PVE Piston Pumps

PVE12 Variable Displacement Single Pump
PVE19 / PVE21 Variable Displacement Single & Thru-Drive Pumps
PVE4*–25V Integrated Models

GB–C–2023

Table of Contents

Introduction

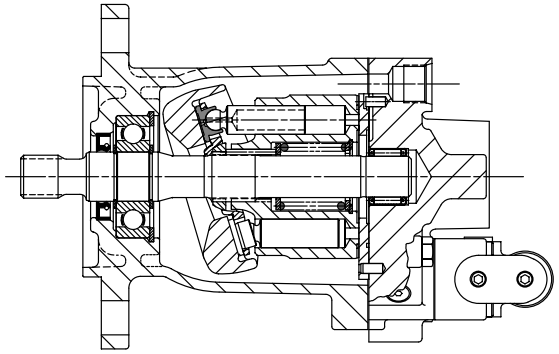
Vickers PVE piston pumps are inline, variable displacement pumps that are available in three displacement sizes. An assortment of optional controls offer maximum operating flexibility. Pump displacement is varied by means of pressure and/or flow compensator controls.

PVE Integrated Pump

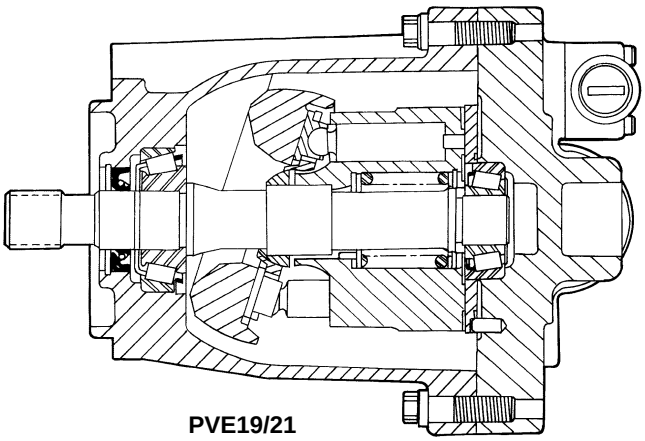
A unique integrated pump package is also available. This package includes a 72 or 79 l/min (19 or 21 USgpm at 1800 r/min) PVE piston pump and a 25V fixed intra-vane pump in a single inlet, double outlet ported unit. This compact package is used in a wide variety of circuits with both fixed and variable 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

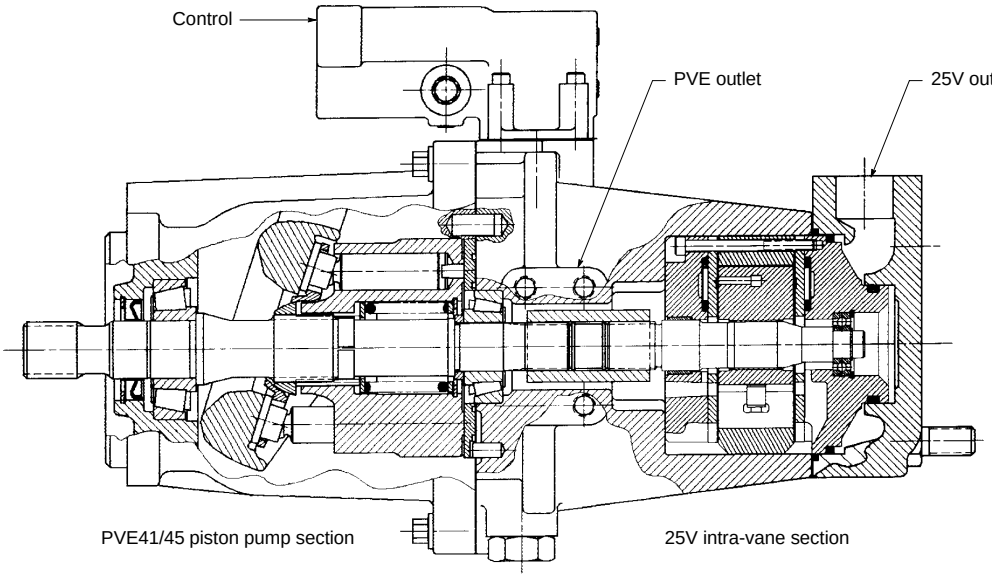


PVE12



PVE19/21

PVE41/45-25V Integrated Pump



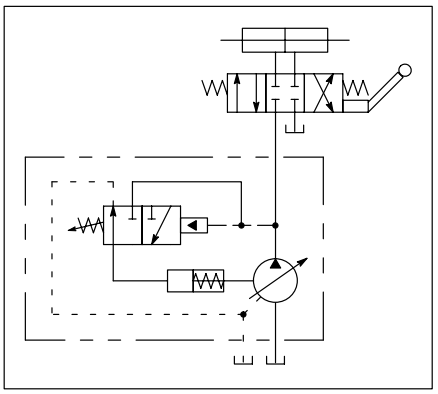
Controls

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%.

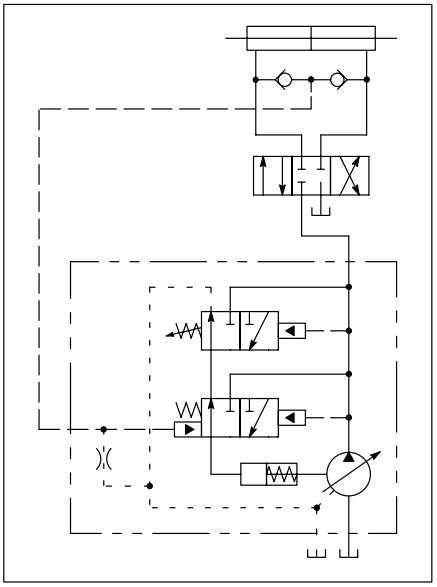


“CC”

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

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.

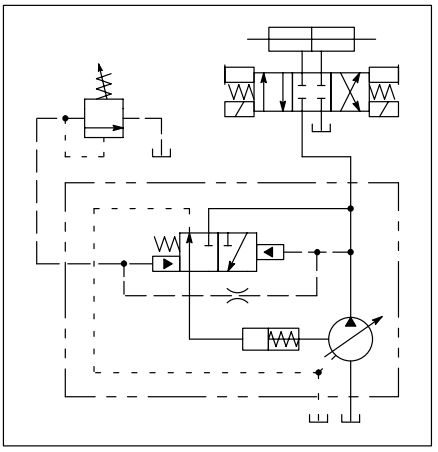


“CVP(C)”

Note: Optional internal bleed orifice diameter is .015”

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.



“CG”

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

Model Code	Displacement cm^3/r (in^3/r)		Rated Input Speed (At 0 psig Inlet)	Maximum Pressure bar (psi)	
	Shaft End Pump	Cover End Pump		Shaft End	Cover End
PVE12	25 (1.54)	—	3000	207 (3000)	—
PVE19	41 (2.50)	—	2400	207 (3000)	—
PVE21	45 (2.75)	—	2400	186 (2700)	—
PVE41-25V40M (mobile)	41 (2.50)	40 (2.44)	2400	207 (3000)	207 (3000)
PVE41-25V45M (mobile)	41 (2.50)	45 (2.75)	2400	207 (3000)	207 (3000)
PVE41-25V55M (mobile)	41 (2.50)	55 (3.36)	2400	207 (3000)	207 (3000)
PVE41-25V67M (mobile)	41 (2.50)	67 (4.09)	2400	207 (3000)	207 (3000)
PVE45-25V40M (mobile)	45 (2.75)	40 (2.44)	2400	186 (2700)	207 (3000)
PVE45-25V45M (mobile)	45 (2.75)	45 (2.75)	2400	186 (2700)	207 (3000)
PVE45-25V55M (mobile)	45 (2.75)	55 (3.36)	2400	186 (2700)	207 (3000)
PVE45-25V67M (mobile)	45 (2.75)	67 (4.09)	2400	186 (2700)	207 (3000)
PVE41-25V40I (quieted)	41 (2.50)	40 (2.44)	1800	207 (3000)	172 (2500)
PVE41-25V45I (quieted)	41 (2.50)	45 (2.75)	1800	207 (3000)	172 (2500)
PVE41-25V55I (quieted)	41 (2.50)	55 (3.36)	1800	207 (3000)	172 (2500)
PVE41-25V67I (quieted)	41 (2.50)	67 (4.09)	1800	207 (3000)	172 (2500)

Pressure Limits*

Port	Pressure Range
Inlet †	0,2 bar to 2,0 bar (5 in. Hg. vacuum to 30 psi)
Outlet	See Maximum Pressures listed above
Drain	0,35 bar (5 psig) maximum

* 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

Displacement cm^3/r (in^3/r)	**Inlet Pressure/Vacuum***	**Maximum Speed**** rpm
PVE21 full displacement 45 (2.75) PVE19 full displacement 41 (2.50)	5 psig	2800
	0 psig	2400
	5 in. Hg.	2100
PVE19/21 destroked 33 (2.00)	5 psig	3100
	0 psig	2750
	5 in. Hg.	2500
PVE19/21 destroked 25 (1.50)	5 psig	3200
	0 psig	3000
	5 in. Hg.	2850

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.

Model Code	**Maximum Speed** rpm
PVE12	3600
PVE19	3200
PVE21	3200

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.

	PVE12		**PVE19/21**	
Control Type	**On Stroke** sec.	**Off Stroke** sec.	**On Stroke** sec.	**Off Stroke** sec.
Pressure compensator	0.030	0.012	0.050	0.025
Load sense compensator	0.040	0.012	0.060	0.020

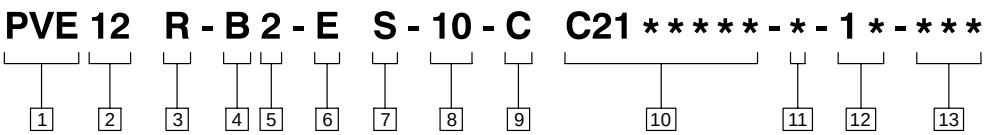
Sound Data

Sound level dB(A) per ISO 4412 standard.

	1200 rpm, 70 bar (1000 psi)		**1500 rpm, 140 bar (2000 psi)**		**1800 rpm, 207 bar (3000 psi)**	
Model Code	**Full Stroke** dB(A)	**Compensated Stroke** dB(A)	**Full Stroke** dB(A)	**Compensated Stroke** dB(A)	**Full Stroke** dB(A)	**Compensated Stroke** dB(A)
PVE12	71	65	76	72	77	77
PVE19	79	74	83	85	86	87
PVE21	75	73	79	81	83	83

PVE12

Model Code



1 Model series

PVE – Piston pump, variable, E series

2 Frame size

12 – 45 l/min (12 USgpm) @ 1800 rpm 25cm^3/r (1.54 in^3/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

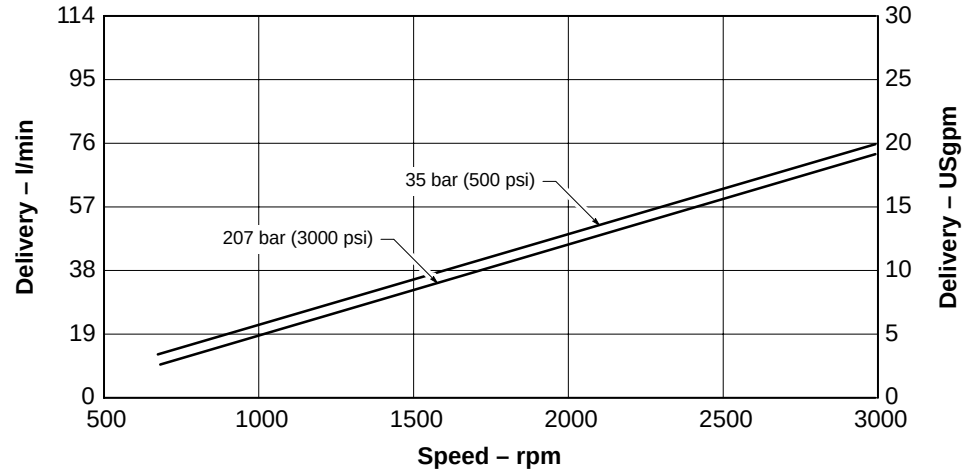
Input Shaft	Designation	Thru–Drive Option	Maximum Input Torque N.m (lb.in.)
1	SAE “B” straight keyed	No	135 (1200)
2	SAE “B” spline 13T, 16/32 D.P., FRMDF	No	208 (1850)
28	Special Vickers 26T for use in rear pump of tandem PVE**-PVE12 unit	No	N/A

Performance Curves

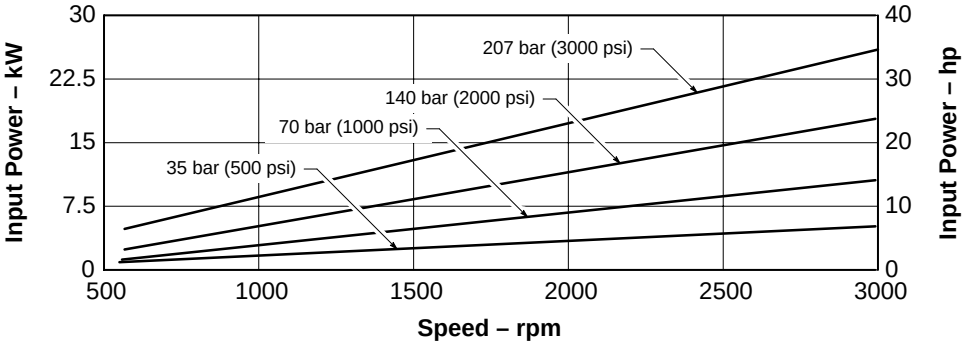
PVE12

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

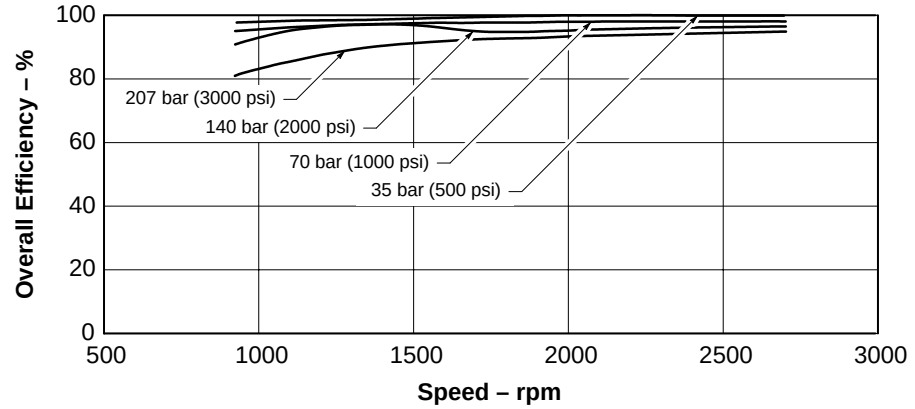
Effective Flow Versus Speed



Input Power Versus Speed



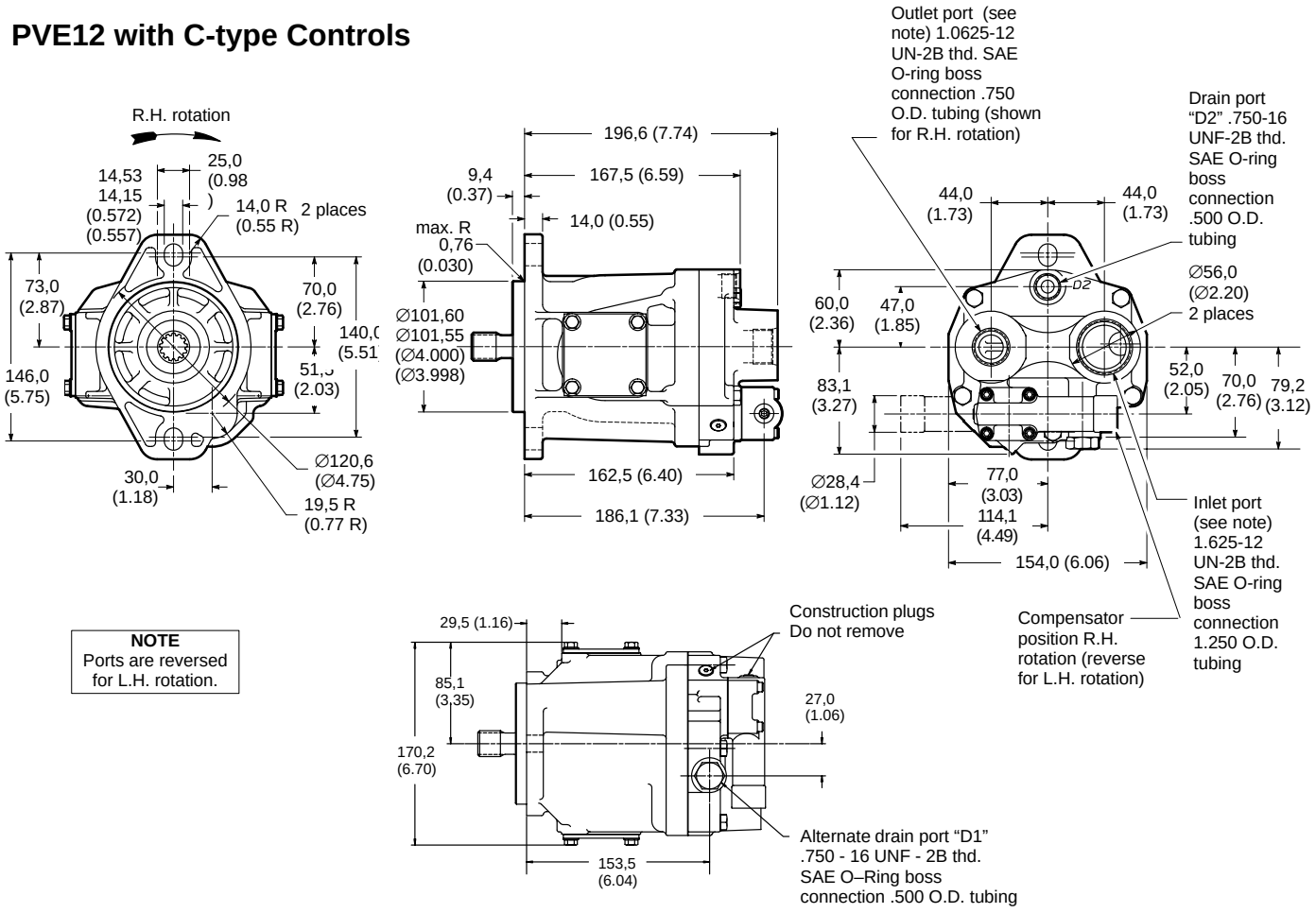
Overall Efficiency Versus Speed



Input power kW

Installation Dimensions

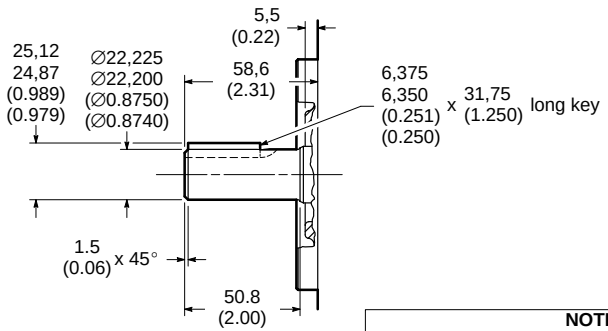
PVE12 with C-type Controls



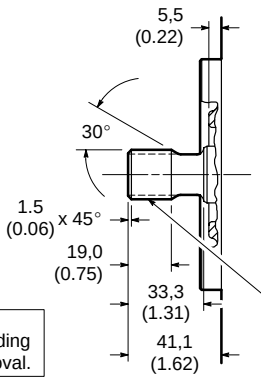
NOTE
Ports are reversed for L.H. rotation.

PVE12 Shaft Options

No. 1 Shaft: SAE "B" Straight Keyed



No. 2 Shaft: SAE "B" Splined



SAE B modified involute spline (0.8585–0.8530 major diameter, 0.715 minimum minor diameter). Flat root, side fit. Class 5 per ANSI B92.1a–1976. 13 teeth, 16/32 diameter pitch, 30°pressure angle.

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

PVE12 Controls

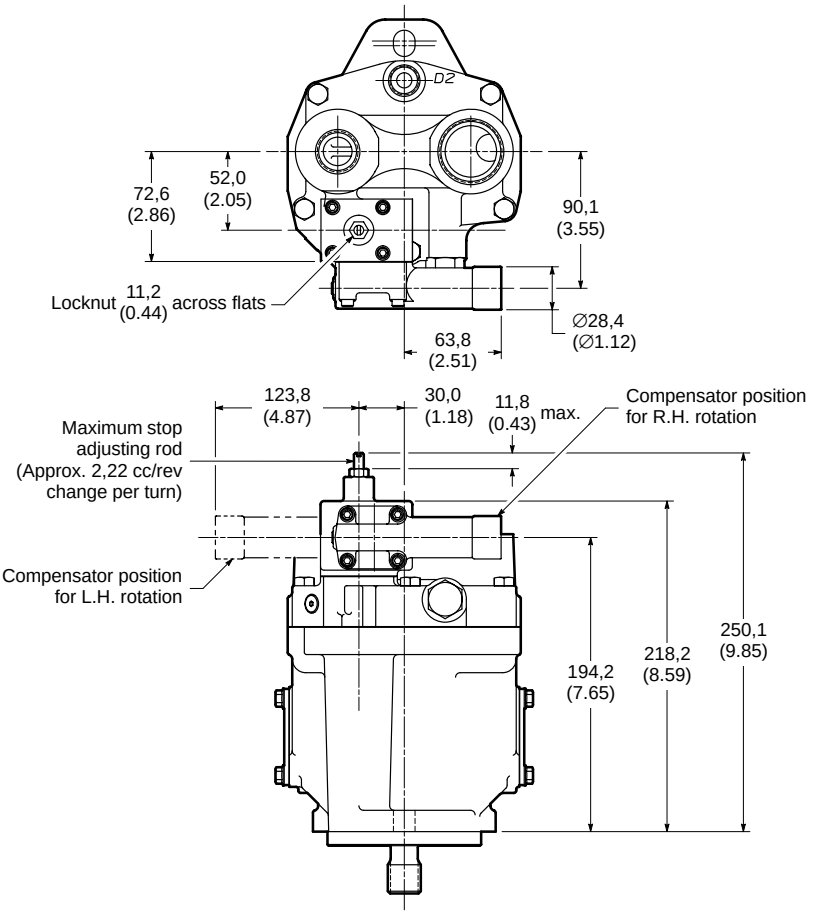
PVE12 CC Adjustable Maximum Volume Stop

See installation dimensions page A.9 for other details.

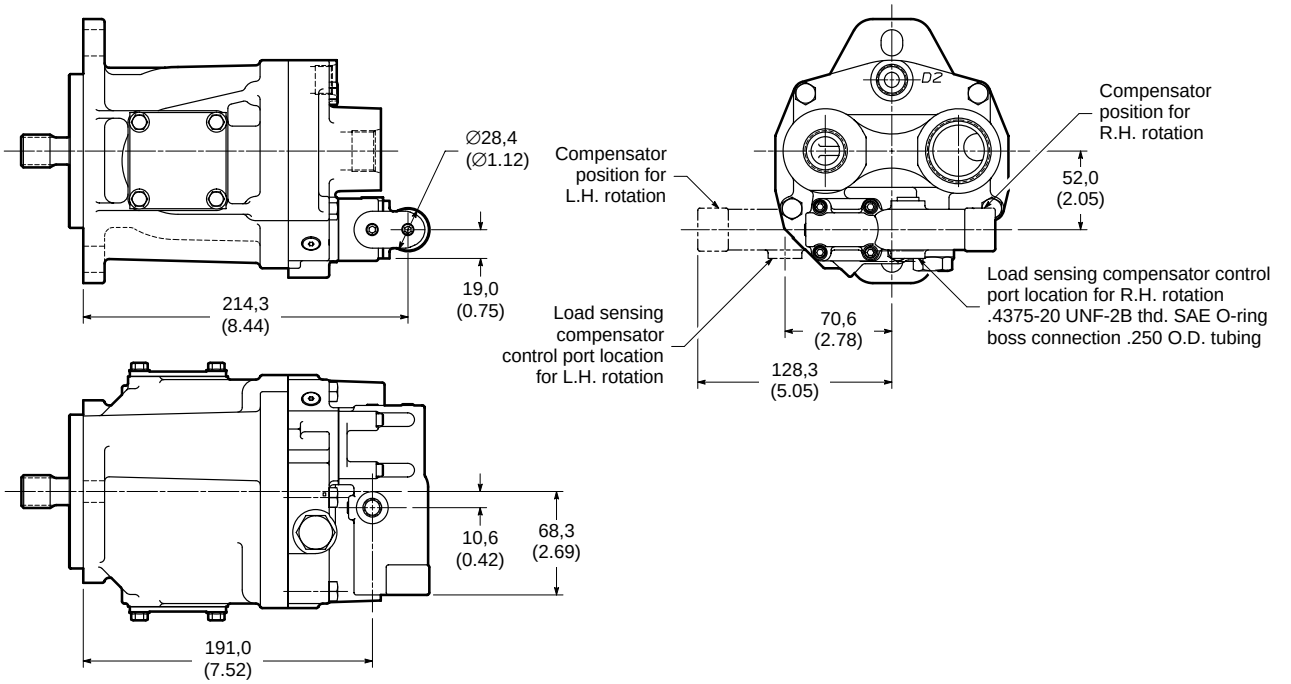
Adjustment

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.

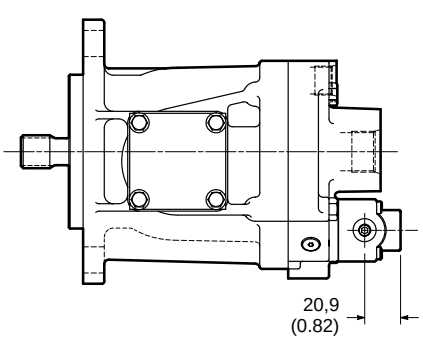


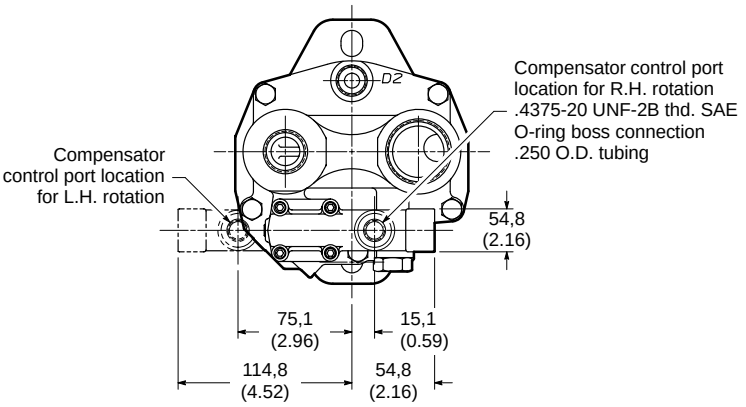
PVE12 CVP Load Sensing with Pressure Limiter

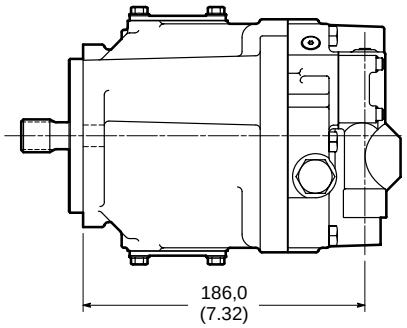


PVE12 CG Remote
Adjustment Compensator

See installation dimensions page A.9
for other details.

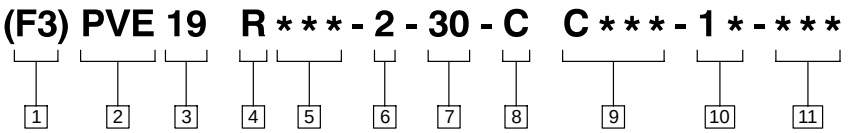






PVE19 / 21

Model Code



1 Seals

F3 – Viton® (optional)
Blank – Buna N (standard)

2 Model series

PVE – Piston pump, variable, E series

3 Frame size

19 – 72 l/min (19 USgpm) @ 1800 rpm 41 cm^3/r (2.50 in^3/r)
21 – 79 l/min (21 USgpm) @ 1800 rpm 45cm^3/r (2.75 in^3/r)

4 Rotation (viewed from shaft end)

R – Right hand
L – Left hand

5 Thru-drive version

Blank – No thru-drive
TA9 – SAE “A” 9T (J744 82-2)
TA11 – SAE “A” 11T (J744 82-2)
TB26 – SAE “B” 26T (J744 101-2)

6 Input shaft

1 – SAE “BB” straight keyed (standard)
2 – SAE “BB” splined (standard)
9 – SAE “B” splined (optional)
16 – SAE “B” straight keyed (optional, not available on thru-drives)
28 – 26 tooth splined (special Vickers, not available on thru-drives). See chart.

7 Pump design

30 – Side port design
40 – End port design (must include 030 special suffix)

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

8 Adjustable maximum volume stop (Not available with thru-drive option)

Blank – Omit if not required and with CAC control option
C – With stop option

9 Control options

C – Pressure compensator, adjustable from 20–207 bar (300–3000 psi) (standard)
CA – Pressure compensator, adjustable from 20–103 bar (300–1500 psi) (standard)
CAC – Adjustable maximum displacement stop with “CA” type pressure compensator
CG – Remote adjustment pressure compensator (optional)
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)
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)

10 Control design

10 – C, CA, and CG
11 – CC, CAC, and CCG
12 – CVP, CVPC, CCVP, and CCVPC

11 Special suffix

Blank – Omit if not required
030 – End ports (40 design)
047 – Plug, no bleed down orifice in load sense control
298 – Special CG control for use with electronically modulated relief valve

PVE19 / 21 Shaft Torque Data

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

Note: See page A.20 for more details.

Typical Rear Pumps for PVE19/21 Thru-Drives

Model	Typical Rear Pump Model	Rear Pump Shaft Code	PVE** Thru-Drive Coupling
TA9	PVQ10/13 PVB5/6 V10 V20	3 Suffix –S214 11 62	864224 (9T / 9T Straight)
TB26	PVE12 PVE19/21 PVQ20/32 PVQ40/45 V2010 or V2020 20V(Q)	2 9 3 3 11 151	864307 (26T / 13T Step)
	PVE19/21 PVQ40/45 2520V(Q)	2 4 166	475134 (26T / 15T Step)
	PVE12 PVE19/21 PVQ20/32 PVQ40/45	28	627168 (26T / 26T Straight)

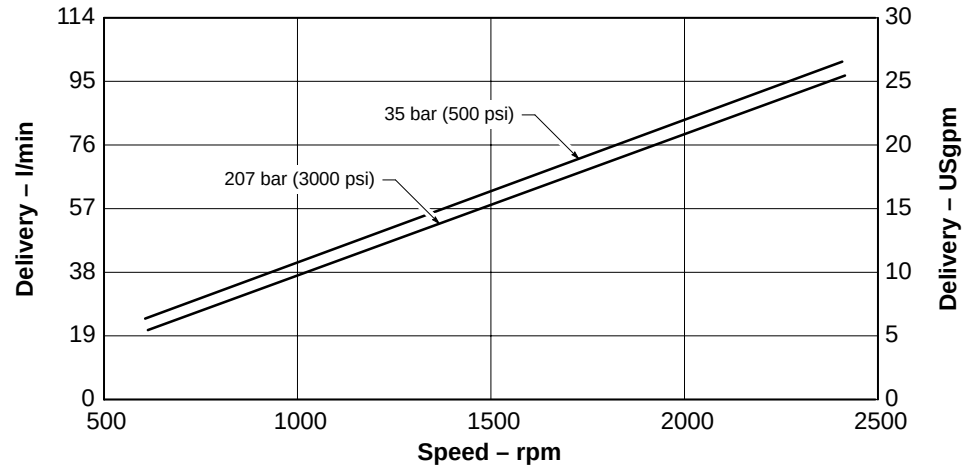
Note: “A11” (not listed above) is intended for special applications only.

Performance Curves

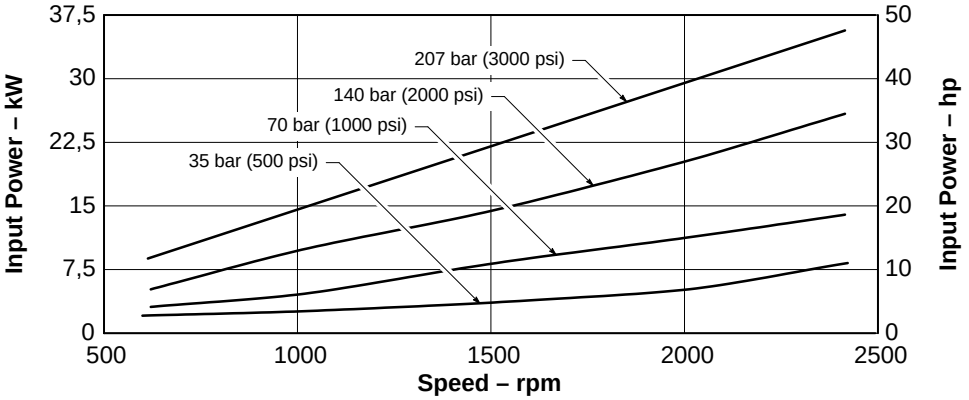
PVE19

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

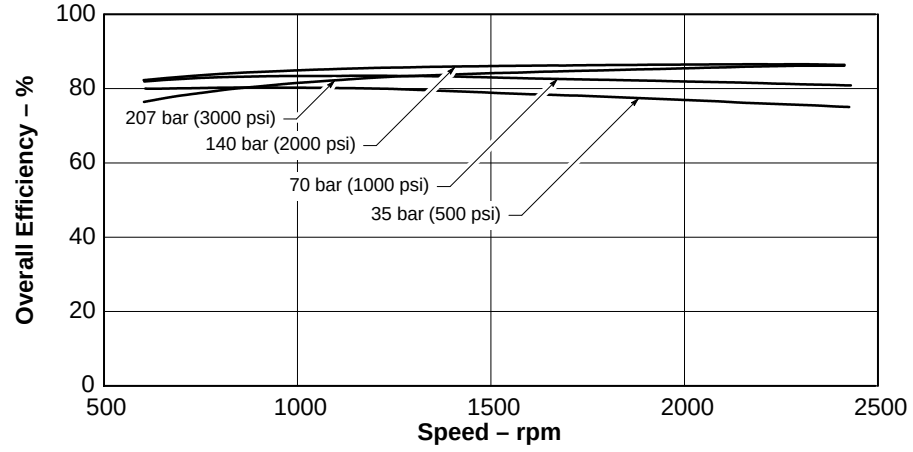
Effective Flow Versus Speed



Input Power Versus Speed



Overall Efficiency Versus Speed

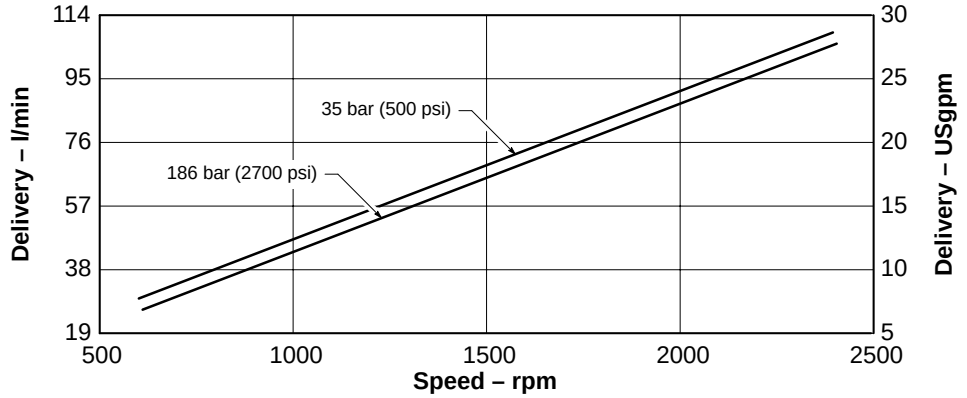


Input power kW

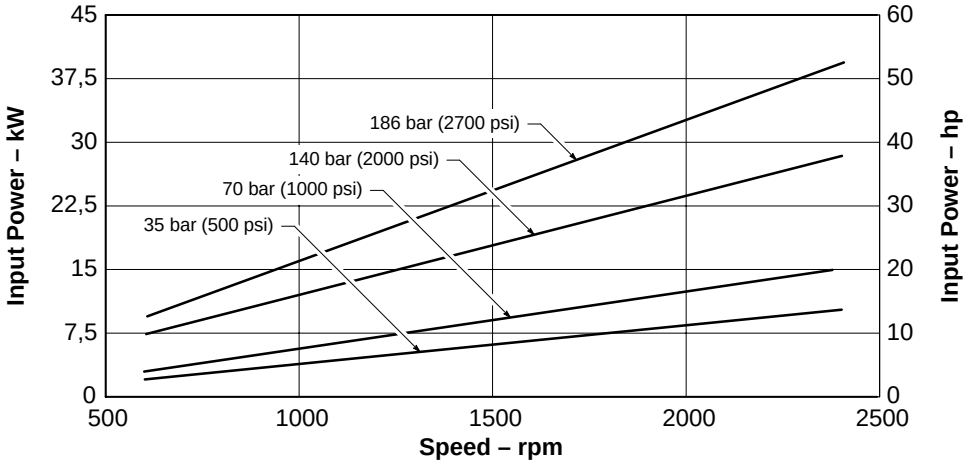
PVE21

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

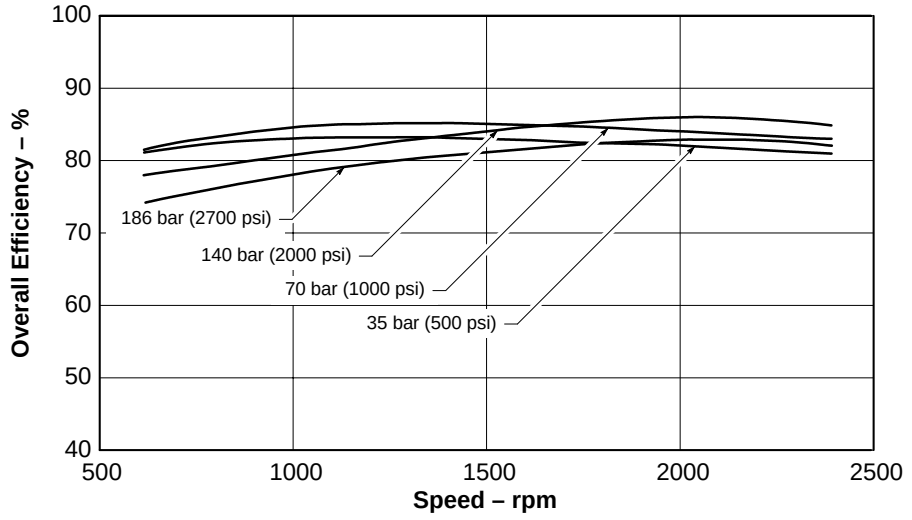
Effective Flow Versus Speed



Input Power Versus Speed



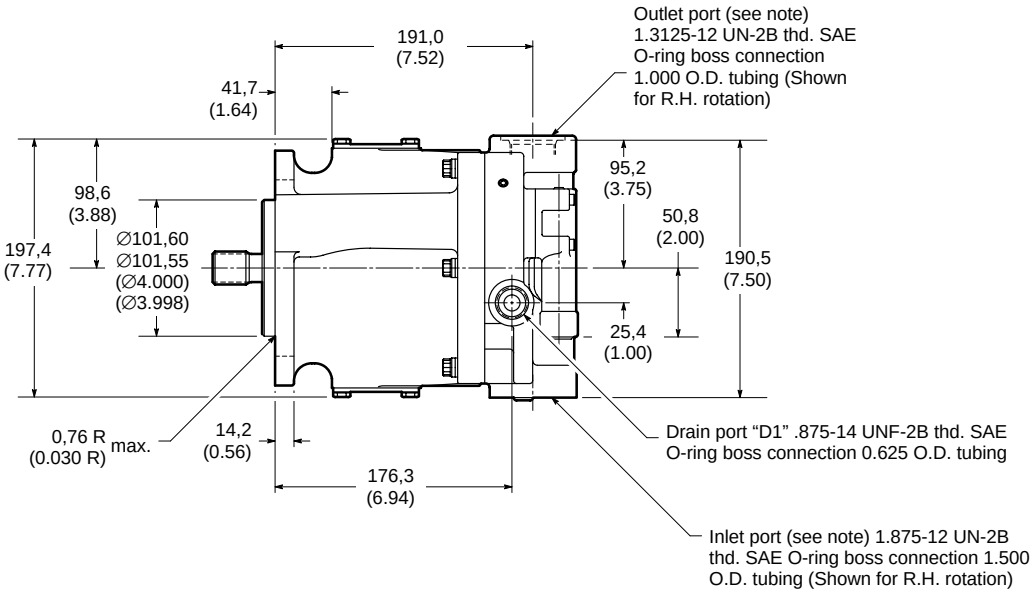
Overall Efficiency Versus Speed

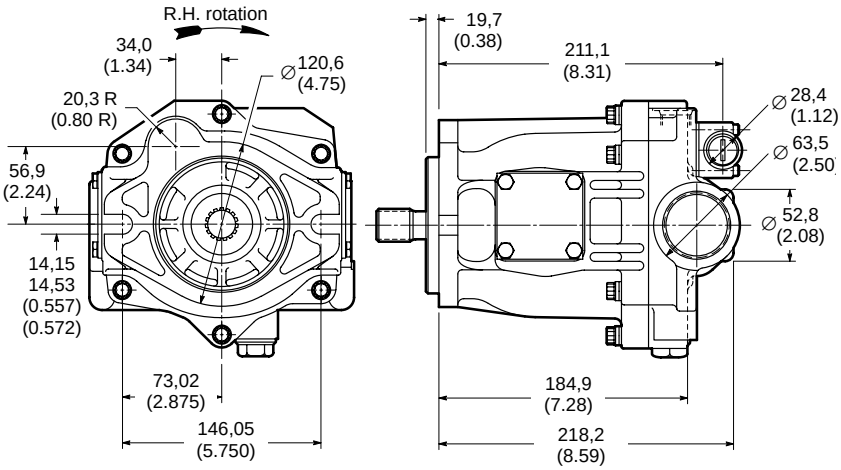


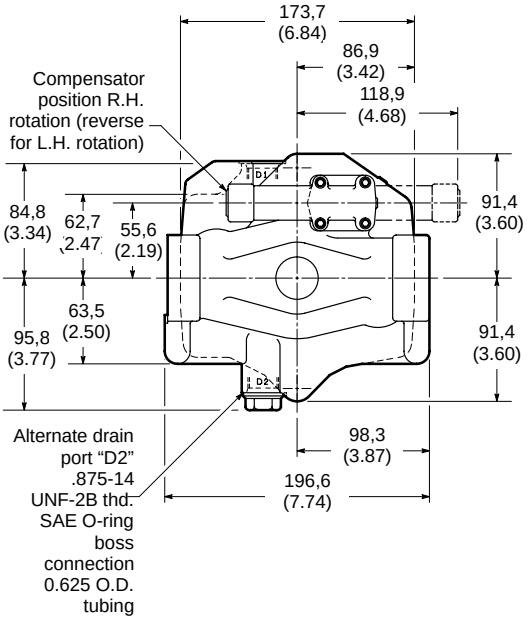
Installation Dimensions

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

Millimeters (inches)



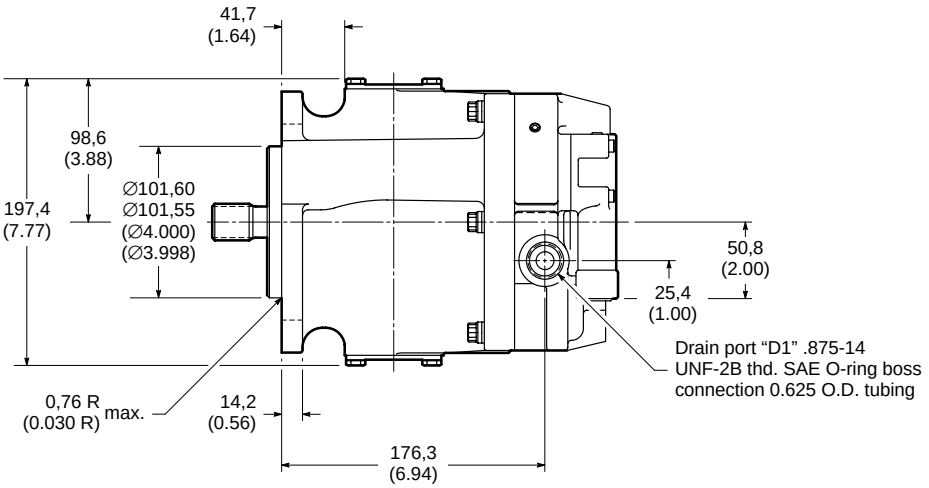


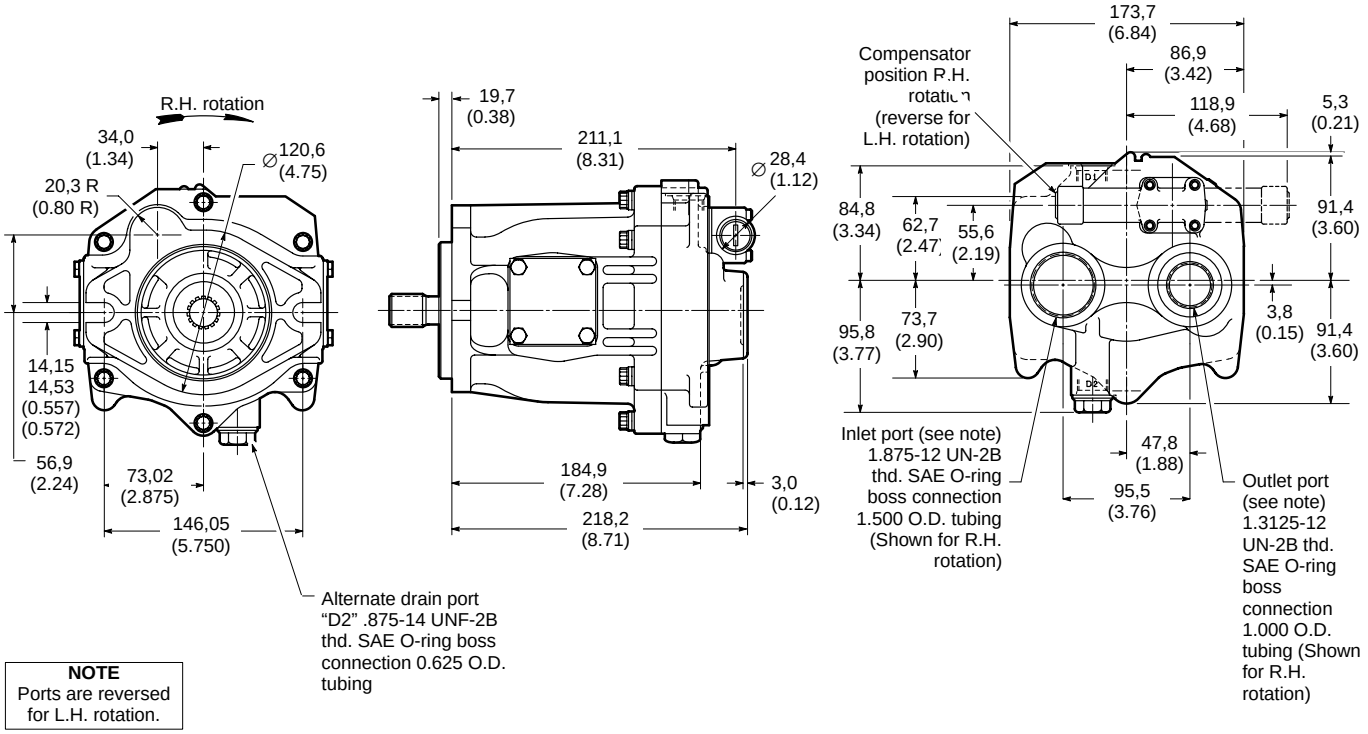


NOTE
Ports are reversed for L.H. rotation.

PVE19/21 with End Ports
(40 Design and C-type Controls)

Millimeters (inches)





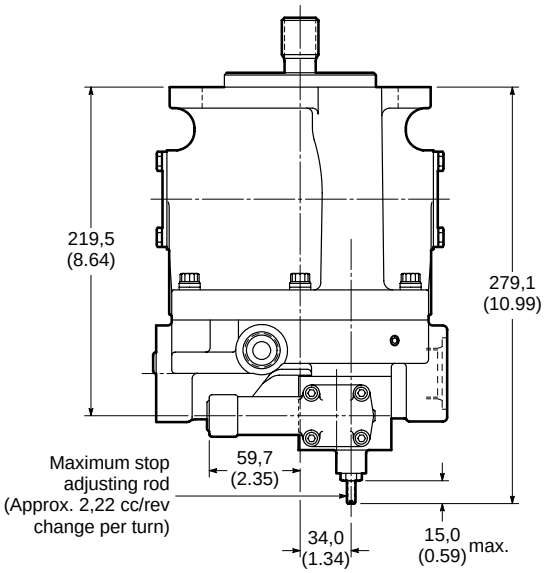
NOTE
Ports are reversed for L.H. rotation.

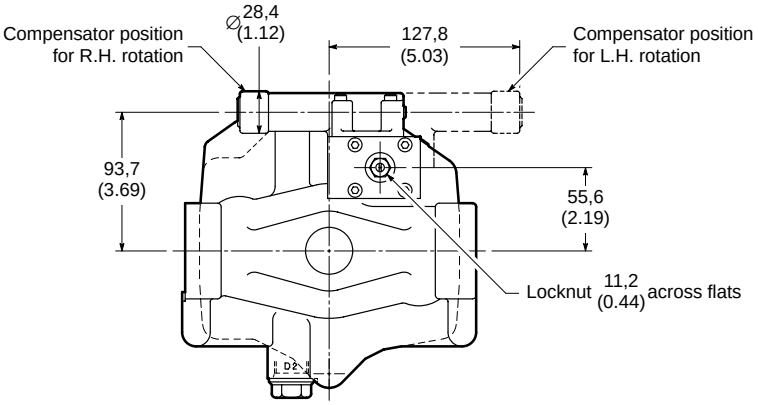
PVE19/21 CC Adjustable Maximum Volume Stop

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.

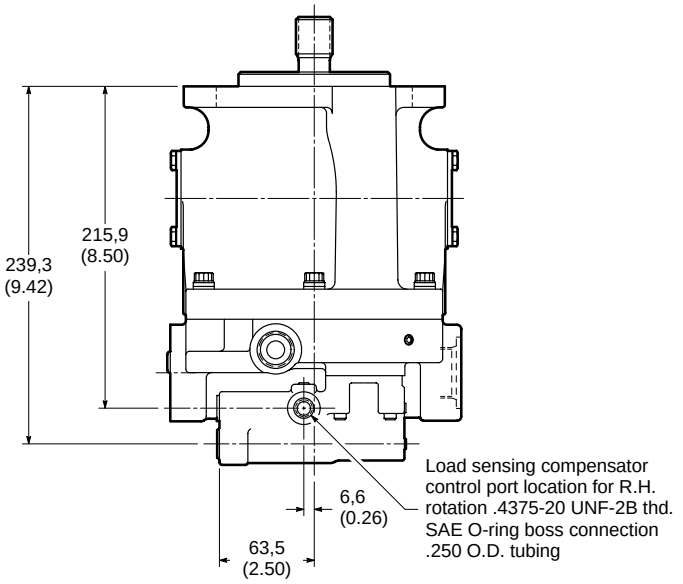
This control enables maximum pump delivery to be externally adjusted from 25% to 100% while maintaining all the standard features of a pressure compensated pump.



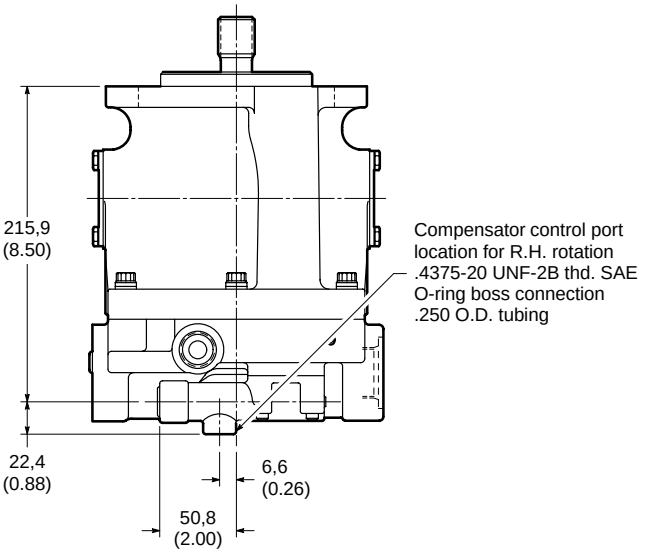


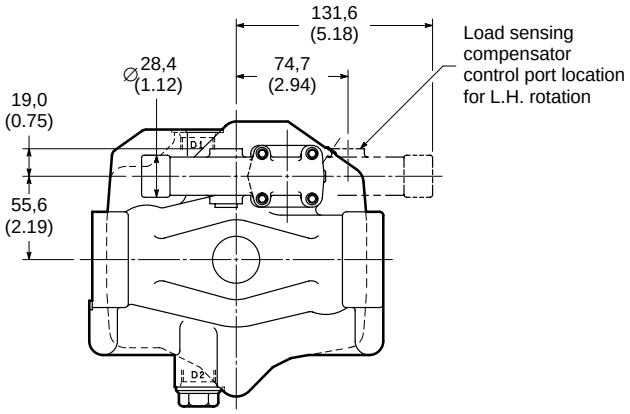
PVE19/21 CVP Load Sensing with Pressure Limiter

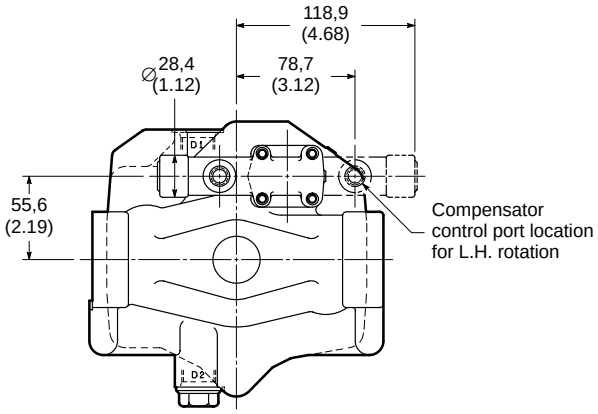
See page A.16 for other details and dimensions.



PVE19/21 CG Remote Adjustment Compensator



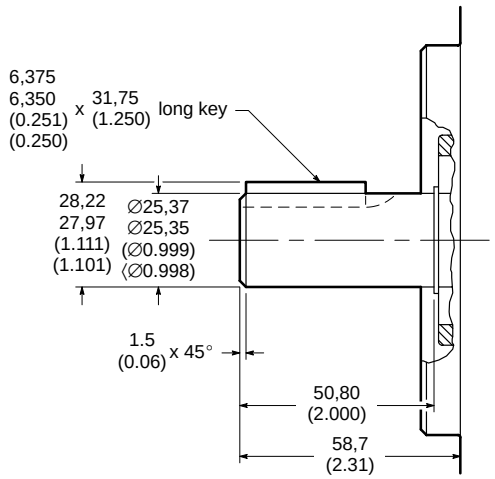




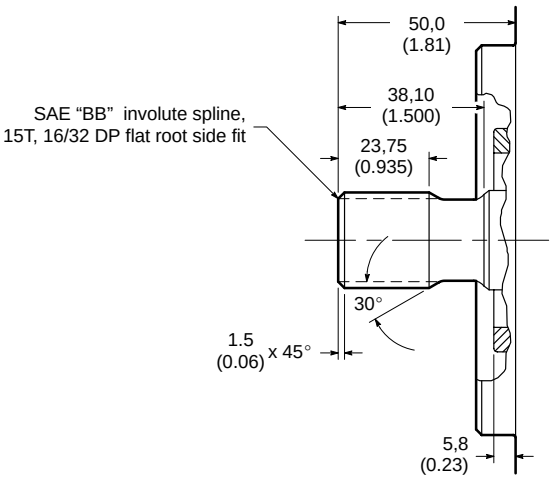
Shaft Options

PVE19/21

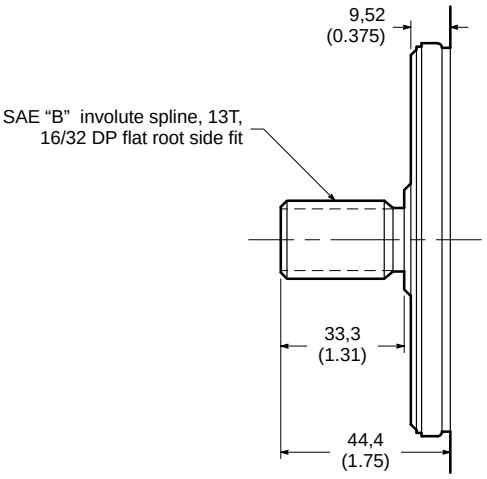
No. 1 Shaft: SAE “BB” Straight Keyed



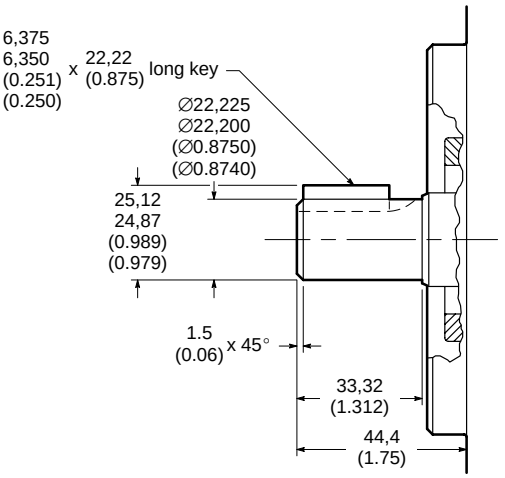
No. 2 Shaft: SAE “BB” Splined



No. 9 Shaft: SAE “B” Splined



No. 16 Shaft: SAE “B” Straight Keyed



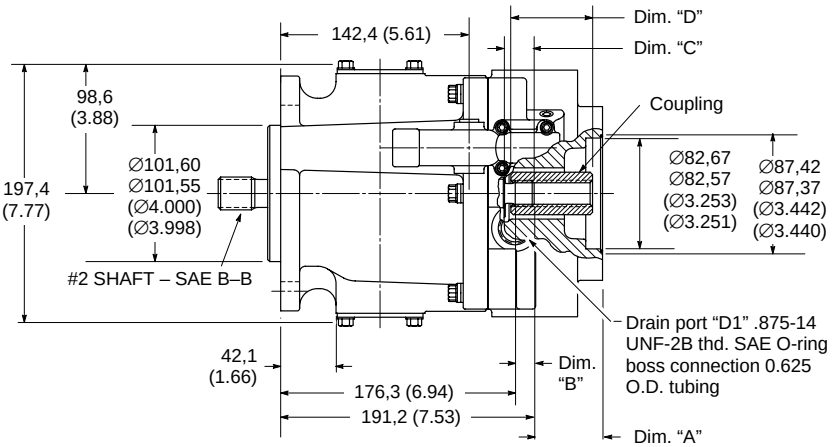
Thru-Drive

PVE19/21-*-TA9/11
SAE “A” Thru-drives

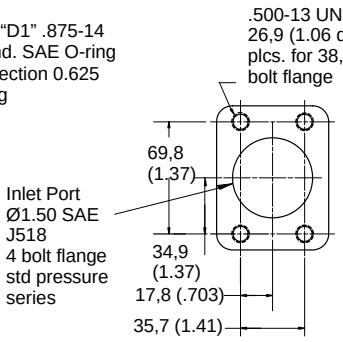
Millimeters (inches)

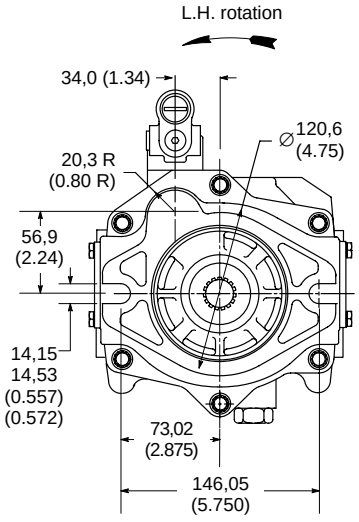
SHAFT	SPLINE DATA	DIM.“A” mm (in.)	DIM.“B” mm (in.)	DIM.“C” mm (in.)	MAX. TORQUE RATING N.m (In. lbs.)	COUPLING Length Dim “D” mm (in.)
TA9	ASA B5.15–1960 9 teeth 16 / 32 D.P. Flat Root Side Fit	50,8 (2.00)	12,7 (0.50)	22,6 (0.89)	58 (517)	**864224** 62,7 (2.47) 62,2 (2.45)
TA11	ANS B92.1–1970 11 teeth 16 / 32 D.P. Flat Root Side Fit	50,8 (2.00)	14,5 (0.57)	22,6 (0.89)	123 (1100)	**864325** 60,9 (2.40) 60,7 (2.39)

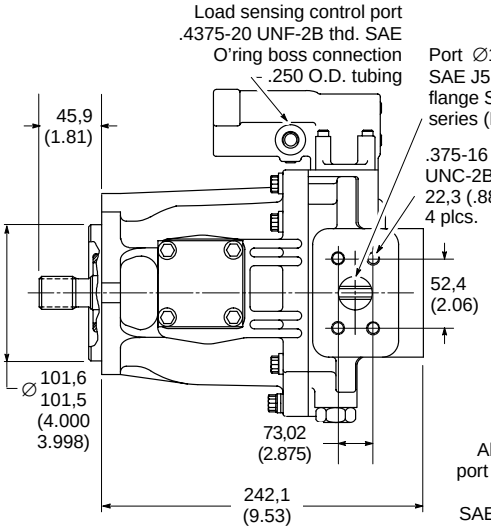
NOTE: Couplings, screws and washers must be ordered separately to mount rear pump.
“A” O-ring (AS568-042) is included with each thru-drive pump.

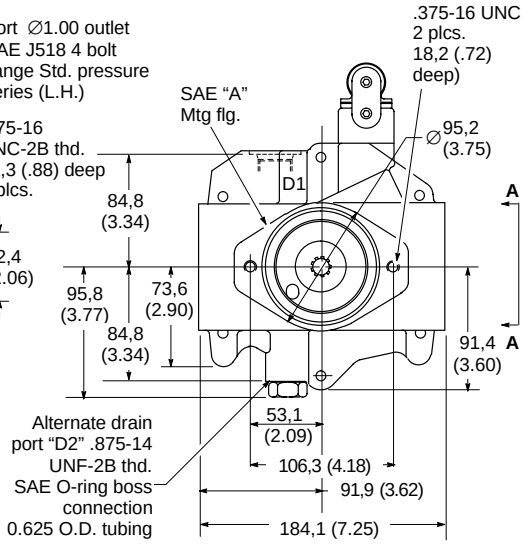


View A – A









NOTE
Ports are reversed for R.H. rotation.

PVE19/21-*-TB26 SAE “B” Thru-drives

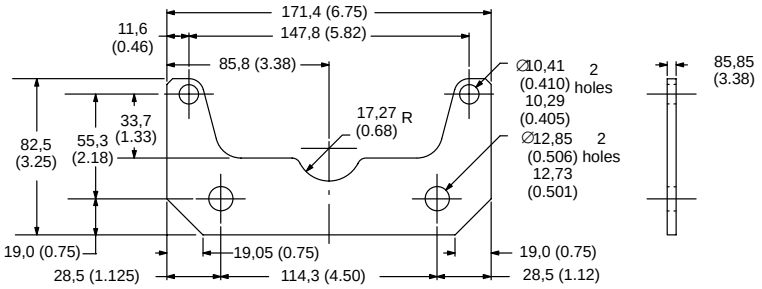
Millimeters (inches)

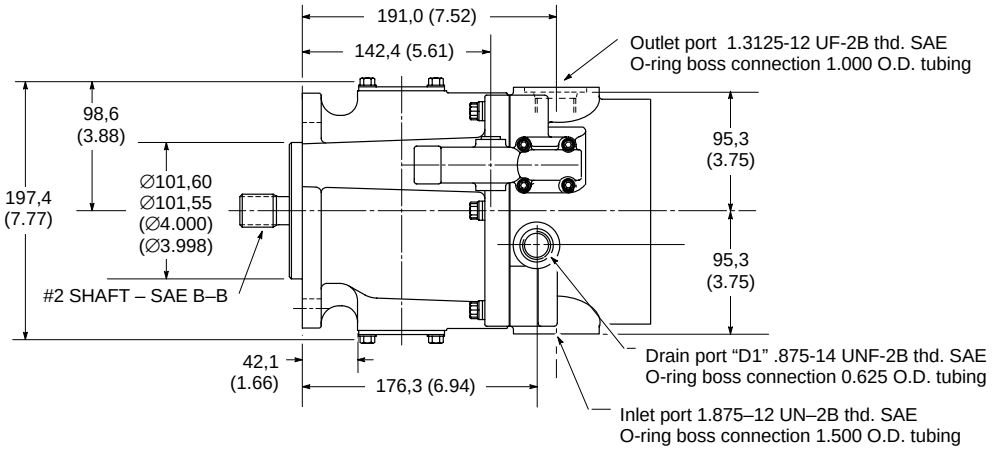
SHAFT	SPLINE DATA	MAX. TORQUE RATING N.m (In. lbs.)	DIM.“A” mm (in.)	COUPLING
TB26	Special Vickers 26 teeth 32 / 64 D.P. Flat Root Side Fit	179 (1587)	10,9 (0.43)	**864307** 26T / 13T
			20,6 (0.81)	**475134** 26T / 15T
			24,9 (0.98)	**627168** 26T / 26T

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.

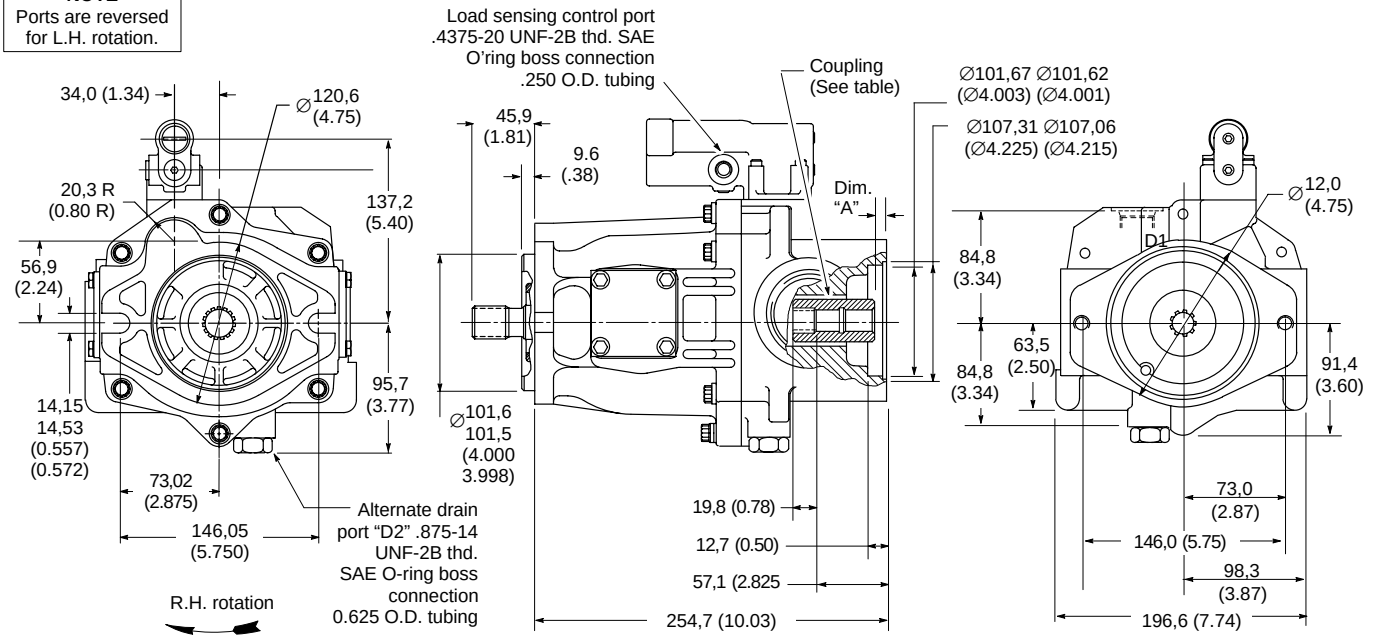
Thru-Drive Pump Support Bracket

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.



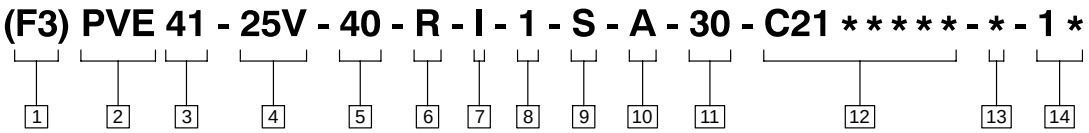


NOTE
Ports are reversed for L.H. rotation.



PVE4*-25V

Model Code



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 cm^3/r (2.50 in^3/r) (PVE19 rotating group)
45 – 45 cm^3/r (2.75 in^3/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 cm^3/r (2.44 in^3/r)
45 – 45 cm^3/r (2.75 in^3/r)
55 – 55 cm^3/r (3.36 in^3/r)
67 – 67 cm^3/r (4.09 in^3/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

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

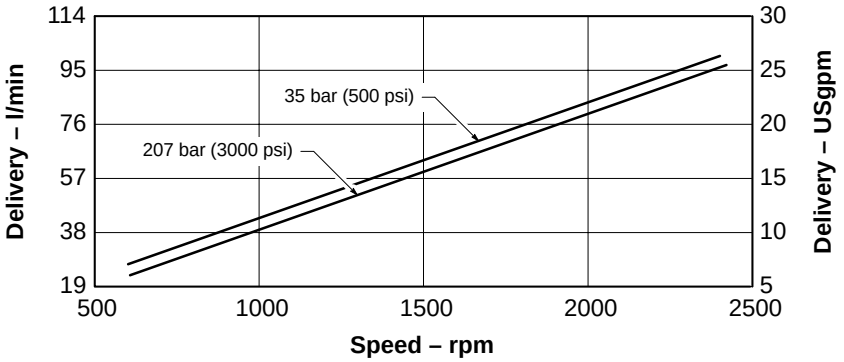
Performance Curves

PVE4*-25V Integrated Pumps

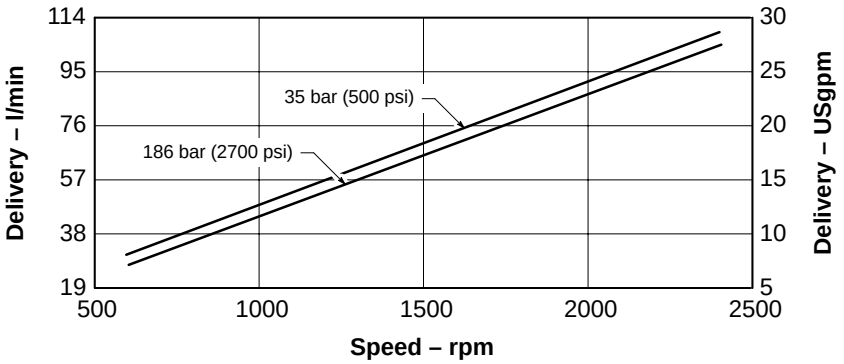
Oil type: SAE 10W Oil temperature: 82°C (180°F) Inlet pressure: 0 psi

Effective Flow Versus Speed

PVE41 Piston Pump Section

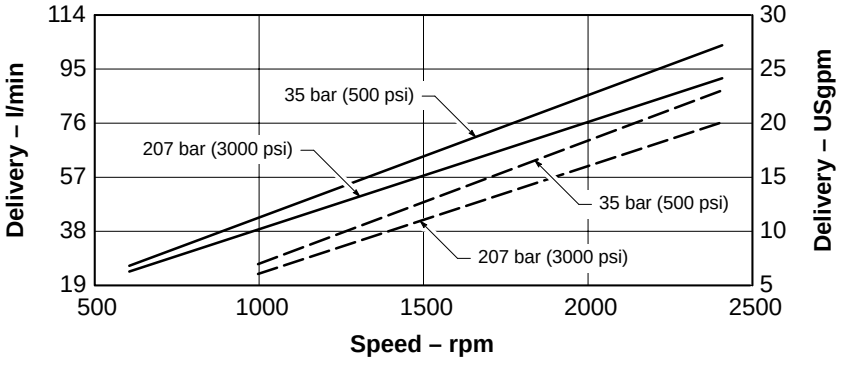


PVE45 Piston Pump Section



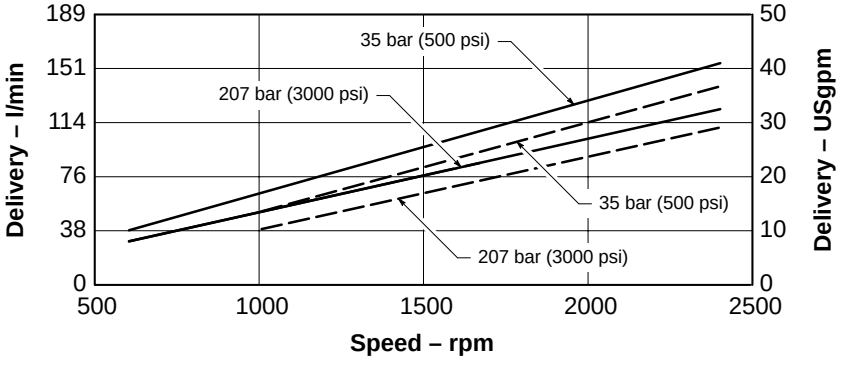
PVE4*-25V Vane Pump Section (45 and 40 Displacement)

PVE4*-25V45 ——————
PVE4*-25V40 — — — —



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

PVE4*-25V67 ——————
PVE4*-25V56 — — — —



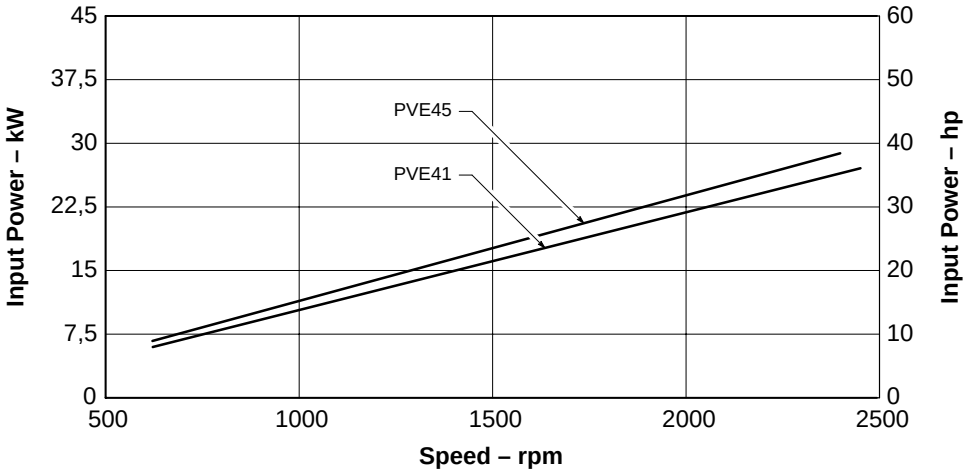
PVE4*-25V Integrated Pumps (continued)

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

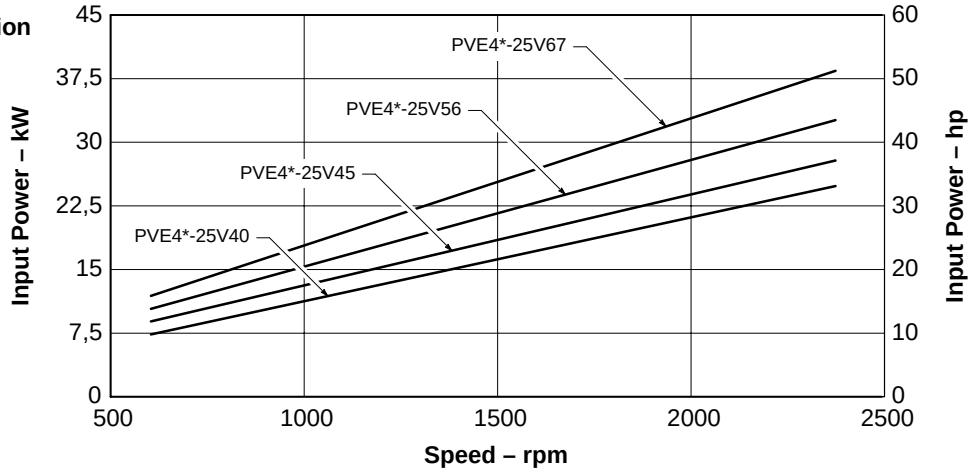
Input Power Versus Speed at 140 bar (2000 psi)

(Input power is proportional to pressure)

PVE4* Piston Pump Section



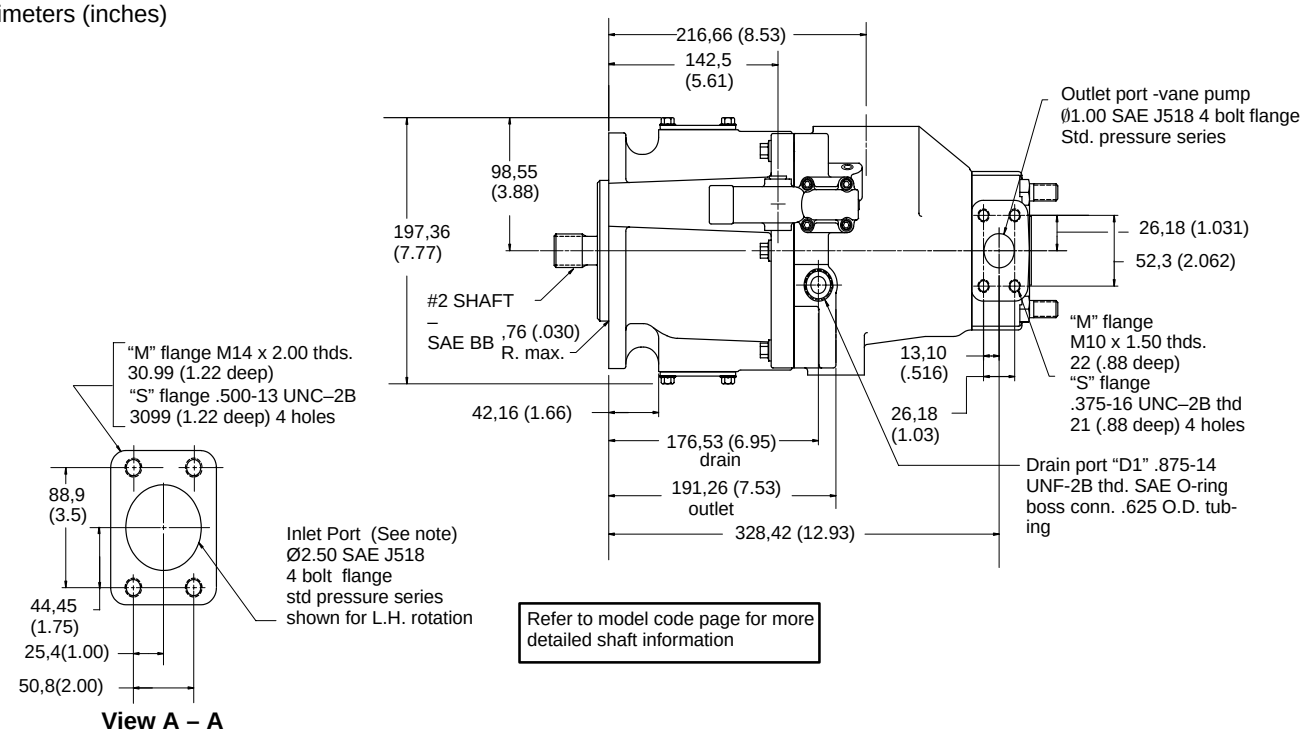
PVE4*-25V Vane Pump Section



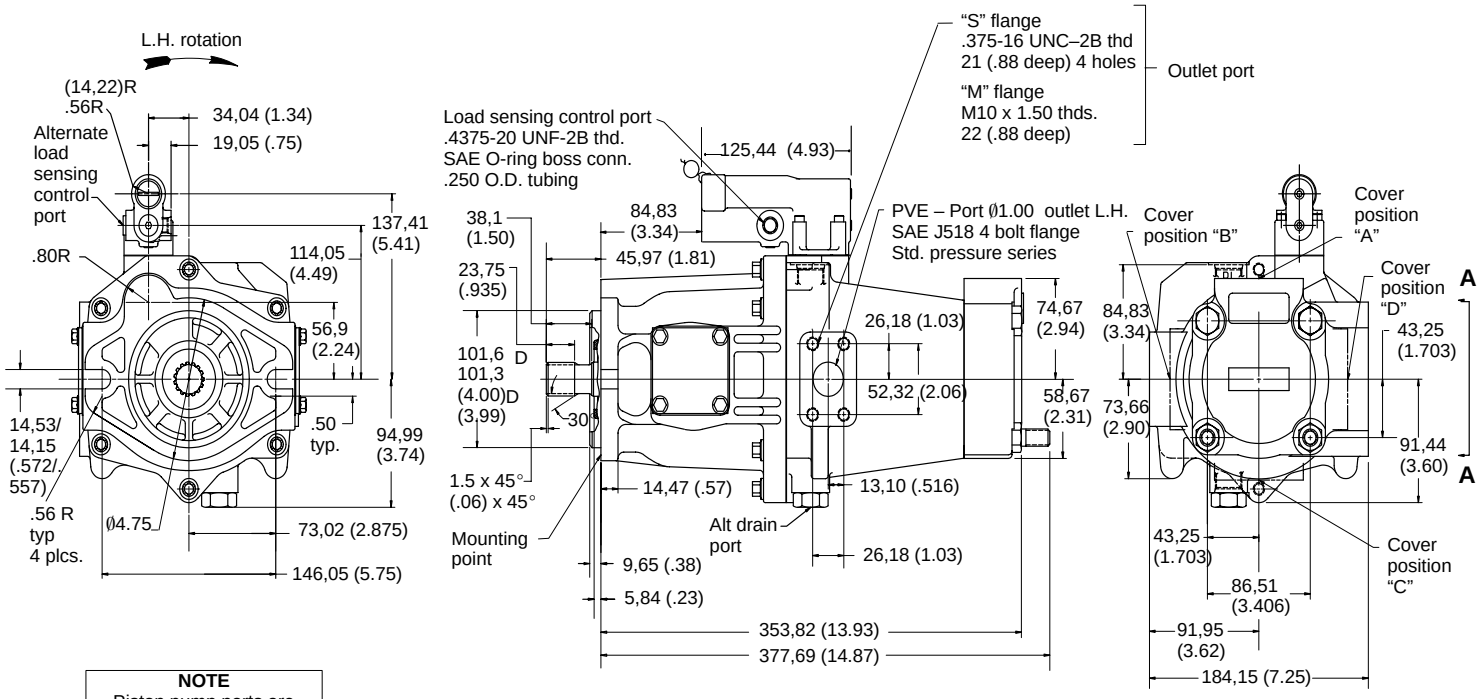
Installation Dimensions

PVE4*–25V Integrated Pump

Millimeters (inches)



View A – A

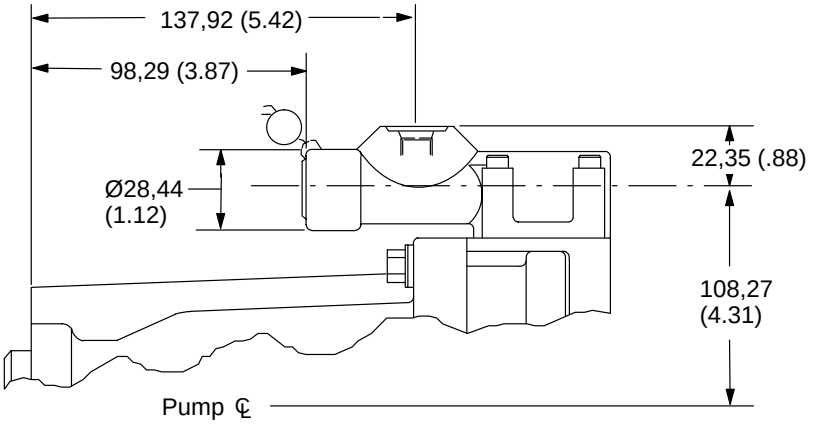


NOTE
Piston pump ports are reversed for R.H. rotation.

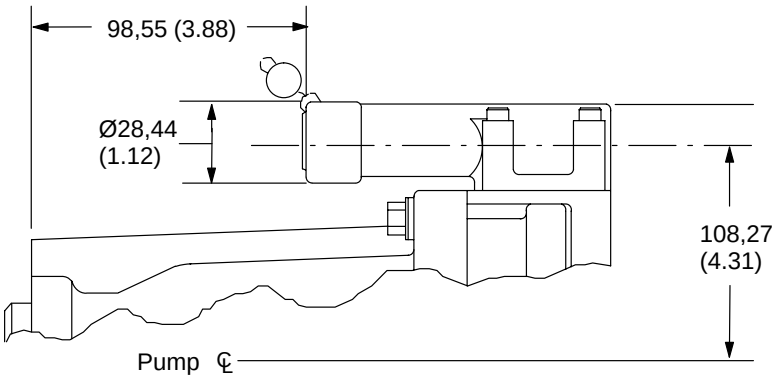
PVE4*-25V Controls

Millimeters (inches)

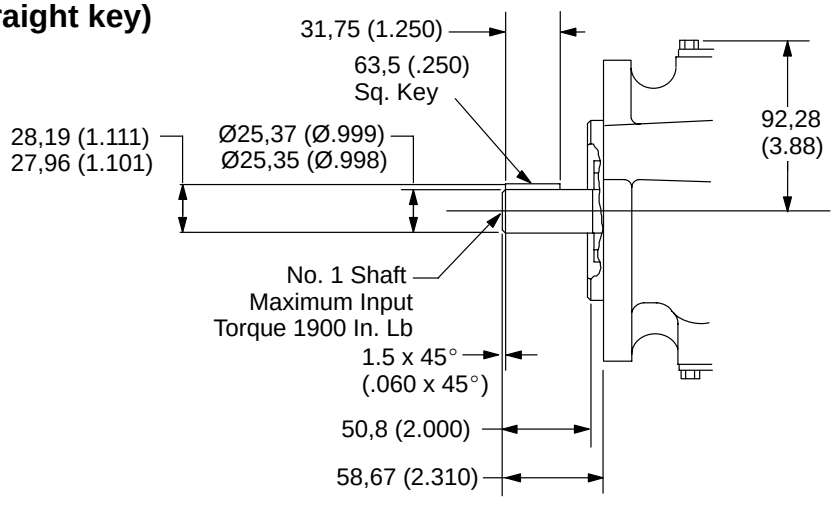
"CG" Remote Adj. Compensator



"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.

Essential information on the correct methods for treating hydraulic fluid is included in Vickers publication 561 “Vickers Guide to Systemic Contamination Control” available from your local Vickers distributor or by contacting Vickers, Incorporated. 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.

	System Pressure Level bar (psi)		
Product	**<70 (<1000)**	**70-210 (1000-3000)**	**210+ (3000+)**
Piston Pumps – Variable	**18/16/14**	**17/15/13**	**16/14/12**

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 shoud 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 funtions are all specified in the full model code.