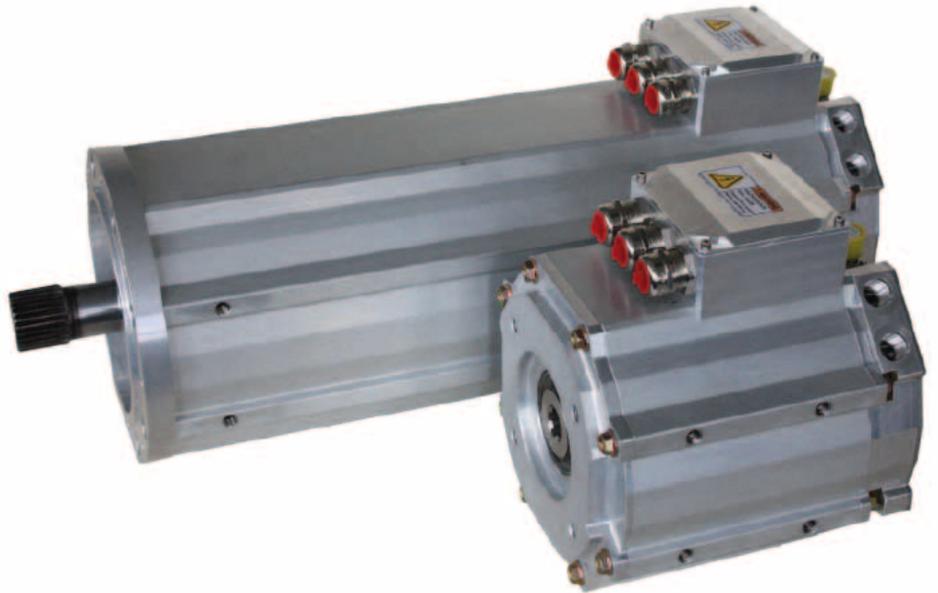




aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



GVM Global Vehicle Motor

Permanent Magnet (PMAC) Motors and Generators for Traction, Electro-Hydraulic Pumps (EHP) and Auxiliary Systems



ENGINEERING YOUR SUCCESS.



WARNING – USER RESPONSIBILITY

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

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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.

Electromechanical Worldwide Manufacturing Locations

Europe

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

Asia

Wuxi, China
Chennai, India

North America

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



Offenburg, Germany

Local Manufacturing and Support in Europe

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



Milan, Italy



Littlehampton, UK



- Electromechanical Manufacturing
- Parker Sales Offices
- Distributors



Dijon, France

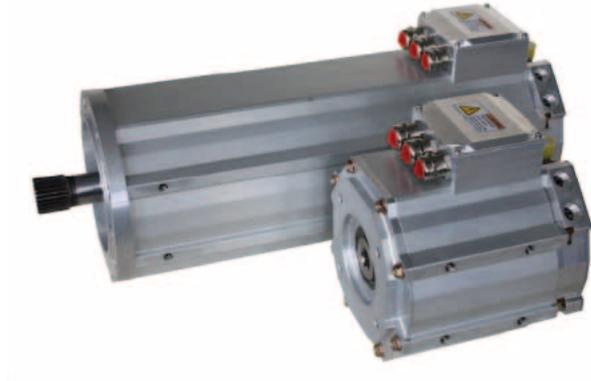
Global Vehicle Motor - GVM

Overview

Description

PMAC servomotors offer the best solution to meet the requirements of vehicle duty performance. The torque density and speed capabilities of Parker Permanent Magnet AC motors (PMAC) combined with a voltage-matched inverter provide the speed and torque required to achieve breakthrough performance in a variety of vehicle platforms.

The GVM is a powerful choice for both on- and off-road vehicles, engineered for Traction, Electro-hydraulic Pumps (EHP) and auxiliary applications. The GVM motor line was designed to be used in a wide variety of vehicle applications including; construction vehicles, refuse truck, city buses, street sweeper, motorcycles and scooters, light commercial vehicles and watercraft.



Features

- High efficiency
- Compactness (High power density)
- Customisation capability including specific mechanical design
- Can be used either as motor or generator
- Operating voltages available from 24 to 640 VDC
- Rare earth magnets allow high temperature operation
- Patent pending cooling

Typical Applications

- Electric motors/generators for hybrid applications
- Electric motors for motorbikes, scooters...
- Traction applications
- Electro-hydraulic pumps for high power cylinders
- Electric power steering
- Auxiliary applications as fan/compressors for air conditioning

Technical Characteristics - Overview

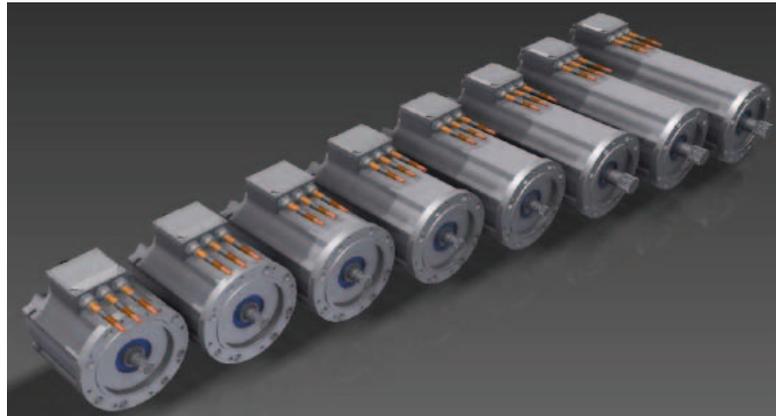
Motor type	Permanent Magnet synchronous motor
Magnet materials	Rare earth magnets
Number of poles	12
Rated voltage	24 to 640 VDC
Power range	up to 167 kW (continuous)
Torque range	up to 710 Nm max.
Speed range	up to 8000 min ⁻¹
Ambient temperature*	liquid cooled: -40 °C...+120 °C natural convection: -40 °C...+65 °C
Storage temperature*	-40 °C...+120 °C
Sensor	Resolver or SinCos encoder
Insulation of the stator winding	Class H with potting
Protection	IP65 as standard IP67 and IP6K9K on request
Random Vibration	0,1 g ² /Hz in frequency range 5-2000 Hz (12 g rms – 3 x 8h)
Operational Shock	25 g, 11 ms, 3 x 6 (with 2 directions per axis)
Thermal protection	1 PTC probes and 1 KTY84-130 sensor
Shaft end	Spline shaft (male or female), other possibilities on request
Connections	Terminal box (flying cables on request); Connector for feedback
Marking	CE

* With resolver as feedback

GVM Motors: A Powerful Range

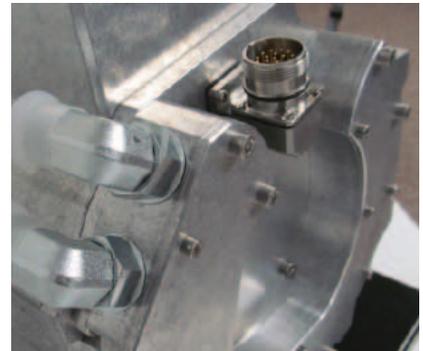
Overview

- Continuous power up to 167 kW
- High power density & compactness
- Peak torque up to 710 Nm
- Rotational speed up to 8000 min⁻¹ max.
- Low inertia / high dynamic
- Low and high voltage options 24 VDC to 640 VDC
- High modularity of standard lamination stack length
- Hollow spline shaft available for EHP and solid spline shaft for traction application



Cooling System

- Enables high power density
- Oil or water can be used in the same system
- Circular stator comprising the cooling system can be inserted in any circular housing (Parker or customer)
- Possibility for natural convection cooling

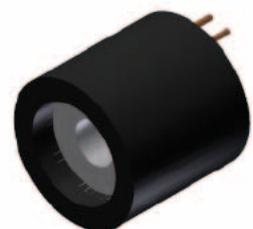


Rugged Design

- Designed to be shock-proof, vibration-proof, salt spray resistant
- Gore vent: to avoid condensation in case of sudden T° variation or during storage at low T°
- Ambient T°: -40 °C to +120 °C (liquid cooling)
- IP65 standard; IP67 / 6K9K on request

The GVM is also available as a Kit

- Available as a potted circular stator including the cooling system
- Provides the customer with a bespoke and integrated mechanical design
- Parker is able to offer support in the integration of GVM kits



Technical Characteristics

Characteristics with Natural Convection - Low voltage windings

GVM210 Stator connected to a heat-exchange surface at 60 °C without water cooling

(Characteristics are given for an optimal drive of the motor)

These associations without liquid cooling are typically dedicated to EHP due to the low speed level available.

Motor	DC Voltage Supply [V]	Rated Torque Mn [Nm]	Rated Power Pn [kW]	Rated Current In [Arms]	Rated Speed Nn [min ⁻¹]	Peak Torque Mp [Nm]	Peak Power Pp [kW]	Peak Current Ip [Arms]	Maximum Speed Nmax [min ⁻¹]
GVM210-050-RN	24	20.9	5.26	235	2400	72.4	9.6	859	3000
GVM210-100-RN	24	43.8	5.27	236	1150	141	9.3	800	1400
GVM210-150-RN	24	62.3	4.89	221	750	198	8.8	730	900
GVM210-050-ZN	36	19.5	5.71	160	2800	72.4	10.6	625	3300
GVM210-100-RN	36	36.9	7.15	201	1850	141	15.2	800	2100
GVM210-150-RN	36	57.2	6.59	204	1100	198	15.4	730	1500
GVM210-200-RN	36	70.4	6.64	188	900	251	14.0	680	1010
GVM210-050-HP	48	19.3	5.75	116	2850	72.4	11.0	458	3400
GVM210-100-ZN	48	36.3	7.23	144	1900	141	14.8	582	2100
GVM210-150-RN	48	44.5	7.92	161	1700	198	21.6	730	1900
GVM210-200-RN	48	59.3	7.89	159	1270	251	20.5	680	1400
GVM210-050-TP	72	19.1	5.79	78.3	2900	72.4	12.1	313	3600
GVM210-100-EP	72	29.7	7.46	101	2400	141	21.0	492	2700
GVM210-150-EP	72	46.9	7.86	104	1600	198	19.7	449	1700
GVM210-200-ZN	72	54.8	8.03	107	1400	251	22.9	495	1550
GVM210-250-ZN	72	67.2	7.88	105	1120	296	21.5	460	1220
GVM210-300-ZN	72	78.5	7.65	102	930	338	20.4	433	1000
GVM210-050-YP	80	19.5	5.71	67.5	2800	72.4	10.6	264	3300
GVM210-100-HP	80	29.7	7.46	87.3	2400	141	18.1	427	2500
GVM210-150-EP	80	42	7.91	93.5	1800	198	21.7	449	1900
GVM210-200-EP	80	56.6	8	93.7	1350	251	20.3	419	1410
GVM210-250-EN	80	59.7	7.93	93.4	1270	296	24.1	460	1320
GVM210-300-ZN	80	70.6	7.84	91.8	1060	338	7.9	433	1070
GVM210-050-BQ	96	18.9	5.83	56.8	2950	72.4	10.9	229	3300
GVM210-100-TP	96	36.3	7.23	71.9	1900	141	16.2	291	2200
GVM210-150-HP	96	39.3	7.82	76.1	1900	198	22.0	389	1900
GVM210-200-HP	96	54.8	8.03	78.8	1400	251	22.0	363	1490
GVM210-250-EP	96	58.1	7.9	77	1300	296	24.4	389	1330
GVM210-300-EP	96	70.6	7.84	77.7	1060	338	23.3	366	1130

Characteristics with Liquid cooling - Low Voltage Windings

GVM210 Cooling 65 °C (Characteristics are given for an optimal inverter / motor association)
 (for other cooling temperature please contact us)

Motor	DC Voltage Supply [V]	Rated Torque Mn [Nm]	Rated Power Pn [kW]	Rated Current In [Arms]	Rated Speed Nn [min ⁻¹]	Peak Torque Mp [Nm]	Peak Power Pp [kW]	Peak Current Ip [Arms]	Maximum Speed Nmax [min ⁻¹]
GVM210-050-EP	96	37.3	23.4	256	6000	82	32.9	626	8000
GVM210-050-HP	120	36.9	25.9	220	6700	82	35.4	543	8000
GVM210-050-ZN	24	39	6.19	312	1510	82	7.9	740	3000
GVM210-050-ZN	36	39	10.2	313	2500	82	13.1	740	5000
GVM210-050-ZN	48	38.6	14.2	310	3500	82	18.7	740	7000
GVM210-050-ZN	72	37.6	21.7	304	5500	82	28.0	740	8000
GVM210-050-ZN	80	37.2	23.8	302	6100	82	31.5	740	8000
GVM210-100-EP	24	90	5.49	294	583	173	6.6	656	1160
GVM210-100-EP	36	90	9.43	295	1000	173	11.5	656	2000
GVM210-100-EP	48	89.6	13	294	1390	173	15.9	656	2780
GVM210-100-EP	72	88.8	19.5	292	2100	173	25.6	656	4200
GVM210-100-EP	80	88.4	22.3	290	2410	173	27.9	656	4820
GVM210-100-EP	96	87.7	26.4	289	2870	173	34.5	656	5740
GVM210-100-EP	120	86.3	33.4	285	3700	173	42.6	656	7400
GVM210-150-EP	36	141	9.02	305	610	262	10.9	658	1220
GVM210-150-EP	48	141	12.8	304	870	262	16.1	658	1740
GVM210-150-EP	72	140	19.7	302	1350	262	25.7	658	2700
GVM210-150-EP	80	139	22.6	301	1550	262	28.2	658	3100
GVM210-150-EP	96	138	26.8	300	1850	262	34.9	658	3700
GVM210-150-EP	120	137	34.4	297	2400	262	43.2	658	4800
GVM210-200-EP	48	190	12.8	306	644	352	15.5	662	1280
GVM210-200-EP	72	190	19.9	307	1000	352	25.1	662	2000
GVM210-200-EP	80	190	22.8	306	1150	352	27.7	662	2300
GVM210-200-EP	96	189	27.7	305	1400	352	33.8	662	2800
GVM210-200-EP	120	187	34.3	303	1750	352	43.7	662	3500
GVM210-250-EP	48	241	12.5	310	494	442	15.0	664	1000
GVM210-250-EP	72	240	19.8	308	790	442	24.3	664	1600
GVM210-250-EP	80	239	22.3	308	892	442	27.4	664	1800
GVM210-250-EP	96	238	27.5	307	1100	442	33.6	664	2200
GVM210-250-EP	120	237	34.8	305	1400	442	42.9	664	2800
GVM210-300-EP	96	288	27.1	308	900	530	33.4	661	1800
GVM210-300-EP	120	286	34.5	307	1150	530	42.7	661	2300
GVM210-350-EP	96	336	26.8	308	760	621	33.0	665	1520
GVM210-350-EP	120	335	34.4	306	980	621	42.1	665	1960
GVM210-400-EP	120	383	34.1	307	850	710	41.6	664	1700

Characteristics with Liquid cooling - High Voltage Windings

GVM210 Cooling 65 °C (Characteristics are given for an optimal inverter / motor association)
(for other cooling temperature please contact us)

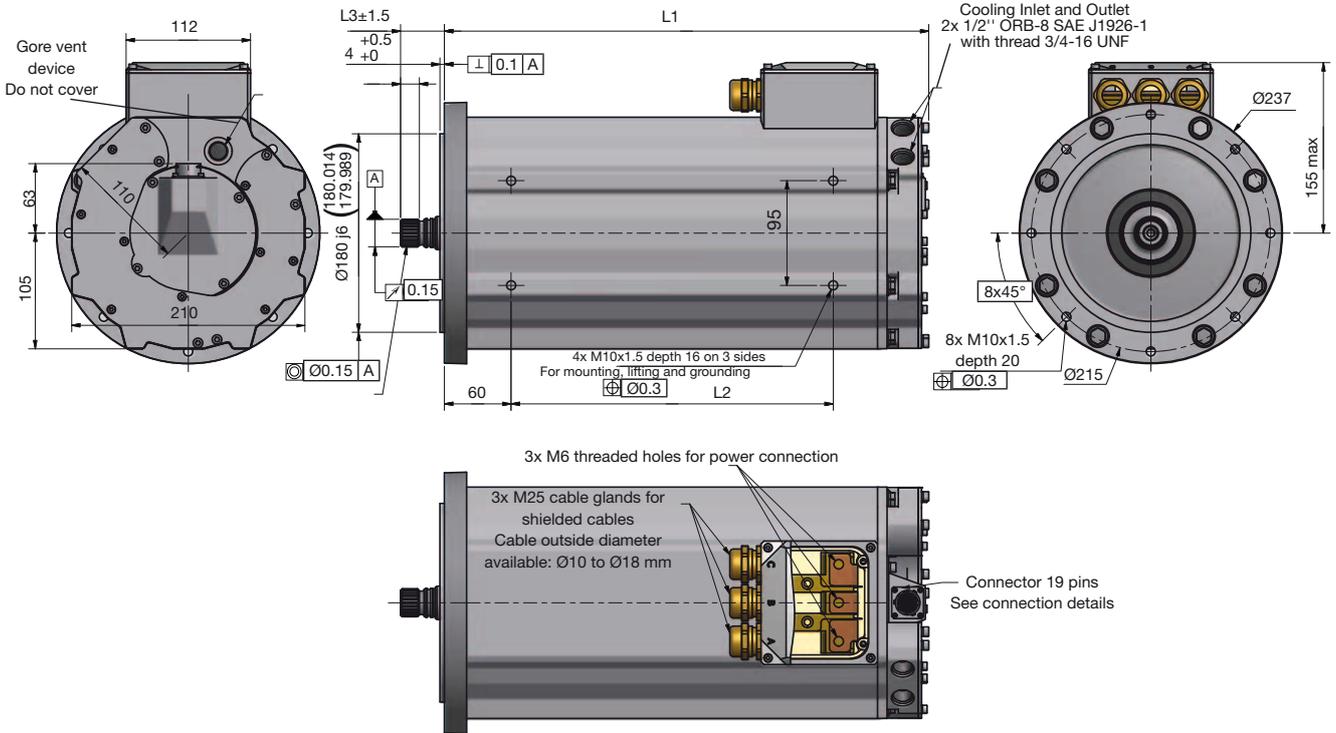
Motor	DC Voltage Supply [V]	Rated Torque Mn [Nm]	Rated Power Pn [kW]	Rated Current In [Arms]	Rated Speed Nn [min ⁻¹]	Peak Torque Mp [Nm]	Peak Power Pp [kW]	Peak Current Ip [Arms]	Maximum Speed Nmax [min ⁻¹]
GVM210-100-BQ	480	79.6	55.8	115	6700	173	73.3	284	8000
GVM210-100-JQ	640	79.1	57.1	87.7	6900	173	75.0	219	8000
GVM210-100-TP	320	81.4	51.1	160	6000	173	67.5	387	8000
GVM210-100-YP	400	80.4	53.9	134	6400	173	70.9	328	8000
GVM210-150-EP	320	118	84.1	259	6800	262	114.0	658	8000
GVM210-150-TP	400	128	65.6	165	4900	262	86.6	389	8000
GVM210-150-TP	480	123	76	159	5900	262	104.1	389	8000
GVM210-150-YP	640	118	84.1	130	6800	262	114.8	329	8000
GVM210-200-EP	320	169	88.4	275	5000	352	116.5	662	8000
GVM210-200-EP	400	158	104	258	6300	352	145.1	662	8000
GVM210-200-HP	480	154	108	219	6700	352	146.8	573	8000
GVM210-200-TP	640	161	101	155	6000	352	136.4	391	8000
GVM210-250-EP	320	219	89.6	283	3900	442	119.3	664	7800
GVM210-250-EP	400	208	109	270	5000	442	146.2	664	8000
GVM210-250-EP	480	195	125	254	6100	442	172.6	664	8000
GVM210-250-HP	640	181	136	205	7200	442	194.2	575	8000
GVM210-300-EP	320	268	91.4	289	3250	530	118.7	661	6500
GVM210-300-EP	400	259	111	279	4100	530	148.4	661	8000
GVM210-300-EP	480	246	129	266	5000	530	175.8	661	8000
GVM210-300-HP	640	232	144	218	5910	530	198.7	573	8000
GVM210-350-EP	320	317	93	291	2800	621	117.3	665	5600
GVM210-350-EP	400	307	114	282	3550	621	146.0	665	7100
GVM210-350-EP	640	265	164	245	5910	621	225.5	665	7100
GVM210-400-EP	320	366	92	294	2400	710	119.2	664	4800
GVM210-400-EP	400	357	114	286	3050	710	148.4	664	6100
GVM210-400-EP	480	344	135	277	3750	710	174.6	664	7500
GVM210-400-EP	640	319	167	257	5000	710	235.2	664	8000

Dimensions

For Traction Applications

GVM210

Dimensions [mm]



Motor size	L1 [mm]	L2 [mm]	Shaft interface	L3 [mm]	L4 [mm]	Weight [kg]
GVM210-050	234 max	90	TA	39.4	16.8	36.5 kg
GVM210-100	285 max	140	TA	39.4	16.8	45.5 kg
GVM210-150	336 max	190	TA	39.4	16.8	54.5 kg
GVM210-200	387 max	240	TA	39.4	16.8	63.5 kg
GVM210-250	438 max	290	TA	39.4	16.8	72.5 kg
GVM210-300	489 max	340	TB	63.5	38.1	81.5 kg
GVM210-350	540 max	390	TB	63.5	38.1	90.5 kg
GVM210-400	591 max	440	TB	63.5	38.1	99.5 kg

	Spline interface TA	Spline interface TB
Involute Spline	ANSI B92.2M	ANSI B92.1
Flat root side fit	Class 6h	Class 5
Number of teeth	24	27
Module	1.000	-
Spline pitch	-	16/32
Pressure angle	30°	30°
Pitch diameter (Ref)	Ø24.000	Ø42.863
Base diameter (Ref)	Ø20.785	Ø37.12
Major diameter	Ø25.00/Ø24.75	Ø44.45/Ø44.32
Minor diameter	Ø22.50/Ø22.26	Ø39.27
Form diameter (max)	Ø22.89	Ø41.17
Circular tooth thickness (max effective)	1.571	2.456
Circular tooth thickness (min actual)	1.485	2.421
Pin diameter	2.12	3.048
Measurement over pins (Ref)	Ø27.479/Ø27.399	Ø47.460/Ø47.407

Order Code

	1	2	3	4	5	6	7	8	9	10	11
Order example	GVM	210	150	EP	W	A	A	A	TA	1	G

1 Motor series

GVM Global Vehicle Motor

GVK Global Vehicle Kit Motor

2 Frame size (outer width)

210 210 mm

3 Stack length*

50

100

150

200 data see chapter

250 "Technical Characteristics"

300

350

400

4 Winding symbol

.... see motor tables

5 Cooling system

N Natural cooling

W Water cooling

O Oil cooling

6 Feedback

A Resolver (standard 2 poles)

S Sin/Cos RM22A
(low voltage applications)

7 Thermal switch

A PTC

8 Thermal sensor

A Omega 44008 30 k Ω thermistor

B KTY84-130 thermistor

9 Interface

TA Traction mount, shaft 24 teeth

TB Traction mount, shaft 27 teeth

PA EHP mount, SAE A, 2 holes

PB EHP mount, SAE B, 2 holes

PC EHP mount, SAE C, 4 holes

PD EHP mount, SAE B, 4 holes

PE EHP mount, SAE BB, 2 holes

PF EHP mount, SAE BB, 4 holes

10 Power connection

1 Terminal box

11 Options

G Global (standard motor)

N North America (custom motor)

E Europe (custom motor)

A Asia (custom motor)

* "Technical Characteristics" (page 7)



Parker's Motion & Control Technologies

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



Aerospace

Key Markets

Aftermarket services
Commercial transports
Engines
General & business aviation
Helicopters
Launch vehicles
Military aircraft
Missiles
Power generation
Regional transports
Unmanned aerial vehicles

Key Products

Control systems & actuation products
Engine systems & components
Fluid conveyance systems & components
Fluid metering, delivery & atomization devices
Fuel systems & components
Fuel tank inerting systems
Hydraulic systems & components
Thermal management
Wheels & brakes



Climate Control

Key Markets

Agriculture
Air conditioning
Construction Machinery
Food & beverage
Industrial machinery
Life sciences
Oil & gas
Precision cooling
Process
Refrigeration
Transportation

Key Products

Accumulators
Advanced actuators
CO₂ controls
Electronic controllers
Filter driers
Hand shut-off valves
Heat exchangers
Hose & fittings
Pressure regulating valves
Refrigerant distributors
Safety relief valves
Smart pumps
Solenoid valves
Thermostatic expansion valves



Electromechanical

Key Markets

Aerospace
Factory automation
Life science & medical
Machine tools
Packaging machinery
Paper machinery
Plastics machinery & converting
Primary metals
Semiconductor & electronics
Textile
Wire & cable

Key Products

AC/DC drives & systems
Electric actuators, gantry robots & slides
Electrohydraulic actuation systems
Electromechanical actuation systems
Human machine interface
Linear motors
Stepper motors, servo motors, drives & controls
Structural extrusions



Filtration

Key Markets

Aerospace
Food & beverage
Industrial plant & equipment
Life sciences
Marine
Mobile equipment
Oil & gas
Power generation & renewable energy
Process
Transportation
Water Purification

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
Membrane & fiber filters
Microfiltration
Sterile air filtration
Water desalination & purification filters & systems



Fluid & Gas Handling

Key Markets

Aerial lift
Agriculture
Bulk chemical handling
Construction machinery
Food & beverage
Fuel & gas delivery
Industrial machinery
Life sciences
Marine
Mining
Mobile
Oil & gas
Renewable energy
Transportation

Key Products

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



Hydraulics

Key Markets

Aerial lift
Agriculture
Alternative energy
Construction machinery
Forestry
Industrial machinery
Machine tools
Marine
Material handling
Mining
Oil & gas
Power generation
Refuse vehicles
Renewable energy
Truck hydraulics
Turf equipment

Key Products

Accumulators
Cartridge valves
Electrohydraulic actuators
Human machine interfaces
Hybrid drives
Hydraulic cylinders
Hydraulic motors & pumps
Hydraulic systems
Hydraulic valves & controls
Hydrostatic steering
Integrated hydraulic circuits
Power take-offs
Power units
Rotary actuators
Sensors



Pneumatics

Key Markets

Aerospace
Conveyor & material handling
Factory automation
Life science & medical
Machine tools
Packaging machinery
Transportation & automotive

Key Products

Air preparation
Brass fittings & valves
Manifolds
Pneumatic accessories
Pneumatic actuators & grippers
Pneumatic valves & controls
Quick disconnects
Rotary actuators
Rubber & thermoplastic hose & couplings
Structural extrusions
Thermoplastic tubing & fittings
Vacuum generators, cups & sensors



Process Control

Key Markets

Alternative fuels
Biopharmaceuticals
Chemical & refining
Food & beverage
Marine & shipbuilding
Medical & dental
Microelectronics
Nuclear Power
Offshore oil exploration
Oil & gas
Pharmaceuticals
Power generation
Pulp & paper
Steel
Water/wastewater

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
Permanent no-weld tube fittings
Precision industrial regulators & flow controllers
Process control double block & bleeds
Process control fittings, valves, regulators & manifold valves



Sealing & Shielding

Key Markets

Aerospace
Chemical processing
Consumer
Fluid power
General industrial
Information technology
Life sciences
Microelectronics
Military
Oil & gas
Power generation
Renewable energy
Telecommunications
Transportation

Key Products

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

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