PVE Piston Pumps

PVE12 Variable Displacement Single Pump
PVE19 / PVE21 Variable Displacement Single & Thru-Drive Pumps
PVE4*-25V Integrated Models
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Vickers PVE piston pumps are inline, variable displacement pumps that are available in three displacement sizes. An assortment of optional controls offer maximum operating flexibility. Pump displacement is varied by means of pressure and/or flow compensator controls.

**PVE Integrated Pump**
A unique integrated pump package is also available. This package includes a 72 or 79 l/min (19 or 21 USgpm at 1800 r/min) PVE piston pump and a 25V fixed intra-vane pump in a single inlet, double outlet ported unit. This compact package is used in a wide variety of circuits with both fixed and variable flow requirements. The result is lower installed costs as only one mounting pad and one inlet line are needed for the two independent pumps.

**Features and Benefits**
- Inline, variable displacement pump
- Three displacement sizes
- Displacement is varied by pressure/flow compensator controls
- Optional controls for maximum operating flexibility
- Thru-drive available on PVE 19/21
- Unique integrated pump package also available
Controls

Pressure Compensator Control, “C” Option
This control automatically varies pump displacement to meet the system flow demand for a constant system pressure. Displacement starts to reduce to zero within 14 bar (200 psi) of the compensator setting. Power draw-off is minimized, therefore, system relief valves should not be required.

Pressure Compensator Control with Maximum Displacement Adjustment, “CC” Option
As indicated for “C” option above, except there is an independent screw adjustment of maximum displacement from 100% (rated) to 25%.

Load Sensing Compensator and Pressure Limiter, “CVP(C)” Option
This compensator provides load sensing control under all pressure conditions up to the desired maximum. It automatically adjusts pump flow in response to a remote pressure signal and maintains outlet pressure at approximately 11 bar (160 psi) above load pressure. The integral pressure limiter overrides the load sensing control, reducing pump displacement as the preset maximum operating pressure is reached. Override begins within 14 bar (200 psi) of the preset maximum pressure compensator setting.

PVE with Pressure Compensator Arranged for Remote Control, “CG” Option
Exactly the same as the “C” (pressure compensation option) except the machine operator is able to change the compensator setting through the use of a remote pilot relief valve.

Note: Graphic symbols shown with external valve(s) and cylinder to illustrate typical usage.

“CC”

“CVP(C)”

“CG”

Note: Optional internal bleed orifice diameter is .015”

NOTE
A kit is available for an electrical dual pressure compensator. This control automatically adjusts pump delivery to maintain system volume requirements at either of two preselected operating pressures. This allows lower settings for low horsepower start-up, equipment testing, etc. This kit also allows for higher pressure settings as required in machine applications. For details refer to service drawing I–3255–S.
# Operating Data

## Displacement, Speed, and Pressure Ratings

<table>
<thead>
<tr>
<th>Model Code</th>
<th>Displacement cm³/r (in³/r)</th>
<th>Rated Input Speed (At 0 psig Inlet)</th>
<th>Maximum Pressure bar (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shaft End Pump</td>
<td>Cover End Pump</td>
<td>Shaft End</td>
</tr>
<tr>
<td>PVE12</td>
<td>25 (1.54)</td>
<td>—</td>
<td>207 (3000)</td>
</tr>
<tr>
<td>PVE19</td>
<td>41 (2.50)</td>
<td>2400</td>
<td>207 (3000)</td>
</tr>
<tr>
<td>PVE21</td>
<td>45 (2.75)</td>
<td>2400</td>
<td>186 (2700)</td>
</tr>
<tr>
<td>PVE41-25V40M (mobile)</td>
<td>41 (2.50)</td>
<td>40 (2.44)</td>
<td>207 (3000)</td>
</tr>
<tr>
<td>PVE41-25V45M (mobile)</td>
<td>41 (2.50)</td>
<td>45 (2.75)</td>
<td>207 (3000)</td>
</tr>
<tr>
<td>PVE41-25V55M (mobile)</td>
<td>41 (2.50)</td>
<td>55 (3.36)</td>
<td>207 (3000)</td>
</tr>
<tr>
<td>PVE41-25V67M (mobile)</td>
<td>41 (2.50)</td>
<td>67 (4.09)</td>
<td>207 (3000)</td>
</tr>
<tr>
<td>PVE45-25V40M (mobile)</td>
<td>45 (2.75)</td>
<td>40 (2.44)</td>
<td>186 (2700)</td>
</tr>
<tr>
<td>PVE45-25V45M (mobile)</td>
<td>45 (2.75)</td>
<td>45 (2.75)</td>
<td>186 (2700)</td>
</tr>
<tr>
<td>PVE45-25V55M (mobile)</td>
<td>45 (2.75)</td>
<td>55 (3.36)</td>
<td>186 (2700)</td>
</tr>
<tr>
<td>PVE45-25V67M (mobile)</td>
<td>45 (2.75)</td>
<td>67 (4.09)</td>
<td>186 (2700)</td>
</tr>
<tr>
<td>PVE41-25V40I (quieted)</td>
<td>41 (2.50)</td>
<td>40 (2.44)</td>
<td>1800</td>
</tr>
<tr>
<td>PVE41-25V45I (quieted)</td>
<td>41 (2.50)</td>
<td>45 (2.75)</td>
<td>1800</td>
</tr>
<tr>
<td>PVE41-25V55I (quieted)</td>
<td>41 (2.50)</td>
<td>55 (3.36)</td>
<td>1800</td>
</tr>
<tr>
<td>PVE41-25V67I (quieted)</td>
<td>41 (2.50)</td>
<td>67 (4.09)</td>
<td>1800</td>
</tr>
</tbody>
</table>

## Pressure Limits*

<table>
<thead>
<tr>
<th>Port</th>
<th>Pressure Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inlet †</td>
<td>0.2 bar to 2.0 bar (5 in. Hg. vacuum to 30 psi)</td>
</tr>
<tr>
<td>Outlet</td>
<td>See Maximum Pressures listed above</td>
</tr>
<tr>
<td>Drain</td>
<td>0.35 bar (5 psig) maximum</td>
</tr>
</tbody>
</table>

* Integral relief valve protects pump by limiting case pressure peaks to 0.7 bar (10 psi) above inlet pressure. Flow from valve returned directly to pump inlet. Case drain line required to limit steady-state case pressure.

† See page A.6 for Inlet vs. Speed details.

## Preparation for Start-up

Before starting a PVE pump, fill the case through the uppermost drain port with system hydraulic fluid. The case drain line must be connected to the reservoir below oil level. For multiple pump arrangements that include non-PVE sections, the requirements of the non-PVE units must also be considered.

## Mounting

Vickers Engineering recommends these PVE series piston pumps be mounted horizontally.
Overspeed Limits

At Full Flow Conditions

<table>
<thead>
<tr>
<th>Displacement cm³/r (in³/r)</th>
<th>Inlet Pressure/Vacuum*</th>
<th>Maximum Speed** rpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVE21 full displacement 45 (2.75)</td>
<td>5 psig</td>
<td>2800</td>
</tr>
<tr>
<td>PVE19 full displacement 41 (2.50)</td>
<td>0 psig</td>
<td>2400</td>
</tr>
<tr>
<td></td>
<td>5 in. Hg.</td>
<td>2100</td>
</tr>
<tr>
<td>PVE19/21 destroked 33 (2.00)</td>
<td>5 psig</td>
<td>3100</td>
</tr>
<tr>
<td></td>
<td>0 psig</td>
<td>2750</td>
</tr>
<tr>
<td></td>
<td>5 in. Hg.</td>
<td>2500</td>
</tr>
<tr>
<td>PVE19/21 destroked 25 (1.50)</td>
<td>5 psig</td>
<td>3200</td>
</tr>
<tr>
<td></td>
<td>0 psig</td>
<td>3000</td>
</tr>
<tr>
<td></td>
<td>5 in. Hg.</td>
<td>2850</td>
</tr>
</tbody>
</table>

PVE12 limited to 3000 rpm at full displacement and 0 psig inlet.

* Minimum pressure/vacuum required at pump inlet to operate at displacement and speed listed.
** Speeds not listed, but within displacements shown above, may be calculated from values listed.

At Load Sense Standby Condition – CVP(C) Controls
Pump must be in zero flow, low pressure, standby condition when operated at listed speed. Pump may be damaged if not slowed to normal rated speed before being operated at full flow.

<table>
<thead>
<tr>
<th>Model Code</th>
<th>Maximum Speed rpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVE12</td>
<td>3600</td>
</tr>
<tr>
<td>PVE19</td>
<td>3200</td>
</tr>
<tr>
<td>PVE21</td>
<td>3200</td>
</tr>
</tbody>
</table>

Response Data
Yoke response recorded at rated speed and pressure, 0 psi inlet, 82°C (180°F), SAE 10W oil. Pressure rise was 6900 bar (100,000 psi) per second.

<table>
<thead>
<tr>
<th>Control Type</th>
<th>PVE12</th>
<th>PVE19/21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure compensator</td>
<td>0.030</td>
<td>0.012</td>
</tr>
<tr>
<td>Load sense compensator</td>
<td>0.040</td>
<td>0.012</td>
</tr>
</tbody>
</table>

Sound Data
Sound level dB(A) per ISO 4412 standard.

<table>
<thead>
<tr>
<th>Model Code</th>
<th>1200 rpm, 70 bar (1000 psi)</th>
<th>1500 rpm, 140 bar (2000 psi)</th>
<th>1800 rpm, 207 bar (3000 psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full Stroke dB(A)</td>
<td>Compensated Stroke dB(A)</td>
<td>Full Stroke dB(A)</td>
</tr>
<tr>
<td>PVE12</td>
<td>71</td>
<td>65</td>
<td>76</td>
</tr>
<tr>
<td>PVE19</td>
<td>79</td>
<td>74</td>
<td>83</td>
</tr>
<tr>
<td>PVE21</td>
<td>75</td>
<td>73</td>
<td>79</td>
</tr>
</tbody>
</table>
Model Code

PVE12 R - B 2 - E S - 10 - C C21 * * * * - * 1 * - ***

1 Model series
PVE – Piston pump, variable, E series

2 Frame size
12 – 45 l/min (12 USgpm) @ 1800 rpm
25cm³/r (1.54 in³/r)

3 Rotation (viewed from shaft end)
R – Right hand
L – Left hand

4 Mounting flange
B – SAE “B” 2-bolt

5 Input shaft
1 – SAE “B” straight keyed
2 – SAE “B” splined
28 – 26 tooth splined (special Vickers).
See chart below

6 Port configuration
E – End ported, SAE O-ring ports (standard)
M – End ported, metric O-ring ports per ISO 6149 (optional)

7 Shaft seal
S – Single

8 Pump design
10 – 10 series
Subject to change. Installation dimensions remain the same for design numbers *0 to *9 inclusive.

9 Adjustable maximum volume stop
C – With stop option
Blank – Omit if not required

10 Control options
C** – Pressure compensator, adjustable from 20–207 bar (300–3000 psi).
Standard setting “C21” indicates 207 bar (3000 psi). (standard)
CG – Remote adjustment pressure compensator (optional)
C**VP11 – Load sensing with “C” type pressure limiter. Load sense set at 11 bar (160 psi). (standard)
C**VPC24 – Load sense with “C” type pressure limiter. Load sense set at 24 bar (350 psi). (optional)

** indicates pressure compensator setting in tens of bar.

11 Control bleed down
(CVP models only)
B – Bleed down orifice (0.015” dia.) in load sense control (standard)
P – Plug, no bleed down orifice in load sense control (optional)
Blank – Omit for C, CC, CD and CG models

12 Control design
11 – CC, CG, and CCG
12 – CVP, CVPC, CCVP, and CCVPC

13 Special suffix
Blank – Omit if not required
298 – Special CG control for use with electronically modulated relief valve

PVE12 Shaft Torque Data

<table>
<thead>
<tr>
<th>Input Shaft</th>
<th>Designation</th>
<th>Thru–Drive Option</th>
<th>Maximum Input Torque N.m (lb.in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SAE “B” straight keyed</td>
<td>No</td>
<td>135 (1200)</td>
</tr>
<tr>
<td>2</td>
<td>SAE “B” spline 13T, 16/32 D.P., FRMDF</td>
<td>No</td>
<td>208 (1850)</td>
</tr>
<tr>
<td>28</td>
<td>Special Vickers 26T for use in rear pump of tandem PVE**-PVE12 unit</td>
<td>No</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Performance Curves

PVE12
Oil type: SAE 10W
Oil temperature: 82°C (180°F)
Inlet pressure: 0 psi

Effective Flow Versus Speed

Input Power Versus Speed

Overall Efficiency Versus Speed
Installation Dimensions

PVE12 with C-type Controls

Outlet port (see note) 1.0625-12 UN-2B thd. SAE O-ring boss connection .750 O.D. tubing (shown for R.H. rotation)

Drain port “D2” .750-16 UNF-2B thd. SAE O-ring boss connection .500 O.D. tubing

Inlet port (see note) 1.625-12 UN-2B thd. SAE O-ring boss connection 1.250 O.D. tubing

Alternate drain port “D1” .750 - 16 UNF - 2B thd. SAE O-Ring boss connection .500 O.D. tubing

Construction plugs Do not remove

Compensator position R.H. rotation (reverse for L.H. rotation)

NOTE
Ports are reversed for L.H. rotation.

PVE12 Shaft Options

No. 1 Shaft: SAE “B” Straight Keyed

No. 2 Shaft: SAE “B” Splined

NOTE
Applications requiring overhung load or side loading of shaft are subject to Vickers engineering approval.
PVE12 Controls

PVE12 CC Adjustable
Maximum Volume Stop
See installation dimensions page A.9 for other details.

Adjustment
Loosen the locknut on the adjusting rod. Turn the adjusting rod clockwise to decrease maximum pump delivery, or counterclockwise to increase maximum pump delivery, until the desired setting is obtained. Secure the setting by tightening the locknut. To assist initial priming, the manual adjustment control setting must be at least 40% of the maximum flow position.

This control enables maximum pump delivery to be externally adjusted from 25% to 100% while maintaining all the standard features of a pressure compensated pump.

PVE12 CVP Load Sensing
with Pressure Limiter
PVE12 CG Remote
Adjustment Compensator
See installation dimensions page A.9
for other details.

Compensator control port location for R.H. rotation
.4375-20 UNF-2B thd. SAE O-ring boss connection
.250 O.D. tubing

Compensator control port location for L.H. rotation

186.0
(7.32)

20.9
(0.82)

75.1
(2.96)

54.8
(2.16)

114.8
(4.52)

15.1
(0.59)

54.8
(2.16)
**Model Code**

<table>
<thead>
<tr>
<th>(F3) PVE 19</th>
<th>R *** - 2 - 30 - C</th>
<th>C *** - 1 * - ***</th>
</tr>
</thead>
</table>

### Seals
1. **F3** – Viton® (optional)
2. Blank – Buna N (standard)

### Model series
1. PVE – Piston pump, variable, E series

### Frame size
1. 19 – 72 l/min (19 USgpm) @ 1800 rpm 41 cm³/r (2.50 in³/r)
2. 21 – 79 l/min (21 USgpm) @ 1800 rpm 45 cm³/r (2.75 in³/r)

### Rotation (viewed from shaft end)
1. **R** – Right hand
2. **L** – Left hand

### Thru-drive version
1. Blank – No thru-drive
2. **TA9** – SAE “A” 9T (J744 82-2)
3. **TA11** – SAE “A” 11T (J744 82-2)
4. **TB26** – SAE “B” 26T (J744 101-2)

### Input shaft
1. **1** – SAE “BB” straight keyed (standard)
2. **2** – SAE “BB” splined (standard)
3. **9** – SAE “B” splined (optional)
4. **16** – SAE “B” straight keyed (optional, not available on thru-drives)

### Pump design
1. **30** – Side port design
2. **40** – End port design (must include 030 special suffix)

Subject to change. Installation dimensions remain the same for design numbers “0” to “9” inclusive.

### Adjustable maximum volume stop (Not available with thru-drive option)
1. Blank – Omit if not required and with CAC control option
2. **C** – With stop option

### Control options
1. **C** – Pressure compensator, adjustable from 20–207 bar (300–3000 psi) (standard)
2. **CA** – Pressure compensator, adjustable from 20–103 bar (300–1500 psi) (standard)
3. **CAC** – Adjusting maximum displacement stop with “CA” type pressure compensator
4. **CG** – Remote adjustment pressure compensator (optional)
5. **CVP** – Load sensing with “C” type pressure limiter and 0.015” bleed orifice set at 11 bar (160 psi). Range of 11–17 bar (160–250 psi). (standard)
6. **CVPC** – Load sensing with “C” type pressure limiter and 0.015” bleed orifice set at 24 bar (350 psi). Range of 17–31 bar (250–450 psi). (optional)

### Control design
1. **10** – C, CA, and CG
2. **11** – CC, CAC, and CCG
3. **12** – CVP, CVPC, CCVP, and CCVPC

### Special suffix
1. Blank – Omit if not required
2. **030** – End ports (40 design)
3. **047** – Plug, no bleed down orifice in load sense control
4. **298** – Special CG control for use with electronically modulated relief valve
## PVE19 / 21 Shaft Torque Data

<table>
<thead>
<tr>
<th>Input Shaft</th>
<th>Designation</th>
<th>Thru–Drive Option</th>
<th>Maximum Input Torque N.m (lb.in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SAE “BB” straight keyed</td>
<td>Yes</td>
<td>215 (1900)</td>
</tr>
<tr>
<td>2</td>
<td>SAE “BB” spline 15T, 16/32 D.P., FRSF</td>
<td>Yes</td>
<td>337 (2987)</td>
</tr>
<tr>
<td>9</td>
<td>SAE “B” spline 13T, 16/32 D.P., FRSF</td>
<td>Yes</td>
<td>208 (1850)</td>
</tr>
<tr>
<td>16</td>
<td>SAE “B” straight keyed</td>
<td>No</td>
<td>135 (1200)</td>
</tr>
<tr>
<td>28</td>
<td>Special Vickers 26T for use in rear pump of tandem PVE**-PVE** unit</td>
<td>No</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Note:** See page A.20 for more details.

## Typical Rear Pumps for PVE19/21 Thru-Drives

<table>
<thead>
<tr>
<th>Model</th>
<th>Typical Rear Pump Model</th>
<th>Rear Pump Shaft Code</th>
<th>PVE** Thru-Drive Coupling</th>
</tr>
</thead>
<tbody>
<tr>
<td>TA9</td>
<td>PVQ10/13</td>
<td>3</td>
<td>864224 (9T / 9T Straight)</td>
</tr>
<tr>
<td></td>
<td>PVQ20/32</td>
<td>2</td>
<td>864307 (26T / 13T Step)</td>
</tr>
<tr>
<td></td>
<td>PVQ40/45</td>
<td>2</td>
<td>475134 (26T / 15T Step)</td>
</tr>
<tr>
<td></td>
<td>V2010 or V2020 20V(Q)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>TB26</td>
<td>PVQ10/13</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PVQ20/32</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PVQ40/45</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2520V(Q)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>V2010 or V2020 20V(Q)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PVQ10/13</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** “A11” (not listed above) is intended for special applications only.
Performance Curves

PVE19
Oil type: SAE 10W
Oil temperature: 82°C (180°F)
Inlet pressure: 0 psi

Effective Flow Versus Speed

Input Power Versus Speed

Overall Efficiency Versus Speed
PVE21
Oil type: SAE 10W Oil temperature: 82°C (180°F)
Inlet pressure: 0 psi

Effective Flow Versus Speed

Input Power Versus Speed

Overall Efficiency Versus Speed
Installation Dimensions

PVE19/21 with Side Ports
(30 Design and C-type Controls)

Millimeters (inches)

Outlet port (see note) 1.3125-12 UN-2B thd. SAE O-ring boss connection 1.000 O.D. tubing (Shown for R.H. rotation)

Drain port “D1” .875-14 UNF-2B thd. SAE O-ring boss connection 0.625 O.D. tubing

Inlet port (see note) 1.875-12 UN-2B thd. SAE O-ring boss connection 1.500 O.D. tubing (Shown for R.H. rotation)

NOTE
Ports are reversed for L.H. rotation.
PVE19/21 with End Ports
(40 Design and C-type Controls)

Millimeters (inches)

NOTE
Ports are reversed for L.H. rotation.
Controls

PVE19/21 CC Adjustable
Maximum Volume Stop

Adjustment
Loosen the locknut on the adjusting rod. Turn the adjusting rod clockwise to decrease maximum pump delivery, or counterclockwise to increase maximum pump delivery, until the desired setting is obtained. Secure the setting by tightening the locknut. To assist initial priming, the manual adjustment control setting must be at least 40% of the maximum flow position.

This control enables maximum pump delivery to be externally adjusted from 25% to 100% while maintaining all the standard features of a pressure compensated pump.

![Diagram of PVE19/21 CC Adjustable Maximum Volume Stop]
PVE19/21 CVP Load Sensing with Pressure Limiter
See page A.16 for other details and dimensions.

Compensator control port location for R.H. rotation
.4375-20 UNF-2B thd. SAE O-ring boss connection
.250 O.D. tubing

Load sensing compensator control port location for R.H. rotation
.4375-20 UNF-2B thd. SAE O-ring boss connection
.250 O.D. tubing

Compensator control port location for L.H. rotation

Load sensing compensator control port location for L.H. rotation
Shaft Options

PVE19/21

No. 1 Shaft: SAE “BB” Straight Keyed

No. 2 Shaft: SAE “BB” Splined

No. 9 Shaft: SAE “B” Splined

No. 16 Shaft: SAE “B” Straight Keyed
# Thru-Drive

## PVE19/21-* TA9/11 SAE “A” Thru-drives

**Millimeters (inches)**

<table>
<thead>
<tr>
<th>SHAFT</th>
<th>SPLINE DATA</th>
<th>DIM.”A” mm (in.)</th>
<th>DIM.”B” mm (in.)</th>
<th>DIM.”C” mm (in.)</th>
<th>MAX. TORQUE RATING N.m (ln. lbs.)</th>
<th>COUPLING LENGTH Dim. “D” mm (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TA9</td>
<td>ASA B5.15–1960 9 teeth 16 / 32 D.P. Flat Root Side Fit</td>
<td>50.8 (2.00)</td>
<td>12.7 (0.50)</td>
<td>22.6 (0.89)</td>
<td>58 (517)</td>
<td>864224 62.7 (2.47)</td>
</tr>
<tr>
<td>TA11</td>
<td>ANSI B92.1–1970 11 teeth 16 / 32 D.P. Flat Root Side Fit</td>
<td>50.8 (2.00)</td>
<td>14.5 (0.57)</td>
<td>22.6 (0.89)</td>
<td>123 (1100)</td>
<td>864325 60.9 (2.40)</td>
</tr>
</tbody>
</table>

**NOTE:** Ports are reversed for R.H. rotation.

**View A – A**

- .500-13 UNC–2B thd. 26.9 (1.06 deep) 8 plcs. for 38.1 (1.50) bolt flange
- .375-16 UNC 2 plcs. 18.2 (.72) deep

**NOTE:** Couplings, screws and washers must be ordered separately to mount rear pump. "A" O-ring (AS568-042) is included with each thru-drive pump.

**SPLINE DATA**

- ASA B5.15–1960
- ANSI B92.1–1970

**AS A5.15**

- 9 teeth 16 / 32 D.P.
- 11 teeth 16 / 32 D.P.

**Dim. “A”**

- 24.00 (0.9492)
- 23.998 (0.9443)

**Dim. “B”**

- 101.60 (4.0000)
- 101.55 (4.0000)

**Dim. “C”**

- 101.6 (4.000)
- 101.5 (4.000)

**Max. Torque Rating**

- 58 (517)
- 123 (1100)

**COUPLING Length Dim. “D”**

- 864224 62.7 (2.47)
- 864325 60.9 (2.40)
PVE19/21-*-TB26 SAE “B” Thru-drives
Millimeters (inches)

Thru-Drive Pump Support Bracket
An optional support bracket should be used when a heavy second pump is mounted to a thru-drive PVE19/21. The support bracket (627179), two screws (199740), and two washers (427700) must be ordered separately.

NOTE: Couplings, screws and washers must be ordered separately to mount rear pump. “A” O-ring (AS568-155) is included with each thru-drive pump.
Model Code

(F3) PVE 41 - 25V - 40 - R - I - 1 - S - A - 30 - C21 ****** - * - 1 *

1. **Seals**
   - F3 – Viton® (optional)
   - Blank – Buna N (standard)

2. **Model series**
   - PVE – Piston pump, variable, E series

3. **Piston pump frame size** (shaft end pump)
   - 41 – 41 cm³/r (2.50 in³/r) (PVE19 rotating group)
   - 45 – 45 cm³/r (2.75 in³/r) (PVE21 rotating group)

4. **Vane pump series** (cover end pump)
   - 25V – High performance, fixed displacement, intra-vane pump

5. **Vane pump displacement**
   - 40 – 40 cm³/r (2.44 in³/r)
   - 45 – 45 cm³/r (2.75 in³/r)
   - 55 – 55 cm³/r (3.36 in³/r)
   - 67 – 67 cm³/r (4.09 in³/r)

6. **Rotation** (viewed from shaft end)
   - R – Right hand
   - L – Left hand

7. **Rotating group type**
   - I – Quieted (1800 rpm)
   - M – Mobile (2400 rpm)

8. **Shaft type** [torque limitation]
   - 1 – SAE “BB” straight keyed
     - [215 Nm (1900 in. lbs.)]
   - 2 – SAE “BB” splined
     - [337 Nm (2987 in. lbs.)]
   - 9 – SAE “B” splined
     - [208 Nm (1850 in. lbs.)]
     - See chart below

9. **Ports** (SAE 4 bolt flange)
   - S – Inch threads (standard)
   - M – Metric threads (optional)

10. **Cover orientation** (vane pump outlet)
    - A – Outlet opposite inlet (standard)
    - B – Outlet 90° CCW from inlet (optional)
    - C – Outlet inline with inlet (standard)
    - D – Outlet 90° CW from inlet (optional)

11. **Pump design**
    - 30 – 30 series
    - Subject to change. Installation dimensions remain the same for design numbers *0 to *9 inclusive.

12. **Control options**
    - C** – Pressure compensator.
      - For PVE41: Adjustable from 20–207 bar (300–3000 psi). Standard setting “C21” indicates 207 bar (3000 psi).
      - For PVE45: Adjustable from 20–186 bar (300–2700 psi). Standard setting “C19” indicates 186 bar (2700 psi). (standard)
    - CG – Remote adjustment pressure compensator (optional)
    - C**VP11 – Load sensing with “C” type pressure limiter. Load sense set at 11 bar (160 psi). (standard)
    - C**VPC24 – Load sense with “C” type pressure limiter. Load sense set at 24 bar (350 psi). (optional)
    - ** indicates pressure compensator setting in tens of bar.

13. **Control bleed down**
    - (CVP and CVPC models only)
    - B – Bleed down orifice (0.015” dia.) in load sense control (standard)
    - P – Plug, no bleed down orifice in load sense control (optional)
    - Blank – Omit for C and CG models

14. **Control design**
    - 10 – C and CG
    - 12 – CVP and CVPC

---

PVE4*-25V Shaft Torque Data

<table>
<thead>
<tr>
<th>Input Shaft</th>
<th>Designation</th>
<th>Thru–Drive Option</th>
<th>Maximum Input Torque N.m (lb.in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SAE “BB” straight keyed</td>
<td>No</td>
<td>215 (1900)</td>
</tr>
<tr>
<td>2</td>
<td>SAE “BB” spline 15T, 16/32 D.P., FRSF</td>
<td>No</td>
<td>337 (2987)</td>
</tr>
<tr>
<td>9</td>
<td>SAE “B” spline 13T, 16/32 D.P., FRSF</td>
<td>No</td>
<td>208 (1850)</td>
</tr>
</tbody>
</table>
Performance Curves

PVE4*-25V Integrated Pumps
Oil type: SAE 10W     Oil temperature: 82°C (180°F)     Inlet pressure: 0 psi

Effective Flow Versus Speed
PVE41 Piston Pump Section

PVE45 Piston Pump Section

PVE4*-25V Vane Pump Section
(45 and 40 Displacement)

PVE4*-25V Vane Pump Section
(67 and 56 Displacement)
**PVE4*-25V Integrated Pumps** (continued)

Oil type: SAE 10W  
Oil temperature: 82 °C (180 °F)  
Inlet pressure: 0 psi

**Input Power Versus Speed at 140 bar (2000 psi)**  
(Input power is proportional to pressure)
Installation Dimensions

PVE4*-25V Integrated Pump
Millimeters (inches)

Refer to model code page for more detailed shaft information

L.H. rotation

Alternate load sensing control port

Inlet Port (See note)
Ø2.50 SAE J518
4 bolt flange
std pressure series
shown for L.H. rotation

Outlet port - vane pump
ø1.00 SAE J518 4 bolt flange
Std. pressure series

Load sensing control port
.4375-20 UNF-2B thd.
SAE O-ring boss conn.
.250 O.D. tubing

Mounting point

Cover position “B”

Cover position “D”

Cover position “C”

**NOTE**
Piston pump ports are reversed for R.H. rotation.

PVE – Port ø1.00 outlet L.H.
SAE J518 4 bolt flange
Std. pressure series

Outlet port

Load sensing control port
.375-16 UNC–2B thd
21 (.88 deep) 4 holes

“M” flange
M10 x 1.50 thds.
22 (.88 deep)

“S” flange
.500-13 UNC–2B
3099 (1.22 deep)
4 holes

Mounting point

Cover position “A”

Cover position “C”

NOTE
Piston pump ports are reversed for R.H. rotation.
Controls

PVE4*-25V Controls
Millimeters (inches)

“CG”
Remote Adj.
Compensator

“C” Compensator

PVE4*-25V
No. 1 Shaft
(BB Straight key)
Application Data

Fluid Cleanliness
Proper fluid condition is essential for long and satisfactory life of hydraulic components and systems. Hydraulic fluid must have the correct balance of cleanliness, materials, and additives for protection against wear of components, elevated viscosity, and inclusion of air.


Recommendations on filtration and the selection of products to control fluid condition are included in 561.

Recommended cleanliness levels, using petroleum oil under common conditions, are based on the highest fluid pressure levels in the system and are coded in the chart below. Fluids other than petroleum, severe service cycles, or temperature extremes are cause for adjustment of these cleanliness codes. See Vickers publication 561 for exact details.

Vickers products, as any components, will operate with apparent satisfaction in fluids with higher cleanliness codes than those described. Other manufacturers will often recommend levels above those specified. Experience has shown, however, that life of any hydraulic component is shortened in fluids with higher cleanliness codes than those listed below. These codes have been proven to provide a long, trouble-free service life for the products shown, regardless of the manufacturer.

<table>
<thead>
<tr>
<th>System Pressure Level</th>
<th>Piston Pumps – Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>bar (psi)</td>
<td>18/16/14</td>
</tr>
<tr>
<td>&lt;70 (&lt;1000)</td>
<td>70-210 (1000-3000)</td>
</tr>
</tbody>
</table>

Fire resistant fluids
Water glycol, phosphate ester and polyol ester fluids may be used with PVE pumps. With the PVE12 and 19, system pressure and input speed should not exceed 140 bar (2000 psi) and 1800 r/min.

With the PVE41-25V, system pressure and input speed should not exceed 140 bar (2000 psi) and 1200 r/min (1800 r/min for water glycol). System temperature should not exceed 54°C (130°F). Inlet vacuum should not exceed 101,6 millibar (3 in. Hg.)

Hydraulic fluids and temperature ranges
Use antiwear hydraulic oil, or automotive type crankcase oil designations SC, SD, SE or SF per SAE J183FEB80.

Select a viscosity grade that will allow optimum viscosity, between 40 cSt (180 SUS) and 16 cSt (80 SUS), to be achieved within the optimum performance envelope shown.

For further information, see Vickers Hydraulic Hints and Trouble Shooting Guide

Ordering procedure
Order PVE pumps by the full model designation. Pump displacement, mounting flange type, direction of rotation, pump configuration, shaft end type, seals, pressure adjustment range, specific control functions are all specified in the full model code.