

**EATON** | **Vickers**

## E Series Piston Pumps

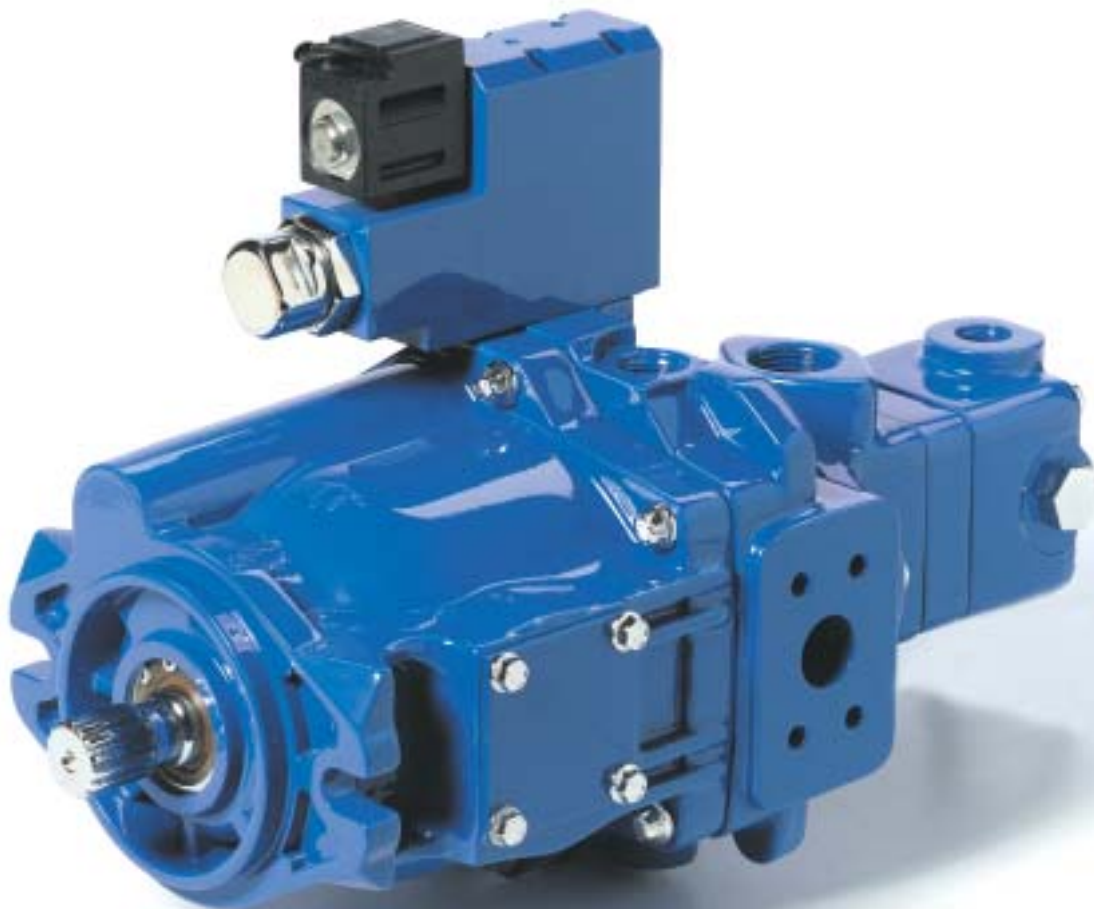
Variable Displacement Series for Mobile Applications

Technical Catalog

PVE012

PVE19

PVE21



**VICKERS**<sup>®</sup>

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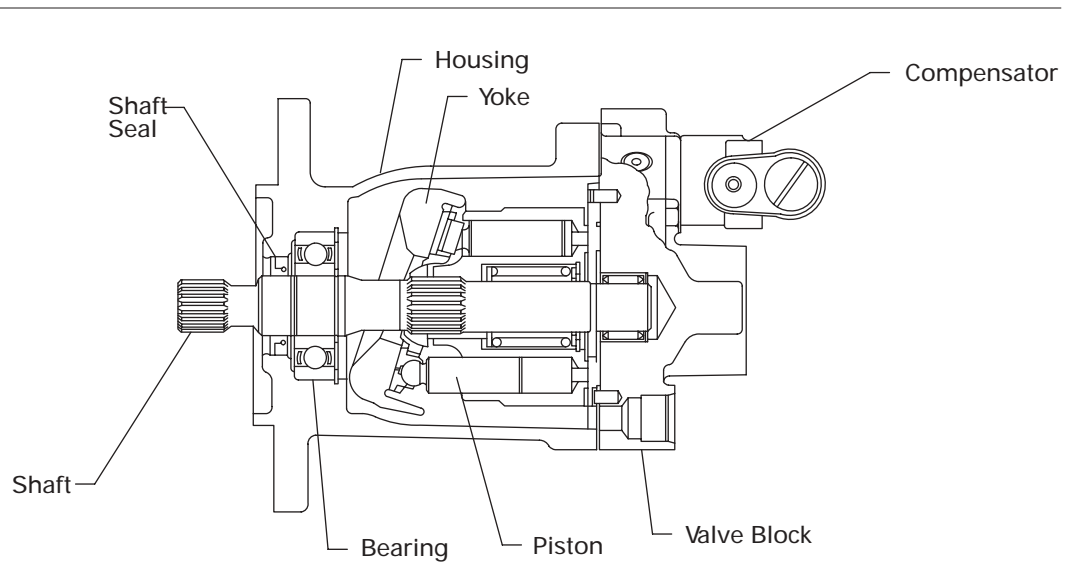
# Introduction

Eaton PVE piston pumps are inline, variable displacement pumps that are available in three displacement sizes. An assortment of optional controls offer maximum operating flexibility.

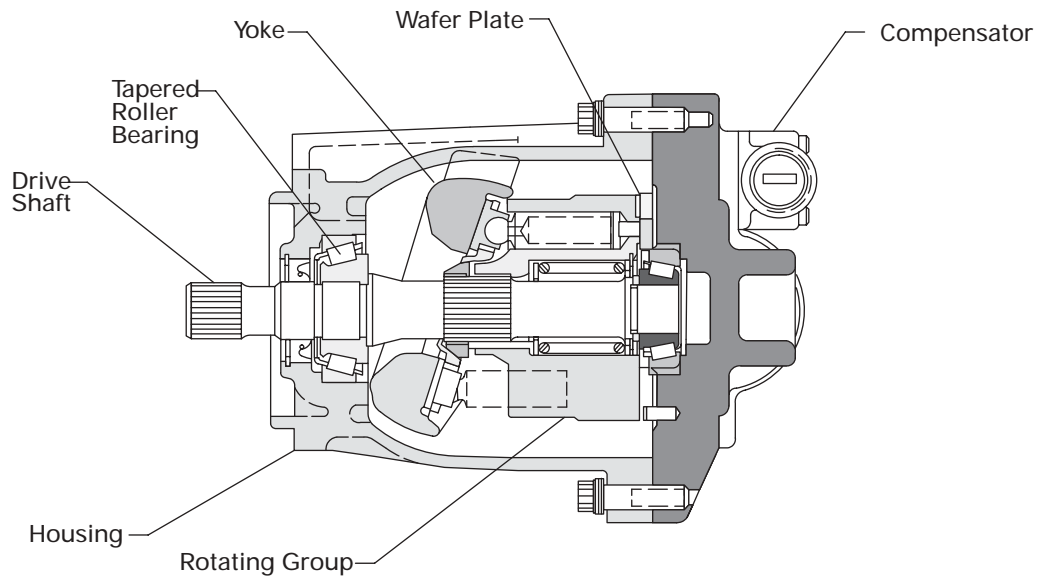
Pump displacement is varied by means of pressure and/or flow compensator controls.

## Features and Benefits

- Inline, variable displacement pump
- Displacement is varied by pressure/flow compensator controls
- Optional controls for maximum operating flexibility
- Thru-drive available on PVE 19/21



PVE012 Section View



PVE012 Section View

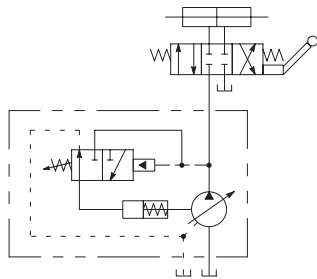
Figure 1. Sectional Views of the PVE Pumps

## Pressure Compensator Control, "A" 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

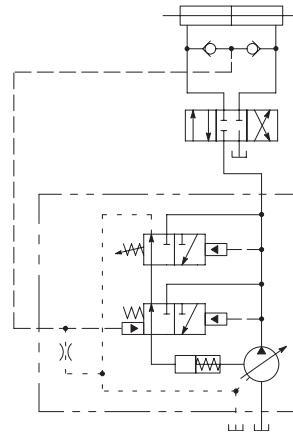
As indicated for "A" option above, except there is an independent screw adjustment of maximum displacement from 100% (rated) to 25%.



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

## Load Sensing Compensator and Pressure Limiter, "B" Option

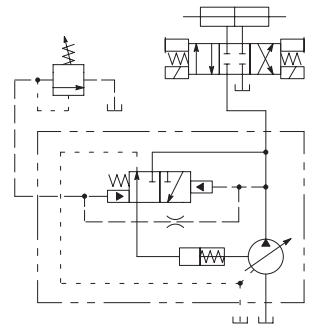
This compensator provides load sensing control under all pressure conditions up to the desired maximum. It automatically adjusts pump flow in response to a remote pressure signal and maintains outlet pressure at approximately 11 bar (160 psi) above load pressure. The integral pressure limiter overrides 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. A 24 bar LS option is also available.



**Note:** Optional internal bleed orifice diameter is .015" and is "A" option-control special features.

## PVE with Pressure Compensator Arranged for Remote Control, "D" Option or "J" Option

Exactly the same as the "A" (pressure compensation option) except the machine operator is able to change the compensator setting through the use of a remote pilot relief valve.



**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

## Preparation for Start-up

Before starting a PVE pump, fill the case through the uppermost drain port with clean 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

Eaton Hydraulics recommends these PVE series piston pumps be mounted horizontally.

## DISPLACEMENT, SPEED AND PRESSURE RATINGS

Model Number System	Displacement cm <sup>3</sup> /r (in <sup>3</sup> /r)		Rated Input Speed (At 0 psig Inlet)	Maximum Pressure bar (psi)	
	Shaft End Pump	Cover End Pump		Shaft End	Cover End
PVE012	25 (1.54)	–	3000	210(3000)	–
PVE19	41 (2.50)	–	2400	210(3000)	–
PVE21	45 (2.75)	–	2400	186(2700)	–

\*Shaded product may not be available

## 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 6 for Inlet vs. Speed details.  
For non-intergrated units only

# Operating Data Overspeed Limits

## AT FULL FLOW CONDITIONS

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

PVE012 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 – “B” OPTION CONTROLS

Model Number System	Maximum Speed rpm
PVE012	3600
PVE19	3200
PVE21	3200

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.

## RESPONSE DATA

Control Type	PVE012		PVE19/21	
	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

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.

## SOUND DATA

Model Number System	1200 rpm, 70 bar (1000 psi)		1500 rpm, 140 bar (2000 psi)		1800 rpm, 210bar (3000 psi)	
	Full Stroke dB(A)	Compensated Stroke dB(A)	Full Stroke dB(A)	Compensated Stroke dB(A)	Full Stroke dB(A)	Compensated Stroke dB(A)
PVE012	71	65	76	72	77	77
PVE19	79	74	83	85	86	87
PVE21	75	73	79	81	83*	83*

\*2700 psi

Sound level dB(A) per ISO 4412-1 standard.

# Model Number System E Series, PVE012 Pump

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
P	V	E	0	1	2	R	0	1	A	U	B	0	B	3	3	2	4	0	0	A	1	0	0	1	0	0	C	D	0	A

Nos	Feature	Code	Description	Nos	Feature	Code	Description
1,2	Code title	PV	Open circuit piston pump	15,16	Pressure comp./ unloading valve setting	00	No pressure compensator setting
3,4,5,6	Displacement	E012	25.2cm <sup>3</sup> /r [1.54 in <sup>3</sup> /r]			33	206.8-213.7 bar [3000-3100 lbf/in <sup>2</sup> ]
7	Input shaft rotation	L	Left-hand rotation (CCW)				
		R	Right-hand rotation (CW)				
8,9	Front mounting and input shaft	01	2 Bolt B (SAE J744-101-2) with 22.2 [.88] DIA straight key shaft (SAE J744-22-1), key included	17,18	Flow comp. setting or unload valve standby	00	No flow compensator setting
						11	9.65-12.41 bar [140-180 lbf/in <sup>2</sup> ]
						24	22.75-25.51 bar [330-370 lbf/in <sup>2</sup> ]
		05	2 Bolt B (SAE J744-101-2) with 13T 16/32DP 41.1 [1.62] long splined shaft	19,20	Secondary compensator setting	00	No secondary compensator setting
						04	186.2-193.1 bar [2700-2800 lbf/in <sup>2</sup> ]
		09	2 Bolt B (SAE J744-101-2) with 26T 32/64DP splined shaft	21	Control special features	0	No special features
10,11	Main ports location and size	AU	End ports; tube ports per SAE J514, suction 1.625-12 UN-2B SAE, pressure – 1.0625-12 UN-2B SAE			A	Bleed down orifice, LS only
						B	External load-sensing adjustment
						G	High rate spring for low pressure setting
		AV	End ports; tube ports per ISO 6149-1, suction M42 x 2, pressure – M27 x 2			J	Bleed down orifice and high rate spring for low pressure setting
12	Drain port size	6	M18 metric O-ring port – top (D1)	22	Maximum displacement option	1	Standard displacement
		7	M18 metric O-ring port – bottom (D2)			2	Adjustable maximum displacement (set at maximum)
		B	.750-16 UNF-2B SAE O-ring port – top (D1)	23,24	Auxiliary mounting and output shaft	00	No auxiliary mounting or output shaft
		C	.750-16 UNF-2B SAE O-ring port – bottom (D2)	25	Shaft seals	0	No shaft seal
13	Diagnostic pressure port	0	No diagnostic pressure port			1	Standard shaft seal (nitrile)
						3	Flurocarbon shaft seal
14	Controller type	A	Pressure compensator	26,27	Special features	00	No special features
		B	Pressure and flow compensator			AF	Cast iron housing
		C	Electric dual range pressure Compensator with directional control valve	28,29	Paint	00	No paint
						CD	Blue primer
		D	Hydraulic remote control pressure compensator	30	Customer and unit identification	0	STD – mark assembly Number, full model code and build data Code on plate
		E	Unloading valve (accumulator Circuits)	31	Design code	A	First
		F	Electric dual range pressure compensator without directional control valve				
		K	CFD control – 12 volt DC				

**Note:** Consult an Eaton representative for additional settings

## Shaft Torque Data PVE012

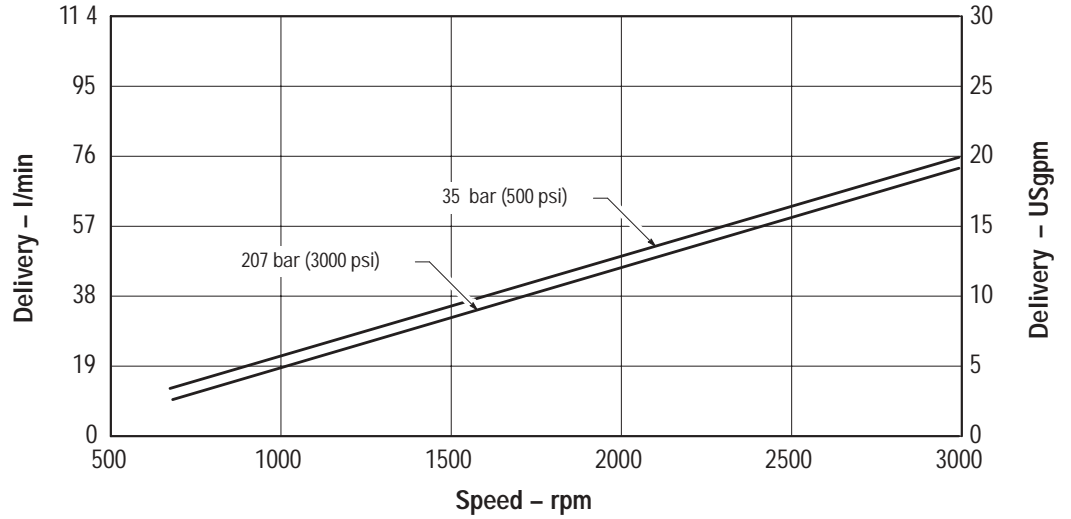
### PVE012 SHAFT TORQUE DATA

Input Shaft Torque N.m (lb.in.)	Designation	Thru-drive Option	Maximum Input
01	SAE "B" straight keyed	No	135 (1200)
05	SAE "B" spline 13T, 16/32 D.P., FRMDF	No	208 (1850)
09	Special Eaton 26T for use in rear pump of tandem PVE** -PVE12 unit	No	N/A

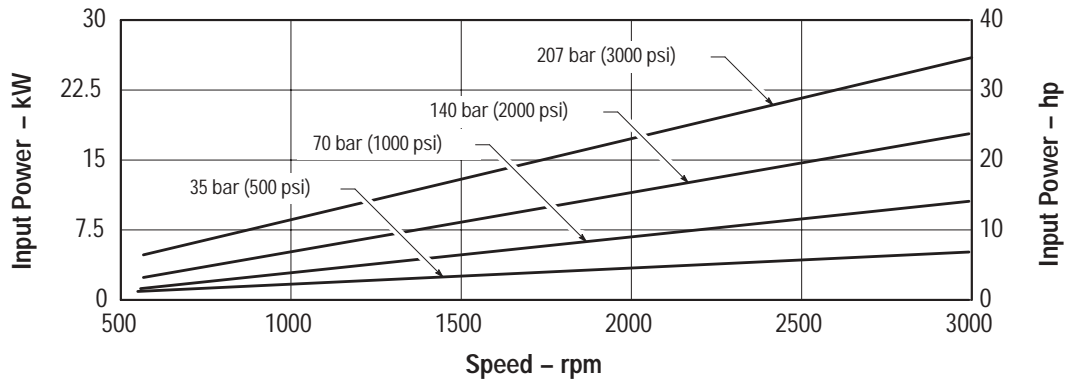
# Performance Curves PVE012

Oil type: SAE 10W  
 Oil temperature: 49°C (180°F)  
 Inlet pressure: 0 psi

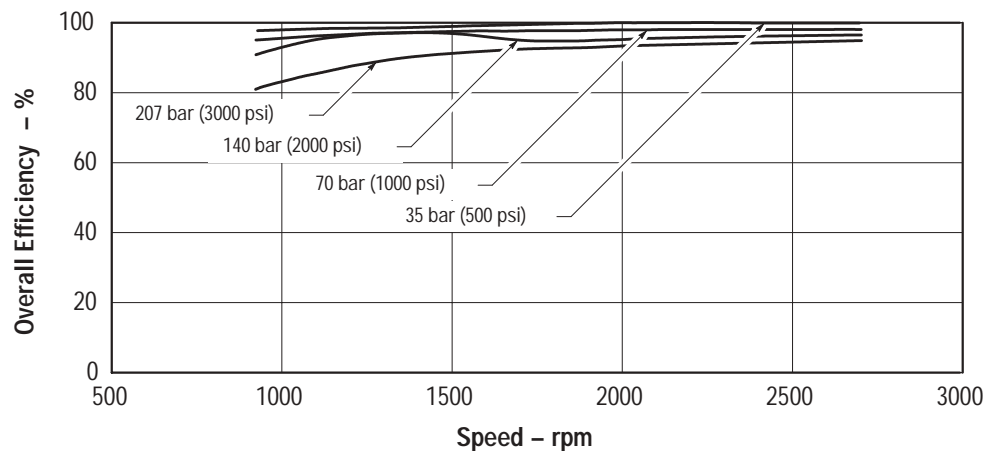
Effective Flow Versus Speed



Input Power Versus Speed

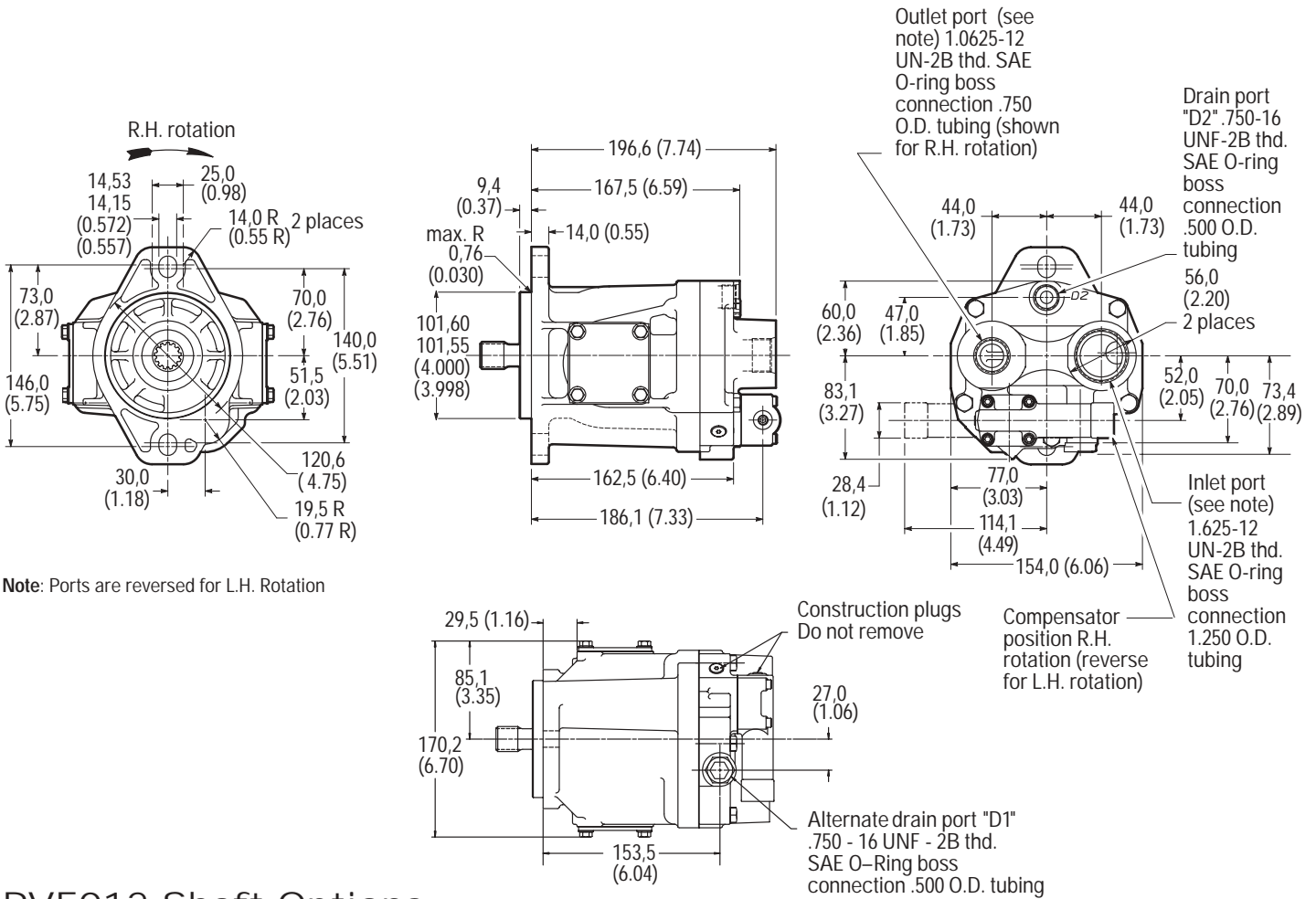


Volumetric Efficiency Versus Speed



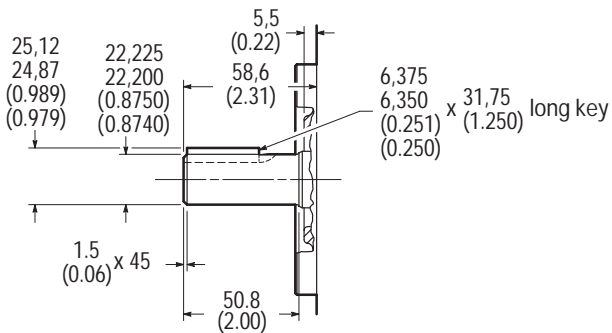


# Installation Dimensions PVE012 with Pressure Compensator



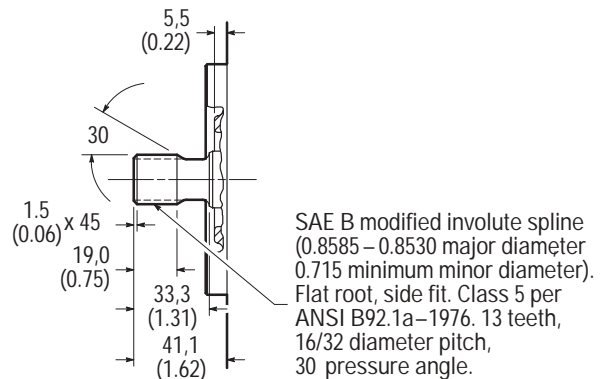
## PVE012 Shaft Options

### #01: SAE "B" Straight Keyed



**Note:** Applications requiring overhung load or side loading of shaft are subject to Eaton engineering approval.

### #05: SAE "B" Splined



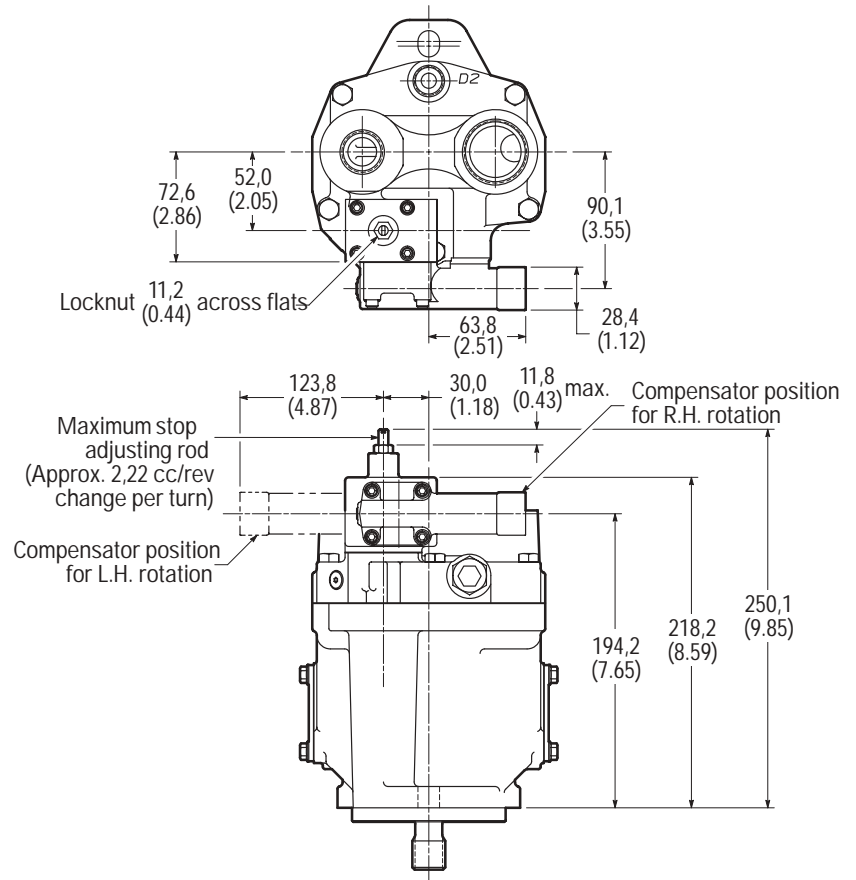
# Controls PVE012 Adjustable Maximum Displacement Stop

See installation dimensions page 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.

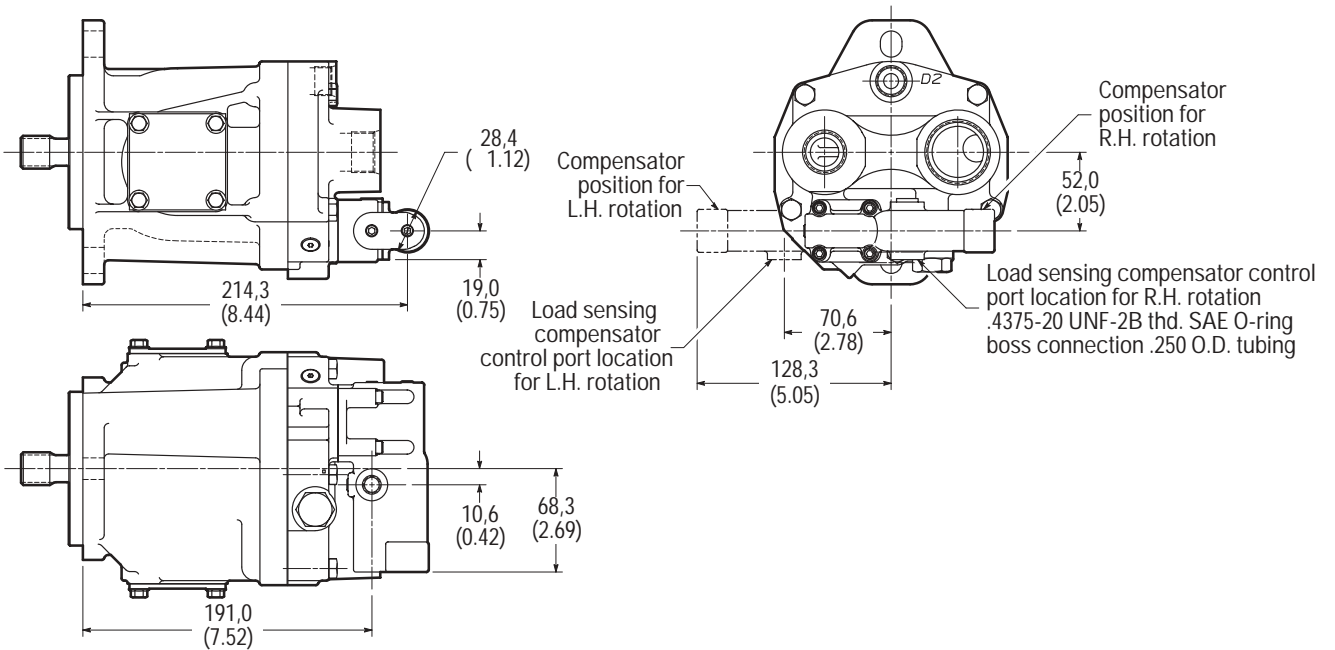
This control enables maximum pump delivery to be externally adjusted from 25% to 100% while maintaining all the standard features of a pressure compensated pump.



# Controls PVE012 Adjustable Maximum Displacement Stop

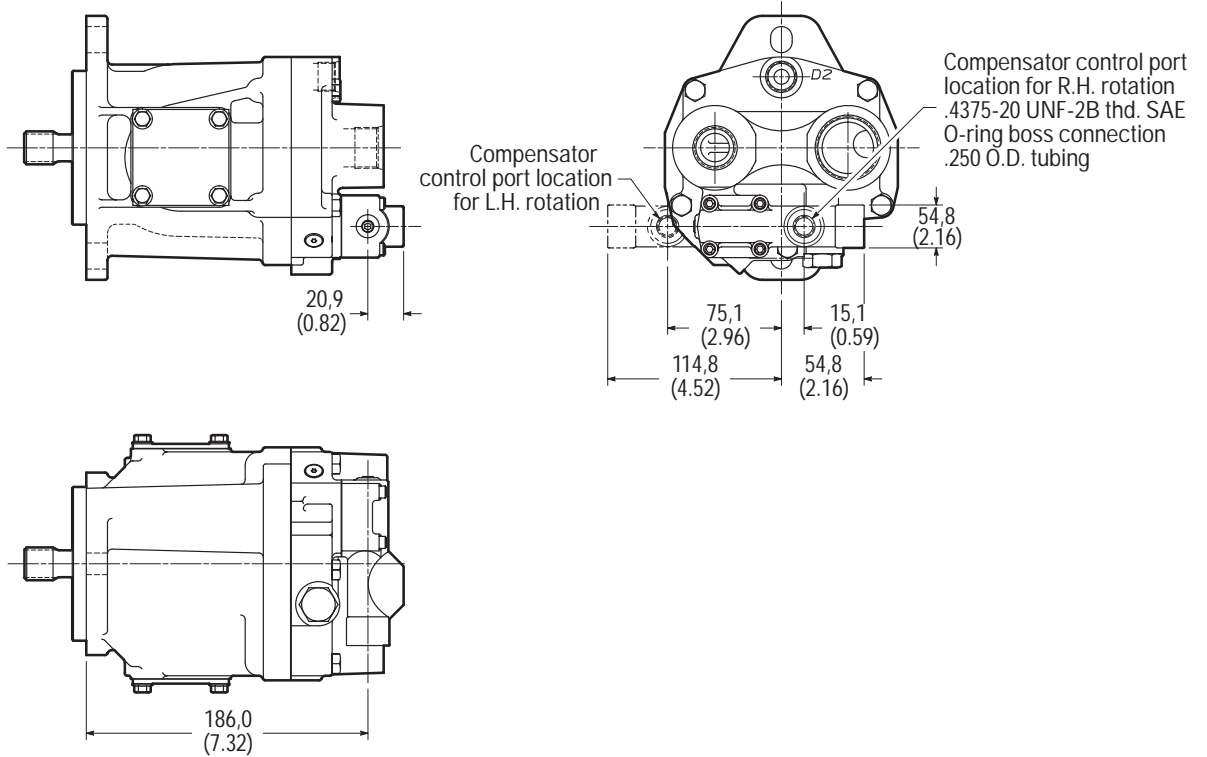
See installation dimensions  
page 9 for other details.

## PVE012 Load Sensing with Pressure Limiter "A" Control Option



# Controls PVE012 Remote Adjustment Compensator

See installation dimensions  
page 9 for other details.



# Model Number System PVE19/21

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
P	V	E	1	9	A	R	0	1	A	A	1	0	B	3	3	2	4	0	0	A	1	A	A	1	A	F	C	D	0	A

Nos	Feature	Code	Description	Nos	Feature	Code	Description
1,2	Code title	PV	Open circuit piston pump	12	Drain port size and location	1	.875-14 UNF-2B SAE O-ring port – top (D1)
3,4,5,6	Displacement	E19A	41.0cm <sup>3</sup> /r [2.50 in <sup>3</sup> /r]			2	.875-14 UNF-2B SAE O-ring port – bottom (D2)
		E21A	45.1cm <sup>3</sup> /r [2.75 in <sup>3</sup> /r]			6	M18 X 1.5 metric O-ring port – top (D1)
7	Input shaft rotation	L	Left-hand rotation (CCW)			7	M18 X 1.5 metric O-ring port – bottom (D2)
		R	Right-hand rotation (CW)				
8,9	Front mounting and input shaft	01	2 Bolt B (SAE J744-101-2) with 22.2 [.88] DIA straight key shaft (SAE J744-22-1) (key included)	13	Diagnostic pressure port	0	No diagnostic pressure port
		02	2 Bolt B (SAE J744-101-2) with 25.4 [1.00] DIA straight key shaft (SAE J744-25-1) (key included)			1	.4375-20 UNF-2B SAE O-ring port – plugged
		04	2 Bolt B (SAE J744-101-2) with 25.4 [1.00] DIA tapered key shaft (SAE J744-25-3) (key included)			2	M14 X 1.5 metric O-ring port – plugged
		05	2 Bolt B (SAE J744-101-2) with 13T 16/32DP 41.1 [1.62] long splined shaft	14	Controller type	A	Pressure compensator
		08	2 Bolt B (SAE J744-101-2) with 15T 16/32DP splined shaft			B	Pressure and flow compensator
		09	2 Bolt B (SAE J744-101-2) with 26T 32/64DP splined shaft			C	Electric dual range pressure compensator with directional control valve
10,11	Main ports location and size	AA	Side ports; tube ports per SAE J514, suction – 1.875-12 UN-2B, pressure – 1.3125-12 UN-2B			D	Hydraulic remote control pressure compensator
		AB	End ports; tube ports per SAE J514, suction – 1.875-12 UN-2B, pressure – 1.3125-12 UN-2B	15,16	Pressure comp./ unloading valve	E	Unloading valve (accumulator circuits)
		AC	Side ports; SAE J518 flange, suction – 1.500 SAE 4-bolt split flange port (code 61); pressure – 1.000 SAE 4-bolt split flange port (code 61)			F	Electric dual range pressure compensator without directional control valve
		AD	End ports; SAE J518 flange, suction – 1.500 SAE 4-bolt split flange port (code 61); pressure – 1.000 SAE 4-bolt split flange port (code 61)			K	CFD control – 12 volt DC
		AE	Side ports; ISO 6149-1 tube, suction – M48 X 2, pressure – M33 X 2			00	No pressure compensator setting
		AF	End ports; ISO 6149-1 tube, suction – M48 X 2, pressure – M33 X2			18	182.7-189.6 bar [2650-2750 lbf/in <sup>2</sup> ]
		AS	End ports; ISO 6162 flange, suction – 1.500 SAE 4-bolt split flange port with M12 X 1.75 threads; pressure – 1.000 SAE 4-bolt split flange port with M10 X 1.5 threads			33	206.8-213.7 bar [3000-3100 lbf/in <sup>2</sup> ]

**Note:** Consult an Eaton representative for additional settings

# Model Number System PVE19/21

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
P	V	E	1	9	A	R	0	1	A	A	1	0	B	3	3	2	4	0	0	A	1	A	A	1	A	F	C	D	0	A

Nos	Feature	Code	Description	Nos	Feature	Code	Description
17,18	Flow comp. setting or unload valve standby	00	No flow compensator setting	25	Shaft seals	0	No shaft seal
		11	9.65-12.41 bar [140-180 lbf/in <sup>2</sup> ]			1	Standard shaft seal (fluorocarbon)
		14	12.41-15.17 bar [180-220 lbf/in <sup>2</sup> ]	26,27	Special features	00	No special features
		24	22.75-25.51 bar [330-370 lbf/in <sup>2</sup> ]			AA	Auxiliary mounting cover plate
19,20	Secondary compensator setting	00	No secondary compensator setting			AF	Cast iron housing
		04	186.2-193.1 bar [2700-2800 lbf/in <sup>2</sup> ]	28,29	Paint	00	No paint
21	Control special features	0	No special features			CD	Blue primer
		A	Bleed down orifice	30	Customer and unit	0	STD – mark assembly number, model number up identification to rotation and build date code on plate
		B	External load-sensing adjustment			D	Mark assembly number, full model code and build data code on plate
		G	High rate spring for low pressure setting				
		J	Bleed down orifice and high rate spring for low pressure setting	31	Design code	A	First design
22	Maximum displacement option	1	Standard displacement				
		2	Adjustable maximum displacement (set at maximum)				
23,24	Auxiliary mounting output shaft	00	No auxiliary mounting or output shaft				
		AA	2 Bolt A (SAE J744-82-2) w/ 9T 16/32DP external splined shaft				
		AB	2 Bolt A (SAE J744-82-2) w/ 11T 16/32DP external splined shaft				
		AC	2 Bolt B (SAE J744-101-2) w/ 13T 16/32 DP internal splined coupling				
		AD	2 Bolt B (SAE J744-101-2) w/ 15T 16/32DP internal splined coupling				
		AE	2 Bolt B (SAE J744-101-2) w/ 26T 32/64DP external splined shaft				
		AH	2 Bolt A (SAE J744-82-2) w/ 9T 16/32DP internal splined coupling				
		AJ	2 Bolt A (SAE J744-82-2) w/ 11T 16/32DP internal splined coupling				
		AK	2 Bolt B (SAE J744-101-2) w/ 26T 32/64DP internal splined coupling				

**Note:** Consult an Eaton representative for additional settings

# Shaft Torque Data PVE19/21

## SHAFT TORQUE DATA

Spline Data	Designation	Thru-drive Option	Maximum Input Torque N.m (lb.in.)
02	SAE "BB" straight keyed	Yes	215 (1900)
08	SAE "BB" spline 15T, 16/32 D.P., FRSF	Yes	337 (2987)
05	SAE "B" spline 13T, 16/32 D.P., FRSF	Yes	208 (1850)
01	SAE "B" straight keyed	No	135 (1200)
09	Special Eaton 26T for use in rear pump of tandem PVE**-PVE** unit	No	N/A

**Note:** See page 22 for more details.

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

### TYPICAL REAR PUMPS FOR THRU-DRIVES

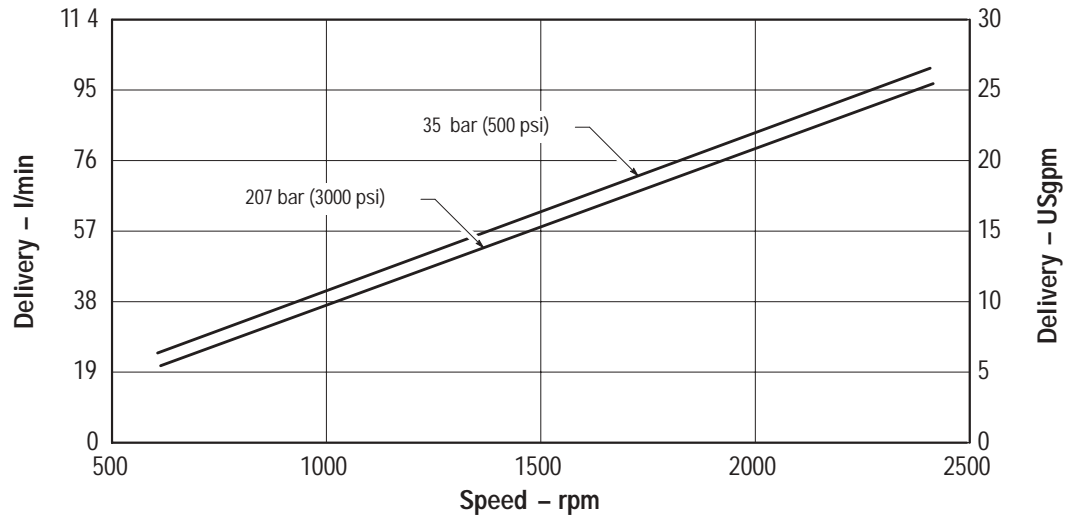
Model Code	Typical Rear Pump Model	Rear Pump Shaft Code	PVE** Thru-drive Coupling
AH	PVQ10/13	3	864224 (9T / 9T Straight)
	PVB5/6	Suffix -S214	
	V10	11	
	V20	62	
AC	PVE012	5	864307 (26T / 13T Step)
	PVE19/21	5	
	PVQ20/32	3	
	PVQ40/45	5	
	V2010 or V2020 20V(Q)	11 151	
AD	PVE19/21	8	475134 (26T / 15T Step)
	PVQ40/45	8	
	2520V(Q)	166	
AK	PVE012	9	627168 / 26T Straight)
	PVE19/21		
	N/C		
	PVQ40/45		

# Performance Curves

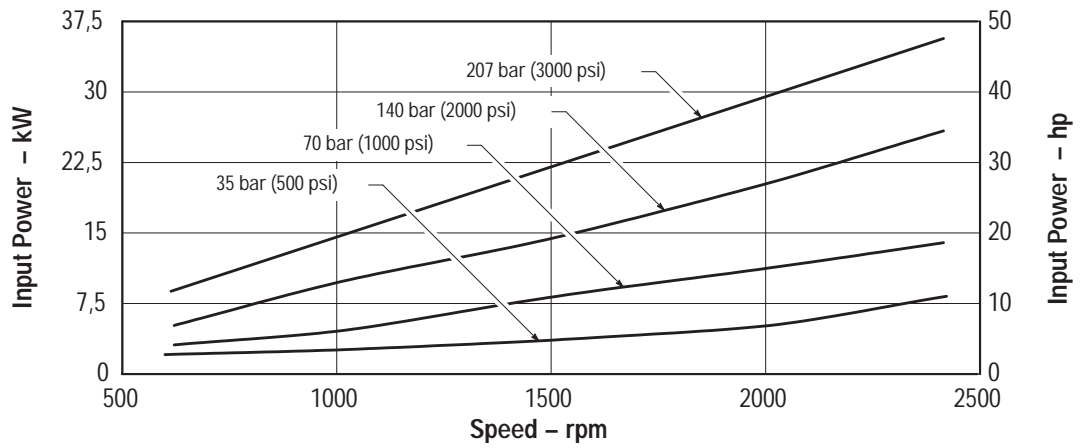
## PVE19

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

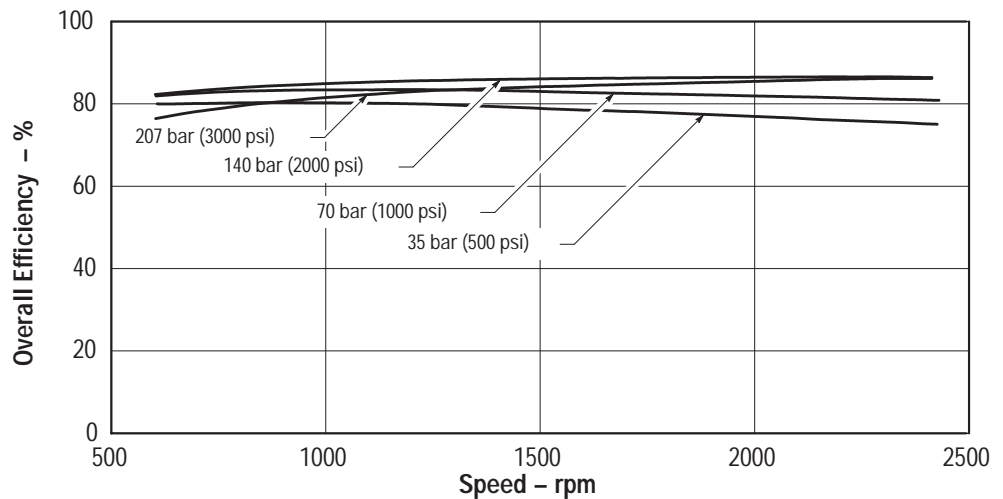
Effective Flow Versus Speed



Input Power Versus Speed



Overall Efficiency Versus Speed



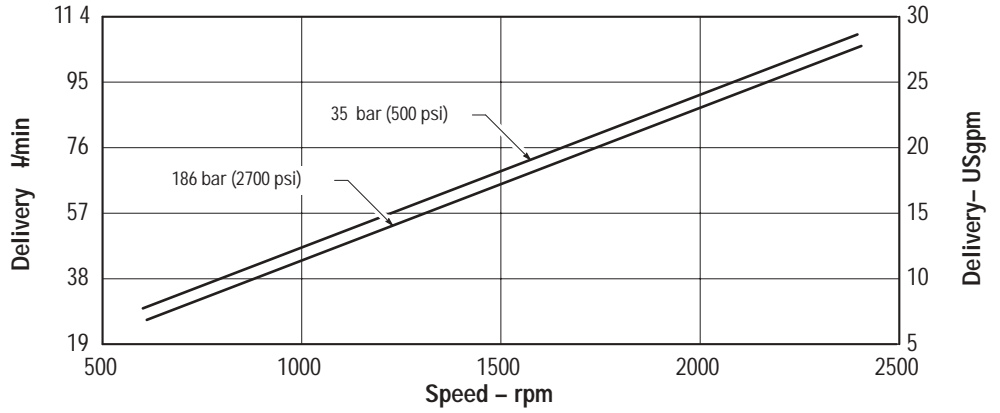


# Performance Curves

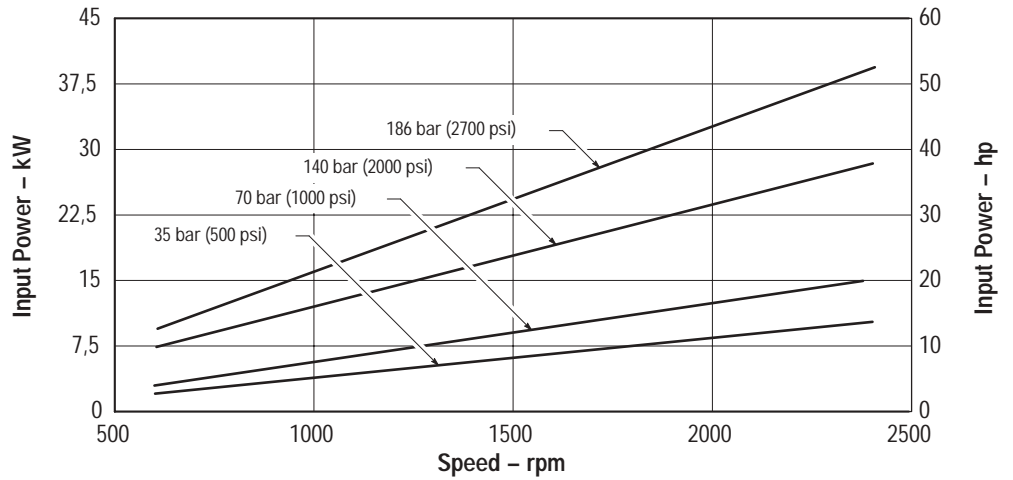
## PVE21

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

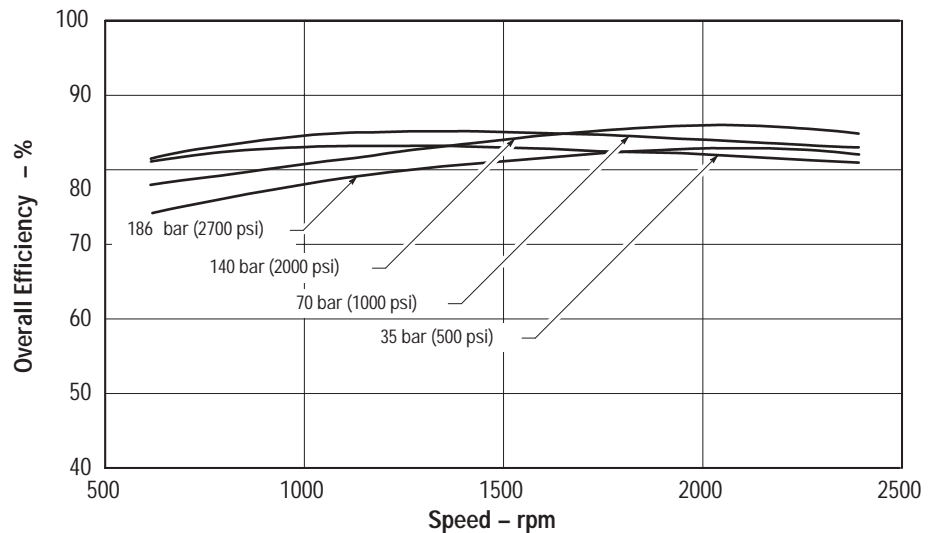
Effective Flow Versus Speed



Input Power Versus Speed

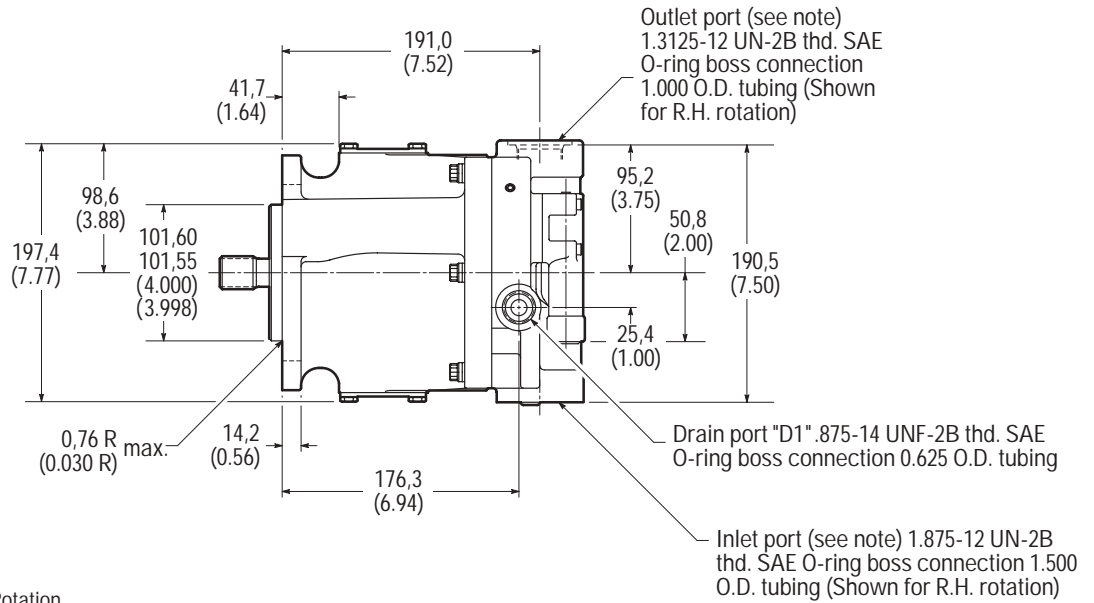


Overall Efficiency Versus Speed

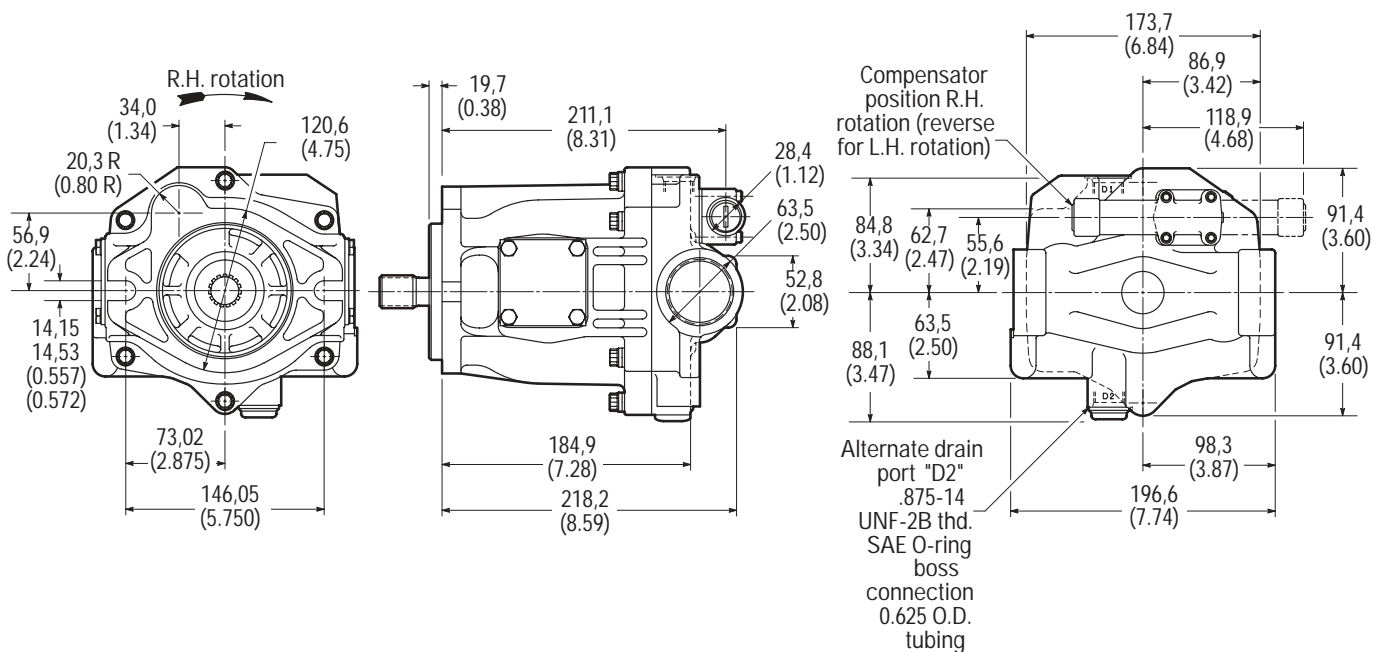


# Installation Dimensions PVE19/21 with Side Ports

Millimeters (inches)

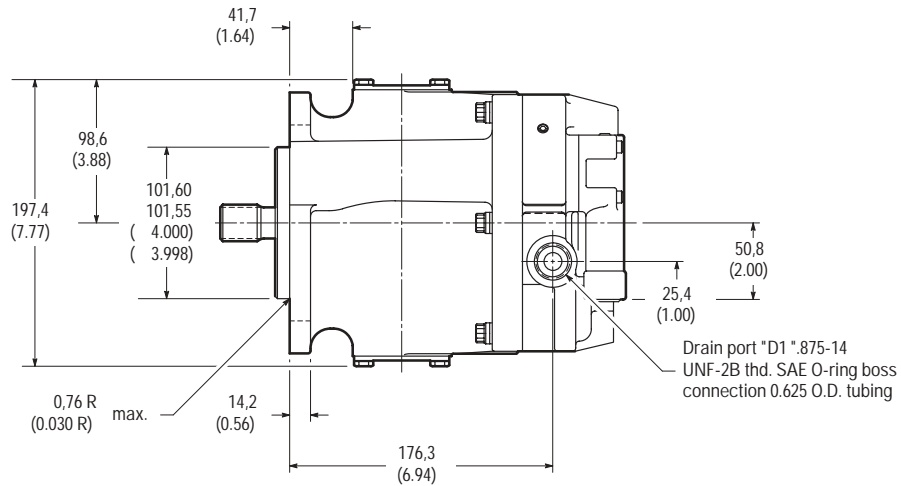


**Note:** Ports are reversed for L.H. Rotation

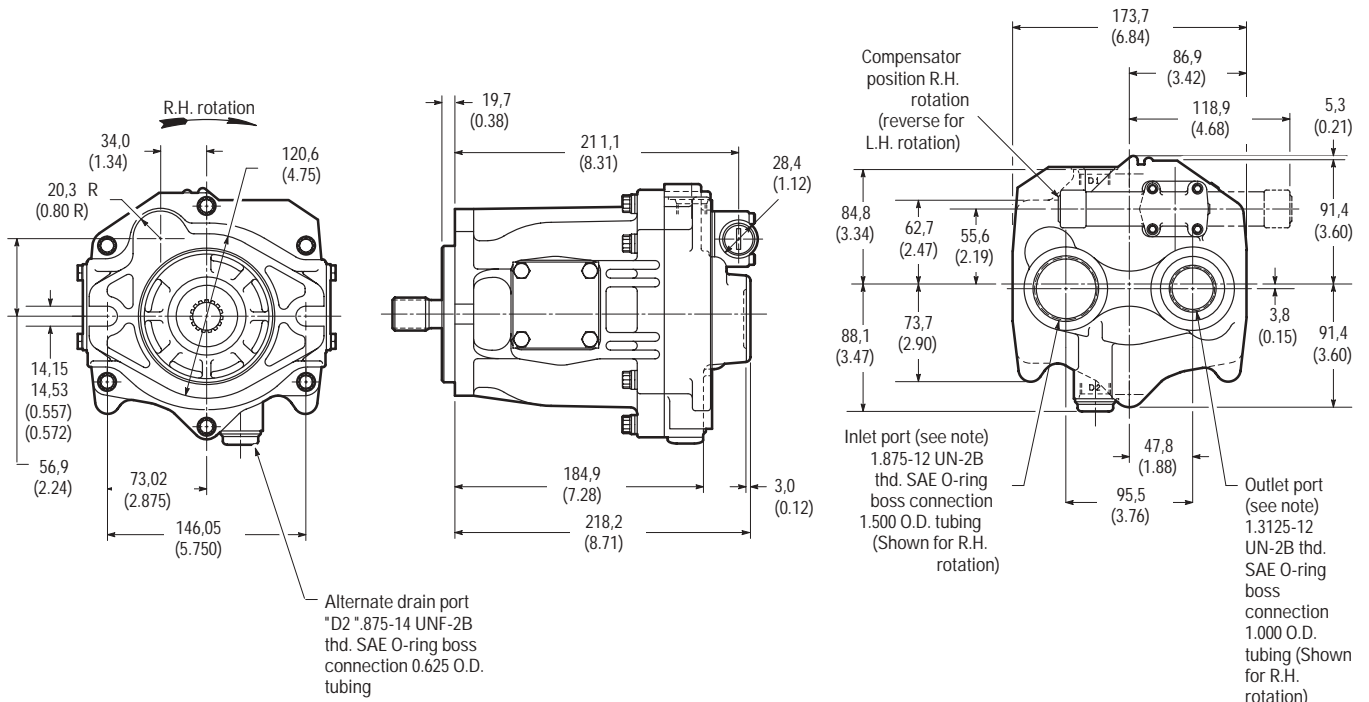


# Installation Dimensions PVE19/21 with End Ports

Millimeters (inches)



**Note:** Ports are reversed for L.H. Rotation

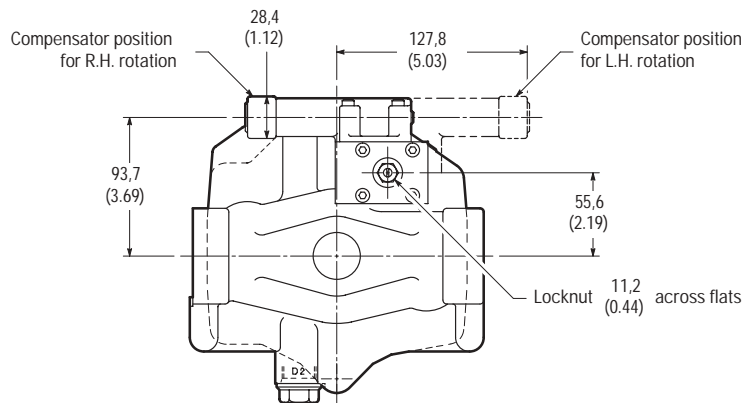
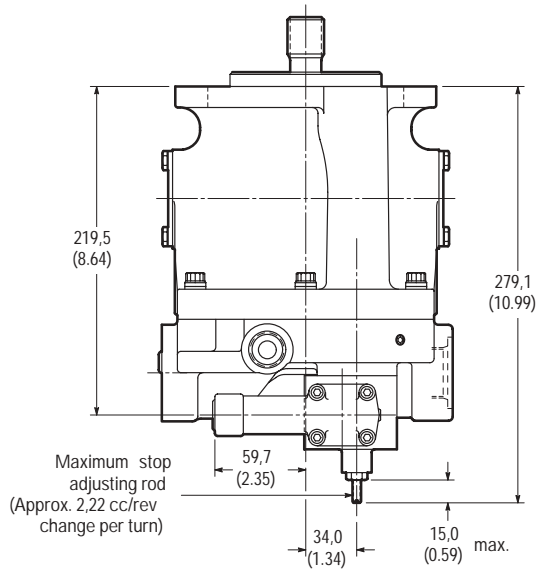


# Controls PVE19/21 Adjustable Maximum Displacement Stop

## Adjustment

Loosen the locknut on the adjusting rod. Turn the adjusting rod clockwise to decrease maximum pump delivery, or counter-clockwise 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% (it is not recommended below 50%) while maintaining all the standard features of a pressure compensated pump.

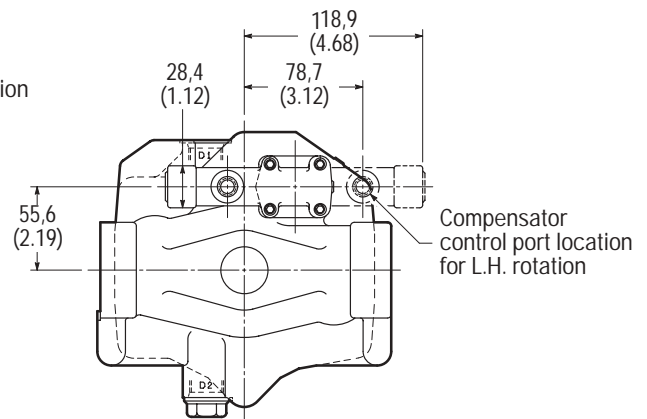
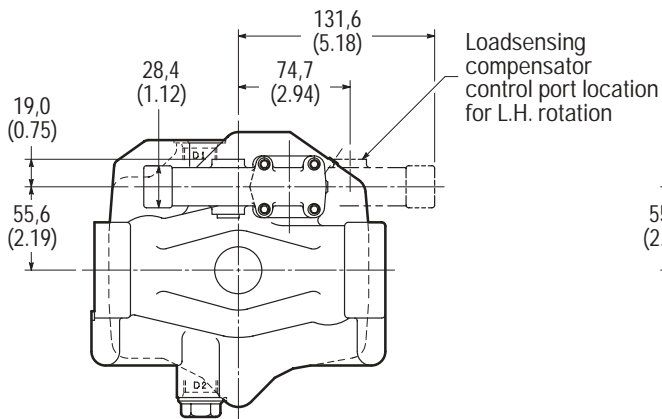
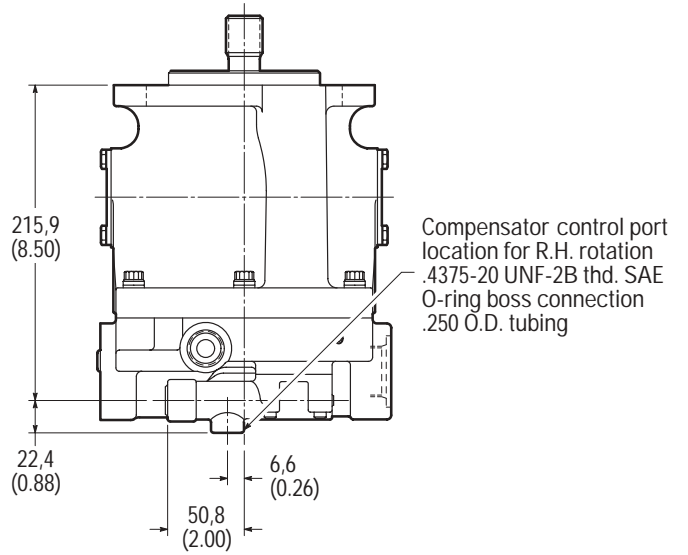
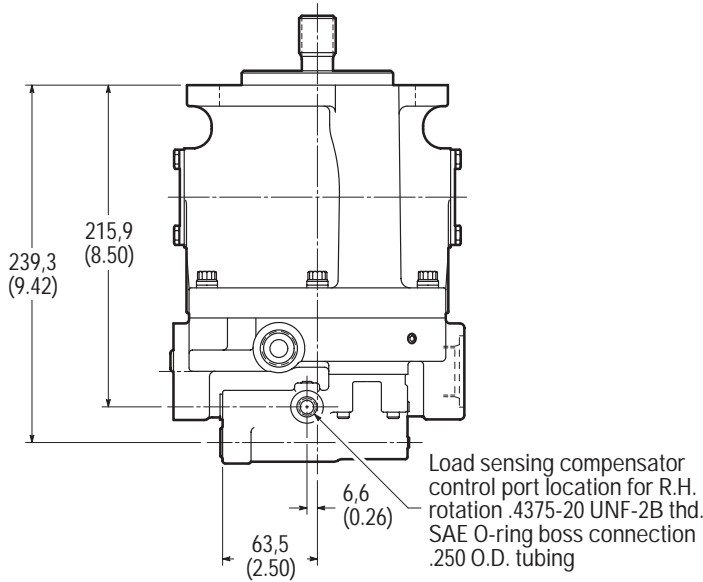


# Controls

## PVE19/21 Load Sensing with Pressure Limiter Control "B" Option

See page 16 for other details and dimensions.

## PVE19/21 Remote Adjustment Compensator Control "D" Option



# Controls

## Unloading Valve Control – “E” Option

With the unloading valve control the variable pump will unload at a preset pressure. The pump will maintain this no flow, low pressure (approximately 14 bar [200 psi]) standby condition, until system pressure drops to about 85% of the preset unloading pressure. The pump will then return on stroke and provide full flow until the preset unloading pressure is reached again.

With this control, an efficient accumulator charging circuit is obtained. The pump will provide full flow to fill the accumulator until the maximum charging pressure is reached. The pump then goes to a standby condition until the accumulator pressure drops to 85% of the desired maximum. The accumulator is then recharged as the cycle starts over again.

A separate right angle check valve must be provided to maintain the accumulator hydraulic charge and prevent back flow when the pump is unloaded. The check valve's internal leakage must not exceed five drops per minute. The control port must be connected to system pressure, downstream of the check valve.

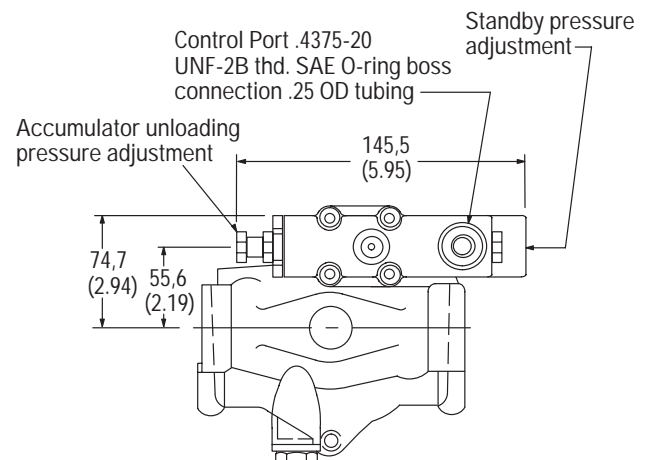
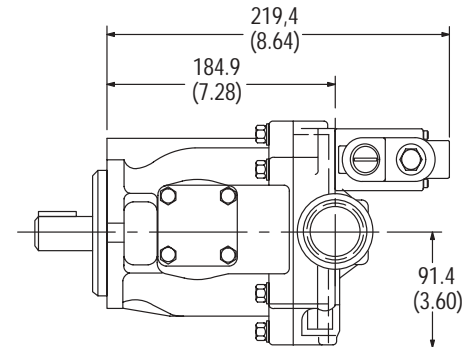
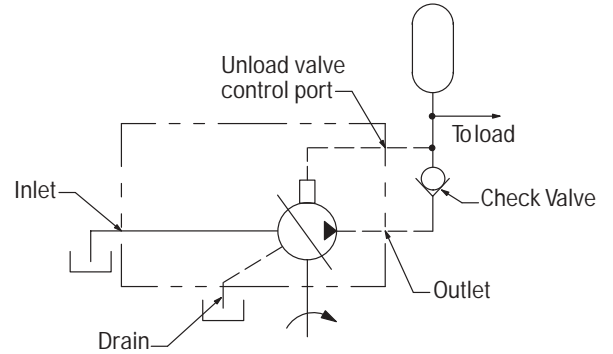
### Adjustment range

PVE19	100-210 bar (1500-3000 psi)
PVE21	100-186 bar (1500-2700 psi)

Cut-in pressure is 85% of unloading pressure, minimum.

### Setting Pressures

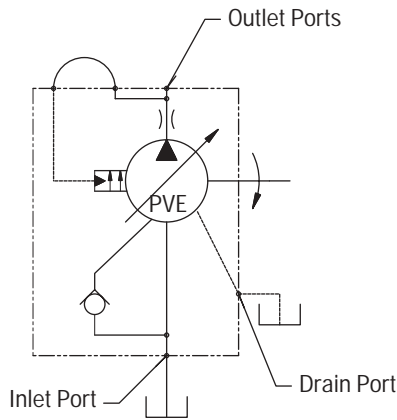
1. Back out accumulator unloading pressure adjustment screw to below desired unloading pressure.
2. Adjust desired standby pressure.
3. Set accumulator pressure by screwing in the accumulator unloading adjustment screw. Accumulator recharge (cut-in) pressure is a function of the maximum accumulator pressure and is not adjustable.
4. Check pressure settings and re-adjust if necessary.



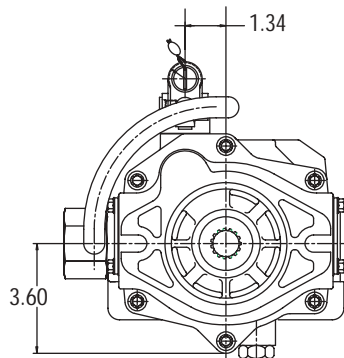
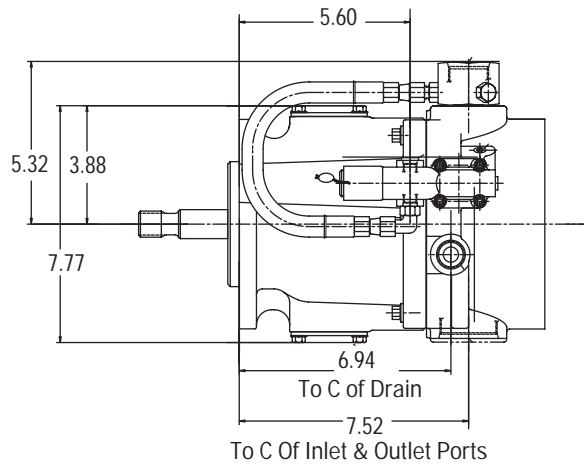
# Controls Valves – Constant Flow Adapter

This control is designed to automatically adjust the PVE outlet flow in response to an internal pressure signal. It will adjust the pump displacement to maintain the outlet flow at a preset level regardless of Input RPM.

Contact your Eaton representative for further detail. This option will fit into the Model code under position 26, 27 - "Special features" 6, 7, 8 GPM constant flow settings available.



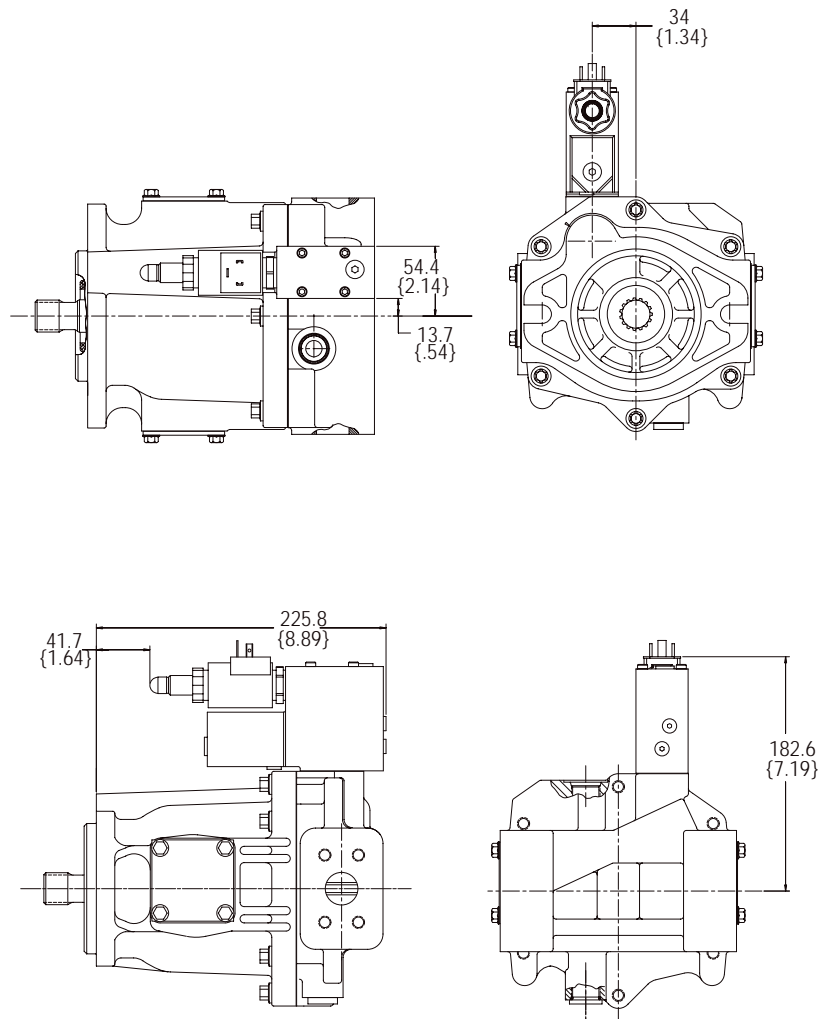
Circuit Diagram



# Controls Valves – Proportional Compensator

This control is designed to automatically adjust the PVE outlet pressure in response to an external electric signal.

Contact your Eaton representative for further detail.

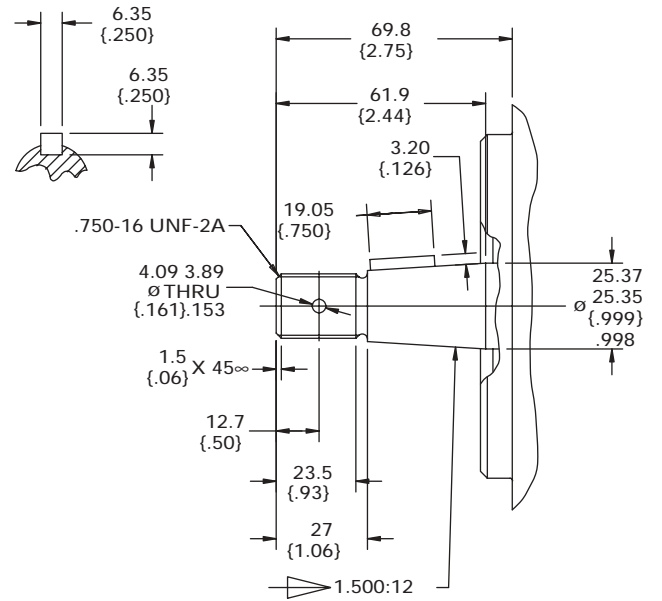




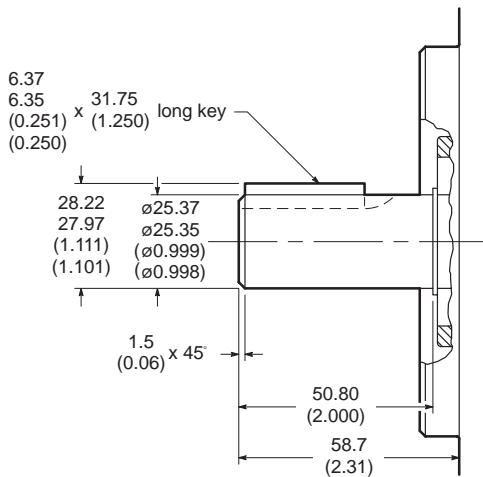
# Shaft Options

## PVE19/21

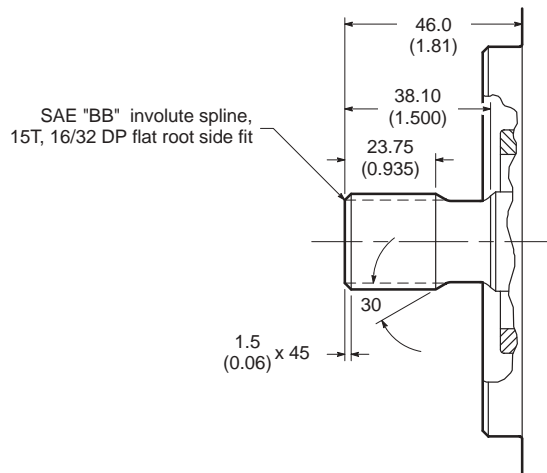
### No. 04 Shaft: Tapered Key shaft



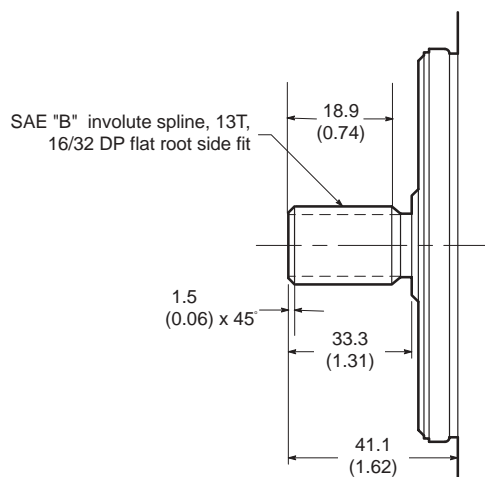
### No. 02 Shaft: SAE "BB" Straight Keyed



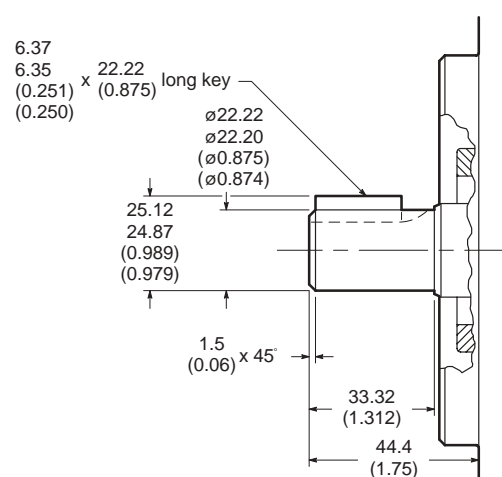
### No. 08 Shaft: SAE "BB" Splined



### No. 05 Shaft: SAE "B" Splined



### No. 01 Shaft: SAE "B" Straight Keyed





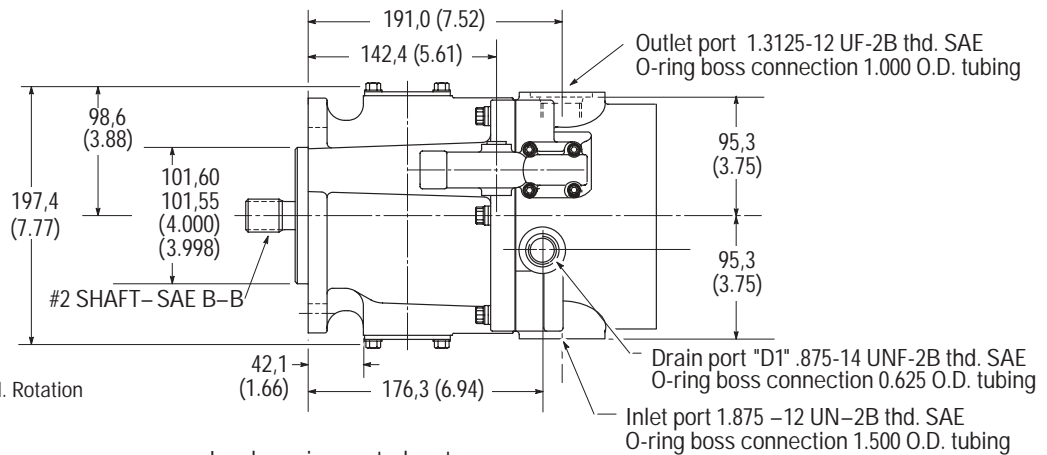
# Thru-drives PVE 19/21 SAE "B" Thru-drives

Millimeters (inches)

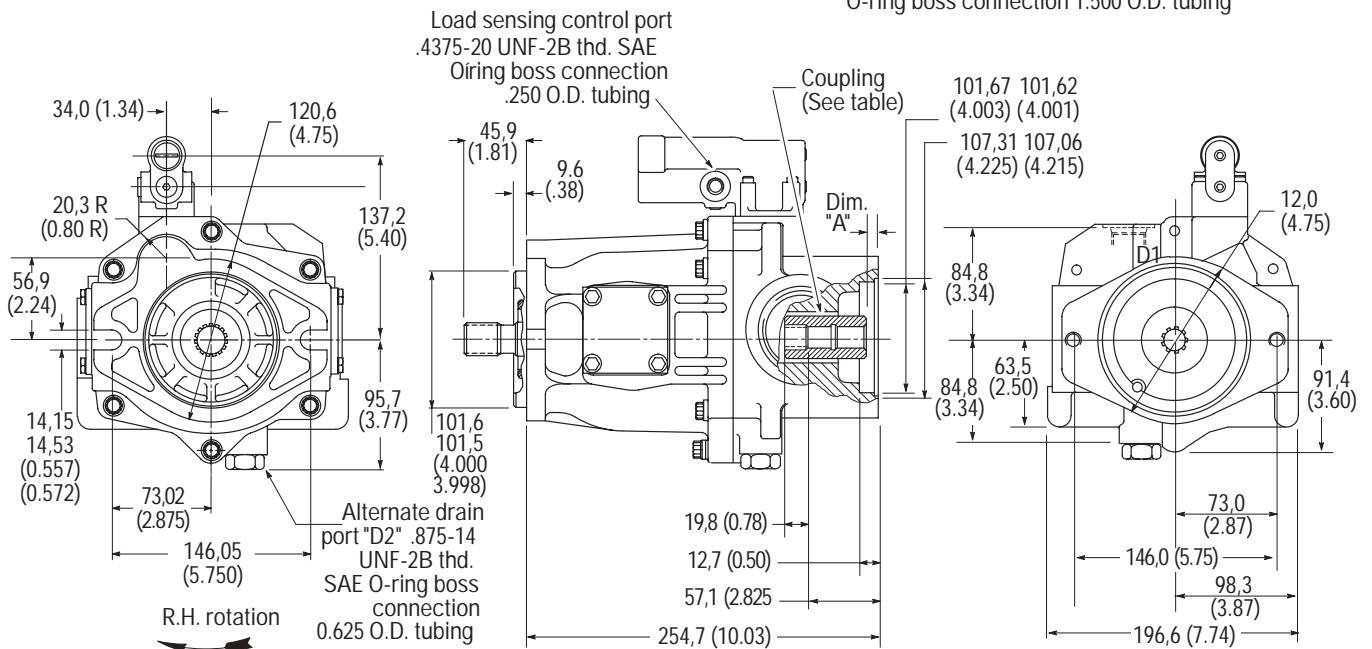
## PVE 19/21 SAE "B" THRU-DRIVES

Thru-shaft	Spline Data	Max Torque Rating N.m (In. lbs.)	DIM. "A" mm (in.)	Coupling Length Dim "D" mm (in.)
AE	Special Eaton 26 tooth 32/64DP 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.  
\* Total input to front pump must not exceed input shaft limit! Thru shaft tongue may be less biased on maximum input tongue to front pump.



**Note:** Ports are reversed for L.H. Rotation

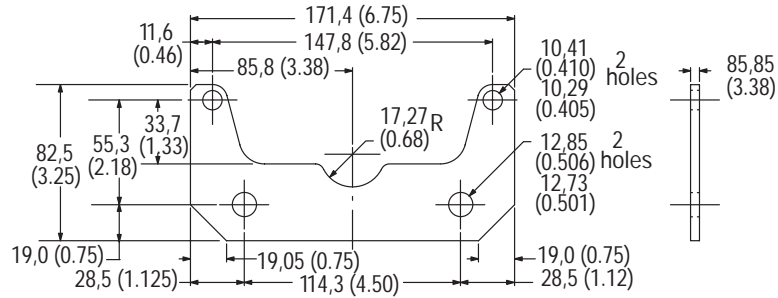


# Thru-drives PVE 19/21 SAE "B" Thru-drives

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.



## 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

Eaton publication 561 "Eaton Guide to Systemic Contamination Control" available from your local Eaton distributor or by contacting Eaton Hydraulics. 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 Eaton publication 561 for exact details.

Eaton 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.

### FLUID CLEANLINESS

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

## Fire resistant fluids

Water glycol, phosphate ester and polyol ester fluids may be used with PVE pumps. With the PVE012 and PVE19, system pressure and input speed should not exceed 140 bar (2000 psi) and 1800 r/min.

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 Eaton 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.

Eaton  
14615 Lone Oak Road  
Eden Prairie, MN 55344  
USA  
Tel: 952 937-9800  
Fax: 952 974-7722  
[www.hydraulics.eaton.com](http://www.hydraulics.eaton.com)

Eaton  
20 Rosamond Road  
Footscray  
Victoria 3011  
Australia  
Tel: (61) 3 9319 8222  
Fax: (61) 3 9318 5714

Eaton  
Dr.-Reckeweg-Str. 1  
D-76532 Baden-Baden  
Germany  
Tel: (49) 7221 682-0  
Fax: (49) 7221 682-788

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