MGV Series
High-Speed Motors for Test Rigs
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High-Speed Motors for Test Rigs - MGV

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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.

Manufacturing to Meet Our Customers’ Needs
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.

Worldwide Manufacturing Locations
Europe
Littlehampton, United Kingdom
Dijon, France
Offenburg, Germany
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Asia
Shanghai, China
Chennai, India

North America
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Wadsworth, Ohio
Charlotte, North Carolina
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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.

For contact information, please refer to the Sales Offices on the back cover of this document or visit www.parker.com
High-Speed Motors for Test Rigs - MGV

Overview

Description
MGV Series Servomotors are innovative direct drive solutions specially designed for applications that require high speeds and low inertias. MGV motors can be found in many automotive or aeronautical component test rigs (starters, pumps, alternators, gearboxes...). Highly responsive with exceptional dynamic performance, MGV motors are ideally suited to the needs of simulation testing: speed in urban cycle or motor racing, speed acyclism of an internal combustion engine, etc...

Features
- High maximum speeds avoid the need for mechanical gearing
- Low inertia allows very fast acceleration/deceleration
- Constant power operation above nominal speed removes the requirement to oversize the drive
- Water cooling ensures compact size and low noise operation
- High dynamic capabilities allow the operating conditions of the tested product to be accurately reproduced

Applications
- Engine testing
  - Lorries
  - Cars
  - Motorbikes
- Components testing
  - Gearboxes
  - Differentials
  - Bearings
  - Belts
  - ...

Technical Characteristics - Overview

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
<td>Up to 230 kW</td>
</tr>
<tr>
<td><strong>Speed</strong></td>
<td>Up to 45 000 min(^{-1})</td>
</tr>
<tr>
<td><strong>Field weakening</strong></td>
<td>Depending on the capabilities of the drive</td>
</tr>
<tr>
<td><strong>Mounting*</strong></td>
<td>Flange B3</td>
</tr>
<tr>
<td><strong>Protection degree</strong></td>
<td>IP40 as standard</td>
</tr>
<tr>
<td><strong>Cooling method</strong></td>
<td>Water jacket</td>
</tr>
<tr>
<td><strong>Supply voltage</strong></td>
<td>400 VAC</td>
</tr>
<tr>
<td><strong>Connections</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.2 m flying cable for power and thermal probe</td>
</tr>
<tr>
<td></td>
<td>Connector for feedback sensor signal</td>
</tr>
<tr>
<td><strong>Stator winding isolation</strong></td>
<td>Class F in accordance with EN60034-1 (overmolding)</td>
</tr>
<tr>
<td><strong>Thermal protection</strong></td>
<td>1 PTC 150 probe as standard</td>
</tr>
<tr>
<td><strong>Rotor balancing</strong></td>
<td>G1 quality</td>
</tr>
<tr>
<td><strong>Shaft end</strong></td>
<td>Solid smooth shaft as standard</td>
</tr>
<tr>
<td><strong>Bearings</strong></td>
<td>Steel or ceramic depending on speed and load</td>
</tr>
<tr>
<td><strong>Feedback sensor</strong></td>
<td>2 poles resolver</td>
</tr>
</tbody>
</table>

\* Note: the motors are designed for horizontal operation. In case of vertical installation, please contact us.
MGV Series are permanent magnet brushless servomotors integrated into a compact water cooled frame. MGV Series servomotors are especially suitable for Automotive and Aerospace components testing, where they offer a large number of advantages over traditional fan ventilated induction motors:

- **Increased maximum speeds**
- **Removal of mechanical gearing**
- **Reduced size**
- **Reduced noise**

A large number of winding variants are available, meeting any desired torque / speed characteristics up to 230 kW.

**Drawings**

![Diagram of MGV Series servomotor](image)

- Water inlet / out
- Holes for lifting bolts
- Power cable output
- Feedback sensor connector
- Output

![Image of MGV Series servomotor test rig](image)
## Drive Associations

<table>
<thead>
<tr>
<th>Motor</th>
<th>Drive</th>
<th>S1 Power P [kW]</th>
<th>Low speed torque S1 M₀ [Nm]</th>
<th>Base speed Nb [min⁻¹]</th>
<th>Max. speed N [min⁻¹]</th>
<th>Permanent current at low speed I₀ [Aₘₐₓ]</th>
<th>Inertia J [kgmm²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGV430BAL</td>
<td>Drive 25/51 - 400</td>
<td>10</td>
<td>7.3</td>
<td>13100</td>
<td>45000</td>
<td>24.7</td>
<td>890</td>
</tr>
<tr>
<td>MGV430BAI</td>
<td>Drive 35/79 - 400</td>
<td>15.6</td>
<td>6.8</td>
<td>21900</td>
<td>45000</td>
<td>35</td>
<td>890</td>
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<tr>
<td>MGV635CAF</td>
<td>Drive 37/57 - 400</td>
<td>15.6</td>
<td>20</td>
<td>7450</td>
<td>30000</td>
<td>36.6</td>
<td>3520</td>
</tr>
<tr>
<td>MGV635CAD</td>
<td>Drive 55/85 - 400</td>
<td>25</td>
<td>20</td>
<td>11900</td>
<td>30000</td>
<td>54.8</td>
<td>3520</td>
</tr>
<tr>
<td>MGV840CAR</td>
<td>Drive 24/37 - 400</td>
<td>10</td>
<td>68</td>
<td>1410</td>
<td>24000</td>
<td>23.2</td>
<td>18600</td>
</tr>
<tr>
<td>MGV840CAH</td>
<td>Drive 73/114 - 400</td>
<td>32</td>
<td>68</td>
<td>4500</td>
<td>24000</td>
<td>72.6</td>
<td>18600</td>
</tr>
<tr>
<td>MGV840CAF</td>
<td>Drive 94/151 - 400</td>
<td>44</td>
<td>66</td>
<td>6370</td>
<td>24000</td>
<td>93.8</td>
<td>18600</td>
</tr>
<tr>
<td>MGV840CAD</td>
<td>Drive 123/227 - 400</td>
<td>63</td>
<td>58</td>
<td>10300</td>
<td>24000</td>
<td>123</td>
<td>18600</td>
</tr>
<tr>
<td>MGV950CAC</td>
<td>Drive 222/456 - 400</td>
<td>105</td>
<td>200</td>
<td>5010</td>
<td>20000</td>
<td>252</td>
<td>63000</td>
</tr>
<tr>
<td>MGV950CAX</td>
<td>Drive 454/821 - 400</td>
<td>175</td>
<td>200</td>
<td>8350</td>
<td>20000</td>
<td>454</td>
<td>63000</td>
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<tr>
<td>MGV970CBX</td>
<td>Drive 542/661 - 400</td>
<td>230</td>
<td>390</td>
<td>5630</td>
<td>12000</td>
<td>542</td>
<td>86000</td>
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<tr>
<td>MGVA50DAC</td>
<td>Drive 154/191 - 400</td>
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<td>480</td>
<td>1330</td>
<td>12000</td>
<td>154</td>
<td>292000</td>
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<tr>
<td>MGVA50DAB</td>
<td>Drive 230/287 - 400</td>
<td>101</td>
<td>480</td>
<td>2010</td>
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<td>230</td>
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<tr>
<td>MGVA50DAA</td>
<td>Drive 439/598 - 400</td>
<td>200</td>
<td>460</td>
<td>4150</td>
<td>12000</td>
<td>439</td>
<td>292000</td>
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<tr>
<td>MGVA50DBB</td>
<td>Drive 470/660 - 400</td>
<td>195</td>
<td>620</td>
<td>3000</td>
<td>12000</td>
<td>465.2</td>
<td>292000</td>
</tr>
</tbody>
</table>

### Global solution

#### Easy integration

Parker Hiross has been designing and manufacturing equipment for industrial water cooling since 1964. Using closed circuits, pollution and waste water are eliminated and efficiency is improved, resulting in energy savings. Hyperchill products can be used to cool the MGV motor enabling you to benefit from a completed integrated Parker solution. We can also help you in the selection, assembly and use of a torque measuring flange that meets your needs.

#### Benefits

- A complete solution from a single supplier
- Maximum reliability
- An optimized system
- Low noise system (deported system)
**Drive Associations**

**Complete and powerful AFE 4Q solution**

When using Parker’s drives in an AFE configuration, harmonic distortion is reduced to (THD < 3%) in accordance with IEEE519 and allows power to be fed back onto the supply grid. In addition, MGV motors benefit from the use of field-weakening which enable them to deliver high torque at low speed as well as constant power from nominal up to maximum speed.

This removes the need to oversize the drive.

<table>
<thead>
<tr>
<th>Motor</th>
<th>AC890 drive</th>
<th>S1 power P S1 [kW]</th>
<th>Low speed torque S1 M, [Nm]</th>
<th>Base speed Nb [min⁻¹]</th>
<th>Max. speed N [min⁻¹]</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGV430BAL</td>
<td>890SD-53230SC</td>
<td>10</td>
<td>7.3</td>
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<td>27900</td>
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<tr>
<td>MGV430BAI</td>
<td>890SD-532450D</td>
<td>16</td>
<td>6.8</td>
<td>22000</td>
<td>30000</td>
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<tr>
<td>MGV635CAF</td>
<td>890SD-532450D</td>
<td>16</td>
<td>20</td>
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<td>15800</td>
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<tr>
<td>MGV635CAD</td>
<td>890SD-532590D</td>
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<td>18</td>
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<td>20000</td>
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<tr>
<td>MGV635CAD</td>
<td>890SD-432730E</td>
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<td>20</td>
<td>12000</td>
<td>16000</td>
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<tr>
<td>MGV840CAP</td>
<td>890SD-532450D</td>
<td>16</td>
<td>68</td>
<td>2300</td>
<td>4510</td>
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<tr>
<td>MGV840CAH</td>
<td>890SD-432870E</td>
<td>32</td>
<td>68</td>
<td>4500</td>
<td>9010</td>
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</table>

<table>
<thead>
<tr>
<th>Motor</th>
<th>Motor Digivex</th>
<th>S1 power P S1 [kW]</th>
<th>Low speed torque S1 M, [Nm]</th>
<th>Base speed Nb [min⁻¹]</th>
<th>Max. speed N [min⁻¹]</th>
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<tr>
<td>MGV430BAL</td>
<td>DIGIVEX 32/64</td>
<td>9.7</td>
<td>6.9</td>
<td>13000</td>
<td>45000</td>
</tr>
<tr>
<td>MGV430BAI</td>
<td>DIGIVEX 50/80</td>
<td>16</td>
<td>6.8</td>
<td>22000</td>
<td>45000</td>
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<tr>
<td>MGV635CAF</td>
<td>DIGIVEX 50/80</td>
<td>16</td>
<td>19</td>
<td>7600</td>
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<tr>
<td>MGV635CAD</td>
<td>DIGIVEX 100/120</td>
<td>25</td>
<td>20</td>
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<td>MGV840CAP</td>
<td>DIGIVEX 50/80</td>
<td>16</td>
<td>66</td>
<td>2300</td>
<td>24000</td>
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<tr>
<td>MGV840CAH</td>
<td>DIGIVEX 100/120</td>
<td>32</td>
<td>66</td>
<td>4600</td>
<td>24000</td>
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<tr>
<td>MGV840CAF</td>
<td>DIGIVEX 150</td>
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<td>66</td>
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<td>24000</td>
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<tr>
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<td>DIGIVEX 300</td>
<td>63</td>
<td>58</td>
<td>10000</td>
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<tr>
<td>MGV50DAC</td>
<td>DIGIVEX 300</td>
<td>67</td>
<td>480</td>
<td>1300</td>
<td>12000</td>
</tr>
</tbody>
</table>
## Dimensions

![Motor Dimensions Diagram](image)

<table>
<thead>
<tr>
<th>Motor</th>
<th>Dimensions [mm]</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
<td>L1</td>
</tr>
<tr>
<td>MGV430</td>
<td>376</td>
<td>225</td>
</tr>
<tr>
<td>MGV635</td>
<td>444</td>
<td>275</td>
</tr>
<tr>
<td>MGV840</td>
<td>531</td>
<td>334</td>
</tr>
<tr>
<td>MGV950</td>
<td>1050</td>
<td>496</td>
</tr>
<tr>
<td>MGV970</td>
<td>1250</td>
<td>658</td>
</tr>
<tr>
<td>MGVA50</td>
<td>1300</td>
<td>650</td>
</tr>
</tbody>
</table>
# Order Code

<table>
<thead>
<tr>
<th>MGV Series</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Order example</td>
<td>MGV</td>
<td>840</td>
<td>CAE</td>
<td>A</td>
<td>B3</td>
<td>L</td>
<td>R</td>
<td>1</td>
<td>000</td>
</tr>
</tbody>
</table>

1. **Product series**  
   - MGV: Water cooling high speed motors

2. **Size**  
   - 430
   - 635
   - 840
   - see “Drive Associations” tables

3. **Torque/Speed characteristics**  
   - BAL: see “Drive Associations” tables
   - BAI
   - CAF

4. **Feedback sensor**  
   - A: Resolver
   - K: Sin/cos encoder (option)

5. **Mounting**  
   - B3: Horizontal, Foot mounting (standard)

6. **Design**  
   - L: High speed design
   - H: Very high speed design
   - X: Ultra high speed design

7. **Fix Code**  
   - R

8. **Electrical connections**  
   - 1: Power out cables 1.2 m, PTC and connector for encoder signals (standard)
   - 6: Terminal box (option)

9. **Interface**  
   - 000: Standard motor
   - Other code: customer specificity
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 00800 27 27 5374.

Parker’s Motion & Control Technologies

FLUID & GAS HANDLING

Key Markets
- Aerospace
- Agriculture
- Bulk chemical handling
- Construction machinery
- Food & beverage
- Fuel & gas delivery
- Industrial machinery
- Mobile
- Oil & gas
- Transportation
- Vehicle

Key Products
- Brass fittings & valves
- Diaphragm pumps
- Diaphragm pumps & accumulators
- Fluid conveyance systems
- Industrial hose
- PTFE & PFA hose, tubing & plastic fittings
- Rubber & Thermoplastic hose & couplings
- Tube fittings & adapters
- Quick disconnects

HYDRAULICS

Key Markets
- Aerospace
- Aerial lift
- Agriculture
- Construction machinery
- Firefighting
- Industrial machinery
- Mining
- Oil & gas
- Power generation & energy
- Truck hydraulic systems

Key Products
- Diagnostic equipment
- Hydraulic cylinders & accumulators
- Hydraulic motors & pumps
- Hydraulic systems
- Hydraulic valves & controls
- Power take-offs
- Quick disconnects
- Tube fittings & adapters

PNEUMATICS

Key Markets
- Aerospace
- Aircraft
- Aerospace
- Aerial lift
- Agriculture
- Construction machinery
- Firefighting
- Industrial machinery
- Mining
- Oil & gas
- Power generation & energy
- Truck hydraulic systems

Key Products
- Air preparation
- Compact cylinders
- Field bus valve systems
- Grippers
- Guided cylinders
- Manifolds
- Miniature fluidics
- Pneumatic accessories
- Pneumatic actuators & grippers
- Pneumatic valves & controls
- Rodless cylinders
- Rotary actuators
- Train air cylinders
- Vacuum generators, cups & sensors

PROCESS CONTROL

Key Markets
- Chemical & refining
- Food, beverage & dairy
- Medical & dental
- Life science & medical
- Machine tools
- Packaging machinery
- Power generation

Key Products
- Analytical sample conditioning products & systems
- Fluoropolymer chemical delivery fittings, valves & pumps
- High purity gas delivery fittings, valves & regulators
- Instrumentation fittings, valves & regulators
- Medium pressure fittings & valves
- Process control manifolds

FILTERATION

Key Markets
- Food & beverage
- Industrial machinery
- Life sciences
- Marine
- Mobile equipment
- Oil & gas
- Power generation
- Process
- Transportation

Key Products
- Compressed air & gas filters
- Condition monitoring
- Engine air, fuel, & oil filtration & separators
- Hydraulic, lubrication & coolant filters
- Process, chemical, water & biomethanol filters
- Nitrogen, hydrogen & zero air generators

SEALING & SHIELDING

Key Markets
- Aerospace
- Chemical processing
- Consumer
- Energy, oil & gas
- Fluid power
- General industrial
- Information technology
- Life sciences
- Military
- Semiconductor
- Telecommunications
- Transportation

Key Products
- Dynamic seals
- Elastomeric o-rings
- EMI shielding
- Exhaust & precision cut, fabricated elastomeric shapes
- Homogeneous & inserted elastomeric shapes
- High temperature metal seals
- Metal & plastic retained composite seals
- Thermal management

FILTRATION

Key Markets
- Food & beverage
- Industrial machinery
- Life sciences
- Marine
- Mobile equipment
- Oil & gas
- Power generation
- Process
- Transportation

Key Products
- Compressed air & gas filters
- Condition monitoring
- Engine air, fuel, & oil filtration & separators
- Hydraulic, lubrication & coolant filters
- Process, chemical, water & biomethanol filters
- Nitrogen, hydrogen & zero air generators
Parker Worldwide

Europe, Middle East, Africa

AE – United Arab Emirates, Dubai
Tel: +971 4 8127100	parker.me@parker.com

AT – Austria, Wiener Neustadt
Tel: +43 (0)2622 23501-0	parker.austria@parker.com

AT – Eastern Europe, Wiener Neustadt
Tel: +43 (0)2622 23501 900	parker.easteurope@parker.com

AZ – Azerbaijan, Baku
Tel: +994 50 2233 458	parker.azerbaijan@parker.com

BE/LU – Belgium, Nivelles
Tel: +32 (0)67 280 900	parker.belgium@parker.com

BY – Belarus, Minsk
Tel: +375 17 209 9399	parker.belarus@parker.com

CH – Switzerland, Etoy
Tel: +41 (0)21 821 87 00	parker.switzerland@parker.com

CZ – Czech Republic, Klecany
Tel: +420 284 083 111	parker.czechrepublic@parker.com

DE – Germany, Kaarst
Tel: +49 (0)2131 4016 0	parker.germany@parker.com

DK – Denmark, Ballerup
Tel: +45 43 56 04 00	parker.denmark@parker.com

ES – Spain, Madrid
Tel: +34 902 330 001	parker.spain@parker.com

FI – Finland, Vantaa
Tel: +358 (0)20 753 2500	parker.finland@parker.com

FR – France, Contamine s/Arve
Tel: +33 (0)4 50 25 80 25	parker.france@parker.com

GR – Greece, Athens
Tel: +30 210 933 6450	parker.greece@parker.com

HU – Hungary, Budapest
Tel: +36 1 220 4155	parker.hungary@parker.com

IE – Ireland, Dublin
Tel: +353 (0)1 466 6370	parker.ireland@parker.com

IT – Italy, Corsico (MI)
Tel: +39 02 45 19 21	parker.italy@parker.com

KZ – Kazakhstan, Almaty
Tel: +7 7272 505 800	parker.easteurope@parker.com

NL – The Netherlands, Oldenzaal
Tel: +31 (0)541 585 000	parker.nl@parker.com

NO – Norway, Asker
Tel: +47 66 75 34 00	parker.norway@parker.com

PL – Poland, Warsaw
Tel: +48 (0)22 573 24 00	parker.poland@parker.com

PT – Portugal, Leça da Palmeira
Tel: +351 22 999 7360	parker.portugal@parker.com

RO – Romania, Bucharest
Tel: +40 21 252 1382	parker.romania@parker.com

RU – Russia, Moscow
Tel: +7 495 645-2156	parker.russia@parker.com

SE – Sweden, Spånga
Tel: +46 (0)8 59 79 50 00	parker.sweden@parker.com

SK – Slovakia, Banská Bystrica
Tel: +421 484 162 252	parker.slovakia@parker.com

SL – Slovenia, Novo Mesto
Tel: +386 7 337 6650	parker.slovenia@parker.com

ZA – South Africa, Kempton Park
Tel: +27 (0)11 961 0700	parker.southafrica@parker.com

North America

CA – Canada, Milton, Ontario
Tel: +1 905 693 3000

US – USA, Cleveland
Tel: +1 216 896 3000

Asia Pacific

AU – Australia, Castle Hill
Tel: +61 (0)2-9634 7777

CN – China, Shanghai
Tel: +86 21 2899 5000

HK – Hong Kong
Tel: +852 2428 8008

IN – India, Mumbai
Tel: +91 22 6513 7081-85

JP – Japan, Tokyo
Tel: +81 (0)3 6408 3901

KR – South Korea, Seoul
Tel: +82 2 559 0400

MY – Malaysia, Shah Alam
Tel: +60 3 7849 0800

NZ – New Zealand, Mt Wellington
Tel: +64 9 574 1744

SG – Singapore
Tel: +65 6887 6300

TH – Thailand, Bangkok
Tel: +66 2 186 7000-99

TW – Taiwan, Taipei
Tel: +886 2 2298 8987

South America

AR – Argentina, Buenos Aires
Tel: +54 3327 44 1129

BR – Brazil, Sao Jose dos Campos
Tel: +55 800 727 5374

CL – Chile, Santiago
Tel: +56 2 623 1216

MX – Mexico, Apodaca
Tel: +52 51 8156 6000

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