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PGP/PGM 500 Series

Gear Pumps and Motors In
Single And Multiple Configurations



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Pump/Motor Products

PGP/PGM 505

- Flows to 8 gpm
- Continuous pressures to 4000 psi
- Speeds to 4000 rpm
- Wide variety of integral valve options
- Single and bi-rotational motors

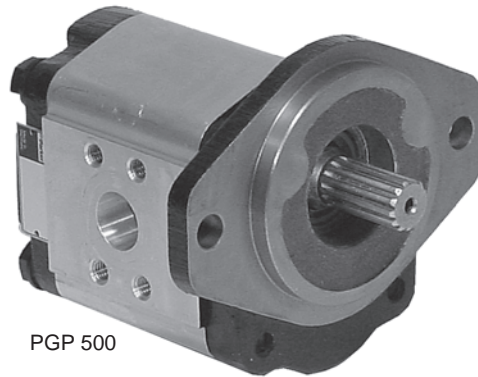
PGP/PGM 511

- Flows to 19 gpm
- Continuous pressures to 3625 psi
- Speeds to 4000 rpm
- Wide variety of integral valve options
- Single and bi-rotational motors

PGP/PGM 500 Series

- **High Performance**
- **High Efficiency**
- **High Pressure Operation**

PGP/PGM 500 series gear pumps/motors are an advanced performance version of the international “bushing block” style pumps. PGP/PGM 500 series pumps/motors offer superior performance, high efficiency and low noise operation at high operating pressures. They are produced in three frame sizes (PGP/PGM 505, PGP/PGM 511) with displacements ranging from 2 to 52 cm³ (.12 to 3.17 in³/rev). A wide variety of standard options are available to meet specific application requirements worldwide.



Advantages

- **Up to 275 bar (4000 psi) continuous operation**
High strength materials and large journal diameters provide low bearing loads for high pressure operation.
- **Low noise**
PGP/PGM 505 - 13 tooth gear profile,
PGP/PGM 511 – 12 tooth gear profile and optimized flow metering provide reduced pressure pulsation and exceptionally quiet operation.

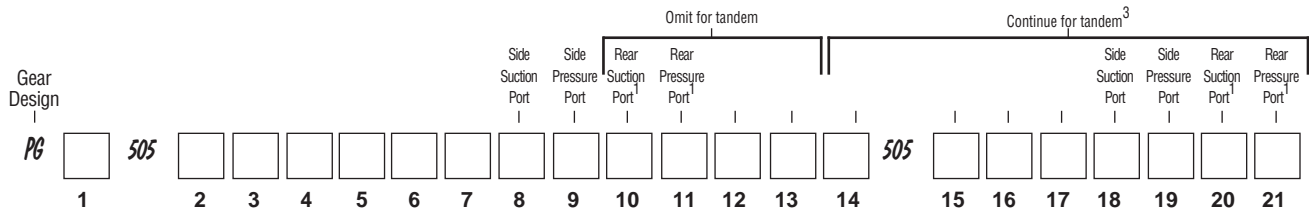
- **High efficiency**
Pressure balanced bearing blocks assure maximum efficiency under all operating conditions.
- **Application flexibility**
International mounts and connections, integrated valve capabilities and common inlet multiple pump configurations provide unmatched design and application versatility.

Characteristics

Product Features	Description
Pump Type	Heavy-duty, aluminum, external gear
Mounting	SAE, rectangular, thru-bolt, and application specific
Ports	SAE/metric split flange, metric and others
Shaft Style	SAE splined, keyed, tapered, tang and specials.
Speed	500 - 4000 rpm, see tables on pages 6, 14 and 21.
Theoretical Displ.	See tables on pages 6, 14 and 18.
Drive	Drive direct with flexible coupling is recommended.
Axial / Radial Load	Units subject to axial or radial loads should be specified with an outboard bearing. Please contact Product Support for assistance.
Inlet Pressure	Operating range - 0.8 to 2 bar abs (12-29 psia). Minimum inlet pressure -0.25 bar abs (-3.6 psia). Short time w/o load. Max. pressure not to exceed 20 psig.
Outlet Pressure	See tables on pages 6, 14 and 18.
Fluids	Mineral oil, fire resistant fluids: - water-oil emulsions 60/40, HFB - water-glycol, HFC - phosphate-esters, HFD
Fluid Temperature	Range of operating temperature -15 to +80°C (5 to 176° F). Max. permissible operating pressure dependent on fluid temperature. Temperature for cold start -20 to -15°C (-4 to 5° F) at speed ≤ 1500 rpm.

Product Features	Description
Fluid Viscosity	Range of operating viscosity 8 to 1000 mm ² /s max. Permissible operating pressure dependent on viscosity. Viscosity range for cold start 1000 to 2000 centistokes at operating pressure ≤10 bar (145 psi) and speed ≤1500 rpm.
Range of Ambient Temperature	-40°C to +70°C (-40°F to 158°F)
Filtration	According to ISO 4406 Cl. 16/13
Flow Velocity	See table on page 19.
Direction of Rotation (looking at the driveshaft)	Clockwise, counter-clockwise or birotational. Note: Drive pump or motor only in indicated direction of rotation.
Multiple Pump Assemblies	- Available in two, three or four section configurations. - Max. shaft loading must conform to the limitations shown in the shaft loading rating tables on pages 9 and 17 in this catalog. - Max. load is determined by adding the torque values for each pumping section that will be simultaneously loaded.
Separate or Common Inlet Capability	Separate inlet configuration: - Each gear housing has individual inlet and outlet ports. Common inlet configuration: - Two gear sets share a common inlet. - Inlet port can be in either section.

PGP/PGM 505 How to Specify



1 Pump/Motor	
P	Pump
M	Motor

2,15 Unit		
	Pump	Motor
A	Single unit	Standard Motor w/o checks
B	Multiple unit	Standard Motor w/ two checks
C	—	Standard Motor w/one anti cavitation check (ACC)
D	—	Motor w/check valve and restrictor

3,16 Displacement	
0020	2.0 ccm (0.12 cir)
0030	3.0 ccm (0.18 cir)
0040	4.0 ccm (0.24 cir)
0050	5.0 ccm (0.31 cir)
0060	6.0 ccm (0.37 cir)
0070	7.0 ccm (0.43 cir)
0080	8.0 ccm (0.49 cir)
0100	10.0 ccm (0.61 cir)
0110	11.0 ccm (0.67 cir)
0120	12.0 ccm (0.73 cir)

4 Rotation	
C	Clockwise
A	Counter clockwise
B	Bi-directional motors only

5 Shaft	
A1	9T, 16/32 Pitch, 32L, SAE "A" spline
A2	9T, 20/40 Pitch, 27L, SAE "AA" spline
J1	Ø12.7, 3.2 Key, no thread, 38L, parallel
K1	Ø15.88, 4.0 Key, no thread, 32L, SAE "A", parallel

6 Shaft End Covers	
A1	50.8x50.8 - Ø45.25 4bolt square flange
H1	82.5 - Ø50.8 SAE "A-A" 2bolt flange
H2	106.4 - Ø82.55 SAE "A" 2bolt flange

7,17 Shaft Seal	
X	No seal
N	NBR
V	FPM, FKM

8,9,10,11,18,19,20,21 Port Options	
B1	No ports
D2	9/16" - 18 UNF thread
D3	3/4" - 16 UNF thread
D4	7/8" - 14 UNF thread
D5*	1 1/16" - 12UN thread
*Not usable for rear ports	

12 Motor Drain Option ²	
B1	No drain
A	7/16"-20 UNF thread
C	9/16"-18 UNF thread

13 Drain Position ²	
2	Drain on bottom
3	Drain on top
4	Rear drain

14 Section Connection	
S	Separate inlets
C	Common inlets

NOTES:

- 1 Only coded for the last section.
- 2 Only for motors
- 3 For further "B" triple unit repeat displacement, shaft seal between sections, side suction port, side pressure port, rear suction port, rear pressure port.
4. Dimensions are in millimeters except where noted.
5. Distributor unit contains shaft with add on capability for multiples.

Please note the bold, italicized items reflect Parker preferred product options.

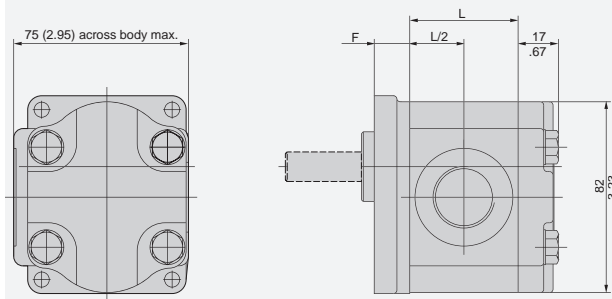
PGP/PGM 505 Specifications

Description	Code	0020	0030	0040	0050	0060	0070	0080	0090	0100	0110	0120
Displacements	cm ³ /rev	2	3	4	5	6	7	8	9	10	11	12
	in ³ /rev	0.12	0.18	0.24	0.31	0.37	0.43	0.49	0.55	0.61	0.67	0.73
Continuous Pressure	bar	275	275	275	275	275	275	275	250	250	250	220
	psi	3988	3988	3988	3988	3988	3988	3988	3625	3625	3625	3190
Intermittent Pressure	bar	300	300	300	300	300	300	300	275	275	275	220
	psi	4350	4350	4350	4350	4350	4350	4350	3988	3988	3988	3190
Minimum Speed @ Max. Outlet Pressure	rpm	500	500	500	500	500	500	500	500	500	500	500
Maximum Speed @ 0 Inlet & Max. Outlet Pressure	rpm	4000	4000	4000	4000	3600	3300	3000	2900	2800	2400	2400
Pump Input Power @ Max. Pressure and 1500 rpm	kW	2	2.3	3	3.8	4.5	5.3	6	6.5	6.9	7.6	8.4
	HP	2.68	3.08	4.02	5.10	6.03	7.11	8.05	8.72	9.25	10.19	11.26
Dimension "L"	mm	38.4	41.1	43.8	46.5	49.1	51.8	54.5	57	59.8	62.5	65.2
	in	1.51	1.62	1.72	1.83	1.93	2.04	2.15	2.24	2.35	2.46	2.57
Approximate Weight ¹⁾	kg	1.72	2.22	2.27	2.32	2.38	2.43	2.48	2.53	2.58	2.63	2.68
	LB	3.80	4.91	5.02	5.13	5.26	5.37	5.48	5.59	5.70	5.81	5.92

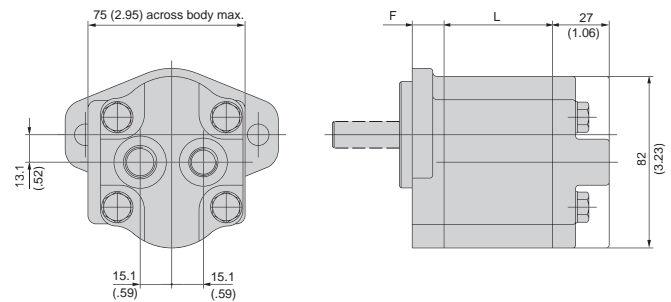
¹⁾ Single pump with Shaft End Cover D3 and non ported Port End Cover.

PGP/PGM 505 Dimensions

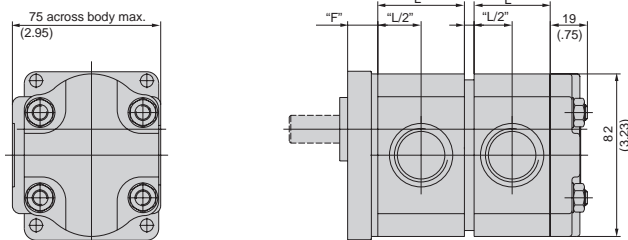
Single Unit PGP/PGM 505



Single Unit PGP/PGM 505 with rear ports



Tandem Unit PGP/PGM 505



NOTE:
Dimension "F" see shaft end covers on page 7
Dimension "L" see table above

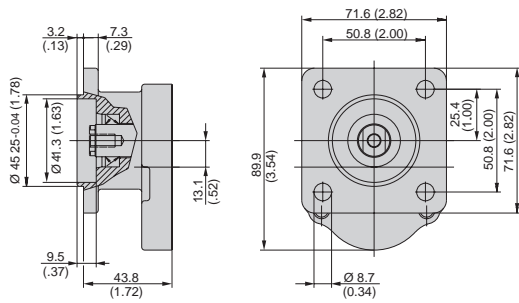
- Notes: 1. Dimensions are in millimeters (inches).
- 2. Dimensions are nominal except where noted.
- 3. Subscript and/or superscript numbers are tolerances.

Please note the bold, italicized items reflect Parker preferred product options.

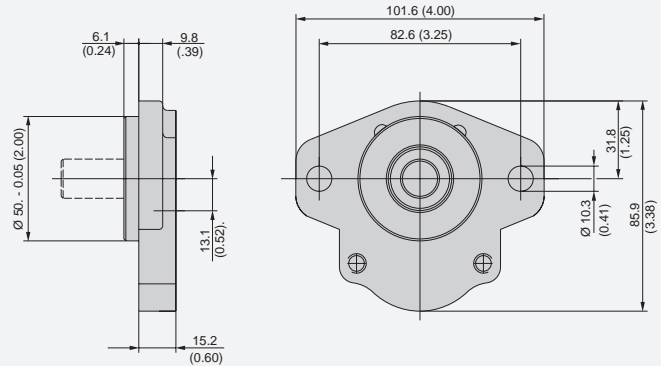


PGP/PGM 505 Shaft End Covers

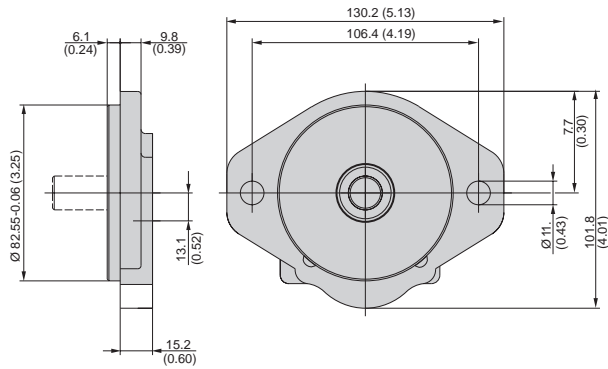
Code A1



Code H1



Code H2



- Notes: 1. Dimensions are in millimeters (inches).
- 2. Dimensions are nominal except where noted.
- 3. Subscript and/or superscript numbers are tolerances.

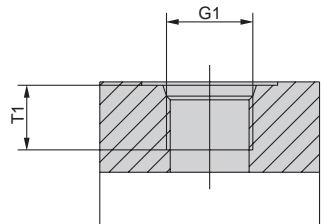
Please note the bold, italicized items reflect Parker preferred product options.

PGP/PGM 505 Porting

Code D2, D3, D4, D5

SAE straight thread

See table below for specific port dimensions.

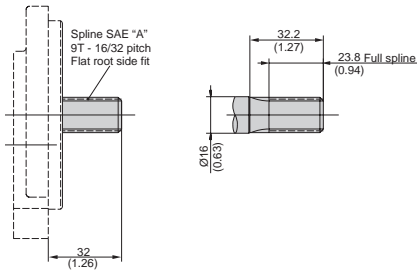


PGP/PGM 505

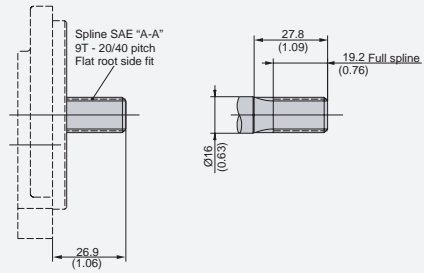
Code	G1	T1
Thread	Thread	Dimensions
D2	9/16"-18 UNF	12.7
D3	3/4"-16 UNF	14.3
D4	7/8"-14 UNF	16.7
D5	1 1/16"-12 UN	19.0

PGP/PGM 505 Drive Shaft

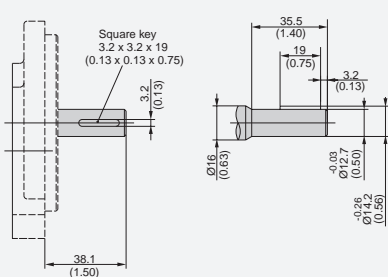
Code A1



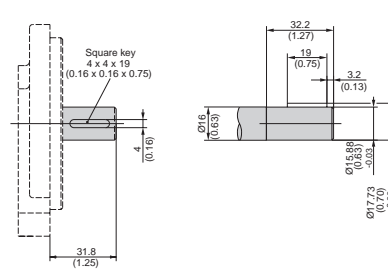
Code A2



Code J1



Code K1



- Notes: 1. Dimensions are in millimeters (inches).
 2. Dimensions are nominal except where noted.
 3. Subscript and/or superscript numbers are tolerances.

When applying a multiple section pump, the maximum drive shaft load is determined by adding the torque values for each pumping section that will be simultaneously loaded.

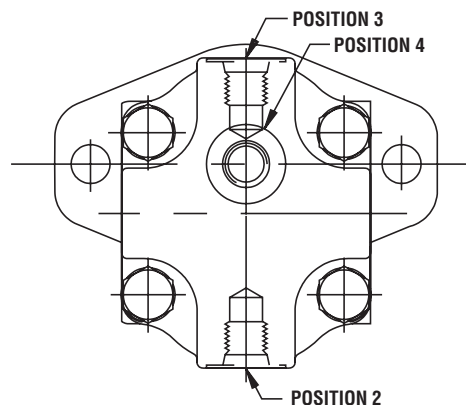
PGP/PGM 505 - Shaft Load Capacity

Code	Description	Style	Torque Rating
A1	9T, 16/32 Pitch, SAE "A"	Spline	108Nm/954 in-lb
A2	<i>9T, 20/40 Pitch, SAE "A-A"</i>	<i>Spline</i>	<i>108Nm/954 in-lb</i>
J1	<i>Ø 12.7, 3.2 Key, No thread, 38L</i>	<i>Parallel</i>	<i>43Nm/380in-lb</i>
K1	Ø 15.88, 4.0 Key. No Thread, 32L, SAE "A"	Parallel	85Nm/751 in-lb
	Tandem Pump/Connecting Shaft	Spline	36Nm/318in-lb

$$\text{Torque [in-lb]} = \frac{\text{Displacement [in}^3\text{/rev]} \times \text{Pressure [psi]}}{5.72}$$

$$\text{Torque [Nm]} = \frac{\text{Displacement [cc/rev]} \times \text{Pressure [bar]}}{57.2}$$

PGP/PGM 505 Drain Positions



Please note the bold, italicized items reflect Parker preferred product options.

PGP505 Performance Curves

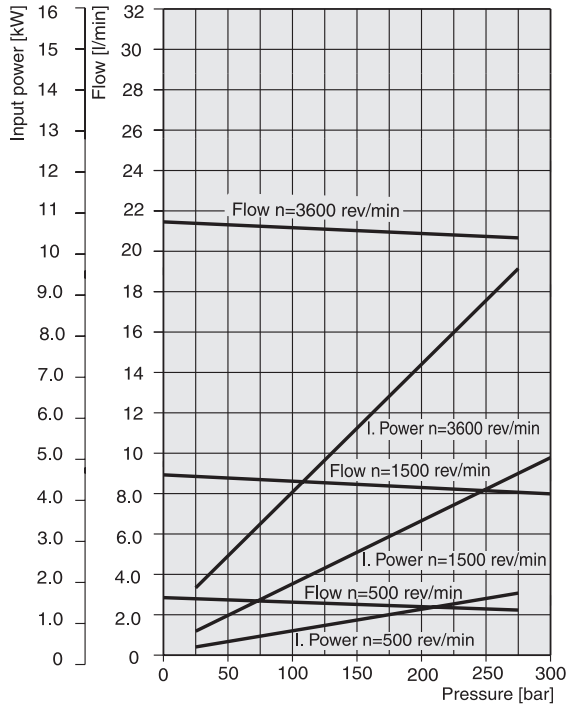
Single or Multiple Aluminum Pumps & Motors

PGP 505 - 6.0 CC

Fluid Temperature = 45± 2°C

Viscosity = 36mm²/s

Inlet Pressure = 0.9 + 0.1 bar absolute

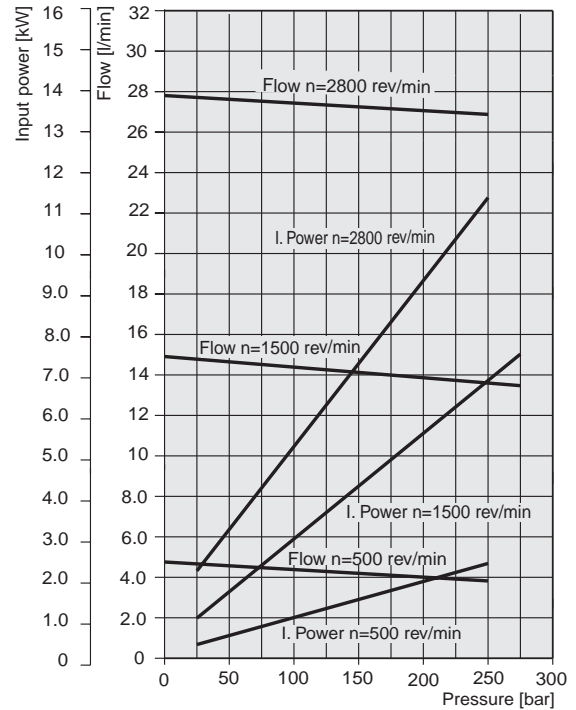


PGP 505 - 10.0 CC

Fluid Temperature = 45± 2°C

Viscosity = 36mm²/s

Inlet Pressure = 0.9 + 0.1 bar absolute

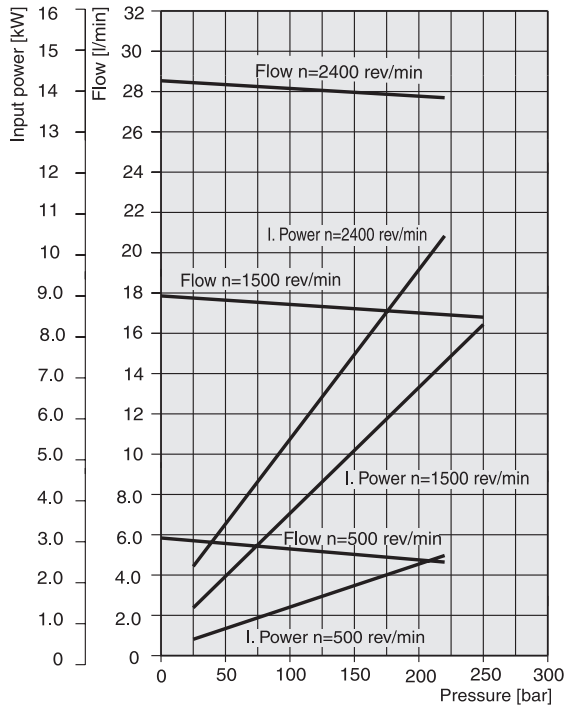


PGP 505 - 12.0 CC

Fluid Temperature = 45± 2°C

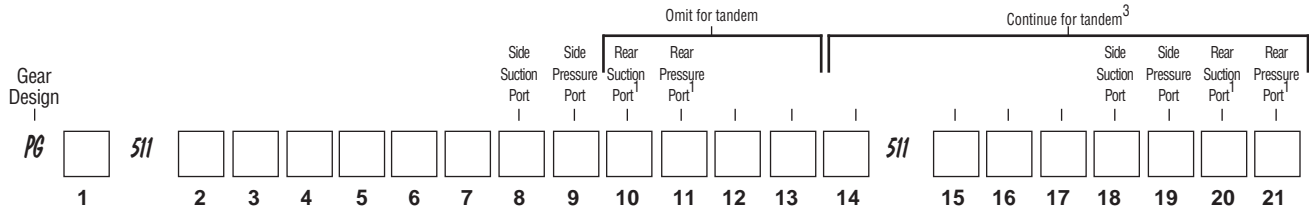
Viscosity = 36mm²/s

Inlet Pressure = 0.9 + 0.1 bar absolute



Performance data shown is based upon a series of laboratory tests and is not representative of any one unit.

PGP/PGM 511 How to Specify



1 Pump/Motor	
P	Pump
M	Motor

2,15 Unit		
	Pump	Motor
A	Single unit	Standard Motor w/o checks
B	Multiple unit	Standard Motor w/ two checks
C	—	Standard Motor w/one anti cavitation check (ACC)
D	—	Standard Motor w. one ACC + restrictor

* Only for displacement codes 0060 to 0280

3,16 Displacement	
0060	6.0 ccm (0.37 cir)
0070	7.0 ccm (0.43 cir)
0080	8.0 ccm (0.49 cir)
0100	10.0 ccm (0.61 cir)
0110	11.0 ccm (0.67 cir)
0140	14.0 ccm (0.85 cir)
0160	16.0 ccm (0.98 cir)
0180	18.0 ccm (1.10 cir)
0190	19.0 ccm (1.16 cir)
0210	21.0 ccm (1.28 cir)
0230	23.0 ccm (1.40 cir)
0270	27.0 ccm (1.65 cir)
0280	28.0 ccm (1.71 cir)
0310	31.0 ccm (1.89 cir)

4 Rotation	
C	Clockwise
A	Counter clockwise
B	Bi-directional motors only

5 Shaft	
A1	9T, 16/32 Pitch, 32L, SAE "A" spline
B1	10T, 16/32 Pitch, 32L spline
B2	10T, 16/32 Pitch, 38.2L spline
C1	11T, 16/32 Pitch, 38.2L, SAE 19-4 spline
C2	11T, 16/32 Pitch, 32.2L, SAE 19-4 spline
K1	Ø15.88, 4.0 Key, no thread, 32L, SAE "A", parallel
K4	Ø15.88, 4.0 Key, no thread, 58.7L, parallel
L1	Ø17.46, 4.8 Key, 7/16" UNF ext., 44.7L, parallel
L6	Ø19.05, 4.8 Key, no thread, 32L, parallel

6 Shaft End Covers	
D4	72.0x100.0 - Ø80 rectangular
H2	106.4 - Ø82.55 SAE "A" 2bolt flange
H3	146.1 - Ø101.6 SAE "B" 2bolt flange
Q2	60.0x60.0 - Ø50.0 w. shaft seal, O' thrubolt flange
Q4	60.0x60.0 - Ø50.0 w. shaft seal, O',thrubolt flange
J5	H2 with slots, spec 2bolt
L2	106.4 - Ø82.55 SAE "A" 2bolt, w. OBB + cont. drive shaft

7,17 Shaft Seal	
X	No seal
N	NBR
V	FPM, FKM
M	Double NBR
W	Double FPM

8,9,10,11,18,19,20,21 Port Options	
B1	No ports
D2	9/16" - 18 UNF thread
D3	3/4" - 16 UNF thread
D4	7/8" - 14 UNF thread
D5	1 1/16" - 12UN thread
D6¹	1 5/16" - 12 UN thread
D7²	1 5/8" - 12 UN thread
D8²	1 7/8" - 12 UN thread

¹Not usable for rear ports.
²Inlet port only. For 19cc and larger.

12 Motor Drain Option ²	
B1	No drain
C	9/16-18 UNF thread

13 Drain Position ²	
2	Drain on bottom
3	Drain on top
4	Rear drain
5	Drain right view on drive shaft
6	Drain left view on drive shaft

14 Section Connection	
S	Separate inlets
C	Common inlets

NOTES:

- 1 Only coded for the last section.
- 2 Only for motors
- 3 For further "B" triple unit repeat displacement, shaft seal between sections, side suction port, side pressure port, rear suction port, rear pressure port.
4. Dimensions are in millimeters except where noted.

Please note the bold, italicized items reflect Parker preferred product options.



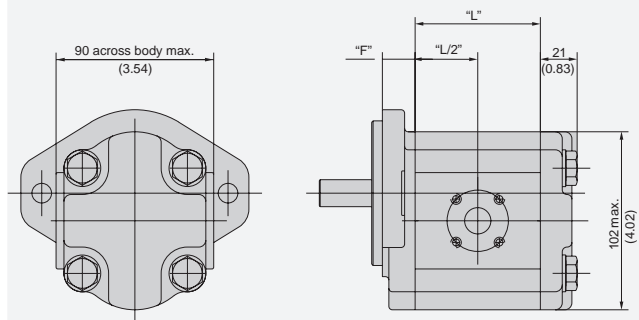
PGP/PGM 511 Specifications

Description	Code	0060	0070	0080	0100	0110	0140	0160	0180	0190	0210	0230	0270	0280	0310
Displacements	cm ³ /rev	6	7	8	10	11	14	16	18	19	21	23	27	28	31
	in ³ /rev	0.37	0.43	0.49	0.61	0.67	0.85	0.98	1.10	1.16	1.28	1.40	1.65	1.71	1.89
Continuous Pressure	bar	250	250	250	250	250	250	250	250	250	235	225	190	185	165
	psi	3625	3625	3625	3625	3625	3625	3625	3625	3625	3410	3265	2755	2685	2395
Intermittent Pressure	bar	275	275	275	275	275	275	275	260	260	240	235	200	190	170
	psi	3988	3988	3988	3988	3988	3988	3988	3770	3770	3480	3408	2900	2755	2465
Minimum Speed @ Max. Outlet Pressure	rpm	500	500	500	500	500	500	500	500	500	500	500	500	500	500
Maximum Speed @ 0 Inlet & Max. Outlet Pressure	rpm	4000	4000	4000	3600	3600	3300	3000	3000	3000	2800	2800	2400	2300	2300
Pump Input Power @ Max. Pressure and 1500 rpm	kW	4.5	5.25	6	7.5	8.3	10.5	12	13.5	14.3	14.4	14.7	14.9	15.8	16.7
	HP	6.03	7.04	8.05	10.06	11.1	14.0	16.0	18.1	19.1	19.3	19.7	19.9	21.1	22.4
Dimension "L"	mm	51.8	53.3	54.9	57.9	59.4	64	67	70.1	71.6	76.6	77.6	83.7	84.2	89.8
	in	2.04	2.10	2.16	2.28	2.34	2.52	2.64	2.76	2.82	3.02	3.06	3.30	3.31	3.54
Approximate Weight ¹⁾	kg	3.5	3.5	3.6	3.6	3.7	3.8	3.9	4.0	4.0	4.1	4.2	4.3	4.4	4.5
	LB	7.70	7.70	7.90	7.90	8.10	8.40	8.60	8.80	8.80	9.00	9.20	9.50	9.70	9.9

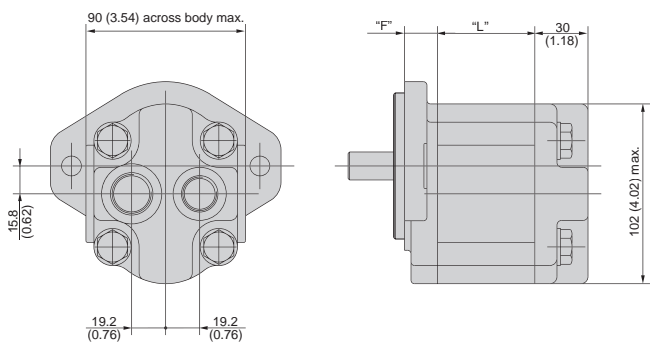
¹⁾ Single pump with Shaft End Cover Q1 and non ported Port End Cover.

PGP/PGM 511 Dimensions

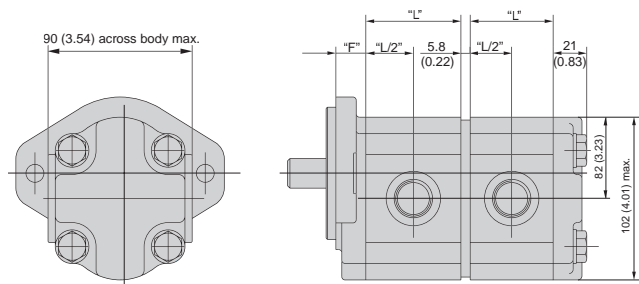
Single Unit PGP/PGM 511



Single Unit PGP/PGM 511 with rear ports



Tandem Unit PGP/PGM 511



NOTE:
Dimension "F" see shaft end covers on page 15
Dimension "L" see table above

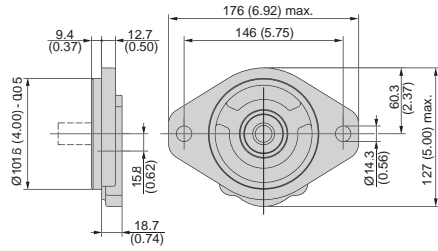
- Notes: 1. Dimensions are in millimeters (inches).
- 2. Dimensions are nominal except where noted.
- 3. Subscript and/or superscript numbers are tolerances.

Please note the bold, italicized items reflect Parker preferred product options.

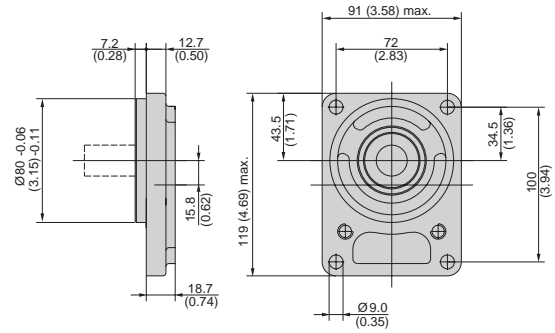


PGP/PGM 511 Shaft End Covers

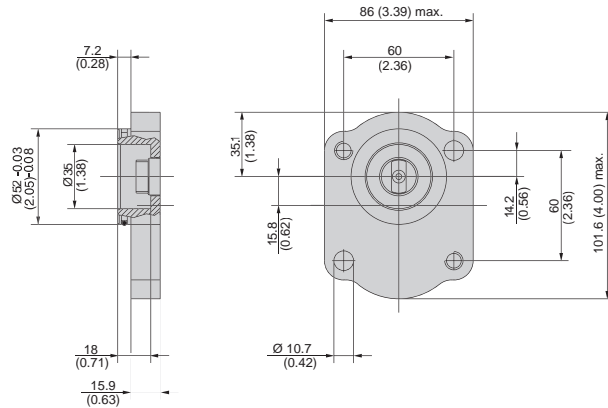
Code H3



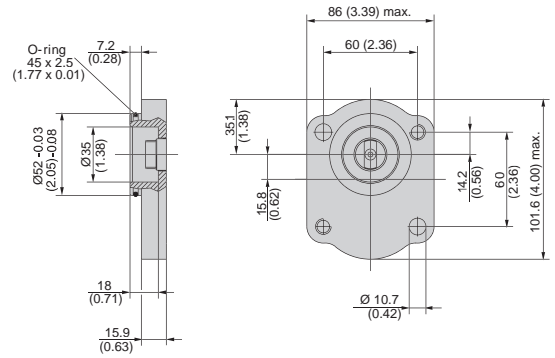
Code D4



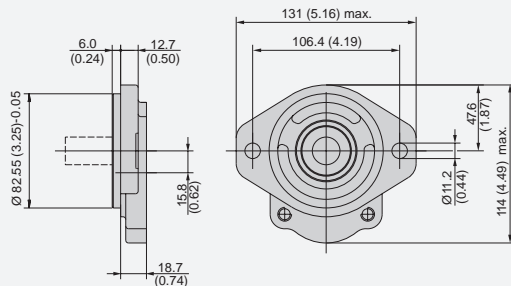
Code Q2



Code Q4



Code H2



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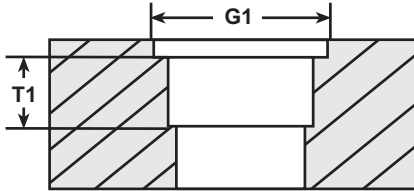


PGP/PGM 511 Porting

Code D

SAE straight thread

See table at right for specific port dimensions.



Code	G1 Thread	T1 Dimensions
D2	9/16"-18 UNF	12.7
D3	3/4"-16 UNF	14.3
<i>D4</i>	<i>7/8"-14 UNF</i>	<i>16.7</i>
<i>D5</i>	<i>1 1/16"-12 UN</i>	<i>19.0</i>
<i>D6</i>	<i>1 5/16"-12 UN</i>	<i>19.0</i>
D7	1 5/8"-12 UN	19.0
D8	1 7/8"-12 UN	19.0

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 2. Dimensions are nominal except where noted.
 3. Subscript and/or superscript numbers are tolerances.

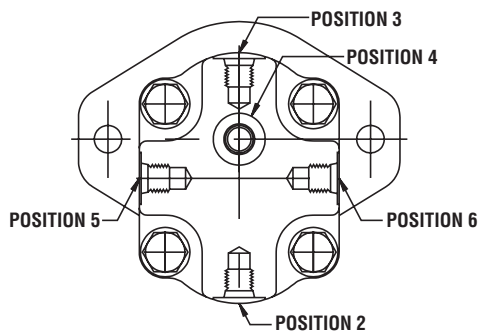
PGP/PGM 511 - Shaft Load Capacity

Code	Description	Style	Torque Rating
A1	9T, 16/32 Pitch, 32L, SAE "A"	Spline	86Nm/759in-lb
C1	11T, 16/32 Pitch, 38.2L, SAE 19-4	Spline	184Nm/1625in-lb
C2	11T, 16/32 Pitch, 32.2L, SAE 19-4	Spline	184Nm/1625in-lb
K1	Ø 15.88 4.0 Key, no thread, 32L, SAE "A"	Parallel	75Nm/662in-lb
K4	Ø 15.88, 3.95 Key, no thread, 58.7L	Parallel	75Nm/662in-lb
L1	Ø 17.46, 4.8 Key, 7/16UNF ext., 44.2L	Parallel	112Nm/989in-lb
L6	Ø 19.05, 4.8 Key, no thread, 32L, SAE 19-1	Parallel	145Nm/1280in-lb
	Tandem pump Connecting Shaft	Spline	110Nm/971in-lb

When applying a multiple section pump, the maximum drive shaft load is determined by adding the torque values for each pumping section that will be simultaneously loaded.

$$\text{Torque [in-lb]} = \frac{\text{Displacement [in}^3\text{/rev]} \times \text{Pressure [psi]}}{5.72} \quad \text{Torque [Nm]} = \frac{\text{Displacement [cc/rev]} \times \text{Pressure [bar]}}{57.2}$$

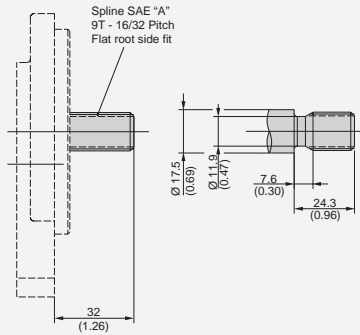
PGP/PGM 511 Drain Positions



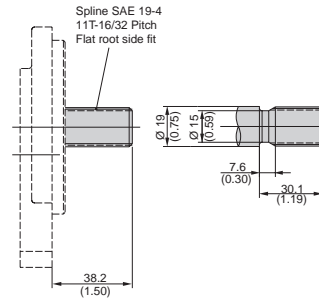
Please note the bold, italicized items reflect Parker preferred product options.

PGP/PGM 511 Drive Shaft

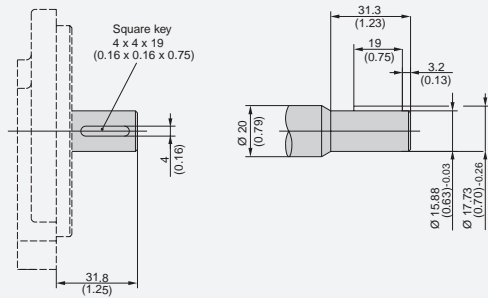
Code A1



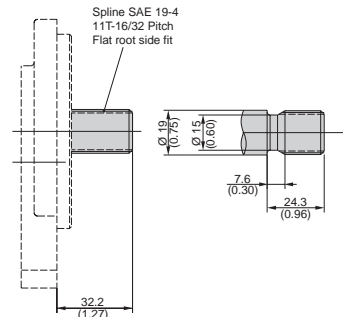
Code C1



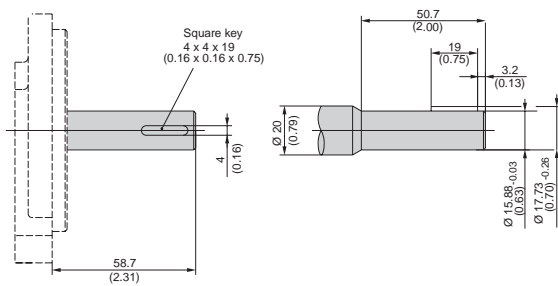
Code K1



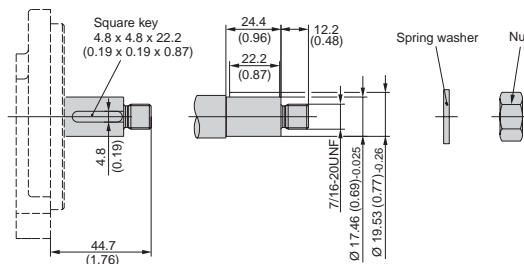
Code C2



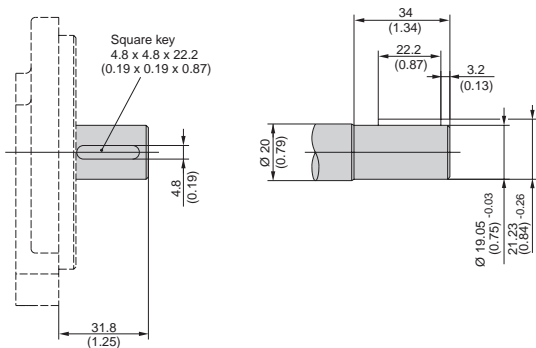
Code K4



Code L1



Code L6



Please note the bold, italicized items reflect Parker preferred product options.

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PGP511 Performance Curves

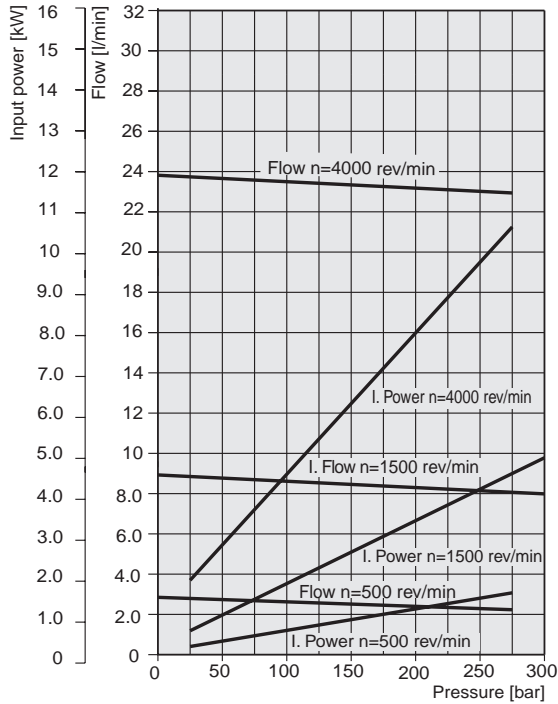
Single or Multiple Aluminum Pumps & Motors

PGP511 - 6.0 CC

Fluid Temperature = 45± 2°C

Viscosity = 36mm²/s

Inlet Pressure = 0.9 + 0.1 bar absolute

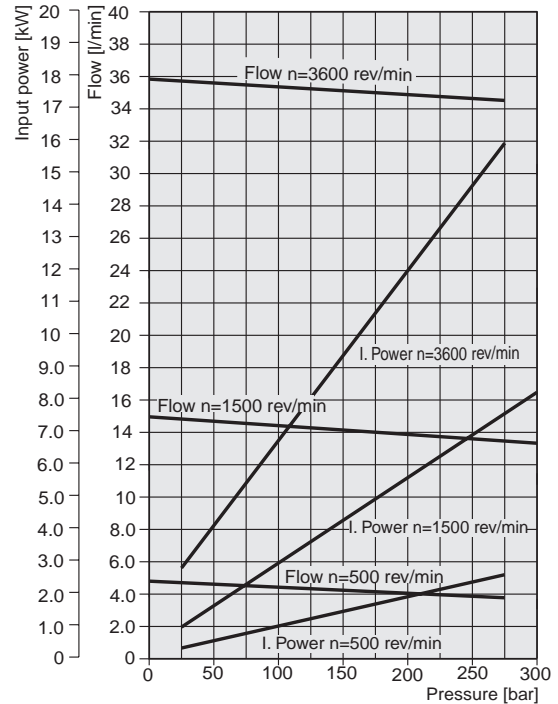


PGP511 - 10.0 CC

Fluid Temperature = 45± 2°C

Viscosity = 36mm²/s

Inlet Pressure = 0.9 + 0.1 bar absolute

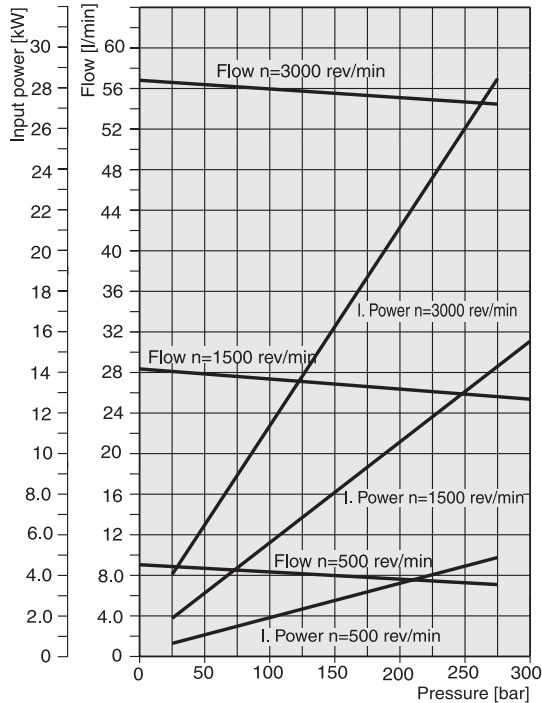


PGP511 - 19.0 CC

Fluid Temperature = 45± 2°C

Viscosity = 36mm²/s

Inlet Pressure = 0.9 + 0.1 bar absolute

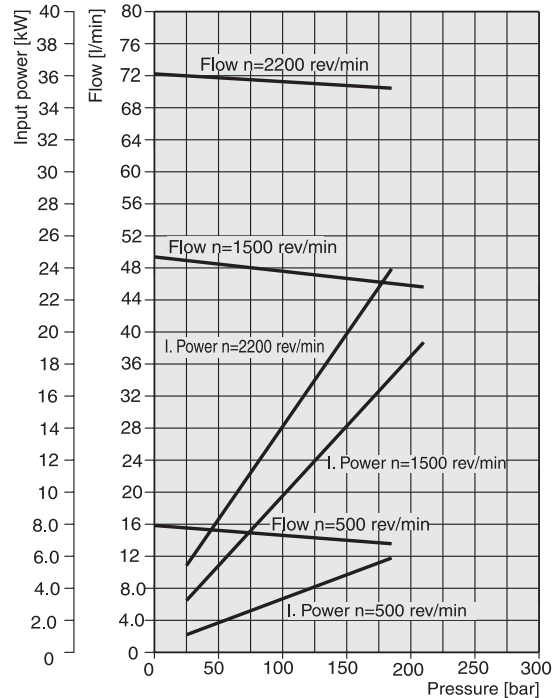


PGP511 - 33.0 CC

Fluid Temperature = 45± 2°C

Viscosity = 36mm²/s

Inlet Pressure = 0.9 + 0.1 bar absolute



Performance data shown is based upon a series of laboratory tests and is not representative of any one unit.

Integral Valve Options and Market Experience

This appendix provides overviews of the valves currently offered as well as options that are available from the wide range of Parker gear pumps and motors. Many valves are already in production for OEM customers on specific pumps or motors, while others have been supplied for prototype evaluation. A few valves are derivatives of valves already in production and can be produced for OEM customers. Parker's integral valve program was developed in response

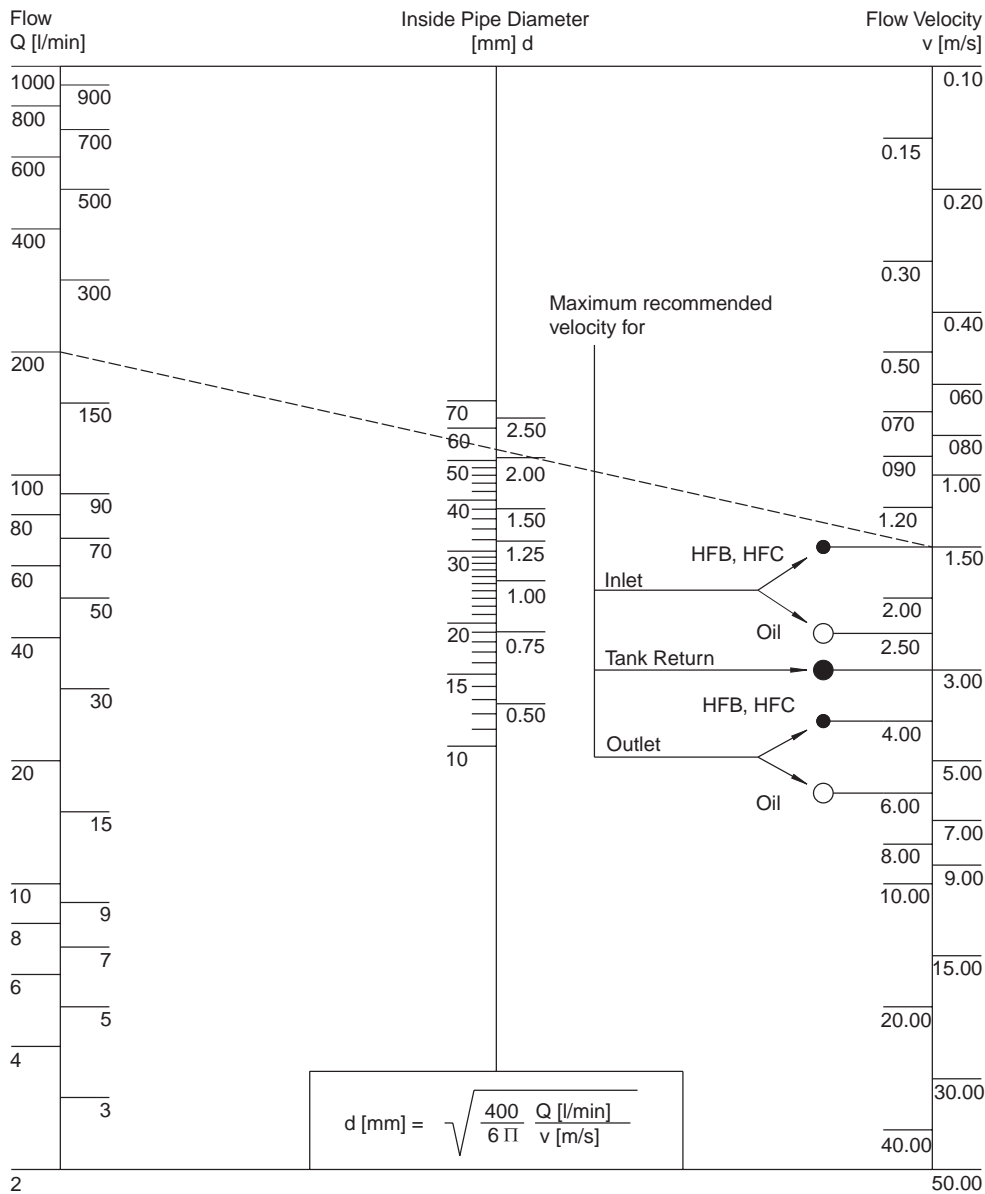
to requests from our OEM customers to reduce the number and total cost of components on their machines. We addressed this challenge by integrating the valves required for machine functions into our hydraulic pumps and motors. This integration has reduced the number of purchased components, eliminated many of the hydraulic hoses and associated fittings (and potential leak points), and reduced assembly labor costs on the production line.

	Implement Pumps (Single)	Implement Pumps (Tandem)	Triple and Quad Pumps	Two Stage Pumps	Power Steering Pumps	Power Steering/Fan Drive Pumps	Fan Drive Pumps	Direct Acting Relief Valves	Pilot Operated Relief Valves	Load Sensing Relief Valves	Solenoid Unloading Relief Valves	Unloaders for Tandem Pumps	Priority Flow Dividers	Load Sense Priority Valves	Single Accumulator Charge Pumps	Dual Accumulator Charge Pumps	Single Accumulator Charge Valves	Dual Accumulator Charge Valves	Load Sense Charge Valves	Modulating Brake Valves	Hydraulic Motors	Motors with Integral Relief Valves	Motors with Cross Port Relief Valves	Motors with Integral By-Pass Valves	Steering & Accumulator Charge Valve (STAC)	Custom Valve Manifolds	Brake Valve	Check Valve & Restrictor
Applications:																												
Materials Handling																												
Electric Lift Trucks	•	•		•				•	•				•	•	•		•									•		
I.C. Powered Lift Trucks	•	•		•					•	•			•	•												•		
Rough Terrain Lift Trucks	•	•		•						•			•	•	•	•	•	•	•	•						•		
Turf Care and Grasscutting																												
Reel Commercial Mowers	•	•	•	•	•	•	•	•	•		•		•	•								•	•	•		•		•
Rotary Commercial Mowers	•	•	•	•	•	•	•	•	•		•		•	•								•	•	•		•		
Heavy Duty Industrial Mowers	•	•	•	•	•	•	•	•	•		•		•	•							•	•	•		•	•	•	
Construction Equipment																												
Road Construction	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•
Wheel Loaders		•		•	•	•	•		•			•	•	•	•	•	•	•	•	•					•	•		
Backhoe-Loaders		•	•	•	•	•	•		•			•	•	•	•	•	•	•	•	•					•	•		
Cranes and Winches	•	•	•	•	•	•	•		•			•	•	•	•	•	•	•	•	•	•	•	•			•	•	
Haul Trucks			•	•	•									•	•	•	•	•								•		
Truck, Bus & Rec. Vehicles				•	•	•	•	•					•	•		•		•	•	•	•	•				•		
Municipal, Street Sweepers	•	•	•	•	•	•	•	•	•		•		•	•	•	•	•	•	•	•	•	•	•	•		•		

List of Available Pump Combinations - PGP 505 and PGP 511

First pump	Second pump	
	PGP 505	PGP 511
PGP 505	X	
PGP 511		X

Nomograph for Pipe Velocity



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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.

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Parker Hannifin Corporation

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