# PB VP1 095-110-130

GEJE Truck Hydraulics

## Specifications

| Frame size VP1 - | 045 | 060 | 075 | 095 | 110 | 130 |
|---|---|---|---|---|---|---|
| **Displacement** [cm$^3$/rev] | 45 | 60 | 75 | 95 | 110 | 128 |
| **Max operating pressure** [bar] | | | | | | |
| continuous | 350 | 350 | 350 | 400 | 400 | 400 |
| intermittent [1] | 400 | 400 | 400 | 420 | 420 | 420 |
| **Mass moment of inertia J** [kgm$^2$] | 0.00606 | 0.00606 | 0.00606 | 0.00681 | 0.00690 | 0.00690 |
| **Shaft speed** [2] [rpm] | | | | | | |
| - short circuited pump (low press.) | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 |
| - max selfpriming speed [2] | 3000 | 2700 | 2500 | 2300 [3] | 2200 [3] | 2100 [3] |
| **Control type** | LS | | | | | |
| **Shaft end spline** | DIN 5462 | | | | | |
| **Mounting flange** | ISO 7653-1985 | | | | | |
| **Weight** (with control) [kg] | 27 | | | | | |

[1] Max 6 seconds in any one minute.

[2] At an inlet pressure of 1.0 bar (abs.) with mineral oil at a viscosity of 30 mm$^2$/s (cSt).

[3] Valid with 3" inlet (suction) line

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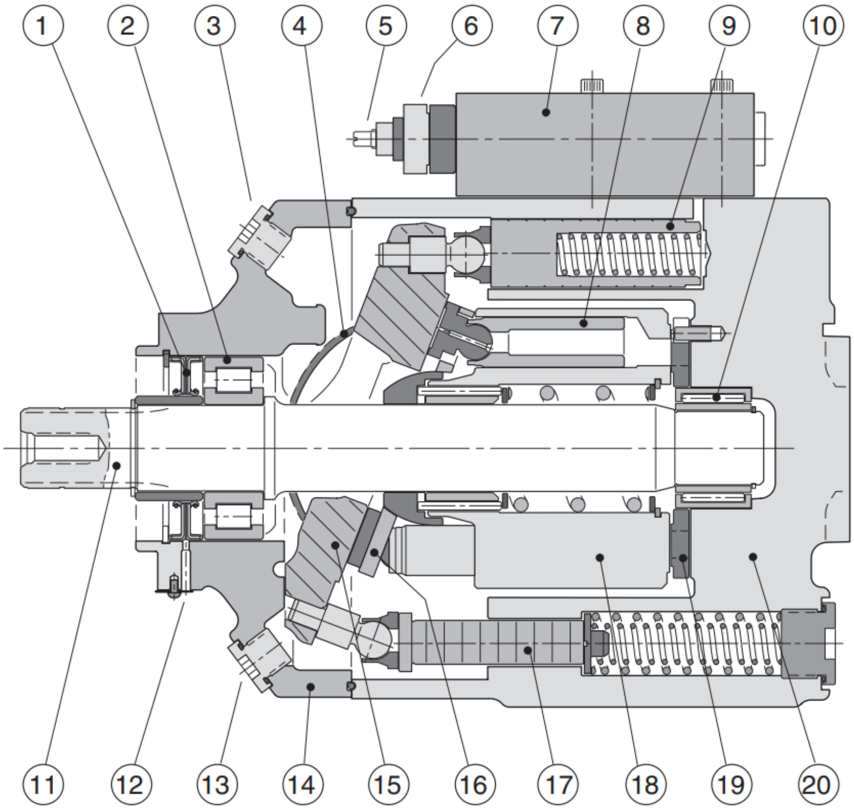
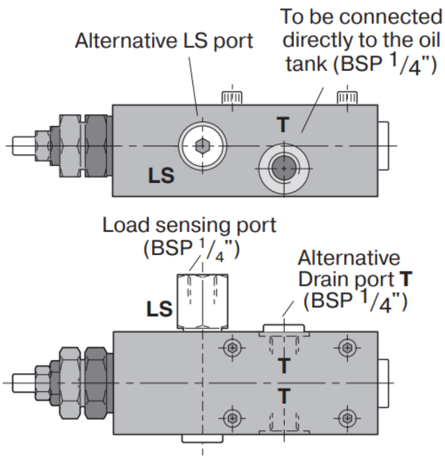
## VP1-095/-110/-130 cross section

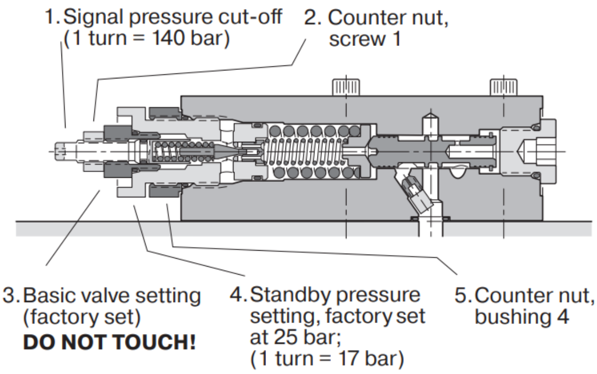
1. Shaft seal
2. Roller bearing
3. 'Upper' purge plug
4. Bearing shell
5. Setting screw (pressure relief valve)
6. Setting bushing (standby pressure)
7. Control
8. Piston with piston shoe
9. 'Upper' setting piston (control pressure)
10. Needle bearing
11. Shaft
12. Drain hole, shaft seals
13. 'Lower' 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/-110/-130)




*LS control ports.*




*LS control cross section.*

| Item | Wrench / dimension |
| --- | --- |
| 1 | Hex Head Wrench / 4 mm |
| 2 | Wrench / 13 mm |
| 3 | **DO NOT TOUCH** |
| 4 | Wrench / 27 mm |
| 5 | Wrench / 27 mm |

**NOTE:**
Always run a function, after adjusting the standby pressure or the max pressure setting, before you read the value.

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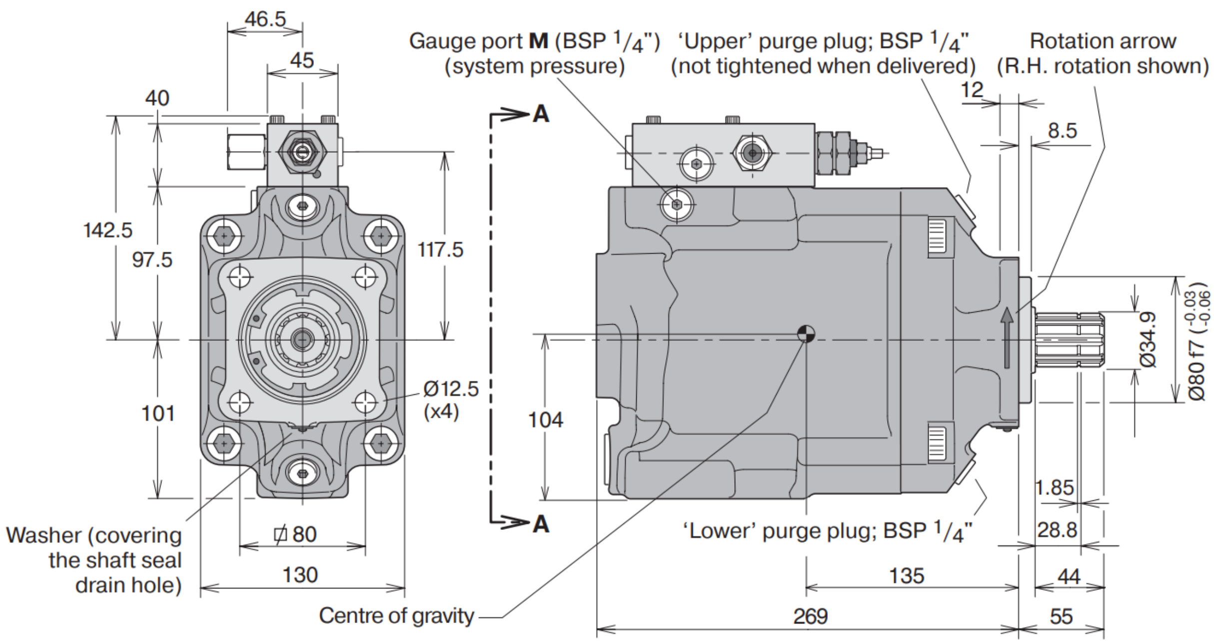
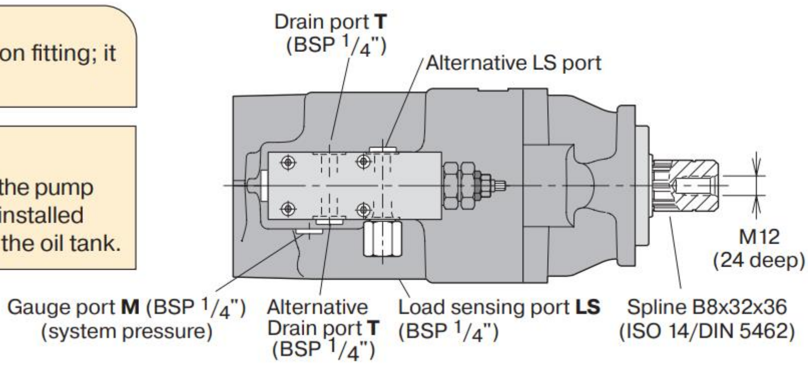
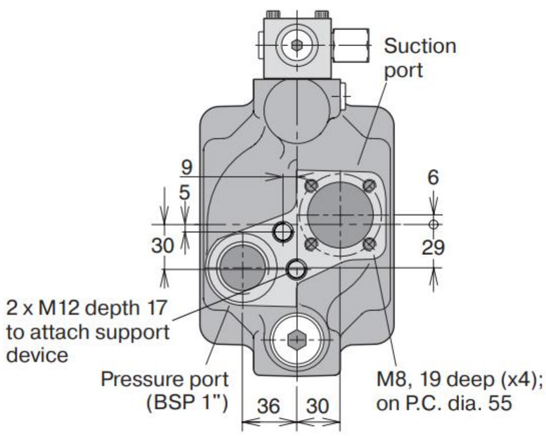
## VP1-095/-110/-130



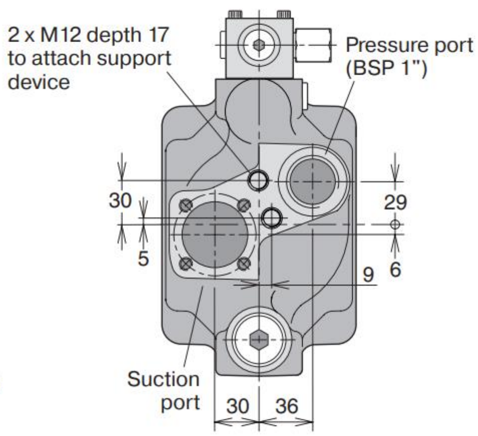

**NOTE:**
The pump **does not** include a suction fitting; it must be ordered separately.

**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.




**View A–A**
**Left hand rotating pump**




**View A–A**
**Right hand rotating pump**

## VP1 in load sensing systems

When installed in a load sensing system, the VP1 supplies the correct amount of flow required by the various work functions currently engaged.

This means that energy consumption and heat generation are minimised and much reduced in comparison with a fixed displacement pump used in the same system.

Diagram 1 shows the required power (flow times pressure) in a constant flow system with a fixed displacement pump.

Diagram 2 shows the sharply reduced power requirement in a load sensing system with a variable displacement pump such as the VP1.

In both cases the pump pressure is slightly higher than what is required by the heaviest load ('Load 2') but the VP1, because of the much smaller flow being delivered, needs only the power indicated by the shaded area 'Load power'.

In a constant flow system, on the other hand, excess fluid is shunted to tank and the corresponding power, 'Wasted power' (shown in diagram 1), is a heat loss.

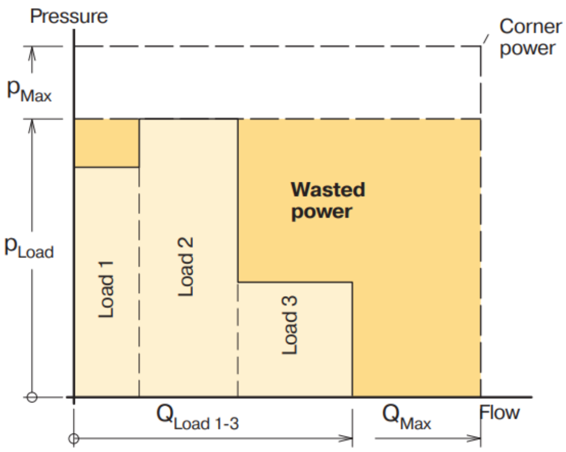



*Diagram 1. Constant flow system with a fixed displacement pump.*

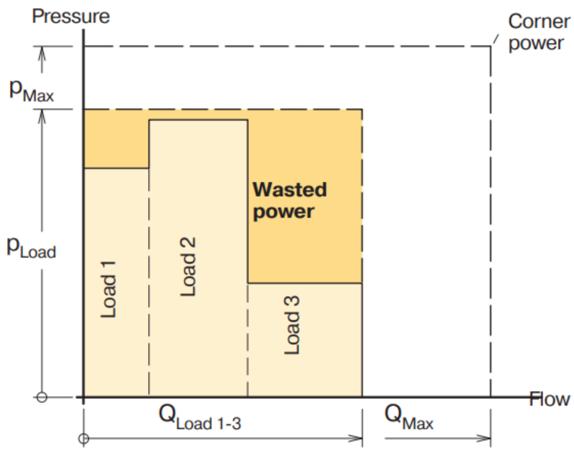



*Diagram 2. Constant flow system with a variable displacement pump (e.g. VP1).*

## Systems comparison

| System | Constant flow | Load-sensing |
|---|---|---|
| Pump | Fixed displ. | VP1 variable displ. |
| Pump adjustments | Pressure only | Pressure and flow |
| Load * | Some influence | Some influence |
| Energy consumption | High | Low |
| Heat generation | High | Low |

* Simultaneous operation of loads with non-equal flows and pressures; refer to the above diagrams.

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## LS load sensing control function

Refer to corresponding hydraulic schematic below.

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 over the spool and, consequently, also a Δp 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 pistons then decreases and the pump displacement increases.

The increase in pump displacement stops when the Δp finally reaches the setting (e.g. 25 bar) 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, no-flow position) the pump only delivers sufficient flow to maintain the standby pressure as determined by the Δp setting.

## LS control adjustments

**Pressure limiter**

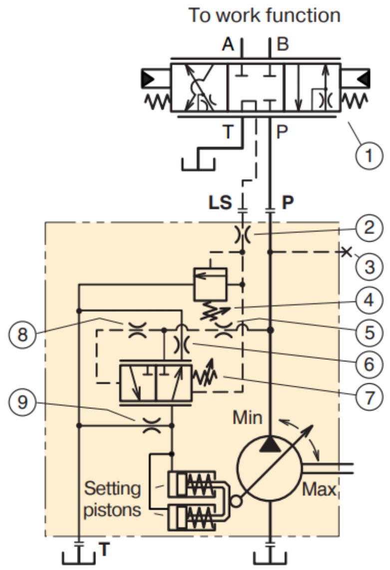
| Pump size | Factory setting [bar] | Max pressure intermittent [bar] |
|---|---|---|
| VP1-045/060/075 | 350 | 400 |
| VP1-095/110/130 | 350 | 420 |

**LS load sensing valve**

| Pump size | Factory setting [bar] | Min pressure [bar] | Max pressure [bar] |
|---|---|---|---|
| VP1-045/060/075 | 25 | 20 | 35 |
| VP1-095/110/130 | 25 | 15 | 40 |

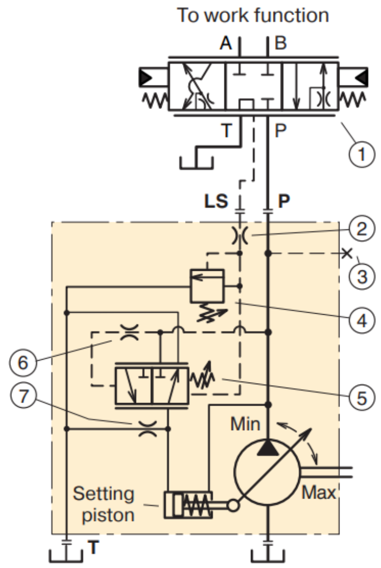
The factory setting, and the standard orifice sizes shown in the corresponding schematic below, will usually provide an acceptable directional valve characteristic as well as system stability.

**Hydraulic schematic for VP1-45/-060/-075**




1. Directional, load sensing control valve
2. Load signal orifice (1.0 mm; fixed)
3. Gauge port
4. Signal pressure limiter adjustment
5. System pressure dampening nozzle (2.0 mm)
6. Return line nozzle (0.6 mm)
7. Standby (Δp) pressure adjustment
8. System pressure dampening orifice (fixed)
9. Bleed-off nozzle (0.6 mm).

**Hydraulic schematic for VP1-095/-110/-130**




1. Directional, load sensing control valve
2. Load signal orifice (1.0 mm)
3. Gauge port
4. Signal pressure limiter adjustment
5. Standby (Δp) pressure adjustment
6. System pressure dampening orifice (fixed)
7. Bleed-off nozzle (1.2 mm)