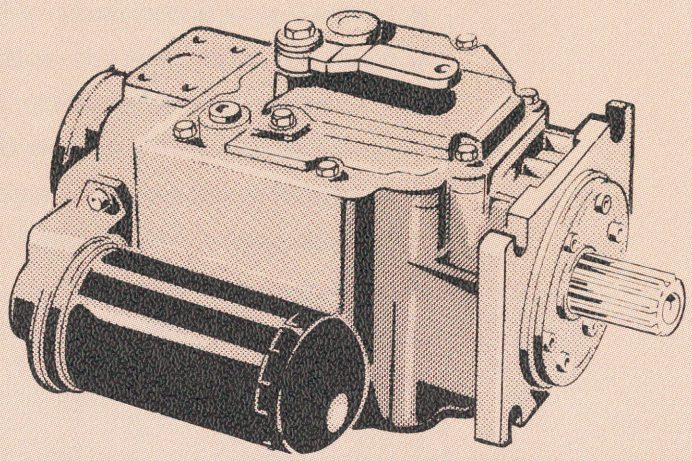


Linde

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

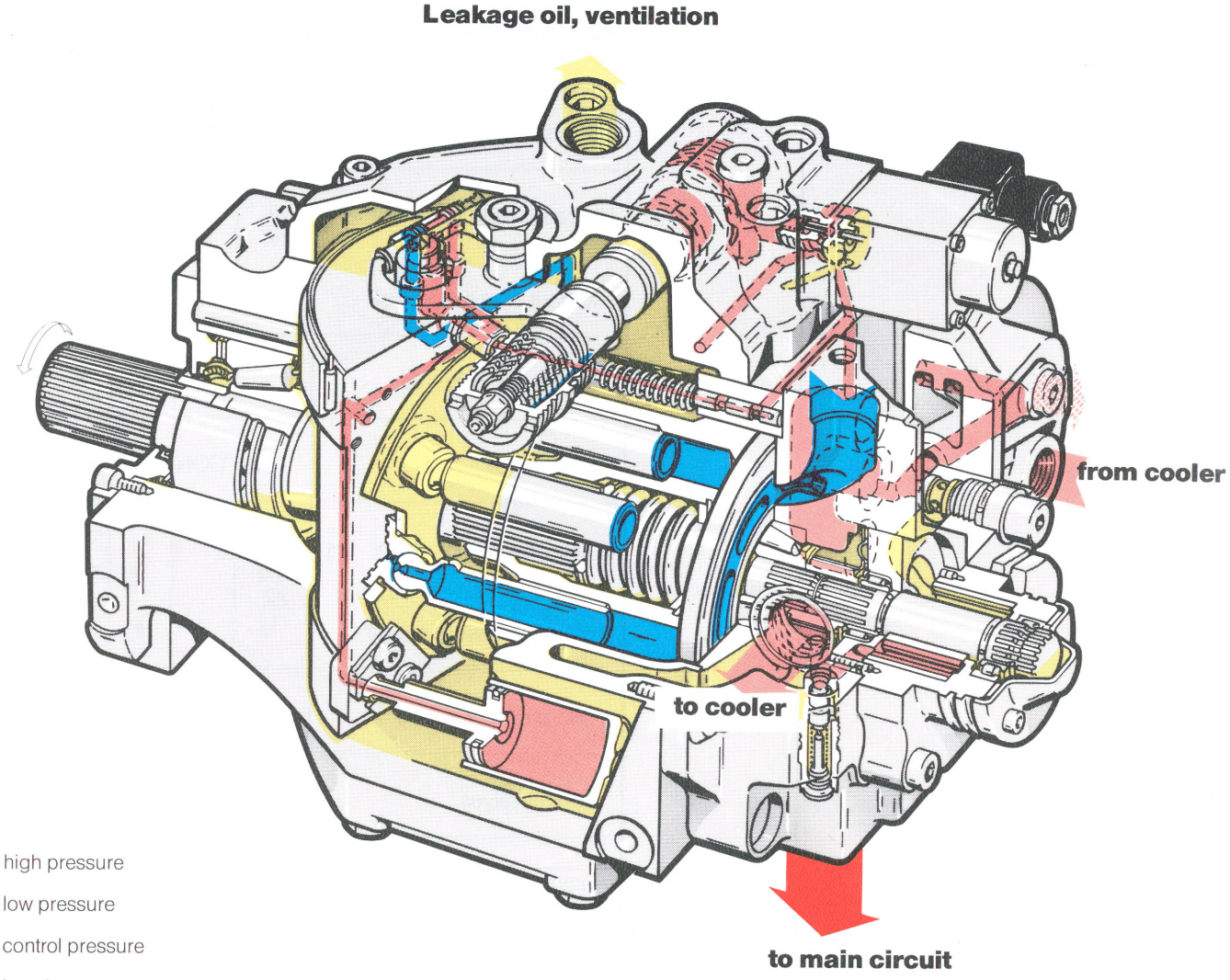
1.2 Technical features

- 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

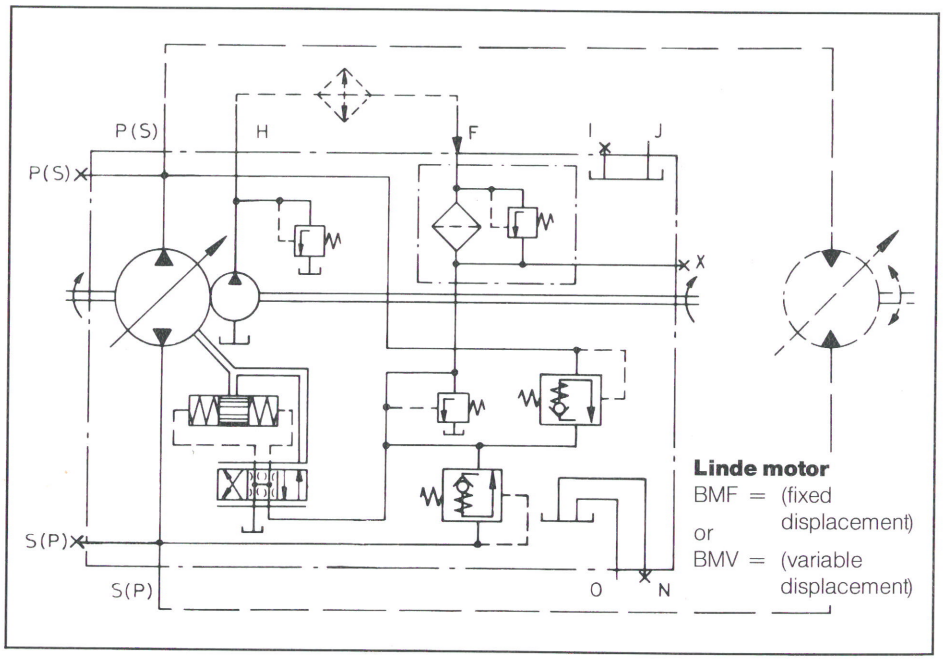
- cam control with positive stretched neutral
- hydraulic remote control
- electro-hydraulic control
- automotive control
- torque control

1.4 Functional diagram



Variable pump BPV .. EH for electro-hydraulic control

1.5 Standard circuit diagram



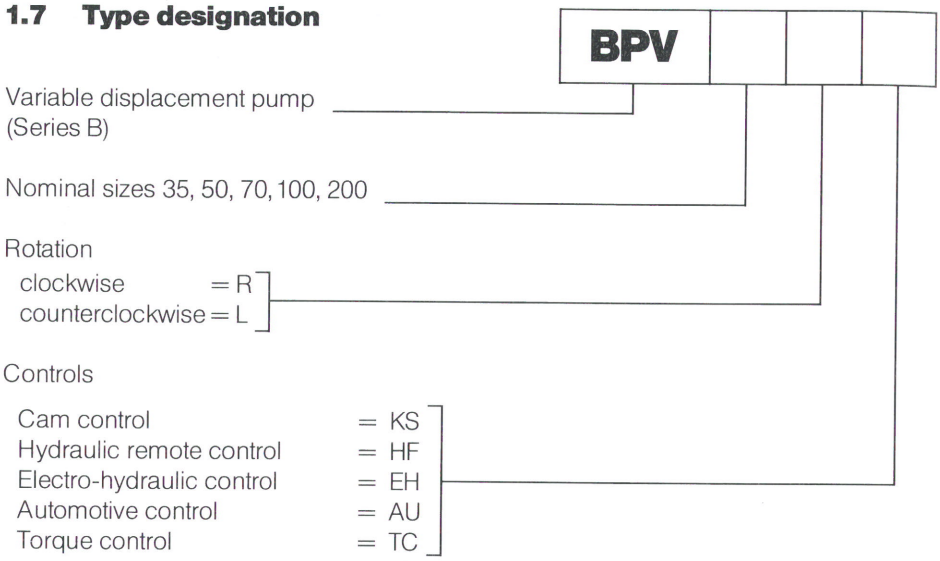
Legend:

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

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					upon request
	without pressure cut-off			•	•	•	•	
	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					

1.7 Type designation



2. Characteristics

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.

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. General characteristics

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

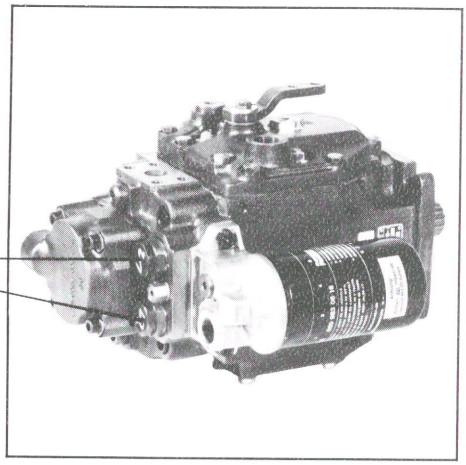
Nominal sizes		35	50	70	100	200
Moment of inertia	kgm^2	0,0077	0,0110	0,0169	0,0280	0,1350

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



5.1.1 Opening stroke

approx. 3 mm = 2 turns at sizes35...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

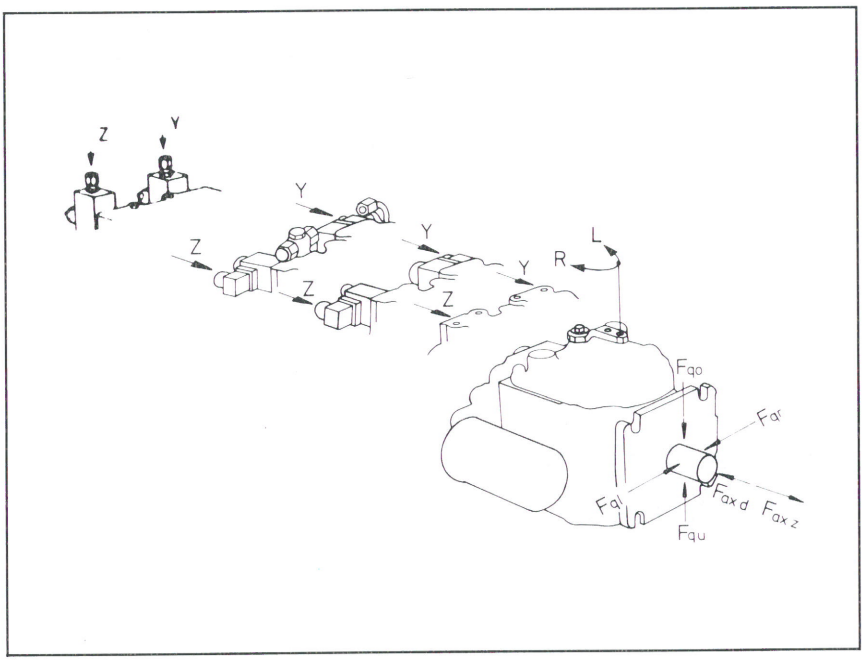
approx. 20 ... 25% of the installed input power (normally)

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} Position R, Y	F_{qr} Position L, Z	F_{ql} Position R, Y	F_{ql} Position L, Z	$F_{ax\,d}$	$F_{ax\,z}$
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

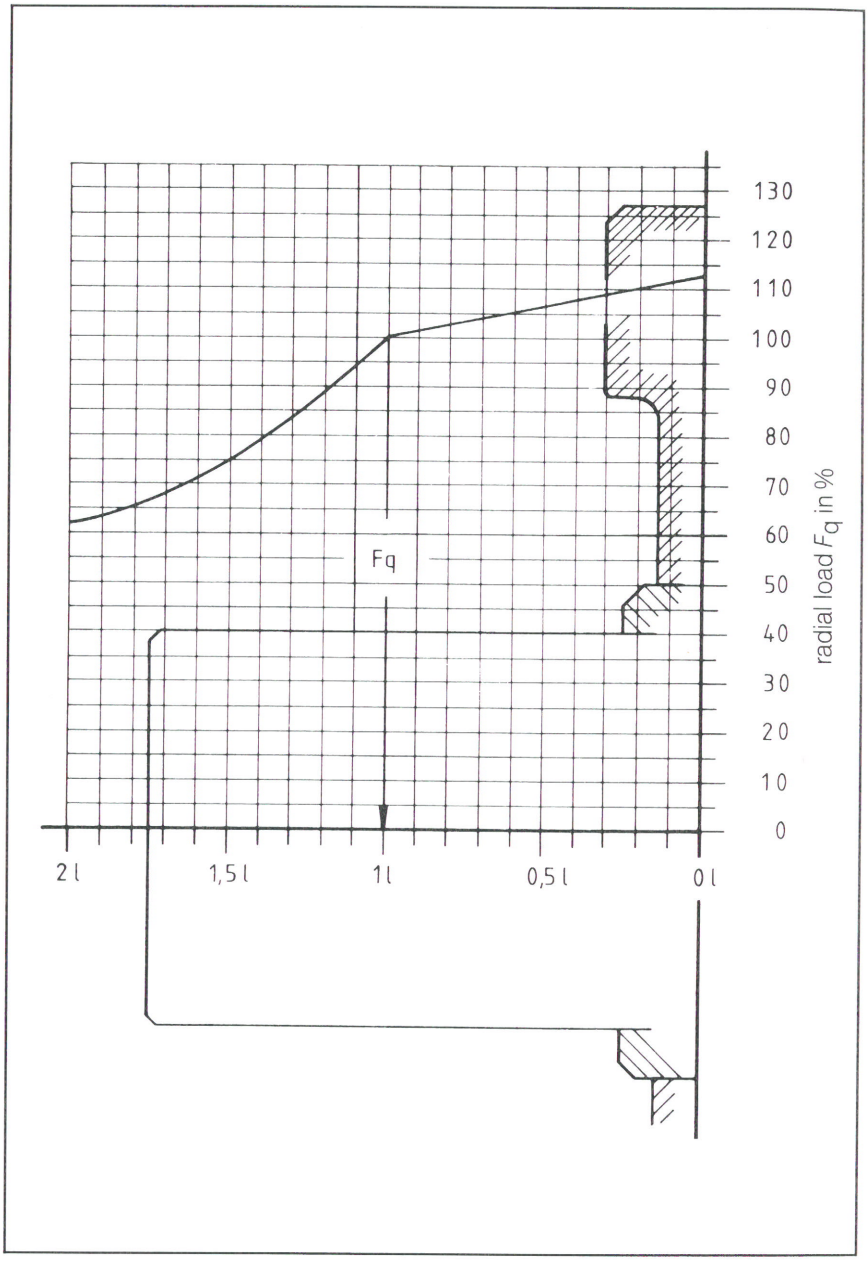
double the load is permitted intermittently*

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

7.2 *l*-F_q characteristic

at continuous pressure = 250 bar and max. speed

percentage radial force F_q % depending on load distance 1 *l*

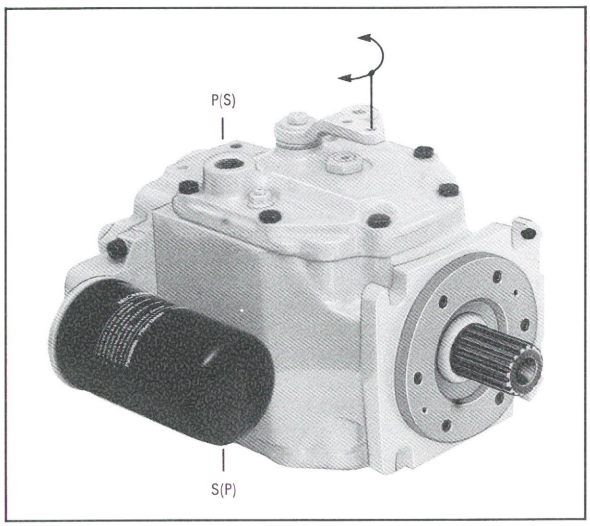


Nominal size		35	50	70	100	200
Point of impact 1 *l* (from front flange to shaft)	mm	32	32	32	32	42.5

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	
8.2.1	Control from neutral position (control lever on top)	clockwise	counterclockwise
	clockwise	S(P) → P(S)	P(S) → S(P)
	counterclockwise	P(S) → S(P)	S(P) → P(S)

8.3 Control force

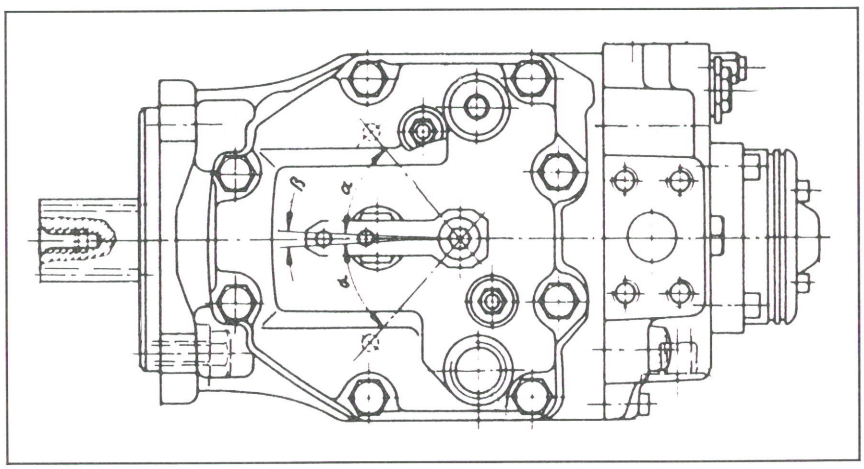
17 . . . 22 N (see page 20)

8.4 Control angle

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

8.4.1 From neutral range to one end position $\alpha = 48°$

8.4.2 Neutral range $\beta = 4°$



8.5 Control torque

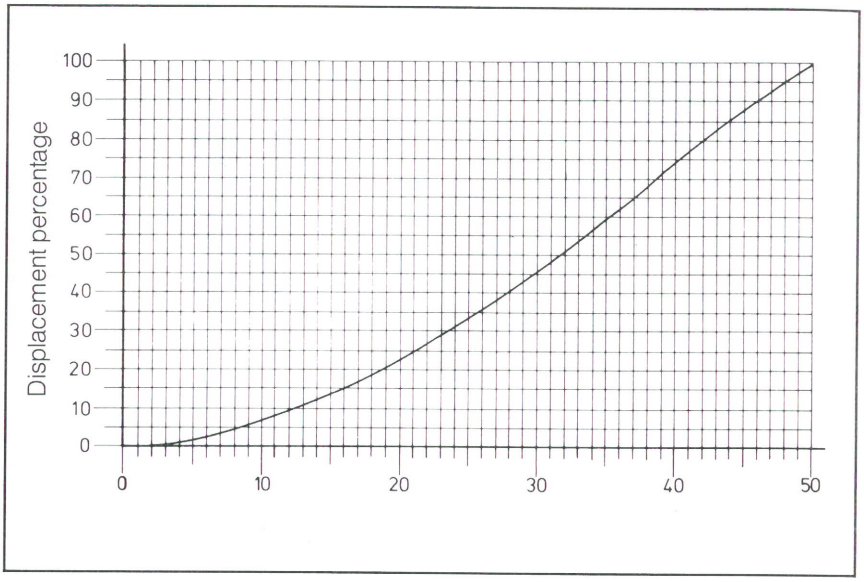
1,19 . . . 1,54 Nm

8.6 Minimum response time

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

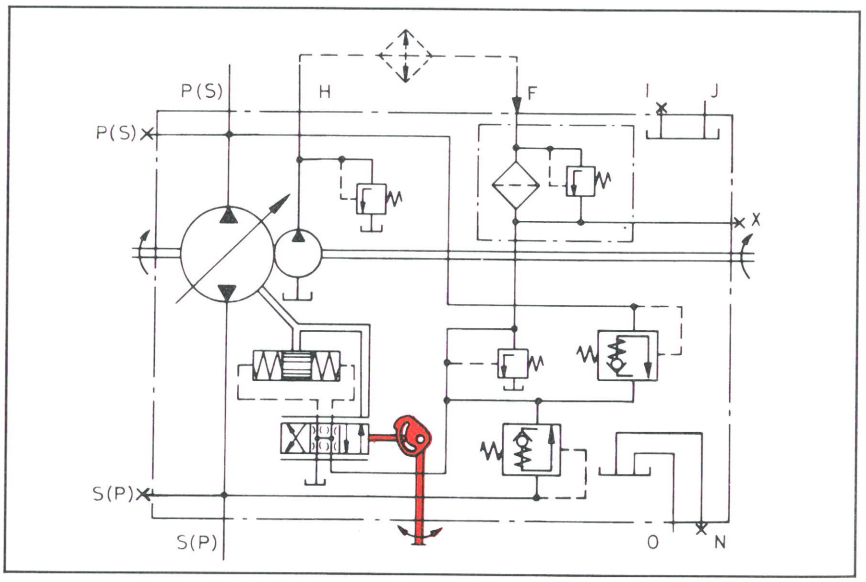
"Cam control"
KS version

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
→X *X*	=	control pressure port
→X *P(S)* and →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

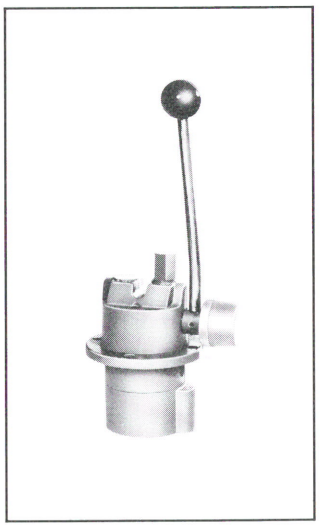


Fig. 3. Pilot valve for stepless hydraulic remote control

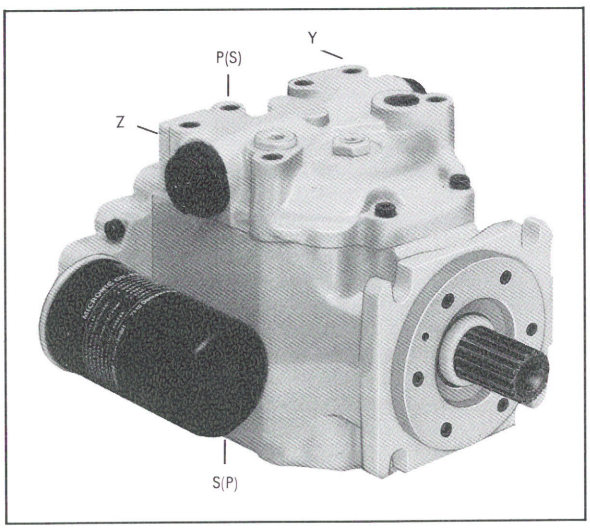


Fig. 4. Variable pump BPV .. HF (without pressure cut-off)

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).

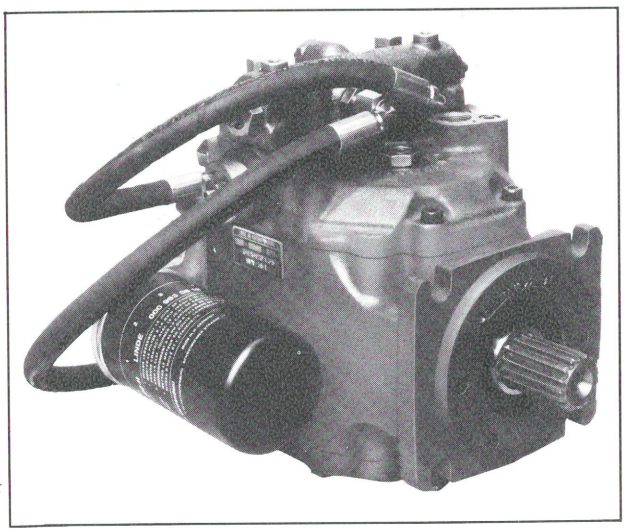


Fig. 5. Variable pump BPV .. HF (with pressure cut-off)

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

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

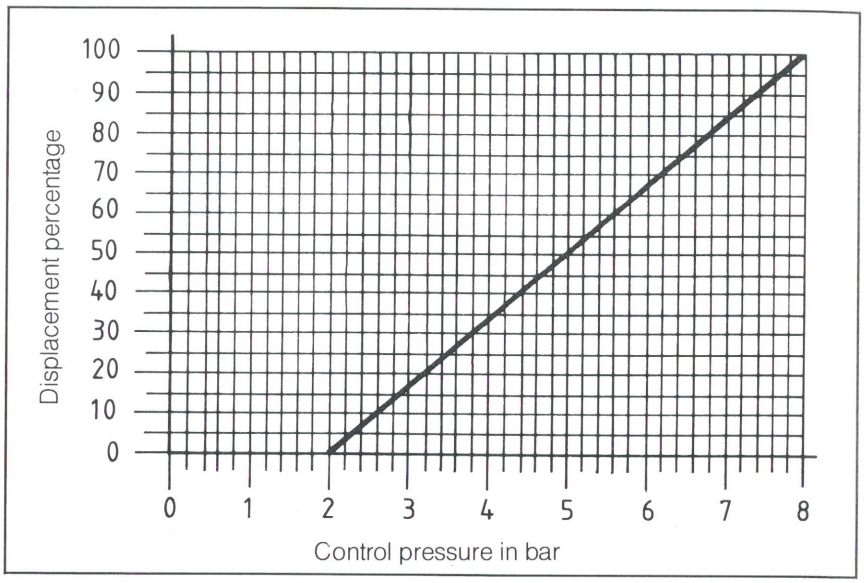
8,6 cm^3 for sizes 35 . . . 100;
12,3 cm^3 for size 200

9.5 Minimum response time

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

"Hydraulic remote control" HF version

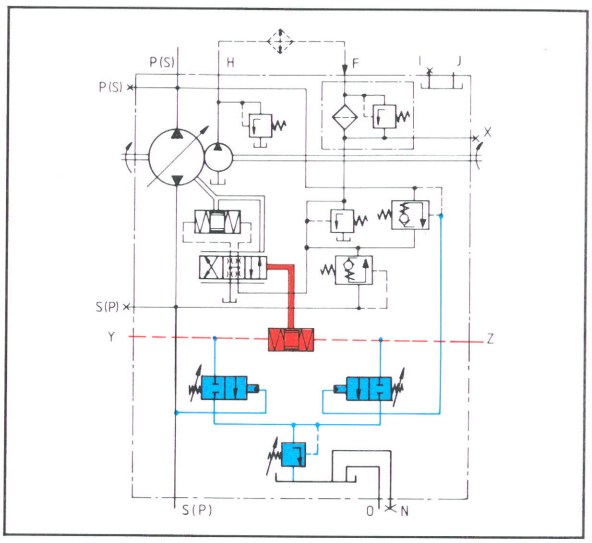
9.6 Displacement depending on control pressure



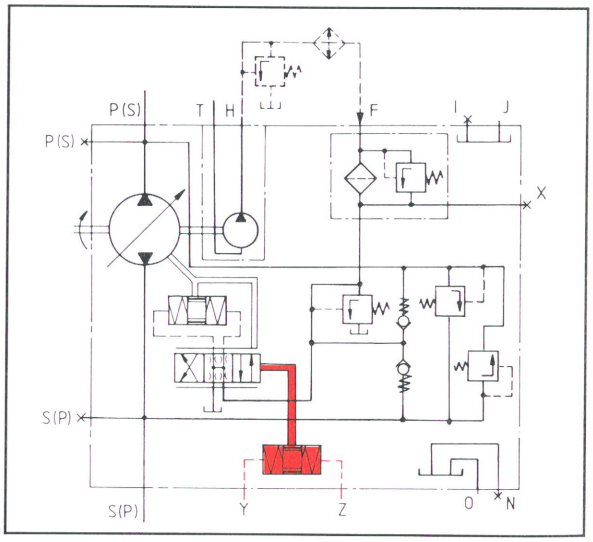
9.7 Circuit diagram

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
→X *X*	=	control pressure gauge port
→X *P(S)* and →X *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

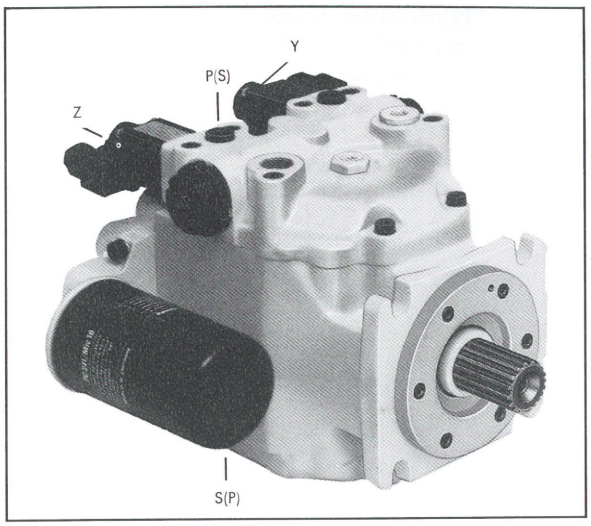


Fig. 7. Variable pump BPV .. EH (without pressure cut-off)

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).

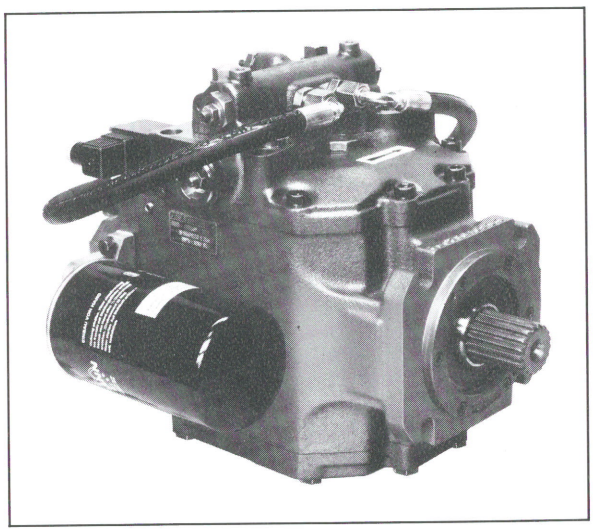


Fig. 8. Variable pump BPV .. EH (with pressure cut-off)

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	clockwise	counterclockwise
	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)

10.3 Rated voltage = continuous voltage limit

12 V or 24 V

10.4 Voltage type

d.c. voltage

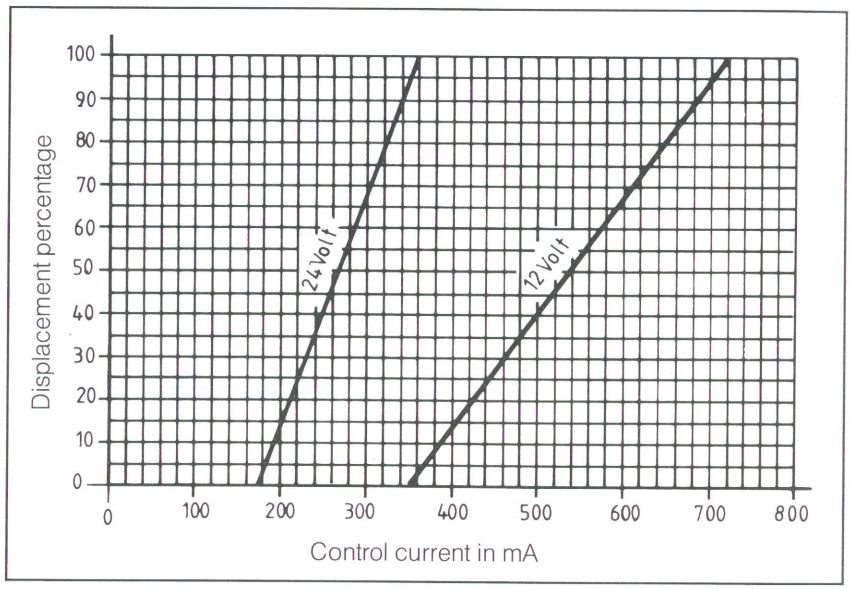
10.5 Power input

26 W

"Electro-hydraulic control" EH version

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

10.11 Displacement depending on regulation current



10.12 Circuit diagram

P(S) and *S(P)*
= pressure ports

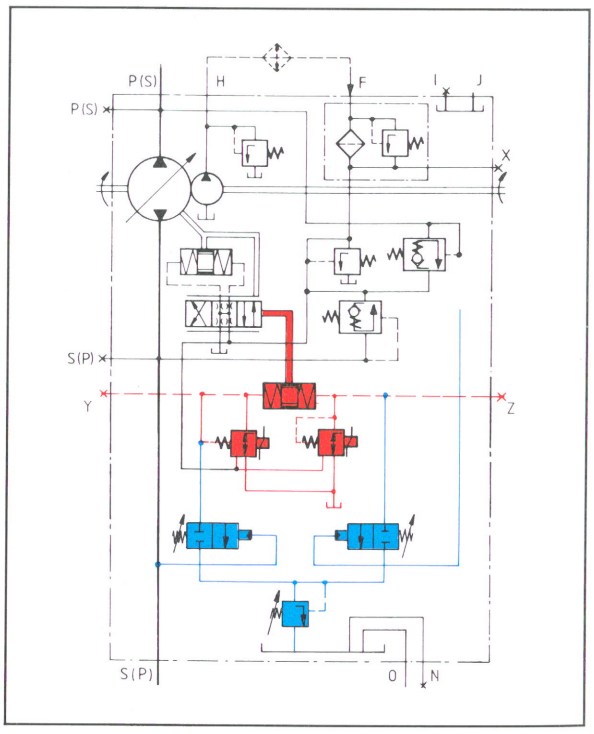
I, *J*, *N* and *O*
= vent ports or oil filling, resp. drain ports, depending on mounting position

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

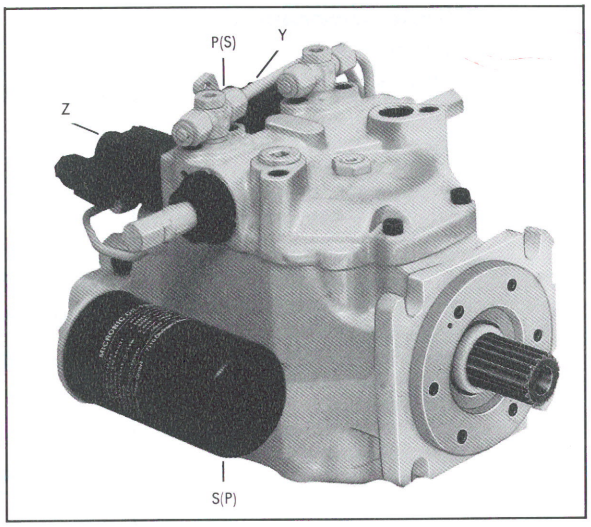


electro-hydraulic control
pressure cut-off

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	
11.2.1	Control from neutral position	clockwise	counterclockwise
	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

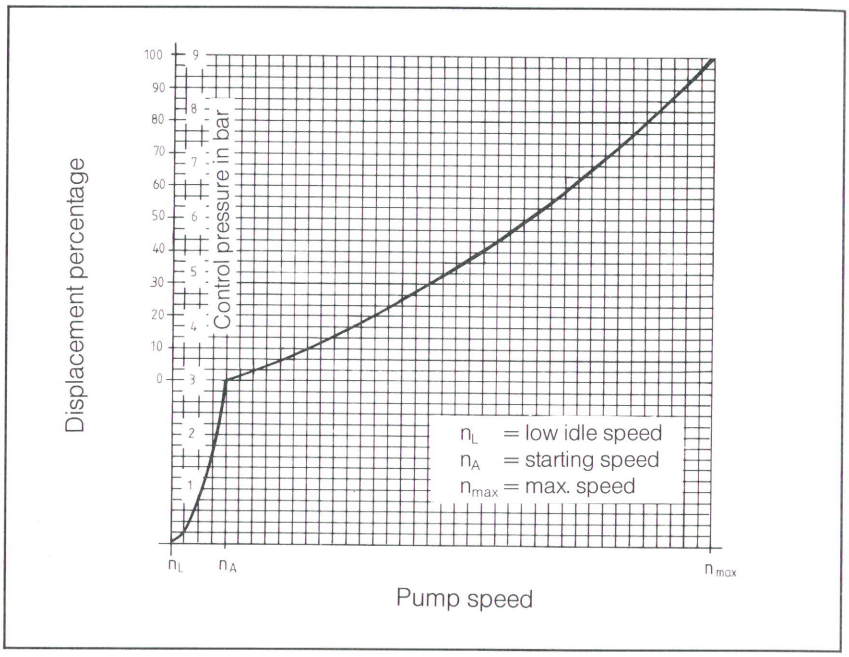
I P 54 as per DIN 40050

11.9 Minimum response time

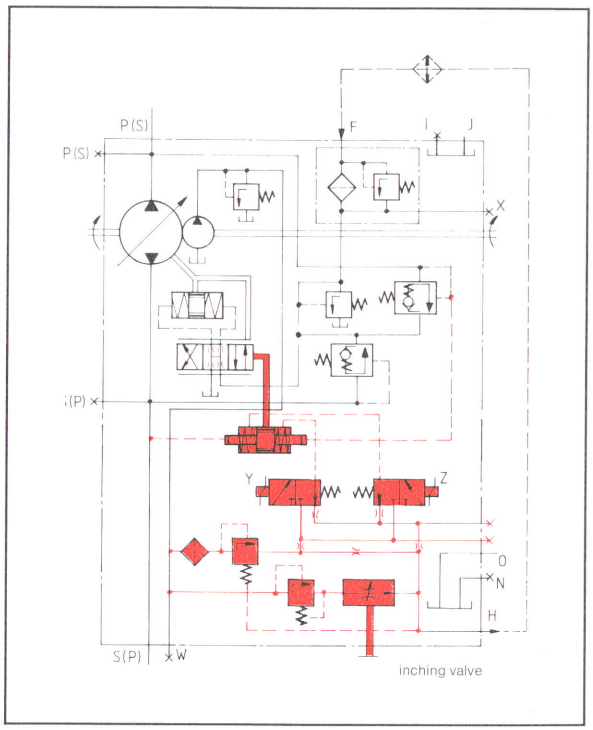
0,8 s, other response times possible using special restrictors

"Automotive control" AU version

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
→× *X*	=	control pressure gauge port
→× *P(S)* and →× *S(P)*	=	gauge ports for working pressure
→× *W*	=	gauge port for boost pump pressure

12. "Torque control" TC version

with hydraulic pilot control
with deliberately variable
holding pressure setting

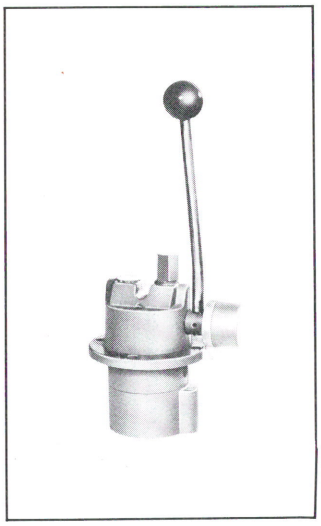


Fig. 10. Pilot valve for stepless hydraulic control

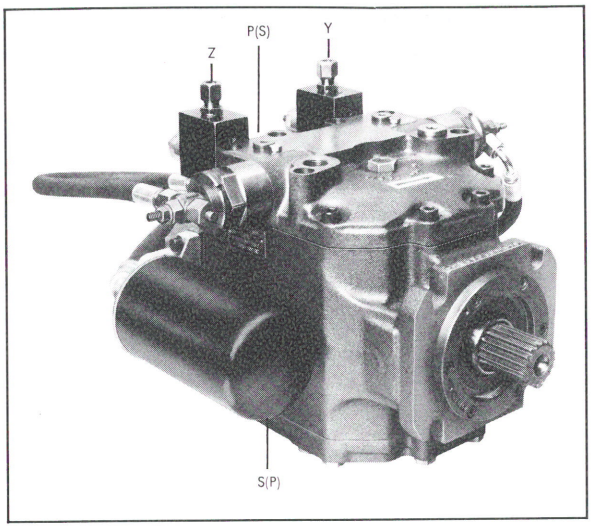


Fig. 11. Variable pump BPV .. TC

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	
12.2.1	Control from neutral position	clockwise	counterclockwise
	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

Δ 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

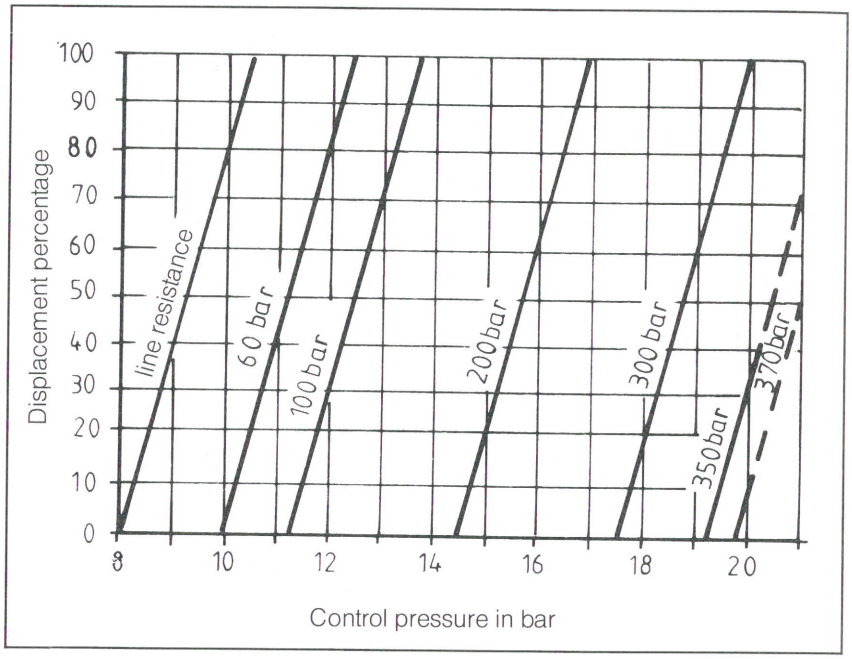
8,6 cm^3

12.5 Minimum response time

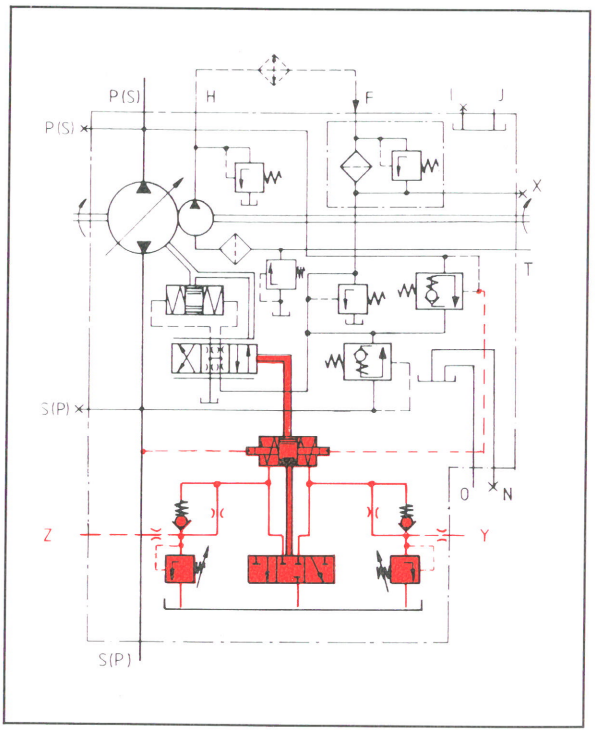
0,8 s at line resistance, other response times possible using special restrictors

"Torque control" TC version

12.6 Displacement depending on control and working pressure



12.7 Circuit diagram



torque control

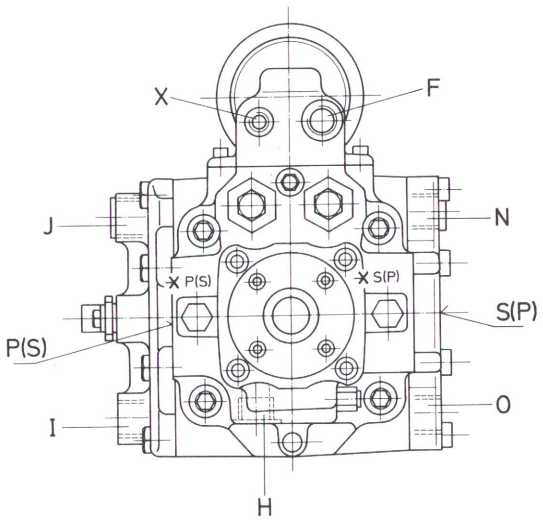
P(S) and *S(P)*	=	pressure ports
I, J, N and *O*	=	vent ports or oil filling, resp. drain ports, depending on mounting position
T	=	tank port
F and *H*	=	cooler ports
Y and *Z*	=	control ports for hydraulic users
→X *X*	=	control pressure gauge port
→X *P(S)* and →X *S(P)*	=	gauge ports for working pressure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

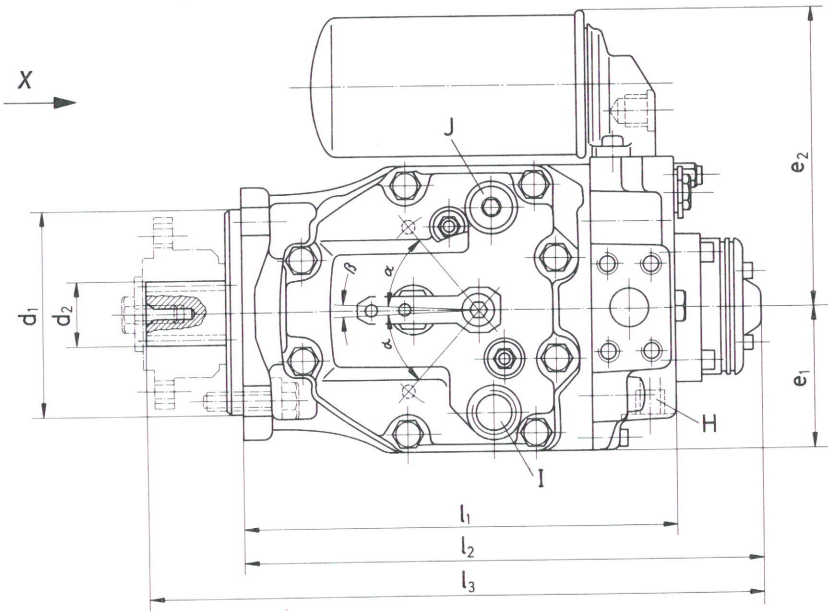
13. Pump dimensions

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

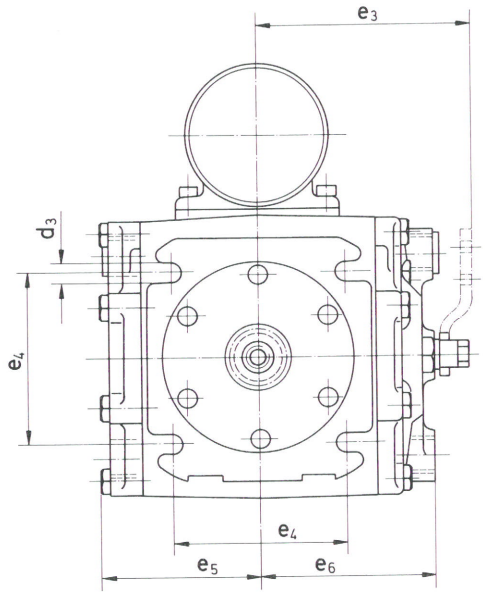
13.1 "Cam control" KS version

"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)* Size	*P(S)* and *S(P)* Pressure series	Weight in kg
35	127	W 35x2x9 g	15	82,5	175,5	130	114,6	89	104,5	246,5	293	349	48	4	¾"	High pressure	34,8
50		W 35x2x9 g		84	179	134		93	108,5	257	304	360			¾"		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

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

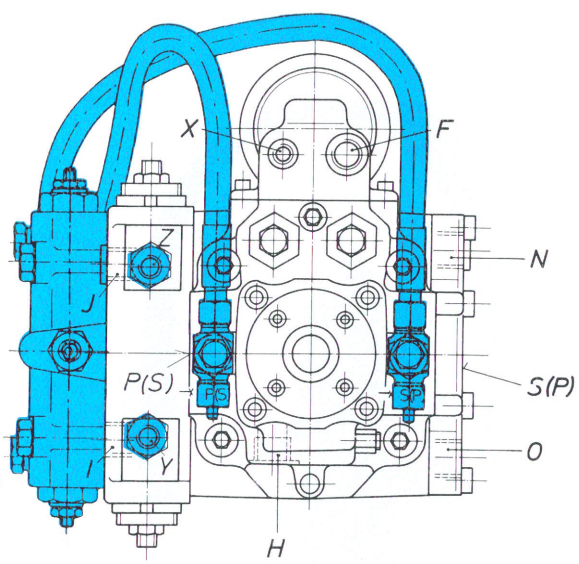
13.2 "Hydraulic remote control" HF version

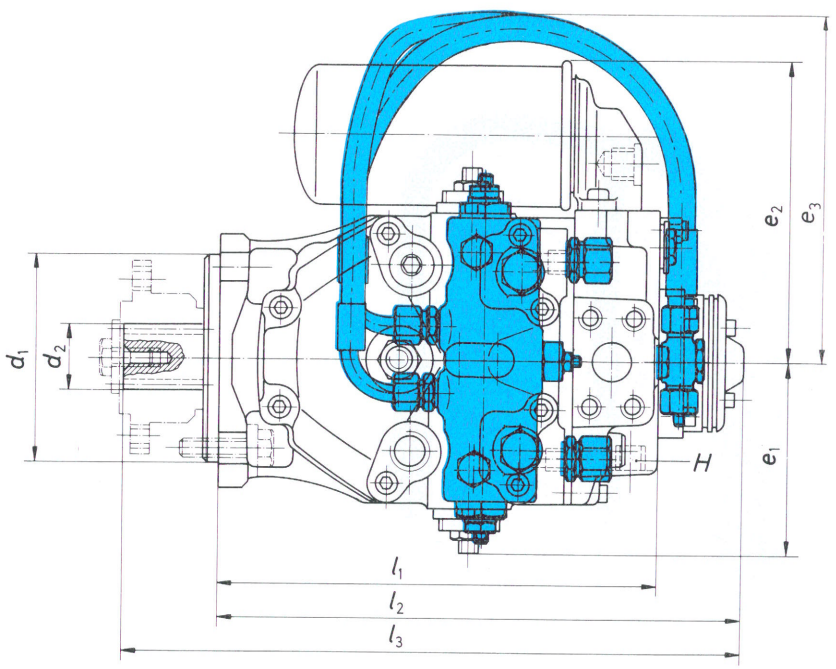
Installation position preferably horizontal in relation to the drive shaft and the upper pivot, other installation positions on request.

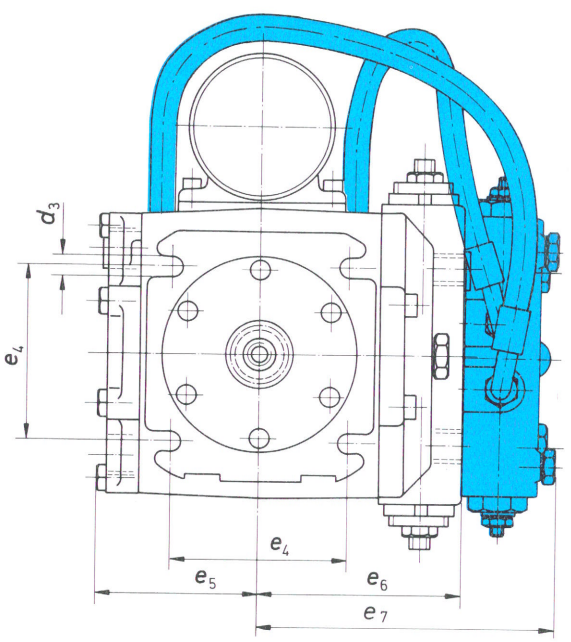
			Sizes 35 . . . 100	Size 200
P(S) and *S(P)*	=	pressure ports		
I, J, N and *O*	=	vent ports or oil filling, resp. drain ports, depending on mounting position	M 22x1,5	M 26x1,5
F	=	cooler port	M 22x1,5	M 26x1,5
H	=	cooler port	M 22x1,5	18 Ø
T	=	tank port (inlet)	–	26 Ø
X, Y and *Z*	=	control ports	M 14x1,5	M 14x1,5

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

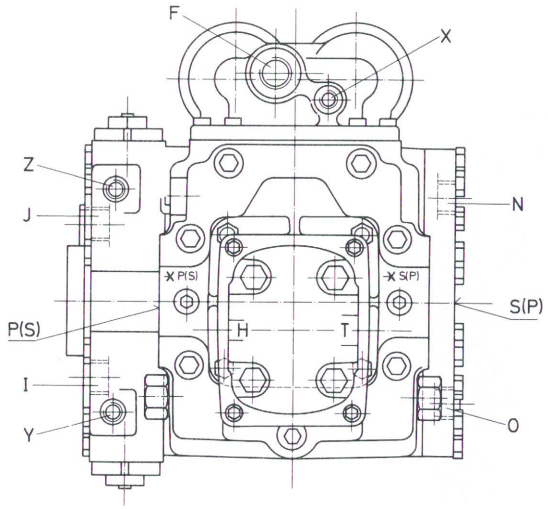
Pressure cut-off

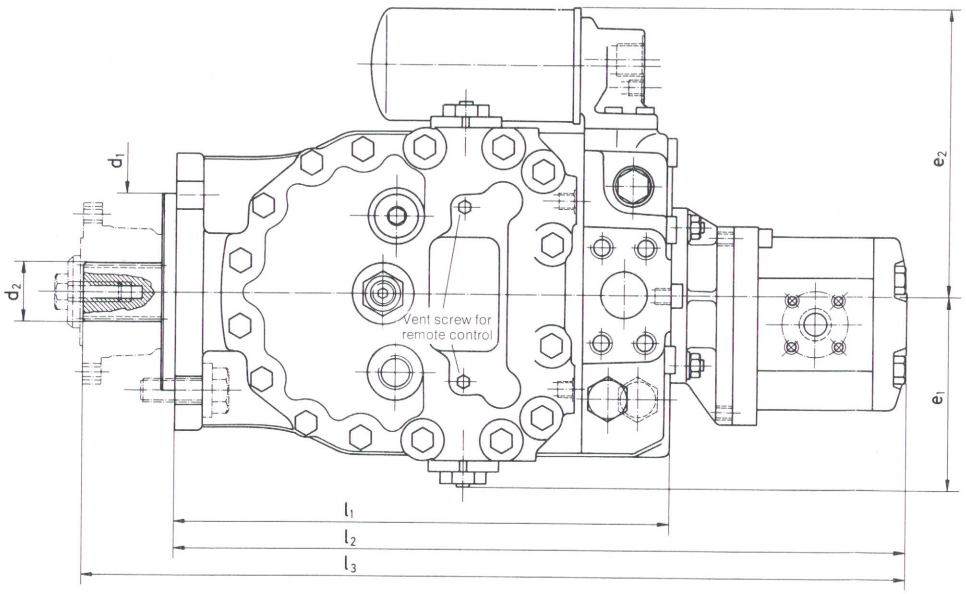


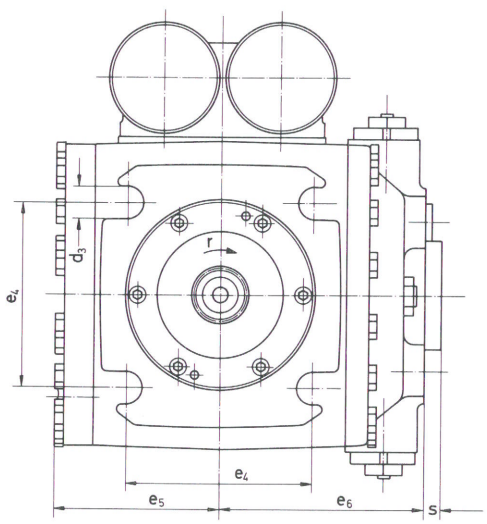




Nominal size 200, "external suction" version
(not available with internal suction)







Dimensions (in mm)

Nominal size	d_1 h8	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	s	*P(S)* and *S(P)* Size	*P(S)* and *S(P)* Pressure series	Weight in kg with pressure cut-off	Weight in kg without pressure cut-off
35	127	W 35x2x9 g	15	118	175,5	205	114,6	89	117	165,5	246,5	293	349	–	¾"	High pressure	43	37
50		W 35x2x9 g			179	205		93	121	169,5	257	304	360	–	¾"		45,5	39,5
70		W 35x2x9 g			196	222		107,5	129	178,5	282,5	341,5	397,5	–	1"		59,5	53,5
100		W 40x2x9 g			205	230		115,5	138	187	306,5	366	422	–	1"		73	67
200	165	W 50x2x9 g	23	147,5	238	–	162	144	177	–	406	600,7	677,7	11	1½"		–	161

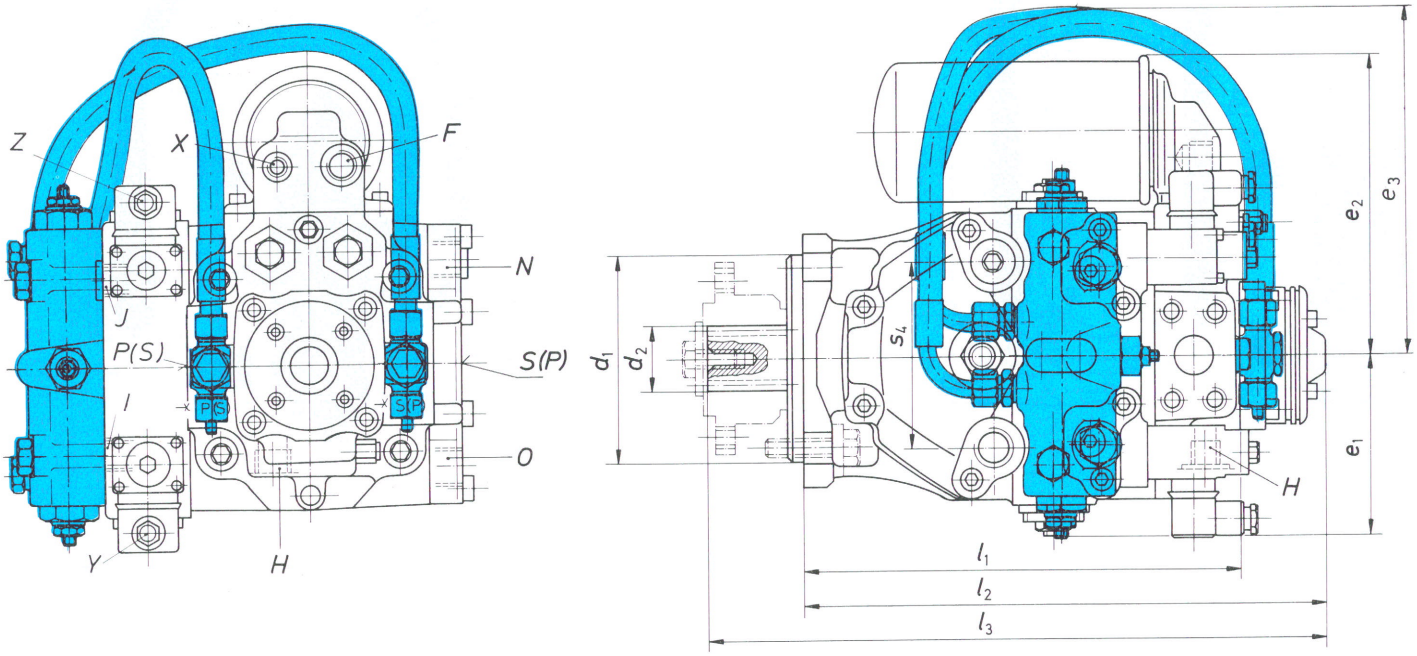
Please refer to installation drawings for exact dimensions or those not shown – design changes are reserved in the interest of technical progress.

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

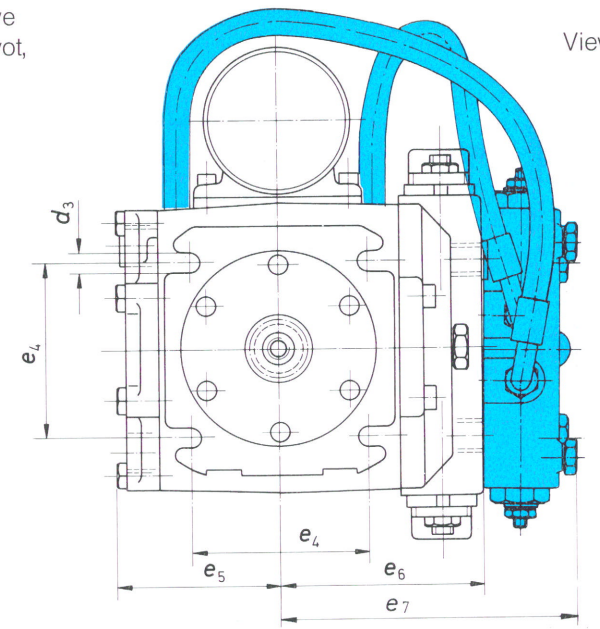
"Internal suction" version
(for external suction see 14 in Annex)

Pressure cut-off



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

View *X*



Dimensions (in mm)

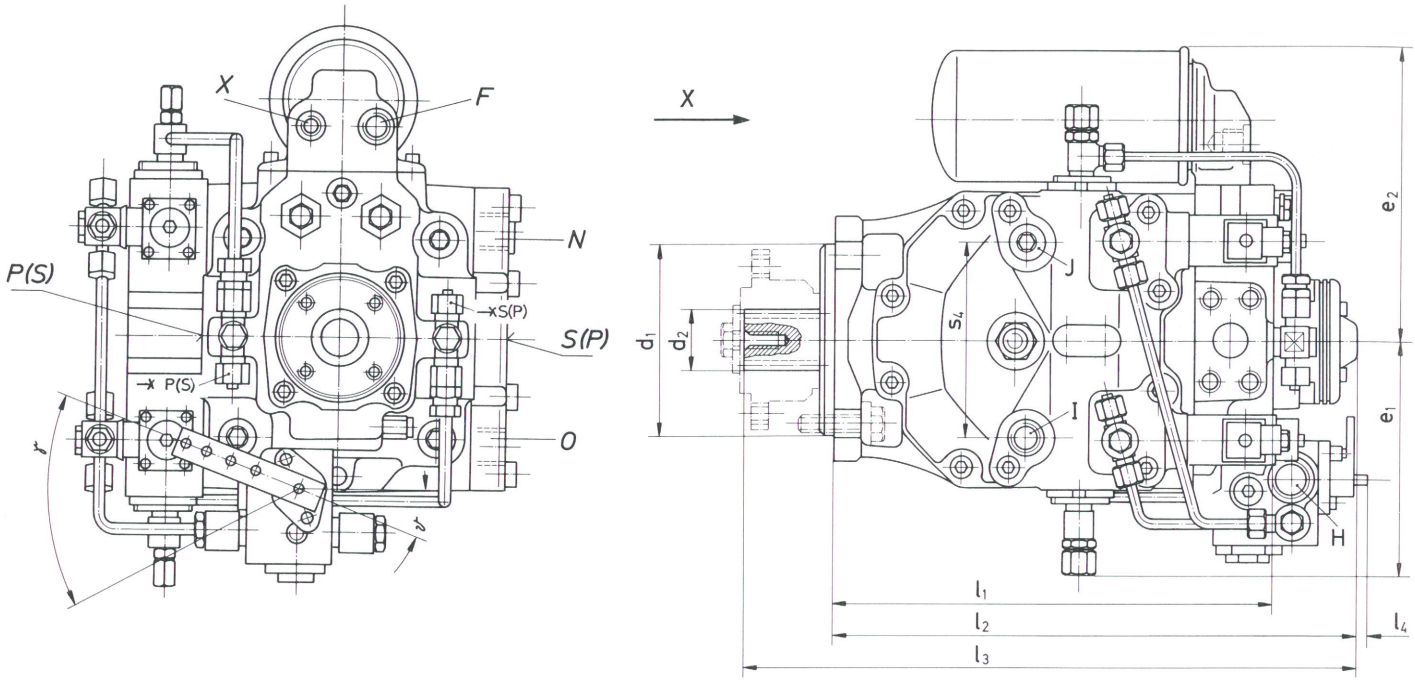
Nominal size	d_1 h8	d_2 DIN 5480	d_3	e_1	e_2	e_3 ~	e_4	e_5	e_6	e_7 ~	l_1	l_2	l_3	*P(S)* and *S(P)* Size	*P(S)* and *S(P)* Pressure series	Weight in kg with pressure cut-off	Weight in kg without pressure cut-off
35	127	W 35x2x9 g	15	112	175,5	205	114,6	89	117	165,5	246,5	293	349	¾"	High pressure	44	38
50		W 35x2x9 g		112	179	205		93	121	169,5	257	304	360	¾"		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

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

13.4 "Automotive control" AU version

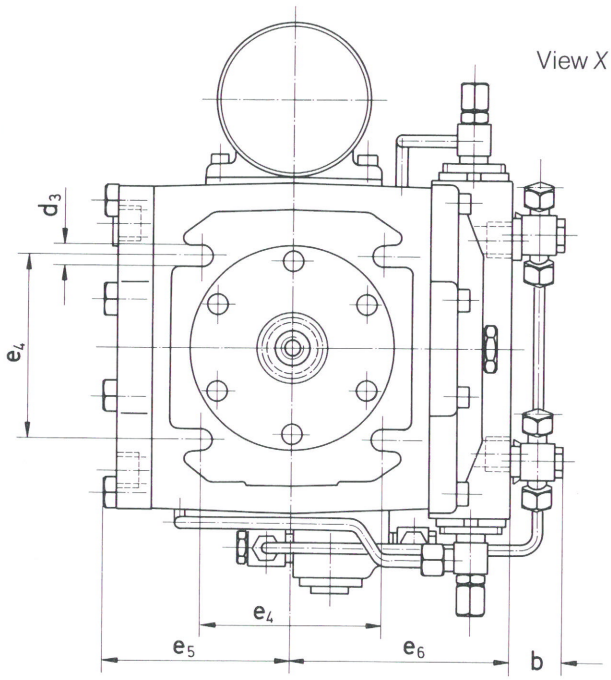
P(S) and *S(P)* = pressure ports
I, *J*, *N* and *O* = vent ports or oil filling, resp. drain ports, depending on mounting position, M 22 x 1,5
F and *H* = cooler ports, M 22 x 1,5
X = control port, M 14 x 1,5

"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.

View *X*



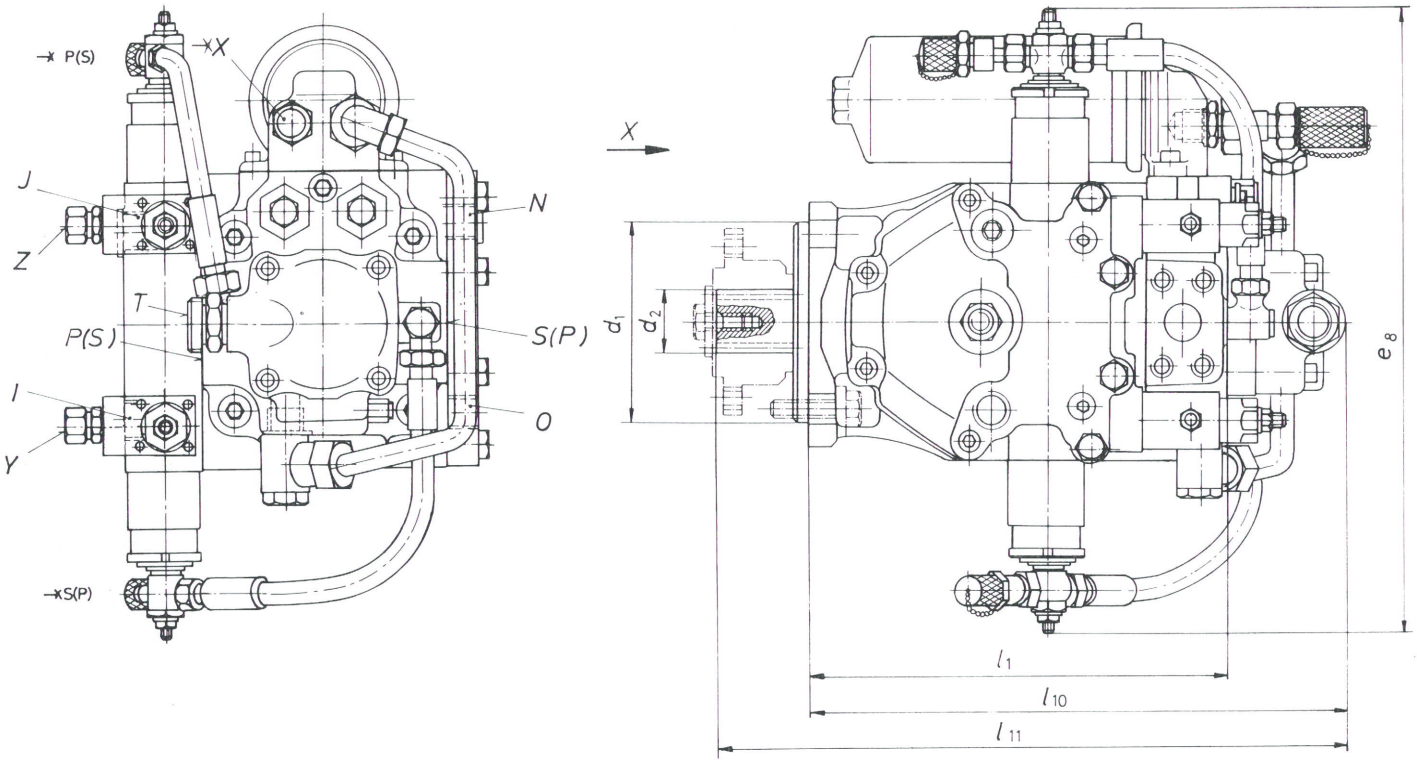
Dimensions (in mm)

Nominal size	b	d_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 °	in °	P(S) and S(P) Size	P(S) and S(P) Pressure series	Weight in kg
35	36	127	W 35x2x9 g	15	104	175,5	114,6	89	117	246,5	293	349	20,5	50	21	¾"	High pressure	39,5
50	36		W 35x2x9 g		104	179		93	121	257	304	360	20			¾"		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

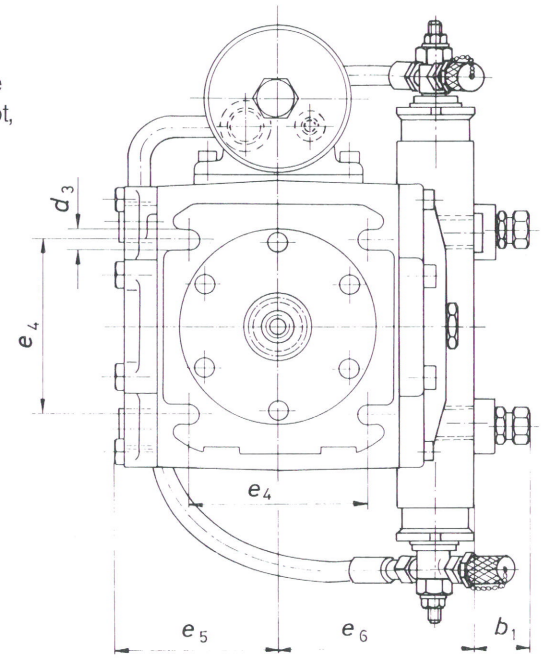
13.5 "Torque control" TC version

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)* Size	*P(S)* and *S(P)* Pressure series	Weight in kg
35	39,5		W 35 x 2 x 9g			89	117	415	246,5	310	366	¾"		37
70	39,5	127	W 35 x 2 x 9g	15	114,5	107,5	129	428	282,5	357	413	1"	High pressure	53,5
100	41,5		W 40 x 2 x 9g			115,5	138	428	306,5	381	437	1"		67

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

14. Annex

For mounting dimensions see page 27.

14.1 Coupling flanges

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

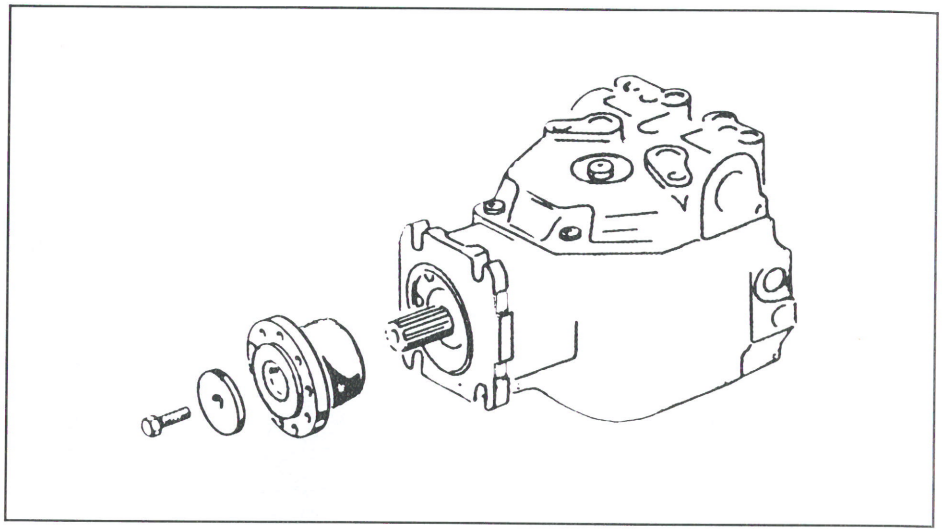


Fig. 12. Variable pump BPV .. KS with coupling flange

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.

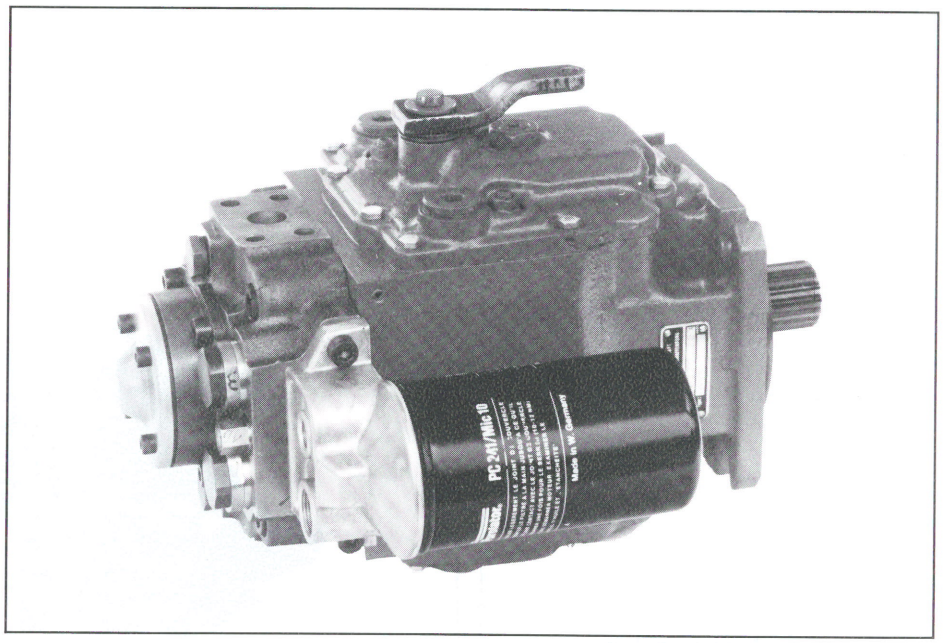


Fig. 13. Variable pump BPV .. with internal suction boost pump

14.3 Auxiliary pump with external suction

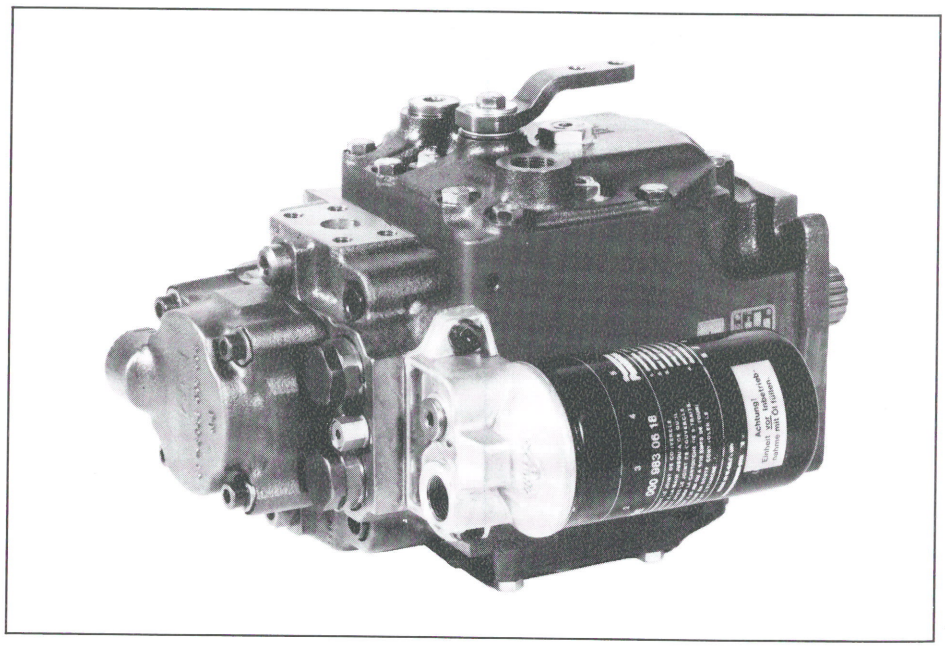


Fig. 14. Variable pump BPV .. with external suction boost pump

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.

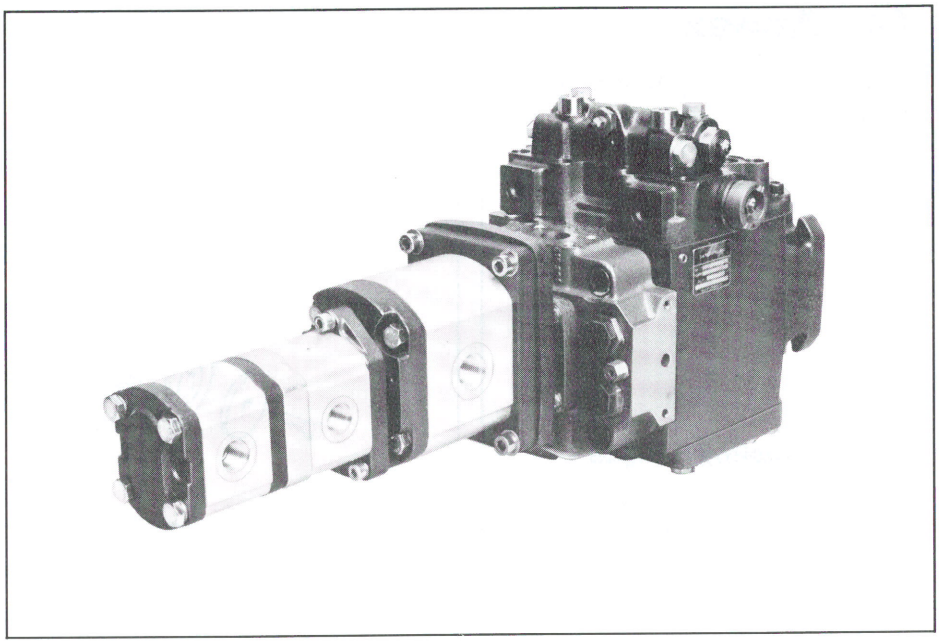


Fig. 15. Variable pump BPV .. with additionally mounted gear pump

14.5 Tandem version

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

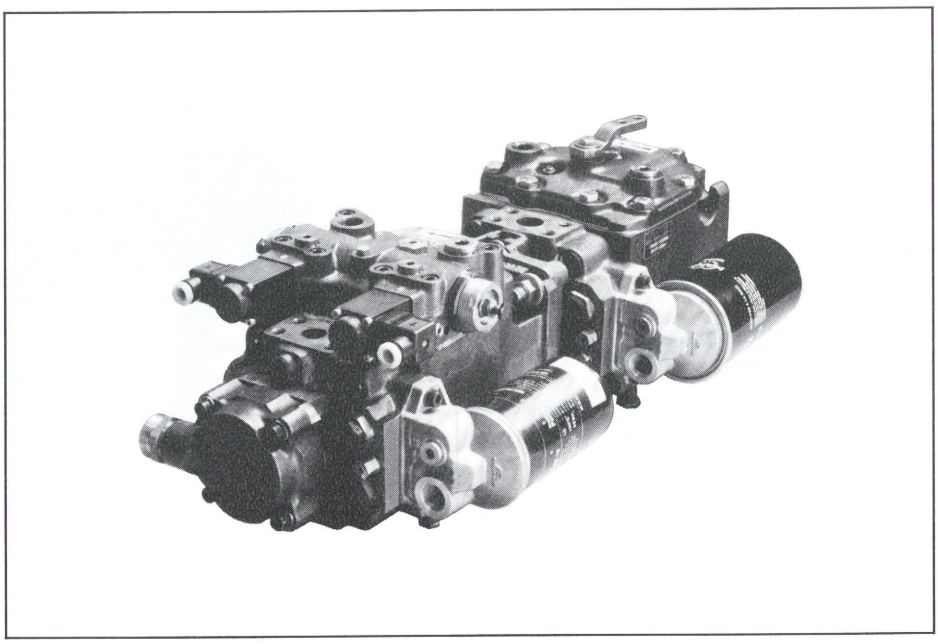
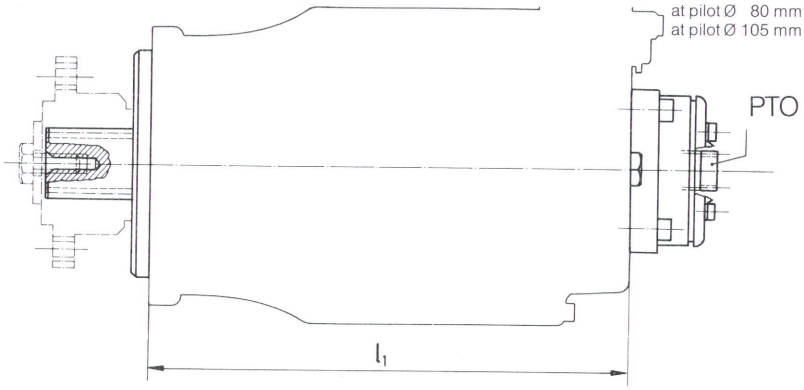


Fig. 16. Variable pump BPV .. KS and BPV .. EH in tandem version

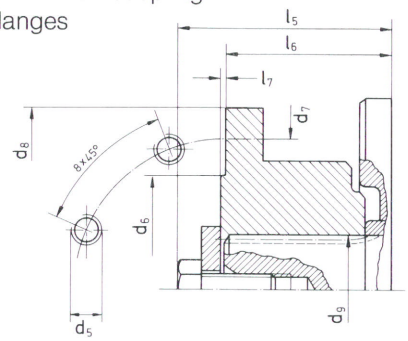
14.6 Mounting dimensions

T_1 = tank port (inlet) M 26x1,5
T_2 = tank port (inlet) M 36x2

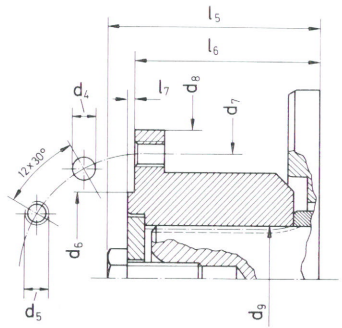
PTO = additional power take-off W 25x1,25x9 g – DIN 5480
PTO (1) = additional drive for auxiliary pumps
at pilot Ø 80 mm A 17x14
at pilot Ø 105 mm A 28x25



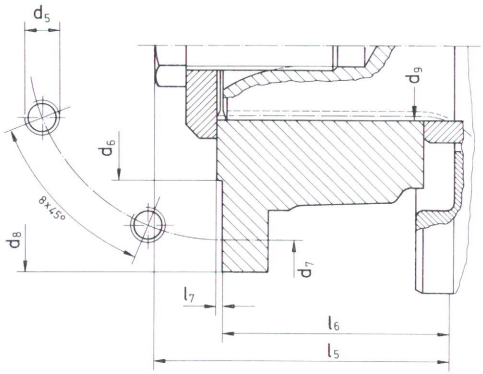
14.6.1 Drive shaft coupling flanges



Sizes 35 . . . 100 standard version

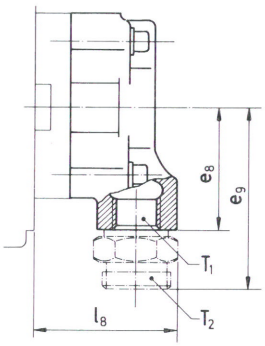


Sizes 35 . . . 70 cardan shaft version



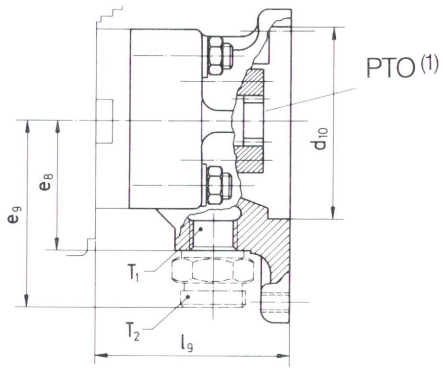
Size 200 standard version

14.6.2 Auxiliary pump with external suction

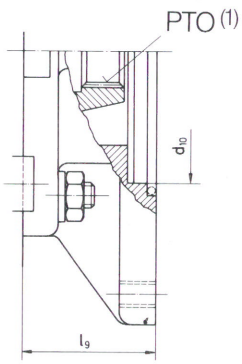


External suction (sizes 35 . . . 100)

14.6.3 PTO shaft flanges



Flange for PTO shaft (sizes 35 . . . 100), port T_1 closed for internal suction



Flange for PTO shaft (size 200)

Dimensions (in mm)

Nominal size	Displ. in cm³/rev	d_4	d_5 A	d_5 B	d_6 (h 8) A	d_6 (h 8) B	d_7 A	d_7 B	d_8 A	d_8 B	d_9 DIN 5480	d_{10} Pilot diam N7	l_1	l_5	l_6 A	l_6 B	l_7	l_8	l_9 Pilot diam 80	l_9 Pilot diam 105	e_8 Ext suction	e_8 Flange for PTO	e_9 Ext suction	e_9 Flange for PTO
35	12	8,2	M 10	M 8	75	57	101,5	84	120	98	W35x2x9g	80	246,5	71	56	62	2	63,5	75,5	93,5	65	70	90	95
50	18,3											or	257					64	75,5	93,5				
70													282,5					74,5	86,5	104,5				
100		–	M 10	–	75	–	101,5	–	120	–	W40x2x9g	105	306,5	71	56	–	2	74,5	86,5	104,5	65	70	90	95
200	38	–	M 12	–	90	–	130	–	144	–	W50x2x9g	105	406	98,6	76,6	–	2	–	–	52	–	–	–	–

A = standard version B = cardan shaft version

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