Hi-Drive Series
Flexible Servo Drive
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Flexible Servo Drive - Hi-Drive

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Parker Hannifin

The global leader in motion and control technologies

A world class player on a local stage

Global Product Design
Parker Hannifin has more than 40 years experience in the design and manufacturing of drives, controls, motors and mechanical products. With dedicated global product development teams, Parker draws on industry-leading technological leadership and experience from engineering teams in Europe, North America and Asia.

Local Application Expertise
Parker has local engineering resources committed to adapting and applying our current products and technologies to best fit our customers’ needs.

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Parker is committed to meeting the increasing service demands that our customers require to succeed in the global industrial market. Parker’s manufacturing teams seek continuous improvement through the implementation of lean manufacturing methods throughout the process. We measure ourselves on meeting our customers’ expectations of quality and delivery, not just our own. In order to meet these expectations, Parker operates and continues to invest in our manufacturing facilities in Europe, North America and Asia.

Electromechanical Worldwide Manufacturing Locations

Europe
Littlehampton, United Kingdom
Dijon, France
Offenburg, Germany
Filderstadt, Germany
Milan, Italy

Asia
Wuxi, China
Jangan, Korea
Chennai, India

North America
Rohnert Park, California
Irwin, Pennsylvania
Charlotte, North Carolina
New Ulm, Minnesota

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Parker provides sales assistance and local technical support through a network of dedicated sales teams and authorized technical distributors throughout Europe.

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Flexible Servo Drive - Hi-Drive

Overview

Description
Hi-Drive is a fully digital drive for brushless motors with currents from 2 to 450 A and operating from 230 VAC or 480 VAC supplies. Hi-Drive is able to control induction motors; its target market is where high precision, accuracy, performance, fieldbus connectivity and custom applications are required. Hi-Drive features several built-in motion control functions, including current, torque and speed control, positioning with trapezoidal profiles, digital lock with variable ratio and phase correction, electronic cam, real-time mode, S-ramp positioning, homing functions and position capture.

An axis card with Power PC 400 MHz micro processor which is able to control up to 32 interpolated axes via CANopen DS402, further enhances the Hi-Drive functionality. The Hi-Drive series is suited for simple as well as extremely sophisticated applications such as: Printing machines, wood and metal working machines, feeders, palletizers, applications with different interpolated axes and robots.

Features
- Current, torque and speed control
- Positioner with trapezoidal profile and S-ramps
- Digital lock with variable ratio and phase correction
- Electronic cam
- Configurable feedback input
- Configurable second encoder input
- Fieldbus RS232, RS422/485, SBCCan, EtherCAT, CANopen DS402, PROFINET
- DC bus connection to clamping board is possible (mono or three-phased)
- Built-in braking resistor (to 45 A)
- Safety relay optional CAT.3 EN 954-1
- Built-in EMC filter: HID2...HID10, HID75...HID450
- Built-in three-phased line choke (HID75...HID155)

Technical Characteristics - Overview

<table>
<thead>
<tr>
<th>Device</th>
<th>Nominal current [A]</th>
<th>Peak current [A]</th>
<th>Peak current time [s]</th>
<th>Frame size</th>
</tr>
</thead>
<tbody>
<tr>
<td>HID2</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>HID5</td>
<td>5</td>
<td>10</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>HID8</td>
<td>8</td>
<td>16</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>HID10</td>
<td>10</td>
<td>20</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>HID15</td>
<td>15</td>
<td>30</td>
<td>5</td>
<td>5</td>
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<tr>
<td>HID16</td>
<td>16</td>
<td>32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HID25</td>
<td>25</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HID35</td>
<td>35</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HID45</td>
<td>45</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HID75</td>
<td>75</td>
<td>135</td>
<td></td>
<td>4</td>
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<tr>
<td>HID100</td>
<td>100</td>
<td>180</td>
<td></td>
<td></td>
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<tr>
<td>HID130</td>
<td>130</td>
<td>234</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HID155</td>
<td>155</td>
<td>232</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HID250</td>
<td>250</td>
<td>375</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>HID450</td>
<td>450</td>
<td>675</td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>
Applications

Trajectory control of a six axis vertical robot

This is a six axis vertical robot that drives the globe in order to direct a laser pointer on the desired city, selected from the onboard operator panel or from a remote interface. The application is driven by six servo drives, controlled by a CN board integrated in one of the drives. In the board resides the interpolation and transformation part of the robot coordinates. The data for the optimized trajectory are transmitted to the individual axes via CANopen with DSP402 profile, at defined times by the sync protocol. In order to reach motion uniformity, the controller card transmits the demand speed together with the optimized motion data. Thus, every servo drive can internally execute a cubical interpolation of the information received. Moreover at every synch the real CN quota are sent back to the six joints.

The human-machine interface is represented by an industrial PC. By the PC, the operator choose in a graphical globe the city it wants to reach and gives the start/stop command.
# Technical Characteristics

## Technical Data

### Hi-Drive

<table>
<thead>
<tr>
<th>Model</th>
<th>HID2</th>
<th>HID5</th>
<th>HID8</th>
<th>HID10</th>
<th>HID15</th>
<th>HID16</th>
<th>HID25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

#### Supply voltage and device currents

<table>
<thead>
<tr>
<th>Supply voltage</th>
<th>[V]</th>
<th>200...277 VAC single phase (±10 %) 50-60 Hz (±5 %)</th>
<th>200...480 VAC three phase (±10 %) 50-60 Hz (±5 %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal current</td>
<td>[A]</td>
<td>2 5 8 10 15 16 25</td>
<td>4 10 16 20 30 32 50</td>
</tr>
<tr>
<td>Peak current time</td>
<td>[s]</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Control Voltage</td>
<td>[V]</td>
<td>24 VDC (0/ +10 %)</td>
<td>24 VDC (0/ +10 %)</td>
</tr>
<tr>
<td>Overload</td>
<td>200 % for 2 s</td>
<td>200 % for 2 s</td>
<td></td>
</tr>
</tbody>
</table>

### Model

<table>
<thead>
<tr>
<th>HID35</th>
<th>HID45</th>
<th>HID75</th>
<th>HID100</th>
<th>HID130</th>
<th>HID155</th>
<th>HID250</th>
<th>HID450</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Supply voltage and device currents

<table>
<thead>
<tr>
<th>Supply voltage</th>
<th>[V]</th>
<th>200...480 VAC three phase (±10 %) 50-60 Hz (±5 %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal current</td>
<td>[A]</td>
<td>35 45 75 100 130 155 250 450</td>
</tr>
<tr>
<td>Peak current</td>
<td>[A]</td>
<td>70 90 135 180 234 232 375 675</td>
</tr>
<tr>
<td>Peak current time</td>
<td>[s]</td>
<td>2 3 4.5</td>
</tr>
<tr>
<td>Control Voltage</td>
<td>[V]</td>
<td>24 VDC (0/ +10 %)</td>
</tr>
<tr>
<td>Overload</td>
<td>200 % for 2 s</td>
<td></td>
</tr>
</tbody>
</table>

### Ambient Conditions

#### Temperature range

Operating temperature 0...45 °C

#### Tolerated humidity

<85 % non condensing

#### Elevation of operating site

1000 m ASL (derate by 1.5 % every 100 m)

#### Product Enclosure Rating

IP20

### Standards and Conformance

#### In compliance with Directive 89/336/EEC following the standard:

- EN61800-3 (I° and II° environment) with built-in filter when available/A11
- Electromagnetic Compatibility

#### In compliance with Directive 73/23/EEC following the standard:

- EN 50178 (Safety, Low Voltage Directive)
- EN 60204-1
- EN 61800-2
- EN 61800-5-1

#### Safety technology

EN 954-1/ISO 13849-1 (optional safety relay)

#### Conformance CE and UL

- UL508C (USA)
- CSA 22.2 No. 14-05 (Canadian)
- CE marked

#### ATEX

for use in or in connection with potentially explosive environments
Hi-Drive
Technical Characteristics

Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>Frame size</th>
<th>Height (2) [mm]</th>
<th>Width (1) [mm]</th>
<th>Depth (3) [mm]</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>HID 2-5-8-10-15</td>
<td>1</td>
<td>428</td>
<td>87</td>
<td>227</td>
<td>5.8</td>
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<tr>
<td>HID 15</td>
<td></td>
<td></td>
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<td>-</td>
</tr>
<tr>
<td>HID 16-25</td>
<td>2</td>
<td>428</td>
<td>122</td>
<td></td>
<td>8.5</td>
</tr>
<tr>
<td>HID 35-45</td>
<td>3</td>
<td>428</td>
<td>227</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>HID 75</td>
<td>4</td>
<td>660</td>
<td>250</td>
<td>320</td>
<td>40</td>
</tr>
<tr>
<td>HID 100-130-155</td>
<td>5</td>
<td>720</td>
<td>365</td>
<td>465</td>
<td>59</td>
</tr>
<tr>
<td>HID 250</td>
<td>6</td>
<td>1145</td>
<td>600</td>
<td>465</td>
<td>100</td>
</tr>
<tr>
<td>HID 450</td>
<td></td>
<td>1400</td>
<td>900</td>
<td>465</td>
<td>-</td>
</tr>
</tbody>
</table>

Connection Layout

- Motor
- Fieldbus RS232 - PC connection
- Motor resolver input
- LED STATUS
  - 5 opto-isolated digital inputs 24 VDC
  - 2 opto-isolated digital outputs 24 VDC
  - 1 digital relay output (clean contact)
  - 2 differential analogue reference ±10 V
  - 2 analog outputs (±10 V)

- Supply voltage / DC bus / Dynamic braking
- Braking module / holding brake
- Configurable encoder input
- Interface RS482/485
- Auxiliary encoder input RS422
- Encoder output
- Configurable CAN interface (2 ports)
Accessories and Options

Keypad
SK161
Optional keypad, size 2x6 characters with upload/download functions (port RS232)

Cables
- Resolver cable
- Incremental encoder cable
- Absolute encoder EnDat + SinCos cable
- Absolute encoder Hiperface + SinCos cable
- Encoder SinCos cable
- Motor cable
- Servoventilation cable

Fieldbus Options
By selecting one of the numerous fieldbus options the Hi-Drive becomes a highly versatile networked drive. EtherCAT based on the Ethernet industry standard, has been implemented within the Hi-Drive to exploit operating performance of industrial PC’s.
- EtherCAT
- CANopen (DS402)
- Profinet DP
- PROFINET
- SBCCan (standard)
Axis Board

High performances CN

This board is an axis controller which can be integrated into the Hi-Drive in order to increase the servo drive performance. The board can generate trajectories of “n” interpolated axes with a low dissipated power, piloting the slave axis via CANopen DSP402. Managing resident I/O and field bus remote I/O the CN board can be linked to the plant network or to any operator panels via Ethernet TCP/IP. The board is equipped with an embedded OPC server. Equipped with a multitasking real time operating system and can be programmed using standard programming and motion control languages.

- Power PC 400 MHz microprocessor
- Real time multitasking RTE operating system
- Cycle tasks, event control and background
- Interpolation of up to 32 axes for CPU
- CANopen DS402 communication channels
- Libraries with a wide range of function blocks
- 64 MB RAM, 128 MB extractable flash memory and 128 kB EEPROM
- RS232, RS485 and Ethernet

<table>
<thead>
<tr>
<th>Programming language</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structured text</td>
<td>for motion control functions</td>
</tr>
<tr>
<td>Ladder diagram</td>
<td>for machine cycles programming</td>
</tr>
<tr>
<td>ISO</td>
<td>for tool machines programming</td>
</tr>
<tr>
<td>RHLL</td>
<td>for robot programming</td>
</tr>
</tbody>
</table>

Connection to serial devices RS232
Connection to serial devices RS422/485
Modem for online service

Hi-Drive + Axis board

Device 1    Device 2    Device 3    Device 4    Device ..n    Device 16
Device 17   Device 18   Device 19   Device ..n    Device 32

Communications:
- Programming
- Online service
- Communication with other control boards
- Communication with HMI
- OPC Server
- SCADA
Software

MotionWiz and LogicLab

The free MotionWiz configuration software is available to configure the Hi-Drive system with just a few clicks of the mouse. MotionWiz features a simple and user-friendly interface to speed up installation, optimization and diagnostics procedures. To simplify configuration, MotionWiz shows a typical Windows® environment on the monitor with dialogue windows and toolbars. MotionWiz permits performing operations in both "online" mode, directly in the device, and in "offline" mode on a remote PC. In this case, personalized configuration can be sent to the mechanism subsequently. To simplify the configuration of systems with a large number of axis but with different cuts and the same operating mode, MotionWiz permits maintaining the same mechanism configuration and only changing the type of selected motor. Inside the MotionWiz configurator is a database containing the data of standard Parker motors. MotionWiz incorporates "picoPLC", a built-in PLC environment programmable with standard languages. PicoPLC allows the external word to communicate with the drive and to execute function sequences. If the customer application requires additional calculation resources, an option board programmable with PLC commands in accordance with IEC61131-3 can be inserted.
# Order Code

**Hi-Drive**

<table>
<thead>
<tr>
<th>1</th>
<th>Device family</th>
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<tbody>
<tr>
<td><strong>HID</strong></td>
<td>Servo drive</td>
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<table>
<thead>
<tr>
<th>2</th>
<th>Version</th>
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<tr>
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<td>Standard version</td>
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<td><strong>X</strong></td>
<td>ATEX device version</td>
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<table>
<thead>
<tr>
<th>3</th>
<th>Device current (nominal current rms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2 A</td>
</tr>
<tr>
<td>5</td>
<td>5 A</td>
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<tr>
<td>8</td>
<td>8 A</td>
</tr>
<tr>
<td>10</td>
<td>10 A</td>
</tr>
<tr>
<td>15</td>
<td>15 A</td>
</tr>
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<td>16</td>
<td>16 A</td>
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<td>35</td>
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<tr>
<td>45</td>
<td>45 A</td>
</tr>
<tr>
<td>75</td>
<td>75 A</td>
</tr>
<tr>
<td>100</td>
<td>100 A</td>
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<tr>
<td>130</td>
<td>130 A</td>
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<tr>
<td>155</td>
<td>155 A</td>
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<tr>
<td>250</td>
<td>250 A</td>
</tr>
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<td>450 A</td>
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<table>
<thead>
<tr>
<th>4</th>
<th>Protocol</th>
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<tr>
<td><strong>S</strong></td>
<td>SBCCan (standard)</td>
</tr>
<tr>
<td><strong>D</strong></td>
<td>CANopen (DS402)</td>
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</table>

<table>
<thead>
<tr>
<th>5</th>
<th>Second input encoder</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S</strong></td>
<td>for SinCos - 1 Vpp signal</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td>for digital signals after quadrature - RS422</td>
</tr>
<tr>
<td><strong>H</strong></td>
<td>for SinCos signal + Hall sensor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Y1...Y3</th>
<th>Option cards (slot1, slot2, slot3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Empty field</strong></td>
<td>without option</td>
</tr>
<tr>
<td><strong>P</strong></td>
<td>PROFINET</td>
</tr>
<tr>
<td><strong>I</strong></td>
<td>I/O option (8 digital inputs, 8 digital outputs)</td>
</tr>
<tr>
<td><strong>E5</strong></td>
<td>EtherCAT</td>
</tr>
<tr>
<td><strong>P1</strong></td>
<td>PROFINET</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Axis board, without compact flash</td>
</tr>
<tr>
<td><strong>C1</strong></td>
<td>Axis card for up to 1.5 axes (with CANopen DS402)</td>
</tr>
<tr>
<td><strong>C2</strong></td>
<td>Axis card for up to 4 axes (with CANopen DS402)</td>
</tr>
<tr>
<td><strong>C3</strong></td>
<td>Axis card for up to 32 axes (with CANopen DS402)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9</th>
<th>Safety technology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Empty field</strong></td>
<td>without option</td>
</tr>
<tr>
<td><strong>R</strong></td>
<td>Built-in Safety relay cat. 3 in accordance with EN 954-1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10</th>
<th>Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Empty field</strong></td>
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</tr>
<tr>
<td><strong>M</strong></td>
<td>Memory area for retentive variables</td>
</tr>
</tbody>
</table>
At Parker, we’re guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further info call 08000 27 27 5374

### Fluid & Gas Handling

**Key Products**

- Check valves
- Connectors for low pressure fluid conveyance
- Deep sea umbilicals
- Diagnostic equipment
- Hose subassemblies
- Industrial hose
- Misting systems & power cables
- PTFE hose & tubing
- Quick couplings
- Rubber & thermoplastic hose
- Tubing & fittings & adapters
- Tubing & plastic fittings

### Hydraulics

**Key Markets**

- Aerial lift
- Agriculture
- Alternative energy
- Construction machinery
- Food & beverage
- Industrial machinery
- Marine
- Mining
- Mobile
- Oil & gas
- Renewable energy
- Transportation

**Key Products**

- Compression
- Connectors for low pressure fluid conveyance
- Diagnostic equipment
- Industrial hose
- Misting systems & power cables
- PTFE hose & tubing
- Quick couplings
- Rubber & thermoplastic hose
- Tubing & fittings & adapters
- Tubing & plastic fittings

### Pneumatics

**Key Markets**

- Aerial lift
- Agriculture
- Alternative energy
- Construction machinery
- Food & beverage
- Industrial machinery
- Marine
- Mining
- Mobile
- Oil & gas
- Renewable energy
- Transportation

**Key Products**

- Accumulators
- Cartridge valves
- Electrohydraulic actuators
- Fluid conveyance systems & components
- Fluid metering, delivery & atomization devices
- Fuel systems & components
- Fuel tank fueling systems
- Hydraulic systems & components
- Thermal management
- Wheels & brakes

### Process Control

**Key Markets**

- Aerial lift
- Agriculture
- Alternative energy
- Construction machinery
- Food & beverage
- Industrial machinery
- Marine
- Mining
- Mobile
- Oil & gas
- Renewable energy
- Transportation

**Key Products**

- Analytical instruments
- Analytical sample conditioning products & systems
- Chemical injection fittings & valves
- Fluoropolymer chemical delivery fittings, valves & pumps
- High purity gas delivery fittings, valves, regulators & digital flow controllers
- Industrial mass flow meters & controllers
- Process control double block & bleed
- Process control fittings, valves, regulators & manifold valves

### Electromechanical

**Key Markets**

- Aerospace
- Factory automation
- Life sciences & medical
- Machine tools
- Packaging machinery
- Paper machinery
- plastics machinery & converting
- Primary metals
- Semiconductor & electronics
- Tooling
- Wire & cable

**Key Products**

- AC/DC drives & systems
- Electric actuators, gantry robots & slides
- Electrophysical actuation systems
- Electromechanical actuation systems
- Linear motors
- Stepper motors, servo motors, drives & controls
- Structural extrusions

### Filtration

**Key Markets**

- Aerospace
- Chemical processing
- Compressed air filters & dryers
- Engine air, coolant, fuel & oil filtration systems
- Fluid condition monitoring systems
- Hydraulic & lubrication filters
- Hydrogen, nitrogen & zero air generators
- Instrumentation filters
- Membranes & pocket filters
- Microfiltration
- Sterile air filtration
- Water desalination & purification filters & systems

**Key Products**

- Analytical gas generators
- Compressed air filters & dryers
- Engine air, coolant, fuel & oil filtration systems
- Fluid condition monitoring systems
- Hydraulic & lubrication filters
- Hydrogen, nitrogen & zero air generators
- Instrumentation filters
- Membranes & pocket filters
- Microfiltration
- Sterile air filtration
- Water desalination & purification filters & systems

### Sealing & Shielding

**Key Markets**

- Aerospace
- Chemical processing
- Compressed air filters & dryers
- Engine air, coolant, fuel & oil filtration systems
- Fluid condition monitoring systems
- Hydraulic & lubrication filters
- Hydrogen, nitrogen & zero air generators
- Instrumentation filters
- Membranes & pocket filters
- Microfiltration
- Sterile air filtration
- Water desalination & purification filters & systems

**Key Products**

- Dynamic seals
- Elastic o-rings
- Electro-medical instrument design & assembly
- EMI shielding
- Entrained & precision cut, fabricated elastomeric seals
- High temperature metal seals
- Homogeneous & marbled elastomeric sheets
- Medical device fabrication & assembly
- Metal & plastic retained composite seals
- Shielded optical windows
- Silicone tubing & extrusions
- Thermal management
- Vibration dampening

### Parker’s Motion & Control Technologies

- Rotary actuators
- Integrated hydraulic circuits
- Hydrostatic steering
- Hydraulic motors & pumps
- Hydraulic systems
- Hydraulic valves & controls
- Hydraulic steering
- Integrated hydraulic circuits
- Power take-offs
- Power units
- Rotary actuators
- Sensors

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**Extraction:**

- **Fluid & Gas Handling**
- **Hydraulics**
- **Pneumatics**
- **Process Control**
- **Electromechanical**
- **Filtration**
- **Sealing & Shielding**

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**Extraction:**

- **Key Markets**
- **Key Products**
- **Aerospace**
- **Climate Control**
- **Electromechanical**
- **Filtration**
- **Sealing & Shielding**

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**Extraction:**

- **Key Markets**
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**Extraction:**

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