. The drive mechanism features a worm gear drive. A position locking knob allows the stage to be positively locked in place. The 10000 and 20000 models offer a 2.75 inch (69,8 mm) diameter stage with a calibrated dial and vernier, readable to 6.00 arc minutes. The 10001 and 20001 models, which do not include the vernier readout, offer a larger 4.75 inch (120.6 mm) diameter mounting surface. These versatile low-cost units can be combined with linear positioning stages having 4.00 inch (English) or 100.0 mm (Metric) mounting hole centers for multi-axis polar set-ups.



| Specifications    | English          | Metric |
|-------------------|------------------|--------|
| Load Capacity:    |                  |        |
| Normal            | 50 lb            | 22 kg  |
| Moment            | Consult factory. |        |
| Rotational Range: | 360°continuous   |        |
| Drive Ratio       | 120:1            | 120:1  |
| Weight            | 2.0 lbs          | 1.0 kg |
| Vernier:          | 6 arc-min        |        |

## Dimensions inches (mm)†



## Selection Guide

|         | Model  | Diameter | Vernier Readout | Thru Hole Diameter | A        |
|---------|--------|----------|-----------------|--------------------|----------|
| English | 10000  | 2.75 in  | Yes             | 0.25 in            | —        |
|         | 20000  | 2.75 in  | Yes             | 1.50 in            | —        |
|         | 10001  | 4.75 in  | No              | 0.25 in            | 4.0 in   |
|         | 20001  | 4.75 in  | No              | 1.50 in            | 4.0 in   |
| Metric  | M10000 | 69.8 mm  | Yes             | 6.3 mm             | —        |
|         | M20000 | 69.8 mm  | Yes             | 38.1 mm            | —        |
|         | M10001 | 120.6 mm | No              | 6.3 mm             | 100.0 mm |
|         | M20001 | 120.6 mm | No              | 38.1 mm            | 100.0 mm |

† Note: Values shown in parentheses are actual metric dimensions for metric models (not conversions).

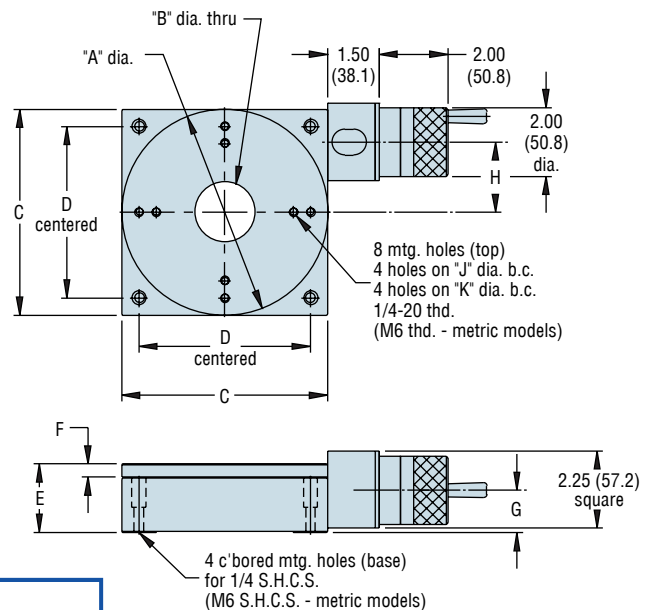
## 30000 Worm Gear Drive Heavy Load-Carrying Stage

Parker rotary indexing tables provide accurate rotational positioning with a heavy load-carrying capability. Tables feature an angular contact ball-bearing system, which is stiffly preloaded to produce precise rotation of the table top. The drive mechanism is a precision worm gear drive that provides precise rotational positioning. An angular readout – graduated in degrees – is provided around the circumference of the table top, while a finer position readout dial, found on the control knob, reads directly in 0.01° increments, with the vernier providing even higher (0.002°) resolution. A thumb-screw lock is included to lock the table at the desired setting. For customer convenience, threaded mounting holes with locking threaded inserts are provided as well as a clearance hole through the center of the table to allow easy access from below. If desired, the table top can easily be removed to permit custom modification. These units can be mounted in any orientation and are compatible with Parker linear tables.



| Specifications      | English         | Metric       |
|---------------------|-----------------|--------------|
| Load Capacity:      |                 |              |
| Normal              | 25 - 200 lb     | 11.5 - 90 kg |
| Moment              | See note        | See note     |
| Runout:             |                 |              |
| Standard Grade      | 0.003 in        | 75 µm        |
| Precision Grade     | 0.001 in        | 25 µm        |
| Concentricity:      |                 |              |
| Standard Grade      | 0.005 in        | 1.3 µm       |
| Precision Grade     | 0.001 in        | 0.3 µm       |
| Rotational Range:   | 360° continuous |              |
| Vernier Resolution: | 0.002°½         |              |

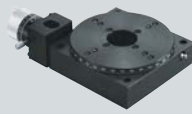
NOTE: For moment loads refer to [www.parkermotion.com](http://www.parkermotion.com)



Note: Values shown in parentheses are actual metric dimensions for metric models (not conversions).

### Selection Guide

|         | Table Diameter | Normal Load | Output Torque | Weight   | Model Number Std. Grd. | Model Number Prec. Grd. | A     | B    | C     | D     | E    | F    | G    | H    | J     | K     |
|---------|----------------|-------------|---------------|----------|------------------------|-------------------------|-------|------|-------|-------|------|------|------|------|-------|-------|
| English | 5.00 in        | 25 lbs      | 25 in-lb      | 6.0 lbs  | 30005-S                | 30005-P                 | 5.00  | 1.00 | 5.00  | 4.00  | 1.81 | 0.31 | 1.11 | 1.66 | 3.00  | 4.00  |
|         | 6.00 in        | 122 lbs     | 40 in-lb      | 8.0 lbs  | 30006-S                | 30006-P                 | 6.00  | 1.75 | 6.00  | 5.00  | 2.00 | 0.38 | 1.23 | 2.04 | 4.00  | 5.00  |
|         | 8.00 in        | 122 lbs     | 40 in-lb      | 15.0 lbs | 30008-S                | 30008-P                 | 8.00  | 1.75 | 8.00  | 6.00  | 2.50 | 0.50 | 1.57 | 2.04 | 4.00  | 6.00  |
|         | 10.00 in       | 200 lbs     | 190 in-lb     | 27.0 lbs | 30010-S                | 30010-P                 | 10.00 | 2.00 | 10.00 | 9.00  | 3.00 | 0.75 | 1.81 | 3.03 | 6.00  | 8.00  |
|         | 12.00 in       | 200 lbs     | 190 in-lb     | 31.0 lbs | 30012-S                | 30012-P                 | 12.00 | 2.00 | 10.00 | 9.00  | 3.00 | 0.75 | 1.81 | 3.03 | 8.00  | 10.00 |
| Metric  | 127.0 mm       | 11.5 kg     | 2.8 Nm        | 2.7 kg   | M30005-S               | M30005-P                | 127.0 | 25.4 | 127.0 | 100.0 | 46.0 | 7.9  | 28.2 | 42.2 | 75.0  | 100.0 |
|         | 124.0 mm       | 68.0 kg     | 4.5 Nm        | 3.6 kg   | M30006-S               | M30006-P                | 124.4 | 44.5 | 124.4 | 125.0 | 50.8 | 9.7  | 31.2 | 51.8 | 100.0 | 125.0 |
|         | 203.0 mm       | 68.0 kg     | 4.5 Nm        | 6.8 kg   | M30008-S               | M30008-P                | 203.2 | 44.5 | 203.2 | 175.0 | 63.5 | 12.7 | 39.9 | 51.8 | 100.0 | 175.0 |
|         | 254.0 mm       | 90.0 kg     | 21.5 Nm       | 12.2 kg  | M30010-S               | M30010-P                | 254.0 | 50.8 | 254.0 | 225.0 | 76.2 | 19.1 | 46.0 | 77.0 | 122.0 | 200.0 |
|         | 305.0 mm       | 90.0 kg     | 21.5 Nm       | 14.1 kg  | M30012-S               | M30012-P                | 304.8 | 50.8 | 254.0 | 225.0 | 76.0 | 19.1 | 46.0 | 77.0 | 200.0 | 250.0 |



## Model 4575/M4575 Combination Linear/Rotary Stage

The model 4575 combines both linear and rotary motion into one compact unit. It is designed for applications where space restrictions do not allow stacking a linear stage and a rotary stage. The mounting surface is 2.44" diameter with a 0.75" diameter thru hole, with (4) #10-32 threaded mounting holes on 2.00" centers.

Linear travel is provided by a fine-resolution micrometer. Rotary travel is provided by a tangent arm drive offering both a coarse and a fine adjustment. This feature allows quick rotation over a continuous 360° range, plus precise angular adjustment at any selected position.

| Specifications        | English                                        | Metric    |
|-----------------------|------------------------------------------------|-----------|
| Load Capacity:        |                                                |           |
| Normal                | 5 lb                                           | 2.25 kg   |
| Moment                | See note.                                      | See note. |
| Rotational range      | 360° (free rotation)<br>10° (fine positioning) |           |
| Linear range          | 0.50 in                                        | 12.7 mm   |
| Straightline accuracy | 0.00008 in                                     | 2.5 µm    |
| Micrometer gradations | 0.001 in                                       | 0.01 mm   |
| Weight                | 1.0 lb                                         | 0.5 kg    |

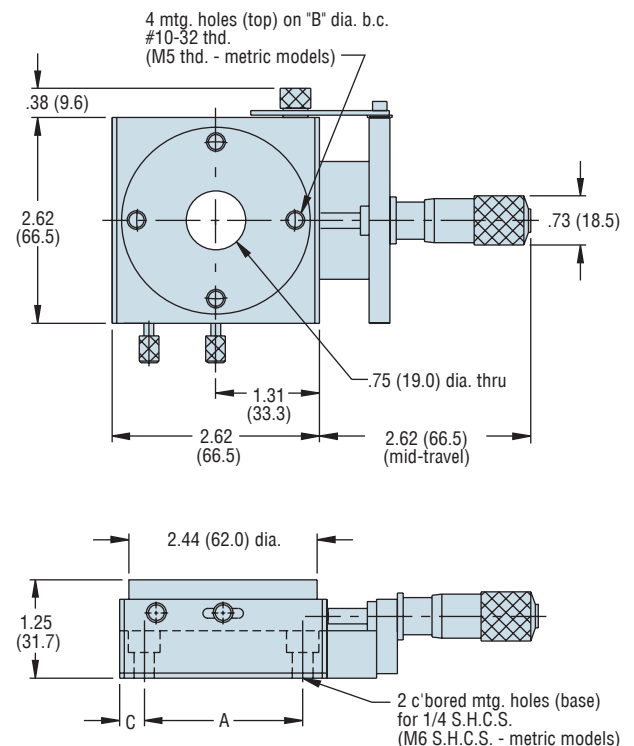
NOTE: For moment loads refer to [www.parkermotion.com](http://www.parkermotion.com)

### Selection Guide

|         | Model No. | A      | B      | C       |
|---------|-----------|--------|--------|---------|
| English | 4575      | 2.0 in | 2.0 in | 0.31 in |
| Metric  | M4575     | 50 mm  | 50 mm  | 8.3 mm  |



### Dimensions inches (mm)<sup>†</sup>



<sup>†</sup> Note: Values shown in parentheses are actual metric dimensions for metric models (not conversions).

# Engineered Precision Motion Systems



- Development collaboration
- Project management process
- Applications
  - Wafer metrology
  - Wafer inspection
  - Genomic - assaying
  - Flat panel inspection
  - Solar panel scribing
  - Semiconductor lead inspection



# Motion System Development

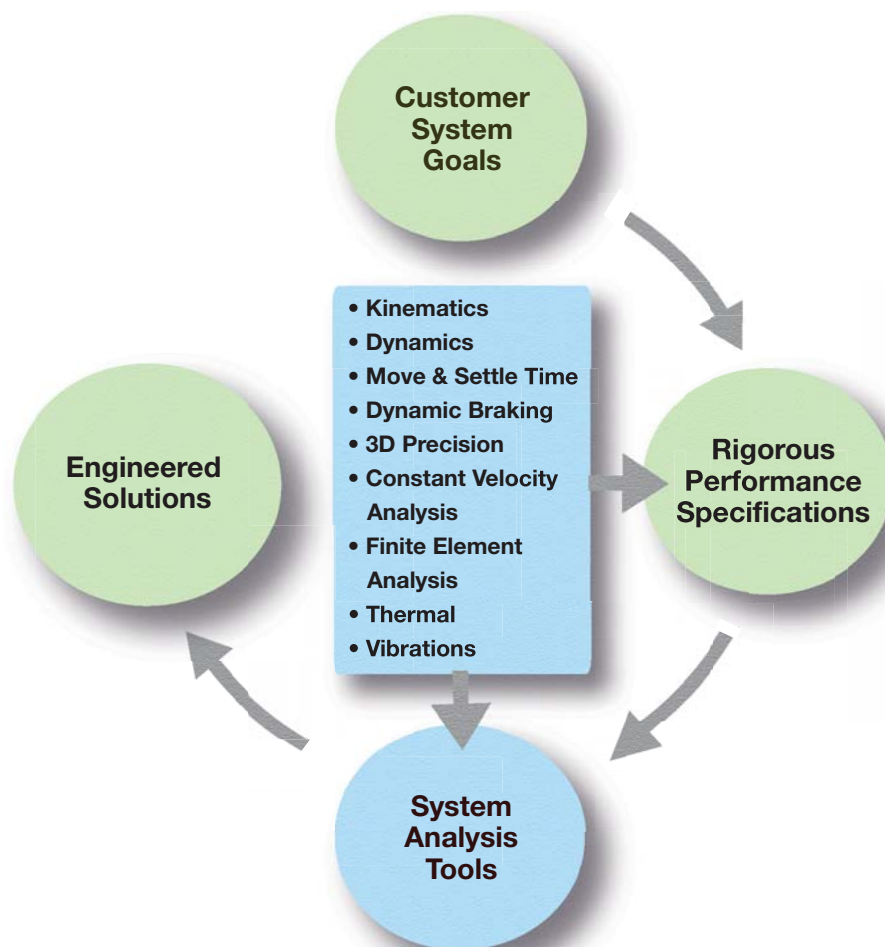
OEMs and manufacturers look to Parker because they know our extensive motion system design experience, systematic project management process, and global infrastructure ensure their needs are met.

Through years of motion system design and manufacturing, we have developed a collaborative development cycle and systematic six-step project management process that lead the motion industry.

Since our technology enables our customer's technology, we build strategic partnerships and strictly maintain confidentiality with our customers.

Parker's Engineered Solutions incorporate air-bearing, linear motor, and pneumatic technology with composite or conventional materials to create a total solution.

## Collaborative Development Cycle



# Parker's Six-Step Project Management Process

Parker recognizes the critical value of bringing your technology to market quickly, and our systematic approach allows our engineering team to maintain a strict timeline to develop and execute your project.

This six-step process includes:



### 1. Understanding Your Needs

Based on a review of your goals, we help develop a rigorous definition of system requirements.



### 4. Project Management

A project manager assigned to your project uses a secure, web-based tool to manage progress and keep everyone in the loop.



### 2. System Analysis

Proprietary software analyzes the proposed system value and optimal component sizing.



### 5. Acceptance Test Procedure

This mutually agreed upon document outlines the procedures, tools and methods used to verify that all project performances meet desired specifications.



### 3. Solution Proposal

We document the system requirements, cost effectiveness of options, proposed system design and analysis, price quotation and delivery schedule.



### 6. After-Sales Support

Includes: an engineer on site during delivery, machine inspection, training, maintenance and 24/7 support.



## Road map for optimal positioning solutions

### Positioning System Performance Requirements

#### STATIC

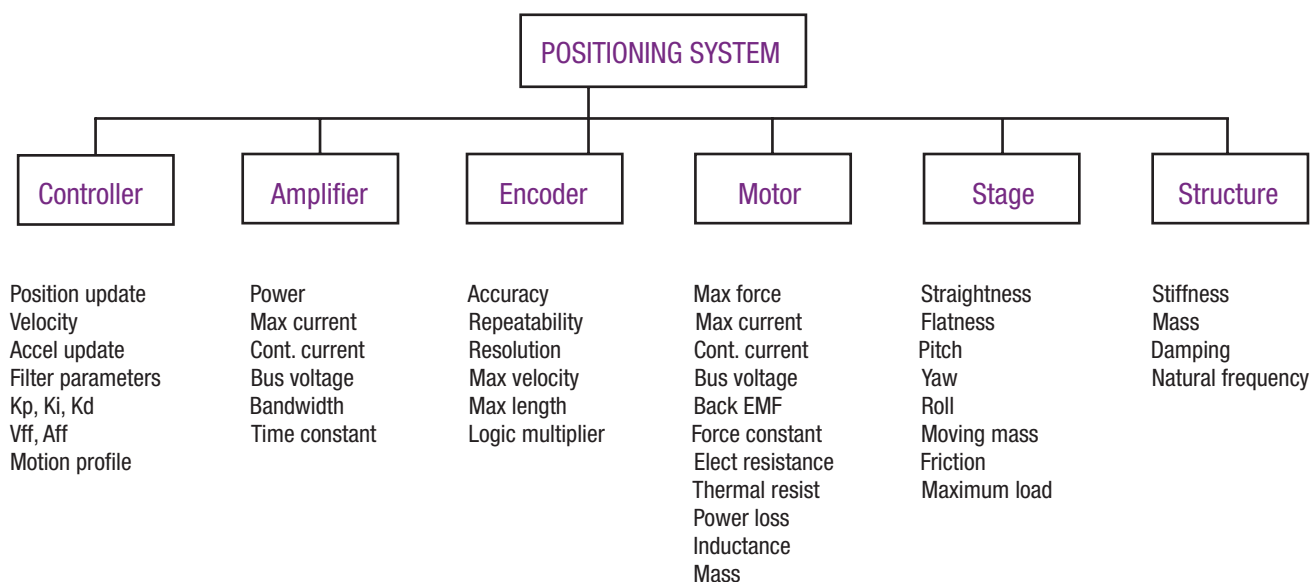
Accuracy  
Repeatability  
Resolution  
Max load  
Size

#### SERVO

Closed loop bandwidth  
Settling-time  
Constant velocity

#### DYNAMIC

Max travel  
Max velocity  
Max acceleration  
Step size  
Dwell  
Cycle time jitter



### Motion Control Component Parameters

#### System Analysis Tools

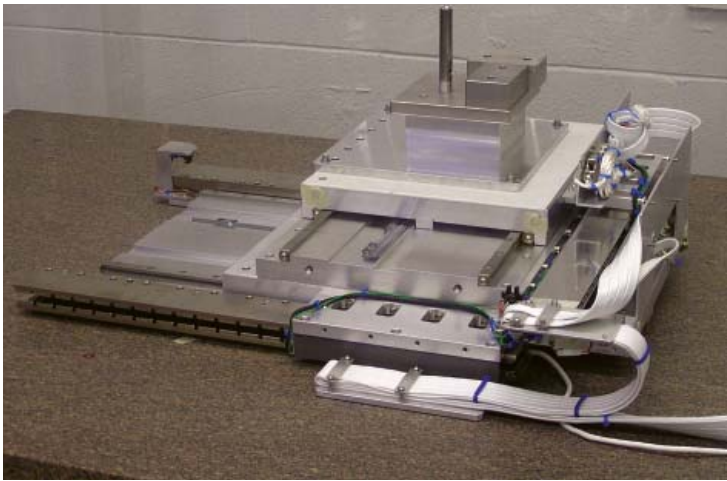
- Kinematics
- Dynamics
- Move & settle
- Dynamic braking
- 3-D precision
- Constant velocity
- Flying sheer
- Strength FEA
- Thermal
- Vibrations

#### Automatic Optimal Stage Sizing Tools

- Comprehensive Data Base of Stage Test Data
- Configuration Selection
- XYZ 5-step Motion Profile Optimization
- 3-D Precision Optimization
- 3-D Force Optimization
- Cost / Performance Optimization

### Semiconductor - E-Beam Inspection

- Modified Ultra 400 x 300 mm
- +/- 0.5 micron repeatability +/- 3-micron accuracy
- +/- 2 micron flatness / straightness
- +/- 5 arc sec pitch +/- 2 arc sec yaw
- Vacuum  $10^{-7}$  Torr, 100 mGauss, 90 Kg moving weight
- 3 U amplifier box, and PCI motion controller



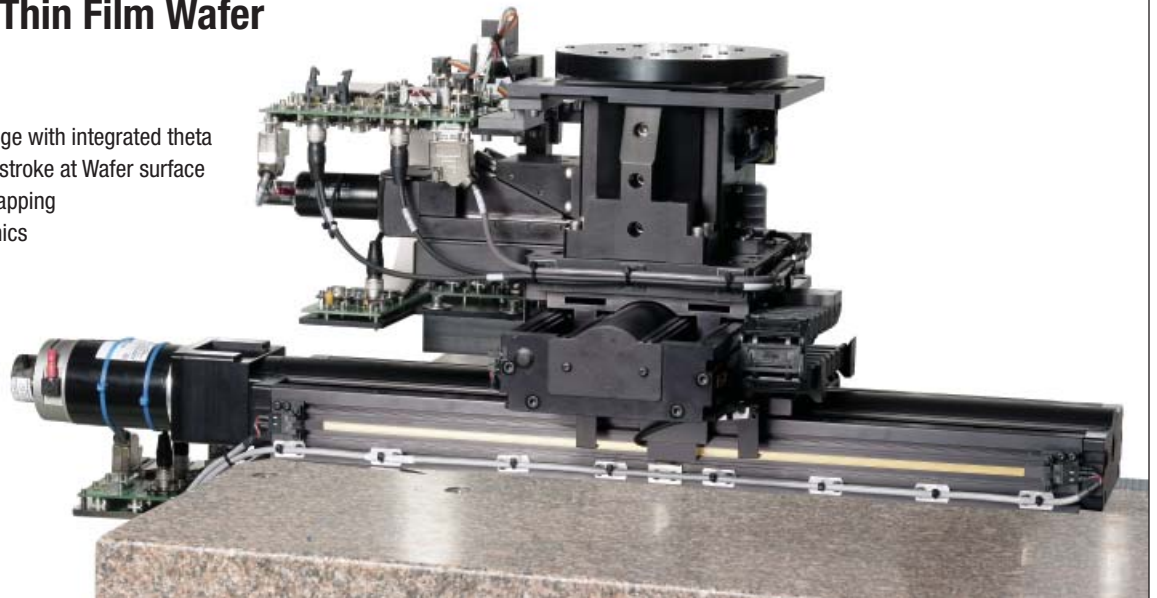
### Genomics, High-Throughput Screening

- Luge LM XYZ travel 1,200 x 600 x 90 mm
- 500 mm/ sec velocity 0.6 g acceleration
- +/- 25 micron accuracy +/- 5-micron repeatability
- 3 U amplifier and PCI motion controller



### Semiconductor - Thin Film Wafer Metrology

- XY Luge LM with special Z wedge with integrated theta
- Repeatability +/- 1 micron full-stroke at Wafer surface
- Accuracy +/- 5-micron after mapping
- Integrated to customer electronics





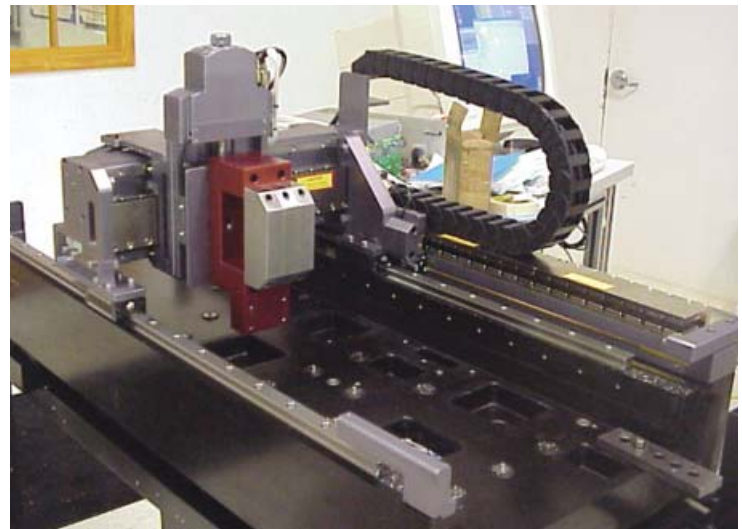
## Flat Panel Gen 5 Metrology

- XY Open-frame gantry (1900 x 600 mm)
- Flatness +/- 50 micron, yaw +/- 3 arc sec
- Accuracy +/- 30 micron, repeatability +/- 6-micron
- Vacuum -  $10^{-3}$  Torr
- 3 U amplifier box, and PCI motion controller



## Semiconductor - Vision-Based IC Lead Verification

- XYZ composite-base gantry
- Straightness +/- 5um per 400mm
- Flatness 1.27um per 25mm
- Constant velocity +/- 0.5% per 25um interval
- Digital current loop integrated motion controller



## Solar Panel Scribing

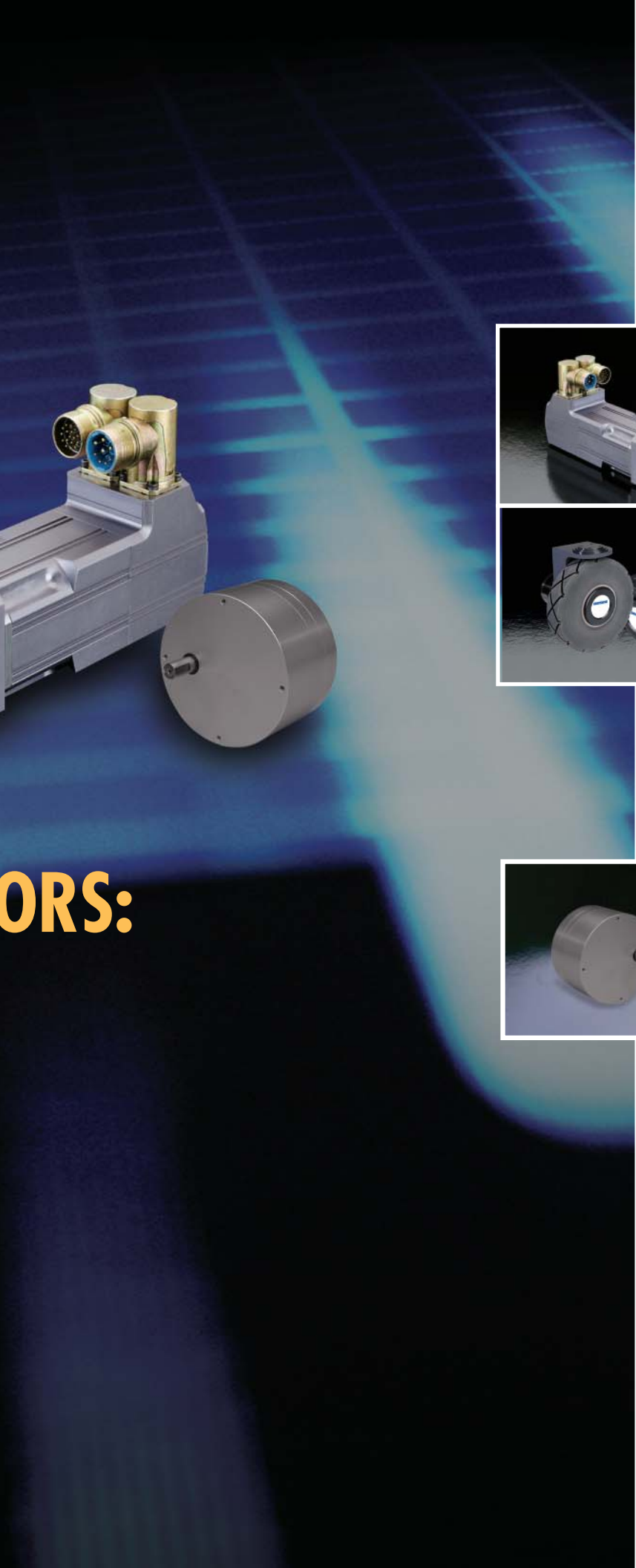
- Linear motor driven XY stages
- Travel 1.5m x 1m
- Accuracy +/- 12um (full travel)
- Bi-directional repeatability +/- 3um
- Straightness +/- 10um
- Flatness +/- 5um





# FRAMELESS MOTORS AND GEARMOTORS

COMBINING SERVO AND GEARING TECHNOLOGIES



## Frameless Motor & Gearmotors

### Frameless

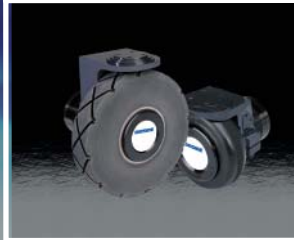
142 Frameless Kit Motor

### Gearmotors

156 GM Servo Gearmotors

170 DX Servo Wheel

180 Pancake Gearmotor



# Frameless & Gearmotors: Application Solutions



## Stealth Gearmotors for Office Automation

### APPLICATION CHALLENGE

A manufacturer of pressure form-folder/sealers, Bri-Lin, had a desire to develop a new product to replace their current table top model. The current model is typically used in the production of W2, wage, and education waste report forms. The success of their new model was dependent on a number of design criteria required for an office setting inclusive of size, quiet operation with little to no maintenance. On the mechanical side, the requirements for speed control and constant torque was a must, but the critical objective of the new model would be a major productivity improvement over the 5,000 to 7,000 forms per hour offered by their present model.

### Design Change Criteria:

- ▶ Existing machine frame width must be maintained as these models are designed for desktop use utilizing 8½ x 11 inch sheets. To maintain registration and speed control a DC servo is required. A brushless motor would be preferred for low maintenance and a "no dust" environment. This frame size does not accommodate an in-line or right-angle gearbox even if the cost could allow it.
- ▶ A gearmotors option would meet the speed/torque and size requirements, but the cable cost and connector size would be an issue.
- ▶ Cut the one-month delivery cycle of complete machine in half by utilizing a JIT component supplier with less than two-week lead times.



### APPLICATION CHALLENGE

The customer manufactures an auger-filler machine that uses a fluted screw to volumetrically fill a container. The standard framed servomotor was mounted to the screw using a mechanical coupling device, gearbox and timing belt, but this proved unable to provide the performance required in a space-efficient package. When engineers were looking to improve their machine design, the issues they faced were:

### Large package size

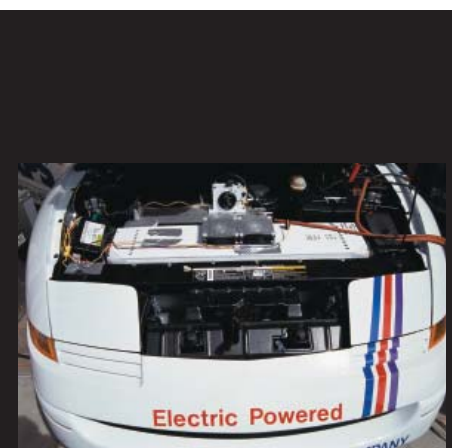
The motor, together with all the mechanical coupling and reduction devices, took up a lot of space on the machine.

### Overtorque and Runout

The timing belts used in this application created a condition of overtorque and runout, which caused the auger screw to rub the side of the funnel.

### Reduced System Reliability

These mechanical devices created reliability issues, causing down time and tolerance problems.



### APPLICATION CHALLENGE

A major US manufacturer of vehicles was developing a new car powered by electric motors. Since the car had no gas-powered engine to drive the power-assist steering, alternate methods were required. Mechanical gearing was ruled out due to space requirements and standard electric motors would drain the batteries of the vehicle too quickly. The company had a problem and needed a unique, cost-effective solution. The opportunity was as follows:

### Reduced Package Size

The unit needed to provide the torque with an effective weight-to-space ratio

### Rugged Design

The motor had to operate in stringent "under the hood" conditions

## Parker Bayside SOLUTION

### GM90-D1A2F Brushless Servo Gearmotors with 10:1 ratio, with flying leads option.

- ▶ The Parker Bayside solution provided a cost-effective package of less than 8 inch overall length with a speed/torque capability that offered a 4 X productivity improvement, raising rates of production to 20,000 forms/hour. The incremental cost was nearly zero with reduced noise and need for routine maintenance. The one-piece gearmotors design with the rotor, sun gear and motor magnets attached reduces the need for multiple seals and bearings. The resulting package of the helical planetary brushless DC gearmotors was a small, quiet, powerful machine that runs clean and cool. The IP65 and stainless steel output shaft also lends itself to wet applications.
- ▶ Plans are now underway for the next generation; a 30,000 forms/hour unit on the drawing board utilizing Parker Bayside's next step up in gearmotors frame size, based on the success of the tested 20,000/hour Forms Folder/Sealer.
- ▶ This solution can be used in a variety of applications including:
  1. Packaging Industry
  2. Printing/Graphics Industry
  3. Medical/Pharmaceutical
  4. Office Automation



## Parker Bayside SOLUTION

### (1) Frameless Brushless Motor

- ▶ The design problems were solved using a frameless kit motor integrated into the auger drive assembly. This allowed the manufacturer to build a single-shaft system eliminating the problems that existed before. Fewer parts were needed in the design, eliminating the couplings and bearings in the auger assembly. This increased reliability, allowing for higher speeds, accuracy and stiffness.
- ▶ Without couplings, timing belts and gearboxes, the customer was able to create a much more compact design.
- ▶ Due to increased reliability, down-time no longer becomes a critical issue for users.
- ▶ This solution can be used in packaging applications in the following industries:
  1. Consumer products
  2. Food Processing
  3. Medical/Pharmaceutical



## Parker Bayside SOLUTION

### (1) Custom-designed brushless steering pump motor.

- ▶ Parker Bayside engineering collaborated with the auto maker and its pump manufacturer and presented various options. The final solution was a custom-designed, high-efficiency motor directly driving the pump. The front mounting flange mated to the pump surface and formed the back end housing of the pump. A zero-porosity surface was therefore required for proper sealing. The housing was designed from an extrusion to minimize cost and maximize yield and was formed to plug into a unique low-profile drive/controller design. The stator was custom designed to operate at its highest efficiency point on a 48 volt DC bus.
- ▶ The solution was designed using (FEMA) "Failure effect mode analysis" methodology and put into manufacturing in record time.
- ▶ The efficiency of the motor assisted in providing maximum battery life for the vehicle.
- ▶ The motor was brushless and therefore required no maintenance.
- ▶ The motor was designed to be configurable for standard gas vehicles.



# Frameless Kit Motors:

Build your own high-performance motor



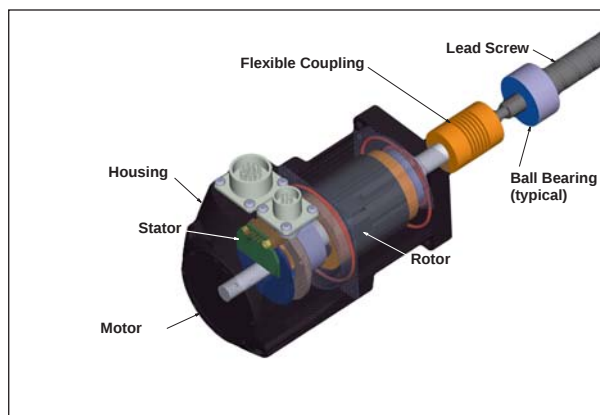
Direct drive motion construction gives equipment designers the advantages of lower costs, increased reliability and improved performance



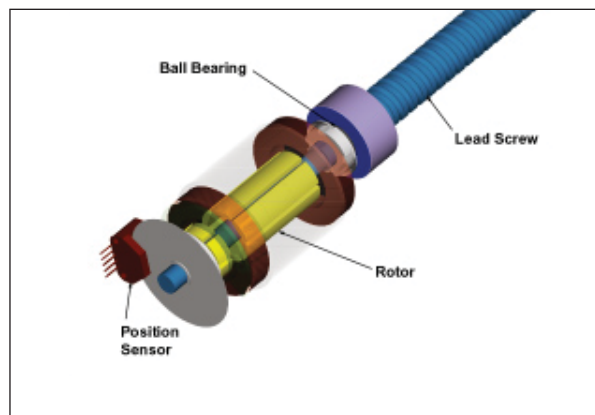
# Frameless Kit Motor overview

- The frameless motor allows for direct integration with a mechanical transmission device, eliminating parts that add size, complexity, response and settling time.
- The design engineer is not constrained to the mounting interface and shaft dimensions of a typical framed motor.
- The frameless motor offering comes in a wide range of sizes ranging from 32mm to 254mm in diameter providing a continuous torque from 0.04 Nm to 58 Nm (see below).
- Custom frame sizes are available for OEM applications.

Traditional Coupled Motor



Integrated Frameless Kit Motor



Frameless Kit Motor Torque Range

|       | Stack Range  |              | Continuous Torque |                | Peak Torque    |                 |
|-------|--------------|--------------|-------------------|----------------|----------------|-----------------|
| Frame |              |              |                   |                |                |                 |
| Size  | (mm)         | (in)         | (Nm)              | (oz-in)        | (Nm)           | (oz-in)         |
| K032  | 6.35 to 50.8 | 0.25 to 2.00 | 0.044 to 0.22     | 6.3 to 31.1    | 0.095 to 0.654 | 13.5 to 93.4    |
| K044  | 6.35 to 50.8 | 0.25 to 2.00 | 0.119 to 0.607    | 17 to 86       | 0.357 to 1.820 | 50 to 258       |
| K064  | 6.35 to 50.8 | 0.25 to 2.00 | 0.31 to 2.16      | 44.3 to 308    | 0.93 to 6.47   | 133 to 924      |
| K089  | 6.35 to 50.8 | 0.25 to 2.00 | 1.307 to 4.291    | 186.7 to 613   | 3.92 to 12.87  | 560 to 1,839    |
| K375  | 6.35 to 50.8 | 0.25 to 2.00 | 1.715 to 4.935    | 245 to 705     | 5.14 to 14.82  | 734 to 2,117    |
| K127  | 12.7 to 50.8 | 0.50 to 2.00 | 3.94 to 11.75     | 563 to 1,678   | 11.83 to 35.24 | 1,690 to 5,034  |
| K500  | 12.7 to 50.8 | 0.50 to 2.00 | 3.05 to 9.44      | 435 to 1,349   | 9.14 to 28.32  | 1,306 to 4,046  |
| K178  | 12.7 to 50.8 | 0.50 to 2.00 | 10.12 to 30.7     | 1,445 to 4,386 | 16.18 to 49.12 | 2,312 to 7,017  |
| K700  | 12.7 to 50.8 | 0.50 to 2.00 | 5.05 to 17.52     | 722 to 2,503   | 8.09 to 28.03  | 1,155 to 4,004  |
| K254  | 12.7 to 50.8 | 0.50 to 2.00 | 18.78 to 58.35    | 2,683 to 8,336 | 30.04 to 93.37 | 4,292 to 13,338 |

## Build Your Own High-Performance Motor

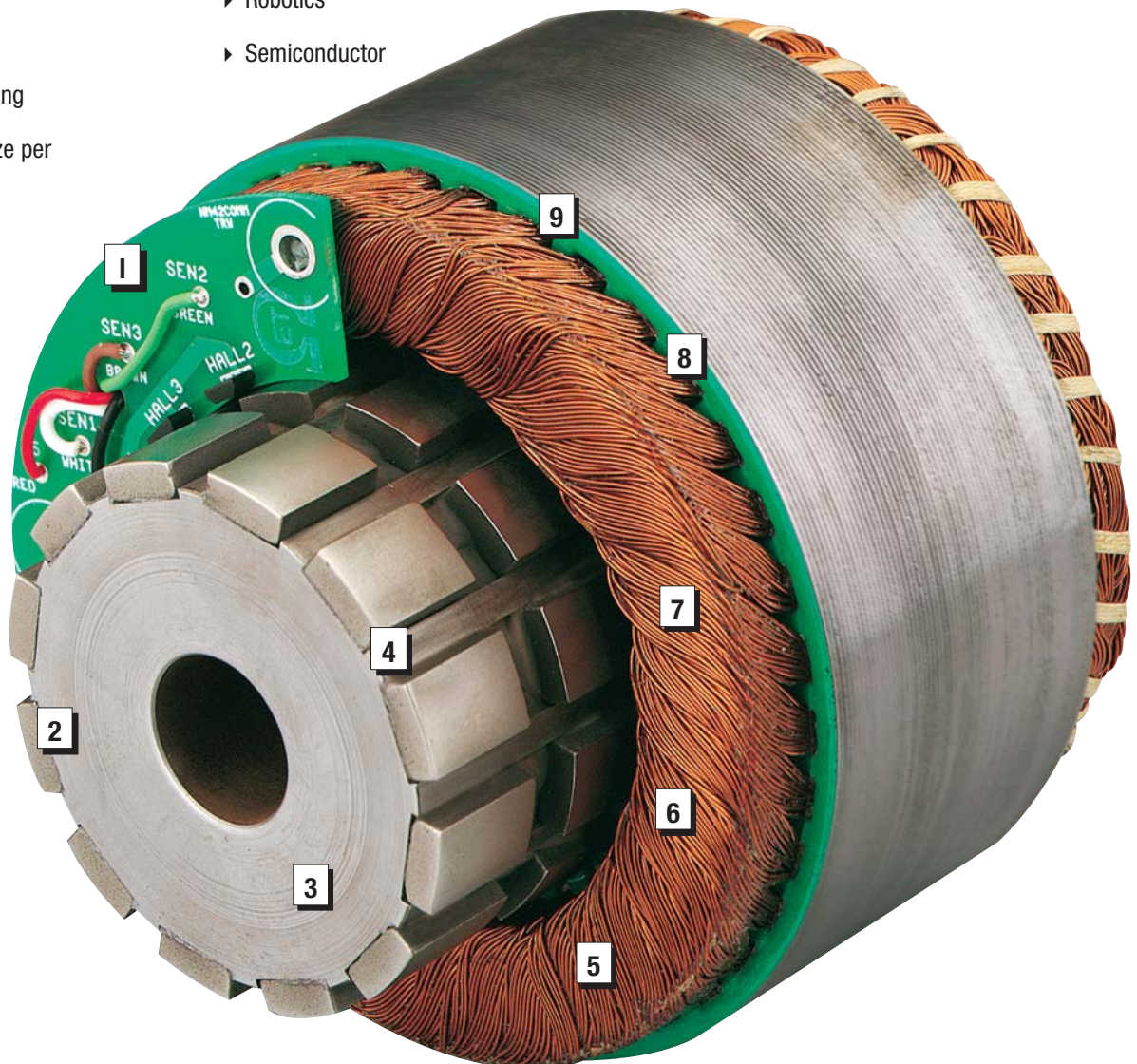
The frameless kit motors are ideal solutions for machine designs that require high performance in small spaces. The kit motors approach allows for direct integration with a mechanical-transmission device, eliminating parts that add size and complexity. The use of frameless kit motors results in a smaller, more reliable motor package.

### When to Use:

- ▶ A significant cost savings
- ▶ Reduced mechanical complexity
- ▶ Greater design flexibility
- ▶ High performance in a compact package
- ▶ Improved dynamic response and settling
- ▶ Minimum motor size per application space
- ▶ Low cogging for smooth operation
- ▶ Low inertia for high acceleration

### Applications:

- ▶ Automotive
- ▶ Machine tool
- ▶ Material handling
- ▶ Packaging
- ▶ Robotics
- ▶ Semiconductor





### What goes into our Frameless Kit Motors...

Our direct drive brushless kit motors consist of three components:

- ▶ The stator and winding
- ▶ The rotor with high energy product neodymium magnets
- ▶ Hall sensor device for motor commutation

### What comes out of our Frameless Kit Motors...

- ▶ High Torque - from 0.06 Nm (0.5 in lb) to 9.7 Nm (85.6 in lb)
- ▶ High Speeds - up to 50,000 RPM
- ▶ Superior Performance - high stiffness and better response
- ▶ High Reliability - no mechanical transmission devices (couplings, flanges)
- ▶ Compact Design - minimizes product size
- ▶ Low Cogging - unique magnetic circuit design decreases cogging

**1 Pre-installed Integral Commutation Board**  
with Hall effects is prealigned for easy assembly. Motor and feedback as integrated unit.

**2 Rare Earth Magnets**  
provide high-flux in a small volume, high resistance to thermal demagnetizing.

**3 Rotor Assembly**  
for easy mounting directly on the drive shaft with or without keyway.

**4 Machined Grooves**  
to securely lock magnets to rotor and ensures optimized radial location.

**5 Class H Insulation**  
for high-temperature operation (up to 155°C) meeting UL approved requirements.

**6 High-Density Copper Winding**  
for low thermal resistance and consistent performance across all motors.

**7 Minimized End Turns**  
to maximize performance. Formed to minimize motor size.

**8 Skewed Laminations**  
with odd slot counts reduce cogging for precise rotary motion with drastically reduced torque ripple even at low speeds.

**9 Optimized Slot Fill**  
for maximum torque-to-size ratio; hand inserted to obtain highest slot fill possible maximizing ampere-turns.

# Frameless Motor Series

## K032 to K0254 Motors

### Performance Specifications (six step/trapezoidal commutation)

| Frame Size | Stack Length |      | Continuous Torque <sup>(1)</sup> |         | Peak Torque |         | Motor Constant     |                       | Core Loss | Rotor Inertia             |                           | Electrical Time Constant | Thermal Resistance | Weight |       |
|------------|--------------|------|----------------------------------|---------|-------------|---------|--------------------|-----------------------|-----------|---------------------------|---------------------------|--------------------------|--------------------|--------|-------|
|            |              |      | $T_C$                            |         | $T_P$       |         | $K_m$              |                       | $P_C$     | $J_m$                     |                           | $T_C$                    |                    | $W_m$  |       |
|            | (mm)         | (in) | (Nm)                             | (oz in) | (Nm)        | (oz in) | (Nm / $\sqrt{W}$ ) | (oz in / $\sqrt{W}$ ) | W @1KRPM  | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) | (msec)                   | (°C / W)           | (kg)   | (oz)  |
| K032025    | 6.35         | 0.25 | 0.044                            | 6.3     | 0.095       | 13.5    | 0.009              | 1.25                  | 0.03      | 0.0016                    | 0.000022                  | 0.21                     | 3.44               | 0.042  | 1.5   |
| K032050    | 12.7         | 0.5  | 0.08                             | 11.4    | 0.188       | 27      | 0.016              | 2                     | 0.06      | 0.0032                    | 0.000045                  | 0.35                     | 3.44               | 0.068  | 2.4   |
| K032075    | 19.05        | 0.75 | 0.11                             | 15.7    | 0.281       | 40      | 0.022              | 3                     | 0.09      | 0.0048                    | 0.000067                  | 0.44                     | 3.44               | 0.096  | 3.4   |
| K032100    | 25.4         | 1    | 0.136                            | 19.4    | 0.375       | 54      | 0.027              | 4                     | 0.12      | 0.0064                    | 0.000089                  | 0.5                      | 3.44               | 0.122  | 4.3   |
| K032150    | 38.1         | 1.5  | 0.181                            | 25.8    | 0.544       | 77.7    | 0.036              | 5.15                  | 0.18      | 0.0096                    | 0.000134                  | 0.6                      | 3.44               | 0.173  | 6.1   |
| K032200    | 50.8         | 2    | 0.22                             | 31.1    | 0.654       | 93.4    | 0.044              | 6.25                  | 0.24      | 0.013                     | 0.000178                  | 0.66                     | 3.44               | 0.26   | 9.2   |
| K032300    | 76.2         | 3    | 0.33                             | 46.5    | 0.99        | 139.5   | 0.054              | 7.56                  | 0.36      | 0.0192                    | 0.000268                  | 0.7                      | 3.44               | 0.36   | 12.8  |
| K044025    | 6.35         | 0.25 | 0.119                            | 17      | 0.357       | 50      | 0.02               | 3                     | 0.11      | 0.0072                    | 0.0001                    | 0.39                     | 2.36               | 0.085  | 3     |
| K044050    | 12.7         | 0.5  | 0.214                            | 30.6    | 0.642       | 90      | 0.035              | 5                     | 0.24      | 0.014                     | 0.0002                    | 0.62                     | 2.36               | 0.133  | 5     |
| K044075    | 19.05        | 0.75 | 0.297                            | 42.4    | 0.891       | 127     | 0.049              | 7                     | 0.37      | 0.022                     | 0.0003                    | 0.76                     | 2.36               | 0.200  | 7     |
| K044100    | 25.4         | 1    | 0.364                            | 52      | 1.092       | 156     | 0.06               | 9                     | 0.49      | 0.03                      | 0.00041                   | 0.89                     | 2.36               | 0.224  | 8     |
| K044150    | 38.1         | 1.5  | 0.501                            | 71      | 1.510       | 213     | 0.08               | 11.4                  | 0.74      | 0.044                     | 0.00061                   | 1.05                     | 2.36               | 0.311  | 11    |
| K044200    | 50.8         | 2    | 0.607                            | 86      | 1.820       | 258     | 0.097              | 13.8                  | 1.11      | 0.06                      | 0.00082                   | 1.12                     | 2.36               | 0.399  | 14.1  |
| K044300    | 76.2         | 3    | 0.96                             | 136.0   | 2.88        | 408     | 0.13               | 18.3                  | 1.48      | 0.088                     | 0.00122                   | 1.3                      | 2.36               | 0.549  | 19.4  |
| K064025    | 6.35         | 0.25 | 0.31                             | 44.3    | 0.93        | 133     | 0.048              | 6.88                  | 0.37      | 0.046                     | 0.00064                   | 0.59                     | 1.68               | 0.142  | 5     |
| K064050    | 12.7         | 0.5  | 0.62                             | 89      | 1.87        | 267     | 0.087              | 12.48                 | 0.78      | 0.092                     | 0.00128                   | 0.98                     | 1.68               | 0.286  | 10.1  |
| K064075    | 19.05        | 0.75 | 0.85                             | 121.7   | 2.56        | 365     | 0.122              | 17.44                 | 1.19      | 0.138                     | 0.00192                   | 1.26                     | 1.68               | 0.427  | 15.1  |
| K064100    | 25.4         | 1    | 1.08                             | 154     | 3.23        | 462     | 0.15               | 21.44                 | 1.6       | 0.184                     | 0.00256                   | 1.47                     | 1.68               | 0.572  | 20.2  |
| K064150    | 38.1         | 1.5  | 1.46                             | 209     | 4.39        | 627     | 0.204              | 29.12                 | 2.37      | 0.276                     | 0.00384                   | 1.77                     | 1.68               | 0.846  | 30.2  |
| K064200    | 50.8         | 2    | 2.16                             | 308     | 6.47        | 924     | 0.244              | 34.88                 | 3.23      | 0.369                     | 0.00512                   | 1.97                     | 1.68               | 1.129  | 40.3  |
| K064300    | 76.2         | 3    | 2.91                             | 410     | 8.73        | 1,230   | 0.33               | 46.6                  | 4.74      | 0.552                     | 0.00768                   | 2.6                      | 1.68               | 1.701  | 60.5  |
| K089050    | 12.7         | 0.5  | 1.307                            | 186.7   | 3.92        | 560     | 0.164              | 23.36                 | 2.14      | 0.38                      | 0.00528                   | 1.26                     | 1.02               | 0.498  | 17.6  |
| K089075    | 19.05        | 0.75 | 1.96                             | 280     | 5.88        | 840     | 0.235              | 33.6                  | 3.35      | 0.576                     | 0.008                     | 1.64                     | 1.02               | 0.747  | 26.4  |
| K089100    | 25.4         | 1    | 2.618                            | 374     | 7.84        | 1,120   | 0.283              | 40.64                 | 4.42      | 0.792                     | 0.011                     | 1.92                     | 1.02               | 0.996  | 35.2  |
| K089150    | 38.1         | 1.5  | 3.92                             | 560     | 11.76       | 1,680   | 0.381              | 54.4                  | 6.7       | 1.15                      | 0.016                     | 2.33                     | 1.02               | 1.494  | 52.8  |
| K089200    | 50.8         | 2    | 4.291                            | 613     | 12.87       | 1,839   | 0.466              | 66.56                 | 8.95      | 1.51                      | 0.021                     | 2.6                      | 1.02               | 1.992  | 70.4  |
| K089300    | 76.2         | 3    | 7.13                             | 1,004   | 21.4        | 3,012   | 0.631              | 88.9                  | 13.4      | 2.30                      | 0.032                     | 2.9                      | 1.02               | 3.00   | 105.6 |

(1) = Housed in a motor frame.

Typically an aluminum cylinder with 6.35mm (0.250in) thick walls,  
K032, K044 and K064 mounted to a 152mm x 152mm x 12.5 mm (6in x 6in x 0.5in) aluminum plate  
K089 mounted to a 203mm x 203mm x 12.5mm (8in x 8in x 0.5in) aluminum plate

#### Pole Count

K032 is 4  
K044 is 6  
K064 is 8  
K089 is 12



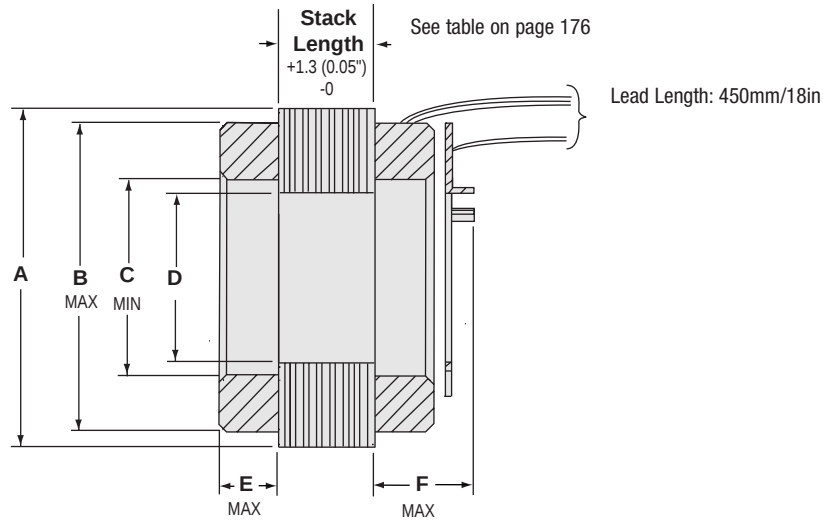
| Frame Size | Stack Length |      | Continuous Torque <sup>(1)</sup> |         | Peak Torque            |         | Motor Constant              |              | Core Loss                 | Rotor Inertia                               |                           | Electrical Time Constant | Thermal Resistance | Weight                 |       |
|------------|--------------|------|----------------------------------|---------|------------------------|---------|-----------------------------|--------------|---------------------------|---------------------------------------------|---------------------------|--------------------------|--------------------|------------------------|-------|
|            |              |      |                                  |         |                        |         |                             |              |                           |                                             |                           |                          |                    |                        |       |
|            | (mm)         | (in) | T <sub>C</sub><br>(Nm)           | (oz in) | T <sub>P</sub><br>(Nm) | (oz in) | K <sub>m</sub><br>(Nm / √W) | (oz in / √W) | P <sub>C</sub><br>W@1kRPM | J <sub>m</sub><br>(gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) | T <sub>C</sub><br>(msec) | (°C / W)           | W <sub>m</sub><br>(kg) | (oz)  |
| K375050    | 12.7         | 0.5  | 1.715                            | 245     | 5.14                   | 734     | 0.153                       | 21.8         | 1.2                       | 0.324                                       | 0.0045                    | 1.45                     | 1.02               | 0.611                  | 21.6  |
| K375075    | 19.05        | 0.75 | 2.401                            | 343     | 7.19                   | 1,027   | 0.213                       | 30.4         | 1.8                       | 0.497                                       | 0.0069                    | 1.9                      | 1.02               | 0.917                  | 32.4  |
| K375100    | 25.4         | 1    | 3.003                            | 429     | 9                      | 1,286   | 0.267                       | 38.1         | 2.4                       | 0.655                                       | 0.0091                    | 2.24                     | 1.02               | 1.095                  | 38.7  |
| K375150    | 38.1         | 1.5  | 4.025                            | 575     | 12.6                   | 1,723   | 0.357                       | 51           | 3.6                       | 1.01                                        | 0.014                     | 2.68                     | 1.02               | 1.554                  | 54.9  |
| K375200    | 50.8         | 2    | 4.935                            | 705     | 14.82                  | 2,117   | 0.438                       | 62.6         | 4.8                       | 1.30                                        | 0.018                     | 3.03                     | 1.02               | 2.02                   | 71.1  |
| K375300    | 76.2         | 3    | 6.69                             | 942     | 20.1                   | 2,826   | 0.592                       | 83.4         | 7.2                       | 2.02                                        | 0.028                     | 3.5                      | 1.02               | 2.94                   | 103.5 |
| K127050    | 12.7         | 0.5  | 3.94                             | 563     | 11.83                  | 1,690   | 0.29                        | 41.4         | 4.7                       | 1.15                                        | 0.016                     | 2.38                     | 0.7                | 1.087                  | 38.4  |
| K127100    | 25.4         | 1    | 6.98                             | 997     | 21.04                  | 3,006   | 0.513                       | 73.3         | 9.6                       | 2.38                                        | 0.033                     | 3.7                      | 0.7                | 1.766                  | 62.4  |
| K127150    | 38.1         | 1.5  | 9.56                             | 1,365   | 28.66                  | 4,094   | 0.702                       | 100.3        | 14.5                      | 3.53                                        | 0.049                     | 4.6                      | 0.7                | 2.355                  | 83.2  |
| K127200    | 50.8         | 2    | 11.75                            | 1,678   | 35.24                  | 5,034   | 0.864                       | 123.4        | 19.4                      | 4.75                                        | 0.066                     | 5.23                     | 0.7                | 2.99                   | 105.6 |
| K127300    | 76.2         | 3    | 16.1                             | 2,263   | 48.3                   | 6,789   | 1.18                        | 166.1        | 29.0                      | 7.06                                        | 0.098                     | 6.1                      | 0.7                | 3.65                   | 147.2 |
| K500050    | 12.7         | 0.5  | 3.05                             | 435     | 9.14                   | 1,306   | 0.224                       | 32           | 1.6                       | 1.15                                        | 0.016                     | 2.6                      | 0.7                | 1.087                  | 38.4  |
| K500100    | 25.4         | 1    | 5.49                             | 784     | 16.46                  | 2,352   | 0.403                       | 57.6         | 3                         | 2.30                                        | 0.032                     | 4.5                      | 0.7                | 1.766                  | 62.4  |
| K500150    | 38.1         | 1.5  | 7.92                             | 1,131   | 23.76                  | 3,394   | 0.582                       | 83.2         | 4.8                       | 3.46                                        | 0.048                     | 6                        | 0.7                | 2.355                  | 83.2  |
| K500200    | 50.8         | 2    | 9.44                             | 1,349   | 28.32                  | 4,046   | 0.694                       | 99.2         | 6.4                       | 4.61                                        | 0.064                     | 6.4                      | 0.7                | 2.988                  | 105.6 |
| K500300    | 76.2         | 3    | 15.4                             | 2,170   | 46.2                   | 6,510   | 1.13                        | 159.3        | 8.6                       | 6.92                                        | 0.096                     | 8.0                      | 0.7                | 4.18                   | 147.2 |
| K178050    | 12.7         | 0.5  | 10.12                            | 1,445   | 16.18                  | 2,312   | 0.627                       | 89.6         | 9.1                       | 4.75                                        | 0.066                     | 4.16                     | 0.5                | 2.4                    | 84.8  |
| K178100    | 25.4         | 1    | 18.06                            | 2,580   | 28.89                  | 4,127   | 1.12                        | 160          | 18.7                      | 9.36                                        | 0.13                      | 6.54                     | 0.5                | 3.71                   | 131.2 |
| K178150    | 38.1         | 1.5  | 24.75                            | 3,535   | 39.59                  | 5,655   | 1.534                       | 219          | 14.4                      | 14.4                                        | 0.2                       | 8.15                     | 0.5                | 4.98                   | 176   |
| K178200    | 50.8         | 2    | 30.7                             | 4,386   | 49.12                  | 7,017   | 1.904                       | 272          | 18.7                      | 18.7                                        | 0.26                      | 9.31                     | 0.5                | 6.34                   | 224   |
| K178300    | 76.2         | 3    | 43.1                             | 6,078   | 69.0                   | 9,724   | 2.68                        | 377          | 28.8                      | 28.8                                        | 0.4                       | 12.2                     | 0.5                | 8.90                   | 313.6 |
| K700050    | 12.7         | 0.5  | 5.05                             | 722     | 8.09                   | 1,155   | 0.314                       | 44.8         | 7.70                      | 7.7                                         | 0.107                     | 2.9                      | 0.4                | 2.4                    | 84.8  |
| K700100    | 25.4         | 1    | 9.57                             | 1,367   | 15.32                  | 2,188   | 0.594                       | 84.8         | 15.4                      | 15.4                                        | 0.214                     | 5                        | 0.4                | 3.71                   | 131.2 |
| K700150    | 38.1         | 1.5  | 13.55                            | 1,935   | 21.67                  | 3,096   | 0.84                        | 120          | 23.2                      | 23.2                                        | 0.322                     | 6.8                      | 0.4                | 4.98                   | 176   |
| K700200    | 50.8         | 2    | 17.52                            | 2,503   | 28.03                  | 4,004   | 1.086                       | 155.2        | 30.9                      | 31                                          | 0.429                     | 8.5                      | 0.4                | 6.34                   | 224   |
| K700300    | 76.2         | 3    | 27.5                             | 3,876   | 44.0                   | 6,200   | 1.53                        | 215          | 46.4                      | 46.4                                        | 0.644                     | 10.7                     | 0.4                | 8.91                   | 313.6 |
| K254050    | 12.7         | 0.5  | 18.78                            | 2,683   | 30.04                  | 4,292   | 1.043                       | 149          | 17.9                      | 17.9                                        | 0.248                     | 6.05                     | 0.4                | 4.48                   | 158.4 |
| K254100    | 25.4         | 1    | 33.92                            | 4,846   | 54.27                  | 7,753   | 1.883                       | 269          | 35.5                      | 35.5                                        | 0.493                     | 9.63                     | 0.4                | 6.79                   | 240   |
| K254150    | 38.1         | 1.5  | 46.84                            | 6,692   | 74.95                  | 10,707  | 2.597                       | 371          | 53.1                      | 53.1                                        | 0.738                     | 12.5                     | 0.4                | 9.056                  | 320   |
| K254200    | 50.8         | 2    | 58.35                            | 8,336   | 93.37                  | 13,338  | 3.234                       | 462          | 71.0                      | 71                                          | 0.986                     | 14.7                     | 0.4                | 11.32                  | 400   |
| K254300    | 76.2         | 3    | 80.9                             | 11,400  | 129.4                  | 18,240  | 4.49                        | 632          | 106.2                     | 106                                         | 1.478                     | 18.0                     | 0.4                | 15.9                   | 560   |

(1) = Housed in a motor frame. Typically an aluminum cylinder with 6.35mm (0.250in) thick walls, K375, K127 and K500 mounted to a 305mm x 305mm x 12.5mm (12in x 12in x 0.5in) aluminum plate. K178, K700 and K254 mounted to a 406mm x 406mm x 12.5mm (16in x 16in x 0.5in) aluminum plate.

#### Pole Count:

K127 & K375 are 12  
K700 & K500 are 8  
K178 & K254 are 18

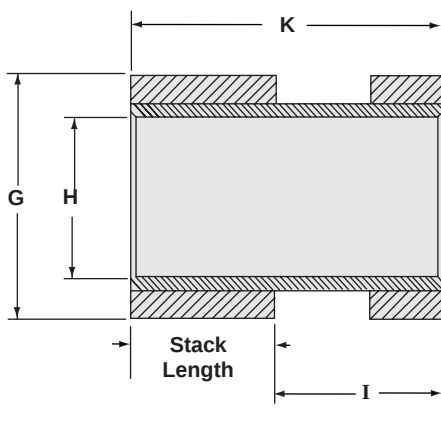
**Dimensions**



**Stator Outline**

| Frame<br>Size | A<br>O.D. |        | B<br>End Turns<br>O.D. |       | C<br>End Turns<br>I.D. |      | D<br>I.D. |       | E<br>End Turns<br>Length |      | F<br>Commutation<br>Length |      |
|---------------|-----------|--------|------------------------|-------|------------------------|------|-----------|-------|--------------------------|------|----------------------------|------|
|               | (mm)      | (in)   | (mm)                   | (in)  | (mm)                   | (in) | (mm)      | (in)  | (mm)                     | (in) | (mm)                       | (in) |
| K032          | 31.78     | 1.251  | 27.94                  | 1.1   | 16.51                  | 0.65 | 15.06     | 0.593 | 6.4                      | 0.25 | 14.5                       | 0.57 |
|               | 31.75     | 1.25   |                        |       |                        |      | 14.8      | 0.583 |                          |      |                            |      |
| K044          | 44.48     | 1.751  | 40.64                  | 1.6   | 26.16                  | 1.03 | 22.35     | 0.88  | 7.9                      | 0.31 | 16.5                       | 0.65 |
|               | 44.42     | 1.749  |                        |       |                        |      | 22.09     | 0.87  |                          |      |                            |      |
| K064          | 63.52     | 2.501  | 60.7                   | 2.39  | 38.1                   | 1.5  | 35.18     | 1.385 | 9.65                     | 0.38 | 17.5                       | 0.69 |
|               | 63.47     | 2.499  |                        |       |                        |      | 34.92     | 1.375 |                          |      |                            |      |
| K089          | 88.92     | 3.501  | 85.8                   | 3.38  | 54.6                   | 2.15 | 53.47     | 2.105 | 9.91                     | 0.39 | 17.5                       | 0.69 |
|               | 88.87     | 3.499  |                        |       |                        |      | 53.21     | 2.095 |                          |      |                            |      |
| K375          | 95.28     | 3.751  | 88.9                   | 3.5   | 53.32                  | 2.06 | 50.93     | 2.005 | 12.7                     | 0.5  | 19.5                       | 0.77 |
|               | 95.22     | 3.749  |                        |       |                        |      | 50.67     | 1.995 |                          |      |                            |      |
| K127          | 127.02    | 5.001  | 122.17                 | 4.81  | 74.17                  | 2.92 | 72.49     | 2.854 | 12.7                     | 0.5  | 19.5                       | 0.77 |
|               | 126.97    | 4.999  |                        |       |                        |      | 72.23     | 2.844 |                          |      |                            |      |
| K500          | 127.05    | 5.002  | 115.32                 | 4.54  | 70.6                   | 2.78 | 68.2      | 2.685 | 20.5                     | 0.81 | 30.5                       | 1.2  |
|               | 126.95    | 4.998  |                        |       |                        |      | 67.94     | 2.675 |                          |      |                            |      |
| K178          | 177.88    | 7.003  | 172.72                 | 6.8   | 111.51                 | 4.39 | 110.64    | 4.355 | 20.3                     | 0.8  | *                          |      |
|               | 177.72    | 6.997  |                        |       |                        |      | 110.38    | 4.345 |                          |      |                            |      |
| K700          | 177.88    | 7.003  | 158.24                 | 6.23  | 117.6                  | 4.63 | 115.19    | 4.535 | 18.8                     | 0.74 | *                          |      |
|               | 177.72    | 6.997  |                        |       |                        |      | 114.93    | 4.525 |                          |      |                            |      |
| K254          | 254.07    | 10.003 | 253.26                 | 9.971 | 165.1                  | 6.5  | 157.61    | 6.205 | 19.6                     | 0.77 | *                          |      |
|               | 253.92    | 9.997  |                        |       |                        |      | 157.35    | 6.195 |                          |      |                            |      |

\*integral commutation not available



Rotor Outline

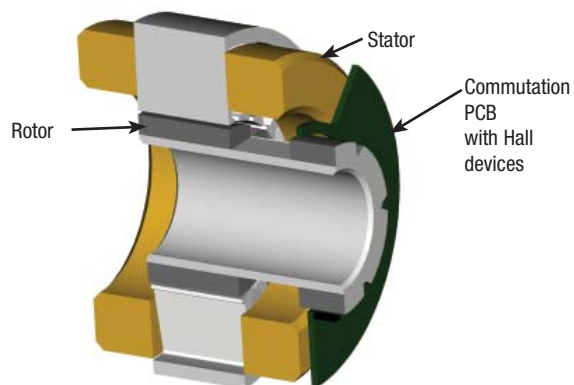


Figure 1.3  
Kit Main Components

| Frame<br>Size | G<br>Rotor O.D. |       | H<br>Rotor I.D. |       | I<br>Commutation Magnet<br>Length |      | K<br>Rotor Length                                                   |
|---------------|-----------------|-------|-----------------|-------|-----------------------------------|------|---------------------------------------------------------------------|
|               | (mm)            | (in)  | (mm)            | (in)  | (mm)                              | (in) |                                                                     |
| K032          | 13.94           | 0.549 | 7.62            | 0.3   | 13.21                             | 0.52 | without Commutation:<br>K = Stack Length + <b>0.76mm</b> (0.030in)  |
|               | 13.89           | 0.547 | 7.59            | 0.299 |                                   |      |                                                                     |
| K044          | 21.23           | 0.836 | 13.97           | 0.55  | 14.73                             | 0.58 | with Commutation:<br>K = Stack Length + <b>I + 0.76mm</b> (0.030in) |
|               | 21.18           | 0.834 | 13.94           | 0.549 |                                   |      |                                                                     |
| K064          | 34.04           | 1.34  | 23.52           | 0.926 | 16.51                             | 0.65 |                                                                     |
|               | 33.98           | 1.338 | 23.49           | 0.925 |                                   |      |                                                                     |
| K089          | 51.84           | 2.041 | 40.64           | 1.6   | 16.71                             | 0.66 |                                                                     |
|               | 51.79           | 2.039 | 40.61           | 1.599 |                                   |      |                                                                     |
| K375          | 49.28           | 1.94  | 38.1            | 1.5   | 19.56                             | 0.77 |                                                                     |
|               | 49.15           | 1.935 | 38.07           | 1.499 |                                   |      |                                                                     |
| K127          | 71.15           | 2.801 | 58.42           | 2.3   | 19.56                             | 0.77 |                                                                     |
|               | 71.09           | 2.799 | 58.39           | 2.299 |                                   |      |                                                                     |
| K500          | 66.54           | 2.62  | 50.83           | 2.001 | 28.52                             | 1.12 |                                                                     |
|               | 66.5            | 2.618 | 50.8            | 2     |                                   |      |                                                                     |
| K178          | 109.2           | 4.292 | 95.76           | 3.77  | *                                 |      |                                                                     |
|               | 108.9           | 4.29  | 95.73           | 3.769 |                                   |      |                                                                     |
| K700          | 113.54          | 4.47  | 95.25           | 3.75  | *                                 |      |                                                                     |
|               | 113.49          | 4.468 | 95              | 3.74  |                                   |      |                                                                     |
| K254          | 156.16          | 6.148 | 140.46          | 5.53  | *                                 |      |                                                                     |
|               | 156.11          | 6.146 | 140.44          | 5.529 |                                   |      |                                                                     |

\*integral commutation not available

The selection of a particular frame size and winding for an application is dependent on:

- Volume (diameter and length) requirement
- Power (torque and speed) requirement
- Voltage and current available or required

The first two items are dependent on the load and performance specifications of the application. They result in the selection of a particular frame size (032 through 254) and stack length.

The winding to be used will then be determined by voltage and current available or required.

**Voltage:** The bus voltage and maximum speed will approximately determine the required voltage constant ( $K_E$ ).

**Current:** The maximum load and acceleration will determine the amount of current required, determined by the torque constant ( $K_T$ ) associated with the selected voltage constant.

Example: Assume a requirement of 1,000 RPM at 50 oz in

If a motor with a particular winding having  $K_E = 18.24$  V/1,000 RPM and  $K_T = 24.62$  oz in/amp is chosen, it will now require a voltage (BEMF) of 18 volts and current of 2 amp.

NOTE:  $K_E$  and  $K_T$  are directly proportional to each other. Increasing  $K_E$  will also increase  $K_T$ ; Decreasing  $K_E$  will also decrease  $K_T$ .

The result is that as the voltage requirement changes, the current requirement changes inversely.

Parker Bayside has a range of **27** windings available for each frame size and stack length, providing for virtually any practical combination of voltage and current required for your application.

The following pages show just a small representative sample of speed/torque curves for each of the 10 frame sizes available.

For the 044, 064, 089 and 127 frame sizes, the speed/torque curves are for stators that are used in the standard BM / GM motor products.

They make a good starting point for determining your specific application requirements and working with Parker Bayside application engineers to choose the proper motor size and power.

The following table lists the range of  $K_E$  and  $K_T$  available for each of the 10 frame sizes.

Detailed information for all these windings can be found on the web site: [www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com)

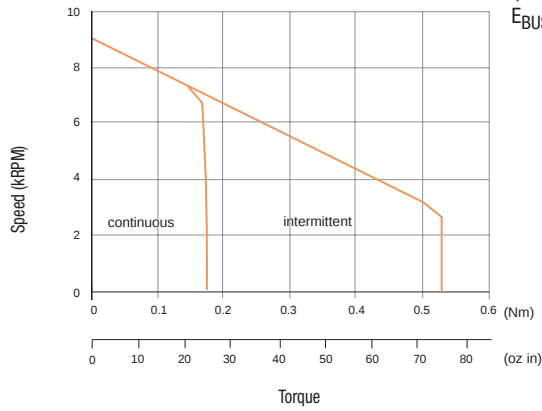
| Frame Size | Stack Range  |              | $K_E$ Range    |                 | $K_T$ Range     |                |
|------------|--------------|--------------|----------------|-----------------|-----------------|----------------|
|            | (mm)         | (in)         | (V/1,000 RPM)  | (V/rad/sec)     | (Nm/amp)        | (oz in/amp)    |
| K032       | 6.35 to 50.8 | 0.25 to 2.00 | 0.14 to 65.52  | 0.0013 to 0.625 | 0.0013 to 0.625 | 0.18 to 88.45  |
| K044       | 6.35 to 50.8 | 0.25 to 2.00 | 0.28 to 126.3  | 0.0027 to 1.2   | 0.0027 to 1.2   | 0.38 to 170.6  |
| K064       | 6.35 to 50.8 | 0.25 to 2.00 | 0.66 to 291.8  | 0.0063 to 2.78  | 0.0063 to 2.78  | 0.89 to 394    |
| K089       | 6.35 to 50.8 | 0.25 to 2.00 | 1.35 to 605    | 0.013 to 5.77   | 0.013 to 5.77   | 1.83 to 817    |
| K375       | 6.35 to 50.8 | 0.25 to 2.00 | 1.27 to 566    | 0.012 to 5.40   | 0.012 to 5.40   | 1.71 to 765    |
| K127       | 12.7 to 50.8 | 0.50 to 2.00 | 3.73 to 827    | 0.036 to 7.88   | 0.036 to 7.88   | 5.04 to 1116   |
| K500       | 12.7 to 50.8 | 0.50 to 2.00 | 3.38 to 714    | 0.032 to 6.81   | 0.032 to 6.81   | 4.56 to 964    |
| K178       | 12.7 to 50.8 | 0.50 to 2.00 | 8.26 to 1716   | 0.079 to 16.4   | 0.079 to 16.4   | 11.18 to 2,323 |
| K700       | 12.7 to 50.8 | 0.50 to 2.00 | 4.14 to 872    | 0.039 to 8.31   | 0.039 to 8.31   | 5.59 to 1,177  |
| K254       | 12.7 to 50.8 | 0.50 to 2.00 | 11.44 to 2,537 | 0.109 to 24.2   | 0.109 to 24.2   | 15.5 to 3,425  |

NOTE: Longer stacks and special windings are available. Call 1-800-305-4555



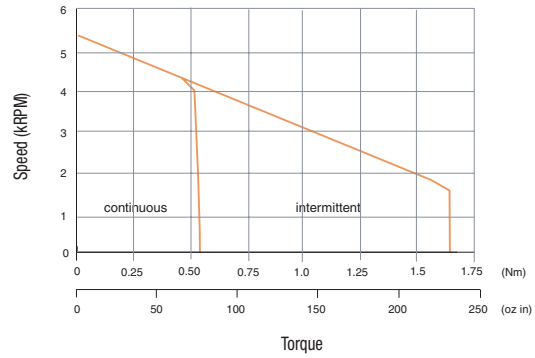
## K032150-7Y

$K_T = 0.051 \text{ Nm / amp}$  (7.19 oz-in / amp)  $R_{T-T} = 2.05 \Omega$   $I_{\text{cont}} = 3.6 \text{ amp}$   
 $K_E = 0.051 \text{ v / rad / sec}$  (5.32 V / kRPM)  $L_{T-T} = 1.16 \text{ mH}$   $I_{\text{peak}} = 10.8 \text{ amp}$   
 $E_{\text{BUS}} = 48 \text{ Vdc}$



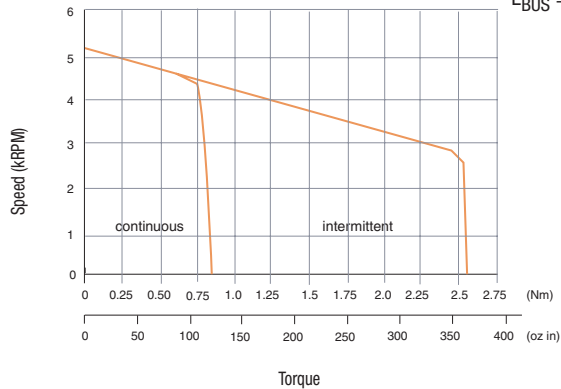
## K044150-FY

$K_T = 0.28 \text{ Nm / amp}$  (39.6 oz-in / amp)  $R_{T-T} = 11.8 \Omega$   $I_{\text{cont}} = 2 \text{ amp}$   
 $K_E = 0.28 \text{ v / rad / sec}$  (29.3 V / kRPM)  $L_{T-T} = 12.5 \text{ mH}$   $I_{\text{peak}} = 6 \text{ amp}$   
 $E_{\text{BUS}} = 160 \text{ Vdc}$



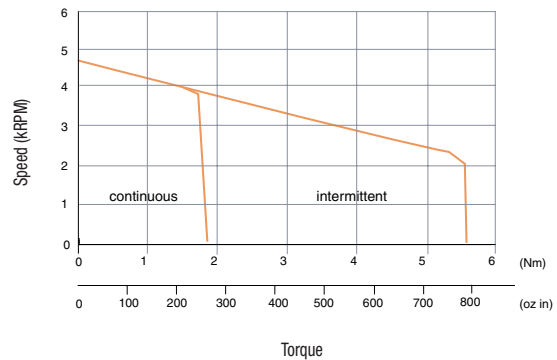
## K044300-8Y

$K_T = 0.28 \text{ Nm / amp}$  (39.6 oz-in / amp)  $R_{T-T} = 4.8 \Omega$   $I_{\text{cont}} = 3 \text{ amp}$   
 $K_E = 0.28 \text{ v / rad / sec}$  (29.3 V / kRPM)  $L_{T-T} = 6.2 \text{ mH}$   $I_{\text{peak}} = 9 \text{ amp}$   
 $E_{\text{BUS}} = 160 \text{ Vdc}$



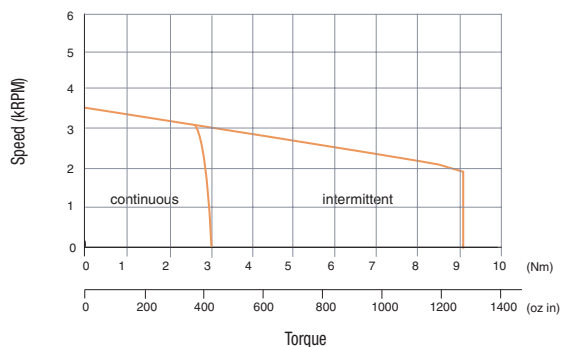
## K064150-8Y

$K_T = 0.33 \text{ Nm / amp}$  (46.1 oz-in / amp)  $R_{T-T} = 2.5 \Omega$   $I_{\text{cont}} = 6 \text{ amp}$   
 $K_E = 0.33 \text{ v / rad / sec}$  (34.1 V / kRPM)  $L_{T-T} = 4.5 \text{ mH}$   $I_{\text{peak}} = 18 \text{ amp}$   
 $E_{\text{BUS}} = 160 \text{ Vdc}$



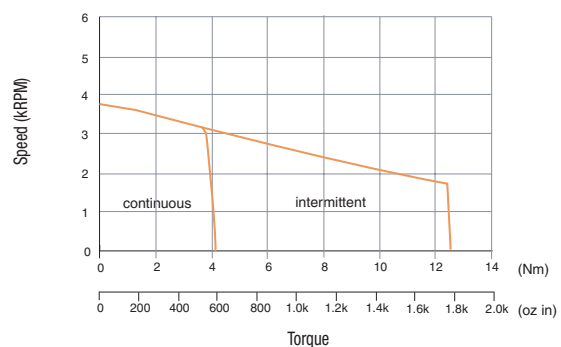
## K064300-6Y

$K_T = 0.42 \text{ Nm / amp}$  (59.9 oz-in / amp)  $R_{T-T} = 1.6 \Omega$   $I_{\text{cont}} = 7 \text{ amp}$   
 $K_E = 0.42 \text{ v / rad / sec}$  (44.3 V / kRPM)  $L_{T-T} = 3.8 \text{ mH}$   $I_{\text{peak}} = 21 \text{ amp}$   
 $E_{\text{BUS}} = 160 \text{ Vdc}$



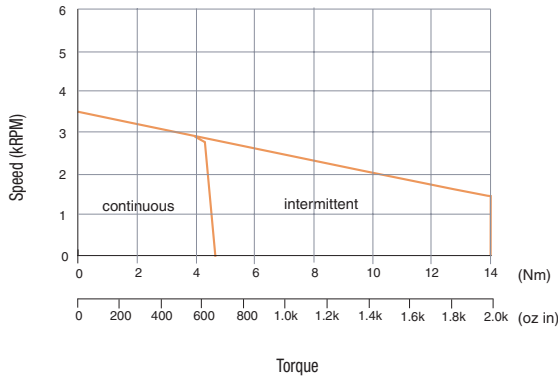
## K375150-6Y

$K_T = 0.41 \text{ Nm / amp}$  (57.92 oz-in / amp)  $R_{T-T} = 1.21 \Omega$   $I_{\text{cont}} = 10 \text{ amp}$   
 $K_E = 0.41 \text{ v / rad / sec}$  (47.82 V / kRPM)  $L_{T-T} = 3.45 \text{ mH}$   $I_{\text{peak}} = 30 \text{ amp}$   
 $E_{\text{BUS}} = 160 \text{ Vdc}$



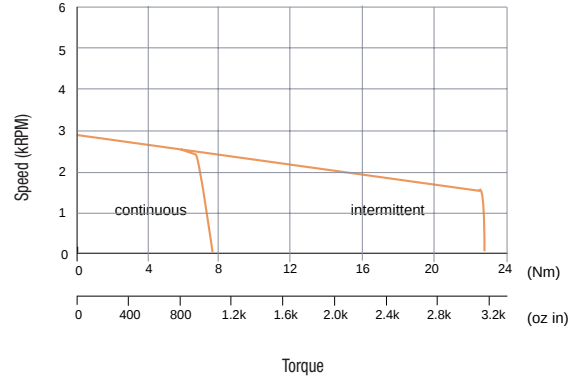
### K089150-6Y

$K_T = 0.43 \text{ Nm / amp}$  (61.6 oz-in / amp)  $R_{T-T} = 1.2 \Omega$   $I_{\text{cont}} = 11 \text{ amp}$   
 $K_E = 0.43 \text{ v / rad / sec}$  (45.6 V / kRPM)  $L_{T-T} = 2.9 \text{ mH}$   $I_{\text{peak}} = 33 \text{ amp}$   
 $E_{\text{BUS}} = 160 \text{ Vdc}$



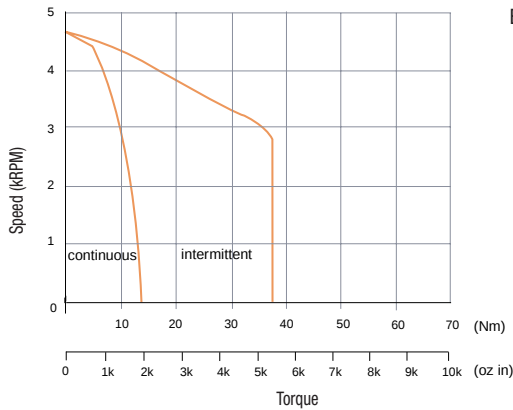
### K089300-4Y

$K_T = 0.54 \text{ Nm / amp}$  (75.8 oz-in / amp)  $R_{T-T} = 0.73 \Omega$   $I_{\text{cont}} = 15 \text{ amp}$   
 $K_E = 0.54 \text{ v / rad / sec}$  (56.1 V / kRPM)  $L_{T-T} = 2.2 \text{ mH}$   $I_{\text{peak}} = 45 \text{ amp}$   
 $E_{\text{BUS}} = 160 \text{ Vdc}$



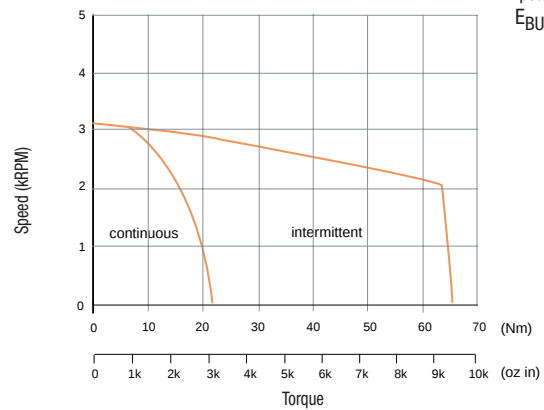
### K127250-4Y

$K_T = 0.61 \text{ Nm / amp}$  (86.9 oz-in / amp)  $R_{T-T} = 0.35 \Omega$   $I_{\text{cont}} = 20 \text{ amp}$   
 $K_E = 0.61 \text{ v / rad / sec}$  (64.2 V / kRPM)  $L_{T-T} = 2.1 \text{ mH}$   $I_{\text{peak}} = 60 \text{ amp}$   
 $E_{\text{BUS}} = 300 \text{ Vdc}$



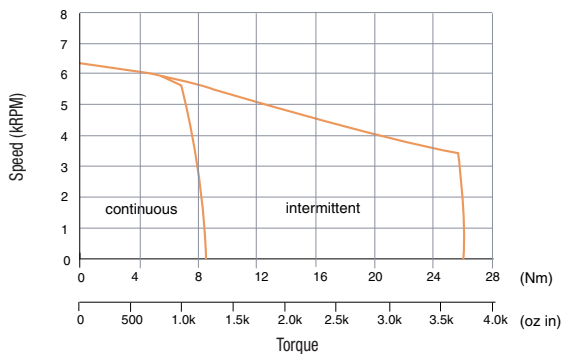
### K127500-3Y

$K_T = 0.92 \text{ Nm / amp}$  (130.4 oz-in / amp)  $R_{T-T} = 0.34 \Omega$   $I_{\text{cont}} = 24 \text{ amp}$   
 $K_E = 0.92 \text{ v / rad / sec}$  (96.4 V / kRPM)  $L_{T-T} = 2.3 \text{ mH}$   $I_{\text{peak}} = 72 \text{ amp}$   
 $E_{\text{BUS}} = 300 \text{ Vdc}$



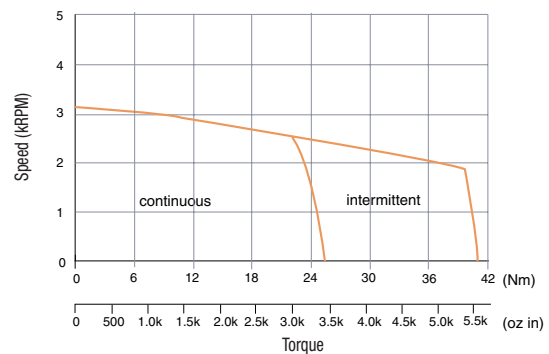
### K500150-5Y

$K_T = 0.45 \text{ Nm / amp}$  (63.78 oz-in / amp)  $R_{T-T} = 0.49 \Omega$   $I_{\text{cont}} = 18 \text{ amp}$   
 $K_E = 0.45 \text{ v / rad / sec}$  (47.19 V / kRPM)  $L_{T-T} = 2.72 \text{ mH}$   $I_{\text{peak}} = 53 \text{ amp}$   
 $E_{\text{BUS}} = 300 \text{ Vdc}$



### K178150-5Y

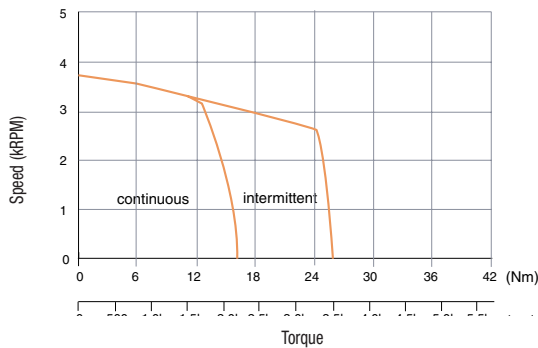
$K_T = 0.93 \text{ Nm / amp}$  (130.5 oz-in / amp)  $R_{T-T} = 0.37 \Omega$   $I_{\text{cont}} = 27 \text{ amp}$   
 $K_E = 0.93 \text{ v / rad / sec}$  (96.2 V / kRPM)  $L_{T-T} = 2.95 \text{ mH}$   $I_{\text{peak}} = 43 \text{ amp}$   
 $E_{\text{BUS}} = 300 \text{ Vdc}$





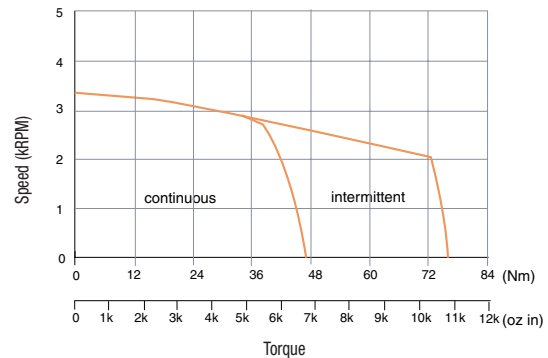
## K700150-7Y

$K_T = 0.78 \text{ Nm / amp}$  (110.35 oz-in / amp)     $R_{T-T} = 0.84 \Omega$      $I_{\text{cont}} = 18 \text{ amp}$   
 $K_E = 0.78 \text{ v / rad / sec}$  (81.71 V / kRPM)     $L_{T-T} = 5.79 \text{ mH}$      $I_{\text{peak}} = 28 \text{ amp}$   
 $E_{\text{BUS}} = 300 \text{ Vdc}$



## K254150-5Y

$K_T = 1.42 \text{ Nm / amp}$  (199.7 oz-in / amp)     $R_{T-T} = 0.78 \Omega$      $I_{\text{cont}} = 34 \text{ amp}$   
 $K_E = 1.42 \text{ v / rad / sec}$  (147.6 V / kRPM)     $L_{T-T} = 3.6 \text{ mH}$      $I_{\text{peak}} = 54 \text{ amp}$   
 $E_{\text{BUS}} = 300 \text{ Vdc}$



## MOUNTING FRAMELESS MOTOR INTO ASSEMBLY

This section outlines a number of methods that can be used to mount the stator and rotor assemblies in the product.

Which method to be used will largely depend on the product design, performance requirements (torque, velocity, temperature, etc.) and the manufacturing capabilities of the user.

Dimensioned drawings for all the kits are shown in the catalog pages.

### STATOR

The stator will be typically be mounted into a cylindrically shaped hole in the product (see Figure 9). It is recommended that a banking step be incorporated at the bottom of the hole to assure accurate and repeatable location of the stator.

Alternately, a non-ferrous "plug" could be used to provide a banking surface, which can be removed once the stator is fixed in place.

Figure 9 shows two methods for holding the stator in position; either with adhesive for a permanent assembly or with set screws for a removable assembly.

In designing the housing, be sure to provide a means for the stator lead wires (three) and the commutation Hall sensor PCB wires (five) to extend outside of the housing without interfering with the rotor / shaft assembly.

For volume production, a jig should be fabricated that will assure that the stator is located in the same position for each assembly. The yellow dot on the stator provides an index point for accomplishing this. This will eliminate the need to perform mechanical commutation alignment at final assembly.

### Rotor

Except for the smaller motors (K032 and K044), the ID of the rotor will usually be larger than the shaft diameter.

An adapter sleeve will be required to allow mounting of the rotor to the shaft (see Figure 9).

The rotor / sleeve assembly must be positioned on the shaft such that the magnets are located in line with the stator assembly laminations. If the version in which the commutation PCB assembly is bonded to the end turns is being used, the commutation magnets must be located in proper proximity to the Hall sensors on the PCB. Figure 9 shows two methods for holding the rotor / sleeve on the shaft, either with adhesive or by using a spring pin and retaining ring.

When using the adhesive method, a shoulder should be provided on the shaft to properly locate the rotor/sleeve assembly.

When using the spring pin/retaining ring method, a slot must be provided in the sleeve that will engage the spring pin in the shaft, thus properly locating the rotor / sleeve assembly. During assembly, be sure that the pin and slot are fully engaged.

Note: The following adhesives are recommended for rotor and stator assembly (see Figure 9)

Loctite #325  
 Activator #7074  
 Loctite #609

### Assembly

#### Stator Assembly:

Assemble stator in housing or sleeve (aluminum recommended) with the following locational clearances:

- Diameter to 127mm (5in) 0.025mm (0.001in) to 0.127mm (0.005in) diametrical clearance.
- Diameter over 127mm (5in) 0.05mm (0.002in) to 0.254mm (0.010in) diametrical clearance.

Do not force stator in position. This may damage or deform stator.

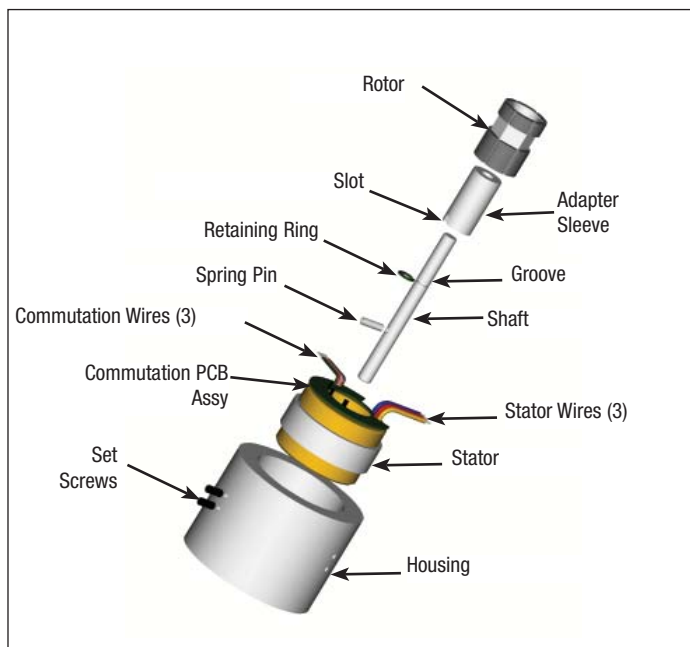
#### Permanent Assembly:

Secure stator with adhesive, Loctite #325 with activator #7074 or equivalent

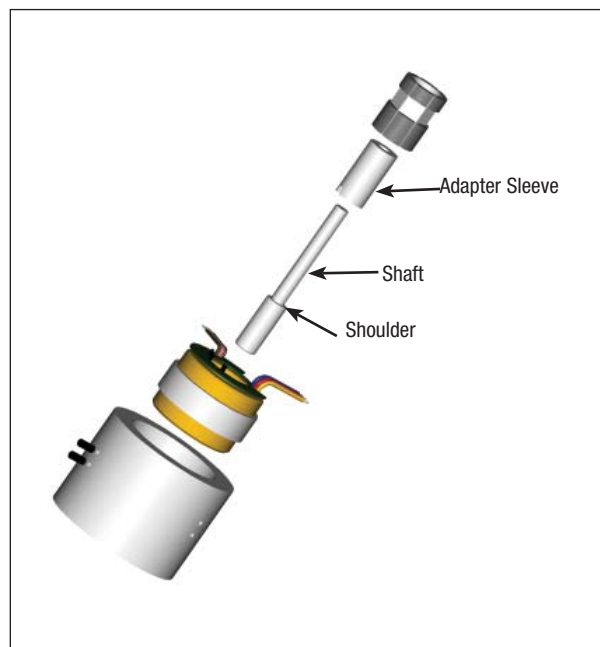
#### Removable Assembly:

Secure with cup point screws or setscrews thru housing into stator steel laminations only. Use a minimum of three (3) screws equally spaced about stator O.D. Tighten evenly. Do not over torque screws. This may damage or deform stator.

# Frameless Motor Series



Spring Pin / Retaining Ring Method



Shoulder / Adhesive Method

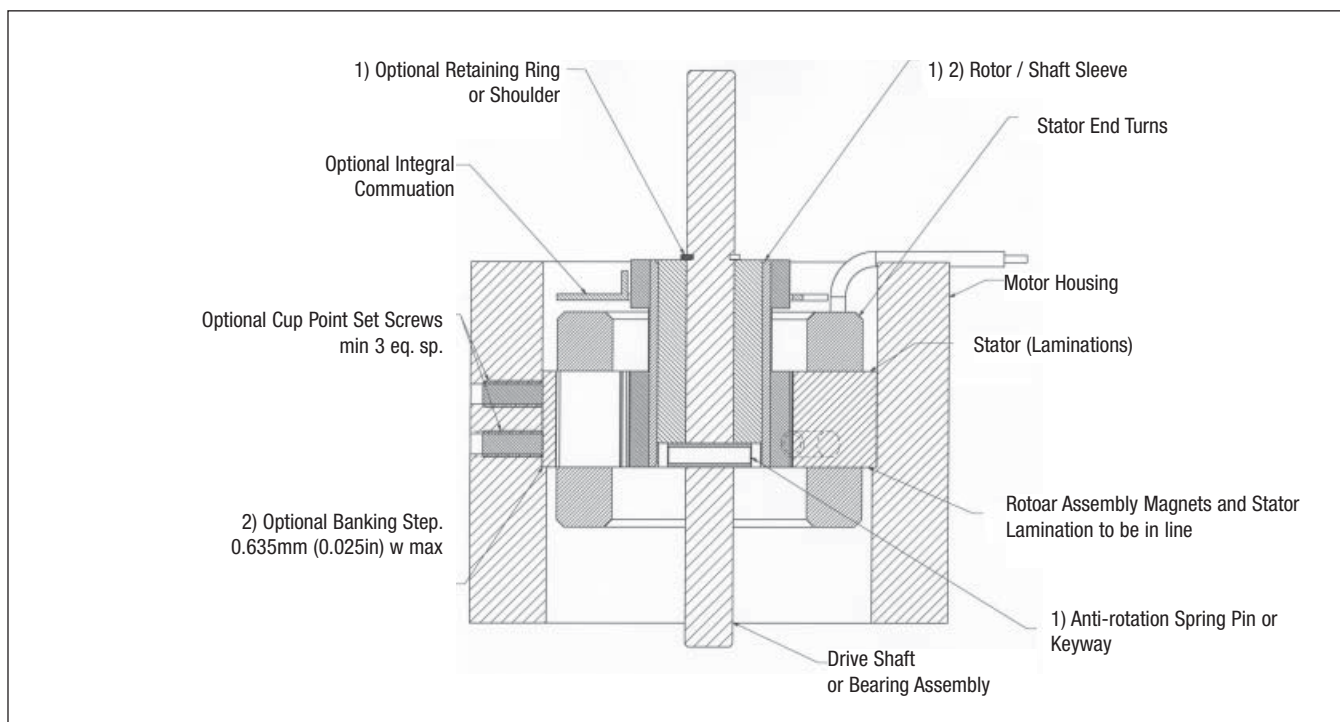


Figure 9



#### Rotor Assembly:

Assemble rotor to shaft with a locational clearance fit of 0.013mm (0.0005in) to 0.038mm (0.0015in) diametrical clearance.

#### Shoulder / Adhesive Method:

Fabricate shaft with shoulder. Secure rotor assembly and sleeve with adhesive. Loctite#609 or equivalent.

#### Spring Pin / Retaining Ring Method:

Fabricate a sleeve (steel or aluminum) with anti rotation spring pin groove. Fabricate shaft to accept retaining ring and spring pin. Permanently bond to rotor assembly.

#### Final Assembly:

Rotor magnets to be in line with stator laminations and concentric to stator lamination I.D. within 0.127mm (0.005in) MAX.

#### Caution:

Rotor assembly magnets are powerful and fragile!  
Do not place near magnetically sensitive material  
Do not place near other ferromagnetic materials such as iron, steel and nickel alloys. Strong uncontrolled attraction may damage magnets on contact.

Improper assembly of rotor into stator can cause serious injury and or damage to equipment.

When assembling the rotor into the stator, high radial forces will be experienced, which can cause the magnets to "crash" into the stator and be damaged and / or cause bodily injury!

The following precautions should be taken:

- ▶ Wrap the rotor with a thin (0.005in thick) Mylar sleeve which will fill the air gap between the rotor and stator during assembly and can be easily removed when assembly is complete.
- ▶ Support the rotor and stator assemblies in a fixturing arrangement which will prevent radial motion while the two assemblies are being mated.

#### Example:

1. Hold the rotor / shaft / product assembly in a machine tool vise on the base of an arbor press.
2. Fasten the stator assembly to the vertical moving member of the arbor press, away from the stator.
3. Slowly lower the stator assembly around the rotor / shaft / product assembly.
4. Tighten all fasteners to complete assembly.
5. Remove Mylar shim and check for rotational clearance.

## How to Order

Order  
Numbering  
Example:

**K 0 4 4 1 0 0 - E Y 2 XXX**

| MODEL | STACK LENGTH | WINDING <sup>(1)</sup> | CONNECTION <sup>(2)</sup> | COMMUTATION       |
|-------|--------------|------------------------|---------------------------|-------------------|
| 032   | 025 (0.25")  | 1                      | Y=Wye                     | 1 = Without       |
| 044   | 050 (0.50")  | 2                      | D=Delta                   | 2 = With Integral |
| 064   | 075 (0.75")  | 3                      |                           |                   |
| 089   | 100 (1.00")  | 4                      |                           |                   |
| 375   | 150 (1.50")  | 5                      |                           |                   |
| 127   | 200 (2.00")  | 6                      |                           |                   |
| 500   |              | 7                      |                           |                   |
| 178   |              | 8                      |                           |                   |
| 700   |              | 9                      |                           |                   |
| 254   |              | E                      |                           |                   |
|       |              | F                      |                           |                   |
|       |              | G                      |                           |                   |
|       |              | H                      |                           |                   |
|       |              | J                      |                           |                   |
|       |              | K                      |                           |                   |
|       |              | L                      |                           |                   |

- (1) Consult Parker Bayside (1-800-305-4555 or [www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com)) for specific winding designations.  
(2) Consult factory for special options

Parker Bayside Kit Motors are supported by a worldwide network of offices and local distributors.  
Call 1-800-305-4555 for application engineering assistance or for the name of your local distributor.  
Information can also be obtained at [www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com).

Specifications are subject to change without notice.

# Stealth<sup>®</sup> GM Gearmotor Series: An Integrated Solution



Combining brushless servo  
motor and helical planetary  
gearing technology

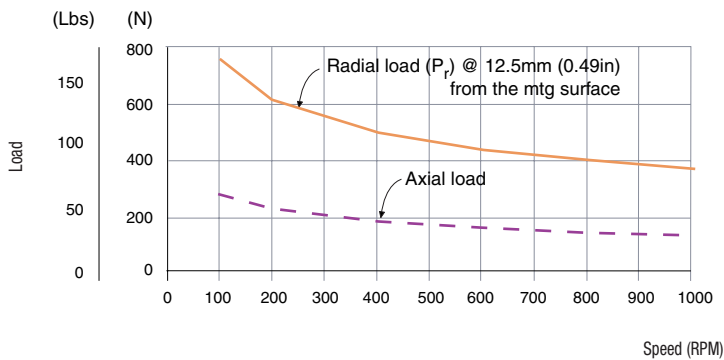
| 4 Frame Sizes |      |
|---------------|------|
| GM60          | GM23 |
| GM90          | GM34 |
| GM115         | GM42 |
| GM142         | GM56 |

| Ratios |       |
|--------|-------|
| 5:1    | 25:1  |
| 7:1    | 30:1  |
| 10:1   | 50:1  |
| 20:1   | 100:1 |



# Stealth<sup>®</sup> GM Gearmotors Series: Output Shaft Load Rating

## GM60/GM23

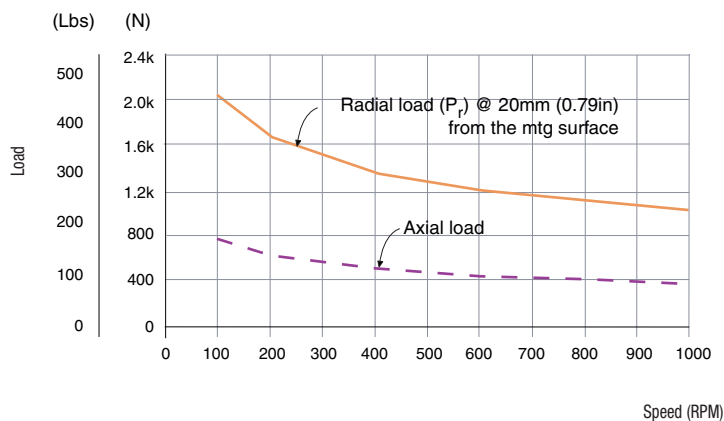


Formulas to calculate radial load ( $P_{rx}$ ) at any distance "X" from the gearhead mounting surface.

$$P_{rx} = (P_r)(54\text{mm}) / (41\text{mm} + X)$$

$$P_{rx} = (P_r)(2.13\text{in}) / (1.61\text{in} + X)$$

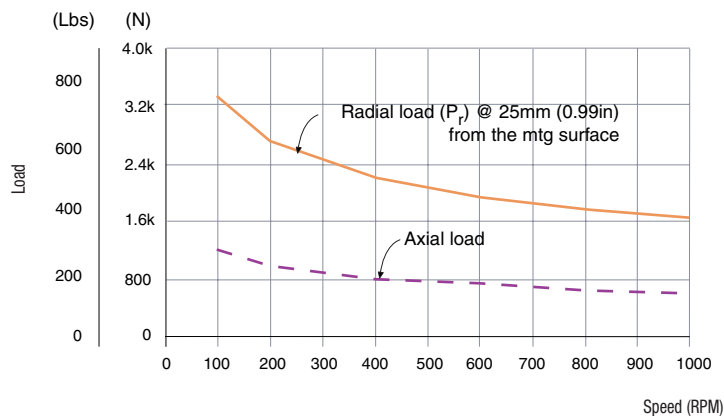
## GM90/GM34



$$P_{rx} = (P_r)(73\text{mm}) / (52\text{mm} + X)$$

$$P_{rx} = (P_r)(2.87\text{in}) / (2.05\text{in} + X)$$

## GM115/GM42



$$P_{rx} = (P_r)(89\text{mm}) / (63\text{mm} + X)$$

$$P_{rx} = (P_r)(3.5\text{in}) / (2.48\text{in} + X)$$

## An Integrated Step Forward

Parker Bayside's Stealth® Gearmotors represent the first time a brushless servo motor and a helical planetary gearhead have been integrated into a single product. Previously, engineers needing a gear drive with servo motor were forced to purchase the gearhead and motor separately. Parker Bayside manufactures precision gearheads and gearmotors under one roof.

Stealth® Gearmotors combine both mechanical and electronic parts into a compact, powerful package. The motor magnets are attached directly to the input gearshaft, eliminating the extra couplings, shafts and bearings required when the two components are separate. Eliminating these extra parts means that Stealth gearmotors are more reliable, have higher performance and cost less than traditional motor/gearhead assemblies.

### When to Use:

- ▶ High torque in compact package
- ▶ Reduce mechanical complexity
- ▶ Cost reduction

### Applications:

- ▶ Automotive
- ▶ Machine tool
- ▶ Material handling
- ▶ Medical
- ▶ Packaging
- ▶ Paper converting
- ▶ Robotics
- ▶ Semiconductor

**1 Large Output Bearings**  
for high radial loads

**2 IP65 Protection**  
with Viton seals, DIN-type connectors, O-rings and an anodized aluminum alloy housing for use in harsh environments

**3 High-Density Copper Windings and Rare-Earth Magnets**  
provides maximum torque and efficiency

**4 Skewed Laminations with Odd Slot Counts**  
reduce cogging

**5 Duplex Angular Contact Bearing**  
for optimum motor assembly stiffness

**6 Modular Encoders, Resolvers and Brakes**  
offered standard without increasing package size

**7 Two Winding Options, Single or Double Stack Motors and Multiple Gear Ratios**  
for a wide range of torques and speeds

**8 Single-Piece Construction**  
of rotor and sun gear guarantees alignment for smooth operation

**9 Motor, Gearhead and Encoder**  
in one compact package eliminates extra parts, improving reliability and performance

**10 Stealth® Helical Planetary Output**  
provides high torques, low backlash and quiet, reliable performance

**11 Innovative Thermal Design**  
runs 20% cooler than a separate motor/gearhead assembly

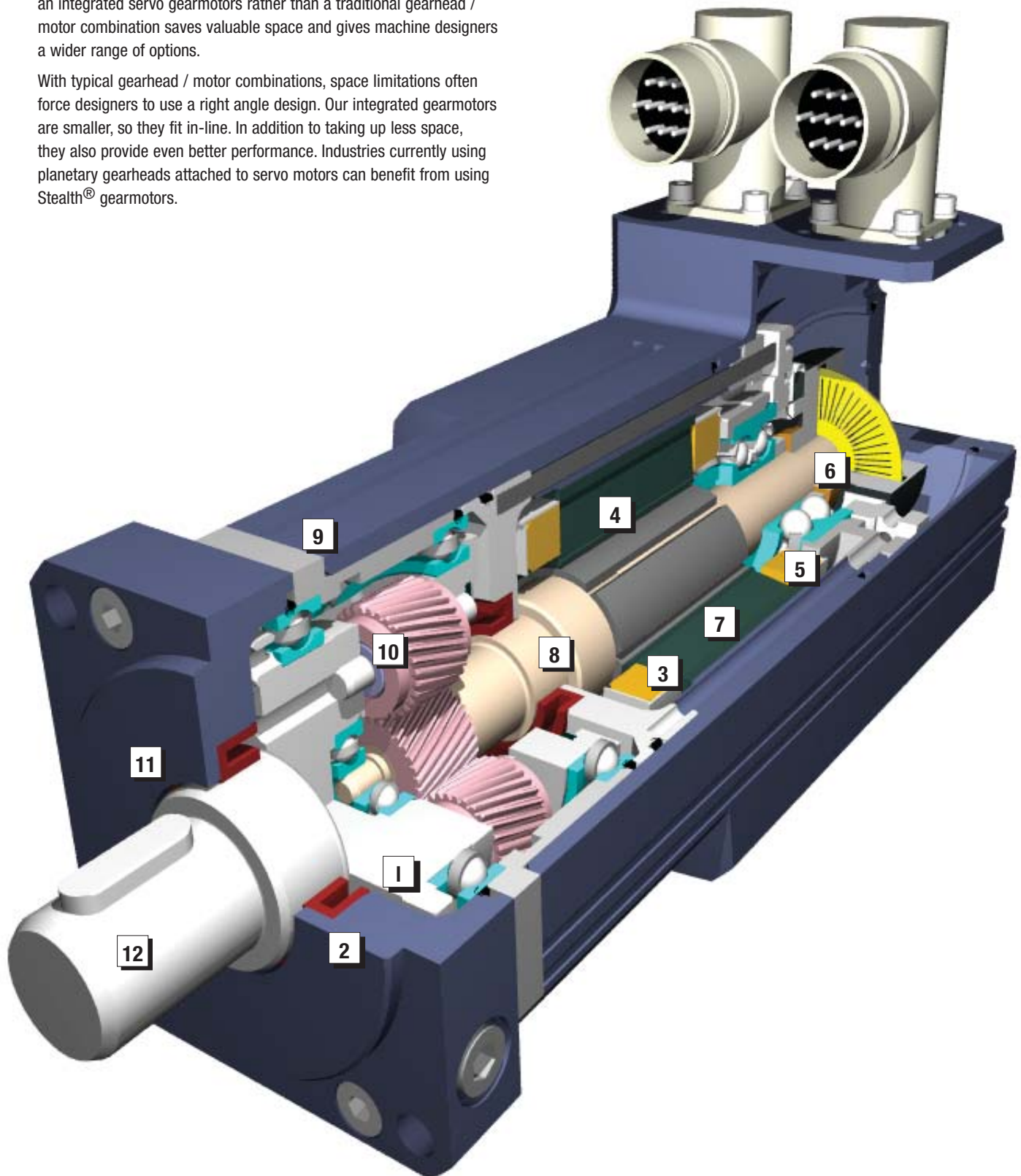
**12 Stainless Steel Output Shaft**  
won't rust in corrosive environments



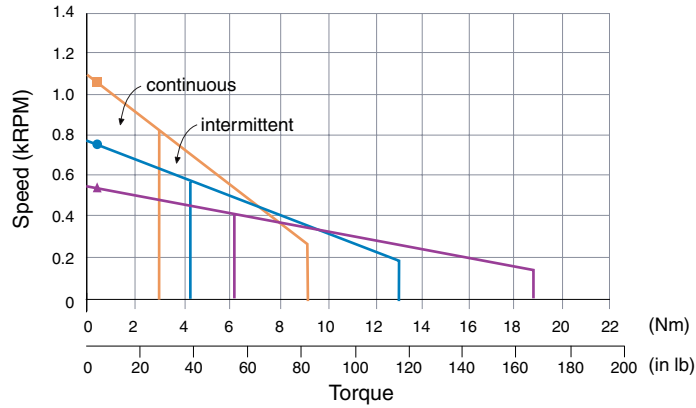
## Motor and Gearhead All In One

Stealth® gearmotors fit in-line for maximum design flexibility. Using an integrated servo gearmotors rather than a traditional gearhead / motor combination saves valuable space and gives machine designers a wider range of options.

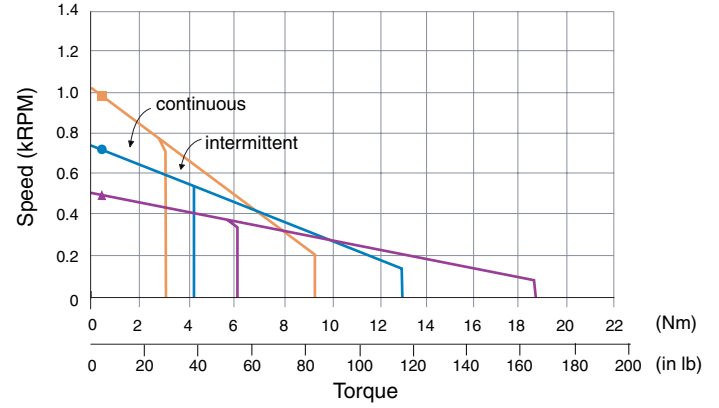
With typical gearhead / motor combinations, space limitations often force designers to use a right angle design. Our integrated gearmotors are smaller, so they fit in-line. In addition to taking up less space, they also provide even better performance. Industries currently using planetary gearheads attached to servo motors can benefit from using Stealth® gearmotors.



**Single Stack - 160 volt**



**Single Stack - 300 volt**

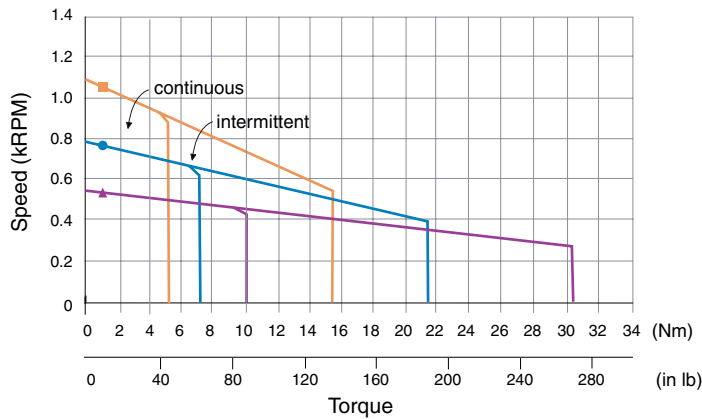


5:1 ————■————

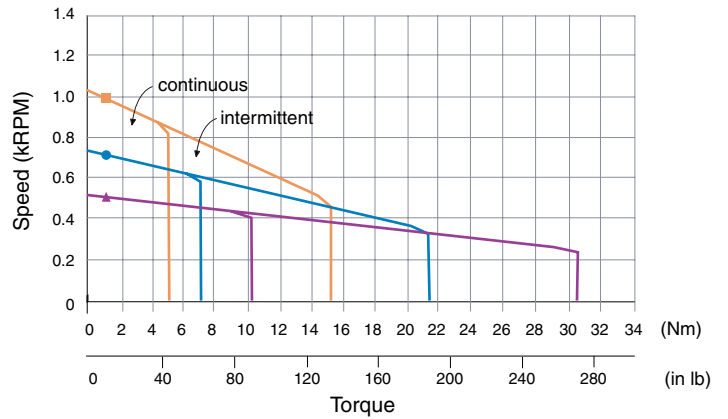
7:1 ————●————

10:1 ————▲————

**Double Stack - 160 volt**



**Double Stack - 300 volt**





## Performance Specifications (six step/trapezoidal commutation)

### Mechanical Specifications

| Frame Size | Stack Length | Weight without Brake |      | Maximum Radial Load |      | Torsional Stiffness |                 | Standard Backlash<br>(arc min) | Low Backlash<br>(arc min) |
|------------|--------------|----------------------|------|---------------------|------|---------------------|-----------------|--------------------------------|---------------------------|
|            |              | (kg)                 | (lb) | (N)                 | (lb) | (Nm/arc min)        | (in lb/arc min) |                                |                           |
| GM060      | Single       | 2.1                  | 4.7  | 1,300               | 292  | 6                   | 53              | 15                             | 10                        |
| GM060      | Double       | 2.8                  | 6.2  | 1,300               | 292  | 6                   | 53              | 15                             | 10                        |

\* Measured at 2% of rated torque

### Single Stack Specifications

| Frame Size | Ratio | Max. Speed <sup>(1)</sup><br>T <sub>C</sub><br>(RPM) | Cont. Stall Torque <sup>(1)</sup><br>T <sub>P</sub> |         | Peak Torque <sup>(1)</sup><br>D:300 Vdc |         | Winding<br>C:160 Vdc<br>K <sub>EL-L</sub> | Voltage Constant <sup>(1)(3)</sup><br>K <sub>TL-L</sub><br>(V/kRPM) | Torque Constant <sup>(1)(3)</sup><br>L <sub>L-L</sub> |             | Induct<br>R <sub>L-L</sub><br>(mH) | Cold Resistance<br>I <sub>C</sub><br>(ohms) | Cont. Current<br>I <sub>P</sub><br>(amps) | Peak Current<br>(amps) | Inertia <sup>(2)</sup>    |                           |
|------------|-------|------------------------------------------------------|-----------------------------------------------------|---------|-----------------------------------------|---------|-------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------|-------------|------------------------------------|---------------------------------------------|-------------------------------------------|------------------------|---------------------------|---------------------------|
|            |       |                                                      | (Nm)                                                | (in lb) | (Nm)                                    | (in lb) |                                           |                                                                     | (Nm/amp)                                              | (in lb/amp) |                                    |                                             |                                           |                        | (gm cm sec <sup>2</sup> ) | (lb in sec <sup>2</sup> ) |
| GM060      | 5:1   | 1,100                                                | 3.1                                                 | 27.5    | 9.3                                     | 82.5    | C                                         | 146.5                                                               | 1.40                                                  | 12.5        | 12.5                               | 11.8                                        | 2                                         | 7                      | 0.23                      | 0.00019                   |
| GM060      | 5:1   | 1,000                                                | 3.1                                                 | 27.5    | 9.3                                     | 82.5    | D                                         | 296.5                                                               | 2.85                                                  | 25.0        | 51.2                               | 48.3                                        | 1                                         | 3                      | 0.23                      | 0.00019                   |
| GM060      | 7:1   | 780                                                  | 4.3                                                 | 38.5    | 13.0                                    | 115.5   | C                                         | 205.1                                                               | 1.96                                                  | 17.5        | 12.5                               | 11.8                                        | 2                                         | 7                      | 0.19                      | 0.00016                   |
| GM060      | 7:1   | 720                                                  | 4.3                                                 | 38.5    | 13.0                                    | 115.5   | D                                         | 415.1                                                               | 3.99                                                  | 35.0        | 51.2                               | 48.3                                        | 1                                         | 3                      | 0.19                      | 0.00016                   |
| GM060      | 10:1  | 540                                                  | 6.2                                                 | 55.0    | 18.6                                    | 165.0   | C                                         | 293.0                                                               | 2.80                                                  | 25.0        | 12.5                               | 11.8                                        | 2                                         | 7                      | 0.19                      | 0.00016                   |
| GM060      | 10:1  | 500                                                  | 6.2                                                 | 55.0    | 18.6                                    | 165.0   | D                                         | 593.0                                                               | 5.70                                                  | 50.0        | 51.2                               | 48.3                                        | 1                                         | 3                      | 0.19                      | 0.00016                   |

### Double Stack Specifications

| Frame Size | Ratio | Max. Speed <sup>(1)</sup><br>T <sub>C</sub><br>(RPM) | Cont. Stall Torque <sup>(1)</sup><br>T <sub>P</sub> |         | Peak Torque <sup>(1)</sup><br>D:300 Vdc |         | Winding<br>C:160 Vdc<br>K <sub>EL-L</sub> | Voltage Constant <sup>(1)(3)</sup><br>K <sub>TL-L</sub><br>(V/kRPM) | Torque Constant <sup>(1)(3)</sup><br>L <sub>L-L</sub> |             | Induct<br>R <sub>L-L</sub><br>(mH) | Cold Resistance<br>I <sub>C</sub><br>(ohms) | Cont. Current<br>I <sub>P</sub><br>(amps) | Peak Current<br>(amps) | Inertia <sup>(2)</sup>    |                           |
|------------|-------|------------------------------------------------------|-----------------------------------------------------|---------|-----------------------------------------|---------|-------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------|-------------|------------------------------------|---------------------------------------------|-------------------------------------------|------------------------|---------------------------|---------------------------|
|            |       |                                                      | (Nm)                                                | (in lb) | (Nm)                                    | (in lb) |                                           |                                                                     | (Nm/amp)                                              | (in lb/amp) |                                    |                                             |                                           |                        | (gm cm sec <sup>2</sup> ) | (lb in sec <sup>2</sup> ) |
| GM060      | 5:1   | 1,100                                                | 5.1                                                 | 45.0    | 15.2                                    | 135.0   | C                                         | 146.5                                                               | 1.40                                                  | 12.5        | 6.2                                | 4.8                                         | 4                                         | 11                     | 0.29                      | 0.00025                   |
| GM060      | 5:1   | 1,000                                                | 5.1                                                 | 45.0    | 15.2                                    | 135.0   | D                                         | 293.0                                                               | 2.80                                                  | 25.0        | 25                                 | 19                                          | 2                                         | 5                      | 0.29                      | 0.00025                   |
| GM060      | 7:1   | 780                                                  | 7.1                                                 | 63.0    | 21.3                                    | 189.0   | C                                         | 205.6                                                               | 1.96                                                  | 17.5        | 6.2                                | 4.8                                         | 4                                         | 11                     | 0.25                      | 0.00022                   |
| GM060      | 7:1   | 720                                                  | 7.1                                                 | 63.0    | 21.3                                    | 189.0   | D                                         | 410.2                                                               | 3.92                                                  | 35.0        | 25                                 | 19                                          | 2                                         | 5                      | 0.25                      | 0.00022                   |
| GM060      | 10:1  | 540                                                  | 10.1                                                | 90.0    | 30.4                                    | 270.0   | C                                         | 293.0                                                               | 2.80                                                  | 25.0        | 6.2                                | 4.8                                         | 4                                         | 11                     | 0.25                      | 0.00022                   |
| GM060      | 10:1  | 500                                                  | 10.1                                                | 90.0    | 30.4                                    | 270.0   | D                                         | 586.0                                                               | 5.60                                                  | 50.0        | 25                                 | 19                                          | 2                                         | 5                      | 0.25                      | 0.00022                   |

Note: Pole Count for GM060 is 6

Thermal Resistance for GM060 is 1.5 °C/W

Stator winding thermal resistance (winding to ambient) is for the unit, mounted to a 254mm x 254mm x 12.7mm (10in x 10in x 0.5in) aluminum plate.

(1) These specifications refer to the output of the GM assembly.

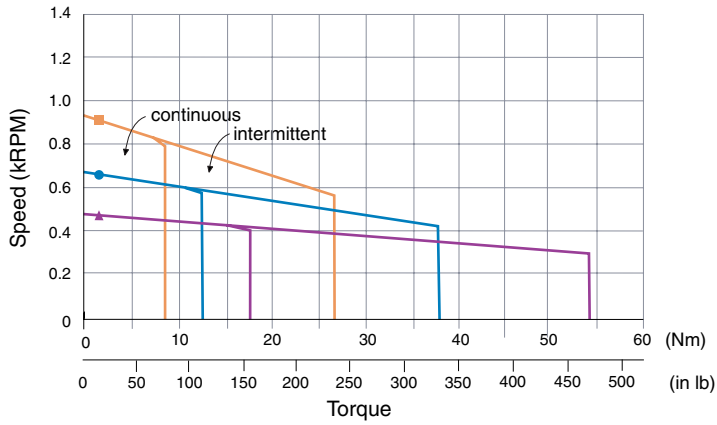
When programming a digital amplifier for use with a GM assembly, these specifications must be adjusted by the ratio to create actual motor performance

(2) Inertia = Motor Rotor + Gear Selection. External Inertia must be divided by the square of the ratio.

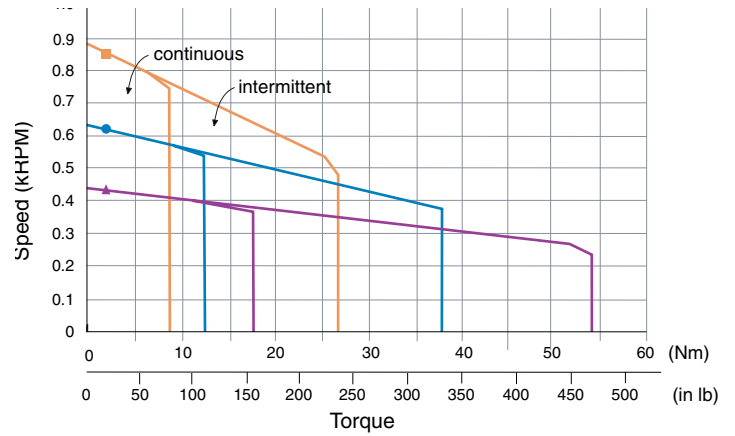
(3) Peak of sine wave

Specification are subject to change without notice

**Single Stack - 160 volt**



**Single Stack - 300 volt**

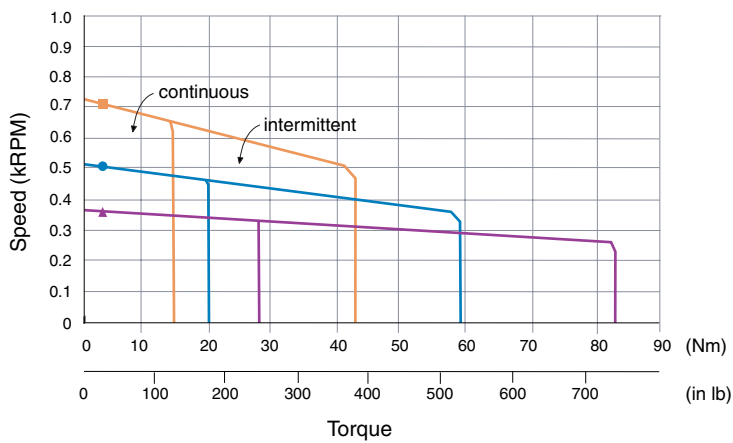


5:1 ————■———

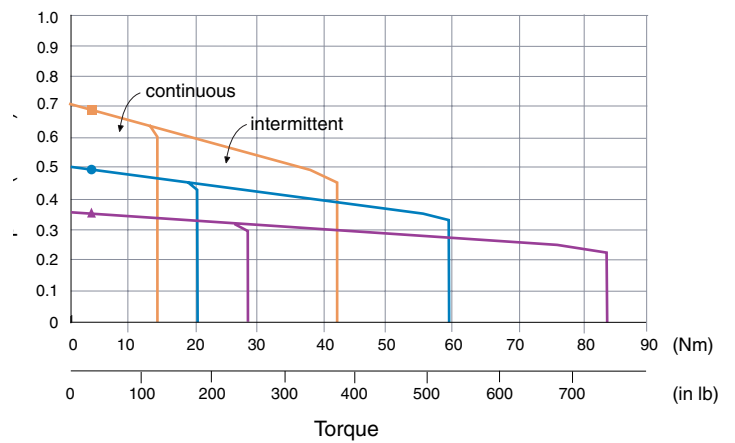
7:1 ————●———

10:1 ————▲———

**Double Stack - 160 volt**



**Double Stack - 300 volt**





## Performance Specifications (six step/trapezoidal commutation)

### Mechanical Specifications

| Frame Size | Stack Length | Weight without Brake |      | Maximum Radial Load |      | Torsional Stiffness |                 | Standard Backlash (arc min) | Low Backlash (arc min) |
|------------|--------------|----------------------|------|---------------------|------|---------------------|-----------------|-----------------------------|------------------------|
|            |              | (kg)                 | (lb) | (N)                 | (lb) | (Nm/arc min)        | (in lb/arc min) |                             |                        |
| GM090      | Single       | 6.0                  | 13.2 | 2,600               | 584  | 11                  | 87              | 15                          | 10                     |
| GM090      | Double       | 7.4                  | 16.3 | 2,600               | 584  | 11                  | 87              | 15                          | 10                     |

\* Measured at 2% of rated torque

### Single Stack Specifications

| Frame Size | Ratio | Max. Speed <sup>(1)</sup><br>T <sub>C</sub> | Cont. Stall Torque <sup>(1)</sup><br>T <sub>P</sub> |         | Peak Torque <sup>(1)</sup><br>D:300 Vdc |         | Winding C:160 Vdc<br>K <sub>EL-L</sub> | Voltage Constant <sup>(1)(3)</sup><br>K <sub>TL-L</sub> | Torque Constant <sup>(1)(3)</sup><br>L <sub>L-L</sub> |             | Induct<br>R <sub>L-L</sub> | Cold Resistance<br>I <sub>C</sub> | Cont. Current<br>I <sub>P</sub> | Peak Current | Inertia <sup>(2)</sup>    |                           |
|------------|-------|---------------------------------------------|-----------------------------------------------------|---------|-----------------------------------------|---------|----------------------------------------|---------------------------------------------------------|-------------------------------------------------------|-------------|----------------------------|-----------------------------------|---------------------------------|--------------|---------------------------|---------------------------|
|            |       | (RPM)                                       | (Nm)                                                | (in lb) | (Nm)                                    | (in lb) |                                        | (V/kRPM)                                                | (Nm/amp)                                              | (in lb/amp) | (mH)                       | (ohms)                            | (amps)                          | (amps)       | (gm cm sec <sup>2</sup> ) | (lb in sec <sup>2</sup> ) |
| GM090      | 5:1   | 900                                         | 8.7                                                 | 77.0    | 26.0                                    | 231.0   | C                                      | 170.5                                                   | 1.65                                                  | 14.5        | 4.5                        | 2.5                               | 5                               | 16           | 1.16                      | 0.00100                   |
| GM090      | 5:1   | 870                                         | 8.7                                                 | 77.0    | 26.0                                    | 231.0   | D                                      | 341.0                                                   | 3.25                                                  | 29.0        | 18.1                       | 10.1                              | 3                               | 8            | 1.16                      | 0.00100                   |
| GM090      | 7:1   | 670                                         | 12.0                                                | 107.0   | 36.1                                    | 321.0   | C                                      | 238.7                                                   | 2.31                                                  | 20.3        | 4.5                        | 2.5                               | 5                               | 16           | 0.94                      | 0.00081                   |
| GM090      | 7:1   | 620                                         | 12.0                                                | 107.0   | 36.1                                    | 321.0   | D                                      | 477.9                                                   | 4.55                                                  | 40.6        | 18.1                       | 10.1                              | 3                               | 8            | 0.94                      | 0.00081                   |
| GM090      | 10:1  | 450                                         | 17.2                                                | 153.0   | 51.7                                    | 459.0   | C                                      | 341.0                                                   | 3.30                                                  | 29.0        | 4.5                        | 2.5                               | 5                               | 16           | 0.94                      | 0.00081                   |
| GM090      | 10:1  | 430                                         | 17.2                                                | 153.0   | 51.7                                    | 459.0   | D                                      | 682.0                                                   | 6.50                                                  | 58.0        | 18.1                       | 10.1                              | 3                               | 8            | 0.94                      | 0.00081                   |

### Double Stack Specifications

| Frame Size | Ratio | Max. Speed <sup>(1)</sup><br>T <sub>C</sub> | Cont. Stall Torque <sup>(1)</sup><br>T <sub>P</sub> |         | Peak Torque <sup>(1)</sup><br>D:300 Vdc |         | Winding C:160 Vdc<br>K <sub>EL-L</sub> | Voltage Constant <sup>(1)(3)</sup><br>K <sub>TL-L</sub> | Torque Constant <sup>(1)(3)</sup><br>L <sub>L-L</sub> |             | Induct<br>R <sub>L-L</sub> | Cold Resistance<br>I <sub>C</sub> | Cont. Current<br>I <sub>P</sub> | Peak Current | Inertia <sup>(2)</sup>    |                           |
|------------|-------|---------------------------------------------|-----------------------------------------------------|---------|-----------------------------------------|---------|----------------------------------------|---------------------------------------------------------|-------------------------------------------------------|-------------|----------------------------|-----------------------------------|---------------------------------|--------------|---------------------------|---------------------------|
|            |       | (RPM)                                       | (Nm)                                                | (in lb) | (Nm)                                    | (in lb) |                                        | (V/kRPM)                                                | (Nm/amp)                                              | (in lb/amp) | (mH)                       | (ohms)                            | (amps)                          | (amps)       | (gm cm sec <sup>2</sup> ) | (lb in sec <sup>2</sup> ) |
| GM090      | 5:1   | 720                                         | 14.0                                                | 124.0   | 41.9                                    | 372.0   | C                                      | 221.5                                                   | 2.10                                                  | 18.5        | 3.8                        | 1.6                               | 7                               | 20           | 1.31                      | 0.00113                   |
| GM090      | 5:1   | 700                                         | 14.0                                                | 124.0   | 41.9                                    | 372.0   | D                                      | 426.0                                                   | 4.05                                                  | 36.0        | 14.1                       | 6.3                               | 3                               | 10           | 1.31                      | 0.00113                   |
| GM090      | 7:1   | 500                                         | 19.5                                                | 173.0   | 58.4                                    | 519.0   | C                                      | 310.1                                                   | 2.94                                                  | 25.9        | 3.8                        | 1.6                               | 7                               | 20           | 1.10                      | 0.00094                   |
| GM090      | 7:1   | 500                                         | 19.5                                                | 173.0   | 58.4                                    | 519.0   | D                                      | 596.4                                                   | 5.67                                                  | 50.4        | 14.1                       | 6.3                               | 3                               | 10           | 1.10                      | 0.00094                   |
| GM090      | 10:1  | 360                                         | 27.8                                                | 247.0   | 83.4                                    | 741.0   | C                                      | 443.0                                                   | 4.20                                                  | 37.0        | 3.8                        | 1.6                               | 7                               | 20           | 1.10                      | 0.00094                   |
| GM090      | 10:1  | 350                                         | 27.8                                                | 247.0   | 83.4                                    | 741.0   | D                                      | 852.0                                                   | 8.10                                                  | 72.0        | 14.1                       | 6.3                               | 3                               | 10           | 1.10                      | 0.00094                   |

Note: Pole Count for GM090 is 8

Thermal Resistance for GM090 is 1.2 °C/W

Stator winding thermal resistance (winding to ambient) is for the unit, mounted to a 254mm x 254mm x 12.7mm (10in x 10in x 0.5in) aluminum plate.

(1) These specifications refer to the output of the GM assembly.

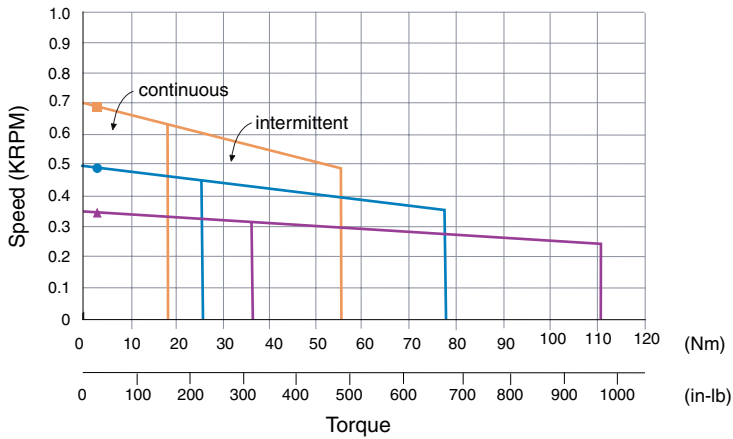
When programming a digital amplifier for use with a GM assembly, these specifications must be adjusted by the ratio to create actual motor performance

(2) Inertia = Motor Rotor + Gear Selection. External Inertia must be divided by the square of the ratio.

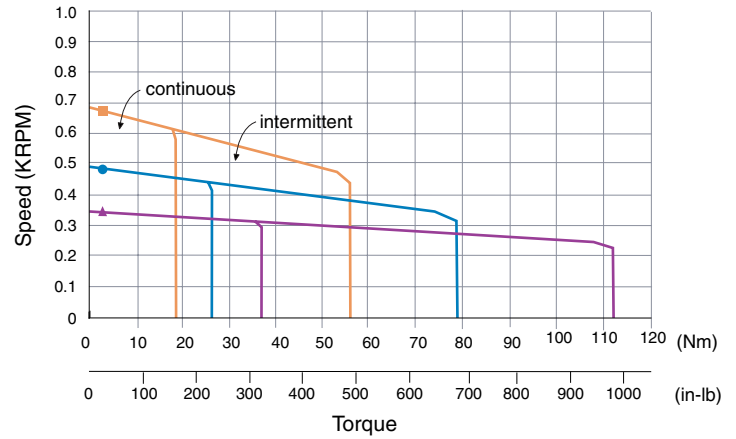
(3) Peak of sine wave

Specification are subject to change without notice

**Single Stack - 160 volt**



**Single Stack - 300 volt**

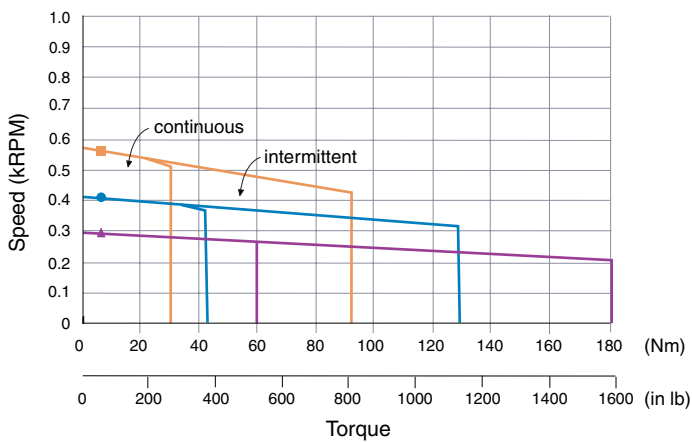


5:1 

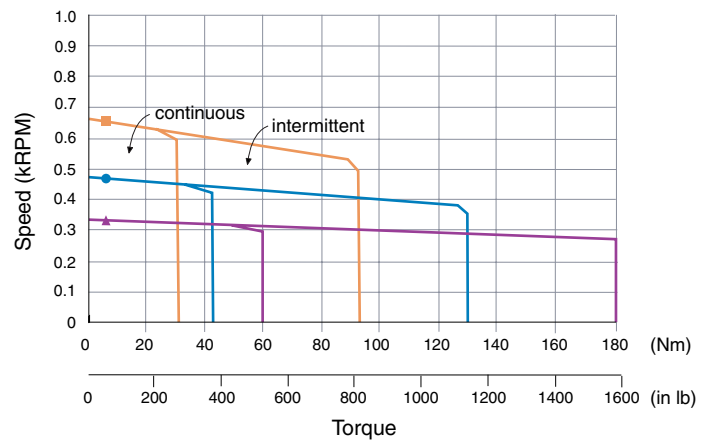
7:1 

10:1 

**Double Stack - 160 volt**



**Double Stack - 300 volt**





## Performance Specifications (six step / trapezoidal commutation)

### Mechanical Specifications

| Frame Size | Stack Length | Weight without Brake |      | Maximum Radial Load |      | Torsional Stiffness |                 | Standard Backlash (arc min) | Low Backlash (arc min) |
|------------|--------------|----------------------|------|---------------------|------|---------------------|-----------------|-----------------------------|------------------------|
|            |              | (kg)                 | (lb) | (N)                 | (lb) | (Nm/arc min)        | (in lb/arc min) |                             |                        |
| GM115      | Single       | 8.4                  | 18.5 | 3,900               | 876  | 20                  | 177             | 15                          | 10                     |
| GM115      | Double       | 10.6                 | 23.4 | 3,900               | 876  | 20                  | 177             | 15                          | 10                     |

\* Measured at 2% of rated torque

### Single Stack Specifications

| Frame Size | Ratio | Max. Speed <sup>(1)</sup><br>T <sub>C</sub> | Cont. Stall Torque <sup>(1)</sup><br>T <sub>P</sub> |         | Peak Torque <sup>(1)</sup><br>D:300 Vdc |         | Winding<br>C:160 Vdc<br>K <sub>EL-L</sub> | Voltage Constant <sup>(1)(3)</sup><br>K <sub>TL-L</sub><br>(V/kRPM) | Torque Constant <sup>(1)(3)</sup><br>L <sub>L-L</sub> |             | Induct<br>R <sub>L-L</sub><br>(mH) | Cold Resistance<br>I <sub>C</sub><br>(ohms) | Cont. Current<br>I <sub>P</sub><br>(amps) | Peak Current<br>(amps) | Inertia <sup>(2)</sup>    |                           |
|------------|-------|---------------------------------------------|-----------------------------------------------------|---------|-----------------------------------------|---------|-------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------|-------------|------------------------------------|---------------------------------------------|-------------------------------------------|------------------------|---------------------------|---------------------------|
|            |       | (RPM)                                       | (Nm)                                                | (in lb) | (Nm)                                    | (in lb) |                                           |                                                                     | (Nm/amp)                                              | (in lb/amp) |                                    |                                             |                                           |                        | (gm cm sec <sup>2</sup> ) | (lb in sec <sup>2</sup> ) |
| GM115      | 5:1   | 700                                         | 18.2                                                | 162     | 54.7                                    | 486     | C                                         | 228.0                                                               | 2.15                                                  | 19.5        | 2.9                                | 1.2                                         | 8                                         | 25                     | 4.33                      | 0.00375                   |
| GM115      | 5:1   | 680                                         | 18.2                                                | 162     | 54.7                                    | 486     | D                                         | 438.0                                                               | 4.15                                                  | 37.0        | 10.7                               | 4.7                                         | 4                                         | 13                     | 4.33                      | 0.00375                   |
| GM115      | 7:1   | 500                                         | 25.4                                                | 227     | 76.6                                    | 681     | C                                         | 319.2                                                               | 3.01                                                  | 27.3        | 2.9                                | 1.2                                         | 8                                         | 25                     | 3.54                      | 0.00306                   |
| GM115      | 7:1   | 480                                         | 25.4                                                | 227     | 76.6                                    | 681     | D                                         | 613.2                                                               | 5.81                                                  | 51.8        | 10.7                               | 4.7                                         | 4                                         | 13                     | 3.54                      | 0.00306                   |
| GM115      | 10:1  | 350                                         | 36.5                                                | 324     | 109.4                                   | 972     | C                                         | 456.0                                                               | 4.30                                                  | 39.0        | 2.9                                | 1.2                                         | 8                                         | 25                     | 3.54                      | 0.00306                   |
| GM115      | 10:1  | 340                                         | 36.5                                                | 324     | 109.4                                   | 972     | D                                         | 876.0                                                               | 8.30                                                  | 74.0        | 10.7                               | 4.7                                         | 4                                         | 13                     | 3.54                      | 0.00306                   |

### Double Stack Specifications

| Frame Size | Ratio | Max. Speed <sup>(1)</sup><br>T <sub>C</sub> | Cont. Stall Torque <sup>(1)</sup><br>T <sub>P</sub> |         | Peak Torque <sup>(1)</sup><br>D:300 Vdc |         | Winding<br>C:160 Vdc<br>K <sub>EL-L</sub> | Voltage Constant <sup>(1)(3)</sup><br>K <sub>TL-L</sub><br>(V/kRPM) | Torque Constant <sup>(1)(3)</sup><br>L <sub>L-L</sub> |             | Induct<br>R <sub>L-L</sub><br>(mH) | Cold Resistance<br>I <sub>C</sub><br>(ohms) | Cont. Current<br>I <sub>P</sub><br>(amps) | Peak Current<br>(amps) | Inertia <sup>(2)</sup>    |                           |
|------------|-------|---------------------------------------------|-----------------------------------------------------|---------|-----------------------------------------|---------|-------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------|-------------|------------------------------------|---------------------------------------------|-------------------------------------------|------------------------|---------------------------|---------------------------|
|            |       | (RPM)                                       | (Nm)                                                | (in lb) | (Nm)                                    | (in lb) |                                           |                                                                     | (Nm/amp)                                              | (in lb/amp) |                                    |                                             |                                           |                        | (gm cm sec <sup>2</sup> ) | (lb in sec <sup>2</sup> ) |
| GM115      | 5:1   | 570                                         | 30.1                                                | 267     | 90.2                                    | 801     | C                                         | 280.5                                                               | 2.70                                                  | 23.5        | 2.2                                | 0.73                                        | 11                                        | 34                     | 6.28                      | 0.00544                   |
| GM115      | 5:1   | 650                                         | 30.1                                                | 267     | 90.2                                    | 801     | D                                         | 455.5                                                               | 4.35                                                  | 38.5        | 5.8                                | 1.9                                         | 7                                         | 21                     | 6.28                      | 0.0054                    |
| GM115      | 7:1   | 400                                         | 42.0                                                | 373     | 125.9                                   | 1,119   | C                                         | 392.7                                                               | 3.78                                                  | 32.9        | 2.2                                | 0.73                                        | 11                                        | 34                     | 5.50                      | 0.00475                   |
| GM115      | 7:1   | 470                                         | 42.0                                                | 373     | 125.9                                   | 1,119   | D                                         | 637.7                                                               | 6.09                                                  | 53.9        | 5.8                                | 1.9                                         | 7                                         | 21                     | 5.50                      | 0.00475                   |
| GM115      | 10:1  | 280                                         | 60.0                                                | 533     | 179.9                                   | 1,599   | C                                         | 561.0                                                               | 5.40                                                  | 47.0        | 2.2                                | 0.73                                        | 11                                        | 34                     | 5.50                      | 0.00475                   |
| GM115      | 10:1  | 320                                         | 60.0                                                | 533     | 179.9                                   | 1,599   | D                                         | 911.0                                                               | 8.70                                                  | 77.0        | 5.8                                | 1.9                                         | 7                                         | 21                     | 5.50                      | 0.00475                   |

Note: Pole Count for GM115 is 12

Thermal Resistance for GM115 is 0.95 °C/W

Stator winding thermal resistance (winding to ambient) is for the unit, mounted to a 254mm x 254mm x 12.7mm (10in x 10in x 0.5in) aluminum plate.

(1) These specifications refer to the output of the GM assembly.

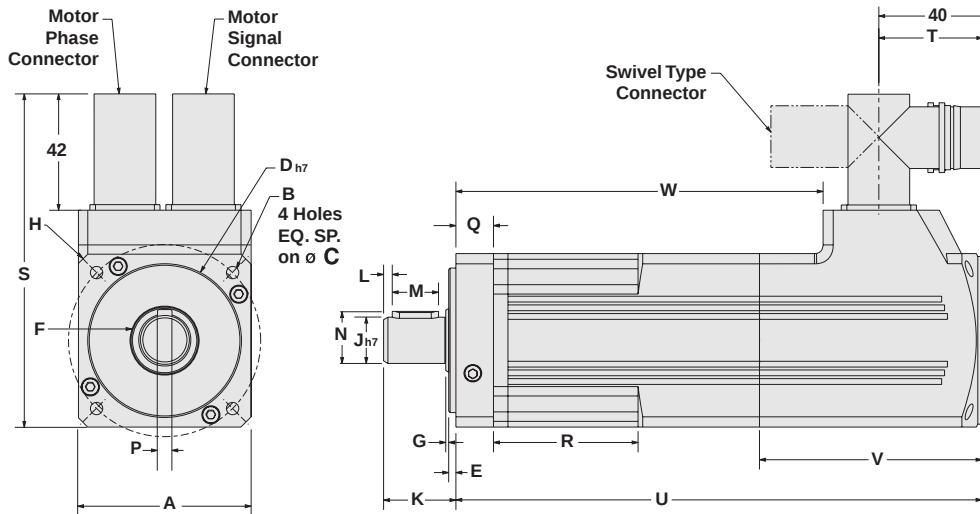
When programming a digital amplifier for use with a GM assembly, these specifications must be adjusted by the ratio to create actual motor performance

(2) Inertia = Motor Rotor + Gear Selection. External Inertia must be divided by the square of the ratio.

(3) Peak of sine wave

Specification are subject to change without notice

## Dimensions



## METRIC SIZES

| Frame Size | A             |      | B         |      | C                    |       | D              |       | E            |      | F                 |      | G               |      | H                |      | J              |      |
|------------|---------------|------|-----------|------|----------------------|-------|----------------|-------|--------------|------|-------------------|------|-----------------|------|------------------|------|----------------|------|
|            | Square Flange |      | Bolt Hole |      | Bolt Circle Diameter |       | Pilot Diameter |       | Pilot Thick. |      | Shoulder Diameter |      | Shoulder Height |      | Housing Diameter |      | Shaft Diameter |      |
|            | (mm)          | (in) | (mm)      | (in) | (mm)                 | (in)  | (mm)           | (in)  | (mm)         | (in) | (mm)              | (in) | (mm)            | (in) | (mm)             | (in) | (mm)           | (in) |
| GM060      | 60            | 2.36 | 5.5       | 0.22 | 70                   | 2.756 | 50             | 1.969 | 2.5          | 0.1  | 23                | 0.91 | 1.0             | 0.04 | 80               | 3.15 | 16             | 0.63 |
| GM090      | 90            | 3.54 | 6.5       | 0.26 | 100                  | 3.94  | 80             | 3.15  | 3.0          | 0.12 | 36                | 1.42 | 1.0             | 0.04 | 116              | 4.57 | 20             | 0.79 |
| GM115      | 115           | 4.53 | 8.5       | 0.33 | 130                  | 5.12  | 110            | 4.33  | 3.5          | 0.14 | 36                | 1.42 | 1.5             | 0.6  | 152              | 5.95 | 24             | 0.94 |

| Frame Size | K            |      | L                   |       | M             |       | N             |       | P            |      | Q            |      | R             |       | S      |      | T                  |       |
|------------|--------------|------|---------------------|-------|---------------|-------|---------------|-------|--------------|------|--------------|------|---------------|-------|--------|------|--------------------|-------|
|            | Shaft Length |      | Dist From Shaft End |       | Keyway Length |       | Keyway Height |       | Keyway Width |      | Flange Thick |      | Recess Length |       | Height |      | Connector Location |       |
|            | (mm)         | (in) | (mm)                | (in)  | (mm)          | (in)  | (mm)          | (in)  | (mm)         | (in) | (mm)         | (in) | (mm)          | (in)  | (mm)   | (in) | (mm)               | (in)  |
| GM060      | 25.0         | 0.98 | 3                   | 0.118 | 16            | 0.630 | 18.0          | 0.709 | 5            | 0.20 | 13           | 0.51 | 50.0          | 1.969 | 117    | 4.60 | 37                 | 1.457 |
| GM090      | 40.0         | 1.57 | 5                   | 0.20  | 28            | 1.10  | 22.5          | 0.886 | 6            | 0.24 | 17           | 0.67 | 54.5          | 2.15  | 147    | 5.79 | 39                 | 1.535 |
| GM115      | 50.0         | 1.97 | 7                   | 0.28  | 32            | 1.26  | 27.0          | 1.063 | 8            | 0.32 | 20           | 0.79 | 55.5          | 2.18  | 175    | 6.89 | 46                 | 1.811 |

## NEMA SIZES

| Frame Size | B         |      | C           |       | D              |      | J                     |      | K                   |      | M             |           | N             |          | P            |      |
|------------|-----------|------|-------------|-------|----------------|------|-----------------------|------|---------------------|------|---------------|-----------|---------------|----------|--------------|------|
|            | Bolt Hole |      | Bolt Circle |       | Pilot Diameter |      | Output Shaft Diameter |      | Output Shaft Length |      | Keyway Length |           | Keyway Height |          | Keyway Width |      |
|            | (in)      | (mm) | (in)        | (mm)  | (in)           | (mm) | (in)                  | (mm) | (in)                | (mm) | (in)          | (mm)      | (in)          | (mm)     | (in)         | (mm) |
| GM023      | 0.195     | 5.0  | 2.625       | 66.7  | 1.500          | 38.1 | 0.375                 | 9.5  | 1.000               | 25.4 | 0.750 flat    | 19.1 flat | 0.015 flat    | 0.4 flat | —            | —    |
| GM034      | 0.218     | 5.5  | 3.875       | 98.4  | 2.875          | 73.0 | 0.500                 | 12.7 | 1.250               | 31.8 | 1.063         | 27.0      | 0.072         | 1.8      | 0.125        | 3.2  |
| GM042      | 0.281     | 7.1  | 4.950       | 125.7 | 2.187          | 55.5 | 0.625                 | 15.9 | 1.500               | 38.1 | 1.130         | 28.7      | 0.108         | 2.7      | 0.188        | 4.8  |



## Single Stack

## Double Stack

| Options                                            | U<br>Length |       | V<br>Rear Cover Length |      | W<br>Flange Offset |      | U<br>Length |       | V<br>Rear Cover Length |      | W<br>Flange Offset |       |
|----------------------------------------------------|-------------|-------|------------------------|------|--------------------|------|-------------|-------|------------------------|------|--------------------|-------|
|                                                    | (mm)        | (in)  | (mm)                   | (in) | (mm)               | (in) | (mm)        | (in)  | (mm)                   | (in) | (mm)               | (in)  |
| GM060 Single Stack – Encoder or Resolver           | 178         | 7.01  | 70                     | 2.76 | 121                | 4.76 | 219.2       | 8.63  | 70                     | 2.76 | 162.2              | 6.39  |
| GM060 Single Stack – Encoder or Resolver and Brake | 203         | 7.99  | 95                     | 3.74 | 143                | 5.63 | 244.2       | 9.61  | 95                     | 3.74 | 184.2              | 7.25  |
| GM060 Double Stack – Encoder or Resolver           | 216         | 8.5   | 70                     | 2.76 | 159                | 6.26 | 257.2       | 10.13 | 70                     | 2.76 | 200.2              | 7.88  |
| GM060 Double Stack – Encoder or Resolver and Brake | 241         | 9.46  | 95                     | 3.74 | 181                | 7.12 | 282.2       | 11.11 | 95                     | 3.74 | 222.2              | 8.75  |
| GM090 Single Stack – Encoder or Resolver           | 202.3       | 7.96  | 83                     | 3.27 | 143.3              | 5.64 | 259.3       | 10.21 | 83                     | 3.27 | 200.3              | 7.89  |
| GM090 Single Stack – Encoder or Resolver and Brake | 230.3       | 9.07  | 111                    | 4.37 | 171                | 6.73 | 287.3       | 11.31 | 111                    | 4.37 | 228                | 8.98  |
| GM090 Double Stack – Encoder or Resolver           | 240.4       | 9.46  | 83                     | 3.27 | 181.4              | 7.14 | 297.4       | 11.71 | 83                     | 3.27 | 238.4              | 9.39  |
| GM090 Double Stack – Encoder or Resolver and Brake | 268.4       | 10.57 | 111                    | 4.37 | 209.1              | 8.23 | 325.4       | 12.81 | 111                    | 4.37 | 266.1              | 10.48 |
| GM115 Single Stack – Encoder or Resolver           | 207.2       | 8.16  | 70                     | 2.76 | 147.3              | 5.8  | 276.2       | 10.87 | 70                     | 2.76 | 216.3              | 8.52  |
| GM115 Single Stack – Encoder or Resolver and Brake | 240.2       | 9.46  | 103                    | 4.06 | 170.3              | 6.7  | 309.2       | 12.17 | 103                    | 4.06 | 239.3              | 10.02 |
| GM115 Double Stack – Encoder or Resolver           | 245.3       | 9.66  | 70                     | 2.76 | 185.4              | 7.3  | 314.3       | 12.37 | 70                     | 2.76 | 254.4              | 2.14  |
| GM115 Double Stack – Encoder or Resolver and Brake | 278.3       | 10.96 | 103                    | 4.06 | 208.4              | 8.2  | 347.3       | 13.67 | 103                    | 4.06 | 277.4              | 10.92 |

## Encoder Specifications (All GM Frame Sizes)

|                   |                                                                                                          |
|-------------------|----------------------------------------------------------------------------------------------------------|
| Resolution        | 2,000 LPR (8,000 LPR)                                                                                    |
| Electrical Input: | 5 Vdc, 125 ma maximum (plus interface loads)                                                             |
| Encoder Output:   | A, B, I, $\bar{A}$ , $\bar{B}$ , $\bar{I}$<br>Differential, TTL compatible<br>Frequency Response 500 Khz |

## Resolver Specification (All Frame Sizes)

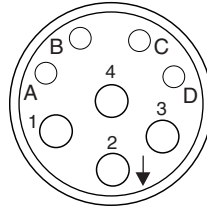
|                      |            |       |
|----------------------|------------|-------|
| Frequency            | Hz         | 5,000 |
| Input Voltage        | Vrms       | 4.0   |
| Input Current        | ma max.    | 23    |
| Input Power          | Watts nom. | 0.045 |
| Transformation Ratio | $\pm 10\%$ | 0.50  |
| Output voltage       | Vrms       | 2.0   |
| Sensitivity          | mv / Deg   | 35    |

## Brake Specification

| Frame Size | Static Holding Torque |         | Voltage | Current | Resistance | Inertia                   |                           |
|------------|-----------------------|---------|---------|---------|------------|---------------------------|---------------------------|
|            | (Nm)                  | (in lb) | (V)     | (amps)  | (ohms)     | (gm cm sec <sup>2</sup> ) | (oz in sec <sup>2</sup> ) |
| GM060      | 0.33                  | 3.0     | 24 Vdc  | 0.19    | 131        | $4.32 \times 10^{-8}$     | $6.0 \times 10^{-10}$     |
| GM090      | 5.64                  | 50      | 24 Vdc  | 0.30    | 65         | $4.32 \times 10^{-8}$     | $6.0 \times 10^{-10}$     |
| GM115      | 5.64                  | 50      | 24 Vdc  | 0.30    | 65         | $2.5 \times 10^{-7}$      | $3.5 \times 10^{-9}$      |

### DIN Motor Power Connection

| Pin Number | Function     |
|------------|--------------|
| 1          | U            |
| 4          | V            |
| 3          | W            |
| 2          | Chassis Gnd. |
| A          | Thermistor + |
| B          | Thermistor - |
| C          | Brake +      |
| D          | Brake -      |
| —          | Shield       |



Power



### Motor Power Mating Connector

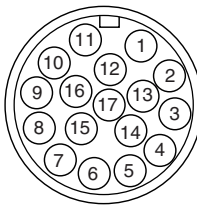
| Manufacturer | Part Number    | Description             |
|--------------|----------------|-------------------------|
| Hypertac     | LPNA08BFRKB170 | Body                    |
|              | 020.232.2000   | 4 Pins Female 18-26 AWG |
|              | 020.090.1020   | 4 Pins Female 16-20 AWG |

### Motor Power Cable

| Part Number   | Length  | Used With    |
|---------------|---------|--------------|
| 10963093-3000 | 3 meter | Flying Leads |
| 10963093-8000 | 8 meter | Flying Leads |

### DIN Sensor Connector Details

| Pin Number | Function      |              | Mating Cable<br>i-Drive Conn.<br>Pin Number |
|------------|---------------|--------------|---------------------------------------------|
|            | Encoder       | Resolver     |                                             |
| 1          | A +           | S1 (SIN+)    | 1                                           |
| 2          | B +           | S4 (COS+)    | 2                                           |
| 7          | +5V           | R2 (Ref+)    | 7                                           |
| 8          | Shield        | Shield       | 8                                           |
| 9          | A -           | S3 (SIN-)    | 9                                           |
| 10         | B -           | S2 (COS-)    | 10                                          |
| 15         | Gnd           | R1 (REF-)    | 15                                          |
| 12         | Spare         | Spare        | —                                           |
| 5          | I +           | —            | 5                                           |
| 13         | I -           | —            | 13                                          |
| 3          | Hall 1 (S1)   | —            | —                                           |
| 11         | Hall 2 (S2)   | —            | —                                           |
| 4          | Hall 3 (S3)   | —            | —                                           |
| 16         | Thermistor +  | Thermistor + | —                                           |
| 17         | Thermistor -  | Thermistor - | —                                           |
| 6 & 14     | No Connection |              | —                                           |



Sensor



### Motor Sensor Mating Connector

| Manufacturer | Part Number  | Description    |
|--------------|--------------|----------------|
| Hypertac     | SPNA17HFRON  | Body           |
|              | 020.256.1020 | 17 Pins Female |

### Mating Sensor Cable

| Part Number   | Length  | Used With    |
|---------------|---------|--------------|
| 10963123-3000 | 3 meter | Flying Leads |
| 10963123-8000 | 8 meter | Flying Leads |

### Flying Leads from out of the Motor (All GM Frame Sizes)

#### Power

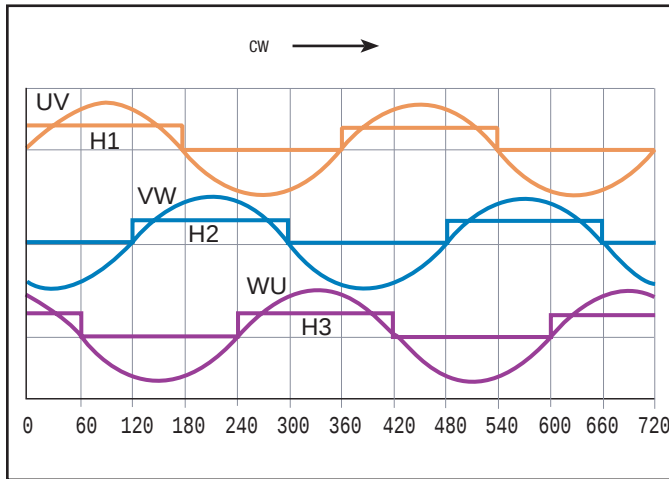
| Function | Color Code |
|----------|------------|
| U        | Red        |
| V        | Black      |
| W        | White      |
| Ground   | Green      |

#### Encoder

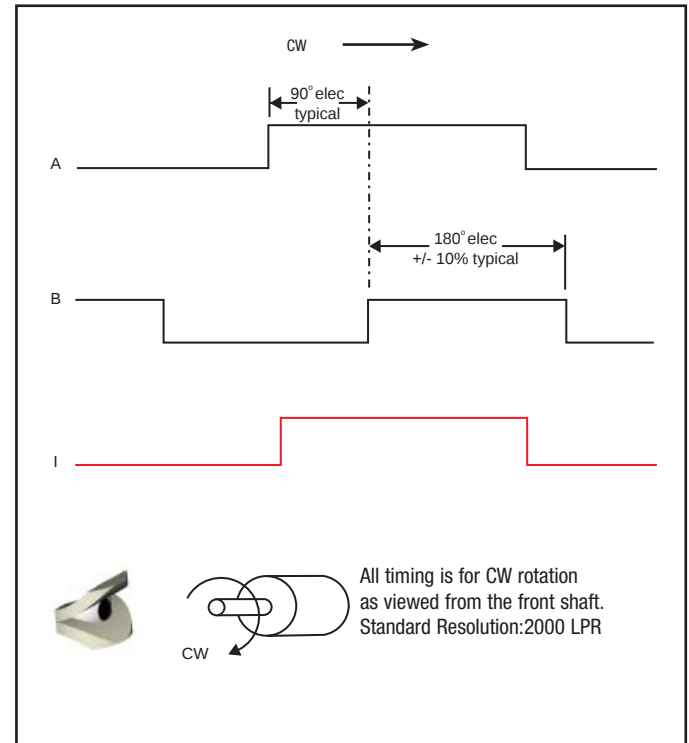
| Function | Color Code     |
|----------|----------------|
| A-       | White          |
| A+       | Brown          |
| B-       | Green          |
| B+       | Blue           |
| I-       | Yellow         |
| I+       | Orange         |
| S2       | Violet         |
| S1       | White / Brown  |
| S3       | White / Orange |
| +5V      | Red            |
| GND      | Black          |
| T1       | White / Red    |
| T2       | White / Black  |



## Motor Signal Timing (C/D winding) at motor connector



## Encoder Timing



Order Numbering Example: **G M 0 6 0 - B 1 C 1 D**

### FRAME SIZE

**Metric**  
060  
090  
115

**NEMA**  
023  
034  
042

### RATIO

B = 5:1  
C = 7:1  
D = 10:1  
E = 15:1  
F = 20:1  
G = 25:1  
H = 30:1  
J = 50:1  
K = 70:1  
L = 100:1

### STACK LENGTH

1 = Single  
2 = Double

### WINDING

C = 160Vdc  
D = 300Vdc

### OPTIONS

1 = 2000 Line (1)  
Encoder  
2 = 2000 Line (1)  
Encoder, Brake  
3 = Resolver  
4 = Resolver, Brake

(1) Includes commutation signals

### CONNECTOR

B = MIL Connector  
D = DIN Connector  
F = Flying Leads (450mm/18in)  
P = Parker standard Din Connector

## How to Order

Gearmotors are supported by a worldwide network of offices and local distributors. Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor. Information can also be obtained at [www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com)

Specifications are subject to change without notice.

# Servo Wheel Series:

## Compact Wheel Drives for Electric Vehicles



Combining servo motor, gearing and wheel design makes system integration easy.



# Servo Wheel Series: Design Features

The Servo Wheel™ combines a brushless DC motor with planetary gears in a lightweight, aluminum housing to provide a compact solution for vehicle control. The Power Wheel's unique design makes system integration easy. You no longer have to purchase the motor, gearhead, wheel, electronics and

bracket from different sources. Parker Bayside does all of the work for you. From component sourcing to actual assembly, Parker Bayside engineers designed the Power Wheel with your application in mind.

**All you have to do is bolt it up and go!**



## SINGLE-PIECE CONSTRUCTION MOTOR SHAFT

The first stage's planetary section sun gear is integrated into the single-piece construction motor shaft, to provide higher reliability in a compact package.



## PLANETARY GEARS

The planetary input stage provides a first pass reduction that is capable of carrying high torques with high input speeds in a small package.



## INTEGRATED OUTPUT STAGE

The second stage planetary's unique design uses two planets for higher efficiency. Built entirely into the wheel, it utilizes an otherwise wasted area to provide a compact, space-saving package. Two large diameter bearings support the weight, protecting the gears from shock loading and dramatically increasing the radial load carrying capacity of the wheels.

# Compact Wheel Drives for Electric Vehicles



**Parker Baysides NEW Servo Wheel™ Drive System features state-of-the-art technology to provide motion for small, battery-powered, electric vehicles, including:**

- ▶ Automated Cleaning Equipment
- ▶ Robotic/Material Handling Equipment
- ▶ Healthcare Equipment
- ▶ AGV's

### **Parker Bayside's Servo Wheel features:**

**BRUSHLESS DC MOTOR AMPLIFIERS** designed for common motion profiles in battery powered vehicles to provide:

- ▶ 12, 24, 36 and 48 volt operation
- ▶ Current and temperature feedback control for safe, reliable operation
- ▶ Multiple input architectures for easy communication with higher-level controllers and navigation systems

### **PERMANENT MAGNET BRUSHLESS MOTORS** to provide:

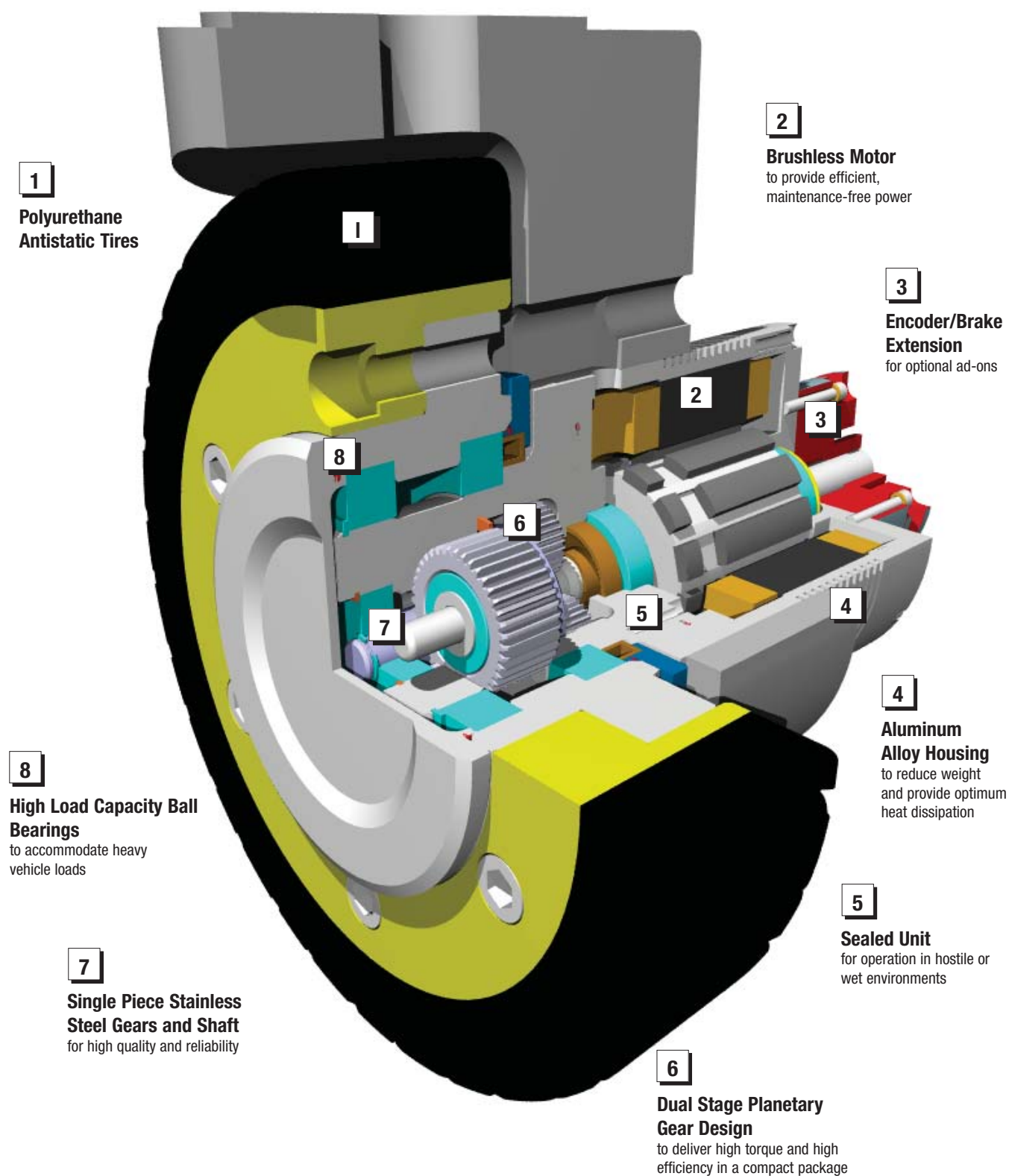
- ▶ High efficiency for longer run times between battery charges
- ▶ Greater power to size ratio for a compact package
- ▶ Integral hall sensors for motor TRAP commutation
- ▶ Long life and maintenance free-operation
- ▶ High input speeds in excess of 10,000 RPM
- ▶ No internal sparking – safe in explosive environments
- ▶ Low EMI, eliminating the need for heavy shielding

### **PLANETARY GEARS** to provide high torque-carrying capability in a small package.

The gears are built into the hub of the wheel, making the package compact and lightweight. This design also increases the radial load-carrying and shock loading capacity of the entire system.

Polyurethane tires are ideal for applications in hospitals, schools, and airports – any place requiring non-marking materials. This material is also ideal for high load carrying applications like material handling.





# Servo Wheel Series

## Performance Specifications

| Tire Diameter            |                 | 152mm (6in)       |              |              |              |              |              | 203mm (8in)   |              |              |              |
|--------------------------|-----------------|-------------------|--------------|--------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|
| Speed Code<br>Gear Ratio |                 | 20                |              |              | 25           | 30           | 36           | 20            | 25           | 30           | 36           |
| Motor Code               | Power Cont. (W) |                   |              |              |              |              |              |               |              |              |              |
| 1                        | 400             | Max Speed         | Km/hr<br>MPH | 5.5<br>3.4   | 4.4<br>2.7   | 3.6<br>2.3   | 3.0<br>1.9   | 7.3<br>4.5    | 5.8<br>3.6   | 4.9<br>3.0   | 4.0<br>2.5   |
|                          |                 | Peak Torque       | Nm<br>in lb  | 62<br>551    | 78<br>689    | 93<br>827    | 112<br>992   | 62<br>551     | 78<br>689    | 93<br>827    | 112<br>992   |
|                          |                 | Continuous Torque | Nm<br>in lb  | 21<br>184    | 26<br>230    | 31<br>276    | 37<br>331    | 21<br>184     | 26<br>230    | 31<br>276    | 37<br>331    |
| 2                        | 450             | Max Speed         | Km/hr<br>MPH | 4.61<br>2.86 | 3.69<br>2.29 | 3.08<br>1.91 | 2.56<br>1.59 | 6.16<br>3.83  | 4.93<br>3.06 | 4.11<br>2.55 | 3.42<br>2.13 |
|                          |                 | Peak Torque       | Nm<br>in lb  | 83<br>735    | 104<br>919   | 125<br>1,103 | 149<br>1,323 | 83<br>735     | 104<br>919   | 125<br>1,103 | 149<br>1,323 |
|                          |                 | Continuous Torque | Nm<br>in lb  | 28<br>245    | 35<br>306    | 42<br>368    | 50<br>441    | 28<br>245     | 35<br>306    | 42<br>368    | 50<br>441    |
| 3                        | 1000            | Max Speed         | Km/hr<br>MPH | 4.58<br>2.85 | 3.67<br>2.28 | 3.06<br>1.90 | 3.40<br>2.11 | 6.12<br>3.80  | 4.90<br>3.04 | 4.08<br>2.53 | 3.40<br>2.11 |
|                          |                 | Peak Torque       | Nm<br>in lb  | 197<br>1,748 | 247<br>2,184 | 296<br>2,621 | 355<br>3,146 | 1.97<br>1,748 | 247<br>2,184 | 296<br>2,621 | 355<br>3,145 |
|                          |                 | Continuous Torque | Nm<br>in lb  | 66<br>583    | 82<br>728    | 99<br>874    | 118<br>1,049 | 66<br>583     | 82<br>728    | 99<br>874    | 118<br>1,049 |
| ALL TIRES                |                 | Load Capacity     | kg<br>lb     | 454<br>1,000 |              |              |              | 454<br>1,000  |              |              |              |

## Antistatic Tires

|      |   |                             |
|------|---|-----------------------------|
| Code | R | Polyurethane Black Smooth   |
|      | S | Polyurethane Black x Thread |

## Operating Voltages

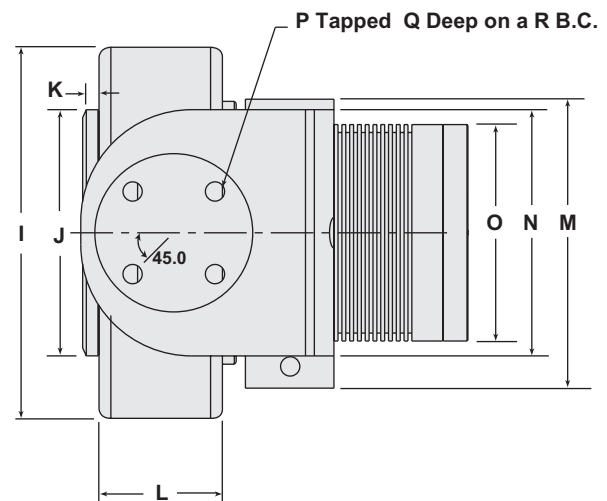
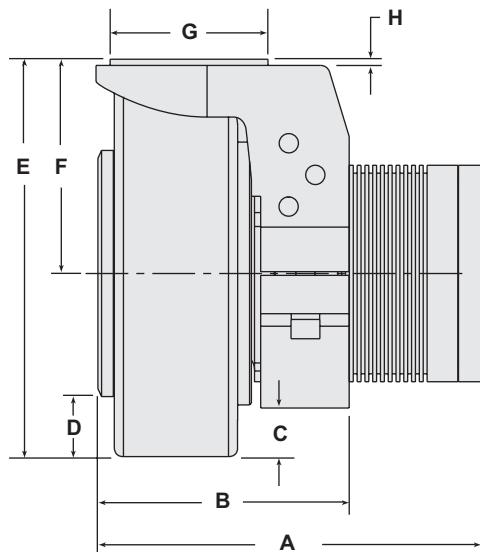
|       |    |
|-------|----|
| Code  | K  |
| Volts | 24 |

## Brake

|      |   |          |
|------|---|----------|
| Code | 0 | None     |
|      | 3 | 50 in-lb |



## Dimensions



| Model Number | Motor Power | A*<br>without Brake |      | B     |      | C    |      | D    |      | E     |      | F     |      |
|--------------|-------------|---------------------|------|-------|------|------|------|------|------|-------|------|-------|------|
|              |             | (mm)                | (in) | (mm)  | (in) | (mm) | (in) | (mm) | (in) | (mm)  | (in) | (mm)  | (in) |
| DX6          | 150         | 158.75              | 6.25 | 104.1 | 4.1  | 20.3 | 0.8  | 25.4 | 1.0  | 165.1 | 6.5  | 87.9  | 3.46 |
|              | 300         | 175.26              | 6.90 | 104.1 | 4.1  | 20.3 | 0.8  | 25.4 | 1.0  | 165.1 | 6.5  | 87.9  | 3.46 |
|              | 746         | 191.77              | 7.55 | 104.1 | 4.1  | 20.3 | 0.8  | 25.4 | 1.0  | 165.1 | 6.5  | 87.9  | 3.46 |
| DX8          | 150         | 158.75              | 6.25 | 104.1 | 4.1  | 45.7 | 1.8  | 50.8 | 2.0  | 218.4 | 8.6  | 116.8 | 4.60 |
|              | 300         | 175.26              | 6.90 | 104.1 | 4.1  | 45.7 | 1.8  | 50.8 | 2.0  | 218.4 | 8.6  | 116.8 | 4.60 |
|              | 746         | 191.77              | 7.55 | 104.1 | 4.1  | 45.7 | 1.8  | 50.8 | 2.0  | 218.4 | 8.6  | 116.8 | 4.60 |

| Model Number | Motor Power | G    |       | H    |      | I     |      | J     |      | K    |      | L    |      |
|--------------|-------------|------|-------|------|------|-------|------|-------|------|------|------|------|------|
|              |             | (mm) | (in)  | (mm) | (in) | (mm)  | (in) | (mm)  | (in) | (mm) | (in) | (mm) | (in) |
| DX6          | 150         | 65.0 | 2.559 | 2.54 | 0.1  | 152.4 | 6.0  | 101.1 | 3.98 | 6.86 | 0.27 | 50.8 | 2.0  |
|              | 300         | 65.0 | 2.559 | 2.54 | 0.1  | 152.4 | 6.0  | 101.1 | 3.98 | 6.86 | 0.27 | 50.8 | 2.0  |
|              | 746         | 65.0 | 2.559 | 2.54 | 0.1  | 152.4 | 6.0  | 101.1 | 3.98 | 6.86 | 0.27 | 50.8 | 2.0  |
| DX8          | 150         | 65.0 | 2.559 | 2.54 | 0.1  | 203.2 | 8.0  | 101.1 | 3.98 | 6.86 | 0.27 | 50.8 | 2.0  |
|              | 300         | 65.0 | 2.559 | 2.54 | 0.1  | 203.2 | 8.0  | 101.1 | 3.98 | 6.86 | 0.27 | 50.8 | 2.0  |
|              | 746         | 65.0 | 2.559 | 2.54 | 0.1  | 203.2 | 8.0  | 101.1 | 3.98 | 6.86 | 0.27 | 50.8 | 2.0  |

| Model Number | Motor Power | M     |      | N     |      | O    |      | P    |      | Q    |      | R     |       |
|--------------|-------------|-------|------|-------|------|------|------|------|------|------|------|-------|-------|
|              |             | (mm)  | (in) | (mm)  | (in) | (mm) | (in) | (mm) | (in) | (mm) | (in) | (mm)  | (in)  |
| DX6          | 150         | 118.6 | 4.67 | 101.1 | 3.98 | 88.9 | 3.5  | 7.94 | 5.16 | 25.4 | 1.0  | 47.98 | 1.889 |
|              | 300         | 118.6 | 4.67 | 101.1 | 3.98 | 88.9 | 3.5  | 7.94 | 5.16 | 25.4 | 1.0  | 47.98 | 1.889 |
|              | 746         | 118.6 | 4.67 | 101.1 | 3.98 | 100  | 3.94 | 7.94 | 5.16 | 25.4 | 1.0  | 47.98 | 1.889 |
| DX8          | 150         | 118.6 | 4.67 | 101.1 | 3.98 | 88.9 | 3.5  | 7.94 | 5.16 | 25.4 | 1.0  | 47.98 | 1.889 |
|              | 300         | 118.6 | 4.67 | 101.1 | 3.98 | 88.9 | 3.5  | 7.94 | 5.16 | 25.4 | 1.0  | 47.98 | 1.889 |
|              | 746         | 118.6 | 4.67 | 101.1 | 3.98 | 100  | 3.94 | 7.94 | 5.16 | 25.4 | 1.0  | 47.98 | 1.889 |

\* Consult factory for increased length with encoder and on brake option.

## 5 Step Procedure

### 1 Motor Code Selection

Based on the application requirement, select the appropriate motor power from the second column in the "Performance Specifications" table. The number to the left of it in the first column is the motor code.

### 2 Speed Code Selection

Find the intersection of the column with the selected tire diameter and the row with the motor code to give you the available speed ranges. From the four given speeds (in mph), select the one that meets your application needs. Proceed to the top of that column to find the speed code just under the tire diameter you have selected in step 1.

### 3 Voltage Code Selection

From the "Operating Voltages" table, select the correct voltage code based on the power supply available for the application.

### 4 Tire Composition Code Selection

Servo Wheels™ are available for a wide variety of applications. Some require a smooth ride or high load carrying capacity, or a combination of both. From the tire composition table, select the appropriate material for your application. The letter in the first column is the tire composition code.

### 5 Compose part number based on the codes selected

## How to Order

Order  
Numbering  
Example:

**D X A - R M V T B**

TIRE  
DIAMETER  
A = 6 in.  
B = 8 in.

RATIO  
1 = 20  
2 = 24  
3 = 30  
4 = 36

MOTOR  
SIZE  
1 = 400V  
2 = 450V  
3 = 1000V

VOLTAGE  
K = 24V

TIRE MATERIAL\*  
S = Polyurethane antistatic black x tread  
R = Polyurethane antistatic black

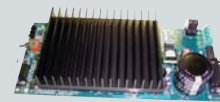
BRAKE/ENCODER\*\*  
SIZE  
0 = No Brake  
3 = 50 in-lb

\* Other tire compositions available upon requests.

\*\* Consult factory for encoder options.

Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor.

Specifications are subject to change without notice.

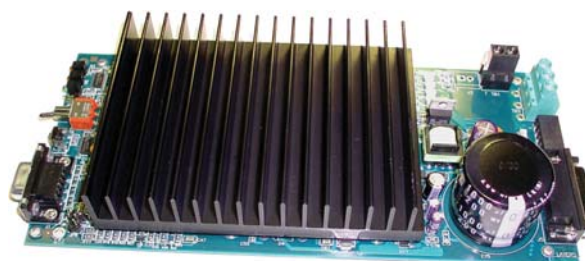


# WHEEL DRIVE SERIES 55 DIGITAL SERVO AMPLIFIER

## High Current Control

### FEATURES

- High-performance DSP-based servo controls motor force or torque. Control of velocity or position using the motor's Hall of encoder signals is an option.
- Controls brush-type, brushless-trapezoidal and brushless-sinusoidal motors.
- User inputs motor parameters, voltage, peak and continuous current limit into Windows-based setup software. Setup software automatically downloads the algorithm for a 2kHz current loop bandwidth via RS-232 communications.
- Proprietary PWM software controlled switching scheme yields ultra-low ripple at low current levels, zero crossover distortion, and minimizes EMI in noise sensitive applications
- Differential amplifiers accept a single +/- 10V analog current command for trapezoidal brushless and brush type motors.
- Optional inputs allow digital commands through the RS-232 or Serial Peripheral Interface.
- 3 Output current ranges and scale factors available.
- Optically isolated digital inputs for Enable/Reset, Brake, and +\_ Travel Limits.
- Motor current monitor output, and optically isolated digital outputs provide controller fault indication. Configurator program provides drive status and fault history via RS-232 link.
- Fault protection makes this drive virtually indestructible.
- Operates from one low-cost 24 - 48 VDC unregulated power supply or battery.



### PRODUCT DESCRIPTION

This digital servo amplifier provides DSP-based digital closed-loop, four-quadrant PWM control of force or torque of permanent magnet, linear or rotary, brush or brushless DC motors. Our PWM current control algorithm, current sensing method, and advanced switching scheme yields performance comparable to a linear servo amplifier.

This digital drive will reduce expensive motor drive stocking requirements because it will control brush-type, brushless-trapezoidal and brushless-sinusoidal motors.

Setup is easy. The operating configuration – motor type, motor parameters, operating voltage, peak and continuous current limits and system parameters for velocity or position control are all input by the user to a PC-based setup program that automatically downloads the information, with the computed algorithm, into the flash memory of the drive via an RS-232 port. The drive can be reconfigured at any time by running the setup-program.

## Specifications

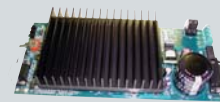
|                                |                                                   |                                                   |
|--------------------------------|---------------------------------------------------|---------------------------------------------------|
| BMG                            | P/N 11564028                                      | 11564030                                          |
| INPUT POWER BUS                | 24 to 48 VDC                                      | 24 to 48 VDC                                      |
| CONT. OUTPUT POWER (Max.)      | 450 watts <sup>1</sup>                            | 1350 watts <sup>1</sup>                           |
| CONT. OUTPUT CURRENT           | 10 amps <sup>1</sup>                              | 30 amps <sup>1</sup>                              |
| PEAK OUTPUT CURRENT            | 20 amps <sup>1</sup><br>(1 sec typ.)              | 60 amps <sup>1</sup>                              |
| SCALE FACTOR ( A / V )         | 2                                                 | 6                                                 |
| VOLTAGE @ CONT. OUTPUT CURRENT | Input Bus Voltage - <sup>3</sup><br>Volts Typical | Input Bus Voltage - <sup>3</sup><br>Volts Typical |
| Max HEAT SINK TEMPERATURE      | Disables if > 70 °C                               | Disables if > 70 °C                               |
| Current LOOP BANDWIDTH         | 2 kHz Typical                                     | 2 kHz Typical                                     |
| SWITCHING FREQUENCY            | 40kHz                                             | 40kHz                                             |
| MINIMUM LOAD INDUCTANCE        | 100 UH                                            | 100 UH                                            |
| WEIGHT                         | 25 OZ                                             | 25 OZ                                             |

## OPERATING CONTROL SIGNALS and INDICATORS

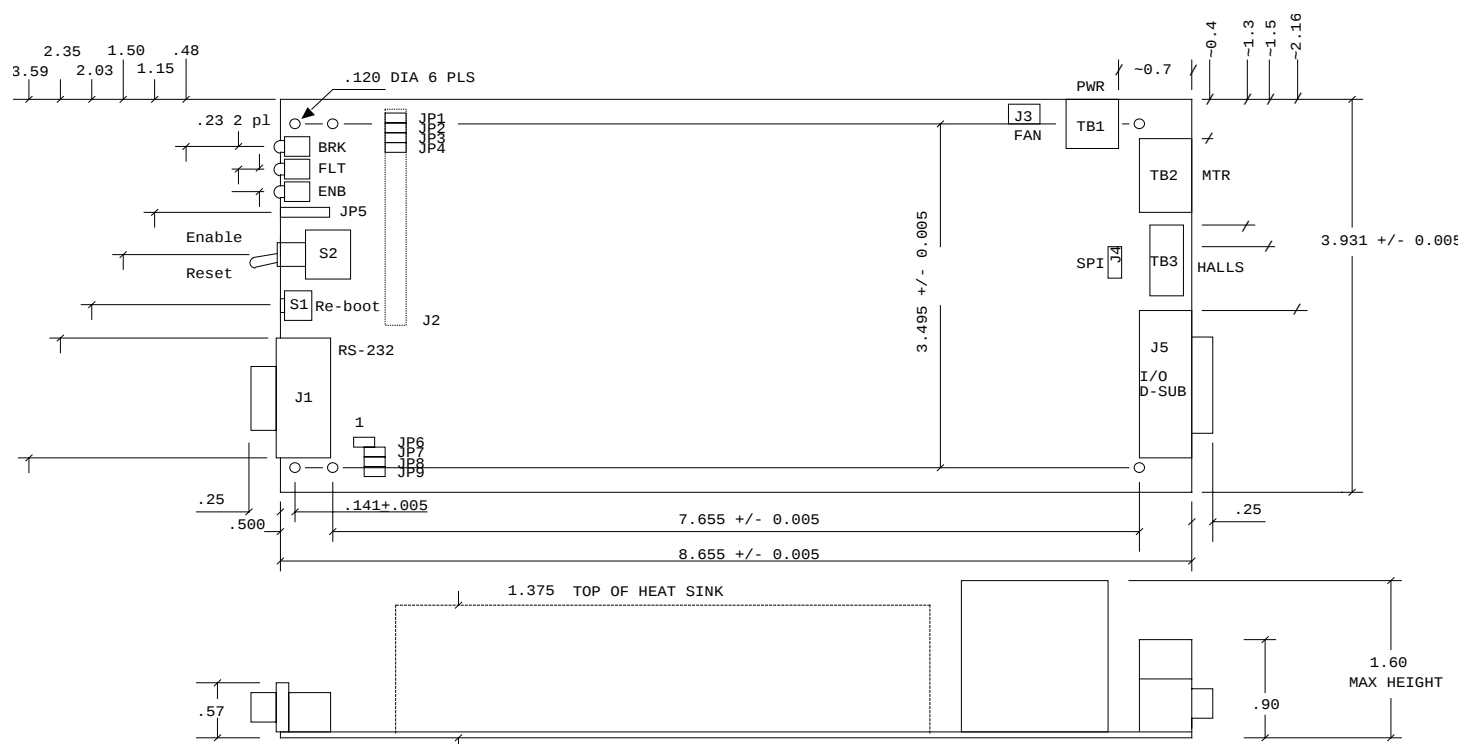
|                             |                              |
|-----------------------------|------------------------------|
| Input analog control signal | + _ 10 Volts                 |
| Digital Input Commands      | Rs-232, SPI                  |
| Peak Current limit          | Software adjustable          |
| Continuous Current limit    | Software adjustable          |
| Drive Enable/Reset          | 5V logic, optically isolated |
| (+) Travel Limit            | 5V logic, optically isolated |
| (-) Travel Limit            | 5V logic, optically isolated |
| Brake                       | 5V logic, optically isolated |
| Fault and/or Brake status   | 5V logic, optically isolated |
| Drive Enabled indicator     | Green LED                    |
| Brake indicator             | Red LED                      |
| Fault indicator             | Red LED                      |
| Digital Hall Effect Sensors | 3 channels,+5 Volts,Gnd      |

NOTES: 1. Depends on ambient operating temperature and heat sink.

For the >10 amperes continuous output, we recommend forced convection cooling with a minimum airflow of 100 CFM. Consult factory for assistance.



## Digital Servo Amplifier Mounting Dimensions



# Pancake Gearmotor:

## Compact Brushless DC Gearmotor



- Compact designs
- 12 and 24 volt operation
- Brushless motors
- Rapid acceleration
- Environmental sealing



# Pancake Gearmotor Series: Design Features

The Pancake Gearmotor combines a brushless DC motor with precision gearing in a lightweight, aluminum housing to provide a compact solution. This unique design makes system integration easy. You no longer have to purchase the motor, gearhead, and electronics bracket from different sources.

Parker Bayside does all of the work for you. From component sourcing to actual assembly, Parker Bayside engineers designed the Pancake Gearmotor with your application in mind.



## SINGLE INTEGRATED PACKAGE

- Environmentally sealed
- Available with brake and encoder add-ons
- Rugged aluminum alloy housing
- Durable anodized finish
- Customized mounting to fit any application



## BRUSHLESS DC MOTOR

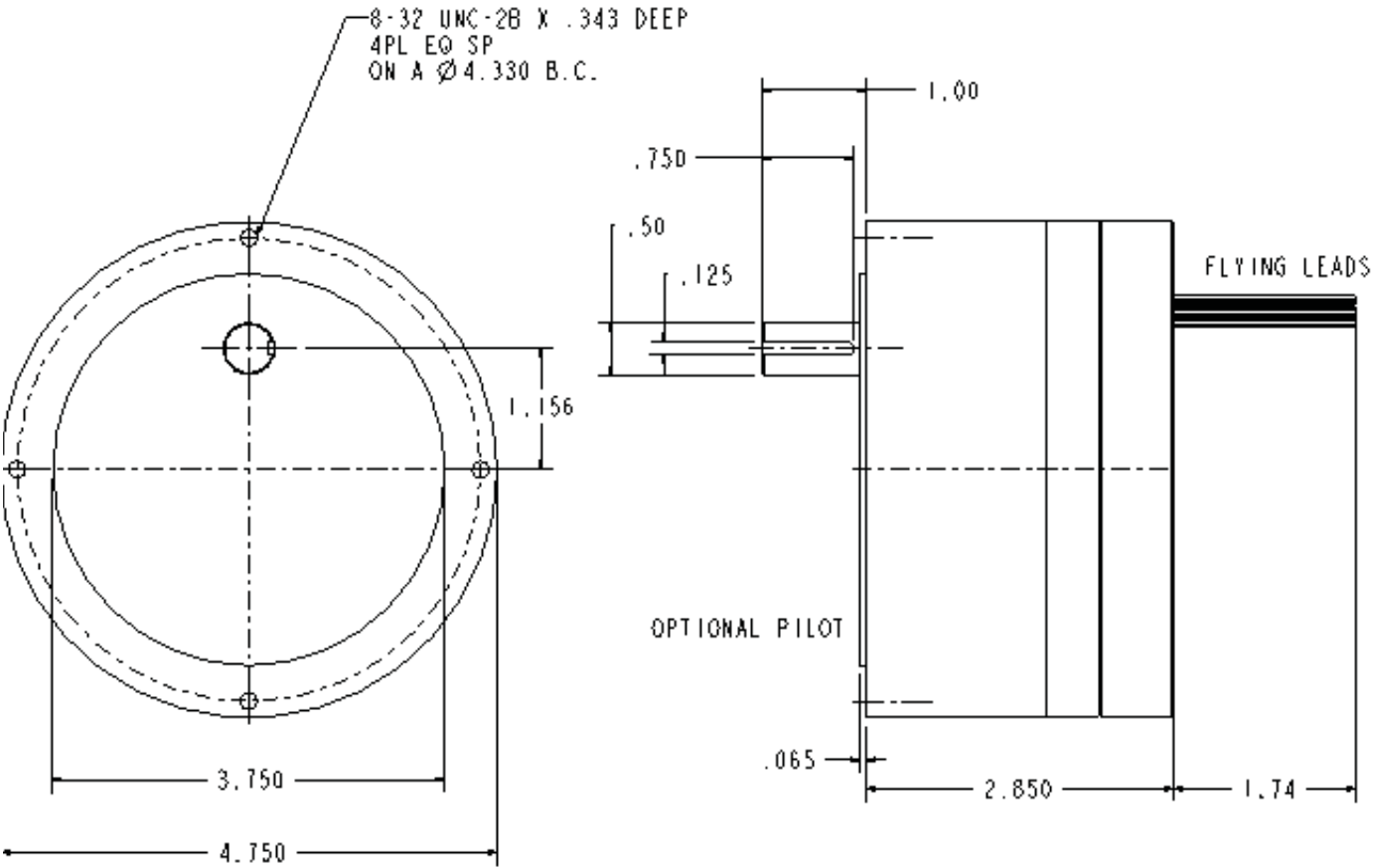
- Maintenance-free brushless design
- Low EMI
- Greater power-to-size factor than brush DC motors
- Built-in position and velocity sensing



## COMPACT GEAR REDUCTION

- Wide range of gear ratios
- Ideal for low-speed applications
- Precision ball bearings throughout
- Reduces load inertia for maximum performance

Dimensions



Flying leads

| Color Coding |          |
|--------------|----------|
| Black        | GND      |
| Red          | Vref     |
| Green        | Sensor C |
| Blue         | Sensor B |
| Yellow       | Sensor A |
| White        | Phase C  |
| Brown        | Phase A  |
| Orange       | Phase B  |



## Mechanical Specifications

| Model | Weight<br>(kg) / (lb) | Radial Load<br>(N) / (lb) | Axial Load<br>(N) / (lb) | Backlash<br>(arc min) |
|-------|-----------------------|---------------------------|--------------------------|-----------------------|
| GM50  | 2.3 / 5               | 223 / 50                  | 45 / 10                  | 30                    |

## Performance Specifications

| Model    | Ratio    | Max Speed)<br>(RPM | Torque<br>(Nm)/(in-lbs) | Voltage<br>(volts DC) | Current<br>(amps) |
|----------|----------|--------------------|-------------------------|-----------------------|-------------------|
| GM50-152 | 152.51:1 | 27                 | 19.8/175                | 12/24                 | 4.6/2.3           |
| GM50-100 | 100.65:1 | 40                 | 18.1/160                | 12/24                 | 6.4/3.2           |
| GM50-043 | 42.47:1  | 93                 | 7.9/70                  | 12/24                 | 6.4/3.2           |
| GM50-011 | 10.51:1  | 364                | 2.0/18                  | 12/24                 | 6.3/3.2           |

## How to Order

Order  
Numbering  
Example:

**G M 5 0 - 0 1 0 XXX**

### RATIO

010 = 10.51:1  
042 = 42.47:1  
100 = 100.65:1  
152 = 152.51:1

### SPECIAL

Factory Issued

Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor.

Specifications are subject to change without notice.



# GEARHEADS:

STEALTH PLANETARY AND NEMA SPUR

## Gearheads

### Stealth® Planetary Gearheads

- 188 PS Advanced In-Line
- 196 PX In-Line
- 200 PV Power & Versatility
- 208 RS Advanced Right Angle
- 216 RX Right Angle
- 220 MultiDrive Right Angle



### NEMA Gearheads

- 228 NE In-Line NEMA
- NR Right Angle NEMA  
Still serviced & MRO  
Consult factory
- 232 Specials
- PG Series - still serviced & MRO  
Consult factory



# Gearheads: Application Solutions

## Stealth Gearmotors for Factory Automation

### APPLICATION CHALLENGE

The customer manufactures machines for gluing, fill, sealing and diverting of food containers for the food-processing industry. The motor and gearhead needed to be mounted above the food plane. Certain modifications had to be made to the gearhead to make it safe in this environment, as well as making the gearhead able to withstand frequent washdowns.

### Design Considerations

- ▶ Gearhead Lubrication – must be USDA food grade approved in case of incidental contact to food.
- ▶ Gearhead Sealing – to prevent any leaking as well as prevent any ingress of the fluid during washdown.
- ▶ Gearhead Finish – special FDA-approved finish must be used, making it very durable and resistant to chipping, oxidizing or rusting.
- ▶ Gearhead Output Shaft – stainless steel to prevent any rust from developing and contaminating the processing food.



## Stealth Gearheads on a Bottling Application

### APPLICATION CHALLENGE

The manufacturer of high-speed milling machines used in the aerospace industry. These milling machines are becoming more commonplace in the aerospace and automotive industries because it allows large structural components to be machined from one piece, where before they were assembled from many smaller subcomponents. In high-speed milling, spindle heads are operating at speeds ranging from 18,000 to 40,000 RPM, so that the cutting is above the resonant frequency of the machine. Because of this, many characteristics become more critical than in standard machines. The extremely large size of the spindle head also posed problems for the customer in trying to keep it accurately positioned during the milling stage.

### Low Stiffness

The spindle head was moved rotationally by 2 bull gears, driving a large ring gear. Because of the system characteristics, it was difficult to keep the spindle head absolutely stiff during the milling process. The problems associated with low stiffness are:

1. Poor surface finish
2. Accuracy errors
3. Excessive tool chatter
4. Reduced tool life



## Stealth Gearheads on High-Speed Milling Machines

### APPLICATION CHALLENGE

The manufacturer of high-performance plastic extrusion equipment. They needed a drop-in replacement gearhead for an existing worm gearbox used with their motor without having to alter the design of their machine. The gearhead/motor combination is being used to drive the machine's rollers. It controls the speed at which the plastic is extruded into high-quality plastic sheets. The smoothness of the rollers is critical to the quality of the plastic sheets being produced.

### ▶ High Transmission Error and Velocity Ripple

The customer used worm gearheads to control the rollers. Worm gears exhibit a sliding action of involute gears instead of a rolling action, contributing to the lack of smoothness of the machine rollers. Due to the high transmission error and velocity ripple from the worm drive, the rollers operated at differing speeds. This produced small lines and imperfections on the plastic sheets, rendering it unusable.

### ▶ High Wear and Low Efficiency

The high level of rubbing (sliding action) between the worm and wheel teeth in the worm gearhead caused a high gear-tooth-wear rate and a lower efficiency (70%) than other major gear types.



## Parker Bayside SOLUTION

PS115-010-F01 Stealth PS planetary gearhead with standard food grade option. The F01 designation provides the gearhead with standard modifications: special lubrication, viton seals, special finish and a stainless steel output shaft.

Since this food grade modification is a standard option, delivery is only one week over the standard (typically one week) gearhead lead time.

Note: Similar standard modifications exist for vacuum, clean room, high temperature and radiation.



## Parker Bayside SOLUTION

### (1) Stealth PS Gearhead and (1) Stealth RT MultiDrive (throughbore) Gearhead

- ▶ The above Stealth gearhead products were used in combination to provide the required 120:1 ratio. The result was high-quality plastics sheets that exceeded the customer's specifications.
- ▶ The Stealth's all-helical planetary design (**HeliCrown Gear Tooth**) features extremely high gear tooth accuracy, minimizing transmission error and velocity ripple. The HeliCrown design features extremely high efficiency (98%) while minimizing tooth wear by providing a pure rolling action. Parker Bayside's Plasma Nitriding heat-treating process further heightens the gear tooth's wear resistance.
- ▶ The Stealth MultiDrive gearhead features a space-saving thru-bore (hollow shaft) option, eliminating compliance that occurs when coupling a gearhead shaft to the rollers being driven.
- ▶ This solution can be used for a variety of applications, including:
  1. Packaging
  2. Food
  3. Semiconductor
  4. Automotive
  5. Medical



## Parker Bayside SOLUTION

### (2) Stealth PS142 Helical Planetary Gearheads

- ▶ The above Stealth gearheads were used in tandem to create a stiff platform for the spindle machine head. One gearhead, acting as the master, and the other as the slave, were attached to the bull gears to simultaneously turn the ring gear that positioned the machine head. While the master gearhead moved the ring, the slave was taking up the backlash. In this way, the precision gears allowed for the spindle to be moved accurately, while the two gearhead combination maintained maximum system stiffness.
- ▶ Parker Bayside's Stealth PS gearhead features an all-helical planetary gear design. Helical gears have a much higher tooth-contact ratio and greater face width than straight-spur gears, providing higher loads, smoother tooth engagement and quieter operation. The Stealth's HeliCrown Gear Tooth design provides extremely high gear tooth accuracy, while minimizing tooth wear. Parker Bayside's Plasma Nitriding heat-treating process further heightens the gear tooth's wear resistance.
- ▶ This solution can be used in the aerospace and automotive industries.



# Stealth® PS Advanced Series:

The Ultimate in Gearhead Performance



Stealth Advanced PS is Parker Bayside's highest-performance servo gearhead. Available in 8 frame sizes and 12 gear ratios, you are guaranteed to find a Stealth PS to fit your high-performance servo applications.

| 7 Frame Sizes |       |
|---------------|-------|
| PS60          | PS180 |
| PS90          | PS220 |
| PS115         | PS300 |
| PS142         |       |

| Ratios * |                             |
|----------|-----------------------------|
| 3:1      | 25:1                        |
| 4:1      | 30:1                        |
| 5:1      | 40:1                        |
| 7:1      | 50:1                        |
| 10:1     | 70:1                        |
| 15:1     | 100:1                       |
| 20:1     | * For PS300<br>see Note (4) |



# Stealth® PS Advanced Series

## Performance Specifications

|                                                                          | Units               | Ratio        | Frame Size                                                         |              |              |              |              |              |               |
|--------------------------------------------------------------------------|---------------------|--------------|--------------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|---------------|
|                                                                          |                     |              | PS60                                                               | PS90         | PS115        | PS142        | PS180        | PS220        | PS300         |
| <b>Nominal Output</b>                                                    | <b>Nm</b>           | 3-10         | <b>25</b>                                                          | <b>74</b>    | <b>170</b>   | <b>294</b>   | <b>735</b>   | <b>1,413</b> | <b>3,616</b>  |
| <b>Torque, <math>T_{nom r}</math></b>                                    | in lb               |              | 220                                                                | 650          | 1,500        | 2,600        | 6,500        | 12,500       | 32,000        |
|                                                                          | <b>Nm</b>           | 15-50        | <b>34</b>                                                          | <b>107</b>   | <b>226</b>   | <b>396</b>   | <b>1,017</b> | <b>1,808</b> | <b>4,520</b>  |
|                                                                          | in lb               |              | 300                                                                | 950          | 2,000        | 3,500        | 9,000        | 16,000       | 40,000        |
|                                                                          | <b>Nm</b>           | 70-100       | <b>28</b>                                                          | <b>90</b>    | <b>203</b>   | <b>339</b>   | <b>893</b>   | <b>1,582</b> | <b>4,181</b>  |
|                                                                          | in lb               |              | 250                                                                | 800          | 1,800        | 3,000        | 7,900        | 14,000       | 37,000        |
| <b>Maximum Acceleration</b>                                              | <b>Nm</b>           | 3-10, 70-100 | <b>34</b>                                                          | <b>105</b>   | <b>232</b>   | <b>367</b>   | <b>972</b>   | <b>1,763</b> | <b>4,825</b>  |
| <b>Output Torque, <math>T_{acc r}</math></b>                             | in lb               |              | 300                                                                | 930          | 2,050        | 3,250        | 8,600        | 15,600       | 42,700        |
|                                                                          | <b>Nm</b>           | 15-50        | <b>42</b>                                                          | <b>130</b>   | <b>283</b>   | <b>452</b>   | <b>1,198</b> | <b>2,011</b> | <b>5,492</b>  |
|                                                                          | in lb               |              | 370                                                                | 1,150        | 2,500        | 4,000        | 10,600       | 17,800       | 48,600        |
|                                                                          | <b>Nm</b>           | 70-100       | <b>78</b>                                                          | <b>243</b>   | <b>537</b>   | <b>853</b>   | <b>2,237</b> | <b>4,068</b> | <b>11,119</b> |
| <b>Emergency<sup>(1)</sup> Stop Output Torque, <math>T_{em r}</math></b> | in lb               |              | 690                                                                | 2,150        | 4,750        | 7,550        | 19,800       | 36,000       | 98,400        |
|                                                                          | <b>Nm</b>           | 15-50        | <b>96</b>                                                          | <b>299</b>   | <b>655</b>   | <b>1,040</b> | <b>2,757</b> | <b>4,520</b> | <b>12,656</b> |
|                                                                          | in lb               |              | 850                                                                | 2,650        | 5,800        | 9,200        | 24,400       | 40,000       | 112,000       |
|                                                                          | <b>Nm</b>           | 70-100       | <b>4,700</b>                                                       | <b>4,300</b> | <b>3,900</b> | <b>3,500</b> | <b>2,800</b> | <b>2,100</b> | <b>1,750</b>  |
| <b>Nominal Input Speed, <math>N_{nom r}</math></b>                       | RPM                 | 3-5          | 3,200                                                              | 2,800        | 2,400        | 2,000        | 1,600        | 1,200        | 1,000         |
|                                                                          | RPM                 | 7-10         | 3,700                                                              | 3,300        | 2,900        | 2,500        | 2,000        | 1,500        | 1,250         |
|                                                                          | RPM                 | 15-50        | 4,200                                                              | 3,800        | 3,400        | 3,000        | 2,400        | 1,800        | 1,500         |
|                                                                          | RPM                 | 70-100       | 4,700                                                              | 4,300        | 3,900        | 3,500        | 2,800        | 2,100        | 1,750         |
| <b>Max. Input Speed, <math>N_{max r}</math></b>                          | RPM                 | 3-100        | 6,000                                                              | 5,300        | 4,500        | 3,800        | 3,000        | 2,300        | 1,900         |
| <b>Standard Backlash <sup>(2)</sup></b>                                  | arc min             | 3-10         | 6                                                                  | 6            | 4            | 4            | 4            | 4            | 4             |
|                                                                          | arc min             | 15-100       | 8                                                                  | 8            | 6            | 6            | 6            | 6            | 6             |
| <b>Low Backlash <sup>(2)</sup></b>                                       | arc min             | 3-10         | 4                                                                  | 4            | 3            | 3            | 3            | 3            | 3             |
|                                                                          | arc min             | 15-100       | 6                                                                  | 6            | 5            | 5            | 5            | 5            | 5             |
| <b>Efficiency at Nominal Torque</b>                                      | %                   | 3-10         | 97                                                                 | 97           | 97           | 97           | 97           | 97           | 97            |
|                                                                          | %                   | 15-100       | 94                                                                 | 94           | 94           | 94           | 94           | 94           | 94            |
| <b>Noise Level<sup>(3)</sup> at:</b>                                     |                     |              |                                                                    |              |              |              |              |              |               |
| <b>3,000 RPM</b>                                                         | dB                  | 3-100        | 62                                                                 | 62           | 62           | 64           | —            | —            | —             |
| <b>2,000 RPM</b>                                                         | dB                  | 3-100        | —                                                                  | —            | —            | —            | 66           | 68           | 70            |
| <b>Torsional Stiffness</b>                                               | <b>Nm / arc min</b> | 3-100        | <b>3</b>                                                           | <b>12</b>    | <b>23</b>    | <b>44</b>    | <b>110</b>   | <b>210</b>   | <b>360</b>    |
|                                                                          | in lb / arc min     |              | 26                                                                 | 106          | 204          | 389          | 973          | 1,858        | 3,185         |
| <b>Maximum Weight</b>                                                    | <b>kg</b>           | 3-10         | <b>1.3</b>                                                         | <b>3</b>     | <b>7</b>     | <b>14</b>    | <b>26</b>    | <b>49</b>    | <b>103</b>    |
|                                                                          | lb                  |              | 2.8                                                                | 7            | 15           | 30           | 57           | 108          | 228           |
|                                                                          | <b>kg</b>           | 15-100       | <b>1.7</b>                                                         | <b>5</b>     | <b>10</b>    | <b>20</b>    | <b>35</b>    | <b>71</b>    | <b>149</b>    |
|                                                                          | lb                  |              | 3.7                                                                | 10           | 22           | 43           | 77           | 157          | 330           |
| <b>Maximum Allowable Case Temperature</b>                                | °C                  | 3-100        | 100                                                                |              |              |              |              |              |               |
|                                                                          |                     |              | For applications requiring lower case temperature, consult factory |              |              |              |              |              |               |

(1) Maximum of 1,000 stops

(2) Measured at 2% of rated torque

(3) Measured at 1 meter

(4) PS300 is available in Ratios of: 4, 5, 7, 10, 20, 50, 70 & 100:1

Specification are subject to change without notice

## Get the Helical Advantage!

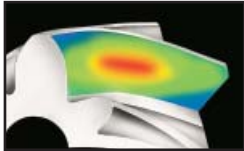
**Stealth® Advanced** in the PS / RS Models incorporates the latest enhancement in gearhead technology:

- ▶ Latest technology in seals...reduce heat and wear
- ▶ Oil lubrication...reduces, friction and operating temperature
- ▶ Front output seal cover...captures and protects output seal

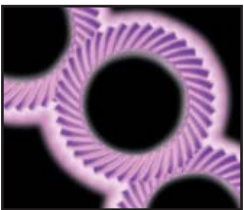


**Helical Planetary Design** - Helical gears have more tooth contact and greater face width than spur gears. This results in higher loads, smoother tooth engagement, quieter operation and lower backlash.

**HeliCrown®** - Parker Bayside developed the HeliCrown gear tooth to further optimize Stealth's® performance. Since most vibration occurs at the entry and exit points of a gear tooth, HeliCrown eliminates metal only in these areas, without sacrificing gear strength, producing a quieter and stronger gear.



**Plasma Nitriding** - Parker Bayside's in-house Plasma Nitriding process results in an ideal gear tooth. The surface is very hard (65 Rc) and the core is strong, but flexible (36 Rc). The result is a wear-resistant gear tooth that can withstand heavy shock, ensuring high accuracy for the life of the gearhead.



**ServoMount®** - Parker Bayside's patented ServoMount design features a balanced input gear supported by a floating bearing. This unique design compensates for motor shaft runout and misalignment, ensuring TRUE alignment of the input sun gear with the planetary section and allowing input speeds up to 6,000 RPM. ServoMount ensures error-free installation to any motor, in a matter of minutes.

Stealth's® superior design and construction deliver "The Helical Advantage":

- ▶ Strong...30% More Torque
- ▶ Fast...6,000 RPM Input Speeds
- ▶ Accurate...Less Than 3 Arc minutes Backlash
- ▶ Quiet...Less Than 68dB Noise

**Plus... Over 97% Efficiency**



11

### Front Output Seal Cover

Completely captures and protects output seal and allows in-field seal replacement.

10

### Output Wave Seal Technology

Creates a hydrodynamic film between seal and shaft and reducing heat and wear.



9

### Magnetic Oil Fill Drain Plug

The magnetic plug attracts normal wear particles keeping them away from the gear mesh.



1

### Helical Planetary

Provides smooth, quiet operation, high torque and high accuracy.

2

### ServoMount®

Patented motor-mounting design ensures error-free installation and the balanced pinion allows higher input speeds.

3

### Precision Bearings

Large, deep groove bearings provide high-speed capacity and radial loads.

4

### HeliCrown®

Parker Bayside's proprietary gear tooth geometry ensures quieter operation and higher loads than conventional gears.

8

### Oil Lubrication

Oil provides better lubrication, reduces friction and operating temperatures.

7

### Integral Ring Gear

Cutting the ring gear directly into the housing allows for larger bearing and planet gears, delivering maximum power and stiffness in a minimum package.

6

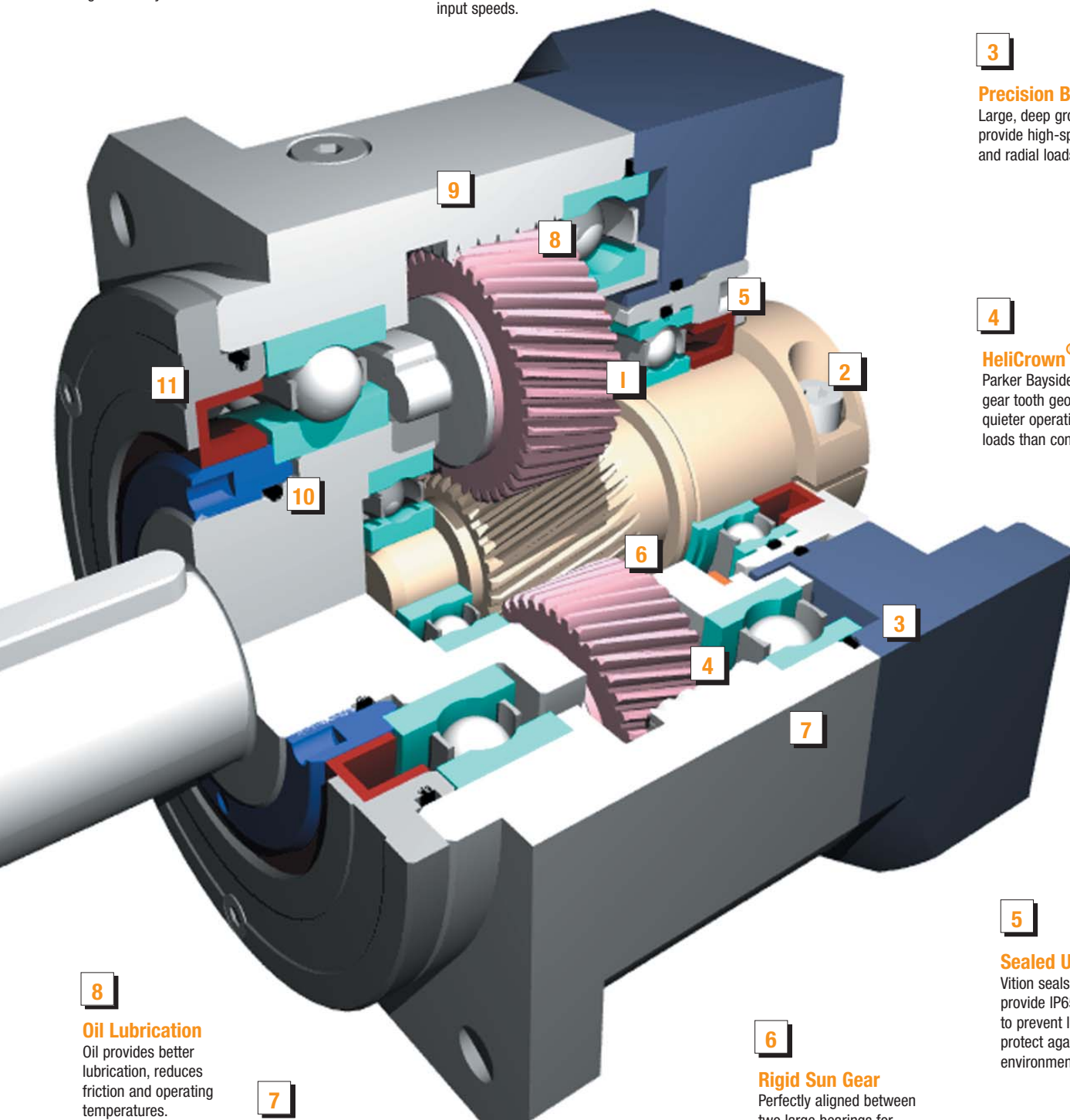
### Rigid Sun Gear

Perfectly aligned between two large bearings for maximum stiffness and strength.

5

### Sealed Unit

Viton seals and O-Rings provide IP65 protection to prevent leaks and protect against harsh environments.



| Specifications:                        | Units                  | Ratio    | Frame Size  |             |             |             |             |            |           |
|----------------------------------------|------------------------|----------|-------------|-------------|-------------|-------------|-------------|------------|-----------|
|                                        |                        |          | PS60        | PS90        | PS115       | PS142       | PS180       | PS220      | PS300     |
| Small Motor<br>Shaft Diameter<br>Range | mm                     | 3-100    | 6-12.7      | 6-16        | 9-19        | 12.7-24     | 15.9-35     | 24-48      | 28-65     |
|                                        | in                     |          | 0.236-0.500 | 0.236-0.630 | 0.354-0.748 | 0.500-0.944 | 0.626-1.378 | 0.945-1.89 | 1.10-2.56 |
|                                        | gm cm sec <sup>2</sup> | 3        | 0.176       | 0.784       | 2.34        | 7.81        | 28.6        | —          | —         |
|                                        | oz in sec <sup>2</sup> |          | 0.002       | 0.011       | 0.033       | 0.109       | 0.397       | —          | —         |
|                                        | gm cm sec <sup>2</sup> | 4,5      | 0.101       | 0.486       | 1.87        | 4.92        | 17.6        | 62.6       | 284       |
|                                        | oz in sec <sup>2</sup> |          | 0.001       | 0.007       | 0.026       | 0.068       | 0.244       | 0.869      | 3.95      |
|                                        | gm cm sec <sup>2</sup> | 7,10     | 0.063       | 0.298       | 0.960       | 2.68        | 9.24        | 34.3       | 136       |
|                                        | oz in sec <sup>2</sup> |          | 0.001       | 0.004       | 0.013       | 0.037       | 0.128       | 0.476      | 1.88      |
|                                        | gm cm sec <sup>2</sup> | 15       | 0.092       | 0.420       | 1.60        | 4.17        | 15.8        | 51.0       | —         |
|                                        | oz in sec <sup>2</sup> |          | 0.001       | 0.006       | 0.022       | 0.058       | 0.219       | 0.708      | —         |
|                                        | gm cm sec <sup>2</sup> | 16,20,25 | 0.098       | 0.444       | 1.73        | 4.50        | 16.7        | 53.3       | 219       |
|                                        | oz in sec <sup>2</sup> |          | 0.001       | 0.006       | 0.024       | 0.063       | 0.232       | 0.741      | 3.05      |
|                                        | gm cm sec <sup>2</sup> | 30-100   | 0.054       | 0.247       | 0.760       | 2.18        | 7.450       | 27.1       | 93.9      |
|                                        | oz in sec <sup>2</sup> |          | 0.001       | 0.003       | 0.011       | 0.030       | 0.104       | 0.377      | 1.30      |
| Large Motor<br>Shaft Diameter<br>Range | mm                     | 3-100    | 16-19       | 19-24       | 24-35       | 35-42       | 48-55       | —          | —         |
|                                        | in                     |          | 0.500-0.630 | 0.630-0.748 | 0.748-0.944 | 0.944-1.38  | 1.38-1.65   | 1.89-2.17  | —         |
|                                        | gm cm sec <sup>2</sup> | 3        | 0.253       | 1.07        | 3.25        | 10.6        | 37.8        | 111        | —         |
|                                        | oz in sec <sup>2</sup> |          | 0.004       | 0.015       | 0.045       | 0.148       | 0.526       | 1.54       | —         |
|                                        | gm cm sec <sup>2</sup> | 4,5      | 0.185       | 0.745       | 2.70        | 7.51        | 25.6        | 72.4       | —         |
|                                        | oz in sec <sup>2</sup> |          | 0.003       | 0.010       | 0.038       | 0.104       | 0.356       | 1.01       | —         |
|                                        | gm cm sec <sup>2</sup> | 7,10     | 0.143       | 0.566       | 1.70        | 5.01        | 15.8        | 44.1       | —         |
|                                        | oz in sec <sup>2</sup> |          | 0.002       | 0.008       | 0.024       | 0.070       | 0.219       | 0.613      | —         |
|                                        | gm cm sec <sup>2</sup> | 15       | 0.176       | 0.685       | 2.43        | 6.76        | 23.8        | 60.8       | —         |
|                                        | oz in sec <sup>2</sup> |          | 0.002       | 0.010       | 0.034       | 0.094       | 0.331       | 0.845      | —         |
|                                        | gm cm sec <sup>2</sup> | 16,20,25 | 0.182       | 0.715       | 2.56        | 7.09        | 24.7        | 62.9       | —         |
|                                        | oz in sec <sup>2</sup> |          | 0.003       | 0.010       | 0.036       | 0.099       | 0.344       | 0.874      | —         |
|                                        | gm cm sec <sup>2</sup> | 30-100   | 0.134       | 0.507       | 1.50        | 4.50        | 14.0        | 37.0       | —         |
|                                        | oz in sec <sup>2</sup> |          | 0.002       | 0.007       | 0.021       | 0.063       | 0.195       | 0.513      | —         |

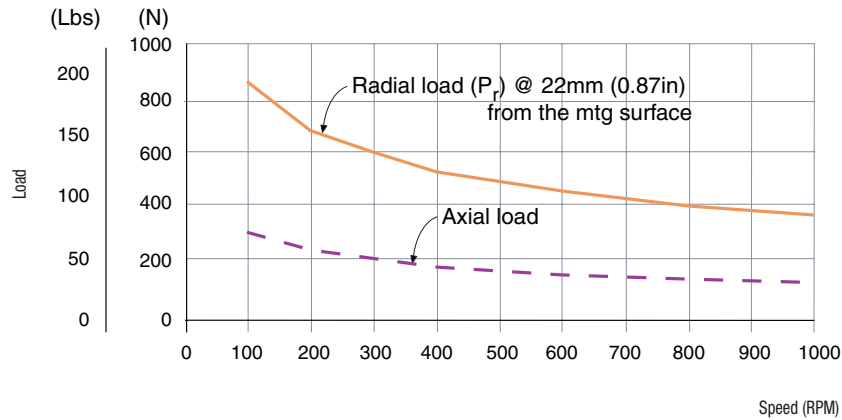
Note: All Moment of Inertia values are as reflected at the input shaft of the gearhead.

Specification are subject to change without notice



Formulas to calculate radial load ( $P_{rx}$ ) at any distance "X" from the gearhead mounting surface.

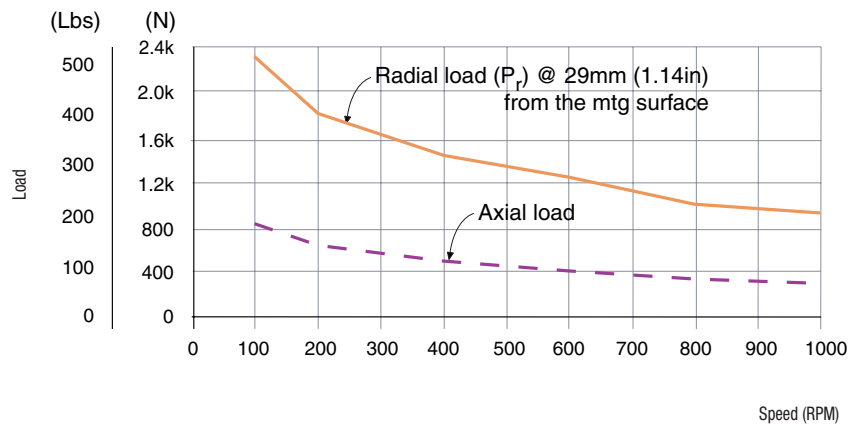
## PS60



$$P_{rx} = (P_r)(57\text{mm}) / (35\text{mm} + X)$$

$$P_{rx} = (P_r)(2.24\text{in}) / (1.38\text{in} + X)$$

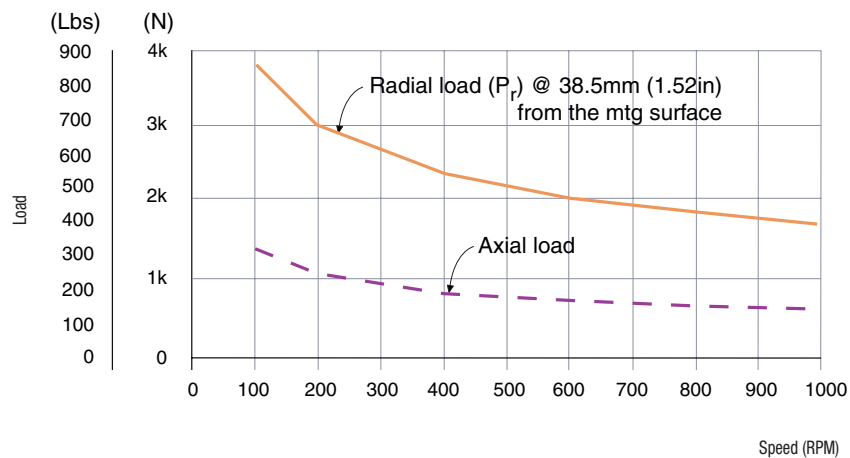
## PS90



$$P_{rx} = (P_r)(74\text{mm}) / (45\text{mm} + X)$$

$$P_{rx} = (P_r)(2.91\text{in}) / (1.77\text{in} + X)$$

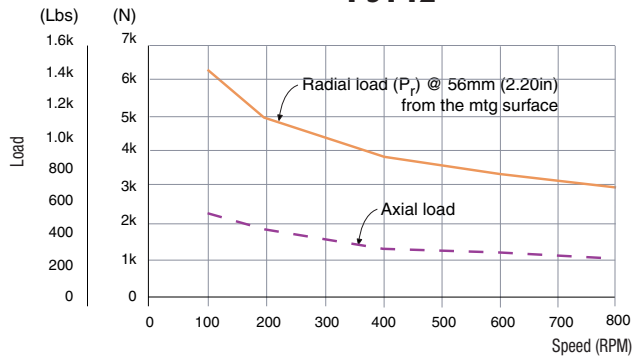
## PS115



$$P_{rx} = (P_r)(95\text{mm}) / (57\text{mm} + X)$$

$$P_{rx} = (P_r)(3.74\text{in}) / (2.24\text{in} + X)$$

## PS142

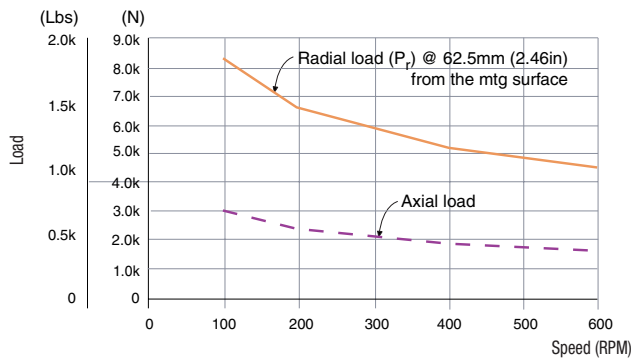


Formulas to calculate radial load ( $P_{rx}$ ) at any distance "X" from the gearhead mounting surface.

$$P_{rx} = (P_r)(127\text{mm}) / (71\text{mm} + X)$$

$$P_{rx} = (P_r)(5\text{in}) / (2.79\text{in} + X)$$

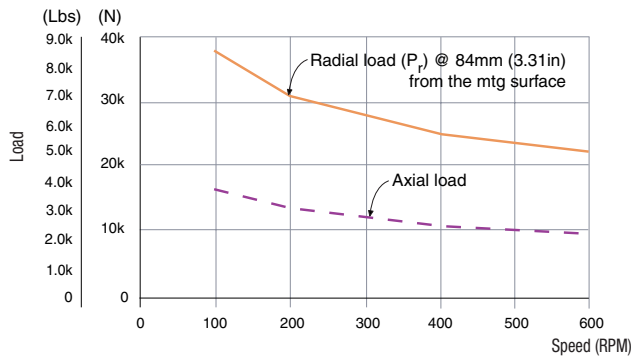
## PS180



$$P_{rx} = (P_r)(138\text{mm}) / (76\text{mm} + X)$$

$$P_{rx} = (P_r)(5.43\text{in}) / (2.99\text{in} + X)$$

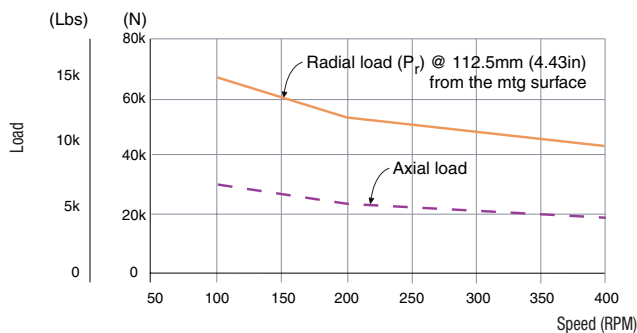
## PS220



$$P_{rx} = (P_r)(190\text{mm}) / (106\text{mm} + X)$$

$$P_{rx} = (P_r)(7.48\text{in}) / (4.17\text{in} + X)$$

## PS300



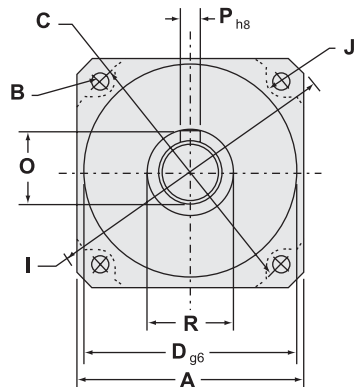
$$P_{rx} = (P_r)(268\text{mm}) / (156\text{mm} + X)$$

$$P_{rx} = (P_r)(10.55\text{in}) / (6.14\text{in} + X)$$

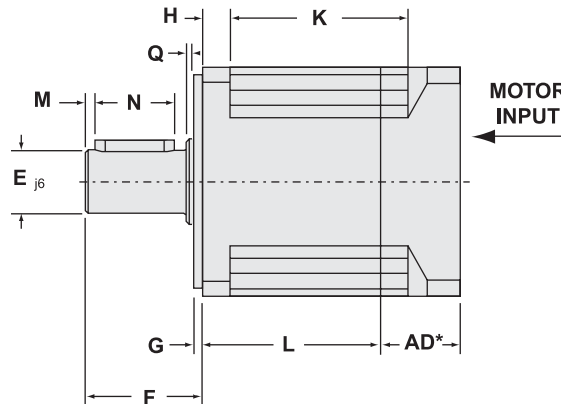


## Dimensions

OUTPUT VIEW



SIDE VIEW



| Frame Size | A Square Flange |        | B Bolt Hole |       | C Bolt Circle |        | D Pilot Diameter |       | E Output Shaft Diameter |       | F Output Shaft Length |       | G Pilot Thickness |       | H Flange Thickness |       | I Housing Diameter |        | J Housing Recess |       |
|------------|-----------------|--------|-------------|-------|---------------|--------|------------------|-------|-------------------------|-------|-----------------------|-------|-------------------|-------|--------------------|-------|--------------------|--------|------------------|-------|
|            | (mm)            | (in)   | (mm)        | (in)  | (mm)          | (in)   | (mm)             | (in)  | (mm)                    | (in)  | (mm)                  | (in)  | (mm)              | (in)  | (mm)               | (in)  | (mm)               | (in)   | (mm)             | (in)  |
| PS60       | 60              | 2.362  | 5.5         | 0.217 | 70            | 2.756  | 50               | 1.969 | 16                      | 0.630 | 37                    | 1.457 | 8                 | 0.315 | 8                  | 0.315 | 80                 | 3.150  | 5                | 0.197 |
| PS90       | 90              | 3.543  | 6.5         | 0.256 | 100           | 3.937  | 80               | 3.150 | 22                      | 0.866 | 48                    | 1.890 | 11                | 0.433 | 10                 | 0.394 | 116                | 4.567  | 6.5              | 0.256 |
| PS115      | 115             | 4.528  | 8.5         | 0.335 | 130           | 5.118  | 110              | 4.331 | 32                      | 1.260 | 65                    | 2.559 | 13                | 0.512 | 14                 | 0.551 | 152                | 5.984  | 7.5              | 0.295 |
| PS142      | 142             | 5.591  | 11          | 0.433 | 165           | 6.496  | 130              | 5.118 | 40                      | 1.575 | 97                    | 3.819 | 15                | 0.591 | 15                 | 0.591 | 185                | 7.283  | 10               | 0.394 |
| PS180      | 182             | 7.165  | 13          | 0.512 | 215           | 8.465  | 160              | 6.299 | 55                      | 2.165 | 105                   | 4.134 | 20                | 0.787 | 16                 | 0.630 | 240                | 9.449  | 16               | 0.630 |
| PS220      | 220             | 8.661  | 17          | 0.669 | 250           | 9.843  | 180              | 7.087 | 75                      | 2.953 | 138                   | 5.433 | 30                | 1.181 | 22                 | 0.866 | 290                | 11.417 | 16               | 0.630 |
| PS300      | 305             | 12.008 | 21          | 0.827 | 350           | 13.780 | 250              | 9.843 | 100                     | 3.937 | 190                   | 7.480 | 35                | 1.378 | 26                 | 1.024 | 400                | 15.748 | 18               | 0.709 |

| Frame Size | K1 Recess Length (For Ratio ≤ 10:1) |       | K2 Recess Length (For Ratio > 10:1) |        | L1 Length (For Ratio ≤ 10:1) |       | L2 Length (For Ratio > 10:1) |        | M Dist. From Shaft End |       | N Keyway Length |       | O Key Height |       | P Keyway Width |       | Q Shoulder Height |       | R Shoulder Diameter |       |
|------------|-------------------------------------|-------|-------------------------------------|--------|------------------------------|-------|------------------------------|--------|------------------------|-------|-----------------|-------|--------------|-------|----------------|-------|-------------------|-------|---------------------|-------|
|            | (mm)                                | (in)  | (mm)                                | (in)   | (mm)                         | (in)  | (mm)                         | (in)   | (mm)                   | (in)  | (mm)            | (in)  | (mm)         | (in)  | (mm)           | (in)  | (mm)              | (in)  | (mm)                | (in)  |
| PS60       | 37                                  | 1.457 | 67                                  | 2.638  | 36.7                         | 1.445 | 66.7                         | 2.626  | 2                      | 0.079 | 25              | 0.984 | 18           | 0.709 | 5              | 0.197 | 0.5               | 0.020 | 22                  | 0.866 |
| PS90       | 48                                  | 1.890 | 88                                  | 3.465  | 49.5                         | 1.949 | 89                           | 3.504  | 3                      | 0.118 | 32              | 1.260 | 24.5         | 0.965 | 6              | 0.236 | 0.5               | 0.020 | 35                  | 1.378 |
| PS115      | 62                                  | 2.441 | 110                                 | 4.331  | 61.7                         | 2.429 | 109.5                        | 4.311  | 5                      | 0.197 | 40              | 1.575 | 35           | 1.378 | 10             | 0.394 | 1                 | 0.039 | 45                  | 1.772 |
| PS142      | 82                                  | 3.228 | 143                                 | 5.630  | 76.5                         | 3.012 | 138                          | 5.433  | 5                      | 0.197 | 63              | 2.480 | 43           | 1.693 | 12             | 0.472 | 3                 | 0.118 | 55                  | 2.165 |
| PS180      | 88                                  | 3.465 | 158                                 | 6.220  | 83.5                         | 3.287 | 153.5                        | 6.043  | 6                      | 0.236 | 70              | 2.756 | 59           | 2.323 | 16             | 0.630 | 3                 | 0.118 | 70                  | 2.756 |
| PS220      | 116                                 | 4.567 | 218                                 | 8.583  | 108                          | 4.252 | 210.5                        | 8.287  | 6                      | 0.236 | 90              | 3.543 | 79.5         | 3.130 | 20             | 0.787 | 3                 | 0.118 | 95                  | 3.740 |
| PS300      | 160                                 | 6.299 | 332                                 | 13.071 | 158                          | 6.220 | 292                          | 11.496 | 7                      | 0.276 | 140             | 5.512 | 106          | 4.173 | 28             | 1.102 | 3                 | 0.118 | 140                 | 5.512 |

\*AD=Adapter Length. Adapter will vary, depending on motor.  
Consult Internet ([www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com)) for details or call Parker Bayside.

## How to Order

1. Pick frame size and ratio.
2. Pick backlash and orientation.
3. Specify motor, make and model for mounting kit.

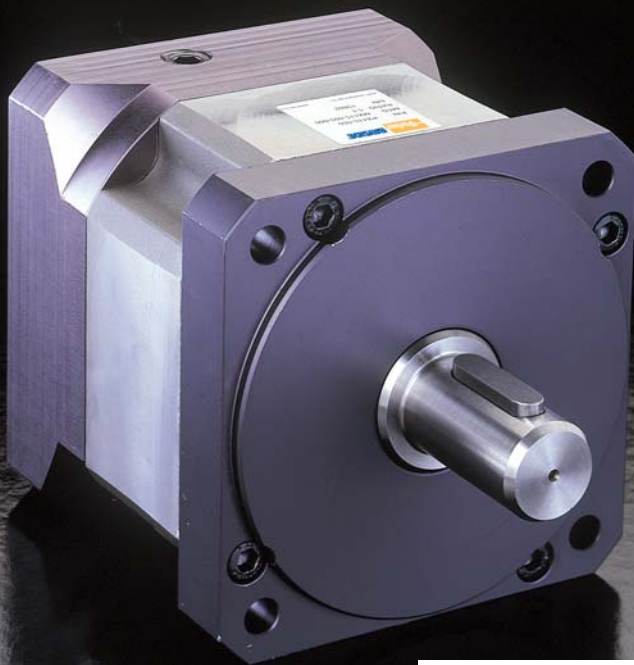
PS Gearheads are supported by a worldwide network of offices and local distributors. Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor. Information can also be obtained at [www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com)

\*\*\* PS300 is available in Ratios of: 4, 5, 7, 10, 20, 50, 70 & 100:1

Specifications are subject to change without notice.

# Stealth® PX Series:

## Best Technology . . Best Value



Stealth PX incorporates Parker Bayside's helical planetary technology in a lower-cost package. Available in NEMA and metric frame sizes, Stealth PX delivers high torque and quiet, smooth operation for less-demanding servo applications.

#### 4 Frame Sizes

|       |      |
|-------|------|
| PX60  | PX23 |
| PX90  | PX34 |
| PX115 | PX42 |
| PX142 | PX56 |

#### Ratios

|     |      |       |
|-----|------|-------|
| 3:1 | 10:1 | 30:1  |
| 4:1 | 15:1 | 50:1  |
| 5:1 | 20:1 | 70:1  |
| 7:1 | 25:1 | 100:1 |



## Performance Specifications

|                                                             | Units           | Ratio        | Frame Size |           |            |          |
|-------------------------------------------------------------|-----------------|--------------|------------|-----------|------------|----------|
|                                                             |                 |              | PX60/PX23  | PX90/PX34 | PX115/PX42 | PX142/56 |
| Nominal Output Torque,<br>$T_{nom}$                         | Nm              | 3-5          | 18         | 45        | 124        | 226      |
|                                                             | in lb           |              | 160        | 400       | 1,100      | 1,994    |
|                                                             | Nm              | 7-15         | 22         | 57        | 147        | 231      |
|                                                             | in lb           |              | 190        | 500       | 1,300      | 2,038    |
|                                                             | Nm              | 20-50        | 28         | 74        | 181        | 278      |
|                                                             | in lb           |              | 250        | 650       | 1,600      | 2,453    |
| Max. Acceleration<br>Output Torque,<br>$T_{acc}$            | Nm              | 70-100       | 23         | 57        | 158        | 261      |
|                                                             | in lb           |              | 200        | 500       | 1,400      | 2,038    |
| Emergency <sup>(1)</sup> Stop<br>Output Torque,<br>$T_{em}$ | Nm              | 3-15, 70-100 | 26         | 71        | 175        | 282      |
|                                                             | in lb           |              | 230        | 630       | 1,550      | 2,488    |
|                                                             | Nm              | 20-50        | 32         | 86        | 215        | 347      |
|                                                             | in lb           |              | 280        | 760       | 1,900      | 3,062    |
| Nominal Input Speed,<br>$N_{nom}$                           | Nm              | 20-50        | 74         | 198       | 497        | 800      |
|                                                             | in lb           |              | 650        | 1,750     | 4,400      | 7,055    |
| Maximum Input Speed, $N_{maxr}$                             | RPM             | 3-5          | 3,200      | 2,800     | 2,400      | 2,000    |
|                                                             | RPM             | 7-15         | 3,700      | 3,300     | 2,900      | 2,500    |
|                                                             | RPM             | 20-50        | 4,200      | 3,800     | 3,400      | 3,000    |
|                                                             | RPM             | 70-100       | 4,700      | 4,300     | 3,900      | 3,500    |
| Standard Backlash <sup>(2)</sup>                            | RPM             | 3-100        | 6,000      | 5,300     | 4,500      | 3,800    |
|                                                             |                 |              |            |           |            |          |
| Low Backlash <sup>(2)</sup>                                 | arc min         | 3-10         | 10         | 9         | 8          | 8        |
|                                                             | arc min         | 15-100       | 12         | 11        | 10         | 10       |
| Efficiency at<br>Nominal Torque                             | arc min         | 3-10         | 8          | 7         | 6          | 6        |
|                                                             | arc min         | 15-100       | 10         | 9         | 8          | 8        |
| Noise Level <sup>(3)</sup> at: 3,000 RPM                    | %               | 3-10         | 96         | 96        | 96         | 96       |
|                                                             | %               | 15-100       | 93         | 93        | 93         | 93       |
| Torsional Stiffness                                         | dB              | 3-100        | 64         | 64        | 64         | 66       |
|                                                             |                 |              |            |           |            |          |
| Maximum Weight                                              | Nm / arc min    | 3-100        | 3          | 10        | 20         | 39       |
|                                                             | in lb / arc min |              | 22         | 88        | 177        | 345      |
| Max. Allowable Case Temperature                             | kg              | 3-10         | 1          | 3         | 7          | 14       |
|                                                             | lb              |              | 3          | 7         | 15         | 30       |
|                                                             | kg              | 15-100       | 2          | 5         | 10         | 20       |
|                                                             | lb              |              | 4          | 10        | 21         | 43       |

| Specifications:                  | Units                  | Ratio  | Frame Size |           |            |          |
|----------------------------------|------------------------|--------|------------|-----------|------------|----------|
|                                  |                        |        | PX60/PX23  | PX90/PX34 | PX115/PX42 | PX142/56 |
| Moment of Inertia <sup>(4)</sup> | gm cm sec <sup>2</sup> | 3      | 0.212      | 0.918     | 2.53       | 8.826    |
|                                  | oz in sec <sup>2</sup> |        | 0.003      | 0.013     | 0.035      | 0.124    |
|                                  | gm cm sec <sup>2</sup> | 4,5    | 0.134      | 0.590     | 1.92       | 4.514    |
|                                  | oz in sec <sup>2</sup> |        | 0.002      | 0.008     | 0.027      | 0.063    |
|                                  | gm cm sec <sup>2</sup> | 7,10   | 0.092      | 0.372     | 1.12       | 3.326    |
|                                  | oz in sec <sup>2</sup> |        | 0.001      | 0.005     | 0.016      | 0.047    |
|                                  | gm cm sec <sup>2</sup> | 15     | 0.122      | 0.524     | 1.64       | 4.849    |
|                                  | oz in sec <sup>2</sup> |        | 0.002      | 0.007     | 0.023      | 0.068    |
|                                  | gm cm sec <sup>2</sup> | 20,25  | 0.128      | 0.548     | 1.78       | 5.179    |
|                                  | oz in sec <sup>2</sup> |        | 0.002      | 0.008     | 0.025      | 0.073    |
|                                  | gm cm sec <sup>2</sup> | 30-100 | 0.083      | 0.322     | 0.924      | 2.840    |
|                                  | oz in sec <sup>2</sup> |        | 0.001      | 0.004     | 0.013      | 0.040    |

(1) Maximum of 1,000 stops

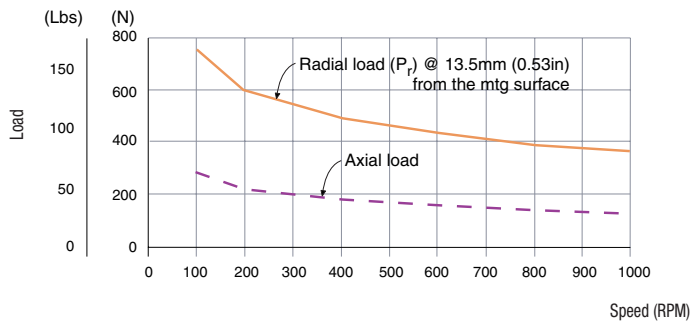
(2) Measured at 2% of rated torque.

(3) Measured at 1 meter

Specification are subject to change without notice

(4) All Moment of Inertia values are as reflected at the input shaft of the gearhead.

## PX60 / PX23

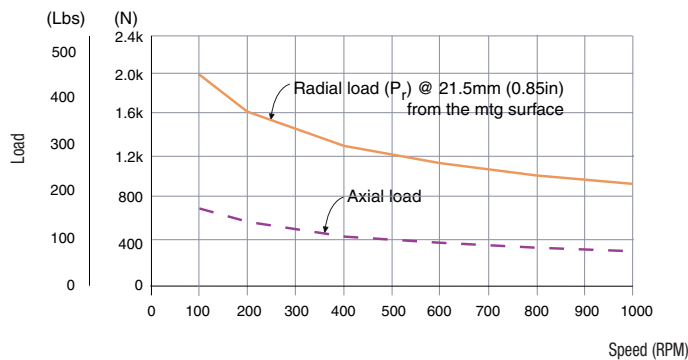


Formulas to calculate radial load ( $P_{rx}$ ) at any distance "X" from the gearhead mounting surface.

$$P_{rx} = (P_r)(54\text{mm}) / (41\text{mm} + X)$$

$$P_{rx} = (P_r)(2.13\text{in}) / (1.61\text{in} + X)$$

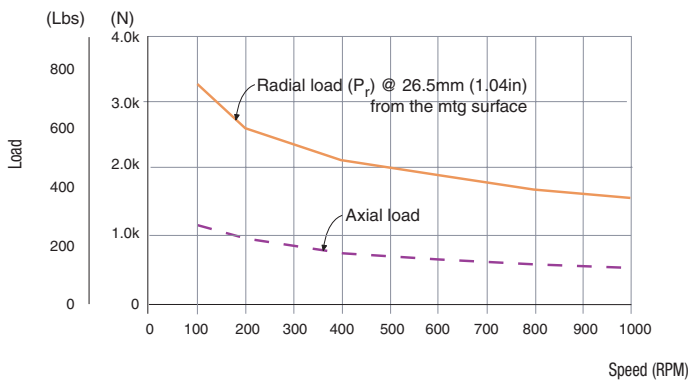
## PX90 / PX34



$$P_{rx} = (P_r)(73\text{mm}) / (52\text{mm} + X)$$

$$P_{rx} = (P_r)(2.87\text{in}) / (2.05\text{in} + X)$$

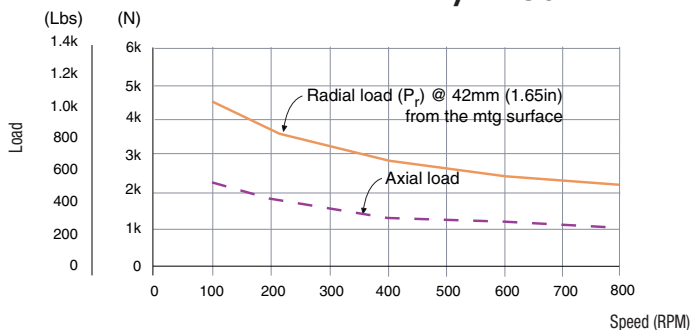
## PX115 / PX42



$$P_{rx} = (P_r)(89\text{mm}) / (63\text{mm} + X)$$

$$P_{rx} = (P_r)(3.5\text{in}) / (2.48\text{in} + X)$$

## PX142 / PX56

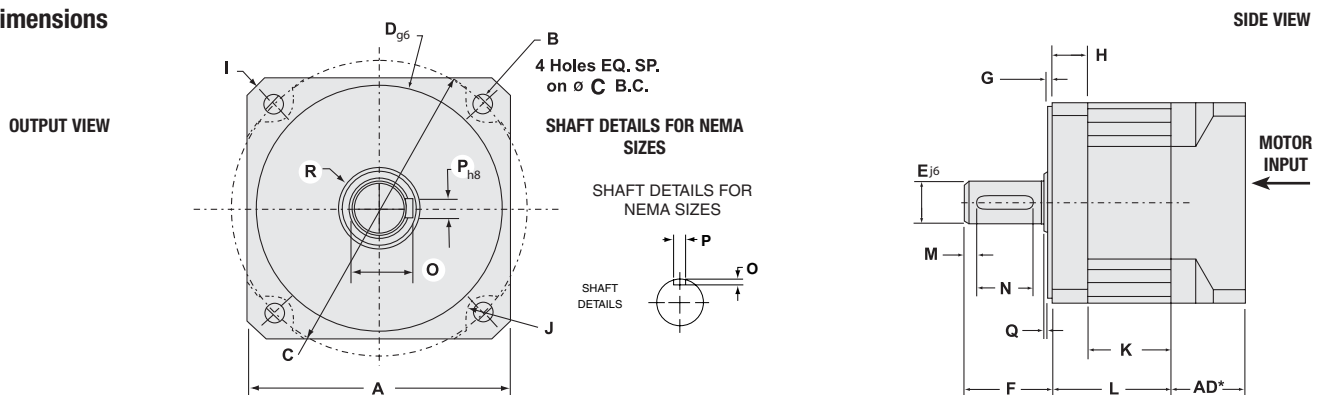


$$P_{rx} = (P_r)(121\text{mm}) / (65\text{mm} + X)$$

$$P_{rx} = (P_r)(4.76\text{in}) / (2.56\text{in} + X)$$



## Dimensions



## METRIC SIZES

| Frame Size | A<br>Square Flange |       | B<br>Bolt Hole |       | C<br>Bolt Circle |       | D<br>Pilot Diameter |       | E<br>Output Shaft Diameter |       | F<br>Output Shaft Length |       | G<br>Pilot Thickness |       | H<br>Flange Thickness |       | I<br>Housing Diameter |       | J<br>Housing Recess |       |
|------------|--------------------|-------|----------------|-------|------------------|-------|---------------------|-------|----------------------------|-------|--------------------------|-------|----------------------|-------|-----------------------|-------|-----------------------|-------|---------------------|-------|
|            | (mm)               | (in)  | (mm)           | (in)  | (mm)             | (in)  | (mm)                | (in)  | (mm)                       | (in)  | (mm)                     | (in)  | (mm)                 | (in)  | (mm)                  | (in)  | (mm)                  | (in)  | (mm)                | (in)  |
| PX60       | 60                 | 2.362 | 5.5            | 0.217 | 70               | 2.756 | 50                  | 1.969 | 16                         | 0.630 | 25                       | 0.984 | 2.5                  | 0.098 | 13                    | 0.512 | 80                    | 3.150 | 5.5                 | 0.217 |
| PX90       | 90                 | 3.543 | 6.5            | 0.256 | 100              | 3.937 | 80                  | 3.150 | 20                         | 0.787 | 40                       | 1.575 | 3                    | 0.118 | 17                    | 0.669 | 116                   | 4.567 | 6.5                 | 0.256 |
| PX115      | 115                | 4.528 | 8.5            | 0.335 | 130              | 5.118 | 110                 | 4.331 | 24                         | 0.945 | 50                       | 1.969 | 3.5                  | 0.138 | 20                    | 0.787 | 152                   | 5.984 | 7.5                 | 0.295 |
| PX142      | 142                | 5.591 | 11.0           | 0.433 | 165              | 6.496 | 130                 | 5.118 | 40                         | 1.575 | 80                       | 3.150 | 3.5                  | 0.138 | 25                    | 0.984 | 194                   | 7.637 | 10.0                | 0.394 |

| Frame Size | K1<br>Recess Length<br>(For Ratio ≤ 10:1) |       | K2<br>Recess Length<br>(For Ratio > 10:1) |       | L1<br>Length<br>(For Ratio ≤ 10:1) |       | L2<br>Length<br>(For Ratio > 10:1) |       | M<br>Dist. From<br>Shaft End |       | N<br>Keyway<br>Length |       | O<br>Key<br>Height |       | P<br>Keyway<br>Width |       | Q<br>Shoulder<br>Height |       | R<br>Shoulder<br>Diameter |       |
|------------|-------------------------------------------|-------|-------------------------------------------|-------|------------------------------------|-------|------------------------------------|-------|------------------------------|-------|-----------------------|-------|--------------------|-------|----------------------|-------|-------------------------|-------|---------------------------|-------|
|            | (mm)                                      | (in)  | (mm)                                      | (in)  | (mm)                               | (in)  | (mm)                               | (in)  | (mm)                         | (in)  | (mm)                  | (in)  | (mm)               | (in)  | (mm)                 | (in)  | (mm)                    | (in)  | (mm)                      | (in)  |
| PX60       | 30                                        | 1.181 | 60                                        | 2.362 | 43                                 | 1.693 | 73                                 | 2.874 | 3                            | 0.118 | 16                    | 0.630 | 18                 | 0.709 | 5                    | 0.197 | 1                       | 0.039 | 22                        | 0.866 |
| PX90       | 39.5                                      | 1.555 | 79                                        | 3.110 | 56.5                               | 2.224 | 96                                 | 3.780 | 5                            | 0.197 | 28                    | 1.102 | 22.5               | 0.886 | 6                    | 0.236 | 1                       | 0.039 | 35                        | 1.378 |
| PX115      | 47.8                                      | 1.882 | 95.6                                      | 3.764 | 67.8                               | 2.669 | 115.6                              | 4.551 | 7                            | 0.276 | 32                    | 1.260 | 27                 | 1.063 | 8                    | 0.315 | 1.5                     | 0.059 | 35                        | 1.378 |
| PX142      | 61.5                                      | 2.421 | 123.0                                     | 4.843 | 86.5                               | 3.406 | 148.0                              | 5.827 | 8                            | 0.315 | 63                    | 2.480 | 43.0               | 1.693 | 12                   | 0.472 | 1.5                     | 0.059 | 46                        | 1.811 |

\*AD=Adapter Length. Adapter will vary, depending on motor. Consult Internet ([www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com)) for details or call Parker Bayside.

## NEMA SIZES

| Frame Size | B<br>Bolt Hole |        | C<br>Bolt Circle |         | D<br>Pilot Diameter |         | E<br>Output Shaft Diameter |        | F<br>Output Shaft Length |        | N<br>Keyway Length |             | O<br>Keyway Depth |            | P<br>Keyway Width |       |
|------------|----------------|--------|------------------|---------|---------------------|---------|----------------------------|--------|--------------------------|--------|--------------------|-------------|-------------------|------------|-------------------|-------|
|            | (in)           | (mm)   | (in)             | (mm)    | (in)                | (mm)    | (in)                       | (mm)   | (in)                     | (mm)   | (in)               | (mm)        | (in)              | (mm)       | (in)              | (mm)  |
| PX23       | 0.195          | 4.953  | 2.625            | 66.675  | 1.5                 | 38.100  | 0.375                      | 9.525  | 1                        | 25.400 | 0.75 flat          | 19.050 flat | 0.015 flat        | 0.381 flat | —                 | —     |
| PX34       | 0.217          | 5.512  | 3.875            | 98.425  | 2.875               | 73.025  | 0.5                        | 12.700 | 1.25                     | 31.750 | 1.063              | 27.000      | 0.072             | 1.829      | 0.125             | 3.175 |
| PX42       | 0.281          | 7.137  | 4.95             | 125.730 | 2.187               | 55.550  | 0.625                      | 15.875 | 1.5                      | 38.100 | 1.142              | 29.007      | 0.094             | 2.388      | 0.188             | 4.775 |
| PX56       | 0.398          | 10.109 | 7.000            | 177.8   | 4.500               | 114.300 | 1.000                      | 25.400 | 2.000                    | 50.800 | 1.625              | 41.275      | 0.142             | 3.607      | 0.250             | 6.350 |

**NOTE:** NEMA sizes have 20% lower torque/stiffness ratings due to smaller output shaft diameter.

## How to Order

Order Numbering Example:

**P X 1 1 5 - 0 1 0 - X X X L B**

### FRAME SIZE

(Metric Sizes)

60

90

115

142

(NEMA Sizes)

23

34

42

56

### RATIO

003

004

005

007

010

015

020

025

100

### SPECIAL

(Factory

Issued)

### OPTIONAL

LOW BACKLASH

1. Pick frame size and ratio.

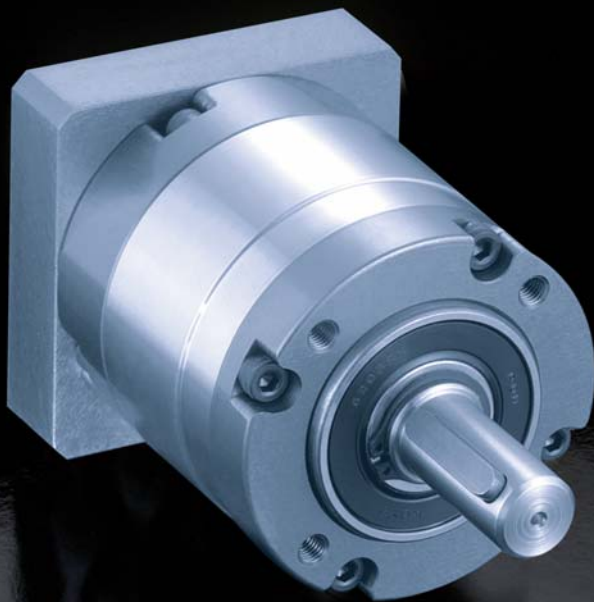
2. Pick options.

3. Specify motor make and model for mounting kit.

PX Gearheads are supported by a worldwide network of offices and local distributors. Call 1-800-305-4555 for application engineering assistance or for the name of your local distributor. Information can also be obtained at [www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com)

# PV Series Gearhead

Power & Versatility in a Value Alternative



High radial load with competitive output faces in a value alternative.

| 100:1 Ratios * |      |      |
|----------------|------|------|
| 3:1            | 12:1 | 30:1 |
| 4:1            | 15:1 | 35:1 |
| 5:1            | 16:1 | 40:1 |
| 7:1            | 20:1 | 50:1 |
| 10:1           | 25:1 | 70:1 |

| 3 Frame Sizes |      |
|---------------|------|
| PV40          | PV17 |
| PV60          | PV23 |
| PV90          | PV34 |

Right Angle coming soon - Spring 2007. Consult factory.



The PV Series planetary gearhead combines power and versatility in an economical package. It comes in a wide range of options including dimensional output face crossovers to the Parker Bayside PX, Alpha LP, Neugart PLE, Stober PE and standard NEMA gearheads.

The PV Series is available in metric or NEMA frame sizes ranging from 40mm, 60mm and 90mm. NEMA sizes are NEMA 17, NEMA 23 and NEMA 34. Ratios are available from 3:1 to 100:1. Whether you're an OEM or an end user searching for competitive alternatives, the PV offers a superior solution. Manufactured in the USA, Parker Bayside's PV Series gearheads are manufactured in the USA."

## PV Series, Specifications

| Parameter                                               | Units      | Ratio                            | PV40                            | PV60                   | PV90                   |
|---------------------------------------------------------|------------|----------------------------------|---------------------------------|------------------------|------------------------|
| Nominal Output Torque, $T_{nom}$                        | Nm (in-lb) | 3                                |                                 | 12 (106.2)             | 35 (309.75)            |
|                                                         |            | 4                                | 5.9 (52.215)                    | 18.9 (167.265)         | 56 (495.6)             |
|                                                         |            | 5                                | 6.2 (54.87)                     | 19.6 (173.46)          | 58 (513.3)             |
|                                                         |            | 7                                | 5.5 (48.675)                    | 16.7 (147.795)         | 52 (460.2)             |
|                                                         |            | 10                               | 3.5 (30.975)                    | 10.6 (93.81)           | 33 (292.05)            |
|                                                         |            | 12                               |                                 | 18.2 (161.07)          | 54 (477.9)             |
|                                                         |            | 15                               |                                 | 19.4 (171.69)          | 58 (513.3)             |
|                                                         |            | 16                               | 6.5 (57.525)                    |                        |                        |
|                                                         |            | 20                               | 6.5 (57.525)                    | 21.5 (190.255)         | 67 (592.95)            |
|                                                         |            | 25                               | 6.7 (59.295)                    | 20.0 (177)             | 63 (557.55)            |
|                                                         |            | 30                               |                                 | 22.5 (199.125)         | 71 (628.35)            |
|                                                         |            | 35                               | 6.7 (59.295)                    |                        |                        |
|                                                         |            | 40                               | 6.5 (57.525)                    | 21.5 (190.275)         | 67 (592.95)            |
|                                                         |            | 50                               | 6.7 (59.295)                    | 20 (177)               | 63 (557.55)            |
|                                                         |            | 70                               | 5.5 (48.675)                    | 16.7 (147.795)         | 52 (460.2)             |
|                                                         |            | 100                              | 3.5 (30.975)                    | 10.6 (93.81)           | 33 (292.05)            |
| Max. Acceleration Output Torque, $T_{acc}$ <sup>1</sup> | Nm (in-lb) | 3                                |                                 | 24 (212.4)             | 70 (619.5)             |
|                                                         |            | 4,5,12,15                        | 11.8 (104.43)                   | 36.4 (322.14)          | 108 (955.8)            |
|                                                         |            | 7,70                             | 11(97.35)                       | 33.4 (295.59)          | 104 (920.4)            |
| Emergency Stop Output Torque, $T_{em}$ <sup>2</sup>     | Nm (in-lb) | 10,100                           | 7 (61.95)                       | 21.2 (187.62)          | 66 (584.1)             |
|                                                         |            | 16,20,25,28,30,35,40,50          | 13 (115.05)                     | 40 (354)               | 126 (1115.1)           |
|                                                         |            | 3,4,5,12,15,16,20,25,30,35,40,50 | 16 (141.6)                      | 55 (486.75)            | 170 (1504.5)           |
| Nominal Input Speed, $N_{nom}$                          | RPM        | All Ratios                       | 4500                            | 4000                   | 3500                   |
| Maximum Input Speed, $N_{max}$                          | RPM        | All Ratios                       | 8000                            | 6000                   | 6000                   |
| Lifetime                                                | h          | All Ratios                       | 20,000                          |                        |                        |
| Standard Backlash <sup>3</sup>                          | arc-min    | $\leq 10:1$<br>$> 1:1$           | $< 15$<br>$< 18$                | $< 12$<br>$< 16$       | $< 10$<br>$< 14$       |
| Efficiency at Nominal Torque                            | %          | $\leq 10:1$<br>$> 10:1$          | 96<br>94                        | 96<br>94               | 96<br>94               |
| Noise Level at 3000 RPM <sup>4</sup>                    | dB(A)      | All Ratios                       | 60                              | 65                     | 65                     |
| Case Temperature                                        | Degree C   | All Ratios                       | Maximum Allowable<br>-20 to 100 |                        |                        |
| Lubrication                                             |            | All Ratios                       | Lifetime lubrication            |                        |                        |
| Mounting Position                                       |            | All Ratios                       | Any                             |                        |                        |
| Direction of Rotation                                   |            | All Ratios                       | Same as input                   |                        |                        |
| Degree of Protection                                    |            | All Ratios                       | IP 64                           |                        |                        |
| Maximum Weight                                          | kg (lbs)   | $\leq 10:1$<br>$> 10:1$          | 0.6 (1.2)<br>0.9 (2.0)          | 1.1 (2.5)<br>1.6 (3.5) | 3.2 (7.0)<br>4.3 (9.5) |

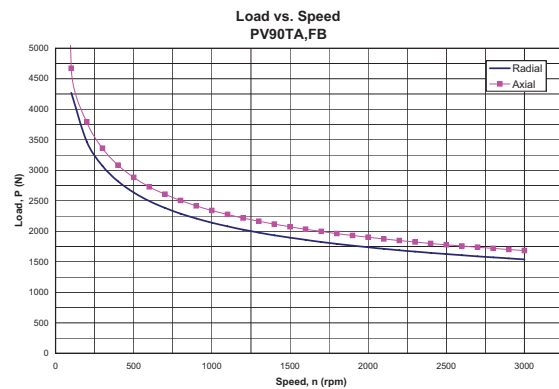
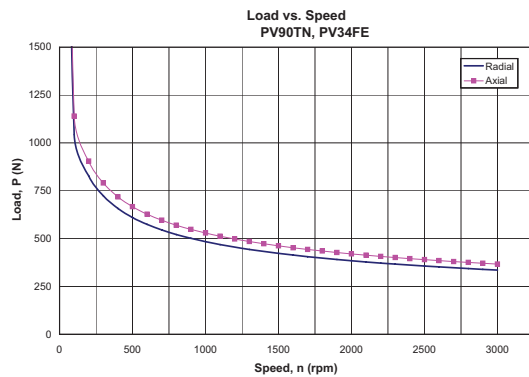
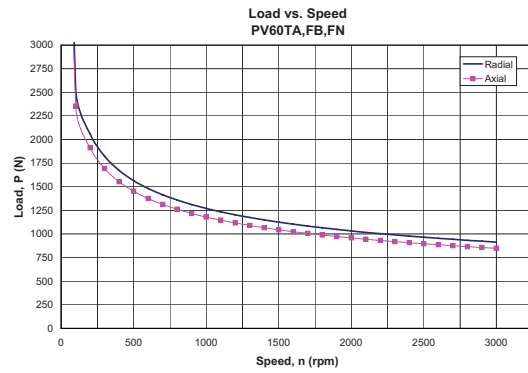
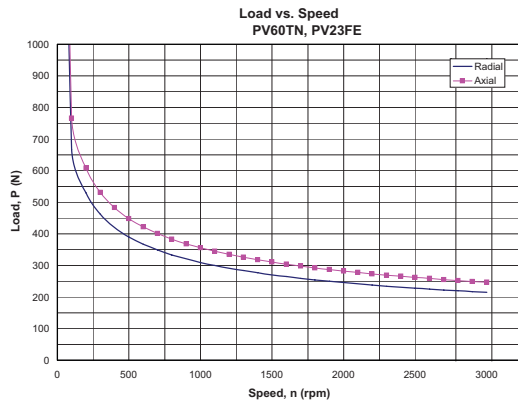
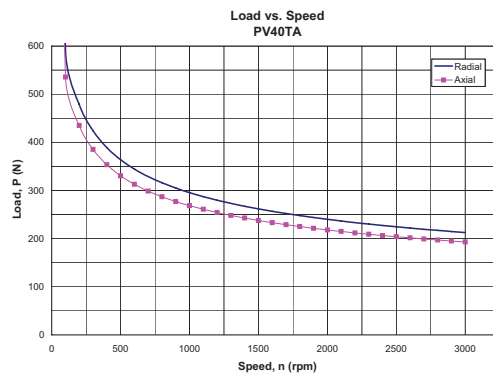
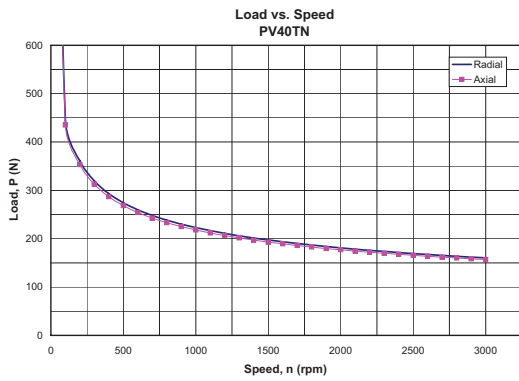
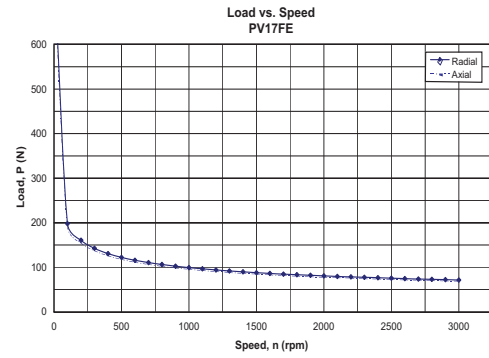
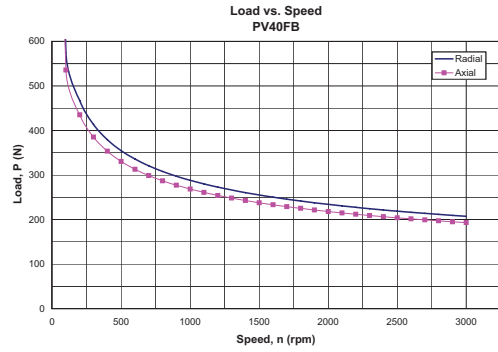
1)  $t_{acc} + t_{dec} = 2(t_{acc} + t_{cont} + t_{dec})$   $T_{cont} = .25T_{acc}$

2) Maximum of 1000 stops.

3) Measured at 2% of rated torque.

4) Measure at 1m.

r = rated values



- 1) Maximum axial load,  $F_a$ .
- 2) Maximum radial load applied to the center of the shaft,  $F_r$ .
- 3) Radial load curves can be used to combine (radial + axial) load if  $F_a/F_r < .22$ .
- 4) If  $F_a/F_r > .22$  consult factory.

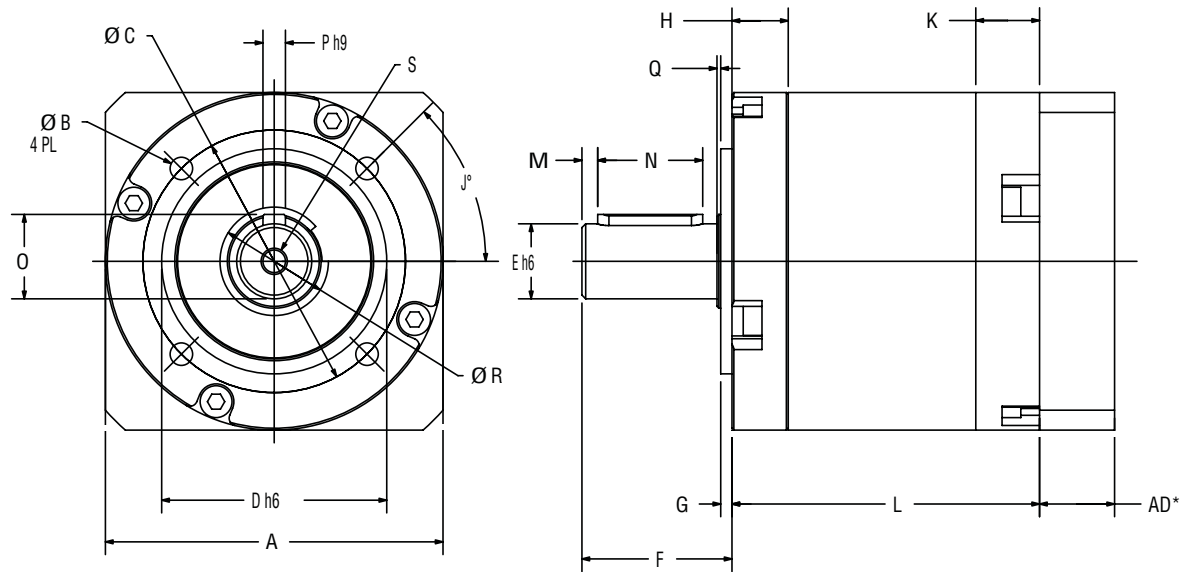


**PV Series, Inertia Table**

| Units                  | Ratio | PV40     | PV60     | PV90     |
|------------------------|-------|----------|----------|----------|
| kg cm <sup>2</sup>     | 3     | ----     | 0.1400   | 0.7400   |
| in lb sec <sup>2</sup> |       | ----     | 0.000124 | 0.000655 |
| kg cm <sup>2</sup>     | 4     | 0.0200   | 0.1000   | 0.5000   |
| in lb sec <sup>2</sup> |       | 0.000018 | 0.000089 | 0.000443 |
| kg cm <sup>2</sup>     | 5     | 0.0180   | 0.0840   | 0.3900   |
| in lb sec <sup>2</sup> |       | 0.000016 | 0.000074 | 0.000345 |
| kg cm <sup>2</sup>     | 7     | 0.0160   | 0.0750   | 0.3400   |
| in lb sec <sup>2</sup> |       | 0.000014 | 0.000066 | 0.000301 |
| kg cm <sup>2</sup>     | 10    | 0.0160   | 0.0070   | 0.3000   |
| in lb sec <sup>2</sup> |       | 0.000014 | 0.000006 | 0.000266 |
| kg cm <sup>2</sup>     | 12    | ----     | 0.0970   | 0.4900   |
| in lb sec <sup>2</sup> |       | ----     | 0.000086 | 0.000434 |
| kg cm <sup>2</sup>     | 15    | ----     | 0.0830   | 0.3900   |
| in lb sec <sup>2</sup> |       | ----     | 0.000073 | 0.000345 |
| kg cm <sup>2</sup>     | 16    | 0.0190   | ----     | ----     |
| in lb sec <sup>2</sup> |       | 0.000017 | ----     | ----     |
| kg cm <sup>2</sup>     | 20    | 0.0170   | 0.0830   | 0.3900   |
| in lb sec <sup>2</sup> |       | 0.000015 | 0.000073 | 0.000345 |
| kg cm <sup>2</sup>     | 25    | 0.0170   | 0.0830   | 0.3900   |
| in lb sec <sup>2</sup> |       | 0.000015 | 0.000073 | 0.000345 |
| kg cm <sup>2</sup>     | 28    | 0.0160   | ----     | ----     |
| in lb sec <sup>2</sup> |       | 0.000014 | ----     | ----     |
| kg cm <sup>2</sup>     | 30    | ----     | 0.0700   | 0.3000   |
| in lb sec <sup>2</sup> |       | ----     | 0.000062 | 0.000266 |
| kg cm <sup>2</sup>     | 35    | 0.0160   | ----     | ----     |
| in lb sec <sup>2</sup> |       | 0.000014 | ----     | ----     |
| kg cm <sup>2</sup>     | 40    | 0.0160   | 0.0700   | 0.3000   |
| in lb sec <sup>2</sup> |       | 0.000014 | 0.000062 | 0.000266 |
| kg cm <sup>2</sup>     | 50    | 0.0160   | 0.0700   | 0.3000   |
| in lb sec <sup>2</sup> |       | 0.000014 | 0.000062 | 0.000266 |
| kg cm <sup>2</sup>     | 70    | 0.0160   | 0.0700   | 0.3000   |
| in lb sec <sup>2</sup> |       | 0.000014 | 0.000062 | 0.000266 |
| kg cm <sup>2</sup>     | 100   | 0.0160   | 0.0700   | 0.3000   |
| in lb sec <sup>2</sup> |       | 0.000014 | 0.000062 | 0.000266 |

(1) Note: All moments of inertia values are as reflected at the input shaft of the gearhead

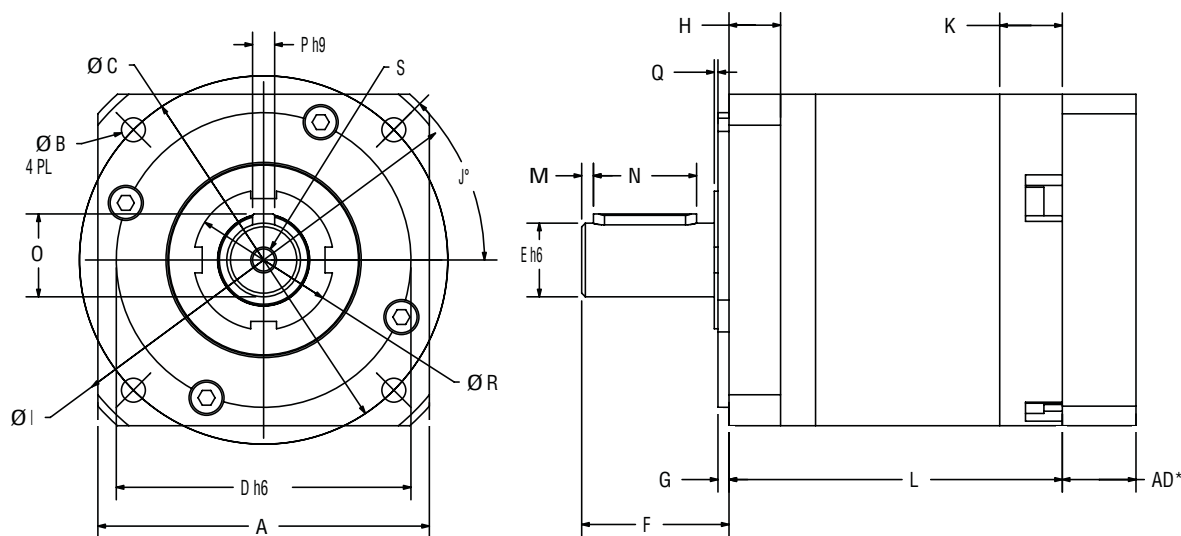
## Dimensions



### PV Tapped Face Dimensions Units: mm (in)

|         | A<br>Body Diameter  |       | B<br>Tap x Depth              |       | C<br>Bolt Circle              |       | D<br>Pilot Diameter          |       | E<br>Output Shaft Diameter |       | F<br>Output Shaft Length |       | G<br>Pilot Thickness |       | H<br>Flange Thickness   |       | I<br>Housing Diameter   |       | J<br>Lead Angle  |  |
|---------|---------------------|-------|-------------------------------|-------|-------------------------------|-------|------------------------------|-------|----------------------------|-------|--------------------------|-------|----------------------|-------|-------------------------|-------|-------------------------|-------|------------------|--|
|         | (mm)                | (in)  | (mm)                          | (in)  | (mm)                          | (in)  | (mm)                         | (in)  | (mm)                       | (in)  | (mm)                     | (in)  | (mm)                 | (in)  | (mm)                    | (in)  | (mm)                    | (in)  | (deg)            |  |
| PV40-TN | 43                  | 1.693 | M4x7                          |       | 34                            | 1.339 | 26                           | 1.024 | 10                         | 0.394 | 26                       | 1.024 | 1.5                  | 0.059 | 10                      | 0.394 | ---                     |       | 45               |  |
| PV40-TA | 50                  | 1.969 | M4X10                         |       | 44                            | 1.732 | 35                           | 1.378 | 12                         | 0.472 | 25                       | 0.984 | 3                    | 0.118 | 10                      | 0.394 | ---                     |       | 90               |  |
| PV60-TN | 62                  | 2.441 | M5x10                         |       | 52                            | 2.047 | 40                           | 1.575 | 14                         | 0.551 | 35                       | 1.378 | 2.5                  | 0.098 | 12                      | 0.472 | ---                     |       | 45               |  |
| PV60-TA | 70                  | 2.756 | M5x10                         |       | 62                            | 2.362 | 52                           | 2.047 | 16                         | 0.630 | 36                       | 1.417 | 5                    | 0.197 | 16                      | 0.630 | ---                     |       | 90               |  |
| PV90-TN | 90                  | 3.543 | M6x11                         |       | 70                            | 2.756 | 60                           | 2.362 | 20                         | 0.787 | 40                       | 1.575 | 3                    | 0.118 | 15                      | 0.591 | ---                     |       | 45               |  |
| PV90-TA | 90                  | 3.543 | M6x12                         |       | 80                            | 3.150 | 68                           | 2.677 | 22                         | 0.866 | 46                       | 1.811 | 5                    | 0.197 | 18.5                    | 0.728 | ---                     |       | 90               |  |
|         | K<br>Rear Thickness |       | L1<br>Length<br>(Ratio <10:1) |       | L2<br>Length<br>(Ratio >10:1) |       | M<br>Dist. From<br>Shaft End |       | N<br>Keyway<br>Length      |       | O<br>Key<br>Height       |       | P<br>Keyway<br>Width |       | Q<br>Shoulder<br>Height |       | R<br>Shoulder<br>Height |       | S<br>Tap x Depth |  |
|         | (mm)                | (in)  | (mm)                          | (in)  | (mm)                          | (in)  | (mm)                         | (in)  | (mm)                       | (in)  | (mm)                     | (in)  | (mm)                 | (in)  | (mm)                    | (in)  | (mm)                    | (in)  |                  |  |
| PV40-TN | 11                  | 0.433 | 48.5                          | 1.909 | 63                            | 2.480 | 3.1                          | 0.122 | 16                         | 0.630 | 10.2                     | 0.402 | 3                    | 0.118 | 0.6                     | 0.024 | 11.633                  | 0.458 | M3X6             |  |
| PV40-TA | 11                  | 0.433 | 48.5                          | 1.909 | 63                            | 2.480 | 1.3                          | 0.051 | 16                         | 0.630 | 13.5                     | 0.531 | 4                    | 0.157 | 3.5                     | 0.138 | 17.831                  | 0.702 | M4x8             |  |
| PV60-TN | 16                  | 0.630 | 63                            | 2.480 | 83                            | 3.268 | 2.71                         | 0.107 | 25                         | 0.984 | 16                       | 0.630 | 5                    | 0.197 | 2.5                     | 0.098 | 19.939                  | 0.785 | M5x12            |  |
| PV60-TA | 16                  | 0.630 | 67                            | 2.638 | 87                            | 3.425 | 2.21                         | 0.087 | 25                         | 0.984 | 18                       | 0.709 | 5                    | 0.197 | 3                       | 0.118 | 28                      | 1.102 | M5x12            |  |
| PV90-TN | 17                  | .670  | 82                            | 3.228 | 105.5                         | 4.154 | 4.197                        | 0.165 | 28                         | 1.102 | 22.5                     | 0.886 | 6                    | 0.236 | 1                       | 0.039 | 25                      | 0.984 | M6x12            |  |
| PV90-TA | 17                  | .670  | 85.5                          | 3.366 | 109                           | 4.291 | 3.197                        | 0.126 | 28                         | 1.102 | 24.5                     | 0.965 | 6                    | 0.236 | 5                       | 0.197 | 38                      | 1.496 | M8x13            |  |

\*AD = Adapter length. See how to order page for mounting kit adapter lengths.



# **PV Flange Face Dimensions Units: mm (in)**

|         | A<br>Square Flange  |       | B<br>Bolt Hole                 |       | C<br>Bolt Circle               |       | D<br>Pilot Diameter          |       | E<br>Output Shaft Diameter |       | F<br>Output Shaft Length |       | G<br>Pilot Thickness |       | H<br>Flange Thickness   |       | I<br>Housing Diameter     |       | J<br>Lead Angle  |
|---------|---------------------|-------|--------------------------------|-------|--------------------------------|-------|------------------------------|-------|----------------------------|-------|--------------------------|-------|----------------------|-------|-------------------------|-------|---------------------------|-------|------------------|
|         | (mm)                | (in)  | (mm)                           | (in)  | (mm)                           | (in)  | (mm)                         | (in)  | (mm)                       | (in)  | (mm)                     | (in)  | (mm)                 | (in)  | (mm)                    | (in)  | (mm)                      | (in)  | (deg)            |
| PV40-FB | 43                  | 1.693 | 3.4                            | 0.134 | 50                             | 1.969 | 35                           | 1.378 | 13                         | 0.512 | 26                       | 1.024 | 3                    | 0.118 | 10                      | 0.394 | 56                        | 2.205 | 45               |
| PV17-FE | 43                  | 1.693 | 3.5                            | 0.138 | 43.8                           | 1.724 | 22                           | 0.866 | 6.35                       | 0.250 | 25                       | 0.984 | 1.5                  | 0.059 | 6                       | 0.236 | 55                        | 2.165 | 45               |
| PV60-FB | 62                  | 2.441 | 5.5                            | 0.217 | 70                             | 2.756 | 50                           | 1.969 | 16                         | 0.630 | 25                       | 0.984 | 2.5                  | 0.098 | 10.3                    | 0.406 | 80                        | 3.150 | 45               |
| PV23-FE | 62                  | 2.441 | 4.95                           | 0.195 | 66.675                         | 2.625 | 38.1                         | 1.500 | 9.525                      | 0.375 | 25.4                     | 1.000 | 2.5                  | 0.098 | 9.5                     | 0.374 | 80                        | 3.150 | 45               |
| PV60-FN | 62                  | 2.441 | 5.5                            | 0.217 | 70                             | 2.756 | 50                           | 1.969 | 14                         | 0.551 | 25                       | 0.984 | 2.5                  | 0.098 | 10.3                    | 0.406 | 80                        | 3.150 | 45               |
| PV90-FB | 90                  | 3.543 | 6.5                            | 0.256 | 100                            | 3.937 | 80                           | 3.150 | 20                         | 0.787 | 40                       | 1.575 | 3                    | 0.118 | 14                      | 0.551 | 116                       | 4.567 | 45               |
| PV34-FE | 90                  | 3.543 | 5.52                           | 0.217 | 98.43                          | 3.875 | 73.025                       | 2.875 | 12.7                       | 0.500 | 31.75                    | 1.250 | 3                    | 0.118 | 15                      | 0.591 | 116                       | 4.567 | 45               |
|         | K<br>Rear Thickness |       | L1<br>Length<br>(Ratio < 10:1) |       | L2<br>Length<br>(Ratio > 10:1) |       | M<br>Dist. From<br>Shaft End |       | N<br>Keyway<br>Length      |       | O<br>Key<br>Height       |       | P<br>Keyway<br>Width |       | Q<br>Shoulder<br>Height |       | R<br>Shoulder<br>Diameter |       | S<br>Tap x Depth |
|         | (mm)                | (in)  | (mm)                           | (in)  | (mm)                           | (in)  | (mm)                         | (in)  | (mm)                       | (in)  | (mm)                     | (in)  | (mm)                 | (in)  | (mm)                    | (in)  | (mm)                      | (in)  |                  |
| PV40-FB | 11                  | 0.433 | 48.5                           | 1.909 | 63                             | 2.480 | 2.1                          | 0.083 | 16                         | 0.630 | 15                       | 0.591 | 5                    | 0.197 | 2                       | 0.079 | 17.831                    | 0.702 | M4x8             |
| PV17-FE | 11                  | 0.433 | 48.5                           | 1.909 | 63                             | 2.480 | ---                          | ---   | ---                        | ---   | ---                      | ---   | ---                  | ---   | 2.3                     | 0.091 | 11.633                    | 0.458 | ---              |
| PV60-FB | 16                  | 0.630 | 71.5                           | 2.815 | 91.5                           | 3.602 | 3.2                          | 0.126 | 16                         | 0.630 | 18                       | 0.709 | 5                    | 0.197 | 1                       | 0.039 | 28                        | 1.102 | M5x12            |
| PV23-FE | 16                  | 0.630 | 60.5                           | 2.382 | 80.5                           | 3.169 | ---                          | ---   | 19                         | 0.748 | 9.444                    | 0.372 | Flat                 | ---   | 1                       | 0.039 | 19.939                    | 0.785 | M5x12            |
| PV60-FN | 16                  | 0.630 | 71.5                           | 2.815 | 91.5                           | 3.602 | 3.2                          | 0.126 | 16                         | 0.630 | 16                       | 0.630 | 5                    | 0.197 | 1                       | 0.039 | 28                        | 1.102 | M5x12            |
| PV90-FB | 17                  | .670  | 90.5                           | 3.563 | 114                            | 4.488 | 3.197                        | 0.126 | 28                         | 1.102 | 22.5                     | 0.886 | 6                    | 0.236 | 1                       | 0.039 | 38                        | 1.496 | M6x12            |
| PV34-FE | 17                  | .670  | 82                             | 3.228 | 105.5                          | 4.154 | ---                          | ---   | 27                         | 1.063 | 14.247                   | 0.561 | 3.175                | 0.125 | 1                       | 0.039 | 25                        | 0.984 | M6x12            |

\*AD = Adapter length. See how to order page for mounting kit adapter lengths.

## PV Completes The Parker Bayside Gear Family

The Parker Bayside gearhead family offers choices to customers in almost every possible feature and specification. The depth of the Parker Bayside gearhead family is unmatched with frame sizes from 40mm (1.57") up to 300mm (11.8"), ratios from 3:1 to 100:1, environmental options, backlash availability from 3 arc minutes to 18 arc minutes and a multitude of output face and mounting options that can fit any application.

Helical planetary technology is superb for low-backlash, high-stiffness and high-accuracy requirements, making the Parker Bayside Stealth line of helical planetary gearheads ideal for these high- and medium-level performance applications. The introduction of the PV Series gearhead completes the Parker Bayside gear family by offering a standard-grade gearhead with the highest radial load capacity available today in a cost-effective solution. Whether you need high-, medium- or standard-grade performance, Parker Bayside can match the need.

All Parker Bayside gearheads are proudly manufactured in the USA in our state-of-the-art facility which, displays the best use of Lean manufacturing practices. For more information go to [parkermotion.com](http://parkermotion.com) or [baysidemotion.com](http://baysidemotion.com)





## Order Numbering Example:

|           |           |          |          |              |
|-----------|-----------|----------|----------|--------------|
| <b>PV</b> | <b>60</b> | <b>F</b> | <b>N</b> | <b>- 003</b> |
| <b>A</b>  | <b>B</b>  | <b>C</b> | <b>D</b> | <b>E</b>     |

|           |                   |
|-----------|-------------------|
| <b>A</b>  | <b>PRODUCT</b>    |
| <b>PV</b> | Power Versatility |

|           |                               |
|-----------|-------------------------------|
| <b>B</b>  | <b>FRAME SIZE<sup>1</sup></b> |
| <b>40</b> | 40mm                          |
| <b>17</b> | NEMA 17                       |
| <b>60</b> | 60mm                          |
| <b>23</b> | NEMA 23                       |
| <b>90</b> | 90mm                          |
| <b>34</b> | NEMA 34                       |

|          |                      |
|----------|----------------------|
| <b>C</b> | <b>FRONT FACE</b>    |
| <b>F</b> | Flange (Square) Face |
| <b>T</b> | Round (Tapped) Face  |

|          |                                          |
|----------|------------------------------------------|
| <b>D</b> | <b>OUTPUT FACE DIMENSIONS</b>            |
| <b>A</b> | Alpha / Stober <sup>2</sup>              |
| <b>N</b> | Neugart <sup>3</sup>                     |
| <b>B</b> | Parker Bayside (Same as PX) <sup>2</sup> |
| <b>E</b> | NEMA (English) <sup>2,4</sup>            |

|          |                                                                                                                     |
|----------|---------------------------------------------------------------------------------------------------------------------|
| <b>E</b> | <b>RATIO</b>                                                                                                        |
|          | 40/17 frame options = 004, 005, 007, 010, 016, 020, 035, 040, 050, 070, 100                                         |
|          | 60/23 and 90/40 frame options = 003, 004, 005, 007, 009, 010, 012, 015, 016, 020, 025, 028, 030, 040, 050, 070, 100 |

## Mounting Kit

|           |           |            |
|-----------|-----------|------------|
| <b>MV</b> | <b>60</b> | <b>XXX</b> |
| <b>A</b>  | <b>B</b>  | <b>C</b>   |

| FRAME SIZE | MOTOR SHAFT LENGTHS<br>MM (IN)    | GEARHEAD ADAPTER LENGTHS<br>MM (IN) |
|------------|-----------------------------------|-------------------------------------|
| PV40/PV17  | 12 thru 20 (0.472 thru 0.787)     | 13.7 (0.539)                        |
|            | 20.1 thru 25.4 (0.791 thru 1.000) | 19 (0.748)                          |
| PV60/PV23  | 16 thru 25.4 (0.630 thru 1.000)   | 16.5 (0.65)                         |
|            | 25.4 thru 31.8 (1.004 thru 1.252) | 22.5 (0.886)                        |
| PV90/PV34  | 20 thru 31.8 (0.787 thru 1.252)   | 20 (0.787)                          |
|            | 31.9 thru 40 (1.256 thru 1.575)   | 28.5 (1.122)                        |

**Note:**  
Adapter lengths may vary based on make and model of motor.

|           |                 |
|-----------|-----------------|
| <b>A</b>  | <b>PRODUCT</b>  |
| <b>MV</b> | PV mounting kit |

|           |                               |
|-----------|-------------------------------|
| <b>B</b>  | <b>FRAME SIZE<sup>1</sup></b> |
| <b>40</b> | 40mm/NEMA 17                  |
| <b>60</b> | 60mm/NEMA 23                  |
| <b>90</b> | 90mm/NEMA 34                  |

|            |                                 |
|------------|---------------------------------|
| <b>C</b>   | <b>Factory assigned</b>         |
| <b>XXX</b> | Consult factory for part number |

Notes:  
(1) NEMA sizes only available with front face option 'F'  
(2) Output face dimensions  
Option 'A' only available with front face option 'T'  
Option 'B' and 'E' only available with front face option 'F'  
(3) For PV90FN use PV90FB  
(4) Only available for NEMA 17, 23 and 34

# Stealth<sup>®</sup> RS Advanced Series:

## Compact, Right-Angle Servo Gearhead



Stealth<sup>®</sup> RS delivers "The Helical Advantage" in a compact, right-angle package. With 7 frame sizes and 9 gear ratios to choose from, you're guaranteed to find a Stealth<sup>®</sup> RS to fit your high performance servo applications.

### 7 Frame Sizes

|       |       |
|-------|-------|
| RS60  | RS180 |
| RS90  | RS220 |
| RS115 | RS300 |
| RS142 |       |

### Ratios\*

|      |                          |
|------|--------------------------|
| 5:1  | 30:1                     |
| 10:1 | 40:1                     |
| 15:1 | 50:1                     |
| 20:1 | 100:1                    |
| 25:1 | * For RS300 see Note (5) |



## Performance Specifications

|                                                               | Units           | Ratio  | Frame Size |       |       |       |        |        |         |
|---------------------------------------------------------------|-----------------|--------|------------|-------|-------|-------|--------|--------|---------|
|                                                               |                 |        | RS60       | RS90  | RS115 | RS142 | RS180  | RS220  | RS300   |
| Nominal Output Torque,<br>$T_{nom r}$                         | Nm              | 5      | 11         | 28    | 75    | 141   | 316    | 678    | 2,203   |
|                                                               | in lb           |        | 95         | 250   | 660   | 1,250 | 2,800  | 6,000  | 19,500  |
|                                                               | Nm              | 10     | 21         | 55    | 147   | 271   | 621    | 1,299  | 2,712   |
|                                                               | in lb           |        | 190        | 490   | 1,300 | 2,400 | 5,500  | 11,500 | 24,000  |
|                                                               | Nm              | 15-25  | 33         | 85    | 215   | 395   | 938    | 1,808  | 4,181   |
|                                                               | in lb           |        | 290        | 750   | 1,900 | 3,500 | 8,300  | 16,000 | 37,000  |
| Max. Acceleration<br>Output Torque,<br>$T_{acc r}$            | Nm              | 30-100 | 28         | 85    | 192   | 316   | 836    | 1,469  | 4,181   |
|                                                               | in lb           |        | 250        | 750   | 1,700 | 2,800 | 7,400  | 13,000 | 37,000  |
|                                                               | Nm              | 5      | 13         | 33    | 88    | 166   | 373    | 802    | 2,644   |
|                                                               | in lb           |        | 115        | 295   | 780   | 1,470 | 3,300  | 7,100  | 23,400  |
|                                                               | Nm              | 10     | 26         | 66    | 169   | 333   | 734    | 1,582  | 3,277   |
|                                                               | in lb           |        | 230        | 580   | 1,500 | 2,950 | 6,500  | 14,000 | 29,000  |
| Emergency <sup>(1)</sup> Stop<br>Output Torque,<br>$T_{em r}$ | Nm              | 15-100 | 37         | 101   | 260   | 452   | 1,096  | 2,000  | 5,311   |
|                                                               | in lb           |        | 330        | 890   | 2,300 | 4,000 | 9,700  | 17,700 | 47,000  |
|                                                               | Nm              | 5      | 31         | 77    | 203   | 384   | 870    | 1,853  | 6,102   |
|                                                               | in lb           |        | 270        | 680   | 1,800 | 3,400 | 7,700  | 16,400 | 54,000  |
|                                                               | Nm              | 10     | 60         | 153   | 395   | 768   | 1,695  | 3,684  | 7,684   |
|                                                               | in lb           |        | 530        | 1,350 | 3,500 | 6,800 | 15,000 | 32,600 | 68,000  |
| Nominal Input Speed,<br>$N_{nom r}$                           | Nm              | 15-100 | 87         | 232   | 599   | 1,040 | 2,520  | 4,588  | 12,316  |
|                                                               | in-lb           |        | 770        | 2,050 | 5,300 | 9,200 | 22,300 | 40,600 | 109,000 |
|                                                               | RPM             | 5,10   | 3,200      | 2,800 | 2,400 | 2,000 | 1,600  | 1,200  | 1,000   |
|                                                               | RPM             | 15-40  | 3,700      | 3,300 | 2,900 | 2,500 | 2,000  | 1,500  | 1,250   |
| Maximum Input Speed, $N_{max r}$                              | RPM             | 50-100 | 4,200      | 3,800 | 3,400 | 3,000 | 2,400  | 1,800  | 1,500   |
|                                                               | RPM             | 5-100  | 6,000      | 5,300 | 4,500 | 3,800 | 3,000  | 2,300  | 1,900   |
| Standard Backlash <sup>(2)</sup>                              | arc min         | 5,10   | 14         | 12    | 12    | 10    | 10     | 10     | 10      |
|                                                               | arc min         | 15-100 | 12         | 10    | 10    | 8     | 8      | 8      | 8       |
| Low Backlash <sup>(2)</sup>                                   | arc min         | 5,10   | 10         | 8     | 8     | 6     | 6      | 6      | 6       |
|                                                               | arc min         | 15-100 | 8          | 6     | 6     | 4     | 4      | 4      | 4       |
| Efficiency at Nominal Torque                                  | %               |        | 94         | 94    | 94    | 94    | 94     | 94     | 94      |
| Noise Level <sup>(3)</sup> at:                                |                 |        |            |       |       |       |        |        |         |
|                                                               | 3,000 RPM       |        |            |       |       |       |        |        |         |
|                                                               | 2,000 RPM       |        |            |       |       |       |        |        |         |
| Torsional Stiffness                                           | Nm / arc min    | 5-100  | 3          | 10    | 19    | 35    | 90     | 170    | 290     |
|                                                               | in lb / arc min |        | 22         | 84    | 164   | 310   | 800    | 1,500  | 2,560   |
| Maximum Weight                                                | kg              | 5-100  | 2          | 6     | 11    | 24    | 43     | 80     | 120     |
|                                                               | lb              |        | 4          | 13    | 25    | 52    | 94     | 177    | 265     |
| Max. Allowable Case Temp.                                     | °C              | 5-100  | ← 100 →    |       |       |       |        |        |         |

| Specifications:                  | Units                  | Ratio    | Frame Size |       |       |       |       |       |       |
|----------------------------------|------------------------|----------|------------|-------|-------|-------|-------|-------|-------|
|                                  |                        |          | RS60       | RS90  | RS115 | RS142 | RS180 | RS220 | RS300 |
| Moment of Inertia <sup>(4)</sup> | g cm sec <sup>2</sup>  | 5        | 0.197      | 0.745 | 2.68  | 8.94  | 26.5  | 82.2  | 378   |
|                                  | oz-in-sec <sup>2</sup> |          | 0.003      | 0.010 | 0.037 | 0.124 | 0.368 | 1.14  | 5.26  |
|                                  | g cm sec <sup>2</sup>  | 10       | 0.095      | 0.489 | 1.67  | 5.87  | 16.7  | 50.4  | 238   |
|                                  | oz-in-sec <sup>2</sup> |          | 0.001      | 0.007 | 0.023 | 0.082 | 0.232 | 0.700 | 3.31  |
|                                  | g cm sec <sup>2</sup>  | 15,30    | 0.092      | 0.453 | 1.58  | 5.60  | 15.2  | 47.4  | 158   |
|                                  | oz-in-sec <sup>2</sup> |          | 0.001      | 0.006 | 0.022 | 0.078 | 0.211 | 0.658 | 2.19  |
|                                  | g cm sec <sup>2</sup>  | 20,25,40 | 0.083      | 0.358 | 1.13  | 4.17  | 10.7  | 34.3  | 116   |
|                                  | oz-in-sec <sup>2</sup> |          | 0.001      | 0.005 | 0.016 | 0.058 | 0.149 | 0.476 | 1.61  |
|                                  | g cm sec <sup>2</sup>  | 50,100   | 0.072      | 0.238 | 0.685 | 2.26  | 6.70  | 21.2  | 95.4  |
|                                  | oz-in-sec <sup>2</sup> |          | 0.001      | 0.003 | 0.010 | 0.031 | 0.093 | 0.294 | 1.32  |

(1) Maximum of 1,000 stops

(2) Measured at 2% of rated torque

(3) Measured at 1 meter

(4) All Moment of Inertia values are as reflected at the input shaft of the gearhead.

(5) RS300 is available in Ratios of: 4, 6, 10, 15, 20, 24, 30 & 50:1

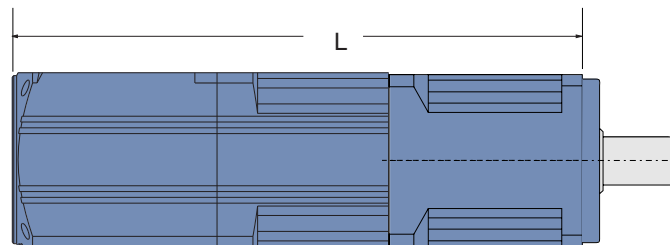
Specification are subject to change without notice

## Space Tight? Turn Right

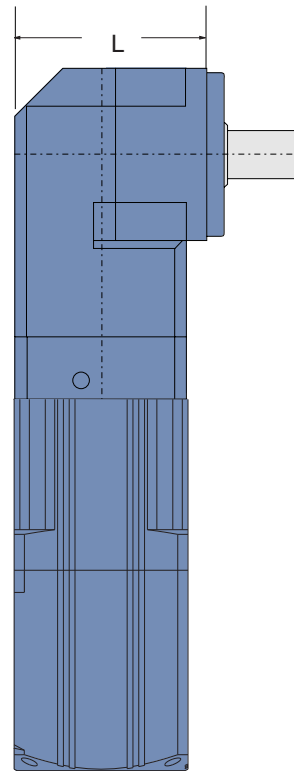
**Stealth® Advanced** in the PS / RS Models incorporates the latest enhancements in gearhead technology:

- ▶ Latest technology in seals...reduce heat and wear
- ▶ Oil lubrication...reduces, friction and operating temperature
- ▶ Front output seal cover...captures and protects output seal

**For space constrained-applications Parker Bayside's Right-Angle gearheads can offer a two times space savings when compared to in-line products.**



**IN-LINE  
MOUNTING**



**RIGHT-ANGLE  
MOUNTING**

Stealth's superior design and construction deliver "The Helical Advantage":

- ▶ Strong...30% More Torque
- ▶ Quiet...Less Than 70dB Noise
- ▶ Fast...6,000 RPM Input Speeds
- ▶ Accurate...Less Than 4 Arc minutes Backlash

**Plus... Over 94% Efficiency**



1

### Stealth Planetary Output

Stealth RS is built into the gearhead to deliver "The Helical Advantage" at the load-carrying output section.

2

### Spiral Bevel Gears

Deliver high efficiency and high torque in a compact, right angle package.

3

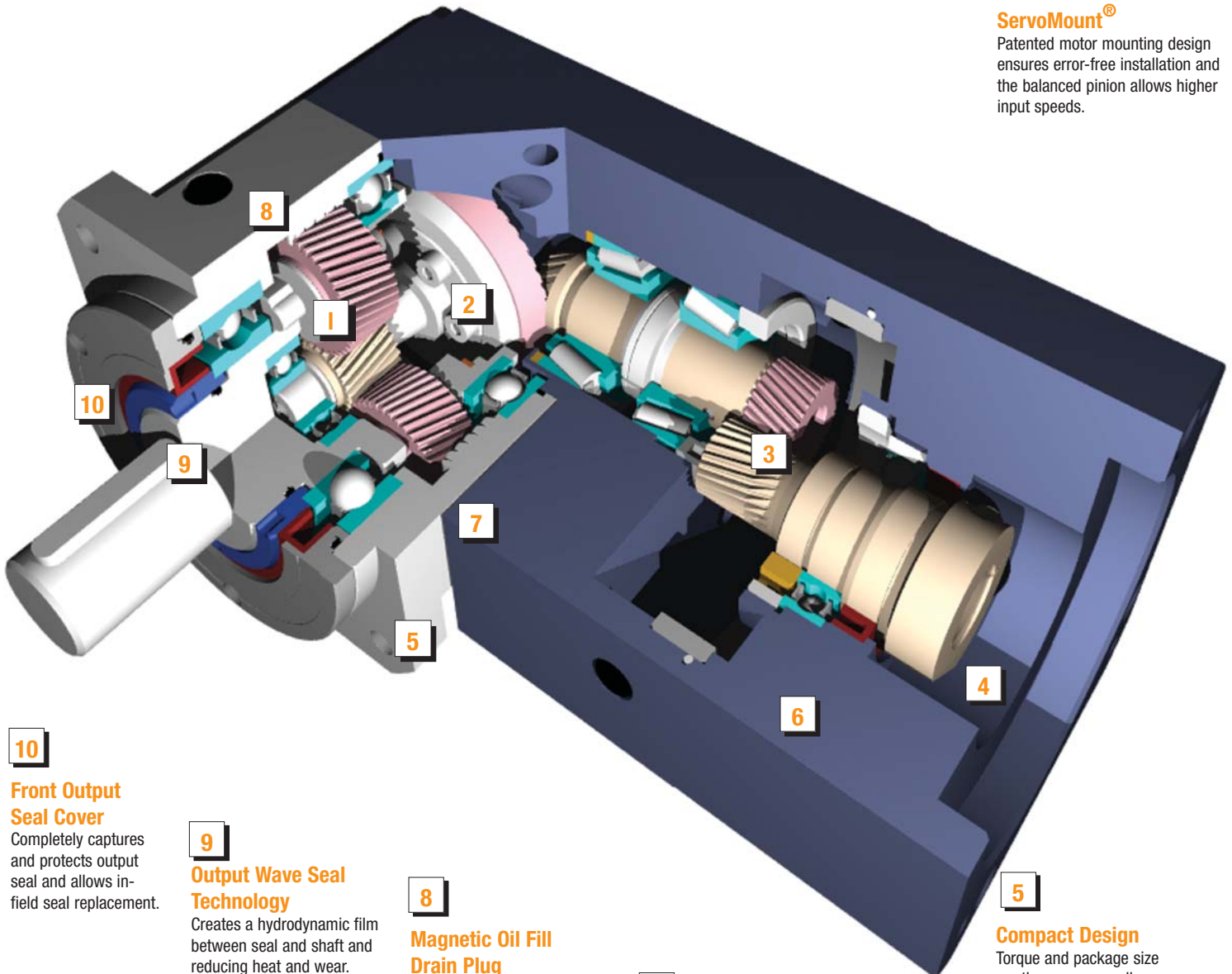
### High Speed Input

Helical Stealth gearing provides high input speeds with quiet operation. Input cavity surrounds the gears for constant lubrication in any orientation.

4

### ServoMount®

Patented motor mounting design ensures error-free installation and the balanced pinion allows higher input speeds.



10

### Front Output Seal Cover

Completely captures and protects output seal and allows in-field seal replacement.

9

### Output Wave Seal Technology

Creates a hydrodynamic film between seal and shaft and reducing heat and wear.

8

### Magnetic Oil Fill Drain Plug

The magnetic plug attracts normal wear particles keeping them away from the gear mesh.

7

### Oil Lubrication

Oil provides better lubrication, reduces friction and operating temperatures.

6

### Sealed Unit

Viton seals and O-Rings provide IP65 protection to prevent leaks and protect against harsh environments.

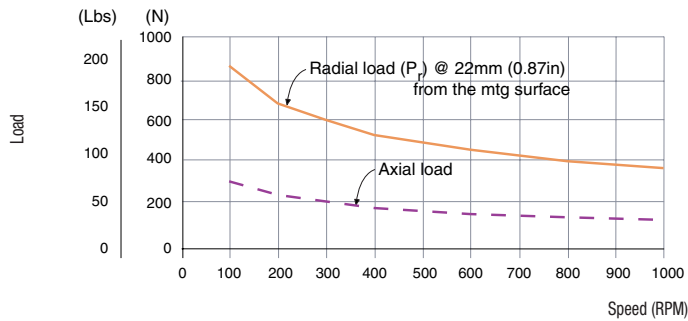
5

### Compact Design

Torque and package size are the same regardless of ratio.

Formulas to calculate radial load ( $P_{rx}$ ) at any distance "X" from the gearhead mounting surface.

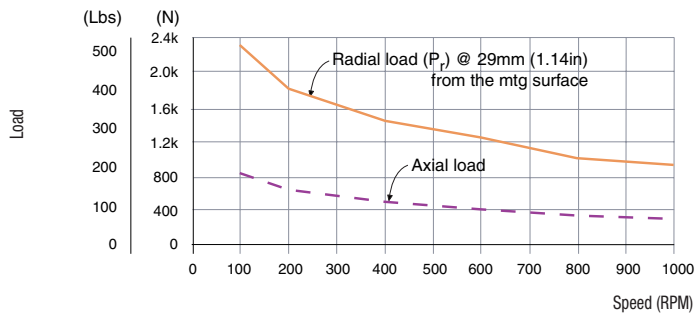
## RS60



$$P_{rx} = (P_r)(57\text{mm}) / (35\text{mm} + X)$$

$$P_{rx} = (P_r)(2.24\text{in}) / (1.38\text{in} + X)$$

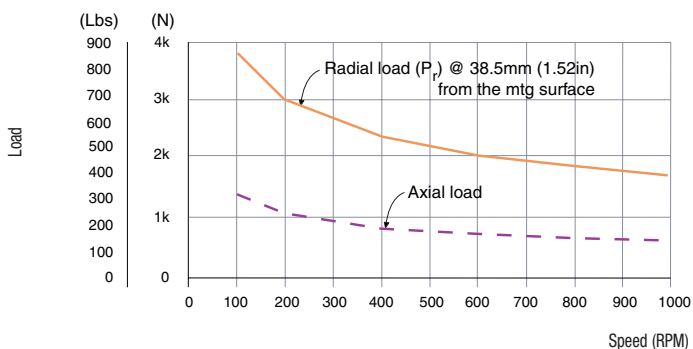
## RS90



$$P_{rx} = (P_r)(74\text{mm}) / (45\text{mm} + X)$$

$$P_{rx} = (P_r)(2.91\text{in}) / (1.77\text{in} + X)$$

## RS115

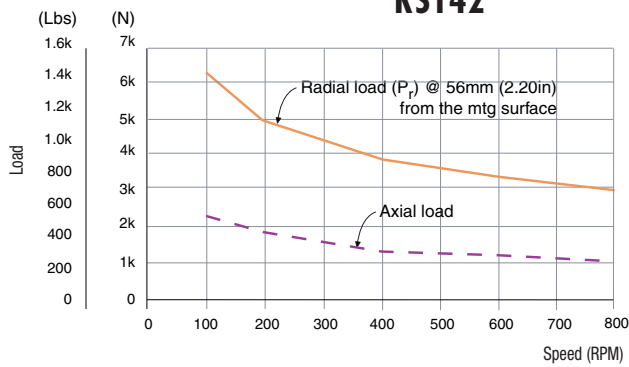


$$P_{rx} = (P_r)(95\text{mm}) / (57\text{mm} + X)$$

$$P_{rx} = (P_r)(3.74\text{in}) / (2.24\text{in} + X)$$



## RS142

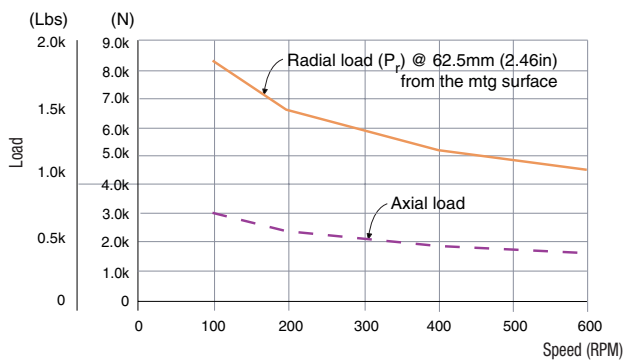


Formulas to calculate radial load ( $P_{rx}$ ) at any distance "X" from the gearhead mounting surface.

$$P_{rx} = (P_r)(127\text{mm}) / (71\text{mm} + X)$$

$$P_{rx} = (P_r)(5\text{in}) / (2.79\text{in} + X)$$

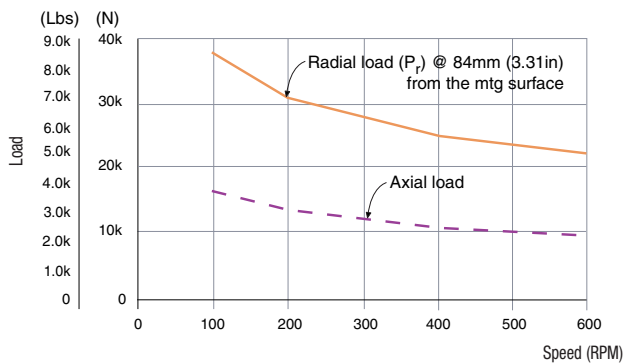
## RS180



$$P_{rx} = (P_r)(138\text{mm}) / (76\text{mm} + X)$$

$$P_{rx} = (P_r)(5.43\text{in}) / (2.99\text{in} + X)$$

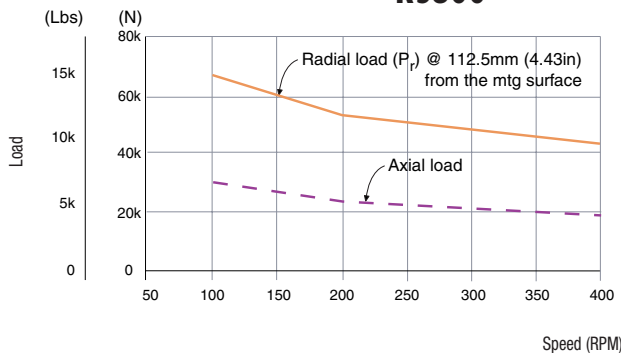
## RS220



$$P_{rx} = (P_r)(190\text{mm}) / (106\text{mm} + X)$$

$$P_{rx} = (P_r)(7.48\text{in}) / (4.17\text{in} + X)$$

## RS300



$$P_{rx} = (P_r)(268\text{mm}) / (156\text{mm} + X)$$

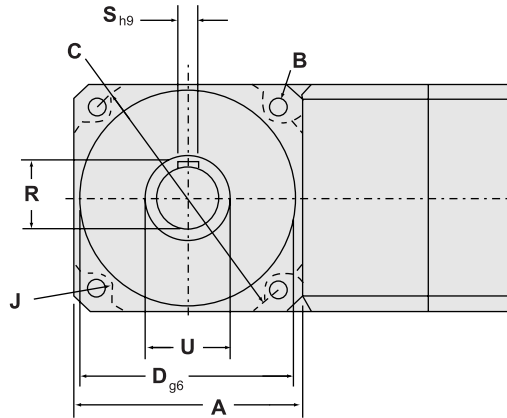
$$P_{rx} = (P_r)(10.55\text{in}) / (6.14\text{in} + X)$$

# Stealth RS

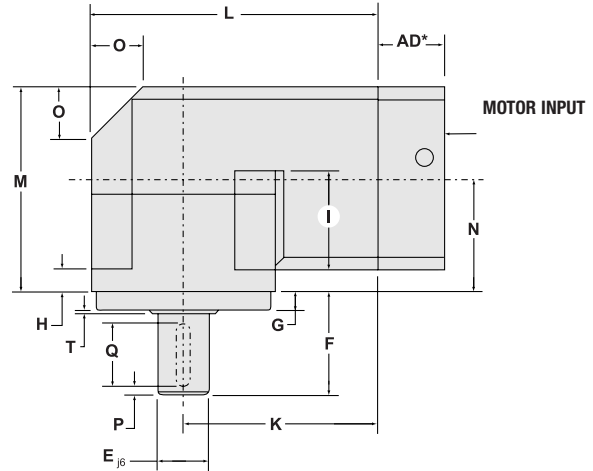
## Advanced Series

### Dimensions

OUTPUT VIEW



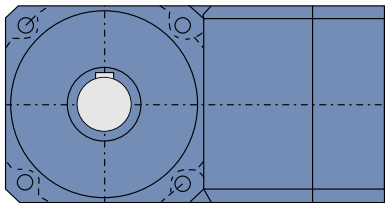
SIDE VIEW



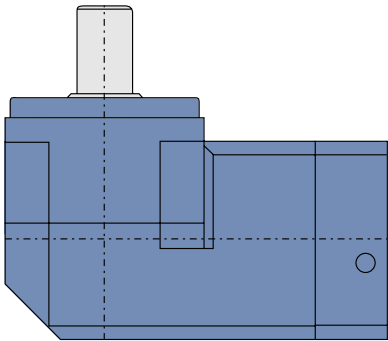
| Frame Size | A                  |        | B              |       | C                |        | D                   |       | E                          |       | F                        |       | G                    |       | H                     |       | I                  |       | J                   |       |
|------------|--------------------|--------|----------------|-------|------------------|--------|---------------------|-------|----------------------------|-------|--------------------------|-------|----------------------|-------|-----------------------|-------|--------------------|-------|---------------------|-------|
|            | Square Flange (mm) | (in)   | Bolt Hole (mm) | (in)  | Bolt Circle (mm) | (in)   | Pilot Diameter (mm) | (in)  | Output Shaft Diameter (mm) | (in)  | Output Shaft Length (mm) | (in)  | Pilot Thickness (mm) | (in)  | Flange Thickness (mm) | (in)  | Recess Length (mm) | (in)  | Housing Recess (mm) | (in)  |
| RS60       | 60                 | 2.362  | 5.5            | 0.217 | 70               | 2.756  | 50                  | 1.969 | 16                         | 0.630 | 37                       | 1.457 | 8                    | 0.315 | 8                     | 0.315 | 36                 | 1.417 | 5                   | 0.197 |
| RS90       | 90                 | 3.543  | 6.5            | 0.256 | 100              | 3.937  | 80                  | 3.150 | 22                         | 0.866 | 48                       | 1.890 | 11                   | 0.433 | 10                    | 0.394 | 51.5               | 2.028 | 6.5                 | 0.256 |
| RS115      | 115                | 4.528  | 8.5            | 0.335 | 130              | 5.118  | 110                 | 4.331 | 32                         | 1.260 | 65                       | 2.559 | 13                   | 0.512 | 14                    | 0.472 | 63                 | 2.480 | 7.5                 | 0.295 |
| RS142      | 142                | 5.591  | 11             | 0.433 | 165              | 6.496  | 130                 | 5.118 | 40                         | 1.575 | 97                       | 3.819 | 15                   | 0.591 | 15                    | 0.591 | 81.5               | 3.209 | 10                  | 0.394 |
| RS180      | 182                | 7.165  | 13             | 0.512 | 215              | 8.465  | 160                 | 6.299 | 55                         | 2.165 | 105                      | 4.134 | 20                   | 0.787 | 16                    | 0.630 | 97.5               | 3.839 | 16                  | 0.630 |
| RS220      | 220                | 8.661  | 17             | 0.669 | 250              | 9.843  | 180                 | 7.087 | 75                         | 2.953 | 138                      | 5.433 | 30                   | 1.181 | 22                    | 0.866 | 101                | 3.976 | 16                  | 0.630 |
| RS300      | 305                | 12.008 | 21             | 0.827 | 350              | 13.780 | 250                 | 9.843 | 100                        | 3.937 | 190                      | 7.480 | 35                   | 1.378 | 26                    | 1.024 | 172                | 6.772 | 18                  | 0.709 |

| Frame Size | K                               |        | L                   |        | M                  |        | N                              |       | O                |       | P                         |       | Q                  |       | R               |       | S                 |       | T                    |       | U                      |       |
|------------|---------------------------------|--------|---------------------|--------|--------------------|--------|--------------------------------|-------|------------------|-------|---------------------------|-------|--------------------|-------|-----------------|-------|-------------------|-------|----------------------|-------|------------------------|-------|
|            | Dist. to Output Centerline (mm) | (in)   | Housing Length (mm) | (in)   | Housing Width (mm) | (in)   | Dist. to Input Centerline (mm) | (in)  | Taper Dist. (mm) | (in)  | Dist. From Shaft End (mm) | (in)  | Keyway Length (mm) | (in)  | Key Height (mm) | (in)  | Keyway Width (mm) | (in)  | Shoulder Height (mm) | (in)  | Shoulder Diameter (mm) | (in)  |
| RS60       | 66                              | 2.598  | 96                  | 3.780  | 73                 | 2.874  | 43                             | 1.693 | 14               | 0.551 | 2                         | 0.079 | 25                 | 0.984 | 18              | 0.709 | 5                 | 0.197 | 0.5                  | 0.020 | 22                     | 0.866 |
| RS90       | 103                             | 4.055  | 148                 | 5.827  | 103                | 4.055  | 58                             | 2.283 | 25               | 0.984 | 3                         | 0.118 | 32                 | 1.260 | 24.5            | 0.965 | 6                 | 0.236 | 0.5                  | 0.020 | 35                     | 1.378 |
| RS115      | 122.5                           | 4.823  | 180                 | 7.087  | 129                | 5.079  | 71.5                           | 2.815 | 32               | 1.260 | 5                         | 0.197 | 40                 | 1.575 | 35              | 1.378 | 10                | 0.394 | 1                    | 0.039 | 45                     | 1.772 |
| RS142      | 159                             | 6.260  | 230                 | 9.055  | 162                | 6.378  | 91                             | 3.583 | 40               | 1.575 | 5                         | 0.197 | 63                 | 2.480 | 43              | 1.693 | 12                | 0.472 | 3                    | 0.118 | 55                     | 2.165 |
| RS180      | 172                             | 6.772  | 263                 | 10.354 | 197                | 7.756  | 106                            | 4.173 | 55               | 2.165 | 6                         | 0.236 | 70                 | 2.756 | 59              | 2.323 | 16                | 0.630 | 3                    | 0.118 | 70                     | 2.756 |
| RS220      | 230                             | 9.055  | 340                 | 13.386 | 245                | 9.646  | 135                            | 5.315 | 60               | 2.362 | 6                         | 0.236 | 90                 | 3.543 | 79.5            | 3.130 | 20                | 0.787 | 3                    | 0.118 | 95                     | 3.740 |
| RS300      | 327.5                           | 12.894 | 480                 | 18.898 | 350                | 13.780 | 197.5                          | 7.776 | 80               | 3.150 | 7                         | 0.276 | 140                | 5.512 | 106             | 4.173 | 28                | 1.102 | 3                    | 0.118 | 140                    | 5.512 |

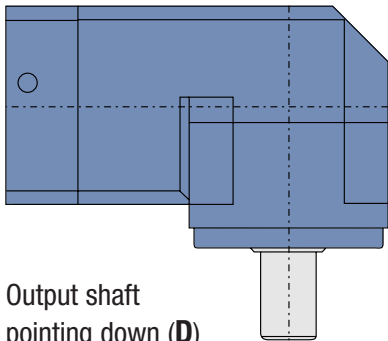
\*AD=Adapter Length. Adapter will vary, depending on motor. Consult Internet ([www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com)) for details or call Parker Bayside.



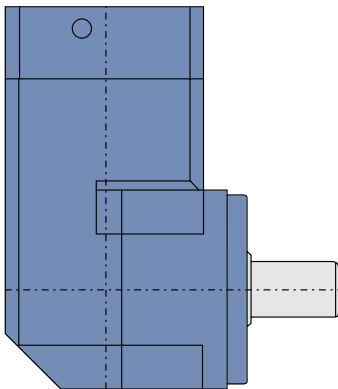
Horizontal orientation (H)



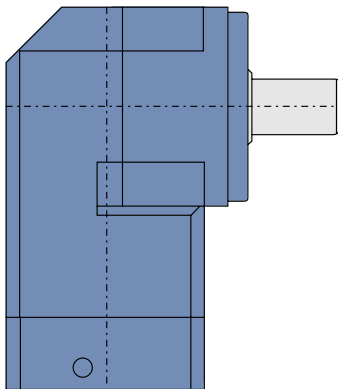
Output shaft pointing up (U)



Output shaft pointing down (D)



RS input facing up (E)



RS input facing down (F)

## How to Order

Order Numbering Example:

**R S 1 8 0 - 0 1 0 - X X X L H**

FRAME SIZE

60  
90  
115  
142  
180  
220  
300

RATIO

005 030  
010 040  
015 050  
020 100  
025

SPECIAL

(Factory Issued)

BACKLASH

L = Low backlash  
S = Standard backlash

ORIENTATION

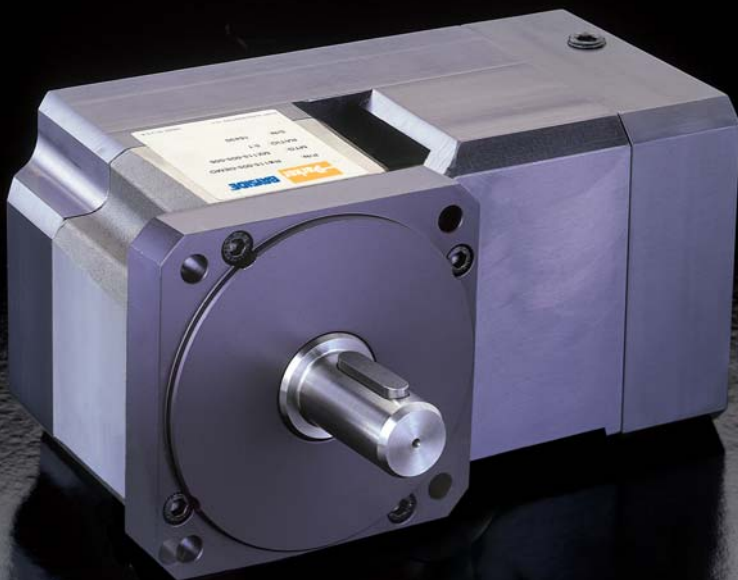
H = Horizontal orientation  
U = Output shaft pointing up  
D = Output shaft pointing down  
E = RS input facing up  
F = RS input facing down

(For other orientations consult the factory)

1. Pick frame size and ratio.
2. Pick backlash and orientation.
3. Specify motor make and model for mounting kit.

RS Gearheads are supported by a worldwide network of offices and local distributors. Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor. Information can also be obtained at **[www.baysidemotion.com](http://www.baysidemotion.com)** or **[www.parkermotion.com](http://www.parkermotion.com)**.

# Stealth<sup>®</sup> RX Series: Best Technology



Stealth RX incorporates Parker BaySide's helical planetary technology in a lower-cost package. Stealth RX delivers high torque and quiet, smooth operation for less-demanding servo applications.

| 6 Frame Sizes |      |
|---------------|------|
| RX60          | RX23 |
| RX90          | RX34 |
| RX115         | RX42 |

| Ratios |      |       |
|--------|------|-------|
| 5:1    | 20:1 | 40:1  |
| 10:1   | 25:1 | 50:1  |
| 15:1   | 30:1 | 100:1 |



## Performance Specifications

|                                                               | Units           | Ratio  | Frame Size |       |       |
|---------------------------------------------------------------|-----------------|--------|------------|-------|-------|
|                                                               |                 |        | RX60       | RX90  | RX115 |
| Nominal Output Torque,<br>$T_{nom r}$                         | Nm              | 5      | 7          | 17    | 45    |
|                                                               | in lb           |        | 58         | 149   | 484   |
|                                                               | Nm              | 10     | 13         | 33    | 88    |
|                                                               | in lb           |        | 112        | 292   | 484   |
|                                                               | Nm              | 15-25  | 20         | 51    | 129   |
|                                                               | in lb           |        | 175        | 451   | 1,238 |
| Max. Acceleration<br>Output Torque,<br>$T_{acc r}$            | Nm              | 30-100 | 17         | 51    | 115   |
|                                                               | in lb           |        | 149        | 451   | 1,323 |
|                                                               | Nm              | 5      | 8          | 20    | 53    |
|                                                               | in lb           |        | 69         | 175   | 587   |
|                                                               | Nm              | 10     | 16         | 40    | 101   |
|                                                               | in lb           |        | 138        | 350   | 1,140 |
| Emergency <sup>(1)</sup> Stop<br>Output Torque,<br>$T_{em r}$ | Nm              | 15-100 | 22         | 61    | 156   |
|                                                               | in lb           |        | 196        | 536   | 1,748 |
|                                                               | Nm              | 5      | 19         | 46    | 122   |
|                                                               | in lb           |        | 165        | 409   | 1,362 |
|                                                               | Nm              | 10     | 46         | 92    | 237   |
|                                                               | in lb           |        | 409        | 812   | 2,653 |
| Nominal Input Speed,<br>$N_{nom r}$                           | Nm              | 15-100 | 67         | 139   | 359   |
|                                                               | in lb           |        | 594        | 1,232 | 4,022 |
|                                                               | RPM             | 5, 10  | 3,200      | 2,800 | 2,400 |
|                                                               | RPM             | 15-40  | 3,700      | 3,300 | 2,900 |
| Maximum Input Speed, $N_{maxr}$                               | RPM             | 50-100 | 4,200      | 3,800 | 3,400 |
|                                                               | RPM             | 5-100  | 6,000      | 5,300 | 4,500 |
| Standard Backlash <sup>(2)</sup>                              | RPM             | 5-10   | 20         | 18    | 18    |
|                                                               | arc min         | 15-100 | 20         | 18    | 16    |
| Low Backlash <sup>(2)</sup>                                   | arc min         | 5-10   | 18         | 16    | 16    |
|                                                               | arc min         | 15-100 | 16         | 14    | 12    |
| Efficiency at<br>Nominal Torque                               | %               | 5-100  | 94         | 94    | 94    |
| Noise Level <sup>(3)</sup> at: 3,000 RPM                      | dB              | 5-100  | 70         | 70    | 70    |
| Torsional Stiffness                                           | Nm / arc min    | 5-100  | 2.5        | 9.5   | 18.5  |
|                                                               | in lb / arc min |        | 22         | 84    | 164   |
| Maximum Weight                                                | kg              | 5-100  | 2.01       | 5.74  | 11.35 |
|                                                               | lb              |        | 4.42       | 12.65 | 25    |
| Max. Allowable Case Temperature                               | °C              | 5-100  | ← 100 →    |       |       |

| Specifications:                  | Units                  | Ratio  | Frame Size |        |        |
|----------------------------------|------------------------|--------|------------|--------|--------|
|                                  |                        |        | RX60       | RX90   | RX115  |
| Moment of Inertia <sup>(4)</sup> | gm cm sec <sup>2</sup> | 5      | 0.1970     | 0.7450 | 2.6820 |
|                                  | oz in sec <sup>2</sup> |        | 0.0030     | 0.0100 | 0.0373 |
|                                  | gm cm sec <sup>2</sup> | 10     | 0.0950     | 0.4890 | 1.6688 |
|                                  | oz in sec <sup>2</sup> |        | 0.0013     | 0.0068 | 0.0232 |
|                                  | gm cm sec <sup>2</sup> | 15, 30 | 0.0920     | 0.4530 | 1.5794 |
|                                  | oz in sec <sup>2</sup> |        | 0.0013     | 0.0063 | 0.0219 |
|                                  | gm cm sec <sup>2</sup> | 20-40  | 0.0830     | 0.3576 | 1.1324 |
|                                  | oz in sec <sup>2</sup> |        | 0.0012     | 0.0050 | 0.0157 |
|                                  | gm cm sec <sup>2</sup> | 50-100 | 0.0720     | 0.2384 | 0.6854 |
|                                  | oz in sec <sup>2</sup> |        | 0.0010     | 0.0033 | 0.0095 |

(1) Maximum of 1,000 stops

(2) Measured at 2% of rated torque

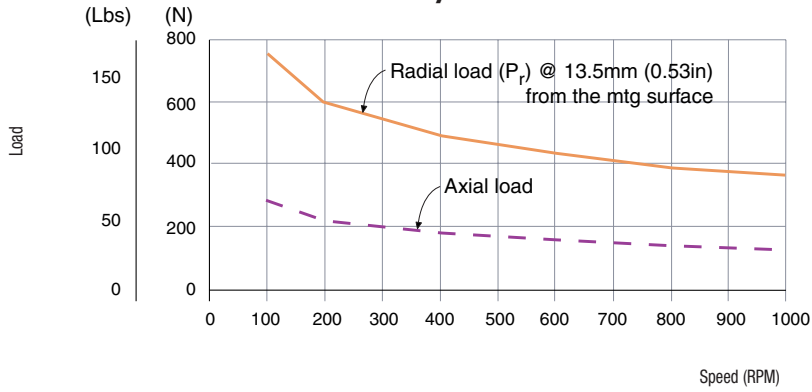
(3) Measured at 1 meter

(4) All Moment of Inertia values are as reflected at the input shaft of the gearhead.

Specification are subject to change without notice

Formulas to calculate radial load ( $P_{rx}$ ) at any distance "X" from the gearhead mounting surface.

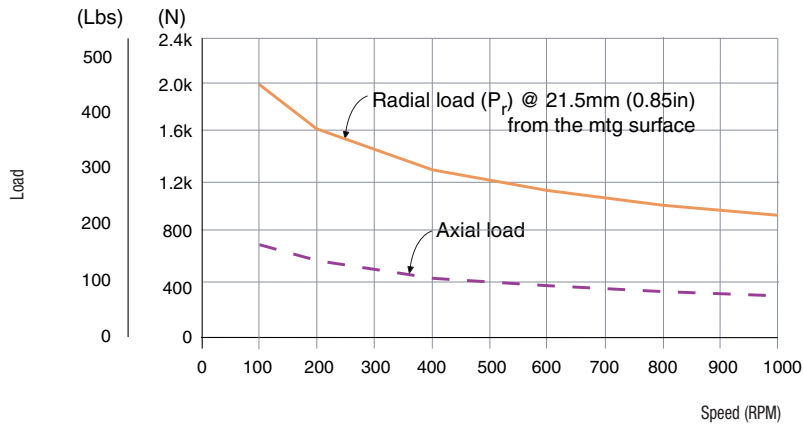
### RX60 / RX23



$$P_{rx} = (P_r)(54\text{mm}) / (41\text{mm} + X)$$

$$P_{rx} = (P_r)(2.13\text{in}) / (1.61\text{in} + X)$$

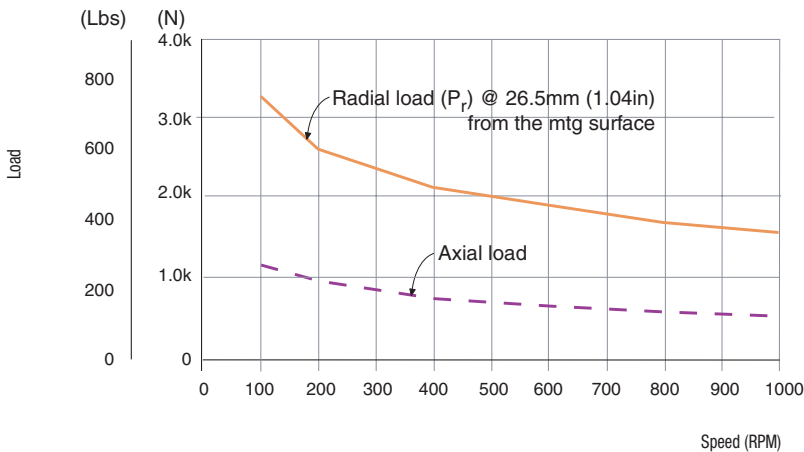
### RX90 / RX34



$$P_{rx} = (P_r)(73\text{mm}) / (52\text{mm} + X)$$

$$P_{rx} = (P_r)(2.87\text{in}) / (2.05\text{in} + X)$$

### RX115 / RX42



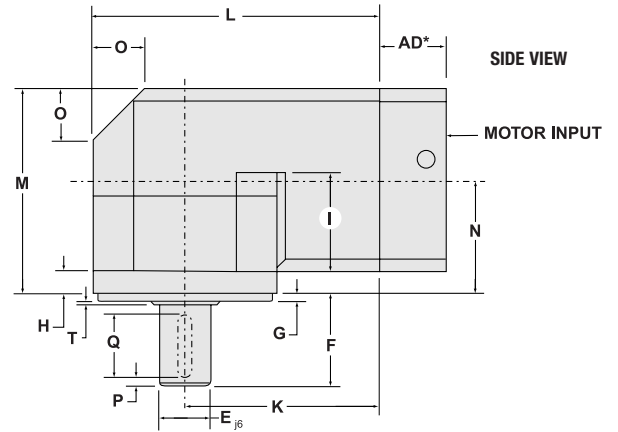
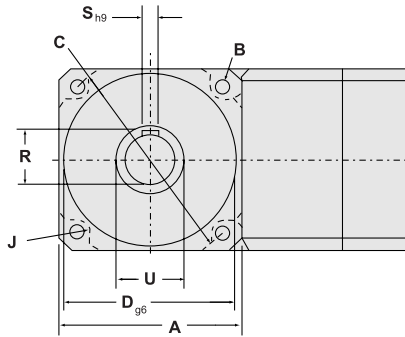
$$P_{rx} = (P_r)(89\text{mm}) / (63\text{mm} + X)$$

$$P_{rx} = (P_r)(3.5\text{in}) / (2.48\text{in} + X)$$



## Dimensions

OUTPUT VIEW



## METRIC SIZES

| Frame Size | A<br>Square Flange<br>(mm) (in) |       | B<br>Bolt Hole<br>(mm) (in) |       | C<br>Bolt Circle<br>(mm) (in) |       | D<br>Pilot Diameter<br>(mm) (in) |       | E<br>Output Shaft Diameter<br>(mm) (in) |       | F<br>Output Shaft Length<br>(mm) (in) |       | G<br>Pilot Thickness<br>(mm) (in) |       | H<br>Flange Thickness<br>(mm) (in) |       | I<br>Recess Length<br>(mm) (in) |       | J<br>Housing Recess<br>(mm) (in) |       |
|------------|---------------------------------|-------|-----------------------------|-------|-------------------------------|-------|----------------------------------|-------|-----------------------------------------|-------|---------------------------------------|-------|-----------------------------------|-------|------------------------------------|-------|---------------------------------|-------|----------------------------------|-------|
| RX60       | 60                              | 2.362 | 5.5                         | 0.217 | 70                            | 2.756 | 50                               | 1.969 | 16                                      | 0.630 | 25                                    | 0.984 | 2.5                               | 0.098 | 13                                 | 0.512 | 36                              | 1.417 | 5                                | 0.197 |
| RX90       | 90                              | 3.543 | 6.5                         | 0.256 | 100                           | 3.937 | 80                               | 3.150 | 20                                      | 0.787 | 40                                    | 1.575 | 3                                 | 0.118 | 17                                 | 0.669 | 51.5                            | 2.028 | 6.5                              | 0.256 |
| RX115      | 115                             | 4.528 | 8.5                         | 0.335 | 130                           | 5.118 | 110                              | 4.331 | 24                                      | 0.945 | 50                                    | 1.969 | 3.5                               | 0.138 | 20                                 | 0.787 | 63                              | 2.480 | 7.5                              | 0.295 |

| Frame Size | K<br>Dist. to Output Centerline<br>(mm) (in) |       | L<br>Housing Length<br>(mm) (in) |       | M<br>Housing Width<br>(mm) (in) |       | N<br>Dist. to Input Centerline<br>(mm) (in) |       | O<br>Taper Dist.<br>(mm) (in) |       | P<br>Dist. From Shaft End<br>(mm) (in) |       | Q<br>Keyway Length<br>(mm) (in) |       | R<br>Key Height<br>(mm) (in) |       | S<br>Keyway Width<br>(mm) (in) |       | T<br>Shoulder Height<br>(mm) (in) |       | U<br>Shoulder Diameter<br>(mm) (in) |       |
|------------|----------------------------------------------|-------|----------------------------------|-------|---------------------------------|-------|---------------------------------------------|-------|-------------------------------|-------|----------------------------------------|-------|---------------------------------|-------|------------------------------|-------|--------------------------------|-------|-----------------------------------|-------|-------------------------------------|-------|
| RX60       | 66                                           | 2.598 | 96                               | 3.780 | 79.3                            | 3.122 | 43                                          | 1.693 | 14                            | 0.551 | 3                                      | 0.197 | 16                              | 0.630 | 18                           | 0.709 | 5                              | 0.197 | 0.5                               | 0.020 | 22                                  | 0.866 |
| RX90       | 103                                          | 4.055 | 148                              | 5.827 | 110                             | 4.330 | 58                                          | 2.283 | 25                            | 0.984 | 5                                      | 0.238 | 28                              | 1.102 | 24.5                         | 0.965 | 6                              | 0.236 | 0.5                               | 0.020 | 35                                  | 1.378 |
| RX115      | 122.5                                        | 4.823 | 180                              | 7.087 | 186                             | 7.323 | 77.6                                        | 3.055 | 32                            | 1.260 | 7                                      | 0.315 | 32                              | 1.260 | 27                           | 1.063 | 8                              | 0.315 | 1                                 | 0.039 | 45                                  | 1.772 |

\*AD=Adapter Length. Adapter will vary, depending on motor. Consult Internet ([www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com)) for details or call Parker Bayside.

## NEMA SIZES

| Frame Size | B<br>Bolt Hole<br>(in) (mm) |       | C<br>Bolt Circle<br>(in) (mm) |         | D<br>Pilot Diameter<br>(in) (mm) |        | E<br>Output Shaft Diameter<br>(in) (mm) |        | F<br>Output Shaft Length<br>(in) (mm) |        | Q<br>Keyway Length<br>(in) (mm) |             | R<br>Keyway Depth<br>(in) (mm) |            | S<br>Keyway Width<br>(in) (mm) |       |
|------------|-----------------------------|-------|-------------------------------|---------|----------------------------------|--------|-----------------------------------------|--------|---------------------------------------|--------|---------------------------------|-------------|--------------------------------|------------|--------------------------------|-------|
| RX23       | 0.195                       | 4.953 | 2.625                         | 66.675  | 1.5                              | 38.100 | 0.375                                   | 9.525  | 1                                     | 25.400 | 0.75 flat                       | 19.050 flat | 0.015 flat                     | 0.381 flat | —                              | —     |
| RX34       | 0.217                       | 5.512 | 3.875                         | 98.425  | 2.875                            | 73.025 | 0.5                                     | 12.700 | 1.25                                  | 31.750 | 1.063                           | 27.000      | 0.072                          | 1.829      | 0.125                          | 3.175 |
| RX42       | 0.281                       | 7.137 | 4.95                          | 125.730 | 2.187                            | 55.550 | 0.625                                   | 15.875 | 1.5                                   | 38.100 | 1.142                           | 29.007      | 0.094                          | 2.388      | 0.188                          | 4.775 |

NOTE: NEMA sizes have 20% lower torque/stiffness ratings due to smaller output shaft diameter.

## How to Order

Order Numbering Example:

**R X 1 1 5 - 0 1 0 - X X X L B**

FRAME SIZE

(Metric Sizes)

60

90

115

(NEMA Sizes)

23

34

42

RATIO

005 020 040

010 025 050

015 030 100

SPECIAL

(Factory

Issued)

OPTIONAL

LOW BACKLASH

1. Pick frame size and ratio.
2. Pick options.
3. Specify motor, make and model for mounting kit.

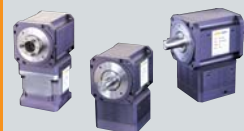
RX gearheads are supported by a worldwide network of offices and local distributors. Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor. Information can also be obtained at [www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com)

Specifications are subject to change without notice.

# Stealth<sup>®</sup> MultiDrive Series: The Flexible Right Angle



Stealth<sup>®</sup> MultiDrive (MD) offers three different output options for true flexibility. MultiDrive models include low-ratio, dual-shaft and hollow-shaft options in a compact, right angle package. With 5 frame sizes and multiple ratios to choose from, you are guaranteed to find a Stealth<sup>®</sup> MultiDrive to fit your servo motor application.



# Stealth® MultiDrive Series: Overview

**MultiDrive™ features Stealth® helical gearing for high torque, high accuracy and quiet operation in a compact, right-angle package.**

- **Low Backlash**  
Standard as low as 8 arc minutes and 4 arc minutes optional
- **Space Saving**  
compact, right-angle design saves space in many applications
- **Smooth, Quiet Operation and Long Life**  
hardened, precision spiral bevel gears ensure quiet operation
- **Quick, Error-Free Mounting**  
to any servo or stepper motor using Parker Bayside's patented ServoMount® design
- **Sealed Unit...**  
seals and o-rings provide IP65 protection to prevent leaks and to protect against harsh environments

## RT Model Hollow Shaft

| 5 Frame Sizes |
|---------------|
| RT90          |
| RT115         |
| RT142         |
| RT180         |
| RT220         |

| Ratios |
|--------|
| 3:1    |
| 9:1    |
| 15:1   |
| 21:1   |
| 30:1   |



## RB Model Low Ratio

| 5 Frame Sizes |
|---------------|
| RB90          |
| RB115         |
| RB142         |
| RB180         |
| RB220         |

| Ratios |
|--------|
| 1:1    |
| 2:1    |
| 3:1    |



## RD Dual Shaft Model

| 5 Frame Sizes |
|---------------|
| RD90          |
| RD115         |
| RD142         |
| RD180         |
| RD220         |

| Ratios |      |
|--------|------|
| 1:1    | 15:1 |
| 2:1    | 21:1 |
| 3:1    | 30:1 |
| 9:1    |      |



# Stealth MultiDrive Series

## Performance Specifications

|                                                               | Units           | Ratio      | Frame Size (RT, RD, RB) |       |       |       |        |
|---------------------------------------------------------------|-----------------|------------|-------------------------|-------|-------|-------|--------|
|                                                               |                 |            | R_90                    | R_115 | R_142 | R_180 | R_220  |
| Nominal Output Torque,<br>$T_{nom r}$                         | Nm              | 1          | 23                      | 45    | 113   | 192   | 508    |
|                                                               | in lb           |            | 200                     | 400   | 1,000 | 1,700 | 4,500  |
|                                                               | Nm              | 2-30       | 34                      | 90    | 136   | 260   | 565    |
|                                                               | in lb           |            | 300                     | 800   | 1,200 | 2,300 | 5,000  |
| Max. Acceleration<br>Output Torque,<br>$T_{acc r}$            | Nm              | 1          | 28                      | 56    | 141   | 240   | 636    |
|                                                               | in lb           |            | 250                     | 500   | 1,250 | 2,125 | 5,625  |
|                                                               | Nm              | 2-30       | 42                      | 113   | 169   | 324   | 636    |
|                                                               | in lb           |            | 375                     | 1,000 | 1,500 | 2,875 | 5,625  |
| Emergency <sup>(1)</sup> Stop<br>Output Torque,<br>$T_{em r}$ | Nm              | 1          | 45                      | 90    | 226   | 384   | 1,017  |
|                                                               | in lb           |            | 400                     | 800   | 2,000 | 3,400 | 9,000  |
|                                                               | Nm              | 2-30       | 68                      | 181   | 271   | 520   | 1,130  |
|                                                               | in lb           |            | 600                     | 1,600 | 2,400 | 4,600 | 10,000 |
| Nominal Input Speed,<br>$N_{nom r}$                           | RPM             | 1,2,3      | 3,000                   | 2,600 | 2,200 | 1,800 | 1,400  |
|                                                               | RPM             | 9,15,21,30 | 3,800                   | 3,400 | 3,000 | 2,400 | 1,800  |
| Max. Input Speed, $N_{maxr}$                                  | RPM             | 1,2,3      | 4,000                   | 3,500 | 2,900 | 2,500 | 1,600  |
|                                                               | RPM             | 9,15,21,30 | 5,300                   | 4,500 | 3,800 | 3,000 | 2,300  |
| Standard Backlash                                             | arc min         | 1,2,3      | 10                      | 9     | 9     | 8     | 8      |
|                                                               | arc min         | 9,15,21,30 | 12                      | 11    | 11    | 10    | 10     |
| Low Backlash                                                  | arc min         | 1,2,3      | 6                       | 5     | 5     | 4     | 4      |
|                                                               | arc min         | 9,15,21,30 | 8                       | 7     | 7     | 6     | 6      |
| Efficiency at<br>Nominal Torque                               | %               | 1,2,3      | 95                      | 95    | 95    | 95    | 95     |
|                                                               | %               | 9,15,21,30 | 92                      | 92    | 92    | 92    | 92     |
| Noise Level <sup>(2)</sup> at:<br>2,500 RPM                   | dB              | All        | 70                      | 70    | 70    | —     | —      |
|                                                               | dB              |            | —                       | —     | —     | 72    | 72     |
| Torsional Stiffness                                           | Nm / arc min    | All        | 3                       | 6     | 16    | 43    | 90     |
|                                                               | in lb / arc min |            | 28                      | 56    | 140   | 380   | 800    |
| Maximum Weight                                                | kg              | All        | 7                       | 13    | 25    | 54    | 114    |
|                                                               | lb              |            | 16                      | 28    | 56    | 120   | 250    |
| Maximum Allowable<br>Case Temperature                         | °C              | All        | ← 100 →                 |       |       |       |        |

| Specifications:                  | Units                  | Ratio   | Frame Size (RT, RD, RB) |       |       |       |       |
|----------------------------------|------------------------|---------|-------------------------|-------|-------|-------|-------|
|                                  |                        |         | R_90                    | R_115 | R_142 | R_180 | R_220 |
| Moment of Inertia <sup>(3)</sup> | gm cm sec <sup>2</sup> | 1       | 3.28                    | 11.0  | 38.7  | 101   | 444   |
|                                  | oz in sec <sup>2</sup> |         | 0.046                   | 0.153 | 0.538 | 1.41  | 6.17  |
|                                  | gm cm sec <sup>2</sup> | 2       | 4.17                    | 11.3  | 32.8  | 95.4  | 274   |
|                                  | oz in sec <sup>2</sup> |         | 0.058                   | 0.157 | 0.455 | 1.32  | 3.81  |
|                                  | gm cm sec <sup>2</sup> | 3       | 2.68                    | 7.75  | 22.3  | 65.6  | 191   |
|                                  | oz in sec <sup>2</sup> |         | 0.037                   | 0.108 | 0.311 | 0.911 | 2.65  |
|                                  | gm cm sec <sup>2</sup> | 9       | 1.07                    | 3.28  | 10.4  | 35.8  | 119   |
|                                  | oz in sec <sup>2</sup> |         | 0.015                   | 0.046 | 0.145 | 0.497 | 1.66  |
|                                  | gm cm sec <sup>2</sup> | 15 - 30 | 0.566                   | 2.09  | 5.36  | 17.9  | 62.6  |
|                                  | oz in sec <sup>2</sup> |         | 0.008                   | 0.029 | 0.075 | 0.248 | 0.869 |

(1) Maximum of 1,000 stops

(2) Measured at 1 meter

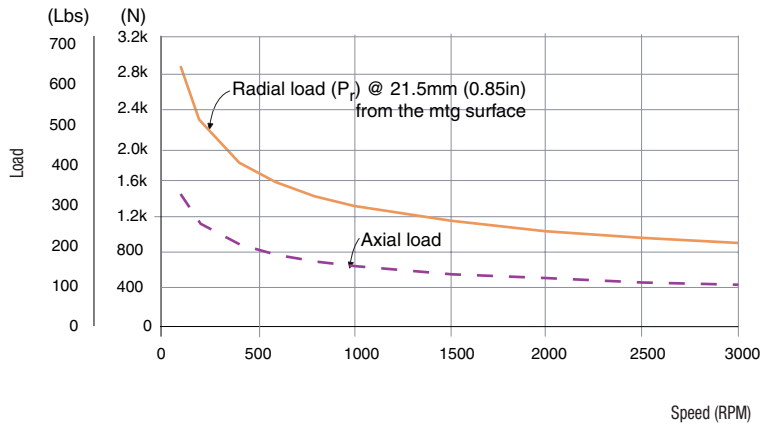
(3) All Moment of Inertia values are as reflected at the input shaft of the gearhead.

Specification are subject to change without notice



Formulas to calculate radial load ( $P_{rx}$ ) at any distance "X" from the gearhead mounting surface.

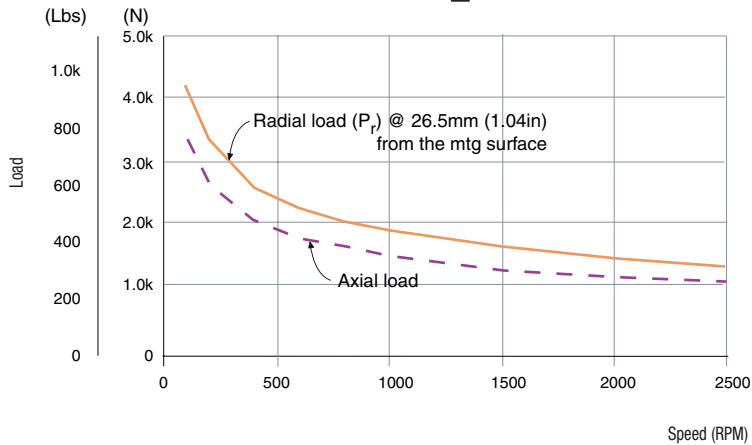
## R\_90



$$P_{rx} = (P_r)(121\text{mm}) / (100\text{mm} + X)$$

$$P_{rx} = (P_r)(4.76\text{in}) / (3.94\text{in} + X)$$

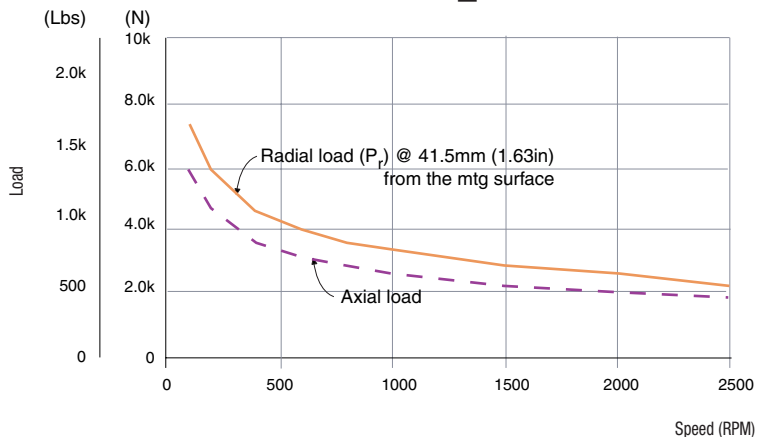
## R\_115



$$P_{rx} = (P_r)(151\text{mm}) / (125\text{mm} + X)$$

$$P_{rx} = (P_r)(5.94\text{in}) / (4.92\text{in} + X)$$

## R\_142

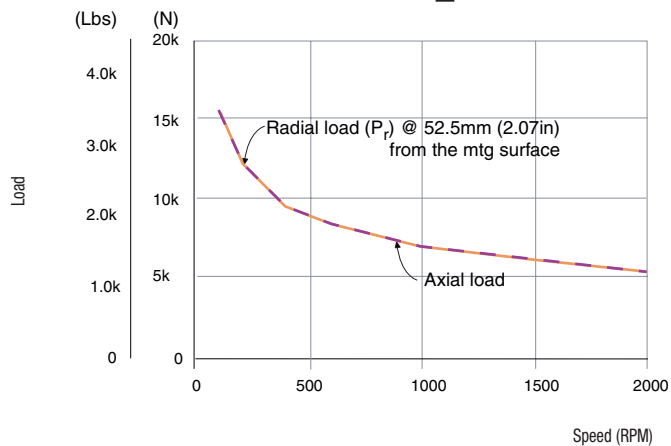


$$P_{rx} = (P_r)(201\text{mm}) / (160\text{mm} + X)$$

$$P_{rx} = (P_r)(7.91\text{in}) / (6.30\text{in} + X)$$

Formulas to calculate radial load ( $P_{rx}$ ) at any distance "X" from the gearhead mounting surface.

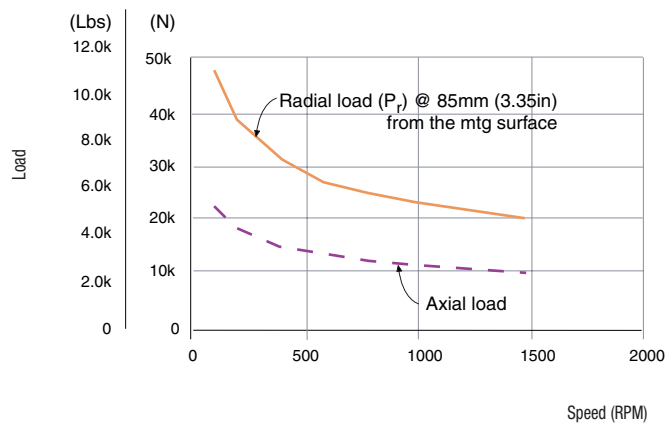
## R\_180



$$P_{rx} = (P_r)(260\text{mm}) / (208\text{mm} + X)$$

$$P_{rx} = (P_r)(10.24\text{in}) / (8.19\text{in} + X)$$

## R\_220



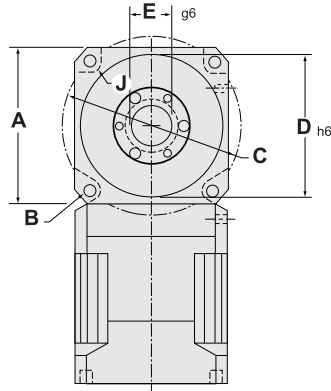
$$P_{rx} = (P_r)(352\text{mm}) / (267\text{mm} + X)$$

$$P_{rx} = (P_r)(13.86\text{in}) / (10.5\text{in} + X)$$

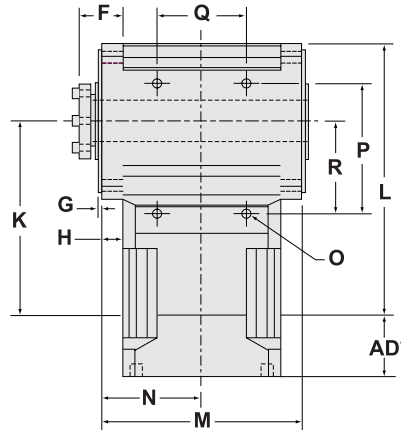


## Dimensions

OUTPUT VIEW



SIDE VIEW



| Frame Size | A<br>Square Flange |       | B<br>Bolt Hole |       | C<br>Bolt Circle |       | D<br>Pilot Diameter |       | E<br>Thru Bore Diameter** |       | F<br>Taper Bushing Extension |       | G<br>Pilot Thickness |       | H<br>Flange Thickness |       |
|------------|--------------------|-------|----------------|-------|------------------|-------|---------------------|-------|---------------------------|-------|------------------------------|-------|----------------------|-------|-----------------------|-------|
|            | (mm)               | (in)  | (mm)           | (in)  | (mm)             | (in)  | (mm)                | (in)  | (mm)                      | (in)  | (mm)                         | (in)  | (mm)                 | (in)  | (mm)                  | (in)  |
| RT90       | 90                 | 3.543 | 6.5            | 0.256 | 100              | 3.937 | 80                  | 3.150 | 22                        | 0.866 | 26.5                         | 1.043 | 3                    | 0.118 | 12                    | 0.472 |
| RT115      | 115                | 4.528 | 8.5            | 0.335 | 130              | 5.118 | 110                 | 4.331 | 30                        | 1.181 | 31                           | 1.220 | 3.5                  | 0.138 | 14                    | 0.551 |
| RT142      | 142                | 5.591 | 11             | 0.433 | 165              | 6.496 | 130                 | 5.118 | 38                        | 1.496 | 43                           | 1.693 | 3.5                  | 0.138 | 20                    | 0.787 |
| RT180      | 182                | 7.165 | 13             | 0.512 | 215              | 8.465 | 160                 | 6.299 | 48                        | 1.890 | 54.2                         | 2.134 | 10                   | 0.394 | 25                    | 0.984 |
| RT220      | 220                | 8.661 | 17             | 0.669 | 250              | 9.843 | 180                 | 7.087 | 60                        | 2.362 | 74.1                         | 2.917 | 15                   | 0.591 | 35                    | 1.378 |

| Frame Size | J<br>Housing |       | K<br>Dist. to Output Centerline |       | K2<br>Dist. to Output Centerline |        | L1<br>Housing Length   |        | L2<br>Housing Length   |        | M<br>Housing |        | N<br>Dist. to Input |       |
|------------|--------------|-------|---------------------------------|-------|----------------------------------|--------|------------------------|--------|------------------------|--------|--------------|--------|---------------------|-------|
|            | Recess (mm)  | (in)  | (For ratio = 3:1) (mm)          | (in)  | (For ratio > 3:1) (mm)           | (in)   | (For ratio = 3:1) (mm) | (in)   | (For ratio > 3:1) (mm) | (in)   | Width (mm)   | (in)   | Centerline (mm)     | (in)  |
| RT90       | 6.6          | 0.260 | 95                              | 3.740 | 117                              | 4.606  | 140                    | 5.512  | 162                    | 6.378  | 114          | 4.488  | 57                  | 2.244 |
| RT115      | 7.9          | 0.311 | 116                             | 4.567 | 144.2                            | 5.677  | 173.5                  | 6.831  | 201.7                  | 7.941  | 143          | 5.630  | 71.5                | 2.815 |
| RT142      | 10.5         | 0.413 | 134                             | 5.276 | 179                              | 7.047  | 205                    | 8.071  | 250                    | 9.843  | 182          | 7.165  | 91                  | 3.583 |
| RT180      | 10           | 0.394 | 169                             | 6.654 | 209.1                            | 8.228  | 260                    | 10.236 | 300.1                  | 11.815 | 232          | 9.134  | 116                 | 4.567 |
| RT220      | 16           | 0.630 | 206                             | 8.110 | 266                              | 10.472 | 316                    | 12.441 | 376                    | 14.803 | 290          | 11.417 | 145                 | 5.709 |

Both output flanges have identical dimensions.

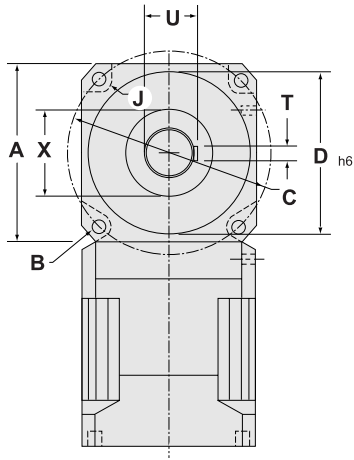
\*AD=Adapter Length. Adapter will vary, depending on motor. Consult Internet ([www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com)) for details or call Parker Bayside.

\*\*Maximum bushing bore diameter. Actual through bore of output shaft is larger. For additional bore diameter, contact Parker Bayside's Application Engineers for information.

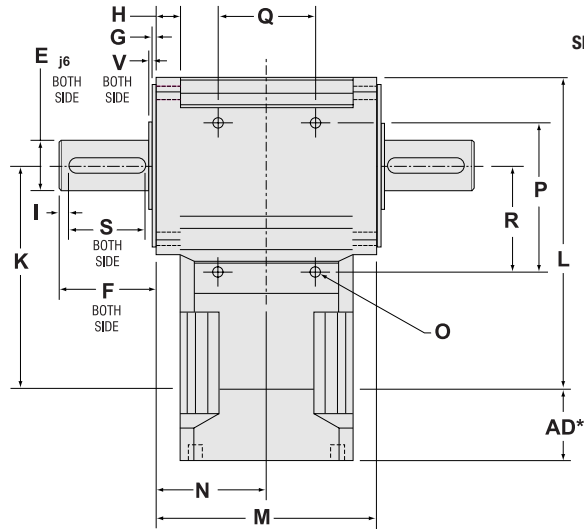
| Foot Mounting Holes Location<br>(RT, RD, RB) |                             |      |       |      |       |      |       |
|----------------------------------------------|-----------------------------|------|-------|------|-------|------|-------|
| Frame Size                                   | O<br>Thread Size<br>x Depth | P    |       | Q    |       | R    |       |
|                                              |                             | (mm) | (in)  | (mm) | (in)  | (mm) | (in)  |
| R_90                                         | M4x6                        | 80   | 3.150 | 60   | 2.362 | 60   | 2.362 |
| R_115                                        | M6x9                        | 100  | 3.937 | 70   | 2.756 | 75   | 2.953 |
| R_142                                        | M8x12                       | 120  | 4.724 | 80   | 3.150 | 85   | 3.346 |
| R_180                                        | M10x15                      | 160  | 6.299 | 100  | 3.937 | 110  | 4.331 |
| R_220                                        | M12x20                      | 195  | 7.677 | 130  | 5.118 | 136  | 5.354 |

## Dimensions

OUTPUT VIEW



SIDE VIEW



| Frame Size | A<br>Square Flange |       | B<br>Bolt Hole |       | C<br>Bolt Circle |       | D<br>Pilot Diameter |       | E<br>Output Shaft Diameter |       | F<br>Output Shaft Length |       | G<br>Pilot Thickness |       | H<br>Flange Thickness |       | I<br>Dist. From Shaft End |       | J<br>Housing Recess |       |
|------------|--------------------|-------|----------------|-------|------------------|-------|---------------------|-------|----------------------------|-------|--------------------------|-------|----------------------|-------|-----------------------|-------|---------------------------|-------|---------------------|-------|
|            | (mm)               | (in)  | (mm)           | (in)  | (mm)             | (in)  | (mm)                | (in)  | (mm)                       | (in)  | (mm)                     | (in)  | (mm)                 | (in)  | (mm)                  | (in)  | (mm)                      | (in)  | (mm)                | (in)  |
| RD90       | 90                 | 3.543 | 6.5            | 0.256 | 100              | 3.937 | 80                  | 3.150 | 20                         | 0.787 | 40                       | 1.575 | 3                    | 0.118 | 12                    | 0.472 | 5                         | 0.197 | 6.6                 | 0.260 |
| RD115      | 115                | 4.528 | 8.5            | 0.335 | 130              | 5.118 | 110                 | 4.331 | 24                         | 0.945 | 50                       | 1.969 | 3.5                  | 0.138 | 14                    | 0.551 | 7                         | 0.276 | 7.9                 | 0.311 |
| RD142      | 142                | 5.591 | 11             | 0.433 | 165              | 6.496 | 130                 | 5.118 | 40                         | 1.575 | 80                       | 3.150 | 3.5                  | 0.138 | 20                    | 0.787 | 8                         | 0.315 | 10.5                | 0.413 |
| RD180      | 182                | 7.165 | 13             | 0.512 | 215              | 8.465 | 160                 | 6.299 | 50                         | 1.969 | 95                       | 3.740 | 10                   | 0.394 | 25                    | 0.984 | 6                         | 0.236 | 10                  | 0.394 |
| RD220      | 220                | 8.661 | 17             | 0.669 | 250              | 9.843 | 180                 | 7.087 | 75                         | 2.953 | 155                      | 6.102 | 15                   | 0.591 | 35                    | 1.378 | 8                         | 0.315 | 16                  | 0.630 |

| Frame Size | K1<br>Dist. to Output Centerline<br>(For ratio <= 3:1) |       | K2<br>Dist. to Output Centerline<br>(For ratio > 3:1) |        | L1<br>Housing Length<br>(For ratio <= 3:1) |        | L2<br>Housing Length<br>(For ratio > 3:1) |        | M<br>Housing Width |        | N<br>Dist. to Input Centerline |       | S<br>Keyway Length |       | T<br>Keyway Thickness |       | U<br>Keyway Height |       | V<br>Shoulder Height |       | X<br>Shoulder Diameter |       |
|------------|--------------------------------------------------------|-------|-------------------------------------------------------|--------|--------------------------------------------|--------|-------------------------------------------|--------|--------------------|--------|--------------------------------|-------|--------------------|-------|-----------------------|-------|--------------------|-------|----------------------|-------|------------------------|-------|
|            | (mm)                                                   | (in)  | (mm)                                                  | (in)   | (mm)                                       | (in)   | (mm)                                      | (in)   | (mm)               | (in)   | (mm)                           | (in)  | (mm)               | (in)  | (mm)                  | (in)  | (mm)               | (in)  | (mm)                 | (in)  | (mm)                   | (in)  |
| RD90       | 95                                                     | 3.740 | 117                                                   | 4.606  | 140                                        | 5.512  | 162                                       | 6.378  | 114                | 4.488  | 57                             | 2.244 | 28                 | 1.102 | 6                     | 0.236 | 22.5               | 0.886 | 2.5                  | 0.098 | 45                     | 1.575 |
| RD115      | 116                                                    | 4.567 | 144.2                                                 | 5.677  | 173.5                                      | 6.831  | 201.7                                     | 7.941  | 143                | 5.630  | 71.5                           | 2.815 | 32                 | 1.260 | 8                     | 0.315 | 27                 | 1.063 | 2.5                  | 0.098 | 50                     | 1.969 |
| RD142      | 134                                                    | 5.276 | 179                                                   | 7.047  | 205                                        | 8.071  | 250                                       | 9.843  | 182                | 7.165  | 91                             | 3.583 | 63                 | 2.480 | 12                    | 0.472 | 43                 | 1.693 | 2.5                  | 0.098 | 50                     | 1.969 |
| RD180      | 169                                                    | 6.654 | 209.1                                                 | 8.232  | 260                                        | 10.236 | 300.1                                     | 11.815 | 232                | 9.134  | 116                            | 4.567 | 70                 | 2.756 | 14                    | 0.551 | 53.5               | 2.106 | 2.5                  | 0.098 | 55                     | 2.165 |
| RD220      | 206                                                    | 8.110 | 266                                                   | 10.472 | 316                                        | 12.441 | 376                                       | 14.803 | 290                | 11.417 | 145                            | 5.709 | 100                | 3.937 | 20                    | 0.787 | 79.5               | 3.130 | 2.5                  | 0.098 | 100                    | 3.937 |

Both output flanges have identical dimensions. Contact Parker Bayside's Application Engineers for information.

\*AD=Adapter Length. Adapter will vary, depending on motor. Consult Internet ([www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com)) for details or call Parker Bayside.

| Encoder Mounting Option | Dimensions For All Frame Sizes |       |
|-------------------------|--------------------------------|-------|
|                         | (mm)                           | (in)  |
| Shaft Diameter          | 9.525                          | 0.375 |
| Shaft Length            | 19.050                         | 0.750 |
| Bolt Circle             | 74.981                         | 2.952 |
| Tapped Holes            | M4x6 (Min. Depth)              |       |
| Encoder (Not Supplied)  | DRC C25, BEI E25, RENCO C2520  |       |

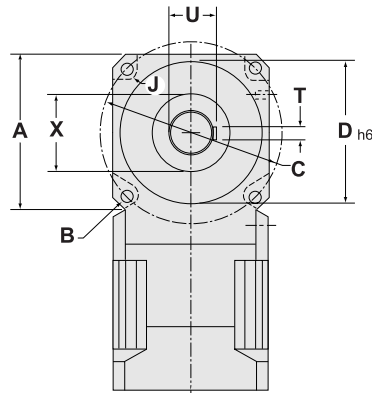
An additional flange is required on the gearhead for encoder mounting. It will increase the thickness of one output flange by 10mm.

| Foot Mounting Holes Location<br>(RT, RD, RB) |                             |      |       |      |       |      |       |
|----------------------------------------------|-----------------------------|------|-------|------|-------|------|-------|
| Frame Size                                   | O<br>Thread Size<br>x Depth | P    |       | Q    |       | R    |       |
|                                              |                             | (mm) | (in)  | (mm) | (in)  | (mm) | (in)  |
| R_90                                         | M4x6                        | 80   | 3.150 | 60   | 2.362 | 60   | 2.362 |
| R_115                                        | M6x9                        | 100  | 3.937 | 70   | 2.756 | 75   | 2.953 |
| R_142                                        | M8x12                       | 120  | 4.724 | 80   | 3.150 | 85   | 3.346 |
| R_180                                        | M10x15                      | 160  | 6.299 | 100  | 3.937 | 110  | 4.331 |
| R_220                                        | M12x20                      | 195  | 7.677 | 130  | 5.118 | 136  | 5.354 |

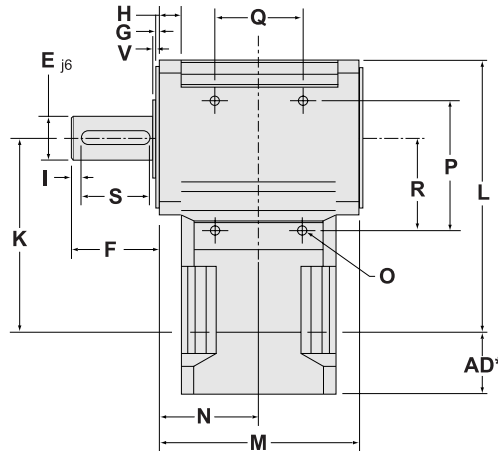


## Dimensions

OUTPUT VIEW



SIDE VIEW



| Frame Size | A<br>Square Flange<br>(mm) (in) | B<br>Bolt Hole<br>(mm) (in) | C<br>Bolt Circle<br>(mm) (in) | D<br>Pilot Diameter<br>(mm) (in) | E<br>Output Shaft Diameter<br>(mm) (in) | F<br>Output Shaft Length<br>(mm) (in) | G<br>Pilot Thickness<br>(mm) (in) | H<br>Flange Thickness<br>(mm) (in) | I<br>Dist. From Shaft End<br>(mm) (in) | J<br>Housing Recess<br>(mm) (in) |
|------------|---------------------------------|-----------------------------|-------------------------------|----------------------------------|-----------------------------------------|---------------------------------------|-----------------------------------|------------------------------------|----------------------------------------|----------------------------------|
| RB90       | 90 3.543                        | 6.5 0.256                   | 100 3.937                     | 80 3.150                         | 20 0.787                                | 40 1.575                              | 3 0.118                           | 12 0.472                           | 5 0.197                                | 6.6 0.260                        |
| RB115      | 115 4.528                       | 8.5 0.335                   | 130 5.118                     | 110 4.331                        | 24 0.945                                | 50 1.969                              | 3.5 0.138                         | 14 0.551                           | 7 0.276                                | 7.9 0.311                        |
| RB142      | 142 5.591                       | 11 0.433                    | 165 6.496                     | 130 5.118                        | 40 1.575                                | 80 3.150                              | 3.5 0.138                         | 20 0.787                           | 8 0.315                                | 10.5 0.413                       |
| RB180      | 182 7.165                       | 13 0.512                    | 215 8.465                     | 160 6.299                        | 50 1.969                                | 95 3.740                              | 10 0.394                          | 25 0.984                           | 6 0.236                                | 10.0 0.394                       |
| RB220      | 220 8.661                       | 17 0.669                    | 250 9.843                     | 180 7.087                        | 75 2.953                                | 155 6.102                             | 15 0.591                          | 35 1.378                           | 8 0.315                                | 16.0 0.630                       |

| Frame Size | K<br>Dist. to Output Centerline<br>(mm) (in) | L<br>Housing Length<br>(mm) (in) | M<br>Housing Width<br>(mm) (in) | N<br>Dist. to Input Centerline<br>(mm) (in) | S<br>Keyway Length<br>(mm) (in) | T<br>Keyway Thickness<br>(mm) (in) | U<br>Keyway Height<br>(mm) (in) | V<br>Shoulder Height<br>(mm) (in) | X<br>Shoulder Diameter<br>(mm) (in) |
|------------|----------------------------------------------|----------------------------------|---------------------------------|---------------------------------------------|---------------------------------|------------------------------------|---------------------------------|-----------------------------------|-------------------------------------|
| RB90       | 95 3.740                                     | 140.6 5.512                      | 114 4.488                       | 57 2.244                                    | 28 1.102                        | 6 0.236                            | 22.5 0.886                      | 2.5 0.098                         | 45 1.575                            |
| RB115      | 116 4.567                                    | 173.5 6.831                      | 143 5.630                       | 71.5 2.815                                  | 32 1.260                        | 8 0.315                            | 27 1.063                        | 2.5 0.098                         | 50 1.969                            |
| RB142      | 134 5.276                                    | 205 8.071                        | 182 7.165                       | 91 3.583                                    | 63 2.480                        | 12 0.472                           | 43 1.693                        | 2.5 0.098                         | 50 1.969                            |
| RB180      | 169 6.654                                    | 260 10.236                       | 232 9.134                       | 116 4.567                                   | 70 2.756                        | 14 0.551                           | 53.5 2.106                      | 2.5 0.098                         | 55 2.165                            |
| RB220      | 206 8.110                                    | 316 12.441                       | 290 11.417                      | 145 5.709                                   | 100 3.937                       | 20 0.787                           | 79.5 3.130                      | 2.5 0.098                         | 100 3.937                           |

Both output flanges have identical dimensions.

\*AD=Adapter Length. Adapter will vary, depending on motor. Consult Internet ([www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com)) for details or call Parker Bayside.

\*Additional hollow shaft bore diameters are available. Contact Parker Bayside's Application Engineers for information.

## How to Order

Order Numbering Example:

**R D 1 4 2 E 0 1 0 - X X X L B**

### MODEL

RB= Low Ratio  
RD= Dual-Shaft  
RT= Hollow Shaft

### FRAME SIZE

090  
115  
142  
180  
220

### OPTIONAL

ENCODER  
MOUNT  
RD Only

### RATIOS

|     |     |     |
|-----|-----|-----|
| RB  | RD  | RT  |
| 001 | 001 | -   |
| 002 | 002 | -   |
| 003 | 003 | 003 |
| -   | 009 | 009 |
| -   | 015 | 015 |
| -   | 021 | 021 |
| -   | 030 | 030 |

### SPECIAL

(Factory Issued)

### OPTIONAL

LOW BACKLASH

1. Pick frame size and ratio.
2. Pick options.
3. Specify motor, make and model for mounting kit.

MultiDrive Gearheads are supported by a worldwide network of offices and local distributors. Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor. Information can also be obtained at [www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com)

# NE Nema Series:

## Lightweight, Compact and Low Friction



Parker Bayside's NEMA gearheads feature a high-efficiency spur-gear design, in a light, compact package. Designed to mount directly to the face of NEMA face stepper and servo motors, NEMA gearheads are ideal for applications requiring smooth operation and low starting torque. Ratios from 3:1 to 100:1 are available in NEMA 23, 34 and 42 frame sizes.

### 3 Frame Sizes

NE23

NE34

NE42

### Ratios

3:1

20:1

5:1

30:1

8:1

50:1

10:1

100:1

15:1



## Performance Specifications

|                                                    | Units                  | Ratio       | Frame Size |        |       |
|----------------------------------------------------|------------------------|-------------|------------|--------|-------|
|                                                    |                        |             | NE23       | NE34   | NE42  |
| Nominal Output Torque,<br>$T_{nom}$ r              | in-lb                  | 3           | 16         | 64     | 123   |
|                                                    | Nm                     |             | 2          | 7      | 14    |
|                                                    | in lb                  | 5           | 27         | 107    | 205   |
|                                                    | Nm                     |             | 3          | 12     | 23    |
|                                                    | in lb                  | 8-10        | 40         | 142    | 250   |
|                                                    | Nm                     |             | 5          | 16     | 28    |
|                                                    | in lb                  | 15          | 46         | 170    | 300   |
|                                                    | Nm                     |             | 5          | 19     | 34    |
| Max. Acceleration<br>Output Torque,<br>$T_{acc}$ r | in lb                  | 3           | 24         | 95     | 185   |
|                                                    | Nm                     |             | 3          | 11     | 21    |
|                                                    | in lb                  | 5           | 40         | 160    | 307   |
|                                                    | Nm                     |             | 5          | 18     | 35    |
|                                                    | in lb                  | 8-10        | 60         | 210    | 375   |
|                                                    | Nm                     |             | 7          | 24     | 42    |
|                                                    | in lb                  | 15          | 70         | 255    | 450   |
|                                                    | Nm                     |             | 8          | 29     | 51    |
| Nominal Input Speed, $N_{nom}$ r                   | in lb                  | 20-100      | 50         | 180    | 350   |
|                                                    | Nm                     |             | 6          | 20     | 40    |
| Max. Acceleration<br>Output Torque,<br>$T_{acc}$ r | in lb                  | 3           | 24         | 95     | 185   |
|                                                    | Nm                     |             | 3          | 11     | 21    |
|                                                    | in lb                  | 5           | 40         | 160    | 307   |
|                                                    | Nm                     |             | 5          | 18     | 35    |
|                                                    | in lb                  | 8-10        | 60         | 210    | 375   |
|                                                    | Nm                     |             | 7          | 24     | 42    |
|                                                    | in lb                  | 15          | 70         | 255    | 450   |
|                                                    | Nm                     |             | 8          | 29     | 51    |
| Nominal Input Speed, $N_{nom}$ r                   | in lb                  | 20-100      | 50         | 180    | 350   |
|                                                    | Nm                     |             | 6          | 20     | 40    |
| Nominal Input Speed, $N_{nom}$ r                   | RPM                    | All         | 4,000      | 4,000  | 4,000 |
| Max. Input Speed, $N_{max}$ r                      | RPM                    | All         | 5,500      | 5,000  | 4,500 |
| Standard Backlash <sup>(1)</sup>                   | arc min                | 3, 5, 8, 10 | 30         | 25     | 25    |
|                                                    | arc min                | 15-100      | 20         | 20     | 20    |
| Low Backlash <sup>(1)</sup>                        | arc min                | 3, 5, 8, 10 | 15         | 15     | 15    |
|                                                    | arc min                | 15-100      | 10         | 10     | 10    |
| Efficiency at Nominal Torque                       | %                      | All         | 98%        | 98%    | 98%   |
| Moment of Inertia                                  | oz in sec <sup>2</sup> | All         | 0.00007    | 0.0005 | 0.004 |
|                                                    | gm cm sec <sup>2</sup> |             | 0.0051     | 0.0408 | 0.306 |
| Maximum Weight                                     | lb                     | All         | 1.0        | 3.0    | 6.0   |
|                                                    | kg                     |             | 0.5        | 1.4    | 3.0   |
| Radial Load <sup>(2)</sup>                         | lb                     | All         | 20         | 80     | 200   |
|                                                    | N                      |             | 90         | 350    | 890   |
| Axial Load                                         | lb                     | All         | 10         | 30     | 60    |
|                                                    | N                      |             | 45         | 135    | 265   |

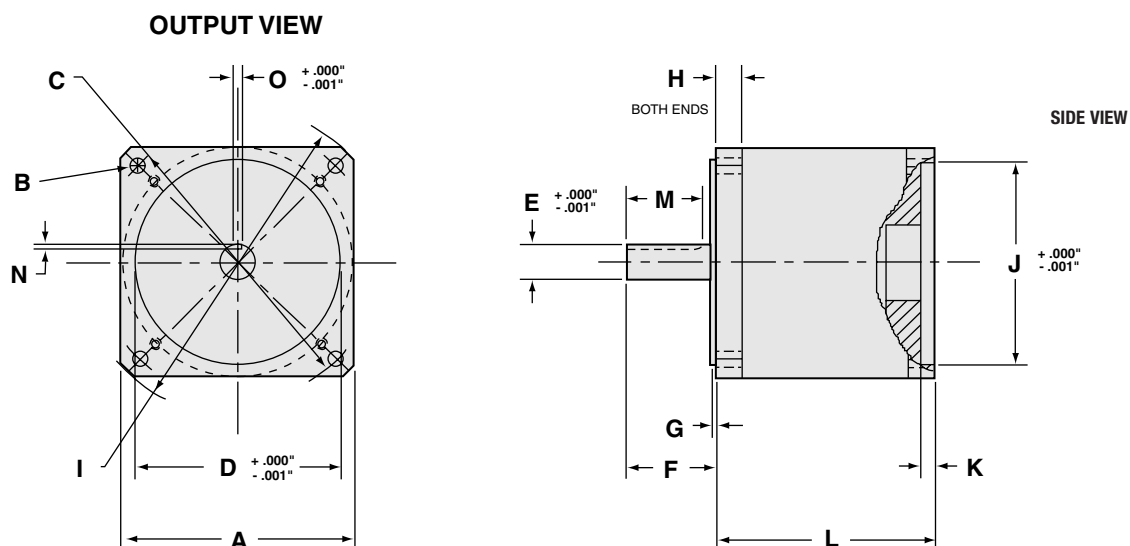
(1) Measured at 2% of rated torque

(2) Radial Loads are measured at 12.7mm (0.5in) from the gearhead mounting surface.  
These ratings are based on gearhead making more than one revolution on output shaft.

Specification are subject to change without notice

## Dimensions

### OUTPUT VIEW



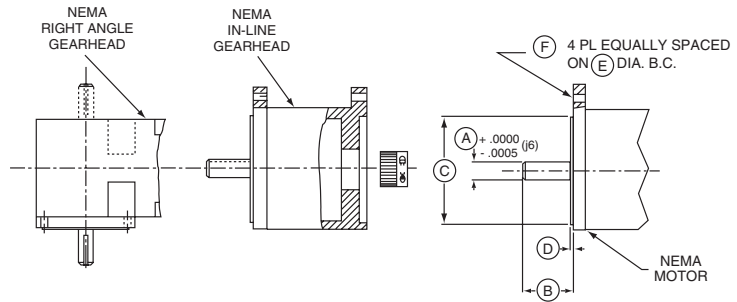
| Frame Size | A Square Flange |      | B Bolt Hole |      | C Bolt Circle |       | D Pilot Diameter |      | E Output Shaft Diameter |      | F Output Shaft Length |      | G Pilot Thickness |      | H Flange Thickness |      |
|------------|-----------------|------|-------------|------|---------------|-------|------------------|------|-------------------------|------|-----------------------|------|-------------------|------|--------------------|------|
|            | (in)            | (mm) | (in)        | (mm) | (in)          | (mm)  | (in)             | (mm) | (in)                    | (mm) | (in)                  | (mm) | (in)              | (mm) | (in)               | (mm) |
| NE 23      | 2.27            | 58   | 0.195       | 5.0  | 2.625         | 66.7  | 1.500            | 38.1 | 0.375                   | 9.5  | 1.00                  | 25.4 | 0.062             | 1.6  | 0.19               | 5    |
| NE 34      | 3.25            | 83   | 0.218       | 5.5  | 3.875         | 98.4  | 2.875            | 73.0 | 0.500                   | 12.7 | 1.25                  | 31.8 | 0.067             | 1.7  | 0.38               | 10   |
| NE 42      | 4.20            | 107  | 0.281       | 7.1  | 4.950         | 125.7 | 2.187            | 55.5 | 0.625                   | 15.9 | 1.50                  | 38.1 | 0.093             | 2.4  | 0.50               | 13   |

| Frame Size | I Housing Diameter |      | J Input Pilot Diameter |       | K Input Pilot Depth |      | L Housing Length |      | M Keyway Length |         | N Keyway Depth |          | O Keyway Width |      |
|------------|--------------------|------|------------------------|-------|---------------------|------|------------------|------|-----------------|---------|----------------|----------|----------------|------|
|            | (in)               | (mm) | (in)                   | (mm)  | (in)                | (mm) | (in)             | (mm) | (in)            | (mm)    | (in)           | (mm)     | (in)           | (mm) |
| NE 23      | 3.00               | 76   | 1.501                  | 38.13 | 0.125               | 3.2  | 2.30             | 58   | 0.75 flat       | 19 flat | 0.015 flat     | 0.4 flat | —              | —    |
| NE 34      | 4.38               | 111  | 2.876                  | 73.05 | 0.200               | 5.1  | 3.00             | 76   | 1.06            | 27      | 0.072          | 1.8      | 0.124          | 3.15 |
| NE 42      | 5.63               | 143  | 2.188                  | 55.58 | 0.187               | 4.7  | 3.75             | 95   | 1.13            | 29      | 0.108          | 2.7      | 0.187          | 4.75 |



## MOUNTING TO NEMA-FRAMED MOTORS: DIRECT MOUNT

Gearheads attach directly to motors with NEMA mounting dimensions (see table). Parker Bayside's clamp-on-pinion and mounting hardware are included with gearheads, so your motor can be up and running in a matter of minutes.



### NEMA DIMENSIONS

| Dimension |                      | Motor Mounting Dimensions |        |           |            |       |         |
|-----------|----------------------|---------------------------|--------|-----------|------------|-------|---------|
|           |                      | NE23                      |        | NE34      |            | NE42  |         |
|           |                      | in                        | (mm)   | in        | (mm)       | in    | (mm)    |
| A         | Motor Shaft Diameter | 0.250                     | (6.4)  | .375/.500 | (9.5/12.7) | 0.625 | (15.9)  |
| B         | Motor Shaft Length   | 0.810                     | (20.6) | 1.250     | (31.8)     | 1.380 | (35.1)  |
| C         | Pilot Diameter       | 1.500                     | (38.1) | 2.875     | (73.0)     | 2.186 | (55.5)  |
| D         | Pilot Length         | 0.063                     | (1.6)  | 0.063     | (1.6)      | 0.093 | (2.4)   |
| E         | Mounting Bolt Circle | 2.625                     | (66.7) | 3.875     | (98.4)     | 4.950 | (125.7) |
| F         | Bolt Hole Size       | 0.195                     | (5.0)  | 0.218     | (5.5)      | 0.281 | (7.1)   |

All dimensions are in inches (millimeters).

## MOUNTING TO NON-NEMA FRAMED MOTORS: ADAPTER MOUNT

For motors with non-NEMA dimensions, Parker Bayside supplies a mounting kit including a clamp-on-pinion, adapter plate and all necessary hardware. When ordering, simply provide the part number or outline drawing of your motor, and the gearhead will be shipped ready to mount.

## How to Order

Order Numbering Example:

**N E 3 4 - 0 1 0 - X X X L B**

### FRAME SIZE

23  
34  
42

### RATIO

003 020  
005 030  
008 050  
010 100  
015

(all ratios are exact)

### SPECIAL

(Factory Issued)

### OPTIONAL

LOW BACKLASH

1. Pick frame size and ratio.
2. Pick options.
3. Specify motor, make and model for mounting kit.

NEMA gearheads are supported by a worldwide network of offices and local distributors. Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor. Information can also be obtained at [www.baysidemotion.com](http://www.baysidemotion.com) or [www.parkermotion.com](http://www.parkermotion.com)

Specifications are subject to change without notice.

# Specials are Standard at Parker Bayside

Parker Bayside has geared our design and manufacturing capabilities to make custom or modified gearheads quickly and inexpensively.

"Standard" specials include many of the products shown on this page. In addition, we have designed hundreds of gearheads for a wide variety of applications, including military, aerospace, food processing, paper mills and other specialized applications. Or, if you simply need a smaller shaft or a different gear ratio, we can accommodate modifications quickly and easily.

## Linear Slide

### **Gearheads ready to mount to linear slides.**

Most belt driven linear slides need a gearhead to reduce inertia. Parker Bayside has pre-engineered in-line and right-angle gearheads to mount directly to most popular linear slides, eliminating the need for couplings or adapters. Standard gearheads are available for the following linear slides: (partial list)

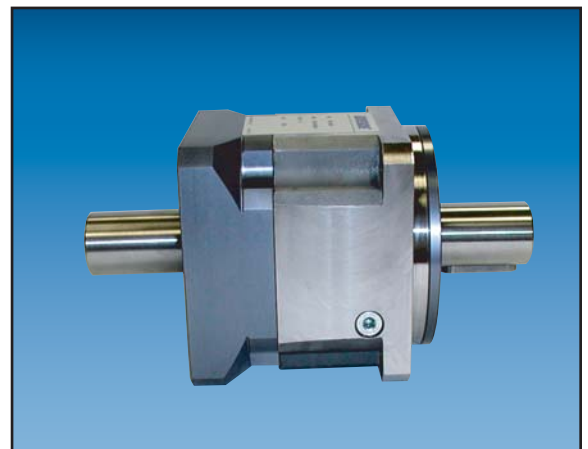
- |                 |                    |                    |
|-----------------|--------------------|--------------------|
| ▶ Parker Daedal | ▶ Bishop Wiscarver | ▶ Item Products    |
| ▶ THK           | ▶ INA              | ▶ Tol-o-Matic      |
| ▶ Hauser        | ▶ NSK              | ▶ Warner Rapidtrak |
| ▶ IKO           | ▶ Star Linear      | ▶ Warner Tollo     |



## Input Shaft / Speed Reducer

### **Increased design flexibility.**

Stealth gearheads are available with an input-shaft option. The input-shaft option allows more design flexibility, as options like brakes, encoders, or safety couplings can be used between the motor and the gearhead. Also, non-standard or oversized motors can be easily attached to a Stealth gearhead via an input shaft. Standard input shaft options are available for each model and frame size.





## Stainless Steel Gearmotor

### Washdown motors for harsh conditions.

Parker's high-performance washdown series servo motors were co-designed with engineers from the world's largest food-processing plants to guarantee the right solution for the most demanding applications. Ideal for above-food-line applications, our IP67-rated stainless steel brushless servo motors feature a non-corrosive housing for extremely long life, field-serviceable seals for easy maintainability, multiple ratios, a paint-free exterior, a shaft PTFE seal, conduit fittings, a 316 SST single-piece housing and high-density copper-fill and rare-earth magnets.



## Military Spec Gearheads

### Mil-spec quality at commercial prices.

Parker Bayside has extensive experience in military and aerospace applications. The Stealth Bomber, M1 Tank and the Space Shuttle all use Parker Bayside gearheads. Parker Bayside's quality system has been approved by NASA and the US Government to MIL-I-45208A. In today's world of tight military budgets, Parker Bayside can give you a mil-spec gearhead at commercial pricing.



## Special Environment

### Put a Parker Bayside gearhead anywhere!

Parker Bayside can supply gearheads to operate in the harshest environments:

**Vacuum** - Available as a standard option to  $10^{-7}$  Torr vacuum ratings.

**Clean Room** - Special gearheads for Class 100 clean room applications.

**High Temperature** - Special lubricants and seals for temperatures up to 250° Celsius.

**Radiation** - Gearheads customized to operate within radioactive environments.

**Food Grade** - Gearheads customized to operate within food-handling environments.



# Parker Bayside Gearhead Selection

Selecting a gearhead for a particular application involves the consideration of a number of interrelated parameters. These are:

- ▶ Speed
- ▶ Continuous torque
- ▶ Repetitive peak torque or acceleration torque
- ▶ Emergency stop torque
- ▶ Duty cycle
- ▶ Ambient temperature
- ▶ Radial and axial shaft load

Parker Bayside has prepared the following procedure that will provide a straightforward method for selecting a gearhead that will provide an L-10 life of 10,000 hours.

In this procedure, two rating factors must be used, which derate the gearhead to compensate for thermal and application related torque effects.

## ▶ $K_T$ - The Torque Thermal Factor

This factor derates the transmitted torque to prevent case temperature from exceeding 100 degrees C.

The Thermal Factors given in the table are for ambient temperature 25 degrees C, medium-size indoor space, with the gearheads mounted to a metal base with a surface area more than 3 times larger than the gearhead surface area.

**TORQUE THERMAL FACTOR,  $K_T$**

| Frame Size              | Ratio                  | Output Speed, (RPM) |     |     |     |     |       |       |       |       |       |
|-------------------------|------------------------|---------------------|-----|-----|-----|-----|-------|-------|-------|-------|-------|
|                         |                        | 100                 | 200 | 400 | 600 | 800 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 |
| <b>PV40</b>             |                        | 1                   | 1   | 1   | 1   | 1   | 1     | —     | —     | —     | —     |
| <b>PS, PX, PV, RS60</b> |                        | 1                   | 1   | 1   | 1   | 1   | 1     | —     | —     | —     | —     |
| <b>PS, PX, PV, RS90</b> |                        | 1                   | 1   | 1   | 1   | 1   | 1.2   | —     | —     | —     | —     |
| <b>PS, PX, RS115</b>    |                        | 1                   | 1   | 1   | 1   | 1.2 | 1.5   | —     | —     | —     | —     |
| <b>PS, RS142</b>        |                        | 1                   | 1   | 1   | 1.3 | 1.7 | —     | —     | —     | —     | —     |
| <b>PS, RS180</b>        | 1 stage <sup>(1)</sup> | 1                   | 1   | 1.5 | 2.3 | —   | —     | —     | —     | —     | —     |
|                         | 2 stage <sup>(2)</sup> | 1.1                 | 1.5 | —   | —   | —   | —     | —     | —     | —     | —     |
| <b>PS, RS220</b>        | 1 stage <sup>(1)</sup> | 1                   | 1.2 | 2.1 | 3.2 | —   | —     | —     | —     | —     | —     |
|                         | 2 stage <sup>(2)</sup> | 1.3                 | 2.5 | —   | —   | —   | —     | —     | —     | —     | —     |
| <b>PS ,RS300</b>        | 1 stage <sup>(1)</sup> | 1                   | 1.5 | 3.1 | —   | —   | —     | —     | —     | —     | —     |
|                         | 2 stage <sup>(2)</sup> | 1.9                 | —   | —   | —   | —   | —     | —     | —     | —     | —     |
| <b>R_90</b>             | 1                      | 1                   | 1   | 1   | 1   | 1   | 1     | 1     | 1     | 1.25  | 1.5   |
|                         | 2-30                   | 1                   | 1   | 1   | 1   | 1   | 1     | 1.1   | —     | —     | —     |
| <b>R_115</b>            | 1                      | 1                   | 1   | 1   | 1   | 1   | 1     | 1     | 1.3   | 1.7   | —     |
|                         | 2-30                   | 1                   | 1   | 1   | 1   | 1   | 1.3   | 2     | —     | —     | —     |
| <b>R_142</b>            | 1                      | 1                   | 1   | 1   | 1   | 1   | 1.3   | 2     | 2.7   | 3.4   | —     |
|                         | 2-30                   | 1                   | 1   | 1   | 1   | 1.3 | 1.6   | —     | —     | —     | —     |
| <b>R_180</b>            | 1                      | 1                   | 1   | 1   | 1   | 1.3 | 1.7   | 2.5   | 3.4   | —     | —     |
|                         | 2-30                   | 1                   | 1   | 1   | 1.4 | 1.8 | 2.3   | —     | —     | —     | —     |
| <b>R_220</b>            | 1                      | 1                   | 1   | 1.2 | 1.8 | 2.4 | 3.0   | 4.5   | —     | —     | —     |
|                         | 2-30                   | 1                   | 1   | 1.3 | 2.0 | 2.6 | —     | —     | —     | —     | —     |

(1) Data given for PS 3:1 to 10:1 and all RS ratios

(2) Data given for PS ratios above 10:1

## ▶ $K_S$ - The Shock Factor

This factor is used to derate the transmitted torque for applications where the application is not well defined, has random duty cycles or experiences varying peak torques subjecting the gear teeth to torques above the estimated torques.

A  $K_S$  has been defined for four general application categories, as shown below, and is independent of gearhead size. If your application does not fit into one of these categories, contact Parker Bayside to discuss your requirements.

|                   | Load Type | Application                                                                 | $K_S$ |
|-------------------|-----------|-----------------------------------------------------------------------------|-------|
| Known Load Data   |           | All Industries                                                              | 1.00  |
|                   | Light     | Textiles, liquid mixers, can filling, food, conveyors, plastics, fans       | 1.25  |
| Unknown Load Data | Moderate  | Paper mills, rubber industry, sugar industry, metal mills, lumber, robotics | 1.50  |

# 9 Step Procedure

1

## Load Parameters

Evaluate the following requirements of the load:

Load inertia  
Acceleration time ( $t_{acc}$ )  
Continuous run time ( $t_{cont}$ )  
Deceleration time ( $t_{dec}$ )  
Dwell time ( $t_{dwell}$ )  
Maximum continuous speed ( $N_{cont}$ )

From these, calculate:

Acceleration torque ( $T_{acc}$ )  
Continuous run torque ( $T_{cont}$ )  
Deceleration torque ( $T_{dec}$ )  
Dwell torque ( $T_{dwell}$ )\*

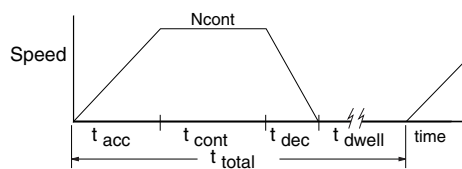
\*Although not used in the following torque calculations, torque requirements during dwell (zero speed) must be considered when selecting gearhead size.

2

## Duty Cycle

Determine if the application is to be considered as **intermittent** or **continuous** by calculating the duty cycle as follows:

$$\text{Duty Cycle} = \frac{(t_{acc} + t_{cont} + t_{dec})}{t_{total}} \times 100$$



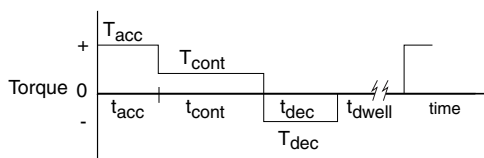
If the duty cycle is < 60%, and ( $t_{acc} + t_{cont} + t_{dec}$ ) is less than 20 minutes, the motion is considered to be **intermittent**.

If the duty cycle is  $\geq 60\%$ , or ( $t_{acc} + t_{cont} + t_{dec}$ ) is greater than 20 minutes, the motion is considered to be essentially **continuous**.

3

Calculate the Root Mean Cube Output Torque,  $T_{mean}$ .

$$T_{mean} = \sqrt[3]{\frac{[(T_{acc}^3)(N_{cont})(t_{acc}) + (T_{cont}^3)(N_{cont})(t_{cont}) + (T_{dec}^3)(t_{dec})]}{2} \div \frac{[(N_{cont})(t_{acc}) + (N_{cont})(t_{cont}) + (N_{cont})(t_{dec})]}{2}}$$



4

Select a gearhead type; PS, PX, RS, Multi-drive, NE or NR (Match gearhead frame size to motor frame size)

5

Review the catalogue listings and determine the gearhead size (40 thru 300) which can meet the following criteria:

$$T_{mean} \leq T_{nomr}$$

$$T_{acc} \text{ and } T_{dec} \leq T_{accr}$$

6

Determine the maximum rated input speed ( $N_{maxr}$ ) for the selected gearhead.

7

Using  $N_{cont}$  and  $N_{maxr}$  from step 6, determine the maximum allowable ratio as:

$$\text{Max ratio} = \frac{N_{maxr}}{N_{cont}}$$

8

Select an actual ratio from the catalogue listing and calculate the mean input speed,  $N_{meani}$  and the maximum input speed,  $N_{maxi}$ , as follows:

$$N_{meani} = \left( \frac{(N_{cont})(t_{acc}) + (N_{cont})(t_{cont}) + (N_{cont})(t_{dec})}{2} \right) \div (t_{acc} + t_{cont} + t_{dec}) \text{ (RATIO)}$$

$$N_{maxi} = (N_{cont})(\text{RATIO})$$

Note: Reflected inertia requirement may determine the actual ratio, as long as it does not exceed the maximum value calculated in STEP 7.

9

|                | CONTINUOUS MOTION                 | INTERMITTENT MOTION          |
|----------------|-----------------------------------|------------------------------|
| Select factor  | $K_T$ and $K_S$                   | $K_S$                        |
| Calculate      | $(T_{mean})(K_T)(K_S)$            | $(T_{mean})(K_S)$            |
| Determine that | $T_{nomr} > (T_{mean})(K_T)(K_S)$ | $T_{nomr} > (T_{mean})(K_S)$ |

► Compare the required accelerate and decelerate torques,  $T_{acc} / T_{dec}$ , to the rated accelerate torque,  $T_{accr}$ .

**$T_{accr}$  must be greater than the larger of  $T_{acc}$  or  $T_{dec}$ .**

► Check the Emergency Stop Torque rating.

► Compare  $N_{meani}$  with the nominal rated speed,  $N_{nomr}$ .

**$N_{nomr}$  must be greater than  $N_{meani}$**

► Compare the maximum input speed  $N_{maxi}$  with the maximum input speed rating,  $N_{maxr}$ .

**$N_{maxr}$  must be greater than  $N_{maxi}$**

► Verify radial and axial shaft load.

► If any of these comparisons are not met, then:

► Choose a larger gearhead

► Reevaluate the ratio

► Reevaluate the torque

► Reevaluate the speed

► Reevaluate the duty cycle

► Reevaluate shaft load

**SELECTION PROCESS IS COMPLETE!**

This gearhead selection is made available as an aid to selection of Parker Bayside Gearheads.

The values are merely an estimate and Parker Bayside cannot accept the responsibility for their interpretation. Parker Bayside standard product warranty supersedes all life estimates.



### **WARNING**

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

### **Offer of Sale**

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the "Offer of Sale" found on the last page of this publication.

## Offer of Sale

The items described in this document and other documents or descriptions provided by Parker Bayside, its subsidiaries and its authorized distributors are hereby offered for sale at prices to be established by Parker Bayside, its subsidiaries and its authorized distributors. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any such item, when communicated to Parker Bayside, its subsidiary or an authorized distributor ("Seller") verbally or in writing, shall constitute acceptance of this offer.

**1. Terms and Conditions of Sale:** All descriptions, quotations, proposals, offers acknowledgments, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between, Buyer and Seller unless expressly accepted in writing by Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer's offer. Acceptance of Seller's products shall in all events constitute such assent.

**2. Payment:** Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

**3. Delivery:** Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

**4. Warranty:** Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 12 months from date of shipment from Parker Bayside. THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED. NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGNS OR SPECIFICATIONS.

**5. Limitation of Remedy:** SELLER'S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLER'S SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEMS SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.

**6. Changes, Reschedules and Cancellations:** Buyers may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification of cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

**7. Special Tooling:** A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture and not withstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

**8. Buyer's Property:** Any designs, tools, patterns, materials, drawings confidential information or equipment furnished by Buyer, or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

**9. Taxes:** Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

**10. Indemnity For Infringement of Intellectual Property Rights:** Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets (hereinafter 'Intellectual Property Rights'). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it non infringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Right. If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

**11. Force Majeure:** Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter 'Events of Force Majeure'). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

**12. Entire Agreement/Governing Law:** The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder of this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

# Find It Fast at Parkermotion.com!

The award-winning site of Parker's Electromechanical Automation Division keeps getting better.

Listening to the needs of Internet users, Parker Electromechanical Automation has devoted considerable energy to make using our Internet site – **parkermotion.com** – as easy, efficient and productive as possible for OEMs, machine builders and end-users. One result of this effort you'll find is that our search engine is powered by Google. Google is widely recognized as the global leader in innovative search technology, and the tool implemented on parkermotion.com offers many of the same great features that users have come to enjoy and rely on with Google.com. Google is also powering our frequently asked questions and part-number databases. This gives users of the Web site a dramatically enhanced search capability and makes finding product information, documents, tools and other information faster and easier.

## A Perfect Landing Site

To make motion control solutions even easier to find, we've created a number of special landing pages devoted to specific technologies and industries.

*Technology pages include:*

Engineered Precision Motion Systems -  
<http://www.parkermotion.com/systems/>

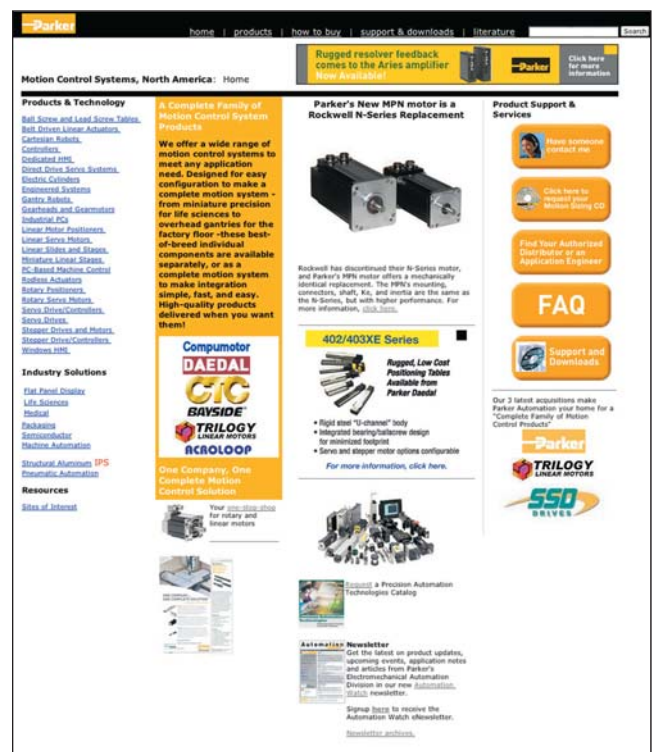
With more than 30 years of motion system design experience, Parker's Engineered Solutions incorporate air-bearing, linear motor, and pneumatic technology with composite or conventional materials to create a total solution. Visit this page for more information.

Motion Sizer - <http://www.parkermotion.com/sizing/>

Choosing the correct motor-and-drive combination is one of the most complicated steps in specifying a new motion application; complex systems may require many hours of tedious sizing calculations. Parker's new generation of computer-aided motor sizing provides solutions within moments, giving engineers the right selection for their application. A new edition of Parker's popular engineering tool Motion Sizer™ is now available as a free CD or download, and it's as easy as visiting this page.

Motors - <http://www.parkermotion.com/motors/>

Parker offers such a comprehensive family of motors for every application that a page devoted to them all has proved very helpful. Servos, steppers, linear, rotary, custom, frameless, direct-drive and more – you'll find them all here!



PROmech - <http://www.parkermotion.com/promech/>

Parker's PROmech Series miniature actuators are packaged linear actuators for OEM applications. As a complete package including linear bearings, drive screw, thrust bearings, motor and coupling, PROmech Series actuators eliminate the need to design, qualify, procure, receive, inventory, and assemble all the components necessary to build linear motion axes into medical and life science instrument applications.

Industry pages include:

Flat Panel Display - <http://www.parkermotion.com/flatpanel/>

Parker has produced the most advanced linear motion technology, has formed the most experienced motion-systems design team and is backed by the financial resources to help drive flat panel processing to capabilities bound only by imagination. Our FPD page is your first stop when seeking application solutions for this industry.

Medical - <http://www.parkermotion.com/medical/>

Focused on the medical device manufacturing industry, this page highlights how Parker helps simplify the manufacturing process to help bring products to market faster. It also provides a PDF of our medical device manufacturing brochure.

Packaging - <http://www.parkermotion.com/packaging/>

Whether you're interested in applying Windows®-based HMI to help meet FDA regulations, you want to use servo technology to give your packaging machinery greater control and cycling times precision, or you just need a simple gantry system, Parker is the only supplier that can provide complete technical and engineered solutions – from electromechanical and pneumatics to hoses, tubes, and fitting – to any packaging requirement.

Semiconductor - <http://www.parkermotion.com/semi/>

The semiconductor industry is one of Parker's key target markets, so a page devoted to our capabilities for this industry is only natural. Check here for the latest on our semiconductor-focused product offerings, programs and events.

And don't forget training ...

Parker training courses are intensive, three- and four-day training seminars that are held at the Electromechanical Automation facility in Rohnert Park, California. Customized, hands-on training is achieved through application examples, programming assignments and lab days. Every course includes literature and software. Learn more at [http://www.parkermotion.com/support\\_training.html](http://www.parkermotion.com/support_training.html)

## Engineers Like What They See

Our online efforts are being recognized by those who really know the industry: design engineers, machine builders, OEMs and system integrators. In fact, parkermotion.com was recently named the Best Motion Control/Automation Website in *Design News* magazine's annual Golden Mousetrap Readers' Choice Awards.





## EM Sales Offices

### Australia

#### **Parker Hannifin (Australia)**

Pty Limited  
9 Carrington Road  
Castle Hill NSW 2154  
Australia  
Tel: +61 (0) 2 9842 5160  
Fax: +61 (0) 2 9634 3749

### China

#### **Parker Hannifin Motion & Control (Shanghai) Co., Ltd**

280 Yungqiao Rd, Jin Qiao Export  
Processing Zone  
Shanghai 201206, China  
Tel: (86-21) 50312525  
Fax: (86-21) 64459717

### France

#### **Parker SSD Parvex**

8 avenue du Lac  
B.P. 249  
F-21007 Dijon Cedex  
Tel: +33 (0) 3 80 42 41 40  
Fax: +33 (0) 3 80 42 41 23

### India

#### **Parker Hannifin India Pvt. Ltd.**

EL-26, TTC, Industrial Area.  
Mahape, Navi-Mumbai.-400 709.  
Tel: 0091 22 65137081 85, 65137050-03  
Fax: 0091 22 27686841, 27686618

### Italy

#### **Parker Hannifin SpA (SSD Drives Division)**

Via Gran Sasso, 7  
20030 Lentate sul Seveso -  
MI - Italy  
Tel: +39 0362 557308  
Fax: +39 0362 557312

### Korea

#### **Parker Hannifin Korea**

6th Floor Daehwa Building  
169 Samsung-dong Kangnam-gu  
Seoul 135-882, South Korea  
Tel: +82 2 559 0400  
Fax: +82 2 556 8187

### Scotland and Northern Ireland

Unit 59  
Stirling Enterprise Park  
Player Road  
Stirling FK7 7RP  
Tel: +44 (0) 1786 471674  
Fax: +44 (0) 1786 451095

### Singapore

#### **Parker Hannifin Singapore Pte Ltd**

11, Fourth ChinBee Road  
Singapore 619702  
Tel: (65) 6887 6300  
Fax: (65) 6265 5125/6261 4929

#### **Singapore Pte Ltd (Branch Office)**

Lot 558A, Jalan Subang 3  
Off Persiaran Subang  
Sungai Penaga Industrial Park  
47610 Subang Jaya Malaysia  
Tel: (60) 03 5638 1476  
Fax: (60) 03 5638 1527

### Taiwan

#### **Parker Hannifin Taiwan Co., Ltd**

No. 40, Wuchiuan 3rd Road  
Wuku Industrial Park  
Taipei County, Taiwan 248  
ROC  
Tel: 886 2 2298 8987  
Fax: 886 2 2298 8982

### Thailand

#### **Parker Hannifin (Thailand) Co., Ltd.**

1023, 3rd Floor, TPS Building,  
Pattanakarn Road,  
Suanluang, Bangkok 10250  
Thailand  
Tel: (66) 02717 8140  
Fax: (66) 02717 8148

### UK

#### **Parker Hannifin (Main Office)**

New Courtwick Lane  
Littlehampton  
West Sussex BN17 7RZ  
United Kingdom  
Tel: +44 (0) 1903 737000  
Fax: +44 (0) 1903 737100

### USA

#### **Parker Hannifin Electromechanical Automation Division Main Office/Compumotor**

5500 Business Park Drive  
Rohnert Park, CA 94928 USA  
Tel: 707-584-7558  
800-358-9070  
Fax: 707-584-8015  
Email: emn\_support@parker.com

#### **Parker Hannifin Electromechanical Automation Division/CTC**

50 West TechneCenter Dr.  
Milford, OH 45150  
Tel: 513-831-2340  
800-233-3329  
Fax: 513-831-5042  
Email: emn\_moreinfo\_ctc@parker.com

#### **Parker Hannifin Electromechanical Automation Division/Bayside**

27 Seaview Boulevard  
Port Washington, NY 11050  
Tel: 516-484-5353  
800-305-4555  
Fax: 516-629-8000  
Email: emn\_support\_bayside@parker.com

#### **Parker Hannifin Electromechanical Automation Division/Daedal**

1140 Sandy Hill Road  
Irwin, PA 15642  
Tel: 724-861-8200  
800-245-6903  
Fax: 724-861-3330  
Email: ddlcat@parker.com

# Extensive Automation Solutions

## Electric Actuators



Screw, belt-driven, and linear motor actuators for the complete range of industrial applications, offering precise motion and flexibility.

[www.parkermotion.com](http://www.parkermotion.com)

## Motors and Drives



Built using industry standard interfaces and market-leading features that combine great value and performance.

[www.parkermotion.com](http://www.parkermotion.com)

## HMI and Controllers



Superior integration and support for machine control as well as HMI hardware and software.

[www.parkermotion.com](http://www.parkermotion.com)

## Linear Actuators



Aluminum and steel pneumatic cylinders, guided cylinders, rodless cylinders, and short stroke thrusters from the industry leader.

[www.parkermotion.com](http://www.parkermotion.com)

## Rotary Actuators



Industry leader in the design and manufacture of pneumatic rack and pinion, and vane-style rotary actuators.

[www.parker.com/pneu/rotary](http://www.parker.com/pneu/rotary)

## Vacuum Products and Sensors



Vacuum solutions include a broad range of generators (integrated/inline), cups, and pressure sensors.

[www.parker.com/pneu/vacsen](http://www.parker.com/pneu/vacsen)

## Grippers



Parallel, angular, and three jaw grippers are available in over 1,000 configurations.

[www.parker.com/pneu/gripper](http://www.parker.com/pneu/gripper)

## Airline Accessories



Airline accessories include silencers, flow controls, and mufflers to round out Parker's pneumatic solution.

[www.parker.com/pneu/access](http://www.parker.com/pneu/access)

## Air Control Valves



Valve technology that meets the most demanding requirements in any industrial application.

[www.parker.com/pneu/valve](http://www.parker.com/pneu/valve)

## Air Preparation



Parker, the industry leader in air preparation, offers a complete line of products to ensure clean, dry, oil-free air.

[www.parker.com/pneu/airprep](http://www.parker.com/pneu/airprep)

## Connectors and Tubing



The most complete line of fluid connectors worldwide will meet virtually any automation application.

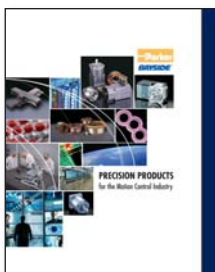
[www.parker.com/pneu/fc](http://www.parker.com/pneu/fc)

## Parker IPS Structural Automation



More than 150 metric and inch profiles, integral motion components, and accessories for unlimited and flexible configurations. Pre-machined kits or complete assemblies.

[www.parker.com/ips](http://www.parker.com/ips)



**New Parker Bayside catalog.** Call for your comprehensive guide today. 800.305.4555 8100/US

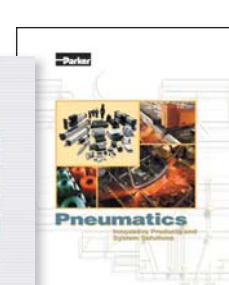
Covering Electromechanical and Pneumatic markets, each of our catalogs is paired with an interactive CD. Call for your comprehensive guides today. 800.272.7537



Electromechanical Precision Bulletin AU01-5000/US



Electromechanical Industrial Bulletin AU01-7500/US



Pneumatic Bulletin AU01-1000/US



Catalog 8100  
Printed in U.S.A

