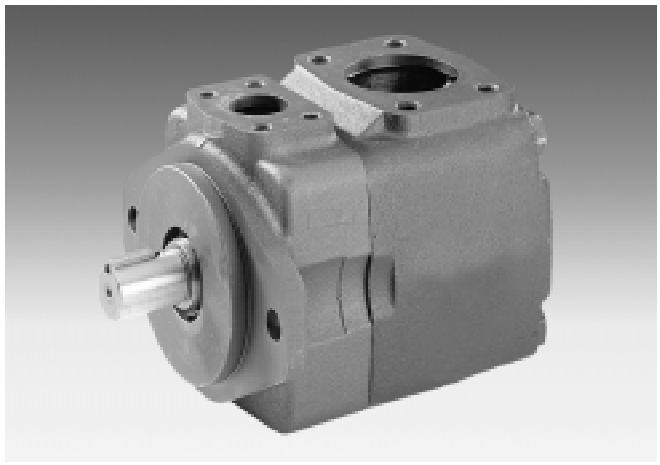
RE 10 335/11.97

engineering mannesmann Rexroth

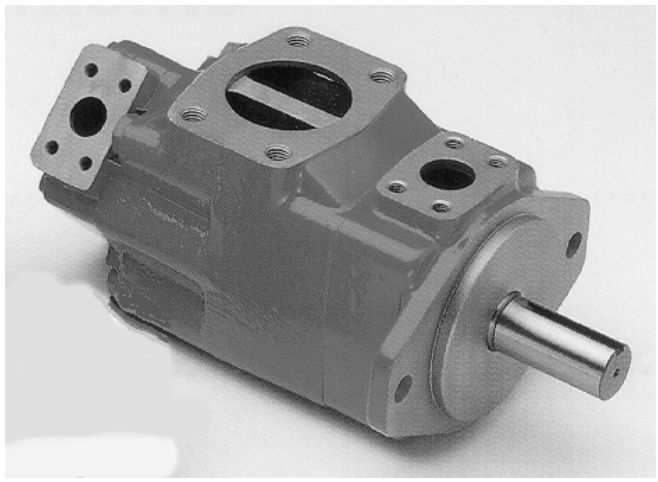
Fixed displacement vane pumps
Types PVV and PVQ

Nominal sizes 18 to 193
Series 1X
Maximum operating pressure 210 bar
Maximum displacement 18 to 193 cm^3



H/A/D 5769/97

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:

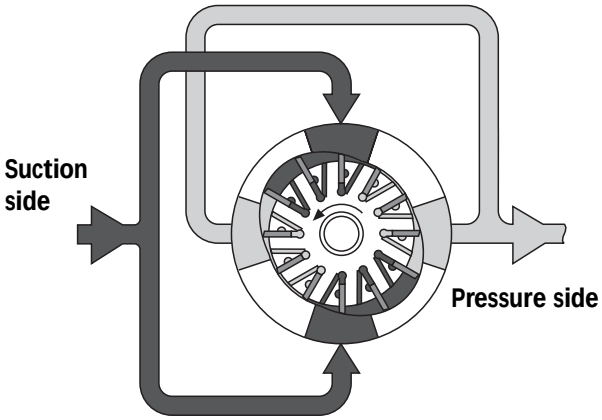
- Available as a double pump
- Very compact design
- The position of the pressure connections is separately selectable

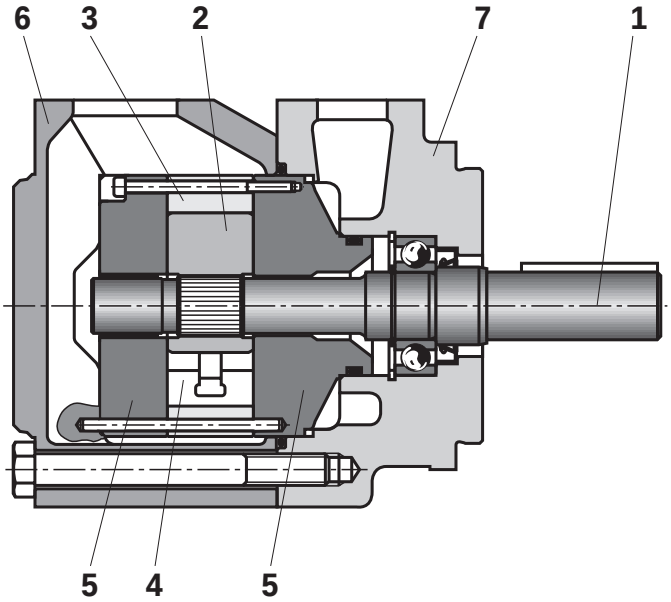
Functional description, section

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.

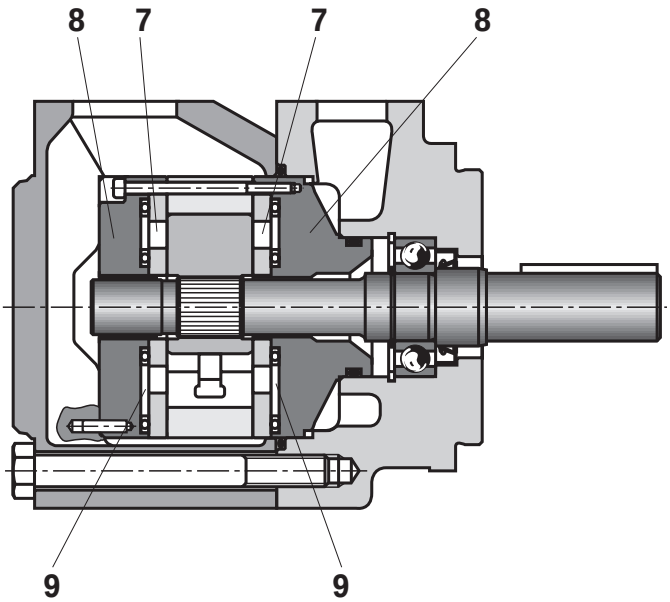




Type PVV..-1X/...A15D...

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.

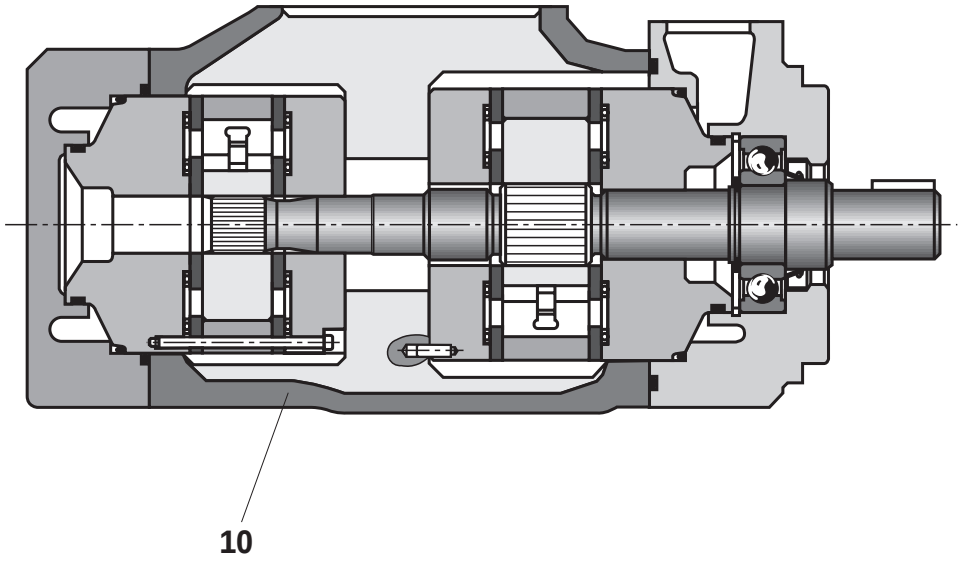


Type PVQ..1X/...A15D...

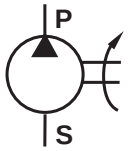
Functional description, section

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.

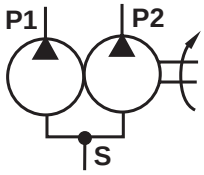
The largest pump cartridge is always fitted at the flange housing end. It is not possible to have identically sized pump cartridges as a double pump.



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 BS 2 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																		
Build size (pump cartridge)		BS	1					2					4					5				
Nominal size ($\approx V$ 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 at n = 1500 min⁻¹, p = 0 .7 bar and ν = 25 mm²/s	q_v	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	$p_{min-max}$	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
	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
	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																			

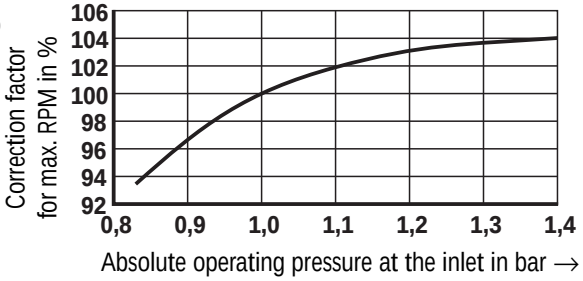
Please consult us before using our fixed displacement vane pumps with these pressure fluids!

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

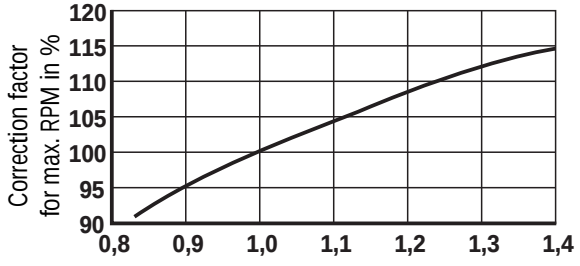
The above stated values for the maximum RPM are valid for an absolute pressure of 1 bar at the inlet.

The maximum permissible RPM has to be corrected to the following diagrams in relation to the absolute pressure present at the inlet.

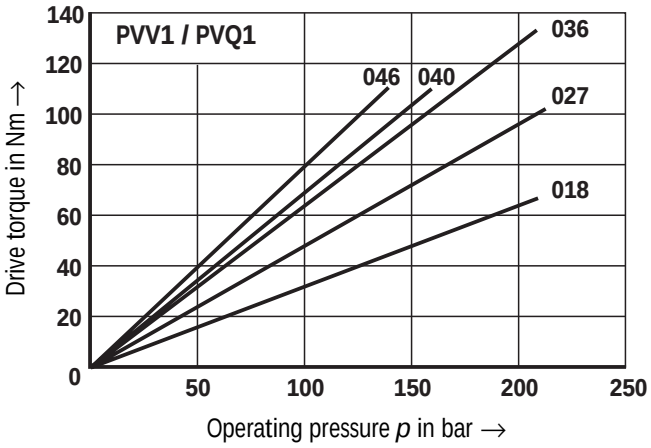
PVV/PVQ
BS 1
BS 2
BS 4
BS 21
BS 41
BS 42

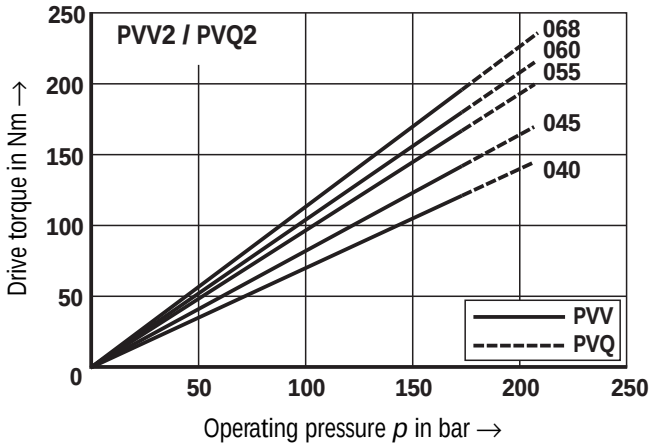


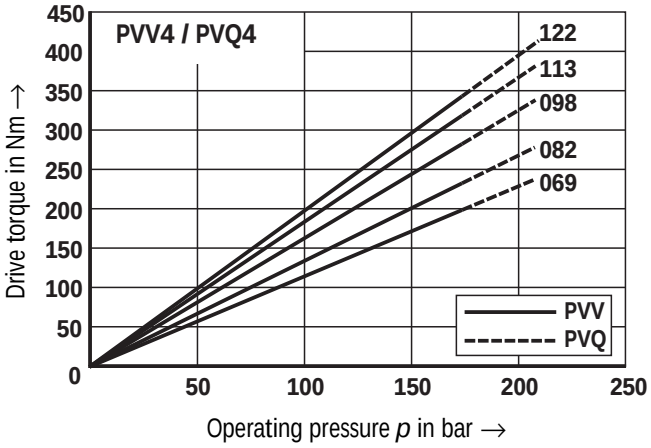
BS 5
BS 51
BS 52
BS 54

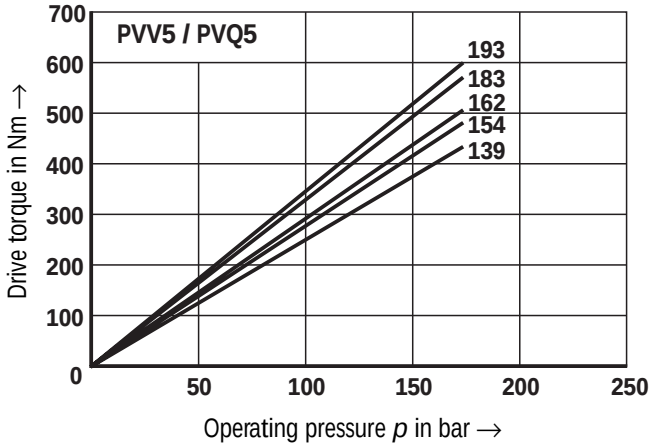


Drive torque (measured at ν = 41 mm²/s; ϑ = 50 °C)

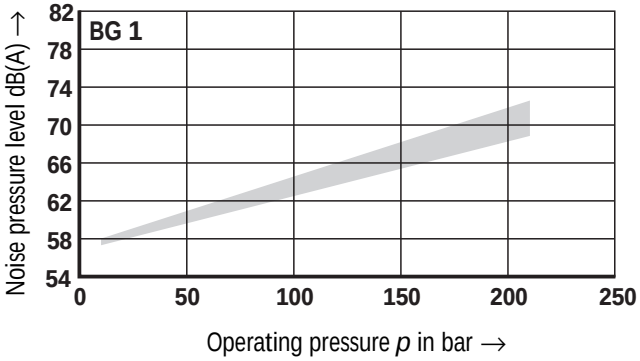


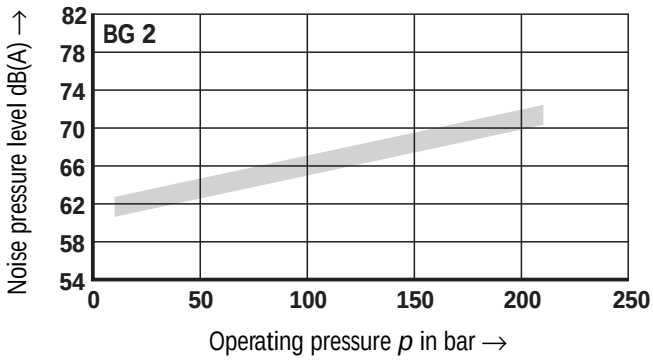


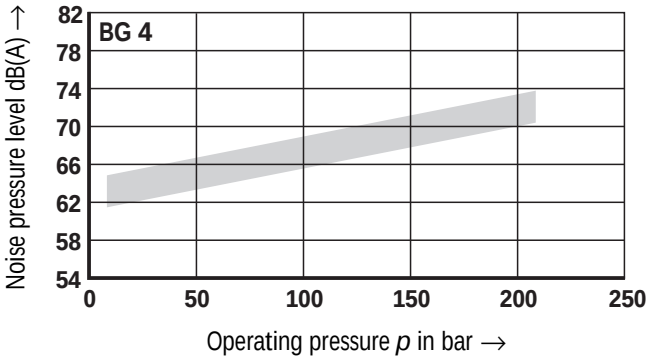


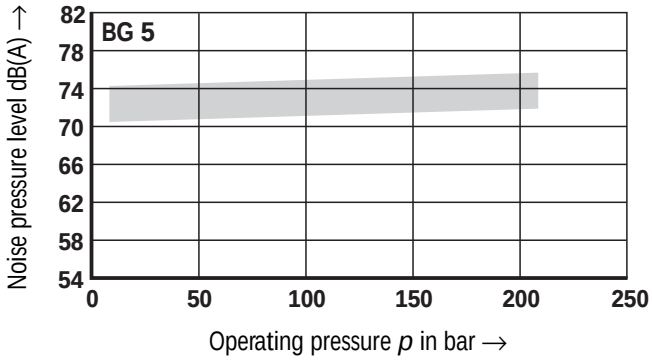


Noise pressure level measured in a low noise room to DIN 45 635 part 26.
Distance of noise sensor to pump = 1 m. ν = 41 mm²/s; n = 1500 and ϑ = 50 °C





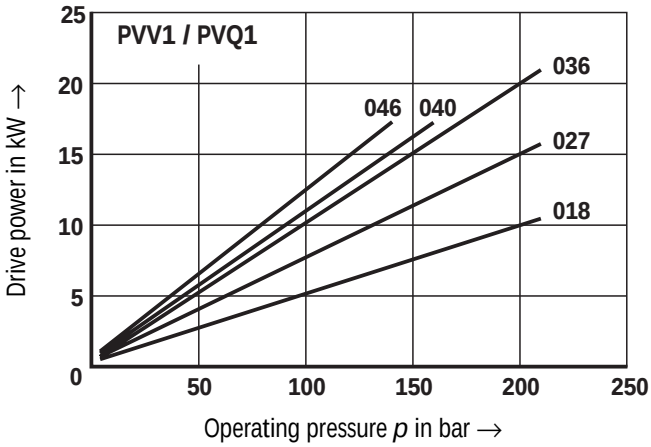


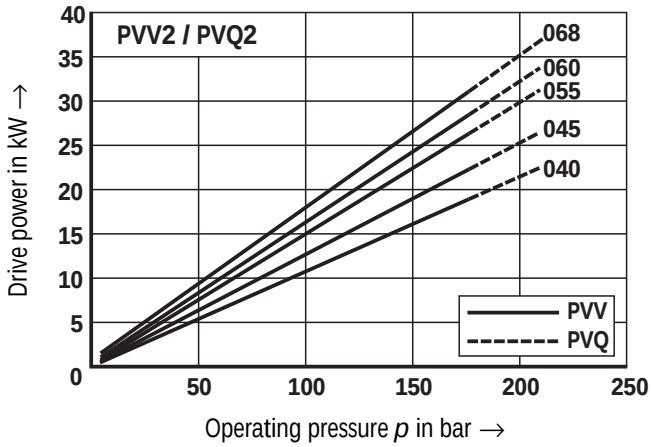


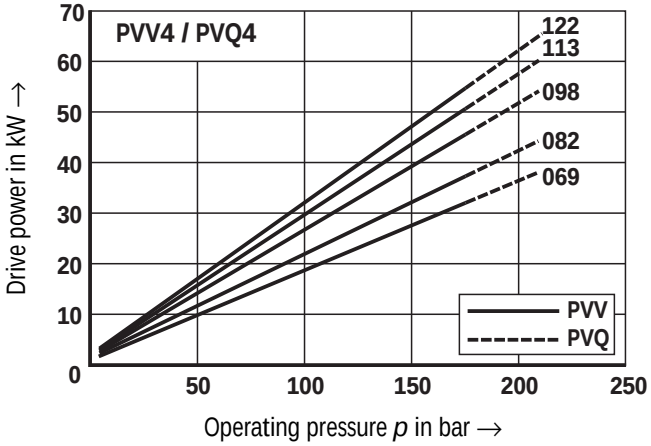
The noise pressure levels for double pumps lie on average 1 to 3 dB(A) above the values for single pumps.

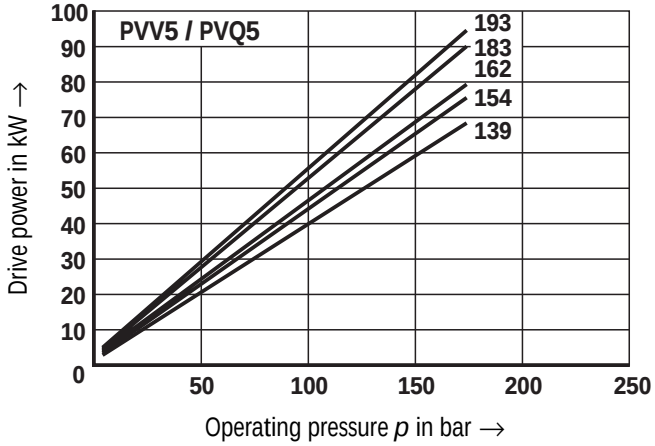
Drive power (measured at ν = 41 mm²/s; ϑ = 50 °C)

n = 1500 min^{-1}

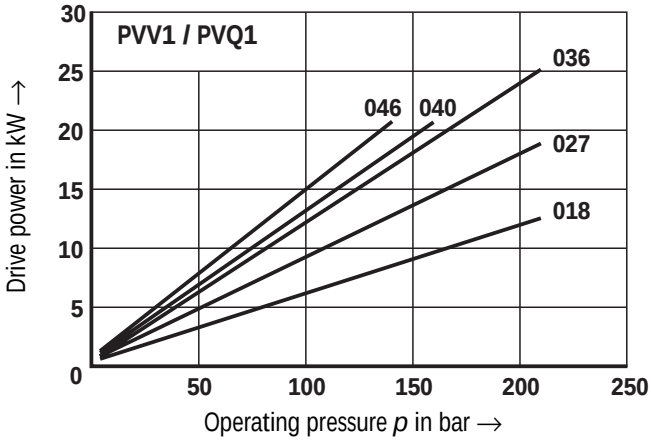


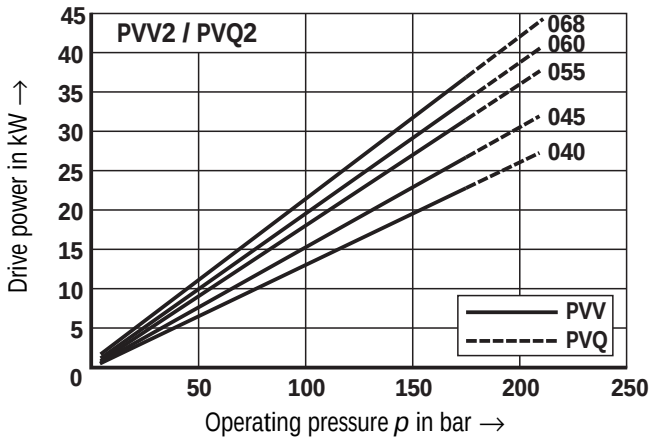


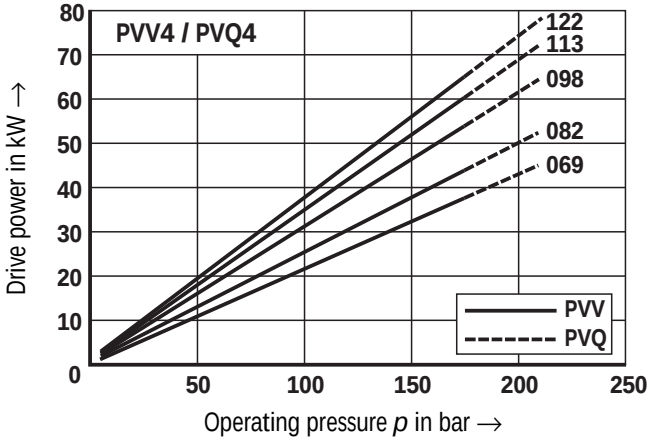


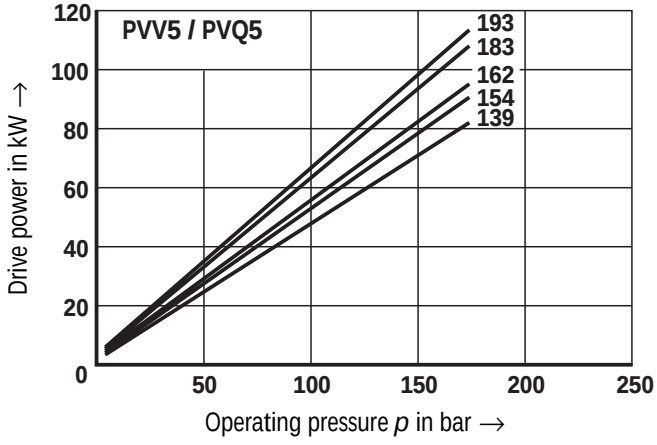


n = 1800 min^{-1}

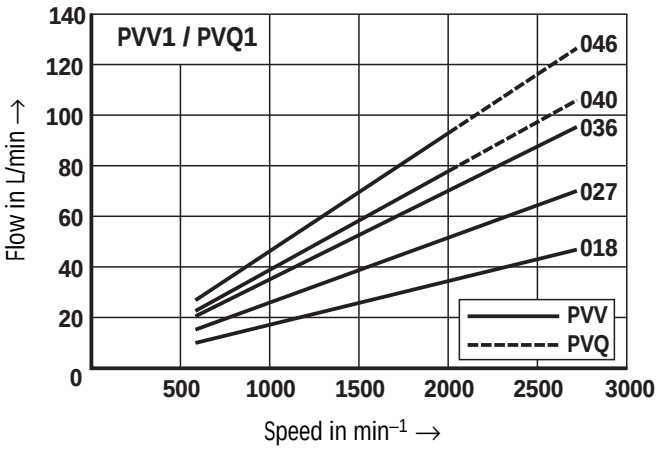


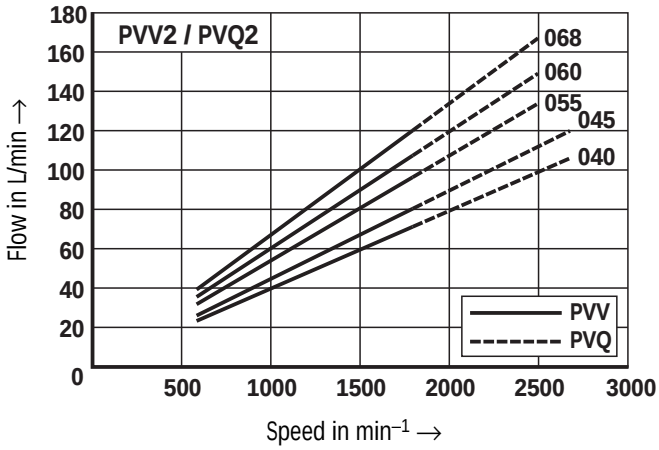


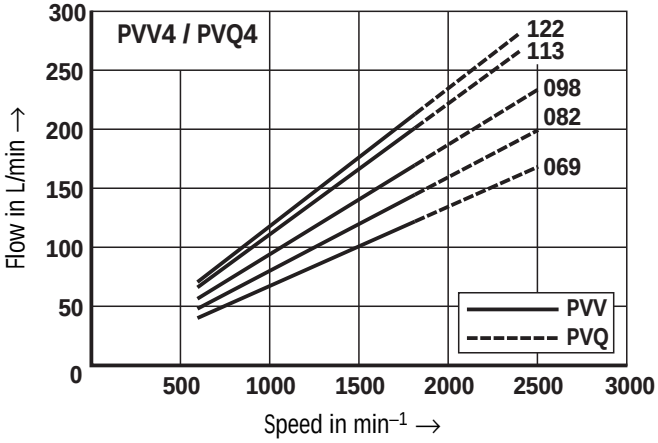


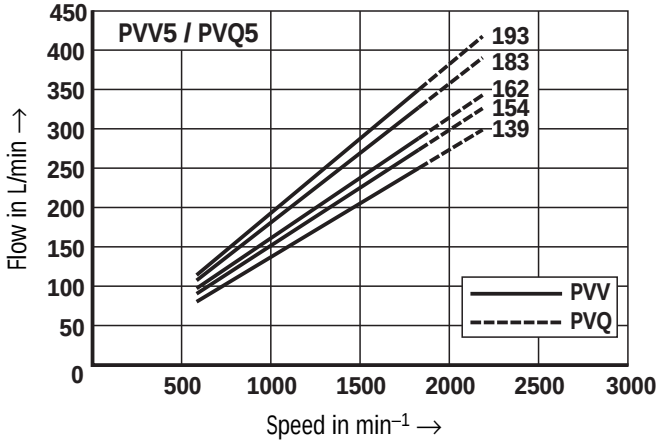


Flow, speed dependent (measured at ν = 41 mm²/s; ϑ = 50 °C; p = 7 bar)

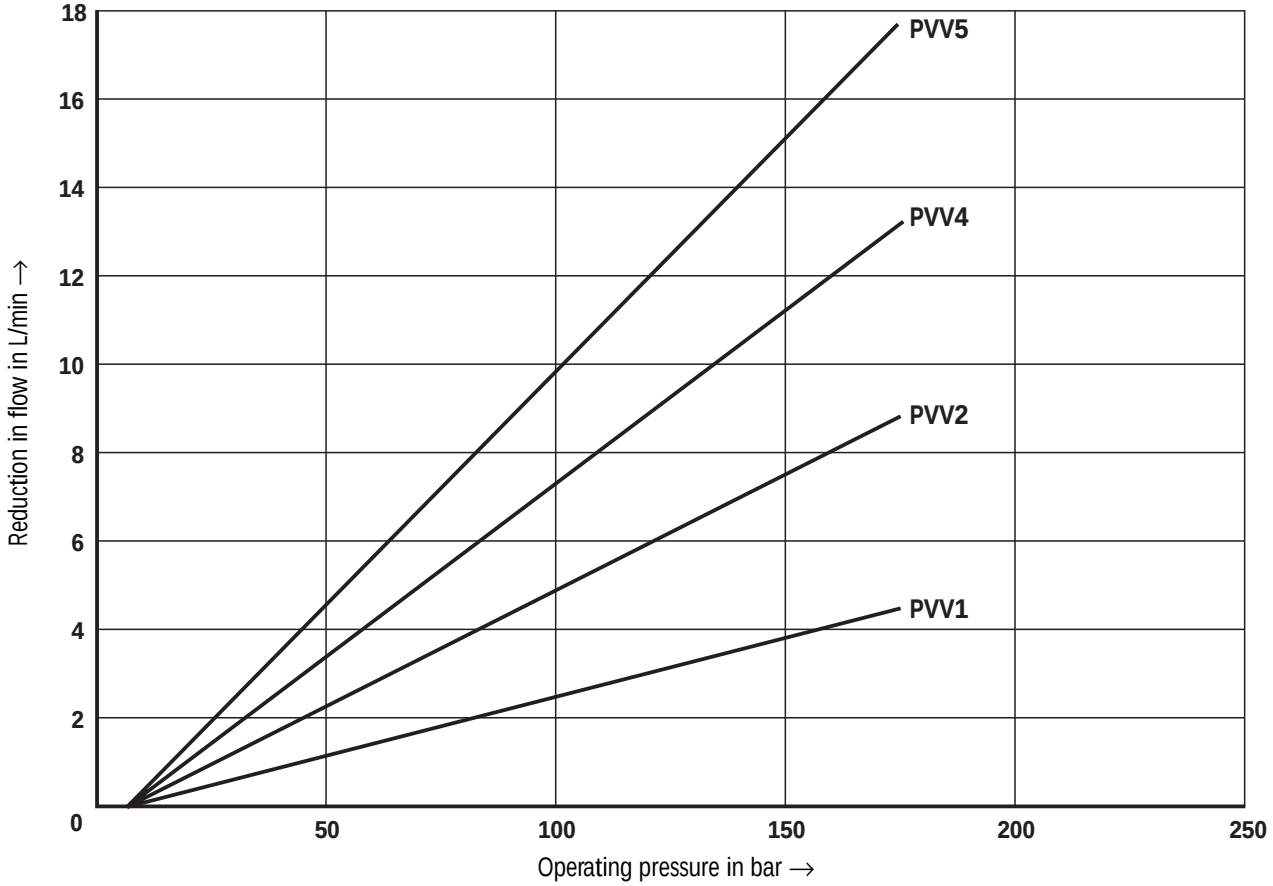






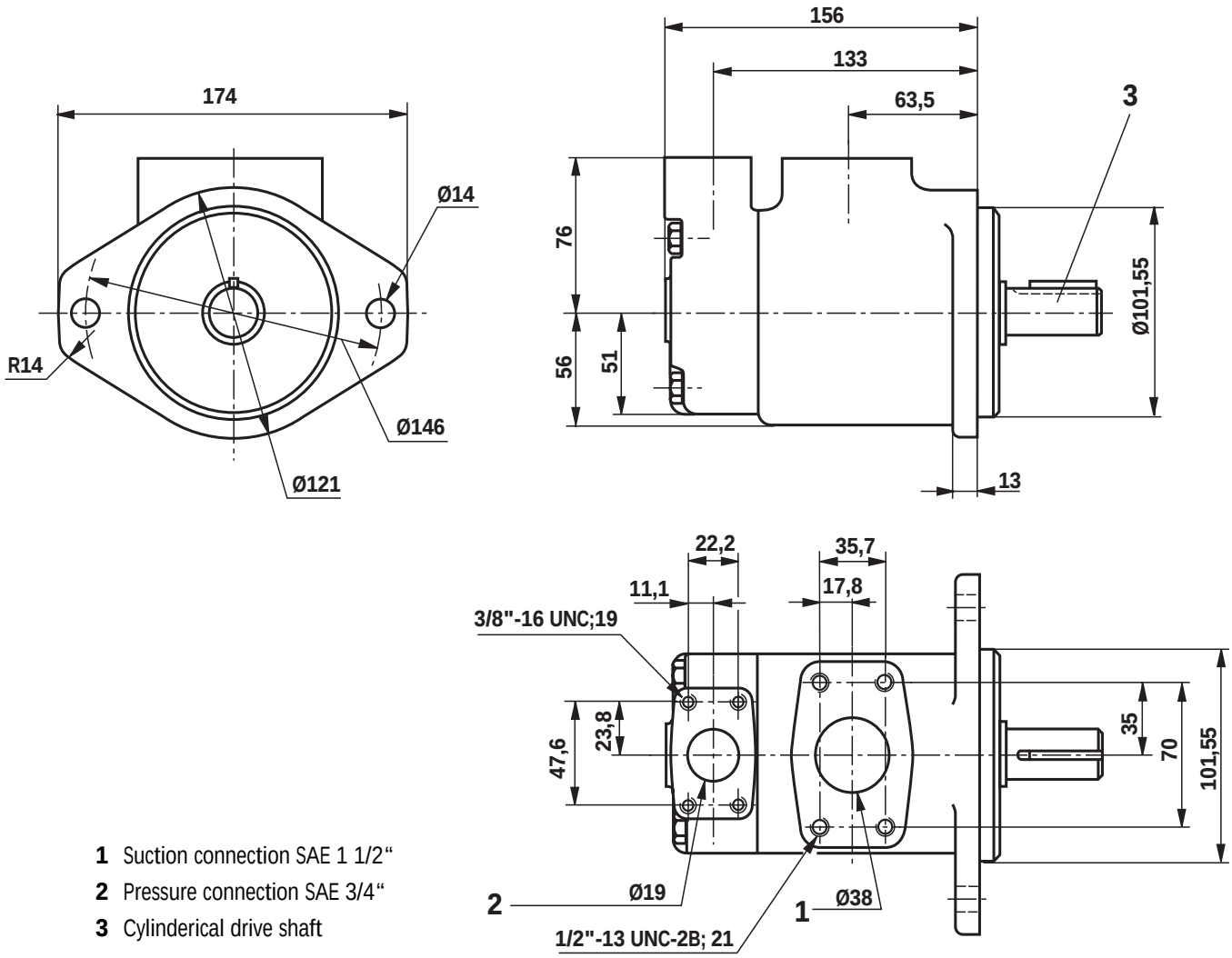


Flow losses, pressure dependent (measured at ν = 41 mm²/s; ϑ = 50 °C)



Unit dimensions: single pump PVV / PVQ, BS 1

(Dimensions in mm)



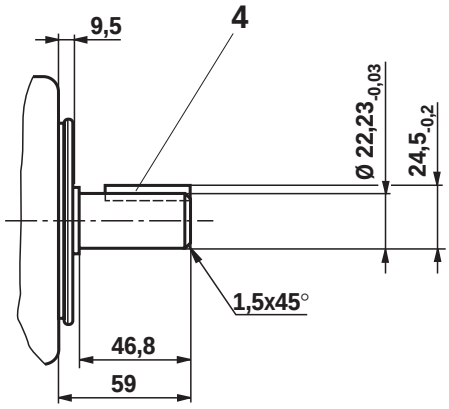
1 Suction connection SAE 1 1/2“

2 Pressure connection SAE 3/4“

3 Cylinderical drive shaft

Shaft for BS 1

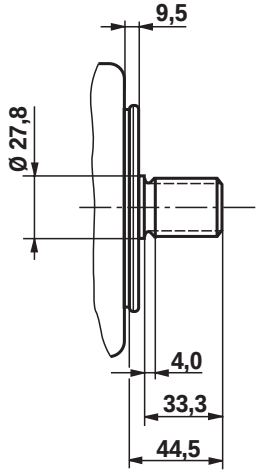
Version **A**
Cylinderical drive shaft
(standard)



4 Key □ 4.76x 31.8

Permissible torque 320 Nm

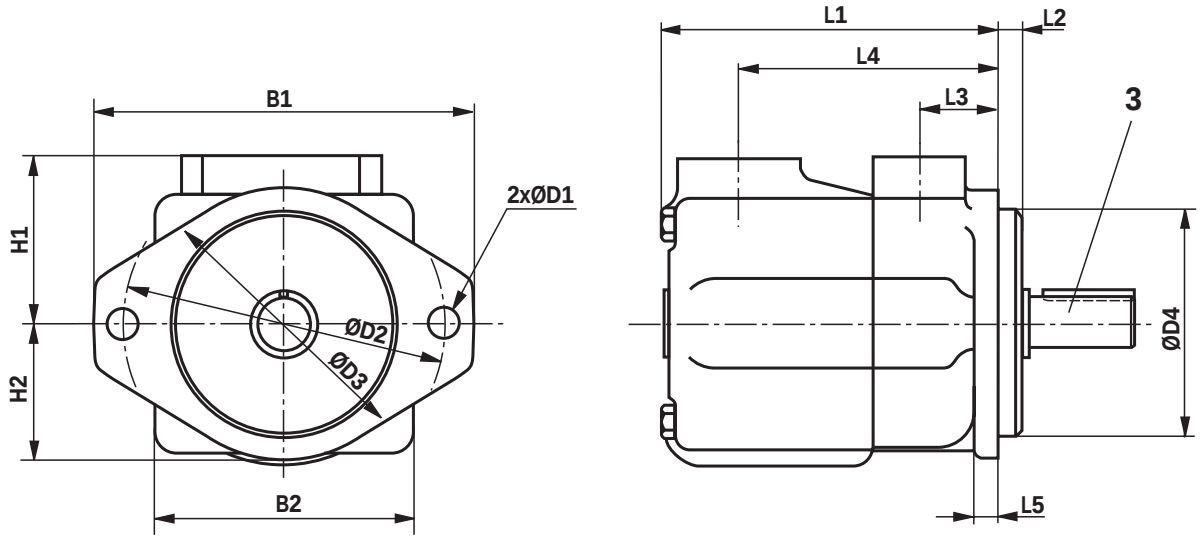
Version **J**
Splined drive shaft SAE-B 7/8“
13 teeth 16/32DP
Tooth thickness t = 2.261

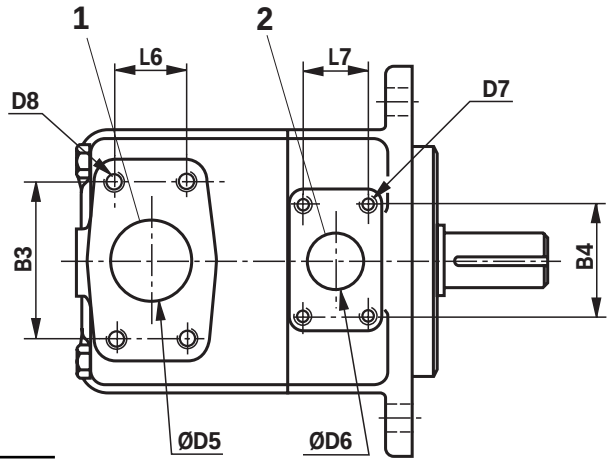


Permissible torque 320 Nm

Unit dimensions: single pump PVV / PVQ, BS 2; 4; 5

(Dimensions in mm)





1 Suction connection

2 Pressure connection

3 Cylinderical drive shaft (for drive shaft dimensions see page 12)

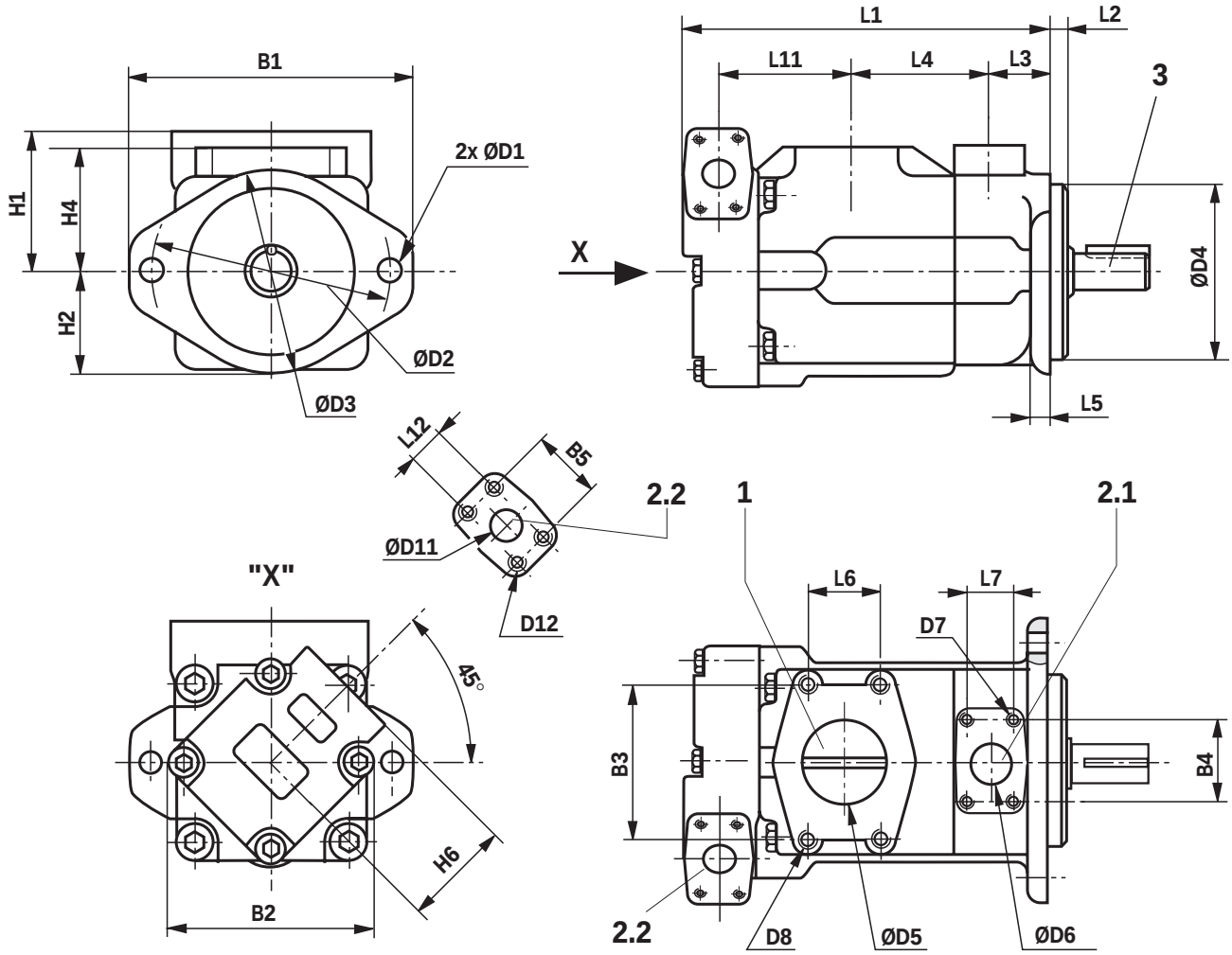
BS	Suction connection						
		ØD5	$D8_{-2B}$	B3	L6	L4	H1
2	SAE 1 1/2"	38	1/2"-13UNC	69.9	35.7	120.6	76.2
4	SAE 2"	50.8	1/2"-13UNC	77.7	42.8	125.5	82.6
5	SAE 3"	76.2	5/8"-11UNC	106.3	61.9	153.2	93.6

BS	Pressure connection					
		ØD6	$D7_{-2B}$	B4	L7	L3
2	SAE 1"	25.4	3/8"-16UNC	52.4	26.2	38.1
4	SAE 1 1/4"	31.8	7/16"-14UNC	58.7	30.1	38.1
5	SAE 1 1/2"	38.1	1/2"-13UNC	69.9	35.7	42.9

BS	Mounting flange										
		B1	ØD1	ØD2	ØD3	$ØD4_{-0.05}$	L2	L5	B2	L1	H2
2	SAE-B	174	14	146	121	101.6	9.5	13	117	163	64
4	SAE-C	212	17.5	181	148	127	9.5	16	140	186	70
5	SAE-C	212	17.5	181	148	127	12.7	16	159	216	83

Unit dimensions: double pump PVV / PVQ, BS 21; 41; 42; 51; 52

(Dimensions in mm)



BS	Mounting flange	B1	ØD1	ØD2	ØD3	ØD4 $_{-0.05}$	L2	L5
21	SAE-B	174	14	146	121	101.6	9.5	13
41; 42	SAE-C	212	17.5	181	148	127	9.5	16
51; 52	SAE-C	212	17.5	181	148	127	12.7	16

BS	Suction connection	ØD5	D8 $_{-2B}$	B3	L6	L4	H1
21	SAE 2 1/2"	63.5	1/2"-13UNC	88.5	50.8	101.6	84.1
41	SAE 3"	76.2	5/8"-11UNC	106.3	61.9	114.4	88.9
42							
51	SAE 3 1/2"	88.9	5/8"-11UNC	120.7	69.9	119.3	102.4
52							

BS	Pressure connection - flange side	ØD6	D7 $_{-2B}$	B4	L7	L3	H4
21	SAE 1"	25.4	3/8"-16UNC	52.4	26.2	38.1	76.2
41; 42	SAE 1 1/4"	31.8	1/16"-14UNC	58.7	30.1	38.1	82.6
51; 52	SAE 1 1/2"	38.1	1/2"-13UNC	69.9	35.7	42.9	93.6

BS	Pressure connection - cover side	ØD11	D12 $_{-2B}$	B5	L12	L11	H6	B2	L1	H2
21	SAE 3/4"	19.1	3/8"-16UNC	47.6	22.2	88	76.2	132	252	64
41	SAE 3/4"	19.1	3/8"-16UNC	47.6	22.2	99.5	74.7	140	275	70
42	SAE 1"	25.4		52.4	26.2	109.5	76.2	143	288	74
51	SAE 3/4"	19.1	3/8"-16UNC	47.6	22.2	119.5	74.7	162	306	85
52	SAE 1"	25.4		52.4	26.2	135.8	76.2		324	

1 Suction connection

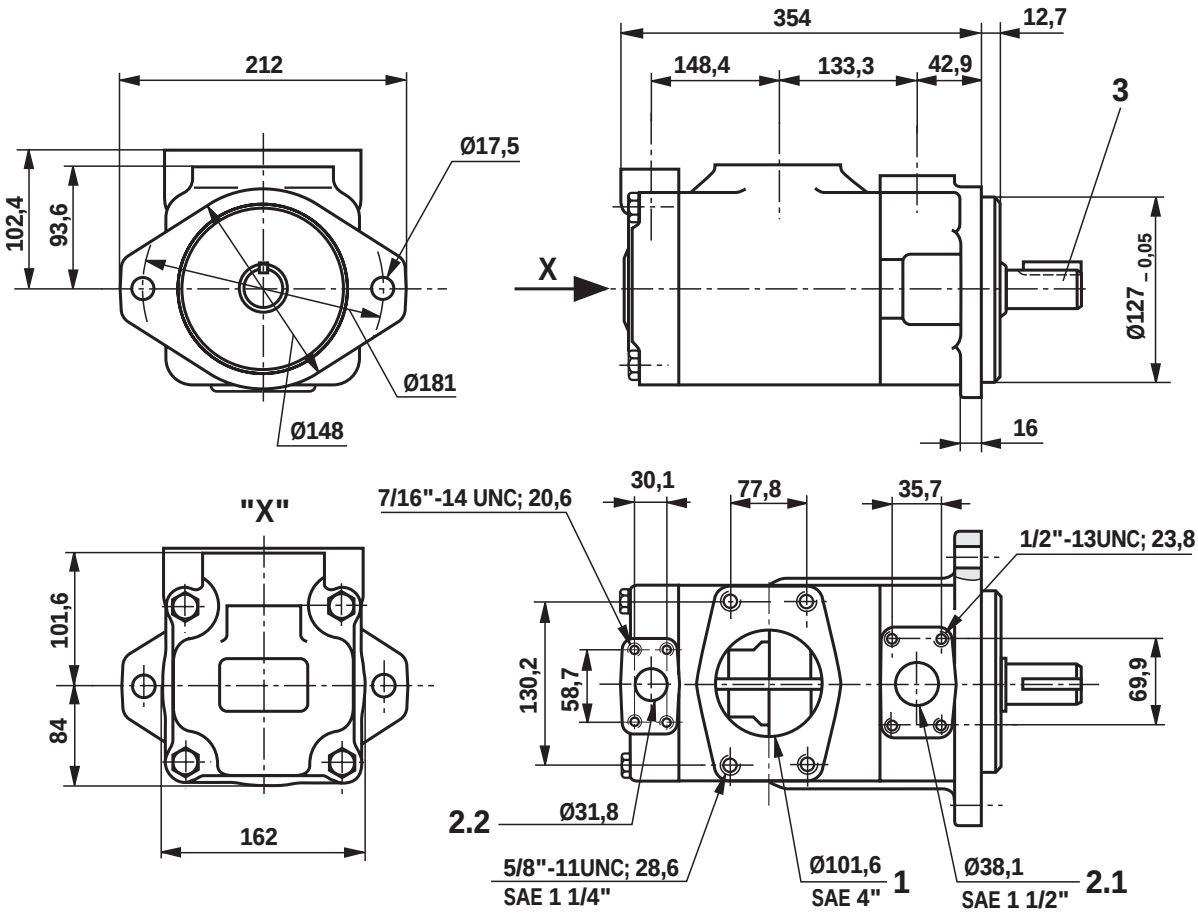
2.1 Pressure connection, flange side

2.2 Pressure connection, cover side

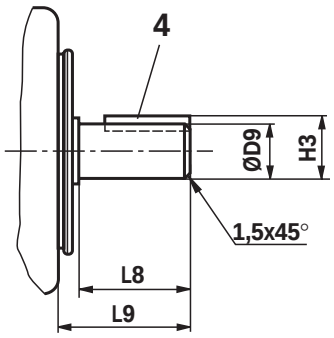
3 Cylinderical drive shaft (for drive shaft dimensions see page 12)

Unit dimensions: double pump PVV / PVQ, BS 54

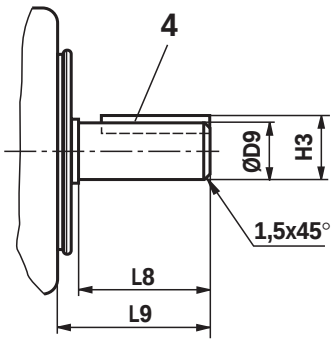
(Dimensions in mm)



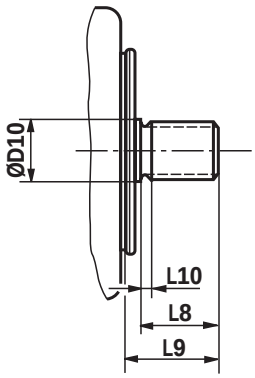
Drive shaft end for BS 2 to 54



Version **A**
Cylindrical drive shaft
(standard)



Version **B**
Cylindrical drive shaft
(strenghtened)



Version **J**
Splided drive shaft SAE-B or C

	Drive shaft version **A**						Drive shaft version **B**					
BS	L8	L9	H3	ØD9	Key	T_{max} in Nm	L8	L9	H3	ØD3	Key	T_{max} in Nm
2; 21	46.8	59	$24.5_{-0.2}$	$22.23_{-0.03}$	□ 4.76x31.8	320	64	78	$28.3_{-0.2}$	$25.37_{-0.02}$	□ 6.36x50.8	400
4; 41; 42	61.9	73.2	$35.2_{-0.3}$	$31.75_{-0.03}$	□ 7.9x38.1	407	74.6	86	$38.6_{-0.3}$	$34.9_{-0.03}$	□ 7.9x54.6	600
5; 51; 52; 54	47.8	62	$35.2_{-0.3}$	$31.75_{-0.03}$	□ 7.9x28.4	610	73	88	$42.37_{-0.23}$	$38.07_{-0.02}$	□ 7.9x54.6	818

Drive shaft version **J**

BS	L8	L9	L10	ØD10	T_{max} in Nm	teeth details
2; 21	33,3	44,5	4,0	27,8	320	SAE-B 7/8“, 13 teeth, 16/32 DP
4; 41; 42	42,1	58,42	3,04	35,05	580	SAE-C 1 1/4“, 14 teeth, 12/24 DP
5; 51; 52; 54	46,6	62	9,7	41,28	818	SAE-C 1 1/4“, 14 teeth, 12/24 DP

1 Suction connection
2.1 Pressure connection, flange side
2.2 Pressure connection, cover side
3 Cylindrical drive shaft (for drive shaft dimensions see table)
4 Key (for dimensions see table)

Pump cartridges for PVV / PVQ

Features

- Service friendly due to exchangable pump cartridges
- Within a build size it is possible to change the flow by exhanging the pump cartridges
- The pump can be changed from type PVV to PVQ or from PVQ to PVV by changing the cartridges.

H/A/D5768/97

Type: EINBAUSATZ PVV1-1X/018R

Ordering details

EINBAUSATZ	PV		– 1X/		

Pump type

Industrial version	**= V**
Mobile version	**= Q**

Build size 1	**= 1**
Build size 2	**= 2**
Build size 4	**= 4**
Build size 5	**= 5**

Series

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

No code =	Cartridge for single pumps or flange side for double pumps
D =	Cartridge for cover side installation for double pumps

Direction of rotation

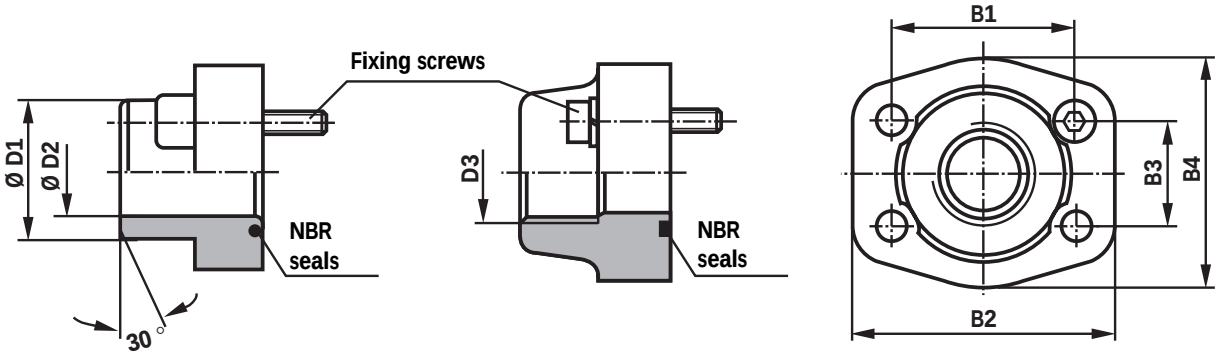
R =	Clockwise
L =	Anti-clockwise

Nominal size/displacement volume

018 =		18.0 cm^3
027 =		27.4 cm^3
036 =	Build size 1	45.4 cm^3
040 =		39.5 cm^3
046 =		45.9 cm^3
040 =		40.1 cm^3
045 =		45.4 cm^3
055 =	Build size 2	55.2 cm^3
060 =		60.0 cm^3
068 =		67.5 cm^3
069 =		69.0 cm^3
082 =		81.6 cm^3
098 =	Build size 4	97.7 cm^3
113 =		112.7 cm^3
122 =		121.6 cm^3
139 =		138.6 cm^3
154 =		153.5 cm^3
162 =	Build size 5	162.2 cm^3
183 =		183.4 cm^3
193 =		193.4 cm^3

SAE connection flanges

(Dimensions in mm)



With welded connection to AB 22-15

With threaded connection to AB 22-13

Suction connection	Pressure connection for PVV / PVQ *)	NS	Seal material	Material number for flange with welded connection	Material number for flange with threaded connection	B1	B2	B3	B4	ØD1	ØD2	D3	Fixing screws
	1; 2**1**; 4**1**; 5**1**	3/4“	NBR	211169	063050	47.6	65	22.2	52	25	19	G3/4	3/8“-16UNC
	2; 2**1**; 4**2**; 5**2**	1“	NBR	211170	211175	52.4	70	26.2	59	30	22	G 1	3/8"-16UNC
	4; **5**; **4**1; **4**2; 5**4**	1 1/4"	NBR	211363	211172	58.7	79	30.2	68	38	28	G 1 1/4	7/16"-14UNC
	51; **5**2; **5**4	1 1/2"	NBR	211168	211171	69.9	95	35.7	76	38	30	G 1 1/2	1/2"-13UNC
1; 2		1 1/2"	NBR	211165	211171	69.9	95	35.7	76	48	39	G 1 1/2	1/2"-13UNC
4		2"	NBR	211434	211173	77.8	102	42.9	90	60	49	G 2	1/2"-13UNC
21		2 1/2"	NBR	063063	211174	88.9	114	50.8	104	76	62	G 2 1/2	1/2"-13UNC
5; 41; 42		3"	NBR	211362	–	106.3	135	61.9	131	76	70	–	5/8"-11UNC
51; 52		3 1/2"	NBR	211166	–	130.7	152	69.9	140	89	82	–	5/8"-11UNC
54		4"	NBR	211167	–	130.2	162	77.8	152	114	107	–	5/8"-11UNC

*) The numbers in bold state the stage (for double pumps) for which the flange is intended.

The material numbers contain the flange, the o-ring and the fixing screws.

Pipe thread “G” to ISO 228/1

Pump safety block

To limit the working pressure or (and) for solenoid actuated unloading of the operating pressure we recommend our pump safety blocks to RE 25 880 and RE 25 890.

Project guidelines

Comprehensive instructions and proposals can be found in the Hydraulic Trainer, Volume 3 RE 00 281, "Planning and design of hydraulic power systems"
When using vane pumps we recommend that the following guidelines are partically taken into account.

Technical data

All the technical data are dependent on manufacturing tolerances and are valid with certain operating conditions.

Please take into account that minor variations are possible and technical data can be affected by differing conditions (e.g. viscosity).

Characteristic curves

Please take into account when dimensioning the drive motor the maximum possible application data as shown by the characteristic curves shown on pages 6 to 8.

Noise

The sound pressure level values given on page 6 are measured according to DIN 45 635, page 26. This means that only the noise emission of the pump is given. Ambient influences (such as place of installation, piping, ect.) are **not** taken into concideration.
The values refer to only one pump.

Unfavourable influences can cause the noise pressure level at the units final place of installation to be 5 to 10 dB (A) higher than that of the pump values alone.

Commissioning guidelines

Commissioning

- Check to see if the system has been carefully, correctly and cleanly assembled.
- Only fill the pressure fluid via a filter which has the necessary retention rate.
- Take into account the direction of rotation arrow.
- Start the pump without load and let it displace oil without pressure for a few seconds in order to provide sufficient lubrication.
- Never run the pump without oil.
- If the pump after approx. 20 seconds does not displace oil without any bubbles then the system has to be rechecked.

  After the operating values have been reached, check the pipe connections for leakage and check the operating temperature.

Bleeding

- Before commissioning we recommend that the housing and suction line are filled with oil. This increases the operating safety and prevents wear in the case of unfavorable installation conditions.
- For the first commissioing the oil which has foamed can be released by carefully lossening the pressure flange (danger of oil spray) when the system is in a de-pressurised condition. Only when bubble-free oil is being released retighten the fittings to the required torque level.

General

- The pumps supplied by ourselves have been tested for function and performance. Changes in any form or manner to the pump are not permitted, as this would invalidate any guarantee claims!
- Repairs may only be carried out by the manufacturer or authorised agent or subsidary. No guarantee will be accepted for commissioning carried out by third parties.

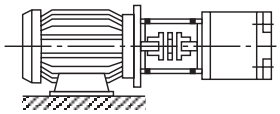
⚠ Important guidelines

- Assembly, maintenance and servicing must only be carried out by authorised, trained and instructed personnel!
- The pump must only be operated within the permitted limits (see page 5)!
- The pump may only be operated in a sound condition!
- When carrying out any work on the pump, switch the system to zero pressure!
- Unauthorised conversions and modifications which affect the safety and function of the pump are not permitted!
- Provide protective measures (e.g. coupling guard) and do not remove any existing protective devices!
- Ensure that the fixing bolts are correctly fitted!
  (take into account the prescribed tightening torque)
- The general valid safety and accident prevention regulations must be adhered to!

Installation guidelines

Drive

E-motor + pump mounting bracket + coupling+ pump



Attention!

- Radial and axial forces on the pump drive shaft are not permitted!
  → Motor and pump must be exactly aligned!
  → Use rotary flexible joints

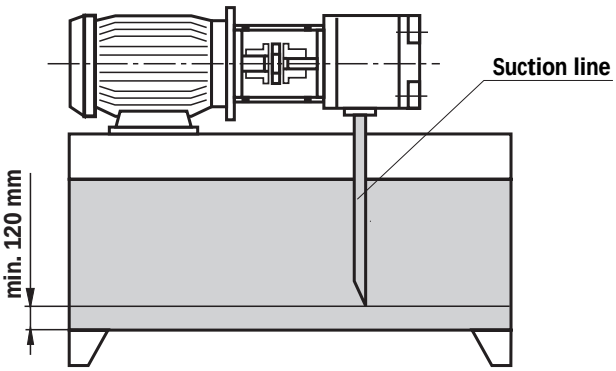
Fluid tank

– Match the service capacity of the tank to the operating conditions.
Attention! The permissible fluid temperature must not be exceeded
→ If required, provide a cooler!

Lines and connections

– Cut at a 45° angle
– Remove protective plugs from the pump.
– We recommend the use of seamless precision steel pipes to DIN 2391 and removable pipe connections.
– Select the inside diameter of the pipes according to the ports.
– Thoroughly clean pipes and fittings before assembly.**– min. distance to the tank bottom 120 mm**
→ Dirt deposits will not be sucked up or whirled up
– Maintain a min. immersion depth of 50 mm, even at the lowest permissible fluid level
→ Avoids foaming
– Under no circumstances must leakage and return fluid be directly taken up by the pump!
→ Fluid temperature remains low
– For inlet pressure see page 5

Piping recommendations



– **Under no circumstances** may return fluid be directly taken up, therefore, select the greatest possible distance between the suction and return lines
– The exit of the return line must always lie under the oil level
– Ensure that the suction lines are assembled leak-proof

Filter

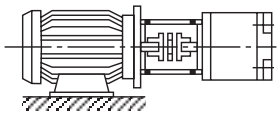
– Whenever possible, use return line or pressure filters.
(Suction filter only in connection with low pressure switch/ clogging indicator)

Pressure fluid

– Please take into account the specifications stated in catalogure sheet RE 07 075.
– We recommend brand name fluids.
– Do not mix hydraulic fluids of different types since this can result in decomposition or deterioration of the lubricating qualitiy.
– The fluid must br replaced at regual intervals according to the operating conditions. In connection with this, the tank must also be cleaned of residues.

Permissible installation positions

– Horizontal position preferred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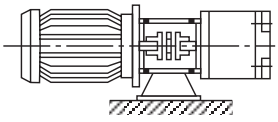
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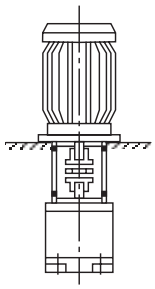
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