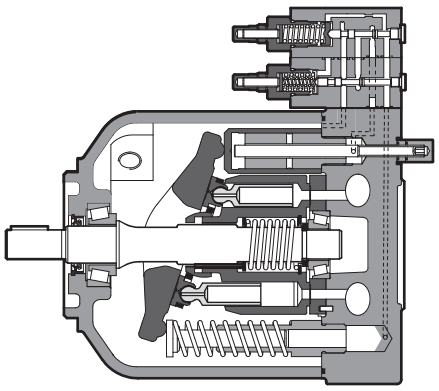
Axial piston pumps type PVPY-C (-R, -L)

variable displacement, with mechanical controls

obsolete components - availability on request



PVPY-L-4045*

PVPY are variable displacement axial piston pumps for open circuits, available with following mechanical controls:
C = manual pressure compensator
R = remote pressure compensator
L = Load sensing compensator

The construction is based on swash plate design with 9 axial pistons sliding into a rotating drum.
This execution ensures fast response times, high reliability and reduced overall dimensions.

The pumps are available in 3 different sizes with displacement range respectively from zero to 28, 45 and 71 cc/rev

- ISO 3019/2, 2 holes Mounting flange
- Keyed or spline shaft
- SAE inlet/outlet connections with metric bolts
- 2 body drain connections located at opposite positions to permit the correct drain pipe orientations (see section 4)

Max pressure = 250 bar (working)
350 bar (peak)

1 MODEL CODE

PVPY	*	-	C	-	4045	/	1	D	/	M	**

Variable displacement axial piston pump

Optional through output shaft:
- = without through output shaft
XA = SAE A connection
XB = SAE B connection
XC = SAE C connection

C = manual pressure compensator
R = remote pressure compensator
L = load sensing compensator

Size and max displacement:
3028 = 28 cm³/rev
4045 = 45 cm³/rev
5071 = 71 cm³/rev

Note: mounting flange SAE 5744 available on request

Shaft:
1 = keyed
5 = splined advisable for version with through output shaft

Direction of rotation (viewed at the shaft end)
D = clockwise **S** = counterclockwise

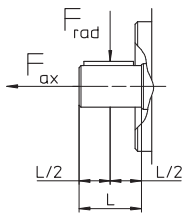
ISO 3019/2
Metric mounting flange

Series number

2 OPERATING CHARACTERISTICS

Pump model PVPY			3028	4045	5071
Displacement	[cm³/rev]		28	45	71
Theorical max flow at 1450 rpm	[l/min]		40,6	65,2	103
Max working pressure / Peak pressure	[bar]		250/300	250/300	250/300
Min/Max inlet pressure	[bar abs.]		0,8 / 30	0,8 / 30	0,8 / 30
Max pressure on drain port	[bar abs.]		1,5	1,5	1,5
Power consumption at 1450 rpm and at maximum pressure and displacement	[kW]		17,2	28,0	45,7
Max shaft torque	[Nm]	type 1	125	200	316
		type 5	190	330	620
Max permissible load on drive shaft	[N]	F_{ax}	1000	1500	2000
		F_{rad}	1500	1500	3000
Speed rating	[rpm]		600 ÷ 3000	600 ÷ 2600	600 ÷ 2200

External loads position



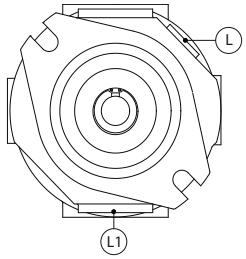
F_{ax} = axial load
F_{rad} = radial load

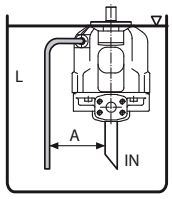
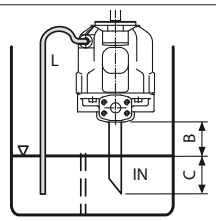
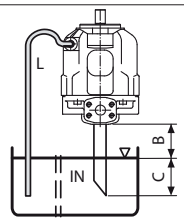
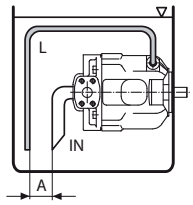
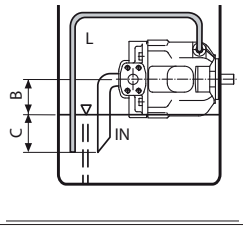
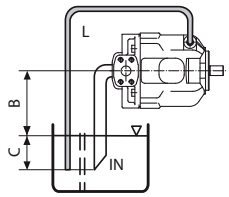
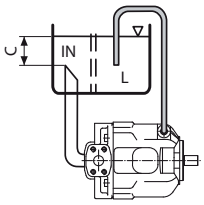
Notes: For speeds over 1800 rpm the inlet port must be under oil level with adeguate pipes.

3 MAIN CHARACTERISTICS OF VARIABLE DISPLACEMENT AXIAL PISTON PUMPS TYPE PVPY

Installation position (see also section 4)	Any position. The drain port must be on the top of the pump. Drain line must be separated and unrestricted to the tank and extended below the oil level as far from the inlet as possible. Suggested maximum line lenght is 3 m.
Ambient temperature	from -20°C to +70°C
Fluid	Hydraulic oil as per DIN 51524...535; for other fluids see section 1
Recommended viscosity	15÷100 mm²/sec at 40°C (ISO VG 15÷100). Maximum start-up viscosity: 1000 mm²/sec
Fluid contamination class	ISO 4401 class 21/19/16 NAS 1638 class 10 (filters at 25 µm value with ß25 ≥ 75 recommended)
Fluid temperature	-20°C +90°C

4 INSTALLATION POSITION

<table>
<tr><td rowspan="2"> 

The pump is supplyed whit drain L open, and L1 plugged. Before installation fill the pump with hydraulic oil for at least 3/4 of its volume, keeping it in horizontal position.
With exception of pump mounted below the oil level, we recomend to interpose a baffle plate between inlet and drain line.</td><td colspan="3">VERTICAL INSTALLATION</td></tr>
<tr><td> 
</td><td> 
</td><td> 
</td></tr>
<tr><td></td><td>INSIDE THE TANK
Minimum oil level equal or above the pump mounting surface.
A ≥ 200mm</td><td>INSIDE THE TANK
Minimum oil level below the pump mounting surface.
Minimum inlet pressure = 0,8 bar absolute
B ≤ 800mm, C= 200mm</td><td>OUTSIDE THE TANK, above oil level
Minimum inlet pressure = 0,8 bar absolute
B ≤ 800mm, C= 200mm</td></tr>
<tr><td colspan="4">HORIZONTAL INSTALLATION</td></tr>
<tr><td> 
</td><td> 
</td><td> 
</td><td> 
</td></tr>
<tr><td>INSIDE THE TANK
Minimum oil level equal or above the pump mounting surface.
A ≥ 200mm</td><td>INSIDE THE TANK
Minimum oil level below the pump mounting surface.
Minimum inlet pressure = 0,8 bar (absolute)
B ≤ 800mm, C= 200mm</td><td>OUTSIDE THE TANK, above oil level
Minimum inlet pressure = 0,8 bar (absolute)
B ≤ 800mm, C= 200mm</td><td>OUTSIDE THE TANK, below oil level
C= 200mm</td></tr>
</table>

IN: inlet line - **L1:** drain line - **A:** minimum distance between inlet and drain line - **B+C:** permissible suction height - **C:** inlet line immersion dept

4.1 Hydraulic fluids and operating viscosity range

Recommended mineral oils type HLP having high viscosity index.

The type of fluid has to be selected in consideration of the effective working temperature range, so that the fluid viscosity remains at the optimal level (see fig. 1).
To ensure the best efficiency and working life, the fluid viscosity should be selected in the range 15 to 36 mm²/s at the effective working temperature.

Note: the temperature of the fluid contained in the pump body (drain line) is always higher than the tank temperature, specially if the pump is working for long time in null flow conditions and at high pressure

Fluid viscosity limits:
- 10 mm²/s for short periods at max fluid temperature on drain line
- 1000 mm²/s for short period at cold start-up

4.2 Filtration

The correct fluid filtration ensures a long service life of the pump and it prevent anomalous wearing which can cause loss of efficiency and increment of noise level.

The fluid contamination class must be not higher than ISO 4401 class 21/19/16 (NAS 1638 class 10), the recommended class for the best pump operation and endurance should be equal or better than ISO 4401 class 20/18/15 (NAS 1638 class 9).

A 150 microns suction filter is suggested on the pumps inlet port to avoid that big contaminants as part of rubber pips, metallic burrs, etc, can be get into the pump.

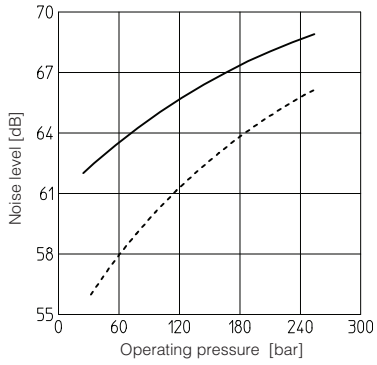
5 DIAGRAMS at 1450 rpm (based on mineral oil ISO VG 46 at 50°C)

5.1 Noise level

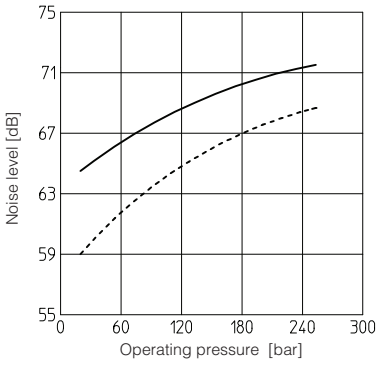
Ambient noise levels measured in compliance with ISO 4412-1 oleohydraulics -Test procedure to define the ambient noise level- Pumps.

—— = Qmax ------ = Qmin

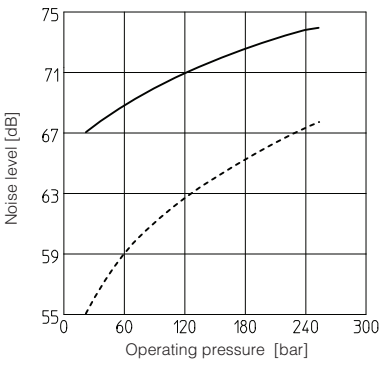
PVPY-*-3028



PVPY-*-4045



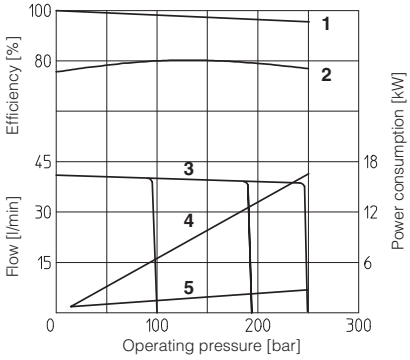
PVPY-*-5071



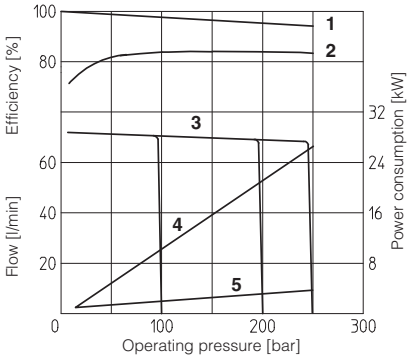
5.2 Performances in static conditions

1 = Volumetric efficiency **2** = Overall efficiency **3** = Flow versus pressure curve
4 = Power consumption with full flow **5** = Power consumption at pressure compensation

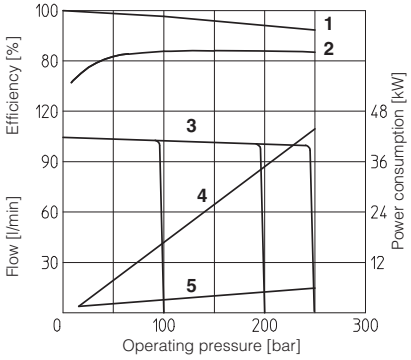
PVPY-*-3028



PVPY-*-4045



PVPY-*-5071

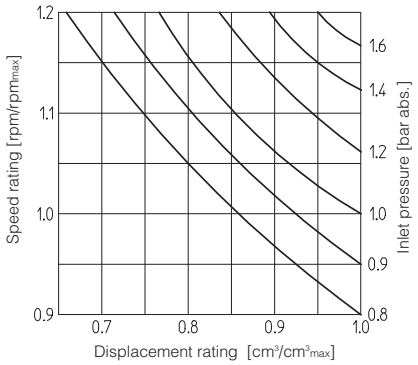


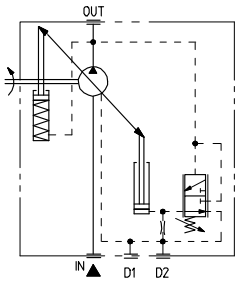
5.3 Response times

T1 = pressure response 10% ÷ 100%
T2 = pressure response 100% ÷ 10%
T3 = flow response 0% ÷ 100%
T4 = flow response 100% ÷ 0%

Pump type	**T1** (ms)	**T2** (ms)	**T3** (ms)	**T4** (ms)
PVPY-*-*-3028	31	19	80	60
PVPY-*-*-4045	44	20	120	80
PVPY-*-*-5071	50	25	160	100

5.4 Variation of inlet pressure and reduction of displacement for increasing speed rating





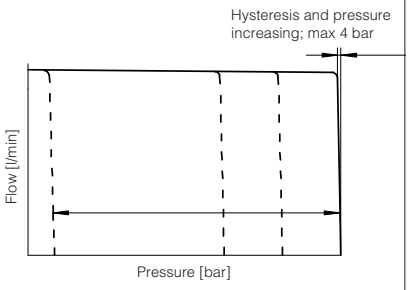
C

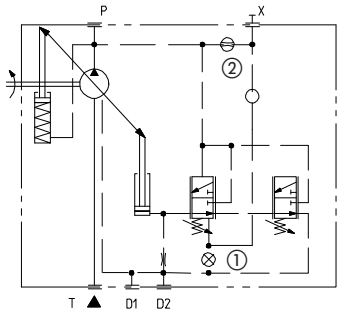
Manual pressure compensator

The pump displacement decreases when the line pressure approaches the setting pressure of the compensator. The pump supplies only the fluid required by the system. Pressure may be steplessly adjusted at the pilot valve.

Compensator setting range: 20 ÷ 350 bar

Compensator standard setting: 280 bar





R

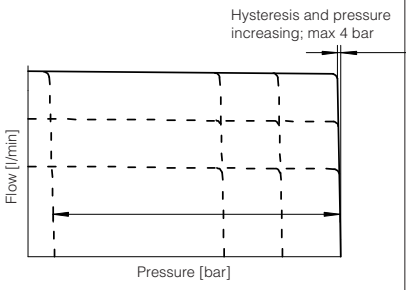
Remote pressure compensator

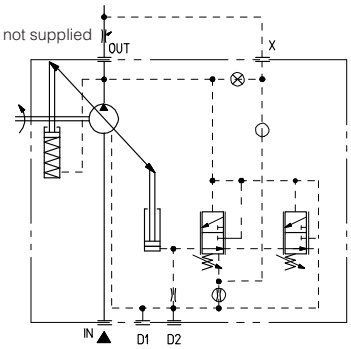
As C, but with remote setting of the compensator by means of a pressure relief valve conneced to the piloting line X.

This version can be obtained from version L using a blind plug UNI 5923 M4x12 in pos. ① and a restrictor M4 drilled ø 0,75 mm in pos. ②.

Compensator setting range: 20 ÷ 350 bar

Compensator standard setting: 280 bar





L

Load sensing

The pump displacement is automatically adjusted to maintain a constant (load indipendent) pressure drop across an external throttle. Changing the throttle regulation, the pump flow is consequently adjusted.

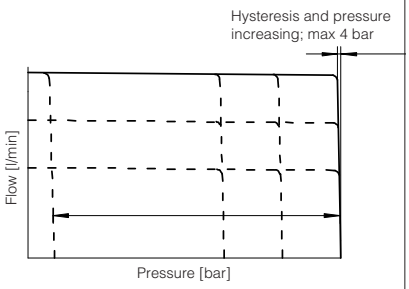
Load sensing control always incorporates an hydraulic compensator to limit the maximum pressure.

Compensator setting range: 20 ÷ 350 bar

Compensator standard setting: 280 bar

Differential pressure setting range: 10 ÷ 40 bar

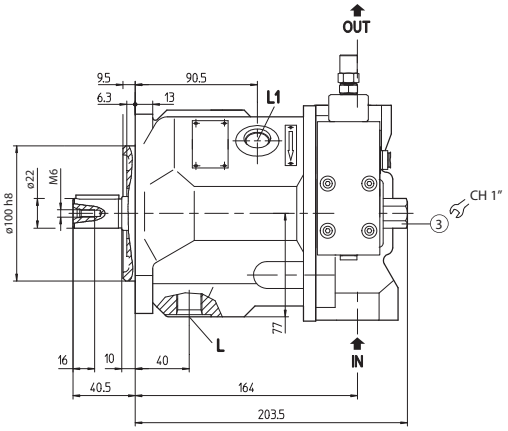
Differential pressure standard setting: 14 bar

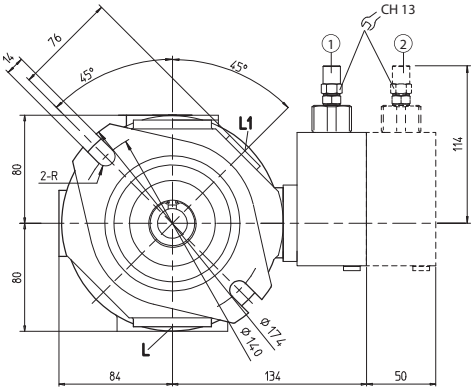


7 DIMENSIONS OF PVPY

DIMENSIONS OF PVPY-3028

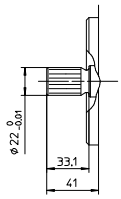
dotted line version “L”





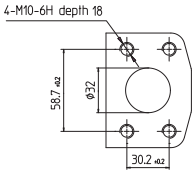
① Max pressure compensator
② Differential pressure compensator
③ Mechanical max displacement limiter

Splined shaft
(option 5)

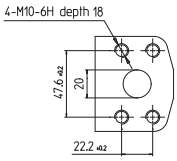


13 teeth
16/32 pitch

IN connection

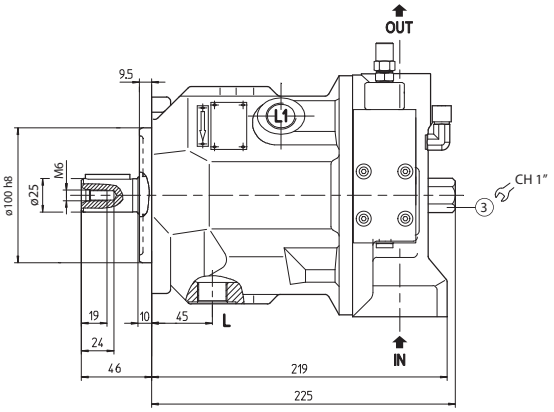


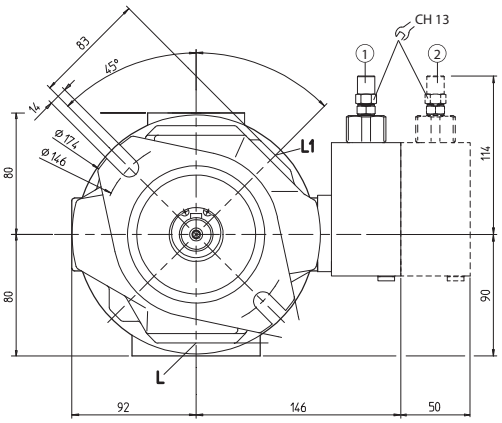
OUT connection



DIMENSIONS OF PVPY-4045

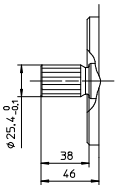
dotted line version “L”





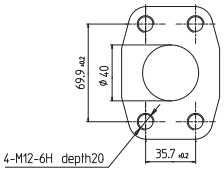
① Max pressure compensator
② Differential pressure compensator
③ Mechanical max displacement limiter

Splined shaft
(option 5)

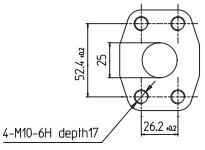


15 teeth
16/32 pitch

IN connection

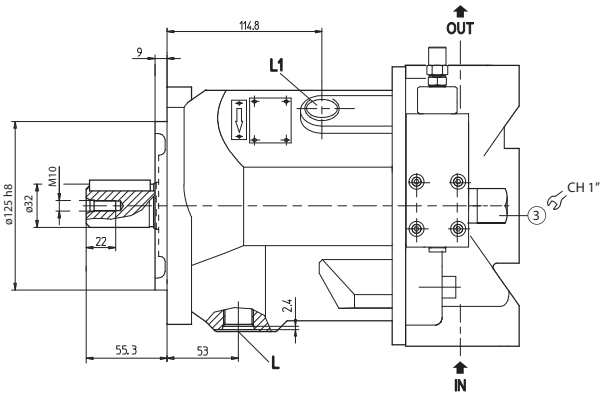


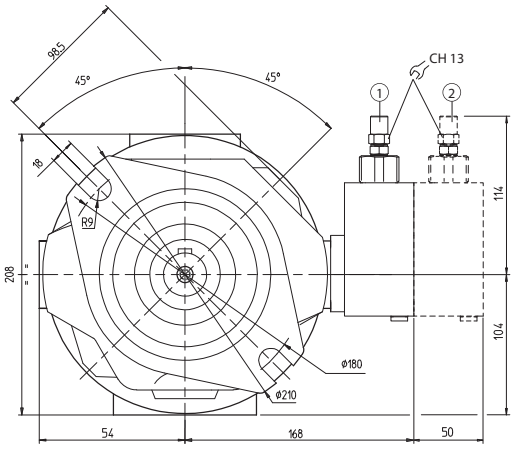
OUT connection



DIMENSIONS OF PVPY-5071

dotted line version “L”



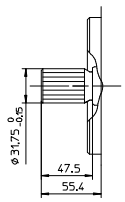


① Max pressure compensator

② Differential pressure compensator

③ Mechanical max displacement limiter

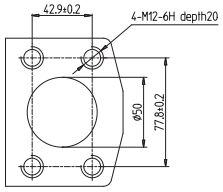
Splined shaft
(option 5)



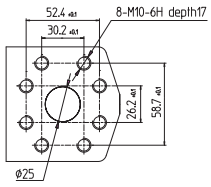
14 teeth

12/24 pitch

IN connection

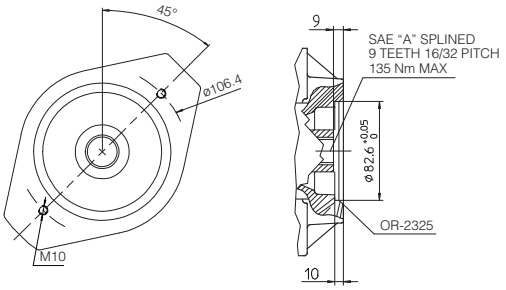


OUT connection

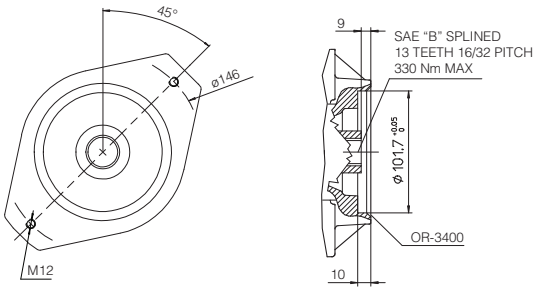


8 INTERMEDIATE FLANGES FOR VERSION WITH TROUGH OUTPUT SHAFT

INTERMEDIATE FLANGE SAE “A” (option **XA**)



INTERMEDIATE FLANGE SAE “B” (option **XB**)



INTERMEDIATE FLANGE SAE “C” (option **XC**)