Specifications

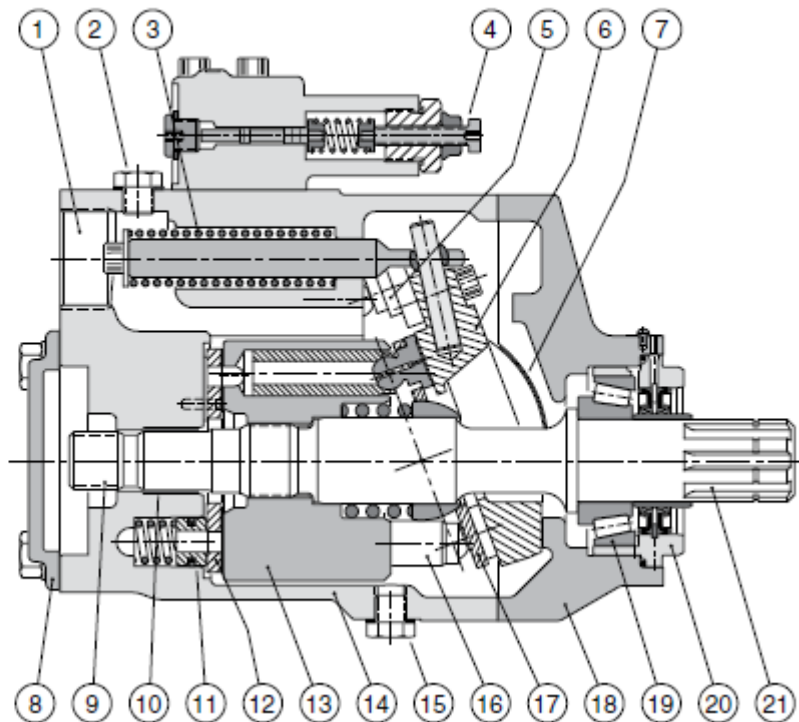| Frame size VP1--	045	060	075	095	110	130
Displacement [cm^3/rev]	45	60	75	95	110	128
Max operating pressure [bar]						
continuous	350	350	350	400	400	400
intermittent [1]	400	400	400	420	420	420
Mass moment of inertia J [kgm^2]	0.00606	0.00606	0.00606	0.00681	0.00690	0.00690
Shaft speed [2] [rpm]						
- 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
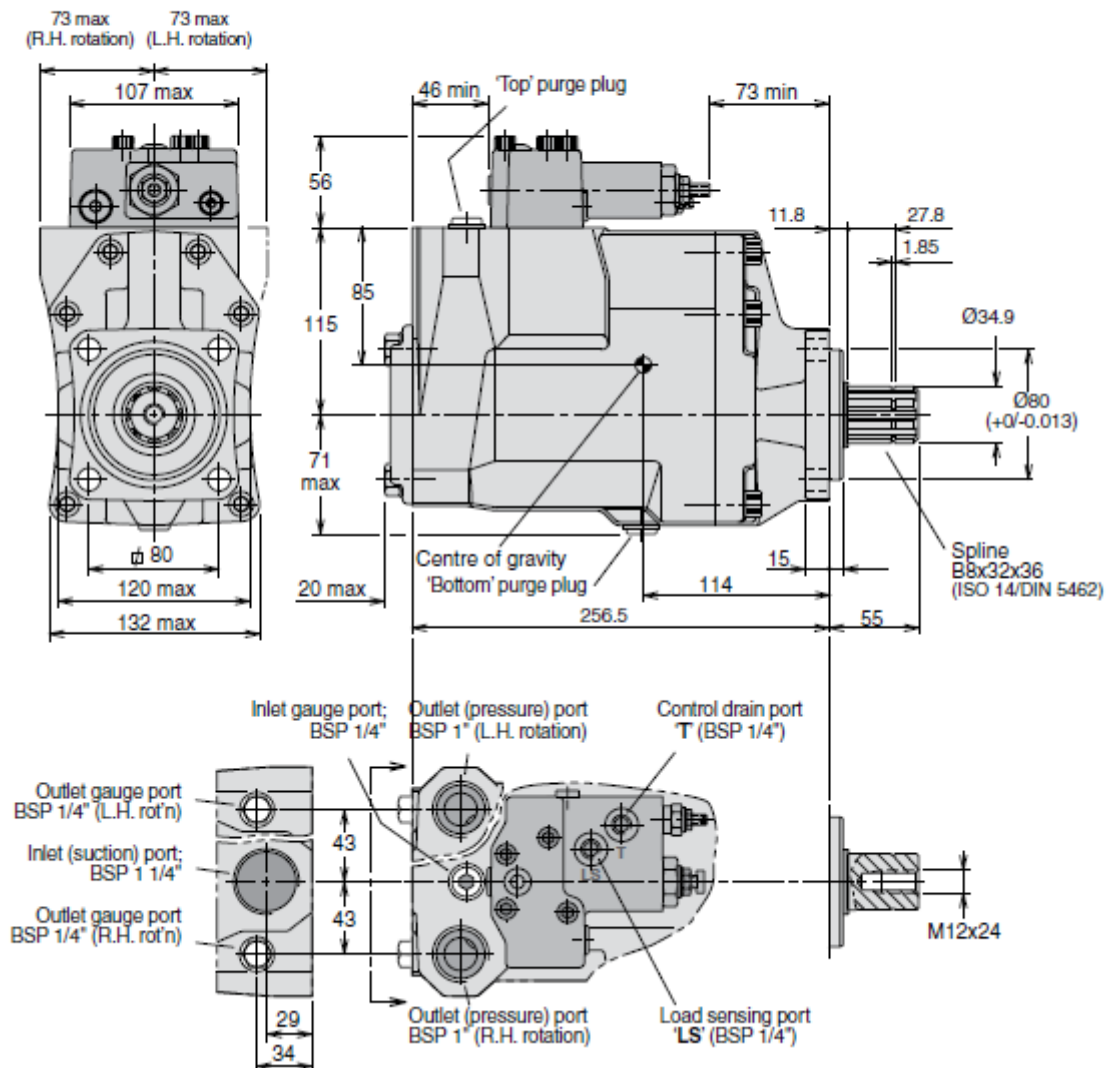   at a viscosity of 30 mm^2/s (cSt).

3) Valid with 3" inlet (suction) line

VP1-045/-060/-075 cross section

1. Inlet port
2. 'Top' purge plug
3. Return spring
4. Control
5. Setting piston (one of two)
6. Swash plate
7. Bearing shell
8. End cover
9. Spline (for mounting an auxiliary pump)
10. Plain bearing
11. Hold-down plunger
12. Valve plate
13. Cylinder barrel
14. Barrel housing
15. 'Bottom' purge plug
16. Piston with piston shoe
17. Retainer plate
18. Bearing housing
19. Roller bearing
20. Shaft seals with carrier
21. Input shaft

VP1-045, -60 and -075

73 max
(R.H. rotation)

73 max
(L.H. rotation)

107 max

46 min

'Top' purge plug

73 min

56

85

115

71 max

11.8

27.8

1.85

Ø34.9

Ø80 (+0/-0.013)

Centre of gravity
'Bottom' purge plug

15

114

256.5

55

Spline
B8x32x36
(ISO 14/DIN 5462)

⌀ 80

120 max

20 max

132 max

Inlet gauge port;
BSP 1/4"

Outlet (pressure) port
BSP 1" (L.H. rotation)

Control drain port
'T' (BSP 1/4")

Outlet gauge port
BSP 1/4" (L.H. rot'n)

Inlet (suction) port;
BSP 1 1/4"

Outlet gauge port
BSP 1/4" (R.H. rot'n)

43

43

29

34

Outlet (pressure) port
BSP 1" (R.H. rotation)

Load sensing port
'LS' (BSP 1/4")

M12x24

IMPORTANT
The control is *not* drained through the pump case.
An external line *must be installed* between the control drain port 'T' and the reservoir.
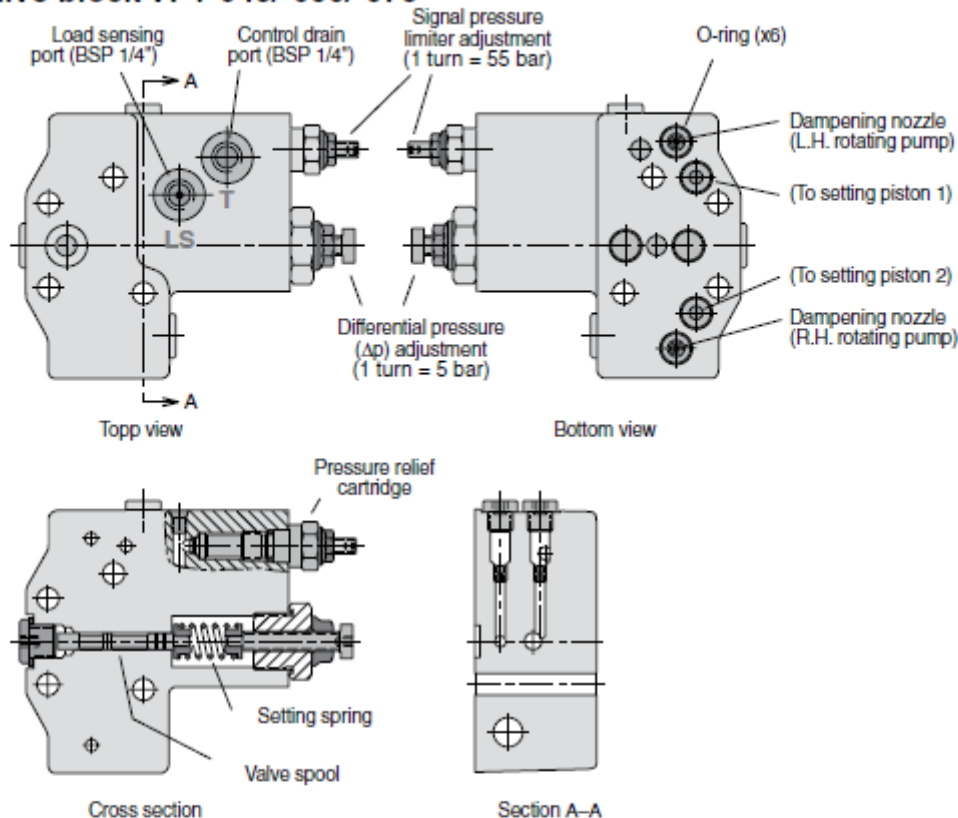
LS valve block VP1-045/-060/-075

Fig. 2. LS valve block.

Through-shaft coupling VP1-045/-060/-075

The VP1 pump has a through-shaft which means that an additional pump, such as a fixed displacement F1, can be installed in tandem with the VP1
by means of an adaptor kit (fig. 3).

NOTE: The bending moment caused by the weight of a tandem assembly normally exceeds that allowed by the PTO.
To prevent damage, the auxiliary pump should be supported by a bracket attached to the gearbox; it *must not* be fastened to the truck chassis.
Likewise, when the tandem assembly is installed on a separate bracket and driven by a cardan shaft, the auxiliary pump should have a support attached to the pump bracket.
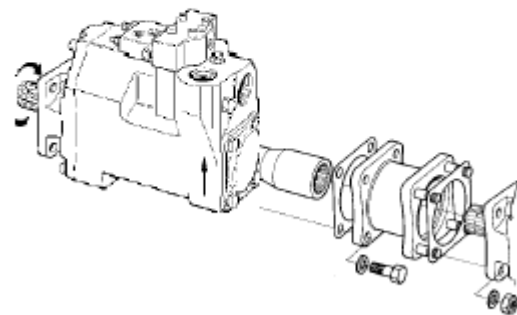

Fig. 3. Adaptor kit (P/N 379 7795) for tandem coupling.

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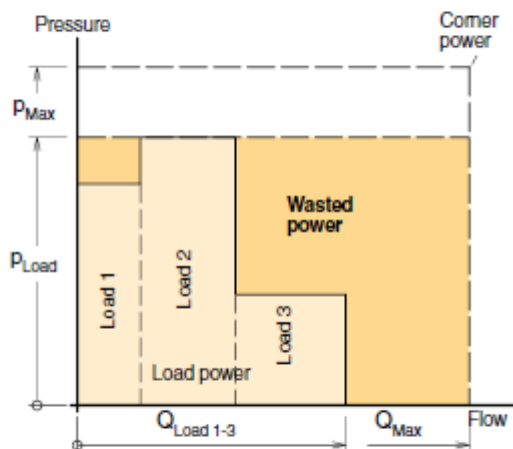
Diagram 2 shows the sharply reduced power requirement in a load sensing system with a variable displacement pump such as the VP1.

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.
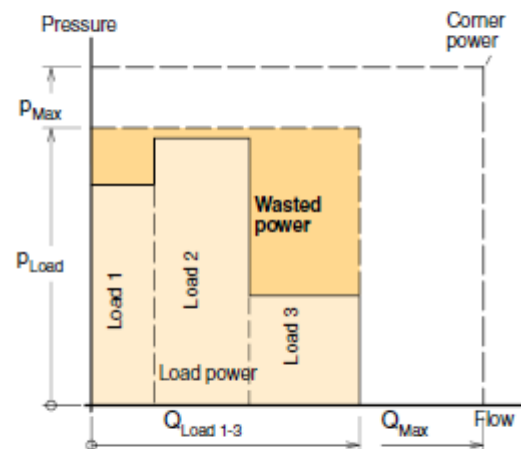

Diagram 1. Constant flow system with a fixed displacement pump.

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.

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.

For additional information, contact Parker Hannifin.

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

Hydraulic schematic for VP1-095/-110/-130
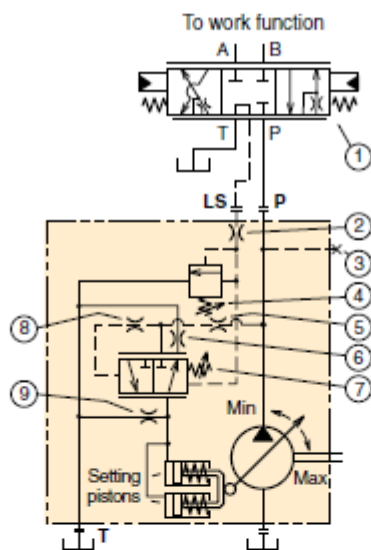
1. Directional, load sensing control valve
2. Load signal orifice (1.0 mm; fixed)
3. Gauge port
4. Signal pressure limiter adjustment
5. System pressure dampening nozzle (2.0 mm)
6. Return line nozzle (0.6 mm)
7. Standby (Δp) pressure adjustment
8. System pressure dampening orifice (fixed)
9. Bleed-off nozzle (0.6 mm).
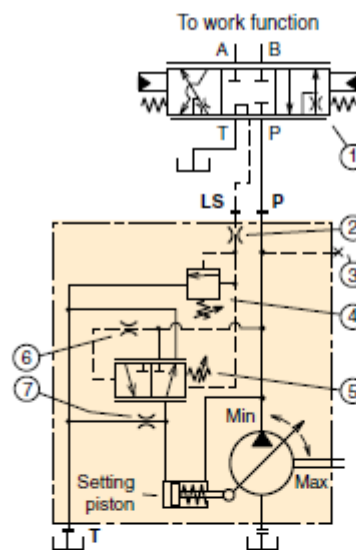
1. Directional, load sensing control valve
2. Load signal orifice (0.8 mm)
3. Gauge port
4. Signal pressure limiter adjustment
5. Standby (Δp) pressure adjustment
6. System pressure dampening orifice (fixed)
7. Bleed-off nozzle (1.2 mm)