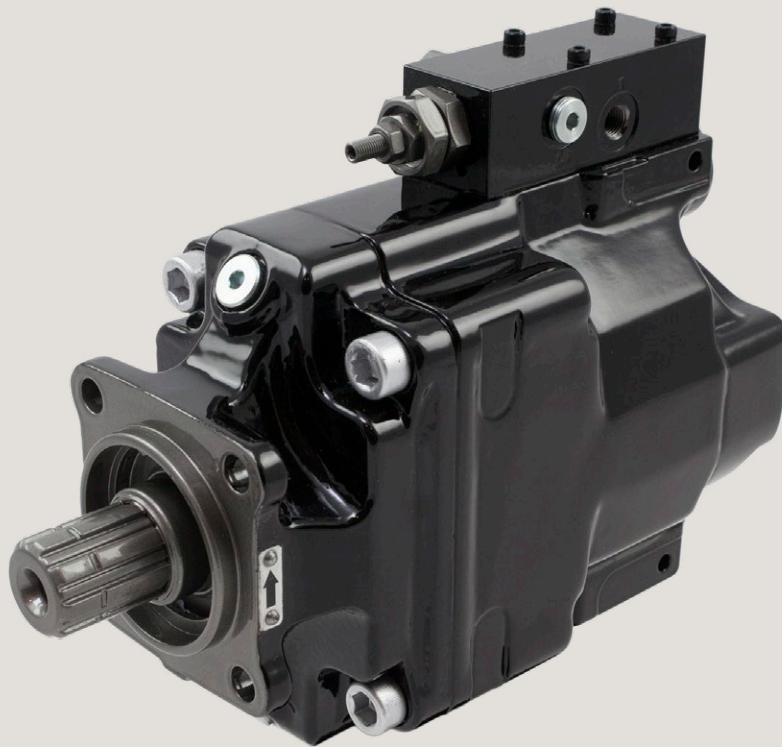


VP1 Pump



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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					

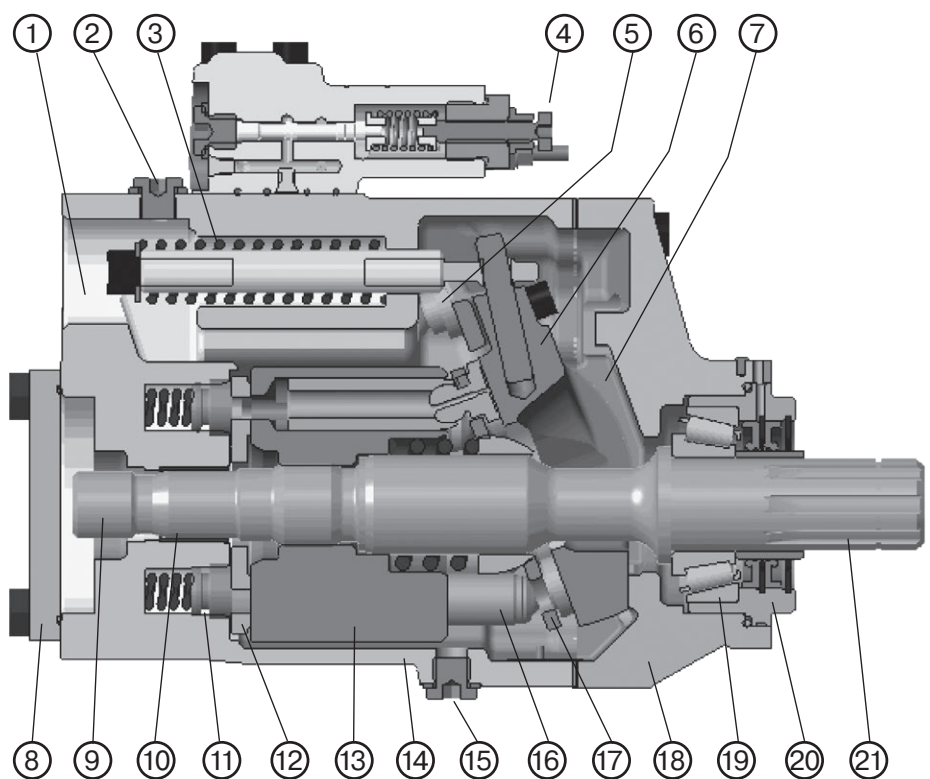
¹⁾ Max 6 seconds in any one minute.

²⁾ At an inlet pressure of 1.0 bar (abs.) with mineral oil at a viscosity of 30 mm²/s (cSt).

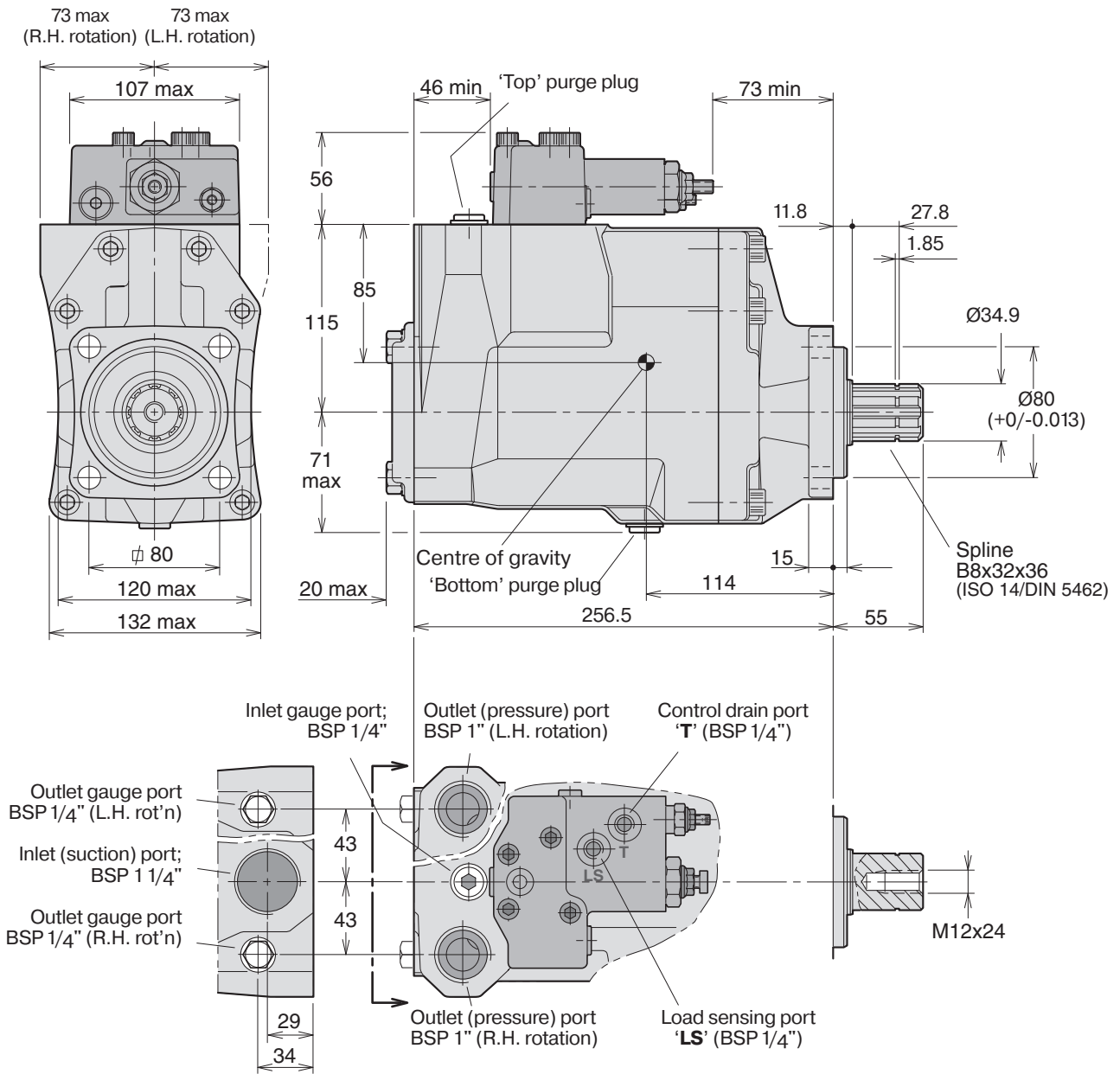
³⁾ Valid with 3" inlet (suction) line

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



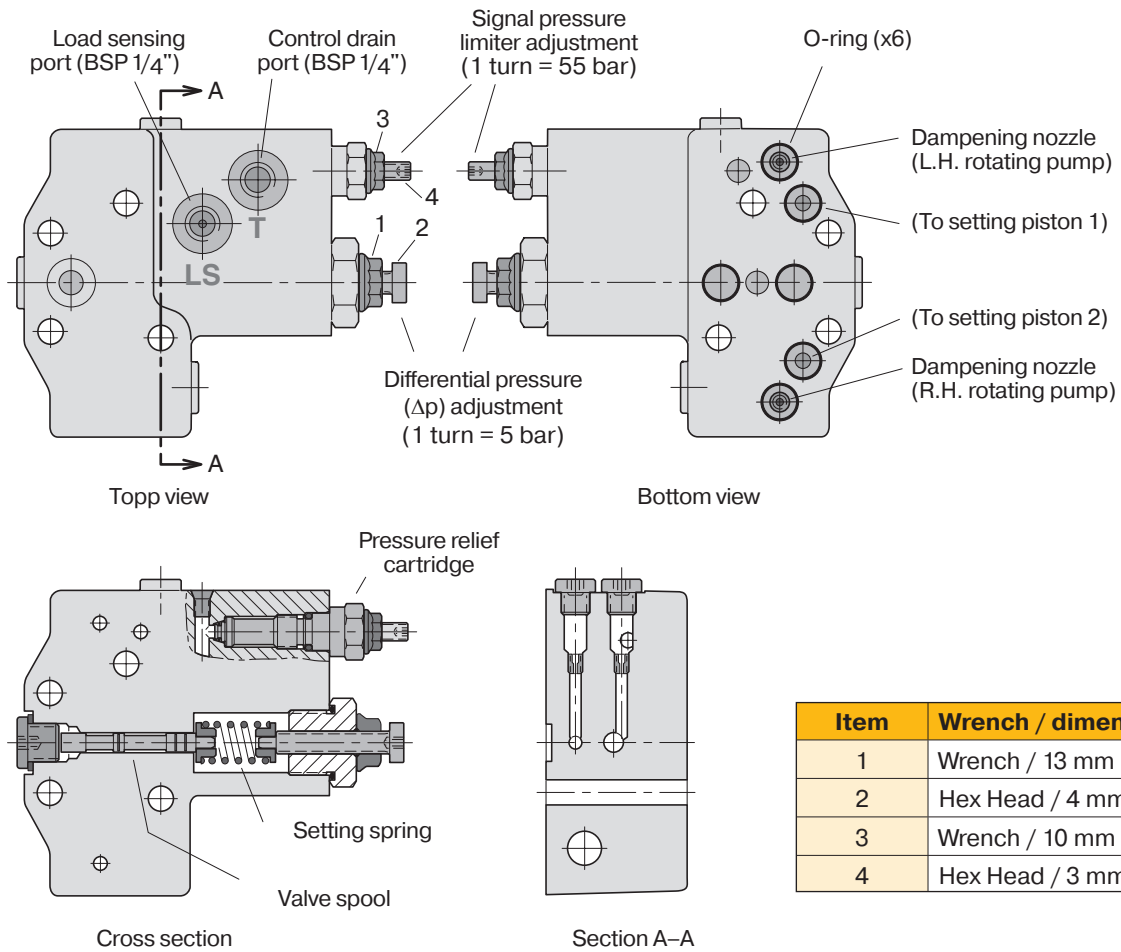
Installation Dimensions VP1-045, -60 and -075



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.

NOTE: The pump **does not** include a suction fitting; it must be ordered separately. See page 63ff.

LS valve block VP1-045/-060/-075



Item	Wrench / dimension
1	Wrench / 13 mm
2	Hex Head / 4 mm
3	Wrench / 10 mm
4	Hex Head / 3 mm

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.

IMPORTANT
 Contact Parker Hannifin for additional information when considering tandem mounting a second VP1 pump.
 The maximum torque that can be transmitted through the first pump VP1-045/-060/-075 in tandem is 420 Nm.

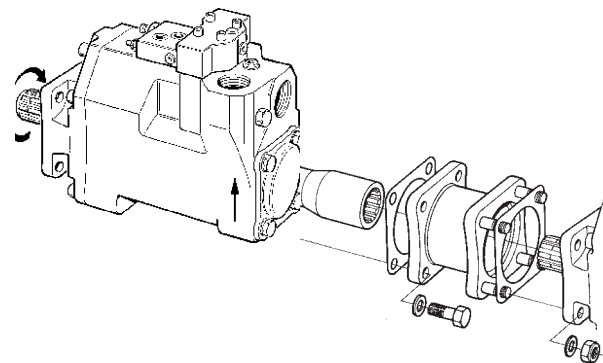
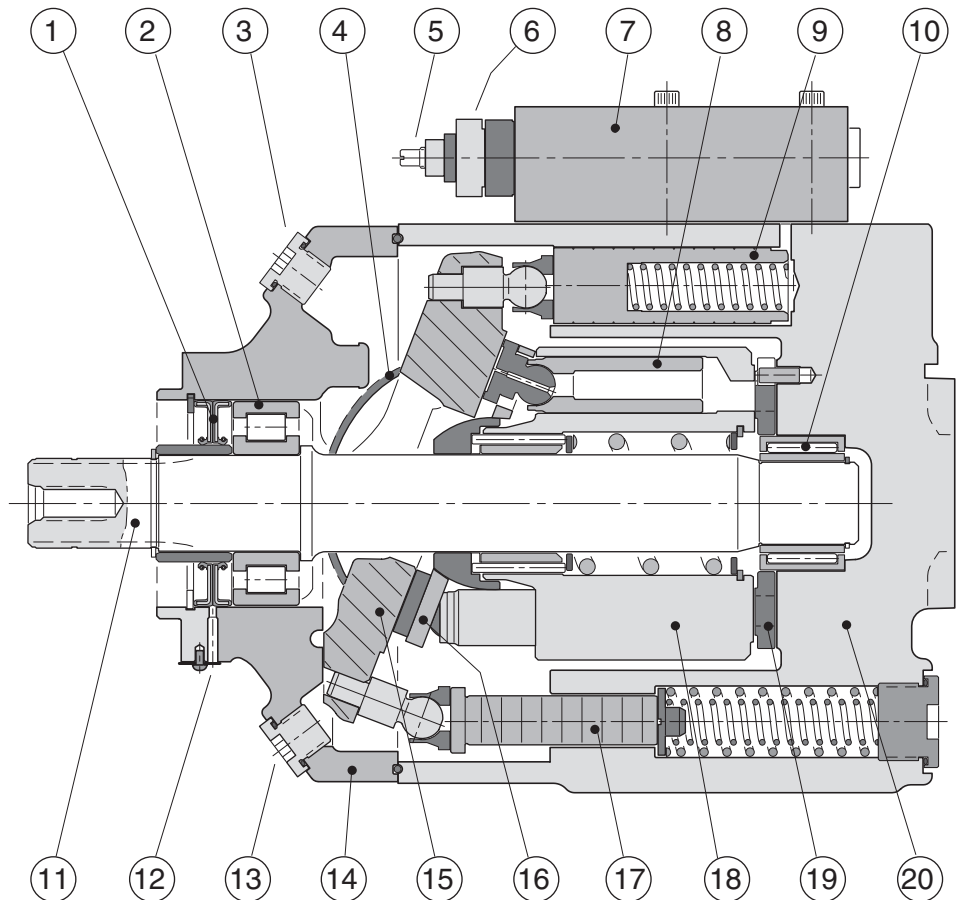


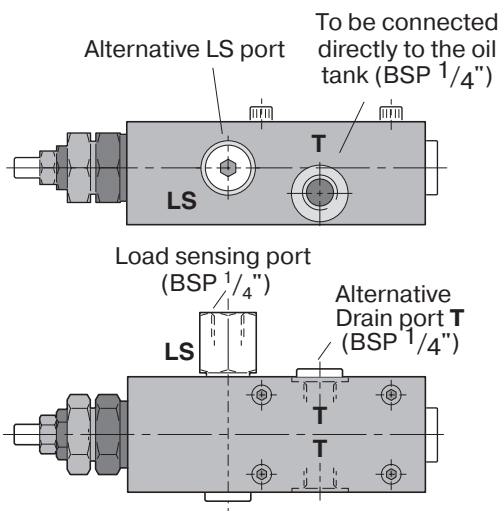
Fig. 3. Adaptor kit (P/N 379 7795) for tandem coupling.

● **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

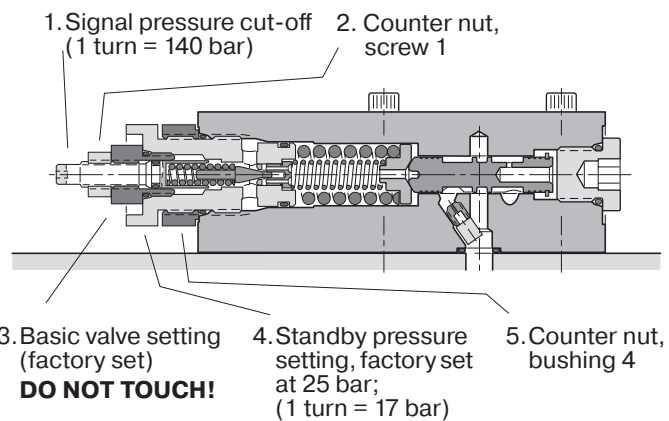


● **LS control (for VP1-095/-110/-130)**



LS control ports.

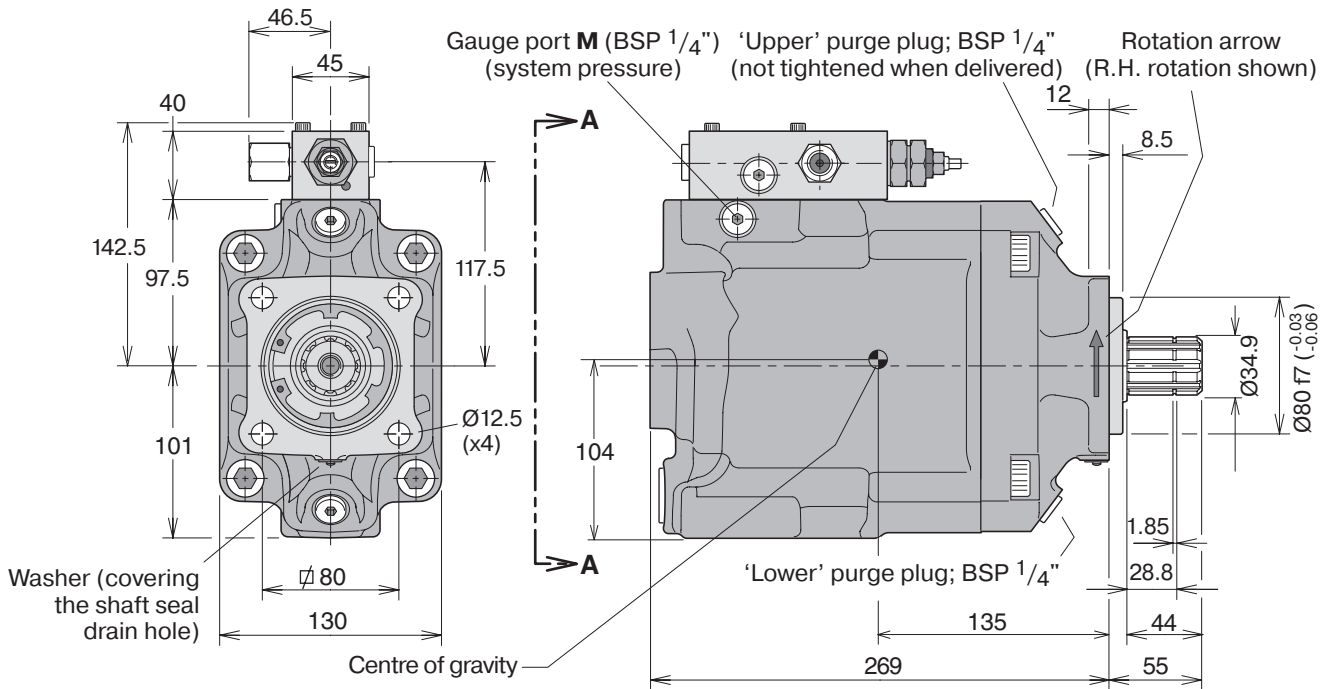
NOTE:
 Always run a function, after adjusting the standby pressure or the max pressure setting, before you read the value.



LS control cross section.

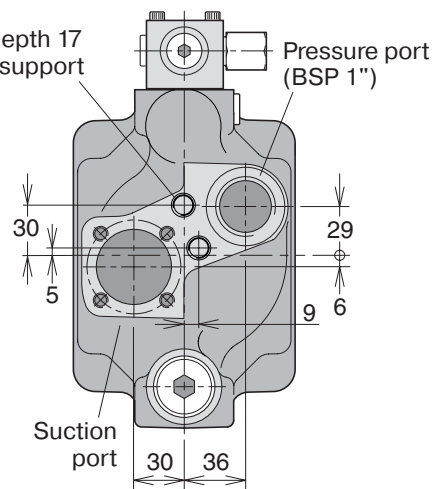
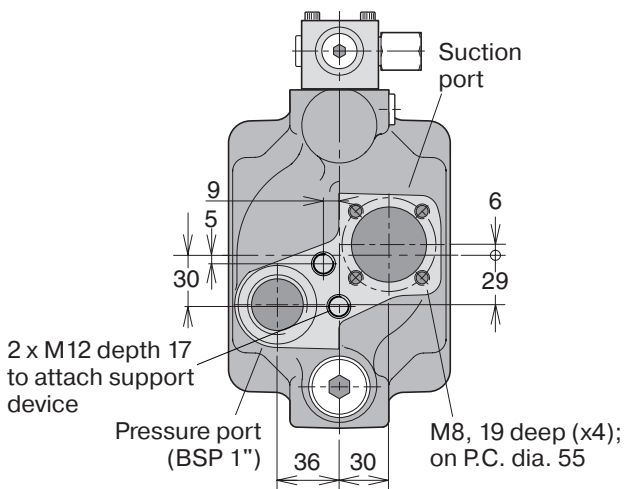
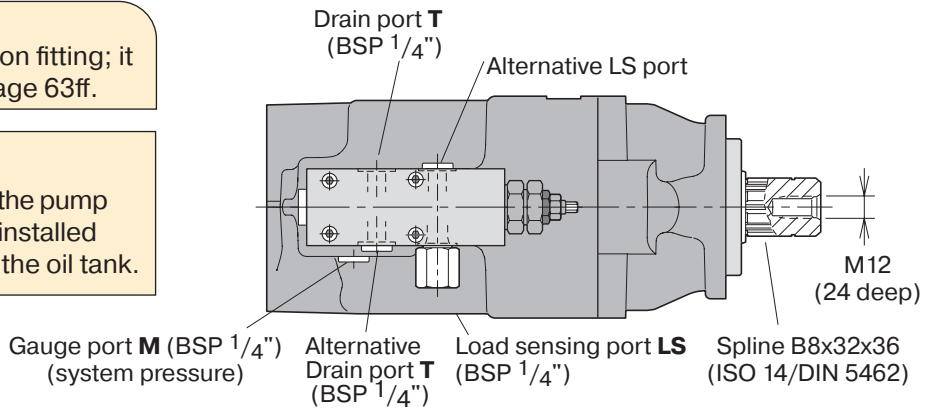
Item	Wrench / dimension
1	Hex Head Wrench / 4 mm
2	Wrench / 13 mm
3	DO NOT TOUCH
4	Wrench / 27 mm
5	Wrench / 27 mm

VP1-095/-110/-130



NOTE:
 The pump **does not** include a suction fitting; it must be ordered separately. See page 63ff.

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.



Ordering information

Example: **VP1 - 045 - L**

Frame size **045, 060, 075, 095, 110 or 130**

Direction of rotation
L Left hand
R Right hand

NOTE:

The VP1 is uni-directional.
 Consequently, the desired direction of rotation must be stated when ordering.

Standard model numbers

Designation	Ordering no. No Paint	Ordering no. Black Paint
VP1-045-R	378 0334	378 6169
VP1-045-L	378 0335	378 6170
VP1-060-R	372 2283	372 2285
VP1-060-L	372 2284	372 2286
VP1-075-R	378 0336	378 6171
VP1-075-L	378 0337	378 6172
VP1-095-R	378 6000	378 6003
VP1-095-L	378 6001	378 6002
VP1-110-R	378 4110	378 3814
VP1-110-L	378 4111	378 3815
VP1-130-R	378 4500	378 4507
VP1-130-L	378 4501	378 4508

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.

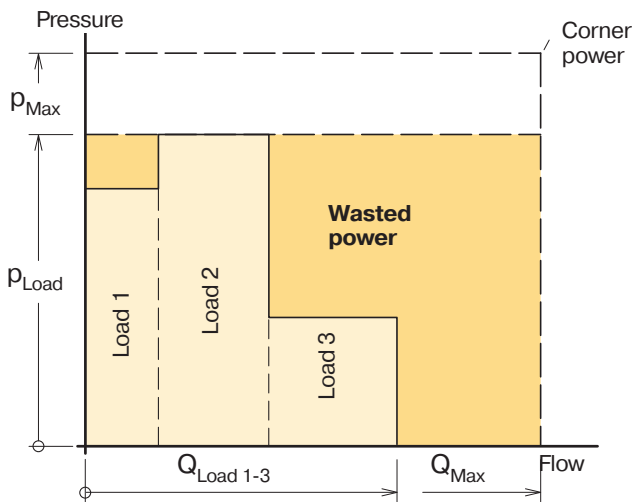


Diagram 1. Constant flow system with a fixed displacement pump.

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.

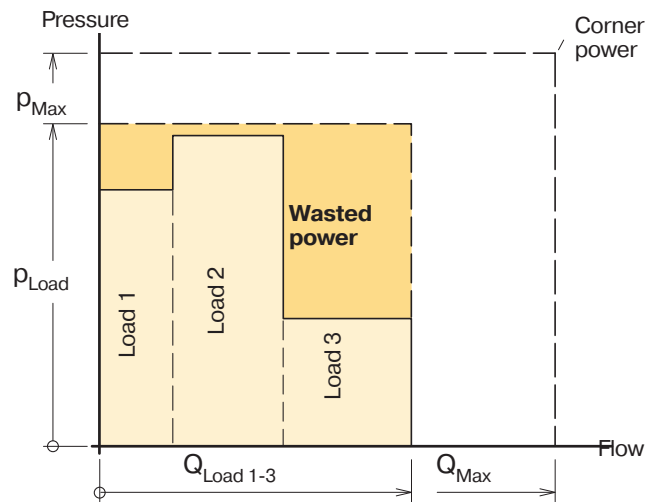


Diagram 2. Constant flow system with a variable displacement pump (e.g. VP1).

Systems comparison

System Pump	Constant flow Fixed displ.	Load-sensing 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

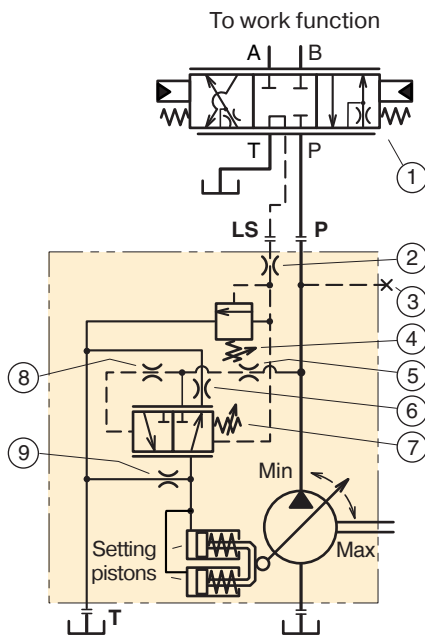
LS load sensing valve

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.

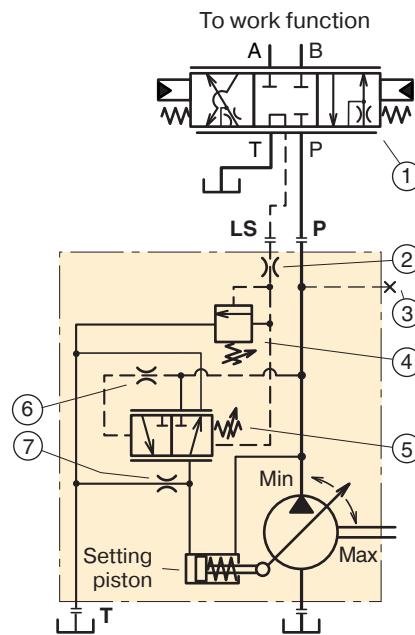
For additional information, contact Parker Hannifin.

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



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)

Suction fittings for series F1, F2, F3, F4 and T1 pumps also VP1-095, -110 and -130

NOTE: A suction fitting must be ordered separately (not included with the pump).
To choose the correct dimension of suction connection, see page 14 ff.

Suctions fittings for VP1-045/075 see page 57.
'Straight' suction fittings for F1, T1, F2, F3, F4, VP1-095/-110/-130

Ordering no.	A mm	B mm	ØC dia. mm (in.)
378 0635 ¹⁾	0	85	38 (1½")
378 0636 ²⁾	17	136	50 (2")
378 0637 ³⁾	25	145	63 (2½")
378 3523 ³⁾	32	174	75 (3")

45° suction fittings for F1, T1, F2, F3, F4
VP1-095/-110/-130

Ordering no.	A mm	B mm	ØC dia. mm (in.)
378 1234 ¹⁾	60	104	32 (1¼")
378 0633 ¹⁾	60	104	38 (1½")
378 0364 ²⁾	67	110	50 (2")
378 0634 ³⁾	75	117	63 (2½")
378 3367 ³⁾	95	138	75 (3")
378 1062	67	110	40
378 0975	67	110	45

90° suction fittings for F1, T1, F2, F3, F4
VP1-095/-110/-130

Ordering no.	A mm	B mm	ØC dia. mm (in.)
378 0978 ¹⁾	126	83	38 (1½")
378 0979 ²⁾	135	83	50 (2")
378 1980 ³⁾	147	83	63 (2½")
378 0976	135	83	45
378 8690 ³⁾	185	83	75 (3")

145° suction fitting for F1, T1, F2, F3, F4
VP1-095/-110/-130

Ordering no.	A mm	B mm	ØC dia. mm (in.)
378 1867	165	73	50 (2")

¹⁾ Recommended for frame size F1-25.

²⁾ Recommended for frame size F1-41,-51,-61,-81, -101.

³⁾ (3 clamps and 3 screws)

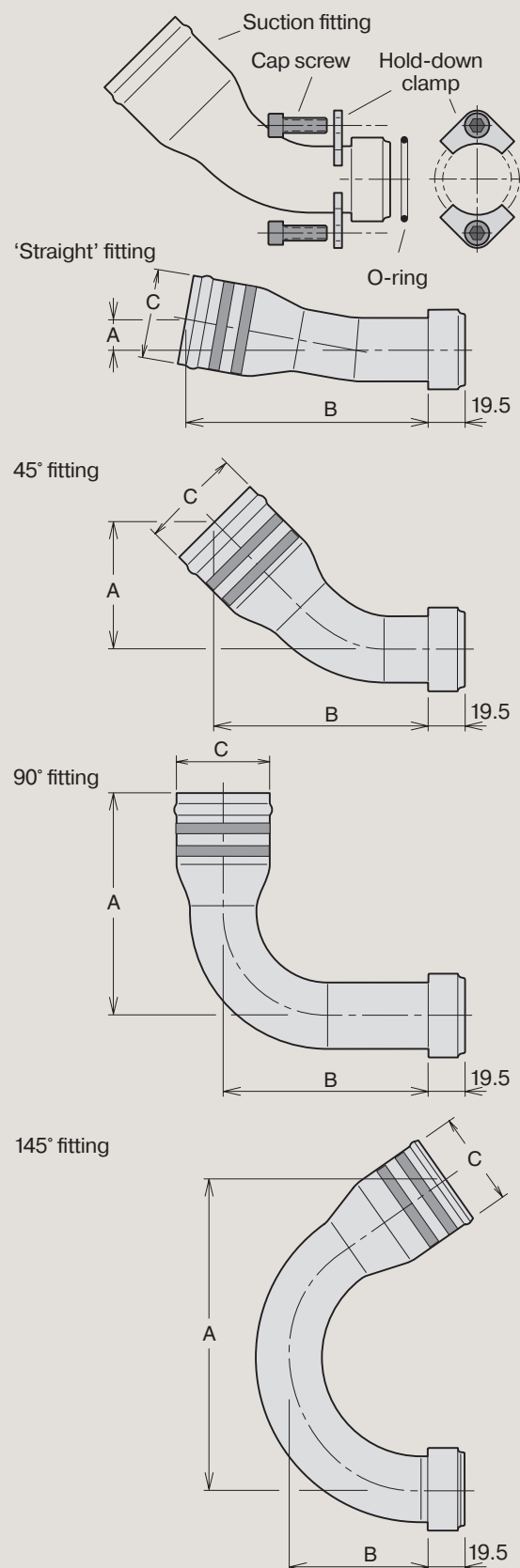
Spare parts

Additional Hold-down-clamp kit consists of:

hold-down-clamp cap screw and O-ring
Ordering no. 378 1321

Additional Hold-down-clamp kit for mounting on BPV
Ordering no. 378 2439

A 'suction fitting' consists of a straight, 45°, 90° or 135° suction fitting, clamps, cap screws and O-ring.



Suitable suction fittings for F1 and VP1-045/-060/-075 with BSP port treads

NOTE: A suction fitting must be ordered separately (not included with the pump).
To choose the correct dimension of suction connection, see page 14 ff.

45° suction fittings

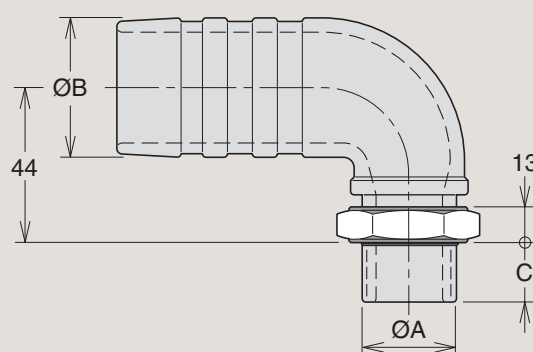
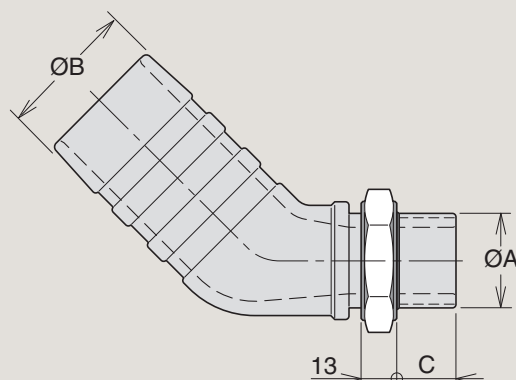
Ordering no.	ØA	ØB inch	C mm
00509035016	BSP 1" ¹⁾	2"	18
00509035116	BSP 1 1/4"	2"	18
00509021916	BSP 1 1/4"	2 1/2"	18

¹⁾ Not for VP1-045/-060/-075

90° suction fittings

Ordering no.	ØA	ØB inch	C mm
00509034516	BSP 1" ¹⁾	2"	18
00509034616	BSP 1 1/4"	2"	18

¹⁾ Not for VP1-045/-060/-075



Fitting kits for VP1-045/-060/-075 pumps

Kits with 45° suction fitting

Order no.	C ₁	ØC ₂ inch	A mm	B mm
379 9563	BSP 3/4"	2"	71	154
379 9562	BSP 1" *	2 3/2"	64	147

* Above 100 l/min

