

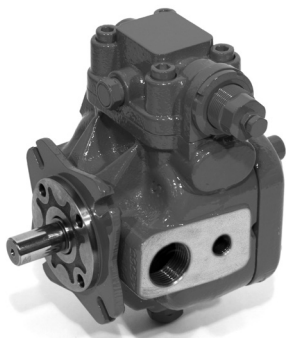
Variable Displacement Vane Pumps:

Installation Manual



HYDRAULIC COMPENSATION

- PVV100-1-20
- PVV100-1-25
- PVV100-2-31
- PVV100-2-40
- PVV100-2-50
- PVV100-3-63
- PVV100-3-80
- PVV100-3-100



- PVV103-05-16
- PVV103-05-32



MECHANICAL COMPENSATION

- PVV101-1-20
- PVV101-1-25
- PVV101-2-31
- PVV101-2-40
- PVV101-2-50
- PVV101-3-63
- PVV101-3-80
- PVV101-3-100



- PVV102-05-16

1. WARNING

All HYDAC pumps are carefully checked during manufacture and subjected to stringent testing cycles before shipment.

To achieve optimum performance, avoid damage and maintain the warranty coverage, the following instructions regarding assembly and start up must be strictly observed.

2. INSTALLATION AND ASSEMBLY

Pumps that can be installed vertically and horizontally

-PVV100-1
-PVV101-1
-PVV102-05
-PVV103-05

only horizontally (compensator at the top)

-PVV100-2
-PVV100-3
-PVV101-2
-PVV101-3
-PVV103-1

If the pump is installed above the oil level, particular attention must be paid to the suction pressure (see point 6. Filtration and Fluid Types).



Cleanliness is essential during assembly!

3. FORCE TRANSMISSION

The pump and motor must be connected using a gear coupling.



During assembly, the minimum distance between the two coupling halves must be strictly observed (see fig. 2).

The pump shaft and motor shaft must be carefully aligned: max. misalignment 0.05 mm; angular deviation less than 0.2° (see fig. 2).

There must be no radial or axial forces on the pump shaft.

Other types of motor-pump couplings are not permitted.

4. FLUID RESERVOIR

The oil tank must be the correct size to dissipate the thermal power generated by the system components, and for a low circulating speed to be achieved (the volume of oil should be approximately four times the displacement of all the pumps). In systems where the pump operates for a long time at a zero flow setting it is recommended that an oil cooler is installed.



The maximum operating temperature must never exceed 60 °C.

To ensure maximum pump working life, the suction oil temperature must never exceed 50 °C.

5. PIPING

Suction line

The suction lines should be as short as possible, with a minimum number of bends and without reducing the cross-section.

The pipe end inside the reservoir should be cut at a 45° angle. There should be a minimum distance between the pipe end and the bottom of the reservoir of 50 mm and the pipe end should be submerged in the oil by at least 100 mm under minimum operating conditions (see fig. 1). The minimum cross-section of the suction line pipe must be equal to the internal diameter at the suction port of the pump.

The suction lines must be completely sealed.

Drain line

The drain line must always feed directly into the tank, independently of all other lines.

The line must extend under the minimum oil level to avoid generating foam and to ensure oil remains in the pump after a lengthy stoppage. The drain line must be positioned at the highest possible port to prevent the pump case from emptying.

The drain line must be positioned so that the returning oil is not drawn into the pump again immediately (see fig. 1).

Discharge line

Ensure that the discharge line is of sufficient strength.

It is recommended that a check valve and an automatic air bleed valve are fitted in the discharge line for trouble-free operation.



6. FILTRATION AND FLUID TYPES

Size		Size 05	Size 1	Size 2	Size 3	
Geometric displacement acc. to UNI-ISO 3662 (cm ³ /rev)		16	20-25-32	31.5-40-50	63-80-100	
Actual displacement (cm ³ /rev)		179	22.1-26.9-34.5	34.5-42.8- 53.1	69-862-105.5	
Maximum operating pressure (bar)	PVV100		160	160	150	
	PVV101	150	100	100	80	
	PVV102	120				
	PVV103	250	250			
Control pressure settings (bar)	PVV100		H - 30 / 160 bar	H - 30 / 160 bar	H - 30 / 150 bar	
	PVV101	L - 15 / 50 bar	L - 15 / 50 bar	L - 15 / 50 bar	L - 15 / 50 bar	
		H - 30 / 100 bar	H - 30 / 100 bar	H - 30 / 100 bar	H - 30 / 80 bar	
		K - 80 / 150 bar				
	PVV102	H - 20 / 120 bar				
PVV103	H - 20 / 250 bar	H - 20 / 250 bar				
Maximum drain port pressure (bar)		1				
Inlet pressure (absolute bar)		0.8 - 1.5				
Drive speed range (rpm)		800 - 1800				
Direction of rotation (viewed from shaft end)		Clockwise - R				
Maximum load on drive shaft		No radial or axial forces allowed.				
Maximum torque on primary shaft (Nm)	PVV100		197	400	740	
	PVV101		197	400	740	
	PVV102	Conical 70	Cylindr. 110			
		PVV103	130	250		
Fluid type		Mineral oil HM acc. to ISO 6743/4 ; HLP acc. to DIN 51524/2. Organic ester HFD-U acc. to ISO 6743/4 (Quintolubric 888). For other fluids, please contact HYDAC.				
Viscosity range (cSt, mm ² /s)		22 - 86				
Viscosity in starting operation in full flow condition (cSt, mm ² /s)		400 max.				
Viscosity index according to ISO 2909		100 min.				
Suction temperature (°C)	PVV100/ PVV101	-10 / +50				
	PVV102/ PVV103	-15 / +60				
Maximum fluid contamination level		20/18/15 acc. to ISO 4406:1999, CLASS 9 acc. to NAS 1638				
Recommended cleanliness level for a longer working life of the pump		18/16/13 acc. to ISO 4406:1999, CLASS 7 acc. to NAS 1638				

For different operating conditions and/or for further information, please contact HYDAC.

7. COMMISSIONING

Prior to commissioning ensure that any valves and shut-off valves are fully open and that all protective caps are removed. Fill the pump via the drain port and reinstall the drain line. Check that the reservoir is full of oil.



Ensure that the pump shaft can be rotated manually without any resistance.

On pumps sizes 1, 2 and 3 this may be checked by removing the cover B as shown in fig. 3. The shaft end A may then be turned by hand. Alternatively, it is possible to rotate the electric motor fan, if the cover is temporarily removed.

Check that the direction of rotation of the motor corresponds with the pump direction of rotation: (clockwise) viewed from shaft end.

Start the motor in jogging mode, allowing free circulation of fluid to the reservoir, aid venting of the pump.



The pump should be completely vented within 5 seconds. If it is not, switch off the motor and investigate the cause. The pump must not run dry.

During initial switch-on the pump must run at maximum flow (P connected to T) with the fluid flowing unloaded directly into the reservoir for several minutes (size 05 and size 1 for 3 to 5 minutes; size 2 and size 3 for 7 to 10 minutes).

After this time, all air should be **completely eliminated** from the system. To aid this procedure, size 2 and size 3 (type PVV100) have an air bleed valve on the compensator: unscrew the plug to release the air and then close plug.

Subsequent start-ups at zero flow setting may only be carried out with a maximum pressure of 30 bar, on condition that the system and pump are completely full of oil.



If the pump is set via the optional volume adjustment screw "Q" to less than 50% of the maximum flow, the system may only be switched on if the pump and system are completely full of oil (see point 10. Volume Adjustment Screw).



During the initial start-up operation and subsequent start-ups the difference in temperature between the pump (environment) and the hydraulic fluid must not exceed 20 °C.

If this is the case, the pump may be switched on only in short intervals of approximately 1 to 2 seconds (jogging mode), unloaded, until the temperatures have equalized.

In the event of queries or for further information, please refer to the HYDAC Pump Catalogue or contact HYDAC's technical sales service.

8. ADJUSTMENTS

The only adjustments that customers are able to make to the pump are the pressure (fig. 4 / 5 / 6) and flow (see point 10. Volume adjustment screw) using the adjustment screws on the unit.



Note: the pressure must only be adjusted when the pump is at zero flow setting (i.e. P is closed).

No other alterations may be made to the pump.

9. DIMENSIONS

Fig. 1

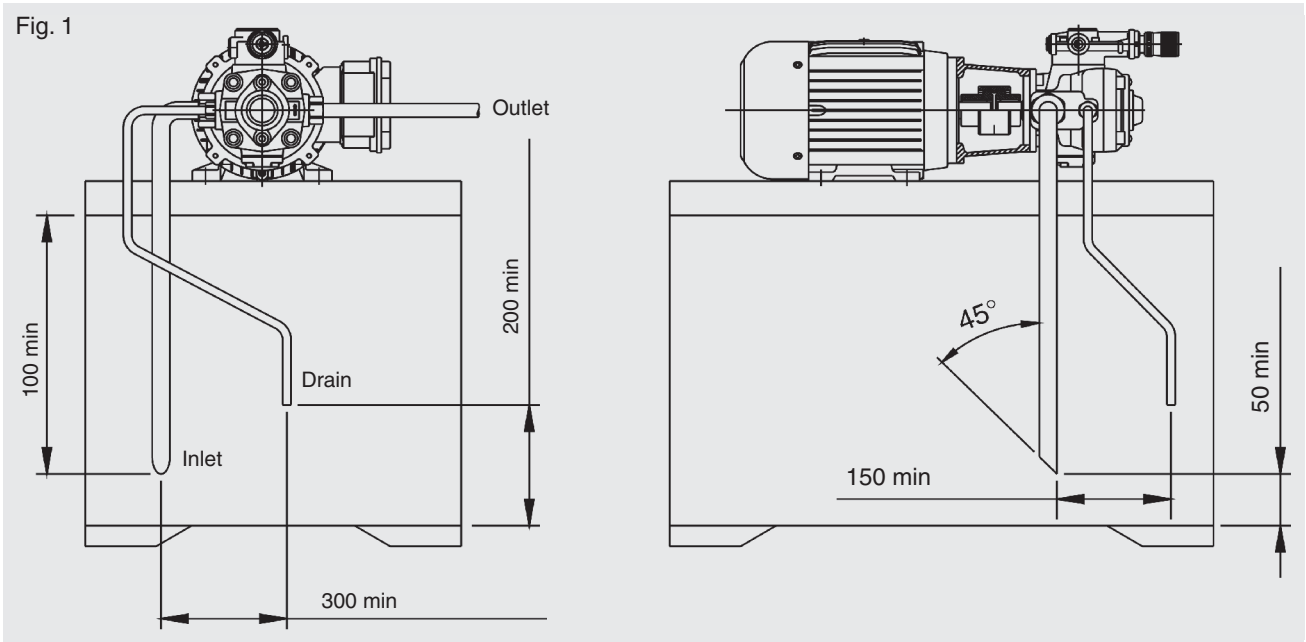


Fig. 2

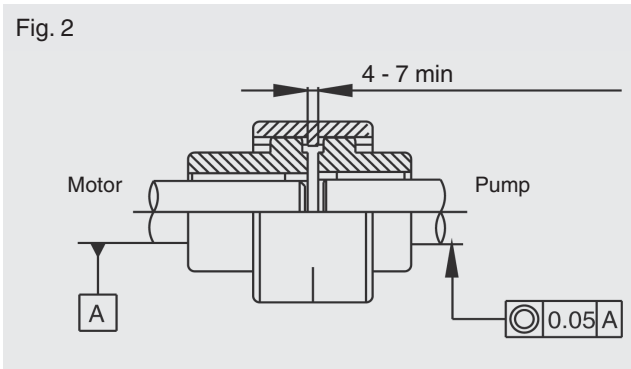


Fig. 3

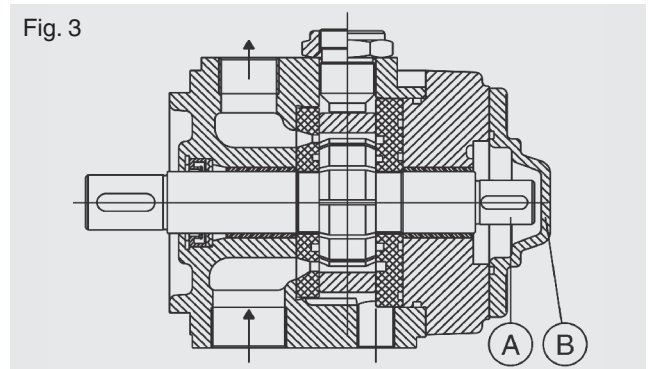
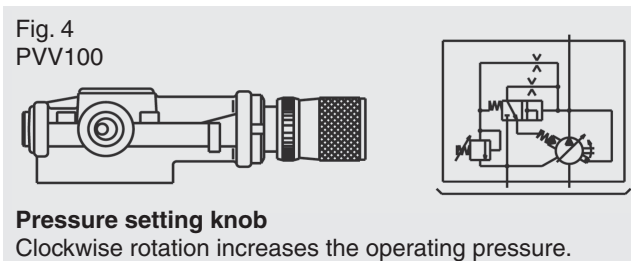


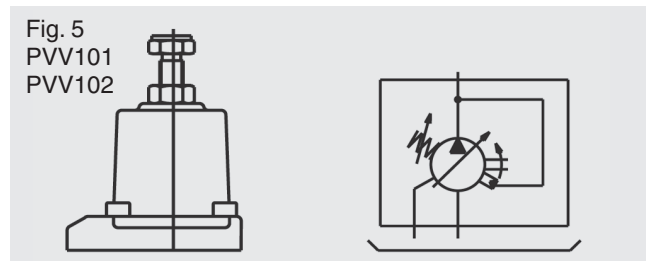
Fig. 4
PVV100



Pressure setting knob

Clockwise rotation increases the operating pressure.

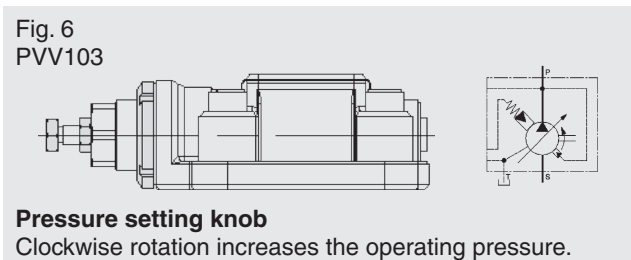
Fig. 5
PVV101
PVV102



Pressure adjustment screw

Clockwise rotation increases the operating pressure.

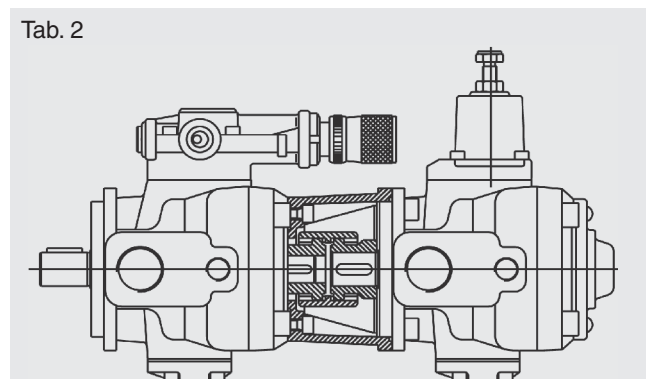
Fig. 6
PVV103



Pressure setting knob

Clockwise rotation increases the operating pressure.

Tab. 2



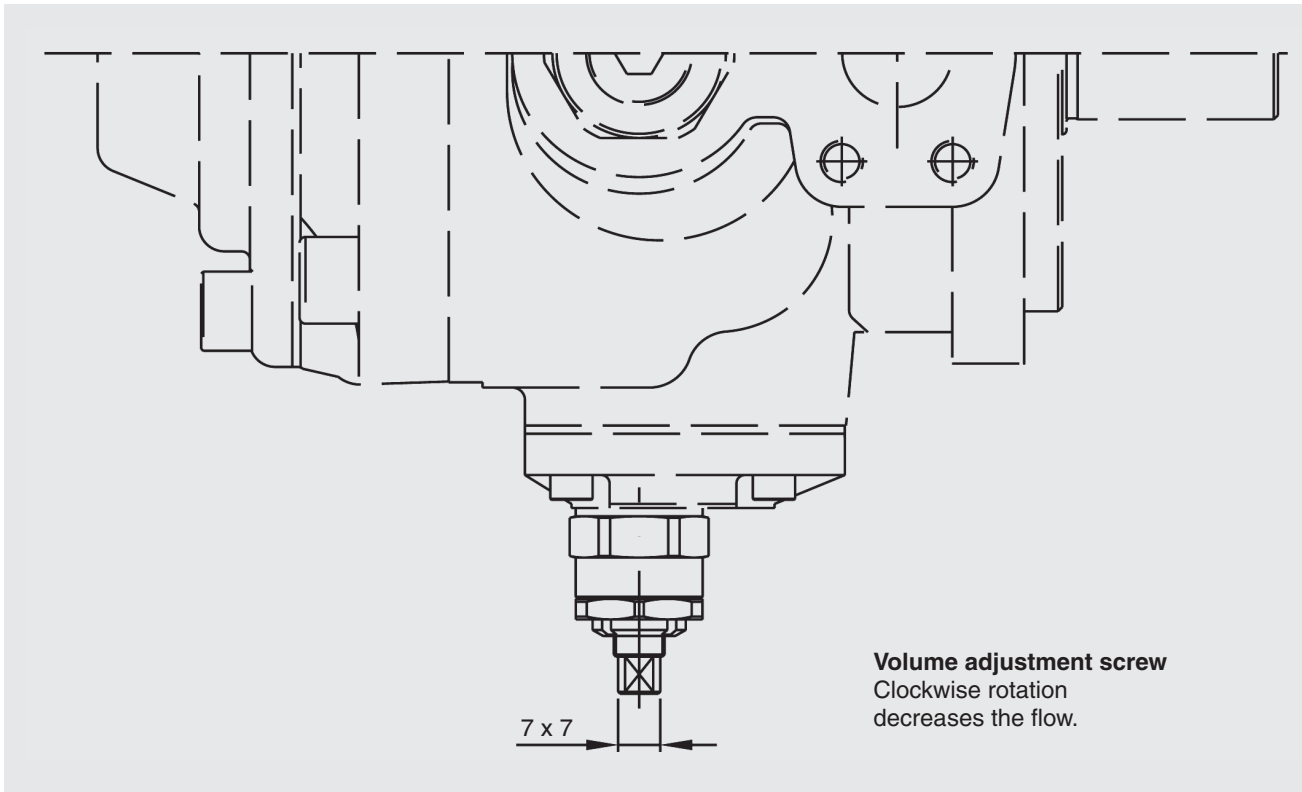
Note:

The sum of the individual torques of the pumps must not exceed the maximum torque permitted on the primary pump.

Primary pump	Max. torque end pump
PVV100- / PVV101- 1	55 Nm
PVV100- / PVV101- 2 / -3	110 Nm
PVV100- / PVV101- 3	180 Nm *
PVV102	55 Nm
PVV103-05	55 Nm
PVV103-01	110 Nm

* only for coupling size 3 and end pump size 3

10. VOLUME ADJUSTMENT SCREW



Geometric displacement (cm ³)	PVV102		PVV103		PVV100 - PVV101						
	16	16	32	20	25	31.5	40	50	63	80	100
Max. flow at 1450 rpm (l/min)	26	26	50	33	39	50	62	78	100	125	152
Min. flow at 1450 rpm (l/min)	4.5	4.8	12	11	17	2.3	14.3	30.3	14	39	66
Decreased flow per screw turn (l/min)	14	16	32	14	14	23.8	23.8	23.8	34.5	34.5	34.5

Data can vary from pump to pump.



If the pump is supplied with a volume adjustment screw "Q" set to less than 50% of the nominal flow, start-up is only permitted on condition that the system and pump are completely filled with fluid.