



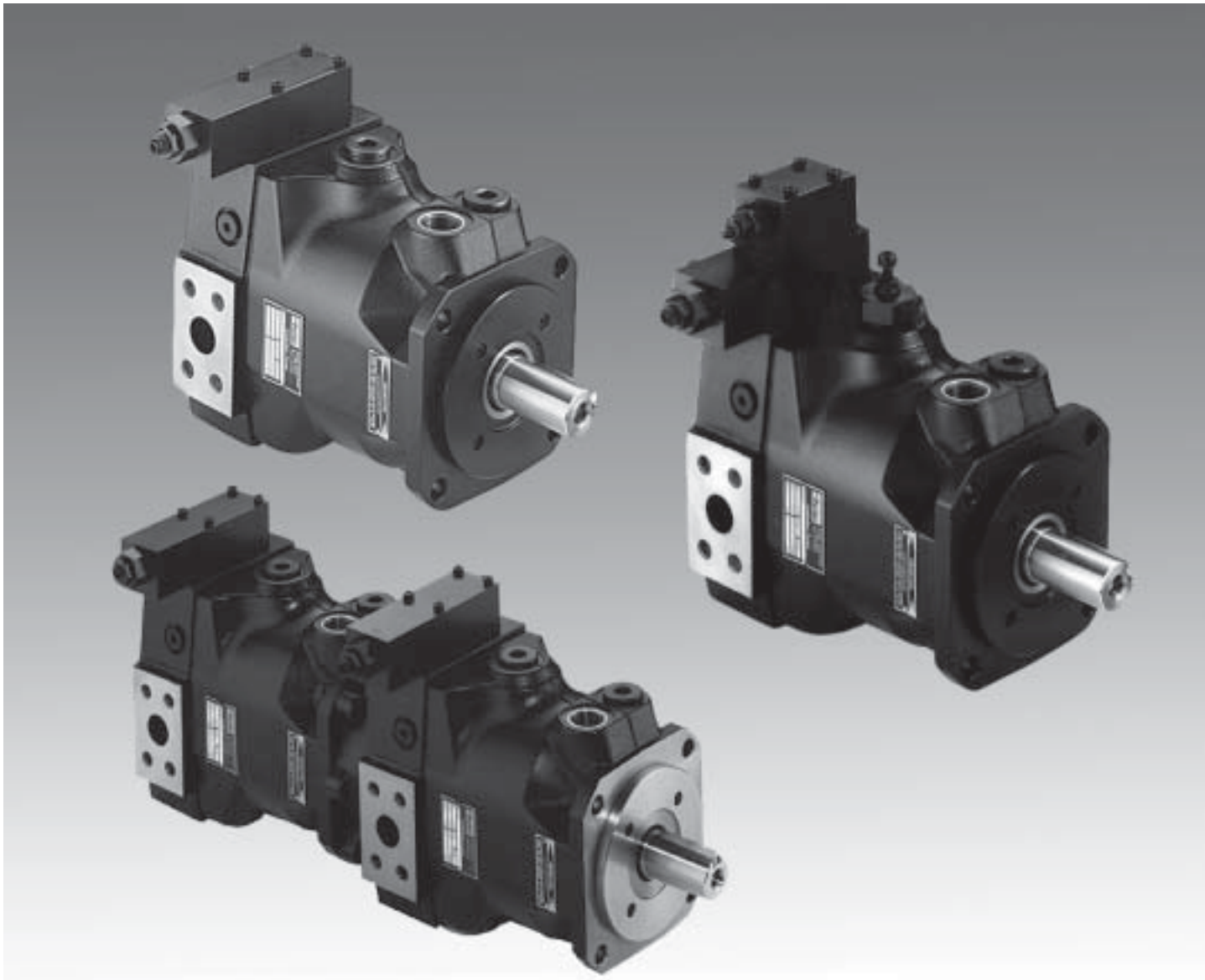
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# Series PV Variable Volume Piston Pumps

A



Catalog HY13-2600-600-3/US





**Quick Reference Data Chart**

Pump Model	Displacement cc/rev (In <sup>3</sup> /rev)	Pump Delivery @ (7 bar) 100 PSI in LPM (GPM)		*Approx. Noise Levels dB(A) @ Full Flow and 1500 RPM			Power at 1800 RPM, Max. Displacement & 345 bar (5000 PSI)	Max. Operating Speed (RPM)
		1200 RPM	1800 RPM	70 bar	207 bar	343 bar		
				(1000 PSI)	(3000 PSI)	(5000 PSI)		
PV016	16 (.98)	19.2 (5.1)	28.8 (7.6)	56	60	68	18.5 kw (24.8 hp)	2750
PV020	20 (1.2)	24.0 (6.3)	36.0 (9.5)	56	60	68	23.4 kw (31.4 hp)	2750
PV023	23 (1.4)	27.6 (7.3)	41.4 (10.9)	56	60	68	25.1 kw (33.6 hp)	2750
PV032	32 (1.9)	38.4 (10.1)	57.6 (15.2)	59	62	69	35.1 kw (47.0 hp)	2400
PV040	40 (2.4)	48.0 (12.7)	72.0 (19.0)	59	62	69	46.5 kw (62.4 hp)	2400
PV046	46 (2.8)	55.2 (14.6)	82.8 (21.9)	59	62	69	50.2 kw (67.3 hp)	2400
PV063	63 (3.8)	75.6 (20.0)	113.4 (30.0)	66	70	74	70.1 kw (94.0 hp)	2400
PV080	80 (4.8)	96.0 (25.4)	144.0 (38.0)	66	70	74	89.2 kw (119.6 hp)	2300
PV092	92 (5.6)	110.4 (29.2)	165.6 (43.8)	66	70	74	136.8 kw (183.5 hp)	2200
PV140	140 (8.5)	168.0 (44.4)	252.1 (66.6)	70	74	76	149.4 kw (200.4 hp)	2400
PV180	180 (10.9)	216.0 (57.1)	324.0 (85.6)	71	75	77	210.0 kw (282.0 hp)	2200
PV270	270 (16.5)	324.0 (85.6)	486.0 (128.4)	77	79	81	298.0 kw (400.0 hp)	1800

\* The noise level values are based on anechoic room measurements at a distance of 1 meter in accordance with DIN 45645.

### General Description

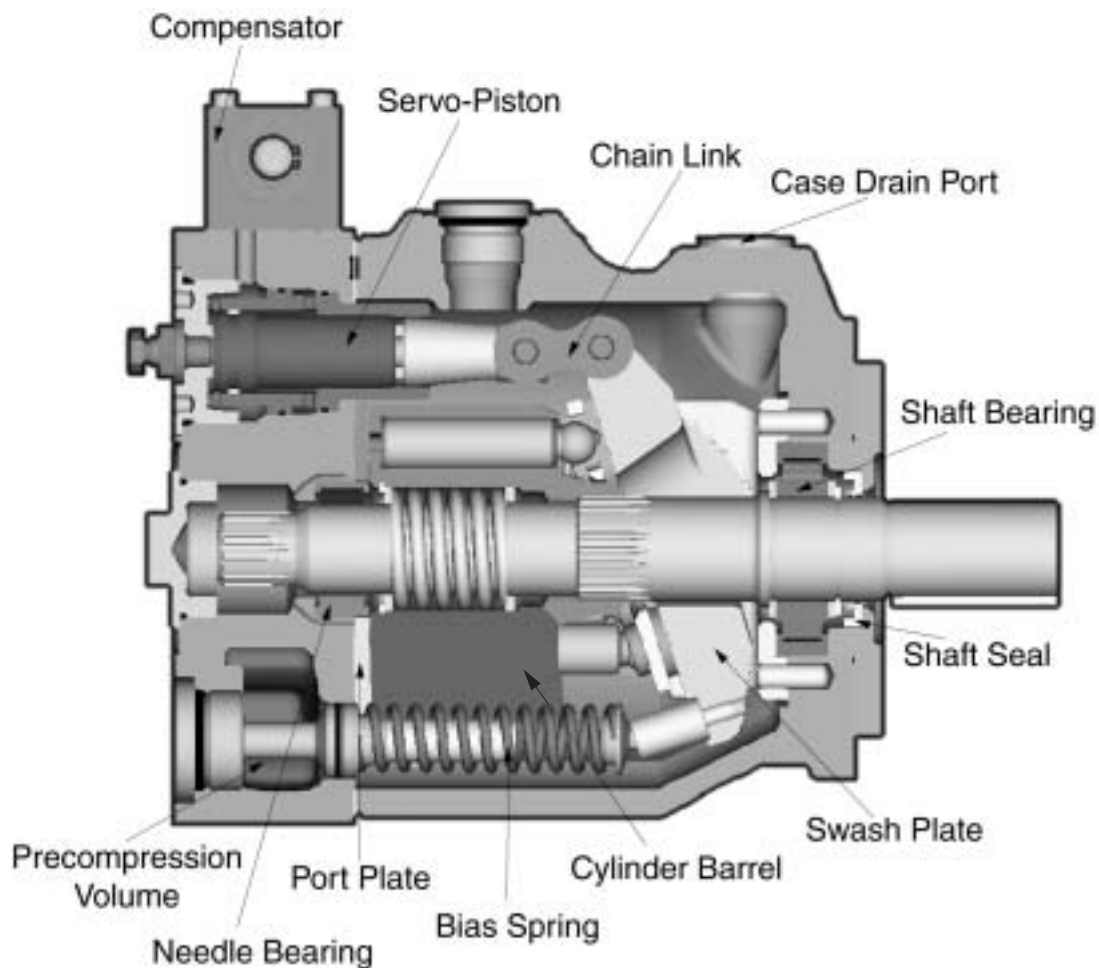
All control of the pump outlet flow is achieved by the proper positioning of the swash plate. Control is accomplished when the bore area forces of the servo piston acting on one end of the swash plate working against the combined effects of the bias spring, and the rod area forces of the servo piston acting on the other end.

As the shaft in the figure below is rotated by a prime mover, it in turn rotates the cylinder barrel. As the cylinder barrel rotates, it drives the pumping pistons in a circular path with the piston slippers supported hydrostatically against the angled swash plate. In one-half of the revolution, the pumping pistons are forced

away from the port plate drawing in fluid, and in the other half of the revolution, the pumping pistons are forced toward the port plate driving out fluid.

The volume of fluid the pump will displace in one revolution of the shaft is dependent upon the area of the pumping piston, the number of pumping pistons and the angle of the swash plate. The swash plate is shown at maximum angle and will produce maximum displacement. As the swash plate is moved toward a vertical position (perpendicular to shaft centerline), the displacement will decrease until it reaches the vertical position and displacement is zero.

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**Performance Information**

Series PV, Pressure Compensated, Variable Volume, Piston Pumps

**Features**

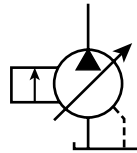
- High Strength Cast-Iron Housing for high reliability and quiet operation
- Modular Controls for field convertability
- Large Control Piston for fast response
- Thru-Shaft Option with 100% thru torque capability
- Multiple Pressure Control with valves mounted directly on pump
- Pre-Compression chamber built in to minimize over-all system noise

**Controls**

- Pressure Compensation
- Remote Pressure Compensation
- Load Sensing
- Adjustable Maximum Volume Stop
- Electrohydraulic Pressure
- Dual and Tri-Pressure Control
- Low Pressure Standby
- Horsepower Limiting

**Schematic Symbol**

(Basic Pump)



**Installation Data**

See Installation Information on page A156 of this catalog for specific recommendations pertaining to a system cleanliness, fluids, start-up, inlet conditions, shaft alignment, drain line restrictions and other important factors relative to the proper installation and use of these products.



**Specifications**

Pressure Ratings: 5000 PSI (350 bar) Continuous  
 6000 PSI (420 bar) Peak

Speed Ratings: 600 to 2400 RPM

Inlet Condition: 230 PSI (16 bar)  
 Maximum Inlet Charge  
 5 In. Hg. Max. Vacuum at  
 1800 RPM

Case Drain Conditions: 7 PSI (0.5 bar) Maximum

Operating Temp. Range: -40°F to 160°F  
 (-40°C to 70°C)

Housing Material: Cast Iron

Filtration: Maintain SAE Class 4 (ISO 16/13)

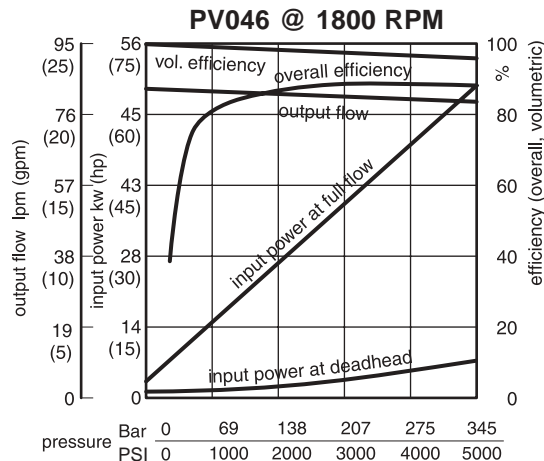
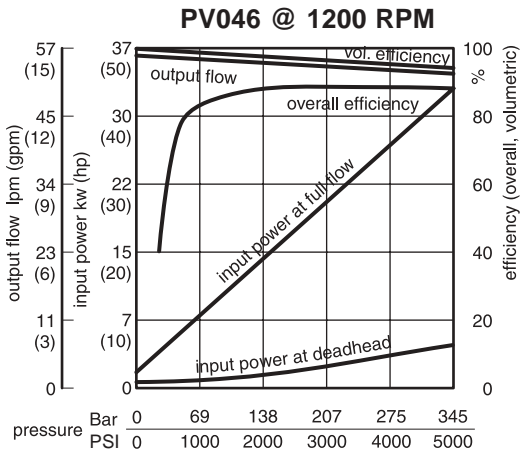
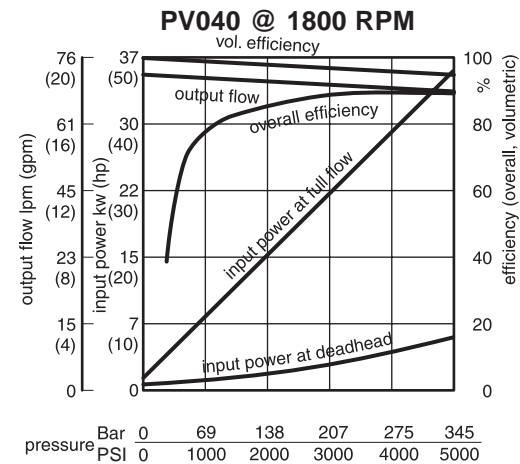
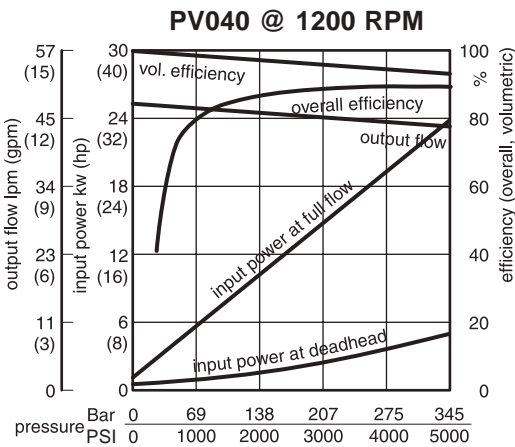
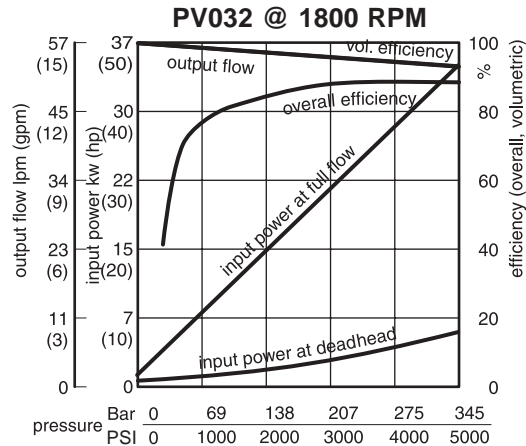
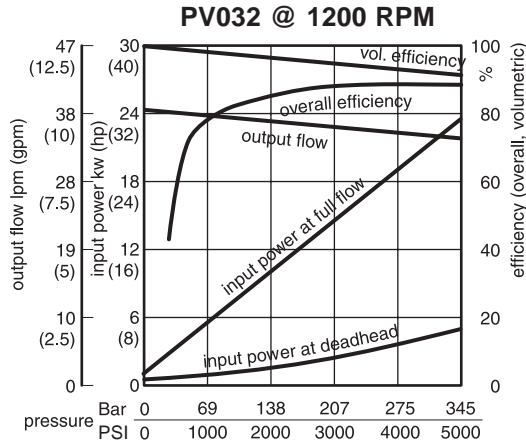
Mounting: SAE "C" 4-Bolt Flange

**Quick Reference Data Chart**

Pump Model	Displacement cc/rev (in <sup>3</sup> /rev)	Pump Delivery @ 7 bar (100 PSI) in LPM (GPM)		*Approx. Noise Levels dB(A) @ Full Flow and 1500 RPM			Input Power At 1800 RPM, Max. Displacement & 343 bar (5000 PSI)	Max. Operating Speed (RPM)
		1200 RPM	1800 RPM	70 bar (1000 PSI)	207 bar (3000 PSI)	343 bar (5000 PSI)		
PV032	32 (1.9)	38.4 (10.1)	57.6 (15.2)	59	62	69	35.1 kw (47.0 hp)	2400
PV040	40 (2.4)	48.0 (12.7)	72.0 (19.0)	59	62	69	46.5 kw (62.4 hp)	2400
PV046	46 (2.8)	55.2 (14.6)	82.8 (21.9)	59	62	69	50.2 kw (67.3 hp)	2400

\* The noise level values are based on anechoic room measurements at a distance of 1 meter in accordance with DIN 45645.

**Performance Curves Fluid: Standard Hydraulic Oil 100 SSU @ 120°F (49°C)**



NOTE: The efficiencies and data in the graphs are good only for pumps running at speeds shown and stroked to maximum. To calculate approximate horsepower for the other conditions, use the following formula:

$$HP = \left[ \frac{Q \times (PSI)}{1714} \right] + (CHp)$$

maximum volume setting. Flow loss, however, is a function of pressure only.

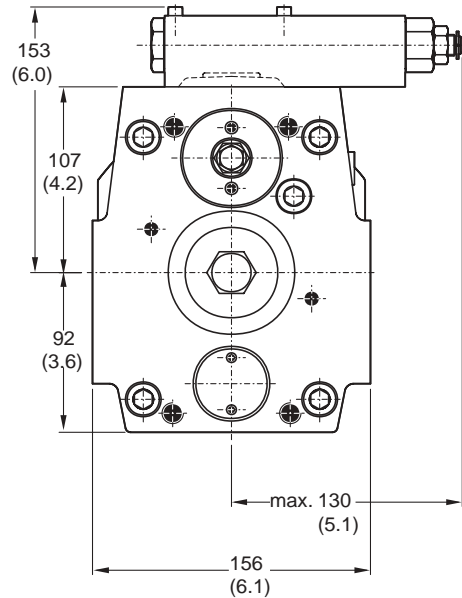
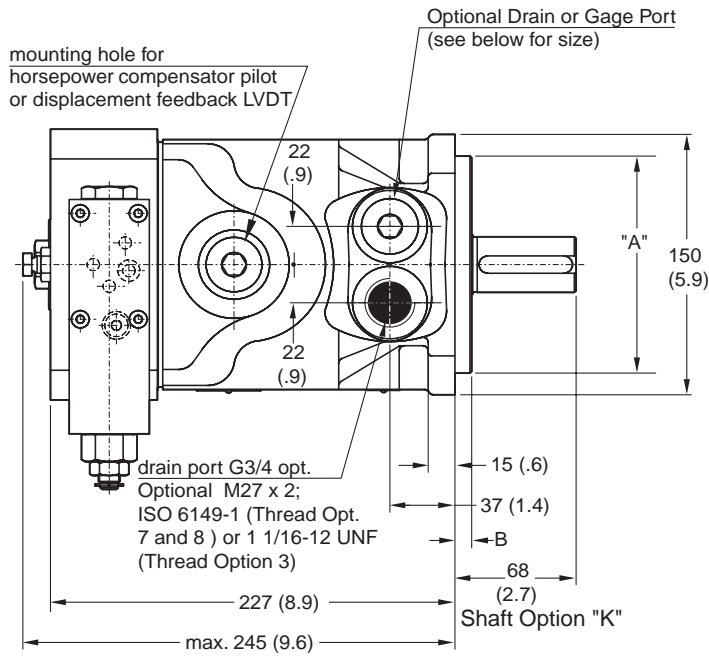
WHERE:

Q = Actual Output Flow in GPM

PSI = Pressure At Pump Outlet

CHp = Input Horsepower @ Full compensation @ 1800 RPM (from graph read at operating pressure)

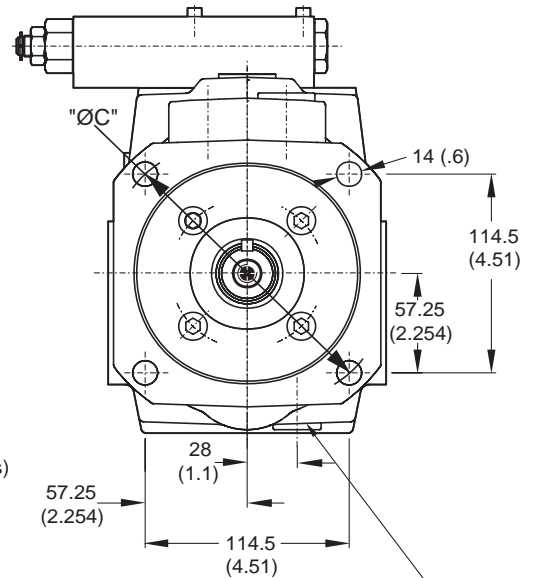
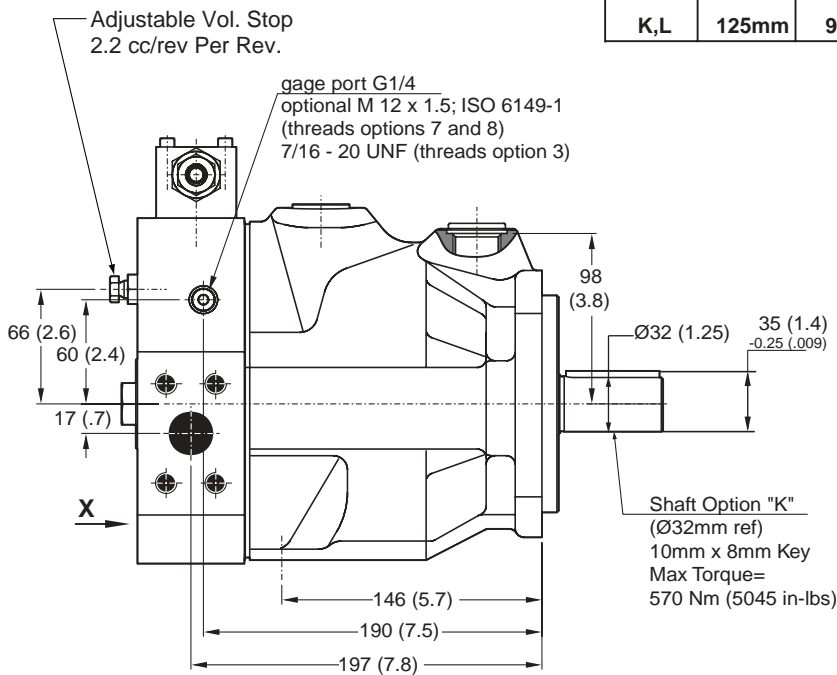
Actual GPM is directly proportional to drive speed and



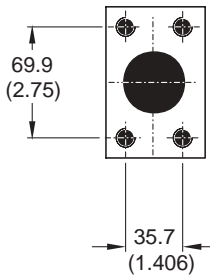
**View X**

Shown with standard pressure compensator

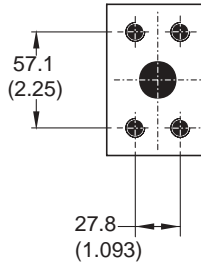
Code	A	B	ØC
D,E	5.0"	.50"	6.37"
K,L	125mm	9mm	160mm



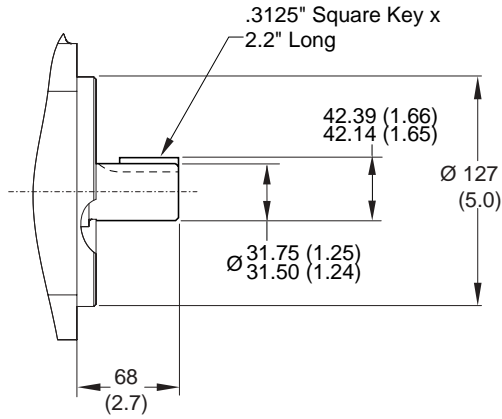
flushing port G1/2  
optional M 22 x 1.5; ISO 6149-1 (threads options 7 and 8)  
or 7/8 - 14 UNF (threads option 3)



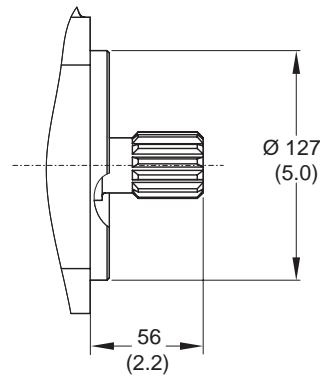
**Inlet:**  
**Option 3 & 7**  
 1-1/2" 4 Bolt Flange  
 1/2-13 UNC-2B Threads  
**Option 1 & 8**  
 35mm 4 Bolt Flange  
 M12 Threads  
 Standard Pressure Series  
 (Code 61)



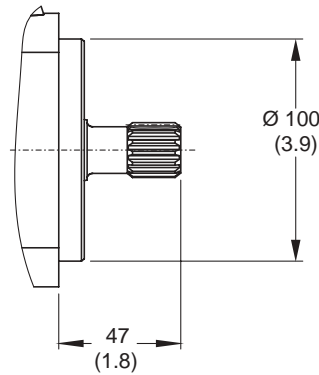
**Outlet:**  
**Option 3 & 7**  
 1" 4 Bolt Flange  
 7/16-14 UNC-2B Threads  
**Option 1 & 8**  
 25mm 4 Bolt Flange  
 M12 Threads  
 High Pressure Series (Code 62)



**Shaft Option "D"**  
 (SAE "C")  
 Max Torque= 550 Nm (4868 In-Lbs)



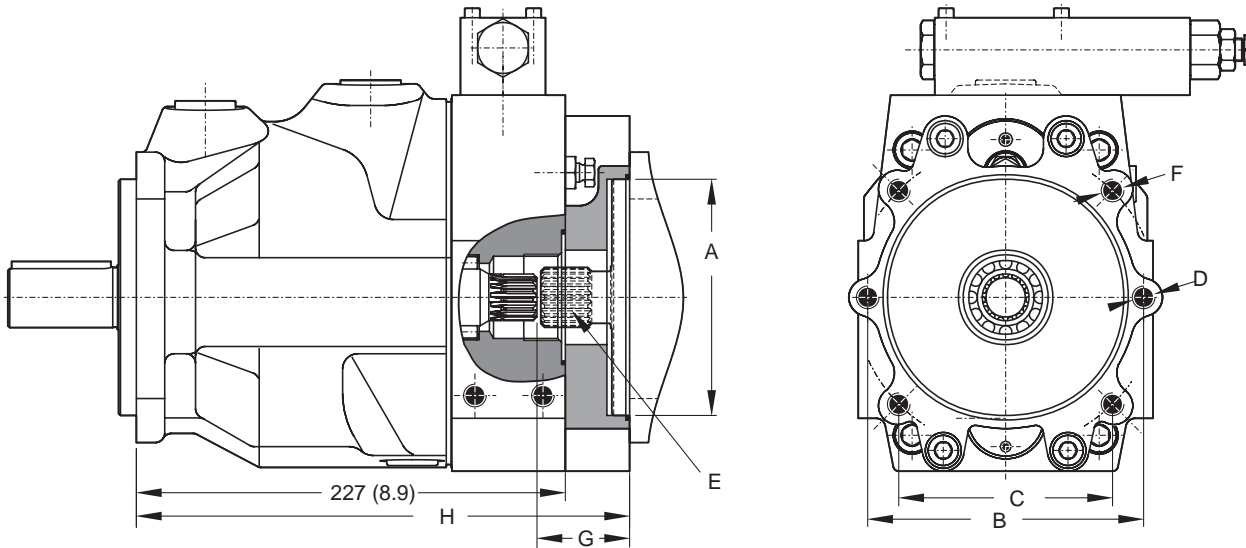
**Shaft Option "E"**  
 (SAE "C")  
 14 Teeth 12/24 Pitch  
 30° Involute Spline  
 Max Torque= 610 Nm (5399 In-Lbs)



**Shaft Option "L"**  
 W32mm x 1.5mm x 20mm x 8f  
 DIN 5480  
 Max Torque = 675 Nm (5974 In-Lbs)

**Thru-Shaft Options**

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**Thru-Shaft Load Limitations**

The maximum allowable torque of the individual shaft must not be exceeded. For 2-pump combinations there is no problem because the PV series offers 100% thru torque capabilities. For 3-pump combinations or more the limit torque could be reached or exceeded. Therefore it is necessary to calculate the torque factor and compare the sum of each pumps torque factor to the table to make sure it does not exceed the torque limit factor.

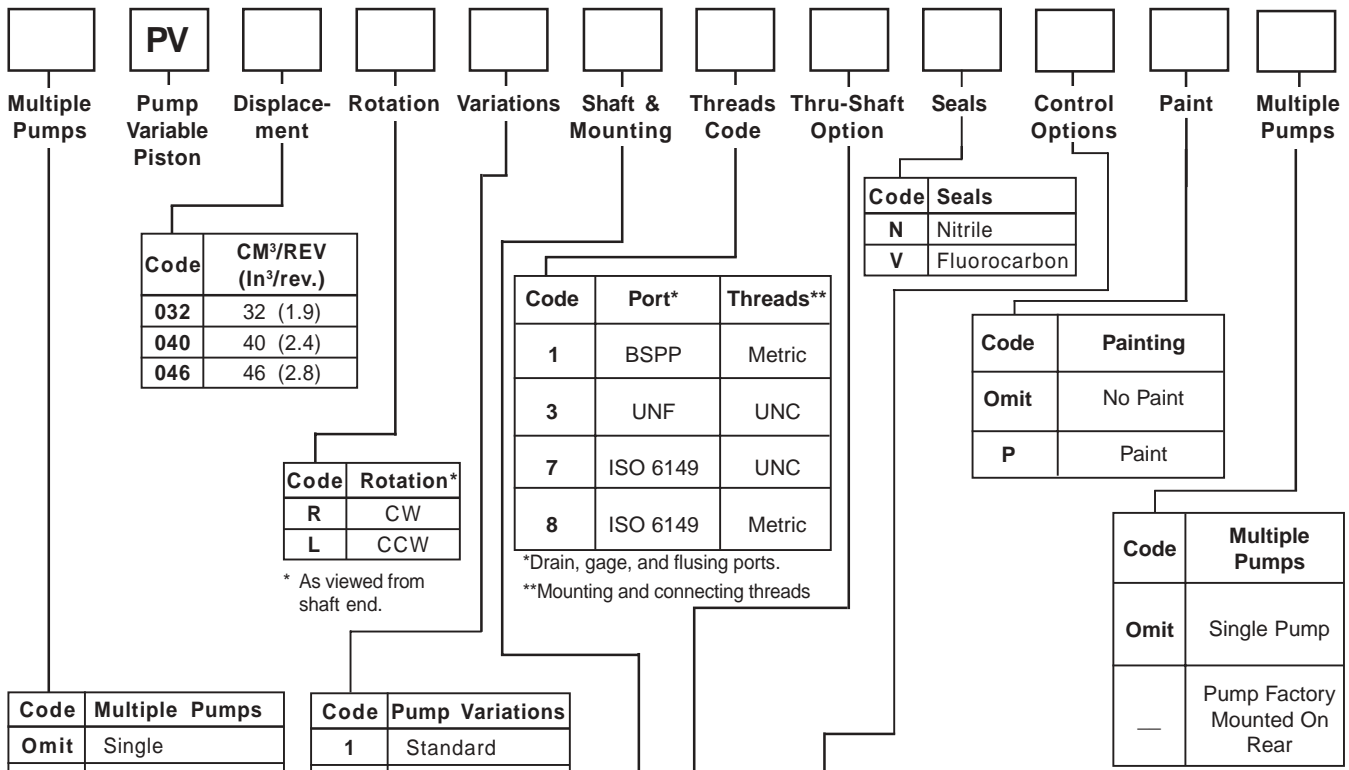
Pump	Shaft	Torque Limit Factor
PV032-046	D	32680
	E	36380
	K	33810
	L	40250

Required: Sum of all calculated torque factors must be <torque limit factor.

Torque factor of any pump =  
 Pressure (bar) x Displacement (cc/rev)

Code	A	B	C	D	E*	F	G	H
A7	Ø3.25"	4.188"	-	3/8"-16	SAE "A" 9T 16/32 DP SPLINE	-	1.93"	10.27"
B3	Ø4.00"	-	3.536"	-	SAE "B" 13T 16/32 DP SPLINE	1/2"-13	1.93"	10.27"
B7	Ø4.00"	5.750"	-	1/2"-13	SAE "B" 13T 16/32 DP SPLINE	-	1.93"	10.27"
W3	Ø4.00"	-	3.530"	-	SAE "BB" 15T 16/32 DP SPLINE	1/2"-13	1.93"	10.27"
W7	Ø4.00"	5.750"	-	1/2"-13	SAE "BB" 15T 16/32 DP SPLINE	-	1.93"	10.27"
C3	Ø5.00"	-	4.508"	-	SAE "C" 14T 12/24 DP SPLINE	1/2"-13	2.52"	10.87"
J3	Ø100mm	-	44mm	-	W25 x 1.5 x 15 x 8f SPLINE	M10	1.93"	10.27"
K3	Ø125mm	-	57mm	-	W32 x 1.5 x 20 x 8f SPLINE	M12	1.93"	10.27"

\*Coupling included with pump if ordered from Greenville, TN



Code	CM <sup>3</sup> /REV (In <sup>3</sup> /rev.)
032	32 (1.9)
040	40 (2.4)
046	46 (2.8)

Code	Rotation*
R	CW
L	CCW

\* As viewed from shaft end.

Code	Port*	Threads**
1	BSPP	Metric
3	UNF	UNC
7	ISO 6149	UNC
8	ISO 6149	Metric

\*Drain, gage, and flusing ports.  
 \*\*Mounting and connecting threads

Code	Seals
N	Nitrile
V	Fluorocarbon

Code	Painting
Omit	No Paint
P	Paint

Code	Multiple Pumps
Omit	Single Pump
—	Pump Factory Mounted On Rear

Code	Multiple Pumps
Omit	Single
—	Factory mounted to rear of another pump

Code	Pump Variations
1	Standard
9*	Reduced Stroke

\* Specify in cc/rev.

Code	Shaft	Pilot
D	1-1/4" Keyed (SAE C)	4 Bolt SAE "C"
E	14T Spline (SAE C)	4 Bolt SAE "C"
K	32mm Keyed	4 Bolt 125mm
L	W32 x 1.5 x 20 x 8f Spline DIN 5480	4 Bolt 125mm

Code	Thru-Shaft Option
T1	Thru-Shaft Capable, Single Pump w/Cover
A7	2 Bolt SAE "A" Pilot Ø3.250/SAE "A" 9T 16/32 DP Spline
B3	4 Bolt SAE "B" Pilot Ø4.00/SAE "B" 13T 16/32 DP Spline
B7	2 Bolt SAE "B" Pilot Ø4.00/SAE "B" 13T 16/32 DP Spline
W3	4 Bolt SAE "B" Pilot Ø4.00/SAE "BB" 15T 16/32 DP Spline
W7	2 Bolt SAE "B" Pilot Ø4.00/SAE "BB" 15T 16/32 DP Spline
C3	4 Bolt SAE "C" Pilot Ø5.00/SAE "C" 14T 12/24 DP Spline
J3*	4 Bolt 100mm Pilot /W25x1.5x15x8f Spline DIN 5480
K3*	4 Bolt 125mm Pilot /W32x1.5x20x8f Spline DIN 5480

\*Must be used with port/thread option 1

Code	Control Options
<b>F</b>	<b>Standard Pressure Compensator</b>
•	<b>Adjustment Type</b>
S	Screw With Nut
•	<b>Pressure Range</b>
W	70-350 bar (1015-5075 PSI)
H	40-210 bar (580-3050 PSI)
D	10-140 bar (150-2050 PSI)
<b>F</b>	<b>Remote/Load Sense Compensator</b>
•	<b>Control Port</b>
1	NG6/D03 Pattern Only*
Z	NG6/D03 with Pressure Valve Mounted**
•	<b>Control Type</b>
R	Remote Compensator
F	Load Sensing Compensator
<b>L</b>	<b>Horsepower Compensator</b>
•	<b>Control Port</b>
A	NG6/Cetop3 (DIVW) Pattern*
C	NG6/D03 with PVAC1PCS*S**ValveMounted
Z	NG6/D03 with Pressure Valve Mounted**
•	<b>Horsepower at 1800 RPM</b>
D	10.0 (350 in-lb)
E	15.0 (525 in-lb)
G	20.0 (700 in-lb)
H	25.0 (875 in-lb)
K	30.0 (1050 in-lb)
M	35.0 (1225 in-lb)

\* Maximum pressure adjustment for pump not included, but necessary. See PVAC section for pressure valve options.

\*\* Valve to be mounted at factory must be ordered as a separate line item. Consult factory. See PVAC section for pressure valve options.



Ordering Examples

1. PV pump with remote pressure control, relief valve with 2 pressure stages, electrical pressure selection, nitrile seals, 24 VDC solenoid, plug to DIN 46350 accessories **fitted**:

PV\*\*\*\*\*FRZ

PVAC2PCMNSJP

2. Same pump accessories **not fitted**:

PV\*\*\*\*\*FR1

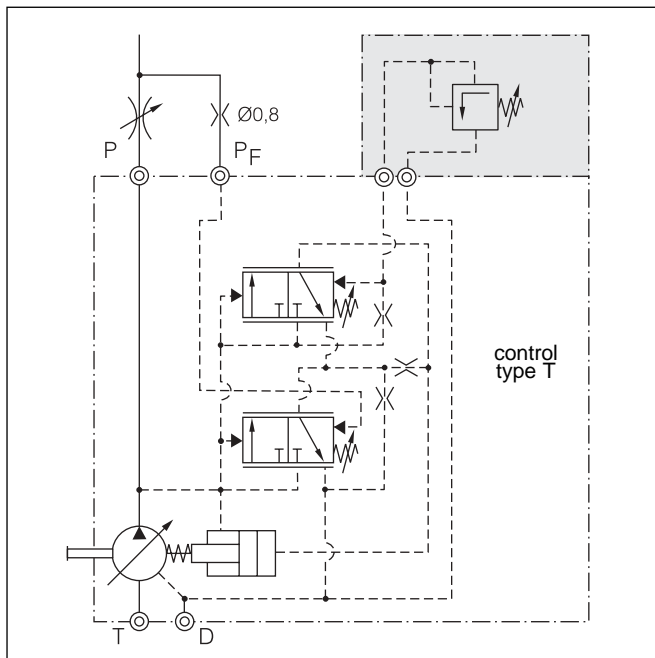
PVAC2PCMNSJP

3. Usable for horsepower control.

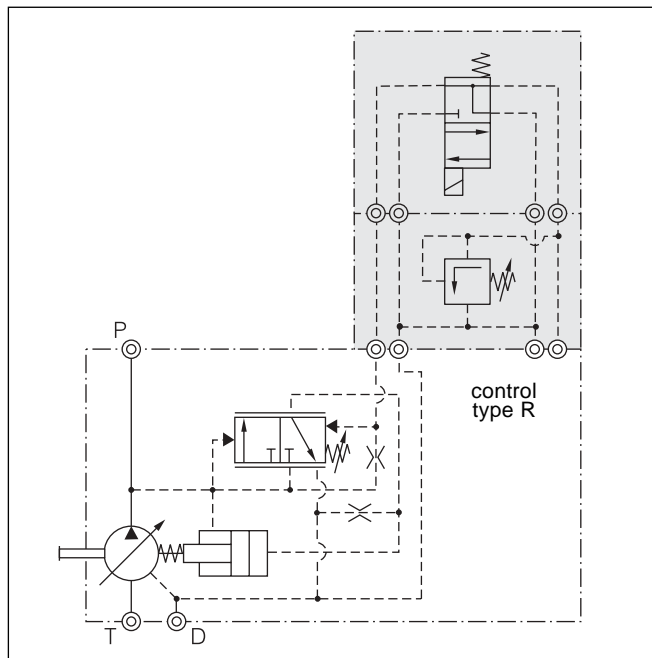
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Symbols

PVAC1P\*

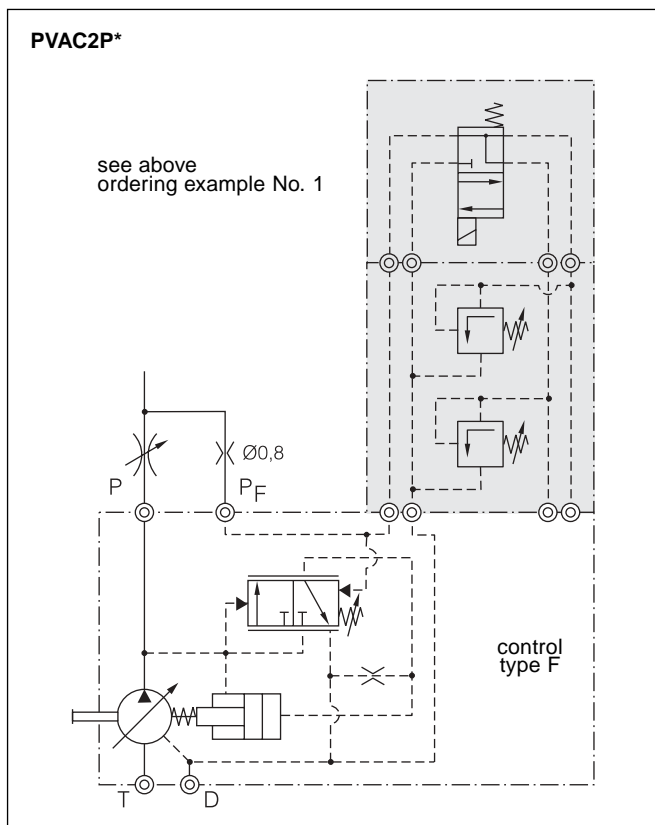


PVAC1E\*

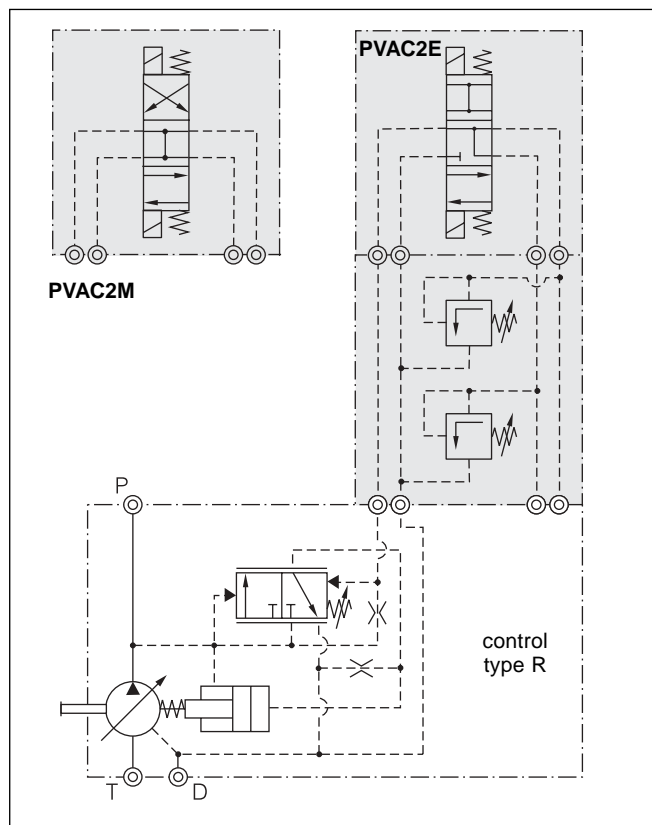


PVAC2P\*

see above  
ordering example No. 1



PVAC2M



**Cross reference ordering codes Parker series PV and Parker series PV plus**

Code example PV:

code field no.:

<b>PV</b>	<b>046</b>	<b>R</b>	<b>1</b>	<b>A</b>	<b>1</b>	<b>T</b>	<b>1</b>	<b>N</b>	<b>PWS</b>	<b>XX</b>	<b>YY</b>
1	2	3	4	5	6	7	8	9	10	11	12



<b>PV</b>	<b>Description</b>	<b>Remark</b>	<b>PVplus</b>
Field 1	<b>Pump type</b>		Field 1
<b>PV</b>	Axial piston pump, open circuit, swashplate type, variable displacement		<b>PV</b>

<b>PV</b>	<b>Description</b>	<b>Remark</b>	<b>PVplus</b>
Field 2	<b>Nominal size, displacement</b>		Field 2
<b>016</b>	16 cm³/rev displacement		<b>016</b>
<b>020</b>	20 cm³/rev displacement		<b>020</b>
<b>023</b>	23 cm³/rev displacement		<b>023</b>
<b>028</b>	28 cm³/rev displacement	no longer available, in future series PVM up to 250 bar	
<b>032</b>	32 cm³/rev displacement		<b>032</b>
<b>040</b>	40 cm³/rev displacement		<b>040</b>
<b>046</b>	46 cm³/rev displacement		<b>046</b>
<b>063</b>	63 cm³/rev displacement		<b>063</b>
<b>080</b>	80 cm³/rev displacement		<b>080</b>
<b>092</b>	92 cm³/rev displacement		<b>092</b>
<b>130</b>	130 cm³/rev displacement	140 cm³/rev displacement	<b>140</b>
<b>180</b>	180 cm³/rev displacement		<b>180</b>
<b>250</b>	250 cm³/rev displacement	270 cm³/rev displacement	<b>270</b>

<b>PV</b>	<b>Description</b>	<b>Remark</b>	<b>PVplus</b>
Field 3	<b>Rotation</b>		Field 3
<b>R</b>	clockwise (looking on shaft)		<b>R</b>
<b>L</b>	counter-clockwise (looking on shaft)		<b>L</b>

<b>PV</b>	<b>Description</b>	<b>Remark</b>	<b>PVplus</b>
Field 4	<b>Variation</b>		Field 4
<b>1</b>	standard		<b>1</b>
<b>9</b>	displacement adjusted		<b>9</b>

<b>PV</b>	<b>Description</b>	<b>Remark</b>	<b>PVplus</b>
Field 5	<b>Mounting interface, shaft</b>		Field 5
<b>A</b>	SAE, 2/4-hole, keyed shaft	4 Bolt SAE Pilot, SAE Keyed Shaft	<b>D</b>
<b>B</b>	SAE, 2/4-hole, splined shaft	4 Bolt SAE Pilot, SAE Spline Shaft	<b>E</b>
<b>C</b>	SAE, 4-hole, splined shaft, second pump	no longer available	
<b>D</b>	SAE, 4-hole, keyed shaft		<b>D</b>
<b>E</b>	SAE, 4-hole, splined shaft		<b>E</b>
<b>J</b>	metric, splined shaft, second pump	no longer available	
<b>K</b>	metric, keyed shaft		<b>K</b>
<b>L</b>	metric, splined shaft		<b>L</b>

<b>PV</b>	<b>Description</b>	<b>Remark</b>	<b>PVplus</b>
Field 6	<b>Was: displacement adjustment</b>	<b>Now: ports, threads</b>	Field 6
<b>1</b>	with displacement adjustment	metric, BSPP	<b>1</b>
		SAE, UNF	<b>3</b>
		SAE, ISO 6149	<b>7</b>
		metric, ISO 6149	<b>8</b>

Code example PV:

code field no.:

<b>PV</b>	<b>046</b>	<b>R</b>	<b>1</b>	<b>D</b>	<b>3</b>	<b>T</b>	<b>1</b>	<b>N</b>	<b>FWS</b>	<b>XX</b>	<b>YY</b>
1	2	3	4	5	6	7	8	9	10	11	12

## Variable Volume Piston Pumps Parker PV plus vs. Parker PV

### Direct Comparison

Cross reference ordering codes Parker series PV and Parker series PV plus

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Code example PV:  
code field no.:

<b>PV</b>	<b>046</b>	<b>R</b>	<b>1</b>	<b>A</b>	<b>1</b>	<b>T</b>	<b>1</b>	<b>N</b>	<b>PWS</b>	<b>XX</b>	<b>YY</b>
1	2	3	4	5	6	7	8	9	10	11	12

PV		Thru drive and Second Pump Option						PVplus	
7	8	Description					Remark	7	8
<b>T</b>	<b>1</b>	Thru shaft Capable with Cover						<b>T</b>	<b>1</b>
<b>A</b>	<b>4</b>	2/4 Bolt SAE "A" Pilot 3.25"/SAE "A" 9T Spline Coupler					2 Bolt SAE "A" Pilot 3.25"/SAE "A" 9T Spline Coupler	<b>A</b>	<b>4</b>
<b>B</b>	<b>7</b>	2/4 Bolt SAE "B" Pilot 4.00"/SAE "B" 13T Spline Coupler					4 Bolt SAE "B" Pilot 4.00"/SAE "B" 13T Spline Coupler	<b>B</b>	<b>3</b>
							2 Bolt SAE "B" Pilot 4.00"/SAE "B" 13T Spline Coupler	<b>B*</b>	<b>7</b>
<b>C</b>	<b>8</b>	2/4 Bolt SAE "C" Pilot 5.00"/SAE "C" 14T Spline Coupler					4 Bolt SAE "C" Pilot 5.00"/SAE "C" 14T Spline Coupler	<b>C**</b>	<b>3</b>
							2 Bolt SAE "C" Pilot 5.00"/SAE "C" 14T Spline Coupler	<b>C***</b>	<b>7</b>
<b>H</b>	<b>2</b>	4 Bolt 80mm Pilot/W ? x ? x ? x 8f DIN 5480 Coupler						<b>H</b>	<b>3</b>
<b>J</b>	<b>2</b>	4 Bolt 100mm Pilot/W 25 x 1.5 x 15 x 8f DIN 5480 Coupler						<b>J</b>	<b>3</b>
<b>K</b>	<b>2</b>	4 Bolt 125mm Pilot/W 32 x 1.5 x 20 x 8f DIN 5480 Coupler						<b>K****</b>	<b>3</b>
<b>W</b>	<b>7</b>	2/4 Bolt SAE "B" Pilot 4.00"/SAE "BB" 15T Spline Coupler					4 Bolt SAE "B" Pilot 4.00"/SAE "BB" 15T Spline Coupler	<b>W</b>	<b>3</b>
							2 Bolt SAE "B" Pilot 4.00"/SAE "BB" 15T Spline Coupler	<b>W</b>	<b>7</b>
<b>Y</b>	<b>7</b>	2 Bolt SAE "AA" Pilot 2.00"/SAE "A" 9T Spline						<b>Y#</b>	<b>7</b>

\*Not available with size 1  
 \*\*Size 2 or larger  
 \*\*\*Not available with size 1 and 2  
 \*\*\*\*Only available with 032 and larger  
 #Only available with size 1

PV	Description	Remark	PVplus
Field 9	<b>Seal material</b>		Field 9
<b>N</b>	NBR		<b>N</b>
<b>V</b>	FPM		<b>V</b>

PV	Description	Remark	PVplus
Field 10	<b>Compensator options</b>		Field 10
<b>**S</b>	standard pressure compensator	only fast response option available	<b>F*S</b>
<b>*RC</b>	remote pressure compensator	only fast response option available	<b>FRC</b>
<b>*R1</b>	remote pressure compensator with D03 interface	only fast response option available	<b>FR1</b>
<b>*F1</b>	load-sensing compensator with D03 interface	only fast response option available	<b>FF1</b>
<b>*L*</b>	horse power compensator	no longer for load sensing	<b>*L*</b>

PV	Description	Remark	PVplus
Field 11	<b>Design series pump</b>		Field 11
	not required on order		

PV	Description	Remark	PVplus
Field 12	<b>Design series compensator</b>		Field 12
	not required on order		

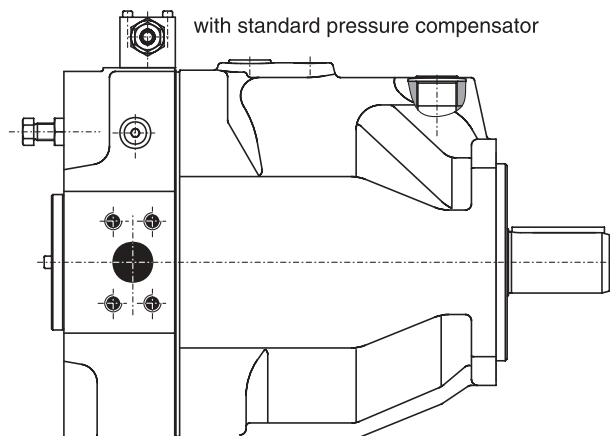
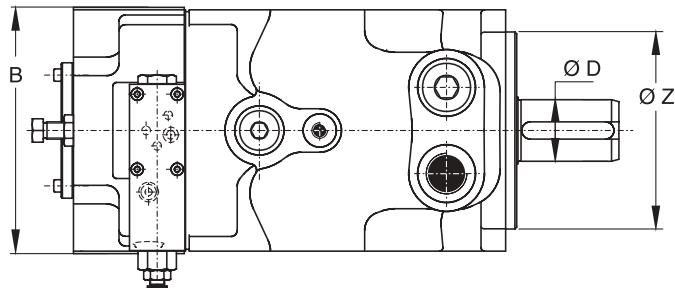
\*Consult Factory for assistance in crossing over PV model codes that are not shown.

Code example PV:  
code field no.:

<b>PV</b>	<b>046</b>	<b>R</b>	<b>1</b>	<b>D</b>	<b>3</b>	<b>T</b>	<b>1</b>	<b>N</b>	<b>FWS</b>	<b>XX</b>	<b>YY</b>
1	2	3	4	5	6	7	8	9	10	11	12

**Differences in dimensions**

**\*Dimensional Differences only  
evident in PV140, 180 & 270.**



Dimension	PV130, PV180	PV140, PV180	PV250	PV270
Z, metric (mm)	Ø160	Ø 160	Ø 200	Ø 200
D, metr., key (mm)	Ø 50	Ø 50	Ø 65	Ø 65
D, metr., spline	W50x1.25x38	W50x2x24	W62x1.25x48	W60x2x28
Z, SAE (in)	Ø 152.4	Ø 152.4	Ø 165.1	Ø 165.1
D, SAE, key (in)	Ø 50.8	Ø 50.8	Ø 50.8	Ø 50.8
D, SAE, spline (in)	15T8/16DP	15T8/16DP	15T8/16DP	15T8/16DP
B (mm)	200	200	330	250

Series	Model	Displacement cc/rev (in <sup>3</sup> /rev)	Mass kg (lbs)
1	PV016	16 (.98)	19 (42)
	PV020	20 (1.2)	
	PV023	23 (1.4)	
2	PV032	32 (1.9)	30 (66)
	PV040	40 (2.4)	
	PV046	46 (2.8)	
3	PV063	63 (3.8)	60 (132)
	PV080	80 (4.8)	
	PV092	92 (5.6)	
4	PV140	140 (8.5)	90 (198)
	PV180	180 (10.9)	
5	PV270	270 (16.5)	172 (379)

**Use of Relief Valve**

The use of a relief valve, while not mandatory is recommended in the main circuit to suppress hydraulic shock loads and adds additional system protection.

**Fluid Recommendations**

Premium quality hydraulic oil with a viscosity range between 150-250 SSU (30-50 cst.) at 100°F (38°C). Normal operating viscosity range between 80-1000 SSU (17-180 cst.). Maximum start-up viscosity is 4000 SSU (1000cst.).

Note: Consult Parker when exceeding 160°F (71°C) operation. Oil should have maximum anti-wear properties, rust and oxidation treatment.

**Filtration**

For maximum pump and system component life, the system should be protected from contamination at a level not to exceed 125 particles greater than 10 microns per milliliter of fluid. (SAE Class 4/ISO 16/13.) Due to the nature of variable displacement pumps, variations in pump inlet conditions, fluid acceleration losses, system aeration, and duty cycle we do not recommend suction line filters. We do recommend the use of a properly sized, in-tank, suction strainer. Contact your Parker representative for assistance.

**Start-Up**

On initial start-up, the pump case must be filled with fluid. Pressure adjustments should be reduced and the circuit should be open to permit priming.

**Special Installations**

Consult your Parker representative for any application requiring the following:

Pressure above rated, drive speed above maximum, indirect drive, fluid other than petroleum oil, fluid temperature above 160°F (71°C)

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**Shaft Rotation and Line Up**

Pump and motor shaft alignment must be within .010 TIR maximum, using a standard floating coupling. Please follow coupling manufacturer's recommended installation instructions to prevent end thrust on pump shaft. Turn pump to assure freedom of rotation. Pump and motor must be on a rigid base.

The coupling should be sized to absorb the peak horsepower developed.

**Installation and Mounting**

When mounting a PV Series Pump, the "case drain" must be on top of the pump. The "case drain" should be a separate line unrestricted to the reservoir and extend below the oil level as far from the inlet as possible. The "case drain" line must not exceed 10 PSI (.69 bar) back pressure.

The "case drain" line should be as large in diameter as possible and as short in length as possible. Suggested maximum line length is 10 ft.

Check that the driving motor rotates in the same direction as indicated by the rotation arrow on the pump.

**Wear Protection, Wear Reduction****Wear protection, wear reduction**

Wear protection resp. wear reduction

In hydraulic components there are many gliding contacts partly under high (side) loads. Beside the correct viscosity, which on one hand is responsible for the required supply of lubricating fluid to the gap, on the other hand assures a stable lubricating film, the wear reduction capability of the hydraulic fluid is of major importance.

The describing parameter, the, "Schadenskraftstufe" (load carrying capability), is determined in the FZG-normal test A/8, 3/90 according to DIN 51354 part 2 (gear transmission test rig, 12 defined load steps at 90° C start temperature and 8,3 m/s circumference speed).

Depending on the nominal working pressure the following FZG Numbers is recommended!

nominal pressure bar (PSI)	FZG
80 - 125 (1160 - 1812)	≥ 5
125 - 200 (1812 - 2900)	5 - 6
200 - 250 (2900 - 3625)	7 - 9
250 - 320 (3625 - 4641)	≥ 10
> 320 (4641)	≥ 12

Max pressure limit: 1,25 x nominal pressure

Mineral oils are offered according to DIN 51 524 in different fluid types:

- HL-fluids according to DIN 51 524 part 2, normal working load conditions, FZG 6-10.
- HLP-fluids according to DIN 51 524 part 3, higher working load conditions, FZG > 10.

Modern HLP-fluids today usually come with a FZG >12. They are equipped with wear prohibiting additives, which ensure a high safety of operation under severe working conditions.

**A**