

Linde

BPV pumps

**Compact and efficient!
The pump for
closed loop circuit**

1. Description

1.1 Design and components

The variable hydraulic pumps type BPV . . are axial piston pumps of swash plate design suitable for closed loop hydrostatic transmissions.

They are equipped with all components required for closed loop operation:

- integral auxiliary pump, optionally with internal or external suction
- 10 µm full boost flow cartridge filter
- high pressure relief valves
- boost check valves
- cold start valve (cooler protection)
- boost pressure relief valve
- short circuit device

1.2 Technical features

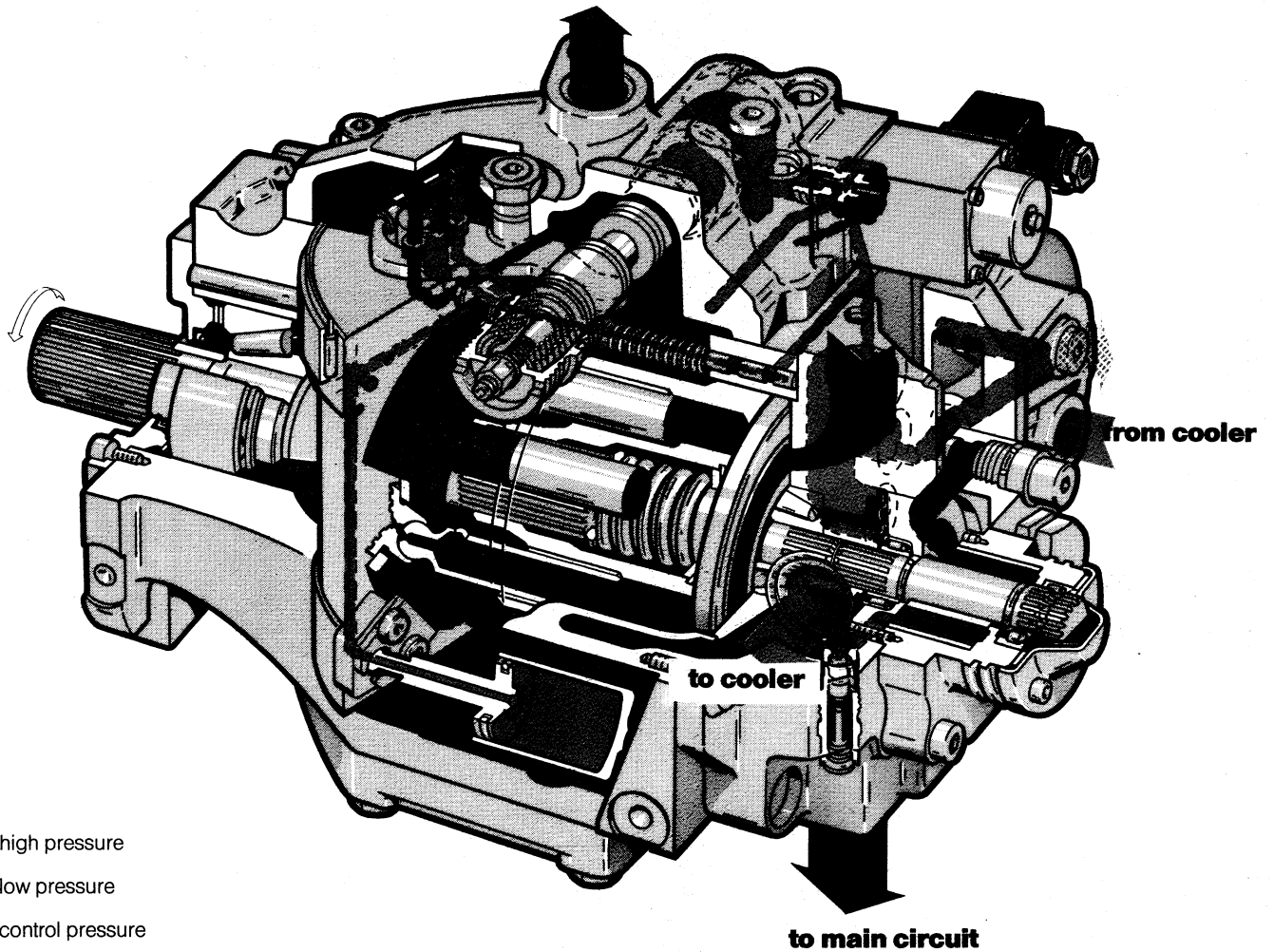
- through-shaft for tandem version or PTO connection for auxiliary drives
- radial loads on drive shaft permissible
- all control components integrated in control cover
- identical spigot mounting diameter for sizes 35, 50, 70 and 100
- identical drive shaft diameter for sizes 35, 50 and 70
- mounting flange suitable for both DIN and SAE pitch circles
- SAE high pressure ports
- clockwise or counterclockwise rotation
- pressure cut-off optional





1.3 Control options

- cam control with positive stretched neutral
- hydraulic remote control
- electro-hydraulic control
- automotive control
- torque control

1.4 Functional diagram

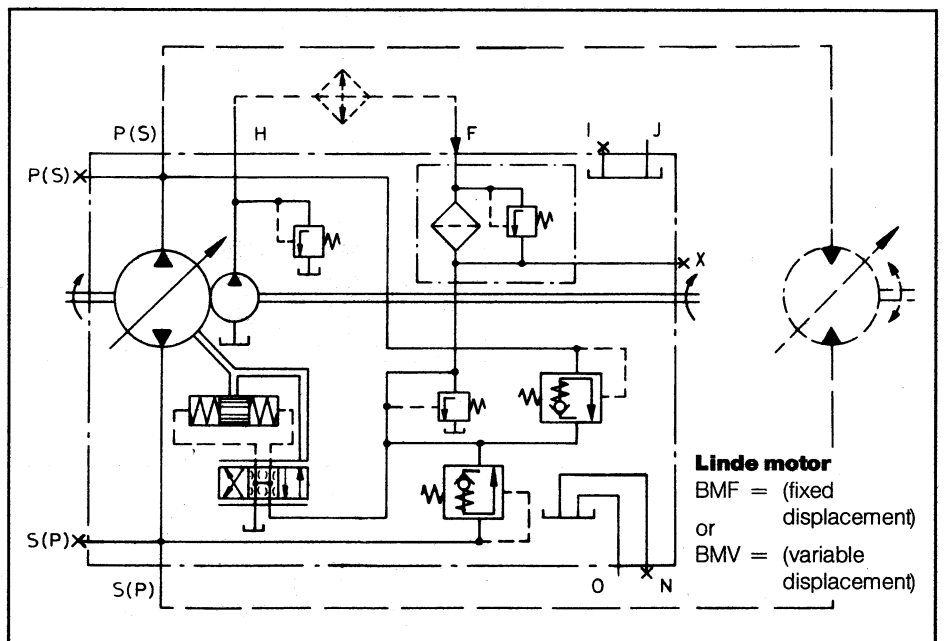
Leakage oil, ventilation



-  high pressure
-  low pressure
-  control pressure
-  housing pressure

Variable pump BPV .. EH for electro-hydraulic control

1.5 Standard circuit diagram



- Legend:
- P(S) and S(P) = pressure ports
 - I, J, N and O = vent ports
 - F and H = cooler ports
 - X X = control pressure port
 - X P(S) and -X S(P) = check ports for working pressure

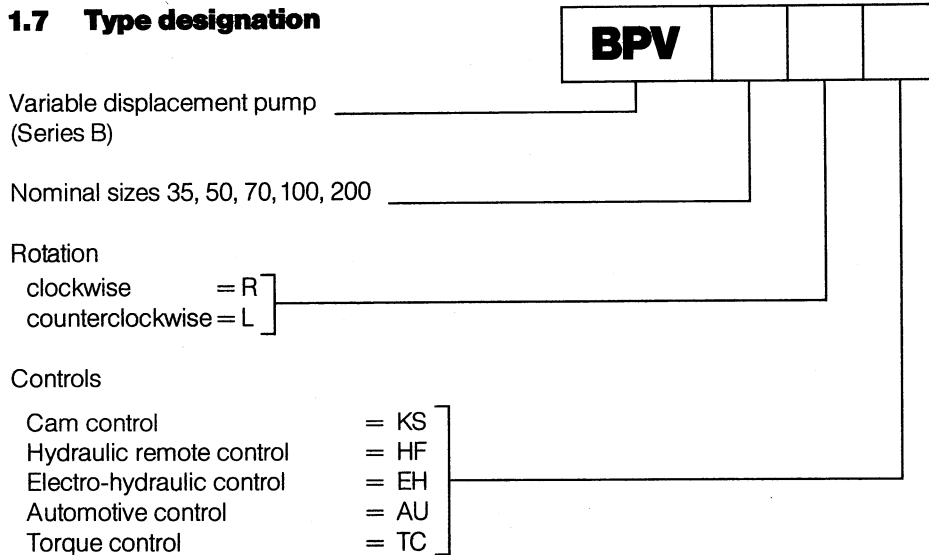
- Linde motor**
 BMF = (fixed displacement)
 or
 BMV = (variable displacement)

1.6 Product range

| Design versions | | Page | Nominal size | | | | |
|-------------------|------------------------------|---------------------------|--------------|----|----|-----|---------------|
| | | | 35 | 50 | 70 | 100 | 200 |
| Controls | Cam control KS | 10 and 20 | • | • | • | • | |
| | Hydraulic remote control HF | 12 and 21 | | | | | |
| | without pressure cut-off | | • | • | • | • | • |
| | with pressure cut-off | | • | • | • | • | |
| | pilot valves | see "CONTROL VALVE RANGE" | | | | | |
| | Electro-hydraulic control EH | 14 and 22 | | | | | |
| | without pressure cut-off | | • | • | • | • | upon re-quest |
| | with pressure cut-off | | • | • | • | • | |
| | control valves | see "CONTROL VALVE RANGE" | | | | | |
| | Automotive control AU | 16 and 23 | • | • | • | • | |
| Torque control TC | 18 and 24 | • | • | • | • | | |
| pilot valves | see "CONTROL VALVE RANGE" | | | | | | |
| Rotation | clockwise | | • | • | • | • | • |
| | counterclockwise | | • | • | • | • | • |
| Auxiliary pump | with internal suction | 25 | • | • | • | • | |
| | with external suction | 25 | • | • | • | • | • |
| Coupling flanges | standard version | 27 | • | • | • | • | • |
| | cardan version | 27 | • | • | • | • | |
| Through-shaft | PTO flange | 27 | • | • | • | • | • |
| | tandem version | upon request | | | | | |

2. Characteristics

1.7 Type designation



2.1 Main pump

2.1.1 Pressure

| | |
|--|---------|
| Peak pressure* | 500 bar |
| Rated pressure (= max. working pressure) | 420 bar |
| Permissible housing internal pressure | 1,5 bar |

| Nominal size | | 35 | 50 | 70 | 100 | 200 |
|--------------|--|------|------|------|-------|-------|
| 2.1.2 | Max. displacement cm ³ /rev | 34,9 | 50,8 | 70,9 | 100,3 | 202,6 |
| 2.1.3 | Speeds | | | | | |
| | Max. speed (100% duty cycle) rpm | 3400 | 3200 | 3000 | 2800 | 2100 |
| | Peak speed rpm | 3700 | 3500 | 3300 | 3100 | 2400 |

2.2 Auxiliary pump (Gerotor type, sizes 35 ... 100 and gear pump, size 200)

| | |
|---|---|
| Boost pressure | 16 bar |
| Cold start pressure | 21 bar standard valve setting |
| Inlet pressure at ports T_1 and T_2 (for external suction of sizes 35 ... 100, refer to page 27) | 0,2 bar below atmospheric pressure ... 2 bar |

| Nominal size | | 35 | 50 | 70 | 100 | 200 |
|--------------|----------------------|----|------------|------|------|-----|
| Displacement | cm ³ /rev | 12 | 12 or 18,3 | 18,3 | 18,3 | 38 |

* Transient pressure over the max. working pressure at which the unit will still function.

3. General characteristics

2.3 Additional drives (PTO) at auxiliary pump

see Fig. 15, page 26, para 14.4

| Nominal sizes | 35 | 50 | 70 | 100 | 200 |
|--|--------|-----|-----|-----|-----|
| Permissible output torques at aux. pump shaft | | | | | |
| max. output torque at 10% d.c. | Nm 140 | 200 | 250 | 250 | 510 |
| continuous torque | Nm 70 | 100 | 140 | 200 | 400 |
| when using standard mounting parts acc. to figures page 27, para 14.6.3. | | | | | |
| continuous output torque in Nm | | | | | |
| pilot-Ø d ₁₀ = 80 mm | 60 | 60 | 60 | 60 | — |
| pilot-Ø d ₁₀ = 105 mm | 70 | 100 | 120 | 120 | 120 |

2.4 Auxiliary pumps (optional)

see pump dimensions page 27

3.1 Weight

see dimension tables

3.2 Pressure fluid

Mineral oil HL or HLP per DIN 51524, other pressure media upon request

| | |
|--|---|
| 3.2.1 Pressure fluid temperature range | -20° ... + 90° C |
| 3.2.2 Working viscosity range | 10 ... 80 mm ² /s |
| 3.2.3 Optimum working viscosity range | 15 ... 25 mm ² /s |
| 3.2.4 Max. viscosity | 1000 mm ² /s (intermittent for starting) |

Recommendations:

| Working temperatures of approx. | Viscosity class (mm ² /s = cSt) |
|---------------------------------|--|
| | HL or HLP |
| 30 ... 40° C | 22 mm ² /s at 40° C |
| 60 ... 70° C | 68 mm ² /s at 40° C |
| 80 ... 90° C | 100 mm ² /s at 40° C |

Beside the minimum requirements of DIN 51524 a brand name hydraulic oil must comply with all requirements of high pressure hydraulic installations. This applies especially to so called HLPD (detergent) oils.

Linde recommend using only pressure fluids which are confirmed by the producer as suitable for high pressure hydraulic installations.

For the correct choice of the suitable pressure fluid it is indispensable to know the working temperature of the hydraulic circuit (closed loop).

When selecting the pressure fluid it must be taken into consideration that the working viscosity is within the optimum working viscosity range (see 3.2.3).

Attention! Due to pressure and speed influences the leakage oil temperature is always higher than the circuit temperature. At no point of the hydraulic installation the temperature should exceed 90° C.

For special applications where the given directions cannot be kept, please ask the manufacturer.

3.3 Filtration

by built-in 10 µm cartridge filter (resistant against pulsation up to 25 bar)

4. Drive

4.1 Couplings

Drive via suitable coupling elements

(for special cases please ask the manufacturer)

4.2 Moment of inertia

| Nominal sizes | | 35 | 50 | 70 | 100 | 200 |
|-------------------|------------------|--------|--------|--------|--------|--------|
| Moment of inertia | kgm ² | 0,0077 | 0,0110 | 0,0169 | 0,0280 | 0,1350 |

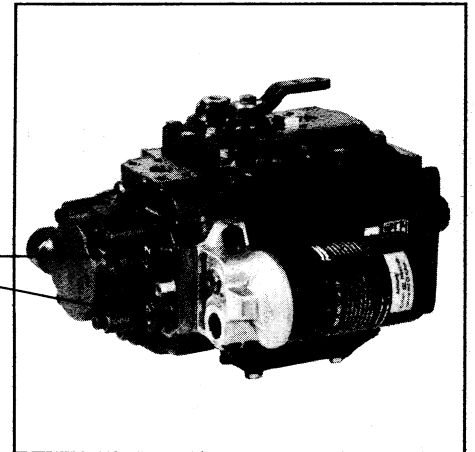
5. Short circuit operation

5.1 Short circuiting

by untightening the two valve cartridges (retighten again afterwards)

Fig. 1. Variable hydraulic pump BPV...KS with auxiliary pump with external suction

valve cartridges



5.1.1 Opening stroke

approx. 3 mm = 2 turns at sizes 35...100
approx. 6 mm = 3 turns at size 200

5.1.2 Tightening torque

85 Nm at sizes 35 ... 70
130 Nm at size 100
200 Nm at size 200

6. Pressure medium cooling

6.1 Required cooling performance

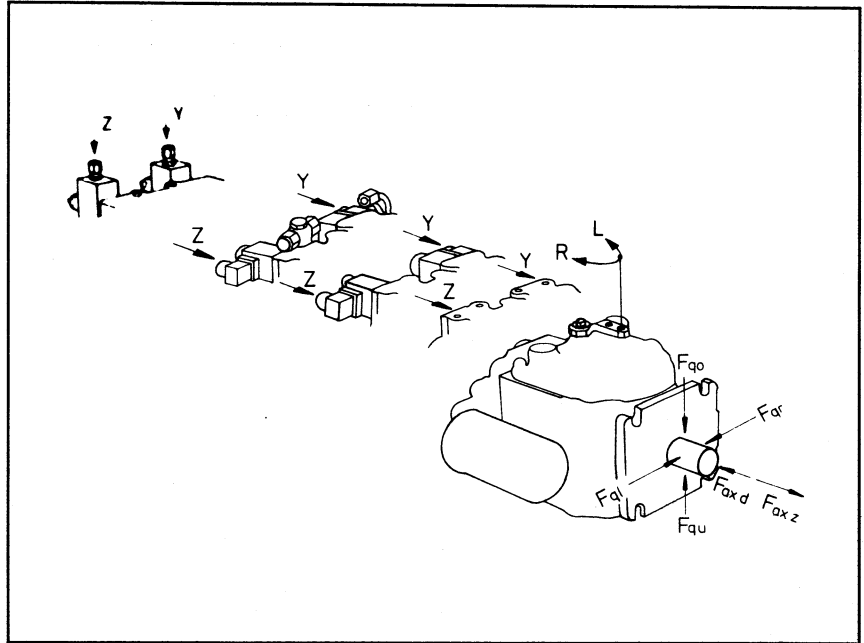
approx. 20 ... 25% of the installed input power (normally)

7. Radial and axial loads

7.1 Max. radial and axial forces F_q and F_{ax}

at continuous pressure = 250 bar
and max. speed

Relating to shaft end center.
Values are valid for cw and ccw rotation



| Pump size (NG) | | F_{qo} | F_{qu} | F_{qr} | | F_{ql} | | F_{axd} | F_{axz} |
|----------------|----|----------|----------|---------------|---------------|---------------|---------------|-----------|-----------|
| | | | | Position R, Y | Position L, Z | Position R, Y | Position L, Z | | |
| 35 | kN | 3 | 3 | 0,8 | 3,5 | 3,5 | 0,8 | 0,8 | 3 |
| 50 | kN | 5,2 | 5,2 | 2,3 | 4,7 | 4,7 | 2,3 | 2,2 | 2,7 |
| 70 | kN | 8,2 | 8,2 | 3,9 | 5,8 | 5,8 | 3,9 | 2,7 | 5,6 |
| 100 | kN | 9,5 | 9,5 | 7,3 | 7,8 | 7,8 | 7,3 | 4,1 | 4,6 |
| 200 | kN | 12 | 12 | 3,2 | 13,4 | 13,4 | 3,2 | 5,9 | 10,9 |

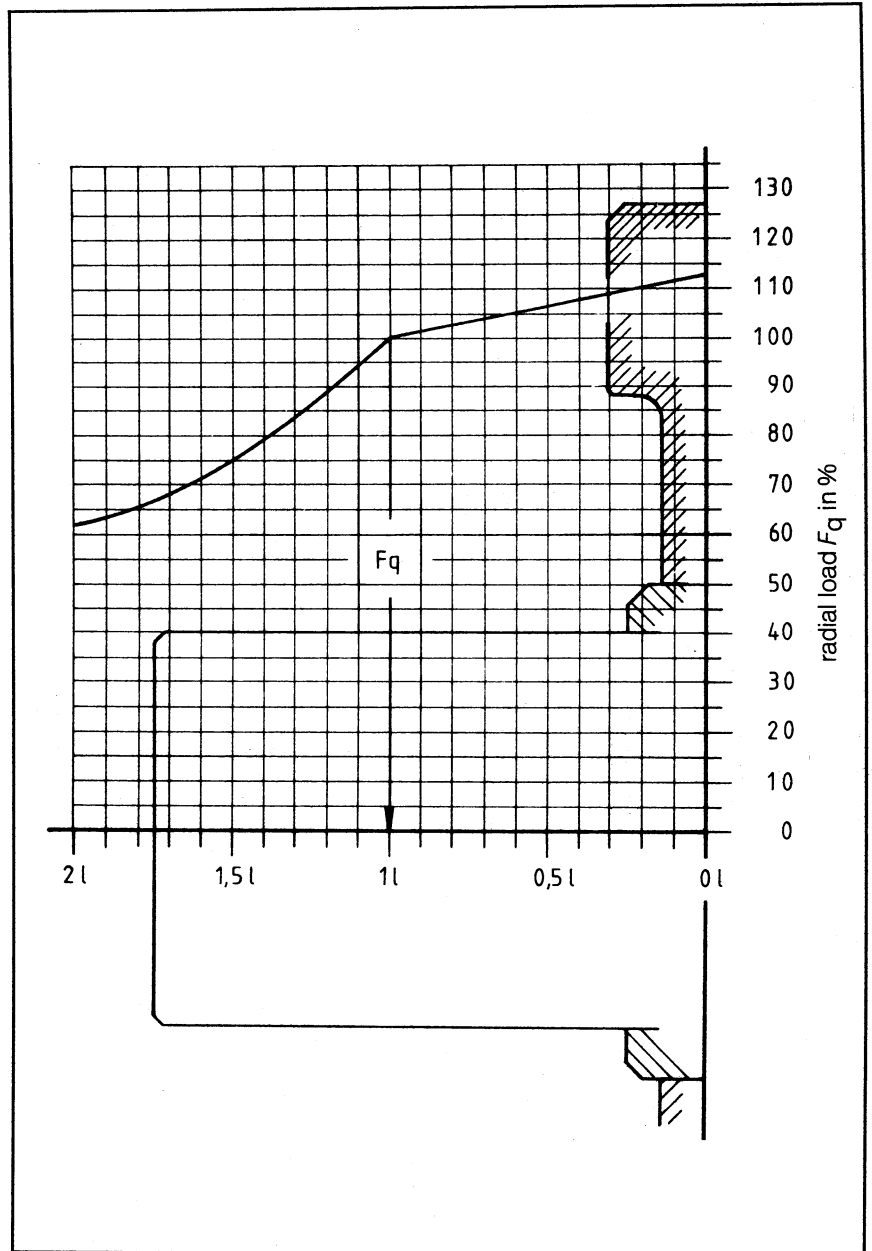
double the load is permitted intermittently*

* For special applications exceeding the given permissible values, please ask the manufacturer.

7.2 I-F_q characteristic

at continuous pressure = 250 bar
and max. speed

percentage radial force F_q % depending
on load distance l

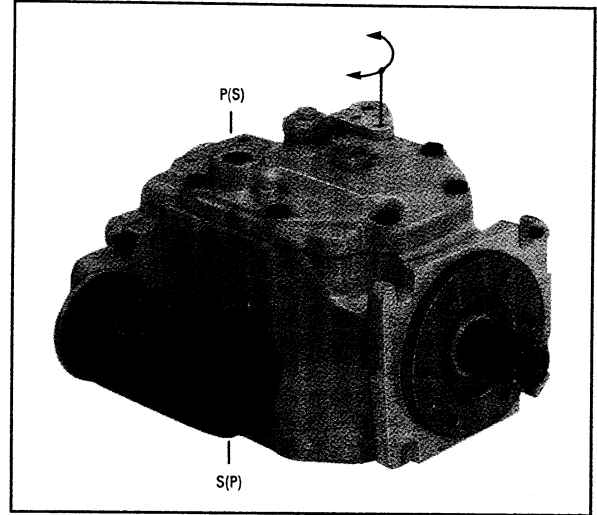


| Nominal size | 35 | 50 | 70 | 100 | 200 | |
|---|----|----|----|-----|-----|------|
| Point of impact l (from front flange to shaft) | mm | 32 | 32 | 32 | 32 | 42.5 |

8. "Cam control" KS version

with mechanical cam
control and progressive
control characteristic

Fig. 2. Variable pump BPV .. KS



8.1 Control

By turning the control lever flow rate and direction of pump flow are controlled via a cam plate with progressive characteristic.

8.2 Flow direction

changes depending on sense of rotation and swivel direction of the swash plate

| | | Sense of rotation | |
|-------|---|-------------------|------------------|
| | | clockwise | counterclockwise |
| 8.2.1 | Control from neutral position (control lever on top) | | |
| | clockwise | S(P) → P(S) | P(S) → S(P) |
| | counterclockwise | P(S) → S(P) | S(P) → P(S) |

8.3 Control force

17 ... 22 N (see page 20)

8.4 Control angle

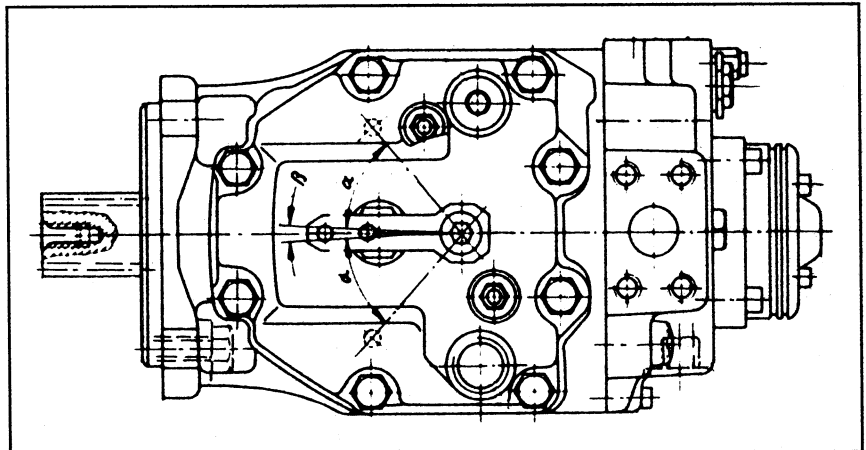
$50^\circ = 48^\circ + \frac{\text{neutral range}}{2}$ in each direction

8.4.1 From neutral range to one end position

$\alpha = 48^\circ$

8.4.2 Neutral range

$\beta = 4^\circ$



8.5 Control torque

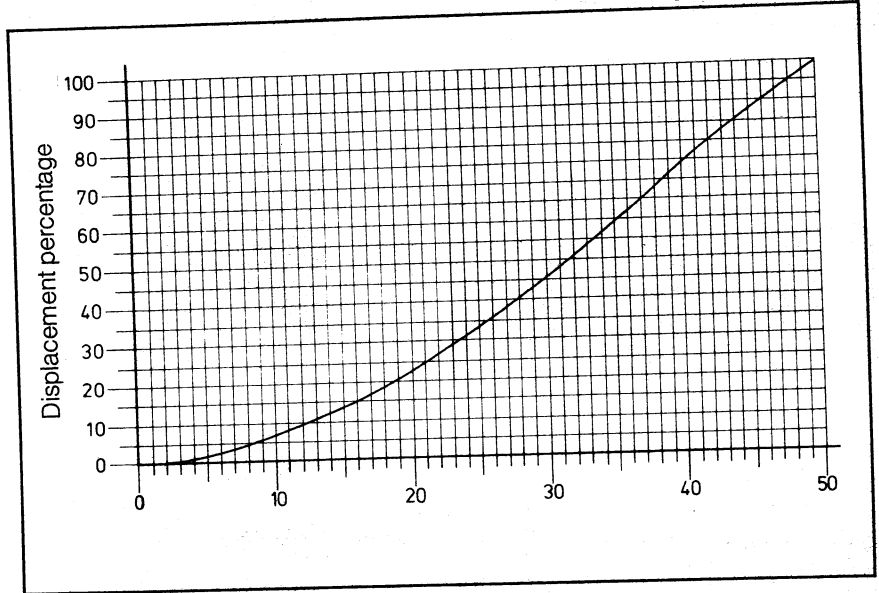
1,19 ... 1,54 Nm

8.6 Minimum response time

$\geq 0,8$ s, other response times possible using special restrictors

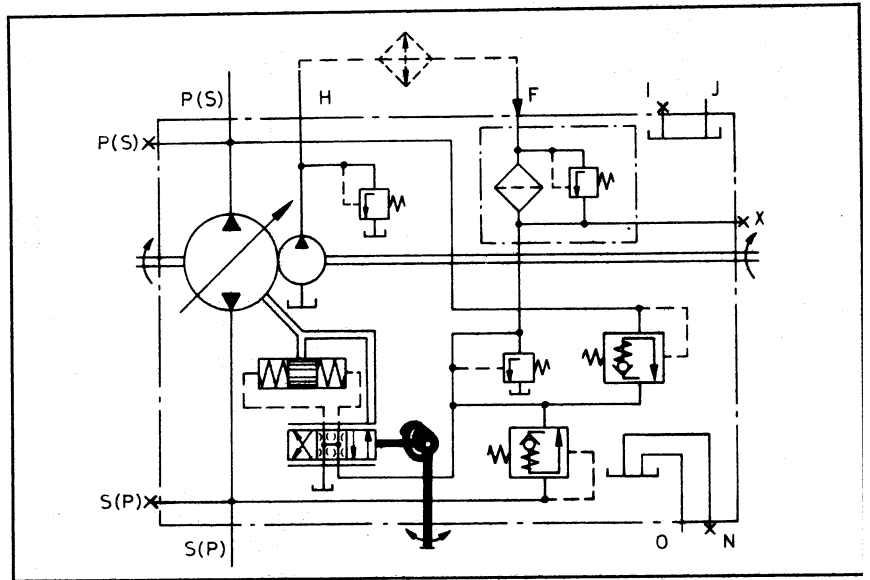
**"Cam control"
KS version**

8.7 Displacement depending on control angle



The cam plate has a progressive control characteristic and stretched neutral position. This provides an especially sensitive displacement of the pump swash angle from neutral and vice versa.

8.8 Circuit diagram



Cam control

- | | |
|---|---|
| $P(S)$ and $S(P)$ | = pressure ports |
| I, J, N and O | = vent ports, or oil filling, resp. drain ports, depending on mounting position |
| F and H | = cooler ports |
| $\rightarrow X$ | = control pressure port |
| $\rightarrow X P(S)$ and $\rightarrow X S(P)$ | = check ports for working pressure |

9. "Hydraulic remote control" HF version

with double acting pressure cut-off as an option

with hydraulic pilot control
with linear control characteristic

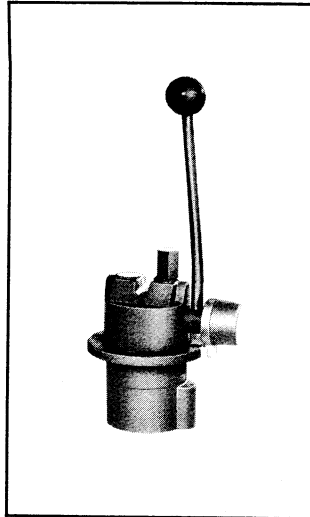


Fig. 3. Pilot valve for stepless hydraulic remote control

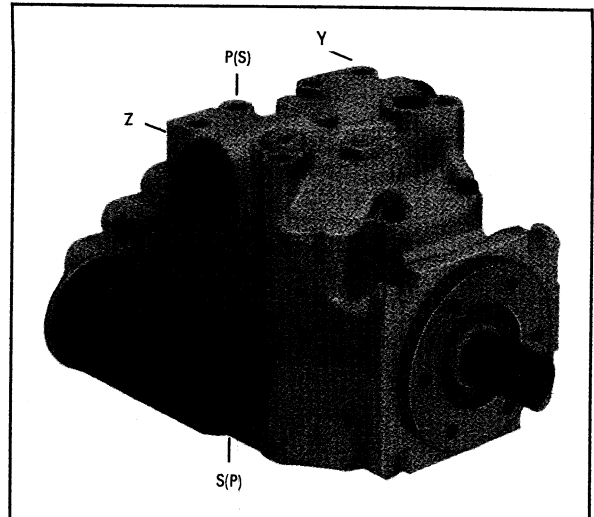


Fig. 4. Variable pump BPV .. HF (without pressure cut-off)

9.1 Control

By pressurizing the control ports Y or Z by means of a pilot valve (Fig. 3, see also prospectus "Control Valve Range") flow rate and direction of pump flow are controlled (see 9.6).

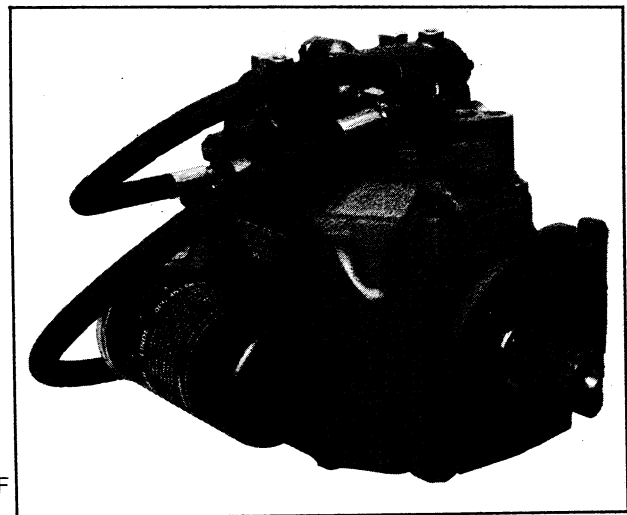


Fig. 5. Variable pump BPV .. HF (with pressure cut-off)

At hydraulic remote controls which are combined with a pressure cut-off (Fig. 5) the pump flow is reduced as soon as it reaches the cut-off pressure, thus replacing the leakage oil of the system only and maintaining the system pressure.

9.2 Flow direction

changes depending on sense of rotation and swivel direction of the swash plate

9.2.1 Control from neutral position
Pressurization at port Y
Pressurization at port Z

| Sense of rotation | |
|-------------------|------------------|
| clockwise | counterclockwise |
| S(P) → P(S) | P(S) → S(P) |
| P(S) → S(P) | S(P) → P(S) |

9.3 Control pressure range

2...8 bar = pressure difference between Y and Z

9.4 Control volume

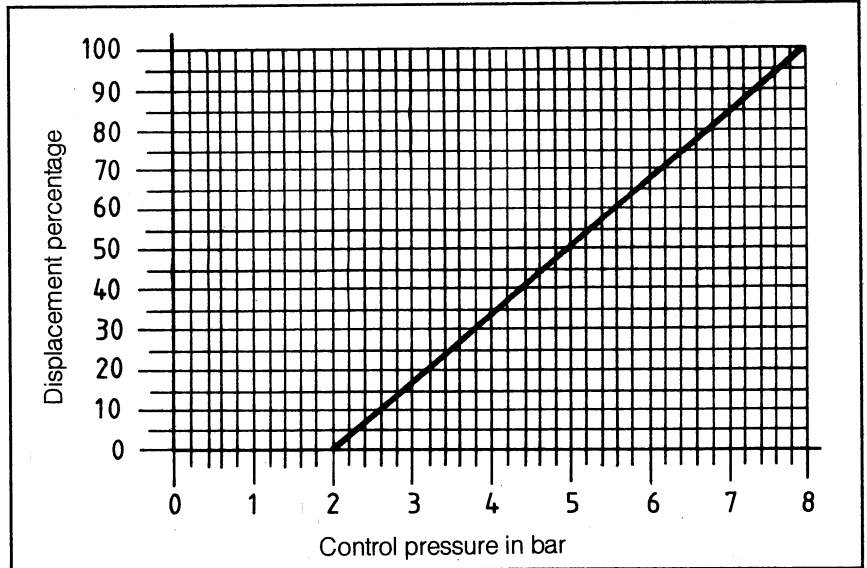
8,6 cm³ for sizes 35 ... 100;
12,3 cm³ for size 200

9.5 Minimum response time

0,8 s, other response times possible using special restrictors

**"Hydraulic remote control"
HF version**

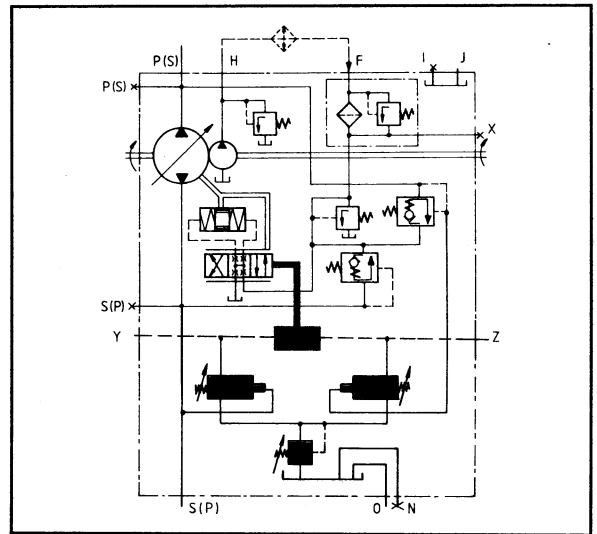
9.6 Displacement depending on control pressure



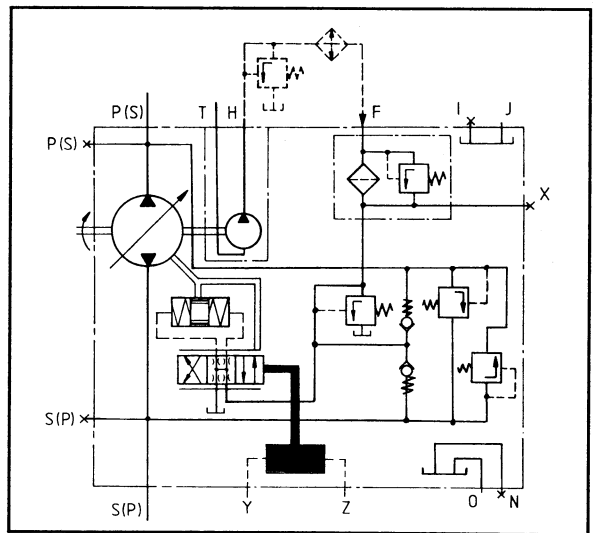
9.7 Circuit diagram

Sizes 35 ... 100
Hydr. remote control

Pressure cut-off



Size 200
Hydr. remote control



- $P(S)$ and $S(P)$ = pressure ports
- I, J, N and O = vent ports or oil filling, resp. drain ports, depending on mounting position
- T = tank port
- F and H = cooler ports
- Y and Z = control ports for hydr. users
- $\rightarrow X$ = control pressure gauge port
- $\rightarrow P(S)$ and $\rightarrow S(P)$ = gauge ports for working pressure

10. "Electro-hydraulic control" EH version

with double acting pressure cut-off as an option

with electro-hydraulic pilot control with linear control characteristic

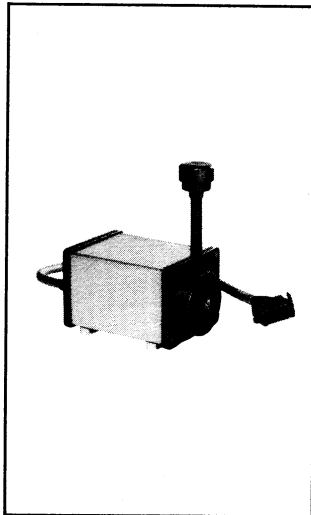


Fig. 6. Pilot valve for stepless electronic pump control

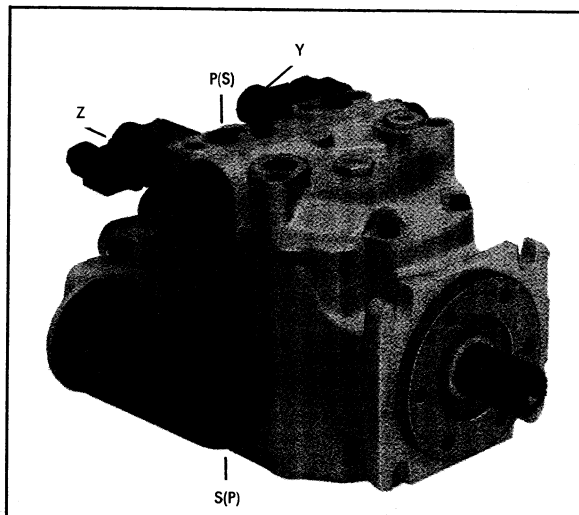


Fig. 7. Variable pump BPV .. EH (without pressure cut-off)

10.1 Control

By means of a pilot valve (Fig. 6, see also prospectus "Control Valve Range") flow rate and pump flow direction are controlled via two control solenoids (see 10.11).

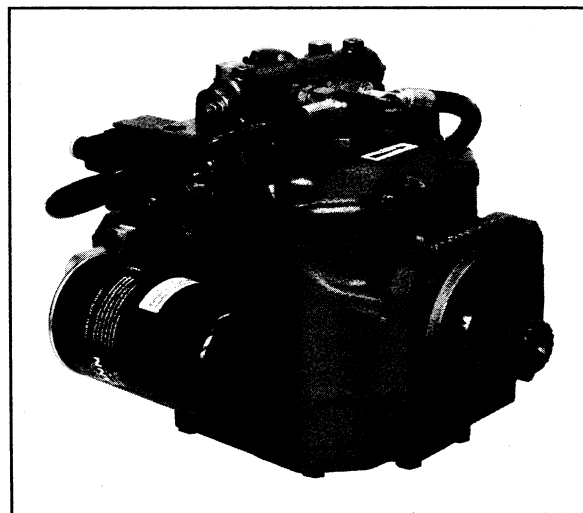


Fig. 8. Variable pump BPV .. EH (with pressure cut-off)

At electro-hydraulic controls which are combined with a pressure cut-off (Fig. 8) the pump flow is reduced as soon as it reaches the cut-off pressure, thus replacing the leakage oil of the system only and maintaining the system pressure.

10.2 Flow direction

changes depending upon sense of rotation and swivel direction of the swash plate

Sense of rotation

| | | | |
|--------------------------------------|--------------------------------|-------------|------------------|
| 10.2.1 Control from neutral position | Electric voltage on solenoid Y | clockwise | counterclockwise |
| | Electric voltage on solenoid Z | S(P) → P(S) | P(S) → S(P) |
| | | P(S) → S(P) | S(P) → P(S) |

10.3 Rated voltage = continuous voltage limit

12 V or 24 V

10.4 Voltage type

d.c. voltage

10.5 Power input

26 W

**"Electro-hydraulic control"
EH version**

10.6 Rated current

(continuous current limit)

10.6.1 Regulation current

Swash begin

Swash end

10.7 Relative duty cycle

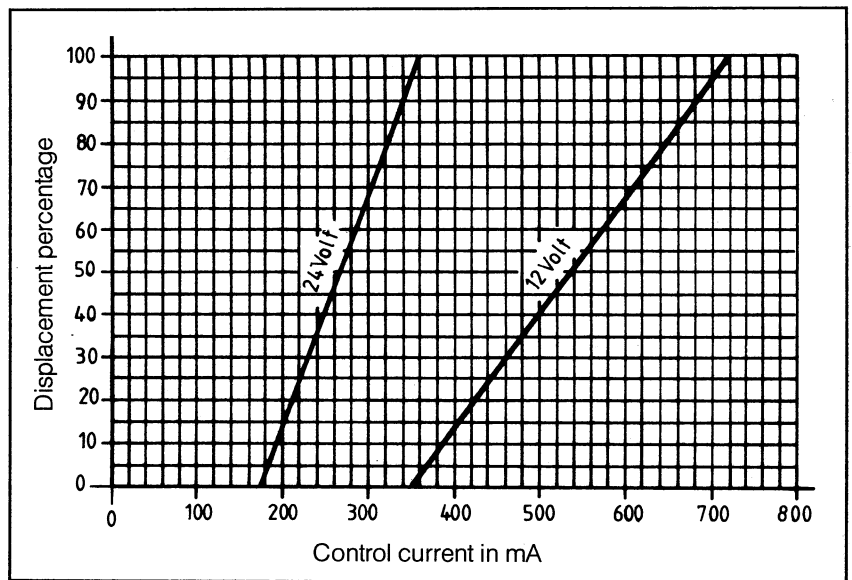
10.8 Protection class

10.9 Dither signal

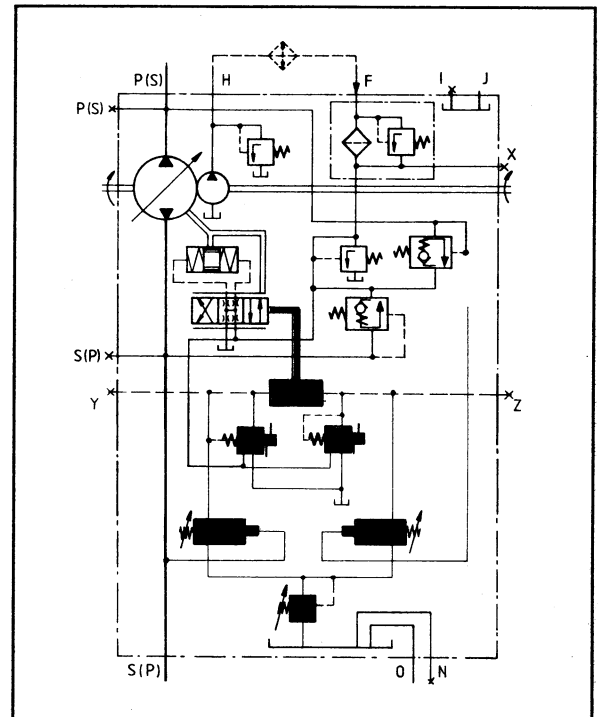
10.10 Minimum response time

10.11 Displacement depending on regulation current

| | 12 V regulated solenoid | 24 V regulated solenoid |
|--|--|----------------------------|
| Rated current (continuous current limit) | 1300 mA | 650 mA |
| Regulation current | | |
| Swash begin | 350 ± 10 mA | 175 ± 10 mA |
| Swash end | 720 mA | 360 mA |
| Relative duty cycle | 100% ED | |
| Protection class | IP 54 as per DIN 40050 | |
| Dither signal | 35 Hz rectangle, pulse ratio 1:1 | |
| | 350 mA | 175 mA |
| | peak-peak superimposed | |
| Minimum response time | 0,8 s, other response times possible using special restrictors | |



10.12 Circuit diagram



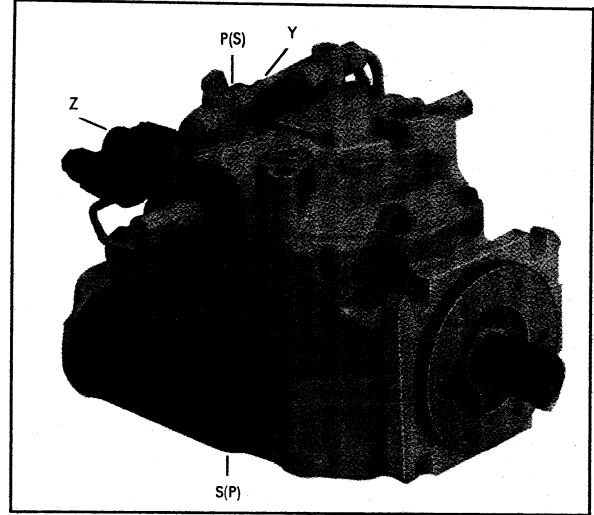
- P(S) and S(P)
= pressure ports
- I, J, N and O
= vent ports or oil filling,
resp. drain ports,
depending on
mounting position
- F and H
= cooler ports
- X X
= control pressure
take-off port
- X P(S) and -X S(P)
= gauge ports for
working pressure
- X Y and -X Z
= gauge ports for
control pressure

electro-hydraulic control
pressure cut-off

11. "Automotive control" Au version

prime mover speed dependant
servo control

Fig. 9. Variable pump BPV .. AU



11.1 Control

The pump displacement depends on the prime mover speed and is determined via the accelerator pedal (see 11.10).

At low idle the pump is in neutral position and starts stroking as soon as an adjustable speed is reached. This means max. pump displacement at max. engine speed.

When operating the accelerator pedal the travel speed of the vehicle is increased, and when releasing it the speed is reduced with normal deceleration. Braking with fast deceleration is done by operating the inching valve.

The stroking direction of the pump can be preselected electrically.

11.2 Flow direction

changes depending upon sense of rotation and swivel direction of the swash plate

Sense of rotation

| | | clockwise | counterclockwise |
|--------|--------------------------------|-------------|------------------|
| 11.2.1 | Control from neutral position | | |
| | Electric voltage on solenoid Y | S(P) → P(S) | P(S) → S(P) |
| | Electric voltage on solenoid Z | P(S) → S(P) | S(P) → P(S) |

11.3 Rated voltage

12 V or 24 V

11.4 Voltage type

d.c. voltage

11.5 Power input

26 W

11.6 Max. current

2,5 A or 1,25 A

11.7 Relative duty cycle of control solenoids

100% ED

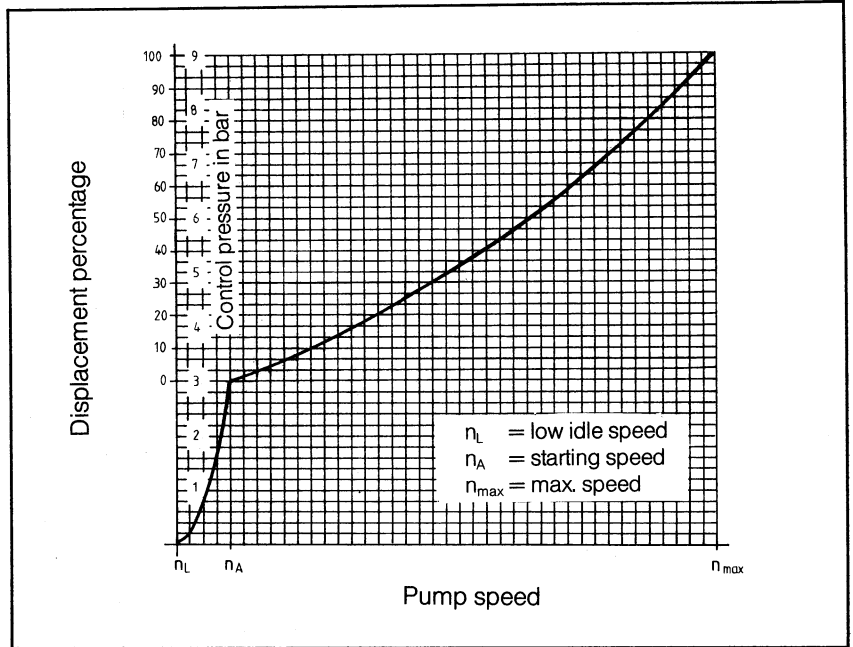
11.8 Protection class of control solenoids

I P 54 as per DIN 40 050

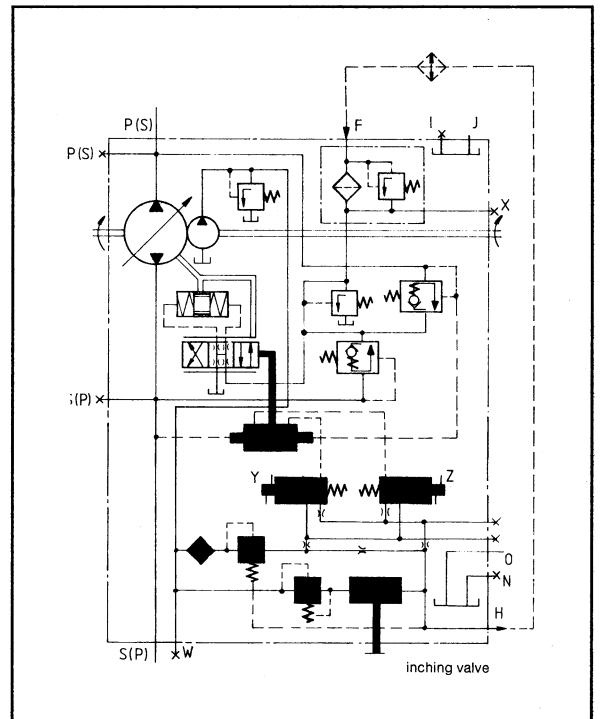
11.9 Minimum response time

0,8 s, other response times possible using special restrictors

11.10 Displacement depending on speed



11.11 Circuit diagram



automotive control

- $P(S)$ and $S(P)$ = pressure ports
- I, J, N and O = vent ports or oil filling, resp. drain ports, depending on mounting position
- F and H = cooler ports
- $\rightarrow X$ = control pressure gauge port
- $\rightarrow X P(S)$ and $\rightarrow X S(P)$ = gauge ports for working pressure
- $\rightarrow X W$ = gauge port for boost pump pressure

12. "Torque control" TC version

with hydraulic pilot control
with deliberately variable
holding pressure setting

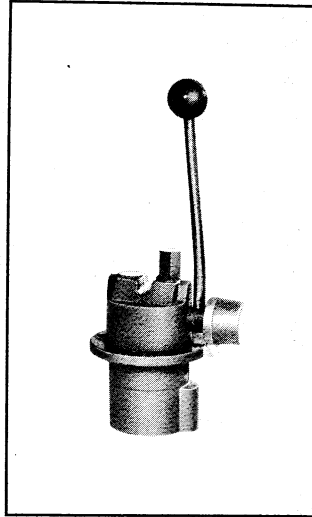


Fig. 10. Pilot valve for stepless hydraulic control

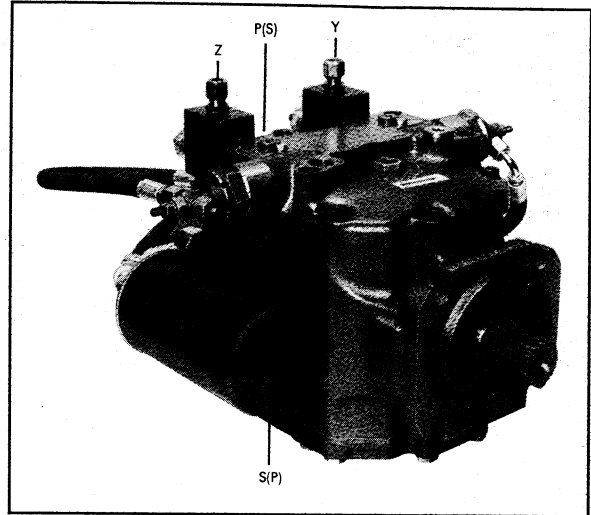


Fig. 11. Variable pump BPV .. TC

12.1 Control

Pump flow rate and direction are determined by the control pressure at port Y or Z (see 9.1).

This signal is, however, opposed by the working pressure, so that the pump flow depends on control and working pressure. The function corresponds to a constant pressure control with deliberately variable holding pressure.

12.2 Flow direction

changes depending upon sense of rotation and swivel direction of the swash plate

Sense of rotation

| | | Sense of rotation | |
|--------|-------------------------------|-------------------|------------------|
| | | clockwise | counterclockwise |
| 12.2.1 | Control from neutral position | | |
| | Pressurization at port Y | S(P) → P(S) | P(S) → S(P) |
| | Pressurization at port Z | P(S) → S(P) | S(P) → P(S) |

12.3 Control pressure range

$\Delta p = 2,5$ bar between neutral position and max. displacement

12.3.1 Control pressure at neutral 8 ... 10,5 bar

12.3.2 Control pressure at working pressure see diagram 12.6

12.4 Control volume

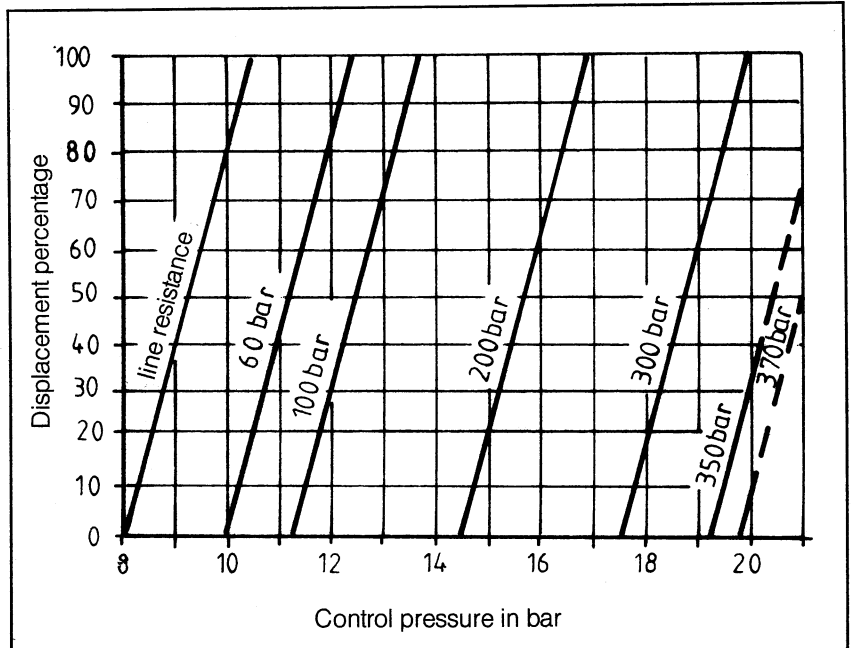
8,6 cm³

12.5 Minimum response time

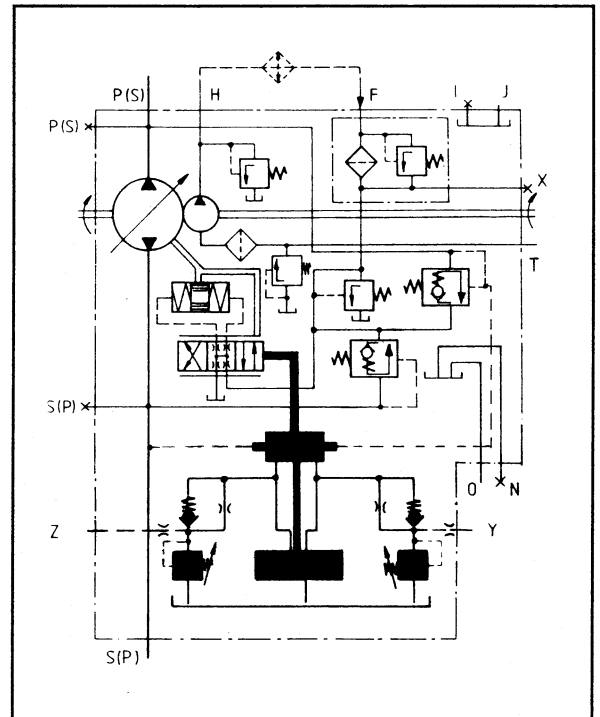
0,8 s at line resistance, other response times possible using special restrictors

**"Torque control"
TC version**

12.6 Displacement depending on control and working pressure



12.7 Circuit diagram



torque control

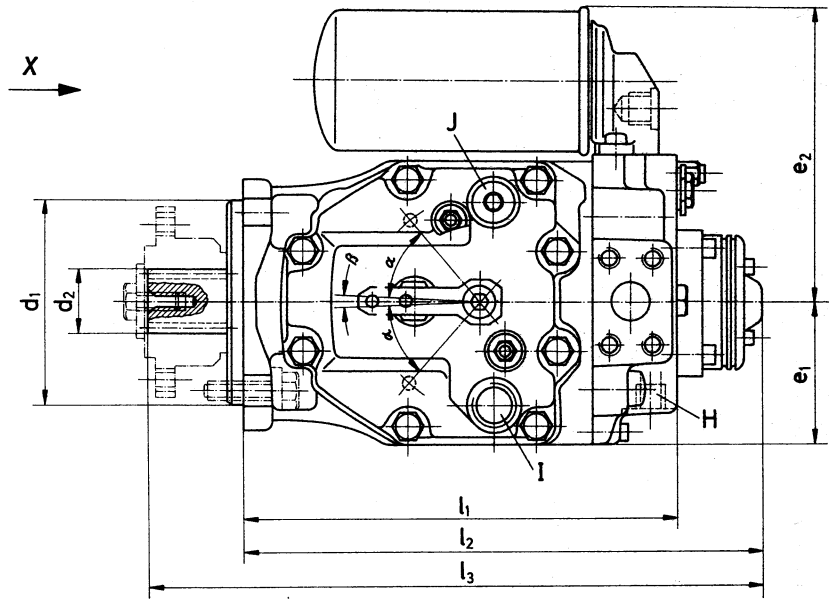
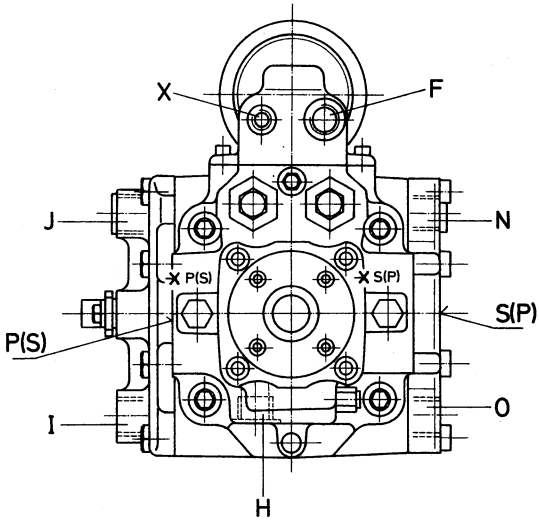
- P(S) and S(P) = pressure ports
- I, J, N and O = vent ports or oil filling, resp. drain ports, depending on mounting position
- T = tank port
- F and H = cooler ports
- Y and Z = control ports for hydraulic users
- > X = control pressure gauge port
- > P(S) and -> S(P) = gauge ports for working pressure
- > Y and -> Z = gauge ports for control pressure

13. Pump dimensions

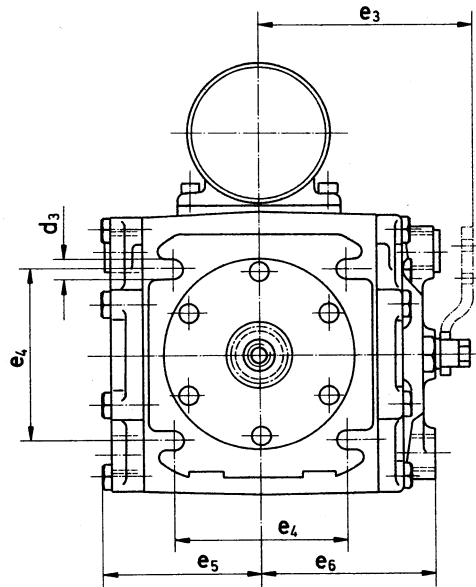
13.1 "Cam control" KS version

- P(S) and S(P) = pressure ports
- I, J, N and O = vent ports or oil filling, resp. drain ports, depending on mounting position
- F and H = cooler ports, M 22 x 1,5
- X = control port, M 14 x 1,5

"Internal suction" version
(for external suction see 14 in Annex)



Installation position preferably horizontal in relation to the drive shaft and the upper control pivot, other installation positions on request.



Ansicht X

Dimensions (in mm)

| Nominal size | d ₁ h8 | d ₂ DIN 5480 | d ₃ | e ₁ | e ₂ | e ₃ | e ₄ | e ₅ | e ₆ | l ₁ | l ₂ | l ₃ | α in° | β in° | P(S) and S(P) | | Weight in kg |
|--------------|----------------------|----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------|----------|---------------|-----------------|--------------------|
| | | | | | | | | | | | | | | | Size | Pressure series | |
| 35 | 127 | W 35x2x9 g | 15 | 82,5 | 175,5 | 130 | 114,6 | 89 | 104,5 | 246,5 | 293 | 349 | 48 | 4 | 3/4" | High pressure | 34,8 |
| 50 | | W 35x2x9 g | | 84 | 179 | 134 | | 93 | 108,5 | 257 | 304 | 360 | | | 3/4" | | 37,5 |
| 70 | | W 35x2x9 g | | 93,5 | 196 | 142 | | 107,5 | 116,7 | 282,5 | 341,5 | 397,5 | | | 1" | | 50,5 |
| 100 | | W 40x2x9 g | | 103 | 205 | 151 | | 115,5 | 125,5 | 306,5 | 366 | 422 | | | 1" | | 64 |

13.2 "Hydraulic remote control" HF version

Installation position preferably horizontal in relation to the drive shaft and the upper pivot, other installation positions on request.

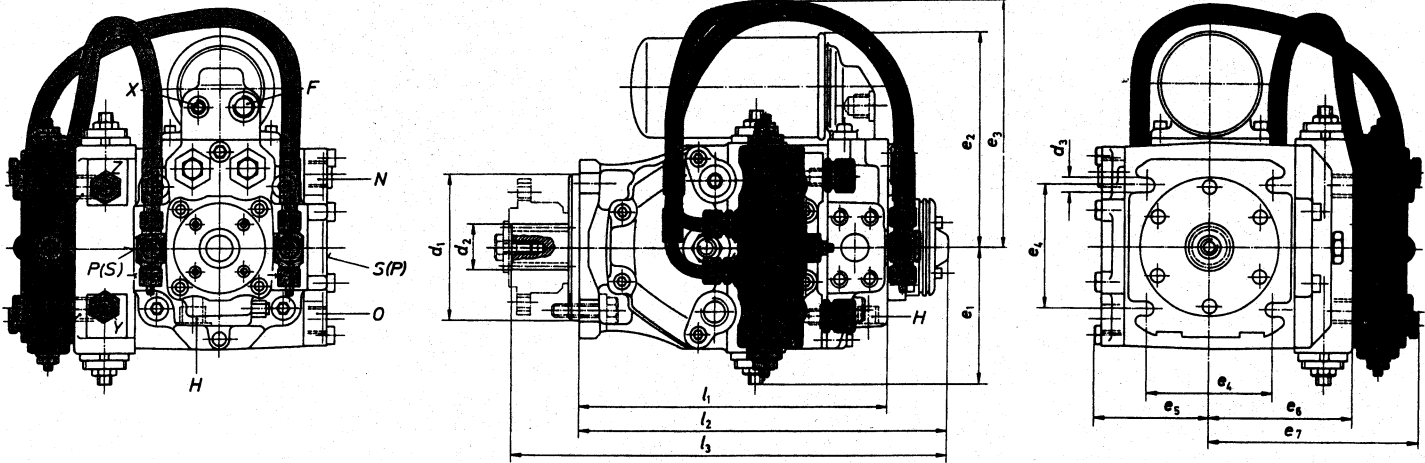
- P(S) and S(P)
I, J, N and O
- pressure ports
 - vent ports or oil filling, resp. drain ports, depending on mounting position
 - F - cooler port
 - H - cooler port
 - T - tank port (inlet)
 - X, Y and Z - control ports

Size 35...100 Size 200

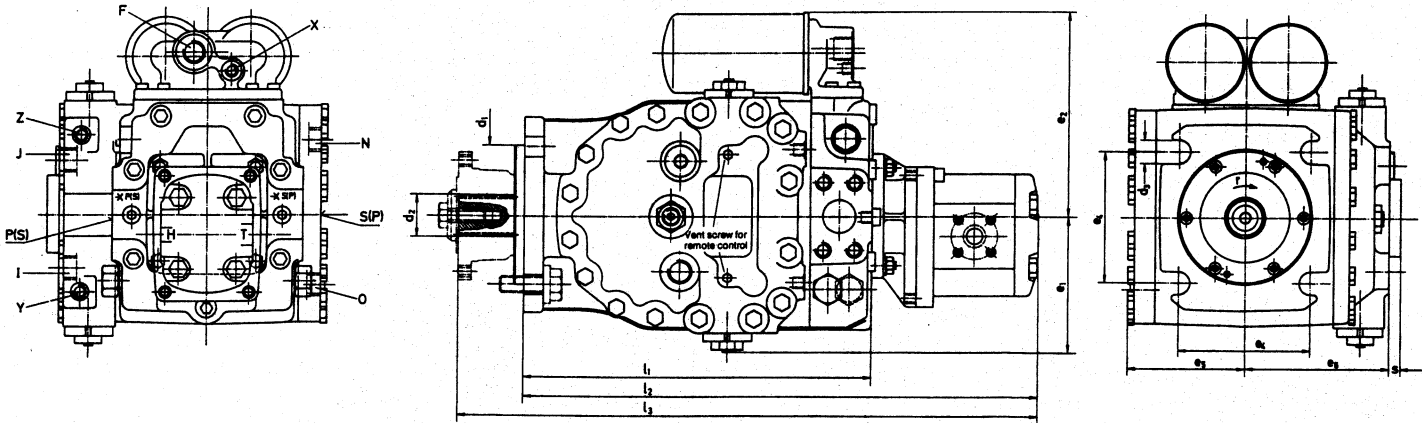
- M 22x1,5 M 28x1,5
- M 22x1,5 M 28x1,5
- M 22x1,5 18 Ø
- 26 Ø
- M 14x1,5 M 14x1,5

Nominal sizes 35...100, "internal suction" version (for external suction see 14 in Annex)

Pressure cut-off



Nominal size 200, "external suction" version (not available with internal suction)



Dimensions (In mm)

| Nominal size | d ₁ | d ₂ DIN 5480 | d ₃ | e ₁ | e ₂ | e ₃ | e ₄ | e ₅ | e ₆ | e ₇ | l ₁ | l ₂ | l ₃ | P(S) and S(P) | | Weight (kg) | | | | | | | |
|--------------|----------------|----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------|-----------------|-----------------------|--------------------------|-------|-------|-------|-------|------|------|
| | | | | | | | | | | | | | | Size | Pressure series | with pressure cut-off | without pressure cut-off | | | | | | |
| 35 | 127 | W 35x2x9 g | 15 | 118 | 175,5 | 205 | 114,6 | 89 | 117 | 165,5 | 246,5 | 293 | 349 | - | 3/4" | High pressure | 43 | 37 | | | | | |
| 50 | | 179 | | | 205 | 93 | | | | | | | | | | | 121 | 169,5 | 257 | 304 | 360 | 45,5 | 39,5 |
| 70 | | 196 | | | 222 | 107,5 | | | | | | | | | | | 129 | 178,5 | 282,5 | 341,5 | 397,5 | 59,5 | 53,5 |
| 100 | 165 | W 40x2x9 g | 23 | 147,5 | 205 | 230 | 162 | 115,5 | 138 | 187 | 306,5 | 366 | 422 | 1" | High pressure | 73 | 67 | | | | | | |
| 200 | | W 50x2x9 g | | | 238 | - | | | | | | | | | | 144 | 177 | - | 406 | 600,7 | 677,7 | 11 | - |

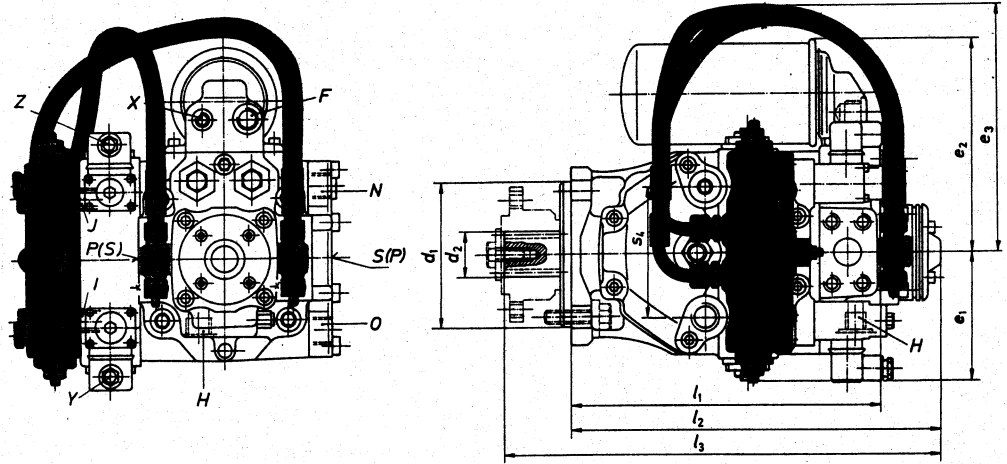
Please refer to installation drawings for exact dimensions or those not shown - design changes are reserved in the interest of technical progress.

13.3 "Electro-hydraulic control" EH version

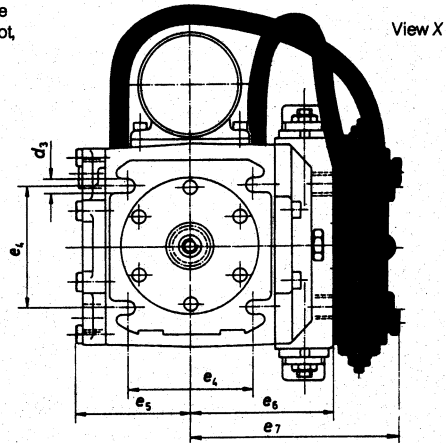
- P(S) and S(P) = pressure ports
- I, J, N and O = vent ports or oil filling, resp. drain ports, depending on mounting position, M 22 x 1,5
- F and H = cooler ports, M 22 x 1,5
- X = control port, M 14 x 1,5

"Internal suction" version
(for external suction see 14 in Annex)

Pressure cut-off



Installation position preferably horizontal in relation to the drive shaft and the upper control pivot, other installation positions on request.



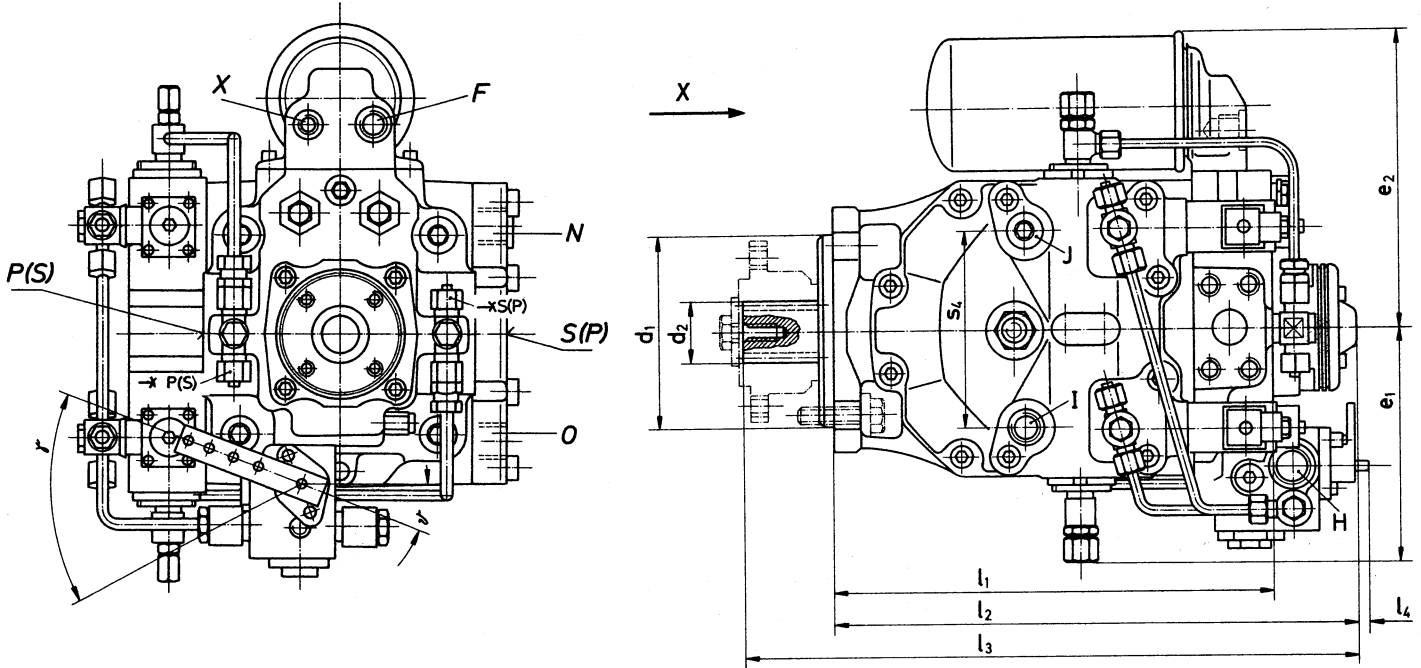
Dimensions (In mm)

| Norm. rail size | e_1 | e_2 | e_3 | e_4 | e_5 | e_6 | e_7 | d_1 | d_2 | d_3 | d_4 | d_5 | d_6 | d_7 | P(S) and S(P) size | Pressure range | with pressure cut-off | without pressure cut-off |
|-----------------|----------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------|----------------|-----------------------|--------------------------|
| NB | DIN 5480 | | | | | | | | | | | | | | | | | |
| 35 | 127 | W 35x2x9 g | 15 | 112 | 175,5 | 205 | 114,6 | 89 | 117 | 165,5 | 246,5 | 293 | 349 | 3/4" | High pressure | 44 | 38 | |
| 50 | | W 35x2x9 g | | 112 | 179 | 205 | | 93 | 121 | 169,5 | 257 | 304 | 360 | 3/4" | | 46,5 | 40,5 | |
| 70 | | W 35x2x9 g | | 120 | 196 | 222 | | 107,5 | 129 | 178,5 | 282,5 | 341,5 | 397,5 | 1" | | 60,5 | 54,5 | |
| 100 | | W 40x2x9 g | | 124 | 205 | 230 | | 115,5 | 138 | 187 | 306,5 | 366 | 422 | 1" | | 74 | 68 | |

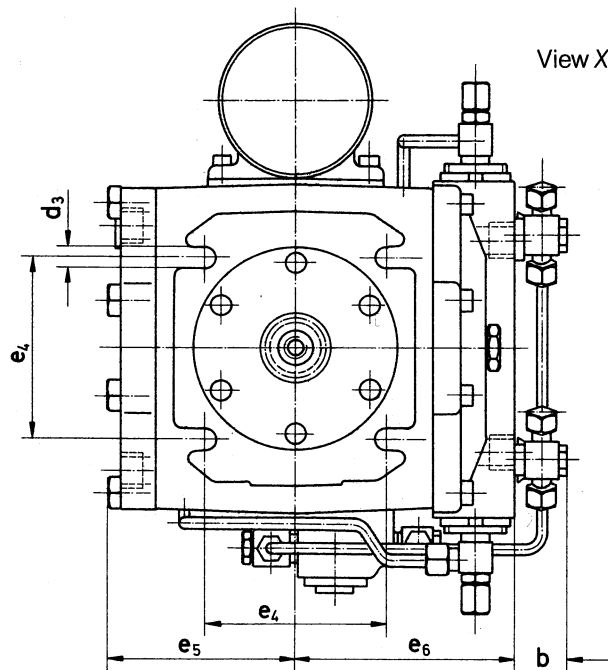
13.4 "Automotive control" AU version

- P(S) and S(P) = pressure ports
- I, J, N and O = vent ports or oil filling, resp. drain ports,
depending on mounting position, M 22 x 1,5
- F and H = cooler ports, M 22 x 1,5
- X = control port, M 14 x 1,5

"Internal suction" version
(for external suction see 14 in Annex)



Installation position preferably
horizontal in relation to the drive
shaft and the upper control pivot,
other installation positions on
request.



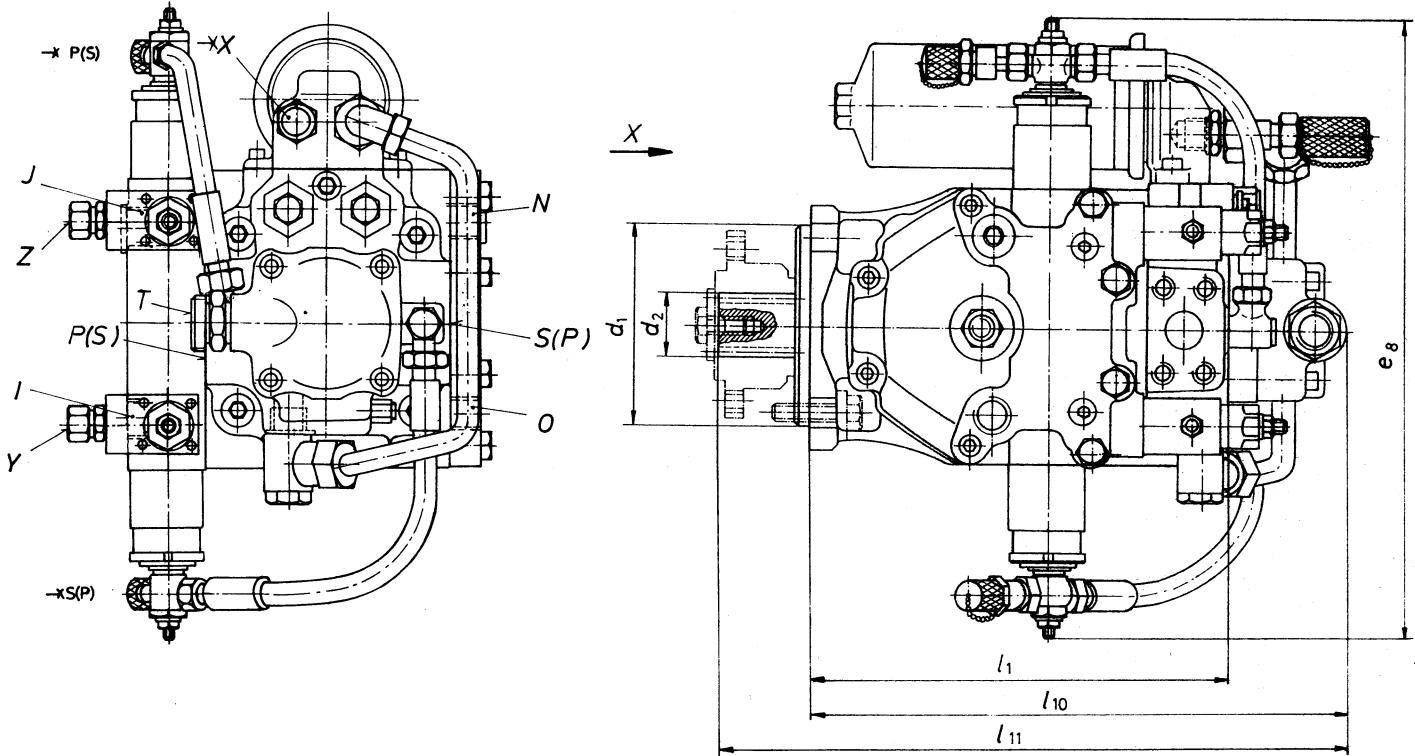
Dimensions (in mm)

| Nominal size | b | c ₁ h8 | d ₂ DIN 5480 | d ₃ | e ₁ | e ₂ | e ₄ | e ₅ | e ₆ | l ₁ | l ₂ | l ₃ | l ₄ | in° | | P(S) and S(P) | | Weight in kg | |
|--------------|----|----------------------|----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|-----|---------------|-----------------|--------------------|------|
| | | | | | | | | | | | | | | in° | in° | Size | Pressure series | | |
| 35 | 36 | | W 35x2x9 g | | 104 | 175,5 | | 89 | 117 | 246,5 | 293 | 349 | 20,5 | 50 | 21 | 3/4" | High pressure | 39,5 | |
| 50 | 36 | 127 | W 35x2x9 g | 15 | 104 | 179 | 114,6 | 93 | 121 | 257 | 304 | 360 | 20 | | | 3/4" | | | 42 |
| 70 | 31 | | W 35x2x9 g | | 113 | 196 | | 107,5 | 129 | 282,5 | 341,5 | 397,5 | 7 | | | 1" | | | 56 |
| 100 | 32 | | W 40x2x9 g | | 163 | 205 | | 115,5 | 138 | 306,5 | 366 | 422 | 8 | | | 1" | | | 69,5 |

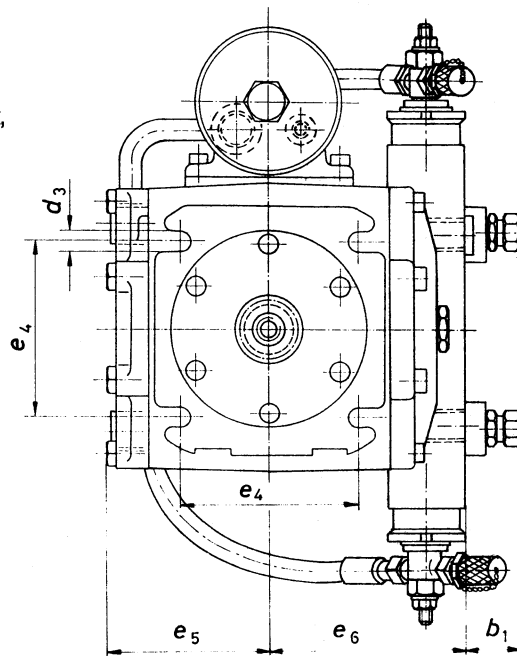
13.5 "Torque control" TC version

- P(S) and S(P) = pressure ports
- I, J, N and O = vent ports or oil filling, resp. drain ports, depending on mounting position, M 22 x 1,5
- F and H = cooler ports, M 22 x 1,5
- X = control port, M 14 x 1,5
- Y and Z = control port for pipe Ø 10 (with GE10 - PLM - ED V80)

"External suction" version



Installation position preferably horizontal in relation to the drive shaft and the upper control pivot, other installation positions on request.



View X

Dimensions (in mm)

| Nominal size | b ₁ | d ₁ h8 | d ₂ DIN 5480 | d ₃ | e ₄ | e ₅ | e ₆ | e ₈ | l ₁ | l ₁₀ | l ₁₁ | P(S) and S(P) | | Weight in kg |
|--------------|----------------|----------------------|----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|-----------------|--------------|
| | | | | | | | | | | | | Size | Pressure series | |
| 35 | 39,5 | | W 35 x 2 x 9g | | | 89 | 117 | 415 | 246,5 | 310 | 366 | ¾" | High pressure | 37 |
| 70 | 39,5 | 127 | W 35 x 2 x 9g | 15 | 114,5 | 107,5 | 129 | 428 | 282,5 | 357 | 413 | 1" | | 53,5 |
| 100 | 41,5 | | W 40 x 2 x 9g | | | 115,5 | 138 | 428 | 306,5 | 381 | 437 | 1" | | 67 |

14. Annex

For mounting dimensions see page 27.

14.1 Coupling flanges

Coupling flanges are available in standard and in cardan shaft version.

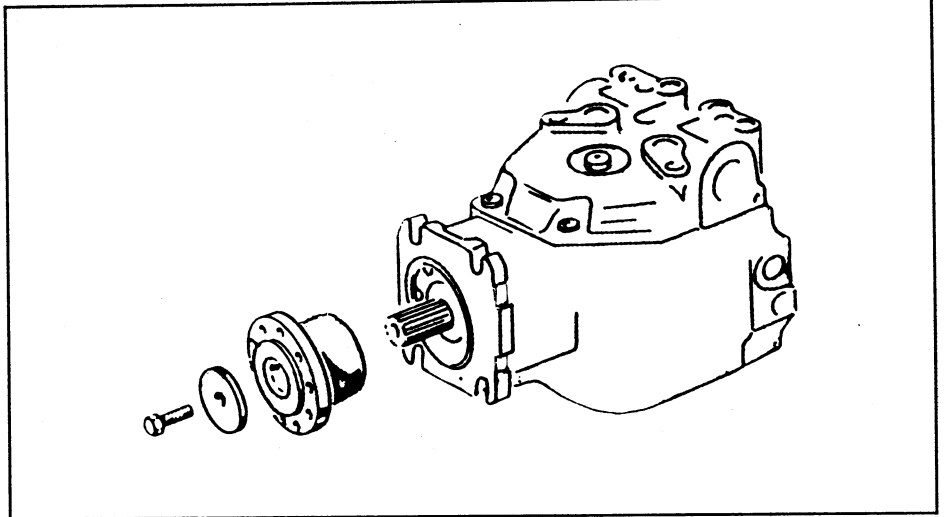


Fig. 12. Variable pump BPV .. KS with coupling flange

14.2 Auxiliary pump with internal suction

This system is an especially cost effective solution mainly for single circuit systems. Another advantage is a reduced contamination risk of the circuit.

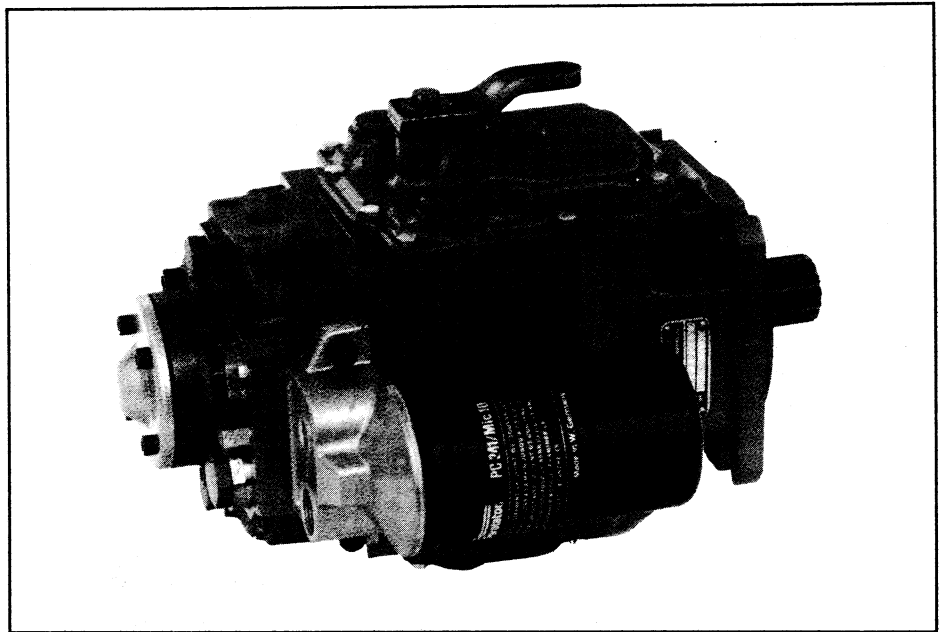


Fig. 13. Variable pump BPV .. with internal suction boost pump

14.3 Auxiliary pump with external suction

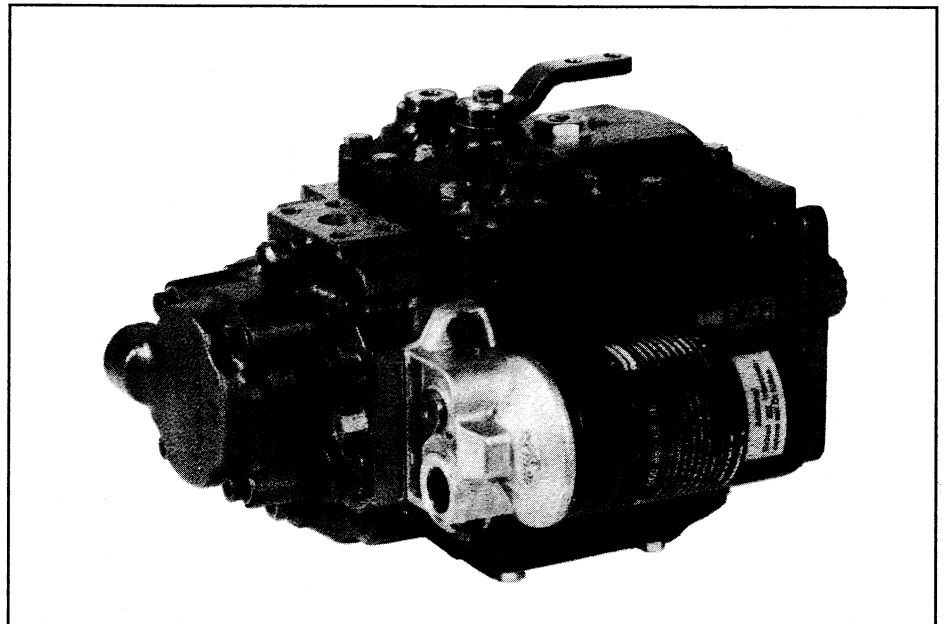


Fig. 14. Variable pump BPV .. with external suction boost pump

14.4 PTO shaft

Additional drives, e.g. auxiliary pumps, can be connected via the external spline at the end of the PTO shaft; this is possible with internal as well as external suction boost pumps.

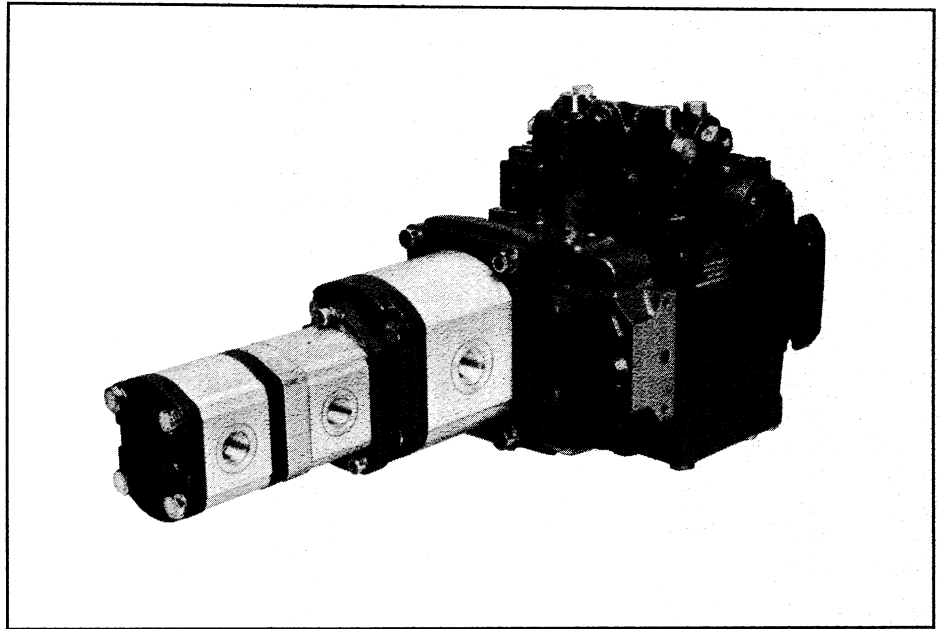


Fig. 15. Variable pump BPV .. with additionally mounted gear pump

14.5 Tandem version

Tandem pumps are a cost effective drive solution for multiple circuit systems.

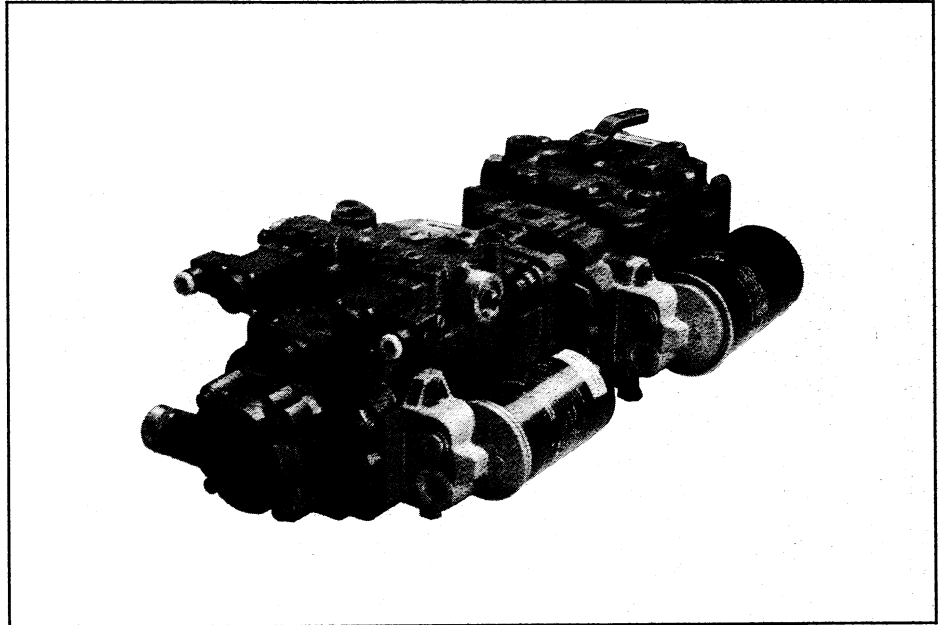
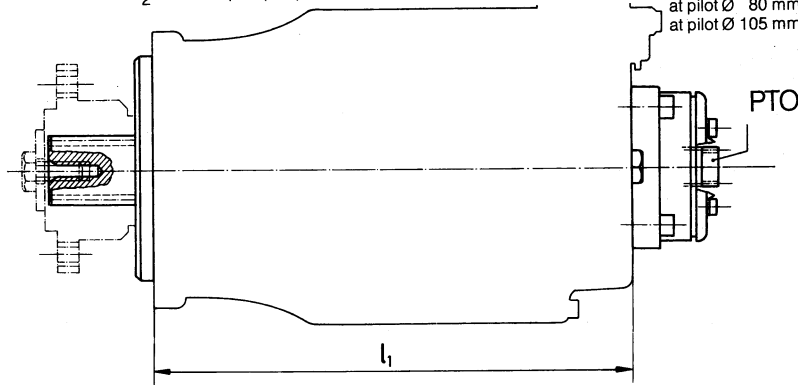


Fig. 16. Variable pump BPV .. KS and BPV .. EH in tandem version

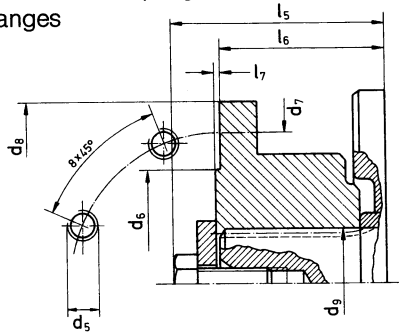
14.6 Mounting dimensions

T₁ = tank port (inlet) M 26x1,5
 T₂ = tank port (inlet) M 36x2

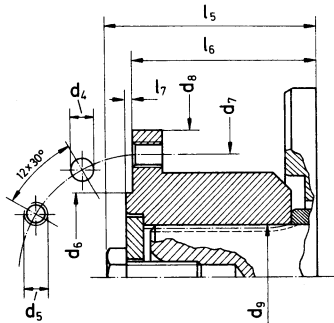
PTO = additional power take-off W 25x1,25x9 g – DIN 5480
 PTO (1) = additional drive for auxiliary pumps
 at pilot Ø 80 mm A 17x14
 at pilot Ø 105 mm A 28x25



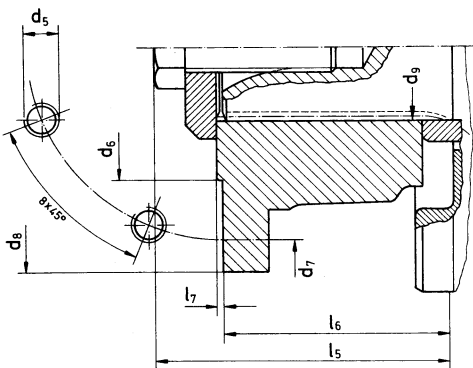
14.6.1 Drive shaft coupling flanges



Sizes 35 ... 100 standard version

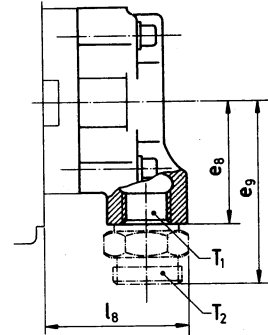


Sizes 35 ... 70 cardan shaft version



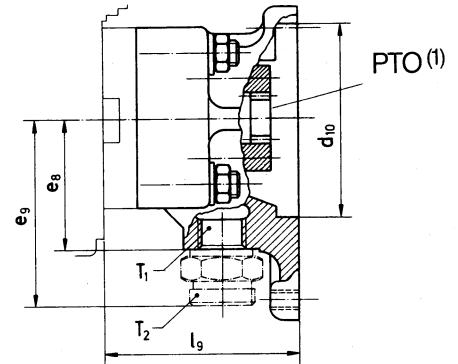
Size 200 standard version

14.6.2 Auxiliary pump with external suction

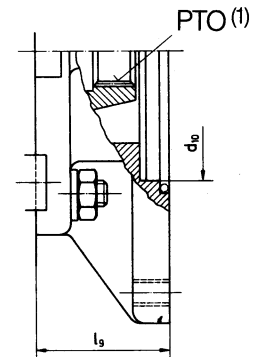


External suction (sizes 35 ... 100)

14.6.3 PTO shaft flanges



Flange for PTO shaft (sizes 35 ... 100), port T₁ closed for internal suction



Flange for PTO shaft (size 200)

Dimensions (in mm)

| Nominal size | Displ. in cm ³ /rev | d ₄ | | d ₅ | | d ₆ (h 8) | | d ₇ | | d ₈ | | d ₉ | | Pilot diam N7 | l ₁ | l ₅ | l ₆ | | l ₇ | l ₈ | l ₉ | | e ₈ Ext suction | Flange for PTO | e ₉ Ext suction | Flange for PTO |
|--------------|--------------------------------|----------------|------|----------------|----|----------------------|-------|----------------|-----|----------------|----------|----------------|----------------|---------------|----------------|----------------|----------------|---|----------------|----------------|----------------|------|----------------------------|----------------|----------------------------|----------------|
| | | A | B | A | B | A | B | A | B | A | B | Pilot diam 80 | Pilot diam 105 | | | | | | | | | | | | | |
| 35 | 12 18,3 | 8,2 | M 10 | M 8 | 75 | 57 | 101,5 | 84 | 120 | 98 | W35x2x9g | | 80 | 246,5 | 71 | 56 | 62 | 2 | 64 | 74,5 | 75,5 | 93,5 | 65 | 70 | 90 | 95 |
| 50 | | | 75,5 | 93,5 | | | | | | | | | | | | | | | | | | | | | | |
| 70 | | | 86,5 | 104,5 | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 38 | — | M 10 | — | 75 | — | 101,5 | — | 120 | — | W40x2x9g | | 105 | 306,5 | 98,6 | 76,6 | — | 2 | 74,5 | 86,5 | 104,5 | — | — | — | — | |
| 200 | | | M 12 | — | 90 | — | 130 | — | 144 | — | W50x2x9g | | 105 | 406 | | | | | | 86,5 | 104,5 | | | | | 52 |

A = standard version B = cardan shaft version

The Linde logo is rendered in a classic, elegant cursive script. The letters are black and stand out against a white background. The 'L' is particularly large and stylized, with a decorative flourish at the top. The 'i' and 'n' are also highly stylized, with the 'n' having a prominent, rounded top. The 'd' is smaller and more compact, and the 'e' is a simple, rounded shape. The overall appearance is that of a professional, high-quality brand mark.

Linde

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