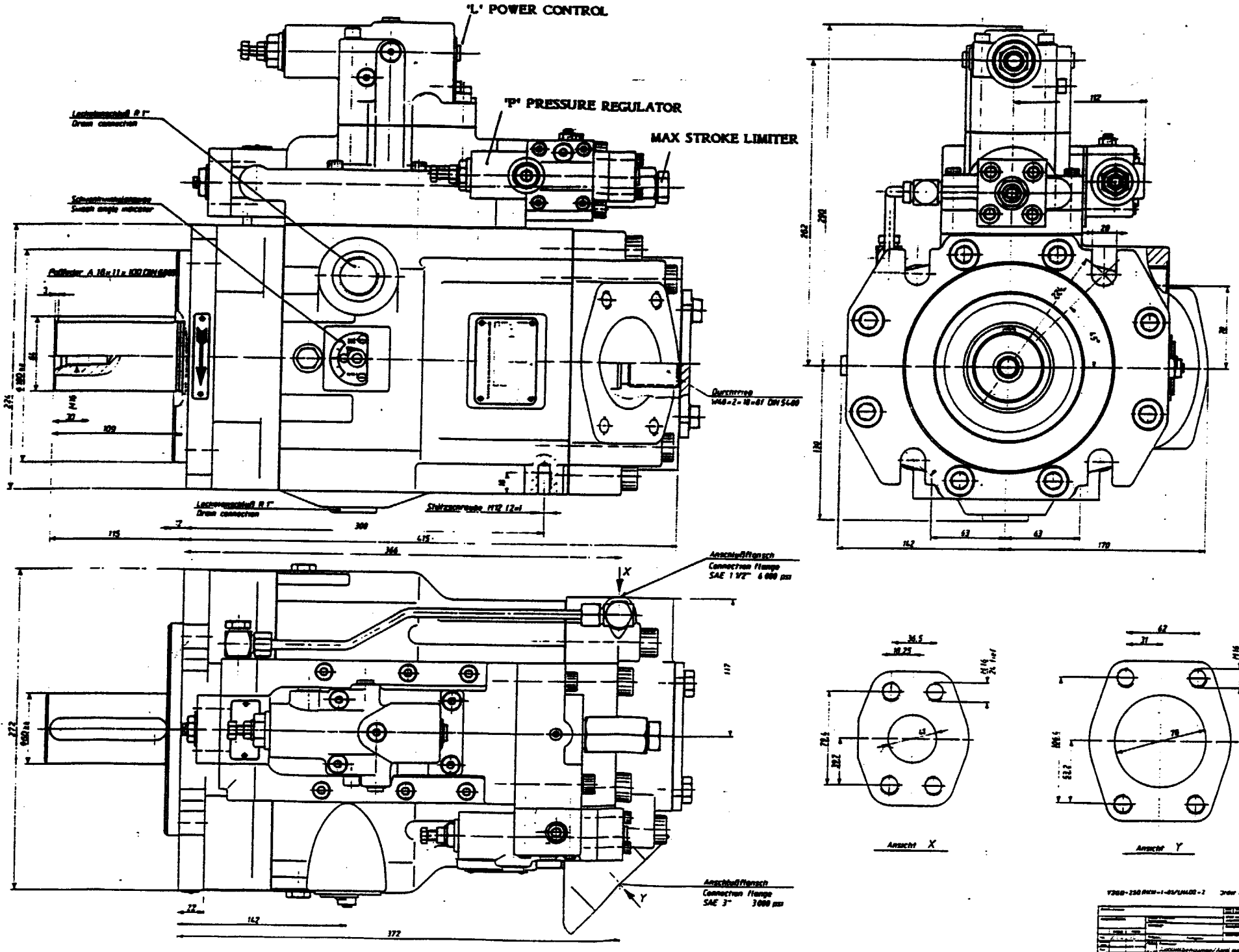
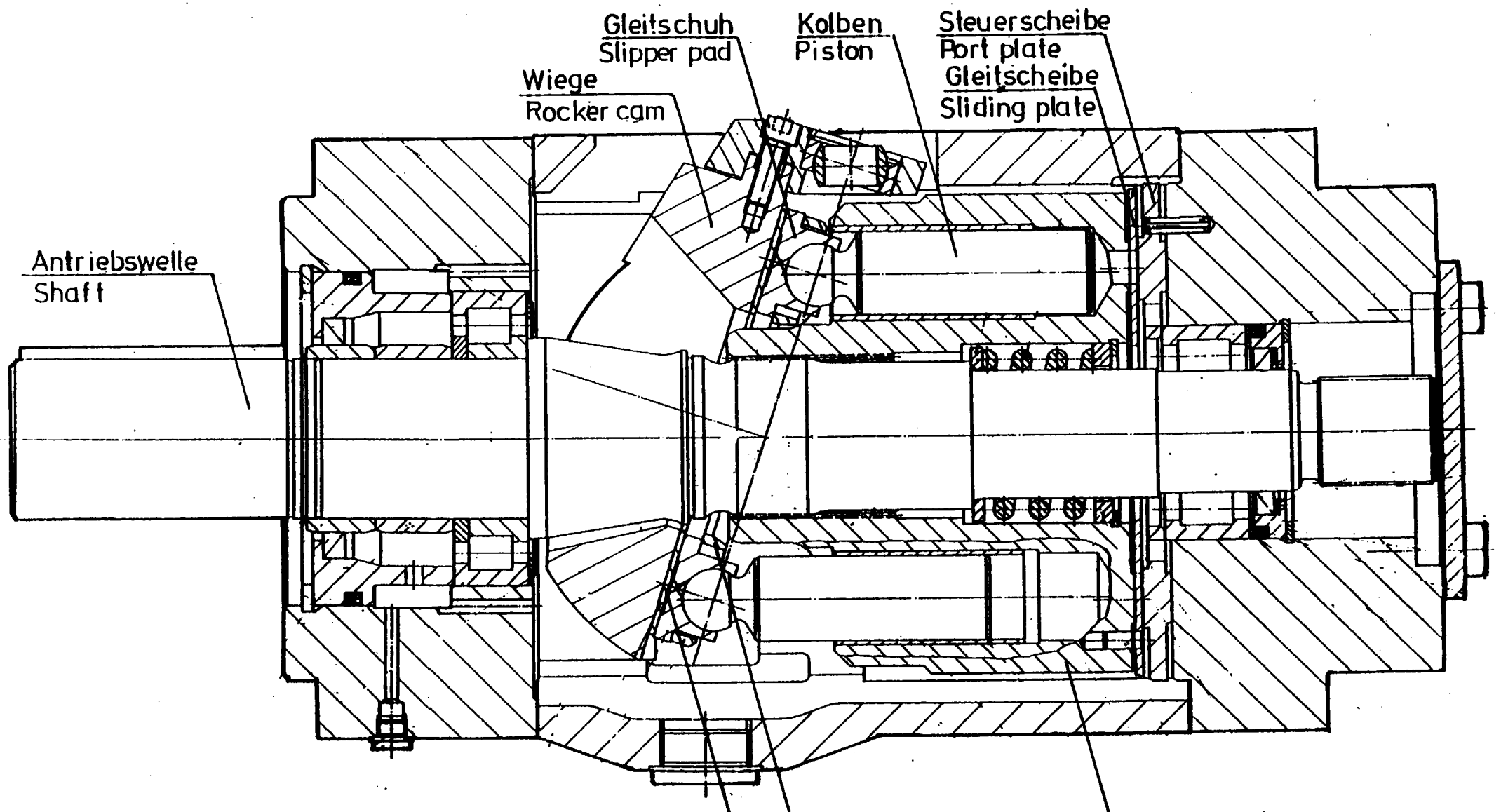
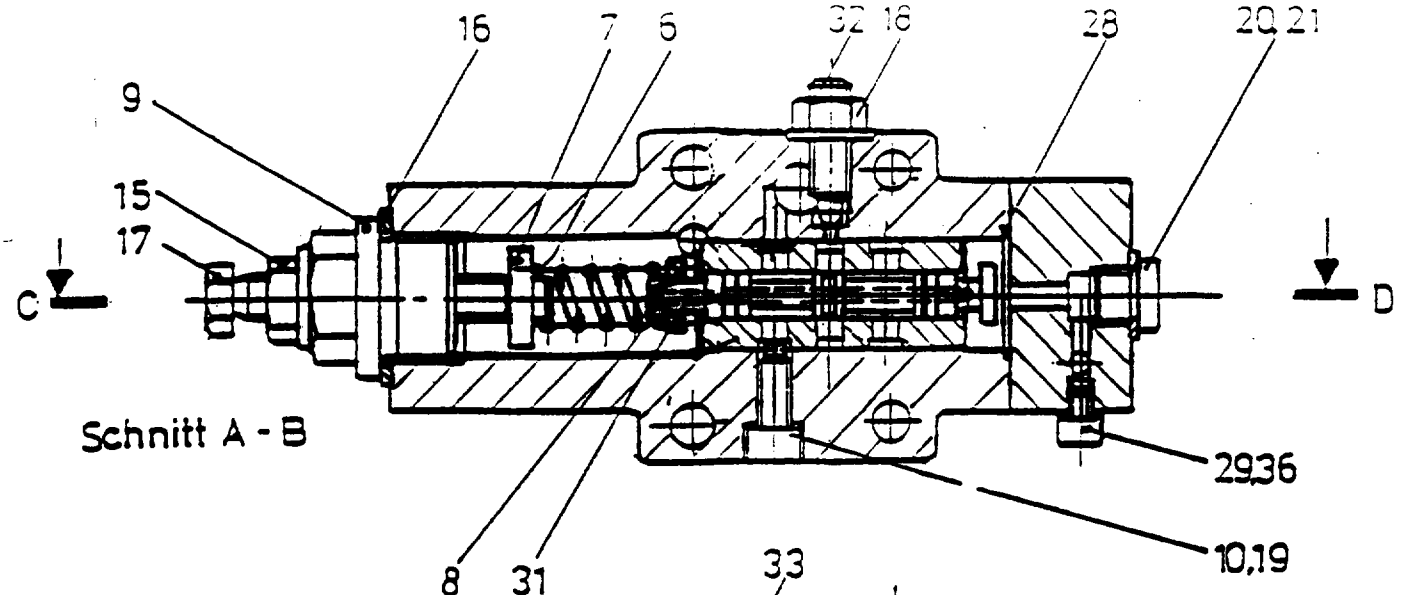
Item	Tag No	Description	Section
2	80P0003A 80P0003B 80P0003C	**Hydraulic Pump.** In-line axial piston pump with 9 pistons. Variable displacement with power control and remotely operated pressure compensator control. Maximum continuous pressure 350 barg. Maximum peak pressure 420 barg. Maximum flow (250cc/rev theo) @ 1490 rpm. 372 l/min. Flow (stroke) limited to 263 l/min. Right hand rotation. Fluorocarbon seals. Model: V30D-250-RKV-1/LP-2. Supplier: VOAC Limited.	

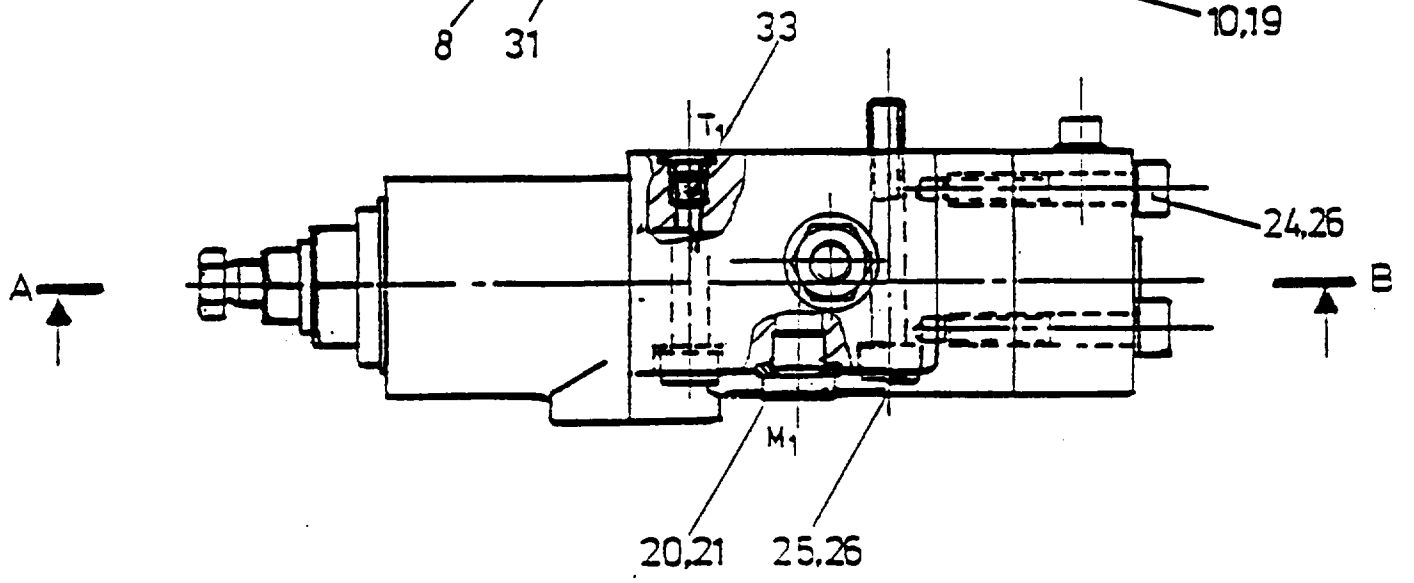

'L' POWER CONTROL
'P' PRESSURE REGULATOR
MAX STROKE LIMITER
Leckölanschluß R 1"
Drain connection
Schwenkwinkelgeber
Swash angle indicator
Anschlußflansch
Connection flange
SAE 1 1/2" 6 000 psi
Anschlußflansch
Connection flange
SAE 3" 3000 psi
Ansicht X
Ansicht Y



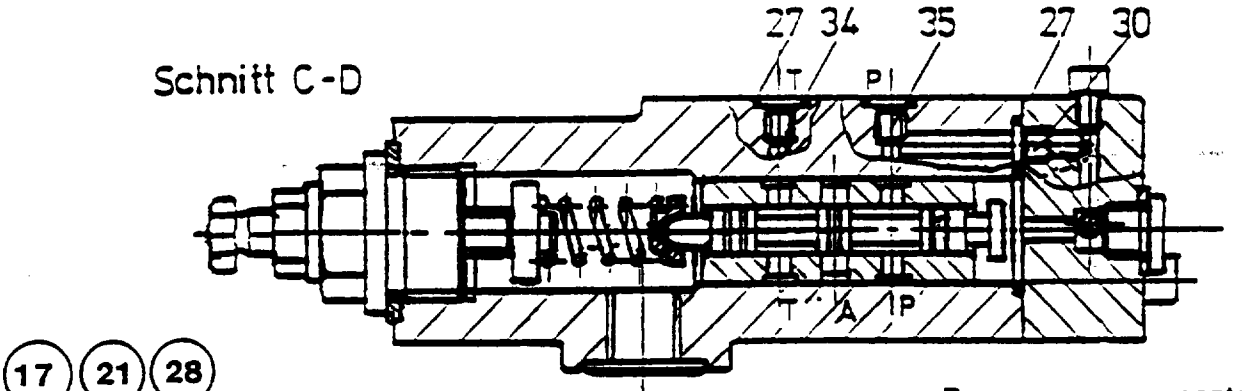
Axial Piston Pump V30D-250

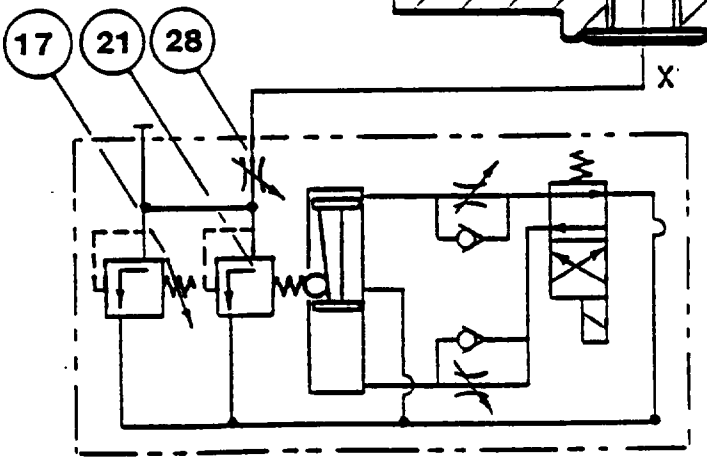


Schnitt A - B



Schnitt C-D





Pressure compensators

The pressure compensator is able to maintain, with small losses, a pre-set pressure. The compensator automatically adjusts the flow within the displacement range of the pump. It is intended for constant pressure systems with varying flow requirements, or used as a no-loss pressure limiter.

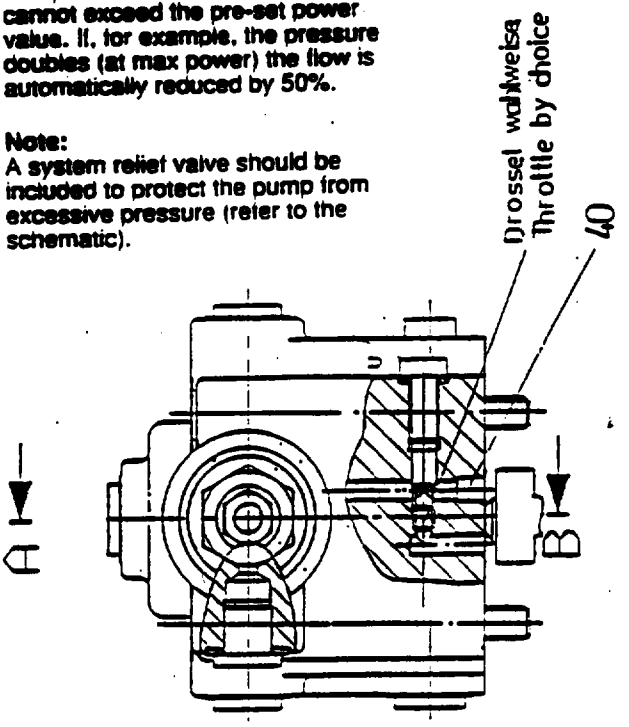
Remotely adjustable pressure setting; the pressure is set with a pilot relief valve such as our PH1. The pilot relief can be positioned up to 20 m from the pump.

PUMP PRESSURE & DAMPING BY ADJUSTING REMOTE VALVES BOM 17 & 28 LOCATED ON MAIN MANIFOLD ARRANGEMENT.
SEE SHEET 'PROGRESSIVE PRESSURE ACTUATOR'.

Power control L

The V30D pump with power control is choosen in installations with highly varying pressure demands and where it is important to protect e. g. the electric motor from overload.
The control limits the hydraulic power (at constant speed) according to the ideal curve 'pressure x flow = const.' The product of pressure and flow cannot exceed the pre-set power value. If, for example, the pressure doubles (at max power) the flow is automatically reduced by 50%.

Note:
A system relief valve should be included to protect the pump from excessive pressure (refer to the schematic).



FINE TUNING THE POWER CONTROL.

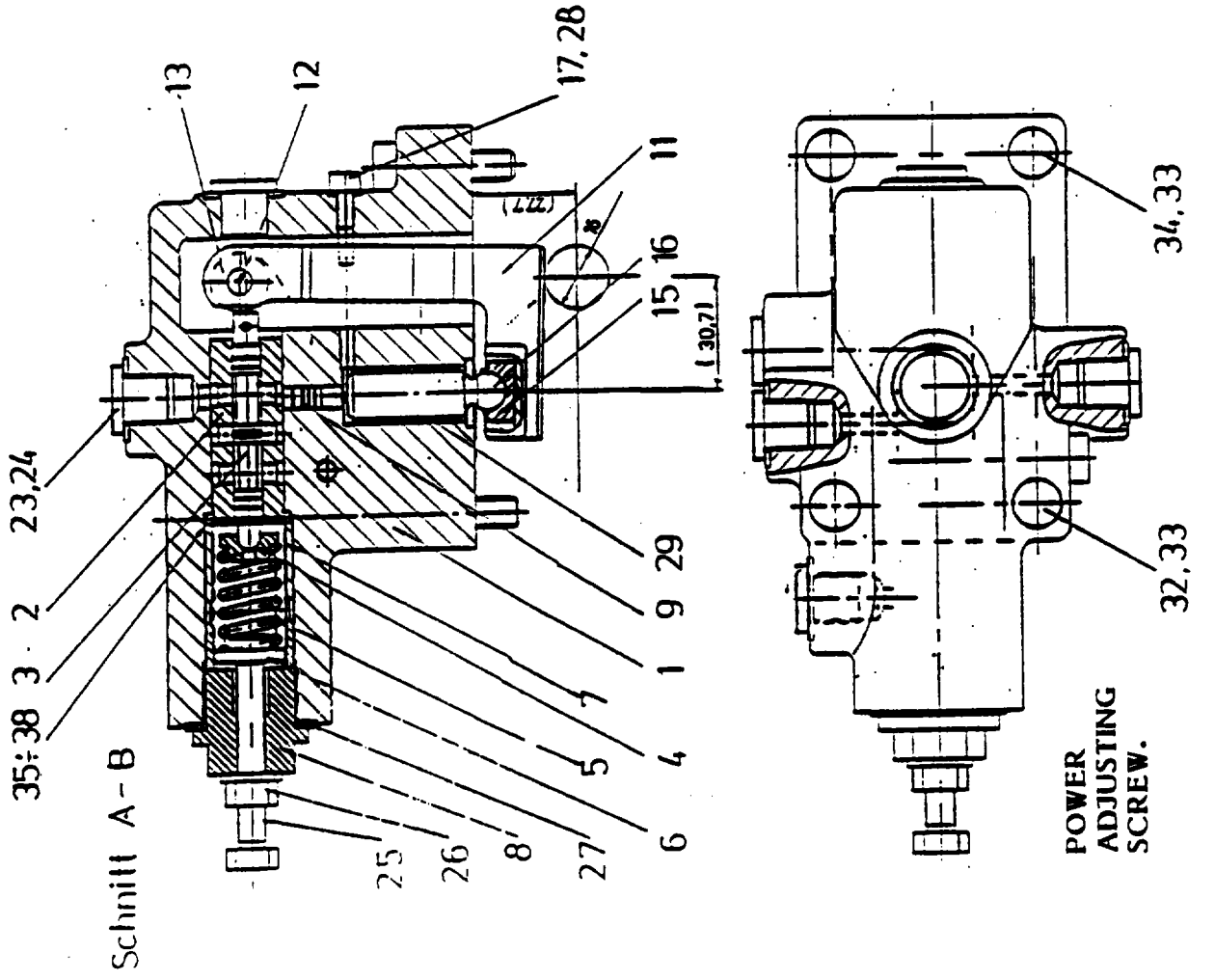
The control is factory-set to the theoretically calculated hydraulic system power figure of 105.7 kw (per pump).

If it is necessary to fine-tune the power against the turbine then the following procedure should be adopted:-

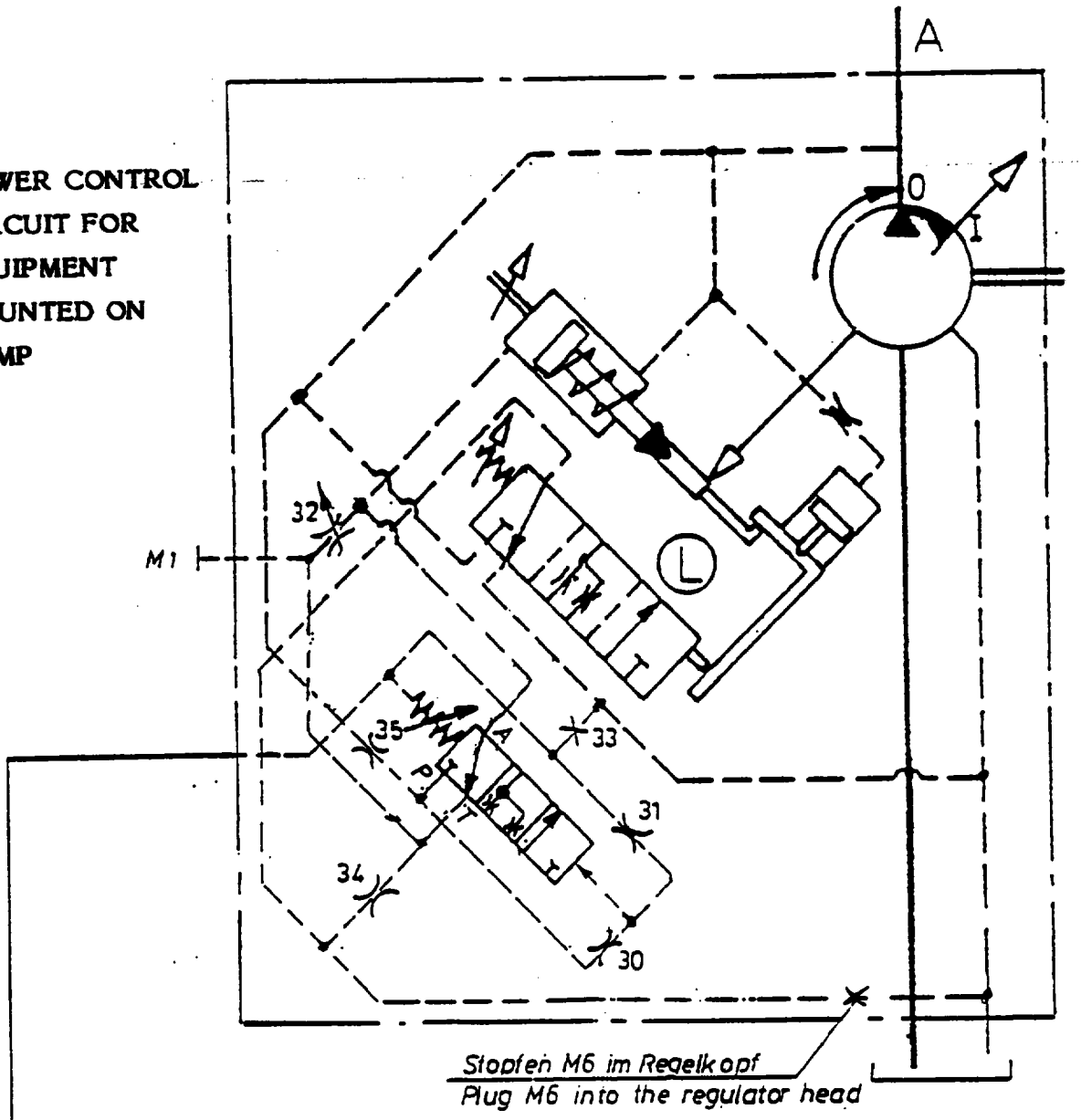
A) System pressure, set by BOM 17 (see separate sheet 'progressive pressure actuator') to R.R. mandatory pressure.

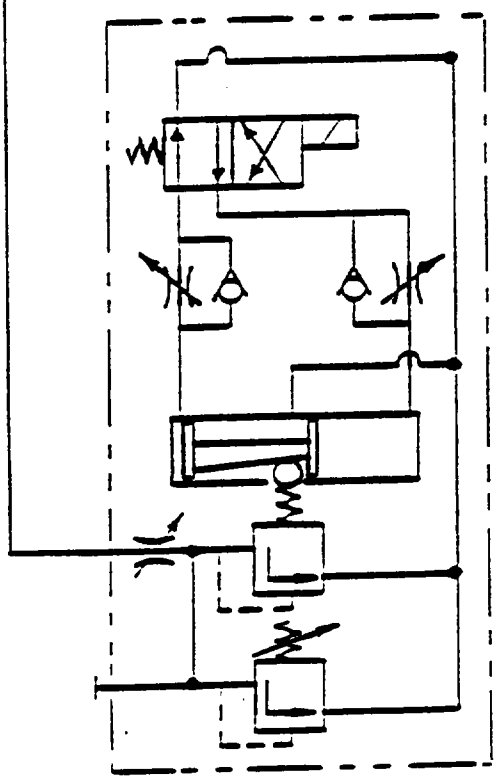
B) Run the system and adjust the control until the required turbine purge speed is maintained. It may be preferred to note the power-peaks of the motor ammeter, and adjust the control against these peaks.

C) Screw control in for more power and out for less power.



POWER CONTROL CIRCUIT FOR EQUIPMENT MOUNTED ON PUMP

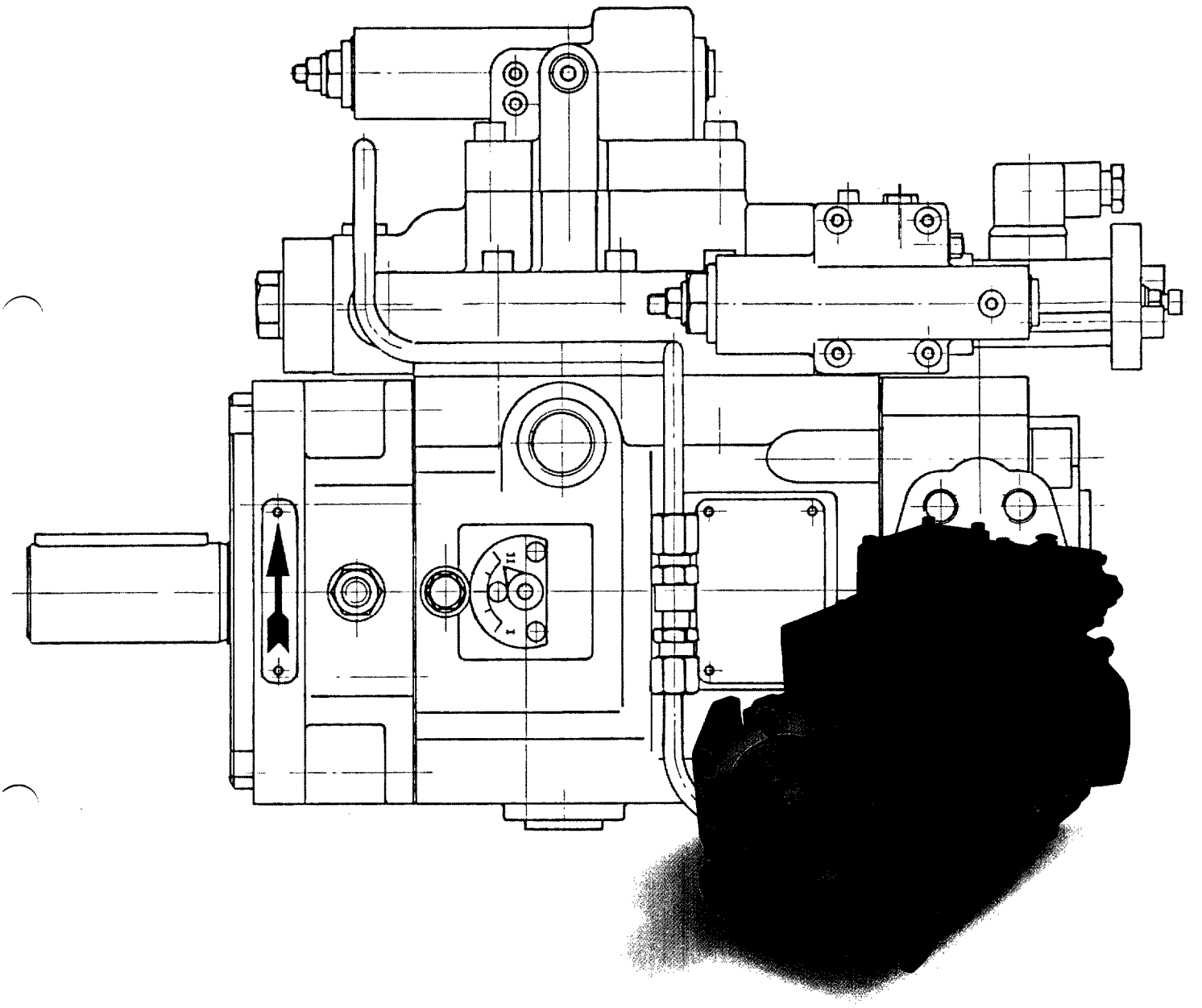




Drossel / Stopfen	Pos. 30	Drossel ⌀ 1,4	M 5
	Pos. 31	Drossel ⌀ 1,0	M 3
	Pos. 32	Variable Drossel	
	Pos. 33	Stopfen	M 6
	Pos. 34	Drossel ⌀ 2,5	M 6
	Pos. 35	Drossel ⌀ 3,0	M 6

REMOTE CONTROL CIRCUIT MOUNTED ON PACKAGE MAIN MANIFOLD ARRANGEMENT

V30D



Variable displacement axial piston pump

VOAC
Hydraulics

74

V30D

Series V30D variable displacement pumps provide outstanding operational reliability. Its remarkably low noise level and extensive control programme make the V30D ideal for a wide range of applications.

Applications

Iron and steel industry
Reliability, long life, ability to utilize fire resistant fluids, and the availability of a control system that facilitates building a power pack with several pumps working in parallel, are some of the features that make the V30D advantageous in this field.

Pulp and paper mills
Continuous operation in mills where downtime is critical, put high demands on reliability. V30D is designed to meet such demands and is therefore specified by many users.

Machine tools
The V30D provides low noise level and suitable control systems, which enables the machine designer to meet high demands for quiet operation and performance.

Mining industry
The robust construction and the possibility of using fire resistant fluids means that the V30D is very suitable for many applications in the mining industry.

Mobile applications
Control systems for advanced mobile hydraulics such as constant flow, load sensing etc, open new possibilities for the designer of mobile systems.

Marine applications
V30D pumps are well suited for numerous types of marine systems, e. g. winches, cranes, and generator drives. The V30D can be combined with our F11/F12 series motors to obtain high speeds, or with a gearbox in low speed/high torque applications. Remote or automatic control of pressure, flow and power enables the V30D to meet the requirements of the marine industry.

Well proven design

In developing the V30D, VOAC Hydraulics concentrated mostly on those parts that influence low noise, reliability, and life.
The basic design is simple and well proven:
An in-line axial piston pump with 9 pistons operating in a rotating cylinder barrel. The axial movement of the pistons is provided by an adjustable swash plate. The setting angle is varied in proportion to the desired displacement/flow. All components used in the V30D are manufactured from high grade material and machined with close tolerances.

Sturdy Construction

High pressure capability
The V30D is designed to operate at max 350 bar and a peak pressure of 420 bar. It is possible to operate at these pressure levels with reliable performance and long life.
A further feature of the V30D is its tolerance to occasional high pressure shocks and sudden speed changes.

Slipper shoes are manufactured from nitrided steel. They are hydrostatically balanced, floating on an oil film, and ride on the swash plate bronze bearing ring.

The swash plate is supported by cradle bearings which absorb vibrations and reduce noise.

Valve plates are made from steel providing high wear resistance. Carefully designed dampening slots in combination with minimum flow pulsations due to the nine pistons result in exceptionally low noise levels.

The shaft is supported by large bearings which increase bearing life. This, in turn, increases the unit's life also when using fire resistant fluids.

Special Design Features

Low noise level because of smooth, vibrationless operation of the rotating parts, low fluid pulsations, and well designed oil passages.

Control assemblies have been designed on a modular bases, and they can be installed without dismantling the basic pump. The system designer can choose from more than 30 different control combinations.

Swash plate position indicator provides visual indication of displacement and can also be used to provide feedback information in control systems.

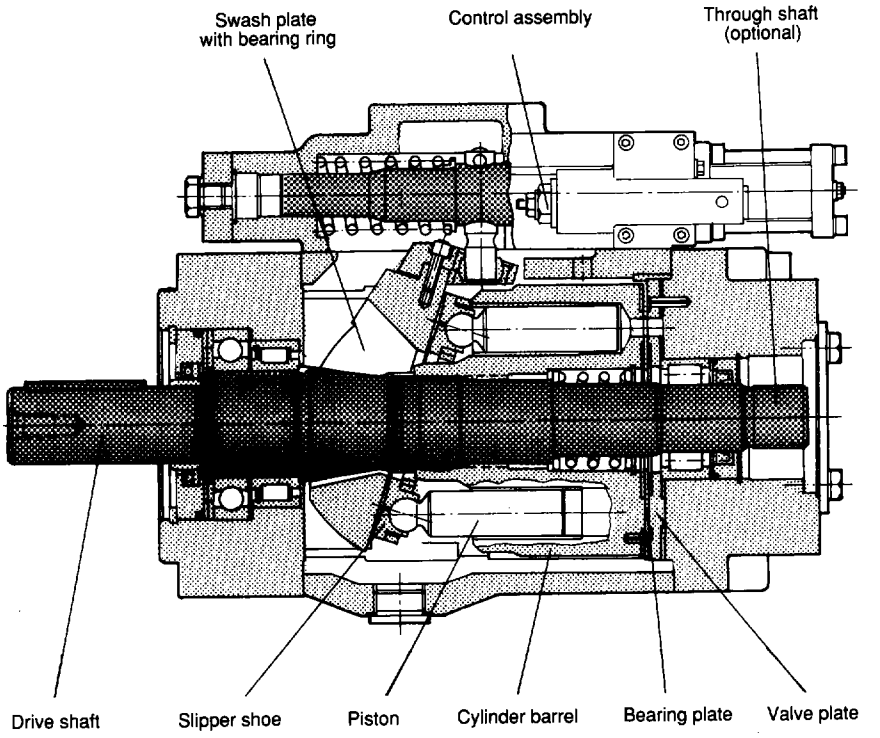
Power control that follows the ideal power curve; can be set to fully utilize the installed power under all operating conditions.

Through shaft with external spline for tandem mounting; adapter flange and shaft coupling required.

Parts with bearing surfaces are easily replaceable.

Short response time through compact design and low inertia.

Long life thanks to the robust design.



75

SPECIFICATIONS

Working principle
In-line axial piston

Installation
Flange mounting

Direction of rotation
Right or left hand

Mounting position
Optional

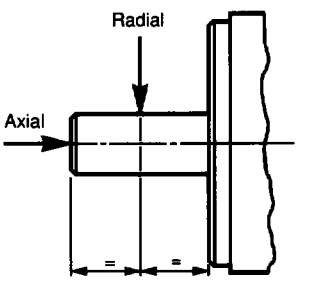
Fluids
Mineral based oils or synthetic fluids; refer to "Installation information" on page 11.

Designation	V30D-95	V30D-250
Displacement [cm³/r]	95	251.4
Max swash angle [°]	17	17
Max continuous pressure [bar]	350	350
Max peak pressure [bar]	420	420
Min inlet pressure (abs.), open circuit [bar]	0.85	0.85
Max case pressure [bar]	1.0	1.0
Selfpriming speed at max swash angle, and 1 bar (abs.) inlet pressure [rpm]	2200	1550
Max speed [rpm]	2900	1800
Min continuous speed [rpm]	500	500
Input torque required at 100 bar (theoretical) [Nm]	151	393
Flow at 1450 rpm (theor.) [l/min]	138	365
Input power at 250 bar and 1450 rpm [kW]	64	165
Weight without control [kg]	70	130
Weight with control (approx.) [kg]	76	136
Moment of inertia [kg m²]	0.0216	0.0825
L_{10} bearing life at 250 bar, 1450 rpm, and max displacement [h]	17 000	23 000
Max dynamic torque [Nm]		
Key shaft (K) - input	650	1450
Spline shaft (D) - input	1200	2800
Spline shaft (D) - output (tandem mounting)	600	1300
Noise level at 250 bar, 1450 rpm, and max displ. (measured in an anechoic room; ISO 4412) [dB(A)]	75	77

Shaft loads

The table shows max permitted radial and axial shaft loads.

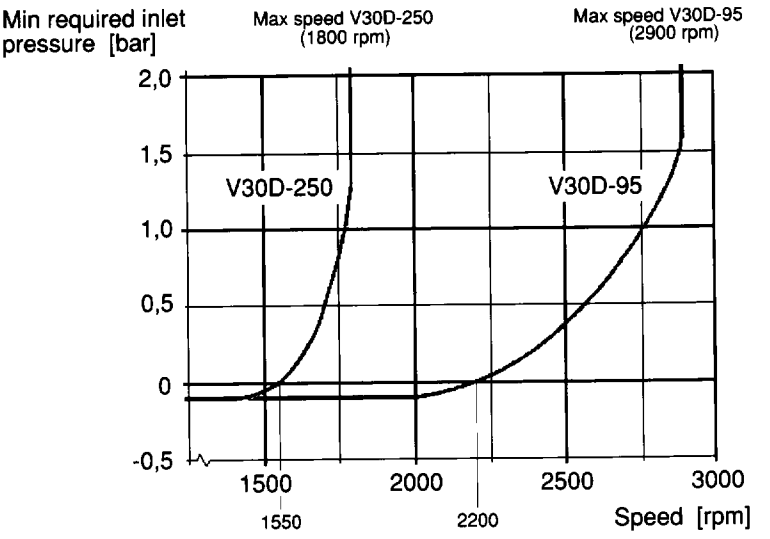
Designation	V30D-95	V30D-250
Max radial shaft load [N]	10 000	20 000
Max axial shaft load [N]	2000	2000



76

Inlet pressure

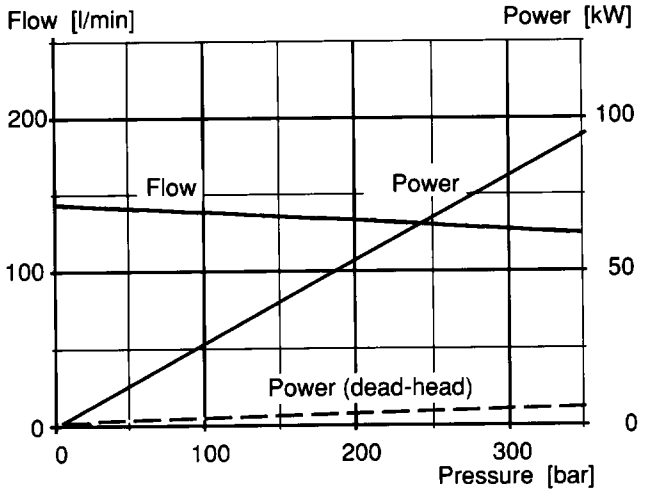
To avoid cavitation, it is essential to ensure that the pump inlet pressure always exceeds what is shown in the diagram to the right.
The diagram is valid for viscosities up to 100 mm²/s (cSt).



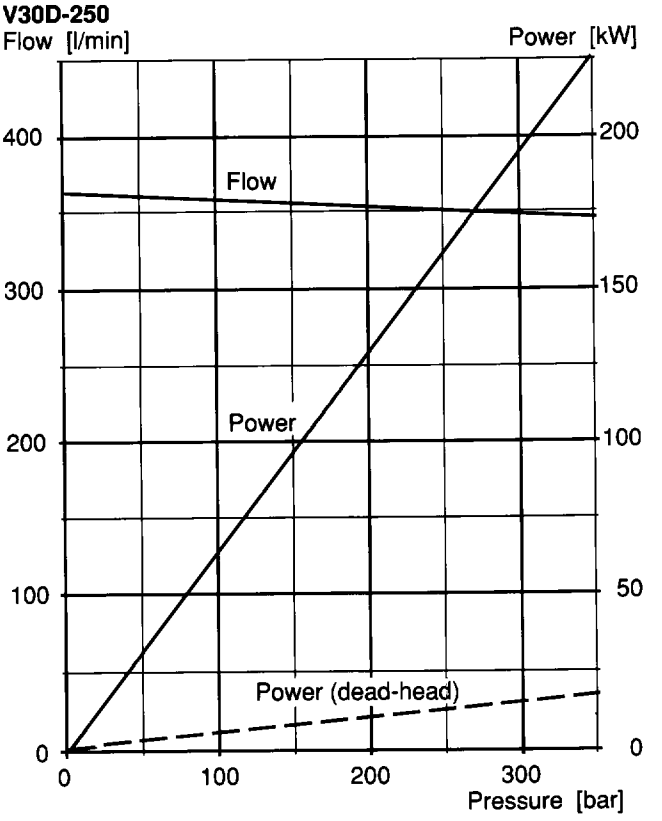
Flow and power

The following diagrams show max delivered flow vs. pressure (without control), required power at max swash angle, and required power when the pump is operating at 'dead head'.
Shaft speed: 1450 rpm

V30D-95



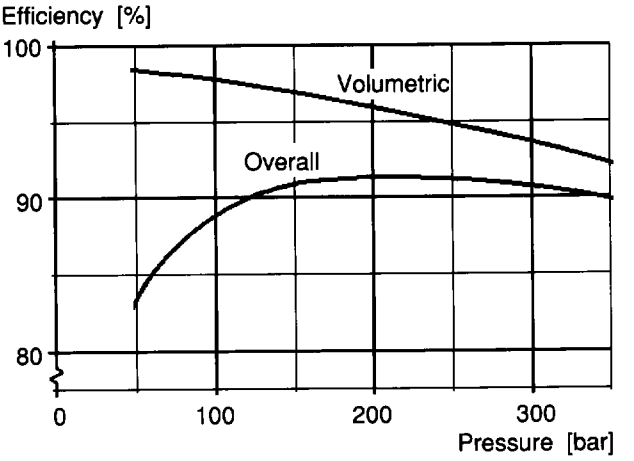
V30D-250



Efficiency

The diagram to the right shows volumetric and overall efficiencies at max swash angle and 1450 rpm.
It applies to both V30D-95 and -250.

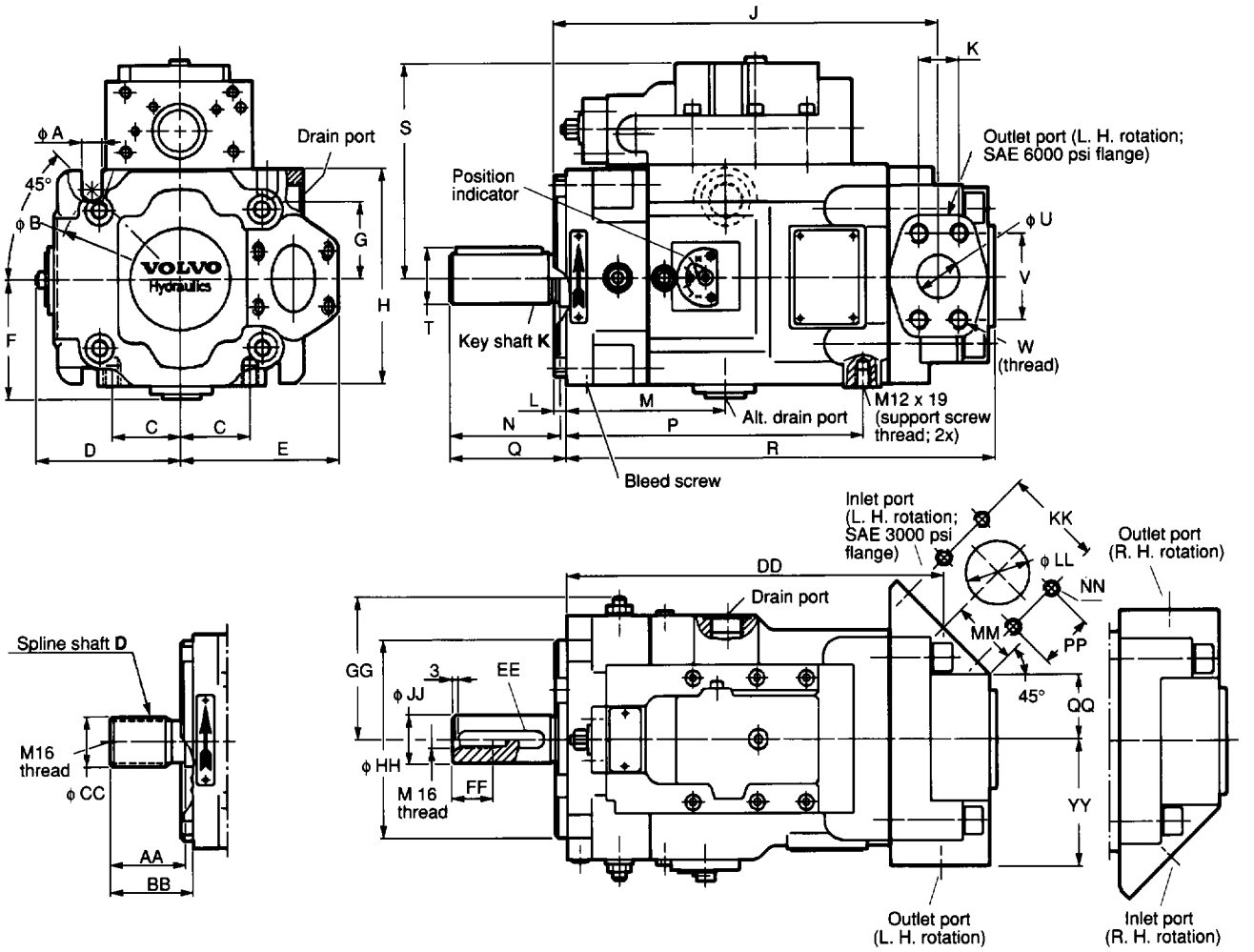
V30D-95 and -250



77

INSTALLATION DIMENSIONS

Basic pump



Designation	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T
V30D-95	18	200	55	116	126	96	60	171	295	31.75	10	125	87	235	93	341	173	43
V30D-250	20	224	63	150	170	130	70	224	366	36.5	12	142	109	300	115	427	198	64

Designation	U	V	W	AA	BB	CC (DIN 5480)	DD	EE (DIN 6885)	FF	GG	HH	JJ
V30D-95	32	66.7	M14 x 22	58	64	W40x2x18x9g	300	A12x8x80	32	114	160 h6	40 k6
V30D-250	41	79.4	M16 x 24	75	83	W60x2x28x9g	372	A18x11x100	30	145	180 h6	60 k6

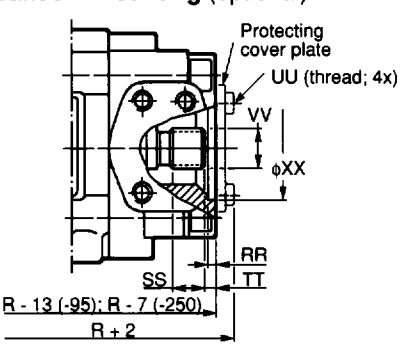
Designation	KK	LL	MM	NN	PP	QQ	RR	SS	TT	UU	VV (DIN 5480)	XX	YY
V30D-95	77.8	51	52.5	M12 x 20	42.9	52.5	10	22	15	M10	W30x2x14x7f	80 H7	101
V30D-250	62	70	50	M16 x 24	106.4	85	10	43	2	M12	W40x2x18x7f	101.60 $^{+0.03}_{+0.01}$	117

Ports

Designation	Outlet	Inlet	Drain
V30D-95	$1^1/_4$"	2"	R $^3/_4$"
V30D-250	$1^1/_2$"	3"	M33 x 2

Note: Outlet flange is SAE 6000 psi
Inlet flange is SAE 3000 psi

Tandem mounting (optional)



78

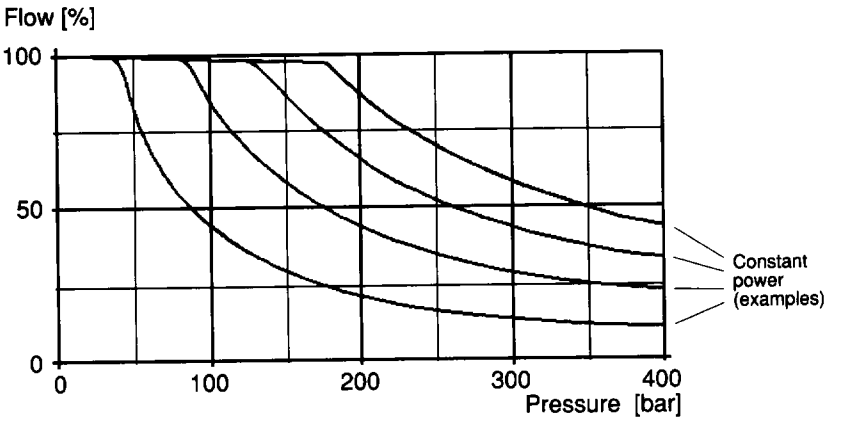
CONTROLS

Power control L

The V30D pump with power control is choosen in installations with highly varying pressure demands and where it is important to protect e. g. the electric motor from overload.
The control limits the hydraulic power (at constant speed) according to the ideal curve 'pressure x flow = const.' The product of pressure and flow cannot exceed the pre-set power value. If, for example, the pressure doubles (at max power) the flow is automatically reduced by 50%.

Note:
A system relief valve should be included to protect the pump from excessive pressure (refer to the schematic).

Pressure/Flow diagram

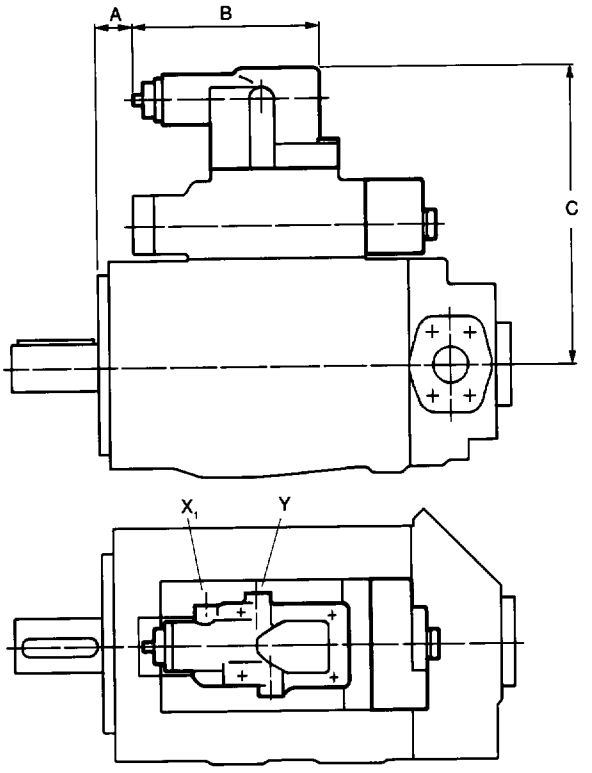


Control ports

Y - Gauge port
X_1 - Remote power setting

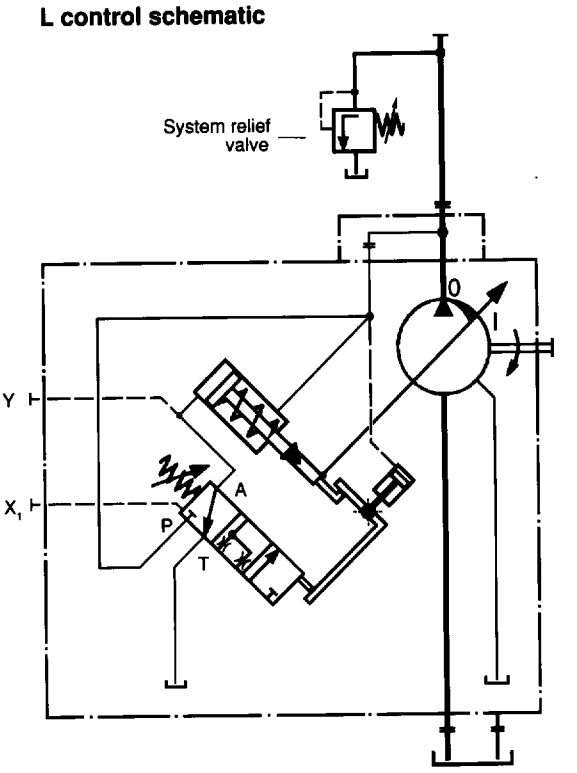
Port size	V30D-95	V30D-250
Y	R 1/8"	R 1/8"
X_1	R 1/4"	R 1/4"

L control installation



Dimension	V30D-95	V30D-250
A	20	45
B	175	175
C	251	286

L control schematic



79

Pressure compensators N and P

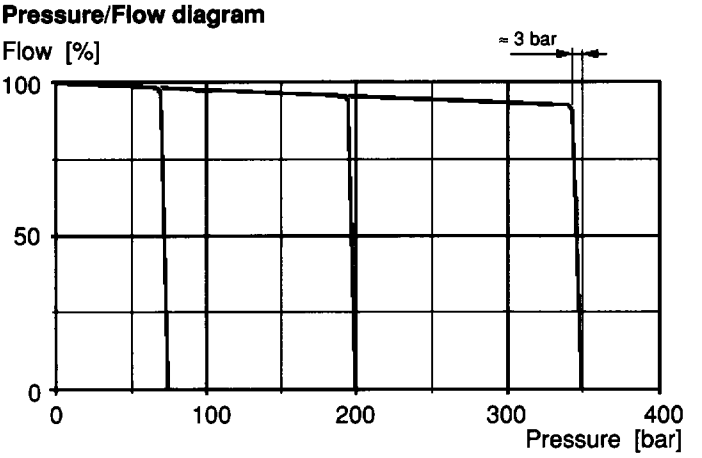
The pressure compensator is able to maintain, with small losses, a pre-set pressure. The compensator automatically adjusts the flow within the displacement range of the pump. It is intended for constant pressure systems with varying flow requirements, or used as a no-loss pressure limiter.

There are two versions of the pressure compensator:

N Adjustable pressure setting

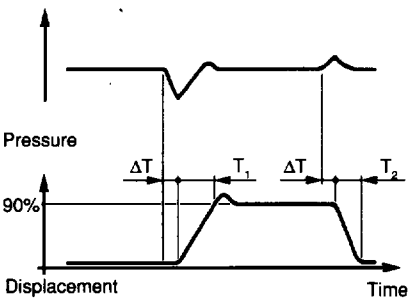
P Remotely adjustable pressure setting; the pressure is set with a pilot relief valve such as our PH1. The pilot relief can be positioned up to 20 m from the pump.

Pressure/Flow diagram



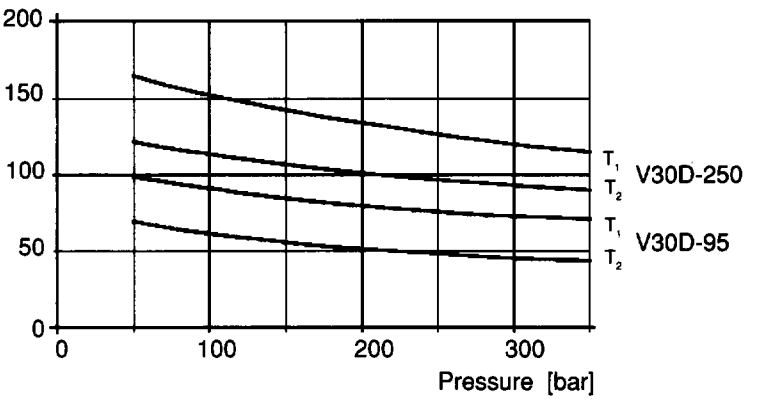
Response time

The response time is measured from 0 to 90% of max displacement. The figure below explains the definitions used in the response time diagram to the right.



ΔT = Delay < 3 ms
T_1 = Response time min-to-max
T_2 = Response time max-to-min

Response time [ms]



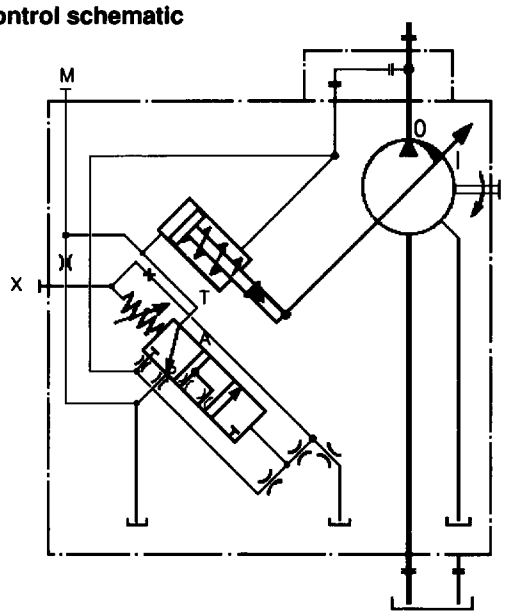
Ports

M Gauge port
X Remote control port

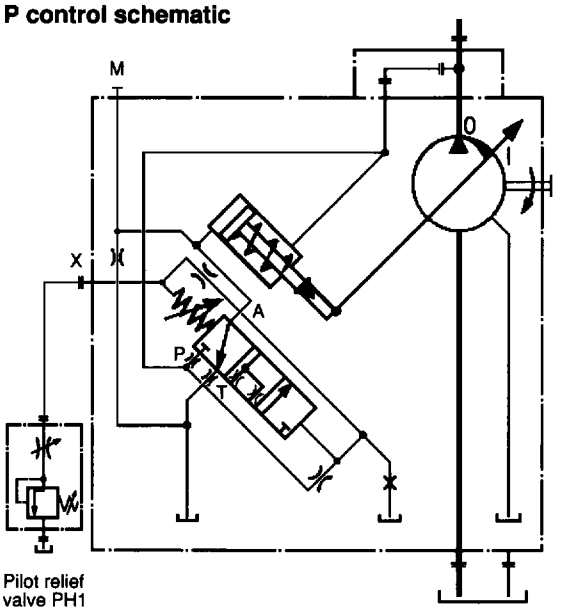
Port size	V30D-95	V30D-250
M	R 1/8"	R 1/8"
X	R 1/4"	R 1/4"

Note:
N and P control dimensions are the same as those of the Q, Qb, and LS controls (page 8).

N control schematic



P control schematic



80

Flow compensators Q / Qb, and load sensing control LS

Q flow compensator

The flow compensator maintains a constant flow, with small power losses, in spite of variations in shaft speed and pressure.
The flow is determined by the size of the external orifice A (see the following schematic).

Qb flow compensator

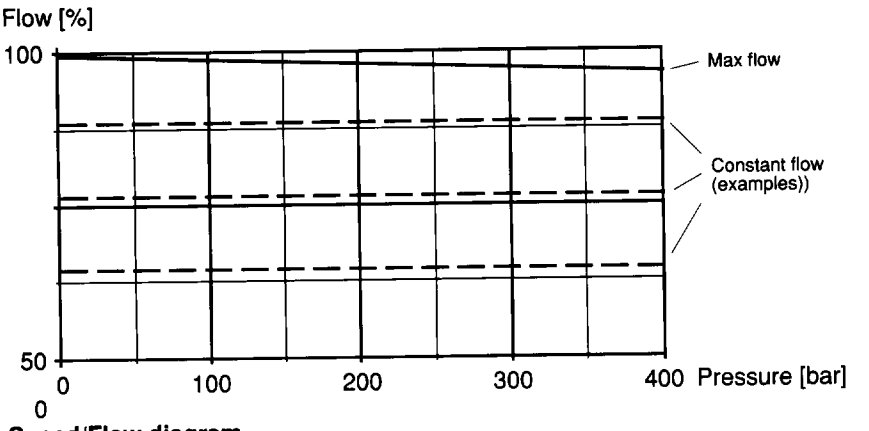
This is a special version of the Q compensator above. It has been developed to meet the accuracy and response requirements of hydrostatic transmissions for generator drives and similar applications. The orifice should be installed close to the pump in the main high pressure line.

Pressure is sensed before and after the orifice (refer to the schematic) and connected to the compensator.

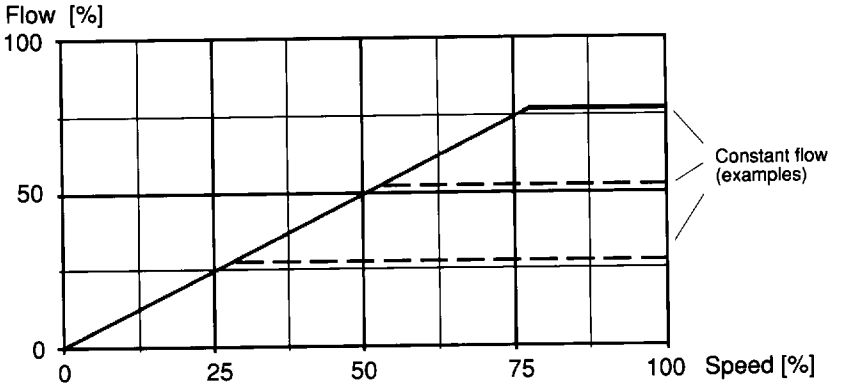
LS control

This control is designed for load sensing systems utilizing a suitable proportional control valve.

Pressure/Flow diagram



Speed/Flow diagram

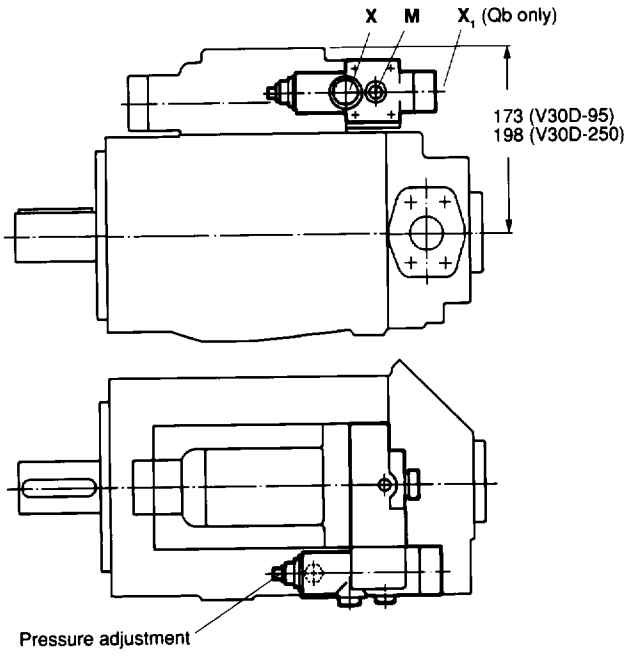


Control ports

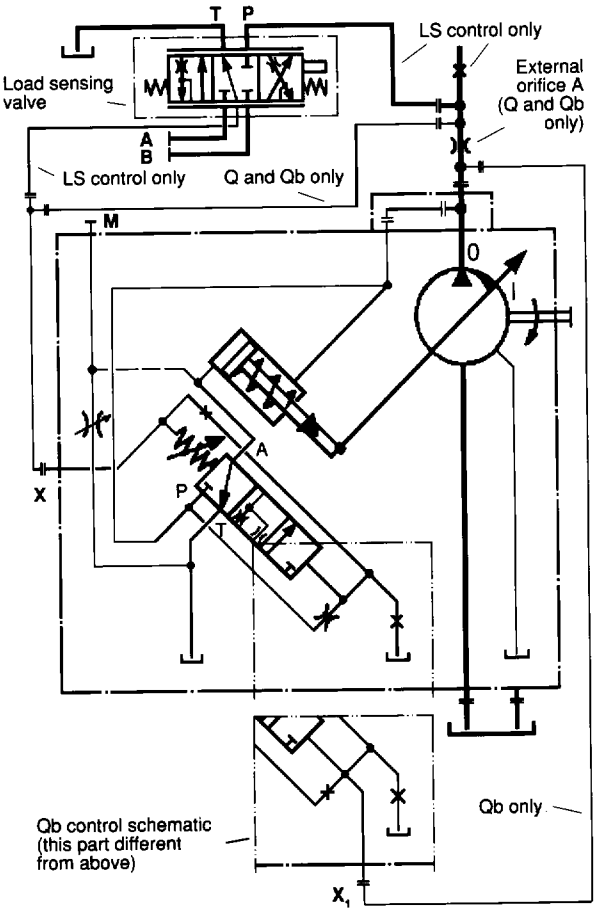
M Gauge port
X Pressure after orifice A
X_1 Pressure before orifice A (Qb only)

Port size	V30D-95	V30D-250
M	R1/8"	R1/8"
X	R1/4"	R1/4"
X1	R1/4"	R1/4"

N, P, Q, Qb, and LS control installation



Q, Qb, and LS control schematic



81

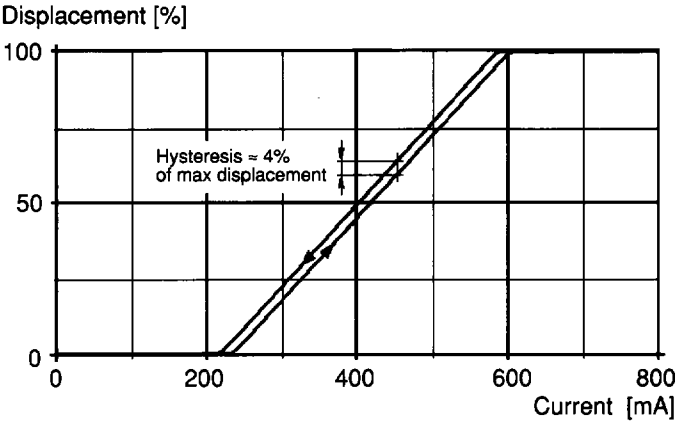
Electrohydraulic proportional control V

The V control is used to control flow or speed in electronic or computer controlled systems.

The V control consists of a proportional solenoid acting on a servo valve that determines the position of the pump servo piston. The displacement of the pump is proportional to the current through the 24 VDC solenoid (about 200 - 670 mA). In order to minimize the influence of temperature changes in the solenoid and valve hysteresis, a pulse width modulated control signal of approx. 100 Hz frequency is recommended.

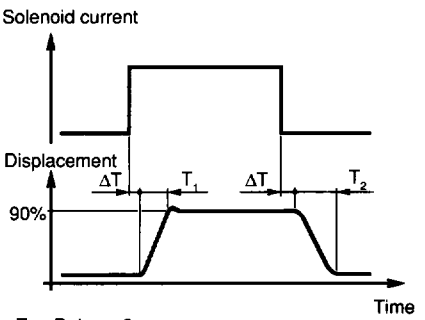
If the system pressure is below 50 bar a small auxiliary pump is required to secure proper functioning of the control (refer to the schematic).

Solenoid current/Displacement diagram (24VDC)

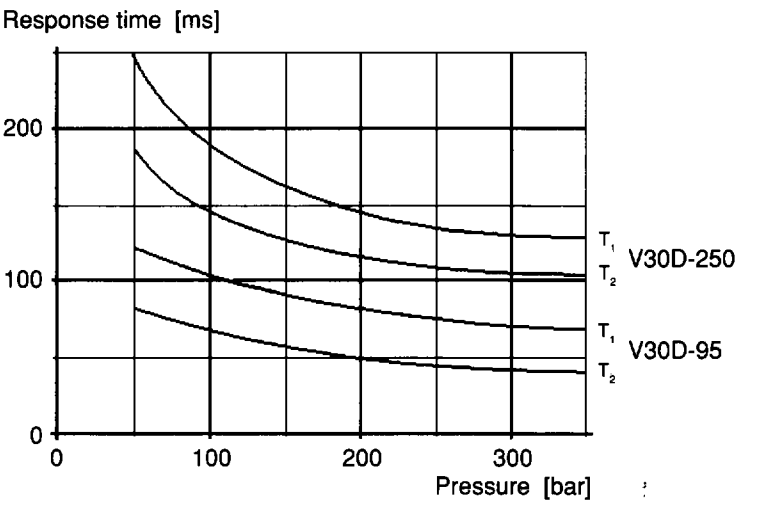


Response time

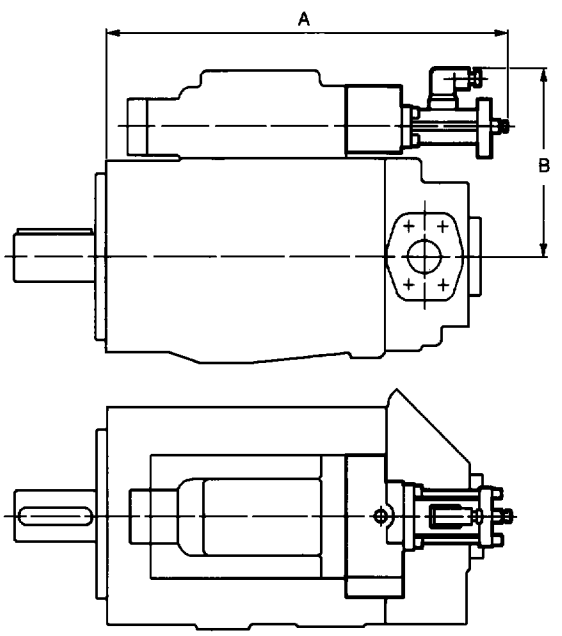
The response time is measured between 0 and 90% of max displacement. The figure below explains the definitions used in the response time diagram to the right.



ΔT = Delay < 3 ms
T_1 = Response time min-to-max
T_2 = Response time max-to-min

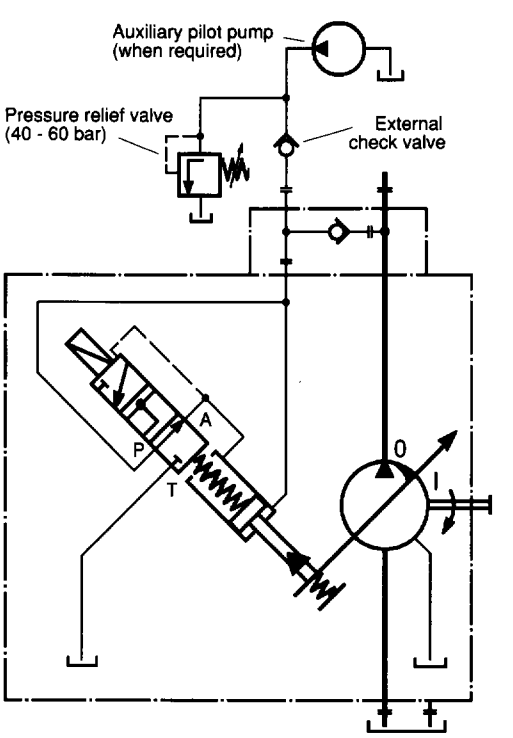


V control installation



Dimension	V30D-95	V30D-250
A	388	437
B	173	197

V control schematic

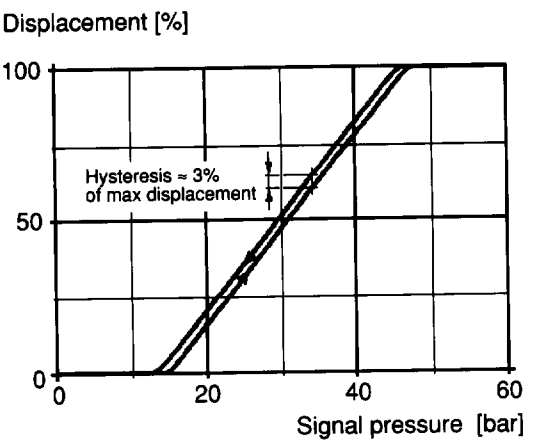


82

Hydraulic proportional control Vh

The Vh is a flow control. It is similar to the V control but the control signal is hydraulic. The required signal range is 15 to 50 bar. The pump displacement is proportional to the control signal (refer to the diagram). Pilot pressure can be supplied either from the system through a pressure reducing valve, or from an auxiliary pump. The pump should provide a pulsating flow of about 100 Hz; a 3-4 cm^3/rev gear pump with 9 teeth at 750 rpm is recommended.
In order to ensure that the displacement can be changed at system pressures below 40 bar, or when the drive motor is at a standstill, the auxiliary pump should also be connected to port St.
The schematic shows an example of a control circuit.

Signal pressure/Displacement diagram

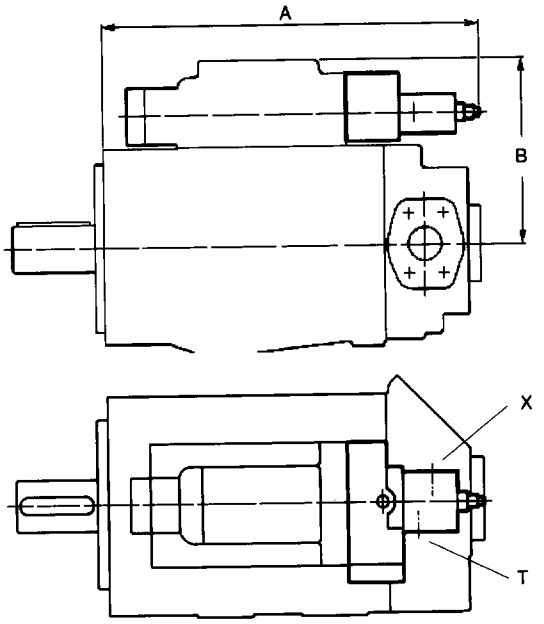


Ports

St = Auxiliary pump connection
T = Drain port
X = Control signal port

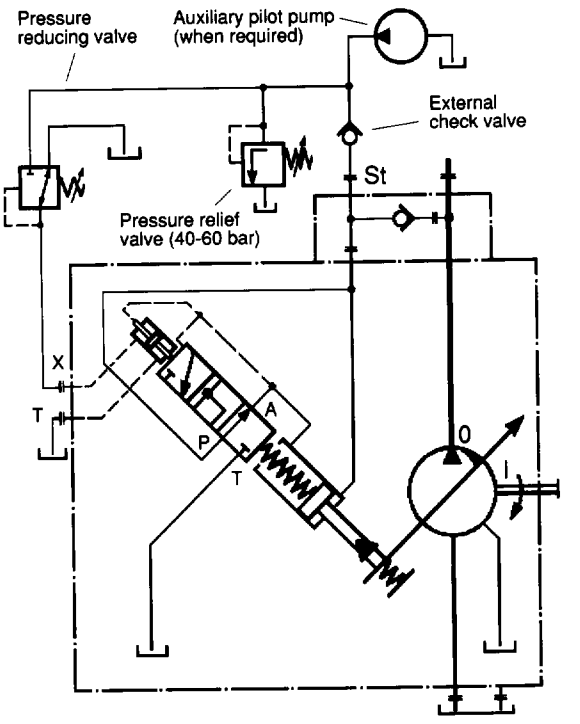
Port size	V30D-95	V30D-250
St	R 1/4"	R 1/4"
T	R 1/8"	R 1/8"
X	R 1/8"	R 1/8"

Vh control installation



Dimension	V30D-95	V30D-250
A	369	418
B	173	197

Vh control schematic



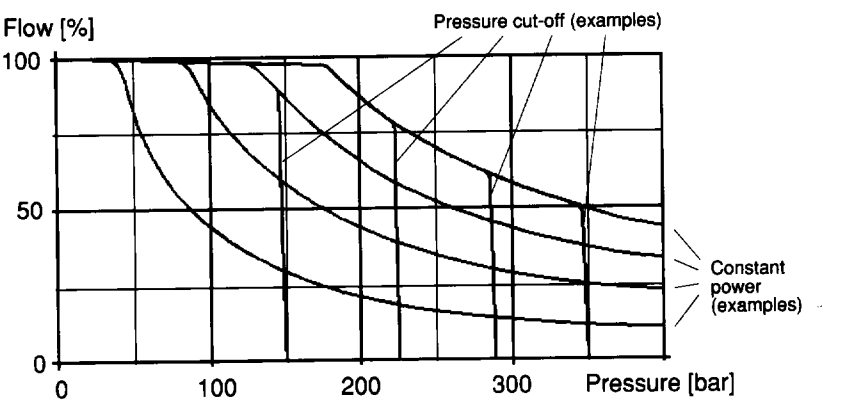
Control combinations

The control assemblies are of modular design, which makes it possible to combine various controls on the same pump. This in turn makes it easy to design the pump for specific control requirements.

Combination examples:
LN, LP, LQ, LQb, LV, LVh, LVhN, LVhP, LVN, Vh, VhN, VN, VP.

The pressure/flow diagram represents an LN control (power control and pressure compensator).

Pressure/Flow diagram



83

ORDERING INFORMATION

Example: **V30D - 250 - R K P - 1 / P - 1**
1 2 3 4 5 6 7 8

1 Basic design
- **V** Variable displacement
- **30** Open circuit
- **D** Series

2 Designation
- **95** 95 cm³/rev
- **250** 251.4 cm³/rev

3 Direction of rotation
- **L** Left hand
- **R** Right hand

4 Shaft options
- **D** Spline (DIN 5480)
- **K** Key

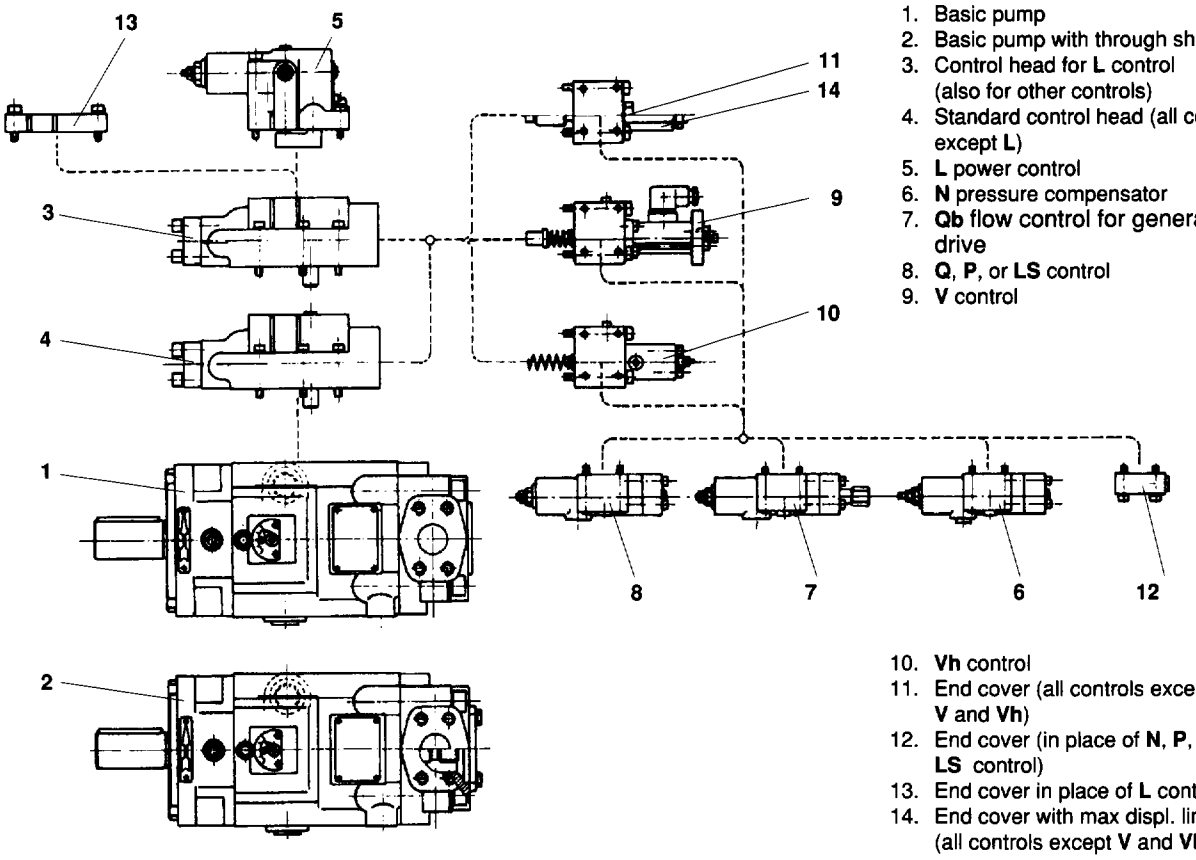
5 Shaft seal
- **P** Nitrile rubber
- **E** EPDM (non-standard)
- **V** Fluorocarbon (non-std.)

6 Shaft design
- **1** Standard
- **2** Through shaft (on request)

7 Controls
- **L** Power control
- **LS** Load sensing control
- **N** Pressure compensator
- **P** Remote control pressure compensator
- **Q** Flow control
- **Qb** Flow control for generator-drive
- **V** Elektrohydraulic proportional control
- **Vh** Hydraulic proportional control

8 Special versions
- **1** Prepared for L control
- **2** Max displacement limiter

V30D STANDARD PROGRAMME



1. Basic pump
2. Basic pump with through shaft
3. Control head for **L** control (also for other controls)
4. Standard control head (all controls except **L**)
5. **L** power control
6. **N** pressure compensator
7. **Qb** flow control for generator-drive
8. **Q**, **P**, or **LS** control
9. **V** control
10. **Vh** control
11. End cover (all controls except **V** and **Vh**)
12. End cover (in place of **N**, **P**, or **LS** control)
13. End cover in place of **L** control
14. End cover with max displ. limiter (all controls except **V** and **Vh**)

INSTALLATION AND START-UP

Fluids
Mineral based oils (HLP according to DIN 51525) or synthetic fluids; refer to our Technical Information on fluids.

Hydraulic fluid temperature
Main circuit: -20°C to +80°C
Drain fluid: max 90°C

Ambient temperature
-20°C to +60°C

Note:
At fluid temperatures constantly over +60°C a flushing through the pump casing of 4–6 l/min should be installed.

Viscosity
Recommended operating range:
16 - 35 mm²/s (cSt)
Intermittent: min 10 mm²/s
max 1000 mm²/s

Filtration
Should conform to ISO standard 4406 code 18/13.

Installation
A properly aligned flexible shaft coupling should be utilized; it must not be forced on the shaft.

Start-up
All hydraulic lines should be flushed with appropriate hydraulic fluid before start-up. The pump case should then be filled through the uppermost drain port.
The drain line must be positioned so that the case is always filled to at least 50% during operation.
At start-up and during the first few minutes of operation the pressure relief valve should be adjusted to 50 bar or less.

84

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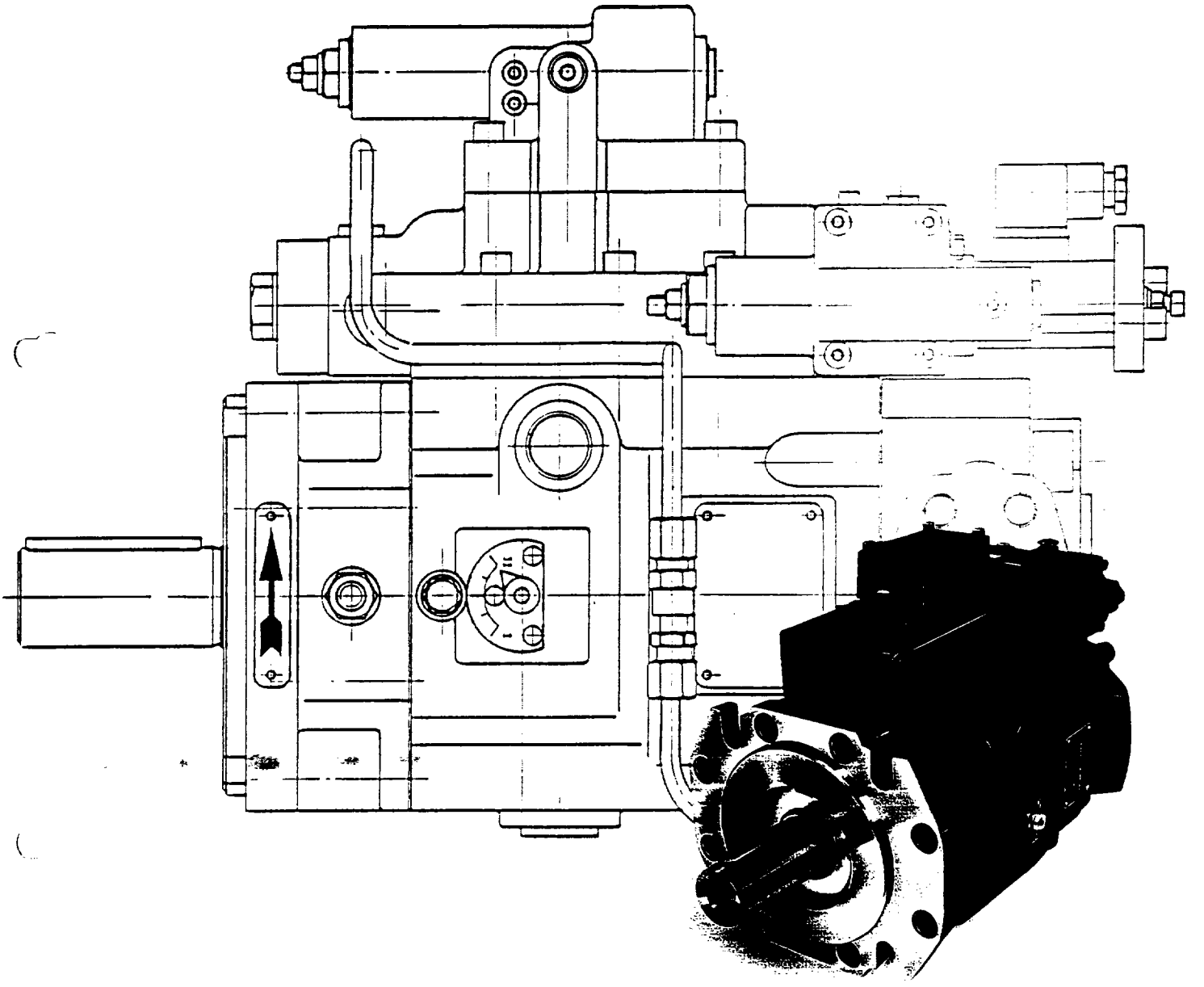
V30D



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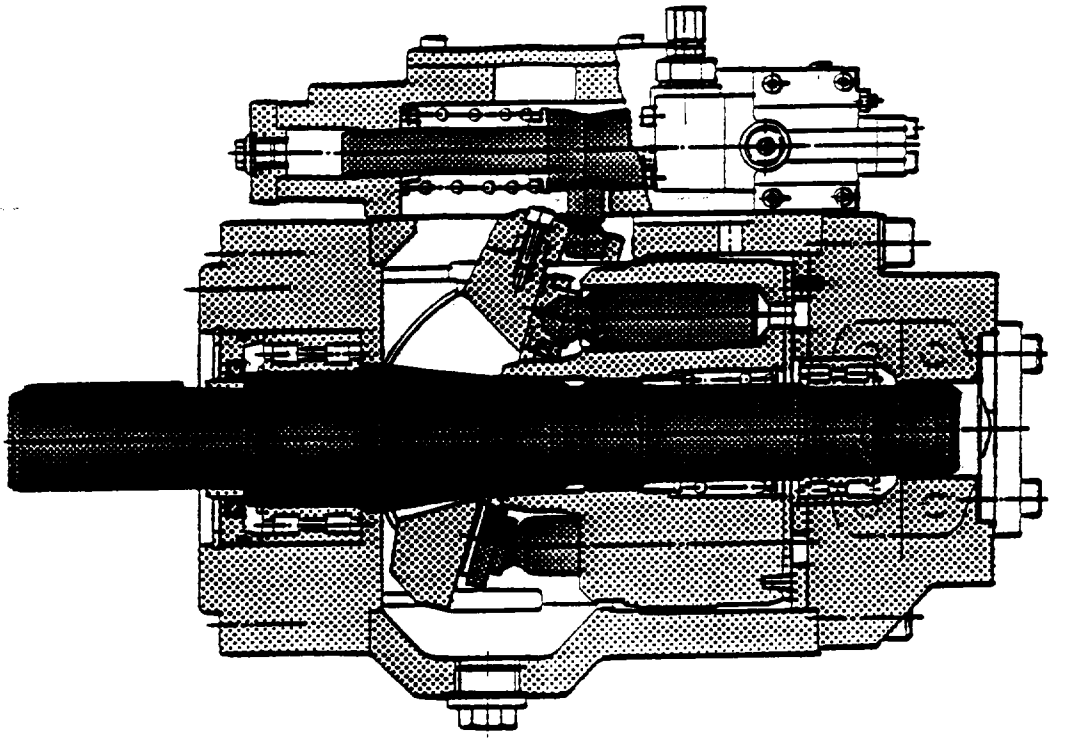
86



Technical Data

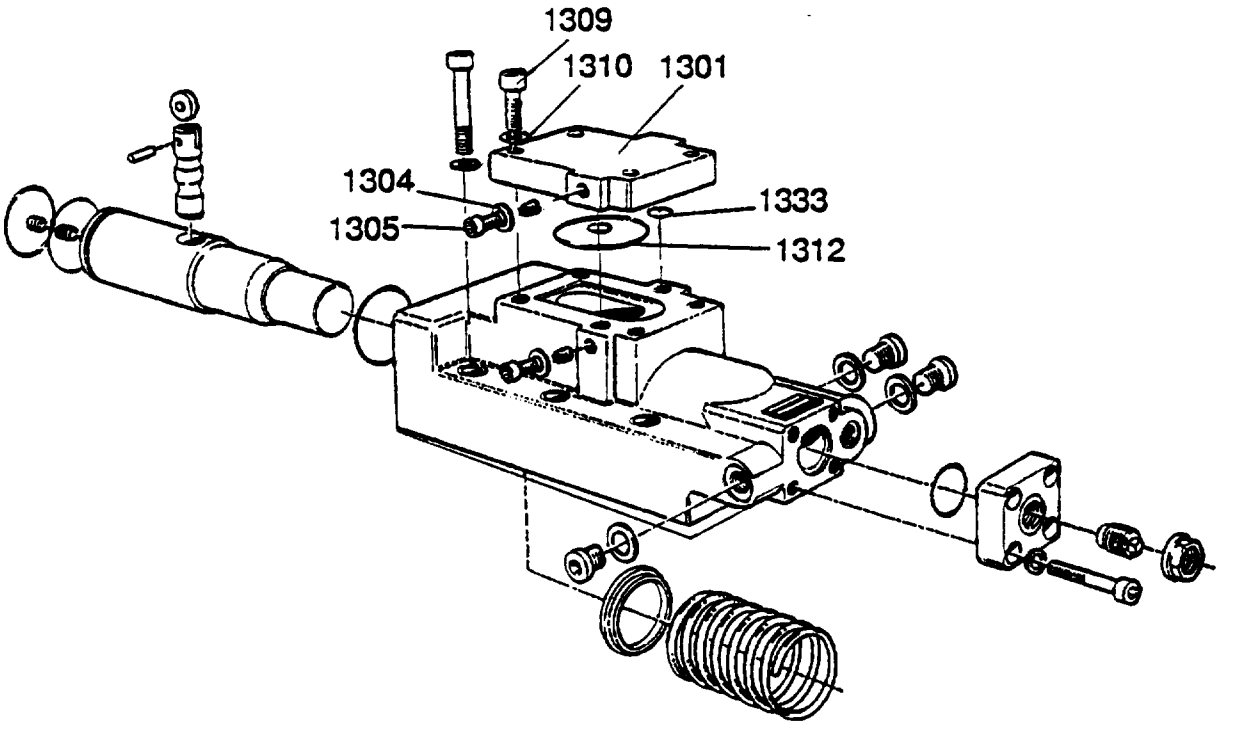
Designation	V30D-250
Displacement (cm³/r)	251,4
Max swash angle (degr.)	17
Max continous pressure (bar)	350
Max peak pressure (bar)	420
Min inlet pressure (abs.) in open circuits (bar)	0,85
Max case pressure (bar)	1
Selfpriming speed at max swash angle, and 1 bar (abs.) inlet pressure (rpm)	1550
Max speed (rpm)	1800
Min continous speed (rpm)	500
Input torque required at 100 bar (theor.) (Nm)	393
Flow at 1450 rpm (theor.) (l/min)	365
Input power at 250 bar and 1450 rpm (kW)	165
Weight without control (kg)	130
Weight with control (approx.) (kg)	136
Moment of inertia (kgm²)	0,0825
L_{10} bearing life at 250 bar, 1450 rpm and max displacement (h)	23 000
Max dynamic torque (Nm)	
Key shaft (K) - input	1450
Spline shaft (D) - input	2800
Spline shaft (D) - output (tandem mounting)	1400

Design

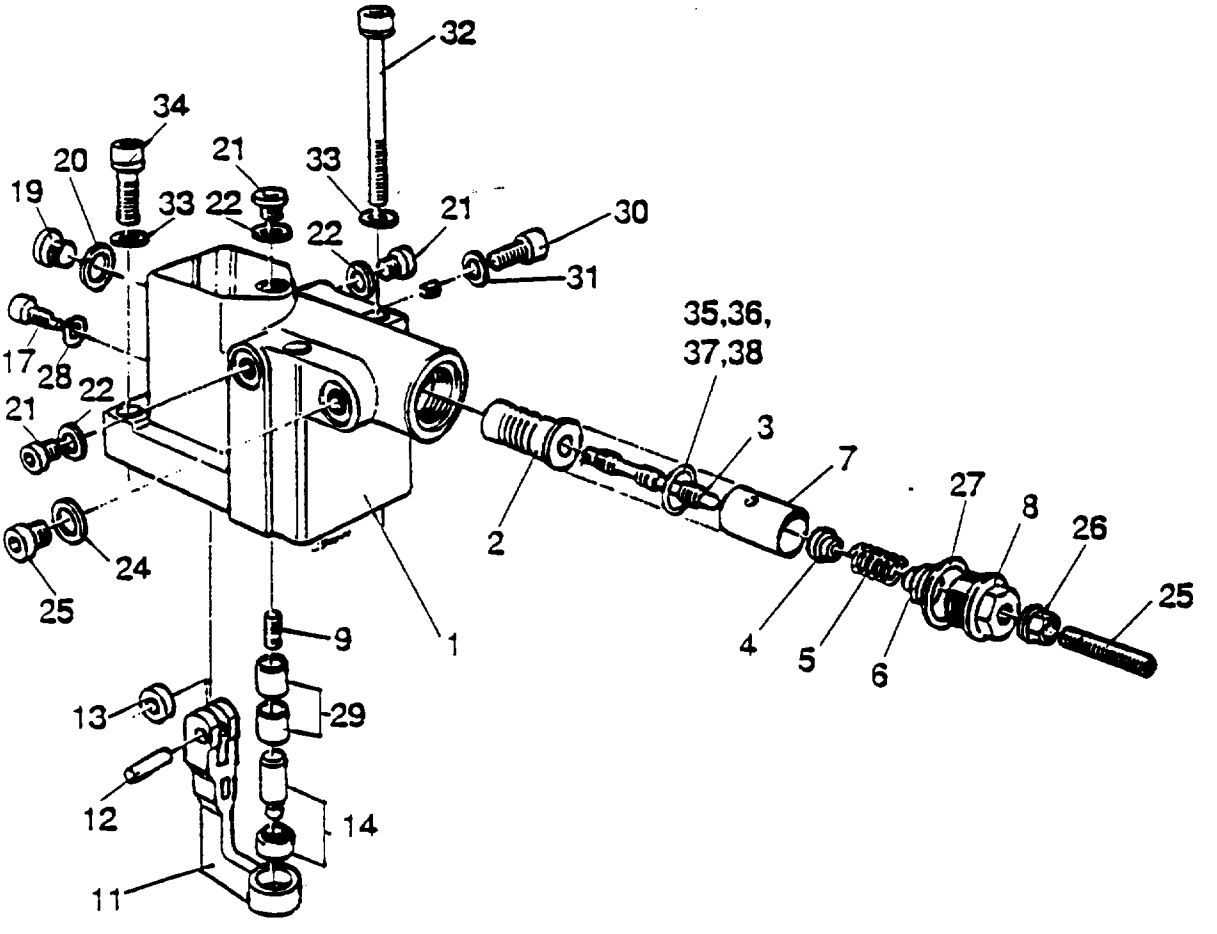
The axial piston pumps V30D are variable displacement pumps for heavy duty use where there are high demands on reliability and low noise level.

V30D has nine guided pistons working in a cylinder barrel. The pump creates flow when the cylinder barrel rotates, driven by the shaft, and the swash plate is tilted.
The pump can be equipped with various controls and combination of controls.

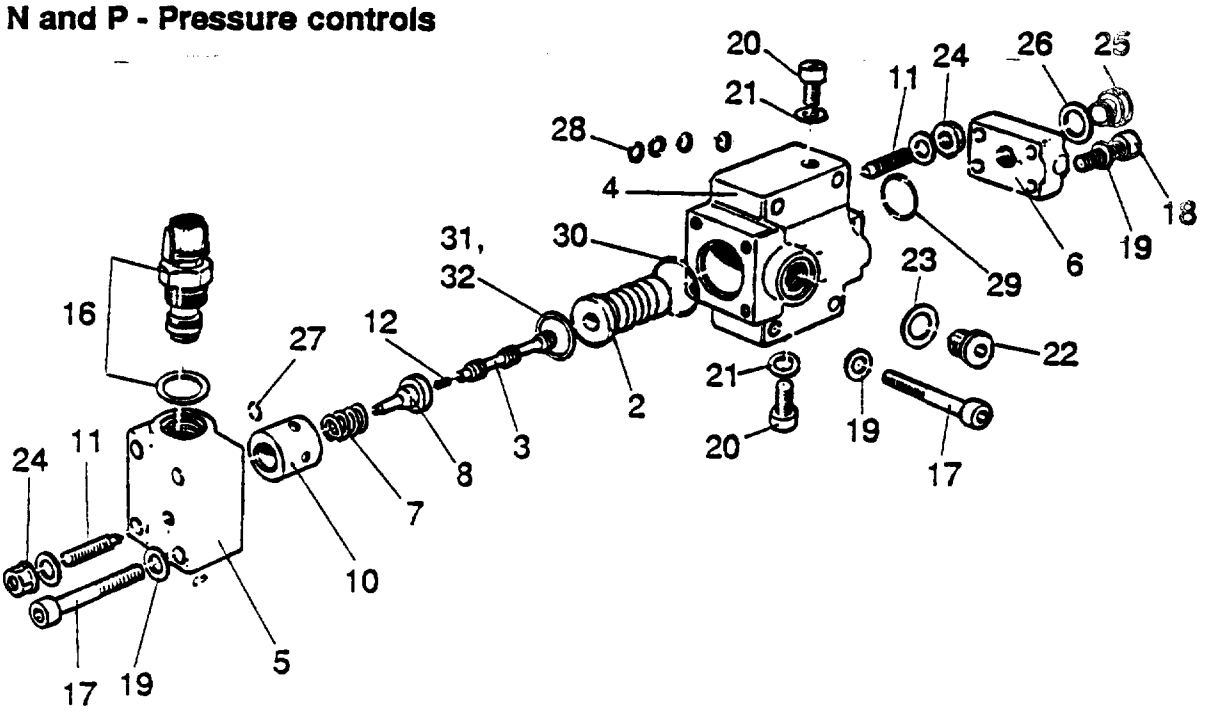
Control head (prepared for L-control)



L - Power control

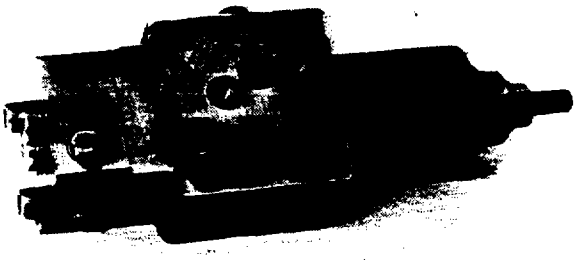


N and P - Pressure controls



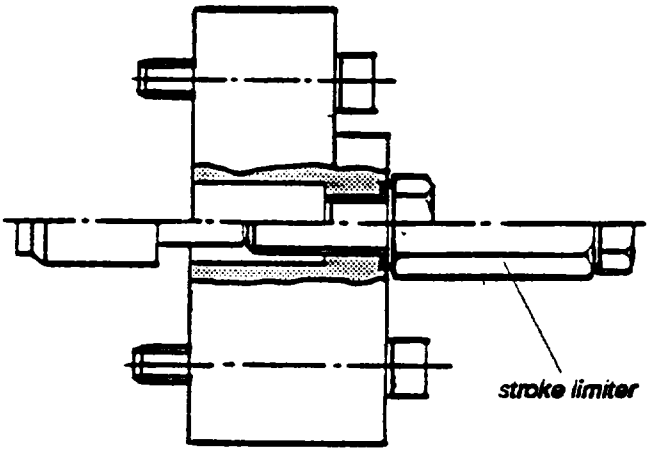
LS, N, P, Q and Qb - New generation

These controls will automatically fit all V30D-95 and -250 and all new V30D-225.
For older V30D-225 an adaptor flange is required (see page 8).



Cover without stroke limiter

Part No.	Size
7925259	V30D-95 and -250
7924572	V30D-225



Cover with stroke limiter

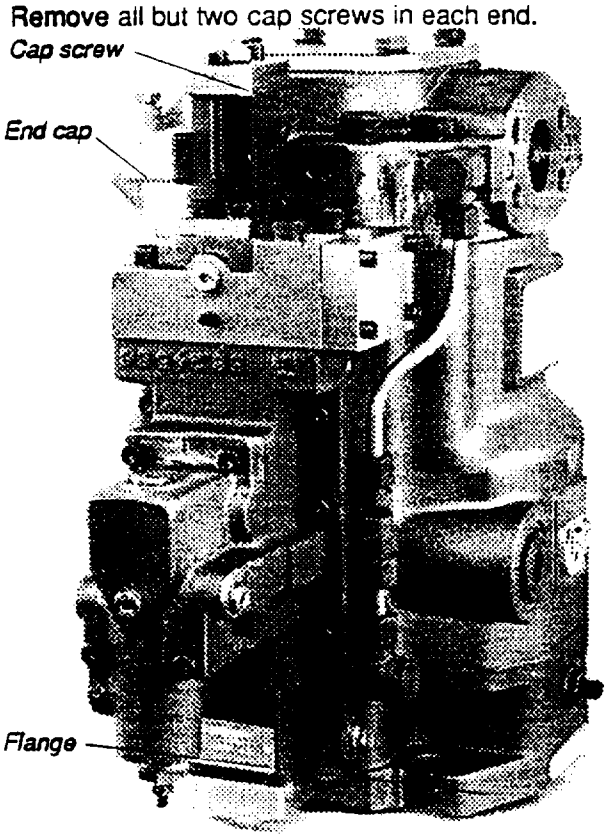
Part No.	Size
7925260	V30D-95
7925442	V30D-225 and -250

Repair procedures

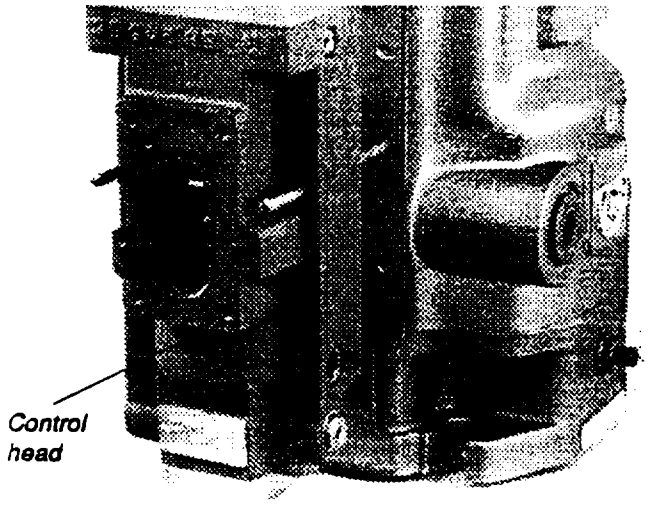
Disassembly

Please make sure that all work is carried out in a clean workshop, and that the pump is protected from dirt.

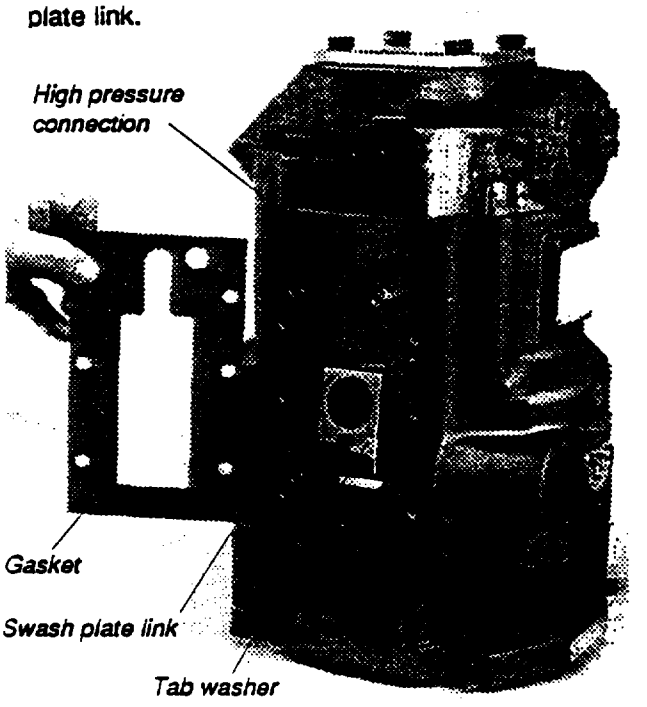
1. Carefully clean the outside of the pump and place the unit on a table with a hole for the shaft, or on a service cart.
2. Remove all pipes and loosen all cap screws in the flange and end cap.
   Remove all but two cap screws in each end.



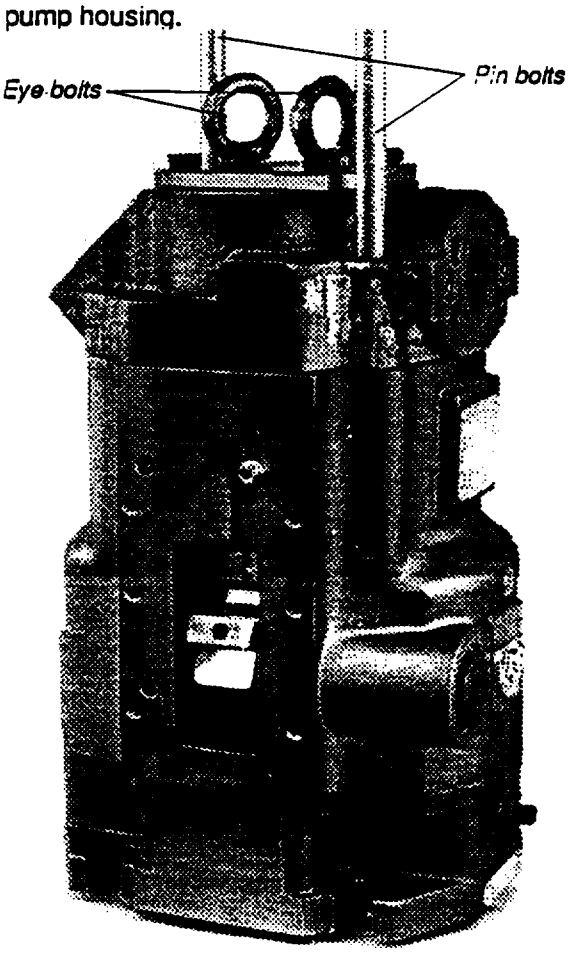
3. Loosen all screws holding the regulator housing. Remove screws and regulator housing; be careful not to damage the gasket placed under the control head. Two pin screws can be used as guidance when removing the control head.
   Note that V30D-225 series 01 has a high pressure connection under the regulator housing; be careful not to damage it.



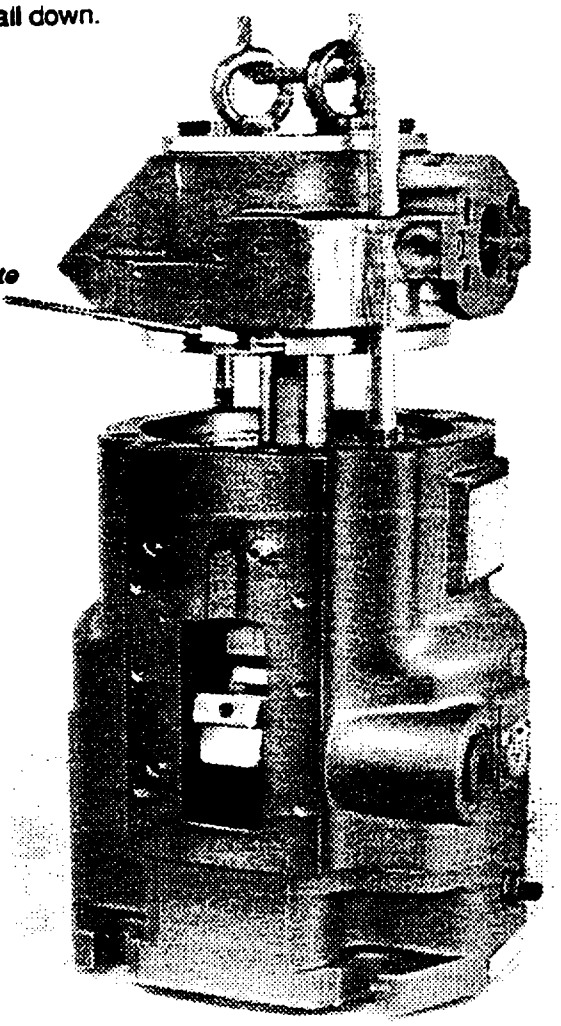
4. Loosen the tab washer and disconnect the swash plate link.



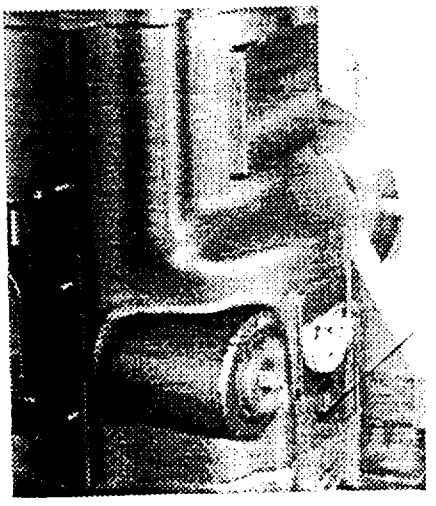
5. Loosen two bolts in the end cap cover and replace by two eye bolts. For the closed end cap the eye bolts can be placed in the pipe connections instead.
   Install two pin bolts diagonally and remove the remaining screws holding the end cap to the pump housing.



6. **By means** of a hoist, or similar, carefully lift the **end cap.**
Try not to damage the gasket between the **housings. The** port plate might stick to the end cap **and can fall** down.

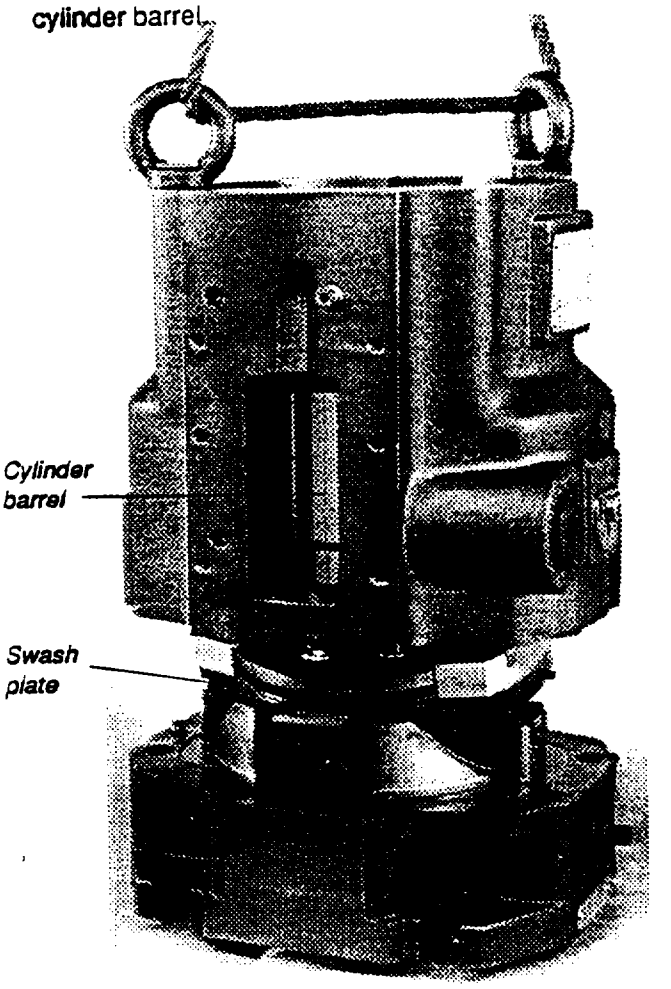


7. **Remove** the swash plate retaining screws (2x) **and the remaining** screws in the mounting flange.
For V30D-225 series 01 the swash plate retainers **are placed** inside the pump and don't have to be **removed** until the housing has been removed (**see point 9**).

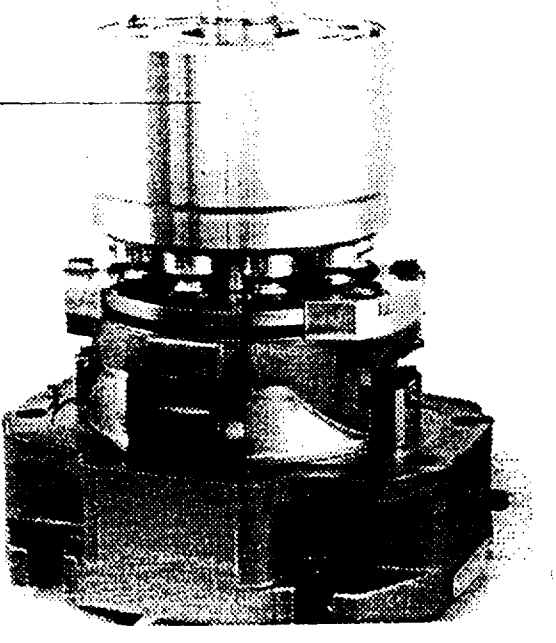


Swash plate retaining screw

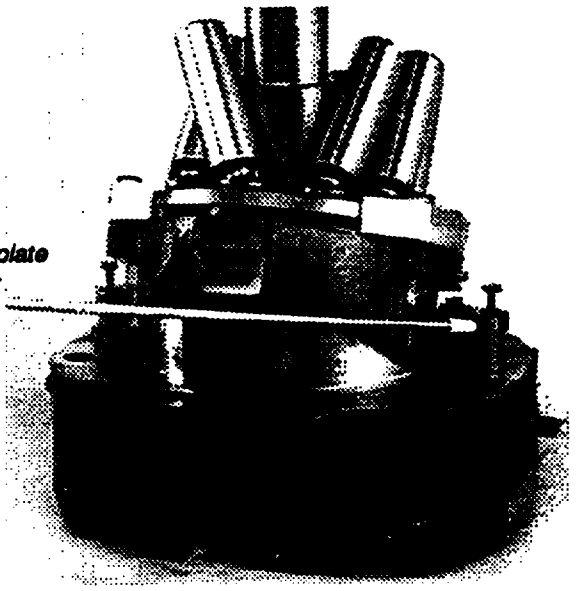
8. **Install two** eye bolts in the upwards facing **holes in the pump** housing. Carefully lift the **housing and be sure** not to lift either the swash plate or the **cylinder** barrel.

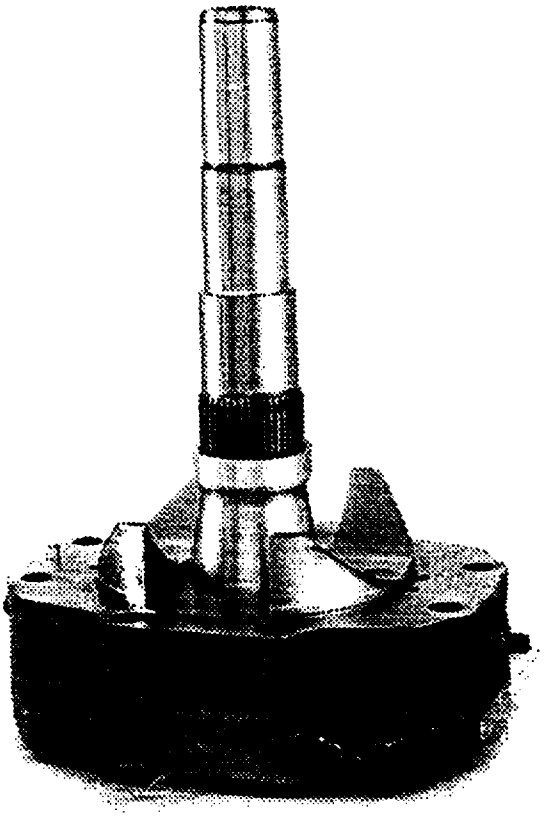


9. **Lift out** the cylinder barrel and the swash plate.

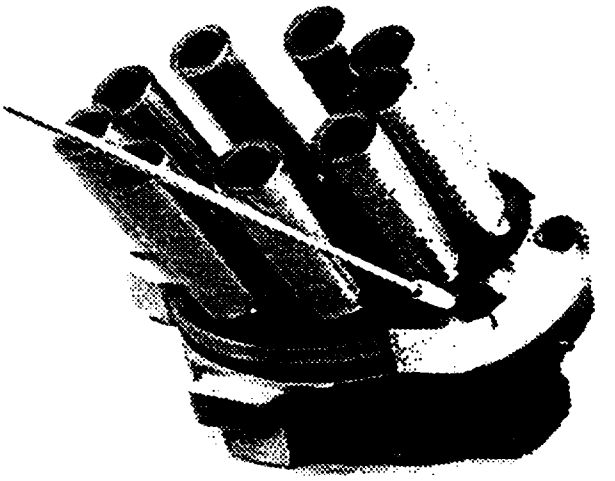


For V30D-225 series 01 the retainers for the swash plate have to be loosened, by unlocking the tab washers and removing one screw from each retainer and turning it 45°, the swash plate can be removed.

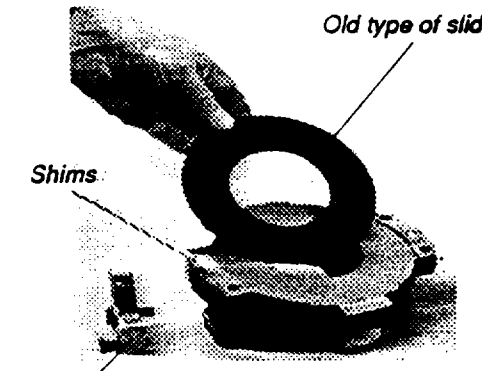


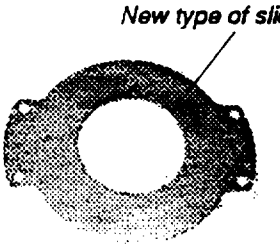


10. To disassemble the swash plate unlock the tab washers and remove the screws.

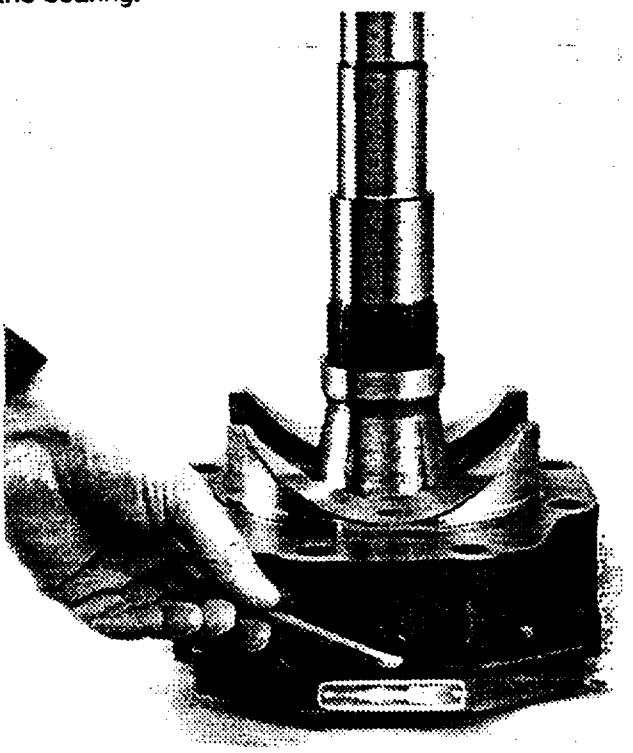


11. If the old type of sliding plate is mounted it should be replaced by the new type that is fixed to the swash plate. This also means that the tripping pieces have to be replaced.

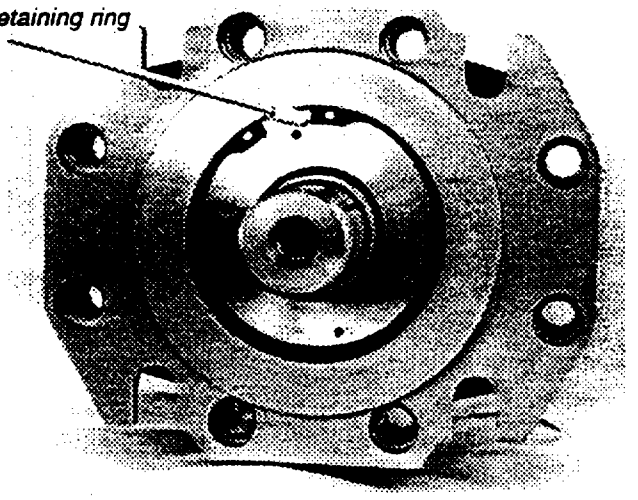


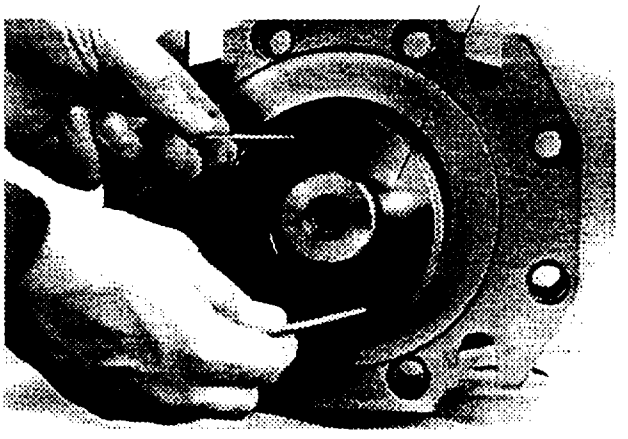


12. To remove the shaft take out the screws holding the bearing.

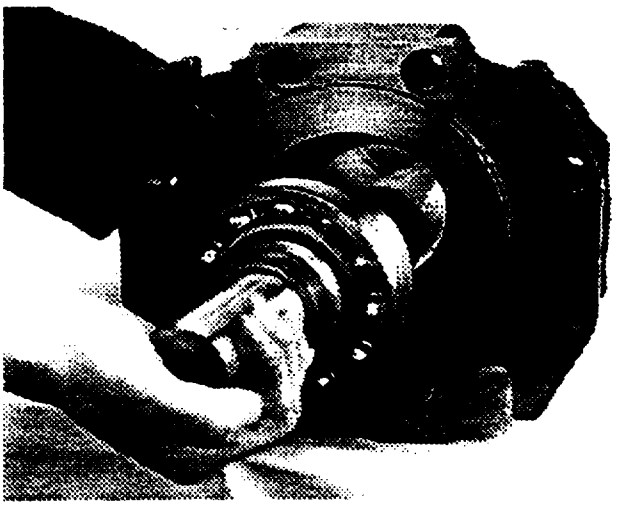


13. Lay the camplate bearing assembly down, remove the retaining ring and, carefully, pull out the seal ring carrier with a puller.

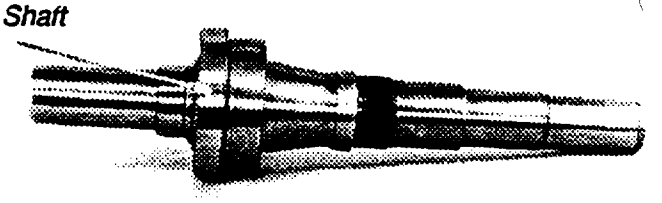




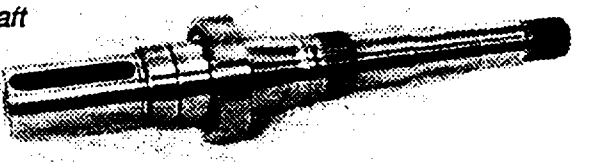
13. Pull out the shaft assembly. If the bearings are damaged they can now be replaced.



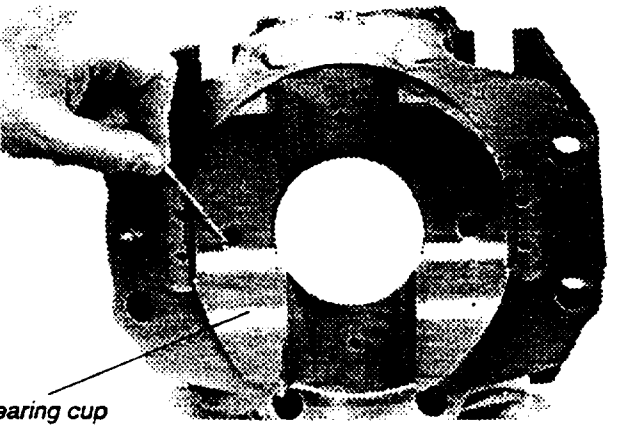
V30D-95 and -225 Shaft



V30D-250 Shaft



13. The bearing cups can now be removed. Note! They are secured with screws secured by Loctite 242.



Adjustments and reassembly

The reassembly is made in opposite order to the disassembly.

Shaft assembly

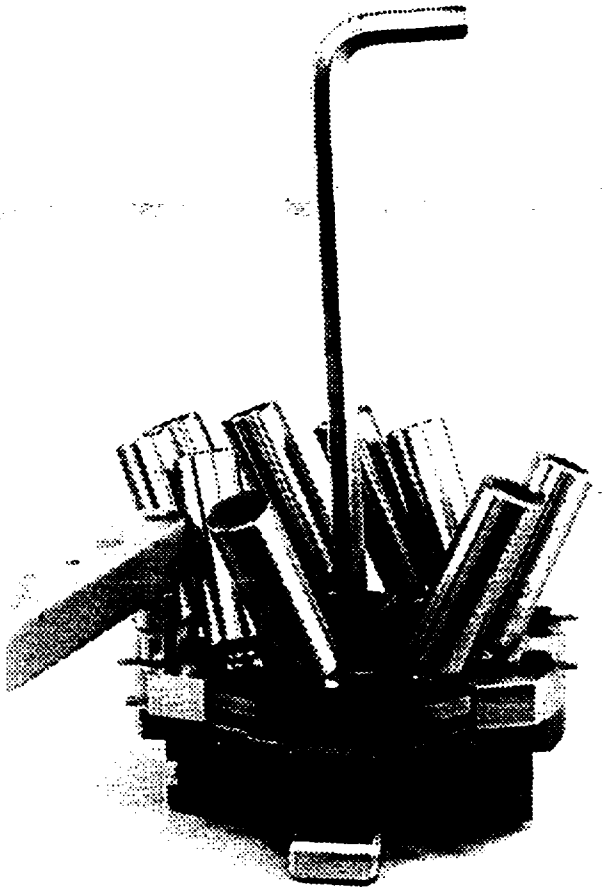
If the bearings have been pulled off push them back on with the spacer between them (V30D-95 and -225 only).

To make the assembly of the bearings easier, heat them in oil to 80°C.

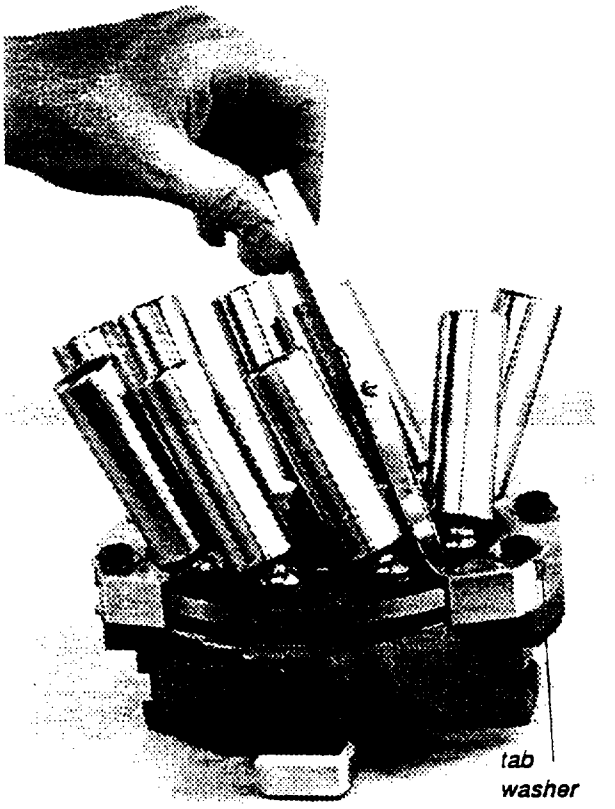
The sleeve for the shaft must be heated to about 100°C before being placed on the shaft to avoid scratches on the sleeve and the shaft which might otherwise cause leakage.

Swash plate assembly

1. Put the nine pistons into the retaining plate and the sliding plate on the swash plate.
2. Place the retaining ring with the pistons against the sliding plate. Fit the tripping pieces with the shims underneath and fasten them with the screws.
3. Press the retaining ring against the swashplate by means of the special tool and tighten with no more than hand torque.

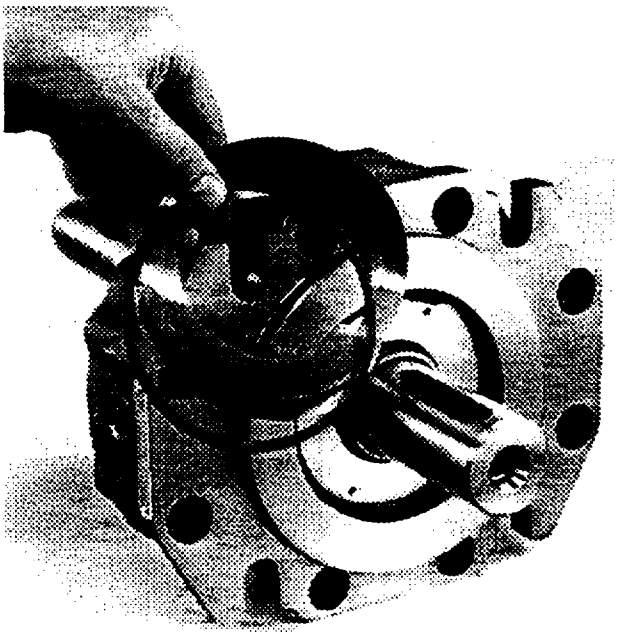


4. Check the play between the retaining plate and the tripping pieces. See picture.
   Correct play is 0,15-0,20 mm; if not, the tripping pieces have to be removed and shims adjusted. The laminated shims have a thickness of 0,05 mm.



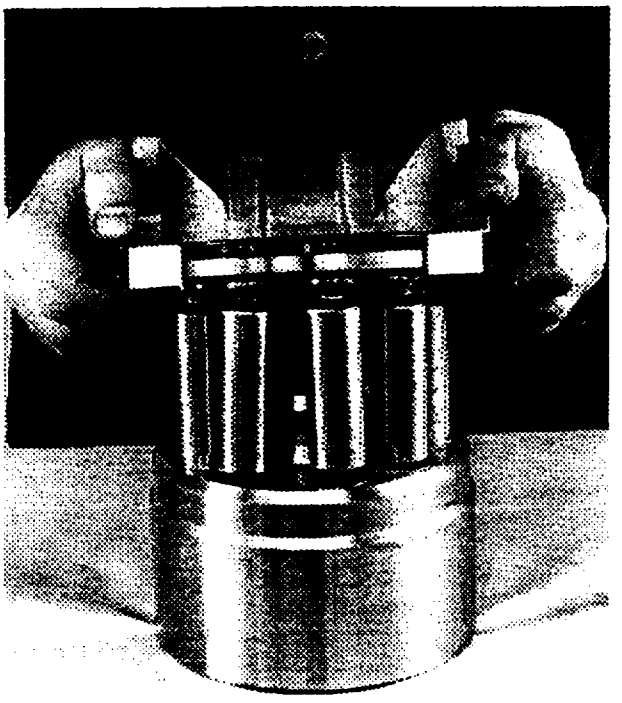
Check after removing the tool that the piston pads run evenly on the sliding plate. Don't forget to lock the tab washers.

5. Fit the shaft. Shaft seal, o-ring and shims should be assembled later. If the bearing cups are worn they have to be replaced.



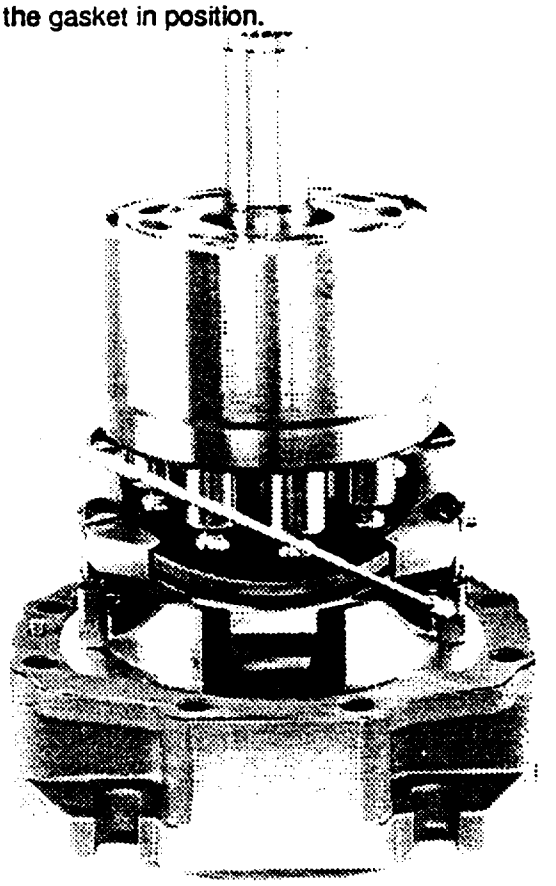
Cylinder barrel and control head

To facilitate the assembly, first enter the pistons into the cylinder barrel.

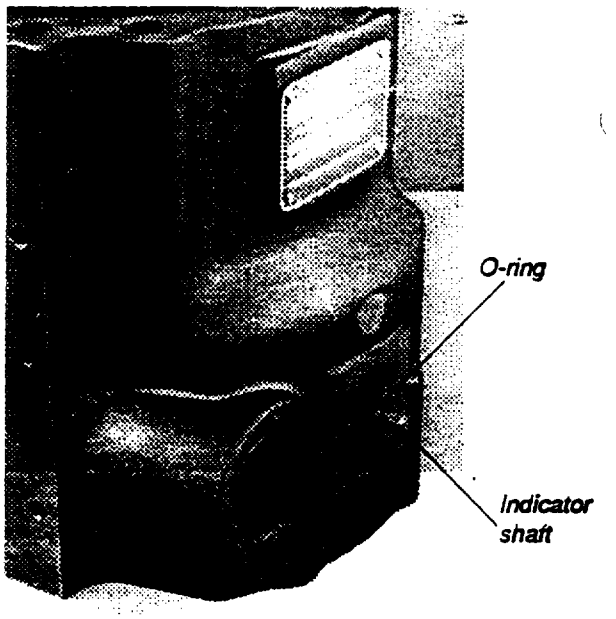


1. Put the camplate bearing assembly, with shaft, in an upright position and enter swash plate with cylinder barrel into the camplate bearing. Please observe that the swash plate link is located opposite the vent plug in the housing.

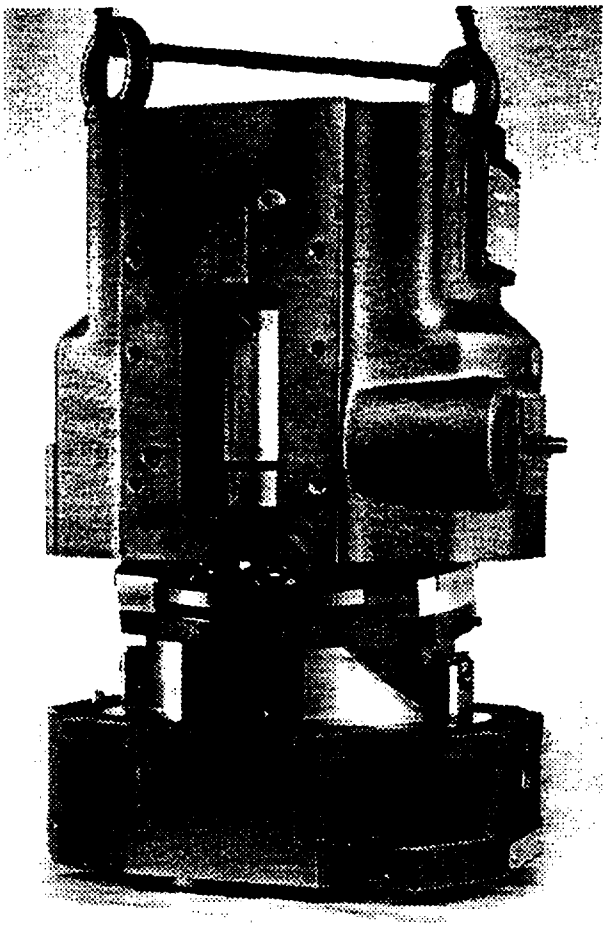
2. Install the retainers (V30D-225 series 01 only) and secure the screws with the tab washers and put the gasket in position.



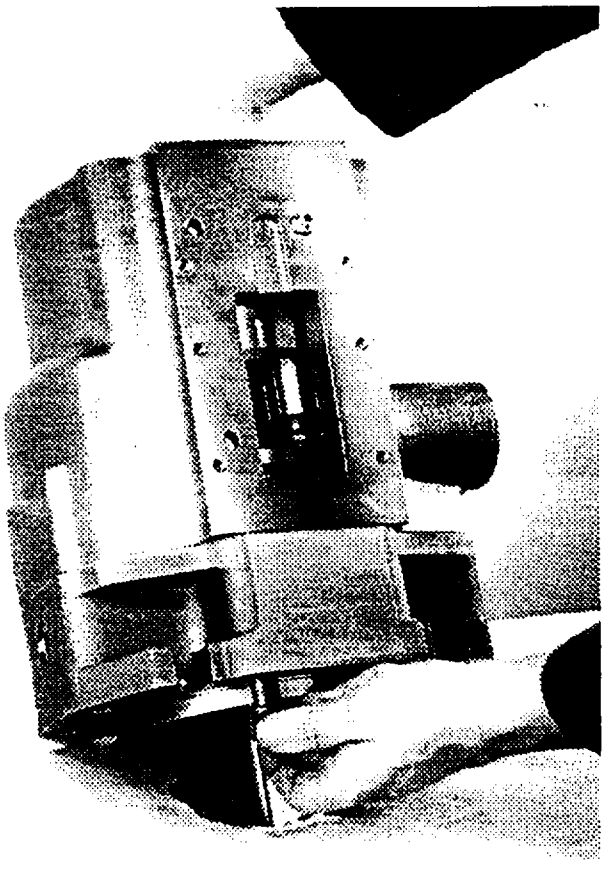
3. Take off the swash plate indicator label and pull out the indicator shaft. Check the o-ring on the shaft, and if damaged, replace it.



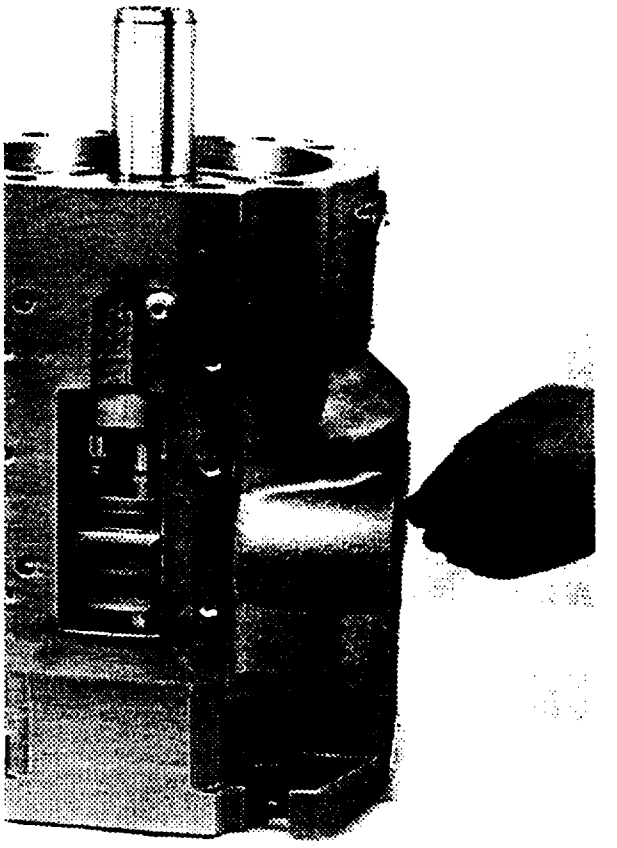
4. **Carefully**, by means of a hoist, fit the **housing.**



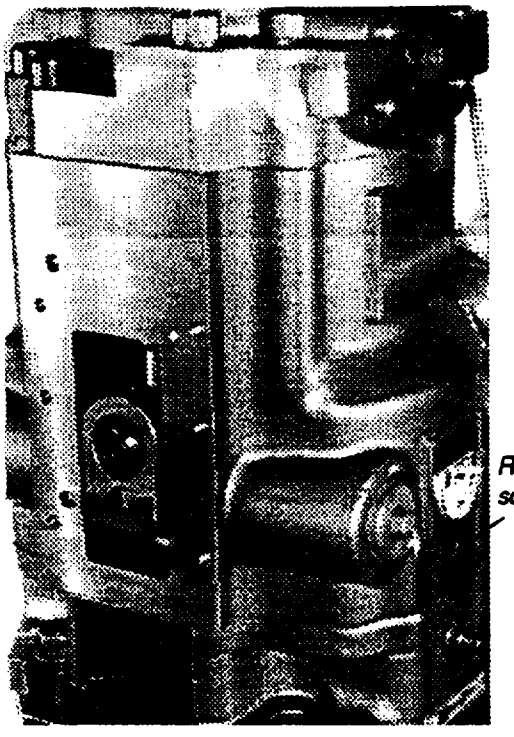
5. **Fit all but two** diagonal screws in the flange.



6. Push in the indicator shaft until it **engages with the pin** in the swash plate and fit the **label for the indicator.**



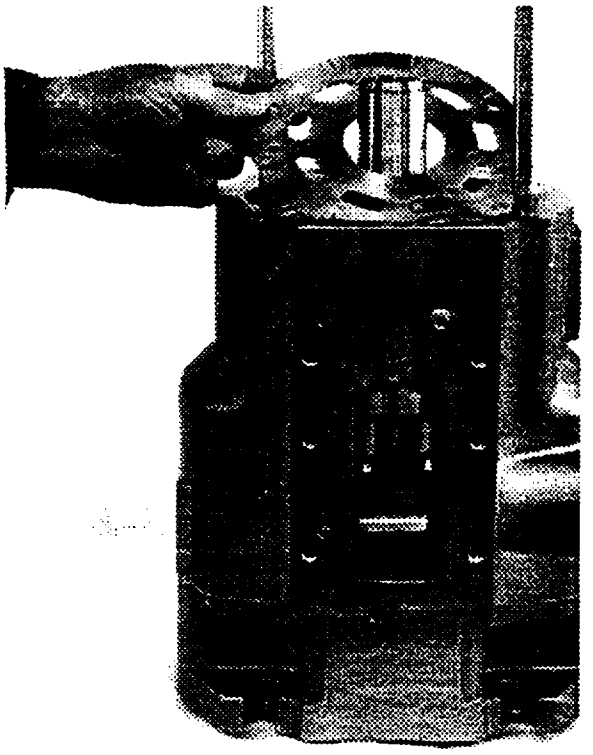
7. Tighten the swash plate retaining **screws.**



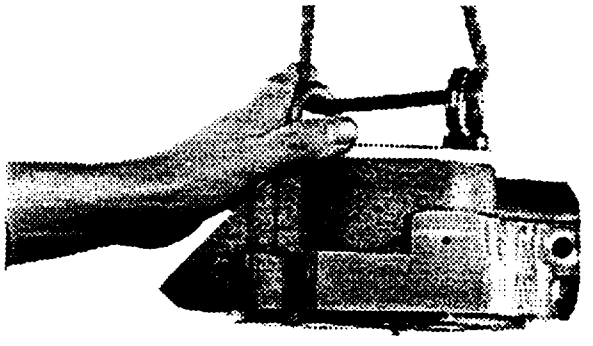
Fitting of end cap and regulator head

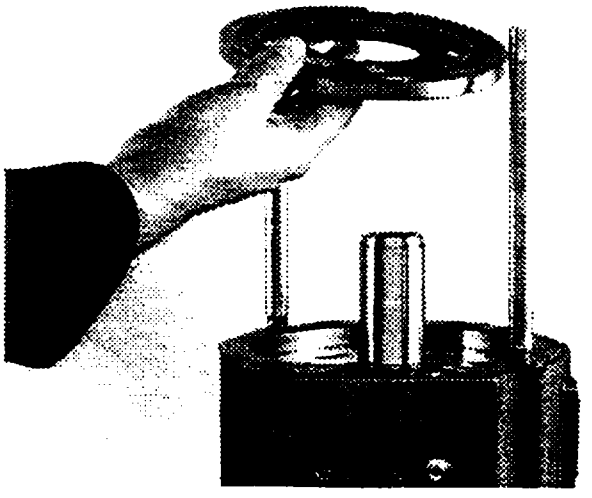
To facilitate the assembly; fit two pin screws in the housing.

1. Fit the sliding plate with the steel side facing the cylinder barrel.

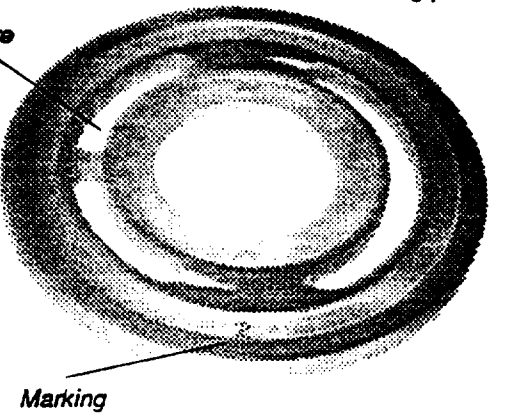


2. Fit the gasket. Fit the port plate against the end cap by means of grease and lift it on with a hoist.

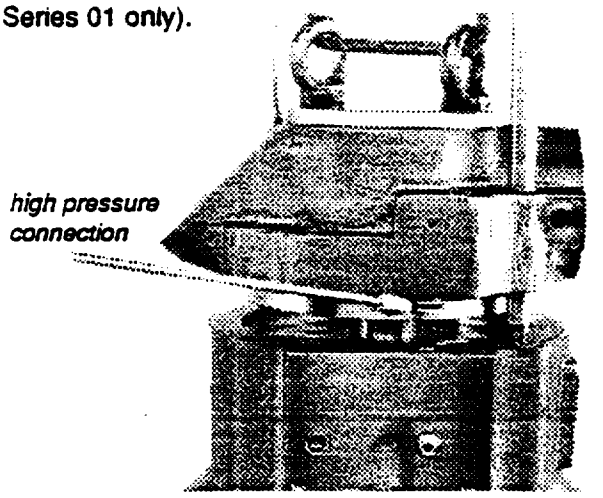




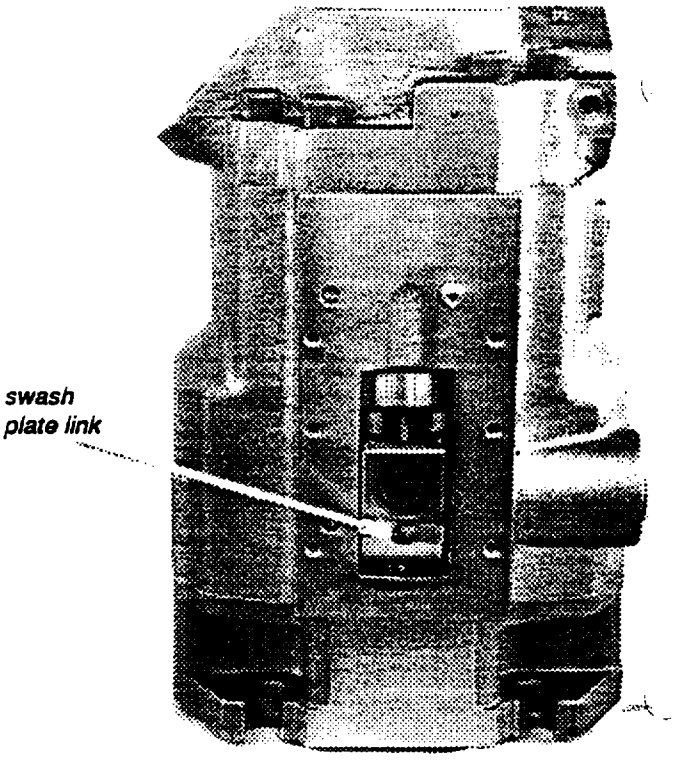
Note the correct position of the port plate. The hole marked either L or R has to engage with the pin in the end cap. The shown side has to face the sliding plate.



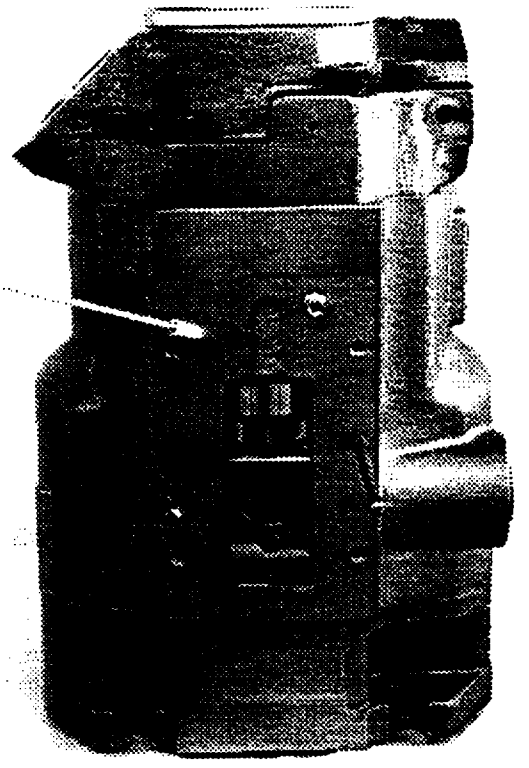
Also note the high pressure connection (V30D-225 Series 01 only).



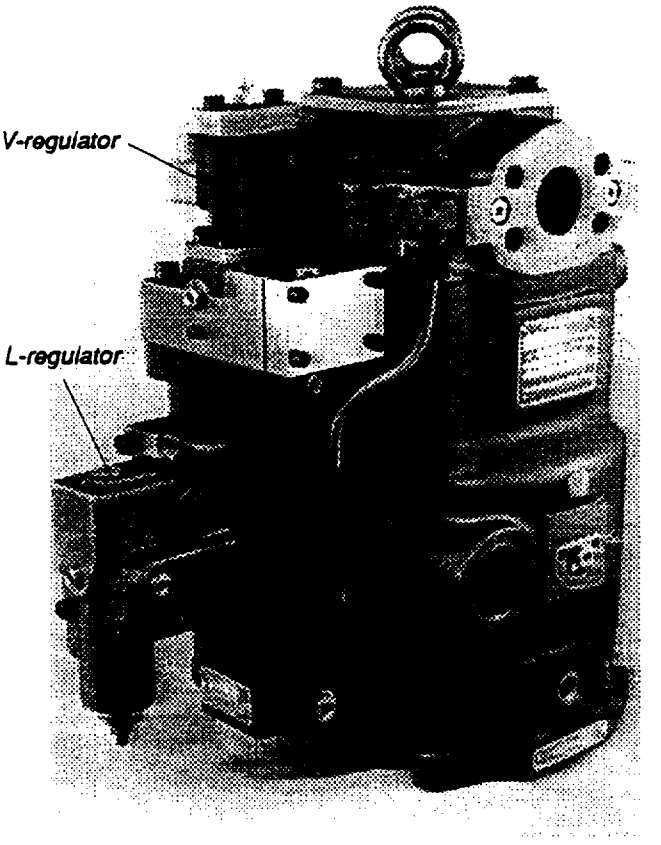
3. Fit all the cap screws.
4. Fit the swash plate link and have it secured with the tab washer.



5. Fit two pin screws into the housing and apply the gasket.



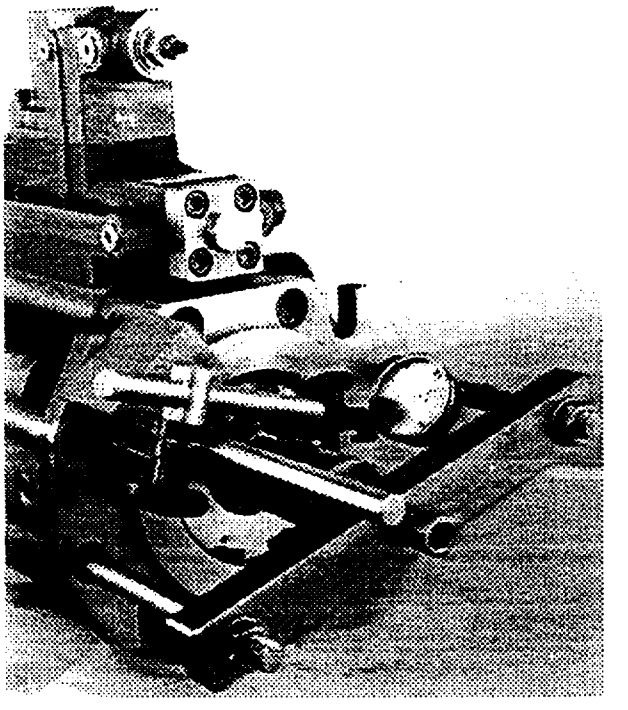
7. Fit the regulators and the tubings. The picture shows the L- and V-regulators.



6. Fit the regulator head.

Adjusting the axial play for the shaft

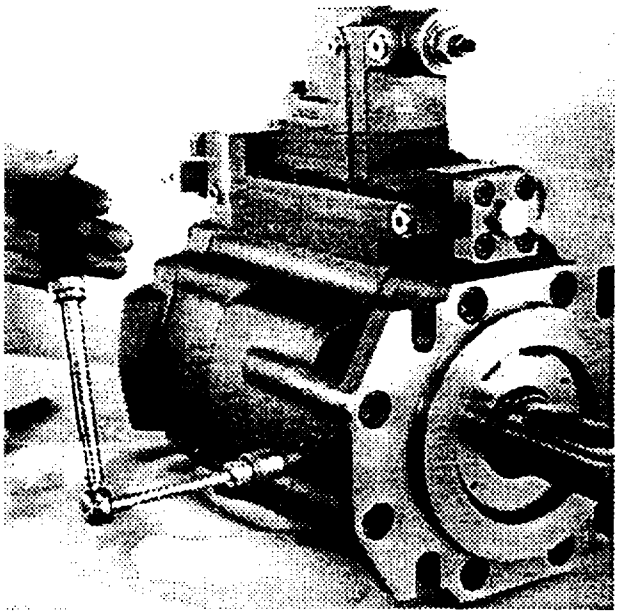
1. Put the pump on its side and fit all but two screws and tighten them. Mount the special tool in the two free screw holes. Fit the indicator clock as shown in the figure.



2. Apply the screw against the shaft until you notice a resistance. This means that the spacer is tight against the cylinder barrel.
   Correct play is 0,35 mm for V30D-95 and 0,40 mm for V30D-225 and -250.
   To achieve this, appropriate shims should be installed behind the seal ring carrier.
   The shims thickness is the difference between the first reading and above mentioned play.

3. Fit the shaft seal into the seal ring carrier. Fit the carrier, with the o-ring, and secure it with the retaining ring.

4. Fit the screws for holding the bearings and torque with 2 Nm (0,2 kpm).

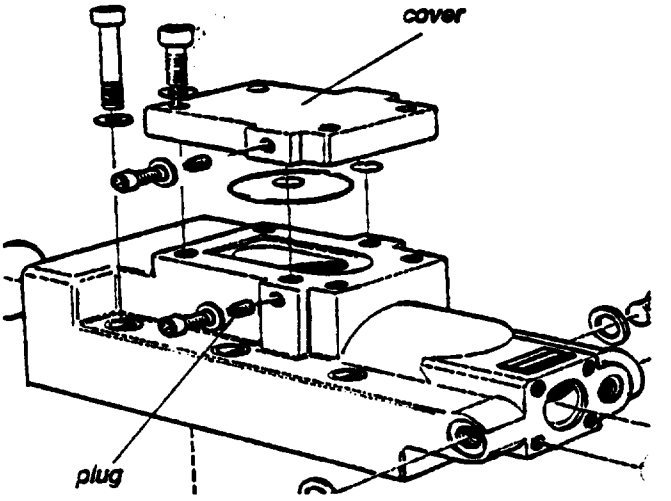


5. Tighten all screws according to the table below.

Screw dimension	Tightening torque Nm	kpm
M5	8	0,8
M6	13	1,3
M8	32	3,2
M10	64	6,4
M12	110	11,0
M14	180	18,0
M16	275	27,5

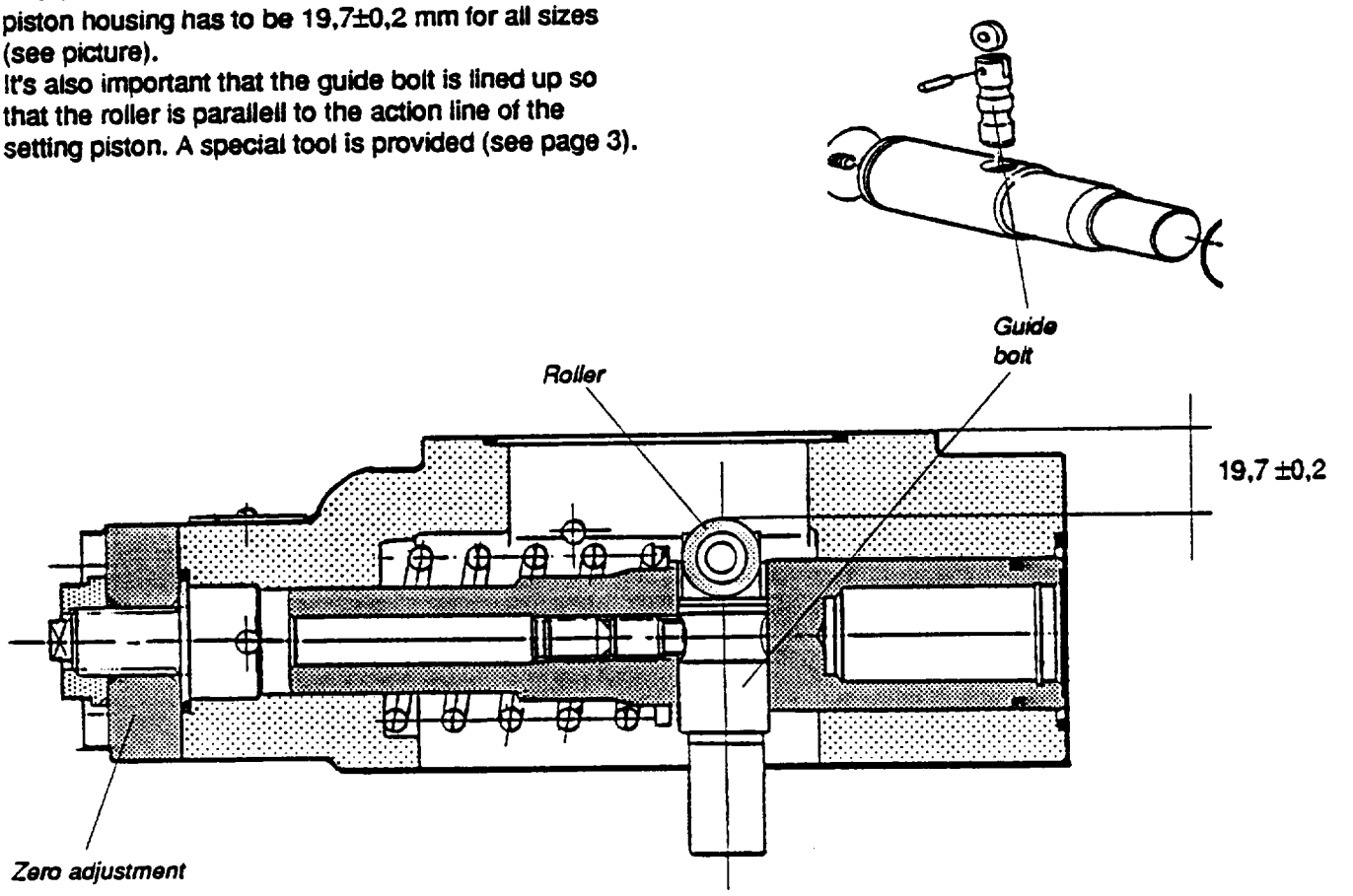
Installing L-regulator

When installing the L-regulator instead of the cover, the orifice (see picture) has to be replaced by a plug to give correct function to the regulator.



Replacement of guide bolt

If the guide bolt has been replaced or exchanged it's important that it's fitted correctly in the setting piston. The distance from the roller to the top of the setting piston housing has to be 19,7±0,2 mm for all sizes (see picture).
It's also important that the guide bolt is lined up so that the roller is parallell to the action line of the setting piston. A special tool is provided (see page 3).



Zero adjustment

In the front end of the setting piston housing a cover with a setting screw is mounted that allows the minimum displacement to be limited. It's fitted on all pumps produced after 880901.

Part No.	Size
7925600	V30D-95
7925297	V30D-225 and -250

Testing

The general condition of the unit can be established by checking the drain flow.
Connect a drain line to the highest positioned drain port and measure the flow for one minute. The drain flow should not exceed the values in the tables below.
Let the pump run at normal speed and pressurize the system to 15-20 MPa (150-200 bar).
Note that the drain flow will increase when the pump regulator is activated.

Drain Flow, unactivated control (l/min)

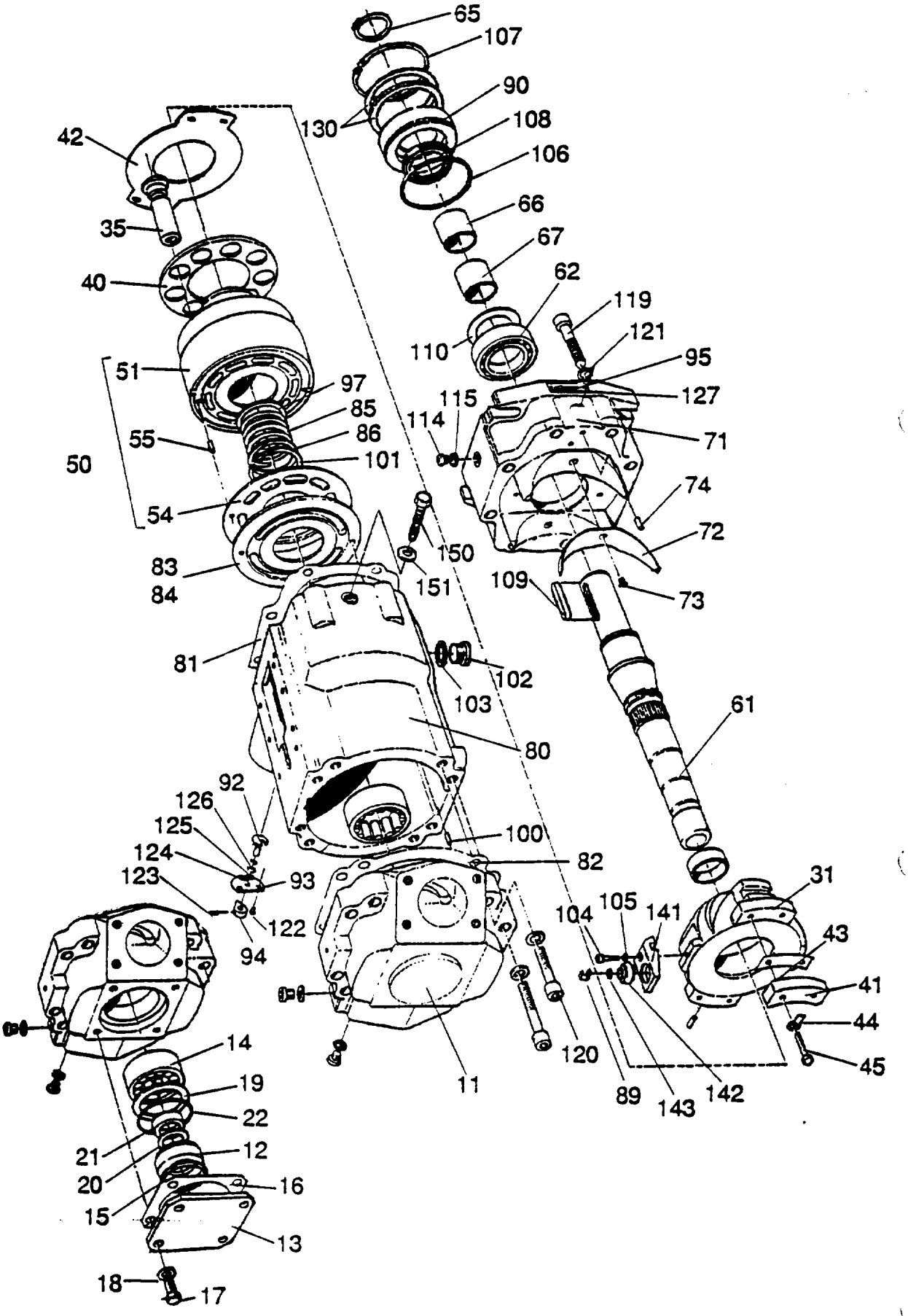
	Normal
V30D-95	3,5
V30D-225	10
V30D-250	10

Drain Flow, activated control (l/min)

	Normal
V30D-95	10
V30D-225	16
V30D-250	16

Parts List

V30D-250, Basic Parts



Parts List

V30D-250, Basic Parts

Item	Title	Qty
10	HOUSING FLANGE ASSY	1
11	HOUSING FLANGE	1
12	COVER	1
13	COVER	1
14	ROLLER BEARING	1
15	RETAINING RING	1
16	SEALING	1
17	SCREW	4
18	LOCK WASHER	4
19	ADJ. WASHER	1
20	ADJ. WASHER	1
21	SHAFT SEAL	1
22	O-RING	1
31	CAMPLATE ASSY	1
38	PISTON ASSY	9
40	RETURN PLATE	1
41	TRIPPING PIECE	2
42	SLIDING PLATE	1
43	LAMINUM WASHER	2
44	LOCKING PLATE	4
45	CAP SCREW	4
50	CYLINDER BARREL ASSY	1
51	CYLINDER BARREL	1
54	SLIDING PLATE	1
55	GUIDE PIN	2
60	SHAFT ASSY	1
61	SHAFT	1
62	ROLLER BEARING	1
65	RETAINING RING	1
66	INNER RACE	1
70	CAMPLATE BEARING ASSY	1
71	CAMPLATE BEARING	1
72	BEARING CUP	2
73	SCREW	2
74	CYLINDRICAL PIN	1
80	HOUSING	1
81	SEALING	1
82	SEALING	1
83	VALVE PLATE, TYPE R	1
84	VALVE PLATE, TYPE L	1
85	SPRING	1
86	WASHER	1
89	LOCKING PLATE	1
90	COVER	1
92	INDICATOR SHAFT	1
93	INDICATOR PLATE	1
94	INDICATOR	1
95	ROTATION INDIC. PLATE	1

Item	Title	Qty
96	NAME PLATE	1
97	THRUST RING	1
100	ROLL PIN	1
101	RETAINING RING	1
102	PLUG SCREW	1
103	BONDED WASHER	1
104	SCREW	1
105	LOCK WASHER	1
106	O-RING	1
107	RETAINING RING	1
108	SHAFT SEAL	1
109	KEY	1
110	ADJ. WASHER	1
114	SCREW PLUG	1
115	BONDED WASHER	1
119	SCREW	2
120	SCREW	2
121	LOCK WASHER	8
122	SCREW	3
123	PIN SCREW	1
124	RETAINING RING	1
125	ADJ. WASHER	2
126	O-RING	1
127	RIVET	6
130	KEY PLATE	1
140	CATCH ASSY	1
141	CATCH	1
142	BALL AND SOCKET JOINT	1
143	SNAP RING	1
150	CAP SCREW	2