

Chelsea PTO Pump Manual

Pro Gear Chelsea PTO Pump Manual to assist in identifying the parts for your Chelsea Power Take Off unit.

If you need any assistance identifying the correct Power Take Off unit for your truck and equipment, contact your Chelsea replacement part specialists at Pro Gear and Transmission.

Pro Gear stocks every part for your Parker Chelsea PTO including: PTO housings, mounts, driveshafts, gears, bearings, gaskets, cable shift cover assembly, post and plate assembly, brackets, stud kits, seal kits, lever control assembly, air shift cover assembly, direct mount pump conversion kits, stud kits including English and metric references, CAT D&H parts and much more.

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Parker Truck

Truck Pump Catalog



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Useful Formulas

Pump Output Horsepower:	$HP = G.P.M. \times PSI \div 1714$
Pump Input Horsepower:	$HP = G.P.M. \times PSI \div 1714 \div E$
Pump Input Torque (Lbs. ft.):	$T = CID \times PSI \div 75.36$
Gallons Per Minute:	$G.P.M. = CID \times R.P.M. \div 231$
Cubic Inches Displacement:	$CID = G.P.M. \times 231 \div R.P.M.$
Horse Power:	$HP = T \times R.P.M. \div 5252$
Flow in G.P.M. using P.T.O.:	$GPM = Engine R.P.M. \times P.T.O.\% \times CIR \div 231 \times E$

Abbreviations

HP = Horsepower
G.P.M. = Gallons per Minute
CID = Cubic Inches Displacement
PSI = Pounds per Square Inch
R.P.M. = Revolutions per Minute
E = Efficiency
T = Torque

WARNING

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

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

Offer of Sale

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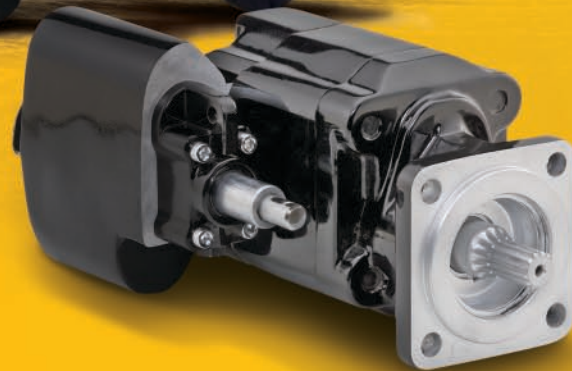
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Commercial Gear Pumps and Chelsea Power Take-Offs, the leading suppliers of gear pumps and Power Take-Off products in the work truck market, combine to provide you with the broadest coverage in the industry.

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



Dump Pumps

C101 / 10 2 - G101 / 102

- Maximum pressure 2500 PSI
- Maximum speed 2400 R.P.M.
- Relief valve setting 2000 PSI
- Genuine Commercial Quality

Standard

- All direct mounts are S.A.E. B 4 Bolt with 13 - Tooth Spline
- Applications – Dump Truck / Trailer

Part #	Description	Rotation	Gear	CID
C101/102 Pumps				
3149310226	C101D-2.5 (Remote Mount)	BI	2.5	6.38
3149325229	C102D-2.5-1 (Direct Mount)	CCW	2.5	6.38
3149324234	C102D-2.5 (Direct Mount)	CW	2.5	6.38
3149325227	C102D-2.5-1-AS (Direct Mount w/ Airshift Installed)	CCW	2.5	6.38
G101/102 Pumps				
3089310047	G101-1-2.0 (Remote Mount)	BI	2.0	3.94
3089310416	G102-1-2.0R-4S (Direct Mount)	CW	2.0	3.94
3089310418	G102-1-2.0L-4S Direct Mount)	CCW	2.0	3.94
3089310903	G102-1-2.0R-4S-AS (Direct Mount w/ Airshift Installed)	CW	2.0	3.94

Note: All dump pumps listed have a 3rd line sleeve included.

Accessories

Part #	Description
G101/102	
3089414016	ASK-16 (Air Shift Cylinder with Hoses and Fittings)
3089414049	ASK-49 (Air Shift Cylinder less Hoses and Fittings)
C101/102	
3149414006	ASK-6 (Air Shift Cylinder with Hoses and Fittings)
3149414017	ASK-17 (Air Shift Cylinder less Hoses and Fittings)
3140100005	Remote Mount Bracket C101
3911832323	Direct Mount Bracket C102
3913283052	3rd Line Sleeve



P16 Pumps

S.A.E. B 2 Bolt

- Maximum pressure up to 3000 PSI
- Maximum speed 2400 R.P.M.
- Applications – Salt & Sand / Aerial Lift / Low Boy
- 7/8" B Tooth Shaft

Part #	Model #	Rotation	Port	Inlet	Outlet	CID	Max Pressure (PSI)
0120018	P16-65A-2N1	CCW	Rear O-Ring	1-1/4"	1"	1.27	3000
0301687	P16-65C-2N1	CW	Rear O-Ring	1-1/4"	1"	1.27	3000
0120321	P16-85A-2N1	CCW	Rear O-Ring	1-1/4"	1"	1.66	3000
0265164	P16-85C-2N1	CW	Rear O-Ring	1-1/4"	1"	1.66	3000
0120446	P16-100A-2N1	CCW	Rear O-Ring	1-1/4"	1"	1.96	3000
0120440	P16-100C-2N1	CW	Rear O-Ring	1-1/4"	1"	1.96	3000
0120623	P16-115A-2N1	CCW	Rear O-Ring	1-1/4"	1"	2.24	3000
0301557	P16-115C-2N1	CW	Rear O-Ring	1-1/4"	1"	2.24	3000
0120748	P16-150A-2N1	CCW	Rear O-Ring	1-1/4"	1"	2.93	3000
0120749	P16-150C-2N1	CW	Rear O-Ring	1-1/4"	1"	2.93	3000
0120893	P16-180A-2N1	CCW	Rear O-Ring	1-1/4"	1"	3.51	2200
0120894	P16-180C-2N1	CW	Rear O-Ring	1-1/4"	1"	3.51	2200
0121057	P16-200A-2N1	CCW	Rear O-Ring	1-1/4"	1"	3.90	2000
0121056	P16-200C-2N1	CW	Rear O-Ring	1-1/4"	1"	3.90	2000

CP-16 Clutch Pumps

- Maximum pressure up to 3000 PSI
- Maximum speed 3100-3600 R.P.M.
- Applications – Salt & Sand / Aerial Lift / Low Boy

Clutch Pump

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



Kits

- 0033520 Switch Kit
- 0015433 Adapter Kit





PGP020 Pumps

Bi Rotational S.A.E. B 2 or 4 Bolt

- Maximum pressure up to 3000 PSI
- Maximum speed 2400 R.P.M.
- Applications – Wrecker / Salt & Sand

Part #	Description	Port	Rear	Side	Gear	CID	Max Pressure (PSI)
3089110271	PGP020 7/8" 13 - Tooth	NPT	1"	1"	1"	1.97	3000
3089110272	PGP020 7/8" 13 - Tooth	NPT	1"	1"	1-1/4"	2.46	3000
3089110264	PGP020 7/8" 13 - Tooth	NPT	1"	1-1/4"	1-1/2"	2.96	3000
3089110265	PGP020 7/8" 13 - Tooth	NPT	1"	1-1/4"	1-3/4"	3.45	2500
3089110266	PGP020 7/8" 13 - Tooth	NPT	1"	1-1/4"	2"	3.94	2500
3089110274	PGP020 7/8" 13 - Tooth	ODT	1"	1"	1"	1.97	3000
3089110278	PGP020 7/8" 13 - Tooth	ODT	1"	1"	1-1/4"	2.46	3000
3089110275	PGP020 7/8" 13 - Tooth	ODT	1"	1-1/4"	1-1/2"	2.96	3000
3089110276	PGP020 7/8" 13 - Tooth	ODT	1"	1-1/4"	1-3/4"	3.45	2500
3089110277	PGP020 7/8" 13 - Tooth	ODT	1"	1-1/4"	2"	3.94	2500

PGP051 Pumps

Bi Rotational S.A.E. B 4 Bolt

- Maximum pressure up to 3000 PSI
- Maximum speed 2400 R.P.M.
- Applications Moving Floors / Roll Off / Refuse



Part #	Description	Port	Rear	Side	Gear	CID	Max Pressure (PSI)
3139610367	PGP051 7/8" 13 - Tooth	NPT	1-1/4"	1-1/4"	2-1/2"	6.38	2500
3139610450	PGP051 7/8" 13 - Tooth	NPT	Blank	1-1/4"	2-1/2"	6.38	2500
3139610727	PGP051 7/8" 13 - Tooth	ODT	1-1/4"	1-1/4"	2"	5.10	2500
3139610725	PGP051 7/8" 13 - Tooth	ODT	1-1/4"	1-1/4"	2-1/4"	5.74	2500
3139610526	PGP051 7/8" 13 - Tooth	ODT	1-1/4"	1-1/4"	2-1/2"	6.28	2500

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

NPT = National Pipe Thread

ODT = O.D. Tube Porting

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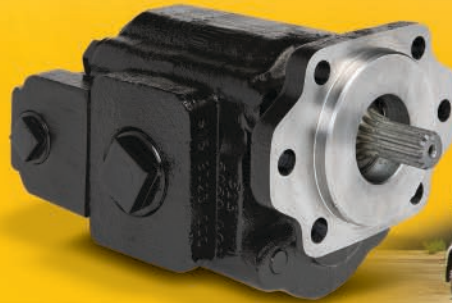
PGP051 Pumps / Motors

Bi Rotational S.A.E. B 2 or 4 Bolt

- Maximum pressure up to 3000 PSI
- Maximum speed 2400 R.P.M.
- Applications – Roll Off / Refuse / Moving Floor / Pup Trailers

Part #	Description	Port	Rear	Side	Gear	CID	Max Pressure (PSI)
3139610665	PGP051 7/8" 13 - Tooth	NPT	1-1/2"	1-1/4"	1-1/2"	3.83	3000
3139610664	PGP051 7/8" 13 - Tooth	NPT	1-1/2"	1-1/4"	1-3/4"	4.46	3000
3139610663	PGP051 7/8" 13 - Tooth	NPT	1-1/2"	1-1/4"	2"	5.10	2500
3139610659	PGP051 7/8" 13 - Tooth	NPT	1-1/2"	1-1/2"	2-1/4"	5.74	2500
3139610658	PGP051 7/8" 13 - Tooth	NPT	1-1/2"	1-1/2"	2-1/2"	6.38	2500

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



PGP051 Pumps

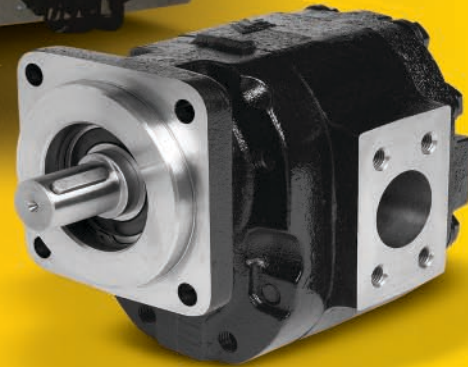
CCW Rotation S.A.E. B 2 or 4 Bolt with Relief Valve

- Maximum pressure up to 3000 PSI
- Maximum speed 2400 R.P.M.
- Application – Moving Floor

Part #	Description	Port	Rear	Side	Gear	CID	Max Pressure (PSI)
3139610677	PGP051 7/8" 13 - Tooth	NPT	RV	1-1/4"	1-1/2"	3.83	3000
3139610678	PGP051 7/8" 13 - Tooth	NPT	RV	1-1/4"	1-3/4"	4.46	3000
3139610679	PGP051 7/8" 13 - Tooth	NPT	RV	1-1/2"	2-1/4"	5.74	2500
3139610699	PGP051 7/8" 13 - Tooth	NPT	RV	1-1/2"	2-1/2"	6.38	2500

NPT = National Pipe Thread

RV = Relief Valve



PGP075 / PGP076 Pumps

CCW Rotation S.A.E. C 4 Bolt Standard and Universal Pumps Ports

- Maximum pressure up to 3000 PSI
- Maximum speed 2500 R.P.M.
- Applications – Refuse / Side Loader / Front Loader / Rear Loader

PGP075 Standard

Part #	Description	Port	Rear	Side	Gear	CID	Max Pressure (PSI)
3169310187	1-1/4" w/key	SF	2"	1-1/4"	2-1/4"	9.23	2250

PGP076 Universal With Test Ports and Adapter Ring

Part #	Description	Port	Rear	Side	Gear	CID	Max Pressure (PSI)
3169610243	1-1/4" w/key	SF	1-1/2"	1-1/4"	1-1/2"	6.15	3000
3169610244	1-1/4" w/key	SF	1-1/2"	1-1/4"	1-3/4"	7.18	3000
3169610245	1-1/4" w/key	SF	2"	1-1/4"	2"	8.20	2500
3169610246	1-1/4" w/key	SF	2"	1-1/4"	2-1/4"	9.23	2500

SF = Split Flange

Accessories

Part #	Description
Dry Valves	
3169414001	Commercial Dry Valve 2" Inlet
0098003	ER-200 Dry Valve 2" Inlet
0098002	ER-150 Dry Valve 1-1/2" Inlet
93839-02	Bleeder Valve
HOC Accessories	
3164000206	HOC By Pass Block 2" Inlet
3169414014	HOC Flow Control 50 G.P.M.
3169414017	HOC Flow Control 45 G.P.M.
3169414021	HOC Flow Control 35 G.P.M.
3169414018	HOC Flow Control 25 G.P.M.
Muncie Dry Valve Adapter	
3912681800	Muncie DV Adapter 2" SF
3912681799	Muncie DV Adapter 1-1/2" SF

Muncie to Commercial Interchange

The Interchanges listed below are for reference to Pumps listed in this catalog.

C Series Dump Pumps

Muncie Part #	Commercial Model #	10 Digit #	General Description
E2XL27-1RPRB	C101D-2.5	314-9310-226	Remote Mount Bi Rotation 2 1/2" Gear
E2XL27-2BPRL	C102D-2.5-1	314-9325-229	Direct Mount CCW Rotation 2 1/2" Gear
E2XL27-2BPRR	C102D-2.5	314-9325-234	Direct Mount CW Rotation 2 1/2" Gear
E3XA27-2BPRL	C102D-2.5-1-AS	314-9325-227	Direct Mount CCW Rotation 2 1/2" Gear Air Shift Installed
ACM-300	ASK17	314-9414-017	Air Shift Kit Without Hoses and Fittings

NOTE: E2 Stands for 2 Line and E3 Stands for 3 Line / All Commercial Pumps in this program are 3 Line and include the sleeve
If a 2 Line Hydraulic System is being used do not install the 3rd line sleeve in the suction port.

G Series Dump Pumps

Muncie Part #	Commercial Model #	10 Digit #	General Description
S2LD15-1-RPRB	G101-1-2.0	308-9310-047	Remote Mount Bi Rotation 2" Gear
S2LD15-2-BPRL	G102-1-2.0L-4S	308-9310-418	Direct Mount CCW Rotation 4 Bolt 2" Gear
S2LD15-2BPRR	G102-1-2.0R-4S	308-9310-416	Direct Mount CW Rotation 4 Bolt 2" Gear
S3AD15-2BPRR	G102-1-2.0R-4S-AS	308-9310-903	Direct Mount CW Rotation 4 Bolt 2" Gear Air Shift Installed
ACM-400	ASK49	308-9414-049	Air Shift Kit Without Hoses and Fittings

NOTE: S2 Stands for 2 Line and S3 Stands for 3 Line / All Commercial Pumps in this program are 3 Line and include the sleeve
If a 2 Line Hydraulic System is being used do not install the 3rd line sleeve in the suction port.

* Commercial Always Recommends the use of a Three - Line Dump Pump System for prolonged trouble-free operation.

P20 Series

Muncie Part #	Commercial Model #	10 Digit #	General Description
PK8-2BPBB	PGP020B346QUYF10-25	3089110271	PGP020 2/4B NPT 7/8" 13T 10
PK11-2BPBB	PGP020B346QUYF12-25	3089110272	PGP020 2/4B NPT 7/8" 13T 12
PK13-2BPBB	PGP020B346QUYL15-25	3089110264	PGP020 2/4B NPT 7/8" 13T 15
PK15-2BPBB	PGP020B346QUYL17-25	3089110265	PGP020 2/4B NPT 7/8" 13T 17
PK17-2BPBB	PGP020B346QUYL20-25	3089110266	PGP020 2/4B NPT 7/8" 13T 20
PK8-2BSBB	PGP020B346JEAL10-25	3089110274	PGP020 2/4B ODT 7/8" 13T 10
PK11-2BSBB	PGP020B346JEAF12-25	3089110278	PGP020 2/4B ODT 7/8" 13T 12
PK13-2BSBB	PGP020B346JEAL15-25	3089110275	PGP020 2/4B ODT 7/8" 13T 15
PK15-2BSBB	PGP020B346JEAL17-25	3089110276	PGP020 2/4B ODT 7/8" 13T 17
PK17-2BSBB	PGP020B346JEAL20-25	3089110277	PGP020 2/4B ODT 7/8" 13T 20

P51 Series

Muncie Part #	Commercial Model #	10 Digit #	General Description
PL16-2BPBB	PGP051A346**YL15-65	3139610665	PGP051 2/4B NPT 7/8" 13T 15
PL19-2BPBB	PGP051A346**YL17-65	3139610664	PGP051 2/4B NPT 7/8" 13T 17
PL23-2BPBB	PGP051A346**YL20-65	3139610663	PGP051 2/4B NPT 7/8" 13T 20
PL25-2BPBB	PGP051A346**YR22-65	3139610659	PGP051 2/4B NPT 7/8" 13T 22
PL27-2BPBB	PGP051A346**YR25-65	3139610658	PGP051 2/4B NPT 7/8" 13T 25
PL16-2BPBL-20	PBP051A346**YL15-75-RV	3139610677	PGP051 2/4B NPT 7/8" 13T 15 RV
PL19-2BPBL-20	PGP051A346**YL17-65-RV	3139610678	PGP051 2/4B NPT 7/8" 13T 17 RV
PL25-2BPBL-20	PGP051A346**YR22-65-RV	3139610679	PGP051 2/4B NPT 7/8" 13T 22 RV
PL27-2BPBL-20	PGP051A346**YR25-65-RV	3139610699	PGP051 2/4B NPT 7/8" 13T 25 RV

P76 Series

Muncie Part #	Commercial Model #	10 Digit #	General Description
PMM27-7-CFSL	PGP076A578**OM15-11	3169610243	PGP076 4B SF 1-1/4" K 15
PMM31-7-CFSL	PGP076A578**OM17-11	3169610244	PGP076 4B SF 1-1/4" K 17
PMM35-7-CFSL	PGP076A578**ON20-11	3169610245	PGP076 4B SF 1-1/4" K 20
PMM40-7-CFSL	PGP076A578**ON22-11	3169610246	PGP076 4B SF 1-1/4" K 22



Permco to Commercial Interchange

The Interchanges listed below are for reference to Pumps listed in this catalog.

C Series Dump Pumps

Permco Model Number	Commercial Model #	10 Digit Order Number	Commercial General Description
DM-640-25-XR-O-T-250	C101D-2.5	314-9310-226	Remote Mount Bi Rotation 2 1/2" Gear
DMD-25-X-L-MS-25-EB	C102D-2.5-1	314-9325-229	Direct Mount CCW Rotation 2 1/2" Gear
DMD-25-X-R-MS-25-EB	C102D-2.5	314-9325-234	Direct Mount CW Rotation 2 1/2" Gear
DMD-25-X-L-AS-25-EB	C102D-2.5-1-AS	314-9325-227	Direct Mount CCW Rotation 2 1/2" Gear Air Shift Installed

NOTE: All Commercial Pumps in this program are 3 Line and include the sleeve
If a 2 Line Hydraulic System is being used do not install the 3rd line sleeve in the suction port.

G Series Dump Pumps

Permco Model Number	Commercial Model #	10 Digit Order Number	Commercial General Description
DMR-400-20-X-200	G101-1-2.0	308-9310-047	Remote Mount Bi Rotation 2" Gear
DMD-400-20-XR-200	G102-1-2.0L-4S	308-9310-418	Direct Mount CCW Rotation 4 Bolt 2" Gear
DMD-400-20-XL-200	G102-1-2.0R-4S	308-9310-416	Direct Mount CW Rotation 4 Bolt 2" Gear
DMD-400-20-XR-200-AS	G102-1-2.0R-4S-AS	308-9310-903	Direct Mount CW Rotation 4 Bolt 2" Gear Air Shift Installed

NOTE: All Commercial Pumps in this program are 3 Line and include the sleeve
If a 2 Line Hydraulic System is being used do not install the 3rd line sleeve in the suction port.

* Commercial Always Recommends the use of a Three - Line Dump Pump System for prolonged trouble-free operation.

P20 SERIES

Permco Model Number	Commercial Model #	10 Digit Order Number	Commercial General Description
P2100A290MDXE10-14	PGP020B346QUYF10-25	3089110271	PGP020 2/4B NPT 7/8" 13T 10
P2100A290MDXE12-14	PGP020B346QUYF12-25	3089110272	PGP020 2/4B NPT 7/8" 13T 12
P2100A290MDXK15-14	PGP020B346QUYL15-25	3089110264	PGP020 2/4B NPT 7/8" 13T 15
P2100A290MDXK17-14	PGP020B346QUYL17-25	3089110265	PGP020 2/4B NPT 7/8" 13T 17
P2100A290MDXK20-14	PGP020B346QUYL20-25	3089110266	PGP020 2/4B NPT 7/8" 13T 20
P2100A290IDZE10-14	PGP020B346JEAL10-25	3089113274	PGP020 2/4B ODT 7/8" 13T 10
P2100A290IDZE12-14	PGP020B346JEAF12-25	3089110278	PGP020 2/4B ODT 7/8" 13T 12
P2100A290IDZK15-14	PGP020B346JEAL15-25	3089110275	PGP020 2/4B ODT 7/8" 13T 15
P2100A290IDZK17-14	PGP020B346JEAL17-25	3089110276	PGP020 2/4B ODT 7/8" 13T 17
P2100A290IDZK20-14	PGP020B346JEAL20-25	3089110277	PGP020 2/4B ODT 7/8" 13T 20

P51 SERIES

Permco Model Number	Commercial Model #	10 Digit Order Number	Commercial General Description
M5151A890AAXK15-54	PGP051B346***YL*15-65	3139610665	PGP051 2/4B NPT 7/8" 13T 15
M5151A890AAXK17-54	PGP051B346***YL*17-65	3139610664	PGP051 2/4B NPT 7/8" 13T 17
M5151A890AAXK20-54	PGP051B346***YL*20-65	3139610663	PGP051 2/4B NPT 7/8" 13T 20
M5151A890AAXQ22-54	PGP051B346***YR*22-65	3139610659	PGP051 2/4B NPT 7/8" 13T 22
M5151A890AAXQ25-54	PGP051B346***YR*25-65	3139610658	PGP051 2/4B NPT 7/8" 13T 25

P75 P76 SERIES

Permco Model Number	Commercial Model #	10 Digit Order Number	Commercial General Description
P75C467ADNM22-00	PGP075C578*BE*ON*22-11	3169310187	PGP075 4B SF 1-1/4" K 22
VP28-4COFLMC	PGP076A578***OM15-11	3169610243	PGP076 4B SF 1-1/4" K 15
VP32-4COFLMC	PGP076A578***OM17-11	3169610244	PGP076 4B SF 1-1/4" K 17
VP37-4COFLMC	PGP076A578***ON20-11	3169610245	PGP076 4B SF 1-1/4" K 20
VP42-4COFLMC	PGP076A578***ON22-11	3169610246	PGP076 4B SF 1-1/4" K 22



Offer of Sale

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2. Payment: Payment shall be made by Buyer net 30 days from the date of shipment of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

4. Warranty: Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 18 months from date of shipment from Parker Hannifin Corporation. **THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED. NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGNS OR SPECIFICATIONS.**

5. Limitation Of Remedy: SELLER'S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLER'S SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEMS SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.

6. Changes, Reschedules and Cancellations: Reschedules and Cancellations: Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. 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 items sold hereunder, 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.

8. Buyer's Property: Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property, Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Taxes: Unless otherwise indicated on the face hereof, 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 the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. 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 Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. Patents, U.S. Trademarks, copyrights, trade dress and trade secrets (hereinafter '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 an item sold pursuant to this contract 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 an item sold hereunder 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 said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item 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 items 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 item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter 'Events of Force Majeure'). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain there/to. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

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