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Gear Pump Division

Vocational Truck Pump Program Catalog







Useful Formulas

Pump Output Horsepower: Pump Input Horsepower: Pump Input Torque (Lbs. ft.): Gallons Per Minute: Cubic Inches Displacement: HP = GPM x PSI \div 1714 \div E

T = CID x PSI \div 75.36

GPM = CID x RPM. \div 231

CID = GPM x 231 \div RPM

HORSE Power: HP = T x RPM. \div 5252

Flow in GPM using P.T.O.: **GPM** = Engine RPM x P.T.O.% x CIR \div 231 x E

CCM Conversion: $CCM = CID \times 16.39$ CID Conversion: $CID = CCM \times .06102$

Abbreviations

HP= HorsepowerCCM = Cubic Centimeter DisplacementRP= Rear PortsGPM = Gallons per MinuteBI= Bi RotationalRV= Relief ValveCID= Cubic Inches DisplacementCCW = Counter ClockwiseSF= Split Flange PortsPSI= Pounds per Square InchCW= ClockwiseSP= Side PortsRPM= Revolutions per MinuteMIX= Mixed PortingSRP= Side and Rear Ports





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Parker Hannifin Corporation is the world's leading diversified manufacturer of motion and control technologies and systems for a wide variety of commercial mobile, industrial and aerospace markets. Among their divisions, the Gear Pump Division engineers specialty products for unique applications in a wide range of industries including truck, refuse, material handling, construction, forestry, agriculture, and industrial. In an effort to meet distributor and customer demands for decreased lead-times, the Gear Pump Division is introducing the Vocational Truck Pump Program.

Highlights from the program include...

- Products to support truck specific applications
- · One price per standard pump families regardless of gear width
- Individually boxed pumps
- · Freight paid subject to program qualification
- Two week (or better!) lead-time

Our ability to engineer products for unique applications has kept us at the forefront of technology, and ensured our position as industry leaders. Our success has come from providing quality products with excellent sales and service support.

We manufacture hydraulic components for a wide range of applications including:

- Aerial Lift
- Refuse
- Dump Truck
- · Salt / Sand
- Low Boy Trailer
- Roll Off
- · Moving Floor

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Dump Pumps

C101 / 102 - G101 / 102

- Pressures to 2500 PSI
- Speeds to 2400 RPM

C101/G101

- Remote Mount
- 1" Round Keyed Shaft

C102/G102

- SAE "B" 4-Bolt
- SAE "B" 13T Spline





Parker #	Description	Rotation	Gear	CID
C101/102 Pumps				
3149310226T	C101D-2.5 (Remote Mount)	BI	2.5"	6.38
3149310902T	C101D-2.5-AS (Remote Mount w/Airshaft)	BI	2.5"	6.38
3149325229T	C102D-2.5-1 (Direct Mount)	CCW	2.5"	6.38
3149325227T	C102D-2.5-1-AS (Direct Mount w/Airshift Installed)	CCW	2.5"	6.38
3149325234T	C102D-2.5 (Direct Mount)	CW	2.5"	6.38
3149325018T	C102D-2.5-1-AS (Direct Mount w/Airshift Installed)	CW	2.5"	6.38
G101/102 Pumps				
3089310047T	G101-1-2.0 (Remote Mount)	BI	2.0"	3.94
3089310416T	G102-1-2.0-R-4S (Direct Mount)	CW	2.0"	3.94
3089310903T	G102-1-2.0-R-4S-AS (Direct Mount w/Airshift Installed)	CW	2.0"	3.94
3089310418T	G102-1-2.0-L-4S (Direct Mount)	CCW	2.0"	3.94
3089310905T	G102-2.0-L-4S-AS (Direct Mount w/Air Shift Installed)	CCW	2.0"	3.94
3089310911T	G102-2.0-L-2/4S-W (Direct Mount, Wet Spline)	CCW	2.0"	3.94
3089310910T	G102-2.0-R-2/4S-W (Direct Mount, Wet Spline)	CW	2.0"	3.94

NOTE: All dump pumps have 3-line sleeve included
All dump pumps have relief valve set at 2000 PSI

Accessories

Parker #	Description
314 9414 006T	ASK-6 (Air Shift Cylinder with Hoses and Fittings)
314 9414 017T	ASK-17 (Air Shift Cylinder less Hoses and Fittings)
314 0100 005T	Remote Mount Bracket C101
391 1832 323T	Direct Mount Bracket C102
391 3283 052T	3rd Line Sleeve
308 9414 016T	ASK-16 (Air Shift Cylinder with Hoses and Fittings)
308 9414 049T	ASK-49 (Air Shift Cylinder less Hoses and Fittings)



P16 Pumps

- SAE "B" 2-Bolt Flange
- 7/8" SAE "B" 13T Shaft
- Pressures to 3000 PSI
- Speeds to 3600 RPM
- Applications Salt & Sand / Aerial Lift / Low Boy





Parker #	Model #	Rotation	Port	Inlet	Outlet	CID
0120018T	P16-65A-2N1	CCW	Rear O-Ring	1-1/4"	1"	1.27
0301687T	P16-65C-2N1	CW	Rear O-Ring	1-1/4"	1"	1.27
0120321T	P16-85A-2N1	CCW	Rear O-Ring	1-1/4"	1"	1.66
0265164T	P16-85C-2N1	CW	Rear O-Ring	1-1/4"	1"	1.66
0120446T	P16-100A-2N1	CCW	Rear O-Ring	1-1/4"	1"	1.96
0120440T	P16-100C-2N1	CW	Rear O-Ring	1-1/4"	1"	1.96
0120623T	P16-115A-2N1	CCW	Rear O-Ring	1-1/4"	1"	2.24
0301557T	P16-115C-2N1	CW	Rear O-Ring	1-1/4"	1"	2.24
0120748T	P16-150A-2N1	CCW	Rear O-Ring	1-1/4"	1"	2.93
0120749T	P16-150C-2N1	CW	Rear O-Ring	1-1/4"	1"	2.93
0120893T	P16-180A-2N1	CCW	Rear O-Ring	1-1/4"	1"	3.51
0120894T	P16-180C-2N1	CW	Rear O-Ring	1-1/4"	1"	3.51
0121057T	P16-200A-2N1	CCW	Rear O-Ring	1-1/4"	1"	3.90
0121056T	P16-200C-2N1	CW	Rear O-Ring	1-1/4"	1"	3.90
0120301T	P16-85A-2N2	CCW	Rear NPT	1"	3/4"	1.66
0120302T	P16-85C-2N2	CW	Rear NPT	1"	3/4"	1.66
0120605T	P16-115A-2N2	CCW	Rear NPT	1"	3/4"	2.24
0120606T	P16-115C-2N2	CW	Rear NPT	1"	3/4"	2.24
0120750T	P16-150A-2N2	CCW	Rear NPT	1"	3/4"	2.93
0120751T	P16-150C-2N2	CW	Rear NPT	1"	3/4"	2.93
0120900T	P16-180A-2N2	CCW	Rear NPT	1"	3/4"	3.90
0120901T	P16-180C-2N2	CW	Rear NPT	1"	3/4"	3.90



CP-16 Clutch Pumps

- Pressures to 3000 PSI
- Speeds to 3600 RPM
- 7/8" Tapered Shaft
- Applications Salt & Sand / Aerial Lift / Low Boy





Parker #	Description	Rotation	Port	Inlet	Outlet	CID
0120283T	CP16-65C-06	CW	Rear O-Ring	1"	3/4"	1.27
0120372T	CP16-85C-06	CW	Rear O-Ring	1"	3/4"	1.66
0120521T	CP16-100C-06	CW	Rear O-Ring	1"	3/4"	1.96
0120705T	CP16-115C-06	CW	Rear O-Ring	1"	3/4"	2.24

Accessories Kits

Parker #		Description	
0033520T	Switch Kit		
0015433T	Adapter Kit		

PGP020 Pumps

- Bi-Rotational
- SAE "B" 2/4-Bolt Flange
- 7/8" SAE "B" 13T Shaft
- Pressures to 3000 PSI
- Speeds to 2400 RPM
- Applications Wrecker / Salt & Sand





Parker #	Description	Rot.	Port	Rear	Side	Gear	CID
3089110271T	PGP020 2/4B NPT SRP 7/8" - 13T 10	BI	NPT	1"	1"	1"	1.97
3089110272T	PGP020 2/4B NPT SRP 7/8" - 13T 12	BI	NPT	1"	1"	1-1/4"	2.46
3089110264T	PGP020 2/4B NPT SRP 7/8" - 13T 15	BI	NPT	1"	1-1/4"	1-1/2"	2.96
3089110265T	PGP020 2/4B NPT SRP 7/8" - 13T 17	BI	NPT	1"	1-1/4"	1-3/4"	3.45
3089110266T	PGP020 2/4B NPT SRP 7/8" - 13T 20	BI	NPT	1"	1-1/4"	2"	3.94
3089110274T	PGP020 2/4B ODT SRP 7/8" - 13T 10	BI	O-Ring	1"	1"	1"	1.97
3089110278T	PGP020 2/4B ODT SRP 7/8" - 13T 12	BI	O-Ring	1"	1"	1-1/4"	2.46
3089110275T	PGP020 2/4B ODT SRP 7/8" - 13T 15	BI	O-Ring	1"	1-1/4"	1-1/2"	2.96
3089110276T	PGP020 2/4B ODT SRP 7/8" - 13T 17	BI	O-Ring	1"	1-1/4"	1-3/4"	3.45
3089110277T	PGP020 2/4B ODT SRP 7/8" - 13T 20	BI	O-Ring	1"	1-1/4"	2"	3.94



PGP020 Pumps - Tandem Units

- Bi-Rotational
- SAE "B" 2 or 4-Bolt Flange
- 7/8" SAE "B" 13T Shaft
- Pressures to 3000 PSI
- Speeds to 2400 RPM
- Applications Bulk Feed





Parker #	Description	Rot.	Port	Side Inlet Front - Rear	Side Outlet Front - Rear	Gear Front - Rear	CID Front - Rear
raikei #	Description	RUL.	FULL	Fibili - Keal	Fivill - Real	Fiolit - Keai	Fiolit - Real
3089123044T	PGP020 2B NPT SP 7/8" - 13T 20-20	BI	NPT	1-1/4" - 1-1/4"	1-1/4" - 1-1/4"	2" - 2"	3.94 - 3.94
3089123013T	PGP020 4B NPT SP 7/8" - 13T 20-10	ВІ	NPT	1-1/4" - 1"	1-1/4" - 1"	2" - 1"	3.94 - 1.97
3089123003T	PGP020 4B NPT SP 7/8" - 13T 20-20	ВІ	NPT	1-1/4" - 1-1/4"	1-1/4" - 1-1/4"	2" - 2"	3.94 - 3.94
3089123036T	PGP020 2B ODT SP 7/8" - 13T 20-20	ВІ	O-Ring	1" - 1"	1" - 1"	2" - 2"	3.94 - 3.94
3089123027T	PGP020 4B ODT SP 7/8" - 13T 20-12	ВІ	O-Ring	1-1/4" - 1-1/4"	1-1/4" - 1-1/4"	2" - 1.25"	3.94 - 2.46
3089123019T	PGP020 4B ODT SP 7/8" - 13T 20-20	BI	O-Ring	1-1/4" - 1-1/4"	1-1/4" - 1-1/4"	2" - 2"	3.94 - 3.94
3089126017T	PGP020 2/4B ODT SP 7/8" - 13T 20-20) BI	O-Ring	1" - 1"	1" - 1"	2" - 2"	3.94 - 3.94

PGP050 Pumps

- SAE "B" 4-Bolt Flange
- 7/8" SAE "B" 13T Shaft
- Pressures to 2000 PSI
- Speeds to 2400 RPM
- Applications Moving Floors / Roll Off / Refuse





Parker #	Description	Rot.	Port	Rear	Side	Gear	CID
3139310362T	PGP050 4B NPT RP 7/8" - 13T 20	BI	NPT	1-1/4"	Blank	2"	5.1
3139310406T	PGP050 4B NPT RP 7/8" - 13T 22	BI	NPT	1-1/4"	Blank	2-1/4"	5.74
3139310382T	PGP050 4B NPT RP 7/8" - 13T 25	BI	NPT	1-1/4"	Blank	2-1/2"	6.38
3139310444T	PGP050 4B NPT SRP 7/8" - 13T 25	BI	NPT	1-1/4"	1-1/4"	2-1/2"	6.38
3139113168T	PGP050 4B NPT SP 7/8" - 13T 25	BI	NPT	Blank	1-1/4"	2-1/2"	6.38



PGP051 Pumps

- SAE "B" 4-Bolt Flange
- 7/8" SAE "B" 13T Shaft
- Pressures to 2500 PSI
- Speeds to 2400 RPM
- Applications Moving Floors / Roll Off / Refuse





Parker #	Description	Rot.	Port	Rear	Side	Gear	CID
3139610442T	PGP051 4B NPT RP 7/8" - 13T 25	BI	NPT	1-1/4"	Blank	2-1/2"	6.38
3139610367T	PGP051 4B NPT SRP 7/8" - 13T 25	BI	NPT	1-1/4"	1-1/4"	2-1/2"	6.38
3139610450T	PGP051 4B NPT SP 7/8" - 13T 25	BI	NPT	Blank	1-1/4"	2-1/2"	6.38
3139610727T	PGP051 4B ODT SRP 7/8" - 13T 20	BI	O-Ring	1-1/4"	1-1/4"	2"	5.10
3139610725T	PGP051 4B ODT SRP 7/8" - 13T 22	BI	O-Ring	1-1/4"	1-1/4"	2-1/4"	5.74
3139610526T	PGP051 4B ODT SRP 7/8" - 13T 25	BI	O-Ring	1-1/4"	1-1/4"	2-1/2"	6.38
3139610527T	PGP051 4B MIX SF-ODT 7/8" - 13T 25	CCW	Mixed	2" SF	1" ODT	2-1/2"	6.38

PGP051 Pumps / Motors

- SAE "B" 2/4-Bolt Flange
- 7/8" SAE "B" 13T Shaft
- Pressures to 3000 PSI
- Speeds to 2400 RPM
- Applications Roll Off / Refuse / Moving Floor





Parker #	Description	Rot.	Port	Rear	Side	Gear	CID
		_					
3139610665T	PGP051 2/4B NPT SRP 7/8" - 13T 15	BI	NPT	1-1/2"	1-1/4"	1-1/2"	3.83
3139610664T	PGP051 2/4B NPT SRP 7/8" - 13T 17	BI	NPT	1-1/2"	1-1/4"	1-3/4"	4.46
3139610663T	PGP051 2/4B NPT SRP 7/8" - 13T 20	BI	NPT	1-1/2"	1-1/4"	2"	5.10
3139610659T	PGP051 2/4B NPT SRP 7/8" - 13T 22	BI	NPT	1-1/2"	1-1/2"	2-1/4"	5.74
3139610658T	PGP051 2/4B ODT SRP 7/8" - 13T 25	BI	NPT	1-1/2"	1-1/2"	2-1/2"	6.38
3139610769T	PGP051 2/4B ODT SRP 7/8" - 13T 17	BI	O-Ring	1-1/4"	1-1/4"	1-3/4"	4.46
3139610768T	PGP051 2/4B ODT SRP 7/8" - 13T 20	BI	O-Ring	1-1/4"	1-1/4"	2"	5.10
3139610767T	PGP051 2/4B ODT SRP 7/8" - 13T 22	BI	O-Ring	1-1/4"	1-1/4"	2-1/4"	5.76
3139610766T	PGP051 2/4B ODT SRP 7/8" - 13T 25	BI	O-Ring	1-1/4"	1-1/2"	2-1/2"	6.38

NOTE: All PGP051 pumps listed on this page have extended studs.



PGP051 Pumps with Relief Valve

- SAE "B" 2/4-Bolt Flange
- 7/8" SAE "B" 13T Shaft
- Pressures to 2500 PSI
- Speeds to 2400 RPM
- Application Moving Floors / Roll Off / Refuse





Parker #	Description	Rot.	Port	Rear	Side	Gear	CID
3139610677T	PGP051 2/4B NPT SP 7/8" - 13T 15 RV	CCW	NPT	RV	1-1/4"	1-1/2"	3.83
3139610678T	PGP051 2/4B NPT SP 7/8" - 13T 17 RV	CCW	NPT	RV	1-1/4"	1-3/4"	4.46
3139610679T	PGP051 2/4B NPT SP 7/8" - 13T 22 RV	CCW	NPT	RV	1-1/2"	2-1/4"	5.74
3139610699T	PGP051 2/4B NPT SP 7/8" - 13T 25 RV	CCW	NPT	RV	1-1/2"	2-1/2"	6.38

Relief Valve Setting 2500 PSI

PGP076 Pumps

- SAE "C" 4-Bolt Flange
- SAE "C" 1-1/4" Rd Key Shaft
- Pressures to 3000 PSI
- Speeds to 2400 RPM
- Applications Refuse / Side Loader / Front Loader / Rear Loader





Parker #	Description	Rot.	Port	Inlet	Outlet	Gear	CID
3169610243T	PGP076 4C SF SP 1-1/4" K 15	CCW	SF	1-1/2"	1-1/4"	1-1/2"	6.15
3169610244T	PGP076 4C SF SP 1-1/4" K 17	CCW	SF	1-1/2"	1-1/4"	1-3/4"	7.17
3169610245T	PGP076 4C SF SP 1-1/4" K 20	CCW	SF	2"	1-1/4"	2"	8.20
3169610246T	PGP076 4C SF SP 1-1/4" K 22	CCW	SF	2"	1-1/4"	2-1/4"	9.22



PGPLS076 Pump with Unloader

- SAE "C" 4-Bolt Flange
- SAE "C" 1-1/4" Rd Key Shaft
- Pressures to 3000 PSI
- Speeds to 2400 RPM
- Applications Refuse / Side Loader / Front Loader / Rear Loader





Parker #	Description	Rot.	Port	Inlet	Outlet	Gear	CID
3169610255T	PGPLS076 4C SF SP 1-1/4" K 15	CCW	SF	1-1/2"	1-1/4"	1-1/2"	6.15
3169610256T	PGPLS076 4C SF SP 1-1/4" K 17	CCW	SF	2"	1-1/4"	1-3/4"	7.17
3169610257T	PGPLS076 4C SF SP 1-1/4" K 20	CCW	SF	2"	1-1/4"	2"	8.20
3169610258T	PGPLS076 4C SF SP 1-1/4" K 22	CCW	SF	2"	1-1/4"	2-1/4"	9.22
3169610263T	PGPLS076 4C SF SP 1-1/4" K 25	CCW	SF	2"	1-1/4"	2-1/2"	10.25

PGPLS076 Pump with Unloader and Wet Spline

- SAE "C" 4-Bolt Flange
- 1-1/4" SAE "C" Rd 14T Shaft
- Pressures to 3000 PSI
- Speeds to 2400 RPM
- Applications Refuse / Side Loader / Front Loader / Rear Loader





Parker #	Description	Rot.	Port	Inlet	Outlet	Gear	CID
3169610265T	PGPLS076 4C SF SP 1-1/4" - 14T 22 W 60	CW	SF	2"	1-1/4"	2 -1/4"	8.20
3169610259T	PGPLS076 4C SF SP 1-1/4" - 14T 22 W 70	CW	SF	2"	1-1/4"	2-1/4"	8.20



PGP315 Pump / Motor

- SAE "B" 2-Bolt Flange
- 7/8" SAE "B" 13T Shaft
- Pressures to 3500 PSI
- Speeds to 3000 RPM
- Applications Tire Trucks / Salt & Sand





Parker #	Description	Rot.	Port	Rear	Side	Gear	CID
3269110481T	PGP315 2B ODT RP 7/8" - 13T 07	BI	O-Ring	1"	Blank	3/4"	0.93
3269110482T	PGP315 2B ODT RP 7/8" - 13T 10	BI	O-Ring	1"	Blank	1"	1.24
3269110483T	PGP315 2B ODT RP 7/8" - 13T 12	BI	O-Ring	1"	Blank	1-1/4"	1.55
3269110484T	PGP315 2B ODT RP 7/8" - 13T 15	BI	O-Ring	1"	Blank	1-1/2"	1.86
3269110485T	PGP315 2B ODT RP 7/8" - 13T 17	BI	O-Ring	1"	Blank	1-3/4"	2.17
3269110486T	PGP315 2B ODT RP 7/8" - 13T 20	BI	O-Ring	1"	Blank	2"	2.48

PGP350 Pump

- SAE "B" 4-Bolt Flange
- 7/8" SAE "B" 13T Shaft
- Pressures to 3500 PSI
- Speeds to 2400 RPM
- Applications Live Floors / Moving Floors / Roll Off Trailers





Parker #	Description	Rot.	Port	Rear	Side	Gear	CID
3239110522T	PGP350 4B ODT RP CW 7/8" - 13T 20 W	CW	O-Ring	1-1/4"	1"	2"	5.10
3239110523T	PGP350 4B ODT RP CCW 7/8" - 13T 20 W	CCW	O-Ring	1-1/4"	1"	2"	5.10
3239110524T	PGP350 4B ODT RP CW 7/8" - 13T 25 W	CW	O-Ring	1-1/4"	1"	2-1/2"	6.38
3239110525T	PGP350 4B ODT RP CCW 7/8" - 13T 25 W	CCW	O-Ring	1-1/4"	1"	2-1/2"	6.38



PGP350 Pump - Tandem Units

- SAE "C" 4-Bolt Flange
- 1-1/4" SAE "C" Keyed Shaft
- Pressures to 3000 PSI
- Speeds to 2400 RPM
- Applications Refuse / Automatated Side Loaders





					Outlet	Gear	CID
Parker #	Description	Rot.	Port	Inlet	Front - Rear	Front - Rear	Front - Rear
3239120278T	PGP350 4C SF SP 1-1/4" K 22 20	CCW	SF	2"	1-1/4" - 1"	2-1/4" - 2"	5.74 - 5.10
3239120285T	PGP350 4C SF SP 1-1/4" K 22 22	CCW	SF	2"	1-1/4" - 1"	2-1/4" - 2-1/4"	5.74 - 5.74

PGP365 Pump

- SAE "C" 4-Bolt Flange
- SAE "C" Shaft, 1-1/4" Round Keyed or 14T Spline
- Pressures to 3250 PSI
- Speeds to 2400 RPM
- Applications Refuse / Side Loaders





Parker #	Description	Rot.	Port	Inlet	Outlet	Gear	CID
3229110125T	PGP365 4C SF SP 1-1/4" K 25	CCW	SF	2"	1-1/4"	2-1/2"	9.00
3229110243T	PGP365 4C SF SP 1-1/4" - 14T 22 W	CW	SF	2"	1-1/4"	2-1/4"	8.10



PGP365 Pump - Tandem Units

- SAE "C" 4-Bolt Flange
- 1-1/4" SAE "C" Keyed Shaft
- Pressures to 3500 PSI
- Speeds to 2400 RPM
- Applications Refuse / Automatated Side Loaders





					Outlet	Gear	CID
Parker #	Description	Rot.	Port	Inlet	Front - Rear	Front - Rear	Front - Rear
3229120166T	PGP365 4C SF SP 1-1/4" K 20 20	CCW	SF	2"	1-1/4" - 1"	2" - 2"	7.2 - 7.2
3229120233T	PGP365 4C SF SP 1-1/4" K 25 15	CCW	SF	2"	1-1/4" - 1"	2-1/2" - 1 1/2"	9.0 - 5.4
3229120168T	PGP365 4C SF SP 1-1/4" K 25 17	CCW	SF	2"	1-1/4" - 1"	2-1/2" - 1 3/4"	9.0 - 6.3
3229120165T	PGP365 4C SF SP 1-1/4" K 25 20	CCW	SF	2"	1-1/4" - 1"	2-1/2" - 2"	9.0 - 7.2



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A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time. 11. Buyer's Obligation; Rights of Seller. To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest. Seller shall have a security interest in, and lien upon, any property of Buyer in Seller's possession as security for the payment of any amounts owed to Seller by Buyer. 12. Improper use and Indemnity. Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided. 13. Cancellations and Changes. Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer. 14. Limitation on Assignment. Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller. 15. Entire Agreement. This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of the agreement. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged. 16. Waiver and Severability. Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect. 17. Termination. This agreement may be terminated by Seller for any reason and at any time by giving Buyer thirty (30) days written notice of termination. In addition, Seller may by written notice immediately terminate this agreement or the following: (a) Buyer commits a breach of any provision of this agreement (b) the appointment of a trustee, receiver or custodian for all or any part of Buyer's property (c) the filing of a petition for relief in bankruptcy of the other Party on its own behalf, or by a third party (d) an assignment for the benefit of creditors, or (e) the dissolution or liquidation of the Buyer. 18. Governing Law. This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall

be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement. Disputes between the parties shall not be settled by arbitration unless, after a dispute has arisen, both parties expressly agree in writing to arbitrate the dispute. 19. Indemnity for Infringement of Intellectual Property Rights. Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify

the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights. 20. Taxes. Unless otherwise indicated, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of Products.

21. Equal Opportunity Clause. For the performance of government contracts and where dollar value of the Products exceed \$10,000, the equal employment opportunity clauses in Executive Order 11246, VEVRAA, and 41 C.F.R. §§ 60-1.4(a), 60-741.5(a), and 60-250.4, are hereby incorporated.

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Sales Offices

North America

Gear Pump Division Headquarters

101 Canterbury Road Kings Mountain, NC 28086 Phone: (704) 730-2000 Fax: (704) 730-5832

Toll Free: (888) 700-7411

Gear Pump Division Facility

2701 Intertech Drive Youngstown, OH 44509 Phone: (330) 270-6000 Fax: (330) 270-6185 Toll Free: (888) 700-7511

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Parker Hannifin Corporation Chelsea Products Division 8225 Hacks Cross Road Olive Branch, MS 38654, USA Phone: (662) 895-1011

Fax: (662) 890-5379 www.parker.com/chelsea