

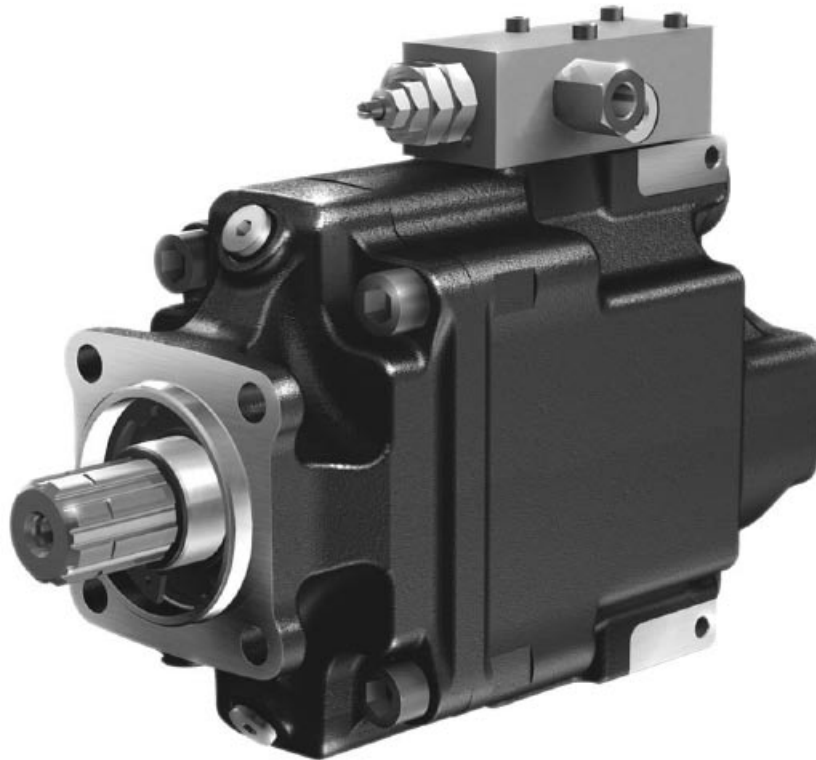


Hydraulic Pump

Serie VP1-095

*Variable Displacement Pumps,
Pressure to 420 bar*

*Catalogue HY30-8220/UK
September 2007*



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Conversion factors

1 kg.....	2.20 lb
1 N.....	0.225 lbf
1 Nm.....	0.738 lbf ft
1 bar	14.5 psi
1 l.....	0.264 US gallon
1 cm ³	0.061 cu in
1 mm.....	0.039 in
$\frac{9}{5} \text{ }^{\circ}\text{C} + 32$	$^{\circ}\text{F}$

 **WARNING**

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General information

VP1-095 is a very powerful, variable displacement pump for truck applications. It can be close-coupled to a gearbox PTO (power-take-off) or to a coupling independent PTO (e.g. an engine PTO) which meets ISO standard 7653-1985.

An application that makes full use of all the features of the VP1 pump is truck cranes with a load sensing system. The complex systems of refuse collection vehicles and sewage trucks as well as various combinations of tippers, cranes, snow ploughs, and salt/sand spreaders can also be greatly simplified and optimised with the VP1 pump.

The VP1 pump provides the hydraulic system with the correct amount of fluid at the precise moment, effectively reducing energy consumption and heat generation. This means a smoother and quieter running system with much reduced impact on the environment.

The VP1 pump is highly efficient, has a small installation envelop and is extremely light. It is reliable, economical and easy to install.

The new frame size, VP1-095, has almost the same installation dimensions as those of the other VP1 pumps, and is suitable for all load sensing systems, regardless of make.

Features

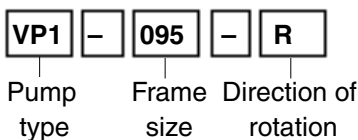
- Lower energy consumption
- Strong and reliable
- 11 pistons for low noise and smooth running
- Compact and light
- Improved overall economy
- High power-to-weight ratio
- Sturdy design.

Specifications

Frame size	VP1-095
Max displacement [cm ³ /rev]	95
Operating pressure [bar]	
- Max. intermittent ¹⁾	420
- Max. continuous ²⁾	400
Selfpriming speed ³⁾ with 3" suction line, max [rpm]	2 200
Max. speed, unloaded pump [rpm]	3 000

- 1) Max 6 seconds in any one minute
- 2) Refer to page 6: LS control
- 3) At an inlet pressure of 1.0 bar (abs.) with mineral oil at a viscosity of 30 mm²/s (cSt).

Ordering information



Code	Frame size [cm ³ /rev]
095	95

Code	Dir. of rotation
R	Right hand
L	Left hand

Standard model numbers

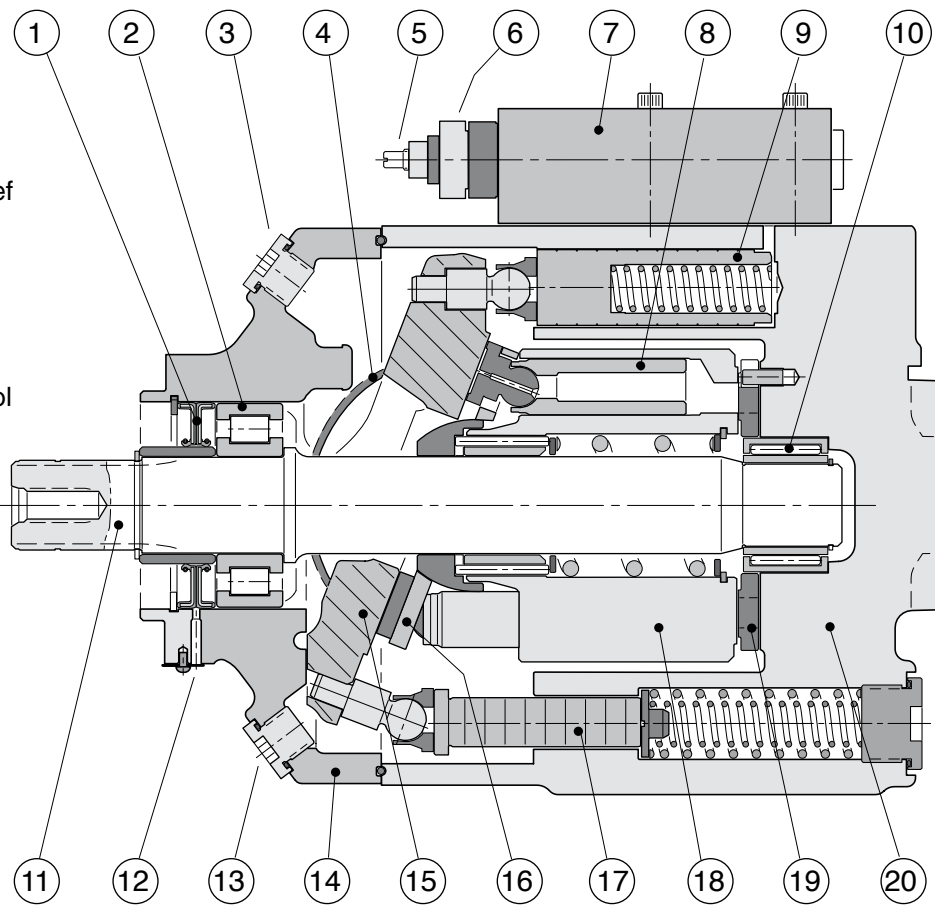
Model	Ordering no.
VP1-095-R	378 6000
VP1-095-L	378 6001

NOTE: - The direction of rotation cannot be changed. The desired direction of rotation must be stated when ordering.

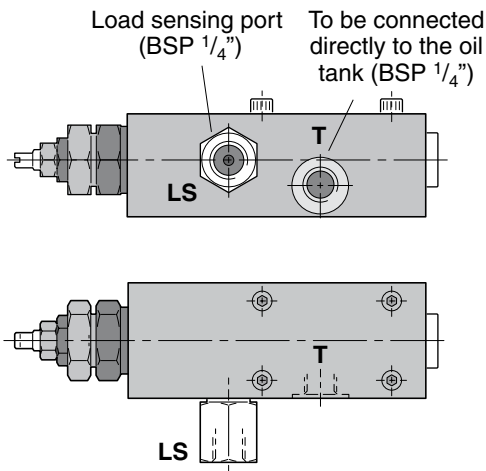
- The suction fitting must be ordered separately (see information on page 7).

VP1-095 cross section

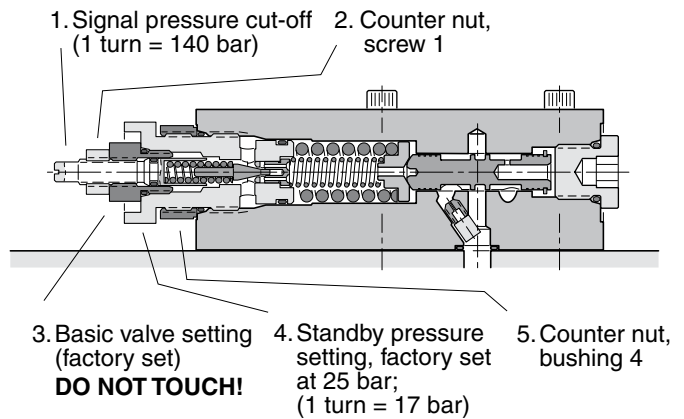
1. Shaft seal
2. Roller bearing
3. 'Upper' purge plug
4. Bearing shell
5. Setting screw (pressure relief valve)
6. Setting bushing (standby pressure)
7. Control
8. Piston with piston shoe
9. 'Upper' setting piston (control pressure)
10. Needle bearing
11. Shaft
12. Drain hole, shaft seals
13. 'Lower' purge plug
14. Bearing housing
15. Swash plate
16. Retainer plate
17. 'Lower' setting piston (pump pressure)
18. Cylinder barrel
19. Valve plate
20. Barrel housing



LS control (for VP1-095)

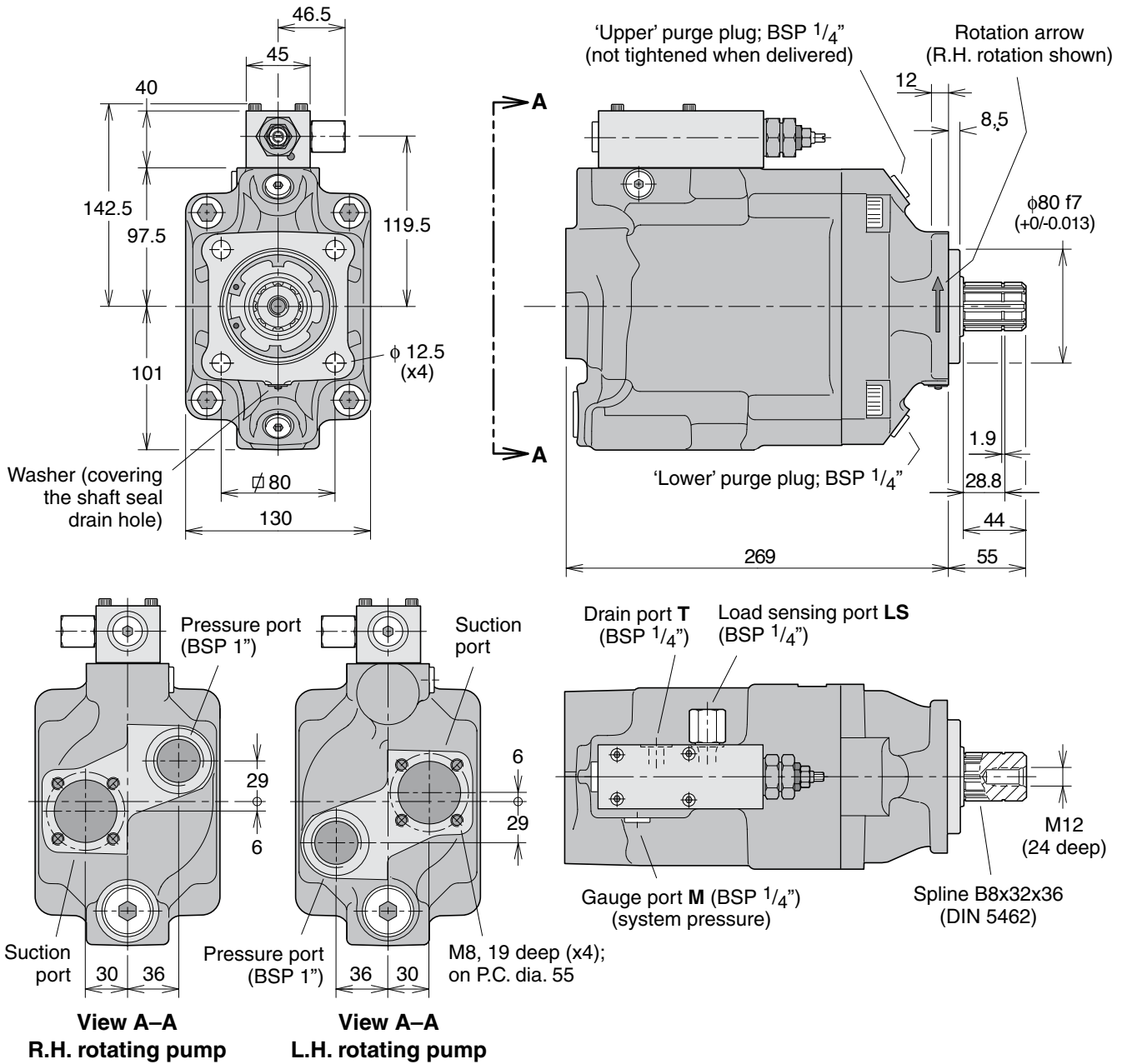


LS control ports.



LS control cross section.

VP1-095 installation



IMPORTANT!

The control is **not** drained through the pump case; an external drain line must be installed from control port T and, directly, to the oil tank.

LS load sensing control (for VP1-095)

The VP1 pump can be used with any load sensing valve on the market. The control governs the pump flow to the hydraulic system as determined by the pressure differential, Δp , between the pump pressure and the signal pressure.

At a certain 'opening' of the directional valve, the pump flow is kept constant (up to max specified rpm and pressure limits of the pump) even if the pump pressure changes due to increasing or decreasing work load.

The LS control, consisting of a valve body, which is installed on the main pump housing, determines the pressure levels for

"standby pressure" (Δp) and "pressure relief"; both functions are adjustable.

As shown in the illustration below, the control is connected to the system pressure, the LS signal and the setting piston.

When pump flow is not required to a consumer, (no-flow mode), the pressure in the signal line is zero. This means that the pump maintains the "standby" pressure as determined by the setting in the setting spring.

LS load sensing control function

Refer to the hydraulic schematic to the right.

A selected 'opening' of the directional control valve spool corresponds to a certain flow to the work function. This flow, in turn, creates a pressure differential, Δp , over the spool and, consequently, also a pressure differential between the pump outlet and the LS port.

When the differential pressure decreases (e.g. the directional valve is 'opened' further) the Δp also decreases and the LS valve spool moves to the left. The pressure to the setting piston then decreases, and the pump displacement increases. The increase in pump displacement stops when the Δp finally reaches the pressure setting and the forces acting on the valve spool are equal.

If there is no LS signal pressure (e.g. when the directional valve is in the neutral position) the pump only delivers sufficient flow to maintain the standby pressure as determined by the setting.

Control adjustments

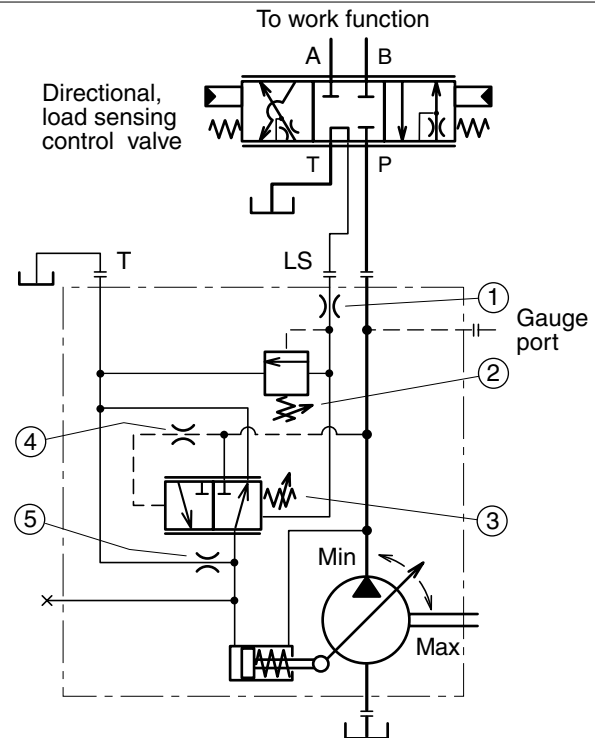
- Signal pressure limiter

The valve is factory set at 350 bar but is adjustable to 420 bar.

- Standby pressure

Δp is factory set at 25 bar but is adjustable (15–40 bar). The 25 bar setting and the standard orifice sizes shown (see also "Control type LS", page 4), will usually provide an acceptable directional valve characteristic as well as physical system stability.

For additional information, please contact Parker Hannifin.



1. Load signal nozzle (0.8 mm)
2. Signal pressure limiter adjustment
3. Standby (Δp) pressure adjustment
4. Dampening nozzle (fixed)
5. Bleed-off nozzle (1.2 mm)

System schematic (with VP1-095); example.

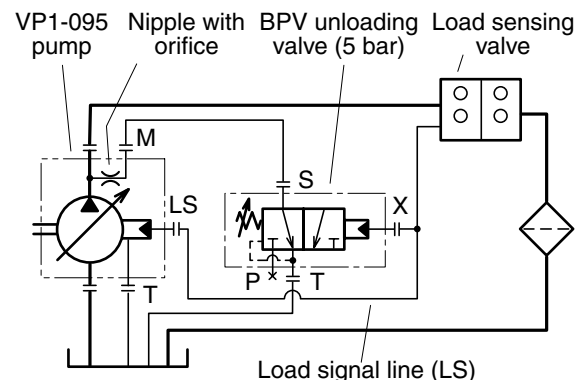
BPV-VP1 unloading valve*

The BPV unloading valve for the VP1-095 is utilized in hydraulic systems where the pump is operating constantly. The valve, which requires no additional control valve, allows the pump to operate off-load for long periods of time, for example when installed on an engine PTO.

The valve protects the pump from overheating in the off-load mode by allowing a small flow through the pump (refer to the schematic to the right). When a load sensing valve function is engaged, the bypass flow is cut off (as port 'X' is being pressurized).

Valve type	Ordering number	Rated flow [l/min]	Max press. [bar]
BPV-VP1	379 8799	20	400

* For more details, refer to the "Truck Hydraulics" catalogue, ordering number HY30-8200/UK, page 54.



BPV unloading valve with VP1-095 pump.

Suction fittings for VP1-095

A 'suction fitting' consists of a 'straight', 45° or 90° fitting, clamps, cap screws and an O-ring.

NOTE: The suction fitting is not supplied with the pump; it must be ordered separately.

'Straight' suction fittings

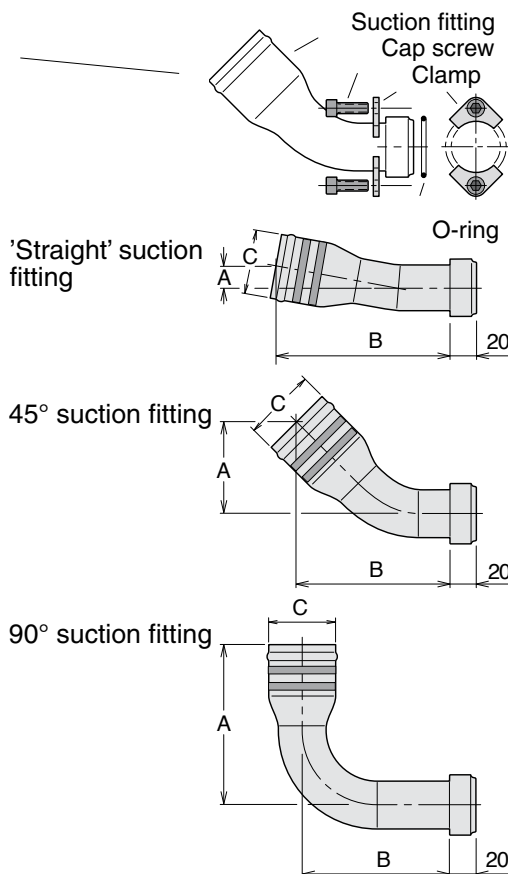
Ordering no.	A mm	B mm	φ C mm (in.)
378 0637	25	145	63 (2 1/2")
378 3523	15	174	75 (3")

45° suction fittings

Ordering no.	A mm	B mm	φ C mm (in.)
378 0634	75	117	63 (2 1/2")
378 3367	88	129	75 (3")

90° suction fitting

Ordering no.	A mm	B mm	φ C mm (in.)
378 1980	147	103	63 (2 1/2")



Start-up

Make sure the entire hydraulic system is clean before filling it with a recommended fluid.

In addition, the VP1 pump must be purged to remove any entrapped air in the pump housing; utilize the uppermost purge port (see figure).

Hydraulic fluids

The VP1 data shown in the specifications on page 3 are valid when operating on a high quality, mineral based fluid.

Hydraulic fluids type HLP (DIN 51524), ATF (automatic transmission fluids), and API type CD engine oils are suitable.

Fluid temperature

Main circuit: Max 75 °C.

Viscosity

Recommended viscosity: 20 – 30 mm²/s (cSt).

Operating viscosity limits:

- Min 10 mm²/s; max 400 mm²/s.
- At start-up: max 1000 mm²/s.

Filtration

To obtain a long VP1 life, we recommend a filtration level of:

- 25 µm (absolute) in clean environment or at low operating pressures
- 10 µm (absolute) in contaminated environment or at high operating pressures.

Filtration should meet ISO standard 4406, code 18/13.

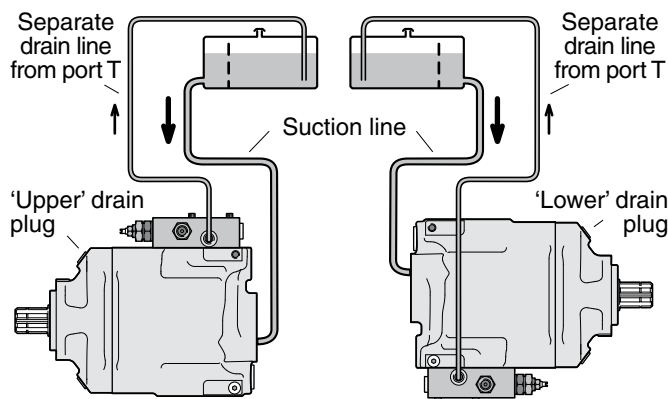
Drain line

The LS-regulator requires a separate drain line, which must be routed directly to the reservoir (refer to the illustration to the right).

IMPORTANT!

As shown in the illustration below, the pump inlet must always be located below the lowest level in the oil tank.

Before start-up: Open the uppermost purge plug and purge the pump. Afterwards, make sure both plugs are tightened (max 30 Nm).



The VP1 pump should be installed below the oil level in the tank. Purging should not be performed before the pump has been connected to the tank and the system is filled with oil.

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