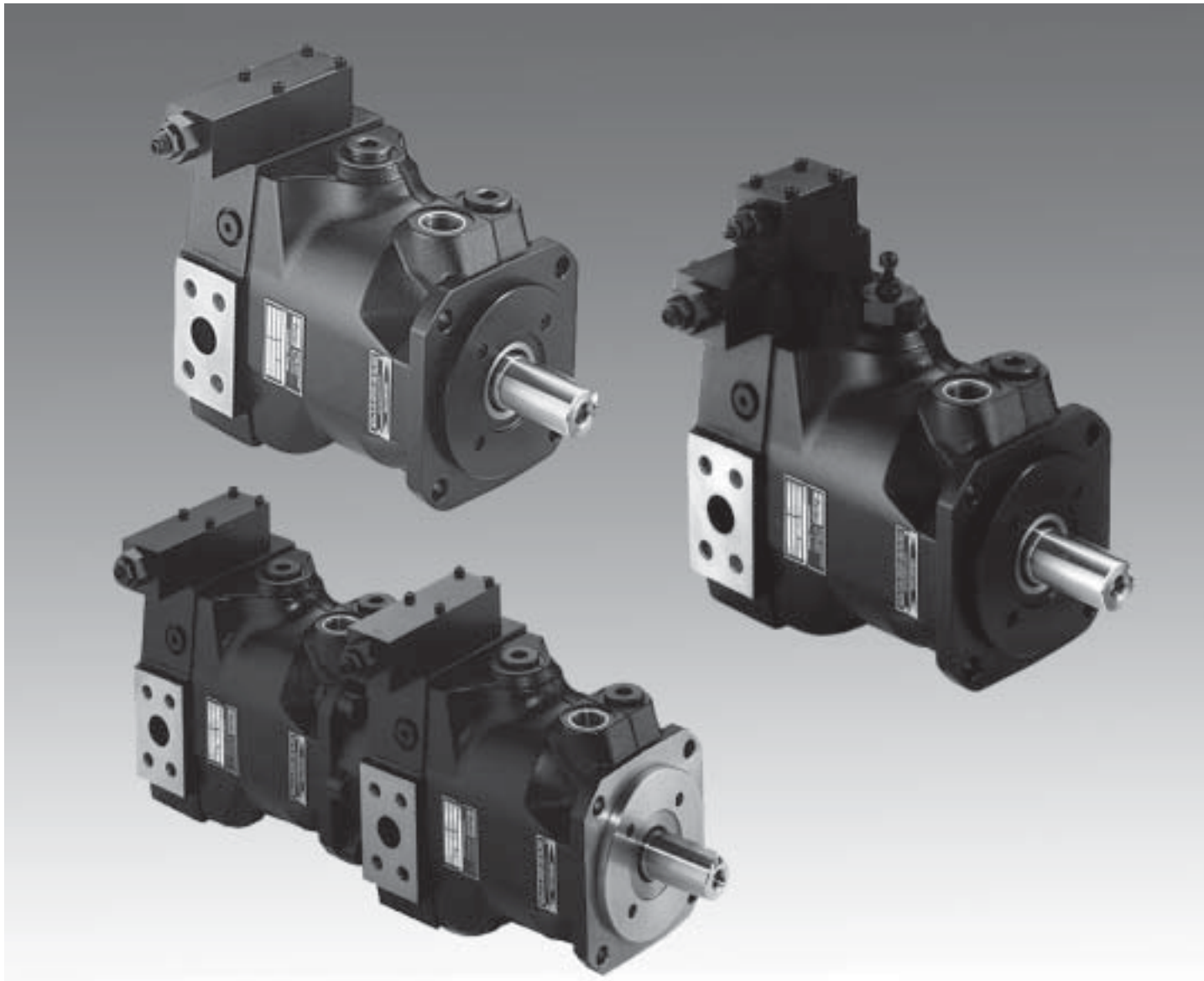
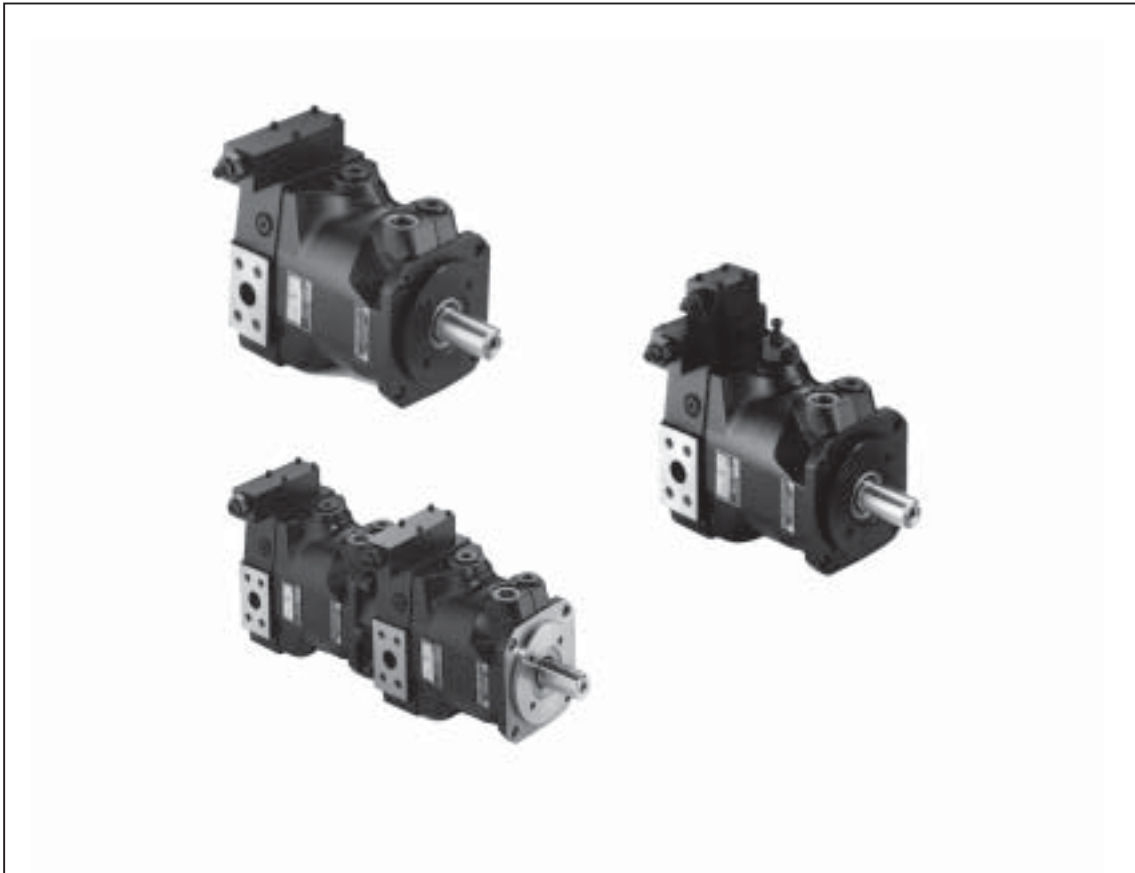


PV Variable Volume Piston Pumps

<https://www.klhyd.com>





Quick Reference Data Chart

Pump Model	Displacement cc/rev (In ³ /rev)	Pump Delivery @ (7 bar) 100 PSI in LPM (GPM)		*Approx. Noise Levels dB(A) @ Full Flow and 1500 RPM			Power at 1800 RPM, Max. Displacement & 345 bar (5000 PSI)	Max. Operating Speed (RPM)
		1200 RPM	1800 RPM	70 bar	207 bar	343 bar		
				(1000 PSI)	(3000 PSI)	(5000 PSI)		
PV016	16 (.98)	19.2 (5.1)	28.8 (7.6)	56	60	68	18.5 kw (24.8 hp)	2750
PV020	20 (1.2)	24.0 (6.3)	36.0 (9.5)	56	60	68	23.4 kw (31.4 hp)	2750
PV023	23 (1.4)	27.6 (7.3)	41.4 (10.9)	56	60	68	25.1 kw (33.6 hp)	2750
PV032	32 (1.9)	38.4 (10.1)	57.6 (15.2)	59	62	69	35.1 kw (47.0 hp)	2400
PV040	40 (2.4)	48.0 (12.7)	72.0 (19.0)	59	62	69	46.5 kw (62.4 hp)	2400
PV046	46 (2.8)	55.2 (14.6)	82.8 (21.9)	59	62	69	50.2 kw (67.3 hp)	2400
PV063	63 (3.8)	75.6 (20.0)	113.4 (30.0)	66	70	74	70.1 kw (94.0 hp)	2400
PV080	80 (4.8)	96.0 (25.4)	144.0 (38.0)	66	70	74	89.2 kw (119.6 hp)	2300
PV092	92 (5.6)	110.4 (29.2)	165.6 (43.8)	66	70	74	136.8 kw (183.5 hp)	2200
PV140	140 (8.5)	168.0 (44.4)	252.1 (66.6)	70	74	76	149.4 kw (200.4 hp)	2400
PV180	180 (10.9)	216.0 (57.1)	324.0 (85.6)	71	75	77	210.0 kw (282.0 hp)	2200
PV270	270 (16.5)	324.0 (85.6)	486.0 (128.4)	77	79	81	298.0 kw (400.0 hp)	1800

* The noise level values are based on anechoic room measurements at a distance of 1 meter in accordance with DIN 45645.

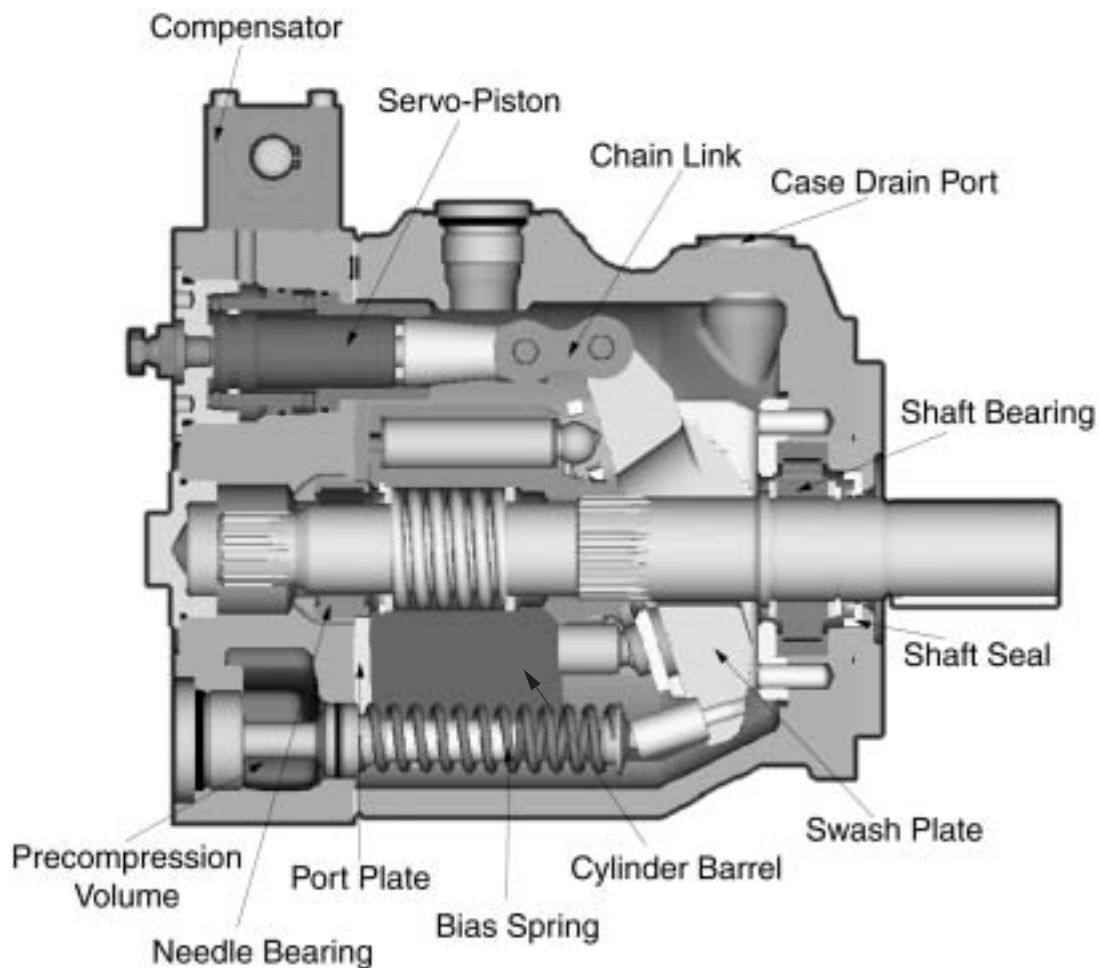
General Description

All control of the pump outlet flow is achieved by the proper positioning of the swash plate. Control is accomplished when the bore area forces of the servo piston acting on one end of the swash plate working against the combined effects of the bias spring, and the rod area forces of the servo piston acting on the other end.

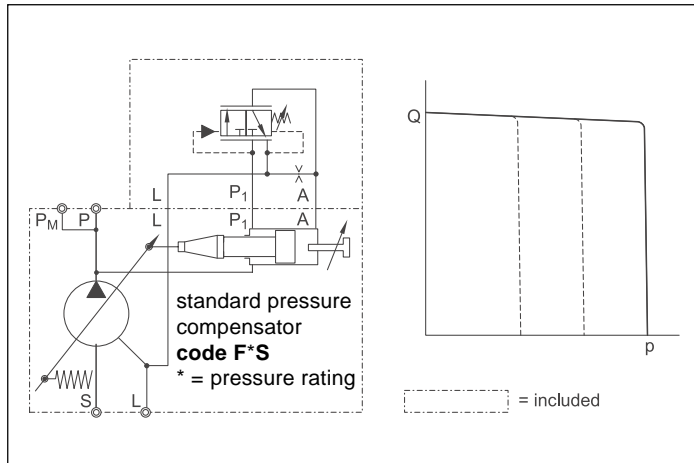
As the shaft in the figure below is rotated by a prime mover, it in turn rotates the cylinder barrel. As the cylinder barrel rotates, it drives the pumping pistons in a circular path with the piston slippers supported hydrostatically against the angled swash plate. In one-half of the revolution, the pumping pistons are forced

away from the port plate drawing in fluid, and in the other half of the revolution, the pumping pistons are forced toward the port plate driving out fluid.

The volume of fluid the pump will displace in one revolution of the shaft is dependent upon the area of the pumping piston, the number of pumping pistons and the angle of the swash plate. The swash plate is shown at maximum angle and will produce maximum displacement. As the swash plate is moved toward a vertical position (perpendicular to shaft centerline), the displacement will decrease until it reaches the vertical position and displacement is zero.



Pressure and Load Sensing Compensators

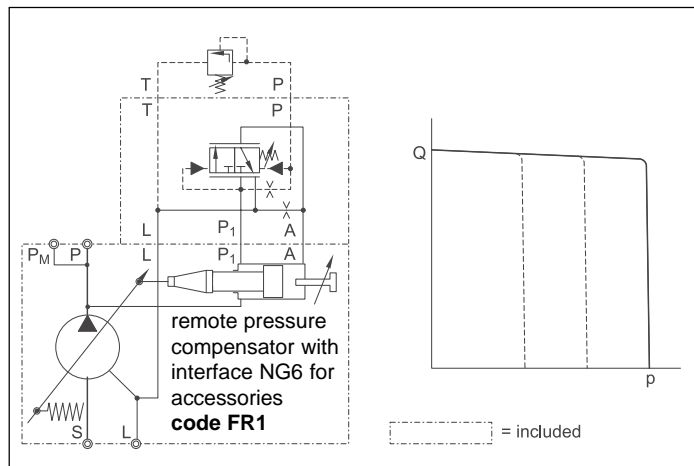


Standard pressure compensator code F*S

The standard pressure compensator adjusts the pump displacement according to the actual need of the system in order to keep the pressure constant.

As long as the system pressure at outlet port P is lower than the set pressure (set as spring preload of the compensator spring) the working port A of the compensator valve is connected to the case drain and the piston area is unloaded. Bias spring and system pressure on the annulus area keep the pump at full displacement.

When the system pressure reaches the set pressure the compensator valve spool connects port P1 to A and builds up a pressure at the servo piston resulting in a downstroking of the pump. The displacement of the pump is controlled in order to match the flow requirement of the system.

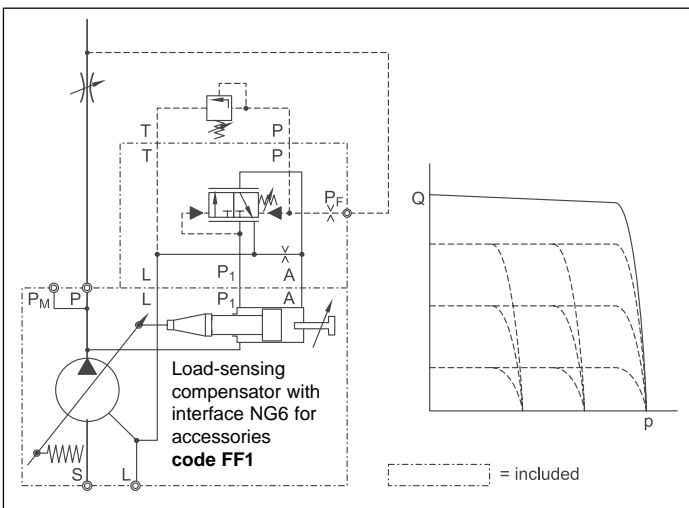


Remote pressure compensator code FR1

Version FR1 of the remote pressure compensator provides on its top side an interface NG6, DIN 24340 (CETOP 03 at RP35H, NFPA D03).

This interface allows a direct mounting of a pilot valve. Besides manual or electrohydraulic operated valves it is also possible to mount complete multiple pressure circuits directly on the compensator body. Parker offers a variety of these compensator accessories ready to install. See page 38 of this catalog.

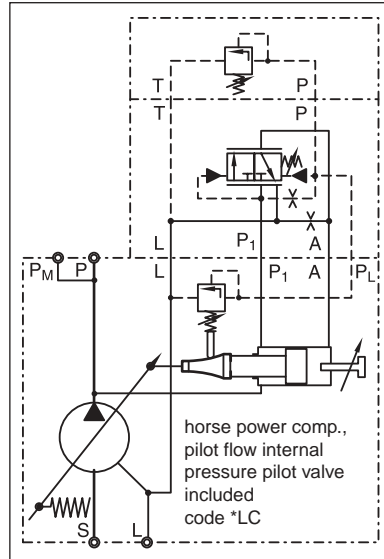
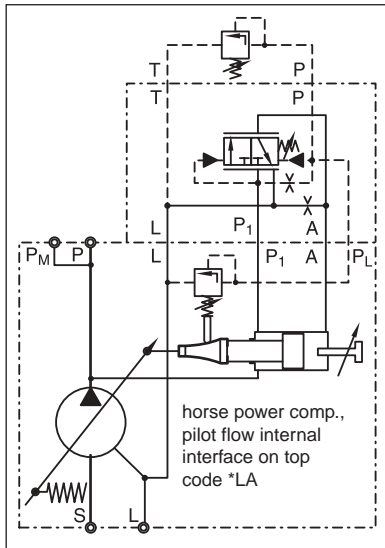
All remote pressure compensators have a factory setting of 15 bar (217 PSI) differential pressure. With this setting, the controlled pressure at the pump outlet is higher than the pressure controlled by the pilot valve.



Shown is load sensing compensator code FF1

with an NG6 interface on top of the control valve. That allows direct mounting of a pilot valve for pressure compensation. This version includes the pilot orifice. Due to the interaction of flow and pressure compensation this package is not the "ideal" control characteristic. The deviation is caused by the pilot valves characteristic.

Horsepower Compensators



Hydraulic-mechanical horsepower compensator

The hydraulic-mechanical horsepower compensator consists of a modified remote pressure compensator (**Code *L***) and a pilot valve. This pilot valve is integrated into the pump and is adjusted by a cam sleeve. The cam sleeve has a contour that is designed and machined for the individual displacement and the nominal horsepower setting.

At a large displacement the opening pressure (given by the cam sleeve diameter) is lower than at small displacements. This makes the pump compensate along a constant horsepower (torque) curve.

For all nominal powers of standard electric motors Parker offers a dedicated cam sleeve. The exchange of this cam sleeve (e. g.: to change horsepower setting) can easily be done without disassembly of the pump.

On top of that an adjustment of the horsepower setting can be done within certain limits by adjusting the preload of the pilot control cartridge spring. That allows an adjustment of a constant horsepower setting for other than the nominal speeds (1500 RPM) or for other horsepower.

The ordering code for the horse power option is as follows:

The first digit designates the horsepower setting:

Code B = 5 HP etc. up to

Code 3 = 200 HP

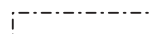
The second digit designates the pilot flow source:

Code L internal pilot pressure, remote pressure function.

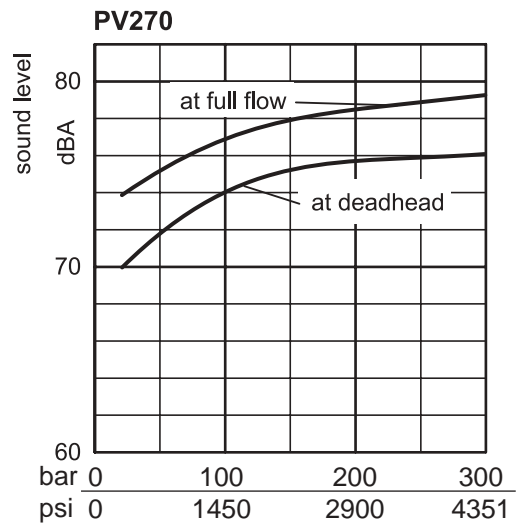
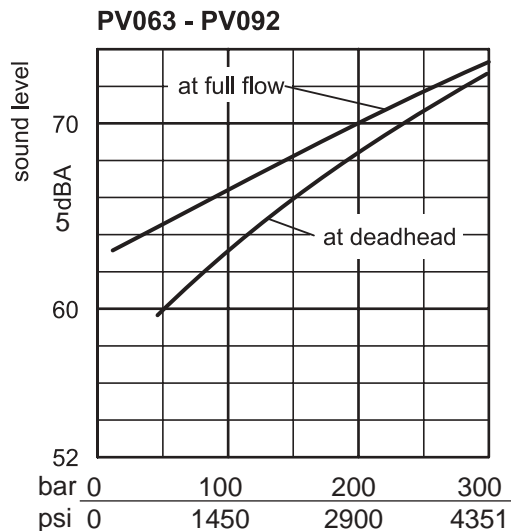
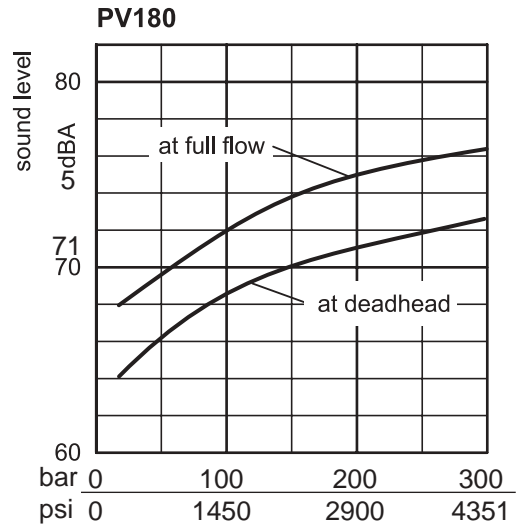
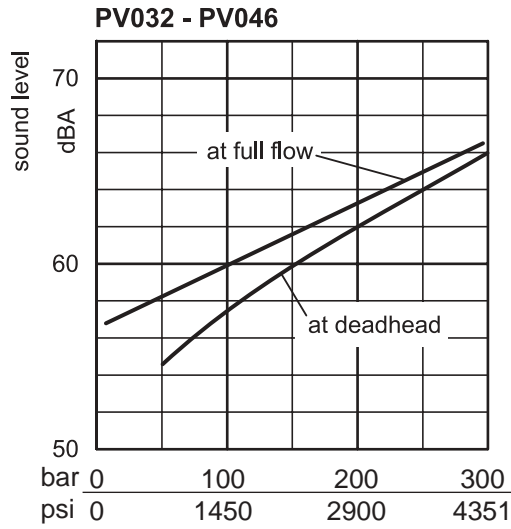
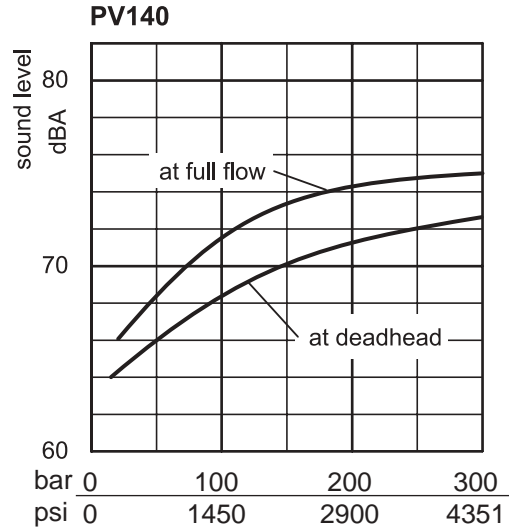
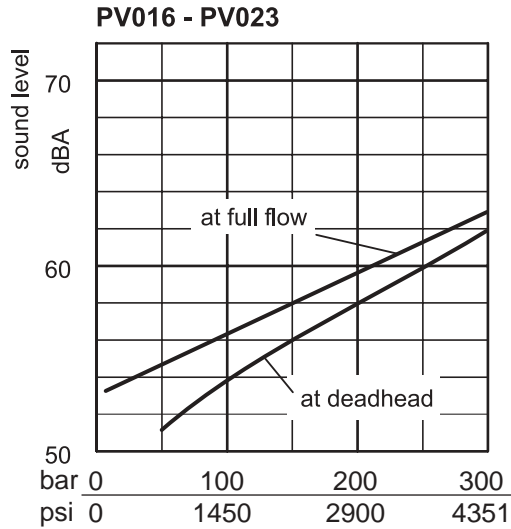
The third digit designates the possibility to adjust the overriding pressure compensation:

Code A comes with a top side NG6/D03 interface on the control valve to mount any suitable pilot valve or Parker pump accessories.

Code C includes a pilot valve for manual pressure adjustment. Max. setting: 350 bar (5075 PSI).

 = included

Noise Levels



Typical sound level for single pumps, measured in anechoic chamber according to DIN 45 635, part 1 and 26. microphone distance 1 m. speed: $n = 1500 \text{ min}^{-1}$.

All data measured with mineral oil viscosity $30 \text{ mm}^2/\text{s}$ (cSt) at 50°C .

Noise reduction measures

Operating noise of pumps

The normal operating noise of a pump and consequently the operating noise of the entire hydraulic system is largely determined by **where** and **how** the pump is mounted and how it is connected to the downstream hydraulic system. Also size, style and installation of the hydraulic tubing have a major influence on the overall noise emitted by a hydraulic system.

Noise reduction measures

Talking about operating noise of a hydraulic pump, primary and secondary pump noise has to be taken into consideration.

Primary pump noise is caused by vibrations of the pump body due to internal alternating forces stressing the body structure.

Flexible elements help to prevent pump body vibration being transmitted to other construction elements, where possible amplification may occur. Such elements can be:

Bell housing with elastic dampening flange with vulcanized labyrinth (1)

Floating and flexible coupling (2)

Damping rails (3) or silent blocks for mounting the electric motor or the foot mounting flange

Flexible tube connections (compensators) or hoses on inlet, outlet and drain port of the pump.

Exclusive use of gas tight tube fittings for inlet connections to avoid ingress of air causing cavitation and excessive noise.

Secondary pump noise is caused by vibration induced into all connected hydraulic components by the flow and pressure pulsation of the pump. This secondary noise adds typical 7 - 10 dBA to the noise of a pump measured in the sound chamber according to DIN 45 635. Therefore pipework, its mounting and the mounting of all hydraulic components like pressure filters and control elements has a major influence to the overall system noise level.

Pulsation reduction with precompression volume: the PV is equipped with a new technology for flow ripple reduction. This method reduces the pulsation at the pump outlet by 40 - 60 %. That leads to a significant reduction of the overall system noise without additional cost and without additional components (silencers etc.). The typical reduction reaches 2 - 4 dBA. That means: with a pump of the PV series the secondary noise adds only some 5 - 7 dBA to the pump noise instead of the usually found 7 - 10 dBA.

Figure 2 compares the measured pulsation of a system with 6 pumps of 180 cm³/rev each.

Last, but not least the connection between pump and driving motor can be the cause of an unacceptably high noise emission.

Even when the mounting space is limited there are suitable means and components to reduce the noise significantly.

The vibration of the pump body, created by high alternating forces in the rotating group and the pulsation of the output flow excite every part of the system connected to the pump mechanically or hydraulically .

A

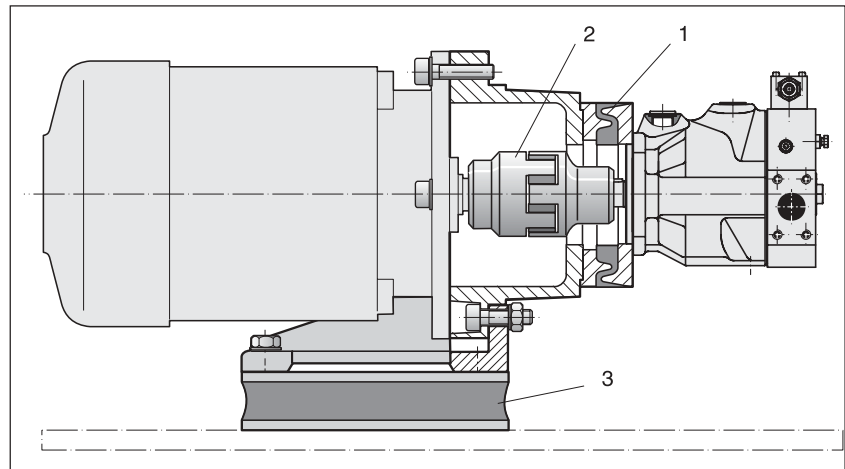


Figure 1: components to avoid vibration transfer from the pump to the drive/installation and their position in the power unit (numbers refer to the text on the left)

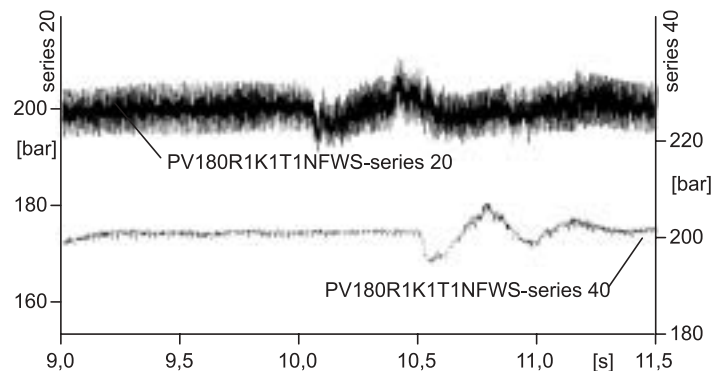


Figure 2: comparison of the pressure pulsation in a system with 6 old PV pumps versus the same system with 6 PVplus pumps. The pulsation reduction effect of the precompression volume is evident.

Other measures

Small diameter tubes do not only cause high flow speeds, turbulences inside the tubes and cavitation in the pump, they also produce noise.

Only correctly sized connections of the largest possible diameter according to the port size of the pump should be used.