RE 10 335/11.97

engineering
mannesmann
Rexroth

Fixed displacement vane pumps
Types PVV and PVQ

Nominal sizes 18 to 193
Series 1X
Maximum operating pressure 210 bar
Maximum displacement 18 to 193 cm³

H/AD5769/97

Single pump type PVV2-1X/...A15D..

Double pump type PVV21-1X/...A15DD..

Contents

Features

- Fixed displacement
- Long bearing life due to hydraulically unloaded shaft
- Low wear due to hydraulically unloaded vanes
- Low operating noise
- Easy to service due to exchangable pump cartridges
- Good efficiency
- Optional positioning of the pressure connection
- Clockwise or anti-clockwise direction of rotation
- Drive shaft optionally cylinderical or splined

Double pump:

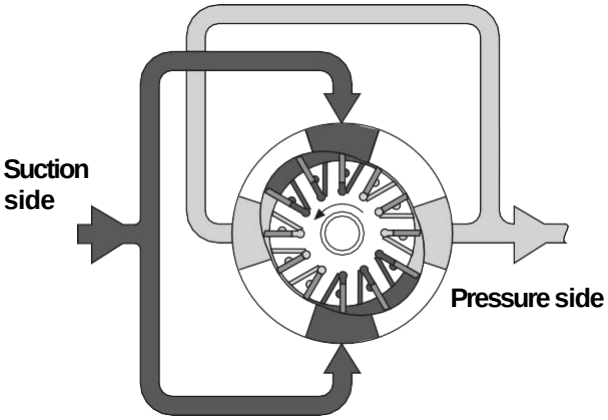
- Available as a double pump
- Very compact design
- The position of the pressure connections is separately selectable

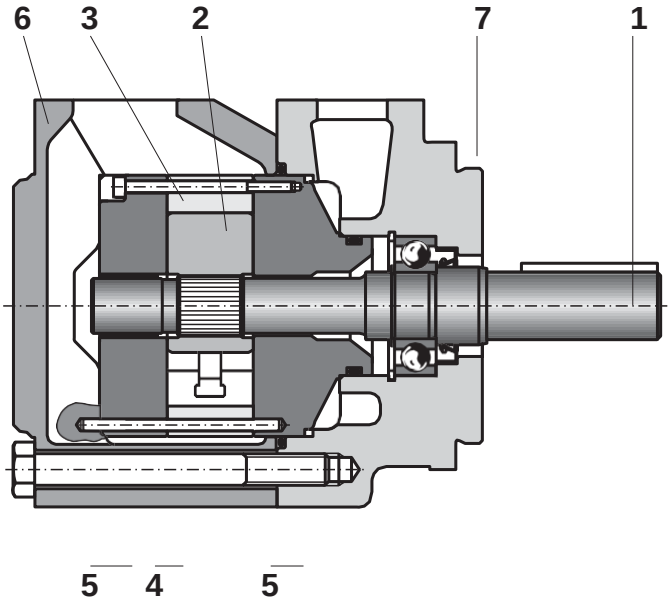
Functional description, section

The PVV and PVQ hydraulic pumps are fixed displacement vane pumps.

The rotor (2) is fitted onto the splines of the drive shaft (1) and rotates inside the stator ring (3). The vanes (4) are fitted into slots in the rotor and are pressed onto the inner surface of the stator ring by centrifugal force as the rotor turns. The displacement chambers are sealed on the sides by the control plates (5). Due to the double extentric form of the stator ring there are two pressure and two suction chambers opposite to each other. The drive shaft is thereby hydraulically unloaded. It only has to carry the torque forces. The vanes are partially unloaded as they pass through the suction areas. This unloading results in reduction in wear and makes it possible to obtain a high efficiency.

By simply removing the cover (6) it is possible to remove the pump cartridge (comprising of rotor, vanes, stator ring and control plates) without having to remove the housing (7) from the pump mounting bracket. This makes it possible to quickly repair and maintain the pump.

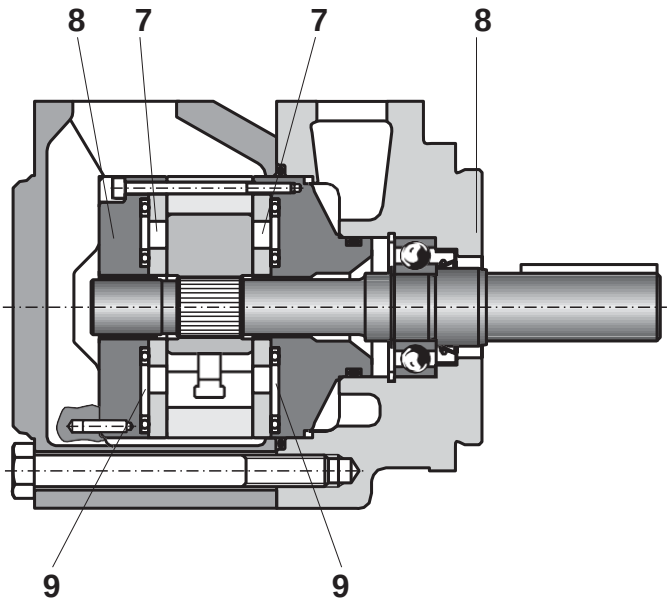




Type PVV..-1X/...A15D...

The design of the PVQ pump makes it particularly suitable for mobile applications.

The special design of the control plates makes it possible to compensate for the heat expansion of the rotor and to act against sudden pressure changes. Due to the division of the control plate (7) into flexible discs and the cover plates (8), counter pressure chambers (9) are created that are balanced against the pressures that are in the displacement chambers. Due to this, the optimum clearance between the rotor and the flexible discs is guaranteed and thus the best volumetric efficiency is made possible.

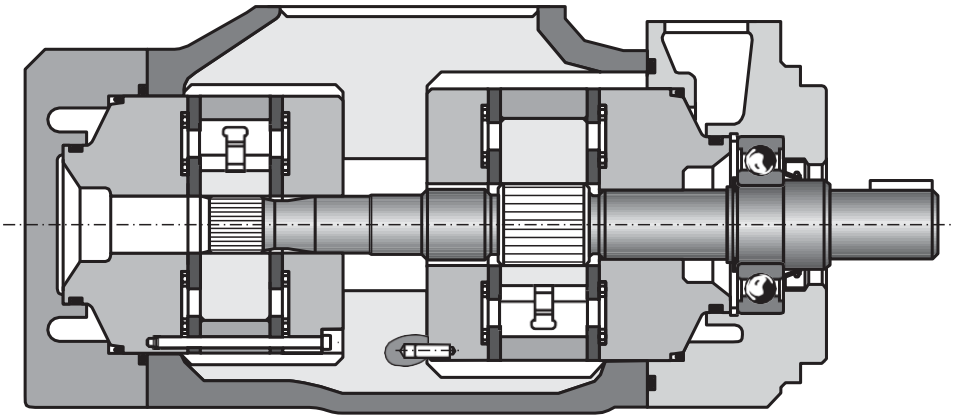


Type PVQ..1X/...A15D...

Functional description, section

The PVV and PVQ double pumps are created by fitting a second pump cartridge onto a mutual shaft. The oil inlet is via a common suction connection in the centre housing (10). The oil output is separate via the pump cartridges. The pressure connection for the front pump cartridge is in the flange housing and for the rear pump cartridge in the cover plate.

The largest pump cartridge is always fitted at the flange housing end. It is not possible to have identically sized pump cartridges as a double pump.



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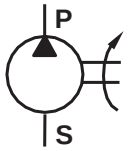
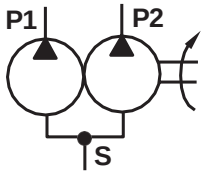
Symbols



Single pump



Double pump

Ordering details

Build size (BS)		Nominal size (NS)		
Single pumps	Double pumps	Single pumps	Double pumps	
			Flange side	Cover side
		Displacement volume	Displacement volume	
1	21	18.0 cm³ = **018**	40.1 cm³ = **040**	18.0 cm³ = **018**
		27.4 cm³ = **027**	45.4 cm³ = **045**	27.4 cm³ = **027**
		36.4 cm³ = **036**	55.2 cm³ = **055**	36.4 cm³ = **036**
		39.5 cm³ = **040**	60.0 cm³ = **060**	39.5 cm³ = **040**
		45.9 cm³ = **046**	67.5 cm³ = **068**	45.9 cm³ = **046**
2	41	40.1 cm³ = **040**	69.0 cm³ = **069**	18.0 cm³ = **018**
		45.4 cm³ = **045**	81.6 cm³ = **082**	27.4 cm³ = **027**
		55.2 cm³ = **055**	97.7 cm³ = **098**	36.4 cm³ = **036**
		60.0 cm³ = **060**	112.7 cm³ = **113**	39.5 cm³ = **040**
		67.5 cm³ = **068**	121.6 cm³ = **122**	45.9 cm³ = **046**
4	42	69.0 cm³ = **069**	69.0 cm³ = **069**	40.1 cm³ = **040**
		81.6 cm³ = **082**	81.6 cm³ = **082**	45.4 cm³ = **045**
		97.7 cm³ = **098**	97.7 cm³ = **098**	55.2 cm³ = **055**
		112.7 cm³ = **113**	112.7 cm³ = **113**	60.0 cm³ = **060**
		121.6 cm³ = **122**	121.6 cm³ = **122**	67.5 cm³ = **068**
5	51	138.6 cm³ = **139**	138.6 cm³ = **139**	18.0 cm³ = **018**
		153.5 cm³ = **154**	153.5 cm³ = **154**	27.4 cm³ = **027**
		162.2 cm³ = **162**	162.2 cm³ = **162**	36.4 cm³ = **036**
		183.4 cm³ = **183**	183.4 cm³ = **183**	39.5 cm³ = **040**
		193.4 cm³ = **193**	193.4 cm³ = **193**	45.9 cm³ = **046**
	52		138.6 cm³ = **139**	40.1 cm³ = **040**
			153.5 cm³ = **154**	45.4 cm³ = **045**
			162.2 cm³ = **162**	55.2 cm³ = **055**
			183.4 cm³ = **183**	60.0 cm³ = **060**
			193.4 cm³ = **193**	67.5 cm³ = **068**
	54		138.6 cm³ = **139**	69.0 cm³ = **069**
			153.5 cm³ = **154**	81.6 cm³ = **082**
			162.2 cm³ = **162**	97.7 cm³ = **098**
			183.4 cm³ = **183**	112.7 cm³ = **113**
			193.4 cm³ = **193**	121.6 cm³ = **122**

Example: 082-060

PV		–1X			15				*

Pump type
Industrial version = **V**
Mobil version = **Q**

Series
Series 10 to 19 = **1X**
(10 to 19, unchanged installation and connection dimensions)

Direction of rotation (viewed on the shaft end)
Clockwise = **R**
Anti-clockwise = **L**

Shaft end
Cylinderical drive shaft (standard) = **A**
Cylinderical drive shaft (strengthened version) only BS2 to 54 = **B**
Splined drive shaft = **J**

Connections
SAE suction and pressure connections, UNC fixing screws = **15**

Position of the pressure connection on the flange (when viewed on the cover)
Top (0° from the inlet) = **D**
Right (90° to the right of the inlet) = **R**
Left (90° to the left of the inlet) = **L**
Bottom (180° from the inlet) = **U**

Ordering example single pump: PVV2-1X/055RA15DMB
Ordering example double pump: PVQ52-1X/154-068RB15DDMC

Further details
in clear text

Flange version
B = SAE-B-2 hole flange (BS1; 2; 21)
C = SAE-C-2 hole flange (BS4; 5 and BS41 to 54)
K = Automotive flange (only PVQ)

Seals
M = NBR seals
V = FPM seals

Only for double pumps
pressure connection location on the cover
(viewed on the cover)

BS 21 to 52
D = Top (45° to the right of the inlet)
R = Right (135° to the right of the inlet)
L = Left (45° to the left of the inlet)
U = Bottom (135° to the left of the inlet)

BS 54
D = Top 0° from the inlet)
R = Right (90° to the right of the inlet)
L = Left (90° to the left of the inlet)
U = Bottom (180° from the inlet)

Technical data

Design	vane pump, fixed
Type	PVV and PVQ
Mounting style	flange mounting to SAE J744
Pipe connections	SAE flange version (UNC fixing threads)
Direction of rotation	clockwise or anti-clockwise
Direction of flow	inlet and outlet are independent of the direction of rotation
Installation	optional, inlet connection preferably at the top
Drive	direct, co-axial drive; radial and axial forces can not be taken up

Parameter	Unit																				
Build size (pump cartridge)	BS	1					2					4					5				
Nominal size (≈ V in cm³)	NS	18	27	36	40	46	40	45	55	60	68	69	82	98	113	122	139	154	162	183	193
Max. flow q_v at n = 1500 min⁻¹, p = 0.7 bar and ν = 25 mm²/s	L/min	26	39	53	59	70	59	66	80	89	100	101	120	141	167	177	203	223	234	267	285
Operating pressure, absolute: Inlet $p_{min\text{-}max}$	bar	0.83 to 2.4 (recommended: 1 ... 1.35) when using fluids containing water and phosphate ester a min. of 0.9 bar																			
Outlet: continuous for PVV p_{max}	bar	210	210	210	160	140	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175
Outlet: continuous for PVQ p_{max}	bar	210	210	210	160	140	210	210	210	210	210	210	210	210	210	210	175	175	175	175	175
Outlet: peak p_{max}		a max. of 10 % above the max. continuous output pressure; not longer than 0.5 seconds																			
RPM: n_{min}	min⁻¹	600					600					600					600				
*) at 1 bar: n_{max} bei PVV	min⁻¹*)	2700			2000		1800					1800					1800				
n_{max} bei PVQ	min⁻¹*)	2700					2700			2500		2500			2400		2200				
Pressure fluid for use with the above stated operating data		HLP mineral oil to DIN 51524 part 2																			
only with FPM seals ("V") phosphate ester (HFD-R): perm. p_{max}	bar	210	210	210	160	140	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175
perm. n_{max}	min⁻¹	1200																			

Pressure fluid temperature range ϑ	°C	– 10 to + 70, (recommended: + 30 to + 60) the permissible viscosity range is to be taken into account
Viscostiry range ν	mm²/s	13 to 860 (recommended: 13 to 54)
Degree of contamination		Maximum permissible degree of contamination of the fluid is to NAS 1638 class 10. We, therefore, recommend a filter with a minimum retention rate of $\beta_{20} \geq 100$. To ensure a long service life, we recommend class 9 to NAS 1638. Achievable with a filter that has a retention rate of $\beta_{10} \geq 100$.

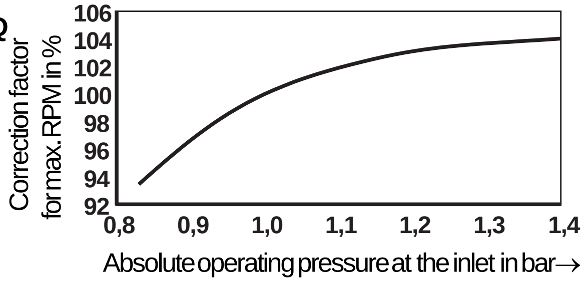
Alternative pressure fluids:	Water in oil emulsion	Water glycole fluids
Max. permissible operating pressure bar	70	140
	Only in conjunction with a return filter with a retension rate of $\beta_{10} \geq 100$ or more. The permissible pressure fluid temperature range is +15°C to +50 °C. Maximum permissible RPM: 1200 min⁻¹	

Please consult us before using our fixed displacement vane pumps with these pressure fluids!

Weight											
	BS	1	2	4	5	21	41	42	51	52	54
	kg	12	14.8	23	34	20	34	34.5	43	46	54

The above stated values for the maximum RPM are valid for an absolute pressure of 1 bar at the inlet.
The maximum permissible RPM has to be corrected to the following diagrams in relation to the absolute pressure present at the inlet.

PVV/PVQ
BS 1
BS 2
BS 4
BS 21
BS 41
BS 42



BS 5
BS 51
BS 52
BS 54