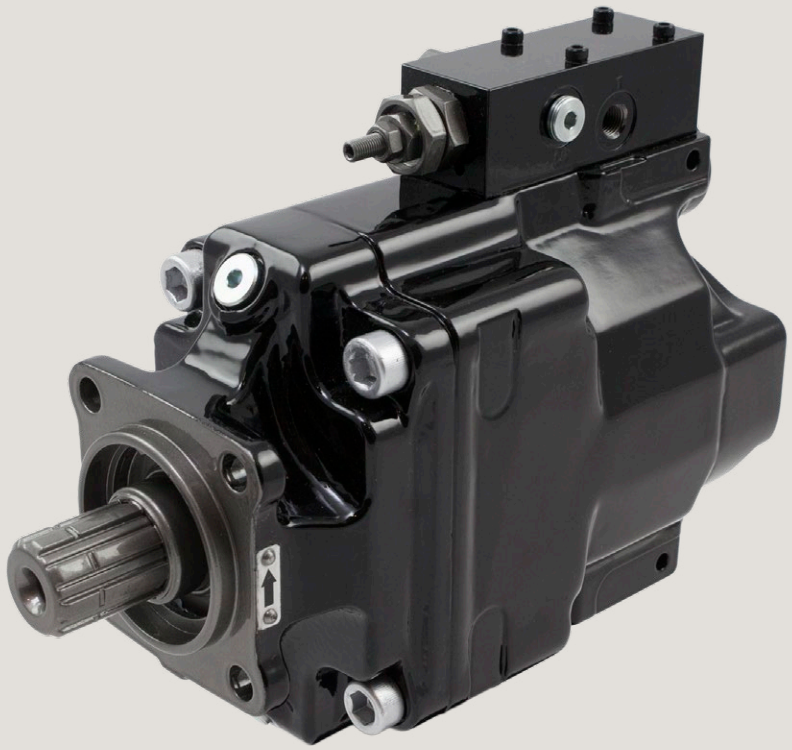
VP1 Pump



Contents ..... **Page**

Specifications

Frame size VP1-	045	060	075	095	110	130
Displacement [cm³/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 [kgm²]	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					

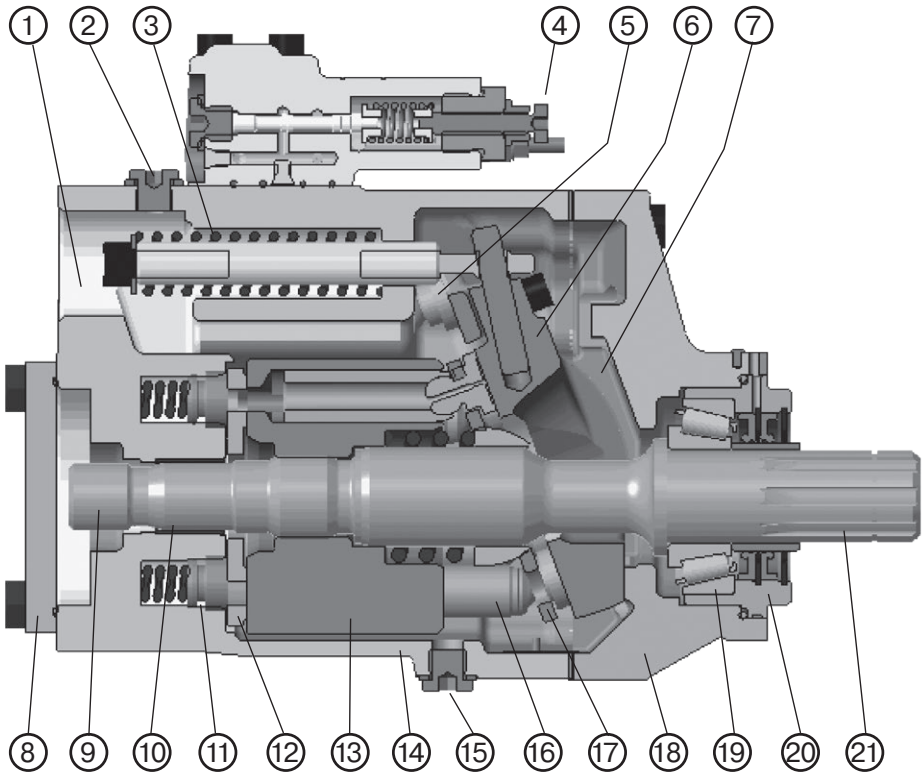
[1] Max 6 seconds in any one minute.

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

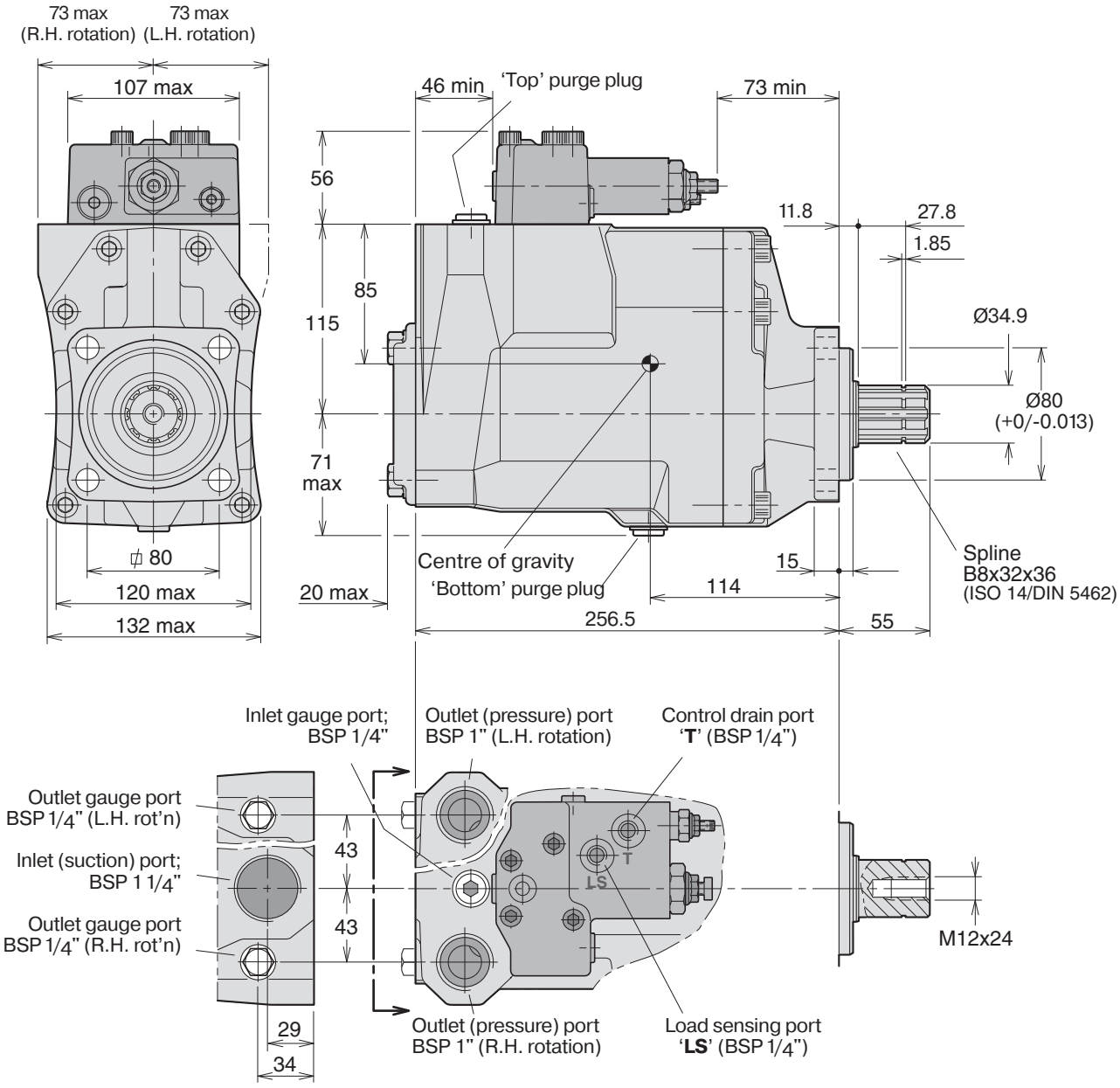
[3] Valid with 3" inlet (suction) line

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



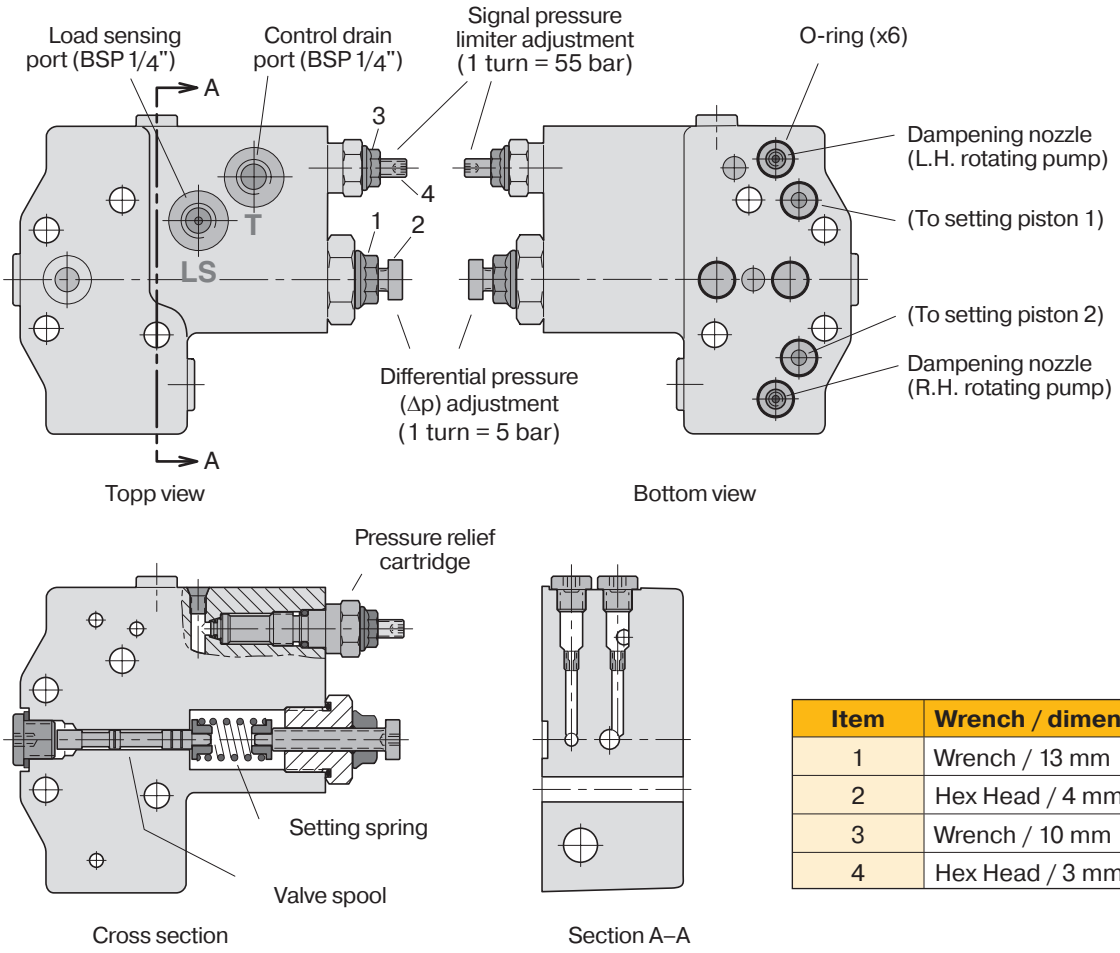
Installation Dimensions VP1-045, -60 and -075



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 trough the first pump VP1-045/-060/-075 in tandem is 420 Nm.

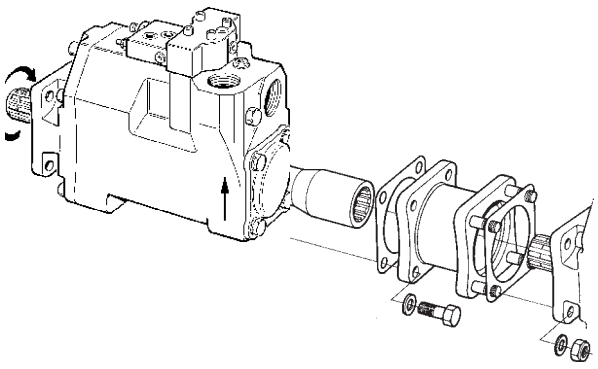
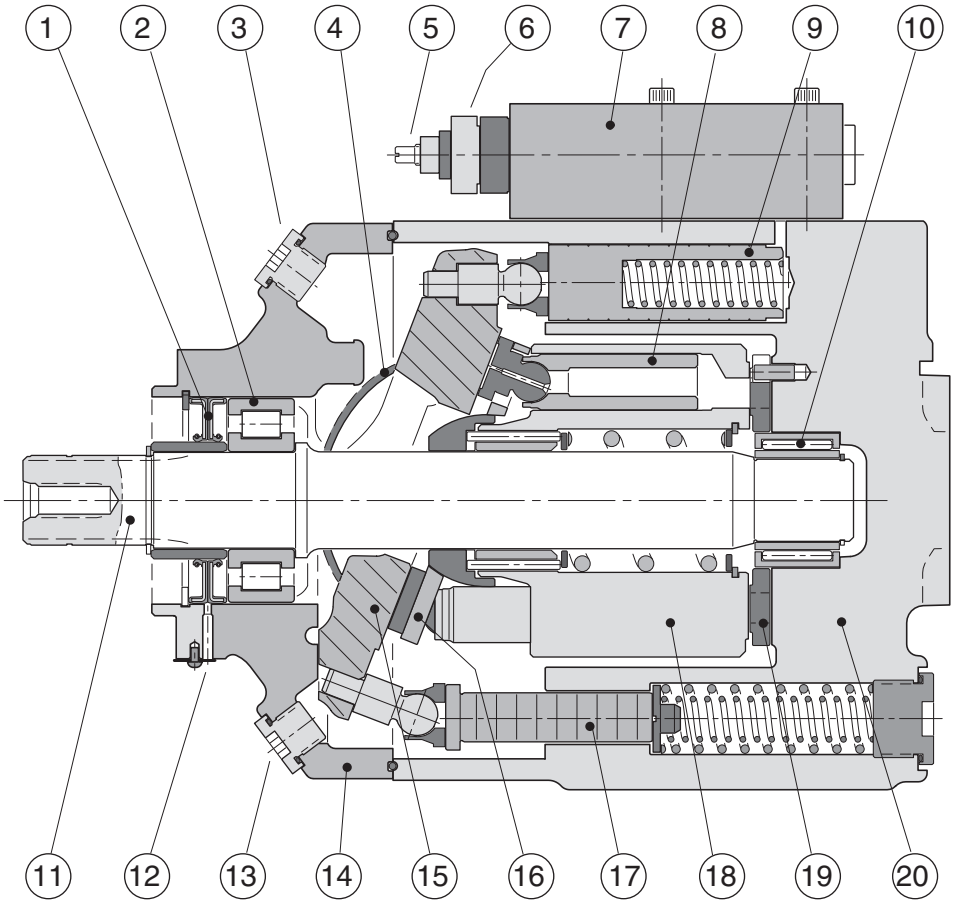


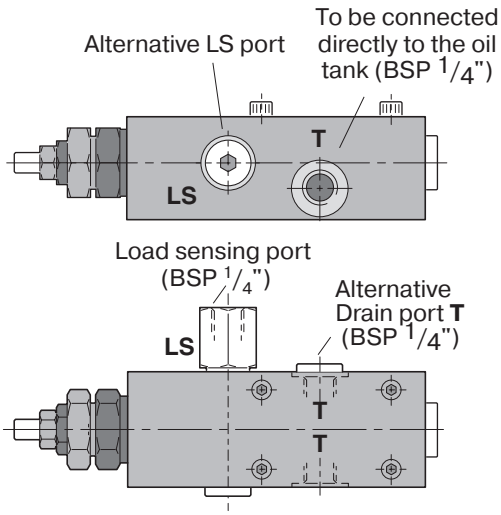
Fig. 3. Adaptor kit (P/N 379 7795) for tandem coupling.

VP1-095/-110/-130 cross section

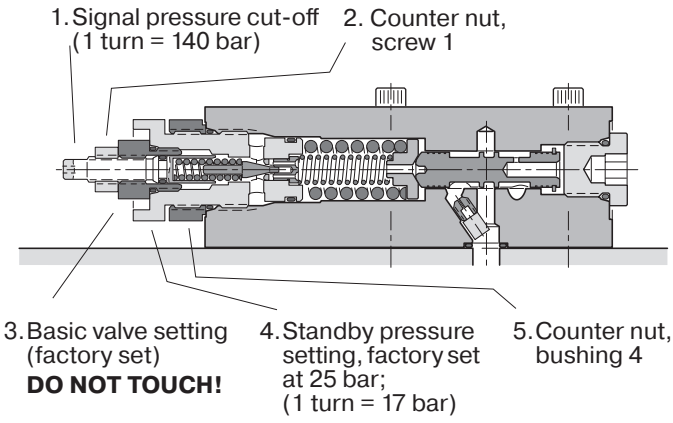
1. Shaft seal
2. Roller bearing
3. 'Upper' purge plug
4. Bearing shell
5. Setting screw (pressure relief valve)
6. Setting bushing (standby pressure)
7. Control
8. Piston with piston shoe
9. 'Upper' setting piston (control pressure)
10. Needle bearing
11. Shaft
12. Drain hole, shaft seals
13. 'Lower'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

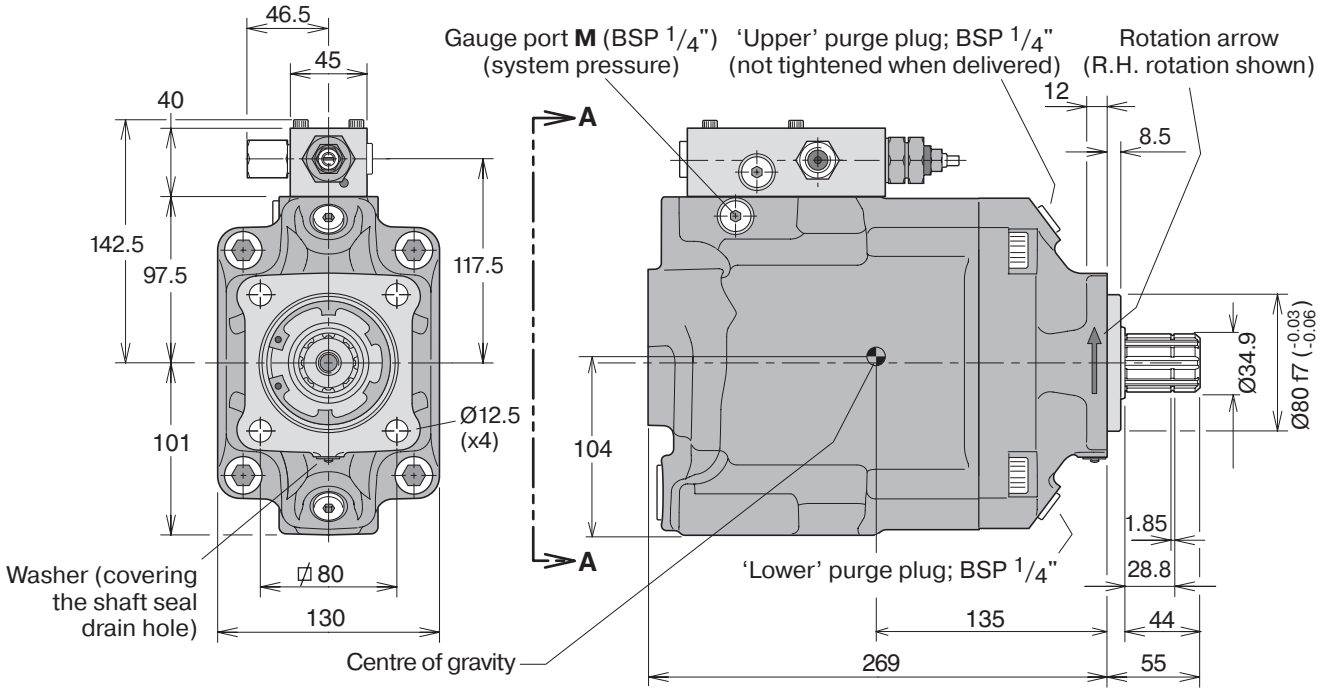


LS control cross section.

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

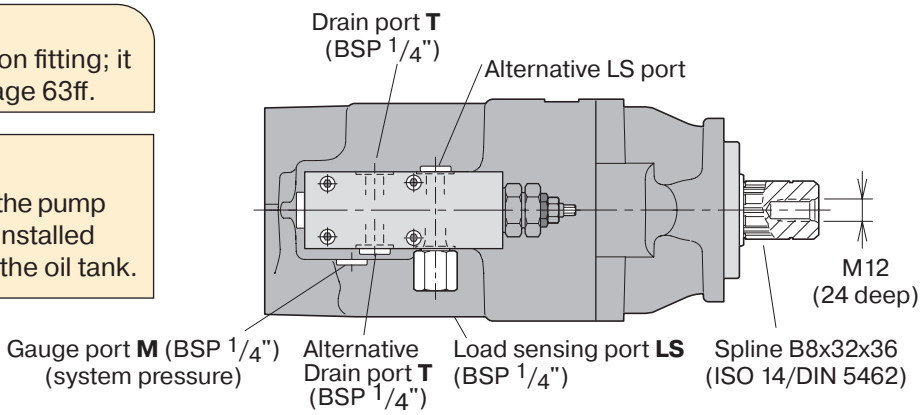
Item	Wrench / dimension
1	Hex Head Wrench / 4 mm
2	Wrench / 13 mm
3	**DO NOT TOUCH**
4	Wrench / 27 mm
5	Wrench / 27 mm

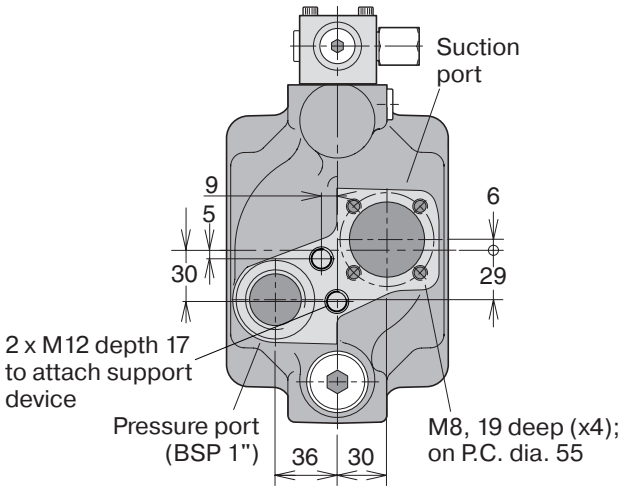
VP1-095/-110/-130



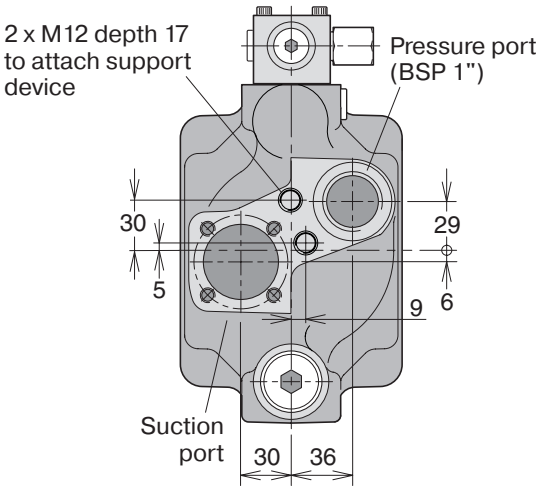
NOTE:
The pump **does not** include a suction fitting; it must be ordered separately. See page 63ff.

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.





View A–A
Left hand rotating pump



View A–A
Right hand rotating pump

Parker Hannifin
Pump & Motor Division Europe
Trollhättan, Sweden

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 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.

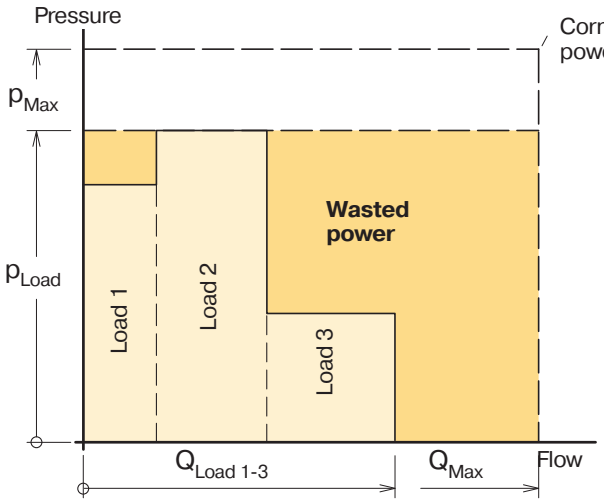


Diagram 1. Constant flow system with a fixed displacement pump.

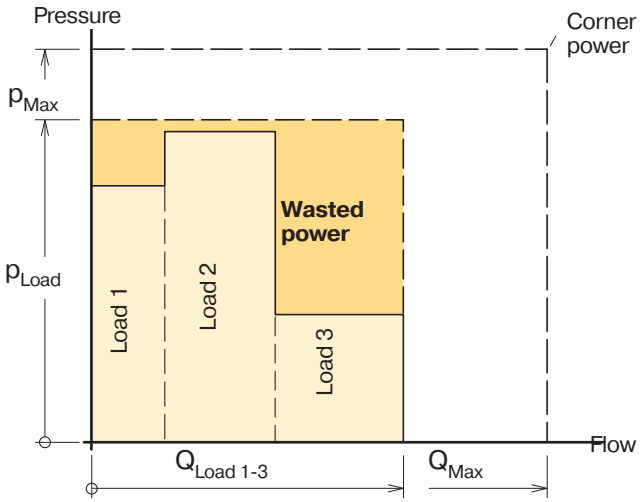


Diagram 2. Constant flow system with a variable displacement pump (e.g. VP1).

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.

Parker Hannifin
Pump & Motor Division Europe
Trollhättan, Sweden

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

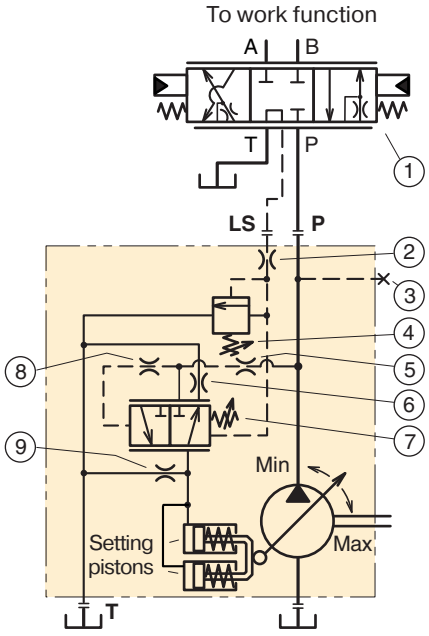
LS load sensing valve

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.

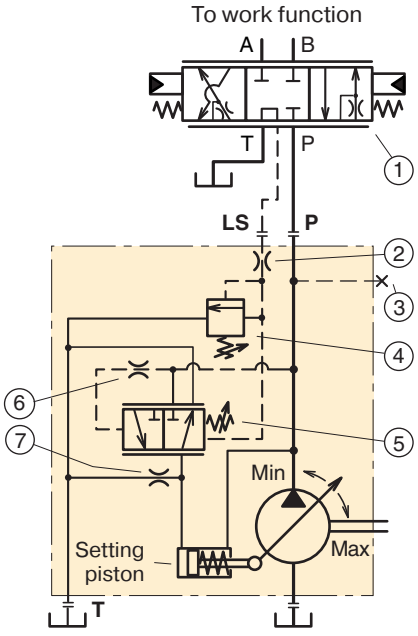
For additional information, contact Parker Hannifin.

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 choice 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 ($1^1/_2$")
378 0636[2)]	17	136	50 (2")
378 0637[3)]	25	145	63 ($2^1/_2$")
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 ($1^1/_4$")
378 0633[1)]	60	104	38 ($1^1/_2$")
378 0364[2)]	67	110	50 (2")
378 0634[3)]	75	117	63 ($2^1/_2$")
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 ($1^1/_2$")
378 0979[2)]	135	83	50 (2")
378 1980[3)]	147	83	63 ($2^1/_2$")
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")

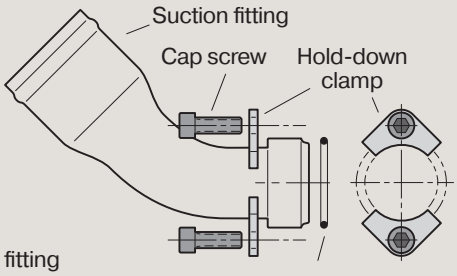
[1)] Recommended for frame size F1-25.
[2)] Recommended for frame size F1-41,-51,-61,-81, -101.
[3)] (3 clamps and 3 screws)

Spare parts

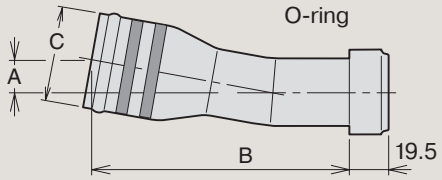
Additional Hold-down-clamp kit consists of:
hold-down-clamp cap screw and O-ring
Ordering no. 378 1321

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

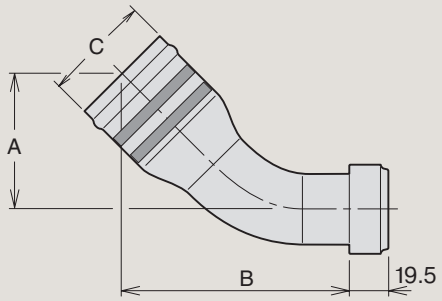
A 'suction fitting' consists of a straight, 45°, 90° or 135° suction fitting, clamps, cap screws and O-ring.



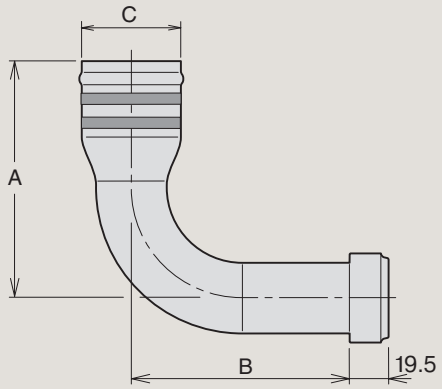
'Straight' fitting



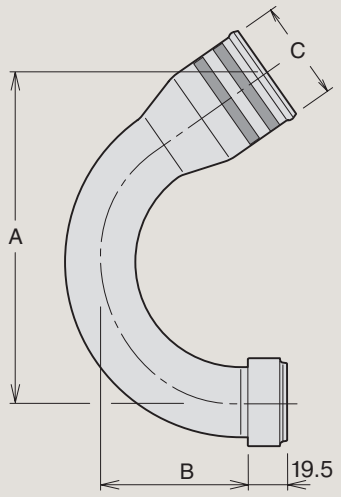
45° fitting



90° fitting



145° fitting



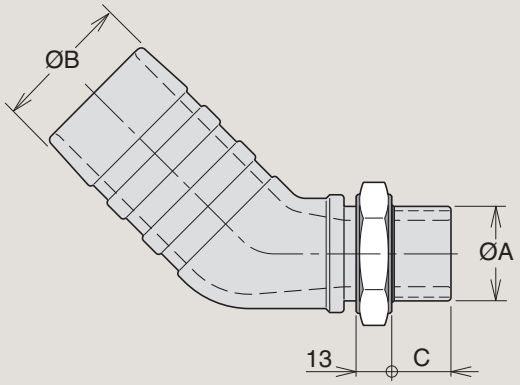
Suitable suction fittings for F1 and VP1-045/-060/-075 with BSP port treads

NOTE: A suction fitting must be ordered separately (not included with the pump).
To choice 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 $1^1/_4$"	21/2"	18

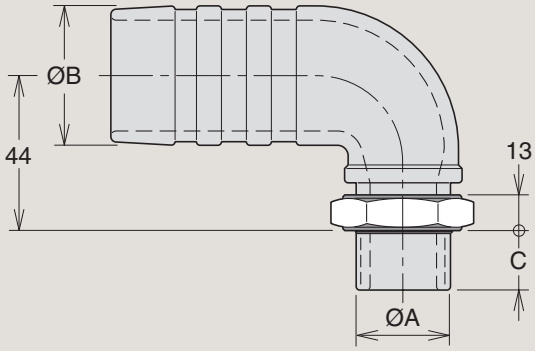
[1)] Not for VP1-045/-060/-075



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

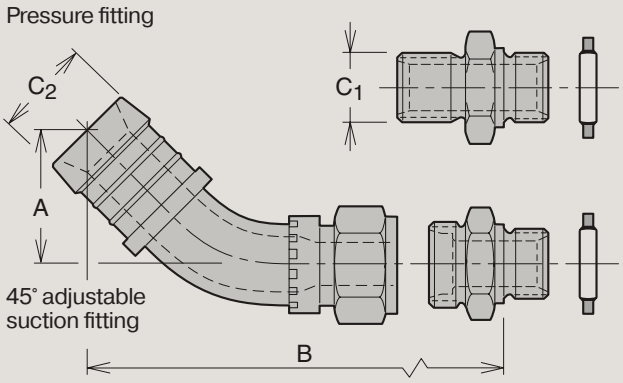


Fitting kits for VP1-045/-060/-075 pumps

Kits with 45° suction fitting

Order no.	C_1	ØC_2 inch	A mm	B mm
379 9563	BSP ¾"	2"	71	154
379 9562	BSP 1" *	$2\,^3/_2$"	64	147

* Above 100 l/min



Auxiliary Valves

Bypass Valves and Unloading Valves for F1, F2, F3, F4, T1 and VP1 pumps

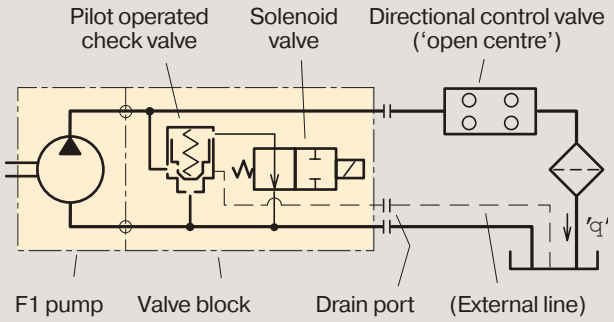
Contents ..... Page

BPV-F1 and BPV-T1 bypass valve

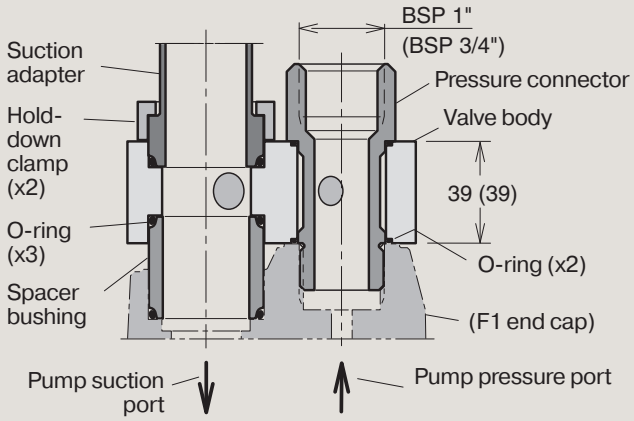
- The bypass valve is mainly utilised in applications where the F1 pump is driven from the crank-shaft through a cardan shaft, or when it is installed on an engine PTO.
- The BPV bypass valve should be disengaged during transportation when the pump is operating constantly and the engine is running at max rpm; the hydraulic system is not sized for the large flow that would otherwise go through it.
- The BPV valve substantially reduces the energy loss during transportation.
- The valve installs directly on top of the pump end cap with a pressure port 'banjo' fitting and an inlet port spacer bushing with two cap screws; refer to the illustration to the right.
- As the BPV valve is symmetrical, it can be 'turned 180°' to prevent interference with chassis compo- nents; it can be utilised for either left hand or right hand pumps.
- The valve function must only be activated or released (by means of the 24 VDC solenoid)
  at no-load (below 20 bar) system pressure.

IMPORTANT INFORMATION

- In order to secure a cooling flow through the system, a separate drain line **must** be connected from the BPV-F1 drain line fitting directly to tank; (shown in the Installation Information Bulletin MSG30-8227-INST/UK/DE) refer also to the schematic.
- The pressure connector must be tightened (to 50 Nm) before the suction fitting clamp screws are tightened.



Bypass valve schematic.



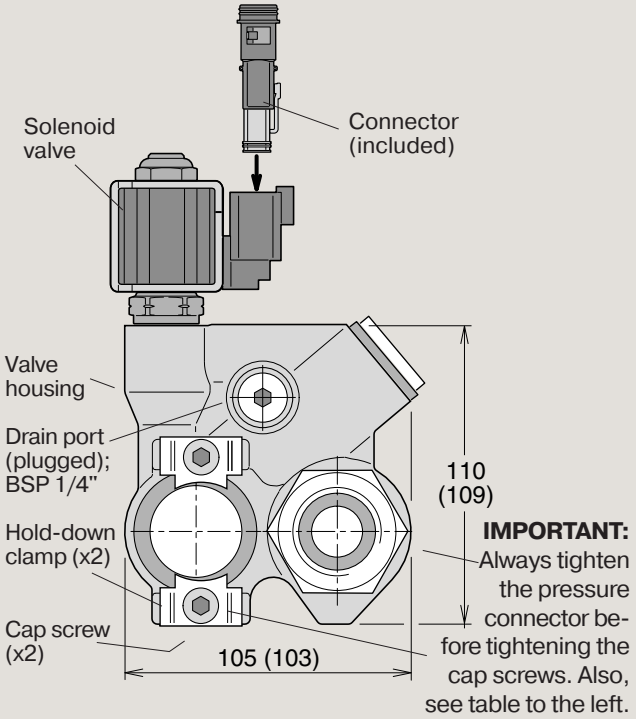
BPV-F1 and BPV-T1 Bypass valve

Without manual override

Bypass valve, type	BPV-F1-25 to -101 and BPV-T1-81 and -121
Max pressure, continuous	350 bar
intermittent	400 bar
Solenoid voltage (option)	24 VDC, (12 VDC)
Power requirement	14 W
Operating mode	Activated solenoid: Check valve closed

Bypass valve	Voltage	Ordering number	For F1 and T1 size	Torque[1]
BPV-F1, BPV-T1	24 VDC 12 VDC	**378 7201** **378 7202**	**F1**-25[2], -41, -51, -61 and **T1**-81	50 Nm
	24 VDC 12 VDC	**378 7203** **378 7204**	**F1**-81, -101 and **T1**-121	100 Nm
Drain fitting kit[2] F1-025		**378 1640**	Contains a drain line fitting a bonded seal and nozzle.	
Drain fitting kit other F1, T1 and F2		**378 3039**	Contains a drain line fitting and a bonded seal. **N.B.** Included in the complete bypass valve.	

1) Torque pressure connector to:
2) Drain fitting kit **378 1640** must be ordered separately for **F1-025**.



NOTE: Dimensions are shown for BPV-F1-81 (those for BPV-F1-25 are in parenthesis)

BPV-F1 and -T1 installation and cross section without manual override

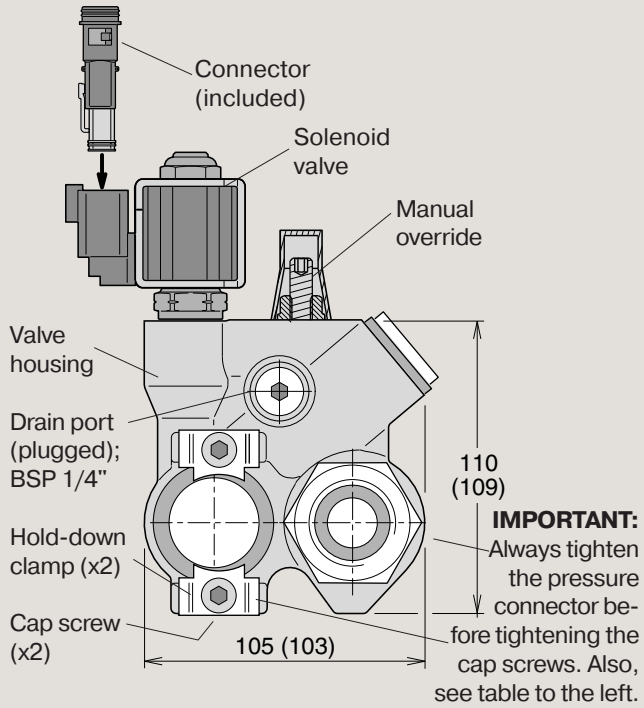
BPV-F1 and BPV-T1 Bypass valve

With manual override

Bypass valve, type	BPV-F1-25 to -101 and BPV-T1-81 and -121
Max pressure, continuous	350 bar
intermittent	400 bar
Solenoid voltage	24 VDC
Power requirement	14 W
Operating mode	Activated solenoid: Check valve closed

Bypass valve	Voltage	Ordering number	For F1 and T1 size	Torque[1]
BPV-F1, BPV-T1	24 VDC	**378 4179**	**F1**-25[2], -41, -51, -61 and **T1**-81	50 Nm
	24 VDC	**378 4180**	**F1**-81, -101 and **T1**-121	100 Nm
Drain fitting kit[2] F1-025		**378 1640**	Contains a drain line fitting a bonded seal and nozzle.	
Drain fitting kit other F1, T1 and F2		**378 3039**	Contains a drain line fitting and a bonded seal. **N.B.** Included in the complete bypass valve.	

1) Torque pressure connector to:
2) Drain fitting kit **378 1640** must be ordered separately for **F1-025**.

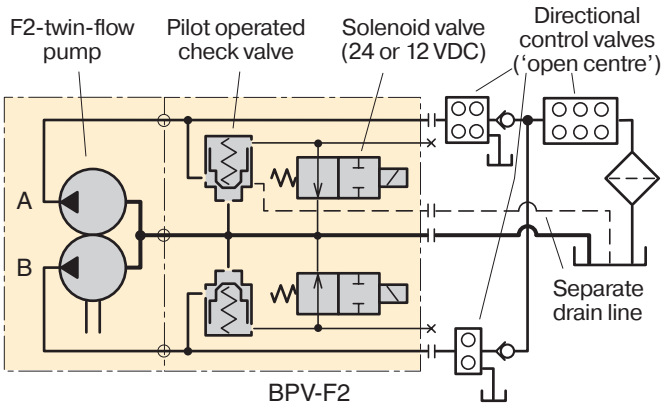


NOTE: Dimensions are shown for BPV-F1-81 (those for BPV-F1-25 are in parenthesis)

BPV-F1 installation and cross section with manual override

BPV-F2 bypass valve

- An F2 twin pump fitted with a bypass valve can be utilised in applications where the pump is operating constantly i.e. when the pump is driven from the crankshaft through a cardan shaft, or when it is installed on an engine-PTO. In addition, it can be used when, temporarily, one of the two circuits is not required; the power loss is thus reduced as the non-required flow is not forced through lines and 'open center' valves.
- The BPV bypass valve should be disengaged during transportation when the pump is operating constantly and the engine is running at max rpm; the hydraulic system is not sized for the large flow that would otherwise go through it.
- The BPV valve connects the outlet and inlet ports of the pump, and only a small oil flow goes through the system and to the reservoir.
- The valve is installed directly on top of the pump port surface with 'banjo' fittings and two cap screws (refer to the split view to the right).
- As the BPV valve is symmetrical it can be 'turned 180°' so as not to interfere with chassis components. The valve can accommodate left hand as well as right hand rotating pumps.
- The valve can only be engaged or disengaged (through the 24 or 12 VDC solenoid) at low system pressures (below 20 bar).



Bypass valve circuit schematic (example).

IMPORTANT INFORMATION

- In order to secure a cooling flow through the system, a separate drain line **must** be connected from the BPV-F2 drain line fitting (shown in the split view) directly to tank; refer also to the schematic.
- The pressure connectors must be tightened (to 50 Nm) before the suction fitting clamp screws are tightened.

BPV-F2 Bypass valve

Without manual override

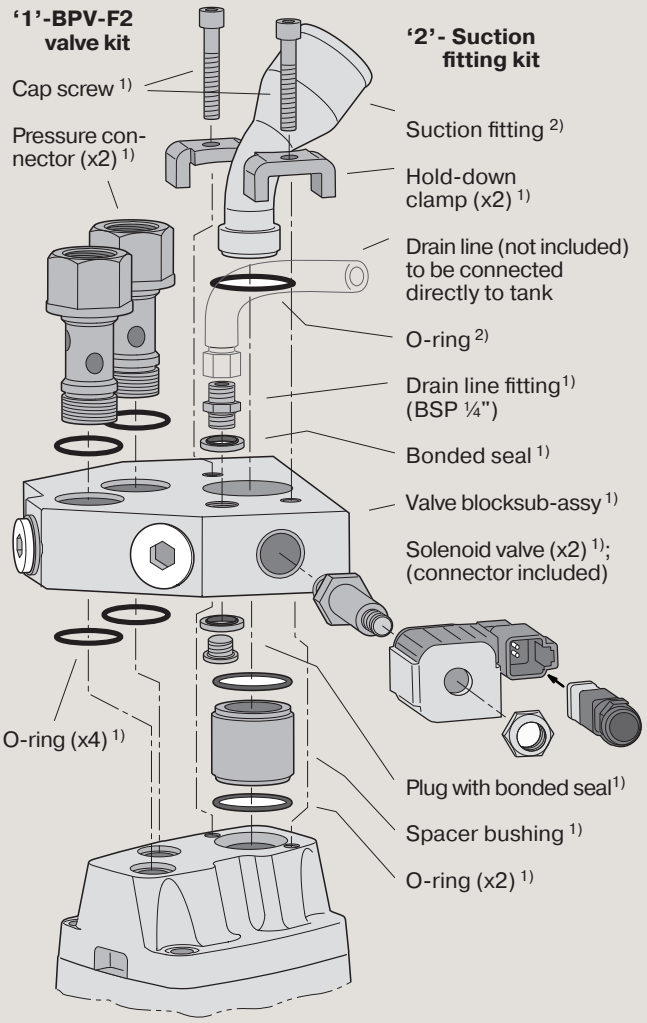
Bypass valve, type	BPV-F2
Max pressure, continuous	350 bar
intermittent	400 bar
Solenoid voltage (option)	24 VDC, (12 VDC)
Power requirement	14 W (each solenoid)
Operating mode	Activated solenoid: Check valve closed

Bypass valve[1)]	Voltage	Ordering number	For F2 size	Torque[3)]
BPV-F2,	24 VDC 12 VDC	**378 7424** **378 7425**	42/42, 53/53, 55/28, 70/35, 70/70	50 Nm

1) The BPV-F2 valve kit contains parts designated '1' in the split view to the right.

2) A suction fitting kit (parts designated '2' in the split view) is not included with the F2 pump; it must be ordered separately (refer to page 63).

3) Torque pressure connector to:



Bypass valve split view without manual override (with F2 end cap).

NOTE: A suction fitting kit (parts designated '2' in the split view) is **not** included with the F2 pump; it must be ordered separately (refer to cpage 63ff).

BPV-F2 Bypass valve

With manual override

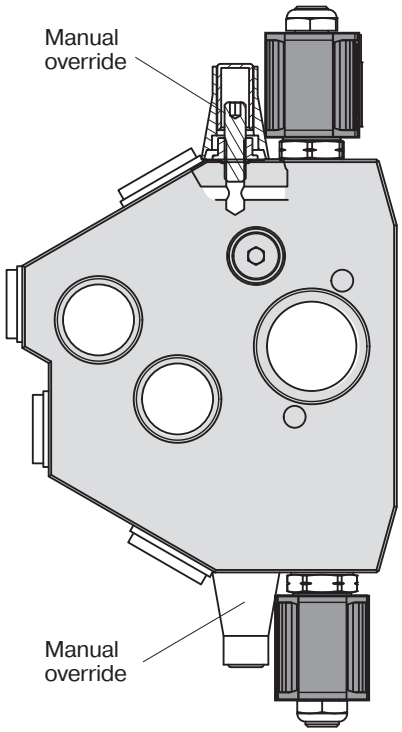
Bypass valve, type	BPV-F2
Max pressure, continuous	350 bar
intermittent	400 bar
Solenoid voltage (option)	24 VDC
Power requirement	14 W (each solenoid)
Operating mode	Activated solenoid: Check valve closed

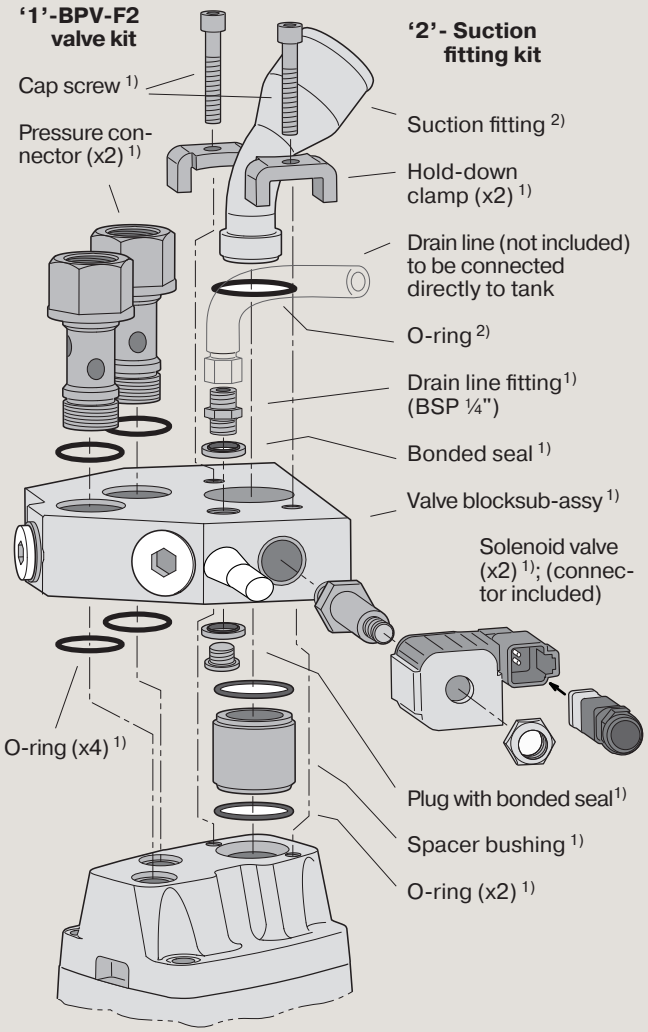
Bypass valve[1)]	Voltage	Ordering number	For F2 size	Torque[3)]
BPV-F2,	24 VDC	**378 4377**	42/42, 53/53, 55/28, 70/35, 70/70	50 Nm

1) The BPV-F2 valve kit contains parts designated ’1’ in the split view to the right.

2) A suction fitting kit (parts designated ’2’ in the split view) is not included with the F2 pump; it must be ordered separately (refer to page 63).

3) Torque pressure connector to:



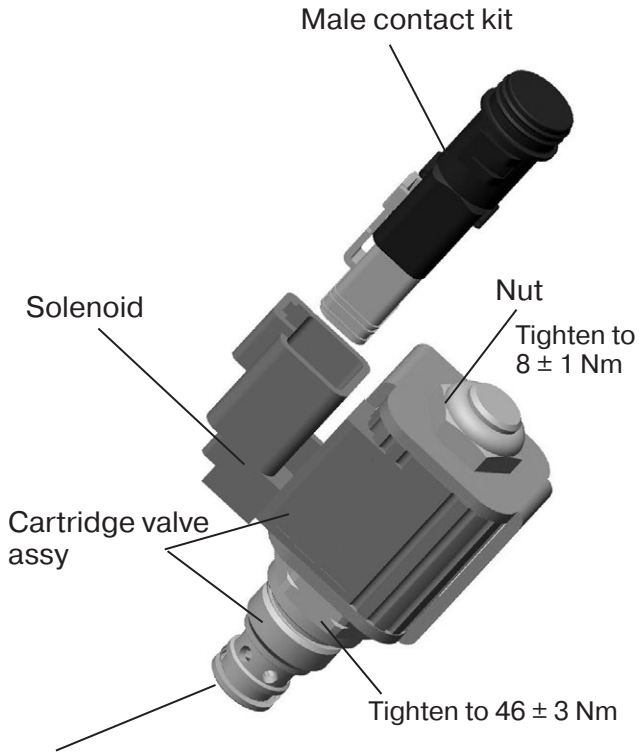


Bypass valve split view with manual override (with F2 end cap).

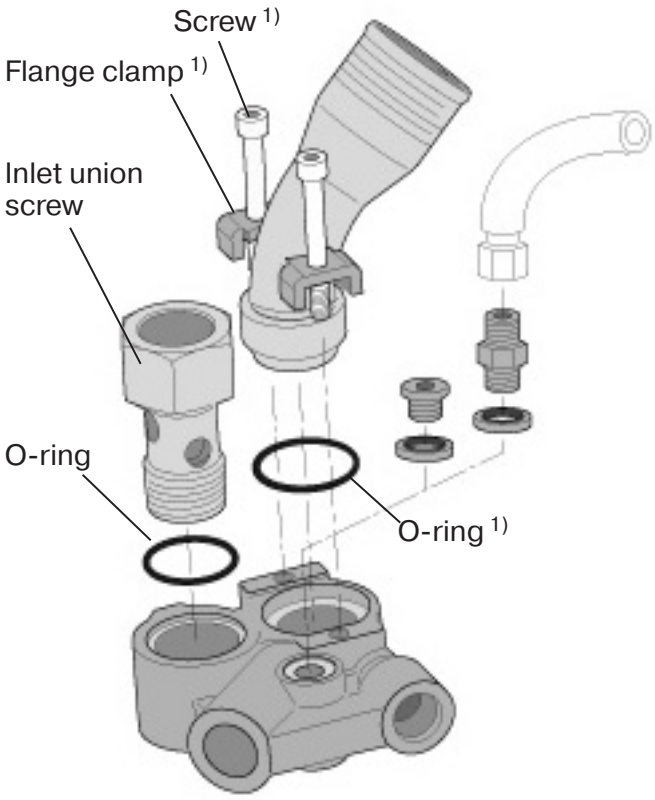
NOTE: A suction fitting kit (parts designated ’2’ in the split view) is **not** included with the F2 pump; it must be ordered separately (refer to page 57 ff).

BPV-F1, -T1, -F2, -F3 and -F4 Accessories / Spare Parts

Part No	Description	Remarks
3787496	Solenoid 24 V	Incl. new connector
3787497	Solenoid 12 V	Incl. new connector
3787494	Cartridge valve assy 24 V	Incl. new connector
3787495	Cartridge valve assy 12 V	Incl. new connector
3785948	Nut for cartridge valve	
3787488	Male contact kit	



Remember to lubricate the seal on the cartridge valve before assembly in the valve block.

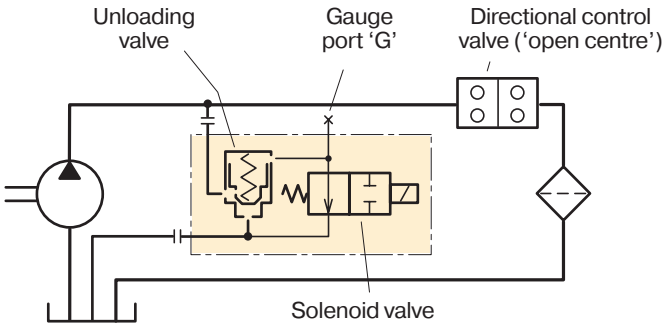


Part No	Description	Remarks
3781480	Inlet union screw	F2 (all sizes)
3781082	Inlet union screw	F1-25, -41, -51, -61 and T1-81
3781094	Inlet union screw	F1-81, -101, T1-121, and F3-81, -101
3780641	O-ring kit	For F1, T1, F2, F3 and F4 (all sizes)
3782439	Hold-down clamp Suction fitting 1)	For BPV F1, T1, F2, F3 and F4

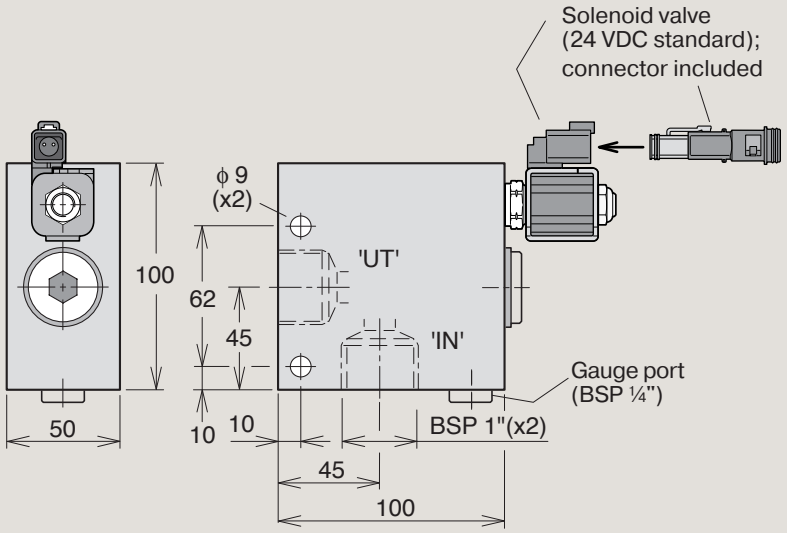
1) Hold-down clamp for suction fitting on bypass valve for F1, T1, F2 and F3 (parts designated '1' in the split view).

BPV-L line mounted bypass valve

- The unloading valve BPV-L is utilised in hydraulic systems where the fixed displacement pump is engaged constantly and no flow is required, i.e. during transportation. The flow is directed through the unloading valve which has a low pressure loss and less heat is being generated in the system.
- When the solenoid is activated the unloading valve closes and the pump flow is directed to the directional control valve or other user.



Unloading valve, type	BPV-L
Max operating pressure [bar]	350
Max flow [l/min]	250
Solenoid voltage [VDC]	24
Required power [W]	14
Operating mode	Activated solenoid: Check valve closed
Ordering number	**378 1487**



Parker Hannifin
Pump & Motor Division Europe
Trollhättan, Sweden

VP1 installation on an engine PTO

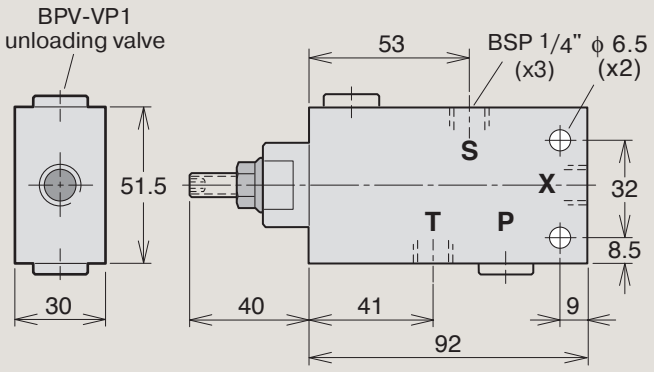
BPV-VP1 unloading valve

The BPV-VP1 unloading valve is utilized in hydraulic systems where the pump is in constant operation.

- The valve protects the pump from being overheated in the off-load mode by allowing a small flow through the pump. When load sensing valve function is engaged, the bypass flow is cut off (as port 'X' is being pressurized).
- The valve will also de-air the suction line and the pump body after a long standstill.
- (The pump is assembled above the oil-tank and during the standstill some of the oil in the pump housing has been drained back to the oil-tank)

Valve type	Ordering number
BPV-VP1	**379 8799**

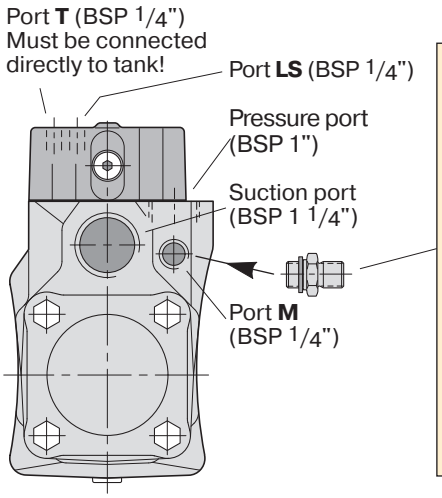
NOTE: - BPV-VP1 with VP1-045, -060 or -075 and
- BPV-VP1 with VP1-095, -110 or -130,
see next page.



BPV-VP1 unloading valve.

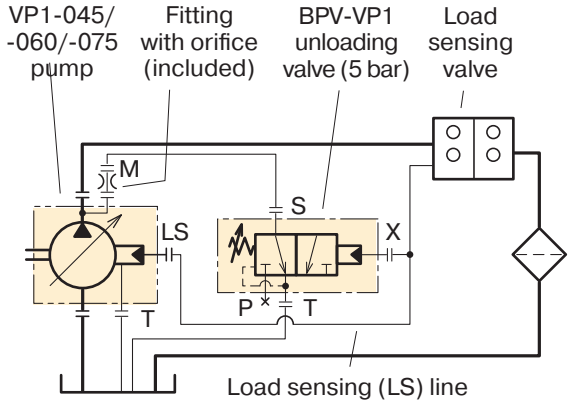
For more information also see MSG30-8226-INST/UK, Installation Information Unloading Valve BPV for VP1

BVP-VP1 with VP1-045/-060/-075 pumps



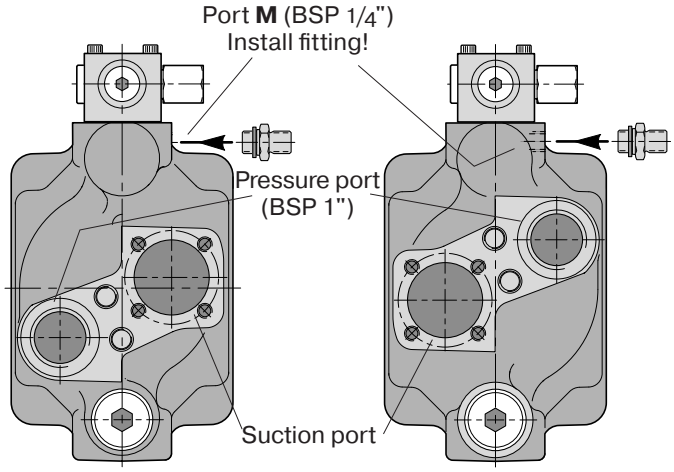
NOTE:
- Install the fitting (included) in port M and connect it, in turn, to port S of the unloading valve (see schematic).
- An orifice is included in the fitting. Connection on the fitting is 1/4" BSP threads. Size of orifice in the fitting is Ø 1.5 mm.

VP1-045/-060/-075 end view (showing ports).

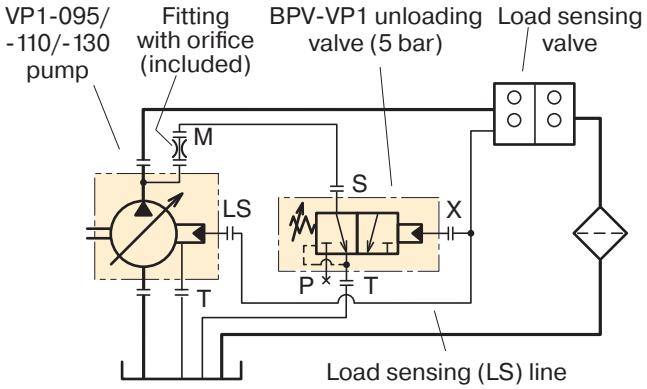


BPV-VP1 installation schematic with VP1-045/-060/-075 pump.

BPV-VP1 with VP1-095/-110/-130 pumps

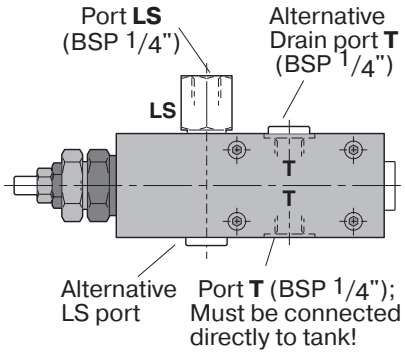


VP1-095/-110/-130 main ports (with fitting installation).



BPV-VP1 installation schematic with VP1-095/-110/-130 pump.

NOTE:
- Install the fitting (included) in port M and connect it, in turn, to port S of the unloading valve (see schematic).
- An orifice is included in the fitting. Connection on the fitting is 1/4" BSP threads. Size of orifice in the fitting is Ø 1.5 mm.



VP1-095/-110/-130 control valve ports.

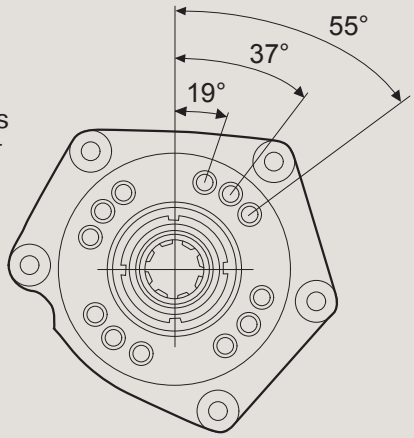
Accessories

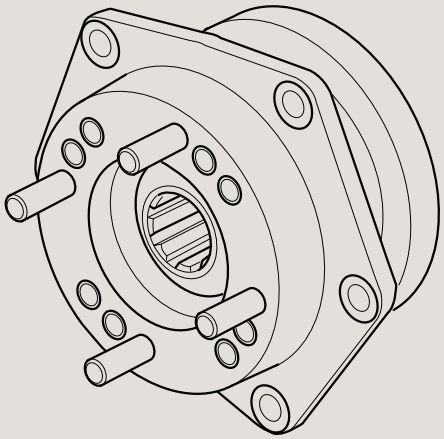
Contents ..... **Page**

PTO adapter kit for Scania ED 120 and 160 engine - PTO

- With the adapter kit, a hydraulic pump (e.g. F1 or VP1) that meets the ISO standard can be installed on the PTO of the Scania engine.
- The PTO gear is supplied with the chassis.
- **Please note:** The engine must be ordered with a PTO.

3 assembly positions in the same adapter 19°, 37°, 55°





ED 120

Technical Information	
Max. torque [Nm]	600
Gear ratio (engine : pump)	1 : 1.19
Pump rotation	Right hand (clockwise)

PTO adapter kit	Ordering number
ED120, bearing supported 19°, 37°, 55°	**378 9592**

ED 160

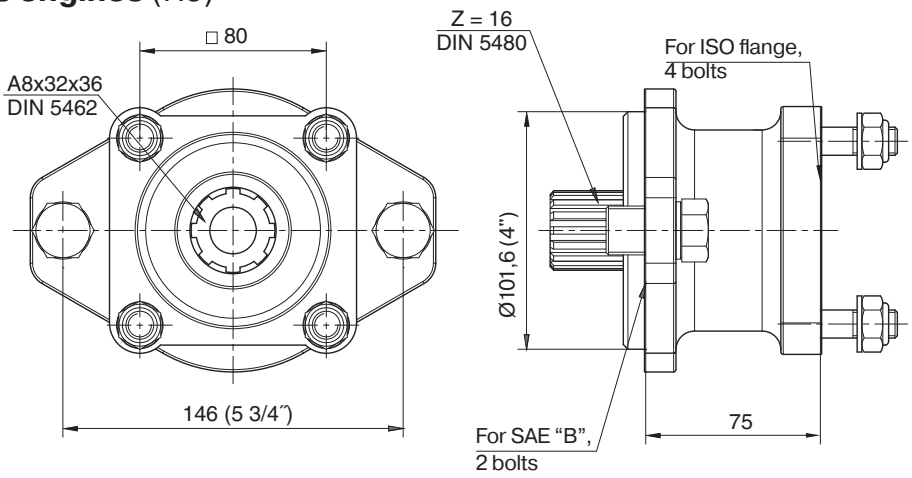
Technical Information	
Max. torque [Nm]	600
Gear ratio (engine : pump)	1 : 1.19
Pump rotation	Left hand (counter clockwise)

PTO adapter kit	Ordering number
ED-160, bearing supported 19°, 37°, 55°	**378 9970**

PTO adapter kit for Mercedes engines (R6)

With the adapter kit, a hydraulic pump that meets the ISO standard can be installed on the PTO of the Mercedes R6 engines.

Torque continuous	300 Nm
Torque intermittent	330 Nm
Gear ratio (engine to pump)	1 : 1.071
Pump rotation	Right hand
Ordering No.	0050706404

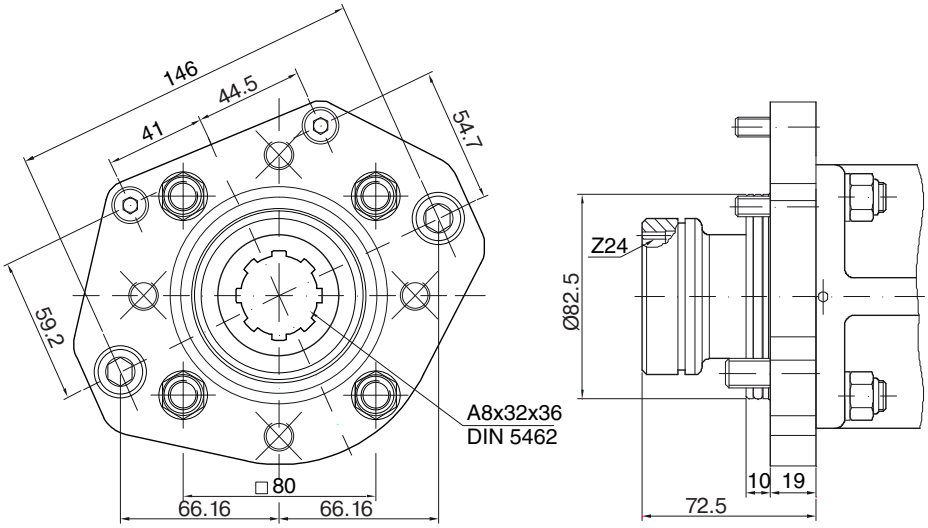


PTO adapter kit for Mercedes engines (V6, V8)

With the adapter kit, a hydraulic pump that meets the ISO standard can be installed on the PTO of the Mercedes V6 and V8 engines.

This adapter (7012104), can be fitted on the original DC SAE-A adapter, delivered together with the new ACTROS from DC factory.

Torque continuous	390 Nm
Torque intermittent	470 Nm
Gear ratio (engine to pump)	1 : 1.15
Pump rotation	Right hand
Ordering No.	00507012104

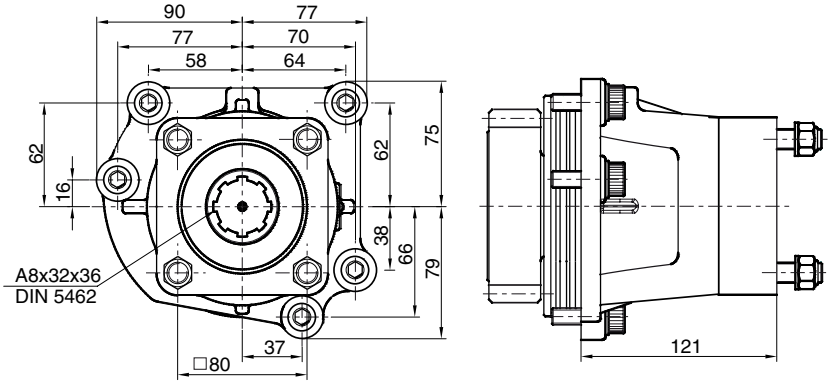


PTO adapter kit for MAN (D20, D26)

With the adapter kit, a hydraulic pump that meets the ISO standard can be installed on the PTO of the MAN D20 engines.

PTO adapter	**D20, D26**
Torque continuous	400 Nm
Torque intermittent	570 Nm
Gear ratio (engine to pump)	1 : 1.233
Pump rotation	Right hand

PTO adapter	**Ordering No.**
D20, D26	0050081903



Pump couplings

Designation	DIN 90 (fig. 1)
A	90
B	74.5
C	47 h7
D	M8
E_1	61.5
E_2 (F1)	57.2
VP1, F2, F1*	**370 4634**
F1	**378 0642**

NOTE: Max torque is limited by the cardan shaft.

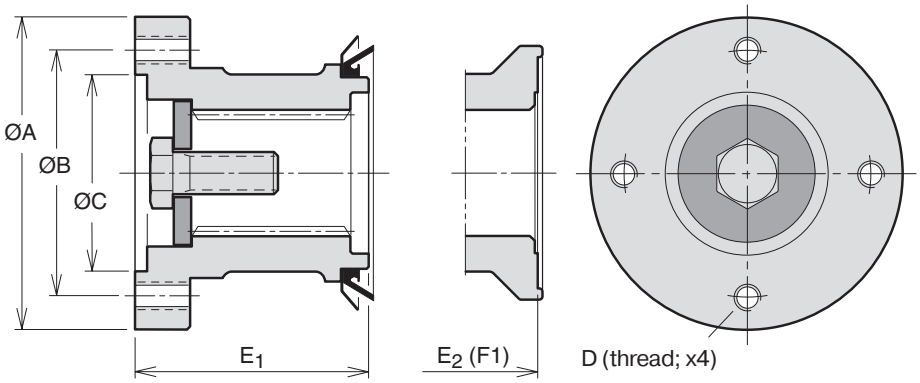


Fig. 1. DIN 90 (370 4634) (378 0642)

Designation	DIN 90 (fig. 2)
A	90
B	74.5
C	47 h7
D	8.2
E_1	61.5
VP1, F2, F1*	**370 7423**

NOTE: Max torque is limited by the cardan shaft.

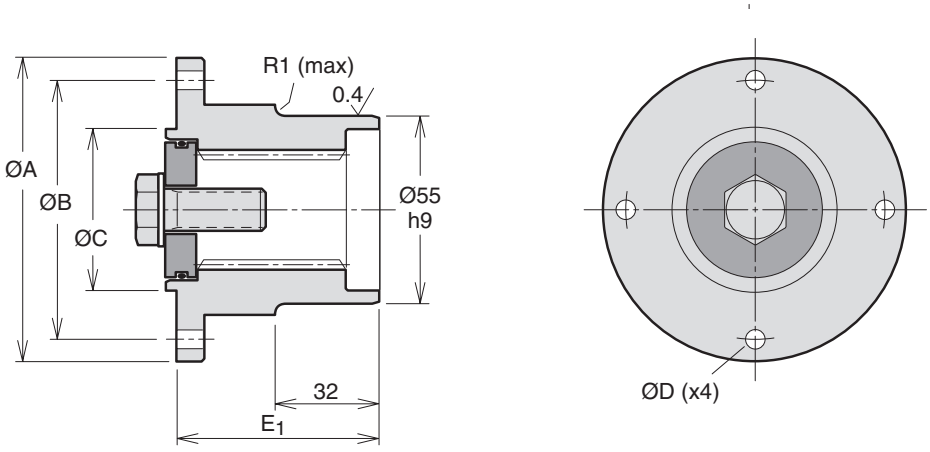


Fig. 2. DIN 90 (370 7423)

Designation	SAE88 (fig. 3)
A	88
B	69.9
C	57.15 H8
D	$^5/_{16}$" UNC
E_1	59.5
Max torque [Nm] interm./ contin.	600/300
F1	**378 0644**

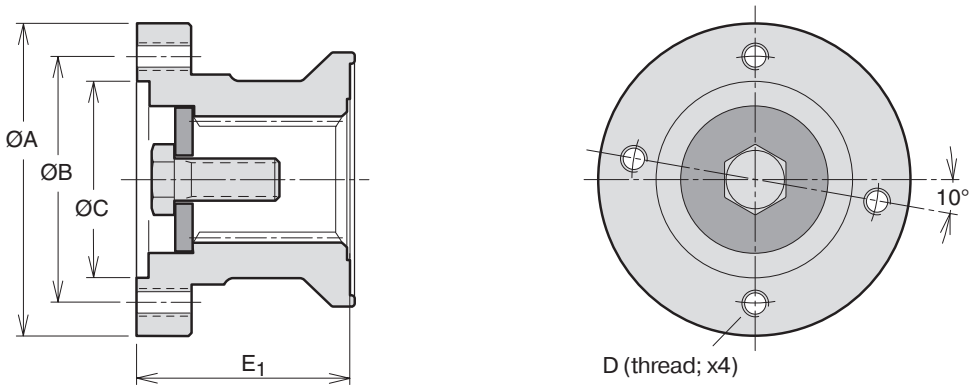


Fig. 3. SAE 88 (378 0644)

Designation	SAE97 (fig. 4)
A	97
B	79.4
C	60.33 H8
D	$^3/_8$" UNC
E_1	65
E_2 (F1)	59.5
Max torque [Nm] interm./ contin.	1000/500
VP1, F2, F1*	**370 4631**
F1	**378 0645**

F1* Old versions

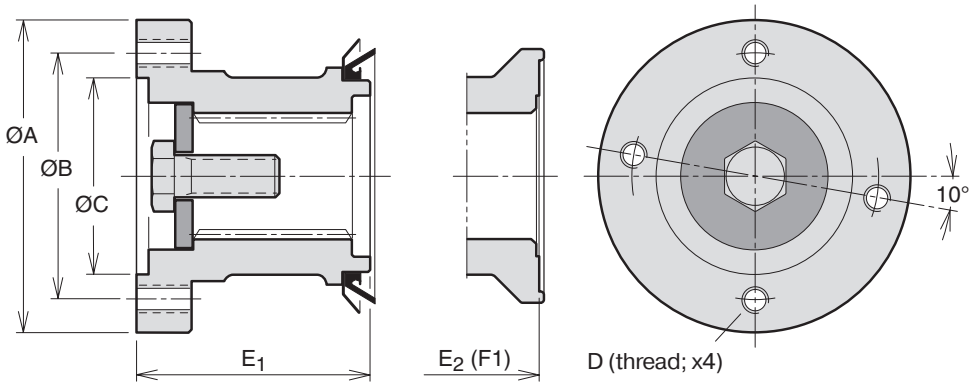


Fig. 4. SAE97 (370 4631) (378 0645)

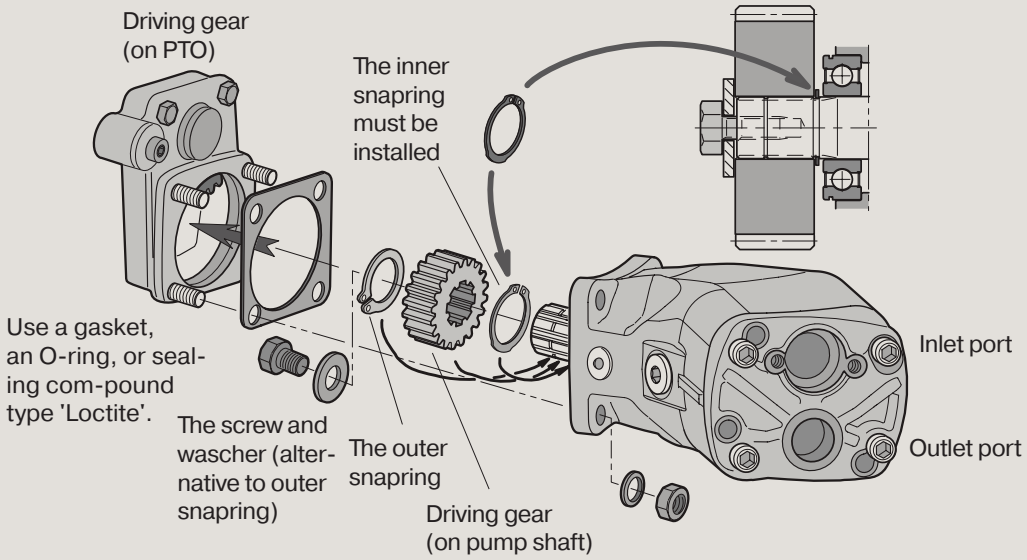
Installation and start up

Installing couplings, sleeves, and gears on the pump shaft.

This is a short installation and start up information. To have the complete and latest installation information, always see the installation info supplied together with the pump.

PTO installation

- 'Left hand' and 'Right hand' rotation defined in the illustrations on page 77.
- The driving gear of the PTO and the driven gear of the pump are shown in the illustration below. (A right hand rotating pump is shown).



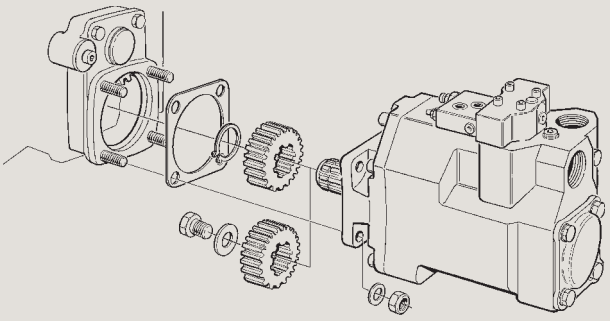


Fig. 6. VP1-to-PTO installation.

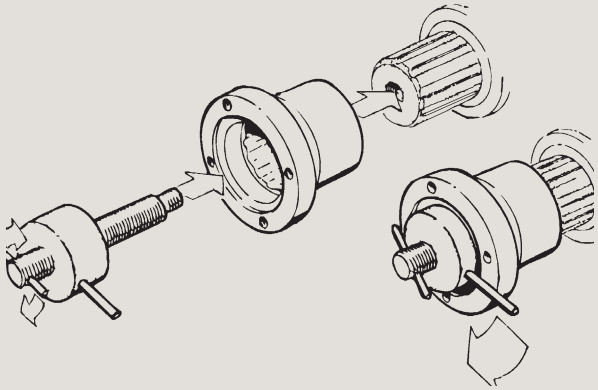
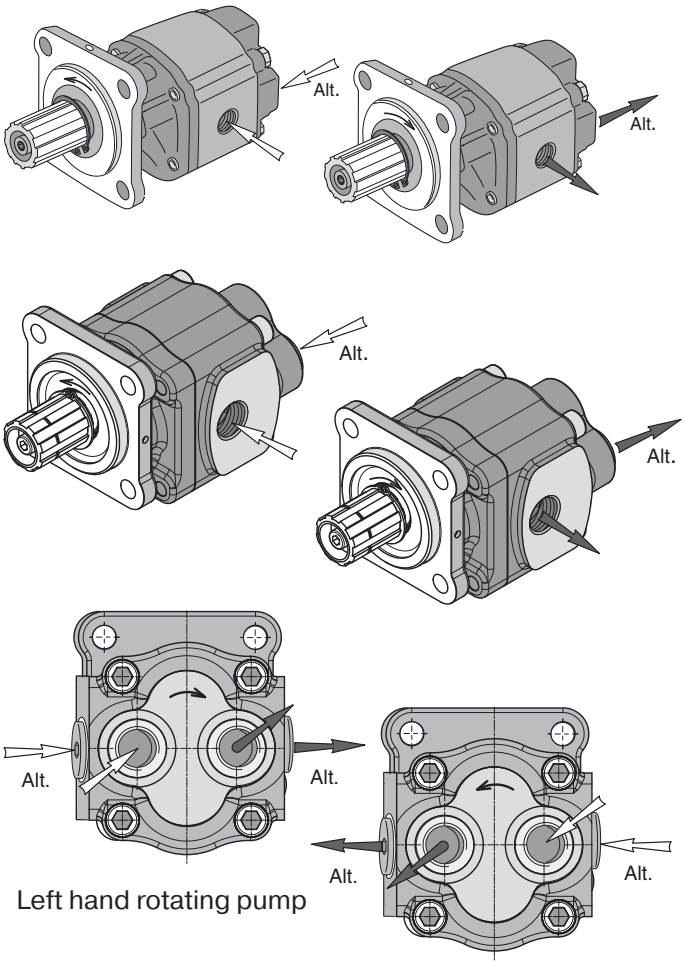


Fig. 7 Mounting tool.

IMPORTANT
Use some kind of special tool when you install couplings, sleeves, and gears on the pump shaft. Force must never be used when installing these parts on the F1 shaft.

1) Flow vs. shaft rotation

- The gear pumps are bi-directional (and internally drained)
- Port connector assembly:
  - Screw in the connector until it firmly touches the pump housing; then tighten the connector 30° ($^1/_{12}$ turn).



Left hand rotating pump

Right hand rotating pump

2) Suction fitting selection

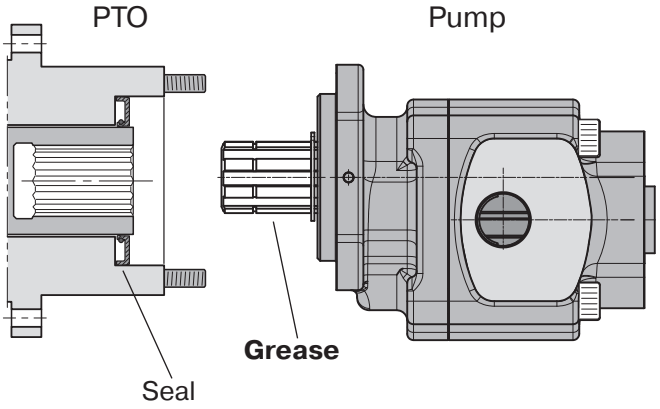
Flow speed [m/s] at indicated line size [mm/in]

[l/min]	19/$^3/_4$"	25/1"	32/1$^1/_4$"	38/1$^1/_2$"	50/2"
5	0.3	0.2	0.1	< 0.1	< 0.1
15	0.9	0.5	0.3	0.2	0.1
25	1.5	0.8	0.5	0.4	0.2
40	-	1.4	0.8	0.6	0.3
60	-	2.0	1.2	0.9	0.5
80	-	-	1.7	1.2	0.7
100	-	-	-	1.5	0.8

The gearpump must not be installed more than 0.5 m above the min. oil level in the reservoir.

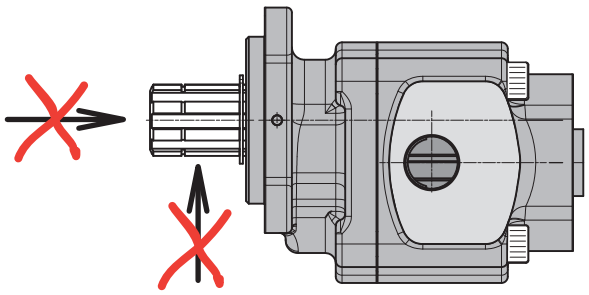
3) Lubricate the spline

When the PTO has a sealed-off output sleeve (as shown in the illustration), the gearpump shaft spline **must be lubricated with a heat-resistant grease before start-up**; repeate periodically (at least once a year).



4) No external shaft loads

- No external radial or axial shaft loads are allowed on the pump shaft.
- In case of radial and/or axial shaft loads an external, bearing supported coupling must be utilized.



5) Hydraulic fluid

Use, exclusively, good quality hydraulic fluid with anti-foam and anti-wear additives. The fluid must meet the following specifications: DIN 51 524 / 51 525 (type HLP).

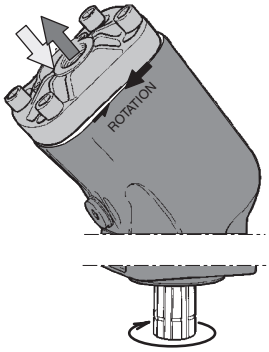
Viscosity
Acceptable:
- 8 – 1000 cSt (mm^2/s)

Recommended:
- 22 cSt (in cold climate)
- 37 cSt (in temperate climate)
- 46 cSt (in hot climate)

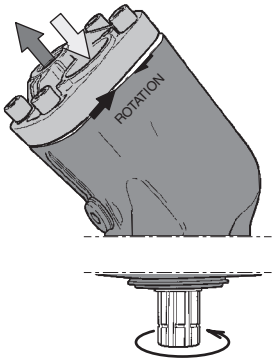
Temperature
- Min. - 15 °C
- Max. + 80 °C

Filtration
- Suction line: Not recommended
- Pressure line: 10 to 25 µm.

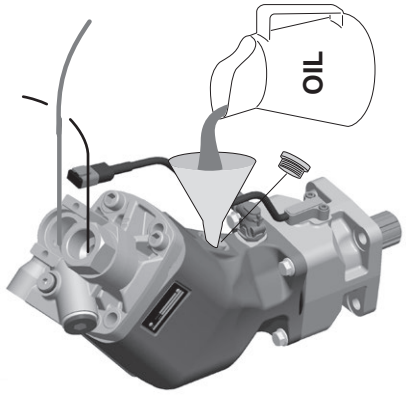
Installation and start-up for F1, T1, F2, F3 and F4



Left hand (L.H.; counter clockwise) rotating pump.



Right hand (R.H.; clockwise) rotating pump.



Before start-up, the housing must be filled with hydraulic fluid.

Direction of rotation

The pictures above show direction of flow vs. shaft rotation.

The direction of rotation can be changed (i.e. from right hand to left hand) by turning the end cap.

Remove the four cap screws and turn the end cap about half a turn while making sure it stays in contact with the barrel housing.

Re-fit the cap screws and torque to 80 – 100 Nm.

Installation

Make sure max torque and bending moment (due to the weight of the pump) of the utilised PTO are not exceeded. (The approx. center of gravity of the various pump sizes are shown in the installation drawings).

The top illustration on page 73 shows two ways of installing a gear on the shaft of fixed displacement pumps. The pump shaft spline end usually fits directly in the PTO internal spline coupling.

NOTE: In order to obtain the longest bearing life, the pump should be installed according to the information shown on page 76"Pump bearing life".

Fluid viscosity

Recommended viscosity:
20 to 30 mm^2/s (cSt).

Operating viscosity limits:
- Min 10 mm^2/s; max 400 mm^2/s.
- At start-up, max 4000 mm^2/s.

Fluids

The fixed displacement pumps data shown in the specifications for each pump are valid when operating on high quality, mineral based hydraulic oil.

Type HLP (according to DIN 51524) hydraulic oil is suitable as well as biologically degradeable fluids like natural and synthetic esters and polyalfaolefins.

The utilised hydraulic fluid shall meet one of the following Swedish standards:

- SS 15 54 34
- SMR Hydraulic Oil Standard 1996-2.

Contact Parker Hannifin for further information.

NOTE: - ATF (automatic transmission fluid) and API type CD engine oils may also be useable.
- Seals are made of nitrile rubber; make sure the utilised fluid is compatible with this material.

Fluid temperature

Main circuit: Max 75 °C.

Drain line

Fixed displacement pumps don't need an external drain line as they are internally drained.

When the pump is mounted in a Engine-PTO we recommend a drain line from the bypass valve directly to oil tank.

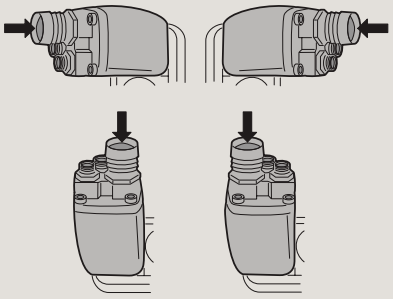
Filtration

Filtration should follow ISO standard 4406, code 20/18/13.
To obtain the longest life of fixed displacement pumps, we recommend an oil cleanliness of 10 µm (absolute).

Start-up

Make sure the entire hydraulic system is clean before filling it with a recommended hydraulic fluid.
In particular, make sure the pump is illed (to at least 50 %) as the internal leakage does not provide sufficient lubrication at start-up.

NOTE: - The suction port should always be above the pressure port when the pump is installed above the reservoir oil level.
- During operation, the pump must be filled with oil to at least 50 %.

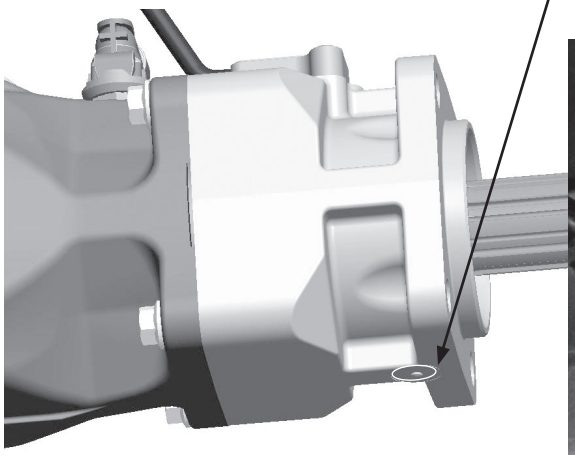


If any oil should drop out of the indication-hole on the pump;

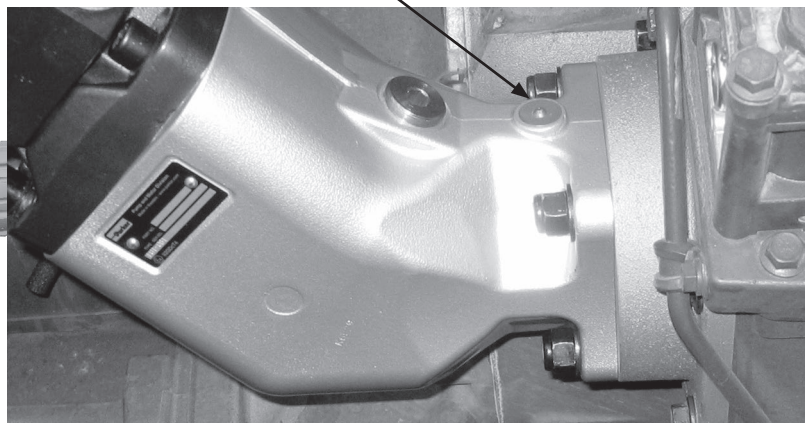
- Stop the system immediately.
- Determine the cause of leakage.
- Replace damaged parts.
- Make sure you have corrected the source of the problem, not only the symptom.

Parker can not be held responsible for damage to PTO, engine and gearbox caused by improper maintenance of the hydraulic system.

F3



F1



Pump bearing life

Bearing life is dependent on how the pump is installed on the PTO as shown in the illustrations below.

A pump mounted according to fig. 1 gives the lowest bearing life; the highest is obtained when installed according to fig. 3.

Parker Hannifin will assist in determining bearing life in a particular application.

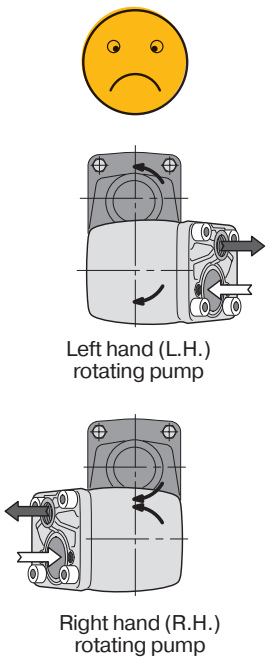


Fig. 1.

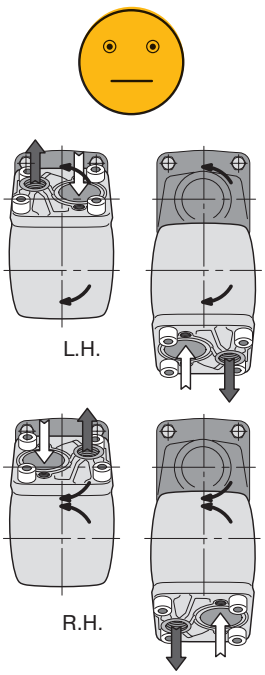


Fig. 2.

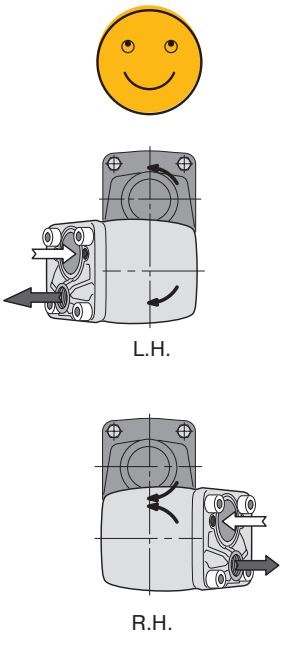


Fig. 3.

Parker Hannifin
Pump & Motor Division Europe
Trollhättan, Sweden

Installation and start-up for VP1

Direction of rotation

The basic VP1 pump is uni-directional; there is a left hand and a right hand version (indicated by the arrow on the side of the VP1 pump (fig. 4 and 5).

Consequently, the required direction of rotation must be stated when ordering the pump.

Installation

The VP1 can be installed (close-coupled) directly on a PTO (which meets ISO DIN 5462).

Before start-up, the pump must be filled with hydraulic fluid and purged. Utilise the uppermost purge plug (refer to the installation drawing on pages 56 and 59).

Figure 6 (page 80) shows two ways of installing a gear on the VP1 shaft. On a non-geared or a geared PTO with support bearings, the pump shaft is usually installed directly in the internally splined PTO output shaft.

Make sure max torque and bending moment (due to the weight of the pump) of the utilised PTO are not exceeded. (The approx. center of gravity of the various pump sizes are shown in the installation drawings).

Hydraulic fluids

The VP1 data shown in the specifications on page 48, 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.

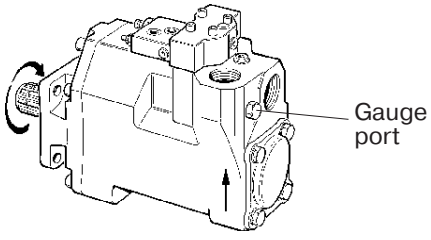


Fig. 4. Left hand rotating pump.

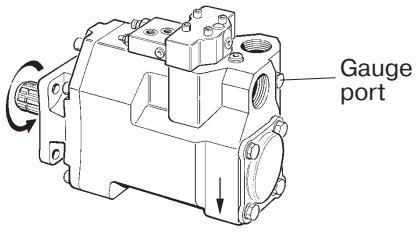


Fig. 5. Right hand rotating pump.

Viscosity

Recommended viscosity: 20 to 30 mm^2/s (cSt).
Operating viscosity limits: 10 to 400 mm^2/s.
At start-up: Max 1000 mm^2/s.

Filtration

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

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

Filtration should meet ISO standard 4406: code 20/18/13.

Drain line

The LS valve requires a separate drain line; it should be routed directly to the reservoir (refer to fig. 8).

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; utilise the uppermost purge port (fig. 8).

IMPORTANT

As shown in fig. 8, the pump inlet must always be below the lowest reservoir oil level.

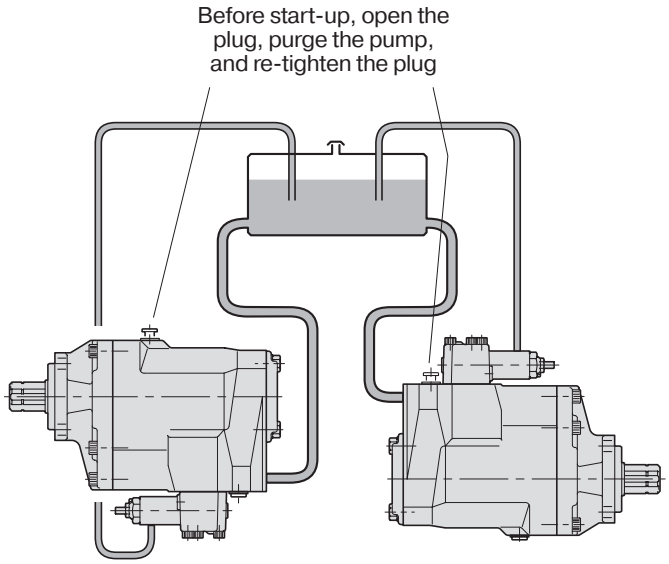


Fig. 8. VP1 should be installed below the reservoir fluid level.

Purging should be performed when the pump is connected to the reservoir and the system is filled with fluid.

WARNING – USER RESPONSIBILITY

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