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Introduction

Pump with Standard Pressure Compensator, code F*S

Pump with Load-Sensing Compensator, code FFC

Technical Features
- Mounting interface according to VDMA-standards sheet 24560 part 1
- Standard: 4-hole flange ISO 3019/2 (metric)
  Optional: 4-hole flange ISO 3019/1 (SAE)
- Large servo piston with strong bias spring achieves fast response; e.g. for PV046
  upstroke < 70 ms
downstroke < 40 ms
Note: Follow installation instructions.

Reduced pressure peaks due to active decompression of system at downstroke
Also at low system pressure reliable compensator operation. Lowest compensating pressure 12-15 bar
9 piston and new precompression technology (precompression volume) result in unbeaten low outlet flow pulsation.
Rigid and FEM-optimized body design for lowest noise level
Complete compensator program
Thru drive for 100% nominal torque
Pump combinations (multiple pumps) of same size and model and mounting interface for basically all metric or SAE mounting interfaces

With thru drive for single and multiple pumps
Swash plate type for open circuit

Pump with Horse Power Compensator, code *LB

Pump with Electrohydr. Displacement Control, code FPV
Technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displacement [cm³/rev]</td>
<td>from 16 to 270</td>
</tr>
<tr>
<td>Operating pressures</td>
<td></td>
</tr>
<tr>
<td>Outlet [bar]</td>
<td>nominal pressure $p_n$ 350</td>
</tr>
<tr>
<td>[bar] max. pressure $p_{max.}$</td>
<td>420 ¹)</td>
</tr>
<tr>
<td>[bar] drain port 2 ²)</td>
<td></td>
</tr>
<tr>
<td>Inlet min. [bar]</td>
<td>0.8 (absolute)</td>
</tr>
<tr>
<td>max. [bar]</td>
<td>16</td>
</tr>
<tr>
<td>Minimum speed [min⁻¹]</td>
<td>300 min⁻¹</td>
</tr>
<tr>
<td>Mounting interface</td>
<td>4-hole flange ISO 3019/2</td>
</tr>
<tr>
<td>Installation</td>
<td>optional ISO 3019/1, SAE drain port as high as possible</td>
</tr>
</tbody>
</table>

¹) max. 20% of working cycle
²) peak pressure only, special version up to 20 bar available (with X-Modification X5877)

Pump combinations

See pages 26–27

Selection table

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. displacement [cm³/rev]</th>
<th>Output flow at 1500 min⁻¹ [l/min]</th>
<th>Input horse power at 1500 min⁻¹ and 350 bar [kW]</th>
<th>Max speed * [min⁻¹]</th>
<th>Moment of inertia [kgm²]</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV016</td>
<td>16</td>
<td>24</td>
<td>15.5</td>
<td>3000</td>
<td>0.0017</td>
<td>19</td>
</tr>
<tr>
<td>PV020</td>
<td>20</td>
<td>30</td>
<td>19.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PV023</td>
<td>23</td>
<td>34.5</td>
<td>22.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PV032</td>
<td>32</td>
<td>48</td>
<td>31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PV040</td>
<td>40</td>
<td>60</td>
<td>39</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PV046</td>
<td>46</td>
<td>69</td>
<td>45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PV063</td>
<td>63</td>
<td>94.5</td>
<td>61.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PV080</td>
<td>80</td>
<td>120</td>
<td>78</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PV092</td>
<td>92</td>
<td>138</td>
<td>89.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PV140</td>
<td>140</td>
<td>210</td>
<td>136</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PV180</td>
<td>180</td>
<td>270</td>
<td>175</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PV270</td>
<td>270</td>
<td>405</td>
<td>263</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The maximum speed ratings are shown for an inlet pressure of 1 bar (absolute) and for a fluid viscosity of $\nu = 30$ mm²/s.

Pump with Standard Pressure Comp. Pump with Horse Power Comp.

Combination PV/PV

Combination PV/PGP
Axial Piston Pump
Series PV

Ordering Code

Axial piston pump variable displacement high pressure version

Size and displacement

Variation

Threads

2nd pump

Compensator

Pump

Compensator Design series:
(not required for order)

Rotation

Mounting code

Thru drive

Seals

see opposite page

Code

Displacement

016
020
023
032
040
046
063
080
092
140
180
270
16 cm³/rev
20 cm³/rev
23 cm³/rev
32 cm³/rev
40 cm³/rev
46 cm³/rev
63 cm³/rev
80 cm³/rev
92 cm³/rev
140 cm³/rev
180 cm³/rev
270 cm³/rev

Code

Rotation ¹)

R
L
Clockwise
Counter clockwise

¹) When looked on shaft

Code

Variation

1
9
Standard
Reduced displacement adjusted ²)

²) For order specify displacement.

Code

Displacement

016
020
023
032
040
046
063
080
092
140
180
270
016
020
023
032
040
046
063
080
092
140
180
270

Code

Mounting interface

D
E
F
G
K
L
SAE
ISO
3019/1
metr. ISO
3019/2

4-hole flange
4-hole flange
4-hole flange
4-hole flange
4-hole flange
4-hole flange

Cylindrical, key
Splined, SAE
Cylindrical, key
Splined, SAE
Cylindrical, key
Splined, DIN 5480

Code

Shaft

4-hole flange
4-hole flange
4-hole flange
4-hole flange
4-hole flange

Cylindrical, key
Splined, SAE
Cylindrical, key
Splined, SAE
Cylindrical, key
Splined, DIN 5480

Code

Threads

1
3
4
7
8
BSP
UNC
BSP
Metr. M14
UNC
Metr M14

⁴) Drain, gauge and flushing ports
⁵) All mounting and connecting threads
⁶) For PV063-PV180 only: pressure port 1 1/4" with 4 x M14 instead of 4 x M12

Seals

Axial piston pump variable displacement high pressure version

Size and displacement

Variation

Threads

2nd pump

Compensator

Pump

Compensator Design series:
(not required for order)

Rotation

Mounting code

Thru drive

Seals

see opposite page

Code

2nd pump option ⁷)

1
2
3
4
Single pump, no 2nd pump and coupling
PV140 or PV180 mounted
PV or PVM pump mounted
Gear pump series PGP mounted

⁷) Specify 2nd pump with full model code

Code

Thru drive option

no adaptor for 2nd pump

T
Single pump prepared for thru drive

With adaptor for 2nd pump

Y
A
B
C
D
E
G
H
J
K
L
M
SAE AA, Ø 50.8mm
SAE A, Ø 82.55mm
SAE B, Ø 101.6mm
SAE C, Ø 127mm
SAE D, Ø 152.4mm
SAE E, Ø 165.1mm
Metric, Ø 63mm
Metric, Ø 80mm
Metric, Ø 100mm
Metric, Ø 125mm
Metric, Ø 160mm
Metric, Ø 200mm

⁸) Only for PV016 - PV023
⁹) Only for PV032 and larger
¹⁰) Only for PV063 and larger
¹¹) Only for PV270
¹²) Only for PV016 - PV092

Bold letters = Short-term availability
Axial Piston Pump  
Series PV

**Standard Pressure Compensator**

<table>
<thead>
<tr>
<th>Code</th>
<th>Compensator options</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 0 1</td>
<td>No compensator, with coverplate, no control function</td>
</tr>
<tr>
<td>1 0 0</td>
<td></td>
</tr>
<tr>
<td>F D S</td>
<td>10 - 140 bar, spindle + lock nut</td>
</tr>
<tr>
<td>F H S</td>
<td>40 - 210 bar, spindle + lock nut</td>
</tr>
<tr>
<td>F W S</td>
<td>70 - 350 bar, spindle + lock nut</td>
</tr>
</tbody>
</table>

**Remote Compensator options**

<table>
<thead>
<tr>
<th>F R S</th>
<th>Remote pressure compensator</th>
</tr>
</thead>
<tbody>
<tr>
<td>F F F</td>
<td>Load-Sensing compensator</td>
</tr>
<tr>
<td>F F T</td>
<td>Two valve load-sensing compensator</td>
</tr>
</tbody>
</table>

**Variations for Remote Compensator**

<table>
<thead>
<tr>
<th>C</th>
<th>External pressure pilot [13]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NG6/D03 interface top side</td>
</tr>
<tr>
<td>2</td>
<td>Like 1 but with ext. pilot port [15]</td>
</tr>
<tr>
<td>P</td>
<td>Pilot valve PVAC1P* mounted</td>
</tr>
<tr>
<td>D</td>
<td>Proportional pilot valve type PVACPP* mounted</td>
</tr>
<tr>
<td>L</td>
<td>Pilot valve with DIN lock mounted</td>
</tr>
<tr>
<td>Z</td>
<td>Accessory mounted [14]</td>
</tr>
</tbody>
</table>

**Horse power compensator**

<table>
<thead>
<tr>
<th>Code</th>
<th>Displacement</th>
<th>Nom. HP [kW] at 1500 min⁻¹</th>
<th>Nom. torque [Nm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>016</td>
<td>032 046 063</td>
<td>092 140 180 270</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>x</td>
<td>3</td>
<td>19.5</td>
</tr>
<tr>
<td>C</td>
<td>x</td>
<td>4</td>
<td>26</td>
</tr>
<tr>
<td>D</td>
<td>x x</td>
<td>5.5</td>
<td>36</td>
</tr>
<tr>
<td>E</td>
<td>x</td>
<td>7.5</td>
<td>49</td>
</tr>
<tr>
<td>G</td>
<td>x x</td>
<td>11</td>
<td>71</td>
</tr>
<tr>
<td>H</td>
<td>x x x</td>
<td>15</td>
<td>97</td>
</tr>
<tr>
<td>K</td>
<td>x x x x</td>
<td>18.5</td>
<td>120</td>
</tr>
<tr>
<td>M</td>
<td>x x x x</td>
<td>22</td>
<td>142</td>
</tr>
<tr>
<td>S</td>
<td>x x x x</td>
<td>30</td>
<td>195</td>
</tr>
<tr>
<td>T</td>
<td>x x x x</td>
<td>37</td>
<td>240</td>
</tr>
<tr>
<td>U</td>
<td>x x x x</td>
<td>45</td>
<td>290</td>
</tr>
<tr>
<td>W</td>
<td>x x x x</td>
<td>55</td>
<td>355</td>
</tr>
<tr>
<td>Y</td>
<td>x x x</td>
<td>75</td>
<td>485</td>
</tr>
<tr>
<td>Z</td>
<td>x x x</td>
<td>90</td>
<td>585</td>
</tr>
<tr>
<td>2</td>
<td>x x x</td>
<td>110</td>
<td>715</td>
</tr>
<tr>
<td>3</td>
<td>x x x</td>
<td>132</td>
<td>850</td>
</tr>
</tbody>
</table>

**Electrohydraulic compensator**

<table>
<thead>
<tr>
<th>Code</th>
<th>Compensator option</th>
</tr>
</thead>
<tbody>
<tr>
<td>F U</td>
<td>Standard (internal), no shuttle valve</td>
</tr>
<tr>
<td>P</td>
<td>Proportional displacement control</td>
</tr>
<tr>
<td>V R</td>
<td>Standard, no pressure compensation</td>
</tr>
<tr>
<td>G D</td>
<td>Remote pressure comp. NG6 interface</td>
</tr>
<tr>
<td>Z S</td>
<td>Remote pressure comp., NG6 interface top side, for quick unload valve</td>
</tr>
<tr>
<td>Z T</td>
<td>Remote pressure comp., NG6 interface top side, for preload and quick unload manifold</td>
</tr>
<tr>
<td>Z E</td>
<td>Remote pressure comp., NG6 interface top side, for preload and horse power control</td>
</tr>
</tbody>
</table>

**Function**

| P        | Proportional displacement control                                                |

**Variation**

| P        | Proportional displacement control                                                |

**Note**

Compensator differential ∆p is to be adjusted:
Remote pressure comp., horse power comp. 15 ± 1 bar
(Codes FR*, FT*, "L", "C", FPR, FPD, FPZ, FPG)
With quick unload manifold 12 ± 1 bar
(Codes FS*, FPS, FPT, FPP, FPE)
Load-Sensing comp. (not horse power comp.) 10 ± 1 bar
(Codes FF*)
The ordering code PVACPP* correspond to the DSAE1007P07*

**Bold letters = Short-term availability**

---

[13] Not for two-valve-compensator
[14] Accessories not included, please specify on order with full model code.
[15] Only for Codes "FR" and "FT"
Axial Piston Pump
Series PV

Noise Levels

PV016 - PV023

PV032 - PV046

PV063 - PV092

PV140

PV180

PV270

Typical sound level for single pumps, measured in anechoic chamber according to DIN 45 635, part 1 and 26. Microphone distance 1m; speed: n = 1500 min⁻¹.

All data measured with mineral oil viscosity 30 mm²/s (cSt) at 50°C.
Operating noise of pumps

The normal operating noise of a pump and consequently the operating noise of the entire hydraulic system are largely determined by where and how the pump is mounted and how it is connected to the downstream hydraulic system.

Also size, style and installation of the hydraulic tubing have a major influence on the overall noise emitted by a hydraulic system.

Noise reduction measures

Talking about operating noise of a hydraulic pump, primary and secondary pump noise has to be taken into consideration.

**Primary pump noise** is caused by vibrations of the pump body due to internal alternating forces stressing the body structure.

Flexible elements help to prevent pump body vibration being transmitted to other construction elements, where possible amplification may occur. Such elements can be:

- Bell housing with elastic dampening flange with vulcanized labyrinth (1)
- Floating and flexible coupling (2)
- Damping rails (3) or silent blocks for mounting the electric motor or the foot mounting flange
- Flexible tube connections (compensators) or hoses on inlet, outlet and drain port of the pump
- Exclusive use of gas tight tube fittings for inlet connections to avoid ingression of air causing cavitation and excessive noise

**Secondary pump noise** is caused by vibration induced into all connected hydraulic components by the flow and pressure pulsation of the pump. This secondary noise adds typical 7 - 10 dB(A) to the noise of a pump measured in the sound chamber according to DIN 45 635 (see diagrams on opposite side). Therefore pipework, its mounting and the mounting of all hydraulic components like pressure filters and control elements have a major influence on the overall system noise level.

Pulsation reduction with precompression volume

The PV is equipped with a new technology for flow ripple reduction. This method reduces the pulsation at the pump outlet by 40 - 60%. That leads to a significant reduction of the overall system noise without additional cost and without additional components (silencers etc.). The typical reduction reaches 2 - 4 dB(A). That means: with a pump of the PV series the secondary noise adds only some 5 - 7 dB(A) to the pump noise instead of 7 - 10 dB(A) as usually found.

Figure 2 compares the measured pulsation of a system with 6 pumps of 180 cm³/rev each.

Last but not least the connection between pump and driving motor can be the cause of an unacceptably high noise emission. Even when the mounting space is limited there are suitable means and components to reduce the noise significantly.

The vibration of the pump body, created by high alternating forces in the rotating group and the pulsation of the output flow excite every part of the system connected to the pump mechanically or hydraulically.

**Other measures**

Small diameter tubes do not only cause high flow speeds, turbulences inside the tubes and cavitation in the pump, they also produce noise.

Only correctly sized connections of the largest possible diameter according to the port size of the pump should be used.
Efficiency and case drain flows PV016, PV020, PV023

The efficiency and power graphs are measured at an input speed of \( n = 1500 \text{ min}^{-1} \), a temperature of 50°C and a fluid viscosity of 30 mm²/s.

Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min, if at pilot operated compensators (codes FR*, FF*, FT*, horse power compensator and p/Q-control) the control flow of the pressure pilot valve also goes through the pump.

Please note: The values shown below are only valid for static operation. Under dynamic conditions and at rapid compensation of the pump the volume displaced by the servo piston also leaves the case drain port. This dynamic control flow can reach up to 40 l/min! Therefore the case drain line is to lead to the reservoir at full size and without restrictions as short and direct as possible.
Efficiency and Case Drain Flows

**Efficiency and case drain flows PV032, PV040, PV046**

The efficiency and power graphs are measured at an input speed of $n = 1500 \text{ min}^{-1}$, a temperature of 50°C and a fluid viscosity of 30 mm²/s.

Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min, if at pilot operated compensators (codes FR*, FF*, FT*, horse power compensator and p-Q-control) the control flow of the pressure pilot valve also goes through the pump.

**Please note:** The values shown below are only valid for static operation. Under dynamic conditions and at rapid compensation of the pump the volume displaced by the servo piston also leaves the case drain port. This dynamic control flow can reach up to 60 l/min! Therefore the case drain line is to lead to the reservoir at full size and without restrictions as short and direct as possible.
Efficiency and Case Drain Flows

Efficiency and power consumption

PV063

The efficiency and power graphs are measured at an input speed of \( n = 1500 \text{ min}^{-1} \), a temperature of 50°C and a fluid viscosity of 30 mm²/s.

Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min, if at pilot operated compensators (codes FR*, FF*, FT*, horse power compensator and p-Q-control) the control flow of the pressure pilot valve also goes through the pump.

Please note: The values shown below are only valid for static operation. Under dynamic conditions and at rapid compensation of the pump the volume displaced by the servo piston also leaves the case drain port. This dynamic control flow can reach up to 80 l/min! Therefore the case drain line is to lead to the reservoir at full size and without restrictions as short and direct as possible.
Efficiency and case drain flows PV140, PV180, PV270

The efficiency and power graphs are measured at an input speed of \( n = 1500 \text{ min}^{-1} \), a temperature of 50°C and a fluid viscosity of 30 mm²/s.

Case drain flow and compensator control flow leave via the drain port of the pump. To the values shown are to be added 1 to 1.2 l/min, if at pilot operated compensators (codes FR*, FF*, FT*, horse power compensator and p-Q-control) the control flow of the pressure pilot valve also goes through the pump.

Please note: The values shown below are only valid for static operation. Under dynamic conditions and at rapid compensation of the pump the volume displaced by the servo piston also leaves the case drain port. This dynamic control flow can reach up to 120 l/min! Therefore the case drain line is to lead to the reservoir at full size and without restrictions as short and direct as possible.

Efficiency, power consumption

**PV140**

- Efficiency and power consumption graph
- Input power vs. output flow
- Overall efficiency and volumetric efficiency
- Pressure vs. efficiency

**PV180**

- Efficiency and power consumption graph
- Input power vs. output flow
- Overall efficiency and volumetric efficiency
- Pressure vs. efficiency

**PV270**

- Efficiency and power consumption graph
- Input power vs. output flow
- Overall efficiency and volumetric efficiency
- Pressure vs. efficiency
PV016 - 023, metric version

The pump shown above has mounting option K and thru drive option T (prepared for thru drive).

For further information about flanges see catalogue No. 4039/UK „Pressure Hydraulic Flanges“ (on request).

Shown is a clockwise rotating pump. Counter clockwise rotating pumps have inlet, outlet and gauge ports reversed.

PI PVplus UK.PMD RH
PV016 - 023, SAE version and thru drive

Variation with thru drive

Thru shaft adaptors are available with the following dimensions:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>63</td>
<td>10</td>
<td>85</td>
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</table>

Dimension H and available couplings see page 24. At threads options 3 and 7 the dimensions E and G are UNC - 2B threads.
PV032 - 046, metric version

Dimensions

The pump shown above has mounting option K and thru drive option T (prepared for thru drive).

Inlet:
- flange according ISO 6162 DN 38; PN 200 bar
  - 38
  - 4 x M12, 18 deep
  - optional 1/2 - 13 UNC - 2B (threads options 3 and 7)

Outlet:
- flange according ISO 6162 DN 25; PN 400 bar
  - 25

For further information about flanges see catalogue No. 4039/UK „Pressure Hydraulic Flanges“ (on request).

Shown is a clockwise rotating pump. Counter clockwise rotating pumps have inlet, outlet and gauge ports reversed.

Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany
PV032 - 046, SAE version and thru drive version

Dimensions

Variation with thru drive

Thru shaft adaptors are available with the following dimensions:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
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</table>

Dimension H and available couplings see page 24. At threads options 3 and 7 the dimensions E and G are UNC - 2B threads.
PV063 - 092, metric version

Inlet:
- Flange according ISO 6162
  - DN 51; PN 200 bar

Outlet:
- Flange according ISO 6162
  - DN 32; PN 400 bar

Mounting hole for horsepower compensator pilot or displacement feedback LVDT

Drain port L2: G3/4
- Optional M 27 x 2; ISO 6149-1
  - (threads options 7 and 8)
- Or 1 1/16 - 12 UNF
  - (threads option 3)

Gage port M: G1/4
- Optional M 12 x 1.5; ISO 6149-1
  - (threads options 7 and 8)
- Or 7/16 - 20 UNF
  - (threads option 3)

Flush port L3: G 1/2
- Optional M27 x 2; ISO 6149-1
  - (threads options 7 and 8)
- Or 1 1/16 - 12 UNF
  - (threads option 3)

View X
- Shown with standard pressure compensator
- Thread: M12 - 28 deep
- Key: 12 x 8 x 80
  - DIN 6885

The pump shown above has mounting option K and thru drive option T (prepared for thru drive).

For further information about flanges see catalogue No. 4039/UK „Pressure Hydraulic Flanges” (on request).

Shown is a clockwise rotating pump. Counter clockwise rotating pumps have inlet, outlet and gauge ports reversed.

PI PVplus UK.PMD RH
PV063 - 092, SAE version and thru drive version

Variation with thru drive

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<thead>
<tr>
<th>A</th>
<th>B</th>
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<th>E</th>
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Thru shaft adaptors are available with the following dimensions:

Dimension H and available couplings see page 24.

At threads options 3 and 7 the dimensions E and G are UNC - 2B threads.
PV140 - 180, metric version

For further information about flanges see catalogue No. 4039/UK „Pressure Hydraulic Flanges“ (on request).

Shown is a clockwise rotating pump. Counter clockwise rotating pumps have inlet, outlet and gauge ports reversed.

Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany
PV140 - 180, SAE version and thru drive version

Thru shaft adaptors are available with the following dimensions:

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Dimension H and available couplings see page 24. At threads options 3 and 7 the dimensions E and G are UNC - 2B threads.
PV 270, metric version

- Mounting hole for horse power pilot or LVDT for displacement feedback
- Drain port L2: G1 1/4
  - Optional M 42 x 2, ISO 6149-1 (threads options 7 and 8)
  - Or 5/8 - 12 UNF (threads option 3)
- Drain port L1, dimensions see L2
- Gage port M; G1/4
  - Optional M 12 x 1.5, ISO 6149-1 (threads options 7 and 8)
  - Or 7/16 - 20 UNF (threads option 3)
- Shown with standard pressure compensator
- Flushing port L3; G 3/4
  - Optional M 27 x 2, ISO 6149-1 (threads options 7 and 8)
  - Or 1 1/16 - 12 UNF (threads option 3)

**Inlet:**
- Flange according ISO 6162
  - DN 89; PN 25 bar
- Ø 88
- 4 x M16, 32 deep
  - Optional 5/8 - 11 UNC - 2B (threads options 3 and 7)

**Outlet:**
- Flange according ISO 6162
  - DN 38; PN 400 bar
- Ø 38
- 4 x M16, 32 deep
  - Optional 5/8 - 11 UNC - 2B (threads options 3 and 7)

The pump shown above has mounting option K and thru drive variation T (prepared for thru drive).

For further information about flanges see catalogue No. 4039/UK „Pressure Hydraulic Flanges“ (on request). Shown is a clockwise rotating pump. Counter clockwise rotating pumps have inlet, outlet and gauge ports reversed.
PV 270, SAE version and thru drive version

Dimension H and available couplings see page 24.
At threads options 3 and 7 the dimensions E and G are UNC - 2B threads.

Thru shaft adaptors are available with the following dimensions:

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<th>A</th>
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</table>
### Mounting kits for multiple pumps, for second pump option

![Diagram](image.png)

**Code** | **Pump size**  
---|---
1 | Pump size 1: PV016 - PV023  
2 | Pump size 2: PV032 - PV046  
3 | Pump size 3: PV063 - PV092  
4 | Pump size 4: PV140 - PV180  
5 | Pump size 5: PV270  

**Code** | **Seals**  
---|---
N | NBR  
V | FPM  
E | EPR  

**Code** | **Thread**  
---|---
M | Metric  
S | SAE  

Kit contains positions 30, 69, 84, 85 and 87, see drawing below.

### Mounting kits for multiple pumps, couplings

![Diagram](image.png)

**Code** | **Pump size**  
---|---
1 | Pump size 1: PV016 - PV023  
2 | Pump size 2: PV032 - PV046  
3 | Pump size 3: PV063 - PV092  
4 | Pump size 4: PV140 - PV180  
5 | Pump size 5: PV270  

**Code** | **Coupling for metric, splined shaft DIN 5480**  
---|---
01 | N25 x 1.5 x 15  
02 | N32 x 1.5 x 20  
03 | N40 x 1.5 x 25  
04 | N50 x 2 x 24  
05 | N60 x 2 x 28  

**Code** | **Coupling for SAE splined shaft**  
---|---
11 | 9T 16/32  
12 | 11T 16/32  
13 | 13T 16/32  
14 | 15T 16/32  
15 | 14T 12/24  
16 | 17T 12/24  
17 | 13T 8/16  
18 | 15T 8/16  

**Code** | **Coupling + adaptor for keyed shaft**  
---|---
20 | Diameter 12 mm  
21 | Diameter 16 mm  
22 | Diameter 18 mm  

Kit contains positions 91 (and 92 for keyed shaft).  

---

Parker Hannifin GmbH  
Hydraulic Controls Division  
Kaarst, Germany  

Parker PVplus UK/PMD RH  

---

24
### Seal kits

**Code** | **Pump size** | **Axial piston pump series PV**
---|---|---
1 | Pump size 1: PV016 - PV023 | SK
2 | Pump size 2: PV032 - PV046 | PV
3 | Pump size 3: PV063 - PV092 | BG
4 | Pump size 4: PV140 - PV180 |
5 | Pump size 5: PV270 |

**Seals**

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<tr>
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<td>E</td>
<td>EPR</td>
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<td>W</td>
<td>NBR with PTFE shaft seal</td>
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<tr>
<td>P</td>
<td>FPM with PTFE shaft seal</td>
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<td>EPDM with PTFE shaft seal</td>
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**Thread, port**

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<td>UNF</td>
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<td>ISO 6149</td>
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<td>8</td>
<td>Metric</td>
<td>ISO 6149</td>
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</tbody>
</table>

### Repair and spare parts kits

**Code** | **Pump Size** | **Axial piston pump series PV**
---|---|---
1 | Pump size 1: PV016 - PV023 | RK
2 | Pump size 2: PV032 - PV046 | PV
3 | Pump size 3: PV063 - PV092 | BG
4 | Pump size 4: PV140 - PV180 |
5 | Pump size 5: PV270 |

**Contents**

<table>
<thead>
<tr>
<th>Code</th>
<th>Contents</th>
</tr>
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<tbody>
<tr>
<td>VT</td>
<td>Connecting parts, kit</td>
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<tr>
<td>WP</td>
<td>Shaft with key</td>
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<tr>
<td>WZ</td>
<td>Splined shaft</td>
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<td>SS</td>
<td>Valve plate</td>
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<tr>
<td>SB</td>
<td>Bushing for servo piston</td>
</tr>
</tbody>
</table>

**Optional**

- Thread
- Rotation

**Seals**

- NBR
- FPM
- EPR

### Repair and spare parts kits for adjustable displacement limiter

**Code** | **Displacement** | **Axial piston pump series PV**
---|---|---
016 | PV016 063 | PV063 |
020 | PV020 080 | PV080 |
023 | PV023 092 | PV092 |
032 | PV032 140 | PV140 |
040 | PV040 180 | PV180 |
046 | PV046 270 | PV270 |

**Contents**

<table>
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<tr>
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<th>Contents</th>
</tr>
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<td>HE</td>
<td>Displacement limiter adjustable</td>
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</tbody>
</table>

For parts included, see spare parts list PVI-BGx-GB-yy; available upon request.

- x stands for frame size 1 - 5
- yy stands for design series

---

Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany
Pump Combinations

Combinations PV / PV or PV / PVM (metric version)

<table>
<thead>
<tr>
<th>Main pump</th>
<th>Second pump</th>
<th>Interface main pump</th>
<th>L</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>H</th>
<th>K</th>
<th>M</th>
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* Combinations PV140/180 + PV140/180 and PV270 + PV270 only with splined shaft on main pump due to high torque.
### Combinations PV / PGP511 or PGP517

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<th>2nd pump</th>
<th>Interface main pump</th>
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<td>PV140 or 180</td>
<td>PGP511</td>
<td>160 B4 HW</td>
<td>593.7-639.3</td>
<td>233</td>
<td>305</td>
<td>86.7-132.3</td>
<td>349</td>
<td>415</td>
<td>86.7-132.3</td>
</tr>
<tr>
<td>PV270</td>
<td>PGP511</td>
<td>200 B4 HW</td>
<td>733.2-778.8</td>
<td>258</td>
<td>403</td>
<td>86.7-132.3</td>
<td>406</td>
<td>531.5</td>
<td>86.7-132.3</td>
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</tbody>
</table>

Dimensions PGP511* code H2 and PGP517* code H3

* For other dimensions of series PGP/PGM, see catalogue HY11-2500/UK, chapter 1, ‘Pumps & Motors’.

### Standard Gear Pumps for combination with PV

<table>
<thead>
<tr>
<th>Model</th>
<th>Ordering code</th>
<th>Part number</th>
<th>Displacement [cm³/U]</th>
<th>Flow [l/min at 1500min⁻¹]</th>
<th>Weight [kg]</th>
</tr>
</thead>
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<tr>
<td>PGP05</td>
<td>PGP505A0040CA1H2NJ4J4B1B1</td>
<td>3319111251</td>
<td>4</td>
<td>6</td>
<td>2.3</td>
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<td></td>
<td>PGP505A0080CA1H2NJ4J4B1B1</td>
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<td>8</td>
<td>12</td>
<td>3.6</td>
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<td>PGP511</td>
<td>PGP511A0110CA1H2NL2L1B1B1</td>
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<td>16.5</td>
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<td>PGP511A0140CA1H2NL2L1B1B1</td>
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<td>14</td>
<td>21</td>
<td>3.8</td>
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<td>PGP511A0160CA1H2NL2L1B1B1</td>
<td>3349111737</td>
<td>16</td>
<td>24</td>
<td>3.9</td>
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<td>PGP511A0190CA1H2NL2L1B1B1</td>
<td>3349111575</td>
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<td>PGP511A0220CA1H2NL2L1B1B1</td>
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<tr>
<td>PGP517</td>
<td>PGP517A0230CD1H3NL3L3L2B1B1</td>
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<td>49.5</td>
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<td>38</td>
<td>57</td>
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<td>52</td>
<td>78</td>
<td>9.5</td>
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<td>PGP350</td>
<td>PGP350A197EVA82025</td>
<td>3239111027</td>
<td>83.6</td>
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</table>
Max. transferable torque in [Nm] for different shafts options

<table>
<thead>
<tr>
<th>Shaft code</th>
<th>PV016-023</th>
<th>PV032-046</th>
<th>PV063-092</th>
<th>PV140-180</th>
<th>PV270</th>
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<tr>
<td>D</td>
<td>300</td>
<td>550</td>
<td>1320</td>
<td>2000</td>
<td>2000</td>
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<tr>
<td>E</td>
<td>300</td>
<td>610</td>
<td>1218</td>
<td>2680</td>
<td>2680</td>
</tr>
<tr>
<td>F</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>1320</td>
<td>--</td>
</tr>
<tr>
<td>G</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>1640</td>
<td>--</td>
</tr>
<tr>
<td>K</td>
<td>300</td>
<td>570</td>
<td>1150</td>
<td>1900</td>
<td>2850</td>
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<tr>
<td>L</td>
<td>405</td>
<td>675</td>
<td>1400</td>
<td>2650</td>
<td>3980</td>
</tr>
</tbody>
</table>

Max. torque transmission cap. for rear mounted pump

140 275 560 1100 1650

Important notice

The max. allowable torque of the individual shaft must not be exceeded. For 2-pump combinations there is no problem because PV series offers 100% thru torque. For 3-pump combinations (and more) the limit torque could be reached or exceeded. Therefore it is necessary to calculate the torque factor and compare it with the allowed torque limit factor in the table.

Required: calculated torque factor
< torque limit factor

To make the necessary calculations easier and more user friendly it is not required to calculate actual torque requirements in Nm and compare them with the shaft limitations. The table on the right shows limit factors that include material specification, safety factors and conversion factors.

The total torque factor is represented by the sum of the individual torque factors of all pumps in the complete pump combination.

The torque factor of each individual pump is calculated by multiplying the max. operating pressure p of the pump (in bar) with the max. displacement Vg of the pump (in cm³/rev).

Torque factor of any pump
= p x Vg
Axial Piston Pump
Series PV

Compensators Dimensions

Remote pressure compensator, code FRC
Load-Sensing compensator, code FFC

All control ports G1/4 optional M 12 x 1.5; ISO 6149-1
(thread options 7 and 8) or 7/16-20 UNF (threads option 3)

Pressure pilot port P_P (code FRC)
Load-sensing-port P_F (code FFC)

2-valve compensator, code FT1

Proportional p-Q-compensator, code FPR
(for code FPV lower valve only without interface)

LVDT for proportional compensator

Pilot valve for horse power compensator

Ordering code seal kit, compensator

<table>
<thead>
<tr>
<th>Code</th>
<th>Seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>NBR</td>
</tr>
<tr>
<td>V</td>
<td>FPM</td>
</tr>
<tr>
<td>E</td>
<td>EPR</td>
</tr>
</tbody>
</table>

The seal kit includes all seals for all single compensator options as well as seals for LVDT and horse power pilot valve. For 2-valve compensators two seal kits have to be ordered.

Spare parts lists and ordering codes for replacement compensator valves see manual upon request.
Standard pressure compensator, code F*S

The standard pressure compensator adjusts the pump displacement according to the actual need of the system in order to keep the pressure constant.

As long as the system pressure at outlet port P is lower than the set pressure (set as spring preload of the compensator spring) the working port A of the compensator valve is connected to the case drain and the piston area is unloaded. Bias spring and system pressure on the annulus area keep the pump at full displacement.

When the system pressure reaches the set pressure the compensator valve spool connects port P₁ to A and builds up a pressure at the servo piston resulting in a downstroking of the pump. The displacement of the pump is controlled in order to match the flow requirement of the system.

Remote pressure compensator, code FRC

While at the standard pressure compensator the pressure is set directly at the compensator spring, the setting of the remote pressure compensator can be achieved by any suitable pilot pressure valve connected to pilot port P₆. The pilot flow supply is internal through the valve spool.

The pilot flow is 1 - 1.5 l/min. The pilot valve can be installed remote from the pump in some distance. That allows pressure setting e. g. from the control panel of the machine. The remote pressure compensator typically responds faster and more precisely than the standard pressure compensator and is able to solve instability problems that may occur with a standard pressure compensator in critical applications.

The pressure pilot valve can also be electronically controlled (proportional pressure valve) or combined with a directional control valve for low pressure standby operation.

Remote pressure compensator, code FR1

Version FR1 of the remote pressure compensator provides on its top side an interface NG6, DIN 24340 (CETOP 03 at RP35H, NFPA D03).

This interface allows a direct mounting of a pilot valve. Beside manual or electrohydraulic operated valves it is also possible to mount complete multiple pressure circuits directly on the compensator body. Parker offers a variety of these compensator accessories ready to install. See pages 44-46.

All remote pressure compensators have a factory setting of 15 bar differential pressure. With this setting, the controlled pressure at the pump outlet is higher than the pressure controlled by the pilot valve.
Load-Sensing compensator, code FFC

The load-sensing compensator has an external pilot pressure supply. Factory setting for the differential pressure is 10 bar. The input signal to the compensator is the differential pressure at a main stream resistor. A load-sensing compensator represents mainly a flow control for the pump output flow, because the compensator keeps the pressure drop at the main stream resistor constant.

A variable input speed or a varying load-pressure has consequently no influence on the output flow of the pump and the speed of the actuator.

By adding a pilot orifice (Ø 0.8 mm) and a pressure pilot valve pressure compensation can be added to the flow control function. See the circuit diagram below, left.

Shown above is load-sensing compensator, code FF1 with an NG6 interface on top of the control valve. That allows direct mounting of a pilot valve for pressure compensation. This version includes the pilot orifice.

Due to the interaction of flow and pressure compensation this package has not the "ideal" control characteristic. The deviation is caused by the pilot valves characteristic.

If a more accurate pressure compensation is required, the 2-valve load-sensing compensator code FT1 can be used. The circuit diagram of this version is shown left.

Here the interaction of the two control functions is avoided by using two separate control valves for flow and pressure compensation.

The 2-valve compensator is equipped with an interface NG6 on the compensators top side.
Hydraulic-mechanical horse power compensator

The hydraulic-mechanical horse power compensator consists of a modified remote pressure compensator (Code *L*) or of a modified load-sensing compensator (Code *C*) and a pilot valve. This pilot valve is integrated into the pump and is adjusted by a cam sleeve. The cam sleeve has a contour that is designed and machined for the individual displacement and the nominal horse power setting.

At a large displacement the opening pressure (given by the cam sleeve diameter) is lower than at small displacements. This makes the pump compensate along a constant horse power (torque) curve (see diagrams on opposite page).

For all nominal powers of standard electrical motors Parker offers a dedicated cam sleeve. The exchange of this cam sleeve (e.g.: to change horse power setting) can easily be done without disassembly of the pump.

On top of that an adjustment of the horse power setting can be done within certain limits by adjusting the preload of the pilot control cartridge spring . That allows an adjustment of a constant horse power setting for other than the nominal speeds (1500 min⁻¹) or for other horse powers.

Ordering code for the horse power option

The first digit designates the horse power setting:
- Code B = 3.0 kW etc. up to
- Code 3 = 132.0 kW

The second digit designates the pilot flow source:
- Code L internal pilot pressure, remote pressure function.
- Code C external pilot pressure, combines horse power compensation with load-sensing compensation.

The third digit designates the possibility to adjust the overriding pressure compensation:
- Code A comes with a top side NG6/D03 interface on the control valve to mount any suitable pilot valve or Parker pump accessories.
- Code B has a threaded pilot port Pₚ (G1/4) to connect a remote pilot valve with piping.
- Code C includes a pilot valve for manual pressure adjustment. Max. setting: 350 bar.

Page 33 shows typical control characteristics and the available horse power settings for the different pump sizes and displacements.
Characteristic curves, horse power compensators

The diagrams shown are only valid for the following working conditions:

- Speed: \( n = 1500 \text{ rev/min} \)
- Temperature: \( t = 50^\circ\text{C} \)
- Fluid: HLP, ISO VG46
- Viscosity: \( \nu = 46 \text{ mm}^2/\text{s at } 40^\circ\text{C} \)
Proportional displacement control, code FPV

The proportional displacement control allows the adjustment of the pump’s output flow with an electrical input signal. The actual displacement of the pump is monitored by an LVDT and compared with the commanded displacement in an electronic control module PQ0*-F00 (see opposite side). The command is given as an electrical input signal (0 - 10 V or 0 resp. 4 - 20 mA) from the supervising machine control. The command can also be provided by a potentiometer. The electronic control module offers a stabilized 10 V source to supply the potentiometer. The electronic module compares permanently the input command and the actual displacement by powering the proportional solenoid of the control valve. A deviation from the commanded displacement leads to a modulation of the input current to the solenoid. The control valve then changes the control pressure (port A) until the correct displacement is adjusted.

Version FPV of the proportional control does not provide a pressure compensation. The hydraulic circuit must be protected by a pressure relief valve.

Proportional displacement control with overriding pressure control, codes FPR, FPZ and FPG

In version FPR an additional pressure compensator valve can override the electrohydraulic displacement control. That adds pressure compensation to this control. The compensator valve has an NG6/D03 interface on top to mount a pressure pilot valve. When using a proportional pressure pilot valve an electro-hydraulic p/Q control can be realized. The electronic driver modules are tuned for the valve type PVACCP* to get the best performance.

The electronic control module PQ*-P00 (see page p-Q control analogue) contains, beside the displacement control unit, also the driver electronics for the a.m. proportional pressure valves. Using ordering code FPZ and specifying the desired pilot valve/compensator accessory, a complete multiple pressure adjustment can be mounted in our factory (see compensator accessories, pages 44-46) and the complete unit will be tested and shipped together with the pump.

With ordering code FPG the proportional pressure pilot valve and a pressure transducer (Parker SCP 8181 CE) are included with the pump control. In combination with control module PQ0*-Q00 a closed loop pressure control of the pump outlet pressure is available. Module PQ*-L00 offers an electronic horse power limiter in addition to the closed loop pressure control.

Parker variable displacement pumps have a large servo piston. That leads to a extremely robust and stable pump control. On the other hand that requires high control flows (up to > 100 l/min). Parker has therefore chosen the 2-valve p-Q control concept, because in this case a hydraulic-mechanical compensator valve takes care of the pressure compensation of the pump. That allows a very fast pressure compensation and makes this the control unsensitive to fluid contamination. We see the 2-valve concept as a contribution to system and pressure control safety.
New version of electrohydraulic displacement and pressure control

Since shortly a new and more compact version of the p-Q-control for the PVplus is available. The two figures below compare the current and the new version. The left hand side image shows a PV046 with compensator code ...FPG. With this ordering code the pump is equipped with an electro hydraulic displacement control and an overriding closed loop pressure control.

In version ...FPG the sandwich style mounting of the compensator valves, pilot valve and transducer leads to a high „tower“ of control elements. This has caused in some cases a space problem. Therefore the version with an „elbow“ manifold - shown in the right figure - has been developed. A manifold on the compensator interface of the pump allows horizontal mounting of all control and pilot elements without stacking. The compensator ordering code changes from ...FPG to ...UPG for this new version (see ordering code “electrohydraulic compensators” on page 6).

**PV046R1K1T1NFP**
Pump with electrohydraulic displacement and closed loop pressure control

**PV046R1K1T1NUP**
Pump with electrohydraulic displacement and closed loop pressure control with elbow manifold

**Beside the more compact and less vibration sensitive arrangement the elbow manifold version has more advantages:**

All elements (compensator valves, pilot valve, pressure sensor) can be removed and serviced separately.

The valve bodies of the compensator valves are standard versions and no longer the special sandwich style versions (simplified logistics).
Dimensions
Axial piston pump series PV with p-Q-control, compensator ordering code ...FPG (closed loop pressure control)

Note
For version without pressure sensor (open loop pressure control) dimensions G and H are shorter by 40 mm and dimension D₂ is not applicable.
Dimensions
Axial piston pump series PV with p-Q-control, compensator ordering code ...UPG (closed loop pressure control).

<table>
<thead>
<tr>
<th>Size</th>
<th>Dimension [mm]</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>P</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG1</td>
<td>PV016-PV023</td>
<td>66</td>
<td>132</td>
<td>94.5</td>
<td>149.5</td>
<td>243.9</td>
<td>197.5</td>
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<td>313.3</td>
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<td>234</td>
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<td>PV032-PV046</td>
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<td>156</td>
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<td>438.3</td>
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<td>92</td>
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<td>33.0</td>
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<td>234</td>
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<td>58.0</td>
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<td>360</td>
<td>176</td>
<td>521</td>
<td>85.5</td>
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<td>234</td>
</tr>
</tbody>
</table>
Axial Piston Pump
Series PV

The electronic modules to power the displacement control and the pressure control are snap-on type modules. They can be mounted on installation rails according to EN 50022. A card holder is not required. The modules have potentiometers to adjust up and down ramps (ramp time up to 5s) and a min. and max. adjustment for optimum resolution and sensitivity as required by the application. They comply with the latest legal requirements and confirm to European law. They are EMC approved and correspond to the CE guidelines.

Electronic module PQ*-P00 to operate the p-Q control for PV pumps

Ordering code analogue electronic module

![Ordering code chart]

More technical information on these modules can be found in catalogue HY11-2500/UK, chapter 10, ‘Electronics’.

Technical data

<table>
<thead>
<tr>
<th>Minimum control pressure required</th>
<th>15 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>(at internal pressure supply = minimum system pressure)</td>
<td>± 0.75 %</td>
</tr>
</tbody>
</table>

Repeatability

Proportional flow compensator (solenoid):

- nominal voltage: 16 V
- environmental temperature: 50 °C
- duty cycle: 100 %
- protection class: IP54
- connector: ISO 4400

Inductive position feedback (LVDT):

- supply voltage: 18 to 36 VDC
- current requirement: <50 mA
- output voltage: 3.5 to 11.5 VDC
- environmental temperature: 0 to 50 °C
- load to output signal: > 5 kOhm (short circuit protected)
- connector: round connector M12x1.5 pin

Response times

<table>
<thead>
<tr>
<th>Size</th>
<th>TA [ms]</th>
<th>TR [ms]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV023</td>
<td>50</td>
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<td>PV046</td>
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<tr>
<td>PV092</td>
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<td>90</td>
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<td>PV180</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>PV270</td>
<td>200</td>
<td>200</td>
</tr>
</tbody>
</table>

Diagrams

Typical static characteristic

Typical dynamic characteristic

NOTE!
The electronic modules are not included in the pump compensator. Please order separately.
Axial Piston Pump
Series PV

The digital control module code PDDXXA-Z00 is also designed for rail mounting like the analog modules.

Features
- Digital control circuit
- Parameter setting via RS-232 interface
- All settings (ramps, MIN/MAX, control parameters) can be stored digitally and recalled from a PC to duplicate settings to other modules
- Ramp time up to 60 seconds
- Compatible to the relevant european EMC specifications
- Easy to use PC based setup software
- Covers all displacements from 16 to 270 cm³/rev

Ordering code

<table>
<thead>
<tr>
<th>PQD</th>
<th>XX</th>
<th>A</th>
<th>Z00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital control module for p-Q control</td>
<td>For all frame sizes series PV</td>
<td>Version A</td>
<td>Option</td>
</tr>
</tbody>
</table>

Note
More technical information on these modules can be found in catalogue HY11-2500/UK, chapter 10, ‘Electronics’.

Technical data

<table>
<thead>
<tr>
<th>Mounting style</th>
<th>Snap-on mounting for EN50022 rail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body material</td>
<td>Polycarbonate</td>
</tr>
<tr>
<td>Inflammation class</td>
<td>V2...V0 acc. UL 94</td>
</tr>
<tr>
<td>Mounting position</td>
<td>any</td>
</tr>
<tr>
<td>Env. temperature range</td>
<td>°C -20...+55</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP 20 acc. DIN 40 050</td>
</tr>
<tr>
<td>Weight [g]</td>
<td>160</td>
</tr>
<tr>
<td>Duty ratio [%]</td>
<td>100</td>
</tr>
<tr>
<td>Supply voltage [V]</td>
<td>18...30VDC, ripple &lt;5% eff.</td>
</tr>
<tr>
<td>Rush in current [A]</td>
<td>22 for 0.2 ms</td>
</tr>
<tr>
<td>Current consumption [A]</td>
<td>&lt; 4 for p/Q-control</td>
</tr>
<tr>
<td>Resolution [%]</td>
<td>0.025 (horse power 0.1)</td>
</tr>
<tr>
<td>Interface</td>
<td>RS232C, 9600 baud, 3.5 mm cinch</td>
</tr>
<tr>
<td>EMC</td>
<td>EN 50 081-2, EN 50 082-2</td>
</tr>
<tr>
<td>Connectors</td>
<td>Screw terminals 0.2...2.5 mm² plug in style</td>
</tr>
<tr>
<td>Cables [mm²]</td>
<td>1.5 (AWG 16) overall braid shield, for supply and solenoid connection 0.5 mm² (AWG 20) overall braid shield, for sensor and command signal connections</td>
</tr>
<tr>
<td>Max. cable length [m]</td>
<td>50</td>
</tr>
</tbody>
</table>

For programming the module via PC, an interface cable is needed, to order separately.

Programming software

The programming of the p-Q-control module is done in an easy to learn mode. To select the pump model and size and to set the control parameters the program ProPVplus must be started. This program runs under WINDOWS® 95 and higher. The latest version of this software can be downloaded at the following internet address:

http://www.parker.com/euro_hcd

The software offers the following features:
- A TERMINAL window to set or read out the control parameters of the module. Settings as well as comments entered in the terminal window can be stored also in RTF-format (opens e. g. under WORD or other text editors)
- A MONITOR window allows to display process variables in numerical format.
- An OSZILLOSKOP window displays process variables as curves. The oscilloscope offers a start - stop function. The images can be saved and stored e. g. for import into other programs.

Features
- Display and documentation of parameter sets
- Save and reload of optimized parameter sets
- Offers oscilloscope function for easy performance evaluation and optimization
- Pre-optimized parameter sets for all PVplus piston pump
- Sizes already in EPROM memory
Preload valve for proportional displacement control, code PVAPVV*  
An alternative solution is the use of a direct operated preload valve. The preload valve is offered in a manifold for direct mounting to the pressure port of the pump. The opening pressure of the valve is set to approx. 20 bar. At 30 bar load pressure the valve is fully open (pressure drop <1 bar).

The ordering code for the preload valve is PVAPVV*. Therefore * stands for the frame size of the pump (thread, port and seal material option).

### Dimensions preload valve PVAPVV*

<table>
<thead>
<tr>
<th>Dimension</th>
<th>BG1 [mm]</th>
<th>BG2 [mm]</th>
<th>BG3 [mm]</th>
<th>BG4 [mm]</th>
<th>BG5 [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>130</td>
</tr>
<tr>
<td>B</td>
<td>92</td>
<td>92</td>
<td>92</td>
<td>92</td>
<td>154</td>
</tr>
<tr>
<td>T</td>
<td>80</td>
<td>80</td>
<td>92</td>
<td>92</td>
<td>105</td>
</tr>
<tr>
<td>L 2)</td>
<td>120</td>
<td>120</td>
<td>140</td>
<td>140</td>
<td>160</td>
</tr>
<tr>
<td>T_{1}</td>
<td>116</td>
<td>116</td>
<td>137</td>
<td>137</td>
<td>150</td>
</tr>
<tr>
<td>for size</td>
<td>PV016 - 023</td>
<td>PV032 - 046</td>
<td>PV063 - 092</td>
<td>PV140 - 180</td>
<td>PV270</td>
</tr>
<tr>
<td>DN</td>
<td>19 (3/4&quot;)</td>
<td>25 (1&quot;)</td>
<td>32 (1 1/4&quot;)</td>
<td>32 (1 1/4&quot;)</td>
<td>38 (1 1/2&quot;)</td>
</tr>
<tr>
<td>PN</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>M</td>
<td>M10</td>
<td>M12</td>
<td>M12 (M14*)</td>
<td>M12 (M14*)</td>
<td>M16</td>
</tr>
<tr>
<td>Q_{nominal}</td>
<td>160</td>
<td>160</td>
<td>300</td>
<td>300</td>
<td>550</td>
</tr>
</tbody>
</table>

* optional for PV063 - PV180, thread option 4; 2) L = clamping length for bolts M

### Hydraulic circuit FPR/UPR control and preload manifold

[Diagram of hydraulic circuit]

**Note:** All auxiliary manifolds can also be supplied in US-version (UNC threads and UNF ports) and with ports according to ISO 6149.
Quick unload manifold for proportional pump control, code PVAPSE*

When working with a proportional pressure control on variable displacement pumps, pressure decrease can be slow. When the pump strokes to deadhead, there is no active pressure relief. To achieve a response similar to a valve controlled system, the quick unload manifold can be mounted to the pump outlet. This manifold includes a cartridge valve with a 4 bar spring preload. The pilot pressure supply for the compensator valve is passing this cartridge valve and creates a pressure drop across the poppet. At normal working conditions this pressure drop does not exceed 3 bar and the poppet stays closed. In a dynamic response situation the pressure drop can exceed 4 bar and the cartridge actively reduces the system pressure according to the setting of the proportional pilot valve.

As the pilot pressure is fed through the quick unload manifold, the compensator needs no orifice in the spool. Ordering code for the proportional displacement and pressure control for combination with the quick unload manifold is FPS for pressure compensation and FPT for closed loop pressure control (pressure transducer and proportional pressure pilot valve included).

Dimensions quick unload manifold PVAPSE*

<table>
<thead>
<tr>
<th>Dimension</th>
<th>BG1</th>
<th>BG2</th>
<th>BG3</th>
<th>BG4</th>
<th>BG5</th>
</tr>
</thead>
<tbody>
<tr>
<td>B [mm]</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>154</td>
</tr>
<tr>
<td>H [mm]</td>
<td>92</td>
<td>92</td>
<td>100</td>
<td>100</td>
<td>120</td>
</tr>
<tr>
<td>T [mm]</td>
<td>80</td>
<td>80</td>
<td>92</td>
<td>92</td>
<td>105</td>
</tr>
<tr>
<td>B1 [mm]</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>199</td>
</tr>
<tr>
<td>H1 [mm]</td>
<td>133</td>
<td>133</td>
<td>141</td>
<td>141</td>
<td>143</td>
</tr>
<tr>
<td>for size</td>
<td>PV016 - 023</td>
<td>PV032 - 046</td>
<td>PV063 - 092</td>
<td>PV140 - 180</td>
<td>PV270</td>
</tr>
<tr>
<td>DN [mm]</td>
<td>19 (3/4&quot;)</td>
<td>25 (1&quot;)</td>
<td>32 (1 1/4&quot;)</td>
<td>32 (1 1/4&quot;)</td>
<td>38 (1 1/2&quot;)</td>
</tr>
<tr>
<td>PN [bar]</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>M</td>
<td>M10</td>
<td>M12</td>
<td>M12 (M14*)</td>
<td>M12 (M14*)</td>
<td>M16</td>
</tr>
<tr>
<td>valve insert</td>
<td>DIN E16</td>
<td>DIN E16</td>
<td>DIN E16</td>
<td>DIN E16</td>
<td>DIN E25</td>
</tr>
<tr>
<td>Q_nominal [l/min]</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>300</td>
</tr>
<tr>
<td>G (port T)</td>
<td>1/2&quot;</td>
<td>1/2&quot;</td>
<td>1/2&quot;</td>
<td>1/2&quot;</td>
<td>3/4&quot;</td>
</tr>
</tbody>
</table>

Hydraulic circuit FPS/UPS control with quick unload manifold

* optional for PV063 - PV180, thread option 4

Also available in US-version (UNC threads and UNF ports) and with ports according to ISO 6149.

Return port T, thread G;
Max. pressure pilot valve

Flange port ISO 6162, DN, PN; fits to PV frame size BG; thread M

Control port p_p, G1/4" (to compensator)

Gage port M_p,

Also available

Proportional displacement control with pressure compensation and quick unload manifold

Flow Q
Displacement
Pressure

Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany
Preload and quick unload manifold, code PVAPVE*

The combination of the preload and the quick unload function into one manifold can be ordered under the code PVAPVE*. This manifold is also designed for direct pump outlet mounting.

To maintain a secure function under all conditions the pressure compensator requires an external sensing line \(P_s\) which is connected to the system side of the preload valve.

The ordering code for this proportional displacement control option is FPP for pressure compensation and FPE for closed loop pressure control.

---

Flange ports ISO 6162; DN, PN; fit to PV, frame size BG; thread M

### Dimensions preload and quick unload manifold PVAPVE*

<table>
<thead>
<tr>
<th>Dimension</th>
<th>BG1</th>
<th>BG2</th>
<th>BG3</th>
<th>BG4</th>
<th>BG5</th>
</tr>
</thead>
<tbody>
<tr>
<td>B [mm]</td>
<td>145</td>
<td>145</td>
<td>175</td>
<td>175</td>
<td>210</td>
</tr>
<tr>
<td>H [mm]</td>
<td>113</td>
<td>113</td>
<td>135</td>
<td>135</td>
<td>160</td>
</tr>
<tr>
<td>T [mm]</td>
<td>80</td>
<td>80</td>
<td>92</td>
<td>92</td>
<td>105</td>
</tr>
<tr>
<td>L [mm]</td>
<td>120</td>
<td>120</td>
<td>140</td>
<td>140</td>
<td>160</td>
</tr>
<tr>
<td>H₁ [mm]</td>
<td>153</td>
<td>153</td>
<td>175</td>
<td>175</td>
<td>205</td>
</tr>
<tr>
<td>T₁ [mm]</td>
<td>116</td>
<td>116</td>
<td>137</td>
<td>137</td>
<td>150</td>
</tr>
<tr>
<td>for size</td>
<td>PV016 - 023</td>
<td>PV032 - 046</td>
<td>PV063 - 092</td>
<td>PV140 - 180</td>
<td>PV270</td>
</tr>
<tr>
<td>DN [mm]</td>
<td>19 (3/4&quot;)</td>
<td>25 (1&quot;)</td>
<td>32 (1 1/4&quot;)</td>
<td>32 (1 1/4&quot;)</td>
<td>38 (1 1/2&quot;)</td>
</tr>
<tr>
<td>PN [bar]</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>M</td>
<td>M10</td>
<td>M12</td>
<td>M12 (M14&quot;)</td>
<td>M12 (M14&quot;)</td>
<td>M16</td>
</tr>
<tr>
<td>valve insert NG1</td>
<td>DIN E16</td>
<td>DIN E16</td>
<td>DIN E25</td>
<td>DIN E25</td>
<td>DIN E32</td>
</tr>
<tr>
<td>valve insert NG2</td>
<td>DIN E16</td>
<td>DIN E16</td>
<td>DIN E16</td>
<td>DIN E16</td>
<td>DIN E25</td>
</tr>
<tr>
<td>(Q_{nominal}) [l/min]</td>
<td>160</td>
<td>160</td>
<td>300</td>
<td>300</td>
<td>550</td>
</tr>
<tr>
<td>(Q_{nominal}) [l/min]</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>300</td>
</tr>
<tr>
<td>(G) (port T₂)</td>
<td>1/2&quot;</td>
<td>1/2&quot;</td>
<td>3/4&quot;</td>
<td>3/4&quot;</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>(G_2) (opt. outlet)</td>
<td>3/4&quot;</td>
<td>1&quot;</td>
<td>1 1/4&quot;</td>
<td>1 1/4&quot;</td>
<td>1 1/2&quot;</td>
</tr>
</tbody>
</table>

* optional for PV063 - PV180, thread option 4
Hydraulic circuit FPS/UPS control with preload and quick unload manifold

Ordering code pump accessories

<table>
<thead>
<tr>
<th>Code</th>
<th>Function</th>
<th>Frame size</th>
<th>Thread option</th>
<th>Seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>VV</td>
<td>Preload manifold</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE</td>
<td>Quick unload manifold</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VE</td>
<td>Preload and quick unload manifold</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PV016-023</td>
</tr>
<tr>
<td>2</td>
<td>PV032-046</td>
</tr>
<tr>
<td>3</td>
<td>PV063-092</td>
</tr>
<tr>
<td>4</td>
<td>PV140-180</td>
</tr>
<tr>
<td>5</td>
<td>PV270</td>
</tr>
</tbody>
</table>

Code Seal
- N: NBR
- V: FPM
- E: EPDM

Ports & Threads

1. BSPP | Metric
2. UNF | UNC
3. BSPP | Metr. M14
4. ISO 6149 | UNC
5. ISO 6149 | Metric

1) Drain, gate and control ports
2) Mounting threads
3) For PV063-PV180 only: pressure port 1 1/4" with M14 instead of M12
Ordering Examples

Example 1
PV pump with fast response remote pressure control, relief valve with 2 pressure stages, electrical pressure selection, nitrile seals, spindle adjustment, 24 VDC solenoid, accessories fitted:

PV * * * * * * * FRZ; Z = PVAC2PCMNSJW35

Example 2
Same pump, accessories not fitted:

PV * * * * * * * FR1; 1 = PVAC2PCMNSJW35

Example 3
Usable for horsepower control and proportional volume control, too.

PV * * * * * * * FRZ; Z = PVAC2PCMNSJW35

Schematics PVAC1P*

Schematics PVAC2P*

Schematics PVAC1E*

Schematics PVAC2E
**Axial Piston Pump**

**Series PV**

<table>
<thead>
<tr>
<th>Code</th>
<th>Function</th>
<th>Adjustments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1P</td>
<td>Max. pressure relief</td>
<td>Spindle with lock nut</td>
</tr>
<tr>
<td>1E</td>
<td>1 pressure, electrical unloading</td>
<td>DIN lock</td>
</tr>
<tr>
<td>2P</td>
<td>2 pressures, electrical selection</td>
<td></td>
</tr>
<tr>
<td>2E</td>
<td>2 pressures + stands electrical selection low pressure default</td>
<td></td>
</tr>
<tr>
<td>2M</td>
<td>2 pressures + stands electrical selection stand by default</td>
<td></td>
</tr>
</tbody>
</table>

For spare parts and replacement kits see manual upon request. Please order plugs separately. See accessories in catalogue HY11-2500/UK, chapter 2, 'DC Valves'.

**Dimensions**

**PVAC1P**

Pressure relief valve mounted on 2-valve pressure-flow compensator type T

**PVAC1E**

Pressure relief valve, electrical unloading, mounted on compensator type R or F

**PVAC2P**

2-pressure relief valve, electrical selection, mounted on compensator type R or F

**PVAC2E/2M**

2-pressure relief valve, electrical selection and unloading, mounted on compensator type R or F

---

---
Ordering code proportional pressure control valve

<table>
<thead>
<tr>
<th>Code</th>
<th>Mounting bolts/ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>For single controller type R or F</td>
</tr>
<tr>
<td>T</td>
<td>For double valve contr. type T</td>
</tr>
<tr>
<td>S</td>
<td>Without bolts*</td>
</tr>
<tr>
<td>D</td>
<td>For code FPD, FPS, FPP</td>
</tr>
<tr>
<td>P</td>
<td>For code FPG, FPE, FPT</td>
</tr>
<tr>
<td>U</td>
<td>For code UP*</td>
</tr>
</tbody>
</table>

* Mounting bolts code "S" only in combination with thread option "M"

Proportional pressure control valve

Proportional pressure pilot valves of series PVACPP* are powered by external electronic modules (e.g. PCD00*, see catalogue HY11-2500/UK, chapter 10, ‘Electronics’). They allow an infinite electronic adjustment of the pumps compensating pressure. The different pressure ratings come with different control orifices in the pilot valve.

Schematic PVACPP*

Dimensions PVACPP*

<table>
<thead>
<tr>
<th>Code</th>
<th>Nominal pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>350 bar</td>
</tr>
<tr>
<td>42</td>
<td>420 bar</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>NBR</td>
</tr>
<tr>
<td>V</td>
<td>FPM</td>
</tr>
<tr>
<td>E</td>
<td>EPDM</td>
</tr>
</tbody>
</table>

Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany
System protection through new manifolds for pump safety

These manifolds for pumps prevent hydraulic systems from inadmissible pressure rises. In addition to pressure limiting types, modules with integrated check valves which allow several pumps to co-operate in a hydraulic circuit are available. The product range also includes electrically unloadable manifolds with or without check valves. The Parker manifolds for pump safety match all pumps with SAE flange bearings from SAE 3/4 to 1 1/2 -6000 PSI. The modules can be mounted directly onto the pump flange, rendering expensive piping and assembly superfluous.

- Protection against inadmissible increase in hydraulic systems
- Variety of functions - pressure relief with check valve for pump combinations, electrical unloading with/without check valve
- Direct mounting on pump pressure port - extra piping and assembly unnecessary
- Pressure-free pump start and bypass function
- Suitable for pump ports SAE 3/4 to SAE 1 1/2 6000 PSI

<table>
<thead>
<tr>
<th>Pump size</th>
<th>Max. flow [l/min]</th>
<th>Min/Max pressure DB [bar]</th>
<th>Min. circulation pressure DCV [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV016 /PV023</td>
<td>24 / 34.5</td>
<td>7 / 350</td>
<td>5</td>
</tr>
<tr>
<td>PV032 /PV046</td>
<td>48 / 69</td>
<td>5 / 350</td>
<td>5</td>
</tr>
<tr>
<td>PV063 /PV092</td>
<td>94.5 / 138</td>
<td>6 / 350</td>
<td>5</td>
</tr>
<tr>
<td>PV140 / PV180</td>
<td>210 / 270</td>
<td>6 / 350</td>
<td>5</td>
</tr>
<tr>
<td>PV270</td>
<td>405</td>
<td>6 / 350</td>
<td>5</td>
</tr>
</tbody>
</table>

Please note that a pressure increase by more than approx. 20% of the adjusted pressure is possible by increasing volume flow.

Ordering code

PVAP

Accessories for axial piston pump, PV series, pressure port mounting

Function

Size

Thread option

Seal

<table>
<thead>
<tr>
<th>Code</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV</td>
<td>Pressure relief valve</td>
</tr>
<tr>
<td>SR</td>
<td>Pressure relief valve with check valve</td>
</tr>
<tr>
<td>ST</td>
<td>Pressure relief valve with check valve, electr. unloading</td>
</tr>
<tr>
<td>SS</td>
<td>Pressure relief valve with electr. unloading</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PV016 – PV023 (SAE3/4–6000PSI)</td>
</tr>
<tr>
<td>2</td>
<td>PV032 – PV046 (SAE1–6000PSI)</td>
</tr>
<tr>
<td>3</td>
<td>PV063 – PV092 (SAE11/4–6000PSI)</td>
</tr>
<tr>
<td>4</td>
<td>PV140 – PV180 (SAE11/4–6000PSI)</td>
</tr>
<tr>
<td>5</td>
<td>PV270 (SAE11/2–6000PSI)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>2</td>
<td>NBR</td>
</tr>
<tr>
<td>3</td>
<td>FPM</td>
</tr>
<tr>
<td>4</td>
<td>NBR</td>
</tr>
<tr>
<td>5</td>
<td>EPDM</td>
</tr>
</tbody>
</table>

Please note:
1) Drain, gage and control ports
2) Mounting threads
3) For PV063-PV180 only: pressure port 1 1/4” with M14 instead of M12

Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany

Pi PVplus UK PMD RH
Option SV, pump safety manifold with pressure relief valve

Size | b1 | b2 | b3 | b4 | h1 | h2 | h3 | t | M | P 6000 PSI | T | O-ring
---|---|---|---|---|---|---|---|---|---|---|---|---
PVAPSV11 | 27 | 85 | 27.4 | 67 | 40 | 90 | 22.5 | 45 | G 1/4 | G/SAE 3/4 | G 1/2 | 2-214
PVAPSV21 | 32 | 95 | 30 | 73.2 | 45 | 100 | 22.5 | 45 | G 1/4 | SAE 1 | G 3/4 | 2-219
PVAPSV31 | 37 | 125 | 27 | 94.3 | 60 | 120 | 30 | 60 | G 1/4 | SAE 1 1/4 | G 1 1/4 | 2-222
PVAPSV41 | 37 | 125 | 31 | 94.3 | 60 | 120 | 30 | 60 | G 1/4 | SAE 1 1/4 | G 1 1/4 | 2-222
PVAPSV51 | 50 | 145 | 36 | 112.4 | 60 | 125 | 35 | 70 | G 1/4 | SAE 1 1/2 | G 1 1/2 | 2-225

Mounting bolts not included in delivery.
Option SR, pressure relief with check valve

| Size     | b1   | b2   | b3   | b4   | b5   | h1   | h2   | h3   | h4   | t1  | t2  | d1  | d2  | M   | P 6000 PSI | T   | O-ring |
|----------|------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|------|-----|--------|
| PVAPSR11 | 63.5 | 85   | 29   | 67.5 | 22.5 | 42   | 93   | 70   | 41   | 89  | 90  | 11  | 17  | G 1/4 | G/SAE 3/4 | G 1/2 | 2-214   |
| PVAPSR21 | 75   | 110  | 30.5 | 88.5 | 104  | 67.5 | 22.5 | 42   | 93   | 70  | 41  | 89  | 90  | 11  | 17  | G 1/4 | G/SAE 3/4 | G 1/2 | 2-219   |
| PVAPSR31 | 95.5 | 140  | 31   | 110.4| 120  | 67.5 | 22.5 | 42   | 93   | 70  | 41  | 89  | 90  | 11  | 17  | G 1/4 | SAE 1  | G 1/2 | 2-222   |
| PVAPSR41 | 95.5 | 140  | 31   | 110.4| 120  | 67.5 | 22.5 | 42   | 93   | 70  | 41  | 89  | 90  | 11  | 17  | G 1/4 | SAE 1  | G 1/2 | 2-222   |
| PVAPSR51 | 115  | 160  | 36.4 | 126  | 135  | 67.5 | 22.5 | 42   | 93   | 70  | 41  | 89  | 90  | 11  | 17  | G 1/4 | SAE 1  | G 1/2 | 2-225   |

Mounting bolts included in delivery.

Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany
Option ST, pressure relief with check valve, electr. unloading with/without check valve

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Mounting bolts included in delivery.

Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany
Option SS, pressure relief valve with electr. unloading

Mounting bolts not included in delivery.

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</table>
**Accessories**

**Axial Piston Pump Series PV**

**Bell housing, coupling and foot flange**

Can be purchased at:

**Raja**
Rahner + Jansen GmbH
Vorthstr. 1
58775 Werdohl, Germany
Tel.: (+2392) 5090, fax: (+2392) 4966

**KTR**
Kupplungstechnik GmbH
Rodder Damm
48432 Rheine, Germany
Tel.: (+5971) 798-0, fax: (+5971) 798443

**Welding flange** *

**Threaded flange** *

Can be purchased at:

**Parker Hannifin GmbH**
**Tube Fittings Division**
Am Metallwerk 9
33659 Bielefeld, Germany
Tel.: (+521) 4048-0, fax: (+521) 4048280

**SAE-flange connections, pipe connection in accordance to DIN 2353**

**Elbow SAE-flange connection WFS** *

**Straight SAE-flange connection GFS** *

Can be purchased at:

**Parker Hannifin GmbH**
**Tube Fittings Division**
Am Metallwerk 9
33659 Bielefeld, Germany
Tel.: (+521) 4048-0, fax: (+521) 4048280

* For further information about flanges see catalogue No. 4039/UK „Pressure Hydraulic Flanges“ (on request)
Fluid recommendations

Premium quality hydraulic mineral oil fluids are recommended, like H-LP oils to DIN 51524, part 2. The viscosity range should be 25 to 50 mm²/s (cSt) at 50 °C.

Normal operating viscosity range between 12 and 100 mm²/s (cSt). Maximum start-up viscosity is 320 mm²/s (cSt). Operating temperature -10 to + 70 °C.

For other fluids such as phosphoric acid esters or for other operating conditions consult your Parker representative for assistance.

Seals

NBR (nitrile) seals are used for operation with hydraulic fluids based on mineral oil. For synthetic fluids, as perhaps phosphoric acid esters, Fluorocarbon seals are required. Consult your Parker representative for assistance.

Drain line

The drain line must lead directly to the reservoir without restriction. The drain line must not be connected to any other return line. The end of the drain line must be below the lowest fluid level in the reservoir and as far away as possible from the pump inlet line. This ensures that the pump does not empty itself when not in operation and that hot aircated oil will not be recirculated.

For the same reason, when the pump is mounted inside the reservoir, the drain line should be arranged in such a way that a siphon is created. This ensures that the pump is always filled with fluid. The drain pressure must not exceed 2 bar. Drain line length should not exceed 2 metres. Minimum diameter should be selected according to the port size and a straight low pressure fitting with maximised bore should be used.

Shaft rotation and alignment

Pump and motor shafts must be aligned within 0.25mm T.I.R. maximum. A floating coupling must be used. Bellhousings and couplings can be ordered at manufacturers listed in this catalogue. Please follow the coupling manufacturer's installation instructions. Consult your Parker representative for assistance on radial load type drives.

Start up

Prior to start up, the pump case must be filled with hydraulic fluid (use case drain port). Initial start up should be at zero pressure with an open circuit to enable the pump to prime. Pressure should only be increased once the pump has been fully primed.

Attention: Check motor rotation direction.

For more details see installation manual HY11-PV016.

Drain port

Compensation may cause short-term (20 to 30 ms) flow increase, e.g. 30 l/min (PV 016 to 023), 40 l/min (PV 032 to 046), 60 l/min (PV 063 to 092), 80 l/min (PV 140 to 180) and/or 120 l/min (PV 270). Please consider for dimensioning.

Filtration

For maximum pump and system component functionality and life, the system should be protected from contamination by effective filtration.

For maximum pump and system component functionality and life, the system should be protected from contamination by effective filtration.

Fluid cleanliness should be in accordance with ISO classification ISO 4406:1999. The quality of filter elements should be in accordance with ISO standards.

Minimum requirement for filtration rate x (mm):

Class 20/18/15, to ISO 4406:1999

\[ x = 25 \, \mu m \left( \beta_{25} \geq 75 \right) \] to ISO 4572

Hydraulic systems with maximised component life and functionality:

Class 18/16/13, to ISO 4406:1999

\[ x = 10 \, \mu m \left( \beta_{10} \geq 75 \right) \] to ISO 4572

It is recommended to use return line or pressure filters. Parker Filter Division offers a wide range of these filters for all common applications and mounting styles. The use of suction filters should be avoided, especially with fast response pumps. Bypass filtration is a good choice for best filter efficiency.

Installation and mounting

Horizontal mounting: Outlet port side or top. Inlet port side or bottom, drain port always uppermost.

Vertical mounting: Shaft pointing upwards.

Install pump and suction line in such a way that the maximum inlet pressure never exceeds 0.8 bar absolute. The inlet line should be as short and as straight as possible. A short suction line cut to 45° is recommended when the pump is mounted inside the reservoir, to improve the inlet conditions. All connections to be leak-free, as air in the suction line will cause cavitation, noise, and damage to the pump.
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Fax: +852 2425 6896

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Fax: +1 216-896-4031
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Fax: +1 847-821-7600

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