Pump & Motor Division

PGP/PGM 500 Series Gear Pumps and Motors in Single and Multiple Configurations

Parker

ENGINEERING YOUR SUCCESS.

⚠ WARNING — User Responsibility

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 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

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the “Offer of Sale”.

⚠ **WARNING:** This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer, birth defects, and other reproductive harm. www.p65warnings.ca.gov

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Pump & Motor Division
Kings Mountain, NC 28086

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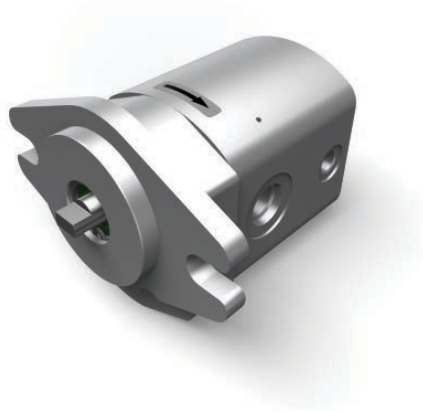
- **Up to 280 bar continuous operation**
  High strength materials and large journal diameters provide low bearing loads for high pressure operation.
- **High efficiency**
  Pressure balanced bearing blocks assure maximum efficiency under all operating conditions.
- **Low noise**
  9 tooth gear profile and optimized flow metering provide reduced pressure pulsation and exceptionally quiet operation.
- **Application flexibility**
  International mounts and connections, and common inlet multiple pump configurations provide unmatched design and application versatility.



Product Features	Description
Pump Type	Pressure balanced, aluminum, external gear
Mounting	SAE, rectangular, thru-bolt standard, specials on request
Ports	SAE and metric split flanges and others
Shaft Style	Keyed, tapered, cylindrical tang drive, specials on request
Maximum Speed	500 - 5000 rpm, see Specifications
Theor. displacement	See Specifications
Drive	Drive direct with flexible coupling is recommended.
Inlet pressure	Operating range 0.8 to 2 bar abs. Min. inlet pressure 0.5 bar abs. Short time without load. Maximum suggested inlet flow velocity for pumps: 2.5 mps. Consultation is recommended.
Outlet pressure	See Specifications
Pressure rising rate	Max. 3000 bar/s
Hydraulic fluids	Hydraulic oil HLP, ISO, DIN 51524-2
Fluid viscosity	Range of operating viscosity 20 to 1000 mm²/s. Max. permissible operating pressure dependent on viscosity. Viscosity range for cold start 1000 to 2000 mm²/s at operating pressure p ≤10 bar and speed n ≤1500 rpm.

Product Features	Description
Fluid temperature	For NBR seals, range of operating temperature -40° to +80°C. For FKM seals, range of operating temperature -20° to +105°C. Max. permissible operating pressure dependent on fluid temperature. Temperature for cold start -20° to -15°C at speed ≤1500 rpm. Max. permissible operating pressure dependent on fluid temperature.
Filtration	According to ISO 4406 Cl. 19/17/13
Direction of rotation (looking at the drive shaft)	Clockwise or counter-clockwise. Attention! Drive pump only in indicated direction of rotation.
Multiple pump assemblies	• Available in two or three sections, limitations shown in the shaft loading rating table 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.

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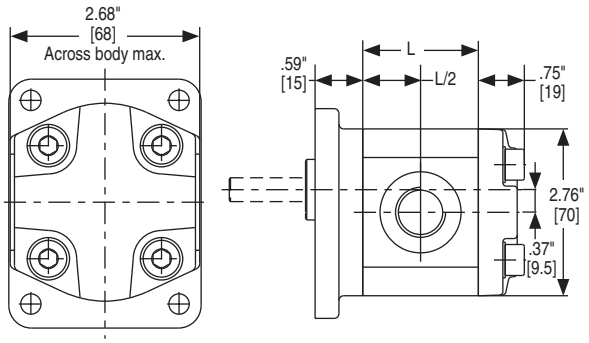
PGP/PGM502 Specifications

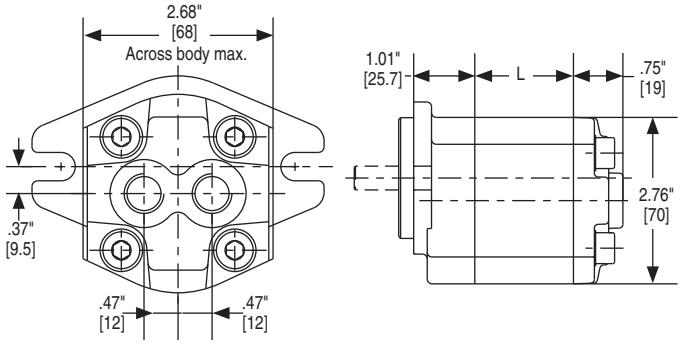
Code		0008	0012	0016	0021	0025	0033	0036	0043	0048	0058	0062	0079
Displacements	cm^3/rev	0.8	1.2	1.6	2.1	2.5	3.3	3.6	4.3	4.8	5.8	6.2	7.9
	in^3/rev	0.05	0.07	0.10	0.13	0.15	0.20	0.22	0.26	0.29	0.35	0.38	0.48
Continuous Pressure	bar	280	280	280	280	280	280	260	250	230	200	180	160
	psi	4061	4061	4061	4061	4061	4061	3771	3626	3336	2901	2611	2321
Minimum Speed @ Max. outlet pressure	rpm	500	500	500	500	500	500	500	500	500	500	500	500
Maximum Speed @ 0 Inlet & Max. outlet pressure	rpm	5000	5000	4500	4500	4000	4000	4000	3500	3000	3000	3000	3000
Input Power @ Max. Pressure and 1500 rpm	HP	1.10	1.48	1.88	2.28	2.68	3.35	3.49	3.49	3.22	3.75	3.89	4.02
	kW	0.82	1.1	1.4	1.7	2.0	2.5	2.6	2.6	2.4	2.8	2.9	3.0
Dimension L	in	1.39"	1.45"	1.51"	1.57"	1.63"	1.75"	1.80"	1.91"	1.97"	2.12"	2.18"	2.43"
	mm	35.3	36.8	38.3	39.9	41.5	44.5	45.6	48.5	50.0	53.8	55.3	61.6
Approximate Weight	lbs	2.43	2.43	2.43	2.43	2.65	2.65	2.65	2.87	3.09	3.09	3.31	3.53
	kg	1.10	1.10	1.10	1.10	1.20	1.20	1.20	1.30	1.40	1.40	1.50	1.60

PGP/PGM502 Dimensions

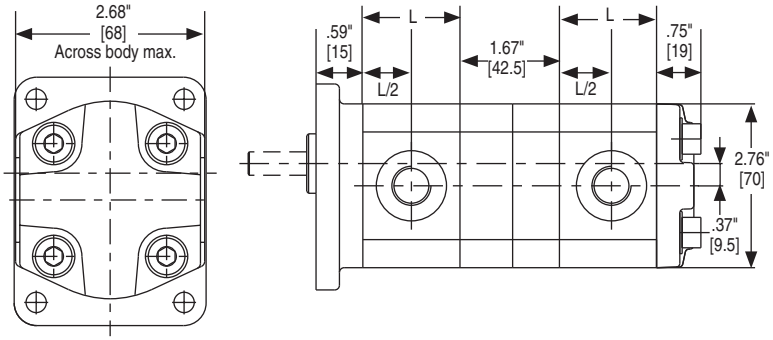
Single Unit



Single Unit with Rear Ports



Tandem Unit



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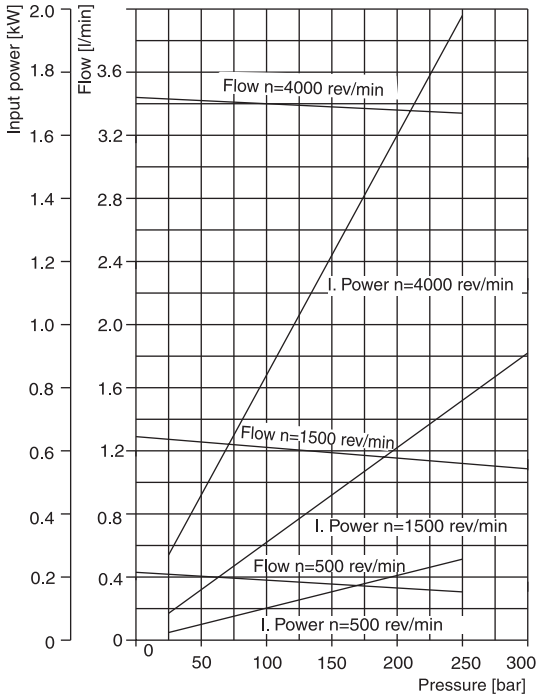

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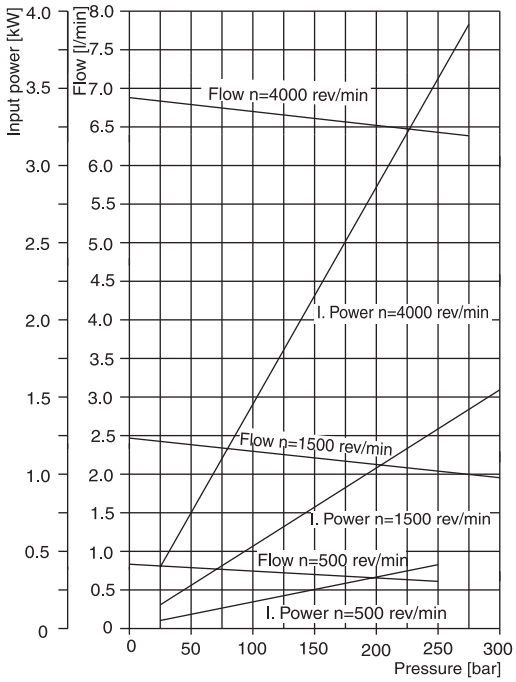

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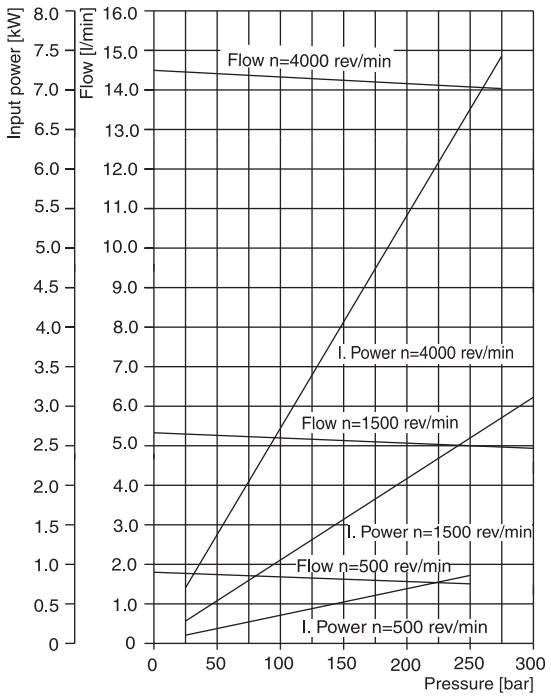

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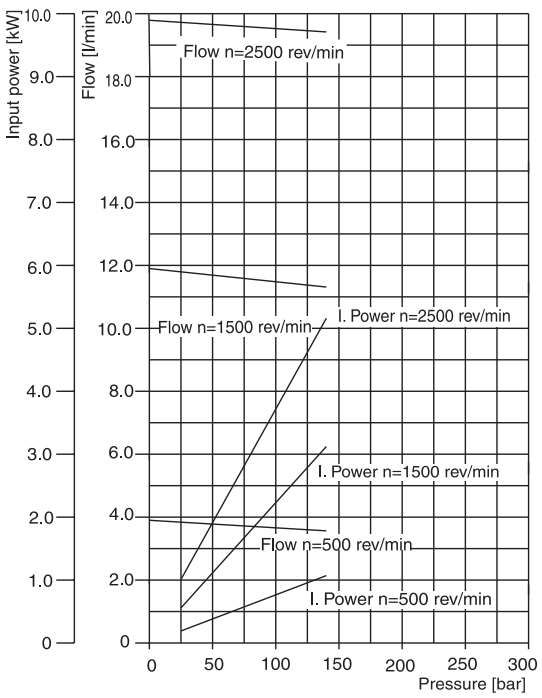

Fluid Temperature = 45± 2°C
Viscosity = 36 mm²/s
Inlet Pressure = 0.9 + 0.1 bar absolute

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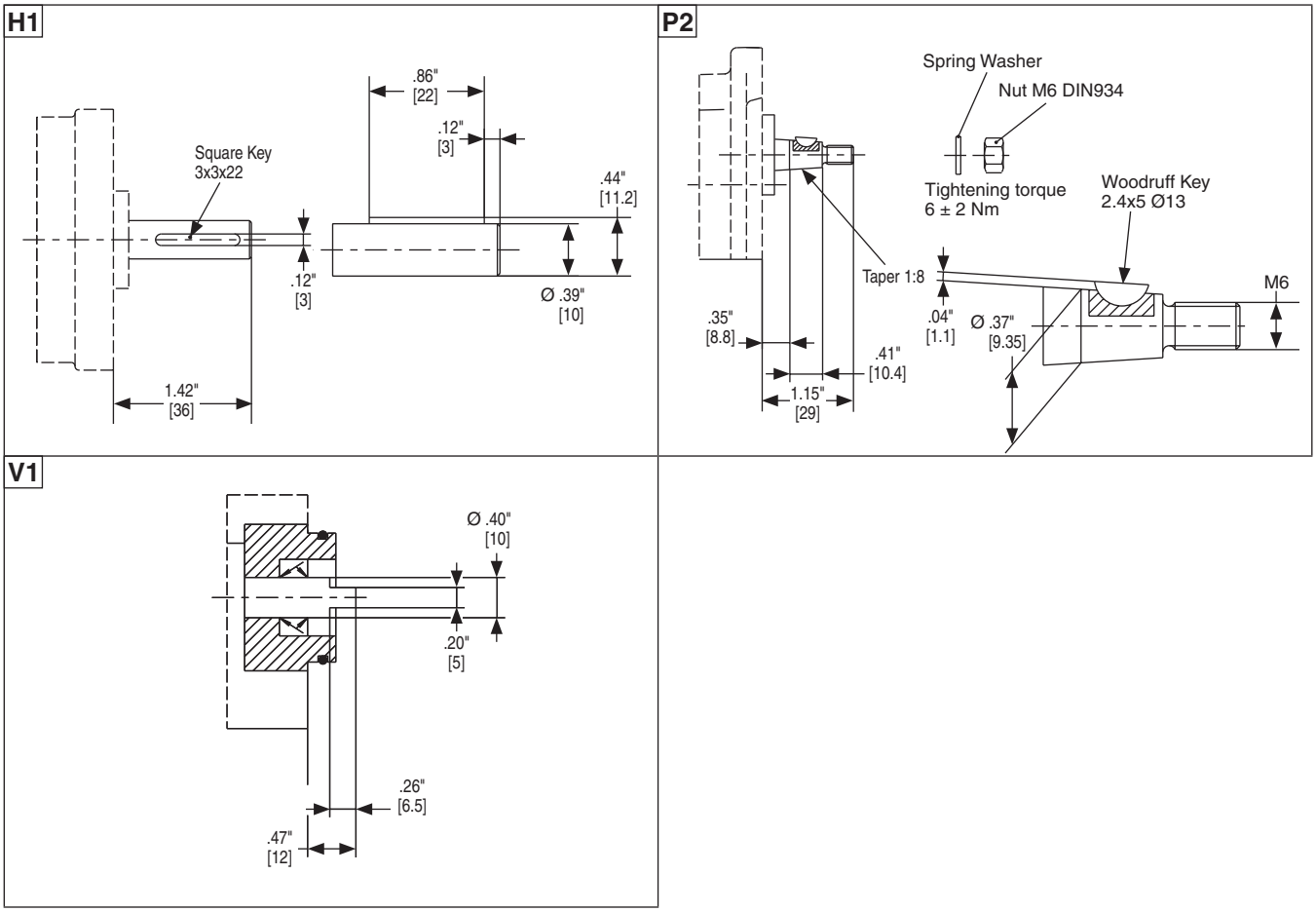
PGP/PGM502 Drive Shafts



PGP/PGM502 Shaft Load Capacity

Code	Description	Torque Rating [Nm]
H1	Ø 10, 3.0 Key, no thread, 36L parallel	30
P2	Ø 9.35, 8.8L, 2.4 Key, M6 taper 1:8	30
V1	5 x 6.5 long shaft w/o coupling tang drive	20

$$\text{Torque [Nm]} = \frac{\text{Displacement [cm}^3\text{/rev]} \times \text{Pressure [bar]}}{57.2}$$

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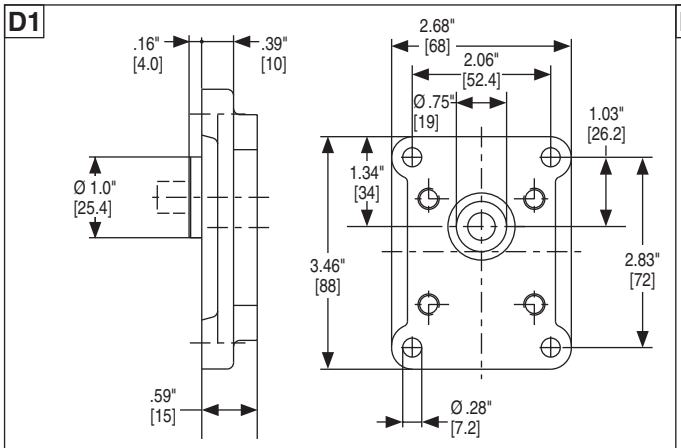
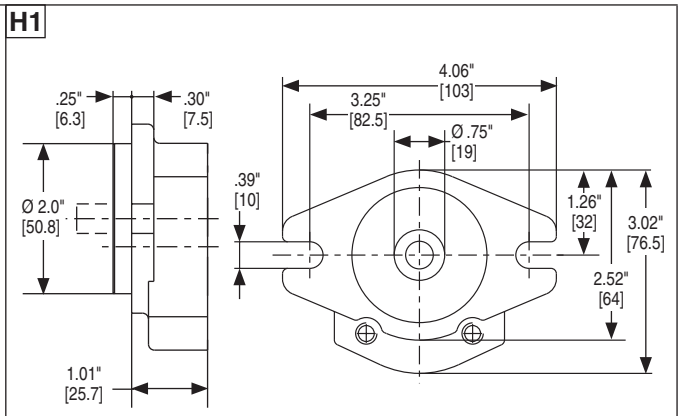
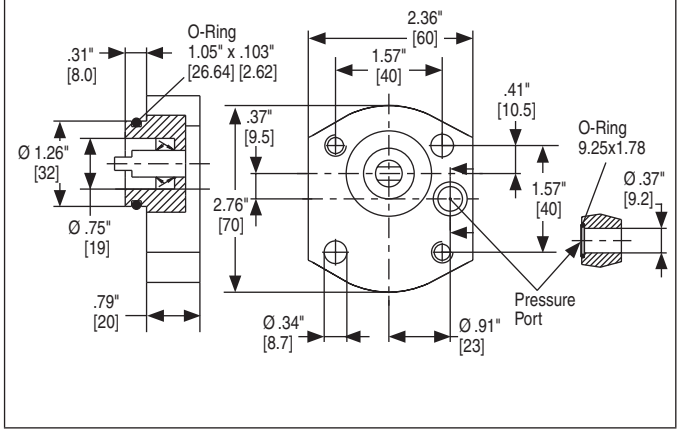
D1



H1



P1



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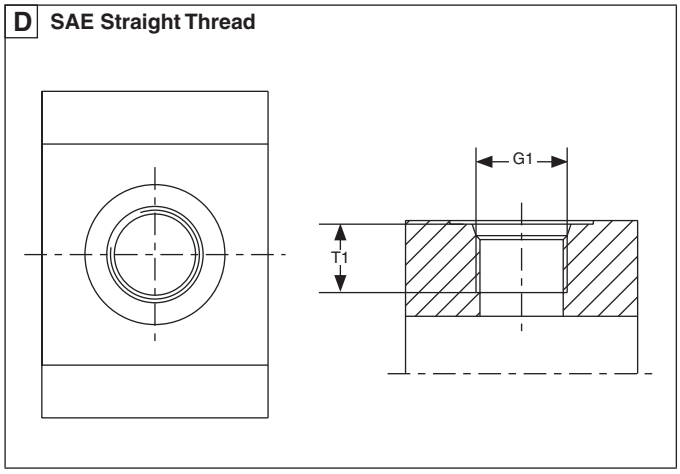
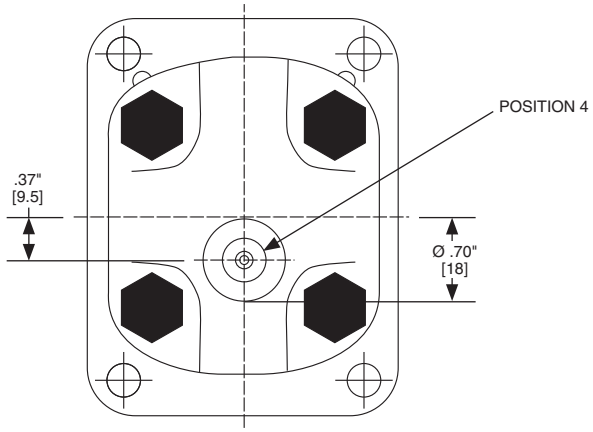
PGP/PGM502 Port Options

D SAE Straight Thread



Code	SAE J1926-1 Dash Size	Nominal Tube OD	G1 Thread	T1 Dimensions
D2	#6	3/8"	9/16" - 18 UNF	0.50" [12.7]
D3	#8	1/2"	3/4" - 16 UNF	0.56" [14.3]

PGP/PGM502 Drain Position



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PG	1	502	2	3	4	5	6	7	8	8	8[1)]	8[1)]	9[2)]	10[2)]	12	502	2	3	7	8	8	11	3)	4)

Code	1 – Type
P	Pump
M	Motor

Code	2 – Unit	
	Pump	Motor
A	Single unit	Standard Motor without checks
B	Multiple unit	Standard Motor with two checks
C	—	Standard Motor w/ one anti-cavitation check (ACC)
Option C MUST NOT HAVE A DRAIN		

3 – Displacement	
Code	ccm
0008	0.8
0012	1.2
0016	1.6
0021	2.1
0025	2.5
0033	3.3
0036	3.6
0043	4.3
0048	4.8
0058	5.8
0062	6.2
0079	7.9

Code	4 – Rotation
C	Clockwise
A	Counter-clockwise
B	Bi-directional

Code	5 – Shaft
H1	Ø 10, 3.0 Key, no thread, 36L, parallel
P2	Ø 9.35, 8.8L, 2.4 Key, M6, taper 1:8
V1	5 x 6.5 long shaft w/o coupling tang drive

Code	6 – Flange	Material
D1	52.2 x 72.0 - Ø 25.4 rectangular	Aluminum
H1	82.5 - Ø 50.8 SAE A-A 2-Bolt	Aluminum
P1	40.0 x 40.0 - Ø 32.0 w/ seal ported, thru bolt	Aluminum

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

Code	8 – Port Options
B1	No ports
D2	9/16" - 18 UNF thread
D3	3/4" - 16 UNF thread

Code	9 – Motor Drain Option
B1	No drain
P	M10X1 Metric-Thread

Code	10 – Drain Port Position
4	Rear drain

Code	11 – Corrosion Protection
Z	Zinc coated
P	Black painted
No code for no protection	

Code	12 – Section Connection
S	Separate inlets
C	Common inlets
No code for single unit	

Not all variances of ordering codes can be offered. Please check available part numbers first. For not yet implemented part numbers or special requests please contact Parker Hannifin.

1) Only coded for the last section.
2) Only for motors.
3) For further unit repeat displacement, shaft seal between section, side suction port, side pressure port, rear suction port, rear pressure port.
4) For adding built-in valves enter valve description at the end of the model code. Valve options described on pages 38-50.

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PGP	502	B	0062	C	P2	D1	N	D3	D2	S	502	A	0036	X	D3	D2	B1	B1

PGP	Gear Design / Type	Parker Gear Pump
502	Series First Section	
B	Unit	Tandem Unit
0062	Displacement	6.2 cc/rev
C	Rotation Direction	Clockwise
P2	Drive Shaft	Taper 1:8
D1	Mounting Flange Type	52.2 x 72.0 Rectangular
N	Shaft Seal	NBR
D3	Side Suction Port	3/4" - 16 UNF Thread
D2	Side Pressure Port	9/16" - 18 UNF Thread
S	Section Connection	Separate Inlets
502	Series Second Section	
A	Unit	Single Unit
0036	Displacement	3.6 cc/rev
X	Shaft Seal	No Shaft Seal
D3	Side Suction Port	3/4" - 16 UNF Thread
D2	Side Pressure Port	9/16" - 18 UNF Thread
B1	Rear Suction Port	No Port
B1	Rear Pressure Port	No Port

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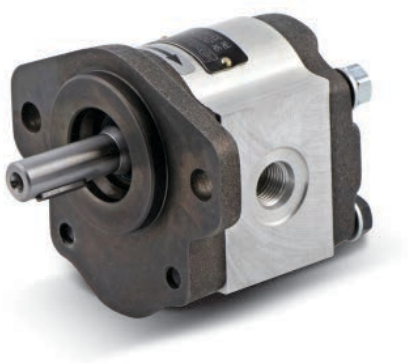
- **Up to 275 bar continuous operation**
  High strength materials and large journal diameters provide low bearing loads for high pressure operation.
- **High efficiency**
  Pressure balanced bearing blocks assure maximum efficiency under all operating conditions.
- **Low noise**
  13 tooth gear profile and optimized flow metering provide reduced pressure pulsation and exceptionally quiet operation.
- **Application flexibility**
  International mounts and connections, integrated valve capabilities and common inlet multiple pump configurations provide unmatched design and application versatility.



Product Features	Description
Pump Type	Pressure balanced, aluminum, external gear
Mounting	SAE, rectangular, thru-bolt standard specials on request
Ports	SAE and metric split flanges and others
Shaft Style	SAE splined, keyed, tapered, cylindrical tang drive, specials on request
Maximum Speed	500 - 4000 rpm, see Specifications
Theor. displacement	See Specifications
Drive	Drive direct with flexible coupling is recommended.
Axial / Radial load	Consult with product service for allowable loading.
Inlet pressure	Operating range 0.8 to 2 bar abs. Min. inlet pressure 0.5 bar abs. Short time without load. Maximum suggested inlet flow velocity for pumps: 2.5 mps. Consultation is recommended.
Outlet pressure	See Specifications
Pressure rising rate	Max. 3000 bar/s
Hydraulic fluids	Hydraulic oil HLP, ISO, DIN 51524-2
Fluid viscosity	Range of operating viscosity 20 to 1000 mm^2/s. Max. permissible operating pressure dependent on viscosity. Viscosity range for cold start 1000 to 2000 mm^2/s at operating pressure p ≤10 bar and speed n ≤1500 rpm.

Product Features	Description
Fluid temperature	For NBR seals, range of operating temperature -40° to +80°C. For FKM seals, range of operating temperature -20° to +105°C. Max. permissible operating pressure dependent on fluid temperature. Temperature for cold start -20° to -15°C at speed ≤1500 rpm. Max. permissible operating pressure dependent on fluid temperature.
Filtration	According to ISO 4406 Cl. 19/17/13
Direction of rotation (looking at the drive shaft)	Clockwise, counter-clockwise or double. Attention! Drive pump only in indicated direction of rotation.
Multiple pump assemblies	• Available in two or three sections; limitations shown in the shaft loading rating table in this catalogue. • 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.

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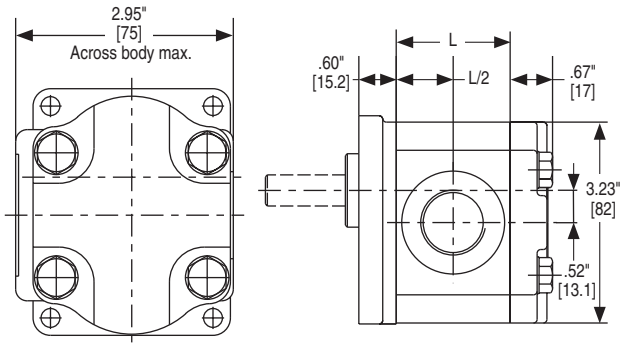
PGP/PGM505 Specifications

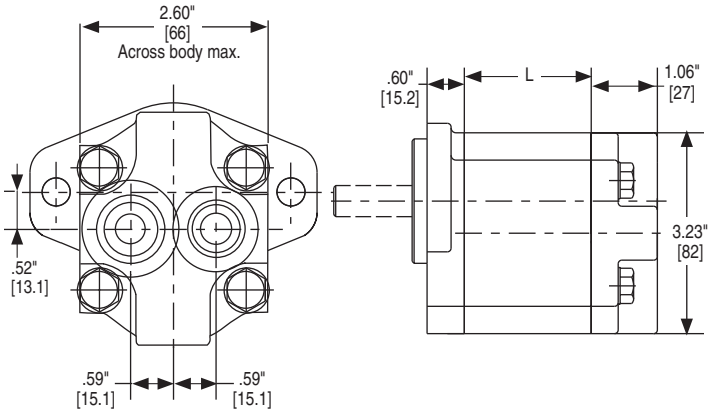
Code		0020	0030	0040	0050	0060	0070	0080	0090	0100	0110	0120
Displacements	cm^3/rev	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0
	in^3/rev	0.12	0.18	0.24	0.31	0.37	0.43	0.49	0.55	0.61	0.67	0.73
Continuous Pressure	bar	275	275	275	275	275	275	275	250	250	250	220
	psi	3988	3988	3988	3988	3988	3988	3988	3625	3625	3625	3190
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	2800	2800	2400	2400
Input Power @ Max. Pressure and 1500 rpm	HP	2.15	3.08	4.02	5.10	6.03	7.11	8.05	8.45	9.25	10.19	10.06
	kW	1.6	2.3	3.0	3.8	4.5	5.3	6.0	6.3	6.9	7.6	7.5
Dimension L	in	1.52"	1.62"	1.72"	1.83"	1.93"	2.04"	2.15"	2.25"	2.35"	2.46"	2.57"
	mm	38.5	41.1	43.8	46.5	49.1	51.8	54.5	57.2	59.8	62.5	65.2
Approximate Weight	lbs	4.76	4.89	5.00	5.11	5.25	5.36	5.47	5.60	5.69	5.80	5.91
	kg	2.16	2.22	2.27	2.32	2.38	2.43	2.48	2.54	2.58	2.63	2.68

PGP/PGM505 Dimensions

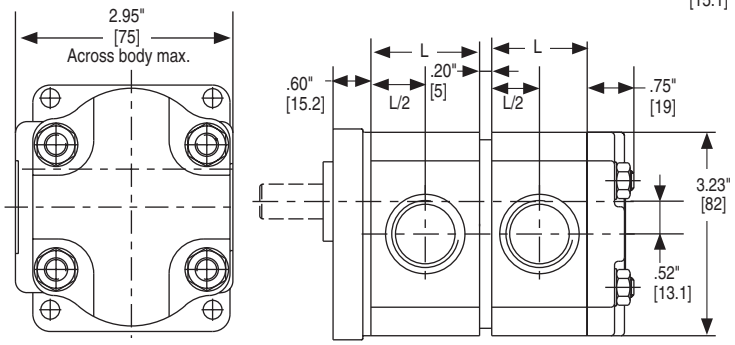
Single Unit



Single Unit with Rear Ports



Tandem Unit



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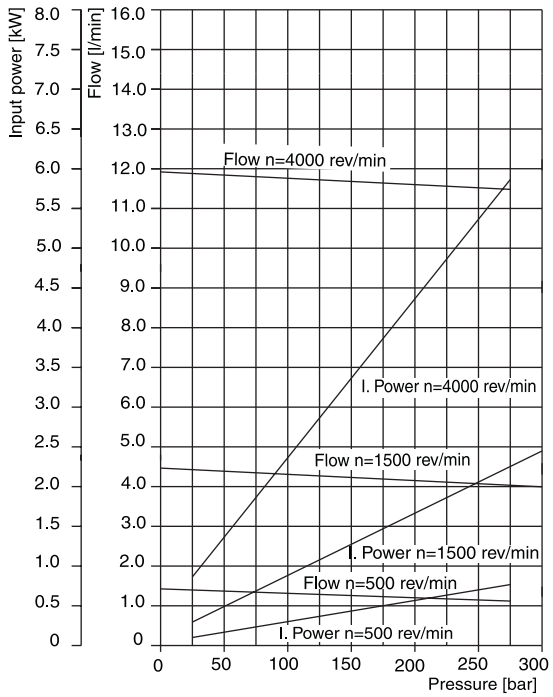

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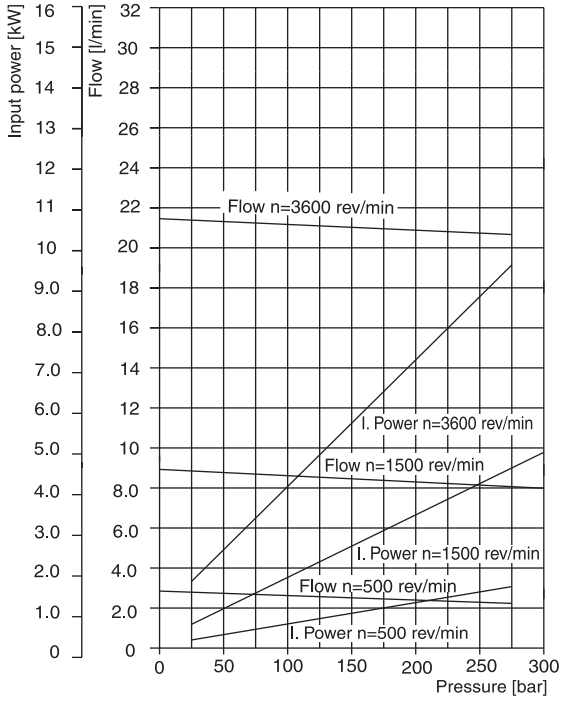

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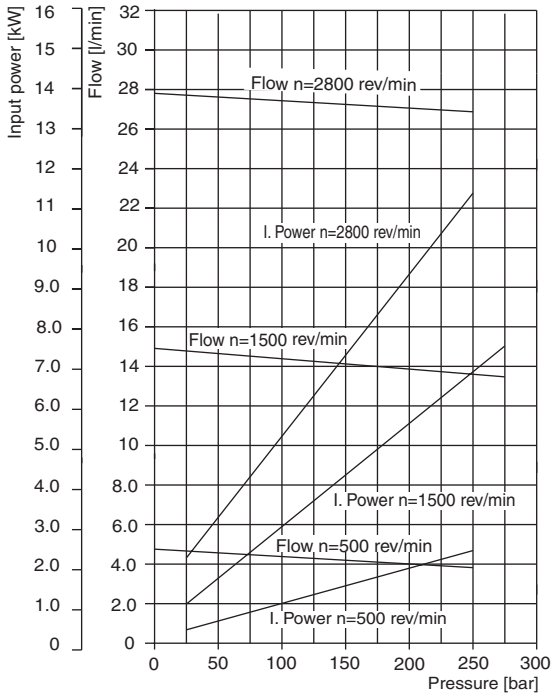

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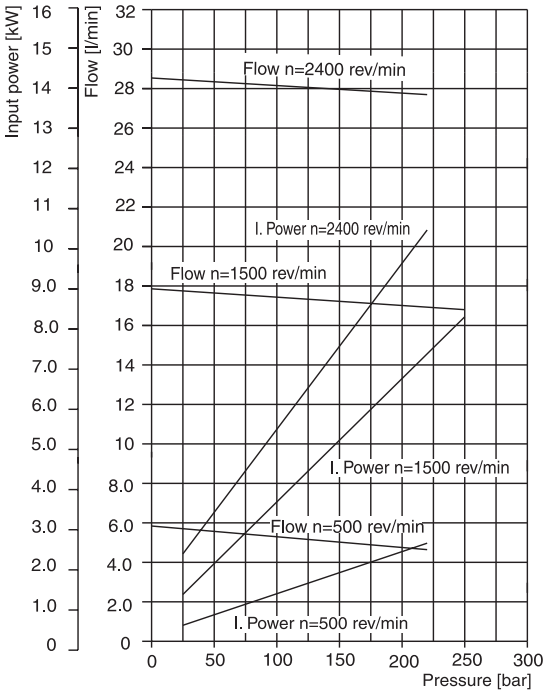

Fluid Temperature = 45± 2ºC
Viscosity = 36 mm²/s
Inlet Pressure = 0.9 + 0.1 bar absolute

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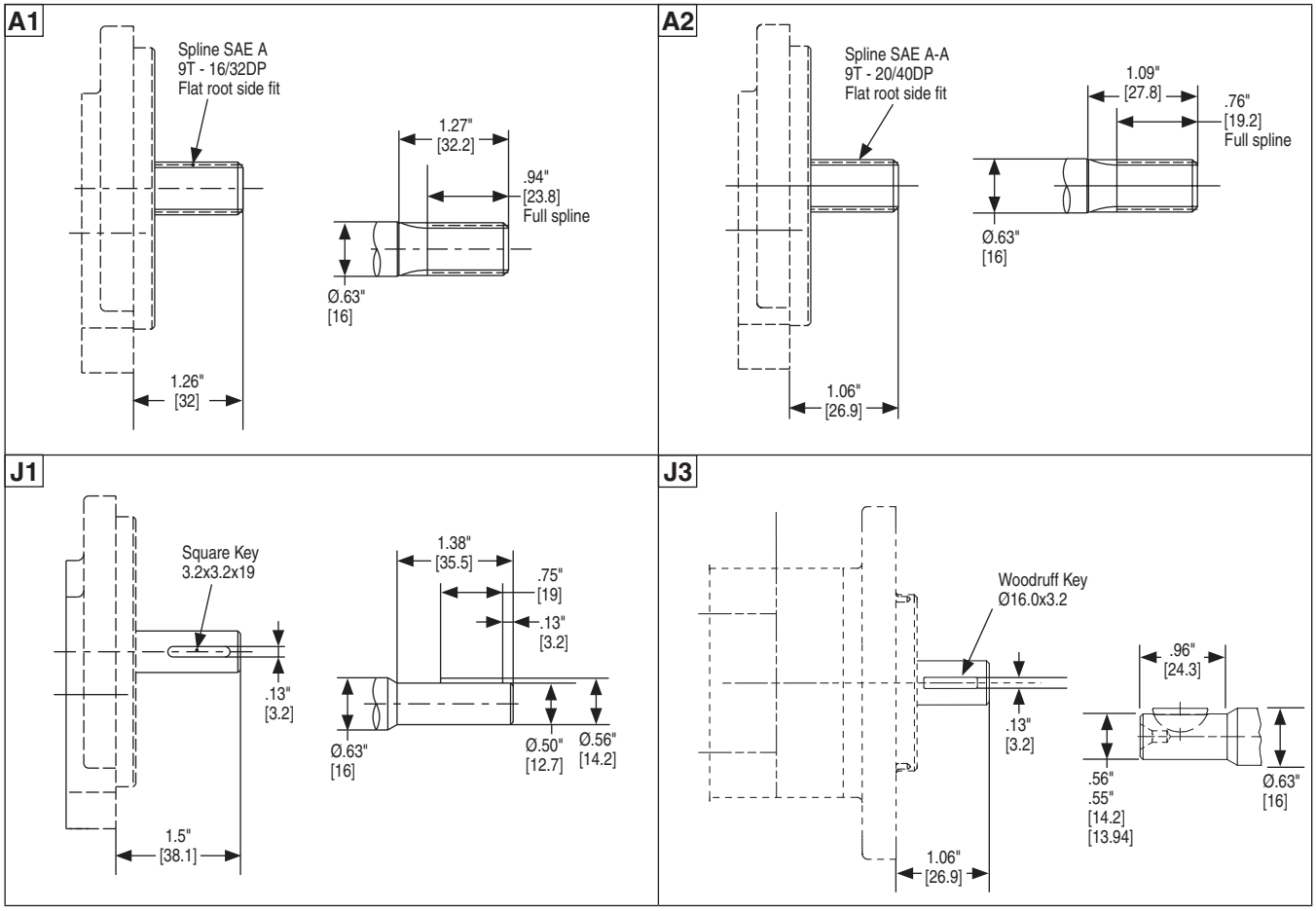

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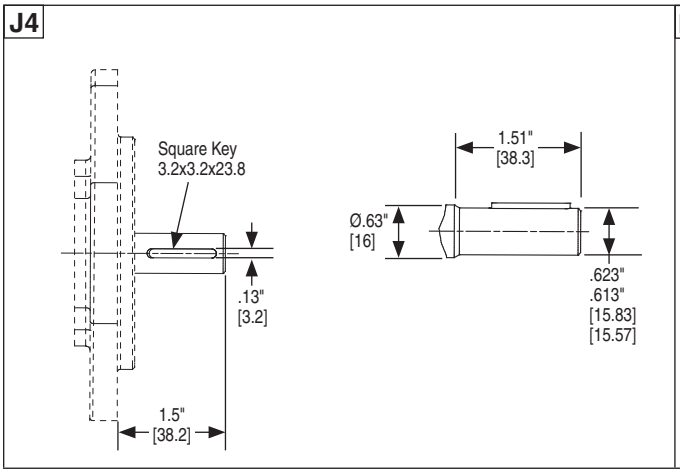
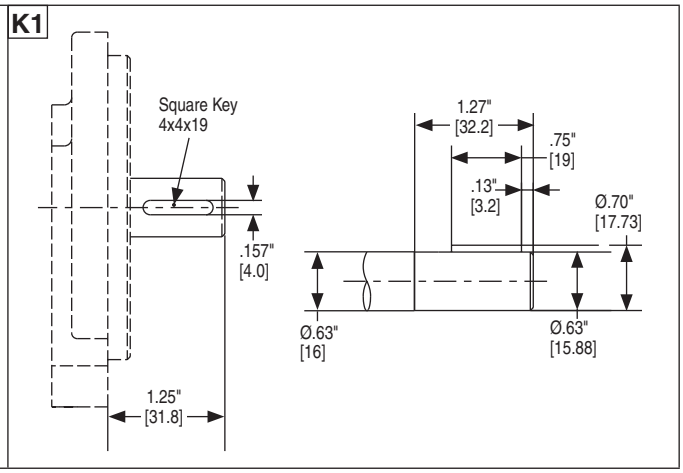
PGP/PGM505 Drive Shafts (Continued)

J4



K1



$$\text{Torque [Nm]} = \frac{\text{Displacement [cm}^3\text{/rev] x Pressure [bar]}}{57.2}$$

PGP/PGM505 Shaft Load Capacity

Code	Description		Torque Rating [Nm]
A1	9T, 16/32DP, 32L, SAE A	spline	108
A2	9T, 20/40DP, 26.9L, SAE AA	spline	108
J1	Ø 12.7, 3.2 Key, no thread, 38L	parallel	43
J3	Ø 12.7, 3.2 Key, no thread, 26.9L	parallel	43
J4	Ø 14.26, 3.2 Key, no thread, 38.1L	parallel	43
K1	Ø 15.88, 4.0 Key, no thread, 32L, SAE A	parallel	85
	Multiple pump connection shaft		36

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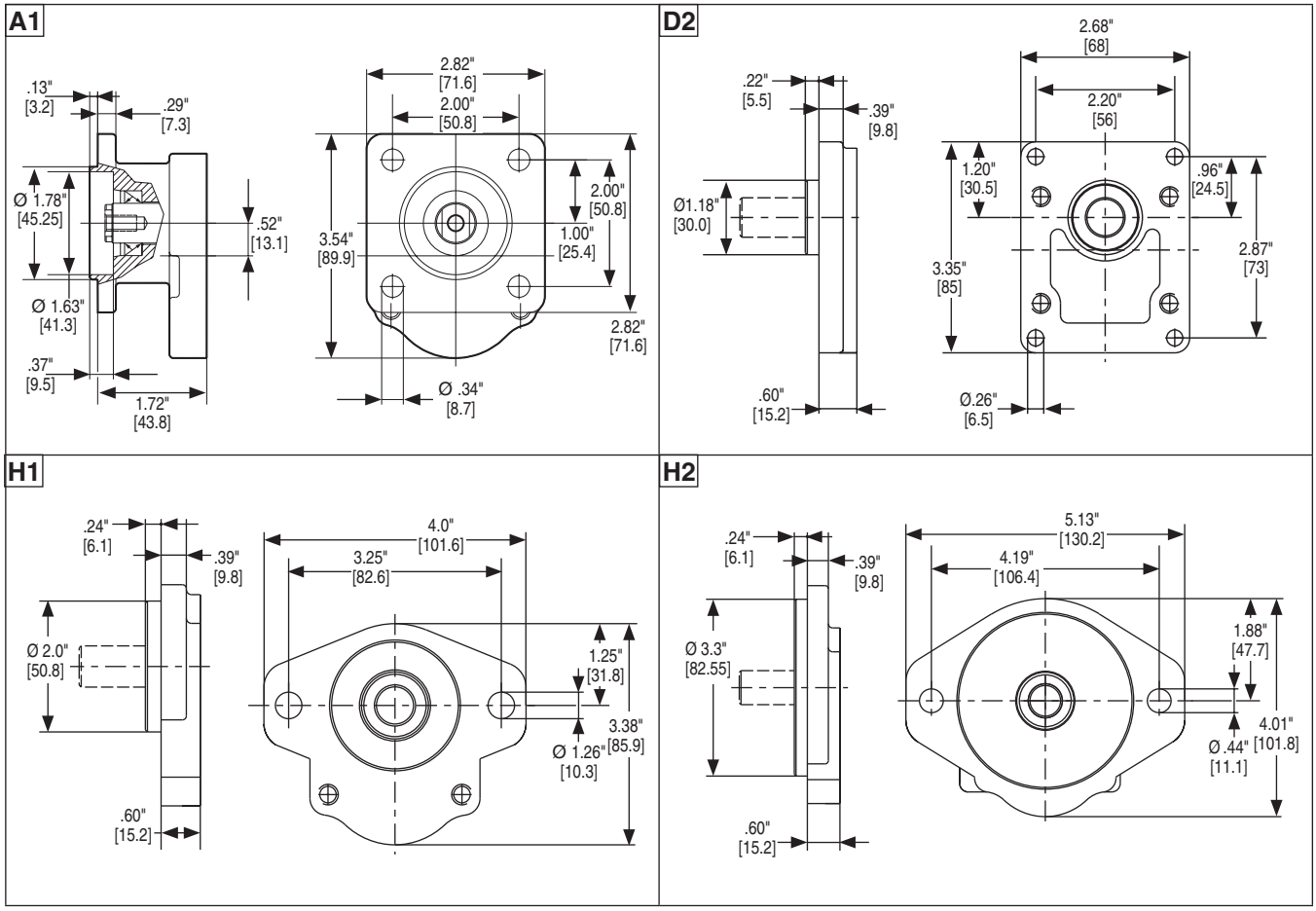

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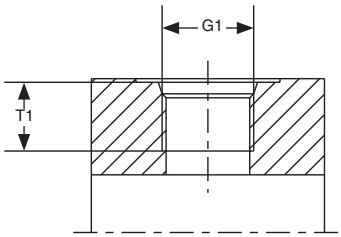
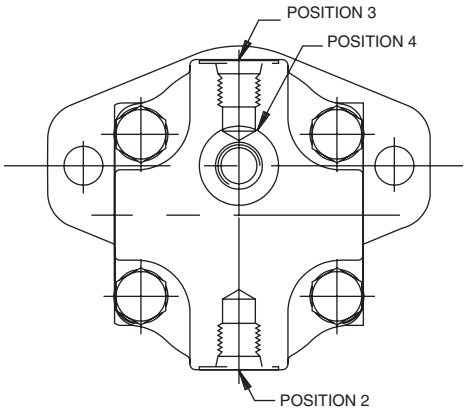
PGP/PGM505 Port Options

D SAE Straight Thread



Code	SAE J1926-1 Dash Size	Nominal Tube OD	G1 Thread	T1 Dimensions
D2	#6	3/8"	9/16" - 18 UNF	0.50" [12.7]
D3	#8	1/2"	3/4" - 16 UNF	0.56" [14.3]
D4	#10	5/8"	7/8" - 14 UNF	0.66" [16.7]
D5	#12	3/4"	1-1/16" - 12 UN	0.75" [19.0]

PGP/PGM505 Drain Positions



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PG	1	505	2	3	4	5	6	7	8	8	8[1)]	8[1)]	9[2)]	10[2)]	12	505	2	3	7	8	8	11	3)	4)

Code	1 – Type
P	Pump
M	Motor

Code	2 – Unit	
	Pump	Motor
A	Single unit	Standard motor without checks
B	Multiple unit	Standard motor with two checks
C	—	Standard Motor w/ one anti-cavitation check (ACC)
M	Single distributor unit	
Option C MUST NOT HAVE A DRAIN		

3 – Displacement	
Code	ccm
0020	2.0
0030	3.0
0040	4.0
0050	5.0
0060	6.0
0070	7.0
0080	8.0
0090	9.0
0100	10.0
0110	11.0
0120	12.0

Code	4 – Rotation
C	Clockwise
A	Counter-clockwise
B	Bi-directional

Code	5 – Shaft
A1	9T, 16/32DP, 32L, SAE A spline
A2	9T, 20/40DP, 26.9L, SAE AA spline
J1	Ø 12.7, 3.2 Key, no thread, 38L, parallel
J3	Ø 12.7, 3.2 Key, no thread, 26.9L, parallel
J4	Ø 14.26, 3.2 Key, no thread, 38.1L, parallel
K1	Ø 15.88, 4.0 Key, no thread, 32L, SAE A, parallel

Code	6 – Flange	Material
A1	50.8 x 50.8 - Ø 45.25 4-Bolt square	Cast Iron
D2	56.0 x 73.0 - Ø 30.0 rectangular	Cast Iron
H1	82.5 - Ø 50.8 SAE A-A 2-Bolt	Cast Iron
H2	106.4 - Ø 82.55 SAE A 2-Bolt	Cast Iron

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

Code	8 – 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" - 12 UN thread

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

Code	10 – Drain Port Position
2	Drain on bottom
3	Drain on top
4	Rear drain

Code	11 – Corrosion Protection
Z	Zinc coated
P	Black painted
No code for no protection	

Code	12 – Section Connection
S	Separate inlets
C	Common inlets
No code for single unit	

Not all variances of ordering codes can be offered. Please check available part numbers first. For not yet implemented part numbers or special requests please contact Parker Hannifin.

1) Only coded for the last section.
2) Only for motors.
3) For further unit repeat displacement, shaft seal between sections, side suction port, side pressure port, rear suction port, rear pressure port.
4) For adding built-in valves enter valve description at the end of the model code. Valve options described on pages 38-50.

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PGP	505	B	0100	C	A1	H2	V	D5	D3	C	505	A	0040	X	B1	D2	B1	B1

PGP	Gear Design / Type	Parker Gear Pump
505	Series First Section	
B	Unit	Tandem Unit
0100	Displacement	10.0 cc/rev
C	Rotation Direction	Clockwise
A1	Drive Shaft	9T Spline SAE A, 32L
H2	Mounting Flange Type	SAE A 2-Bolt
V	Shaft Seal	Viton
D5	Side Suction Port	1-1/16" - 12 UN Thread
D3	Side Pressure Port	3/4" - 16 UNF Thread
C	Section Connection	Common Inlets
505	Series Second Section	
A	Unit	Single Unit
0040	Displacement	4.0 cc/rev
X	Shaft Seal	No Shaft Seal
B1	Side Suction Port	No Port
D2	Side Pressure Port	9/16" - 18 UNF Thread
B1	Rear Suction Port	No Port
B1	Rear Pressure Port	No Port

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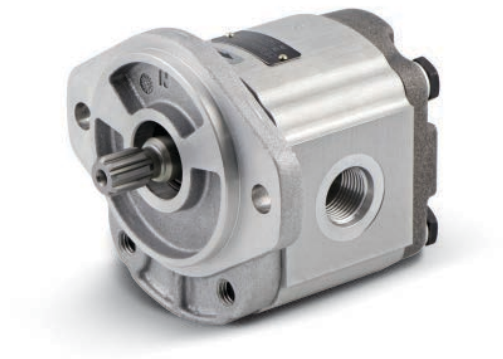
- **Up to 250 bar continuous operation**
  High strength materials and large journal diameters provide low bearing loads for high pressure operation.
- **High efficiency**
  Pressure balanced bearing blocks assure maximum efficiency under all operating conditions.
- **Application flexibility**
  International mounts and connections, integrated valve capabilities and common inlet multiple pump configurations provide unmatched design and application versatility.
- **Low noise**
  12 tooth gear profile and optimized flow metering provide reduced pressure pulsation and quiet operation.
- **Large range of integrated valves**



Product Features	Description
Pump Type	Pressure balanced, aluminum, external gear
Mounting	SAE, rectangular, thru-bolt standard, specials on request
Ports	SAE and metric split flanges and others
Shaft Style	SAE splined, keyed, cylindrical tang drive, specials on request
Maximum Speed	500 - 3500 rpm, see Specifications
Theor. displacement	See Specifications
Drive	Drive direct with flexible coupling is recommended.
Axial / Radial load	Consult with product service for allowable loading.
Inlet pressure	Operating range 0.8 to 2 bar abs. Min. inlet pressure 0.5 bar abs. Short time without load. Maximum suggested inlet flow velocity for pumps: 2.5 mps. Consultation is recommended.
Outlet pressure	See Specifications
Pressure rising rate	Max. 3000 bar/s
Hydraulic fluids	Hydraulic oil HLP, ISO, DIN 51524-2
Fluid viscosity	Range of operating viscosity 8 to 1000 mm²/s. Max. permissible operating pressure dependent on viscosity. Viscosity range for cold start 1000 to 2000 mm²/s at operating pressure p ≤10 bar and speed n ≤1500 rpm.

Product Features	Description
Fluid temperature	For NBR seals, range of operating temperature -40° to +80°C. For FKM seals, range of operating temperature -20° to +105°C. Max. permissible operating pressure dependent on fluid temperature. Temperature for cold start -20° to -15°C at speed ≤1500 rpm. Max. permissible operating pressure dependent on fluid temperature.
Filtration	According to ISO 4406 Cl. 19/17/13
Direction of rotation (looking at the drive shaft)	Clockwise, counter-clockwise or double. Attention! Drive pump only in indicated direction of rotation.
Multiple pump assemblies	• Available in two or three sections; limitations shown in the shaft loading rating table 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.

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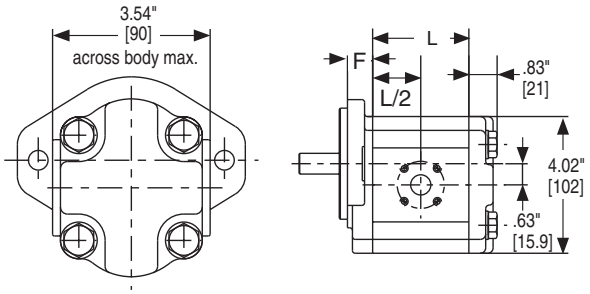
PGP/PGM511 Specifications

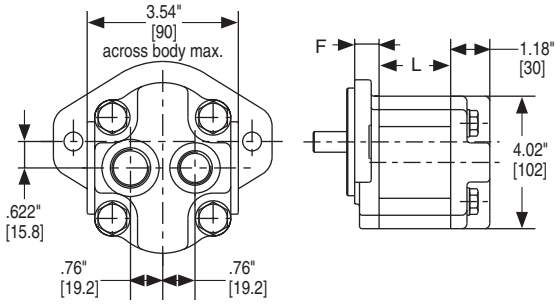
Code		0040	0050	0060	0070	0080	0100	0110	0120	0140	0160	0180	0190	0210	0230	0250	0270	0280	0310	0330
Displacements	cm^3/rev	4	5	6	7	8	10	11	12	14	16	18	19	21	23	25	27	28	31	33
	in^3/rev	0.24	0.31	0.37	0.43	0.49	0.61	0.67	0.73	0.85	0.98	1.10	1.16	1.28	1.40	1.53	1.65	1.71	1.89	2.01
Continuous Pressure	bar	250	250	250	250	250	250	250	250	250	250	250	250	235	225	210	190	185	165	155
	psi	3625	3625	3625	3625	3625	3625	3625	3625	3625	3625	3625	3625	3410	3265	3045	2755	2685	2395	2248
Intermittent Pressure	bar	275	275	275	275	275	275	275	275	275	275	275	275	240	235	220	200	190	170	160
	psi	3988	3988	3988	3988	3988	3988	3988	3988	3988	3988	3988	3988	3480	3408	3190	2900	2755	2465	2320
Min. Speed @ Max. Outlet Pressure	rpm	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
Max. Speed @ 0 Inlet & Max. Outlet Pressure	rpm	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3250	3250	2800	2750	2500	2350	2350	2350	2000
Pump Input Power @Max. Pressure and 1500 rpm	HP	4.02	5.03	6.03	7.04	8.05	10.06	11.13	12.07	14.08	16.09	18.10	19.18	19.31	19.71	19.98	20.12	21.19	22.40	23.20
	kW	3.0	3.8	4.5	5.3	6.0	7.5	8.3	9.0	10.5	12.0	13.5	14.3	14.4	14.7	14.9	15.0	15.8	16.7	17.3
Dimension L	in	1.85"	1.91"	1.97"	2.04"	2.10"	2.22"	2.28"	2.35"	2.47"	2.59"	2.72"	2.78"	2.90"	3.03"	3.15"	3.28"	3.34"	3.52"	3.65"
	mm	47.0	48.6	50.1	51.7	53.3	56.5	58.0	59.6	62.8	65.9	69.0	70.6	73.7	76.9	80.0	83.2	84.8	89.5	92.6
Approximate Weight	lbs	7.1	7.3	7.5	7.7	7.7	7.8	7.9	8.2	8.2	8.4	8.6	8.6	8.8	9.0	9.3	9.3	9.5	9.7	9.9
	kg	3.2	3.3	3.4	3.5	3.5	3.6	3.6	3.7	3.7	3.8	3.9	3.9	4.0	4.1	4.2	4.2	4.3	4.4	4.5

PGP/PGM511 Dimensions

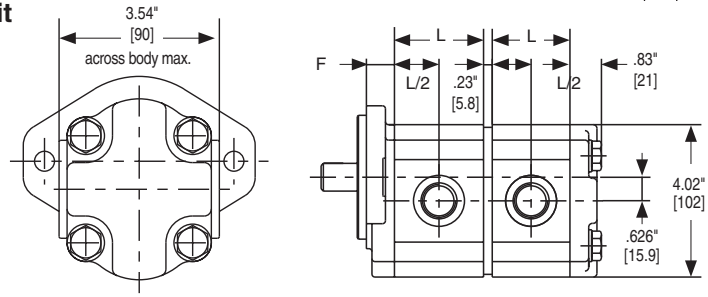
Single Unit



Single Unit with Rear Ports



Tandem Unit



Dimension F:
See Flanges on page 24

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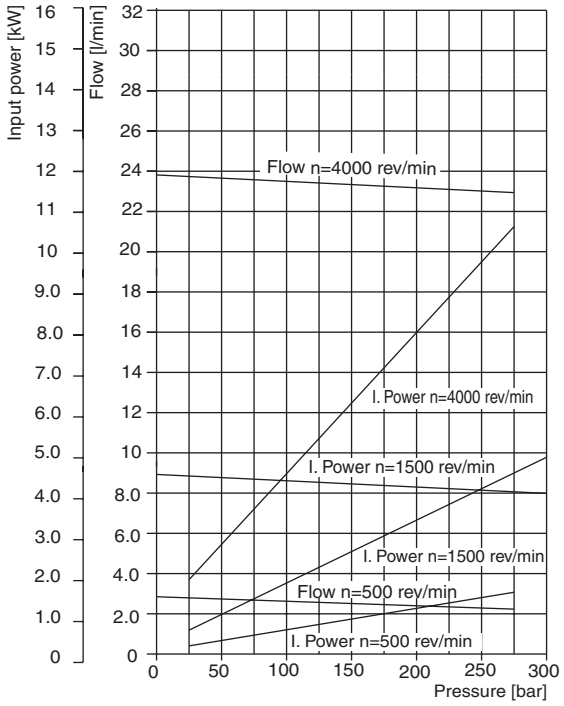
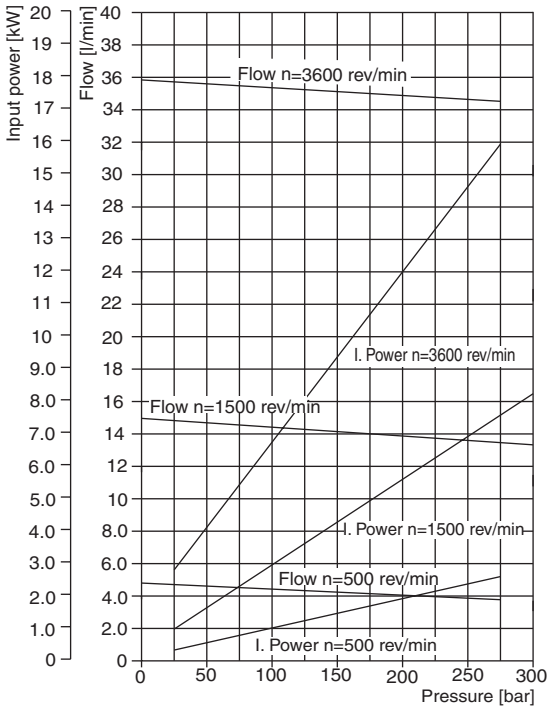
6.0 CC



10.0 CC



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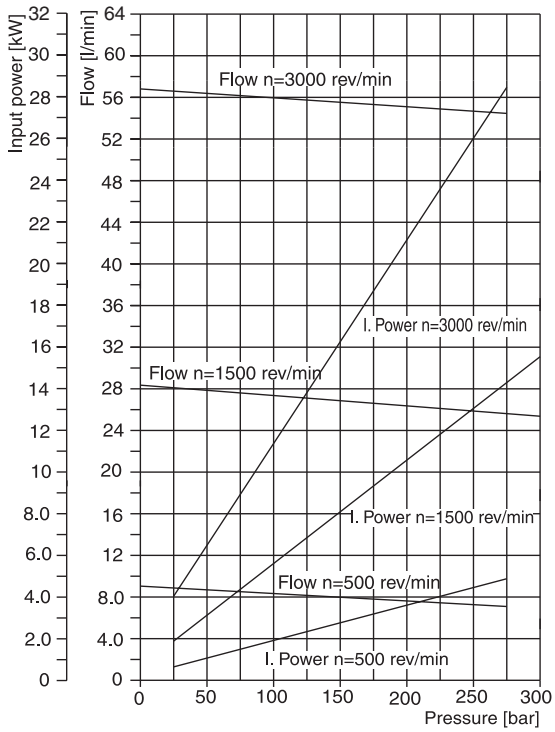
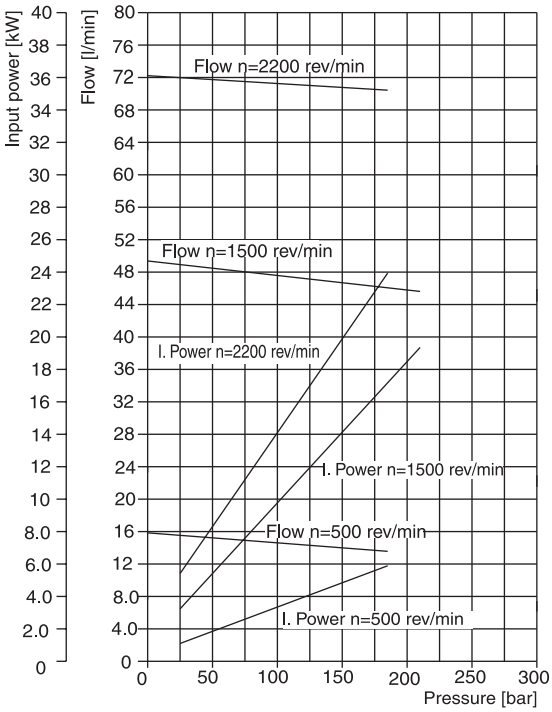


33.0 CC



Fluid Temperature = 45± 2ºC
Viscosity = 36 mm²/s
Inlet Pressure = 0.9 + 0.1 bar absolute

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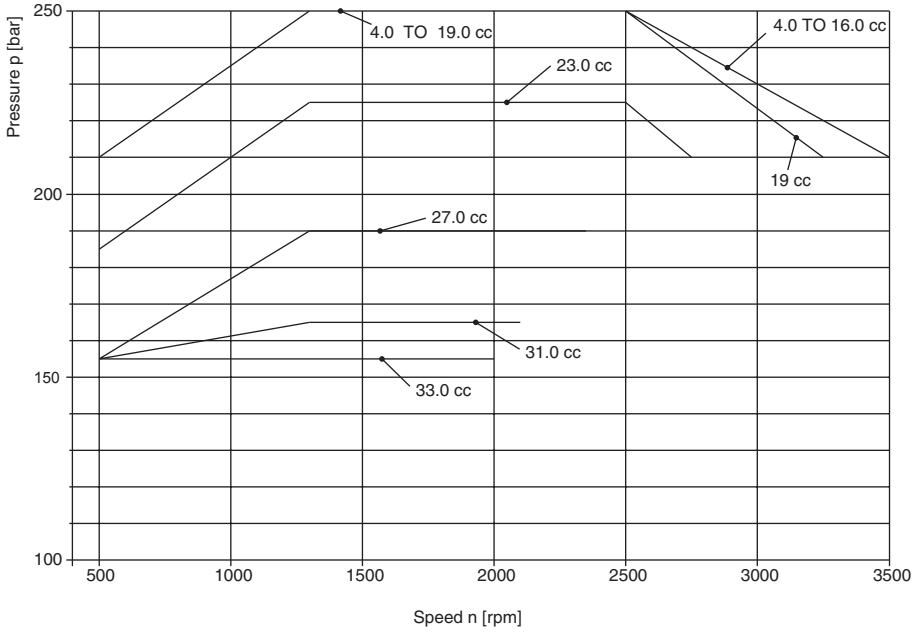
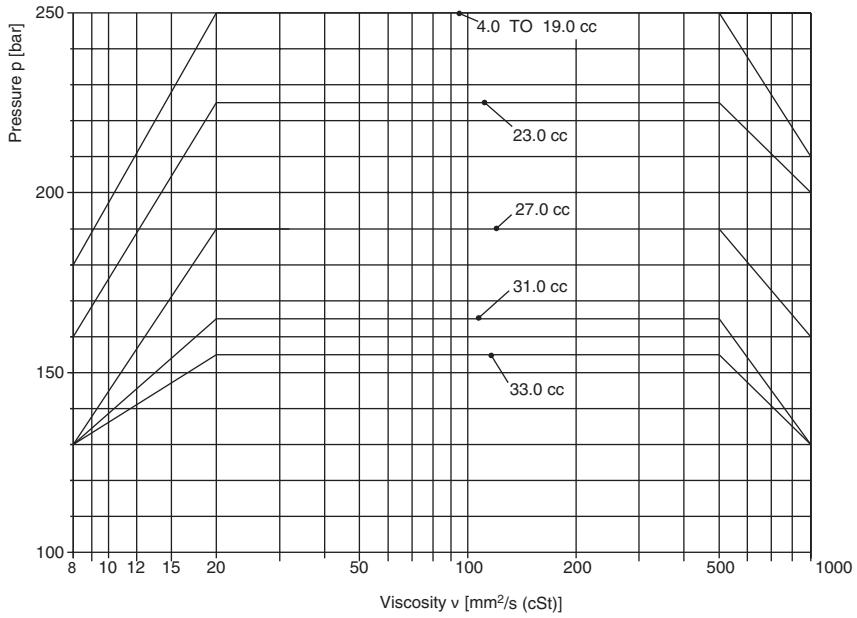
Pressure depending on speed



Pressure depending on viscosity



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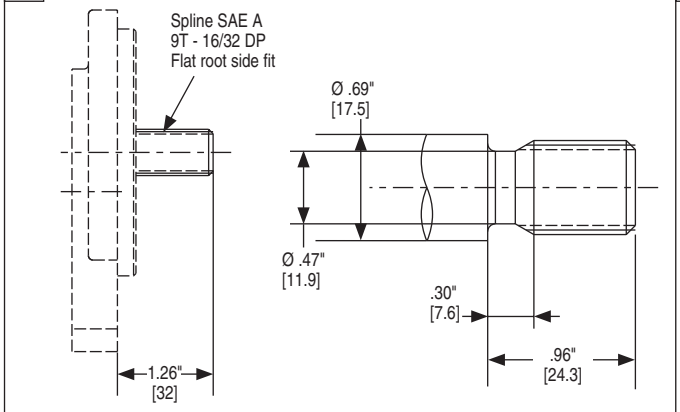
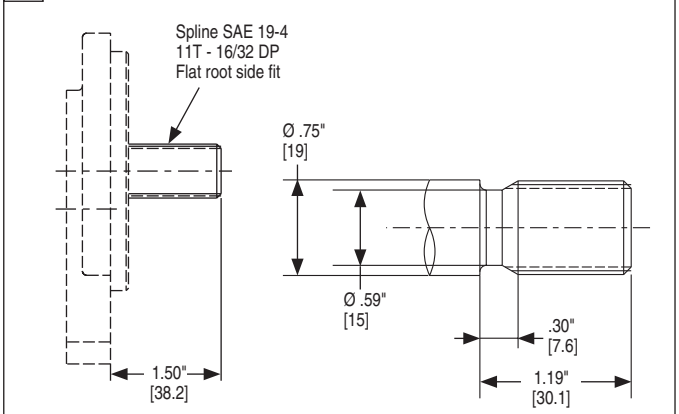
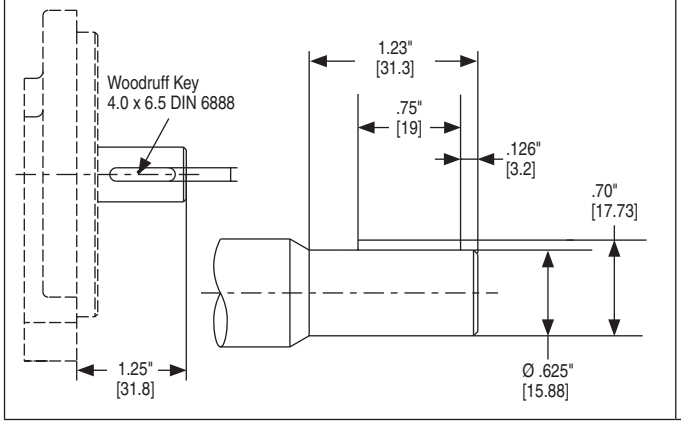
A1



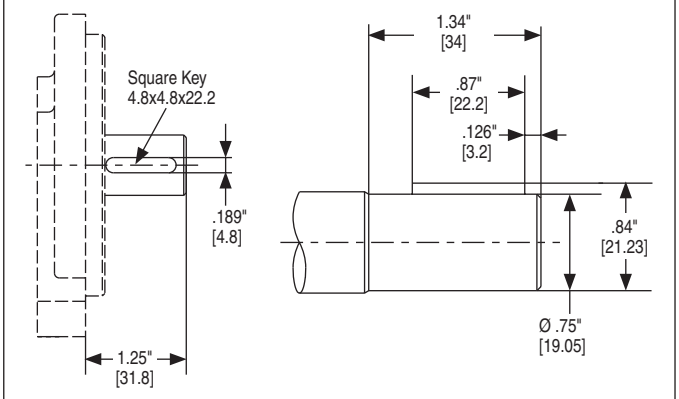
C1



K1



L6



Continued on next page

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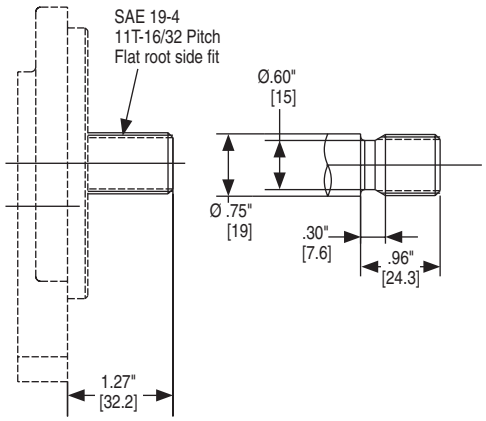
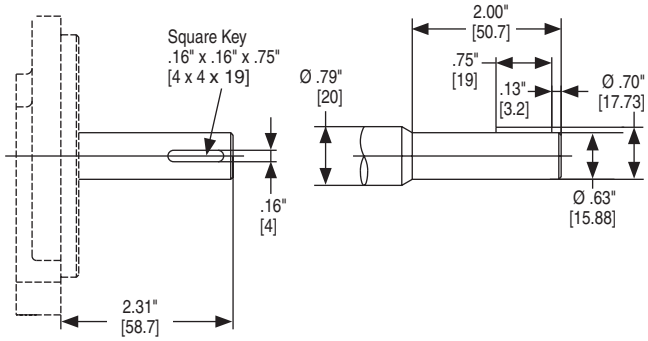
PGP/PGM511 Drive Shafts (Continued)

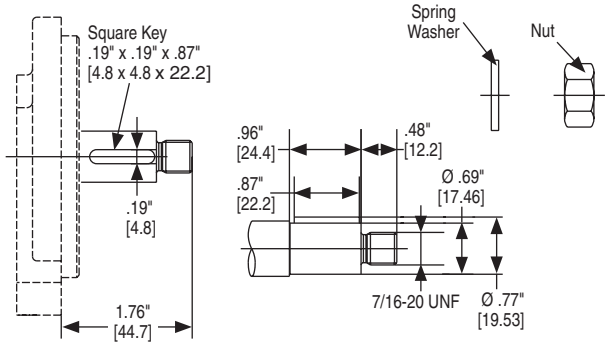
C2



K4



L1



PGP/PGM511 Shaft Load Capacity

Code	Description		Torque Rating [Nm]
A1	9T, 16/32DP, 32L, SAE A	spline	86
C1	11T, 16/32DP, 38.2L, SAE 19-4	spline	184
C2	11T, 16/32DP, 32.2L, SAE 19-4	spline	184
K1	Ø 15.88, 4.0 Key, no thread, 32L, SAE A	parallel	75
K4	Ø 15.88, 3.95 Key, no thread, 58.7L	parallel	75
L1	Ø 17.46, 4.8 Key, 7/16" UNF ext., 44.2L	parallel	112
L6	Ø 19.05, 4.8 Key, no thread, 32L, SAE 19-1	parallel	145
	Tandem pump connection shaft	spline	110

$$\text{Torque [Nm]} = \frac{\text{Displacement [cm}^3\text{/rev]} \times \text{Pressure [bar]}}{57.2}$$

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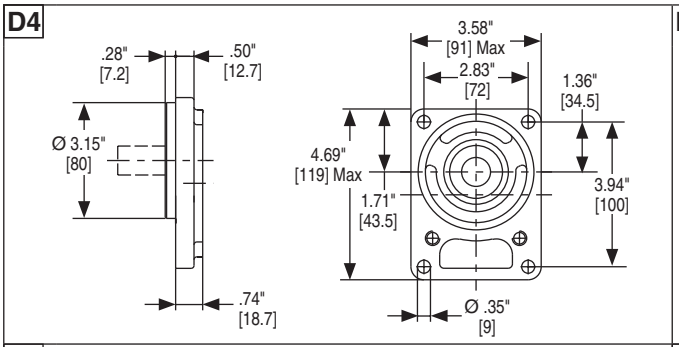
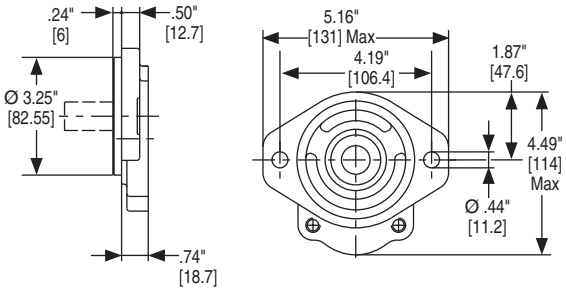
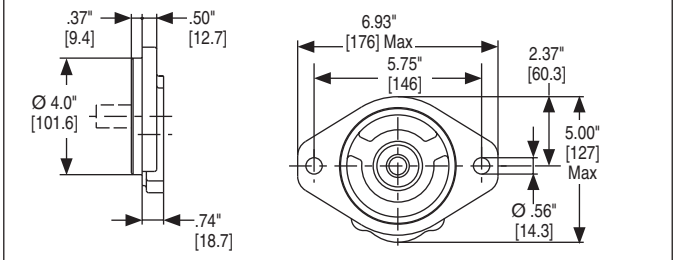
D4



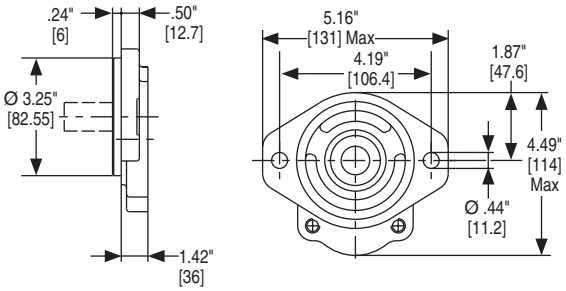
H2



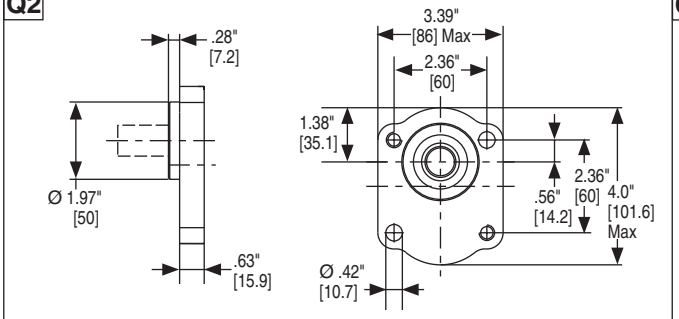
H3



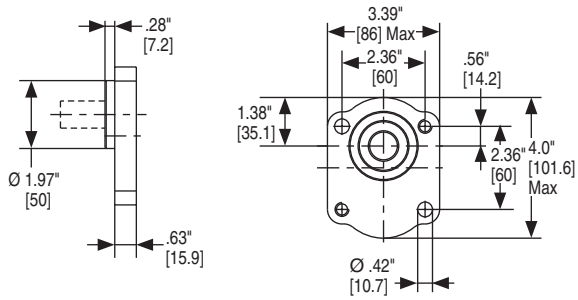
L2



Q2



Q4



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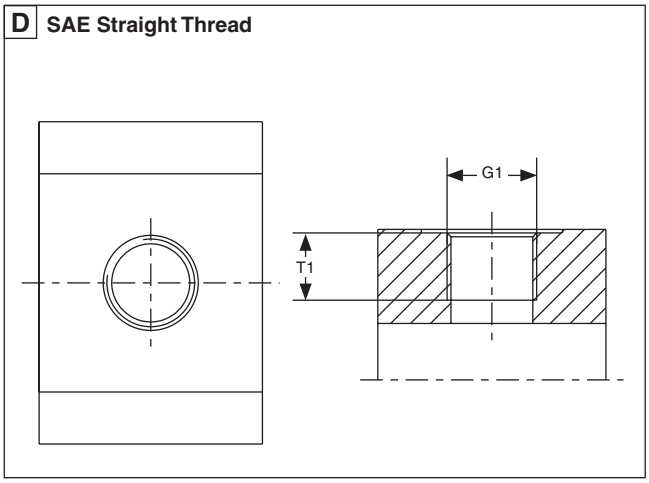
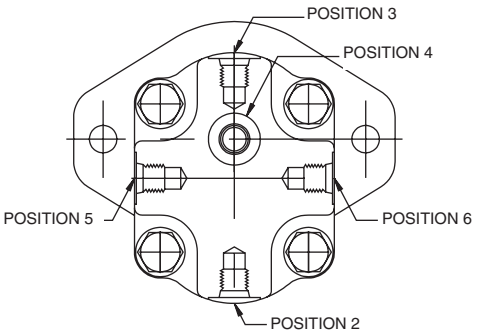
PGP/PGM511 Port Options

D SAE Straight Thread



Code	SAE J1926-1 Dash Size	Nominal Tube OD	G1 Thread	T1 Dimensions
D2	#6	3/8"	9/16" - 18 UNF	0.50" [12.7]
D3	#8	1/2"	3/4" - 16 UNF	0.56" [14.3]
D4	#10	5/8"	7/8" - 14 UNF	0.66" [16.7]
D5	#12	3/4"	1-1/16" - 12 UN	0.75" [19.0]
D6	#16	1"	1-5/16" - 12 UN	0.75" [19.0]
D7	#20	1-1/4"	1-5/8" - 12 UN	0.75" [19.0]
D8	#24	1-1/2"	1-7/8" - 12 UN	0.75" [19.0]

PGP/PGM511 Drain Positions



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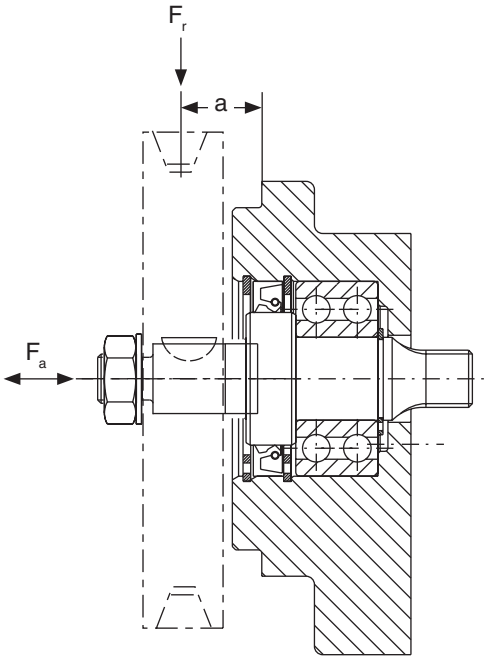
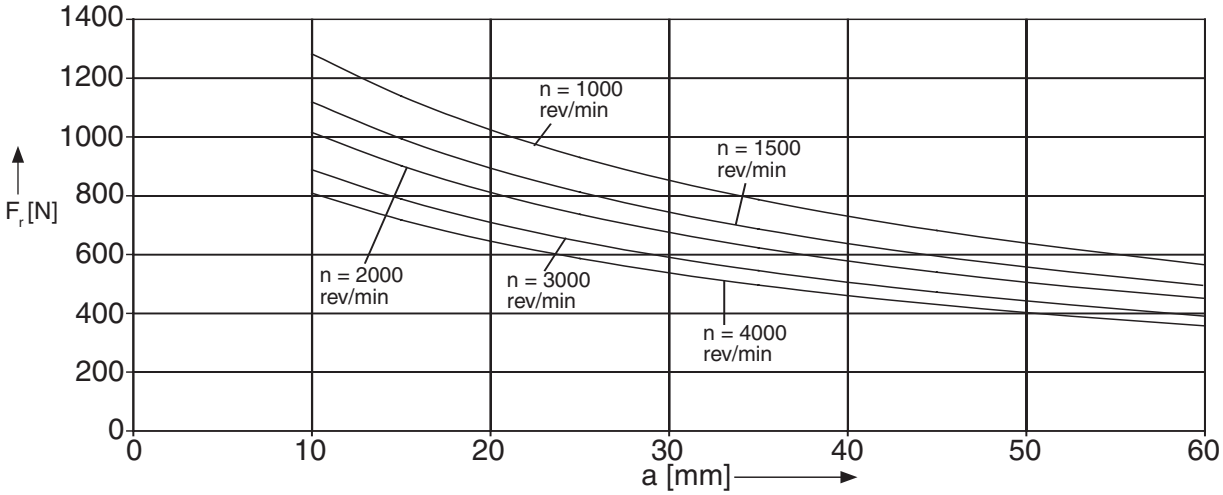
Bearing loads for code L2

Units subject to axial or radial loads, for instance drive with V-belts or gear wheels, must be specified with an outboard bearing. The diagrams below show the maximum axial or radial loads that can be tolerated referred to a bearing life of L_H = 1000 h. F_r is reduced by 0,7 F_a when axial loading is applied.

Outboard Bearing Code L2



Shaft load for outboard bearings



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PG	1	511	2	3	4	5	6	7	8	8	8[1)]	8[1)]	9[2)]	10[2)]	12	511	2	3	7	8	8	11	3)	4)

Code	1 – Type
P	Pump
M	Motor

Code	2 – Unit	
	Pump	Motor
A	Single unit	Standard Motor without checks
B	Multiple unit	Standard Motor with two checks
C	—	Standard Motor w/ one anti-cavitation check (ACC)
D	—	Standard Motor w/ one ACC + restrictor
M	Single distributor unit	—
Option C MUST NOT HAVE A DRAIN		
Option D MUST HAVE A DRAIN		

3 – Displacement*	
Code	ccm
0040	4.0
0050	5.0
0060	6.0
0070	7.0
0080	8.0
0100	10.0
0110	11.0
0120	12.0
0140	14.0
0160	16.0
0180	18.0
0190	19.0
0210	21.0
0230	23.0
0250	25.0
0270	27.0
0280	28.0
0310	31.0
0330	33.0
* Others on request	

Code	4 – Rotation
C	Clockwise
A	Counter-clockwise
B	Bi-directional

Code	5 – Shaft
A1	9T, 16/32DP, 32L, SAE A spline
C1	11T, 16/32DP, 38.2L, SAE 19-4 spline
C2	11T, 16/32DP, 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, SAE 19-1, parallel

Code	6 – Flange	Material
D4	72.0 x 100.0 - Ø80 rectangular	Aluminum
H2	106.4 - Ø82.55 SAE A 2-Bolt	Aluminum
H3	146.1 - Ø101.6 SAE B 2-Bolt	Aluminum
Q2	60.0 x 60.0 - Ø50.0 w/ seal, O thru bolt	Aluminum
Q4	60.0 x 60.0 - Ø50.0 w/ seal, O thru bolt	Aluminum
L2	106.4 - Ø82.55 SAE A 2-Bolt, w/ OBB and cont. drive shaft	Cast Iron

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

Code	8 – 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" - 12 UN thread
D6	1-5/16" - 12 UN thread
D7	1-5/8" - 12 UN thread
D8	1-7/8" - 12 UN thread

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

Code	10 – Drain Position
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

Code	11 – Corrosion Protection
Z	Zinc coated
P	Black painted
No code for no protection	

Code	12 – Section Connection
S	Separate inlets
C	Common inlets
No code for single unit	

Not all variances of ordering codes can be offered. Please check available part numbers first.
For not yet implemented part numbers or special requests please contact Parker Hannifin.

1) Only coded for the last section.
2) Only for motors.
3) For further unit repeat displacement, shaft seal between sections, side suction port, side pressure port, rear suction port, rear pressure port.
4) For adding built-in valves enter valve description at the end of the model code. Valve options described on pages 38-50.

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PGP	511	B	0100	A	C1	H2	N	D6	D5	S	511	A	0110	X	D6	D5	B1	B1	P

PGP	Gear Design / Type	Parker Gear Pump
511	Series	
B	Unit	Tandem Unit
0100	Displacement	10.0 cm³/rev.
A	Rotation Direction	Counter-Clockwise
C1	Drive shaft	SAE 19-4 Spline 11T, 16/32 DP
H2	Flange	Mounting Flange SAE 2-Bolt A
N	Shaft Seal	Shaft Seal NBR
D6	Side Suction Port	1-5/16" - 12 UN Thread
D5	Side Pressure Port	1-1/16" - 12 UN Thread
S	Section Connection	Separate Inlets
511	Series Second Section	
A	Unit	Single Unit
110	Displacement	11.0 cm³/rev.
X	Shaft Seal	No Seal
D6	Side Suction Port	1-5/16" - 12 UN Thread
D5	Side Pressure Port	1-1/16" - 12 UN Thread
B1	Rear Suction Port	No Port
B1	Rear Pressure Port	No Port
P	Corrosion Protection	Black Painted

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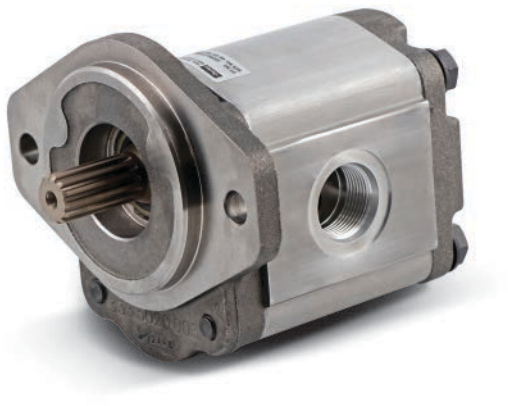

- **Up to 250 bar continuous operation**
  High strength materials and large journal diameters provide low bearing loads for high pressure operation.
- **High efficiency**
  Pressure balanced bearing blocks assure maximum efficiency under all operating conditions.
- **Low noise**
  13 tooth gear profile and optimized flow metering provide reduced pressure pulsation and exceptionally quiet operation.
- **Application flexibility**
  International mounts and connections, integrated valve capabilities and common inlet multiple pump configurations provide unmatched design and application versatility.
- **Large range of integrated valves**

Product Features	Description
Pump Type	Pressure balanced, aluminum, external gear
Mounting	SAE, rectangular, thru-bolt standard specials on request
Ports	SAE and metric split flanges and others
Shaft Style	SAE splined, keyed, tapered, cylindrical tang drive, specials on request
Maximum Speed	500 - 3400 rpm, see Specifications
Theor. displacement	See Specifications
Drive	Drive direct with flexible coupling is recommended.
Axial / Radial load	Consult with product service for allowable loading.
Inlet pressure	Operating range 0.8 to 2 bar abs. Min. inlet pressure 0.5 bar abs. Short time without load. Maximum suggested inlet flow velocity for pumps: 2.5 mps. Consultation is recommended.
Outlet pressure	See Specifications
Pressure rising rate	Max. 3000 bar/s
Hydraulic fluids	Hydraulic oil HLP, ISO, DIN 51524-2
Fluid viscosity	Range of operating viscosity 8 to 1000 mm²/s. Max. permissible operating pressure dependent on viscosity. Viscosity range for cold start 1000 to 2000 mm²/s at operating pressure p ≤10 bar and speed n ≤1500 rpm.

Product Features	Description
Fluid temperature	For NBR seals, range of operating temperature -40° to +80°C. For FKM seals, range of operating temperature -20° to +105°C. Max. permissible operating pressure dependent on fluid temperature. Temperature for cold start -20° to -15°C at speed ≤1500 rpm. Max. permissible operating pressure dependent on fluid temperature.
Filtration	According to ISO 4406 Cl. 19/17/13
Direction of rotation (looking at the drive shaft)	Clockwise, counter-clockwise. Attention! Drive pump only in indicated direction of rotation.
Multiple pump assemblies	• Available in two or three sections, limitations shown in the shaft loading rating table 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.

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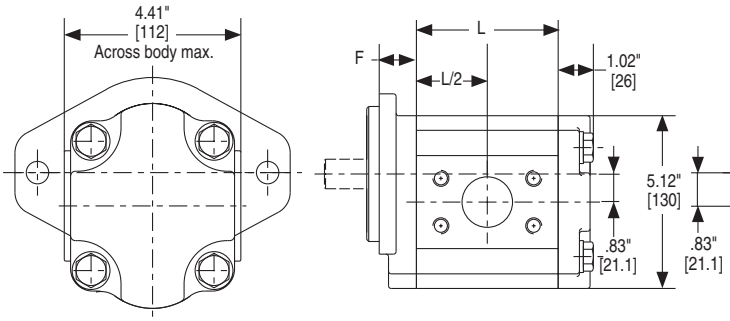
PGP/PGM517 Specifications

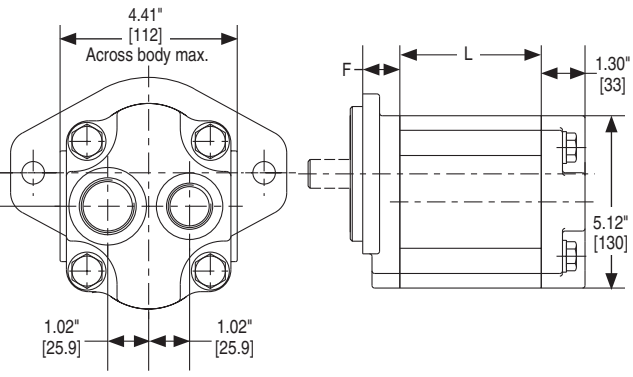
Code		0140	0160	0190	0230	0250	0280	0330	0360	0380	0440	0520	0580	0700
Displacements	cm^3/rev	14.0	16.0	19.0	23.0	25.0	28.0	33.0	36.0	38.0	44.0	52.0	58.0	50.0
	in^3/rev	0.85	0.98	1.16	1.40	1.53	1.71	2.01	2.20	2.32	2.69	3.17	3.54	3.05
Continuous Pressure	bar	250	250	250	250	250	250	250	250	250	220	200	180	160
	psi	3625	3625	3625	3625	3625	3625	3625	3625	3625	3190	2900	2610	2320
Intermittent Pressure	bar	275	275	275	275	275	275	275	275	275	240	220	200	180
	psi	3988	3988	3988	3988	3988	3988	3988	3988	3988	3480	3190	2900	2610
Min. Speed @ Max. Outlet Pressure	rpm	500	500	500	500	500	500	500	500	500	500	500	500	500
Max. Speed @ 0 Inlet & Max. Outlet Pressure	rpm	3400	3400	3300	3300	3100	3100	3000	3000	3000	2800	2700	2600	2400
Pump Input Power @Max. Pressure and 1500 rpm	HP	12.87	14.75	17.57	21.19	23.03	25.88	30.44	33.16	35.00	36.21	38.35	40.23	41.84
	kW	9.6	11.0	13.1	15.8	17.2	19.3	22.7	24.7	26.1	27.0	28.6	30.0	31.2
Dimension L	in	2.69"	2.77"	2.89"	3.05"	3.13"	3.24"	3.44"	3.56"	3.64"	3.88"	4.20"	4.44"	4.92"
	mm	68.3	70.3	73.3	77.4	79.4	82.4	87.5	90.5	92.5	98.6	106.7	112.8	124.9
Approximate Weight	lbs	17.4	17.6	17.9	18.3	18.5	18.7	19.2	19.4	19.6	20.2	20.9	21.5	22.6
	kg	7.9	8.0	8.1	8.3	8.4	8.5	8.7	8.8	8.9	9.2	9.5	9.8	10.2

PGP/PGM517 Dimensions

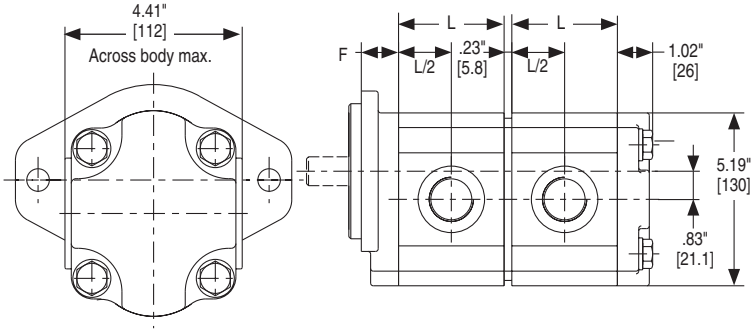
Single Unit



Single Unit with Rear Ports



Tandem Unit



Dimension F:
See Flanges on page 34

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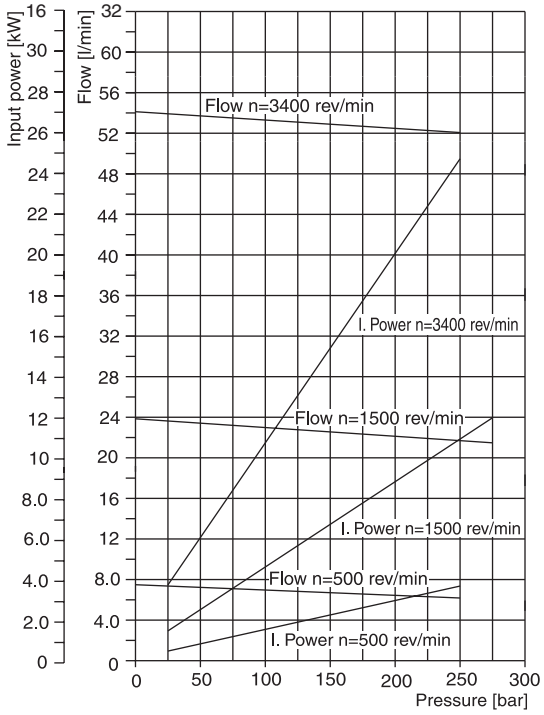
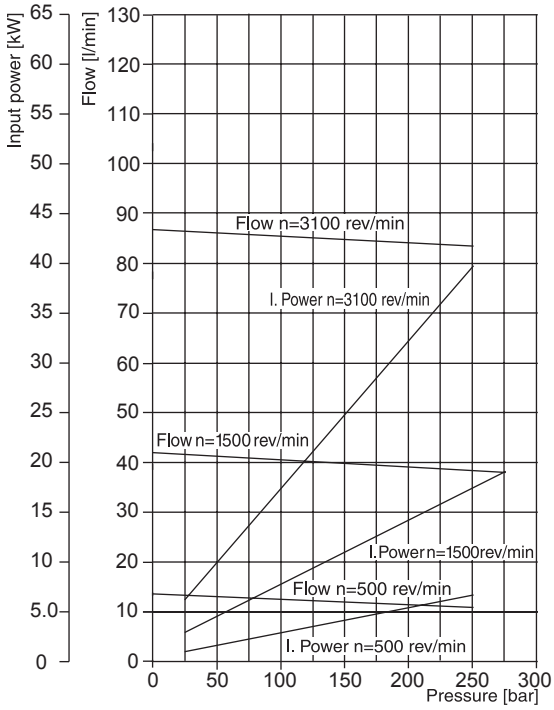
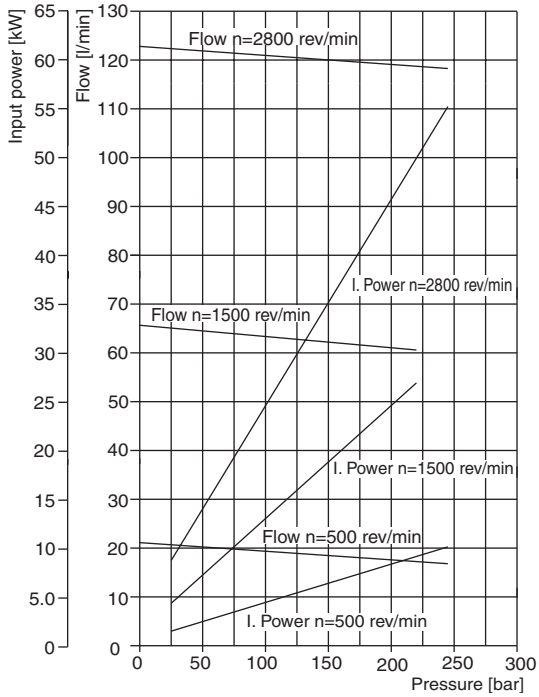
16.0 CC



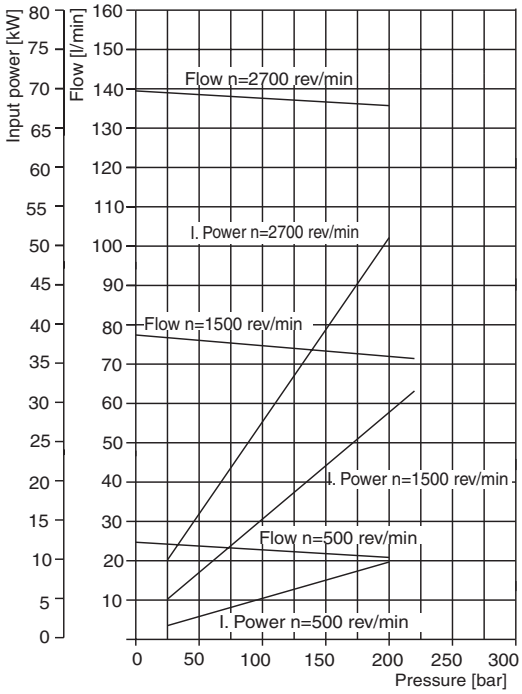
28.0 CC



44.0 CC



52.0 CC



Fluid Temperature = 45± 2°C
Viscosity = 36 mm²/s
Inlet Pressure = 0.9 + 0.1 bar absolute

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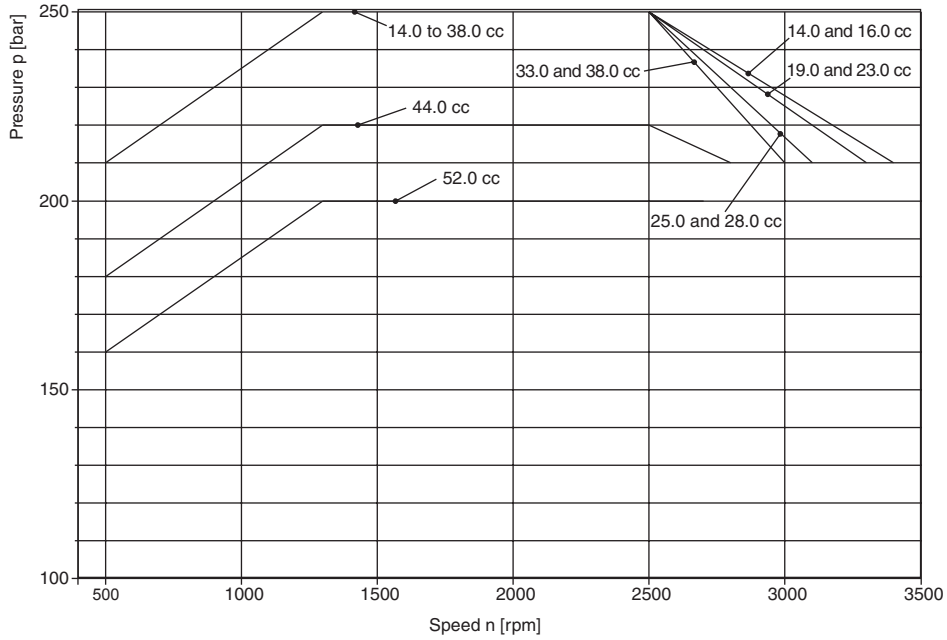
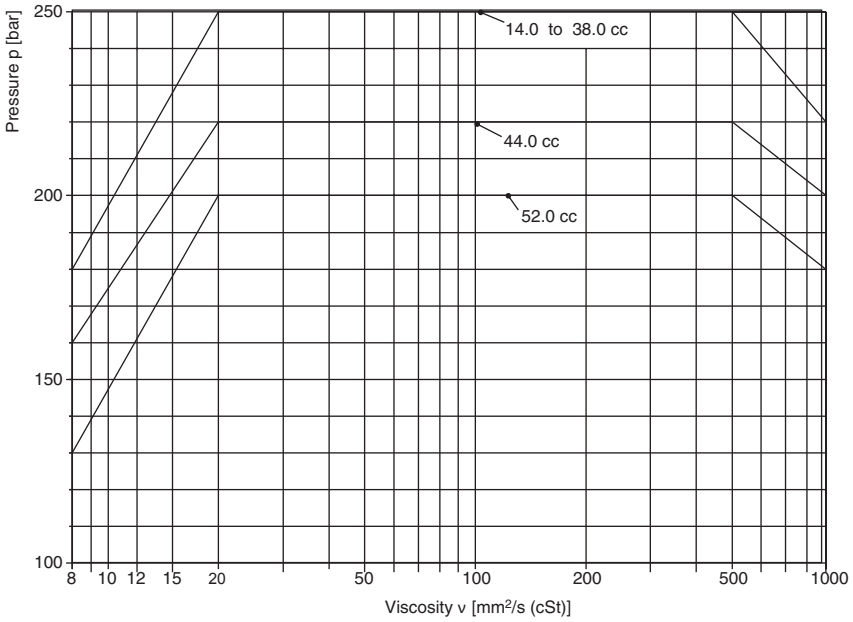
Pressure depending on speed



Pressure depending on viscosity



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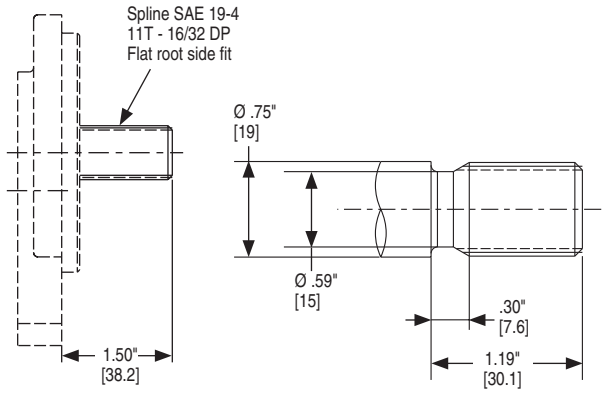
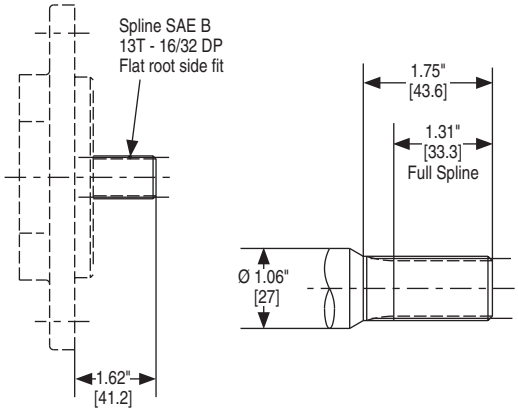
PGP/PGM517 Drive Shafts

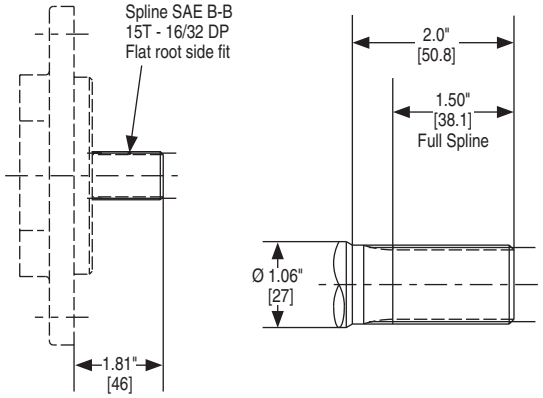
C1



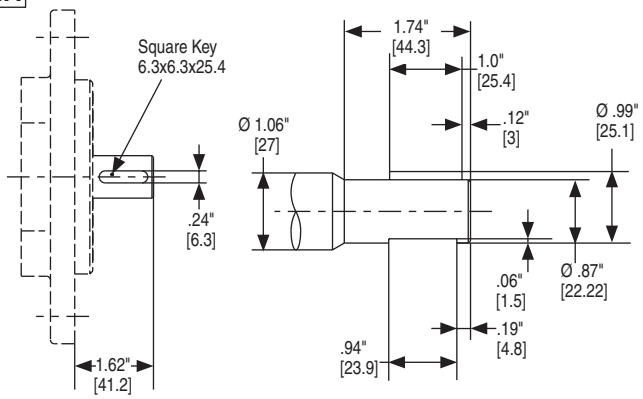
D1



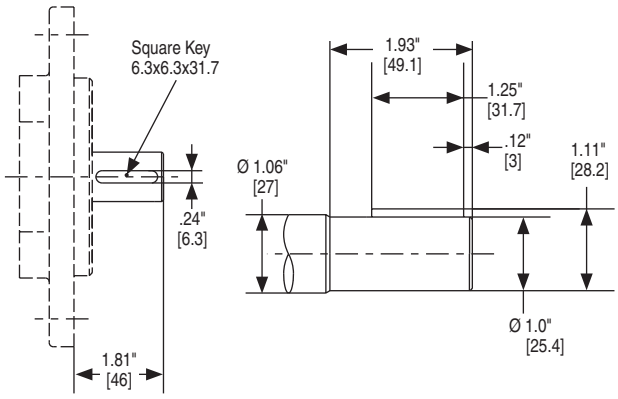
E1



M1



M2



PGP/PGM517 Shaft Load Capacity

Code	Description		Torque Rating [Nm]
C1	11T, 16/32DP, 38.2L, SAE 19-4	spline	86
D1	13T,16/32DP, 41.2L, SAE B	spline	345
E1	15T, 16/32DP, 46L, SAE B-B	spline	530
M1	Ø 22.2, 6.3 Key, no thd, 41.2L, SAE B	parallel	251
M2	Ø 25.4, 6.3 Key, no thd, 46L, SAE B-B	parallel	395
	Multiple pump connection shaft		228

$$\text{Torque [Nm]} = \frac{\text{Displacement [cm}^3\text{/rev] x Pressure [bar]}}{57.2}$$

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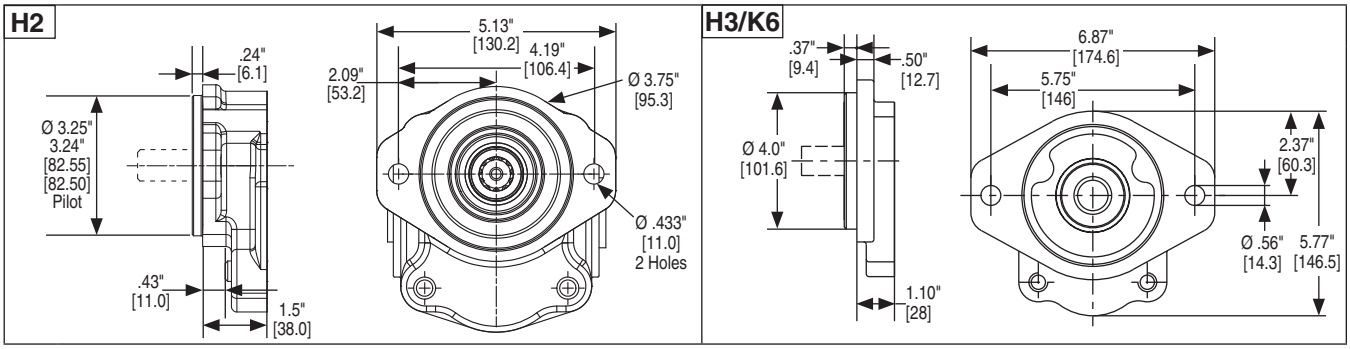

H2 = Cast Iron
H3 = Cast Iron
K6 = Aluminum

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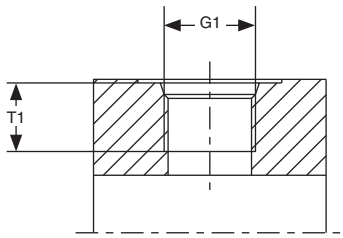
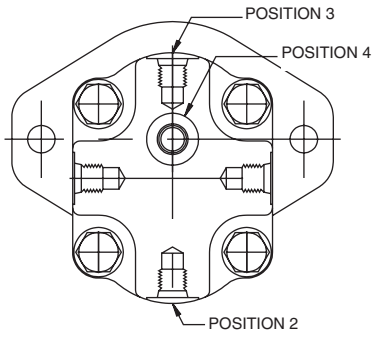
PGP/PGM517 Port Options

D SAE Straight Thread



Code	SAE J1926-1 Dash Size	Nominal Tube OD	G1 Thread	T1 Dimensions
D2	#6	3/8"	9/16" - 18 UNF	0.50" [12.7]
D3	#8	1/2"	3/4" - 16 UNF	0.56" [14.3]
D4	#10	5/8"	7/8" - 14 UNF	0.66" [16.7]
D5	#12	3/4"	1-1/16" - 12 UN	0.75" [19.0]
D6	#16	1"	1-5/16" - 12 UN	0.75" [19.0]
D7	#20	1-1/4"	1-5/8" - 12 UN	0.75" [19.0]
D8	#24	1-1/2"	1-7/8" - 12 UN	0.75" [19.0]

PGP/PGM517 Drain Positions



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PG	1	517	2	3	4	5	6	7	8	8	8[1)]	8[1)]	9[2)]	10[2)]	12	517	2	3	7	8	8	11	3)	4)

Code	1 – Type
P	Pump
M	Motor

Code	2 – Unit	
	Pump	Motor
A	Single unit	Standard Motor without checks
B	Multiple unit	Standard Motor with two checks
C	—	Standard Motor w/ one anti-cavitation check (ACC)
D	—	Standard Motor w/ one ACC + restrictor
M	Single distributor unit	—
Option C MUST NOT HAVE A DRAIN		
Option D MUST HAVE A DRAIN		

3 – Displacement*	
Code	ccm
0140	14
0160	16
0190	19
0230	23
0250	25
0280	28
0330	33
0360	36
0380	38
0440	44
0520	52
0580	58
0700	70
* Others on request	

Code	4 – Rotation
C	Clockwise
A	Counter-clockwise
B	Bi-directional

Code	5 – Shaft
C1	11T, 16/32DP, 38.2L, SAE 19-4 spline
D1	13T, 16/32DP, 41.2L, SAE B spline
E1	15T, 16/32DP, 46L, SAE B-B spline
M1	Ø 22.2, 6.3 Key, no thread, 41.2L, SAE B, parallel
M2	Ø 25.4, 6.3 Key, no thread, 46L, SAE B-B, parallel

Code	6 – Flange	Material
H2	106.4 - Ø 82.55 SAE A 2-Bolt	Cast Iron
H3	146.1 - Ø 101.6 SAE B 2-Bolt	Cast Iron
K6	146.1 - Ø 101.6 SAE B 2-Bolt	Aluminum

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

Code	8 – Port Options
B1	No ports
D3	3/4" - 16 UNF thread
D4	7/8" - 14 UNF thread
D5	1-1/16" - 12 UN thread
D6	1-5/16" - 12 UN thread
D7	1-5/8" - 12 UN thread
D8	1-7/8" - 12 UN thread

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

Code	10 – Drain Port Position
2	Drain on bottom
3	Drain on top
4	Rear drain

Code	11 – Corrosion Protection
Z	Zinc coated
P	Black painted
No code for no protection	

Code	12 – Section Connection
S	Separate inlets
C	Common inlets
No code for single unit	

Not all variances of ordering codes can be offered. Please check available part numbers first. For not yet implemented part numbers or special requests please contact Parker Hannifin.

1) Only coded for the last section.
2) Only for motors.
3) For further unit repeat displacement, shaft seal between sections, side suction port, side pressure port, rear suction port, rear pressure port.
4) For adding built-in valves enter valve description at the end of the model code. Valve options described at pages 38-50.

WARNING: This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer, birth defects, and other reproductive harm. www.p65warnings.ca.gov

Parker Hannifin Corporation
Pump & Motor Division
Kings Mountain, NC 28086

PGP	517	A	0230	A	D1	H3	N	D6	D5	B1	B1	Z

PGP	Gear Design / Type	Parker Gear Pump
517	Series	
A	Unit	Single Unit
0230	Displacement	23.0 cm^3/rev.
A	Rotation Direction	Counter-Clockwise
D1	Shaft	SAE B Spline 13T, 16/32 DP
H3	Flange	Mounting Flange SAE 2-Bolt B
N	Shaft Seal	Shaft Seal NBR
D6	Side Suction Port	1-5/16" - 12 UN Thread
D5	Side Pressure Port	1-1/16" - 12 UN Thread
B1	Rear Suction Port	No Port
B1	Rear Pressure Port	No Port
Z	Corrosion Protection	Zinc Coated

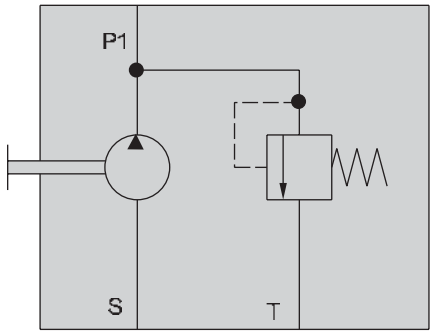
Parker Hannifin Corporation
Pump & Motor Division
Kings Mountain, NC 28086

Valve Type	PGP502	PGP505	PGP511	PGP517
Pressure-Relief Valve - Adjustable - External Vent	x	x	x	x
Pressure-Relief Valve - Non Adjustable - External Vent	x	x	x	x
Two Stage Pump	x	x	x	x
Priority Flow Divider Valve			x	x
Load Sensing Priority Valve			x	x

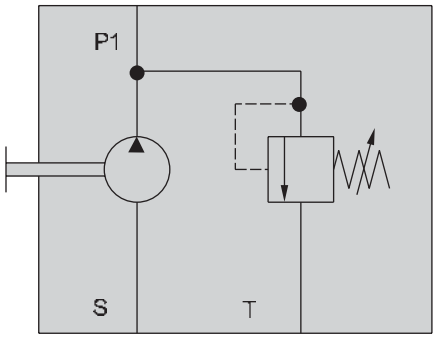
Valve Type	PGM502	PGM505	PGM511	PGM517
Single Pressure-Relief Valve	x	x	x	x
Single Pressure-Relief Valve with Anti-cav	x	x	x	x
Cross Port Pressure-Relief Valves		x	x	
Cross Port Pressure-Relief Valves with Anti-cav		x	x	
Cross Port Pressure-Relief Valves with Anti-cav plus Check Valves		x	x	
Solenoid Proportional Pressure-Relief Valve		x	x	x
Speed Sensor	x	x	x	x

Pressure-Relief Valves – PGP502, PGP505, PGP511 and PGP517

Non adjustable, external tank port

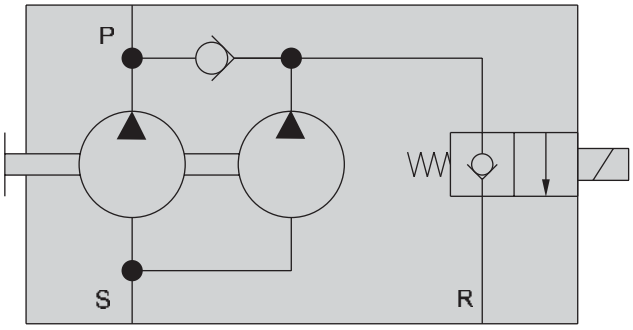


Adjustable, external tank port

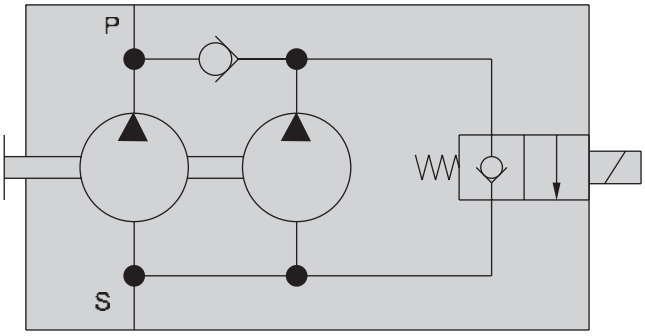


Two - Stage Pump – PGP505, PGP511 and PGP517

With External Tank Port (recommended)



With Internal Vent to Pump Inlet



⚠ **WARNING:** This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer, birth defects, and other reproductive harm. www.p65warnings.ca.gov

Priority Flow Divider

1VP-/CVP100- □ Port Configuration □ Port Orientation □ Function □ Priority Port □ Excess Port □ Priority Flow □ R/V Setting

Code	Port Configuration
A	End Priority, End Excess
B	Side Priority, Side Excess
C	End Priority, Side Excess
D	Side Priority, End Excess
E	Double Side Ported

Code	Port Orientation
A	Priority Port on Pump Inlet Side
B	Priority Port on Pump Outlet Side

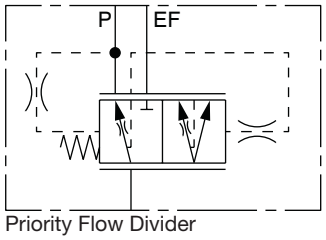
Code	Function
A	Priority Flow Divider
B	PFD with Full Flow R/V
C	PFD with Pilot R/V

Code	Priority Port
J1	3/4" - 16 UNF
J8	9/16" - 18 UNF
T1	3/8" BSP
others on request	

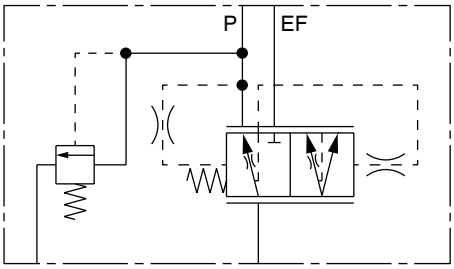
Code	Excess Port
J2	7/8" - 14 UNF
J3	1-1/16" - 12 UN
T2	1/2" BSP
T4	3/4" BSP
others on request	

Code	Priority Flow
08	8 lpm
11	11 lpm
15	15 lpm
19	19 lpm
23	23 lpm
30	30 lpm
38	38 lpm
others on request	

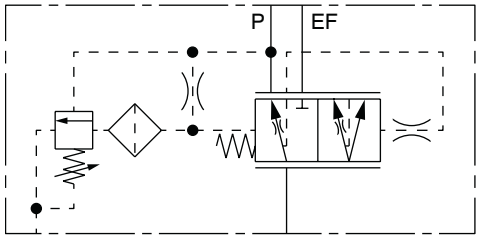
Code	R/V Setting
00	No Relief Valve
A05	Adjustable 40 - 120 bar
A15	Adjustable 130 - 250 bar
05	50 bar
08	80 bar
10	100 bar
11	110 bar
12	120 bar
13	130 bar
14	140 bar
15	150 bar
16	160 bar
17	170 bar
18	180 bar
20	200 bar
others on request	



Priority Flow Divider
Function A



Priority Flow Divider with Full Flow R/V
Function B



Priority Flow Divider with Pilot R/V
Function C

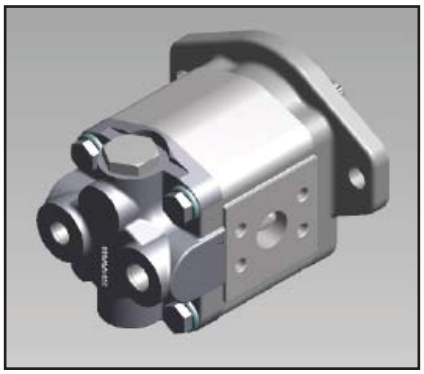
WARNING: This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer, birth defects, and other reproductive harm. www.p65warnings.ca.gov

Parker Hannifin Corporation
Pump & Motor Division
Kings Mountain, NC 28086

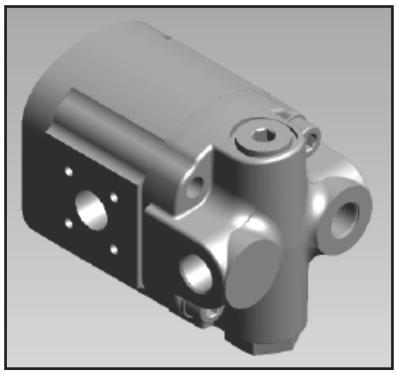
Priority Flow Divider

Pressure Range	
P-port Maximum	230 bar
EF-port Maximum	250 bar

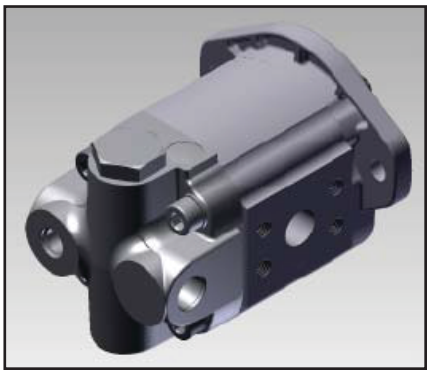
Maximum Flows	
for PGP511	
P-port	32 lpm
EF-port	70 lpm
max. input flow	70 lpm
for PGP517	
P-port	45 lpm
EF-port	100 lpm
max. input flow	100 lpm



Port Configuration A
Port Orientation B



Port Configuration D
Port Orientation A



Port Configuration C
Port Orientation B

Comments:

The Priority Flow Divider provides a constant and specified flow for power steering or other priority functions.
The balance of flow produced by the pump is available from the EF port for additional functions such as open center directional control valves, fan drives, etc. It can also be fitted with a pressure-relief valve.

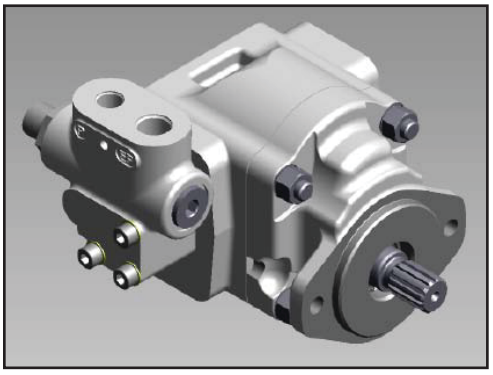
Variations for PGP511/PGP517

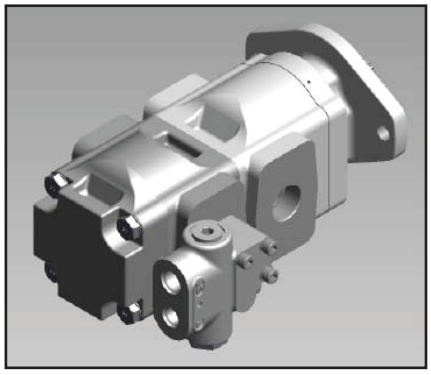
without priority relief valve (Function A)
with full flow priority relief valve (Function B)
with pilot priority relief valve (Function C)

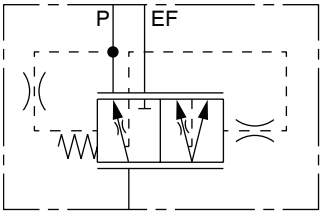
Side Mounted Priority Flow Divider (Load Sense or Fixed Flow)

Pressure Range	
for PGP511/PGP517	
P-port Maximum	230 bar
EF-port Maximum	250 bar
for PGP517	
P-port Maximum	250 bar
EF-port Maximum	310 bar

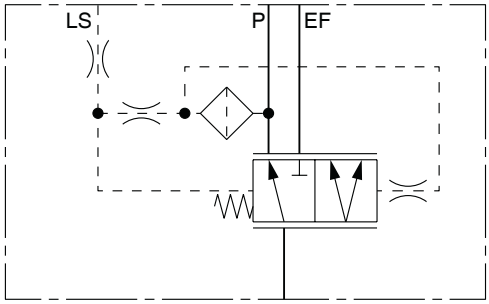
Maximum Flows	
for PGP511	
P-port	32 lpm
max. input flow	80 lpm
for PGP517	
P-port	45 lpm
max. input flow	160 lpm







Priority Flow Divider
Function A



Load Sensing Priority Valve
with Dynamic Load Sensing Signal
Function F

Comments:

Priority Flow Dividers can also be direct mounted to the pressure port to provide a constant and specified flow for power steering or other priority functions.

Variations for PGP511/PGP517

without priority relief valve (Function A)
with full flow priority relief valve (Function B)
with pilot priority relief valve (Function C)

NOTE: Relief valve in the steering unit is required. Control pressure settings and priority flow settings on request.

WARNING: This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer, birth defects, and other reproductive harm. www.p65warnings.ca.gov

Parker Hannifin Corporation
Pump & Motor Division
Kings Mountain, NC 28086

Load Sensing Priority Valve

1VP-/CVP100- □ □ □ □ □ □ □ □

Port Configuration	Port Orientation	Function	Priority Port	Excess Port	LS Port	R/V Setting	Control Setting LS

Code	Port Configuration
A	End Priority, End Excess
B	Side Priority, Side Excess
C	End Priority, Side Excess
D	Side Priority, End Excess
E	Double Side Ported

Code	Port Orientation
A	Priority Port on Pump Inlet Side
B	Priority Port on Pump Outlet Side

Code	Function
D	LSPV, Static LS
E	LSPV, Statis LS with Pilot R/V
F	LSPV, Dynamic LS
G	LSPV, Dynamic LS with Pilot R/V

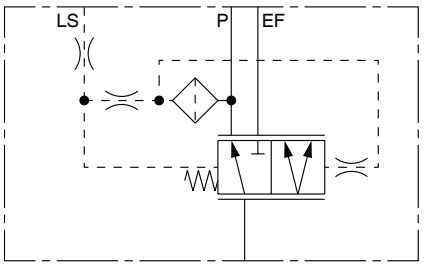
Code	Priority Port
J1	3/4" - 16 UNF
J8	9/16" - 18 UNF
T1	3/8" BSP
others on request	

Code	Excess Port
J2	7/8" - 14 UNF
J3	1-1/16" - 12 UN
T2	1/2" BSP
T4	3/4" BSP
others on request	

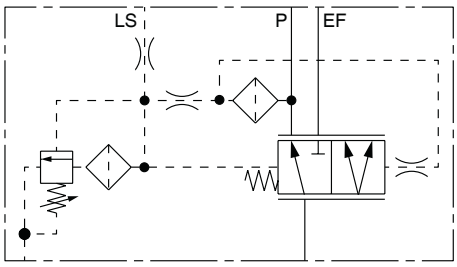
Code	LS Port
X2	7/16" - 20 UNF female
Y1	1/4" BSP male
Y3	1/4" BSP
BX2	7/16" - 20 UNF Body Port
others on request	

Code	R/V Setting
00	No Relief Valve
A05	Adjustable 40 - 120 bar
A15	Adjustable 130 - 250 bar
05	50 bar
08	80 bar
10	100 bar
11	110 bar
12	120 bar
13	130 bar
14	140 bar
15	150 bar
16	160 bar
17	170 bar
18	180 bar
20	200 bar
others on request	

Code	Control Setting LS
052	5.2 bar static
056	5.6 bar dynamic
062	6.2 bar dynamic
063	6.3 bar static
070	7.0 bar static / dynamic
090	9.0 bar dynamic
093	9.3 bar static
104	10.4 bar dynamic
126	12.6 bar dynamic
140	14.0 bar dynamic
186	18.6 bar dynamic
others on request	



Load Sensing Priority Valve
with Dynamic Load Sensing Signal
Function F



Load Sensing Priority Valve
with Dynamic Load Sensing Signal
Function G

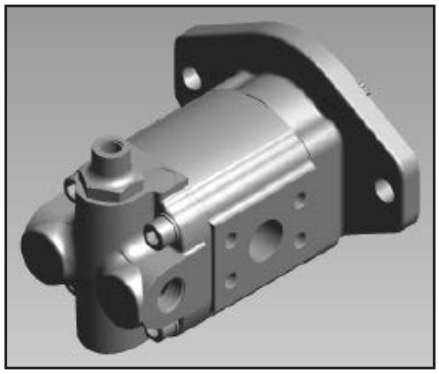
WARNING: This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer, birth defects, and other reproductive harm. www.p65warnings.ca.gov

Parker Hannifin Corporation
Pump & Motor Division
Kings Mountain, NC 28086

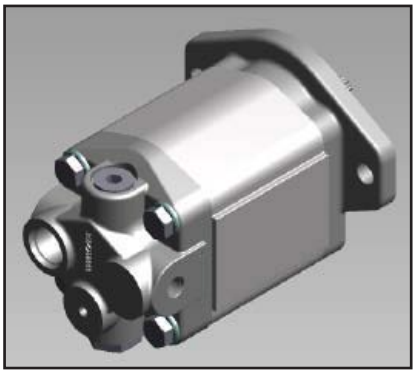
Load Sensing Priority Valve

Pressure Range	
P-port Maximum	230 bar
EF-port Maximum	equal to max. rating of pump

Maximum Flows	
for PGP511	
P-port	32 lpm
EF-port	70 lpm
max. input flow	70 lpm
for PGP517	
P-port	45 lpm
EF-port	100 lpm
max. input flow	100 lpm



Port Configuration B
Port Orientation A



Port Configuration D
Port Orientation B

Port Configuration E
Port Orientation A

Comments:

The Load Sense Priority Valve provides priority flow on demand, typically for LS power steering: The balance of the flow produced by the pump is available from the EF port for additional functions such as open center directional control valves, fan drives, etc. When the power steering is idle, full pump flow is available for these functions.

The selection of pilot relief and static or dynamic signal is dependent on the characteristics of the selected steering unit.

Variations for PGP511/PGP517

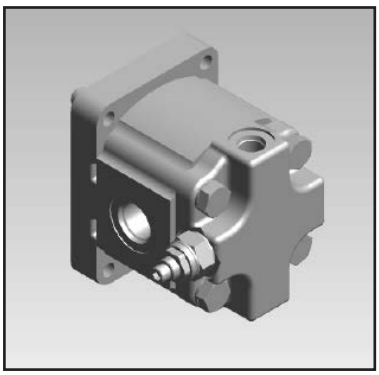
without pilot relief
dynamic LS signal (Function G) / with pilot relief
dynamic LS signal (Function F) / without pilot relief
static LS signal / with pilot relief
static LS signal

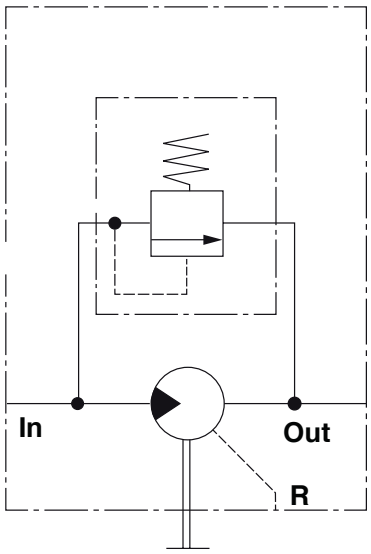
WARNING: This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer, birth defects, and other reproductive harm. www.p65warnings.ca.gov

Parker Hannifin Corporation
Pump & Motor Division
Kings Mountain, NC 28086

Single Pressure-Relief Valve

Motor Range PGM511	
Maximum Flow	75 lpm
Pressure Range	25-250 bar





Comments:
Integral relief valve to protect the motor.
Motors with this valve may be applied in series with relief valve providing a limit to the pressure differential, and hence, the output torque.

Variations for PGM511
adjustable / with internal or external drain

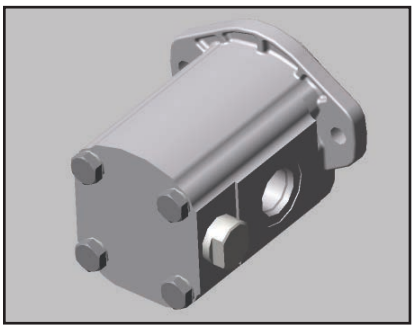
Applications
Fan Drives, Mower Blade Drives, Compressor Drives and Water Pump Drives

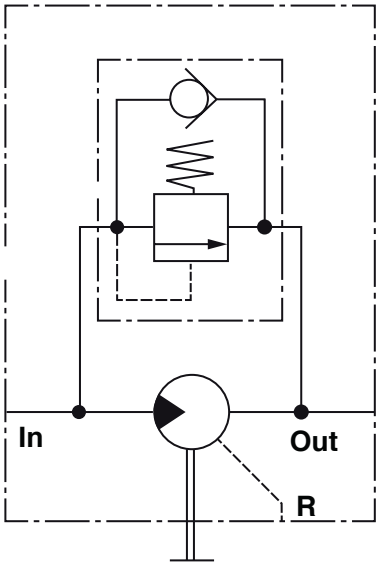
WARNING: This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer, birth defects, and other reproductive harm. www.p65warnings.ca.gov

Parker Hannifin Corporation
Pump & Motor Division
Kings Mountain, NC 28086

Single Pressure-Relief Valve with Anti-Cavitation

Motor Range PGM511	
Maximum Flow	100 lpm
Pressure Range	35-250 bar





Motor Range PGM511	
Code	**Pressure Bar**
RMAF	50
RMAP	90
RMAR	100
RMAV	120
RMBB	150
RMBD	160
RMBK	190
RMBP	210
RMBT	230

Comments:

Motors fitted with this relief valve may be applied in series with relief valve providing a limit to the pressure differential, and hence, the output torque.

The check valve allows the motor and driven load to “spool down” when the fluid supply is shut off or reduced due to engine speed fluctuations.

In series operation, the check valve permits the motor to come to a controlled stop should the outlet flow be suddenly blocked.

This valve reduces the risk of damaging the motor or blowing a hydraulic line.

Motors fitted with this valve are available with side or rear facing ports.

Variations for PGM511

Non-adjustable / with reverse flow check with internal or external drain

Applications

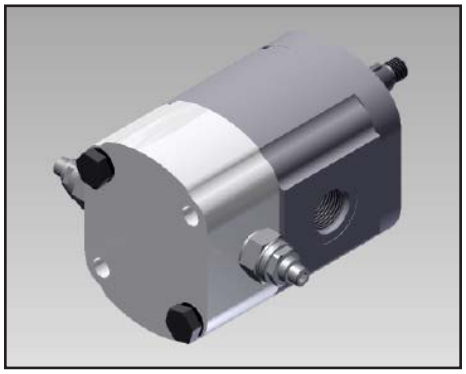
Fan Drives, Mower Blade Drives, Compressor Drives and Water Pump Drives

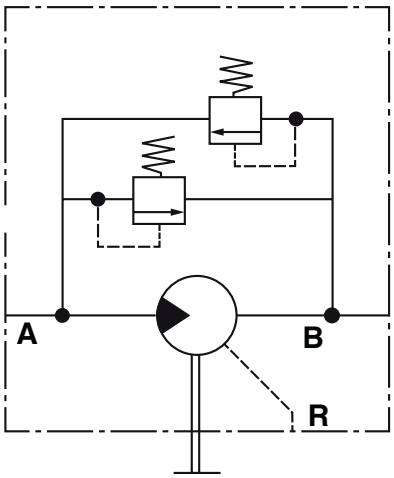
WARNING: This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer, birth defects, and other reproductive harm. www.p65warnings.ca.gov

Parker Hannifin Corporation
Pump & Motor Division
Kings Mountain, NC 28086

Cross Port Pressure-Relief Valves

Motor Range PGM511	
Maximum Flow	75 lpm
Pressure Range	25-250 bar





Comments:

Integral cross port relief to protect motor and to limit torque in both directions of rotation.
Motors fitted with this relief valve cover may be operated in series with other motors downstream when using external case drain.
Limited change to the factory set is possible.
Side ports are standard in order to minimize overall length.

Variations for PGM511

adjustable / with internal and external drain

Applications

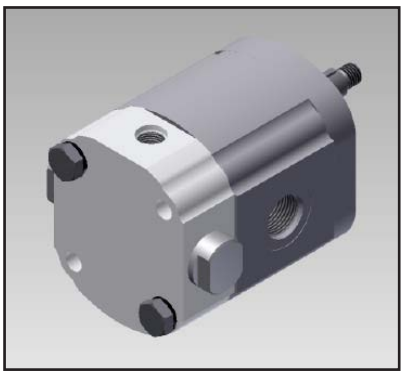
Fan Drives, Mower Reel Drives, and all low-medium power reversible drives

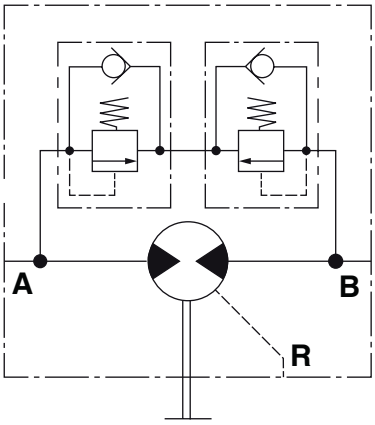
WARNING: This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer, birth defects, and other reproductive harm. www.p65warnings.ca.gov

Cross Port Pressure-Relief Valves with Anti-Cavitation

Motor Range PGM511	
Maximum Flow	100 lpm
Pressure Range	35-250 bar

Motor Range PGM511	
Code	**Pressure Bar**
RMCF	50
RMCP	90
RMCR	100
RMCV	120
RMDB	150
RMDD	160
RMDK	190
RMDP	210
RMDT	230





Comments:

Motors fitted this relief valve may be applied in series or in hydraulic transmission with relief valve providing a limit to the pressure differential, and hence, the output torque.

The check valves allow flow to return to the inlet of the motor to prevent cavitation.

Motor available with side ports, rear ports or combination of side and rear ports.

Variations for PGM511

non-adjustable / with internal or external drain

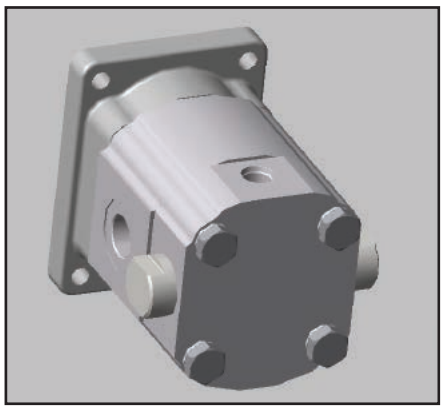
Applications

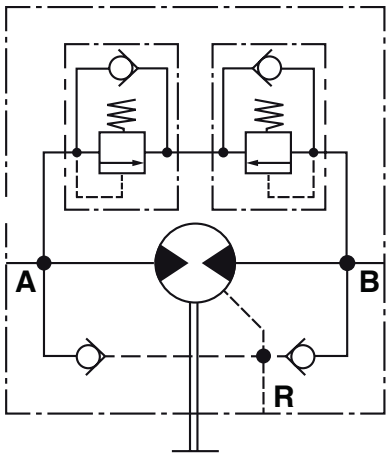
Fan Drives, Mower Blade Drives, Water Pump Drives and reversible hydrostatic transmissions

WARNING: This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer, birth defects, and other reproductive harm. www.p65warnings.ca.gov

Cross Port Pressure-Relief Valves with Anti-Cavitation + Check Valves

Motor Range PGM511	
Maximum Flow	100 lpm
Pressure Range	25-250 bar





Comments:

Motors with cross-port relief valve and anti-cavitation check valves in case drain passages are suitable for open-circuit applications with closed center valves and hydrostatic transmissions. The check valves allow flow to return to the inlet of the motor to prevent cavitation. For winches, make up flow at low pressure is introduced at the case drain port.

Variations for PGM511

non-adjustable / with reverse flow check with internal or external drain

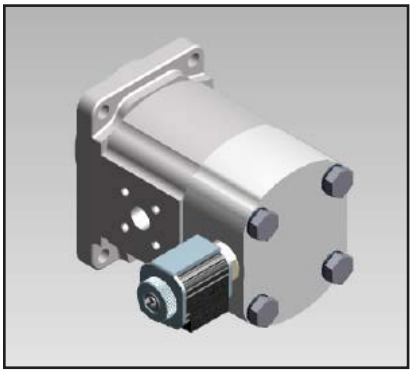
Applications

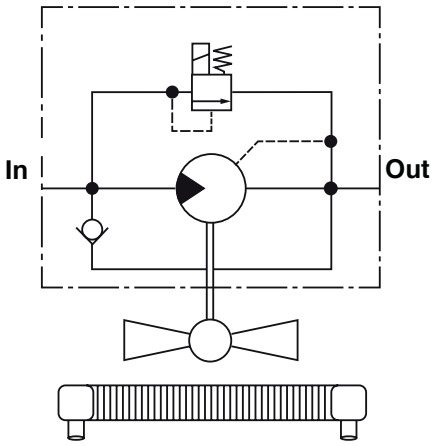
Fan Drives, Mower Blade Drives, Water Pump Drives and reversible hydrostatic transmissions, vibration drives on vibratory, rollers and winches

Solenoid Proportional Pressure-Relief Valve

Motor Range PGM511	
Maximum Flow	95 lpm

Pressure Range	
Pressure Range	standby pressure differential: 5 bar max.: equal to the max. pressure rating of the motor
Standard Pressure-Relief Settings	100 / 210 / 350 bar others on request
Termination	on request





Comments:

In a fan drive circuit fan speed is adjusted by providing a varying Pulse Width Modulated electrical current signal to the proportional relief valve which controls the flow to the fan motor. The proportional valve is typically a normal closed type to assure failsafe full fan speed in case of a lost signal.

The anti-cavitation check valve allows the motor to spin freely when the fan is powered down.

Variations for PGM511

normally open valves / increasing pressure with increasing current

normally closed valves / decreasing pressure with increasing current with internal or tank return

Applications

Fan Drives

WARNING: This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer, birth defects, and other reproductive harm. www.p65warnings.ca.gov

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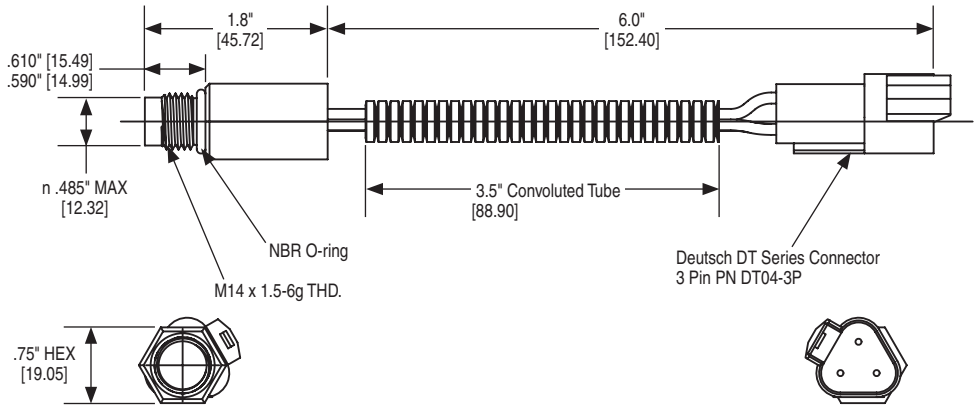
Kings Mountain, NC 28086

Speed Sensor

This rugged, weather resistant sensor uses proven reliable technology and was developed to meet the demanding needs of mobile applications.

- Tough stainless steel housing
- Sealed electrical connectors
- Easy installation
- Protected against shock, vibration and electromagnetic interference
- Excellent stability
- Wide range of operating conditions (IP67)



Speed Sensor Data	
Supply Voltage	5-30 VDC
Operational Voltage	5-27 VDC
Supply Current	13.5 mA MAX
Reverse Polarity Projection Switching Frequency	0 to 15 kHZ
Output	Open collector no internal pull-up resistor 470 OHM series output resistor
Sensor Output	15 pulses/rev

PIN CONNECTIONS		
A	Red	Supply
B	Black	Ground
C	White	Signal

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Notes

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Offer of Sale

1. Definitions. As used herein, the following terms have the meanings indicated.

Buyer: means any customer receiving a Quote for Products from Seller.

Goods: means any tangible part, system or component to be supplied by the Seller.

Products: means the Goods, Services and/or Software as described in a Quote provided by the Seller.

Quote: means the offer or proposal made by Seller to Buyer for the supply of Products.

Seller: means Parker Hannifin Corporation, including all divisions and businesses thereof.

Services: means any services to be supplied by the Seller.

Software: means any software related to the Products, whether embedded or separately downloaded.

Terms: means the terms and conditions of this Offer of Sale or any newer version of the same as published by Seller electronically at www.parker.com/saleterms.

2. Terms. All sales of Products by Seller are contingent upon, and will be governed by, these Terms and, these Terms are incorporated into any Quote provided by Seller to any Buyer. Buyer's order for any Products whether communicated to Seller verbally, in writing, by electronic date interface or other electronic commerce, shall constitute acceptance of these Terms. Seller objects to any contrary or additional terms or conditions of Buyer. Reference in Seller's order acknowledgement to Buyer's purchase order or purchase order number shall in no way constitute an acceptance of any of Buyer's terms of purchase. No modification to these Terms will be binding on Seller unless agreed to in writing and signed by an authorized representative of Seller.

3. Price; Payment. The Products set forth in Seller's Quote are offered for sale at the prices indicated in Seller's Quote. Unless otherwise specifically stated in Seller's Quote, prices are valid for thirty (30) days and do not include any sales, use,or other taxes or duties. Seller reserves the right to modify prices at any time to adjust for any raw material price fluctuations. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS2010). All sales are contingent upon credit approval and payment for all purchases is due thirty (30) days from the date of invoice (or such date as may be specified in the Quote). Unpaid invoices beyond the specified payment date incur interest at the rate of 1.5% per month or the maximum allowable rate under applicable law.

4. Shipment; Delivery; Title and Risk of Loss. All delivery dates are approximate. Seller is not responsible for damages resulting from any delay. Regardless of the manner of shipment, delivery occurs and title and risk of loss or damage pass to Buyer, upon placement of the Products with the shipment carrier at Seller's facility. Unless otherwise agreed, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective indicated shipping date will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.

5. Warranty. The warranty related to the Products is as follows: (i) Goods are warranted against defects in material or workmanship for a period of eighteen (18) months from the date of delivery or 2,000 hours of use, whichever occurs first; (ii) Services shall be performed in accordance with generally accepted practices and using the degree of care and skill that is ordinarily exercised and customary in the field to which the Services pertain and are warranted for a period of six (6) months from the completion of the Services by Seller; and (iii) Software is only warranted to perform in accordance with applicable specifications provided by Seller to Buyer for ninety (90) days from the date of delivery or, when downloaded by a Buyer or end user, from the date of the initial download. All prices are based upon the exclusive limited warranty stated above, and upon the following disclaimer: DISCLAIMER OF WARRANTY: **THIS WARRANTY IS THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING DESIGN, NON INFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE. SELLER DOES NOT WARRANT THAT THE SOFTWARE IS ERROR-FREE OR FAULT-TOLERANT, OR THAT BUYER'S USE THEREOF WILL BE SECURE OR UNINTERRUPTED. BUYER AGREES AND ACKNOWLEDGES THAT UNLESS OTHERWISE AUTHORIZED IN WRITING BY SELLER THE SOFTWARE SHALL NOT BE USED IN CONNECTION WITH HAZARDOUS OR HIGH RISK ACTIVITIES OR ENVIRONMENTS. EXCEPT AS EXPRESSLY STATED HEREIN, ALL PRODUCTS ARE PROVIDED "AS IS".**

6. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon receipt. No claims for shortages will be allowed unless reported to the Seller within ten (10) days of delivery. Buyer shall notify Seller of any alleged breach of warranty within thirty (30) days after the date the non-conformance is or should have been discovered by Buyer. Any claim or action against Seller based upon breach of contract or any other theory, including tort, negligence, or otherwise must be commenced within twelve (12) months from the date of the alleged breach or other alleged event, without regard to the date of discovery.

7. LIMITATION OF LIABILITY. IN THE EVENT OF A BREACH OF WARRANTY, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE THE NON-CONFORMING PRODUCT, RE-PERFORM THE SERVICES, OR REFUND THE PURCHASE PRICE PAID WITHIN A REASONABLE PERIOD OF TIME. IN NO EVENT IS SELLER LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, NON-COMPLETION OF SERVICES, USE, LOSS OF USE OF, OR INABILITY TO USE THE PRODUCTS OR ANY PART THERE OF, LOSS OF DATA, IDENTITY, PRIVACY, OR CONFIDENTIALITY, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, WHETHER BASED IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE PAID FOR THE PRODUCTS.

8. Loss to Buyer's Property. Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which are or become Buyer's property, will be considered obsolete and maybe destroyed by Seller after two (2) consecutive years have elapsed without Buyer ordering the Products 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. Special Tooling. Special Tooling includes but is not limited to tooling, jigs, fixtures and associated manufacturing equipment acquired or necessary to manufacture Products. A tooling charge may be imposed for any Special Tooling. Such Special Tooling shall be and remain Seller's property not withstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in Special Tooling belonging to Seller that is utilized in the manufacture of the Products, even if such Special Tooling has been specially converted or adapted for such manufacture and not withstanding any charges paid by Buyer. Unless otherwise agreed, Seller has the right to alter, discard or otherwise dispose of any Special Tooling or other property in its sole discretion at any time.

10. Security Interest. To secure payment of all sums due, Seller retains a security interest in all Products delivered to Buyer and, Buyer's acceptance of these Terms is deemed to be 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.

11. User Responsibility. The Buyer through its own analysis and testing, is solely responsible for making the final selection of the Products and assuring that all performance, endurance, maintenance, safety and warning requirements of the application of the Products are met. The Buyer must analyze all aspects of the application and follow applicable industry standards, specifications, and other technical information provided with the Product. If Seller provides Product options based upon data or specifications provided by the Buyer, the Buyer is responsible for determining that such data

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and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products. In the event the Buyer is not the end-user, Buyer will ensure such end-user complies with this paragraph.

12. Use of Products, Indemnity by Buyer. Buyer shall comply with all instructions, guides and specifications provided by Seller with the Products. Unauthorized Uses. If Buyer uses or resells the Products for any uses prohibited in Seller's instructions, guides or specifications, or Buyer otherwise fails to comply with Seller's instructions, guides and specifications, Buyer acknowledges that any such use, resale, or non-compliance is at Buyer's sole risk. Buyer shall indemnify, defend, and hold Seller harmless from any losses, claims, liabilities,damages,lawsuits,judgments and costs (including attorney fees and defense costs), whether for personal injury, property damage, intellectual property infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, application, design, specification or other misuse of Products provided by Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, tooling, equipment, plans, drawings, designs or specifications or other information or things furnished by Buyer; (d) damage to the Products from an external cause, repair or attempted repair by anyone other than Seller, failure to follow instructions, guides and specifications provided by Seller, use with goods not provided by Seller, or opening, modifying, deconstructing or tampering with the Products for any reason; or (e) Buyer's failure to comply with these Terms. Seller shall not indemnify Buyer under any circumstance except as otherwise provided in these Terms.

13. Cancellations and Changes. Buyer may not cancel or modify any order 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, at any time, may change Product features, specifications, designs and availability.

14. Limitation on Assignment. Buyer may not assign its rights or obligations without the prior written consent of Seller.

15. Force Majeure. Seller does not assume the risk and is not liable for delay or failure to perform any of Seller's obligations by reason of events or circumstances beyond its reasonable control ("Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents,strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.

16. Waiver and Severability. Failure to enforce any provision of these Terms will not invalidate that provision; nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of these Terms by legislation or other rule of law shall not invalidate any other provision herein and, the remaining provisions will remain in full force and effect.

17. Termination. Seller may terminate any agreement governed by or arising from these Terms for any reason and at anytime by giving Buyer thirty (30) days prior written notice. Seller may immediately terminate, in writing, if Buyer: (a) breaches any provision of these Terms (b) appoints a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or one if filed by a third party(d) makes an assignment for the benefit of creditors; or (e) dissolves its business or liquidates all or a majority of its assets.

18. Ownership of Software. Seller retains ownership of all Software supplied to Buyer hereunder. In no event shall Buyer obtain any greater right in and to the Software than a right in the nature of a license limited to the use thereof and subject to compliance with any other terms provided with the Software.

19. Indemnity for Infringement of Intellectual Property Rights. Seller is not liable for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights ("Intellectual Property Rights") except as provided in this Section. 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 a third party claim that one or more of the Products sold hereunder infringes the Intellectual Property Rights of a third party in the country of delivery of the Products by the Seller to the Buyer. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of any such claim, and Seller having sole control over the defense of the claim including all negotiations for settlement or compromise. If one or more Products sold hereunder is subject to "such a claim, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Products, replace or modify the Products so as to render them non-infringing, or offer to accept return of the Products and refund the purchase price less a reasonable allowance for depreciation. Seller has no obligation or liability for any claim of infringement: (i) a rising from information provided by Buyer; or (ii) directed to any Products provided hereunder for which the designs are specified in whole or part by Buyer; or (iii) resulting from the modification, combination or use in a system of any Products provided hereunder. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for such claims of infringement of Intellectual Property Rights.

20. Governing Law. These Terms and the sale and delivery of all Products are 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 the sale and delivery of the Products.

21. Entire Agreement. These Terms, along with the terms set forth in the main body of any Quote, forms the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. In the event of a conflict between any term set forth in the main body of a Quote and these Terms, the terms set forth in the main body of the Quote shall prevail. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter shall have no effect. These Terms may not be modified unless in writing and signed by an authorized representative of Seller.

22. Compliance with Laws. Buyer agrees to comply with all applicable laws, regulations,and industry and professional standards, including those of the United States of America, and the country or countries in which Buyer may operate,including without limitation the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act"), U.S. and E.U. export control and sanctions laws ("Export Laws"), the U.S. Food Drug and Cosmetic Act ("FDCA"), and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), each as currently amended. Buyer agrees to indemnify, defend, and hold harmless Seller from the consequences of any violation of such laws, regulations and standards by Buyer, its employees or agents. Buyer acknowledges that it is familiar with all applicable provisions of the FCPA, the Anti-Kickback Act, Export Laws, the FDCA and the FDA and certifies that Buyer will adhere to the requirements thereof and not take any action that would make Seller violate such requirements. Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly, to any governmental official, foreign political party or official thereof, candidate for foreign political office, or commercial entity or person, for any improper purpose, including the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller. Buyer further represents and agrees that it will not receive, use, service, transfer or ship any Product from Seller in a manner or for a purpose that violates Export Laws or would cause Seller to be in violation of Export Laws."

05/17

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Parker Hannifin Corporation
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HY13-PMD500/US June 2020

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