



Parker Eco Drive

System Solution for an Optimized Die Casting Process



ENGINEERING YOUR SUCCESS.

Parker's Innovative Hydraulic Break: The Working Principle

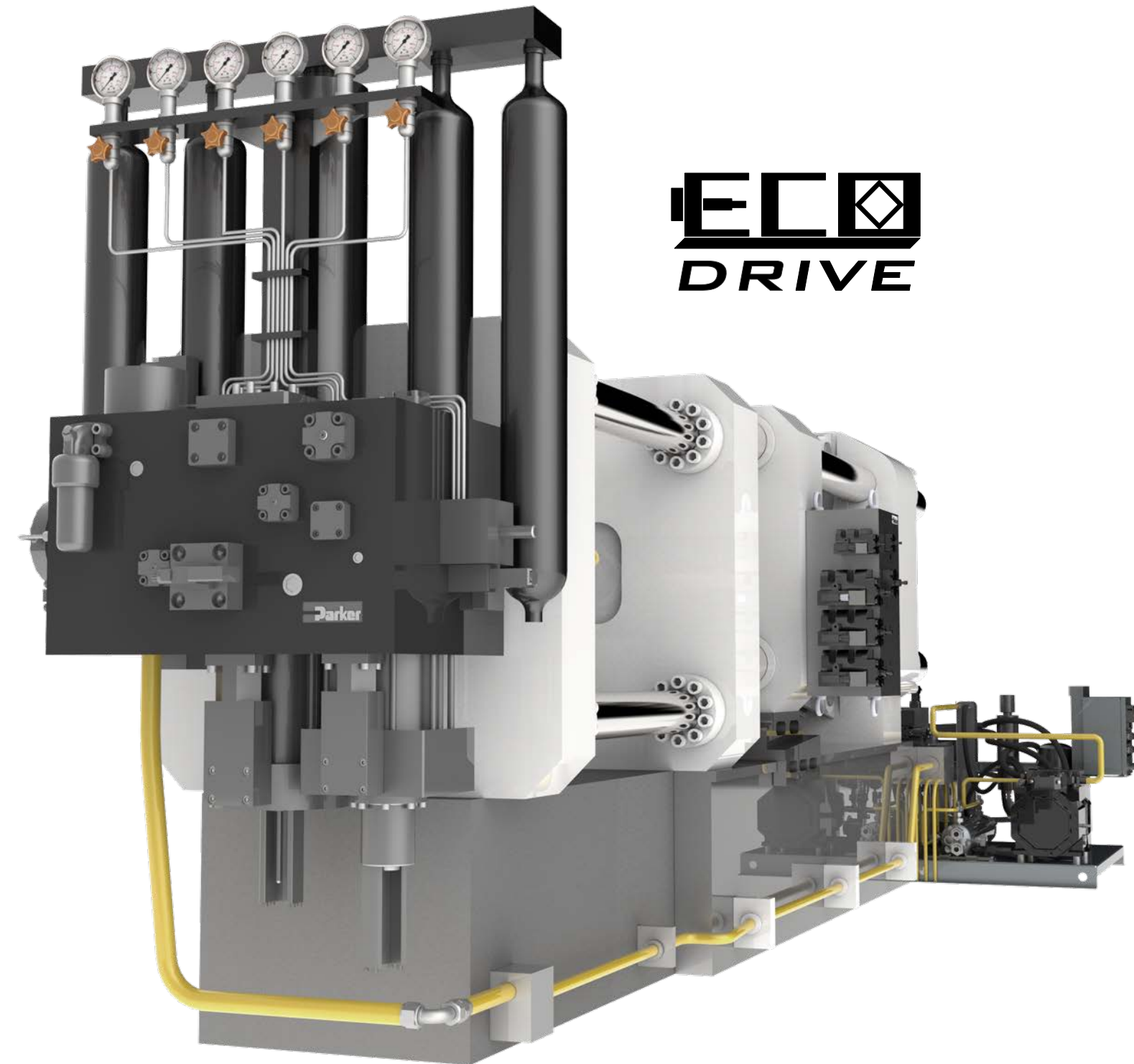
Parker Eco Drive is a system for optimizing the die casting process which both improves productivity as well as product quality. It works with two 2-way high response cartridge valves series TDP on the meter-in and meter-out side. The rod side of the cylinder is connected via a check valve with the accumulator.

In slow movement only the meter-in valve opens. As soon as the pressure on the piston side reaches enough pressure to push the oil on the rod side back to the accumulator, the cylinder starts to move. During the low-speed phase, the meter-in valve has a pressure drop of 60-70 bar (870-1050 psi) and can control the flow very accurately. The rod side of the cylinder is pre-charged to accumulator pressure and gives stable control. The oil of the rod side is recharging the accumulator. Overall only 60 % of the accumulator volume is needed.

When the cylinder is to be stopped, the meter-out valve is closed and builds up breaking force equal to the system pressure on the rod side. At the same time, the meter-in valve is closed and less force is pressing on the piston side. The cylinder can now stop without cavitation. Pressure spikes above system pressures cannot be built up on the rod side. All pressures above system pressure are decompressed via a check valve to the accumulator.

At pressure intensification, a meter-out control valve opens and the pressure inside the EcoReservoir and cylinder rod side drops over the orifice to a few bar and the cylinder piston can build up full force.

During high speed, the oil on the Rod side of the shot cylinder is discharged via the meter-out TDP to the EcoReservoir. The EcoReservoir generates a breaking pressure between 10-30 bar (150-450 psi) to decelerate the high speed drained oil.



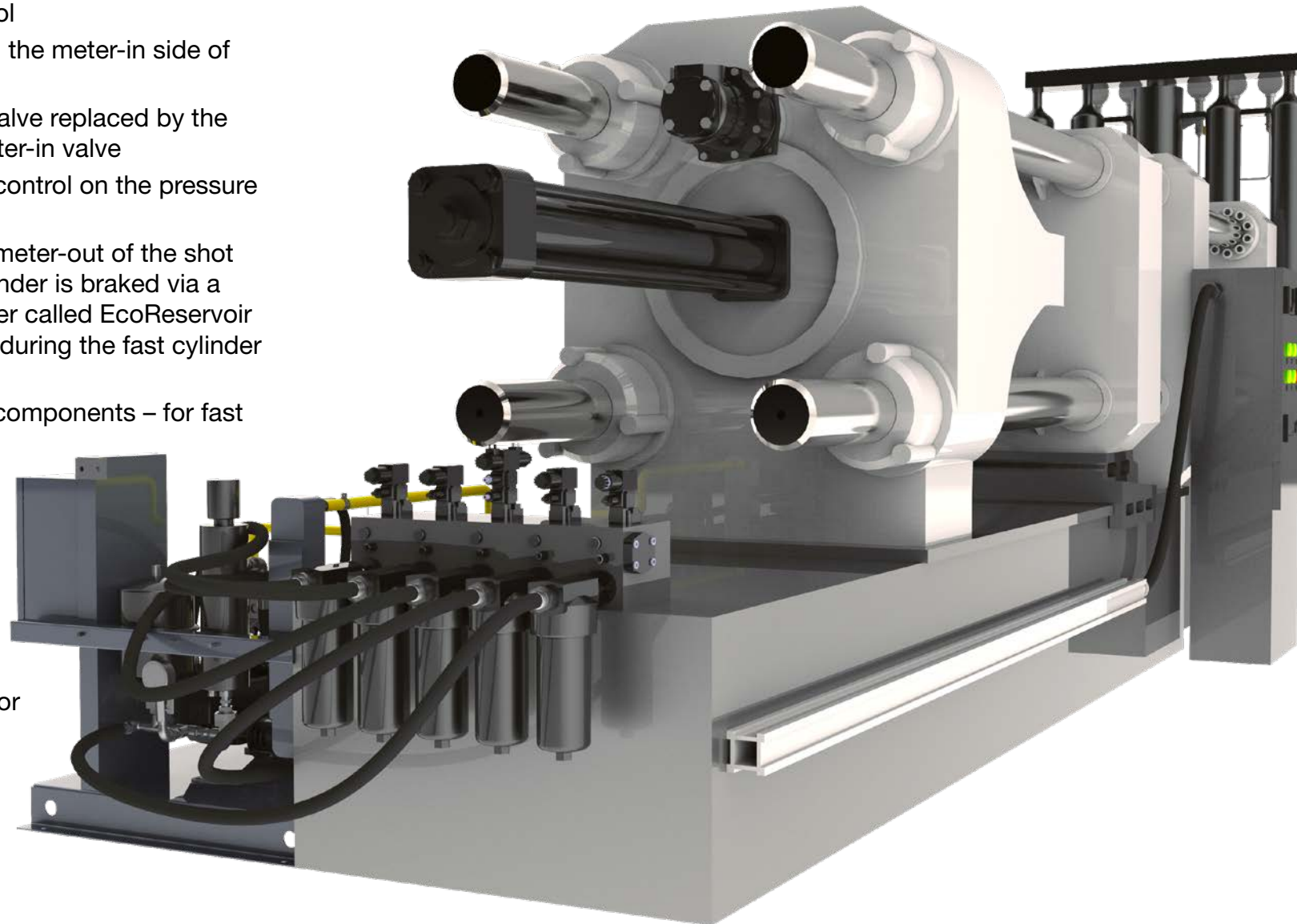
Convincing Features, Advantages and Benefits for Customers

Features

- Low speed control via servo-proportional active cartridge valve on the meter-in side. Cylinder rod side is connected back to the accumulator
- During high speed, the cylinder is controlled via servo-proportional active cartridge valves on the piston and rod side
- At brake, both valves close synchronized and generate a negative force. Closed-loop speed control
- High dynamic shot controller for real-time speed and force control
- Optimized manifold on the meter-in side of the cylinder
- High pressure check valve replaced by the servo-proportional meter-in valve
- Closed loop pressure control on the pressure intensifier
- High speed oil on the meter-out of the shot and intensification cylinder is braked via a shock absorber cylinder called EcoReservoir to eliminate cavitation during the fast cylinder stop
- External access to all components – for fast service
- Separate pilot oil filter for less system contamination
- High pressure membrane accumulators on all servo proportional active cartridge valve pilot lines for more pilot oil stability
- Low pressure membrane accumulator and check valve on the pilot oil drain line

The EcoDrive System works with the 2-way high response valves series TDP in combination with a PAC120/PACHC axis controller, enabling dynamics and accuracies that had not previously been achieved. This contributes to greater productivity since scrap is reduced to an absolute minimum. The solution keeps system pressure low and pro-

vides protection from pressure peaks and cavitation as a result of combining the side of the rod with the storage device via a check valve. This extends the lifetime of all hydraulic components of the die casting machine in the network. Up to 20 % of energy is saved as a result of energy recovery.



Advantages

- No opening jump during start phase
- Better control of the cylinder and less pressure drop due to two control edges
- Less component wear due to lower pressure drops
- Energy-saving regenerative circuitry
- No cavitation due to innovative EcoReservoir technology with mechanical self-protection, automatic retracting and decompression
- Newest technology with highest accuracy and dynamics for less scrap
- Reduces pressure losses on the manifolds for higher cylinder forces and accelerations
- Increased pump lifetime due to less air ingress
- No need for complete manifold disassembly at service
- Measuring ports on all essential components for service
- Pressure peak dampening system on all return lines via EcoReservoir or low pressure membrane accumulators

Benefits

- Increased productivity from reliable shot consistency due to increased system control for shortest payback times
- Increased system reliability from reduced component wear, stress and cavitation
- Reduced power consumption up to 45 %
- Regenerative accumulator charging
- Reduced machine downtime from elimination of sensitive components, easier component access and circuitry simplification. All manifold components can be changed within hours instead days
- Up to 30 % higher injection force at same cylinder dimensions through reduced pressure losses on the meter-in manifold at 6 m/s (235 ips) speed

The Eco Drive Solution Components at a Glance

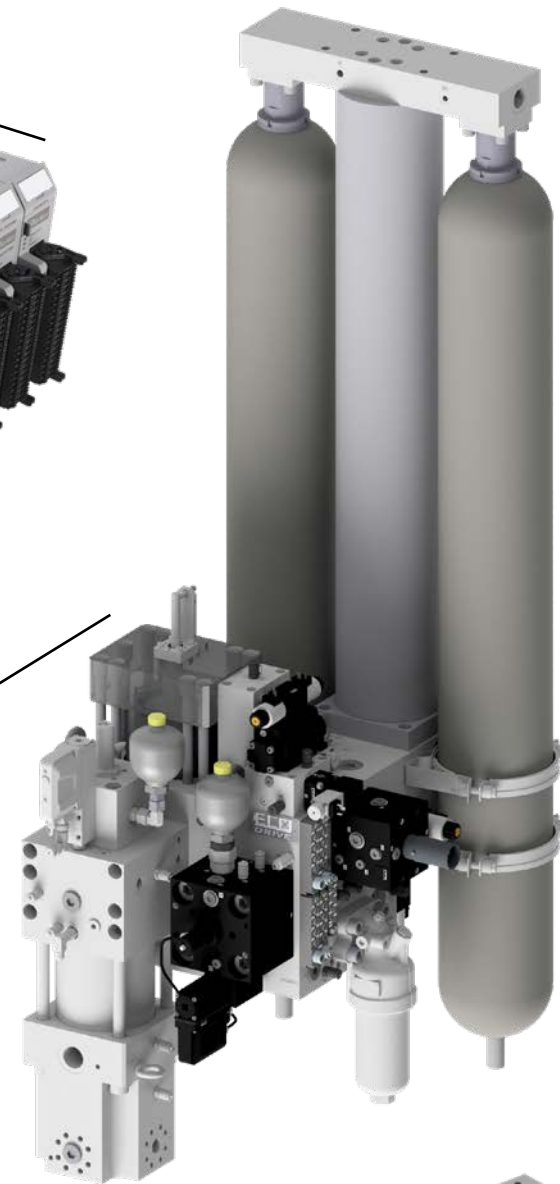
PAC120/PACHC shot controller

The new Parker Automation Controller PAC120 is a mini-IPC and a CODESYS PLC providing EtherCAT master functions for system modules which allow process signals to be directly attached to the control unit. In combination with PACHC hydraulic axis control modules, it forms a modular system for position, force and synchronization control.



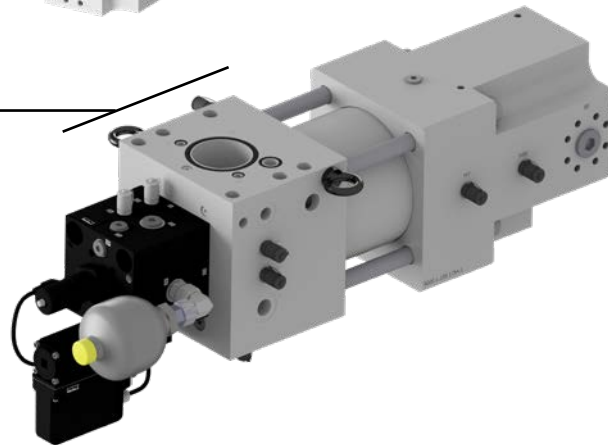
Meter-in control manifold

Meter-in manifold or all-in-one solution (for machines up to 1600 t), without high pressure check valve, external closed loop pressure intensifier with EcoReservoir, pilot oil filters, pressure sensors and optional shot cylinder available.



Meter-out manifold

Our new EcoDrive technology reduces cavitation and pressure peaks.



Drive Controlled Pump

Speed-controlled, hydraulic full-system solution, provides high energy efficiency, reduced noise emissions and lower component costs. Drive Controlled Pumps essentially consist of three components: AC drive unit (frequency controller and electronics), asynchronous or synchronous motor and a hydraulic pump.



TDP 2-way high-response valve

Parker's 2-way high response valves series TDP are particularly suitable for demanding controlled and closed loop applications where high flow (up to 15.000 l/min/4,000 gpm) has to be precisely controlled at highest dynamics.



Pressure sensor SCP08

The SCP08 is characterized by its compact design, high linearity and excellent interference immunity. It is suitable for quick control solutions because of its fast response speed. The electronics are encapsulated for protection against vibration damage and moisture.



Piston accumulator series DC

High speed piston accumulator, specially designed for die casting and press applications. The DC series provides high speed, flow and cycle rate through a piston velocity of 6 to 8 metres per second (236-315 ips).



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 22 33 458
parker.azerbaijan@parker.com

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

BG – Bulgaria, Sofia
Tel: +359 2 980 1344
parker.bulgaria@parker.com

BY – Belarus, Minsk
Tel: +48 (0)22 573 24 00
parker.poland@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, Budaoers
Tel: +36 23 885 470
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 7273 561 000
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
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

TR – Turkey, Istanbul
Tel: +90 216 4997081
parker.turkey@parker.com

UA – Ukraine, Kiev
Tel: +48 (0)22 573 24 00
parker.poland@parker.com

UK – United Kingdom, Warwick
Tel: +44 (0)1926 317 878
parker.uk@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 (industrial)
Tel: +1 216 896 3000

US – USA, Elk Grove Village (mobile)
Tel: +1 847 258 6200

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

ID – Indonesia, Tangerang
Tel: +62 21 7588 1906

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

JP – Japan, Fujisawa
Tel: +81 (0)4 6635 3050

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: +662 186 7000

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

VN – Vietnam, Ho Chi Minh City
Tel: +84 8 3999 1600

South America

AR – Argentina, Buenos Aires
Tel: +54 3327 44 4129

BR – Brazil, Cachoeirinha RS
Tel: +55 51 3470 9144

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

MX – Mexico, Toluca
Tel: +52 72 2275 4200

EMEA Product Information Centre

Free phone: 00 800 27 27 5374

(from AT, BE, CH, CZ, DE, DK, EE, ES, FI, FR, IE, IL, IS, IT, LU, MT, NL, NO, PL, PT, RU, SE, SK, UK, ZA)

US Product Information Centre

Toll-free number: 1-800-27 27 537

www.parker.com

