



**DIPLOMATIC  
HYDRAULICS**

**14 100/103 ED**

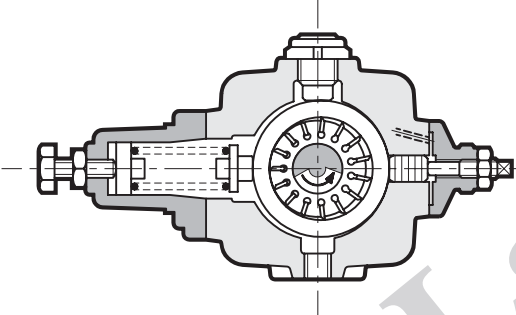


# PVD

## VARIABLE DISPLACEMENT VANE PUMPS

### SERIES 30

#### OPERATING PRINCIPLE



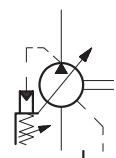
- The PVD pumps are variable displacement vane pumps with a mechanical type of pressure compensator.
- They allow instantaneous adjustment of the flow rate according to the circuit requirements. The consequence is that energy consumption is reduced and adequate in every phase of the cycle.
- The pump group is complete with hydrostatic axial compensation distribution plates that improve the volumetric efficiency and reduce wear of the components.
- The pressure compensator operates with the principle of keeping the cam ring of the pumping group in the eccentric position with use of an adjustable load spring.
- When the delivery pressure equals the pressure corresponding to the spring setting, the cam ring is moved toward the center, 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 and pilotings, keeping the circuit pressure constant.
- The compensator response times are very low such as to allow elimination of the pressure relief valve.
- Also available is the version with maximum flow adjustment PVD\*\*\*Q

#### PERFORMANCE RATINGS (measured with mineral oil with viscosity of 36 cSt at 50°C)

PVD pump nominal dimension		9	13	17	22	28	35	45	56	72	90	115	145
Displacement	cm <sup>3</sup> /rev	6,3	10	12,5	16	20	25	31,5	40	50	63	80	100
Maximum flow rate (at 1450 rpm)	l/min	8.7	14.5	17.4	23.2	29	36.2	45.6	58	72.5	91.3	116	145
Maximum operating pressure	bar	150			100						80		
Pressure adjustment range	Version H bar	30 - 100									30 - 80		
	Version K bar	80-150			-								
Maximum pressure on the drainage port	bar	1											
Rotation speed range	rpm	800 - 1800											
Rotation direction		clockwise (seen from the outlet shaft side)											
Shaft loads		radial and axial loads are not allowed											
Maximum applicable torque on shaft	Nm	70			197			400			740		
Mass	kg	6.5			12			32			44		

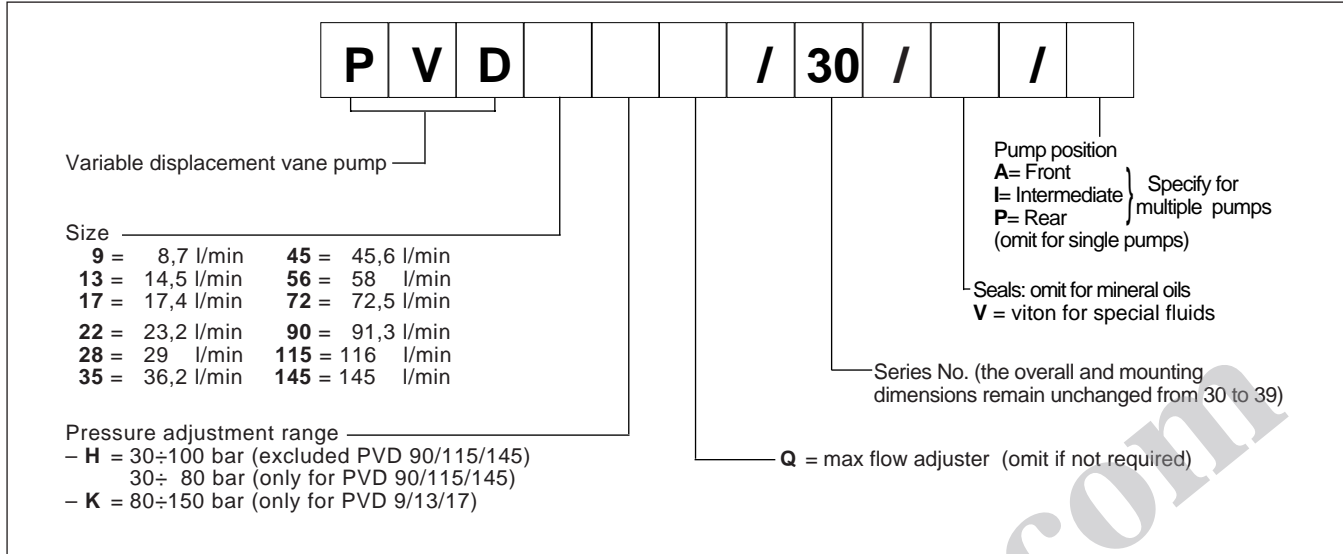
Ambient temperature range	°C	-20 ÷ +50
Fluid temperature range	°C	-10 ÷ +70
Fluid viscosity range		see par. 2.2
Recommended viscosity	cSt	25 ÷ 50
Degree of fluid contamination		see par. 2.3

#### HYDRAULIC SYMBOL





**1 - IDENTIFICATION CODE**



**2 - HYDRAULIC FLUID**

**2.1 - Fluid type**

Use mineral oil based hydraulic fluids with anti-foam and antioxidant additives.

For use of other types of fluid, keep in mind the limitations shown in the following table or consult our technical department for authorization of use.

FLUID TYPE	NOTES
HFC (water glycol solutions with proportion of water ≤ 40 %)	<ul style="list-style-type: none"> <li>- The values shown in the performance ratings table must be reduced by at least 50% .</li> <li>- The pump rotation speed must be limited to 1000 rpm.</li> <li>- The maximum fluid temperature must be less than 50°C.</li> </ul>
HFD (phosphate esters)	There are no particular limitations with respect to the values shown in the performance ratings table. Operation with a fluid viscosity as close as possible to the optimum viscosity range specified in par. 2.2 is recommended.

**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.

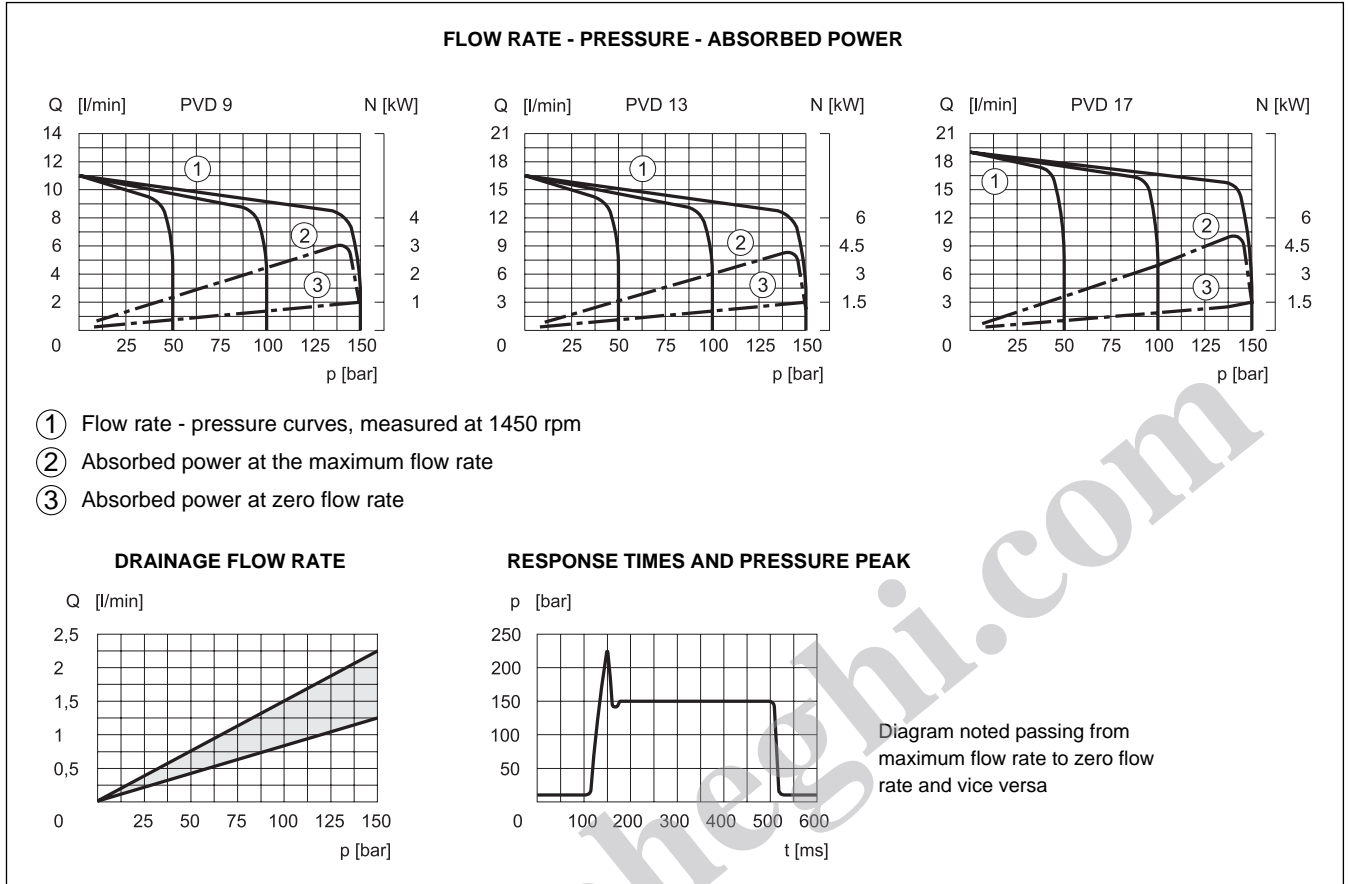
**2.3 - Degree of fluid contamination**

The maximum degree of fluid contamination must be according to NAS 1638 class 9; therefore, use of a filter with  $\beta_{20} \geq 75$  is recommended. A degree of maximum fluid contamination according to NAS 1638 class 7 is recommended for optimum endurance of the pump. Hence, use of a filter with  $\beta_{10} \geq 100$  is recommended.

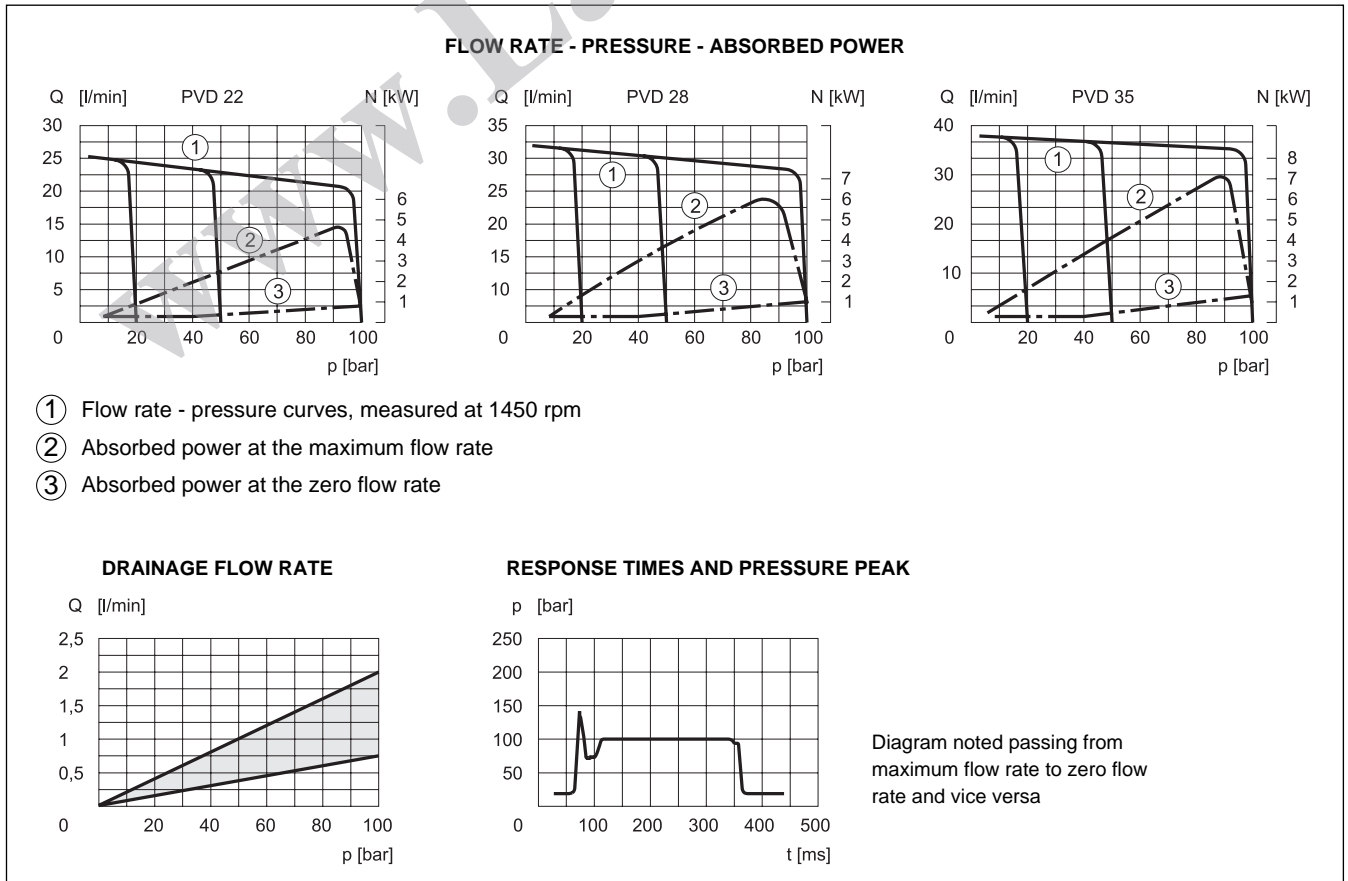
The filter must be equipped with a by-pass valve and, if possible, with a clogging indicator.



**3 - PVD - 9/13/17 CHARACTERISTIC CURVES** (obtained with viscosity of 36 cSt at 50°C)



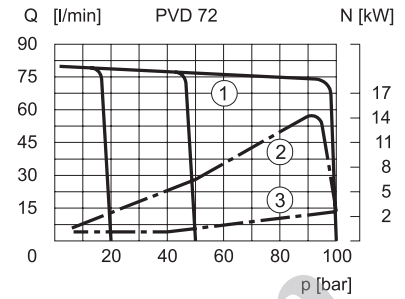
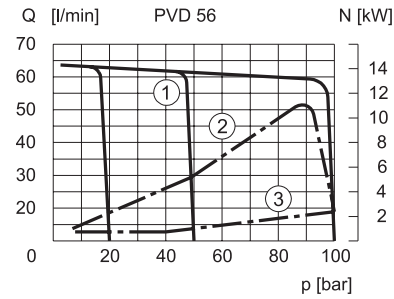
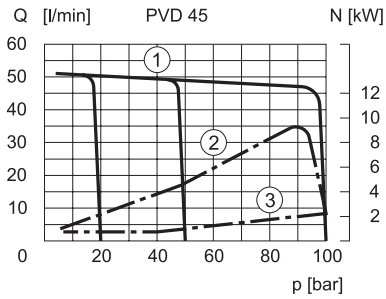
**4 - PVD - 22/28/35 CHARACTERISTIC CURVES** (obtained with viscosity of 36 cSt at 50°C)





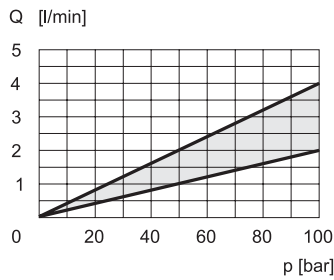
### 5 - PVD - 45/56/72 CHARACTERISTIC CURVES (values obtained with mineral oil with viscosity of 36 cSt at 50°C)

#### FLOW RATE - PRESSURE - ABSORBED POWER



- ① Flow rate - pressure curves, measured at 1450 rpm
- ② Absorbed power at the maximum flow rate
- ③ Absorbed power at zero flow rate

#### DRAINAGE FLOW RATE



#### RESPONSE TIMES AND PRESSURE PEAK

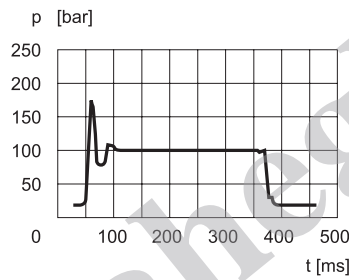
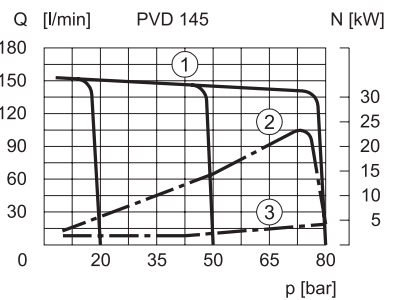
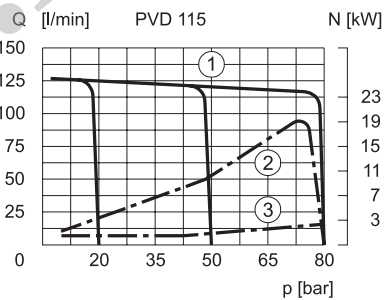
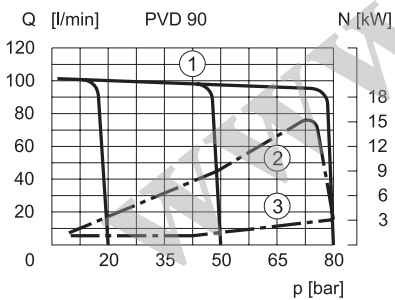


Diagram noted passing from maximum flow rate to zero flow rate and vice versa

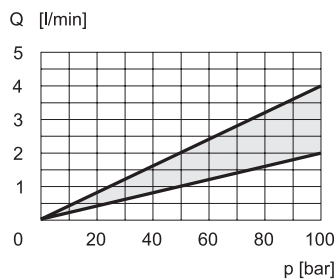
### 6 - PVD - 90/115/145 CHARACTERISTIC CURVES (values obtained with viscosity of 36 cSt at 50°C)

#### FLOW RATE - PRESSURE - ABSORBED POWER



- ① Flow rate - pressure curves, measured at 1450 rpm
- ② Absorbed pressure at the maximum flow rate
- ③ Absorbed pressure at zero flow rate

#### DRAINAGE FLOW RATE



#### RESPONSE TIMES AND PRESSURE PEAK

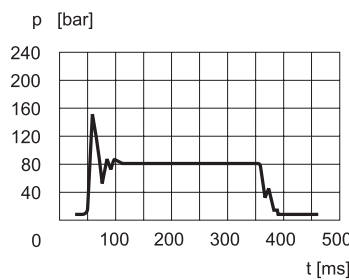
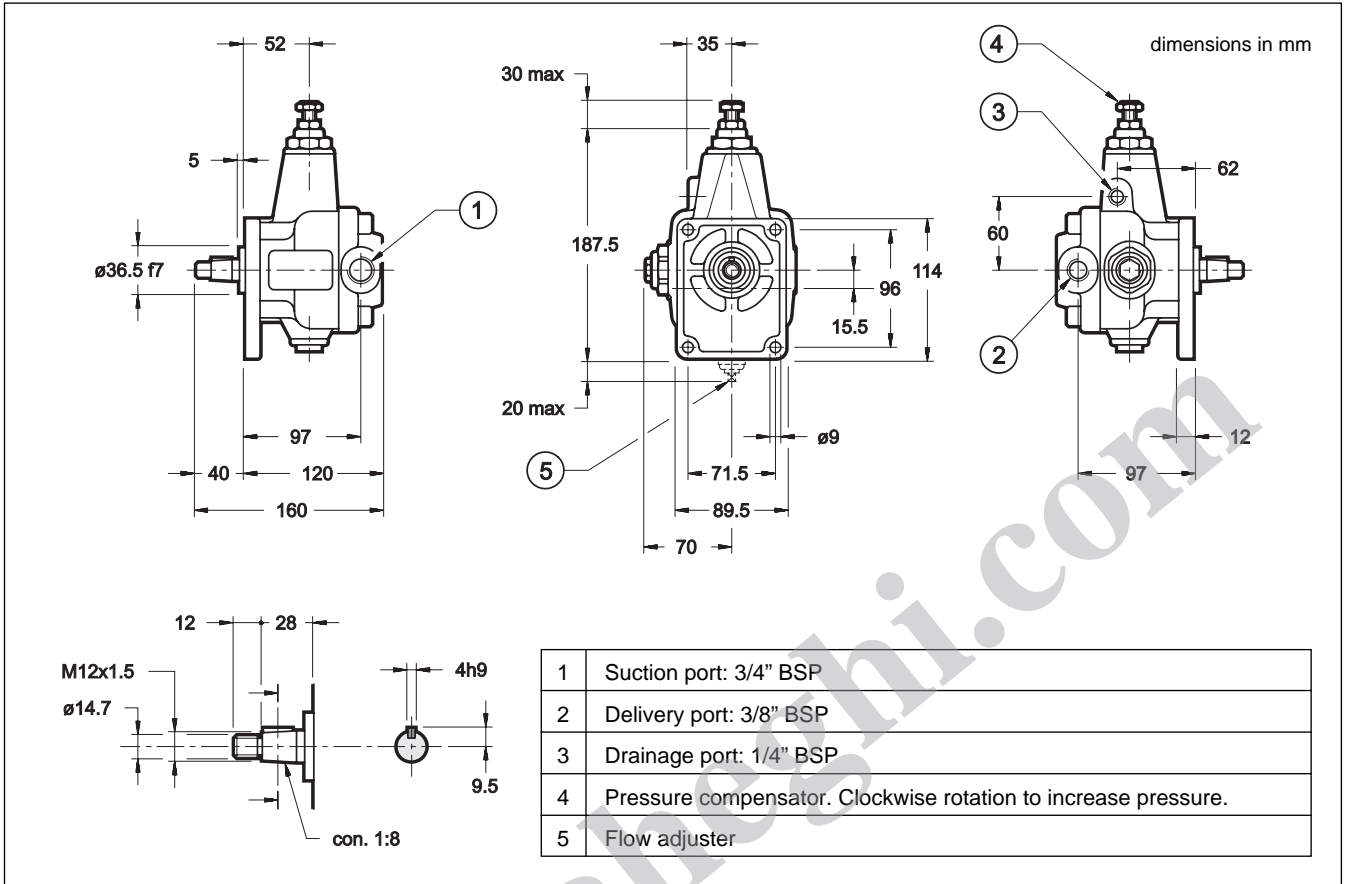


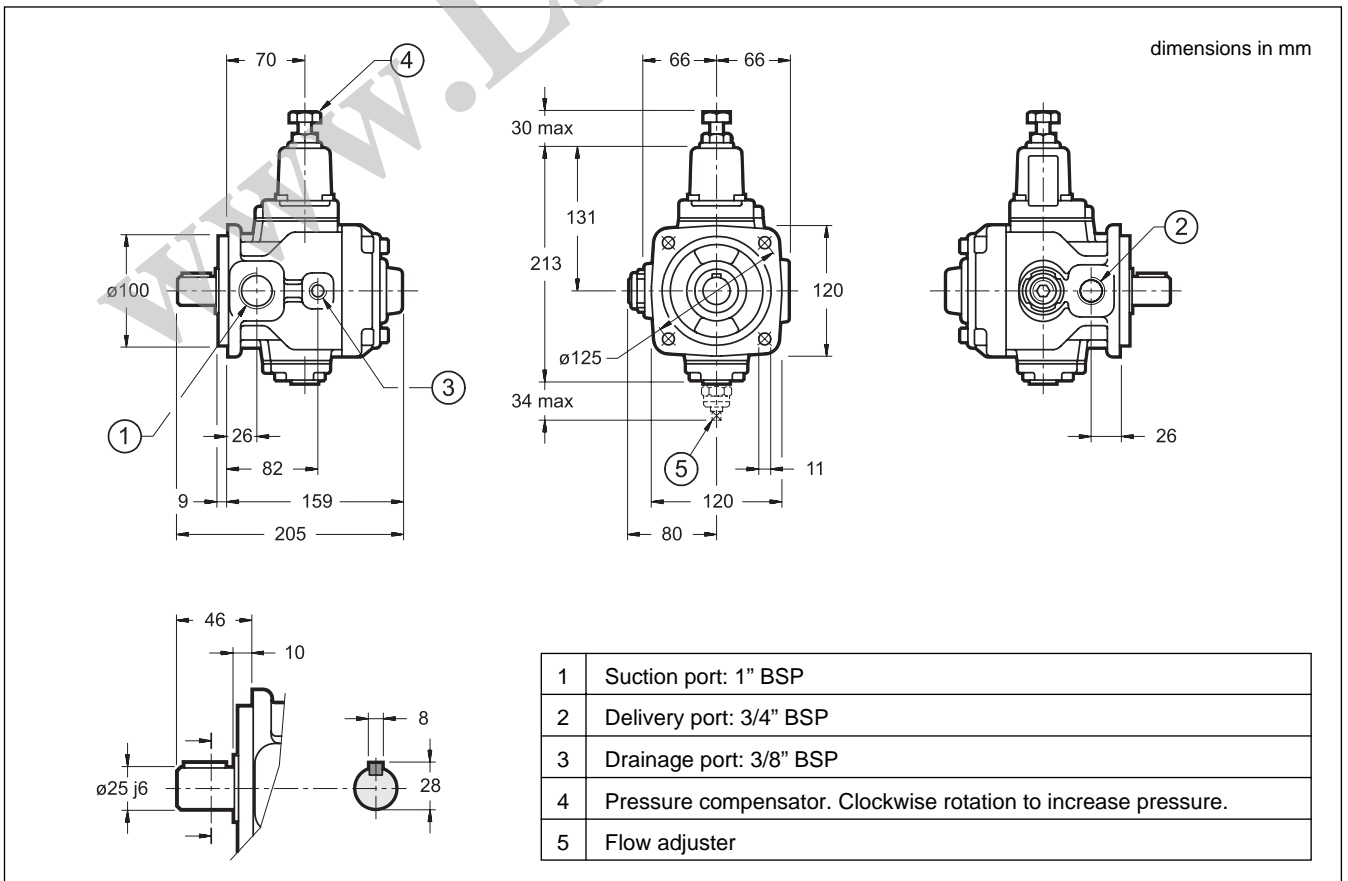
Diagram noted passing from maximum flow rate to zero flow rate and vice versa



**7 - PVD - 9/13/17 OVERALL AND MOUNTING DIMENSIONS**

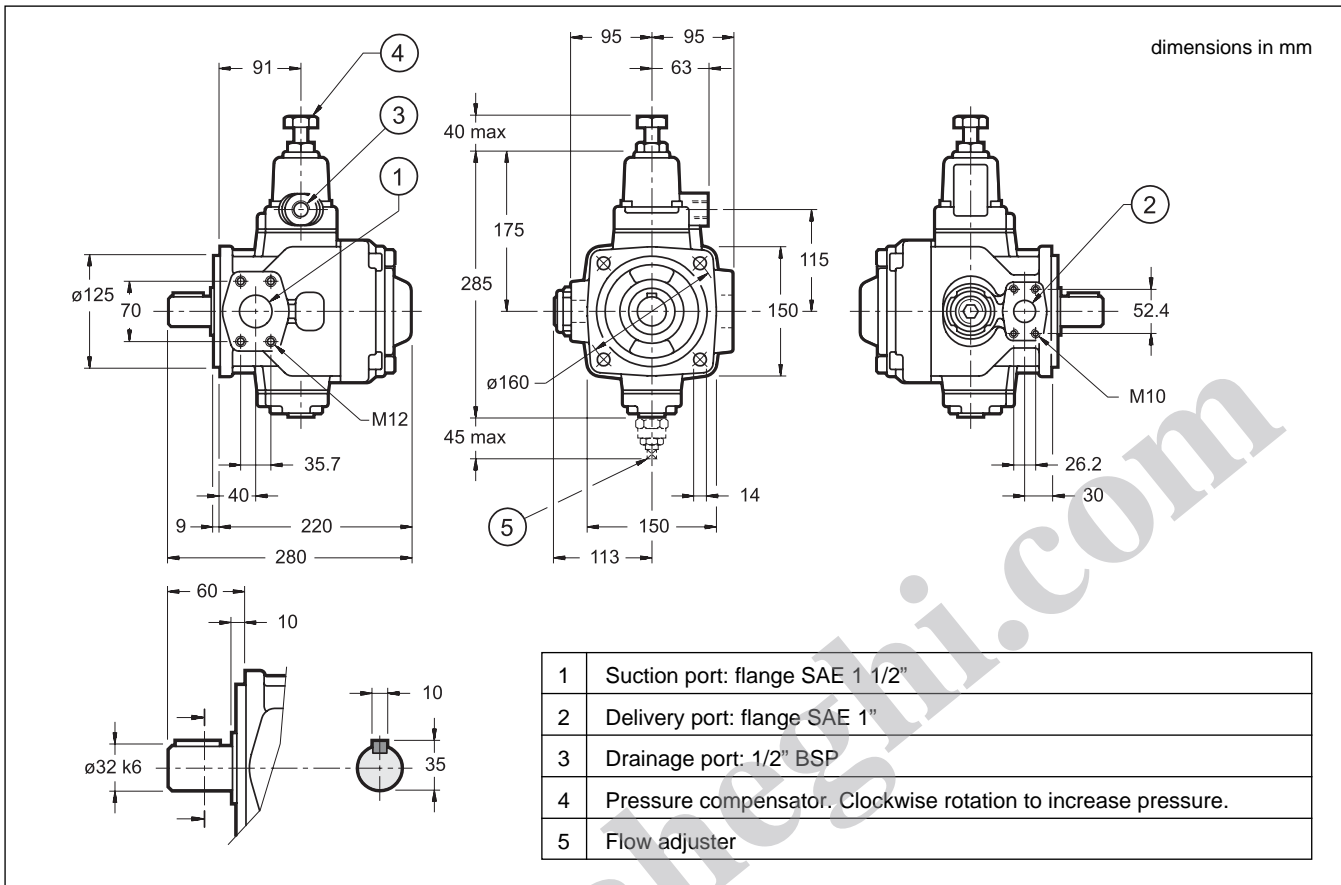


**8 - PVD - 22/28/35 OVERALL AND MOUNTING DIMENSIONS**

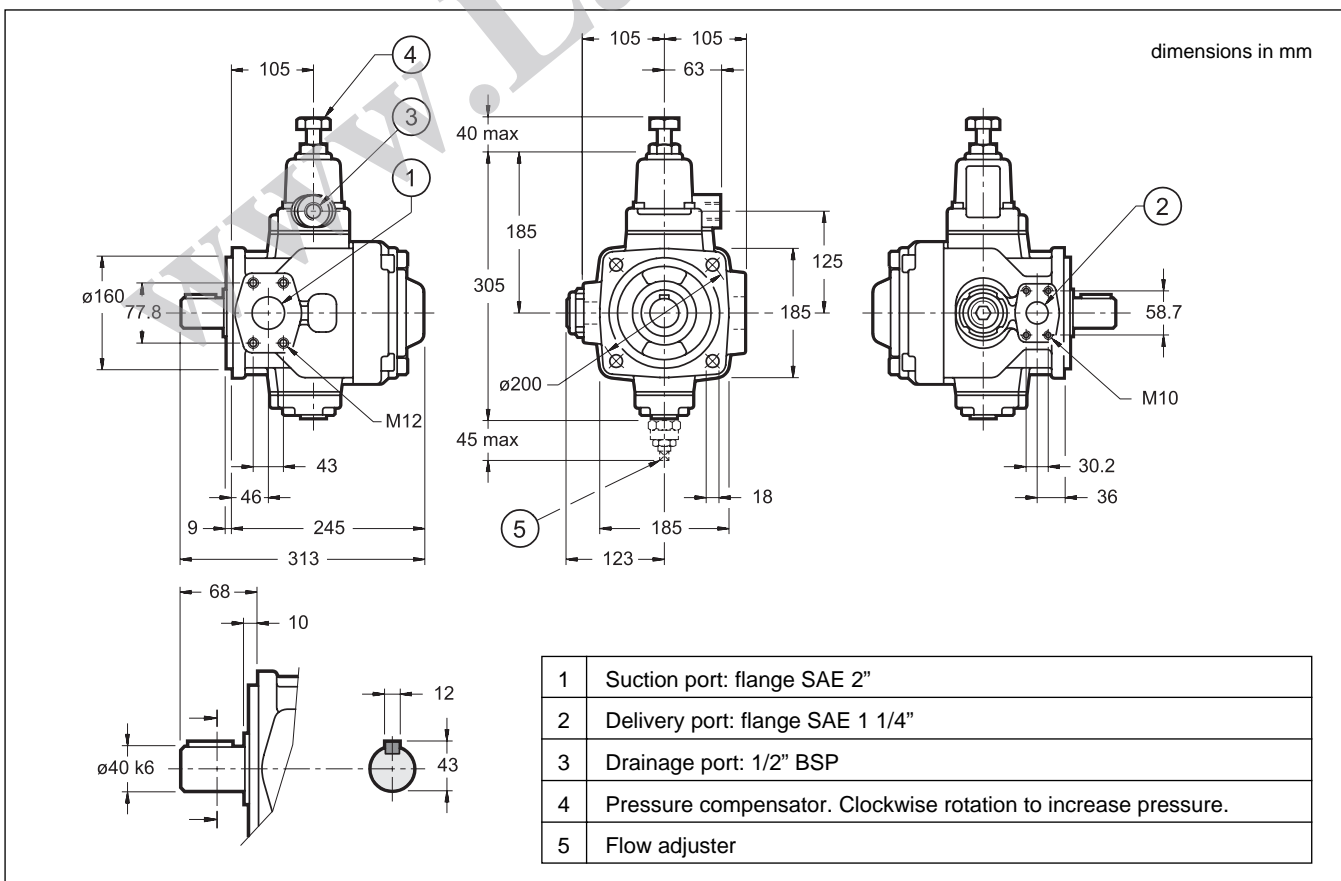




**9 - PVD - 45/56/72 OVERALL AND MOUNTING DIMENSIONS**



**10 - PVD - 90/115/145 OVERALL AND MOUNTING DIMENSIONS**





## **11 - INSTALLATION**

- The PVD pumps up to size 35 can be installed with the axis oriented in any position. For other sizes the pump must be installed with the axis in horizontal position.
- The suction line must be suitably sized to facilitate the flow of oil.  
Bends and restrictions or an excessive line length can impair correct operation of the pump.
- 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.
- The pump start up, especially at a cold temperature, should occur with the pump unloading.
- 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 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.

## **12 - PVD\*\*\*Q FLOW ADJUSTER**

The flow adjustment group, supplied upon request, consists of an adjustment screw and a small balanced piston that limit the maximum eccentricity of the pumping group cam ring, changing the displacement. The screw is supplied with square head, spanner 7, that allows assembly of an adjustment handwheel or the attachment for remote control.

The maximum flow is reduced by turning the adjustment screw clockwise.

