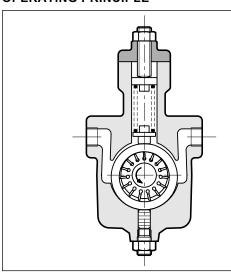


PVE

VARIABLE DISPLACEMENT VANE PUMPS WITH DIRECT PRESSURE ADJUSTMENT

SERIES 30

OPERATING PRINCIPLE



- The PVE pumps are variable displacement vane pumps with direct pressure regulator.
- The pump group is complete with hydrostatic axial compensation distribution plates that improve the volumetric efficiency and reduce wear of the components.
- The pressure regulator adjustable load spring keeps the pump group cam ring in eccentric position.

When the delivery pressure equals the pressure corresponding to the spring setting, the cam ring is moved so to reduce the displacement, adjusting the flow rate to the values required by the plant.

In zero flow demand conditions, the pump delivers oil only to compensate any possible bleedings, keeping the circuit pressure constant.

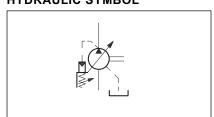
 The PVE pumps are available in four dimensions with maximum displacement from 6,6 to 22,2 cm³/rev and with pressure regulator max setting values up to 35 bar and 70 bar (standard).

TECHNICAL SPECIFICATIONS

PUMP SIZE		006	011	016	023
Displacement	cm ³ /rev	6,6	11,1	16,6	22,2
Flow rate (at 1.500 rpm and with 3.5 bar delivery pressure)	l/min	10,0	16,7	25,0	33,3
Operating pressure	bar	70			
Rotation speed	rpm	min 800 - max 1800			
Rotation direction		clockwise (seen from the shaft side)			
Shaft loads	N	radial and axial loads are not allowed			
Hydraulic connection		BSPP (parallel) threading fittings			
Type of mounting		SAE flange J744 - 2 holes rectangular flange - 4 ho		ange - 4 holes	
Mass	kg	5	6	9	9

Ambient temperature range °C -20 / +50 Fluid temperature range °C -10 / +70 Fluid viscosity range see paragraph 2.2 Fluid contamination degree see paragraph 2.3 Recommended viscosity cSt 25 ÷ 50

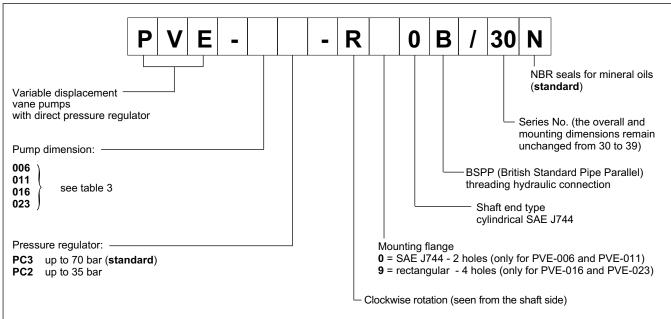
HYDRAULIC SYMBOL



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1 - IDENTIFICATION CODE



2 - HYDRAULIC FLUID

2.1 - Fluid type

Use only HL and HLP mineral oil based hydraulic fluids according to ISO 6743/4.

2.2 - Fluid viscosity

The operating fluid viscosity must be within the following range:

minimum viscosity 16 cSt referred to the maximum drainage fluid temperature of 70 °C.

optimum viscosity 25 ÷ 50 cSt referred to the fluid working temperature in the tank. maximum viscosity 800 cSt limited to only the start-up phase of the pump.

When selecting the fluid type, be sure that the true viscosity is within the range specified above at the operating temperature.

2.3 - Degree of fluid contamination

The maximum degree of fluid contamination must be according to ISO 4406:1999 class 20/18/15; therefore, use of a filter with $\beta_{20} \ge 75$ is recommended. A degree of maximum fluid contamination according to ISO 4406:1999 class 18/16/13 is recommended for optimum endurance of the pump. Hence, use of a filter with $\beta_{10} \ge 100$ is recommended.

The filter must be equipped with a by-pass valve and, if possible, with a clogging indicator.

3 - PERFORMANCES (obtained with viscosity of 46 cSt at 40°C)

PUMP	REGULATOR	DISPLACEMENT [cm³/rev]	MAX FLOW RATE [l/min]		PRESSURE ADJUSTMENT RANGE [bar]		ROTATION SPEED [rpm]	
			1500 rev	1800 rev	min	max	min	max
PVE-006	PC2	6,6	10	12	15	35	- 800	1800
PVE-006	PC3				50	70		
DVE 044	PC2	11,1	16,7	20	15	35		
PVE-011	PC3				50	70		
DVE 040	PC2	16,6	25	30	15	35		
PVE-016	PC3				50	70		
D)/E 000	PC2	22,2	33,3	40	15	35		
PVE-023	PC3				50	70		

NOTE: Flow rate values are obtained with delivery pressure = 3.5 bar

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4 - NOISE LEVEL

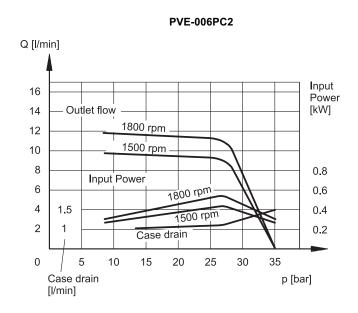
PUMP	NOISE LEVEL [dB (A)] null displacement full displacement			
PVE-006	61	63		
PVE-011	62	65		
PVE-016	64	68		
PVE-023	64	70		

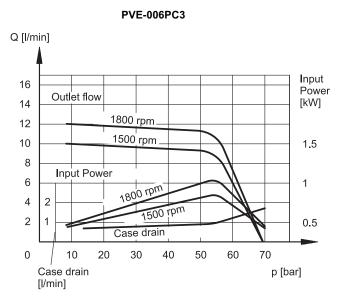
The noise pressure levels were measured in a semi-anechoic room, at an axial distance of 1 m from the pump.

The values shown must be reduced by 5 dB(A) if they are to be considered in a completely anechoic room.

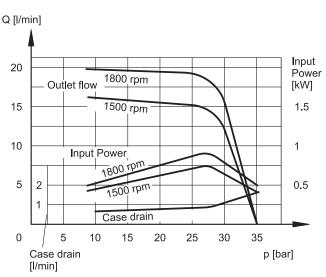
5 - CHARACTERISTIC CURVES (values obtained with mineral oil with viscosity of 46 cSt at 40°C)

The diagram curves were measured with a pump rotation speed of 1500 and 1800 rev/min.

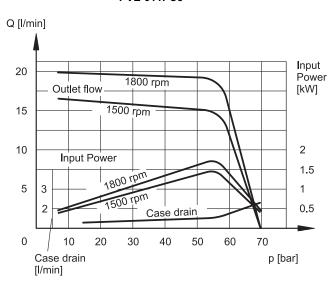




PVE-011PC2



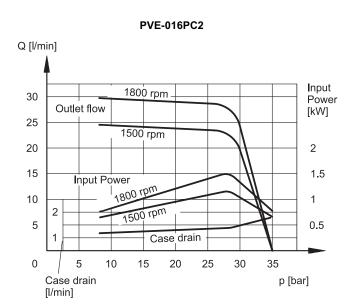
PVE-011PC3

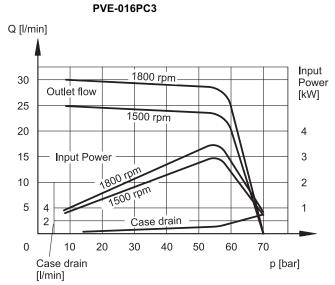


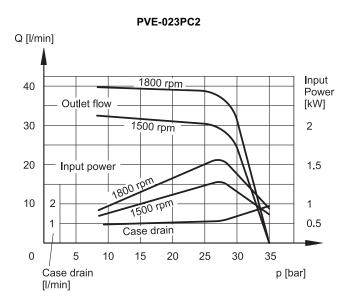
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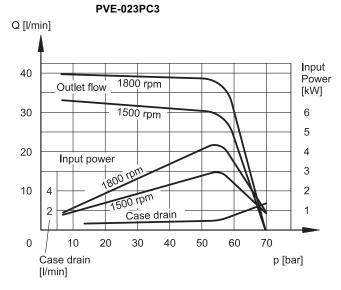


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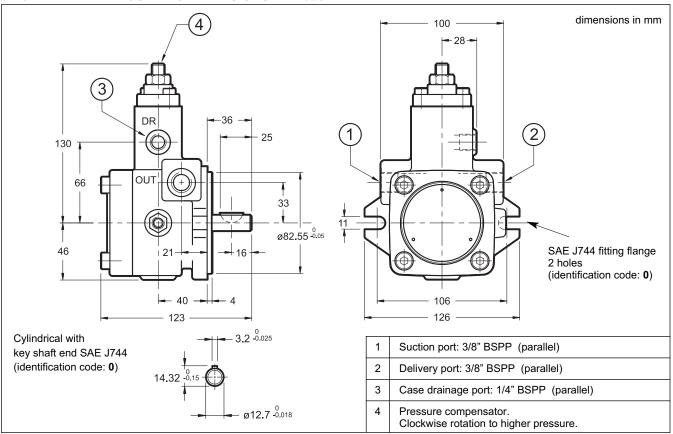




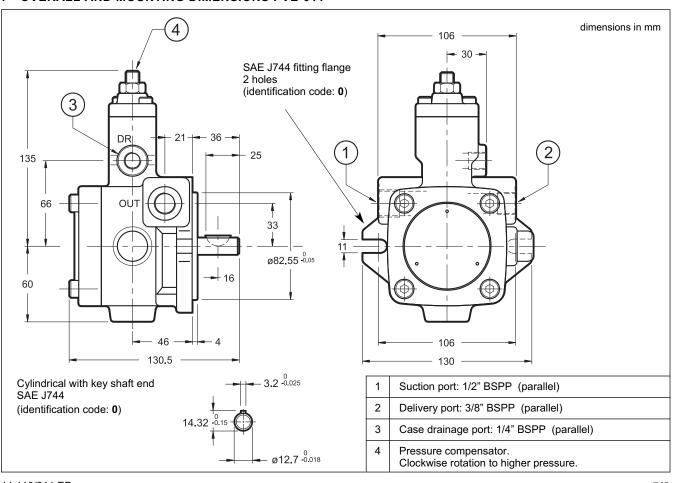
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6 - OVERALL AND MOUNTING DIMENSIONS PVE-006



7 - OVERALL AND MOUNTING DIMENSIONS PVE-011

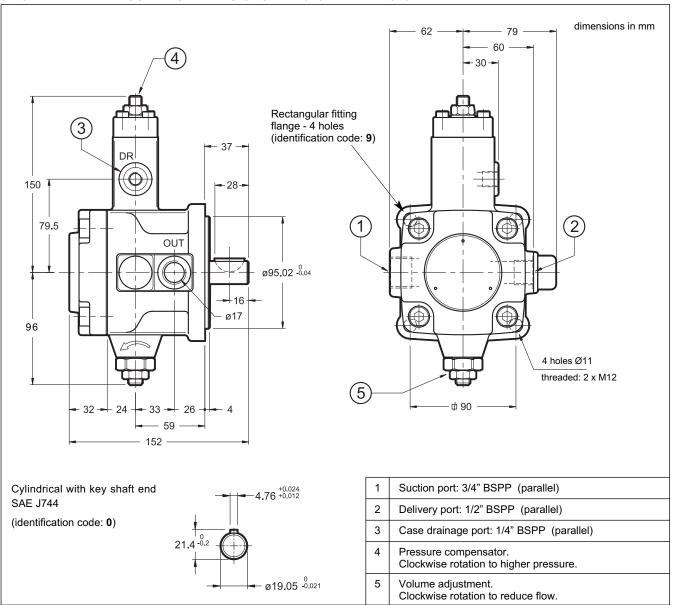


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8 - OVERALL AND MOUNTING DIMENSIONS PVE-016 AND PVE-023



9 - INSTALLATION

- The PVE pumps can be installed with the axis oriented in any position.
- The suction tube has to be suitably sized so that the suction pressure is never lower than -0.3 bar (relative). Bends or restrictions or an excessive tube length could further decrease the value of the suction pressure with a following increase in the noise emissions and a decrease in the pump lifetime.
- The drainage port must be connected directly to the tank by a line separate from other discharges, located far from the suction line and lengthened to below the minimum oil level so as to avoid formation of foam.
- **Before starting, the pump body has to be filled with the fluid.** The pump start up, especially at a cold temperature, should occur with the pump unloading. Start and stop motor several time in order to purge the air from pump and pipelines.
- The pumps are normally positioned directly above the oil tank. Flooded suction port installation of the pumps is advisable in the case of circuits with high flow rates and pressures.
- The drainage tube has to be sized so that the pressure inside the pump body is always lower than 0.3 bars (relative), even during the dynamic change and flow rate phases. The drainage tube has to unload inside the tank far from the suction area. We suggest to interpose a screen between the two lines.
- The motor-pump connection must be carried out directly with a flexible coupling. Couplings that generate axial or radial loads on the pump shaft are not allowed.

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10 - MULTIPLE PUMPS

PVE-016 and PVE-023 pumps can be connected to external gear pumps (see available displacements in the table at par. 10.3). The possibility to couple two pumps makes possible to create multi-flow groups with independent hydraulic circuits.

10.1 - Maximum applicable torque

While sizing coupled pumps, consider that the shaft of the front pump must bear the torque generated by both pumps when they are loaded simoultaneusly.

NOTE: The maximum applicable torque at the shaft of the front pump is 62 Nm.

The input torque (M) for each pump is given by the following ratio:

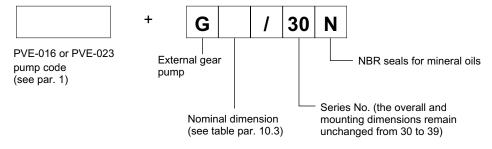
$$M = \frac{9550 \cdot N}{n} = [Nm] \qquad n = \text{rotation speed [rpm]}$$

where the absorbed power (N) is given by:

$$N = \frac{Q \cdot \Delta p}{600 \cdot \eta_{tot}} = \text{[kW]} \qquad \qquad Q = \text{flow rate [l/min]} \\ \Delta p = \text{differential pressure between the pump suction and delivery [bar]} \\ \eta_{tot} = \text{total efficiency (coefficient = 0.8)}$$

If the total of the obtained torques is higher than 62 Nm, it is necessary to reduce the working pressure / flow value of one or both the pumps until the total torque becomes lower than the maximum value indicated.

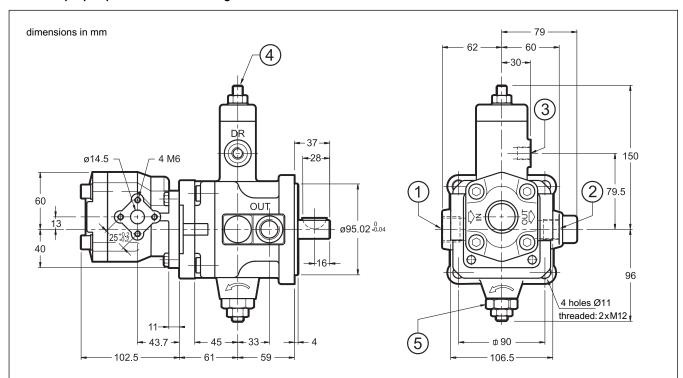
10.2 - Multiple pumps identification code



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10.3 - Multiple pumps overall and mounting dimensions



Cylindrical with key shaft end SAE J744

 $(\text{identification code: } \boldsymbol{0})$

AVAILABLE GEAR PUMPS

Nominal dimension	Displacement [cm³/rev]	Max working pressure [bar]	Peak pressure [bar]	Min speed [rev/min]
0020	2			900
0025	2.5			850
0030	3			030
0040	4			
0050	5	210	250	
0060	6			
0075	7.5			800
0090	9			
0105	10.5			
0120	12	175	210	

Gear pump weight: 1.7 kg

4.76 +0.024 +0.012
21.4-0.2
ø19.05 -0.021

1	Suction port: 3/4" BSPP (parallel)
2	Delivery port: 1/2" BSPP (parallel)
3	Case drainage port: 1/4" BSPP (parallel)
4	Pressure compensator. Clockwise rotation to higher pressure.
5	Volume adjustment. Clockwise rotation to reduce flow.



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