**RE 10 515/07.02**

Replaces: 05.00

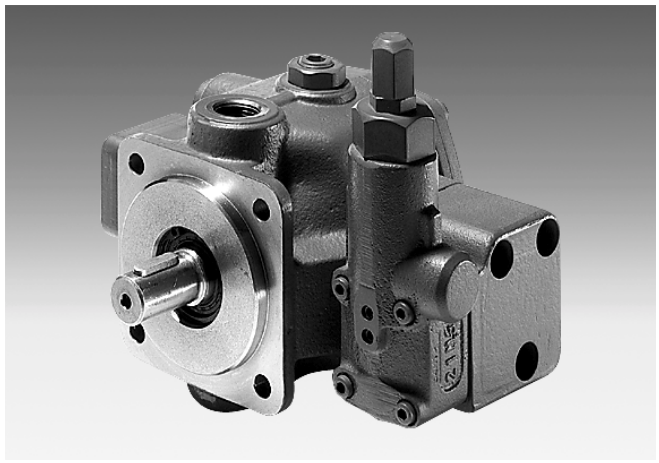
# Variable vane pumps, pilot operated, type PV7

Nominal sizes 14 to 150

Series 1X

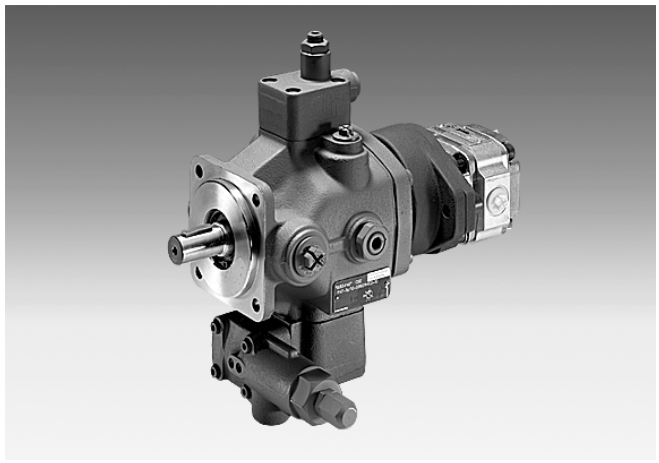
Maximum operating pressure 160 bar

Maximum flow 270 L/min



H/A 1790

Type PV7/16…C…



H/A/D 5641/97

Type P2V7/…+GF1/…

## Overview of contents



## Features

**PV7**

- Variable displacement
- Low operating noise
- Long bearing life due to hydro-dynamically lubricated plain bearings
- Control facility for pressure and flow
- Low hysteresis
- Very short control times for an and off stroke
- Installation and connection dimensions to
  - VDMA 24 560 part 1
  - ISO 3019/2
- Suitable for use with HETG and HEES fluids
- The standard PV7 pumps can be combined into numerous variations of combination pumps
- The PV7 pumps can also be combined with internal and external gear pumps, axial piston and radial piston pumps

**MPU**

- Is supplied as a completely assembled unit
- Drive coupling and pump mounting bracket are not required
- Low operating noise due to the compact design

## Ordering details

| Build and nominal sizes | | Pipe connection | Zero stroke pressure range | |
|---|---|---|---|---|
| BS 10-NS 14 cm³ | = **10-14** | = **01** | **16 =** | up to 160 bar |
| BS 10-NS 20 cm³ | = **10-20** | = **01** | **10 =** | up to 100 bar |
| BS 16-NS 20 cm³ | = **16-20** | = **01** | **16 =** | up to 160 bar |
| BS 16-NS 30 cm³ | = **16-30** | = **01** | **08 =** | up to 80 bar |
| BS 25-NS 30 cm³ | = **25-30** | = **01** | **16 =** | up to 160 bar |
| BS 25-NS 45 cm³ | = **25-45** | = **01** | **08 =** | up to 80 bar |
| BS 40-NS 45 cm³ | = **40-45** | = **37** | **16 =** | up to 160 bar |
| BS 40-NS 71 cm³ | = **40-71** | = **37** | **08 =** | up to 80 bar |
| BS 63-NS 71 cm³ | = **63-71** | = **07** | **16 =** | up to 160 bar |
| BS 63-NS 94 cm³ | = **63-94** | = **07** | **08 =** | up to 80 bar |
| BS 100-NS 118 cm³ | = **100-118** | = **07** | **16 =** | up to 160 bar |
| BS 100-NS 150 cm³ | = **100-150** | = **07** | **08 =** | up to 80 bar |

| PV7–1X / | R | E | | | | – | |
|---|---|---|---|---|---|---|---|

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

**Direction of rotation**
Clockwise = **R**

**Shaft end**
Cylindrical drive shaft with through drive = **E**

**Pipe connections**
*Standard version*
**BS 10, 16, 25:**
Suction, pressure connection: pipe thread = **01**
**BS 40:**
Suction connection: SAE flange connection,
Pressure connection: pipe thread = **37**
**BS 63, 100:**
Suction, pressure connection: SAE flange connection = **07**

**Ordering examples:** PV7-1X/16 20RE01MC5-16
PV7-1X/40-45RE37KD0-16

**For pumps with settings to the customer's requirements:**
On the order please state the required setting data in clear text (e.g. $q_{Vmax}$ = 20 L/min; $p_{zero\ stroke}$ = 70 bar). The pump will be set to the required values and the operating noise optimised respectively.

**Directional valve** [1]
**WG =** Normally closed
**WH =** Normally open

**Controller option**
**0 =** Standard
**3 =** Lockable
**5 =** With K-plate
**6 =** With Q-plate
**7 =** Lockable with K-plate
**8 =** Lockable with Q-plate

**Controller type**
**C =** Pressure controller
**D =** Pressure controller for hydraulic remote pressure control
**E =** Pressure controller with electrical remote pressure control (on request)
**N =** Flow controller
**W =** Pressure controller with electrical 2-stage pressure adjustment

**Seals**
**M =** NBR seals
**K =** FKM shaft seal ring (other seals NBR)

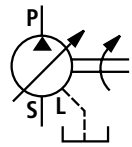
Without any clear text information the flow and the zero stroke pressure will be set to the relevant maximum values and the operating noise will be adjusted accordingly.

[1] Only for C5, D5 and W controllers (optional)

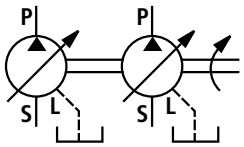
## **Preferred types** (readily available)

| Type | Material No. | Type | Material No. |
|---|---|---|---|
| PV7–1X/10-14RE01MC0-16 | 00580381 | PV7–1X/10-14RE01MD0-16 | 00504653 |
| PV7–1X/10-20RE01MC0-10 | 00534143 | PV7–1X/10-20RE01MD0-16 | 00906584 |
| PV7–1X/16-20RE01MC0-16 | 00580382 | PV7–1X/16-20RE01MD0-16 | 00509274 |
| PV7–1X/16-30RE01MC0-08 | 00533582 | PV7–1X/16-30RE01MD0-08 | 00560658 |
| PV7–1X/25-30RE01MC0-16 | 00580383 | PV7–1X/25-30RE01MD0-16 | 00509506 |
| PV7–1X/25-45RE01MC0-08 | 00534508 | PV7–1X/25-45RE01MD0-08 | 00568833 |
| PV7–1X/40-45RE37MC0-16 | 00580384 | PV7–1X/40-45RE37MD0-16 | 00593330 |
| PV7–1X/40-71RE37MC0-08 | 00535588 | PV7–1X/40-71RE37MD0-08 | 00539886 |
| PV7–1X/63-71RE07MC0-16 | 00506808 | PV7–1X/63-71RE07MD0-16 | 00519094 |
| PV7–1X/63-94RE07MC0-08 | 00560659 | PV7–1X/63-94RE07MD0-08 | 00574560 |
| PV7–1X/100-118RE07MC0-16 | 00506809 | PV7–1X/100-118RE07MD0-16 | 00532770 |
| PV7–1X/100-150RE07MC0-08 | 00561846 | PV7–1X/100-150RE07MD0-08 | 00915470 |

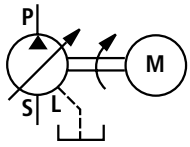
## Symbol




Single pump




Double pump




Motor-pump-drive unit

## Function, section

### Design

The PV7 hydraulic pumps are variable displacement vane pumps.

They mainly consist of the housing (1), rotor (2), vanes (3), stator ring (4), pressure controller (5) and adjustment screw (6).

The circular stator ring (4) is retained between the small control piston (10) and the large control piston (11). The third contact point of the ring is the height adjustment screw (7).

The driven rotor (2) rotates inside the stator ring (4). The vanes contained within the rotor are pressed against the stator ring (4) by centrifugal force.

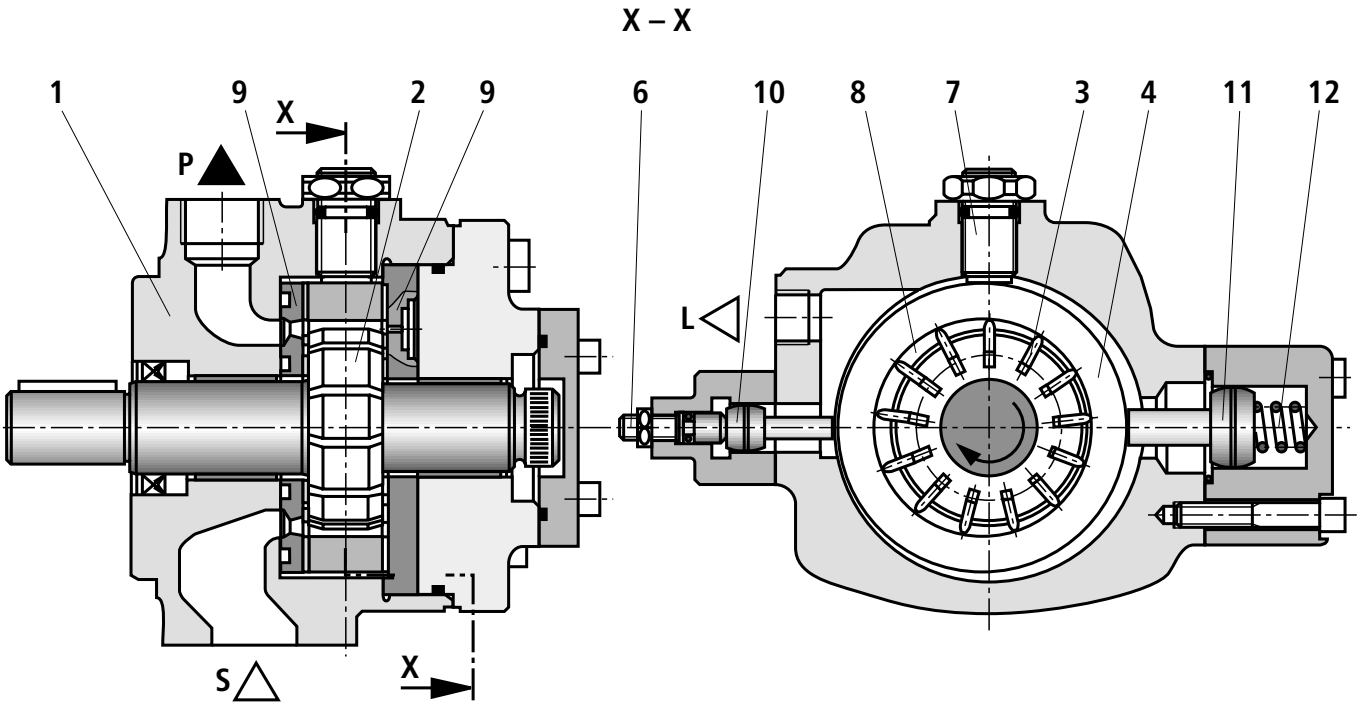
### Adjustment

At the same time as the system pressure builds up, the rear surface of the small control piston (10) is connected to the system via a channel and is, therefore always subjected to the system pressure.

When the pump is in its displacement position, the rear surface of the large control piston (11) is also subjected to the system pressure via a drilling in the control piston (14). The control piston (11) with the larger surface area holds the stator ring (4) in its eccentric position.

The pumps displaces fluid at a pressure that is lower than the zero stroke pressure set on the pressure controller (5).

The control piston (14) is held in a certain position by a spring (13).




### Suction and displacement process

The chambers (8) which are required for the transport of the fluid are formed by the vanes (3), the rotor (2), the stator ring (4) and the control plates (9).

In order to ensure the pump function during commissioning, the stator ring (4) is held in the eccentric position (displacement position) by the spring (12) which is behind the large control piston (11).

Due to the rotation of the rotor (2), the chambers (8) increase in size and at the same time, fill with fluid via the suction channel (S). When the maximum chamber volume is reached, the chambers (8) are disconnected from the suction side. As the rotor (2) continues to rotate, they are connected to the pressure side and become smaller and press the pressure fluid into the system via the pressure channel (P).

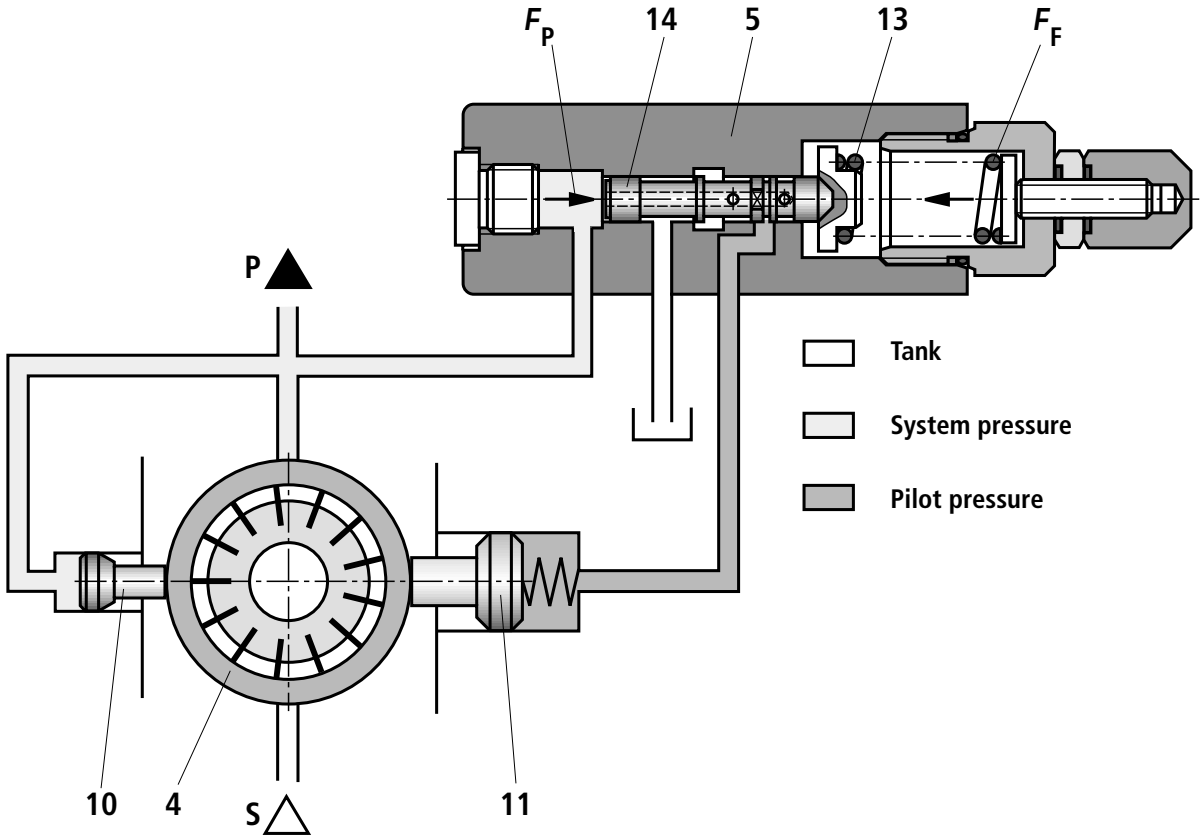
### Off-stroke

If force $F_P$, resulting from the product of pressure x area, exceeds the counter force $F_F$ of the spring, the controller piston (14) is moved against the spring (13). In this way, the chamber behind the large control spool (11) is connected to tank and is thus unloaded.

The small control piston (10), which is constantly under system pressure, moves the stator ring (4) towards the centre position, virtually the zero position. The pump maintains the pressure, the flow decreases to zero, leakages are compensated for.

Power loss and heating of the fluid are kept at a low level.

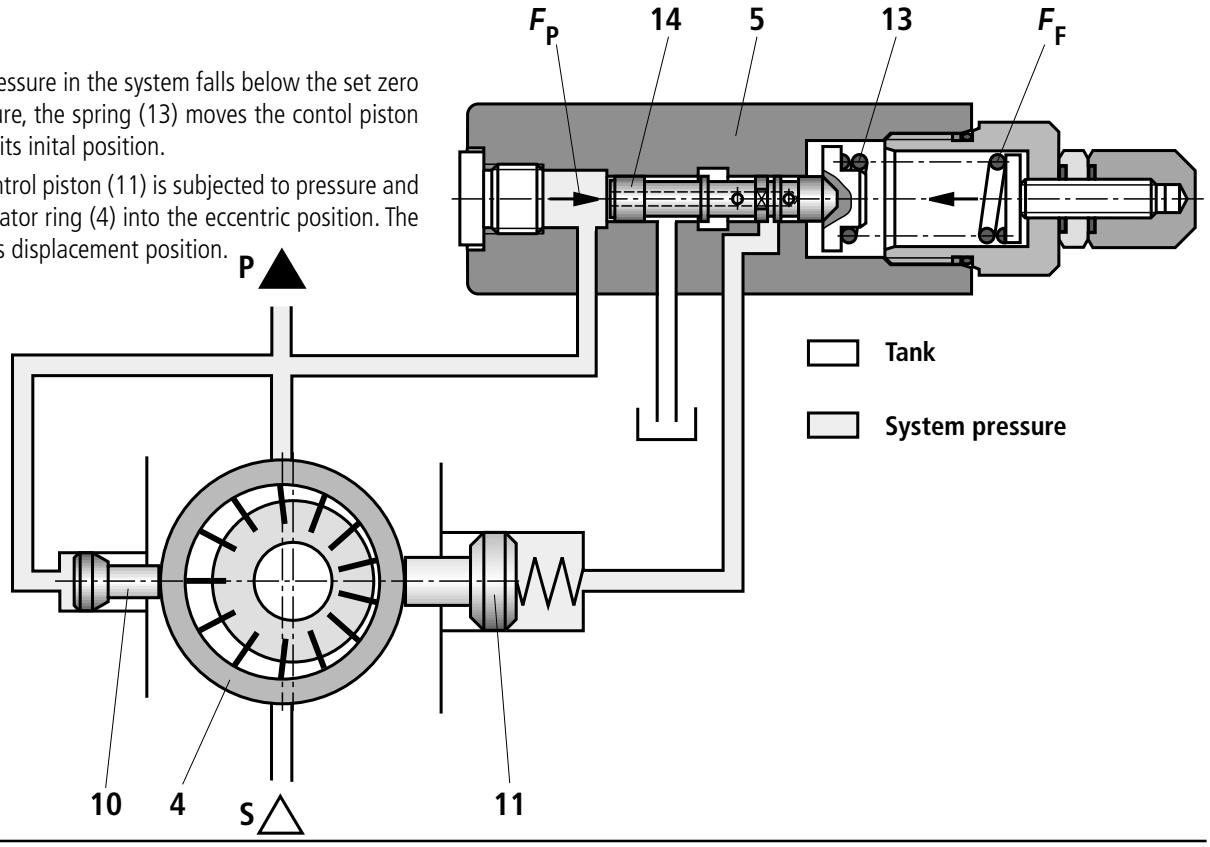
The $q_V$-$p$-characteristic curve runs vertically and shifts in parallel as higher pressures are set.




### On-stroke

When the pressure in the system falls below the set zero stroke pressure, the spring (13) moves the contol piston (14) back to its inital position.

The large control piston (11) is subjected to pressure and moves the stator ring (4) into the eccentric position. The pump is in its displacement position.



## **Technical data** (for applications outside these parameters, please consult us!)

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Model | | | Pilot operated variable displacement vane pump. adjustable | | | | | | | | | | | | | | | |
| Type | | | PV7 | | | | | | | | | | | | | | | |
| Mounting style | | | 4-hole flange (to VDMA 24 560 part 1 and ISO 3019/2) | | | | | | | | | | | | | | | |
| Pipe connections | | | Threaded or SAE flange connection (dependent on build size) | | | | | | | | | | | | | | | |
| Installation | | | Optional, preferably horizontal (see page 21) | | | | | | | | | | | | | | | |
| Shaft loading | | | Radial and axial forces **cannot** be taken up | | | | | | | | | | | | | | | |
| Direction of rotation | | | Clockwise (viewed on the shaft end) | | | | | | | | | | | | | | | |
| Drive speed | $n$ | $min^{-1}$ | 900 to 1800 | | | | | | | | | | | | | | | |
| Build size | | BS | 10 | | 16 | | 25 | | 40 | | 63 | | 100 | | | | | |
| Nominal size | $V_g$ | $cm^3$ | 14 | 20 | 20 | 30 | 30 | 45 | 45 | 71 | 71 | 94 | 118 | 150 | | | | |
| Drive power [1] | $P_{max}$ | kW | 6.3 | 5.8 | 8.5 | 6.8 | 13.7 | 10.2 | 20.5 | 16.5 | 33 | 20.9 | 51.5 | 33 | | | | |
| Permissible drive torque | $T_{max}$ | Nm | 90 | | 140 | | 180 | | 280 | | 440 | | 680 | | | | | |
| Max. flow [2] | $q_V$ | L/min | 21 | 29 | 29 | 43.5 | 43.5 | 66 | 66 | 104 | 108 | 136 | 171 | 218 | | | | |
| Leakage flow at zero stroke (with operating pressure at outlet = $p_{max}$) | $q_{VL}$ | L/min | 2.7 | 1.9 | 4 | 2.5 | 5.3 | 3.2 | 6.5 | 4 | 8 | 5.3 | 11 | 7.3 | | | | |
| Operating pressure, absolute | | | | | | | | | | | | | | | | | | |
| – Inlet | $p_{min-max}$ | bar | 0.8 to 2.5 | | | | | | | | | | | | | | | |
| – Outlet [3] | $p_{max}$ | bar | 160 | 100 | 160 | 80 | 160 | 80 | 160 | 80 | 160 | 80 | 160 | 80 | | | | |
| – Leakage outlet | $p_{max}$ | bar | 2 | | | | | | | | | | | | | | | |
| Pressure fluid for use up to 160 bar (nominal pressure) | | | HLP mineral oil to DIN 51 524 part 2 | | | | | | | | | | | | | | | |
| **Special pressure fluids [4]** (only with ordering detail **„…K…"**) | | | | | | | | | | | | | | | | | | |
| – Up to operating pressure $p_{max}$ = 100 bar | | | HETG and HEES pressure fluids to VDMA 24 568 | | | | | | | | | | | | | | | |
| – Up to operating pressure $p_{max}$ = 80 bar | | | HLP mineral oil to DIN 51 524 part 2 (from 10 $mm^2/s$)<br>HL mineral oil DIN 51 524 part 1 | | | | | | | | | | | | | | | |
| Pressure fluid temperature range | $\vartheta$ | °C | – 10 to + 70, take the permitted viscosity range into account! | | | | | | | | | | | | | | | |
| Viscosity range | $\nu$ | $mm^2/s$ | 16 to 160 at operating temperature<br>Max. 800 when starting under displacement conditions<br>Max. 200 when starting under zero stroke conditions | | | | | | | | | | | | | | | |
| Degree of contamination | | | Max. permissible degree of contamination of the pressure fluid is to NAS 1638 class 9. We, therefore recommend a filter with a minimum retention rate of $\beta_{10}$ = 100. | | | | | | | | | | | | | | | |
| Weight (with pressure controller) | $m$ | kg | 12.5 | | 17 | | 21 | | 30 | | 37 | | 56 | | | | | |
| Change of flow (with one turn of the adjustment screw and $n$ = 1450 $min^{-1}$) | $q_V$ | L/min | 10 | | 14 | | 18 | | 25 | | 34 | | 46 | | | | | |

[1] Measured at $n$ = 1450 $min^{-1}$; $p = p_{max}$; $\nu$ = 41 $mm^2/s$

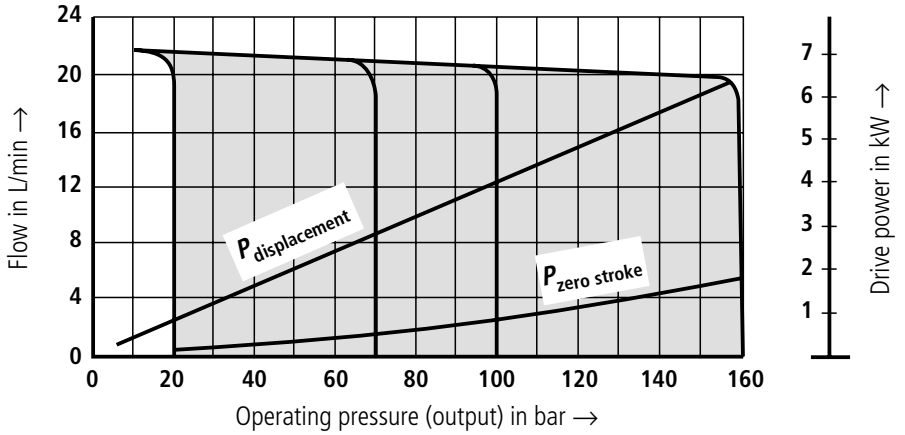
[2] The flow, due to manufacturing tolerances, can exceed the stated values by approx. 6 %
(measured at $n$ = 1450 $min^{-1}$; $p$ = 10 bar; $\nu$ = 41 $mm^2/s$).

[3] The minimum settable pressure is approx. 20 bar, as standard 30 bar is pre-set by the factory.

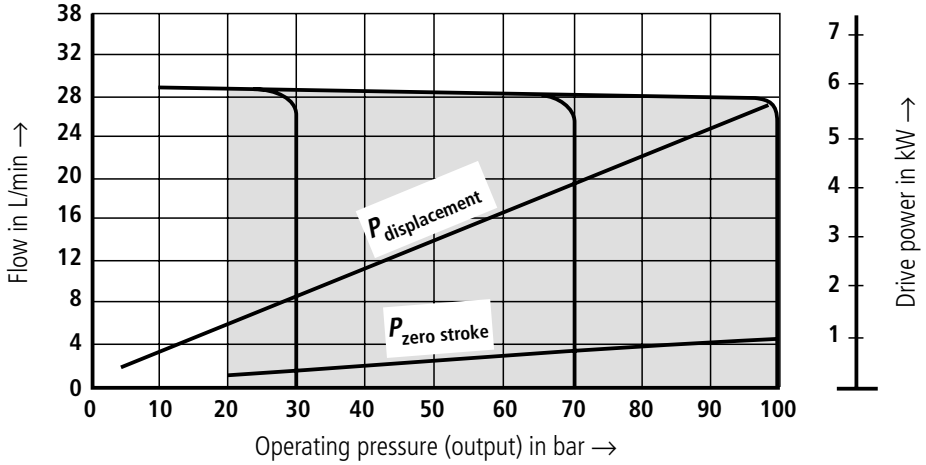
[4] Further special pressure fluids on request (e.g. for systems in the food processing industry or for fire resistant fluids)!

## **Characteristic curves** (measured at $n$ = 1450 min$^{-1}$, $\nu$ = 41 mm$^2$/s and $\vartheta$ = 50 °C)

**PV7/10-14**




**PV7/10-20**



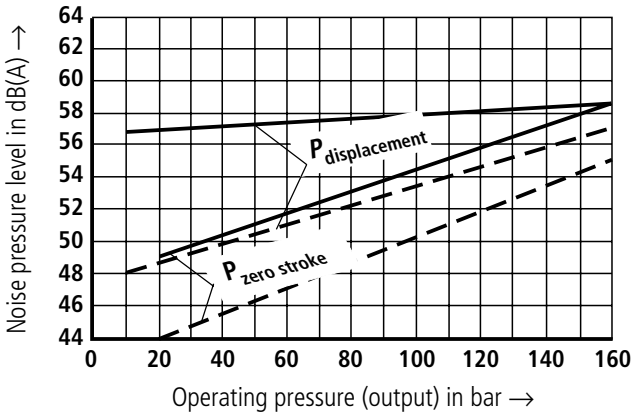

**Noise pressure level** measured in an anechoic chamber to DIN 45 635 part 26. Distance of microphone – pump = 1 m.

**When ordering please take into account!**

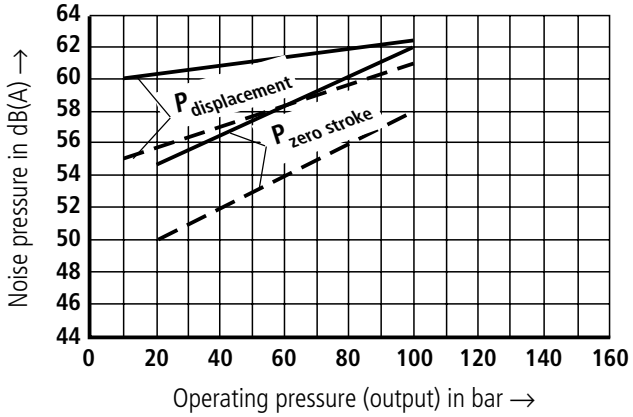
The pump adjustment is so carried out that the most favourable noise pressure level is relation to the largest zero stroke pressure is achieved. It is, therefore vital that the required zero stroke pressure is stated on an order when this differs from the nominal pressure.

Please take into account the engineering notes on page 30.

**PV7/10-14**




**PV7/10-20**

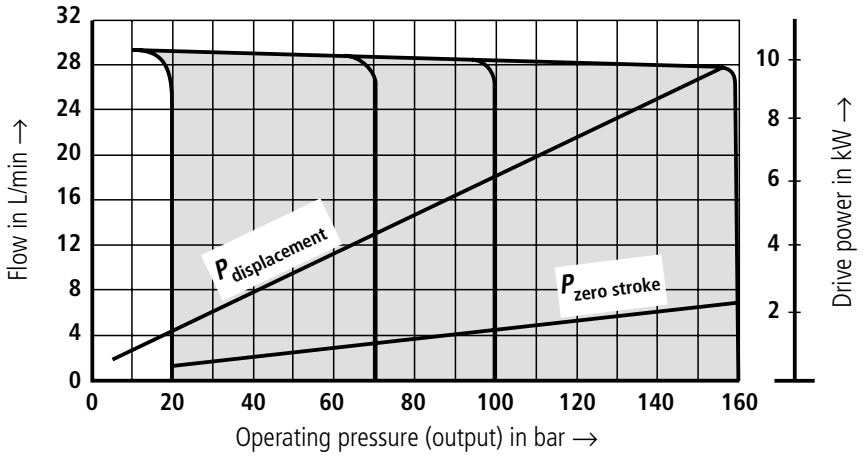



Drive RPM: ——— $n$ = 1450 min$^{-1}$

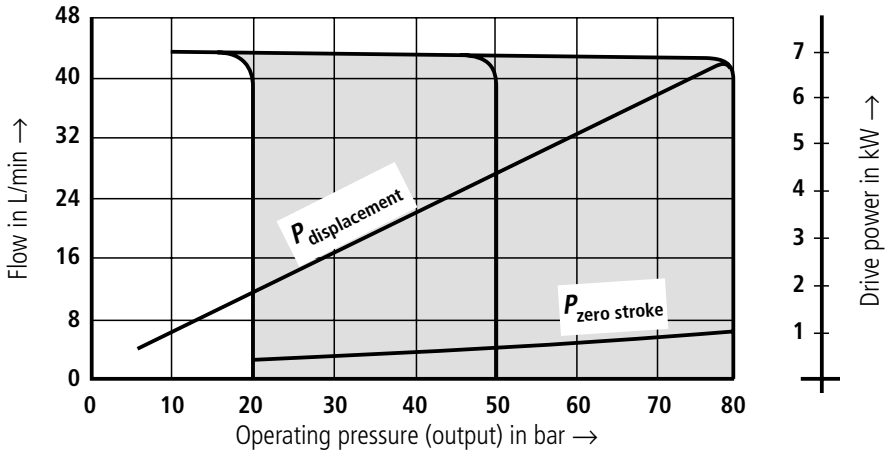
– – – $n$ = 1000 min$^{-1}$

## **Characteristic curves** (measured at $n = 1450\ min^{-1}$, $\nu = 41\ mm^2/s$ and $\vartheta = 50\ °C$)

**PV7/16-20**




**PV7/16-30**




**Noise pressure level** measured in an anechoic chamber to DIN 45 635 part 26. Distance of microphone – pump = 1 m.

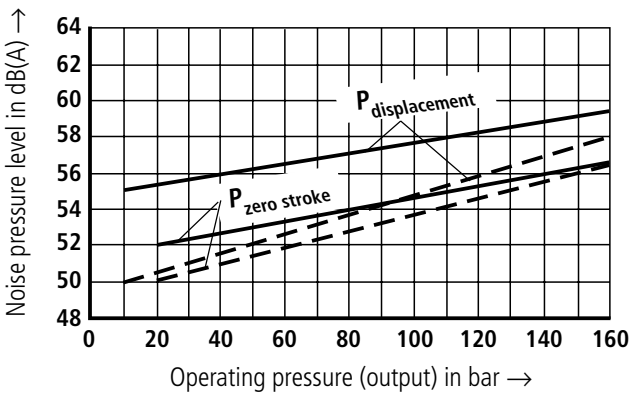
**When ordering please take into account!**

The pump adjustment is so carried out that the most favourable noise pressure level in relation to the largest zero stroke pressure is achieved.

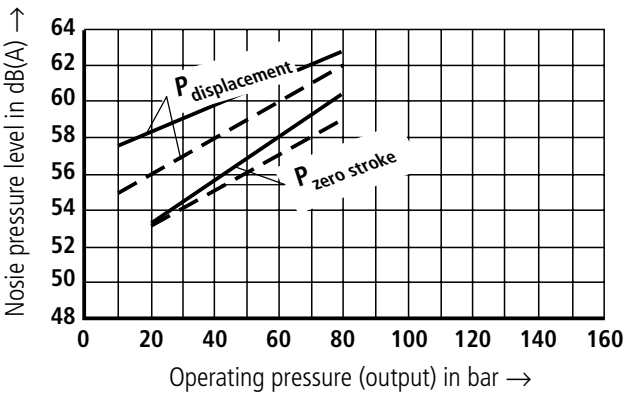
It is, therefore vital that the required zero stroke pressure is stated on an order when this differs from the nominal pressure.

Please take into account the engineering guidelines on page 30.

**PV7/16-20**




**PV7/16-30**

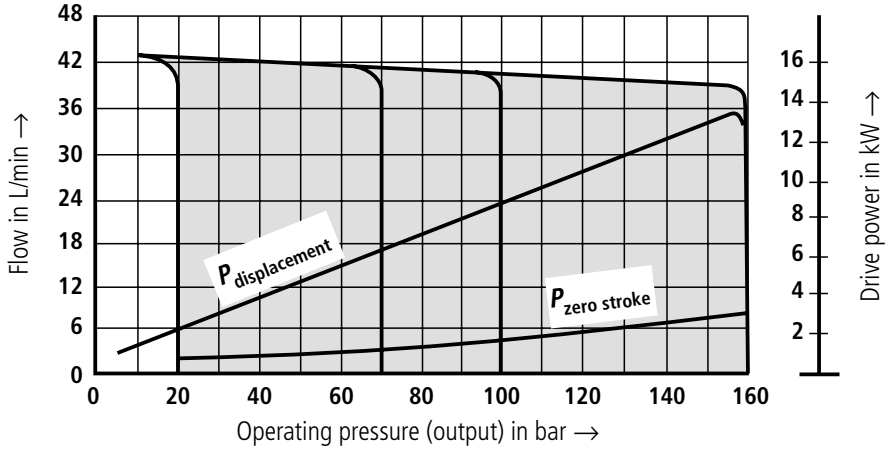



Drive RPM: —— $n = 1450\ min^{-1}$

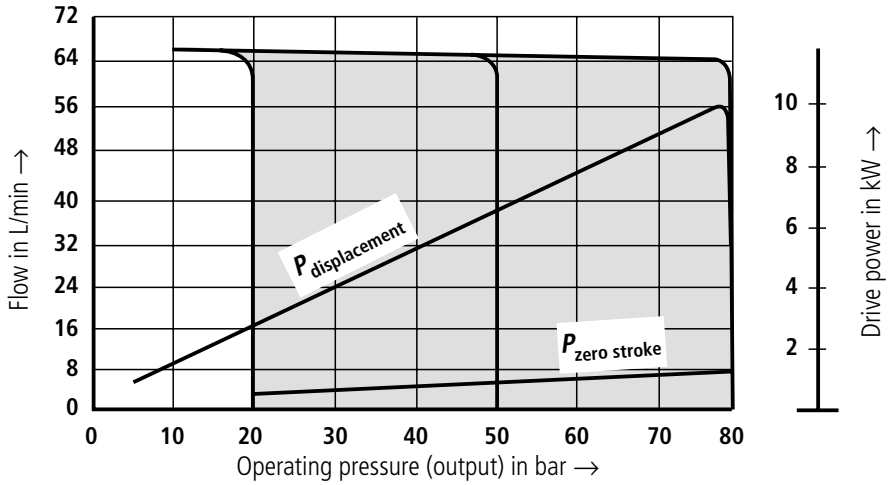
– – – $n = 1000\ min^{-1}$

## **Characteristic curves** (measured at $n$ = 1450 min$^{-1}$, $\nu$ = 41 mm$^2$/s and $\vartheta$ = 50 °C)

**PV7/25-30**




**PV7/25-45**




**Noise pressure level** measured in an anechoic chamber to DIN 45 635 part 26. Distance of microphone – pump = 1 m.

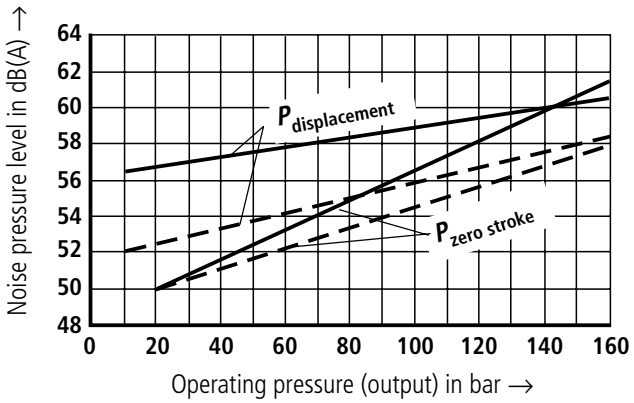
**When order please take into account!**

The pump adjustment is so carried out that the most favourable noise pressure level in relation to the largest zero stroke pressure is achieved.

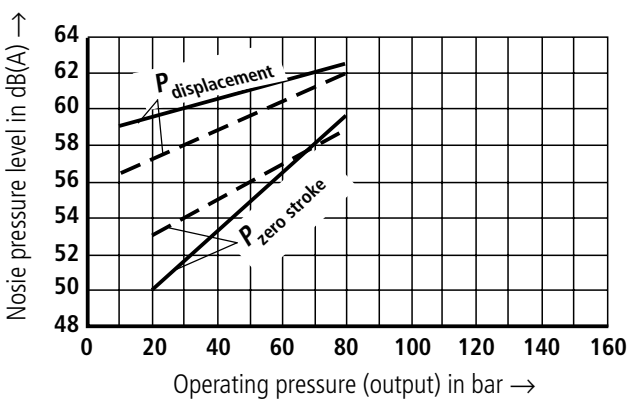
It is, therefore vital that the required zero stroke pressure is stated on an order when this differs from the nominal pressure.

Please take into account the engineering guidelines on page 30.

**PV7/25-30**




**PV7/25-45**

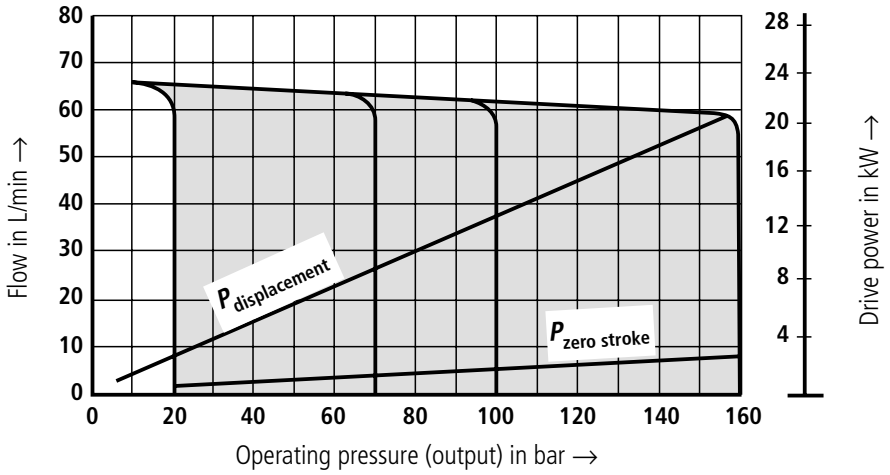



Drive RPM: —— $n$ = 1450 min$^{-1}$

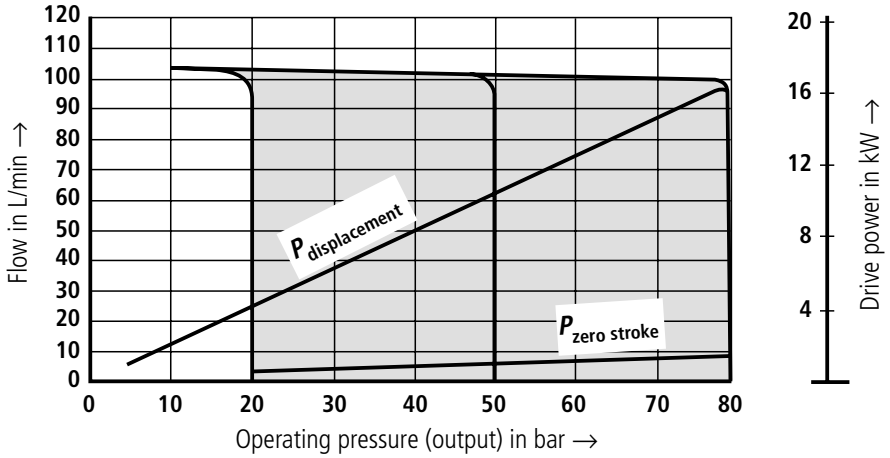
– – – $n$ = 1000 min$^{-1}$

## **Characteristic curves** (measured at $n = 1450\ min^{-1}$, $\nu = 41\ mm^2/s$ and $\vartheta = 50\ °C$)

**PV7/40-45**




**PV7/40-71**




**Noise pressure level** measured in an anechoic chamber to DIN 45 635 part 26. Distance of microphone – pump = 1 m.

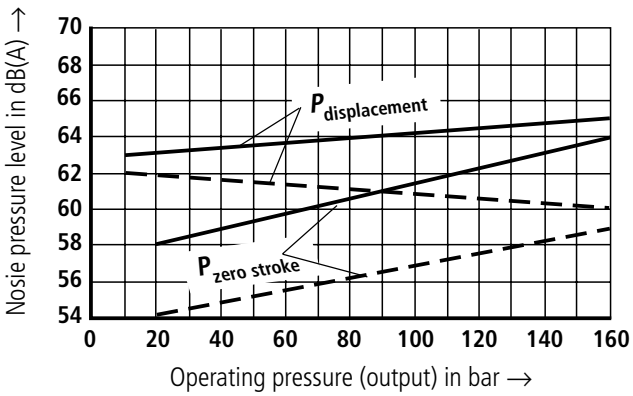
**When ordering please take into account!**

The pump adjustment is so carried out that the most favourable noise pressure level in relation to the largest zero stroke pressure is achieved.

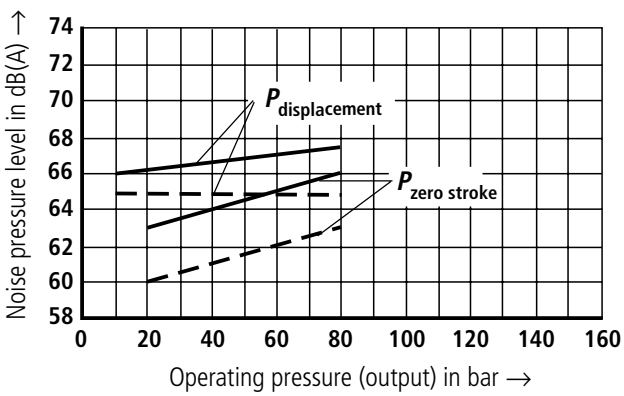
It is, therefore vital that the required zero stroke pressure is stated on an order when this differs from the nominal pressure.

Please take into account the engineering guidelines on page 30.

**PV7/40-45**




**PV7/40-71**

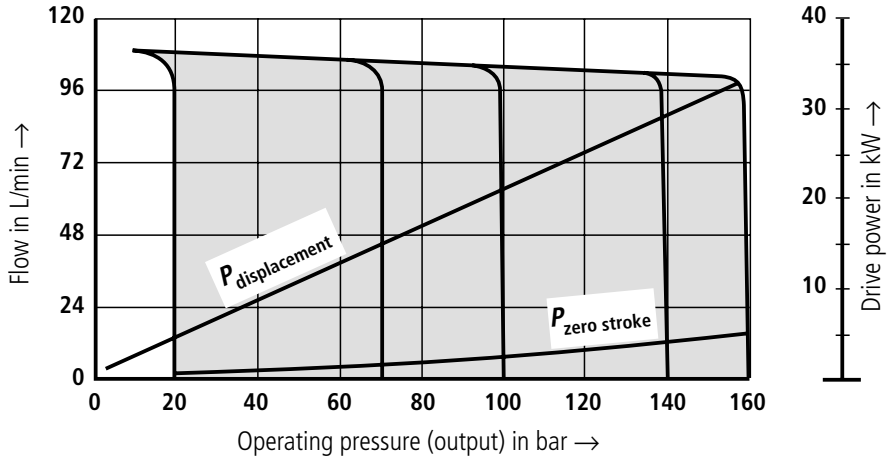



Drive RPM: —— $n = 1450\ min^{-1}$

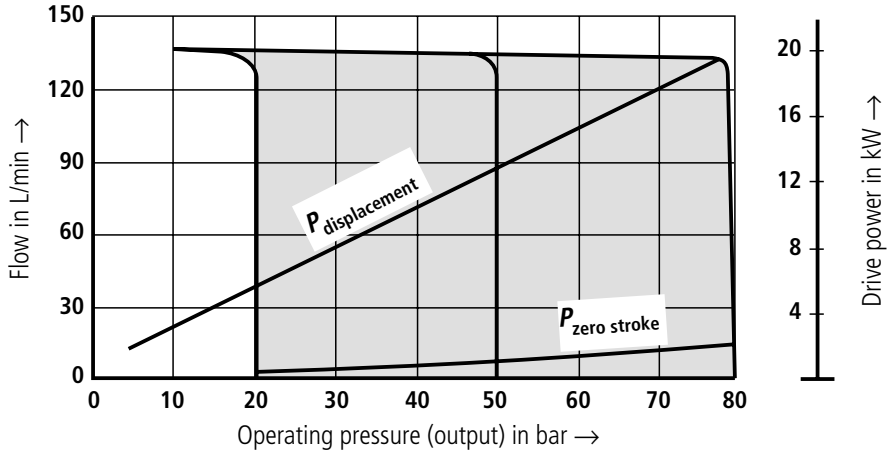
– – – $n = 1000\ min^{-1}$

## **Characteristic curves** (measured at $n$ = 1450 min$^{-1}$, $\nu$ = 41 mm$^2$/s and $\vartheta$ = 50 °C)

**PV7/63-71**




**PV7/63-94**



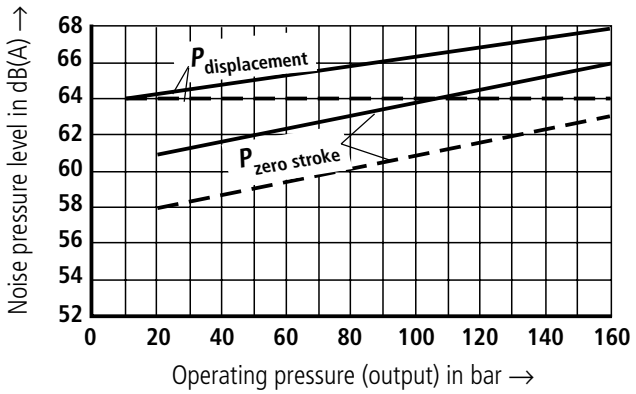

**Noise pressure level** measured in an anechoic chamber to DIN 45 635 part 26. Distance of microphone – pump = 1 m.

**When ordering please take into account!**

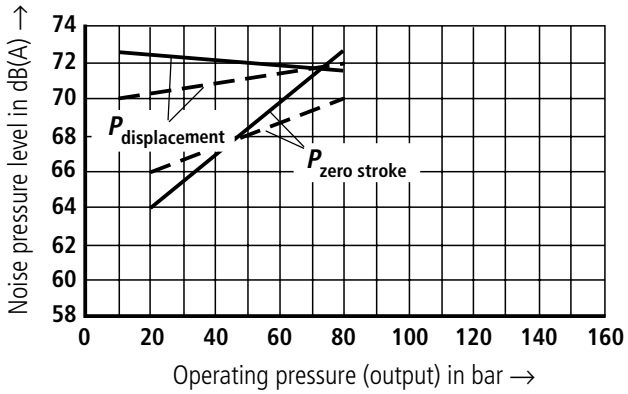
The pump adjustment is so carried out that the most favourable noise pressure level in relation to the largest zero stroke pressure is achieved. It is, therefore vital that the required zero stroke pressure is stated on an order when this differs from the nominal pressure.

Please take into account the engineering guidelines on page 30.

**PV7/63-71**




**PV7/63-94**

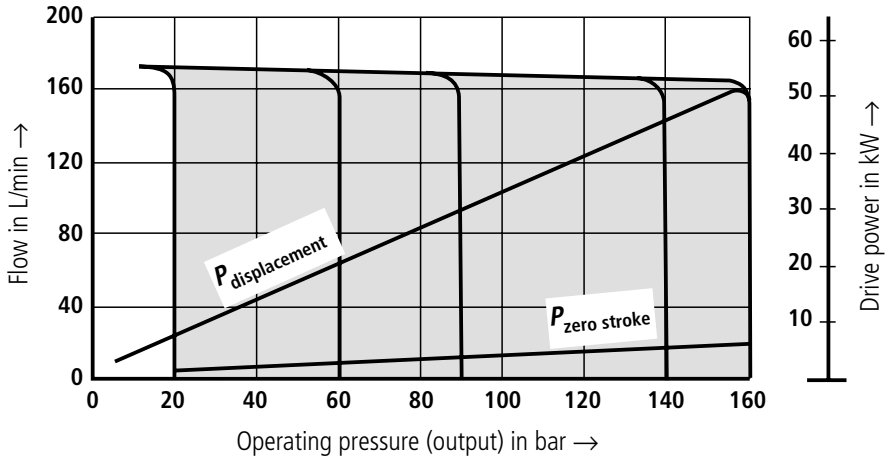



Drive RPM: —— $n$ = 1450 min$^{-1}$

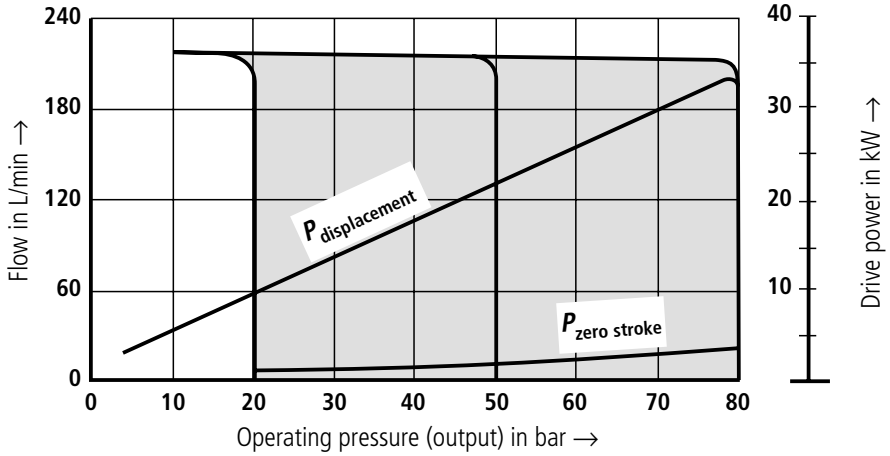
– – – $n$ = 1000 min$^{-1}$

## **Characteristic curves** (measured at $n$ = 1450 min$^{-1}$, $\nu$ = 41 mm$^2$/s and $\vartheta$ = 50 °C)

**PV7/100-118**




**PV7/100-150**




**Noise pressure level** measured in an anechoic chamber to DIN 45 635 part 26. Distance of microphone – pump = 1 m.

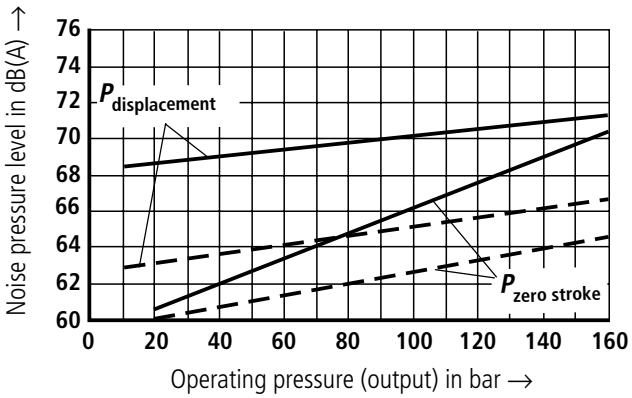
**When ordering please take into account!**

The pump adjustment is so carried out that the most favourable noise pressure level in relation to the largest zero stroke pressure is achieved.

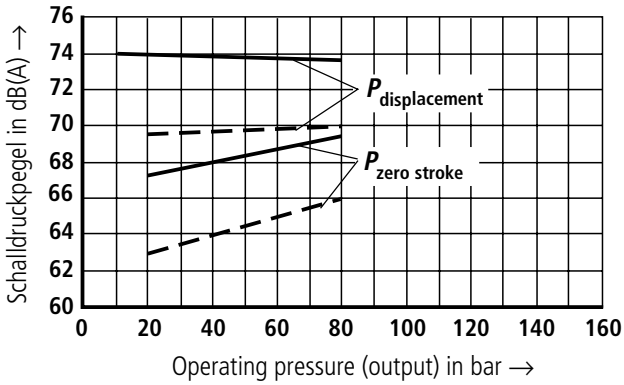
It is, therefore vital that the required zero stroke pressure is stated on an order when this differs from the nominal pressure.

Please take into account the engineering guidelines on page 30.

**PV7/100-118**



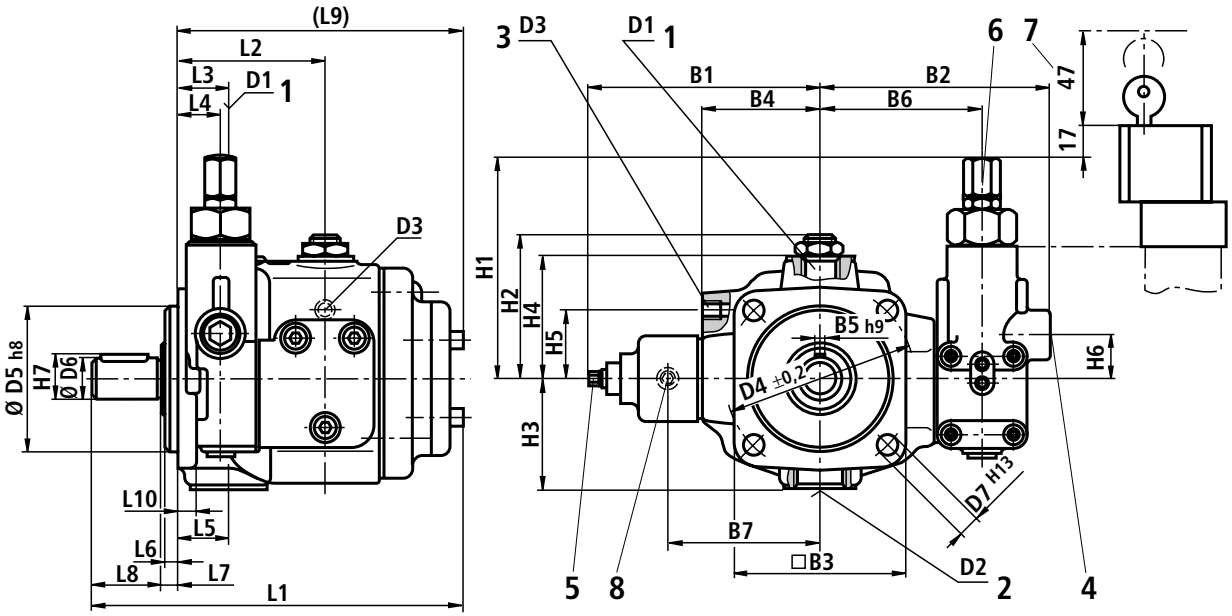

**PV7/100-150**




Drive RPM: —— $n$ = 1450 min$^{-1}$

– – – $n$ = 1000 min$^{-1}$

**Single pump with C-, D- and N-controller**




**1** Pressure port [1)]

**2** Suction port [2)]

**3** Leak-oil port

**4** For controller with hydraulic remote control
Ordering detail **…D…** and flow controller
Ordering detail **…N…**, plug G 1/4, 12 deep

**5** Flow adjustment
Adjustment guidelines:
– Flow decreases when turned in a clockwise direction
– and increases when turned in an anti-clockwise direction
(see page 5)
– The set flow should not be less than 50 % of the maximum value

**6** Pressure controller
Adjustment guidelines:
– The operating pressure increases when turned in a clockwise direction
– and decreases when turned in an anti-clockwise direction

☞ **Note:** The zero stroke pressure changes by approx. 19 bar for 1 turn of the adjustment screw.

**7** The space required to remove the lock cover (the pressure can only be adjusted when the lock cover is removed)

**8** Test point G 1/4, 12 deep

| BS | L1 | L2 | L3 | L4 | L5 | L6 | L7 | L8 | L9 | L10 | B1 | B2 | □B3 | B4 | B5 $_{h9}$ | B6 | B7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **10** | 193 | 78.5 | 26 | 22 | 26 | 7 | 8 | 36 | 149 | 9 | 130 | 125 | 96 | 65 | 6 | 90 | 88 |
| **16** | 217 | 86 | 37 | 20 | 37 | 9 | 10 | 42 | 165 | 10 | 134.5 | 131 | 120 | 69 | 8 | 93 | 92 |
| **25** | 229 | 86 | 34 | 20 | 38 | 9 | 10 | 42 | 177 | 10 | 140.7 | 137 | 120 | 75 | 8 | 99 | 98 |
| **40** | 254,6 | 86 | 26.5 | 21.5 | 43 | 9 | 10 | 58 | 186.6 | 12 | 157.8 | 161 | 141.2 | 94 | 10 | 125 | 115.5 |
| **63** | 279 | 99 | 39 | 34.5 | 51 | 9 | 10 | 58 | 211 | 13 | 163.7 | 165 | 141.2 | 100 | 10 | 130 | 121 |
| **100** | 334 | 111 | 45.5 | 28.5 | 60.5 | 9 | 10 | 82 | 242 | 16 | 191.7 | 184.5 | 200 | 121 | 12 | 149.5 | 150 |

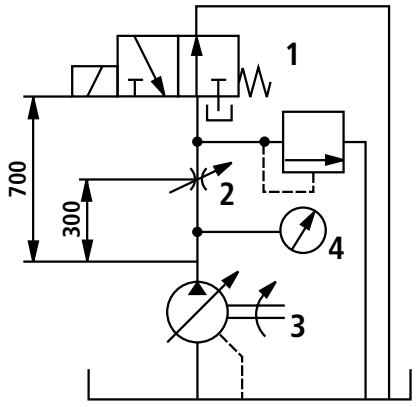
| BS | H1 | H2 | H3 | H4 | H5 | H6 | H7 | D1 [1)] | D2 [2)] | D3 | D4 $_{\pm 0,2}$ | Ø D5 $_{h8}$ | Ø D6 | D7 $^{H13}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **10** | 117 | 74 | 58 | 64 | 37 | 25 | 22.5 | G 1/2 | G 1 | G 1/4 | 103 | 80 | 20 $_{j6}$ | 9 |
| **16** | 118.5 | 81.5 | 68 | 72 | 40 | 26.5 | 28 | G 3/4 | G 1 1/4 | G 3/8 | 125 | 100 | 25 $_{j6}$ | 11 |
| **25** | 118.5 | 91.5 | 92 | 80 | 40 | 26.5 | 28 | G 1 | G 1 1/2 | G 3/8 | 125 | 100 | 25 $_{j6}$ | 11 |
| **40** | 118 | 105.5 | 89 | 94 | 45 | 26 | 35 | G 1 | SAE 1 1/2" | G 1/2 | 160 | 125 | 32 $_{k6}$ | 14 |
| **63** | 118 | 111.5 | 105 | 100 | 47 | 26 | 35 | SAE 1 1/4" | SAE 2" | G 1/2 | 160 | 125 | 32 $_{k6}$ | 14 |
| **100** | 118 | 123.5 | 126 | 111 | 52 | 26 | 43 | SAE 1 1/2" | SAE 2 1/2" | G 3/4 | 200 | 160 | 40 $_{k6}$ | 18 |

**1)** Build sizes 10, 16, 25 and 40
Pipe thread „G…" to ISO 228/1
Build sizes 63 and 100 flange connection to SAE

**2)** Build sizes 10, 16 and 25
Pipe thread „G…" to ISO 228/1
Build sizes 40, 63 and 100 flange connection to SAE

## Dynamic charateristics of the pressure control

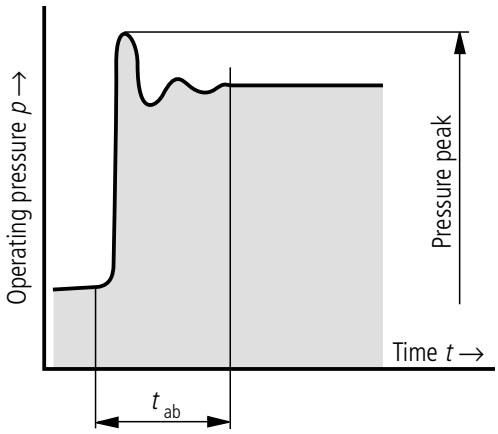
**Test set-up**




**1** Directional valve (switching time 30 ms)
**2** Throttle for adjusting the pressure when the pump is displacing
**3** Hydraulic pump
**4** Pressure measurement point

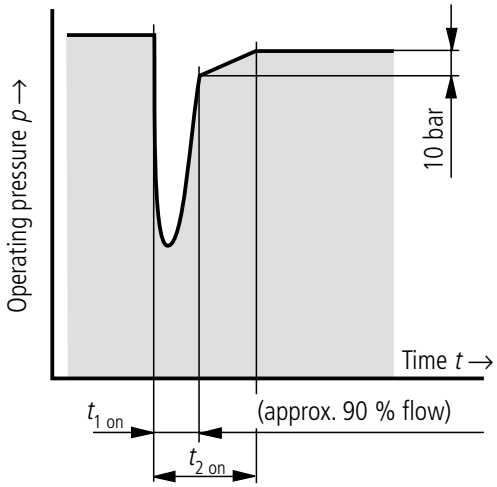
**Off-stroke**

$q_{V\ displacement} \rightarrow q_{V\ zero\ stroke}$




**On-stroke**

$q_{V\ zero\ stroke} \rightarrow q_{V\ displacement}$




| | Control times | Off-stroke in ms (average values) $q_{V\ displacement} \rightarrow q_{V\ zero\ stroke}$ | | | | | | On-stroke in ms (average values) $q_{V\ zero\ stroke} \rightarrow q_{V\ displacement}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 20 → 160 bar | | 20 → 80 bar | | 20 → 40 bar | | 160 → 130 bar | | 80 → 60 bar | | 40 → 30 bar | |
| | | $t_{off}$ | $p_{max}$ [1] | $t_{off}$ | $p_{max}$ | $t_{off}$ | $p_{max}$ | $t_{1\ on}$ | $t_{2\ on}$ | $t_{1\ on}$ | $t_{2\ on}$ | $t_{1\ on}$ | $t_{2\ on}$ |
| Build and nominal sizes | 10-14 | 100 | 180 | – | – | 150 | 80 | 60 | 80 | – | – | 60 | 80 |
| | 10-20 | – | – | 100 | 130 | 150 | 100 | – | – | 60 | 80 | 50 | 100 |
| | 16-20 | 100 | 200 | – | – | 120 | 100 | 50 | 80 | – | – | 50 | 90 |
| | 16-30 | – | – | 100 | 140 | 150 | 110 | – | – | 50 | 80 | 50 | 100 |
| | 25-30 | 100 | 220 | – | – | 120 | 120 | 80 | 100 | – | – | 70 | 100 |
| | 25-45 | – | – | 100 | 150 | 120 | 120 | – | – | 80 | 100 | 80 | 130 |
| | 40-45 | 100 | 240 | – | – | 120 | 140 | 70 | 100 | – | – | 60 | 100 |
| | 40-71 | – | – | 100 | 180 | 120 | 150 | – | – | 80 | 100 | 80 | 140 |
| | 63-71 | 150 | 220 [2] | – | – | 150 | 180 | 80 | 120 | – | – | 100 | 140 |
| | 63-94 | – | – | 200 | 150 [2] | 220 | 150 | – | – | 120 | 150 | 130 | 210 |
| | 100-118 | 200 | 220 [2] | – | – | 250 | 200 | 100 | 150 | – | – | 150 | 250 |
| | 100-150 | – | – | 250 | 150 [2] | 280 | 150 | – | – | 150 | 200 | 180 | 280 |

[1] Permissible pressure peaks

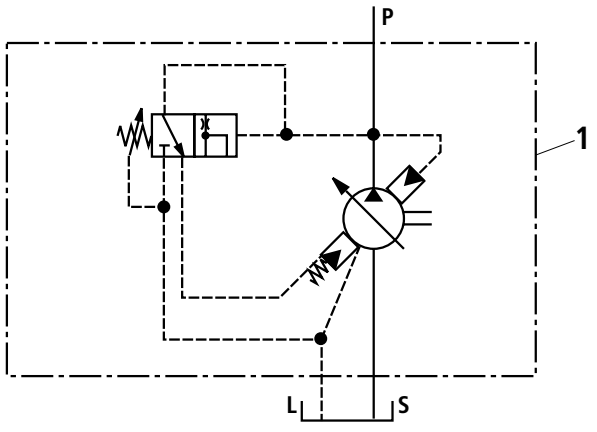
[2] Pressure relief valve is required to limit pressure peaks

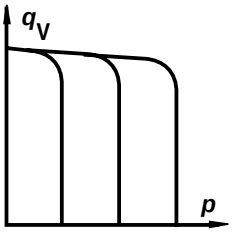
### C-controller

**Pressure controller**

With mechanical pressure adjustment, ordering detail **…C0-…**
(for the lockable version the ordering detail is **…C3-…**)

**Symbol**




**Ordering example:**

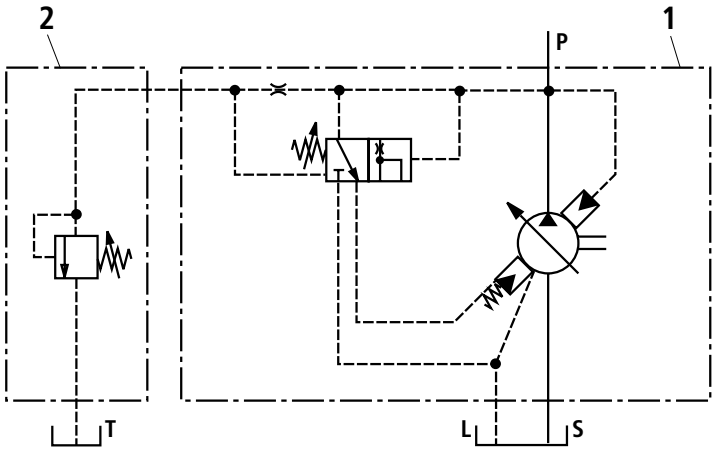
**1** Pump: PV7-1X/16-20RE01MC0-16
or PV7-1X/63-94RE07MC0-08

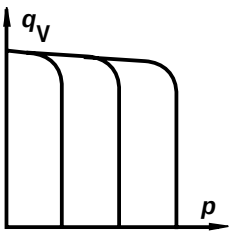
### D-controller

**Pressure controller**

With hydraulic remote pressure adjustment, ordering detail **…D0-…**
(for the lockable version the ordering detail is **…D3-…**)

**Symbol**




**Ordering example:**

**1** Pump: PV7-1X/25-45RE01MD0-08

**2** Optional pressure relief valve; must be ordered separately

The remote control line between the controller and pressure relief valve (2) should not be longer than 2 m.

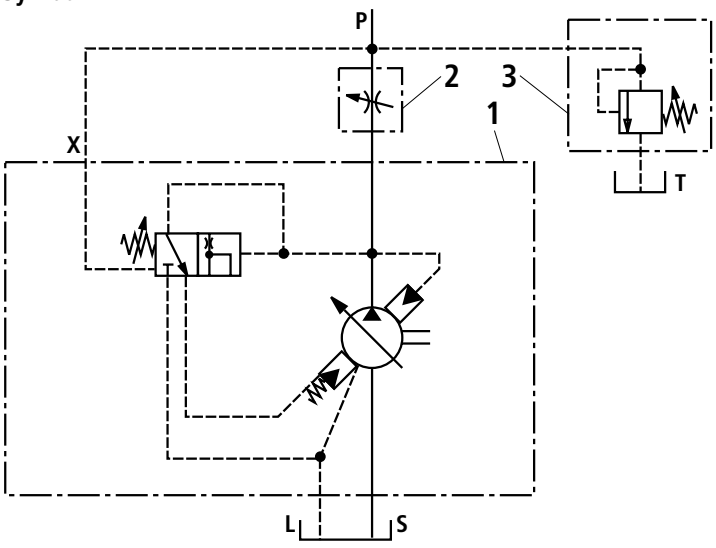
**Note:** The zero stroke pressure results from the pressure set at the pump and pressure relief valve. The remote control port must not be plugged as the pump will not de-stroke!

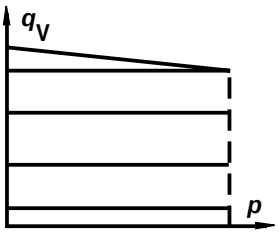
### N-controller

**Flow controller**

With mechanical flow adjustment, ordering detail **…N0-…**
(for the lockable version the ordering code is **…N3-…**)

**Symbol**




**Ordering example:**

**1** Pump: PV7-1X/16-20RE01MN0-16
or PV7-1X/63-94RE07MN3-08

**2** Optional orifice (e.g. throttle to RE 27 219)

**3** Optional pressure relief valve
(this valve is necessary as, in this case, there is no control to zero stroke)

Items 2 and 3 must be ordered separately.

The control lines between the controller connection „X" and the measurement orifice should not be longer than 1.5 m.

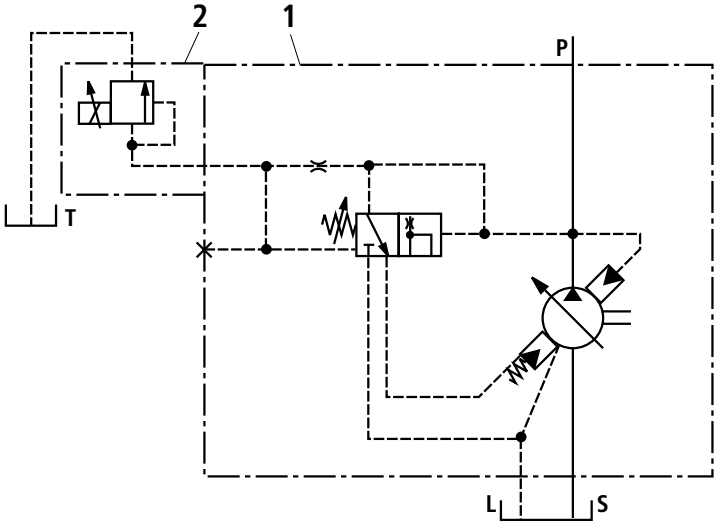
Pressure differential: approx. 13 bar

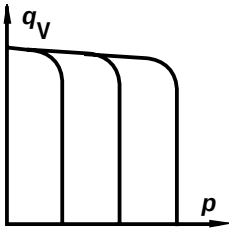
### E-controller (on request)

**Pressure controller**

With electrical remote pressure adjustment, ordering detail **…E0-…**

**Symbol**




**Ordering example:**

**1** Pump: PV7-1X/16-20RE01ME0-16

**2** Pressure relief valve

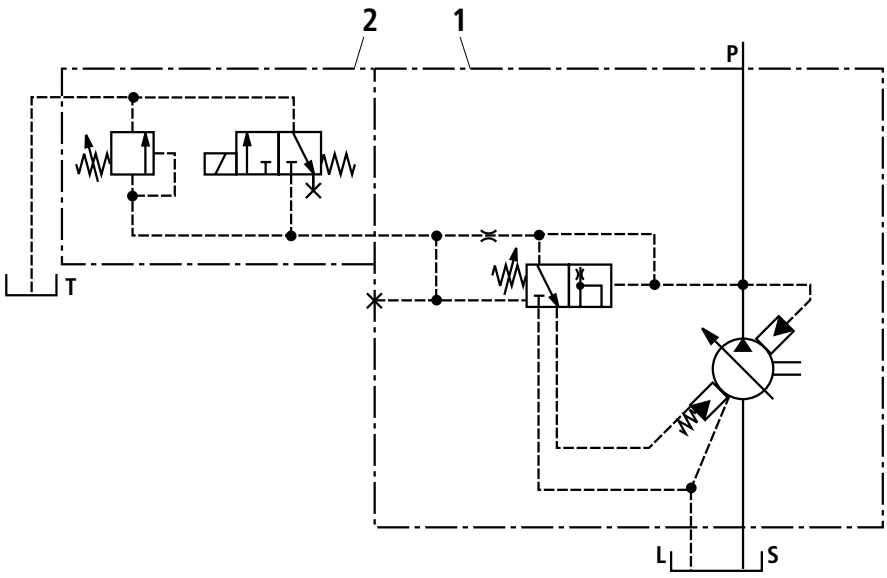
## Controller programme

**W-controller**

**Pressure controller**

With an electrically switchable 2-stage pressure control
Ordering detail **…W0-…**

**Symbol**

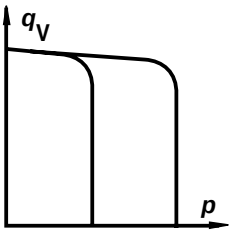



**Ordering example:**

**1** Pump: PV7-1X/16-20RE01MW0-16

**2.1** 3/2-way cartridge valve to RE 23 140, optionally normally open or normally closed

**2.2** Pressure relief valve to RE 25 710



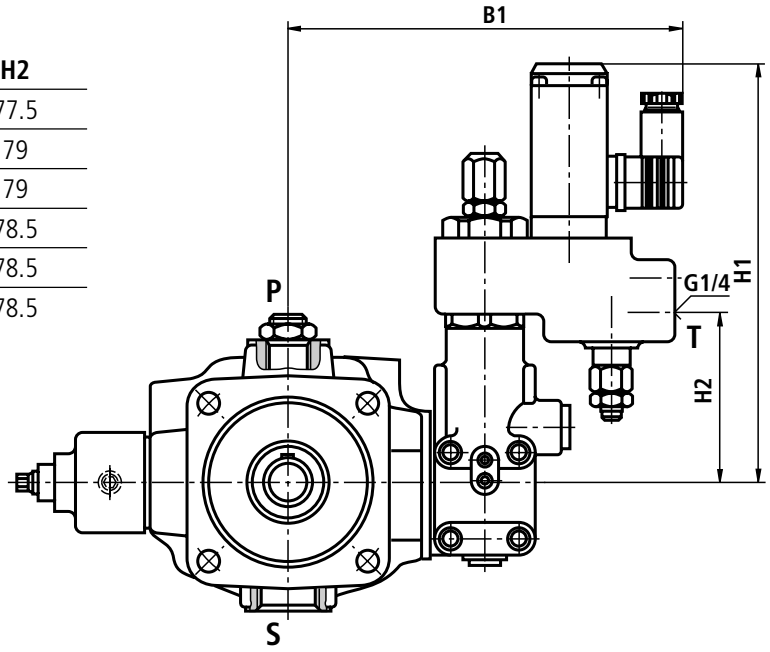

## Unit dimensions

(Dimensions in mm)

**W-controller**

For further unit dimensions see page 12.

| Build size | B1 | H1 | H2 |
|---|---|---|---|
| **10** | 189 | 187.5 | 77.5 |
| **16** | 192 | 189 | 79 |
| **25** | 198 | 189 | 79 |
| **40** | 224 | 188.5 | 78.5 |
| **63** | 229 | 188.5 | 78.5 |
| **100** | 248.5 | 188.5 | 78.5 |

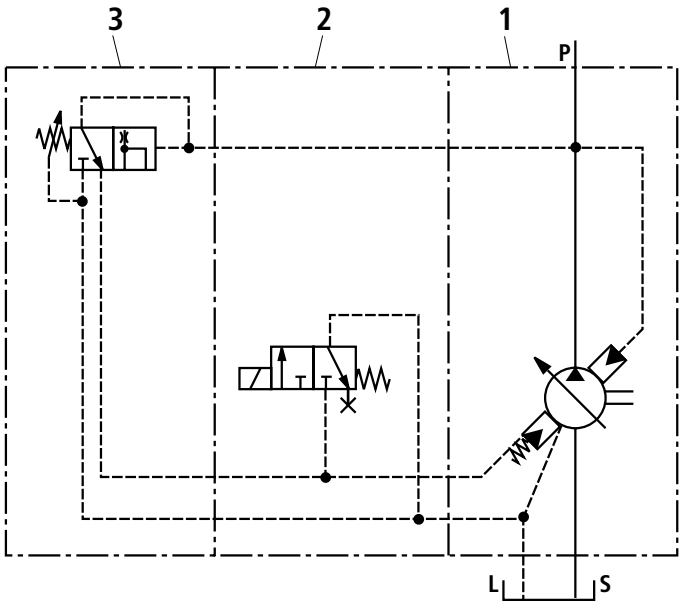


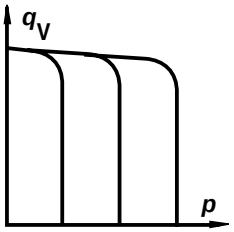
## Controller programme

**Hydraulic start-up assistance (K-plate)**
**Sandwich plate**
With an unloading valve for start-up at the lowest zero stroke pressure.
Zero stroke pressure is approx. 20 bar (application dependent)
Ordering detail **…5-…**
(for the lockable version the ordering detail is **…7-…**)

☞ **Note:** Not suitable for a 2-stage control!

**Symbol**




**Ordering example:**

**1** Pump: PV7-1X/40-71RE37MC5-08

**2** 3/2-cartridge valve to RE 23 140
optionally
Normally closed:
Ordering detail: …WG or
Normally open:
Ordering detail: …WH or separate
Shown is type …WG

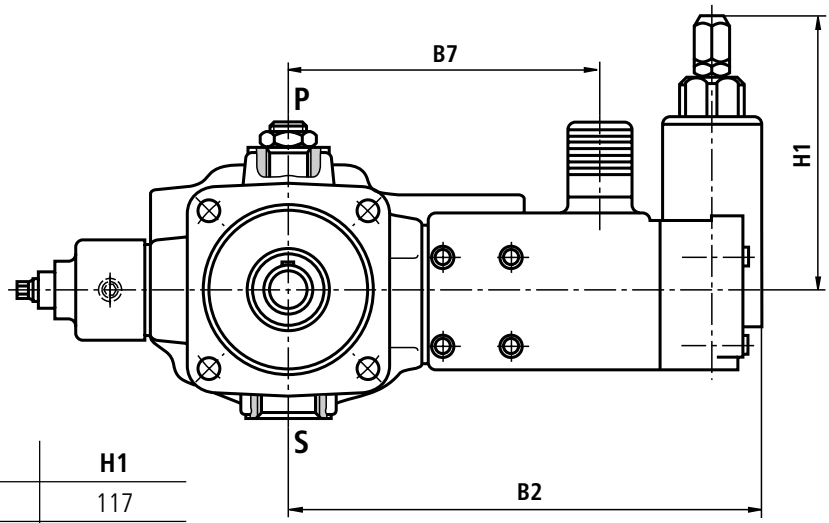
**3** Optionally C-, D- or N-controller

## Unit dimensions

(Dimensions in mm)

**K-plate**

For further unit dimensions see page 12.

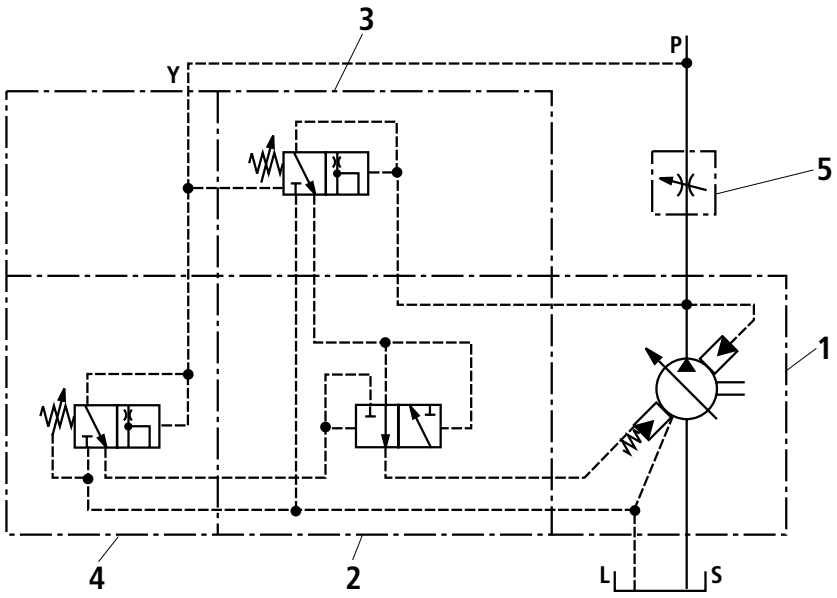


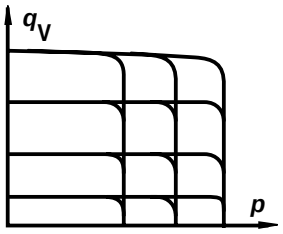

| Build size | B2 | B7 | H1 |
|---|---|---|---|
| **10** | 204.5 | 143.5 | 117 |
| **16** | 207.5 | 146.5 | 118 |
| **25** | 214 | 153 | 118 |
| **40** | 240 | 179 | 118 |
| **63** | 244.5 | 183.5 | 118 |
| **100** | 264 | 203 | 118 |

## Controller programme

**Flow-pressure controller (Q-plate)**
**Sandwich plate**
For connecting a flow controller to a pressure compensated pump.
Fitted with a standard flow controller
Ordering detail **…6-…**
(for the lockable version the ordering detail is **…8-…**)

**Symbol**




**Ordering example:**

**1** Pump: PV7-1X/63-712RE07MC6-16

**2** Sandwich plate for connecting the pressure controller and flow controller functions

**3** Flow controller as described on page 14

**4** Pressure controller optionally types C, D, E or W as described on pages 14 and 15

**5** Optional measurement orifice (e.g. throttle to RE 27 219), must be ordered separately

The control line between the controller connection „Y" and the measurement orifice should not be longer than 1.5 m.

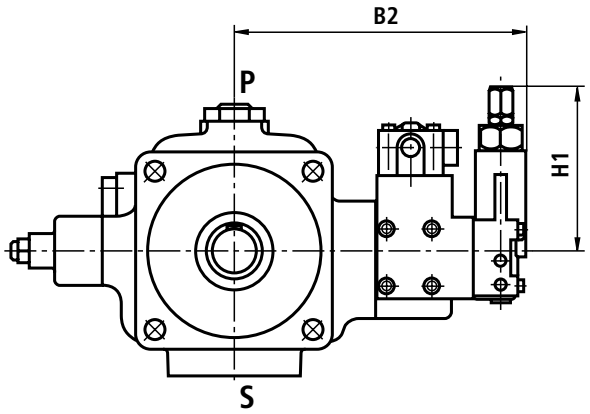
## Unit dimensions

(Dimensions in mm)

**Q-plate**

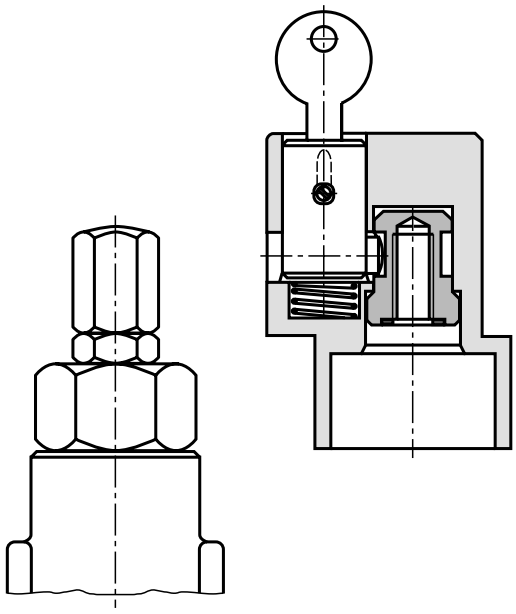
For further unit dimensions see page 12.

| Build size | B2 | H1 |
|---|---|---|
| **10** | 173.5 | 117 |
| **16** | 176.5 | 118.5 |
| **25** | 182.5 | 118.5 |
| **40** | 208.5 | 118 |
| **63** | 213.5 | 118 |
| **100** | 233 | 118 |



## Lock

**Material No.: 00844598**
This lock is fitted to all pumps which have the controller option **…3…, …7…** or **…8….**



**Functional description**
After unlocking (by turning the key clockwise) the enire lock cover can be removed from the control. The control adjuster is then accessible.

To lock, the lock cover is placed over the control adjuster and then pressed home, the lock cylinder is pressed down and the key turned in an anti-clockwise direction.

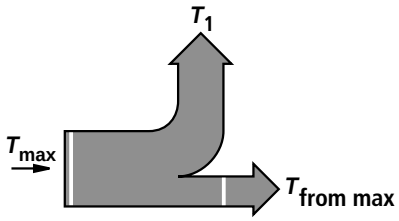
**A lock can be fitted to a standard pump by,**

- Unscrewing the domed nut from the control adjuster.
- Fitting the nut which contains the lock.
- Fitting the lock cover as described in the functional description.

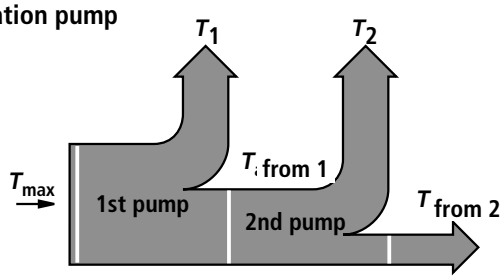
## Engineering guidelines for combination pumps

- The PV7 pumps are, as standard, capable of being combined. Each pump is fitted with a splined second shaft end.
- When operating the PV7 pump, as a fixed displacement unit, the fixed displacement unit must be the rear pump.
- The general technical data is the same as with the single pumps (see page 5).
- The pump with the higher load (pressure x flow) should be the first pump stage.
- When combining several pumps, the torques produced can reach excessively high values.
  The sum of the torques must not exceed the permissible values (see table)
- Combination parts have to be a separate item on an order.
- The necessary seals and screws are included in the combination kit.

**Single pump**




**Combination pump**




| PV7 Build size | Max. permissible Drive torque $T_{max}$ | Output torque $T_{from\ max}$ |
|---|---|---|
| 10 | 90 | 45 |
| 16 | 140 | 70 |
| 25 | 180 | 90 |
| 40 | 280 | 140 |
| 63 | 440 | 220 |
| 100 | 680 | 340 |

**Calculation exaple:**

| | | |
|---|---|---|
| $V$ | = | Displacement in in cm³ |
| $\eta_{hydr.\text{-}mech.}$ | = | Hydraulic-mechanical efficiency |
| $T$ | = | Torque in Nm |
| $\Delta p$ | = | Pressure in bar |

Combination pump: P2V7/25-30… + V7/25-30…
Required max. pressure: $p_n$ = 160 bar

$$T = \frac{\Delta p \bullet V \bullet 0.0159}{\eta_{hydr.\text{-}mech.}} \text{ (Nm)}$$

$$T_{1.2} = \frac{160 \bullet 30 \bullet 0.0159}{0.85} \text{ (Nm)}$$

$T_{1.2} = 90\ \text{Nm} \leq T_{from\ max}$

$T = T_1 + T_2 = 180\ \text{Nm} \leq T_{max}$

**The combination pump can be operated on the basis of the calculated data.**

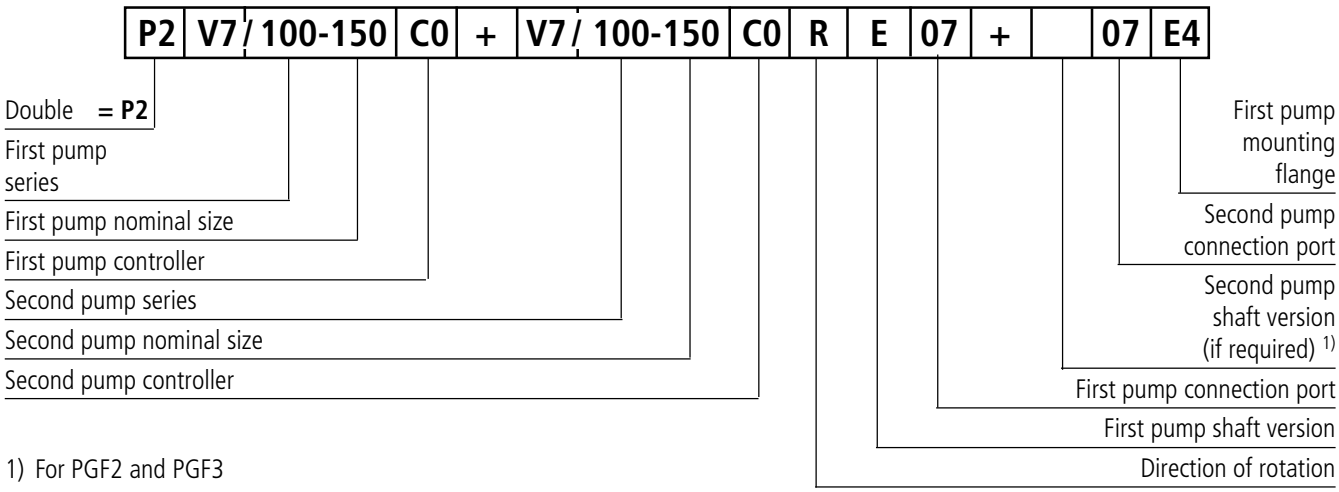
## Combination pump possiblities

All of the type PV7 pumps are capable of being combined. Pumps with an E-shaft have a through drive.

The possible pump combinations, the Material Nos. and the required combination kits are contained within the following table.

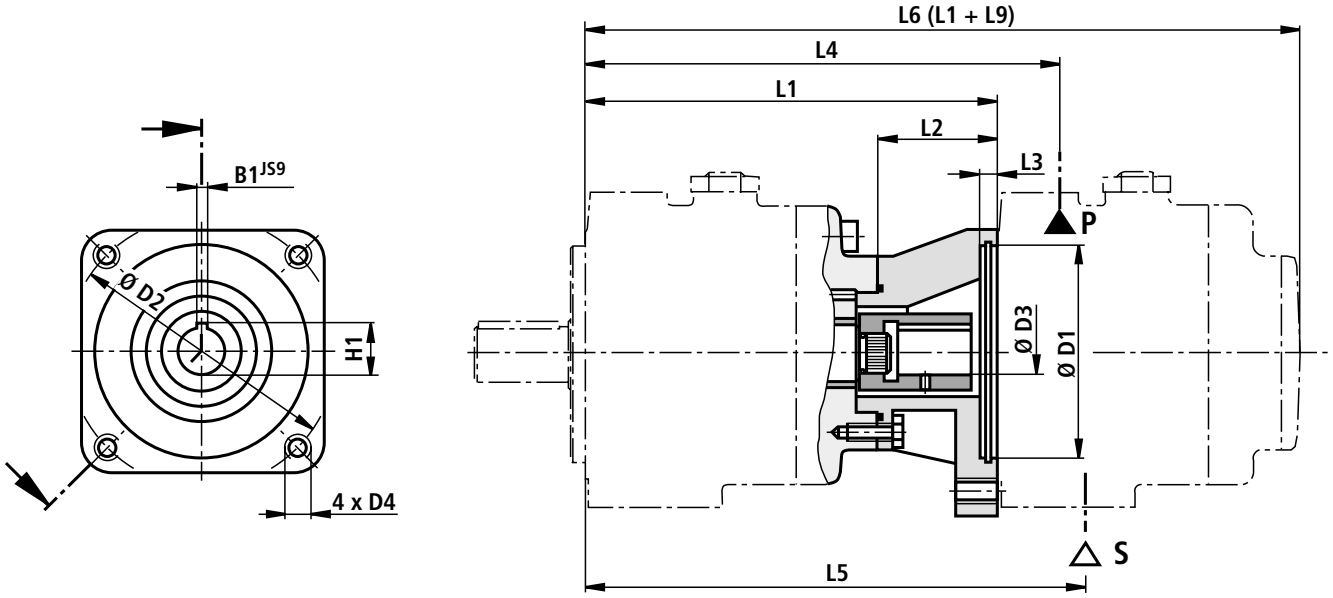
| Rear pump | Front pump | | | |
|---|---|---|---|---|
| | PV7-1X/**10** | PV7-1X/**16/25** | PV7-1X/**40/63** | PV7-1X/**100** |
| PV7-1X/06-…RA01M… | 00540811 | 00540812 | 00540814 | 00543034 |
| PV7-1X/10-…RE01M… | 00540811 | 00540812 | 00540814 | 00543034 |
| PV7-1X/16-…RE01M… | – | 00540813 | 00540815 | 00543035 |
| PV7-2X/20-…RA01M… | – | 00540813 | 00540815 | 00543035 |
| PV7-1X/25-…RE01M… | – | 00540813 | 00540815 | 00543035 |
| PV7-1X/40-…RE37M… | – | – | 00540816 | 00543036 |
| PV7-1X/63-…RE07M… | – | – | 00540816 | 00543036 |
| PV7-1X/100-…RE07M… | – | – | – | 00543037 |
| PGF1-2X/…RH01VU2 | 00857584 | 00857585 | – | – |
| PGF2-2X/…RJ…VU2 | 00541209 | 00541210 | 00541203 | 00544959 |
| PGF3-3X/…RJ…VU2 | – | 00888267 | 00880623 | 00880624 |
| PGP2-2X/…RJ20VU2 | 00541209 | 00541210 | – | 00544959 |
| PGP3-3X/…RJ…VU2 | – | 00888267 | 00880623 | 00880624 |
| PGH2-2X/…RR…VU2 | 00541209 | 00541210 | 00541203 | 00544959 |
| PGH3-2X/…RR…VU2 | 00541209 | 00541210 | 00541203 | 00544959 |
| PGH4-2X/…RR…VU2 | – | – | 00876578 | 00876576 |
| PVV/Q1/2-1X/…RJ15… | – | 00888267 | 00880623 | 00880624 |
| PVV/Q4/5-1X/…RJ15… | – | – | 00876023 | 00875983 |
| 1PF2G2-4X/…RR20MR | 00541209 | 00541210 | 00541203 | 00544959 |
| 1PF1R4-1X/0,40…2,00-…WG… | 00541204 | 00541205 | – | – |
| 1PF1R4-1X/1,60…20,00-…RG… | 00541214 | – | – | – |
| 1PF1R4-1X/1,60…20,00-…RA… | – | 00541207 | 00541208 | 00543767 |
| A10VSO10…U | 00541209 | 00541210 | 00541203 | 00544959 |
| A10VSO18…U | 00541209 | 00541210 | 00541203 | 00544959 |
| A10VO28…S | – | 00888267 | 00880623 | 00880624 |
| A10VO45…S | – | – | – | 00875983 |

## Ordering details for combination pumps



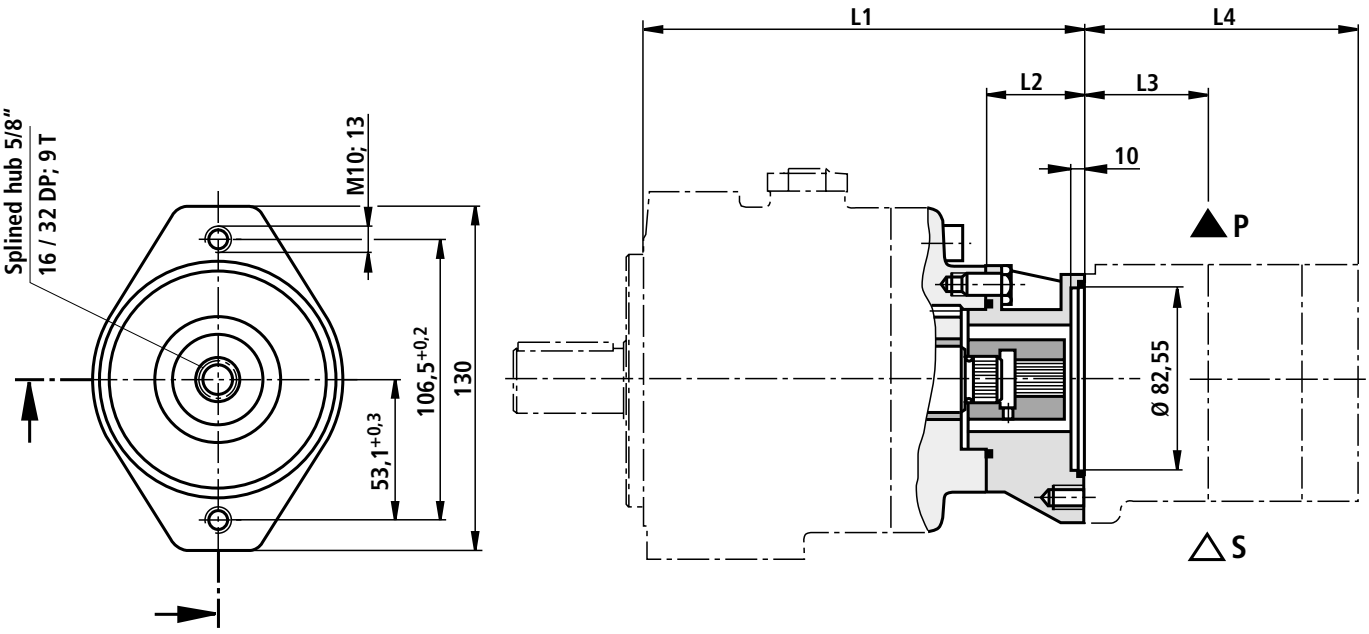

1) For PGF2 and PGF3

Triple and quadruple pumps are coded analogue!




| 1st pump BS | 2nd pump BS | L1 | L2 | L3 | ØD1 | ØD2 | ØD3 | D4 | H1 | B1 | L4 | L5 | L6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 06 | 182 | 50 | 8 | 80 | 103 | 20 | M8 | 22.8 | 6 | 199 | 202.5 | 283 |
| | 10 | 182 | 50 | 8 | 80 | 103 | 20 | M8 | 22.8 | 6 | 208 | 208 | 331 |
| 16 | 06 | 200 | 55 | 8 | 80 | 103 | 20 | M8 | 22.8 | 6 | 217 | 220.5 | 301 |
| | 10 | 200 | 55 | 8 | 80 | 103 | 20 | M8 | 22.8 | 6 | 226 | 226 | 349 |
| | 16 | 208 | 63 | 10 | 100 | 125 | 25 | M10 | 28.3 | 8 | 245 | 245 | 373 |
| 25 | 06 | 212 | 55 | 8 | 80 | 103 | 20 | M8 | 22.8 | 6 | 229 | 232.5 | 313 |
| | 10 | 212 | 55 | 8 | 80 | 103 | 20 | M8 | 22.8 | 6 | 238 | 238 | 361 |
| | 16 | 220 | 63 | 10 | 100 | 125 | 25 | M10 | 28.3 | 8 | 257 | 257 | 385 |
| | 20 | 220 | 63 | 10 | 100 | 125 | 25 | M10 | 28.3 | 8 | 245 | 245 | 354 |
| | 25 | 220 | 63 | 10 | 100 | 125 | 25 | M10 | 28.3 | 8 | 254 | 258 | 397 |
| 40 | 06 | 221.6 | 55 | 8 | 80 | 103 | 20 | M8 | 22.8 | 6 | 238.6 | 242.1 | 322.6 |
| | 10 | 221.6 | 55 | 8 | 80 | 103 | 20 | M8 | 22,8 | 6 | 247.6 | 247.6 | 370.6 |
| | 16 | 229.6 | 63 | 10 | 100 | 125 | 25 | M10 | 28.3 | 8 | 266.6 | 266.6 | 394.6 |
| | 20 | 229.6 | 63 | 10 | 100 | 125 | 25 | M10 | 28.3 | 8 | 254.6 | 254.6 | 363.6 |
| | 25 | 229.6 | 63 | 10 | 100 | 125 | 25 | M10 | 28.3 | 8 | 263.6 | 267.6 | 406.6 |
| | 40 | 246.6 | 80 | 10 | 125 | 160 | 32 | M12 | 35.3 | 10 | 273.1 | 289.6 | 433.2 |
| 63 | 06 | 244.5 | 55 | 8 | 80 | 103 | 20 | M8 | 22.8 | 6 | 261.5 | 265 | 345.5 |
| | 10 | 244.5 | 55 | 8 | 80 | 103 | 20 | M8 | 22.8 | 6 | 270.5 | 270.5 | 393.5 |
| | 16 | 252.5 | 63 | 10 | 100 | 125 | 25 | M10 | 28.3 | 8 | 289.5 | 289.5 | 417.5 |
| | 20 | 252.5 | 63 | 10 | 100 | 125 | 25 | M10 | 28.3 | 8 | 277.5 | 277.5 | 386.5 |
| | 25 | 252.5 | 63 | 10 | 100 | 125 | 25 | M10 | 28.3 | 8 | 286.5 | 290.5 | 429.5 |
| | 40 | 269.5 | 80 | 10 | 125 | 160 | 32 | M12 | 35.3 | 10 | 296 | 312.5 | 456.1 |
| | 63 | 269.5 | 80 | 10 | 125 | 160 | 32 | M12 | 35.3 | 10 | 308.5 | 320.5 | 480.5 |
| 100 | 06 | 276.5 | 55 | 8 | 80 | 103 | 20 | M8 | 22.8 | 6 | 293.5 | 297 | 277.5 |
| | 10 | 276.5 | 55 | 8 | 80 | 103 | 20 | M8 | 22.8 | 6 | 302.5 | 302.5 | 425.5 |
| | 16 | 284.5 | 63 | 10 | 100 | 125 | 25 | M10 | 28.3 | 8 | 321.5 | 321.5 | 449.5 |
| | 20 | 284.5 | 63 | 10 | 100 | 125 | 25 | M10 | 28.3 | 8 | 309.5 | 309.5 | 418.5 |
| | 25 | 284.5 | 63 | 10 | 100 | 125 | 25 | M10 | 28.3 | 8 | 318.5 | 322.5 | 461.5 |
| | 40 | 301.5 | 80 | 10 | 125 | 160 | 32 | M12 | 35.3 | 10 | 328 | 344.5 | 488.1 |
| | 63 | 301.5 | 80 | 10 | 125 | 160 | 32 | M12 | 35.3 | 10 | 340.5 | 352.5 | 515.5 |
| | 100 | 321.5 | 100 | 10 | 160 | 200 | 40 | M16 | 47.3 | 12 | 367 | 382 | 563.5 |

## Pump combinations P2V7… + PGF2 / PGP2 / PGH2 / PGH3 / G2 / A10SVO10;18 (Dimensions in mm)




| PV7 build size | L1 | L2 |
|---|---|---|
| 10 | 168 | 36 |
| 16 | 192 | 47 |
| 25 | 204 | 47 |
| 40 | 213.6 | 47 |
| 63 | 236.5 | 47 |
| 100 | 268.5 | 47 |

| PGF2 / PGP2 nom. size | L3 | L4 |
|---|---|---|
| 006 | 65 | 116 |
| 008 | 67 | 119.5 |
| 011 | 69.5 | 125 |
| 013 | 72 | 130 |
| 016 | 74.5 | 135 |
| 019 | 77.5 | 141 |
| 022 | 80.5 | 147 |

| PGH2 nom. size | L3 | L4 |
|---|---|---|
| 003 | 51 | 102.5 |
| 005 | 54 | 110 |
| 006 | 55.5 | 112.5 |
| 008 | 57 | 116 |

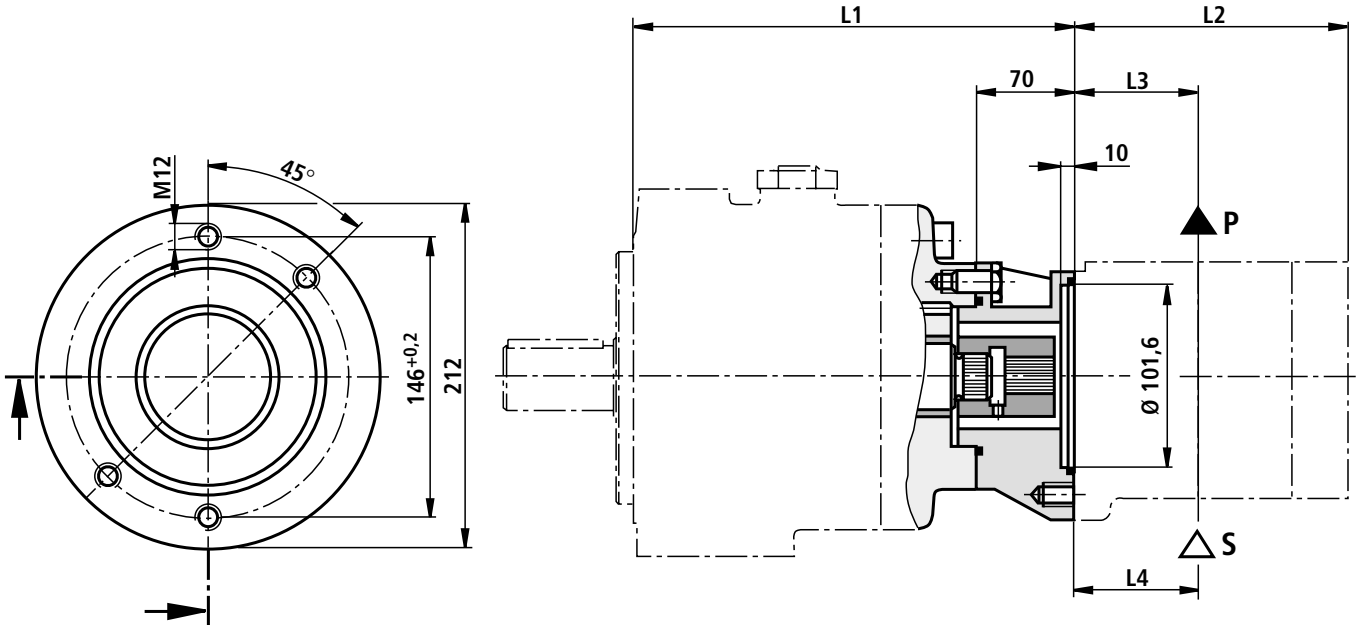
| PGH3 nom. size | L3 | L4 |
|---|---|---|
| 011 | 60 | 121.5 |
| 013 | 62.5 | 126.5 |
| 016 | 65 | 131.5 |

| G2-4X nom. size | L3 | L4 |
|---|---|---|
| 004 | 42.75 | 88.5 |
| 005 | 42 | 93.5 |
| 008 | 45.75 | 93.5 |
| 011 | 48 | 98.5 |
| 014 | 50 | 103.5 |
| 016 | 49 | 108.5 |
| 019 | 51 | 113.5 |
| 022 | 56 | 118.5 |

| A10VSO nom. size | L3 | L4 |
|---|---|---|
| 010 | 148 [1] | 164; 179 [2] |
| 018 | 145 | 195 |

[1] Axial connection port

[2] Controller dependent (see RE 92 713)



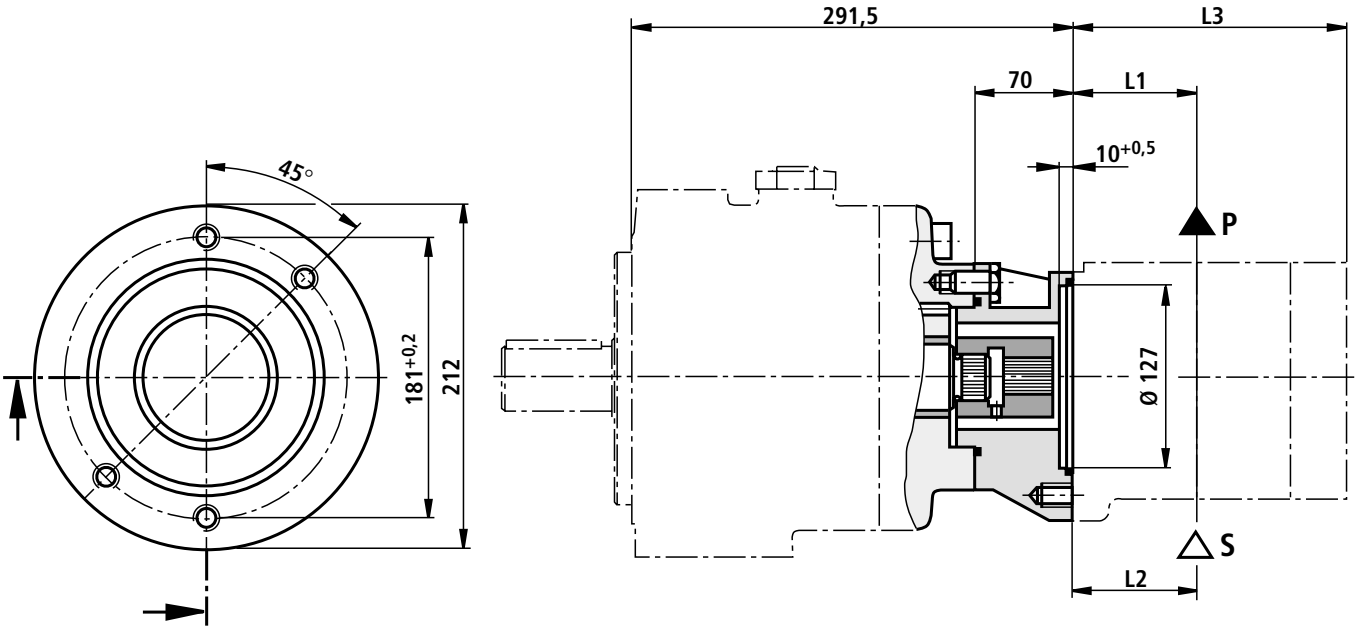

| PV7 build size | L1 |
|---|---|
| 16 | 215 |
| 25 | 227 |
| 40 | 237 |
| 63 | 259.5 |
| 100 | 291.5 |

| PGF3 / PGP3 nom. size | L2 | L3; L4 |
|---|---|---|
| 020 | 144.5 | 79.5 |
| 022 | 146.5 | 80.5 |
| 025 | 150.5 | 82.5 |
| 032 | 159.5 | 87 |
| 040 | 169.5 | 92 |
| 050 | 182.5 | 98.5 |

| PVV.UMB | L2 | L3 (P) | L4 (S) |
|---|---|---|---|
| PVV1 | 156 | 133 | 63,5 |
| PVV2 | 163 | 38.1 | 120.6 |

| PGH4 nom. size | L2 | L3; L4 |
|---|---|---|
| 020 | 147 | 70.5 |
| 025 | 152 | 73 |
| 032 | 159 | 76.5 |
| 040 | 166 | 80 |
| 050 | 176 | 85 |
| 063 | 190 | 92 |
| 080 | 204 | 99 |
| 100 | 224 | 109 |

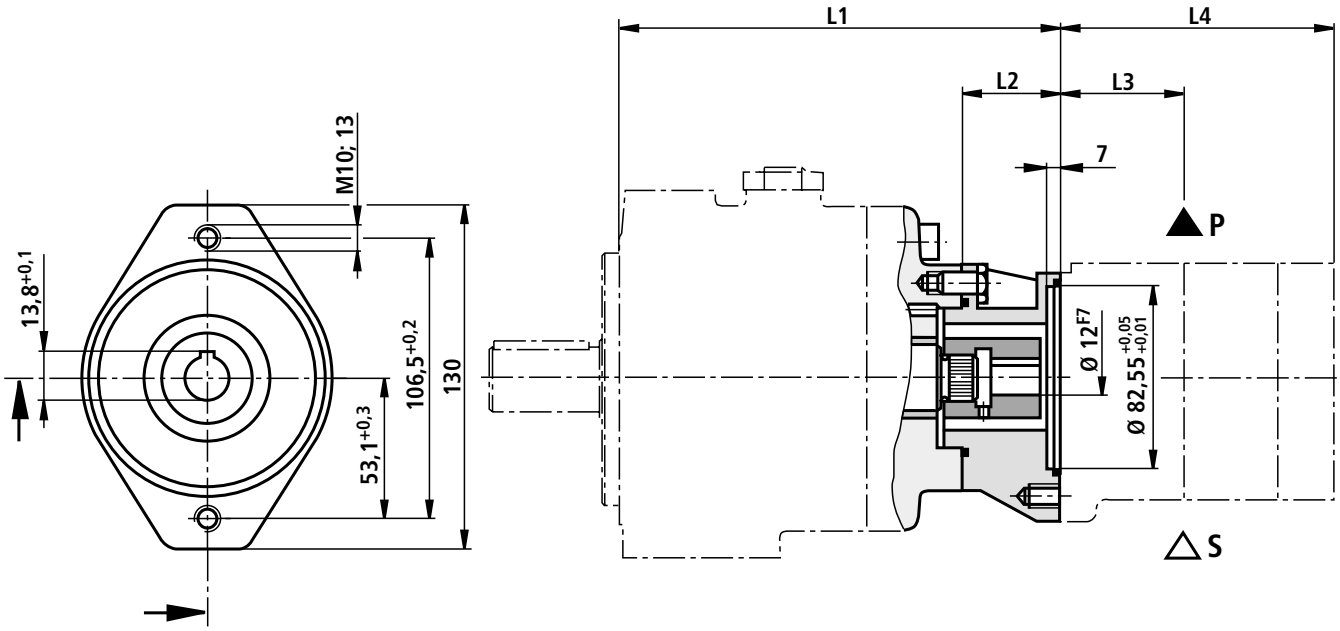
| A10VO nom. size | L2 | L3 | L4 |
|---|---|---|---|
| 028 | 194 | 164.5 | 164.5 |




| | L1 | L2 | L3 |
|---|---|---|---|
| PVV4…UMC | 38.1 | 125.5 | 186 |
| PVV5…UMC | 42.9 | 153 | 216 |
| A10VO45 | 184 | 184 | 219 |

## Pump combinations P2V7… + GF1…

(Dimensions in mm)

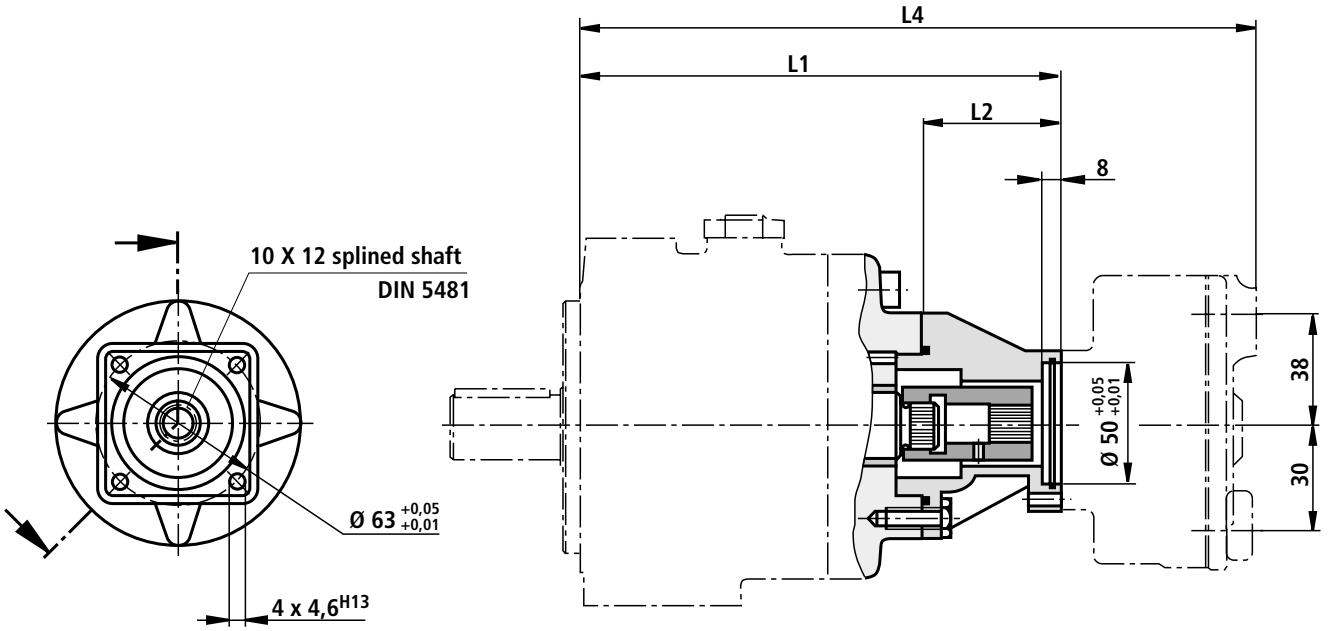



| PV7 build size | L1 | L2 |
|---|---|---|
| 10 | 168 | 36 |
| 16 | 192 | 47 |
| 25 | 204 | 47 |

| GF1 nom. size | L3 | L4 |
|---|---|---|
| 1.7 | 48.6 | 86 |
| 2.2 | 48.6 | 86 |
| 2.8 | 49.7 | 88.6 |
| 3.2 | 50.5 | 89.9 |
| 4.1 | 52.4 | 93.6 |
| 5.0 | 54.2 | 97.3 |

## Pump combinations P2V7… + R4-Mini

(Dimensions in mm)

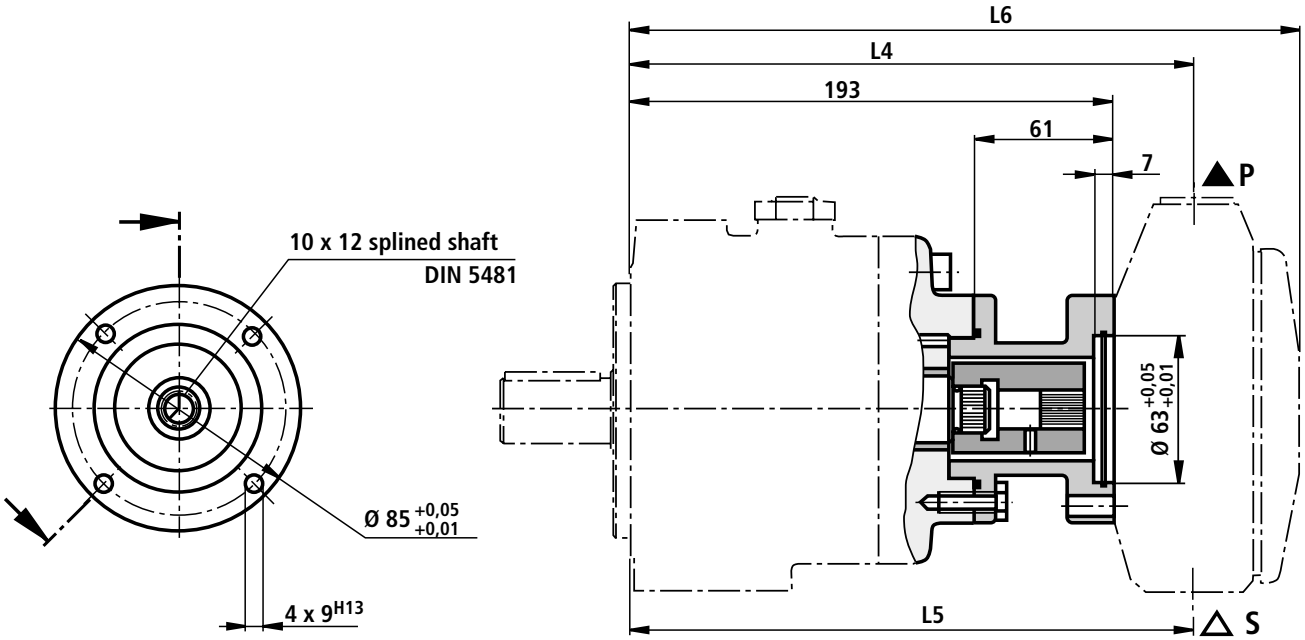



| PV7 build size | L1 | L2 | L4 |
|---|---|---|---|
| 10 | 178 | 46 | 247 |
| 16 | 208 | 63 | 277 |
| 25 | 220 | 63 | 289 |

| PV7 build size | L1 | L2 | L4 |
|---|---|---|---|
| 40 | 229.6 | 63 | 298.6 |
| 63 | 252.5 | 63 | 321.5 |
| 100 | 284.5 | 63 | 353.5 |

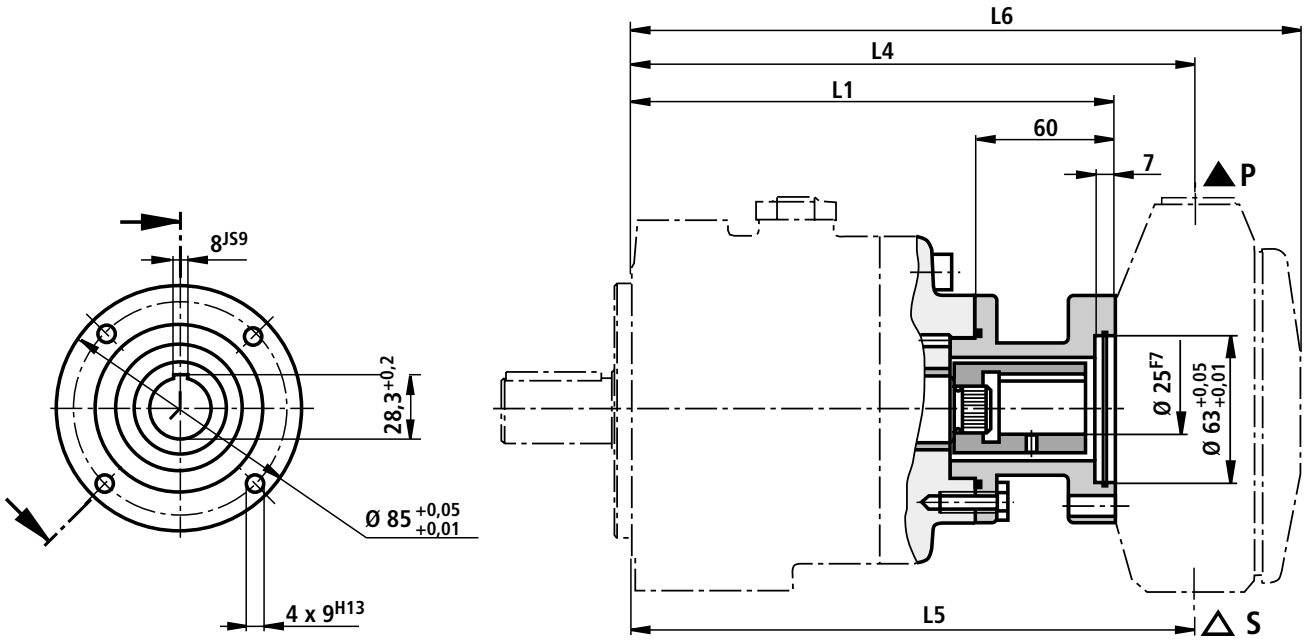
**Note:** The suction connection of the R4 pump should lie above the pressure port!

**PV7/10… + R4-Standard**




| Piston | L4 | L5 | L6 |
|---|---|---|---|
| 3; 5 | 231.5 | 231.5 | 279 |
| 10 | 231.5 | 240.5 | 312.5 |

**PV7/16… to PV7/100… + R4-standard**



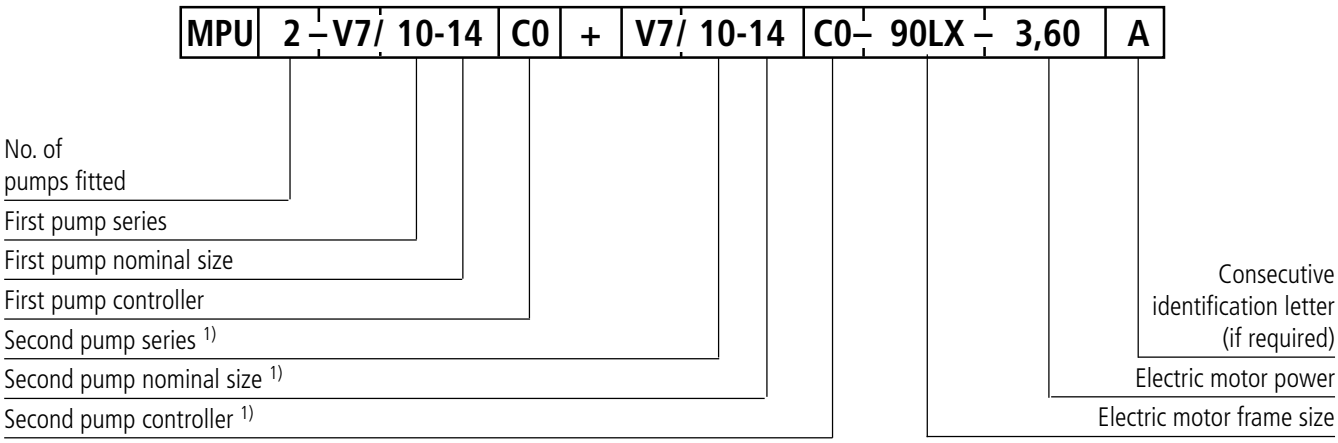

| PV7 build size | L1 | L4 | | L5 | | L6 | |
|---|---|---|---|---|---|---|---|
| | | 3/5 pistons | 10 pistons | 3/5 pistons | 10 pistons | 3/5 pistons | 10 pistons |
| 16 | 205 | 243.5 | 243.5 | 243.5 | 252.5 | 291 | 324.5 |
| 25 | 217 | 255.5 | 255.5 | 255.5 | 264.5 | 303 | 336.5 |
| 40 | 226.6 | 265.1 | 265.1 | 265.1 | 274.1 | 312.6 | 346.1 |
| 63 | 249.5 | 288 | 288 | 288 | 297 | 335.5 | 369 |
| 100 | 281.5 | 320 | 320 | 320 | 329 | 367.5 | 401 |

## Motor-pump drive unit

The electric motor and vane pump are connected **without** a coupling and pump mounting bracket. This results in a very cost effective and compact unit.

The motor design which has a hollow shaft with key-way makes it possible to utilise standard pumps.

## Ordering details




1) If required

**Ordering example:** MPU1-V7/10-14CO-90L-2,20

**Note with reference to the EC machinery guidelines 89/392 EWG, annex II, section B:**

The UPP drive units are manufactured in accordance to the harmonised standards EN 982, EN 983, DIN EN 292 and DIN EN 60 204-1.

Commissioning is not permitted until it has bewen proven that the machine into which the UPP assembly is to be fitted complies with the requirements stated in the EC guidelines.

## Selection table:

**Electric motor**

| Electric motor build size | 90SX | 90L | 90LX |
|---|---|---|---|
| Power in KW | 0.75 | 2.20 | 3.60 |
| Pump build size | Material No. of the available motor variants | | |
| PV7/10 | 00892349 | 00892361 | 00892369 |

The nominal powers stated in the above table are valid for continuous operation to VDE 0530 at a frequency of 50 Hz, and a cooling medium temperature of 40 °C at a height up to 1000 m above sea level.

**MPU-unit**

| Electric motor build size | 90SX | 90L | 90LX |
|---|---|---|---|
| Power in KW | 0.75 | 2.20 | 3.60 |
| PV7/10-14C0 | 00979226 | 00979227 | 00979228 |
| PV7/10-20C0 | – | 00979225 | 00977693 |

## **Technical data: Electric motor** (for applications outside these parameters, please consult us!)

| | | | |
|---|---|---|---|
| Motor type | | | Surface cooled, 3-phase with squirrel cage |
| Frame type | | | B3 with hollow shaft and mounting flange |
| Electrical power connection | | | Pg-fittings and earth in the terminal box |
| Insulation | | | Insulation class F |
| Protection | | | IP55 to VDE 0530 |
| No. of poles | | | 4 |
| Voltage to DIN IEC 38 | | V | Δ230 / Y400 at 50 Hz; Δ266 / Y460 at 60 Hz |
| Frequency | | Hz | 50 or 60 |
| RPM | At 50 Hz | $min^{-1}$ | 1500 |
| | At 60 Hz | $min^{-1}$ | 1800 |
| Installation | | | Only horizontal |

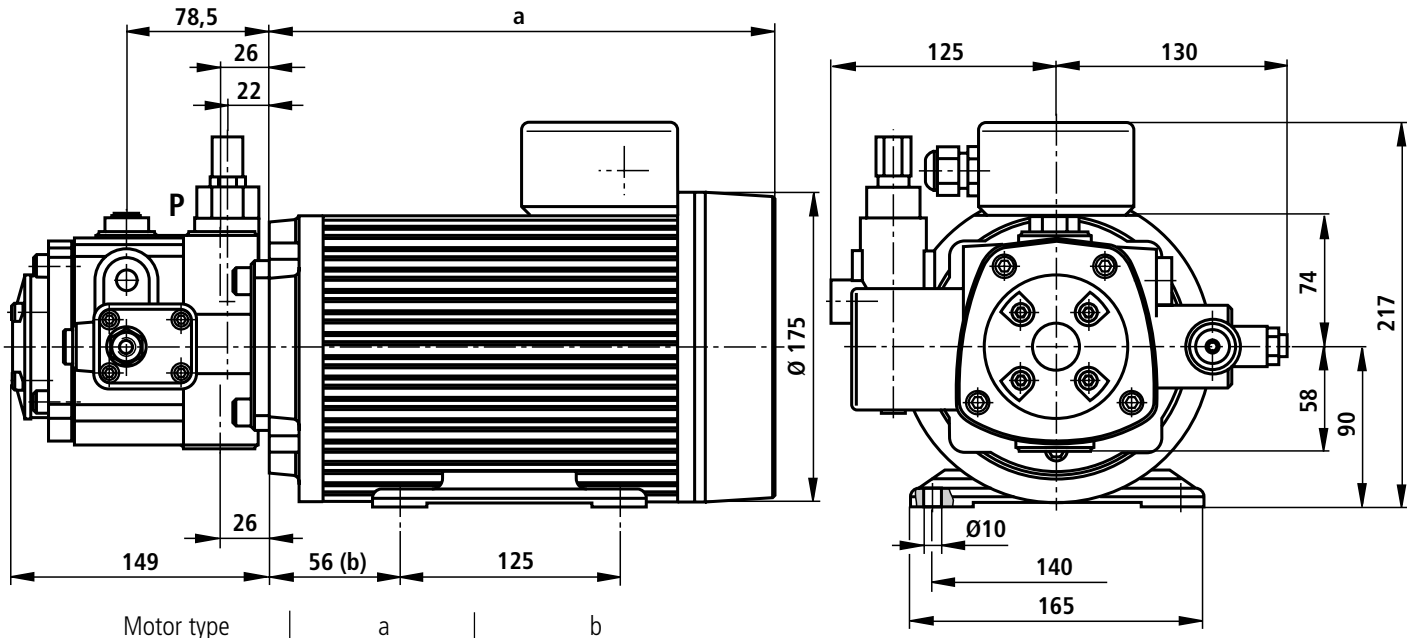
**Operational switching of the AC motors**

| | Type of winding Volt | Operating voltage Volt | For direct starting Volt | For Y Δ starting Volt |
|---|---|---|---|---|
| 50 Hz | 230 Δ / 400 Y | 220…240 | 220…240 Δ | 220…240 Δ |
| | | 380…420 | 380…420 Y | |

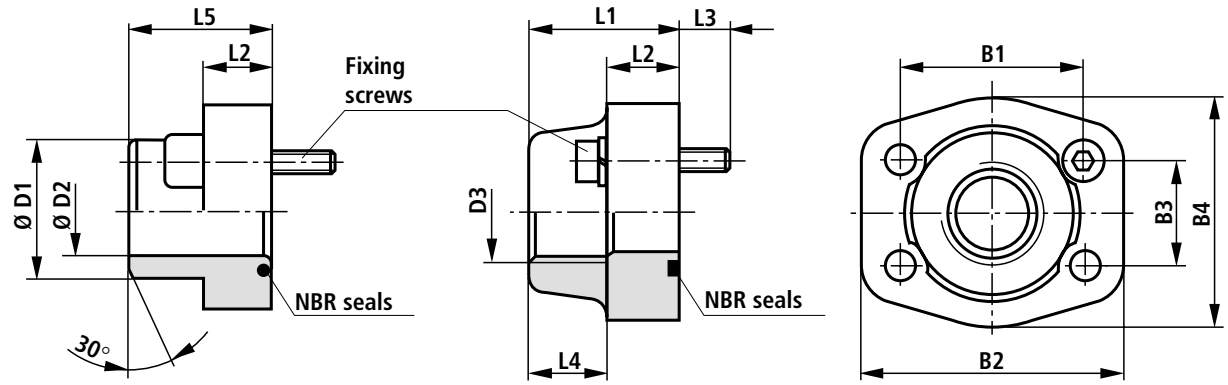
**Motors with a winding for 50 Hz and connected to a 60 Hz supply**

| Conversion factor at 60 Hz | |
|---|---|
| Nom. RPM $n_{nom}$ | Nom. power $P_{nom}$ |
| 1.2 | 1.0 |
| 1.2 | 1.0 |
| 1.2 | 1.15 |
| 1.2 | 1.2 |

## **Unit dimensions: MPU** (Dimensions in mm)




| Motor type | a | b | |
|---|---|---|---|
| 90S | 269 | (16-106) | 56 |
| 90L | 283 | (16-131) | |
| 90X | 315 | (16-151) | |




**With welded connection to AB-E 22-15** **With threaded connection**

The Material No. includes the flange, O-ring and fixing screws.

Pipe threads „G" to ISO 228/1

| NS | Sealing material | Material No. | | For pump type | |
|---|---|---|---|---|---|
| | | Welded connection | Threaded connection | Suction port | Pressure port |
| 1 1/4" | NBR | 00012946 | 0014153 | – | PV7/63-… |
| 1 1/2" | NBR | 00013501 | 00014827 | PV7/40-… | PV7/100-… |
| 2" | NBR | 00013502 | 00014829 | PV7/63-… | – |
| 2 1/2" | NBR | 00013503 | 00024205 | PV7/100-… | – |

| NS | B1 | B2 | B3 | B4 | ØD1 | ØD2 | D3 | L1 | L2 | L3 | L4 | L5 | Fixing screws |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 1/4" | 58.7 | 79 | 30.2 | 68 | 38 | 30 | G 1 1/4 | 41 | 21 | 18 | 22 | 42 | M10-8.8 |
| 1 1/2" | 69.9 | 95 | 35.7 | 76 | 42 | 36 | G 1 1/2 | 44 | 25 | 18 | 24 | 57 | M12-8.8 |
| 2" | 77.8 | 102 | 42.9 | 90 | 61 | 49 | G 2 | 45 | 25 | 18 | 26 | 46 | M12-8.8 |
| 2 1/2" | 88.9 | 114 | 50.8 | 104 | 76 | 62 | G 2 1/2 | 50 | 25 | 18 | 30 | 50 | M12-8.8 |

## Engineering guidelines

Extensive guidelines and suggestions can be found in the Hydraulic Trainer, volume 3, RE 00 281, „Projecting and designing hydraulic systems".

When applying vane pumps, we recommnend that the following guidelines are particulary to be taken into account:

– **Technical data**
  All of the technical data stated are dependent on the manufacturing tolerances and are valid for certain conditions. Please take into account that due to this a small spread is possible and a change in the conditions (e.g. viscosity) can lead to the technical data being affected.

– **Characteristic curves**
  Characteristic curves for flow and absorbed power.
  Please take the maximum possible application data into account when selecting the electric motor.

– **Noise/noise pressure level**
  The values stated on pages 6 to 11 for the noise pressure level have been measured in accordance to DIN 45 635 part 26.

  This means that only the noise emission from the pump is shown. External influences (such as place of installation, pipework, etc.) are eliminated. The values stated always refer to one pump.

  If, for example, two pumps of the same size with the same loading are in use, then the noise level increases in accordance to the following formula

$$L_\Sigma = 10 \lg (10^{0,1 \bullet L1} + 10^{0,1 \bullet L2})$$

$L_\Sigma$ = total level

$L_1 \ldots L_i$ = noise pressure level of a single pump

**Example:** PV7/16 + PV7/16

$p$ = 120 bar

$L_1$ = 56 dB(A)

$L_2$ = 56 dB(A)

$L_\Sigma = 10 \log (10^{0,1 \bullet 56} + 10^{0,1 \bullet 56})$

= 59.01 dB(A)

⚠ **Attention:** The power unit design and the influences at the pumps final place of use result in the fact, in general, that the noise pressue level is 5 to 10 dB(A) higher than the value of the pump on its own.

### Leakage fluid

Part of the frictional heat is dissipated via the leakage fluid from the pump. The leakage fluid should be returned directly to the oil reservoir with a low pipe back pressure. The distance between the leak line and the suction line must be large enough so that the returning leakage fluid cannot be directly taken up by the pump. The average leakage flow via the external port is shown on page 5. These values are **not** to be used for dimensioning the reservoir. For the selection of the reservoir size, the zero stroke power is the relevant value (see pages 6 to 11).

### Leakage fluid cooler

The values stated on page 5 for the external leakage fluid are average values for continuous operation.

When the pump goes off-stroke the leakage fluid flow briefly increases by the control oil flow. Reductions in cross-section, long leak lines and also a leakage fluid cooler can lead to umpermissibly high pressure peaks. By means of suitable measures, e.g. a bypass check valve, it must be ensured that the leakage fluid pressure ($p_{max}$ = 2 bar) does not exceed the permissible values. There is otherwise the danger of the shaft seal being damaged.

## Commissioning

### Air bleeding

– All PV7 vane pumps are self-priming.
– Before commissioning the pump must be bled to protect it from damage.
– When commissioning for the first time, we recommend that the housing is filled via the leakage connection. Take into account the filter rating! This increases the service life and prevents wear in the case of unfavourable installation conditions
– If the pump does not supply fluid free of bubbles after approx. 20 seconds then the system should be rechecked. After reaching the operating values check the pipe connection for leaks. Check the operating temperature.

### Commissioning

– Check to see whether the system has been carefully and cleanly assembled.
– Take into account the direction of rotation arrows on the pump and motor.
– Start up the pump without load and permit it to supply fluid for a few seconds without pressure so that adequate lubrication in ensured.
– **Under no circumstances run the pump without fluid!**

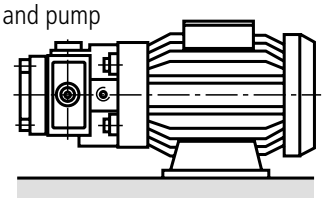
### ⚠ Important guidelines

– Adjustment, service and maintenance of the pump must only be carried out by authorised, trained and instructed personnel!
– Only use original Bosch Rexroth spare parts!
– The pump must only be operated with the permitted data.
– The pump must only be used when it is in a good condition!
– When carrying out any work on the pump (e.g. removing and refitting) the system must be depressurised and isolated from the mains supply!
– Conversion and modifications done by yourselves which affect the safety and function are not permitted!
– Protection features (e.g. coupling guard) are to be fitted!
– Protection features which are present must not be removed!
– The general safety and accident prevention regulations must be adhered too!

## Installation guidelines

**Drive:** Variant 1

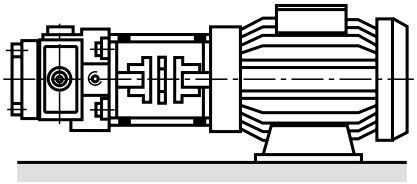
The UPP drive unit (is supplied complete by ourselves)
Electric motor and pump



- Very short design
- Cost effective (coupling and pump mounting bracket are not required)
- No assembly necessary

**Drive:** Variant 2

Electric motor + pump mounting bracket + coupling + pump

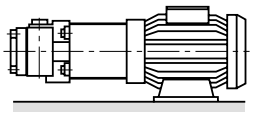


⚠ **Attention!** – Radial and axial forces which act on the pump drive shaft are not permitted!
→ Motor and pump must be exactly aligned!
→ Use a flexible drive coupling

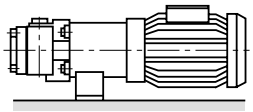
**Installation**

- Horizontal is preferred

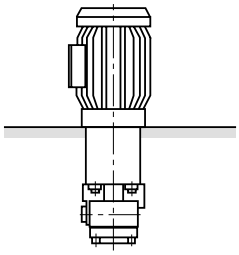
**B3**



**B5**



**V1**



**Fluid reservoir**

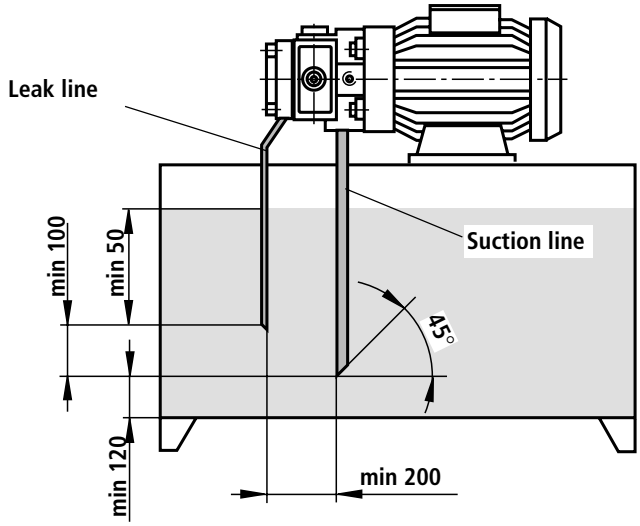
- Match the usable volume of the reservoir to suit the operating conditions.

⚠ **Attention!** – The permissible fluid temperature must not be exceeded
→ A cooler may have to be provided!

**Pipes and connections**

- Cut-off at an angle of 45°.
- Remove protective plugs from the pump.
- We recommend the use of seamless precision steel pipes to DIN 2391 and removable pipe couplings.
- Match the inside diameter of the pipe to the connections.
- Carefully clean pipe and fittings before assembly – **minimum distance to the bottom of the reservoir is 120 mm**.

**Pipework suggestion** (dimensions in mm)




- Lay the leakage line so that the pump **cannot** drain!
- Do **not** pipe with pump **without** a controller!
- Leak and return line fluid **must under no circumstances** be immediately taken up by the pump!

**Filter**

- Use return and pressure filters where possible.
(suction filter only in conjunction with an under pressure switch/ clogging indicator)

**Pressure fluid**

- Please take into account our specifications stated in catalogue sheet RE 07 075.
- We recommend brand name pressure fluids.
- Different types of pressure fluids must not be mixed as decomposition and a reduction in lubricity may result. Take the manufacterer's specifications into account!
- Depending on the operating conditions the pressue fluid must be changed at regular intervals. It is necessary to clean the fluid reservoir of any residues.

## Notes

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