Precision Automation Technologies

Electromechanical Products and System Solutions
# Introduction
Parker Hannifin Corporation
Precision Automation
Unrivaled Support
Selectable Levels of Integration™
Product and Technologies

## Product Range

### Human Machine Interface (HMI)

### Motion Controllers
ACR Controllers
Real-Time Ethernet Motion Control

### Servo Drives and Controller Drives

### Stepper Drives and Controller Drives

### Unique Motor Technologies

## Motors
Custom Applications
Rotary Servo
  - Planetary Gearheads
Servo Gearmotors
Frameless
Linear

## Tables/Positioners
Precision Linear Motor Positioning Tables
Linear Motor Driven Positioning Tables
Precision Ballscrew Tables
Economy Linear Tables
Ultra Series
Miniature Positioners
Vertical Lift Tables
Rotary Tables

## Linear Actuators
Belt-Driven
Linear Motor
Rodless
Electric Cylinders

## Multi-Axis Systems

## Engineered Solutions

## End Effectors

## Structural Framing System

## Information
Sales Offices
Action Directory
Parker is the leading global manufacturer of components and systems designed to control motion, flow and pressure in all types of machinery. Parker Hannifin is a Fortune 300 corporation listed on the New York Stock Exchange as PH.

Parker offers more than 1,400 product lines that control motion in 1,000 mobile, industrial, and aerospace markets. We are the only manufacturer to offer our customers a choice of hydraulic, pneumatic, electromechanical, and computer motion control solutions. Furthermore, we have the largest global distribution network in our field, with over 8,600 distributors serving more than 422,000 customers.

Parker products are found everywhere: in orbiting satellites, machine tools, truck equipment, hospitals and laboratories – anywhere machines depend on motion control.
Today’s High-Technology automation applications demand performance in quality throughput and precision. Miniaturization of semiconductor, electronics and life science applications have created the need to partner with companies that have the experience and products to meet stringent specifications for smaller, more precise motion control solutions.

Parker’s dedicated electromechanical business is rapidly becoming an industry leader in providing precision connectivity to PC-based controls for target industries including:
• Semiconductor
• Electronics
• Computer Peripherals
• Life Science
• Medical Equipment

Parker is about motion control engineering, manufacturing, application expertise and unparalleled customer service. Our electromechanical systems and solutions are available wherever needed—around the corner or around the world.
Customization and Testing

Unlike some motion control technologies, electromechanical applications often require custom solutions. Parker’s Custom Systems Group is staffed by experienced engineers and technicians who utilize systematic processes for handling component modification or complete one-of-a-kind systems.

An advanced manufacturing and assembly process enables us to build precision and quality into every element of your motion system. Performance and specifications are verified with state-of-the-art testing, including:

- **Cleanroom testing** – Parker is equipped with particulate testing to certify materials for cleanroom ratings.
- **EMI testing** – Parker has an EMI test chamber, which allows us to test equipment to verify levels of electromagnetic interference.
- **Precision metrology labs** – When precision is critical to your process, you need validated, proven performance data. Parker certifies all precision-grade positioners using state-of-the-art laser interferometers, and provides reports to validate accuracy and bidirectional repeatability.

24/7 Emergency Breakdown Referrals

The Parker product information center at 800-C-PARKER offers live operators 24/7 to help identify replacement parts or services. The operators at 800-C-PARKER can connect you with on-call representatives for all motion control technologies.

Parker Automation Technology Centers

Parker Automation Technology Centers are a network of premier product and service providers who can serve you locally for your automation needs. Each Automation Technology Center is certified to have completed significant product training and has the ability to provide subsystem solutions with local support.

Industry’s Best Lead Times

#1 rated, industry-leading, on-time delivery to customer-requested ship dates.

www.parkermotion.com

The Parker Electromechanical Automation site offers the most extensive online support tools in the industry, including:

- Complete online catalog
- FAQ database with more than 500 answers to common questions
- Interactive product sizing and selection tool
- Comprehensive CAD drawings and 3-D models for electronic and mechanical products
- User guides and detailed product specifications
- Latest software and firmware revisions
- Application case studies
- Custom solutions photo library
- Innovative technology white papers

Speak with a Motion Control Expert

Toll-Free Applications Engineering Assistance

When you have urgent questions, expert answers are only a phone call away. Our team of experienced engineers is ready to take your call. These engineers have practical field experience and can provide you with application and product assistance throughout the stages of your project and for the life of the product. For presale support, including sizing and selecting systems, call 800-245-6903 (724-861-8200 outside the US). For post-sale support with technical questions on programming and troubleshooting, call 800-358-9070 (707-584-7558 outside the US). Our staffing and support tools allow us to resolve most issues and get your project rolling in less than one hour.

Engineering Support Tools to Make Your Job Easier

Years of experience have culminated in a vast assortment of engineering support tools that help to simplify sizing, selection, installation, and troubleshooting. There are also tools to help design a system to custom application requirements. A few of these tools include:

- Comprehensive engineering reference, available on CD-ROM or on the Web
- Motor sizing and selection software
- Application programming software
- Product installation videos
- CAD files available for most products
Parker’s Selectable Levels of Integration™ is a philosophy of product development and management that allows the machine builder to select an appropriate system, subsystem, or component to meet a specific need. Parker has solutions for machine builders of all types, from those who want a complete integrated system to those who want to build their own system from “best of breed” components.

**Systems**
Machine builders and OEMs often choose to integrate a complete electromechanical system into their machine. They have confidence in knowing that our knowledge, experience, and support will ensure that their goals are met. Minimal design engineering ensures component compatibility from a single source.

**Subsystems and Bundled Products**
For a cost-effective and efficient solution, Parker offers bundled or kitted systems. We can combine motors, gearheads, and positioning systems to deliver a configured subsystem ready for installation. Parker configuration and setup software accommodates the rest of the product line, making start-up a snap. Combining this with our custom product modification capabilities gives the machine builder an economical custom-fit solution, with reduced engineering effort, straightforward integration, and modular compatibility.

**Component Products**
We offer the broadest range of linear and rotary motion products available for automation systems. If you have the capability and experience to develop your own systems, our innovative, easy-to-use products will help you get the job done. Parker provides short lead times, large selection, and proven reliability.
Parker electromechanical automation products are built using industry standard interfaces and market-leading features that combine great value and performance. Whether using one component or an entire system, Parker has the right solution.

**HMI (Human-Machine Interface)**
Parker offers HMI solutions for any application from simple push button replacement through to sophisticated networking, multimedia and data logging requirements. Parker pre-loads Interact or InteractX HMI software on PowerStation Industrial computers to provide a ready to go HMI solution. This bundled approach reduces development and integration time for your HMI project.

**Motion Controllers**
Parker motion controllers are powerful designs that have the processing power to coordinate multiple axes of motion. Parker controllers have advanced features built in, such as kinematics transformation for the control of robots and other non-linear functions. Each Parker controller comes with free libraries for Visual Basic® and Visual C++®.
Drives
Parker drives are digital designs that deliver maximum power output and performance in a minimal package size. These drives have industry leading power density and smart digital designs with features to ease integration and start-up.

Motors
Using advanced technologies, Parker rotary motors provide maximum performance and value. Our exposed-lamination designs provide maximum torque per package size, and the slotless motor designs provide cog-free rotary motion for the best low speed smoothness. Patented linear motor designs provide the greatest winding uniformity and accuracy in the industry, and range from the smallest linear motor on the market to the largest force capacity.

Gearheads
Parker gearheads are high-precision planetary designs, and many ratios have less than three arc-min of backlash. They have an industry leading two-year warranty.

Positioning Tables
Parker high-precision positioning tables integrate linear motors or ground ballscrews and may be prepared for cleanroom operation. The designs combine the low cost of extruded aluminum with machined bases allowing “out of the box” submicron precision. Our positioning tables are modular designs that easily accommodate flexible configurations such as XY and XYZ.

Actuators
Parker actuators are modular, single-axis actuators that can be easily configured in multi-axis systems. These actuators are screw- or belt-driven and give the designer a great deal of flexibility to apply the right technology to meet application needs for accuracy, speed, and distance.

Systems
Parker’s systems combine the breadth of our motion control solutions into XY systems, Cartesian robots, gantry systems, or completely custom configurations.

End Effectors
With the broadest range of automation products in the industry, Parker provides pneumatic grippers, rotational actuators, and vacuum components.

Structural Framing
Parker Industrial Profile Systems provide full engineering, fabrication, and assembly for any structural design. We offer the profiles, fasteners and accessories to complete any system. The only limitation is your imagination.
Parker offers the right HMI Solution for your application:

**Level I**

**Dedicated HMI Platform:**
Parker’s Interact software comes pre-installed on our PA family of PowerStations. Interact is the perfect fit for applications that require features from push-button replacement through to historical trending and machine configuration on the plant floor.

**HMI Software**

<table>
<thead>
<tr>
<th>Level I</th>
<th>Open Windows HMI Platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level I</td>
<td>Dedicated HMI Platform</td>
</tr>
</tbody>
</table>

**Level II**

**Open Windows HMI Platform:**
Parker’s InteractX software comes pre-installed on both our EPX and HPX families of PowerStations. InteractX enables operator interface functionality for higher level applications including networking, open database integration and multimedia support options. InteractX is especially suited to applications that require maintaining an audit trail such as 21CFR11, the USA Patriot Act and Sarbanes-Oxley.

* Parker’s HMI solutions are scalable: Interact applications can be migrated to InteractX as your needs change, leveraging your engineering investment and saving you money.

**Level I: Interact HMI Software and PA PowerStations**

www.parker.com/em/papowerstation
www.parker.com/em/interact

PA PowerStations and Interact provide a powerful, cost-effective solution for Level I applications.

PowerStations are available in the following display sizes: 5", 6", 8", 10" and 15".

Every PowerStation includes:

- Interact runtime software (PTM, GMM, AMM and NET)
- Compact flash storage
- 10/100 BaseT Ethernet
- Analog resistive touchscreen
- Type 4/4X bezels
- CE/UL/CUL agency approvals C1D2 (optional)
- 24VDC power

**Interact Software:**

- Easy to use Windows© development environment
- Intuitive navigation and online help
- Modular architecture supports scalability with optional modules:
  - Machine configuration
  - Recipe handling
  - Data transfer
  - Historical trending
  - Report generation
  - User program
- Over 60 communications drivers included
- Simultaneous multiple device communication
EPX PowerStations provide a bundled Level II hardware and software solution at a price point that is competitive with most Level 1 solutions. EPX PowerStations are available in the following display sizes: 8", 10.4" and 15" (special order).

Every EPX PowerStation includes:
- 650 MHz Celeron ULV CPU
- 512MB DRAM
- Windows XP Professional
- 40GB hard drive (compact flash optional)
- External compact flash slot
- (1) RS-232, (1) RS-232/422/485 serial ports
- 10/100 BaseT Ethernet

HPX PowerStations are fully configurable industrial PCs that are bundled with InteractX HMI runtime software pre-installed. They are available in 10", 15" and 17" display options with CPU options ranging from a Celeron 2.0 GHz to a Pentium 4 2.8GHz.

Parker’s industrial PC products include 10", 15", and 17" panel mount color touchscreen systems and a machine-mount PC only system. The HPC PowerStation line of PC workstations is designed and tested to extremes and delivers more processor, media, and connectivity performance for your money.
- 2.0GHz Celeron or 2.8GHz Pentium 4 CPU
- Up to 2GB DDR SDRAM
- Intel Extreme Graphics
- 80GB EIDE hard drive (160GB HDD or compact flash optional)
- 4 USB 2.0/1.1 ports
- (3) RS-232, (1) RS-232/422/485 serial ports
- 10/100 BaseT Ethernet
- External audio
- Parallel port
- PC only system:
  - Hardened industrial PC
  - Use with our PHM monitors or any 3rd party display
  - Keyhole Mounting
This family of industrially hardened monitors is perfect for harsh environments. They feature a chemical-resistant NEMA 4/4X front bezel and convenient clip mounting, while offering standard VGA and serial connections for video and touchscreen.

- Analog resistive touchscreen
- On screen display controls
- Auto power sensing and sleep mode

- Stainless steel bezel available on 15” models
- 24VDC power
- CE, UL and CUL agency approvals standard
- Class 1 Div. 2 available

### Display Sizes:

- 15” XGA (1024 x 768)
- 17” SXGA (1280 x 1024)
The ACR Series of controllers are among the highest performing controllers on the market. Powerful, yet efficient, project development software makes this family an attractive choice regardless of application complexity. Connectivity and communication features give the ACR controllers flexibility for use in a wide variety of machine architectures. The ACR family excels as a standalone machine and motion controller, interfacing with a PC or working alongside a PLC. A powerful DSP makes the ACR Series an outstanding multi-tasking servo controller.

**Parker System Solutions**
The ACR family is the controller of choice when a complete Parker motion system is needed. Seamless communication to drives and HMI combine with motion algorithms tailored to precision mechanics for a complete high performance system.

**Hardware Features**
- Up to 16 axes of servo or stepper control
- ±10 V analog or step-and-direction command output
- 24 VDC optically isolated onboard inputs and outputs
- Absolute encoder support via SSI

### Motion Control Features
- Multi-tasking of up to 24 simultaneous programs
- Interpolation of eight axes in any combination
- Linear interpolation of up to eight axes
- Segmented electronic CAM
- Electronic gearing with real-time phase advance
- Programmable limit switch with multiple sources
- Advanced gantry control
- 3D arcs and tangent axis control
- Hardware and capture registers
- Time-based moves
- S-curve profiling
- Backlash and ball screw compensation
- High-speed (1 μs) hardware position capture registers

### Communication Features
- Ethernet 10/100 Base-T
- USB 2.0
- CANopen
- ETHERNET Powerlink
- EtherNet/IP™ connectivity
- Visual Basic and Visual C++® libraries
- .NET and ActiveX™ communication controls
- Parker Interact and InteractX compatible via Ethernet

### Table: ACR Series Controllers

<table>
<thead>
<tr>
<th>Series</th>
<th>Bus Type</th>
<th>Number of Axes</th>
<th>Command Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>9000</td>
<td>Ethernet, USB</td>
<td>1 to 8</td>
<td>Servo, Stepper</td>
</tr>
<tr>
<td>9030</td>
<td>Ethernet, USB</td>
<td>1 to 16</td>
<td>Servo, Stepper, ETHERNET Powerlink</td>
</tr>
<tr>
<td>9040</td>
<td>Ethernet, USB</td>
<td>1 to 16</td>
<td>ETHERNET Powerlink</td>
</tr>
<tr>
<td>1505</td>
<td>PCI</td>
<td>1 to 4</td>
<td>Servo, Stepper</td>
</tr>
<tr>
<td>8020</td>
<td>PCI</td>
<td>1 to 16</td>
<td>Servo, Stepper</td>
</tr>
</tbody>
</table>
ETHERNET Powerlink (EPL) expands the ACR family by enabling real-time motion control via Ethernet. The high-bandwidth digital communications network enhances machine performance and configuration possibilities while reducing set-up time and installation complexity.

ETHERNET Powerlink is a deterministic, real-time Ethernet motion bus solution connecting motion controller to servo drives and I/O points using standard Ethernet hardware. EPL is an open standard communication protocol, developed to achieve the timing and synchronization required in high performance automation and motion control applications.

Parker’s EPL solution includes all the motion and communication features of the ACR family for complete motion and machine control solutions. A full range of servo drives is available with Aries and Compax3 Series drives, supporting a wide variety of motors and feedback devices. All drive and motor configuration, programming and system troubleshooting can be accomplished through the ACR controllers.

EPL Highlights

- Open industry standard communication protocol
- Standard Ethernet hardware
- No proprietary ASICs required
- Based on CANopen device profiles
- Simplified system design
- Reduced installation time
- Enhanced diagnostics

Parker EPL Solutions

- Up to 16 axes with ACR controllers
- Aries and Compax3 servo drives
- Built-in repeating hubs for flexible connection options
- Drive and controller on-board I/O
- Single point of communication for entire motion system
- Auto-tuning and motor configuration via ACR-View

ETHERNET Powerlink Standardization Group
Servo Drive Family Attributes

<table>
<thead>
<tr>
<th>Series</th>
<th>ViX</th>
<th>Aries</th>
<th>Gemini</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input power</td>
<td>24 to 80 VDC</td>
<td>120/240 VAC</td>
<td>120/240 VAC</td>
</tr>
<tr>
<td>Shaft power,</td>
<td>Up to 5 A RMS,</td>
<td>Up to 16 A RMS,</td>
<td>Up to 14 A RMS,</td>
</tr>
<tr>
<td>continuous at</td>
<td>2 power levels</td>
<td>7 power levels</td>
<td>5 power levels</td>
</tr>
<tr>
<td>3,000 rpm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feedback</td>
<td>Encoder/Resolver</td>
<td>Smart Encoder,</td>
<td>Encoder/Resolver</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quadrature encoder,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Endat absolute encoder</td>
<td></td>
</tr>
<tr>
<td>Inputs/Outputs</td>
<td>5 inputs, 3 outputs</td>
<td>Enable/Reset/Fault</td>
<td>8 inputs, 6 outputs,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>expandable (GV6K)</td>
</tr>
<tr>
<td>Command input</td>
<td>±10 V analog step/direction</td>
<td>±10 V analog step/direction</td>
<td>±10 V analog step/direction</td>
</tr>
<tr>
<td></td>
<td>CW, CCW encoder input</td>
<td>CW, CCW encoder input</td>
<td>CW, CCW encoder input</td>
</tr>
<tr>
<td>Controller version available</td>
<td>Yes</td>
<td>No</td>
<td>GV6, GV6K</td>
</tr>
<tr>
<td>Compatible motor type</td>
<td>Standard brushless servo motor</td>
<td>Standard brushless servo motor</td>
<td>Standard brushless servo motor</td>
</tr>
<tr>
<td>Compatible Parker motor</td>
<td>SM, BE, MPP, MX80, LX80</td>
<td>MPP, SM, BE Trilogy Linear</td>
<td>MPP, SM, BE Trilogy Linear</td>
</tr>
</tbody>
</table>

The ViX Series of servo drives and controller drives is flexible, powerful and compact. The ViX offers a high-resolution encoder feedback option for optimal use with linear servo motors, such as the MX80. Choose the ViX for low-cost multi-axis drive applications or for powerful but compact standalone drive/controller applications.

- 24 to 80 VDC input
- 2.5 and 5 A RMS continuous versions available
- Torque, velocity, or position control

- Resolver or encoder feedback (software selectable)
- High-resolution encoder feedback option
- Five digital inputs and three digital outputs
- CE (EMC and LVD), UL compliant
- CANopen and RS485 option
- Controller versions available
### Aries Series

The Aries Series of digital servo drives is the easiest to use servo drive on the market. There is no setup, as it auto-configures to any Compumotor motor with smart encoder. With Aries, you only pay for what you need, as it is an optimized torque drive for use with a centralized controller and no additional circuitry. Choose the Aries for hassle-free, low-cost multi-axis torque drive applications.
- Up to 16 A RMS continuous, 48 A RMS peak current
- Auto-configuration
- Torque or velocity control and step/dir control
- Smart encoder, quadrature encoder, or EnDat absolute encoder feedback
- CE (EMC and LVD) and UL compliant

### Gemini Series

The Gemini Series is a family of servo drives and controller drives that covers an extremely wide range of motion control applications. The Gemini is available in three control levels (drive only, basic controller drive, and full-featured controller drive) and five power levels. Choose the Gemini when you need to be flexible or want to mix and match drives but keep the same connectivity and front-end software.
- 120/240 V AC input
- Torque, velocity, or position control
- Five power levels from 2 to 14 A RMS continuous current

### Gemini GV Digital Servo Drive

<table>
<thead>
<tr>
<th>Gemini GV6 Digital Servo Drive with Basic Controller</th>
<th>Gemini GV6K Digital Servo Drive with Full-Featured Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque, velocity, step and direction</td>
<td>Position-based following</td>
</tr>
<tr>
<td>CW/CCW/Encoder tracking mode</td>
<td>Multi-tasking</td>
</tr>
<tr>
<td>Wizard-based setup</td>
<td>Scaling</td>
</tr>
<tr>
<td>Basic motion</td>
<td>High-level variables</td>
</tr>
<tr>
<td>Registration</td>
<td>300 k memory</td>
</tr>
<tr>
<td>Conditionals</td>
<td>RS232, RS485, and Ethernet standard</td>
</tr>
<tr>
<td>Integer variables</td>
<td>8 inputs and 6 outputs onboard</td>
</tr>
<tr>
<td>RS232 and RS485 standard</td>
<td>Up to 256 expansion I/O optional</td>
</tr>
</tbody>
</table>
Stepper Drive Family Attributes

<table>
<thead>
<tr>
<th>Series</th>
<th>E-AC</th>
<th>E-DC</th>
<th>ViX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power input</td>
<td>95 to 132 VAC</td>
<td>24 to 48 VDC</td>
<td>24 to 80 VDC</td>
</tr>
<tr>
<td>Peak current output (Amps)</td>
<td>0.02 to 3.5</td>
<td>0.2 to 4.8</td>
<td>0.2 to 8</td>
</tr>
<tr>
<td>Overall dimensions mm (in)</td>
<td>109.22 x 57.15 x 48.26 (4.3 x 2.25 x 1.9)</td>
<td>127 x 91.44 x 40.64 (5.0 x 3.6 x 1.6)</td>
<td>124.46 x 86.36 x 43.18 (4.9 x 3.4 x 1.7)</td>
</tr>
<tr>
<td>Control version</td>
<td>CP*E-AC</td>
<td>EX-DC</td>
<td>ViX250IM, ViX500IM</td>
</tr>
<tr>
<td>Control version features</td>
<td>Basic position, velocity or acceleration controls</td>
<td>Sequence select, position maintenance, stall detection, following, 6 inputs/3 outputs</td>
<td>Motion profiles, conditionals, registration position maintenance, stall detection, following, 5 inputs/3 outputs</td>
</tr>
</tbody>
</table>

**E-AC and E-DC Microstepping Drives**

The E Series is a high-performing, low-cost family of packaged AC-input and DC-input microstepping drives.
- Anti-resonance circuitry suppresses mid-range instability
- Recommended motor inductance range of 0.5 mH to 80 mH
- Selectable resolution up to 50,800 steps/rev
- Auto standby reduces motor current (and heating)
- Current waveforms to optimize smoothness
- Optically isolated step and direction inputs
- Short-circuit and over-temperature protection

**ViX Microstepping Controller Drives**

The ViX Series is a digital, compact, and high power family of DC-input microstepping drives.
- Wizard-based configuration
- Anti-resonance circuitry suppresses mid-range instability
- Recommended motor inductance range of 0.5 mH to 20 mH
- Five digital inputs and three digital outputs
- One analog input
- Controller version provides basic control functionality
- RS485 and CANopen version also available

**LV/HV Series Stepper Motors**

The LV/HV Series is optimized for use with the E-Series microstepping drives and controller drives. The LV motors are available in five frame sizes, and the HV are available in three frame sizes, so it is easy to choose the optimal speed and torque combination.
- LV – 11, 14, 17, 23, and 34 frame sizes
- HV – 17, 23, and 34 frame sizes
- Single, double, or triple stack lengths available
- LV – up to 80 VDC windings
- HV – up to 170 VDC windings
- Single or double shaft options
- Flying leads or 10-foot cable options
- Customization available
The Dynaserv Series is a direct-drive servo system that eliminates the need for costly mechanical components and the backlash associated with them. The load is mounted directly onto the motor. The unique technology of the motor allows for resolutions of up to 4,096,000 pulses per revolution and torque up to 500 Nm (370 ft-lb). Choose the Dynaserv when you need high accuracy and high torque or would like to eliminate a gearbox or speed reducer.

- Repeatability to ±1 arc second
- 20 models: 4", 6", 8", or 10" diameters
- Speeds up to 5 rps
- Auto-tuning
- Hole through center for wires or tubing

<table>
<thead>
<tr>
<th>Series</th>
<th>DR</th>
<th>DM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor sizes</td>
<td>4&quot;, 6&quot;, 8&quot;, 10&quot;</td>
<td>4&quot;, 6&quot;, 10&quot;</td>
</tr>
<tr>
<td>Feedback device</td>
<td>Resolver</td>
<td>Encoder</td>
</tr>
<tr>
<td>Motor body material</td>
<td>Steel</td>
<td>Aluminum</td>
</tr>
<tr>
<td>Compatible drives and command input</td>
<td>Dynaserv G3 ±10V analog, step-direction or built-in controller</td>
<td>Dynaserv G3 ±10V analog, step-direction or built-in controller</td>
</tr>
<tr>
<td>Main attributes</td>
<td>Lowest cost</td>
<td>Most accurate</td>
</tr>
<tr>
<td></td>
<td>Largest through-hole</td>
<td>Lightest weight</td>
</tr>
<tr>
<td></td>
<td>Most robust</td>
<td></td>
</tr>
</tbody>
</table>
Parker’s standard shaft, feedback, and connection options for brushless servo motors meet the needs of most customers. However, we also engineer custom designs for customers whose applications require unique connectors, mountings, or windings. Purchasing a custom motor from Parker is cost-effective, in part because we don’t require you to order minimum quantities of your design. Plus, we offer short lead times for custom design services. Whether you buy a standard or custom motor, you can count on Parker to provide the best servo motor solution.

**Common Special Requests**

www.parker.com/em/custservo

Parker’s standard shaft, feedback, and connection options for brushless servo motors meet the needs of most customers. However, we also engineer custom designs for customers whose applications require unique connectors, mountings, or windings. Purchasing a custom motor from Parker is cost-effective, in part because we don’t require you to order minimum quantities of your design. Plus, we offer short lead times for custom design services. Whether you buy a standard or custom motor, you can count on Parker to provide the best servo motor solution.

**Connectorization**
- MS connectors
- Right-angle rotatable
- MS connectors on back cover
- Special cable lengths
- High-flex cables
- Custom cables and connectors
- Cable exiting through rear cover

**Feedback**
- Incremental and smart encoders
- Absolute encoders - single and multi-turn
- Custom feedback devices
- Resolver

**Brakes**
- Spring released
- Permanent magnet
- 24 and 90 volt brakes

**Flanges**
- Tapped mounting holes
- NEMA flanges
- Customer-specified flanges
- Face mount

**Gearheads**
- Custom ratios
- Customer-specified flanges
- Customer-specified output shaft

**Shafts**
- Special lengths
- Special flats
- Special keyways
- Special shaft diameters
- Hollow shafts
- Rear shaft extension
- Double flats
- Shaft pinning
- Pressed-on gears
- Center tapped
- Special shaft materials

**Miscellaneous Options**
- Private label
- Special windings
- Shorter lengths
- High-speed balancing
- Special paints/coatings
The SM Series brushless servo motors feature a slotless stator design that eliminates all detent torque in the motor, allowing the motors to provide extremely smooth motion, especially at low speeds. This design is also ideal for applications involving high inertia loads (such as lead screws and belt drives).

- NEMA 16 and 23 sizes
- Up to 180 oz-in continuous torque
- Brushless construction
- Slotless design
  - Negligible detent torque
  - Reduced torque ripple
  - Higher rotor inertia

- Integrated planetary gearheads available
- TENV housing, IP65 option
- Custom modifications available
- Industry-leading delivery times
- CE compliant

### SM Series
www.parker.com/em/sm

### Motor Family Attributes

<table>
<thead>
<tr>
<th>Series</th>
<th>SM 160</th>
<th>SM 161</th>
<th>SM 162</th>
<th>SM 230**</th>
<th>SM 231**</th>
<th>SM 232**</th>
<th>SM 233**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame sizes</td>
<td>NEMA 16, 23</td>
<td>NEMA 16, 23, 34</td>
<td>8 sizes, 40 to 320mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous torque range Nm (in-lbs)</td>
<td>9.2x10^-2 to 1.3 (0.8 to 11.3)</td>
<td>0.2 to 5.2 (1.3 to 46.3)</td>
<td>5.6x10^-2 to 451.9 (0.5 to 4,000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed range</td>
<td>0 to 7,500 rpm</td>
<td>0 to 5,000 rpm</td>
<td>0 to 7,000 rpm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feedback</td>
<td>Encoder/Resolver</td>
<td>Encoder/Resolver</td>
<td>Encoder/Resolver</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Series SM

<table>
<thead>
<tr>
<th>Series SM</th>
<th>160</th>
<th>161</th>
<th>162</th>
<th>230**</th>
<th>231**</th>
<th>232**</th>
<th>233**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous stall torque Nm (oz-in)</td>
<td>9.2x10^-2 (13)</td>
<td>0.2 (26)</td>
<td>0.3 (47)</td>
<td>0.2 (36)</td>
<td>0.4 (54)</td>
<td>0.7 (106)</td>
<td>1.1 (156)</td>
</tr>
<tr>
<td>Peak torque Nm (oz-in)</td>
<td>0.3 (40)</td>
<td>0.6 (78)</td>
<td>0.1 (141)</td>
<td>0.6 (78)</td>
<td>1.1 (160)</td>
<td>2.2 (316)</td>
<td>3.3 (467)</td>
</tr>
<tr>
<td>Rated speed (rpm)</td>
<td>7,500</td>
<td>7,500</td>
<td>7,500</td>
<td>7,500</td>
<td>7,500</td>
<td>7,500</td>
<td>5,800</td>
</tr>
<tr>
<td>Rotor inertia kg-m² (oz-in-s²)</td>
<td>5.0x10^-6 (7.0x10^-4)</td>
<td>1.1x10^-5 (1.5x10^-3)</td>
<td>1.8x10^-5 (2.6x10^-4)</td>
<td>2.7x10^-5 (3.8x10^-4)</td>
<td>5.2x10^-5 (7.4x10^-3)</td>
<td>9.3x10^-5 (1.3x10^-2)</td>
<td>1.4x10^-4 (1.9x10^-2)</td>
</tr>
</tbody>
</table>

*All specifications represent encoder feedback.
**Resolver version available with higher stall and peak torques.*
The BE Series brushless servo motors produce high continuous stall torque in a cost-reduced package. The increased torque is the result of eight magnetic poles on the rotor instead of the four poles traditionally found on motors in these frame sizes. The cost reduction is achieved from their open-lamination design. Unlike traditional servo motors, the BE Series motors do not have a metal housing. The laminations of the motor stator are shaped into the body of the motor, reducing material costs and motor assembly time.

- Peak torque up to 4,537 in-lb.
- Very high torque-to-inertia ratio
- Seven different feedback devices - Encoder, serial encoder, resolver, Heidenhain and Stegmann single and multi-turn absolute encoders
- IP64 standard, IP65 optional
- Right-angle rotatable connectors
- Special shaft, front flange, and feedback devices available
- CE and UL

The BE Series brushless servo motors are available in NEMA 16, 23, and 34 sizes.

- Up to 5.2 Nm (741 oz-in)* continuous torque
- Brushless construction
- Eight-pole open-lamination design - Increased torque - Lower cost
- Integrated planetary gearheads available
- Custom modifications available
- Industry-leading delivery times
- CE compliant

The BE Series brushless servo motors are available in NEMA 16, 23, and 34 sizes.

- Up to 5.2 Nm (741 oz-in)* continuous torque
- Brushless construction
- Eight-pole open-lamination design - Increased torque - Lower cost
- Integrated planetary gearheads available
- Custom modifications available
- Industry-leading delivery times
- CE compliant

The MaxPlusPlus (MPP) family of brushless servo motors is redefining performance, flexibility, and reliability. The industry’s highest performing servo motor uses eight-pole segmented lamination technology, which produces more torque in a shorter package. Use MaxPlusPlus motors for higher torque applications, customization options, or when high performance is required.

- 92 mm to 270 mm frame size
- Continuous stall torque from 14 in-lb (1.5 Nm) to 1,433 in-lb (162 Nm)

- Peak torque up to 4,537 in-lb.
- Very high torque-to-inertia ratio
- Seven different feedback devices - Encoder, serial encoder, resolver, Heidenhain and Stegmann single and multi-turn absolute encoders
- IP64 standard, IP65 optional
- Right-angle rotatable connectors
- Special shaft, front flange, and feedback devices available
- CE and UL

The MaxPlusPlus (MPP) family of brushless servo motors is redefining performance, flexibility, and reliability. The industry’s highest performing servo motor uses eight-pole segmented lamination technology, which produces more torque in a shorter package. Use MaxPlusPlus motors for higher torque applications, customization options, or when high performance is required.

- 92 mm to 270 mm frame size
- Continuous stall torque from 14 in-lb (1.5 Nm) to 1,433 in-lb (162 Nm)

- Peak torque up to 4,537 in-lb.
- Very high torque-to-inertia ratio
- Seven different feedback devices - Encoder, serial encoder, resolver, Heidenhain and Stegmann single and multi-turn absolute encoders
- IP64 standard, IP65 optional
- Right-angle rotatable connectors
- Special shaft, front flange, and feedback devices available
- CE and UL

<table>
<thead>
<tr>
<th>Series BE</th>
<th>161</th>
<th>162</th>
<th>163</th>
<th>164</th>
<th>230*</th>
<th>231*</th>
<th>232*</th>
<th>233*</th>
<th>341*</th>
<th>342*</th>
<th>343*</th>
<th>344*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stall torque</td>
<td>Continuous Nm (oz-in)</td>
<td>0.1 (21)</td>
<td>0.3 (37)</td>
<td>0.3 (47)</td>
<td>0.4 (61)</td>
<td>0.4 (53)</td>
<td>0.7 (94)</td>
<td>1.1 (155)</td>
<td>1.5 (207)</td>
<td>1.7 (239)</td>
<td>2.9 (406)</td>
<td>4.0 (566)</td>
</tr>
<tr>
<td>Peak torque Nm (oz-in)</td>
<td>0.5 (64)</td>
<td>0.8 (111)</td>
<td>1.0 (142)</td>
<td>1.2 (173)</td>
<td>1.1 (160)</td>
<td>2.0 (283)</td>
<td>3.3 (464)</td>
<td>4.4 (622)</td>
<td>5.1 (717)</td>
<td>8.6 (1,217)</td>
<td>12.0 (2,058)</td>
<td></td>
</tr>
<tr>
<td>Rated speed (rpm)</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td></td>
</tr>
<tr>
<td>Rotor inertia kg-m² (lb-in-sec²)</td>
<td>1.3x10⁻⁶</td>
<td>2.0x10⁻⁶</td>
<td>2.7x10⁻⁶</td>
<td>3.5x10⁻⁶</td>
<td>5.2x10⁻⁶</td>
<td>9.1x10⁻⁶</td>
<td>1.7x10⁻⁵</td>
<td>2.4x10⁻⁵</td>
<td>3.1x10⁻⁵</td>
<td>5.0x10⁻⁵</td>
<td>6.9x10⁻⁵</td>
<td>8.2x10⁻⁵</td>
</tr>
</tbody>
</table>

*Resolver version available with slightly higher stall and peak torques.

The MaxPlusPlus (MPP) family of brushless servo motors is redefining performance, flexibility, and reliability. The industry’s highest performing servo motor uses eight-pole segmented lamination technology, which produces more torque in a shorter package. Use MaxPlusPlus motors for higher torque applications, customization options, or when high performance is required.

- 92 mm to 270 mm frame size
- Continuous stall torque from 14 in-lb (1.5 Nm) to 1,433 in-lb (162 Nm)

- Peak torque up to 4,537 in-lb.
- Very high torque-to-inertia ratio
- Seven different feedback devices - Encoder, serial encoder, resolver, Heidenhain and Stegmann single and multi-turn absolute encoders
- IP64 standard, IP65 optional
- Right-angle rotatable connectors
- Special shaft, front flange, and feedback devices available
- CE and UL

The MaxPlusPlus (MPP) family of brushless servo motors is redefining performance, flexibility, and reliability. The industry’s highest performing servo motor uses eight-pole segmented lamination technology, which produces more torque in a shorter package. Use MaxPlusPlus motors for higher torque applications, customization options, or when high performance is required.

- 92 mm to 270 mm frame size
- Continuous stall torque from 14 in-lb (1.5 Nm) to 1,433 in-lb (162 Nm)

- Peak torque up to 4,537 in-lb.
- Very high torque-to-inertia ratio
- Seven different feedback devices - Encoder, serial encoder, resolver, Heidenhain and Stegmann single and multi-turn absolute encoders
- IP64 standard, IP65 optional
- Right-angle rotatable connectors
- Special shaft, front flange, and feedback devices available
- CE and UL

<table>
<thead>
<tr>
<th>Series MPP</th>
<th>092x</th>
<th>100x</th>
<th>115x</th>
<th>142x</th>
<th>190x</th>
<th>230x</th>
<th>270x</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated speed (rpm)</td>
<td>3800 to 5000</td>
<td>4000 to 5000</td>
<td>4000 to 5000</td>
<td>2800 to 4000</td>
<td>2800 to 4000</td>
<td>2000 to 3000</td>
<td>1500 to 2000</td>
</tr>
<tr>
<td>Rated output range (rpm)</td>
<td>0.5 to 1.6</td>
<td>1.5 to 1.9</td>
<td>1.6 to 2.7</td>
<td>3.4 to 7.0</td>
<td>8.3 to 11.8</td>
<td>11.6 to 14.1</td>
<td>12.1 to 20.3</td>
</tr>
<tr>
<td>Continuous stall torque range Nm (in-lb)</td>
<td>1.55 (14) to 4.6 (41)</td>
<td>5.7 (51) to 11.1 (98)</td>
<td>35.5 (315) to 80.3 (712)</td>
<td>120.1 (1063)</td>
<td>35.1 (311) to 113 (996)</td>
<td>255 (2252) to 380 (3366)</td>
<td></td>
</tr>
<tr>
<td>Peak torque range Nm (in-lb)</td>
<td>4.93 (50) to 14.5 (129)</td>
<td>18.1 (160) to 35.1 (311)</td>
<td>113 (996) to 255 (2252)</td>
<td>380 (3366)</td>
<td>4.93 (50) to 14.5 (129)</td>
<td>18.1 (160) to 35.1 (311)</td>
<td>113 (996) to 255 (2252)</td>
</tr>
</tbody>
</table>

*Resolver version available with slightly higher stall and peak torques.

The MaxPlusPlus (MPP) family of brushless servo motors is redefining performance, flexibility, and reliability. The industry’s highest performing servo motor uses eight-pole segmented lamination technology, which produces more torque in a shorter package. Use MaxPlusPlus motors for higher torque applications, customization options, or when high performance is required.

- 92 mm to 270 mm frame size
- Continuous stall torque from 14 in-lb (1.5 Nm) to 1,433 in-lb (162 Nm)

- Peak torque up to 4,537 in-lb.
- Very high torque-to-inertia ratio
- Seven different feedback devices - Encoder, serial encoder, resolver, Heidenhain and Stegmann single and multi-turn absolute encoders
- IP64 standard, IP65 optional
- Right-angle rotatable connectors
- Special shaft, front flange, and feedback devices available
- CE and UL
Stealth Advanced PS (in-line) and RS (right-angle) gearheads, with patented helical planetary technology, are Parker’s highest performance servo gearheads. A patented HeliCrown helical gear tooth design offers greater tooth contact and face width and produces higher load capacity, smoother tooth engagement, lower backlash, and quieter operation. An advanced internal lubrication system extends seal and gearhead life to deliver the best engineered value for high-performance servo applications.

- Strongest – 30% more torque than typical planetaries
- Quietest – less than 68 db noise (PS), 70 db (RS)
- Fastest – up to 6,000 rpm input speeds
- Accurate – less than 3 arc minutes backlash (PS)
- Highest efficiency – over 97% efficiency (PS), 94% (RS)
- Up to eight frame sizes and 12 gear ratios to choose from

<table>
<thead>
<tr>
<th>Frame Size</th>
<th>Backlash (arc min)</th>
<th>Torque (Nm)</th>
<th>Continuous Max Input Speed (rpm)</th>
<th>Noise (dB)</th>
<th>Efficiency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inline (PS)</td>
<td>Rt angle (RS)</td>
<td>Inline (PS)</td>
<td>Rt angle</td>
<td>Inline (PS)</td>
</tr>
<tr>
<td>60</td>
<td>6</td>
<td>8</td>
<td>14</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>90</td>
<td>6</td>
<td>8</td>
<td>12</td>
<td>10</td>
<td>74</td>
</tr>
<tr>
<td>115</td>
<td>4</td>
<td>6</td>
<td>12</td>
<td>10</td>
<td>170</td>
</tr>
<tr>
<td>142</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>8</td>
<td>294</td>
</tr>
<tr>
<td>180</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>8</td>
<td>735</td>
</tr>
<tr>
<td>220</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>8</td>
<td>1,413</td>
</tr>
<tr>
<td>300</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>8</td>
<td>3,616</td>
</tr>
</tbody>
</table>

www.parker.com/em/pgearheads
Stealth® PX (in-line) and RX (right-angle) deliver high torque and quiet, smooth operation for less demanding, cost-sensitive servo applications. Stealth® PX and RX models incorporate Parker’s helical planetary technology into a lower cost package to provide an exceptional value for high performance.

- Strong – more torque than standard planetaries
- Accurate – less than 15 arc minutes (10 arc minute option)
- Quiet operation – less than 70 db
- High input speeds – up to 6,000 rpm
- High efficiency – over 90% efficiency.

<table>
<thead>
<tr>
<th>Backlash (arc min)</th>
<th>Torque (Nm)</th>
<th>Continuous Max Input Speed (rpm)</th>
<th>Noise (dB)</th>
<th>Efficiency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inline (PX)</td>
<td>Rt Angle (RX)</td>
<td>Inline (PX)</td>
<td>Inline (RX)</td>
<td>Inline</td>
</tr>
<tr>
<td>≤10:1</td>
<td>&gt;10:1</td>
<td>≤10:1</td>
<td>&gt;10:1</td>
<td>3-5</td>
</tr>
<tr>
<td>60</td>
<td>10</td>
<td>12</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>90</td>
<td>9</td>
<td>11</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>115</td>
<td>8</td>
<td>10</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>142</td>
<td>8</td>
<td>10</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

www.parker.com/em/pgearheads
Stealth® gearmotors represent the first time a brushless servo motor and a helical planetary gearhead have been integrated into a single product. This provides us with the unique ability to design and supply a precision integrated gearmotor. 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 improved performance and cost less than traditional motor/gearhead assemblies.

- Large output bearings for high radial loads
- IP65 protection
- High density copper windings and rare-earth magnets provide maximum torque and efficiency
- Skewed laminations with odd slot counts reduce cogging
- Duplex angular contact bearing for optimum motor assembly stiffness
- Modular encoders, resolvers and brakes standard without increasing package size
- Two winding options, single or double stack motors and multiple Gear Ratios for a wide range of torques and speeds
- Single piece construction of rotor and sun gear guarantees alignment for smooth operation
- Stealth Helical Planetary Output provides high torques, low backlash and quiet, reliable performance
- Innovative thermal design runs 20% cooler than a separate motor/gearhead assembly
- Stainless steel output shaft won’t rust in corrosive environments

### GM Series Single Stack

<table>
<thead>
<tr>
<th></th>
<th>GM060</th>
<th></th>
<th>GM090</th>
<th></th>
<th>GM115</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5:1</td>
<td>7:1</td>
<td>10:1</td>
<td>5:1</td>
<td>7:1</td>
<td>10:1</td>
</tr>
<tr>
<td>Continuous stall torque, Nm (in-lb)</td>
<td>3.1 (27.5)</td>
<td>4.3 (38.5)</td>
<td>6.2 (55.0)</td>
<td>8.7 (77.0)</td>
<td>12.0 (107.0)</td>
<td>17.2 (153.0)</td>
</tr>
<tr>
<td>Peak torque, Nm (in-lb)</td>
<td>9.3 (82.5)</td>
<td>13.0 (115.5)</td>
<td>18.6 (165.0)</td>
<td>26.0 (231.0)</td>
<td>36.1 (321.0)</td>
<td>51.7 (495.0)</td>
</tr>
<tr>
<td>Max rated speed, rpm</td>
<td>1100</td>
<td>780</td>
<td>540</td>
<td>900</td>
<td>670</td>
<td>450</td>
</tr>
<tr>
<td>Inertia*, gm cm sec² (lb-in-sec²)</td>
<td>0.23 (0.00019)</td>
<td>0.19 (0.00016)</td>
<td>0.19 (0.00016)</td>
<td>1.16 (0.00100)</td>
<td>0.94 (0.00081)</td>
<td>0.94 (0.00081)</td>
</tr>
</tbody>
</table>

### GM Series Double Stack

<table>
<thead>
<tr>
<th></th>
<th>GM060</th>
<th></th>
<th>GM090</th>
<th></th>
<th>GM115</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5:1</td>
<td>7:1</td>
<td>10:1</td>
<td>5:1</td>
<td>7:1</td>
<td>10:1</td>
</tr>
<tr>
<td>Continuous stall torque, Nm (in-lb)</td>
<td>5.1 (45.0)</td>
<td>7.1 (63.0)</td>
<td>10.1 (90.0)</td>
<td>14.0 (124.0)</td>
<td>19.5 (173.0)</td>
<td>27.8 (247.0)</td>
</tr>
<tr>
<td>Peak torque, Nm (in-lb)</td>
<td>15.2 (135.0)</td>
<td>21.3 (189.0)</td>
<td>30.4 (270.0)</td>
<td>41.9 (372.0)</td>
<td>58.4 (519.0)</td>
<td>83.4 (741.0)</td>
</tr>
<tr>
<td>Max rated speed, rpm</td>
<td>1100</td>
<td>780</td>
<td>540</td>
<td>720</td>
<td>500</td>
<td>360</td>
</tr>
<tr>
<td>Inertia*, gm cm sec² (lb-in-sec²)</td>
<td>0.29 (0.00025)</td>
<td>0.25 (0.00022)</td>
<td>0.25 (0.00022)</td>
<td>1.31 (0.00113)</td>
<td>1.10 (0.00094)</td>
<td>1.10 (0.00094)</td>
</tr>
</tbody>
</table>

*Motor Rotor + Gear Selection. External inertia must be adjusted by the ratio to create actual motor performance.
The Frameless Kit motors are ideal solutions for machine designs that require high performance in small spaces. The kit motor approach allows for direct integration with a mechanical transmission device, eliminating parts that add size and complexity. The use of frameless motors results in a smaller, more reliable motor package.

- Pre-installed integral commutation board is pre-aligned for easy assembly
- Rare earth magnets provide high flux in a small volume and high resistance to thermal demagnetizing
- Machined grooves securely lock magnets to rotor and ensure optimized radial location
- Class H insulation for high temperature operation (up to 155°C) meeting UL approved requirements
- High density copper winding for low thermal resistance and consistent performance across all motors
- Minimized end turns to maximize performance and minimize motor size
- Skewed laminations with odd slot counts reduce cogging for precise rotary motion with drastically reduced torque ripple even at low speeds
- Optimized torque-to-size ratio hand inserted to obtain highest slot fill possible maximizing ampere-turns

<table>
<thead>
<tr>
<th>Frame Size</th>
<th>K032</th>
<th>K044</th>
<th>K064</th>
<th>K089</th>
<th>K375</th>
<th>K127</th>
<th>K500</th>
<th>K178</th>
<th>K700</th>
<th>K254</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stack Range:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mm</td>
<td>6.35 to 50.8</td>
<td>(0.25 to 2.00)</td>
<td>12.7 to 50.8</td>
<td>(0.50 to 2.00)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(in)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous Torque:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nm</td>
<td>0.044 to 0.22 (6.3 to 31.1)</td>
<td>0.31 to 2.16 (17 to 86)</td>
<td>1.307 to 4.291 (308 to 1,678)</td>
<td>1.715 to 4.935 (613 to 705)</td>
<td>3.94 to 11.75 (245 to 1,678)</td>
<td>3.05 to 9.44 (245 to 1,678)</td>
<td>10.12 to 30.7 (705 to 4,291)</td>
<td>5.05 to 17.52 (705 to 4,291)</td>
<td>18.78 to 58.35 (705 to 4,291)</td>
<td></td>
</tr>
<tr>
<td>(oz-in)</td>
<td>0.119 to 0.607 (31.1 to 186.7)</td>
<td>2.16 to 4.291 (86 to 308)</td>
<td>4.291 to 9.44 (1,678 to 2,439)</td>
<td>4.935 to 11.75 (705 to 1,678)</td>
<td>7.017 to 17.52 (4,291 to 10,799)</td>
<td>9.44 to 22.4 (1,678 to 4,291)</td>
<td>30.7 to 75.7 (10,799 to 27,108)</td>
<td>17.52 to 44.9 (10,799 to 27,108)</td>
<td>58.35 to 150.5 (27,108 to 717,138)</td>
<td></td>
</tr>
<tr>
<td>Peak Torque:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nm</td>
<td>0.095 to 0.654 (13.5 to 93.4)</td>
<td>0.93 to 6.47 (50 to 258)</td>
<td>3.92 to 12.87 (133 to 924)</td>
<td>5.14 to 18.82 (560 to 2,117)</td>
<td>11.83 to 35.24 (1,690 to 5,034)</td>
<td>9.14 to 28.32 (1,306 to 4,046)</td>
<td>16.18 to 58.35 (2,683 to 8,336)</td>
<td>8.09 to 28.03 (2,683 to 8,336)</td>
<td>30.04 to 93.37 (8,336 to 25,034)</td>
<td></td>
</tr>
<tr>
<td>(oz-in)</td>
<td>0.357 to 1.820 (63 to 86)</td>
<td>3.92 to 12.87 (133 to 924)</td>
<td>5.14 to 18.82 (560 to 2,117)</td>
<td>11.83 to 35.24 (1,690 to 5,034)</td>
<td>16.18 to 58.35 (2,683 to 8,336)</td>
<td>12.87 to 44.9 (1,306 to 4,046)</td>
<td>30.04 to 93.37 (4,046 to 12,250)</td>
<td>8.09 to 28.03 (4,046 to 12,250)</td>
<td>30.04 to 93.37 (12,250 to 36,750)</td>
<td></td>
</tr>
<tr>
<td>Km: Nm/W</td>
<td>0.009 to 0.044 (1.25 to 6.25)</td>
<td>0.048 to 0.244 (3 to 13.8)</td>
<td>0.164 to 0.466 (23.36 to 34.88)</td>
<td>0.153 to 0.438 (21.8 to 66.56)</td>
<td>0.29 to 0.864 (41.4 to 123.4)</td>
<td>0.224 to 0.694 (32 to 99.2)</td>
<td>0.627 to 1.904 (89.6 to 272)</td>
<td>0.314 to 1.086 (149 to 227)</td>
<td>1.043 to 3.234 (1,043 to 1,904)</td>
<td></td>
</tr>
<tr>
<td>(oz-in/W)</td>
<td>0.02 to 0.097 (6.25 to 13.8)</td>
<td>0.164 to 0.466 (23.36 to 34.88)</td>
<td>0.153 to 0.438 (21.8 to 66.56)</td>
<td>0.29 to 0.864 (41.4 to 123.4)</td>
<td>0.627 to 1.904 (89.6 to 272)</td>
<td>0.314 to 1.086 (149 to 227)</td>
<td>1.043 to 3.234 (1,043 to 1,904)</td>
<td>0.314 to 1.086 (149 to 227)</td>
<td>1.043 to 3.234 (1,043 to 1,904)</td>
<td></td>
</tr>
</tbody>
</table>
Linear Motors

Trilogy I-Force Ironless Linear Motors
www.parker.com/em/ironless

Trilogy ML50 Ironless Linear Motors
www.parker.com/em/ML50

Trilogy RIPPED Ironcore Linear Motors
www.parker.com/em/ironcore

Parker Trilogy’s I-Force ironless motors offer high force and rapid accelerations in a compact package. Parker Trilogy’s patented I-beam shape, with its overlapping windings, allows for a higher power density in a smaller motor, improved heat removal, and added structural stiffness. A forgiving air gap and no attractive forces allow for easy installation and zero cogging during motion.

Parker Trilogy’s ML50 ironless linear motors are optimized to provide high forces with minimum moving mass, making them the ideal choice for applications requiring very high, continuous accelerations of relatively light payloads. Demanding applications such as high speed pick and place, die sorting, injection mold loading/unloading, and textile weaving can all benefit from unique characteristics of the ML50 motors.

Parker Trilogy’s RIPPED ironcore linear motors, with their patent-pending anti-cog technology, can produce the large forces needed for many industrial applications – without the roughness associated with traditional ironcore linear motors. The RIPPED family is well suited for a broad range of extremely demanding applications.

---

<table>
<thead>
<tr>
<th>Series</th>
<th>I-Force Ironless</th>
<th>ML50 Ironless</th>
<th>RIPPED Ironcore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous force</td>
<td>5.5 to 197.5 lbf (24.5 to 878.6 N)</td>
<td>43 to 192 lbf (189 to 852 N)</td>
<td>13 to 501 lbf (56 to 2230 N)</td>
</tr>
<tr>
<td>Peak force</td>
<td>45.5 to 883 lbf (202.5 to 3928 N)</td>
<td>190 to 857 lbf (847 to 3811 N)</td>
<td>43 to 1671 lbf (190 to 7433 N)</td>
</tr>
<tr>
<td>Cogging force</td>
<td>Zero</td>
<td>Zero</td>
<td>Low</td>
</tr>
<tr>
<td>Attractive force</td>
<td>Zero</td>
<td>Zero</td>
<td>High</td>
</tr>
<tr>
<td>Magnet tracks</td>
<td>Dual</td>
<td>Dual</td>
<td>Single</td>
</tr>
<tr>
<td>Heat dissipation</td>
<td>Good</td>
<td>Good</td>
<td>Better</td>
</tr>
<tr>
<td>Applications</td>
<td>Rapid accelerations, extremely smooth motion</td>
<td>Ultra high accelerations of relatively light payloads</td>
<td>High force, lower cost for long travels</td>
</tr>
</tbody>
</table>

- 5 different cross sections (110, 210, 310, 410, and ML50) up to 8 poles
- Compact size with high force density and superior heat removal
- Air and water cooling
- Vacuum rated to 10^-6 torr
- Ultra high-flex cable standard

- Optimized for ultra high acceleration of light payloads
- Compact size with high force density and superior heat removal
- Connector module for quick installation and easy cable management
- Ultra high-flex cable standard

- Patent-pending anti-cog technology for extremely smooth motion
- 5 different cross sections
- Single magnet row for high performance at an economical price
- Connector module allows for quick installation and easy cable management
- Ultra high-flex cable standard
Parker linear positioners utilize our high-performance Trilogy ironless and ironcore linear motors in a pre-engineered, easily integrated, ready-to-run package. The principle design goal for these positioners is to achieve high performance at an economical cost while preserving the design flexibility to accommodate customization. Options include multi-axis configurations, bellows, and a variety of cable management systems.

- Single or dual bearing rail positioners to better match the performance and cost requirements for each application
- Magnetic encoders for industrial environments or optical encoders with resolutions down to 0.1 micron
- Multiple carriage options
- Open frame, bellows or covers available
- Zero cogging (ironless) or extremely smooth (ironcore)
- Counterbalance options for vertical applications
- Velocities to 7 m/s

<table>
<thead>
<tr>
<th>Series</th>
<th>T1S / T1D</th>
<th>T2S / T2D</th>
<th>T3S / T3D</th>
<th>T4S / T4D</th>
<th>TR7</th>
<th>TR9</th>
<th>TR16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor</td>
<td>110 ironless</td>
<td>210 ironless</td>
<td>310 ironless</td>
<td>410 ironless</td>
<td>R7 ironcore</td>
<td>R9 ironcore</td>
<td>R16 ironcore</td>
</tr>
<tr>
<td>Travel lengths (mm)</td>
<td>100 to 900</td>
<td>60 to 3840</td>
<td>60 to 4390</td>
<td>78 to 3835</td>
<td>105 to 2745</td>
<td>108 to 3708</td>
<td>94 to 3694</td>
</tr>
<tr>
<td>Load (kg)</td>
<td>11.3 */13.5 **</td>
<td>27.2 */45.3 **</td>
<td>72 */108 **</td>
<td>90 */181 **</td>
<td>200 **</td>
<td>300 **</td>
<td>450 **</td>
</tr>
<tr>
<td>Acceleration (G’s) ***</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Velocity (m/s) †</td>
<td>up to 7</td>
<td>up to 7</td>
<td>up to 7</td>
<td>up to 7</td>
<td>up to 7</td>
<td>up to 7</td>
<td>up to 7</td>
</tr>
<tr>
<td>Peak Force (N)</td>
<td>202.5</td>
<td>494.2</td>
<td>1170.0</td>
<td>3928.1</td>
<td>1761.0</td>
<td>4097.0</td>
<td>7433.0</td>
</tr>
<tr>
<td>Continuous Force (N)</td>
<td>45.4</td>
<td>110.3</td>
<td>262.0</td>
<td>878.6</td>
<td>462.0</td>
<td>1121.0</td>
<td>2230.0</td>
</tr>
<tr>
<td>Resolution (micron)</td>
<td>0.1 to 5.0</td>
<td>0.1 to 5.0</td>
<td>0.1 to 5.0</td>
<td>0.1 to 5.0</td>
<td>0.1 to 5.0</td>
<td>0.1 to 5.0</td>
<td>0.1 to 5.0</td>
</tr>
<tr>
<td>Repeatability (micron) ‡</td>
<td>+/- 1</td>
<td>+/- 1</td>
<td>+/- 1</td>
<td>+/- 1</td>
<td>+/- 1</td>
<td>+/- 1</td>
<td>+/- 1</td>
</tr>
</tbody>
</table>

* Single rail load specifications
** Dual rail load specifications
*** Consult factory for higher accelerations
† Peak velocity is encoder dependent
‡ Repeatability is resolution dependent

Recommended loads based on motor size and typical performance. Bearing specifications exceed listed specifications. Consult factory for higher loads.
400XR Series
Precision Ballscrew
Tables
www.parker.com/em/400xr

The 400XR precision table family offers precise linear positioning with excellent straightness and flatness of travel. Superior performance, modularity, and quick delivery make these tables the perfect building blocks for multi-axis positioning systems. An unrivaled array of sizes, features, and options such as cleanroom preparation, linear encoder feedback, and parallel motor mounts distinguishes the 400XR family from all others.

• 100% certification of precision
• Optional cleanroom preparation
• Easy multi-axis configuration
• Pre-engineered, low-profile, modular cable management
• Proven IP30 strip-seal protection
• Encoder resolutions to 0.1 µm
• Fast settling
• Dowel holes provided for precise payload and multi-axis mounting

<table>
<thead>
<tr>
<th>Series</th>
<th>401XR</th>
<th>402XR</th>
<th>403XR</th>
<th>404XR</th>
<th>405XR</th>
<th>406XR</th>
<th>412XR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile (mm), w x h</td>
<td>41 x 43</td>
<td>58 x 58</td>
<td>95 x 48</td>
<td>50 x 600</td>
<td>100 to 2,000</td>
<td>150 to 2,000</td>
<td>285 x 105</td>
</tr>
<tr>
<td>Travel lengths (mm)</td>
<td>50 to 300</td>
<td>50 to 600</td>
<td>50 to 600</td>
<td>50 to 1,950</td>
<td>150 to 3,000</td>
<td>150 to 2,000</td>
<td></td>
</tr>
<tr>
<td>Rated load (kg)</td>
<td>50</td>
<td>100</td>
<td>170</td>
<td>630</td>
<td>1470</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceleration (g)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability (µm)</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Resolution dependent

400LXR Series
Linear Motor Driven Positioning Tables
www.parker.com/em/400lrx

The 400LXR Series linear servo motor tables offer high acceleration, velocity, and precision with quick settling for superior throughput. Optimum performance is achieved by combining slotless linear motor technology with performancematched feedback and mechanical elements. Offered in three widths and myriad options, the 400LXR Series can solve most high-performance applications.

• 100% certification of precision
• Optional cleanroom preparation
• Easy multi-axis configuration
• Pre-engineered, low-profile, modular cable management
• Proven IP30 strip-seal protection
• Encoder resolutions to 0.1 µm
• Fast settling
• Dowel holes provided for precise payload and multi-axis mounting

<table>
<thead>
<tr>
<th>Series</th>
<th>404LXR</th>
<th>406LXR</th>
<th>412LXR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile (mm), w x h</td>
<td>100 x 60</td>
<td>150 x 70</td>
<td>285 x 105</td>
</tr>
<tr>
<td>Travel lengths (mm)</td>
<td>50 to 1,000</td>
<td>50 to 1,950</td>
<td>150 to 3,000</td>
</tr>
<tr>
<td>Load (kg)</td>
<td>45</td>
<td>180</td>
<td>950</td>
</tr>
<tr>
<td>Acceleration (g)</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Velocity (m/sec)</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Peak force (N)</td>
<td>180</td>
<td>330</td>
<td>1,000</td>
</tr>
<tr>
<td>Continuous force (N)</td>
<td>50</td>
<td>110</td>
<td>355</td>
</tr>
<tr>
<td>Resolution (µm)</td>
<td>0.1 to 5</td>
<td>0.1 to 5</td>
<td>0.1 to 5</td>
</tr>
<tr>
<td>Repeatability (µm)*</td>
<td>±1</td>
<td>±1</td>
<td>±1</td>
</tr>
</tbody>
</table>

*Resolution dependent
The 402/403XE Series of positioners combines a rugged steel body construction with an integrated precision ball screw and bearing guide. The result is a highly accurate, cost-effective line of positioners ideal for applications in the hard disk, semiconductor, medical, machine building and many other industries.

- Significant force per dollar value
- Easily integrated into multi-axis design
- Adjustment-free
- Small package size

The 404XE positioner combines versatility and rugged construction into a compact platform ideal for 100% duty automation applications. Like its cousin the 404XR, the 404XE offers myriad options and accessories. The XE is also mount compatible with the XR and LXR precision tables, allowing mix and match of technologies as cost and performance mandate.

- Reliable, cost-effective positioner
- Short carriage and parallel motor mounts to minimize length
- High-strength design
- Multi-axis configurations

### 400XE Series

**Economy Linear Tables**

www.parker.com/em/404xe

www.parker.com/em/402403xe

<table>
<thead>
<tr>
<th>Series</th>
<th>402XE</th>
<th>403XE</th>
<th>404XE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile (mm), w x h</td>
<td>57 x 36</td>
<td>80 x 45</td>
<td>95 x 48</td>
</tr>
<tr>
<td>Travel lengths (mm)</td>
<td>70 to 220</td>
<td>55 to 655</td>
<td>25 to 700</td>
</tr>
<tr>
<td>Rated load - short carriage (kg)</td>
<td>NA</td>
<td>NA</td>
<td>61.3</td>
</tr>
<tr>
<td>Rated load - long carriage (kg)</td>
<td>90</td>
<td>160</td>
<td>122.6</td>
</tr>
<tr>
<td>Acceleration (g)</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Velocity (mm/sec)*</td>
<td>180 to 450</td>
<td>400 to 800</td>
<td>260 to 1,500</td>
</tr>
<tr>
<td>Repeatability (µm)*</td>
<td>±5</td>
<td>±5</td>
<td>±20 to 30</td>
</tr>
</tbody>
</table>

*Travel and screw dependent
Ultra Series stages, developed for applications requiring the ultimate in precision, feature a crossed roller-bearing technology that provides high accuracy and exceptional repeatability. These stages are offered with a linear motor drive for sub-micron accuracy, a precision ball screw drive with high speed and high force for dynamic move-and-settle applications, or a ground V-thread, leadscrew drive for smooth, slow-speed scanning. They are available in a variety of widths and travels, an open-frame design, and single or multi-axis configurations.

<table>
<thead>
<tr>
<th>Series</th>
<th>Linear Motor Drive</th>
<th>Screw Drive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile - closed frame (mm) w x h</td>
<td>U200 U300 U400 U600</td>
<td>U200 U300 U400 U600</td>
</tr>
<tr>
<td>Profile - open frame (mm) w x h</td>
<td>U200 U300 U400 U600</td>
<td>U200 U300 U400 U600</td>
</tr>
<tr>
<td>Maximum Travel (mm)</td>
<td>400 500 500 500</td>
<td>400 500 500 500</td>
</tr>
<tr>
<td>Rated load (kg)</td>
<td>1859 2187 2187 2187</td>
<td>1859 2187 2187 2187</td>
</tr>
<tr>
<td>Repeatability (microns)</td>
<td>± 0.5 ± 0.5 ± 0.5 ± 0.5</td>
<td>± 2.0 ± 2.0 ± 2.0 ± 2.0</td>
</tr>
<tr>
<td>Maximum Velocity (mm/sec)</td>
<td>1500 1500 1500 1500</td>
<td>300 300 300 300</td>
</tr>
</tbody>
</table>

Parker Daedal PROmech Series miniature actuators are packaged linear actuators consisting of linear bearings, drive screw, thrust bearings, motor and coupling. Ideal for OEM applications, 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.

<table>
<thead>
<tr>
<th>Series</th>
<th>LP28</th>
<th>LD28</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile (mm), w x h</td>
<td>40 x 41</td>
<td>28 x 28</td>
</tr>
<tr>
<td>Travel length (mm)</td>
<td>5 to 500</td>
<td>5 to 300</td>
</tr>
<tr>
<td>Rated load (kg)</td>
<td>22</td>
<td>10</td>
</tr>
<tr>
<td>Acceleration (g)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Repeatability (µm)</td>
<td>+/- 50</td>
<td>NA</td>
</tr>
</tbody>
</table>
Parker’s family of miniature positioning stages are small in size and big on performance. This miniature stage family offers multiple drive technologies including linear motor, ballscrew, leadscrew, micrometer, and manual. Multi-axis systems are easily constructed that mix drive technologies, allowing price performance trade-offs per axis. The MX80 family features anti-cage creep, cross-roller bearings, and encoder resolutions down to 10 Nm. The LX80 Series is offered with single or double square rail bearings to allow travels to 750 mm.

### Key Features
- Miniature size – low profile
- Linear motor or ballscrew drive
- Cross roller bearing (zero cage-creep design)
- Encoder resolutions to 10 Nm
- Accelerations to 5 g
- Velocities to 3 m/s
- Fast settling
- Smooth translation
- Cleanroom and low-ESD options
- Dowel holes for precise payload and multi-axis mounting
- Master reference surface to actual path of travel
- Integral home/limit sensors
- High-flex cable system

### Specifications

<table>
<thead>
<tr>
<th>Series</th>
<th>MX80LP</th>
<th>MX80LS</th>
<th>LX80L</th>
<th>MX80SP</th>
<th>MX80SS</th>
<th>MX80M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile (mm), w x h</td>
<td>80 x 25</td>
<td>80 x 25</td>
<td>80 x 45</td>
<td>80 x 35</td>
<td>80 x 35</td>
<td>80 x 25</td>
</tr>
<tr>
<td>Drive system</td>
<td>Linear motor</td>
<td>Linear motor</td>
<td>Linear motor</td>
<td>Ballscrew</td>
<td>Leadscrew</td>
<td>Micrometer</td>
</tr>
<tr>
<td>Travel lengths (mm)</td>
<td>25 to 150</td>
<td>25 to 150</td>
<td>150 to 750</td>
<td>25 to 150</td>
<td>25 to 150</td>
<td>50</td>
</tr>
<tr>
<td>Peak thrust (N)</td>
<td>24</td>
<td>24</td>
<td>36</td>
<td>123</td>
<td>44</td>
<td>–</td>
</tr>
<tr>
<td>Load capacity (kg)</td>
<td>8</td>
<td>8</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>Max resolution (µm)</td>
<td>0.01</td>
<td>0.01</td>
<td>0.1</td>
<td>0.5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Repeatability (µm)</td>
<td>±0.4</td>
<td>±0.8</td>
<td>±1.5</td>
<td>±1.5</td>
<td>±5</td>
<td>–</td>
</tr>
<tr>
<td>Accuracy (µm)</td>
<td>3</td>
<td>12</td>
<td>8</td>
<td>22</td>
<td>30</td>
<td>–</td>
</tr>
<tr>
<td>Material</td>
<td>Steel</td>
<td>Aluminum</td>
<td>Aluminum</td>
<td>Aluminum</td>
<td>Aluminum</td>
<td>Aluminum</td>
</tr>
</tbody>
</table>
Parker’s ZP200 vertical lift platform offers precise vertical positioning for elevating small to large payloads up to 75 kg (165 lb). A unique wedge design generates stable vertical elevation of the platform with absolutely no displacement in the horizontal plane.

- 25 mm of travel
- 100% duty cycle
- Laser certified precision
- Multi-axis compatible with XR, LXR, XE, and MX80 tables
- Precision linear encoder option
- Class 10 cleanroom option

<table>
<thead>
<tr>
<th>Series</th>
<th>ZP200P</th>
<th>ZP200S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile (mm), w x h</td>
<td>200 x 60.4</td>
<td>200 x 60.4</td>
</tr>
<tr>
<td>Travel length (mm)</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Rated load (kg)</td>
<td>15</td>
<td>75</td>
</tr>
<tr>
<td>Accuracy (µm)*</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>Repeatability (µm)*</td>
<td>±3</td>
<td>±5</td>
</tr>
<tr>
<td>Velocity (mm/sec)**</td>
<td>440</td>
<td>440</td>
</tr>
<tr>
<td>Acceleration (g)</td>
<td>0.72</td>
<td>0.72</td>
</tr>
</tbody>
</table>

*Encoder dependent
**Screw dependent

The 200RT Series rotary tables offer precision motorized rotation and angular positioning. The 200RT is mount compatible with Parker’s linear positioners and their low profile design minimizes stack height in multi-axis configurations. Five diameters and four drive ratios make matching size, speed, and load requirements simple.

- Preloaded, precision worm gear
- Repeatable indexing – 12 arc sec
- 360-degree continuous rotation
- Through hole for cables, etc.
- Dual race preloaded angular contact support bearing
- Four selectable drive ratios: 36:1, 45:1, 90:1, 180:1
- Direct mount encoder option
- English or metric mounting

<table>
<thead>
<tr>
<th>Series</th>
<th>205RT</th>
<th>206RT</th>
<th>208RT</th>
<th>210RT</th>
<th>212RT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile (mm), dia x h</td>
<td>127 x 46</td>
<td>152.4 x 50.8</td>
<td>203.2 x 63.5</td>
<td>254 x 76.2</td>
<td>254 x 76.2</td>
</tr>
<tr>
<td>Rated load (kgf)</td>
<td>11</td>
<td>68</td>
<td>68</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Repeatability (arc sec)*</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Accuracy (arc min)*</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Runout/concentricity (µm)*</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Output torque (Nm)</td>
<td>2.8</td>
<td>4.5</td>
<td>4.5</td>
<td>21.5</td>
<td>21.5</td>
</tr>
</tbody>
</table>

*Grade of precision and ratio dependent
The HPLA and HLE are ideal for guiding, transporting and positioning payloads over large distances at high speeds and accelerations. The polymer wheel bearing is especially suited to cleanroom applications since it requires no lubrication or maintenance. Cleanroom test data is available on request.

- Reliable and proven technology
- 20 m of travel with splice
- 5 m/s maximum velocity
- Ideal for cleanroom wafer handling applications
- Stainless steel option provides moisture and chemical resistance
- Quiet operation
- Low maintenance

### HPLA-HLE Series

**Belt – Pulley Actuator**

www.parker.com/em/hpla

www.parker.com/em/hle

<table>
<thead>
<tr>
<th>Series</th>
<th>HLE60</th>
<th>HPLA80</th>
<th>HLE100</th>
<th>HPLA120</th>
<th>BLMA120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section (mm)</td>
<td>60 x 60</td>
<td>80 x 80</td>
<td>100 x 100</td>
<td>120 x 120</td>
<td>120 x 120</td>
</tr>
<tr>
<td>Drive type</td>
<td>Belt-pulley</td>
<td>Belt-pulley</td>
<td>Belt-pulley</td>
<td>Belt-pulley</td>
<td>Linear motor</td>
</tr>
<tr>
<td>Max travel (m)</td>
<td>3</td>
<td>5.6</td>
<td>6.2</td>
<td>9.5</td>
<td>6.3</td>
</tr>
<tr>
<td>Max velocity (m/s)</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Rated acceleration (g)*</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Max thrust (N)</td>
<td>688</td>
<td>1,114</td>
<td>1,478</td>
<td>2,234</td>
<td>1,720</td>
</tr>
<tr>
<td>Rated load (N)</td>
<td>750</td>
<td>1,300</td>
<td>1,250</td>
<td>2,500</td>
<td>1,500</td>
</tr>
<tr>
<td>Repeatability (mm)</td>
<td>±0.2</td>
<td>±0.2</td>
<td>±0.2</td>
<td>±0.2</td>
<td>±0.01</td>
</tr>
<tr>
<td>Linear feedback</td>
<td>No</td>
<td>Optional</td>
<td>No</td>
<td>Optional</td>
<td>Standard</td>
</tr>
<tr>
<td>Cleanroom option</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Stainless option</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*Higher applications possible - application dependent

### BLMA Series

**Balanced Linear Motor Actuator**

www.parker.com/em/blma

The innovative BLMA provides linear motor performance in the form of a long travel actuator. Utilizing a patented balanced linear motor design, the BLMA offers the best possible settling time and response of any long travel actuator. A single magnet track keeps cost and weight to a minimum.

- Highest dynamic performance, even at long travels
- High positional stiffness
- Fastest settling time
- Balanced ironcore linear motor
- Internal linear feedback
- 1,720 N of peak force
- 7 m/s max velocity
- High-flex cable management
- Mount compatible with HPLA
Linear Actuators

**ERV and ER Series Rodless Actuators**

Parker’s ERV Series rodless actuator is designed in an affordable package that includes an extruded base and an external carriage containing outboard roller bearings for high load capacity.
- High-strength extruded body
- External bearing carriage for high-loads
- Economical design for high-load and high-speed applications

The ER Series rodless actuator features an internal bearing carriage and the option of a belt or screw drive.
- Modular design with either belt or screw drive
- Internal bearing carriage with strip seal

### Specifications

<table>
<thead>
<tr>
<th>Series</th>
<th>ER32</th>
<th>ER50</th>
<th>ER80</th>
<th>ERV5</th>
<th>ERV8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max load: Roller bearing N (lbf)</td>
<td>222 (50)</td>
<td>445 (100)</td>
<td>667 (150)</td>
<td>1,126 (253)</td>
<td>2,112 (474)</td>
</tr>
<tr>
<td>Max load: Square rail N (lbf)</td>
<td>1,112 (250)</td>
<td>2,224 (500)</td>
<td>4,448 (1000)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Max load: Extended carriage N (lbf)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>1,915 (430)</td>
<td>3,590 (807)</td>
</tr>
<tr>
<td>Max velocity: Belt m/sec (in/sec)*</td>
<td>3.5 (140)</td>
<td>5.0 (200)</td>
<td>5.0 (200)</td>
<td>5.0 (200)</td>
<td>5.0 (200)</td>
</tr>
<tr>
<td>Ball screw m/sec (in/sec)*</td>
<td>0.4 (15.6)</td>
<td>1.5 (60)</td>
<td>1.3 (50)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Acme screw m/sec (in/sec)*</td>
<td>0.8 (31.2)</td>
<td>0.64 (25)</td>
<td>0.8 (31.2)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Rated acceleration (g)*</td>
<td>9.8 (386)</td>
<td>9.8 (386)</td>
<td>9.8 (386)</td>
<td>9.8 (386)</td>
<td>9.8 (386)</td>
</tr>
<tr>
<td>Max travel m (in)**</td>
<td>1 (39.2)</td>
<td>1.5 (59.0)</td>
<td>1.5 (59.0)</td>
<td>6 (238)</td>
<td>6 (237)</td>
</tr>
<tr>
<td>Bi-directional repeatability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Screw (mm)</td>
<td>±0.025/±0.152 (±0.001/±0.006)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Belt (mm)</td>
<td>±0.102±0.203 (±0.004/±0.008)</td>
<td>±0.1/±0.2 (±0.004/±0.008)</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

*Application dependent, consult catalog for specifications.

**Single piece Extrusion, Longer strokes available with spliced units.
The LCB Series of linear actuators incorporates a low friction, dry running sliding bearing carriage that provides long and reliable travel life even at 100% duty cycle. The low mass of the carriage and steel reinforced timing belt design allows for very high accelerations and velocity. Combined with Parker motors and controls, the LCB offers a fully programmable, high performance solution at a great value.

### LCB Series Compact Rodless Actuators

**www.parker.com/em/lcb**

### Linear Actuators

The LCB Series of linear actuators incorporates a low friction, dry running sliding bearing carriage that provides long and reliable travel life even at 100% duty cycle. The low mass of the carriage and steel reinforced timing belt design allows for very high accelerations and velocity. Combined with Parker motors and controls, the LCB offers a fully programmable, high performance solution at a great value.

### LR Series Linear Roller System

**www.parker.com/em/lr**

Linear Roller Series products from Parker IPS provide a high level of accuracy, load-bearing strength, and flexibility in a modular, low-cost package. These products utilize standard components and can adapt to a wide range of applications.

**Series**

<table>
<thead>
<tr>
<th>Series</th>
<th>LCB040</th>
<th>LCB060</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Load, N (lbf)</td>
<td>60 (146)</td>
<td>66 (295)</td>
</tr>
<tr>
<td>Max Velocity, m/sec (in/sec)</td>
<td>8.0 (315)</td>
<td>8.0 (315)</td>
</tr>
<tr>
<td>Rated acceleration (g's)*</td>
<td>20 (787)</td>
<td>20 (787)</td>
</tr>
<tr>
<td>Max travel m (in)*</td>
<td>2.0 (78)</td>
<td>5.5 (216)</td>
</tr>
<tr>
<td>Bi-directional repeatability (mm)</td>
<td>±0.2 (±0.008)</td>
<td></td>
</tr>
</tbody>
</table>

*Application dependant, consult catalog for specifications.

**LCB Series**

**www.parker.com/em/lcb**

### LCB Series Compact Rodless Actuators

**www.parker.com/em/lcb**

### Linear Actuators

The LCB Series of linear actuators incorporates a low friction, dry running sliding bearing carriage that provides long and reliable travel life even at 100% duty cycle. The low mass of the carriage and steel reinforced timing belt design allows for very high accelerations and velocity. Combined with Parker motors and controls, the LCB offers a fully programmable, high performance solution at a great value.

### LR Series Linear Roller System

**www.parker.com/em/lr**

Linear Roller Series products from Parker IPS provide a high level of accuracy, load-bearing strength, and flexibility in a modular, low-cost package. These products utilize standard components and can adapt to a wide range of applications.

**Series**

<table>
<thead>
<tr>
<th>Series</th>
<th>LR 6</th>
<th>LR 14</th>
<th>LR 14HD</th>
<th>LR 25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Load, N (lbf)</td>
<td>649 (146)</td>
<td>2,669 (600)</td>
<td>3,350 (753)</td>
<td>11,552 (2,597)</td>
</tr>
<tr>
<td>Pully diameter (mm): reversing unit 40</td>
<td>47.75</td>
<td>47.75</td>
<td>47.75</td>
<td>47.75</td>
</tr>
<tr>
<td>Pully diameter (mm): reversing unit 80</td>
<td>89.12</td>
<td>89.12</td>
<td>89.12</td>
<td>89.12</td>
</tr>
<tr>
<td>Pully lead (mm/rev): reversing unit 40</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Pully lead (mm/rev): reversing Unit 80</td>
<td>280</td>
<td>280</td>
<td>280</td>
<td>280</td>
</tr>
<tr>
<td>Maximum travel without splice (mm)*</td>
<td>5900</td>
<td>5850</td>
<td>5840</td>
<td>5680</td>
</tr>
<tr>
<td>Minimum travel (mm)</td>
<td>300</td>
<td>250</td>
<td>240</td>
<td>80</td>
</tr>
<tr>
<td>Maximum drive torque (Nm): reversing unit 40</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Maximum drive torque (Nm): reversing unit 80</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td>Maximum belt traction (lb/belt)</td>
<td>575</td>
<td>575</td>
<td>575</td>
<td>575</td>
</tr>
<tr>
<td>Maximum number of belts</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Maximum speed (m/s)</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Maximum acceleration at no load (m/s²)</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Repeatability (mm)</td>
<td>± .10</td>
<td>± .10</td>
<td>± .10</td>
<td>± .10</td>
</tr>
</tbody>
</table>

*Consult factory for long travel lengths*
The ET Series electric cylinders are engineered to provide long life and high thrust capacity in a compact cylinder package. Its robust design ensures durability in the most demanding applications.

- Ball or Acme screw drive
- Angular contact thrust bearings for long life

<table>
<thead>
<tr>
<th>Series</th>
<th>ET32</th>
<th>ET50</th>
<th>ET80</th>
<th>ET100</th>
<th>ET125</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max thrust N (lbf)</td>
<td>600 (135)</td>
<td>3,200 (720)</td>
<td>7,120 (1,600)</td>
<td>23,500 (5,300)</td>
<td>44,500 (10,000)</td>
</tr>
<tr>
<td>Max velocity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ball screw, m/sec (in/sec)*</td>
<td>1.3 (50)</td>
<td>1.5 (60)</td>
<td>1.3 (50)</td>
<td>1.3 (50)</td>
<td>1.5 (60)</td>
</tr>
<tr>
<td>Acme screw, m/sec (in/sec)*</td>
<td>0.8 (31.2)</td>
<td>0.64 (25)</td>
<td>0.8 (31.2)</td>
<td>0.4 (15.6)</td>
<td>—</td>
</tr>
<tr>
<td>Rated acceleration (g)*</td>
<td>9.8 (386)</td>
<td>9.8 (386)</td>
<td>9.8 (386)</td>
<td>9.8 (386)</td>
<td>9.8 (386)</td>
</tr>
<tr>
<td>Max travel (m)</td>
<td>1000 (39.4)</td>
<td>1500 (59)</td>
<td>1500 (59)</td>
<td>1500 (59)</td>
<td>1500 (59)</td>
</tr>
<tr>
<td>Bi-directional repeatability (mm)</td>
<td>±0.025/±0.152 (±0.001/±0.006)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Application dependant, consult catalog for specifications
Using the HPLA and BLMA actuators as building blocks, Parker can create gantry-style robots that are more economical than pedestal-style robots. Parker’s standard systems accommodate work areas up to 7.9 m x 3.3 m x 1.5 m and payloads up to 100 kg. Larger work areas and payloads are accommodated with custom configurations.

- XY, XZ and XYZ configurations
- XY, XZ and XYZ configurations
- Linear motor and ballscrew technologies
- Right- and left-hand versions
- Work areas to 1 m x 1 m
- Payloads: 5, 12, and 25 kg
- Pass-through, high-flex cabling for power, signals, and air
- Dowel holes for repeatable system and payload installation
- 3D CAD drawings available
- Easily customized for special requirements: travel, payload, idlers, cleanroom, etc.

Using the ET, ER, ERV, LCB and LR actuators as building blocks, Parker can create economical and customized work cell-level robotic solutions that are ideal for pick-and-place and dispensing applications. Beyond the base system, Parker can integrate pneumatic axes, grippers, vacuum cups, custom structures, and guarding. Six basic types are available in XY, XZ and XYZ configurations.

- Standard or custom configurations available
- Payloads up to 75 kg
- Velocity up to 3 m/s
- Economical robotic solution
- Optional hardware
  - Cable management
  - Machine base and guarding
  - Pneumatic actuators
  - Vacuum and generators
OEMs and manufacturers look to Parker because they know our extensive motion system design experience, systematic project management process, and global infrastructure ensure that 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.

### Motion System Development

![Motion System Development Image]

### Parker’s Six-Step Project Management Process

1. **Understand Your Needs**
   Based on a review of your goals, we help develop a rigorous definition of system requirements.

2. **System Analysis**
   Proprietary software analyzes the proposed system value and optimal component sizing.

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

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.

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.

6. **After-Sales Support**
   Includes: an engineer on site during delivery, machine inspection, training, maintenance and 24/7 support.
### Vacuum Cups

- Flat and bellows styles
- Sizes up to 200 mm diameter
- Wide variety of cup material and mounting styles

### Integrated Vacuum Generators

- Integrated solenoids and sensors reduce cycle time
- Emergency stop systems
- High vacuum flows

### Pressure Sensors

- Vacuum to 8,820 PSI range
- Up to IP67 rating
- PNP/NPN open collector transistor outputs
- 4 to 20 mA, 1-5VDC analog outputs

---

**Pneumatic Grippers**

With more than 100 types available in more than 1,000 configurations, Parker’s complete line of pneumatic grippers can solve any application. Parker offers products designed to handle the lightest loads in cleanroom environments, in addition to products capable of producing grip forces up to 12.5 kN (3,000 lbf) in high-speed and high-load situations.

- Three gripper styles
- High grip force-to-weight ratio keeps other system components smaller

**Parallel Type**

| Maximum stroke range mm (in) | 4 to 150 (0.2 to 6.0) |
| Angular rotation (degrees) | — |
| Total grip force range N (lbf) at 7 bar (100 PSI) | 28 to 8,088 (6 to 694) |
| Pressure range bar (PSI) | 0.3 to 7 (5 to 100) |
| Cleanroom capability | Optional |
| Sensors (proximity, reed, Hall effect) | Optional |
| Non-synchronous motion | Optional |
| Filtration requirement | 40 micron (dry air) |

**Three-Jaw Type**

| Maximum stroke range mm (in) | 8 to 35 (0.3 to 1.4) |
| Angular rotation (degrees) | — |
| Total grip force range N (lbf) at 7 bar (100 PSI) | 356 to 12,460 (80 to 2,800) |
| Pressure range bar (PSI) | 1.5 to 7 (20 to 100) |
| Cleanroom capability | Standard |
| Sensors (proximity, reed, Hall effect) | Not available |
| Non-synchronous motion | Not available |

**Angular Type**

| Maximum stroke range mm (in) | — |
| Angular rotation (degrees) | 12°, 30°, 180° |
| Total grip force range N (lbf) at 7 bar (100 PSI) | 5 to 2,318 (2 to 521) |
| Pressure range bar (PSI) | 0.3 to 7 (5 to 100) |
| Cleanroom capability | Optional |
| Sensors (proximity, reed, Hall effect) | Not available |
High-Strength Modular Solutions To Fit Your Needs
www.parker.com/pneu/ips

Structural automation products from Parker Industrial Profile Systems (IPS) offer unique benefits over traditional methods of structural fabrication. All systems and assemblies are pre-engineered to customer requirements, yet offer extreme flexibility as needs change. Profiles and accessories are available in metric or inch designs.

**Benefits**
- Extremely short turnaround time from design to completion
- No welding, grinding, cleaning, painting, or distortions
- Lower cost through the elimination of costly traditional manufacturing processes
- Flexibility to reconfigure as requirements change

**Profiles**
Parker Industrial Profile Systems has one of the most comprehensive product offerings in the industry.
- More than 130 individual high-strength aluminum profiles
- Metric and inch profiles and accessories
- Metric sizes range from 20 mm to 160 mm
- Inch sizes range from 1" to 6"
- Extensive range of smooth, grooveless profiles
- Provide attractive and robust structures

**Linear Motion**
- Roller bearing systems
- Extrusion-based linear actuators
- Delrin and UHMW slide bearings

**Fasteners and Accessories**
- Unique T-slot design for reliable connection and easy modification
- Metric and inch hardware available
- Complete line of accessories

**Typical Applications**
- Enclosures and guarding
- Machine bases and frames
- Work stations and tables
- Material handling systems

www.parker.com/pneu/ips
North America
United States – Great Lakes and Mid American Region
Tel: +001 330 670 2680
Fax: +001 330 670 2681
United States – Gulf, Northeast, and Southeast Region
Tel: +001 972 984 1067
Fax: +001 972 984 1063
United States – Midwest, Western, and Pacific Regions
Tel: +001 206 285 7559
Fax: +001 206 285 7432
Canada – Milton
Tel: +001 905 693 3000
Fax: +001 905 693 0788
Mexico – Toluca
Tel: +52 722 275 4200
Fax: +52 722 279 9308

Asia Pacific
Australasia – Castle Hill
Tel: +61 2 9634 7777
Fax: +61 2 842 5111
China – Beijing
Tel: +861 10 6561 0520
Fax: +861 10 6561 0526
China – Guangzhou
Tel: +86 20 3878 1583
Fax: +86 20 3878 1700
China – Hong Kong
Tel: +852 2428 8008
Fax: +852 2480 4256
China – Shanghai
Tel: +86 21 5031 2525
Fax: +86 21 6445 9717
India – Mumbai
Tel: +91 22 55 90 7081/85
Fax: +91 22 55 90 7080/50
Japan – Tokyo
Tel: +81 3 6408 3900
Fax: +81 3 5449 7201
Korea – Hwaseong
Tel: +82 31 379 2200
Fax: +82 31 377 9710
Malaysia – Kuala Lumpur
Tel: +60 03 5638 1476
Fax: +60 03 5638 1527
Singapore – Jurong
Tel: +65 6887 6300
Fax: +65 6265 5125
Taiwan – Taipei
Tel: +886 2 2298 8987
Fax: +886 2 2298 8982
Thailand – Bangkok
Tel: +662 717 8140
Fax: +662 717 8148
United Arab – Abu Dhabi
Tel: +971 2 6786987
Fax: +971 2 6793812

South America
Argentina – Buenos Aires
Tel: +54 11 3327 44 4199
Fax: +54 11 3327 44 4199
Brazil – Sao Paulo
Tel: +55 12 3954 5100
Fax: +55 12 3954 5266
Pan American Division
Tel: +001 305 470 8800
Fax: +001 305 470 8808
Venezuela – Caracas
Tel: +58 212 238 5422
Fax: +58 212 239 2272

Africa
South Africa – Kempton Park
Tel: +27 11 9610700
Fax: +27 11 3927213
Egypt
Tel: +20 2 5194018
Fax: +20 2 5190605

Europe
Austria – Wr.Neustadt
Tel: +43 2622 23501
Fax: +43 2622 66212
Belgium – Nivelles
Tel: +32 327 280 900
Fax: +32 67 280 999
Czech & Slovak Republics – Klecany
Tel: +420 284 083 111
Fax: +420 284 083 112
Denmark – Ballerup
Tel: +45 43 560400
Fax: +45 43 733107
Finland – Vantaa
Tel: +358 9 4767 31
Fax: +358 9 4767 3200
France – Contamine
Tel: +33 4 50 25 80 25
Fax: +33 4 50 03 67 37
Germany – Kaarst
Tel: +49 2131 4016-0
Fax: +49 2131 4016-9199
Greece – Athens
Tel: +30 210 933 6450
Fax: +30 210 933 6451
Hungary – Budapest
Tel: +36 1 220 4155
Fax: +36 1 422 1525
Ireland – Dublin
Tel: +353 1 293 9999
Fax: +353 1 293 9999
Italy – Corsico, Milan
Tel: +39 02 4519 21
Fax: +39 02 4479 340
Netherlands – Oldenzaal
Tel: +31 541 585000
Fax: +31 541 585459
Norway – Langhus
Tel: +47 6491 1000

Fax: +47 6491 1090
Poland – Warsaw
Tel: +48 22 573 24 00
Fax: +48 22 573 24 03
Portugal – Leça da Palmeira
Tel: +351 22 999 7360
Fax: +351 22 996 1527
Romania – Bucharest
Tel: +40 21 252 1382
Fax: +40 21 252 3381
Russia – Moscow
Tel: +7 095 234 0054
Fax: +7 095 234 0528
Slovenia – Novo mesto
Tel: +386 7337 6650
Fax: +386 7337 6651
Spain – Madrid
Tel: +34 91 675 7300
Fax: +34 91 675 7711
Sweden – Spånga
Tel: +46 (0) 8 5979 5000
Fax: +46 (0) 8 5979 5120
Switzerland – Bolligen
Tel: +41 31 917 18 50
Fax: +41 31 917 18 59
Turkey – Istanbul
Tel: +90 212 482 91 06
Fax: +90 212 482 91 10
UK – Warwick
Tel: +44 1926 317 878
Fax: +44 1926 317 855
Ukraine – Kiev
Tel: +380 44 220 7432
Fax: +380 44 220 6534
When it comes to electromechanical components and solutions, no company offers more than Parker. Get a jump on your next solution by contacting Parker today.

- For literature, call 800-CPARKER (272-7537), e-mail to e-parker@parker.com, or visit us online at www.parkermotion.com.
- Visit www.parkermotion.com/support_training.html for more information on software and training programs.

Parker also has product ranges available for the Industrial Automation and Pneumatic markets, each paired with an interactive CD. Call 800-CPARKER.

Bulletin AU01-7500/US
Bulletin AU01-1000/US

<table>
<thead>
<tr>
<th>WARNING - USER RESPONSIBILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIPTION HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.</td>
</tr>
</tbody>
</table>

This document and other information from Parker-Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

<table>
<thead>
<tr>
<th>OFFER OF SALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>The items described in this document are hereby offered for sale by Parker-Hannifin Corporation, its subsidiaries or its authorized distributor. This offer and its acceptance are governed by the provisions stated in the detailed “Offer of Sale” elsewhere in this document.</td>
</tr>
</tbody>
</table>

© Copyright 2007, Parker Hannifin Corporation. All Rights Reserved.
System Requirements
To view the CD, the following are required:
• Pentium®-class processor
• Win® 95 OSR 2.0, Win 98 Sec. Ed., Win ME, Win NT 4.0 (with Service Pack 5 or 6), Win 2000 or Win XP
• 16 MB of RAM (32 recommended)
• 20 MB of available hard-disk space

Acrobat Reader™
Catalog files are viewed using Adobe Acrobat Reader. If you do not have Acrobat Reader installed on your PC, it will install from the CD. If you have Acrobat Reader but do not have the search plug-in, you will be given the option to either install Acrobat Reader 6.0 with search, leaving your existing version, or not install Acrobat Reader 6.0 with search.
You must have the search plug-in to take advantage of the search feature described in the next section.

To View the CD
The CD is self-loading. Just place it in your CD drive. Acrobat Reader will open (or install), and the opening page will appear on your monitor. From this page you can navigate to the following sections.
• Search takes you to the search feature. When the search window opens, type a word(s) or code* and press enter. A list of pages where that word appears is shown. Select one and click the View button. Repeat as needed.
• Contents takes you to the selection of catalogs and products on the CD.
• Product Overview takes you to a .pdf file of this Precision Automation Technologies Product Range.
• Warning/Offer of Sale takes you to these legal documents.
• Getting Started provides a summary of how to navigate using Acrobat Reader.
• Contact Us provides you with phone, fax and on-line information.

Text links are easily identified by blue type. The catalog files are fully bookmarked to make navigation quick and easy. Each catalog also has a bookmark which will take you to the Parker web home page for that division if you are online while you are viewing the CD. You must first enter your web browser information into the Acrobat preferences.

Adobe and Acrobat are registered trademarks of Adobe Systems Inc.
Windows is a registered trademark of Microsoft Corp.