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VP1 Pump



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TECHNICAL INFORMATION

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					

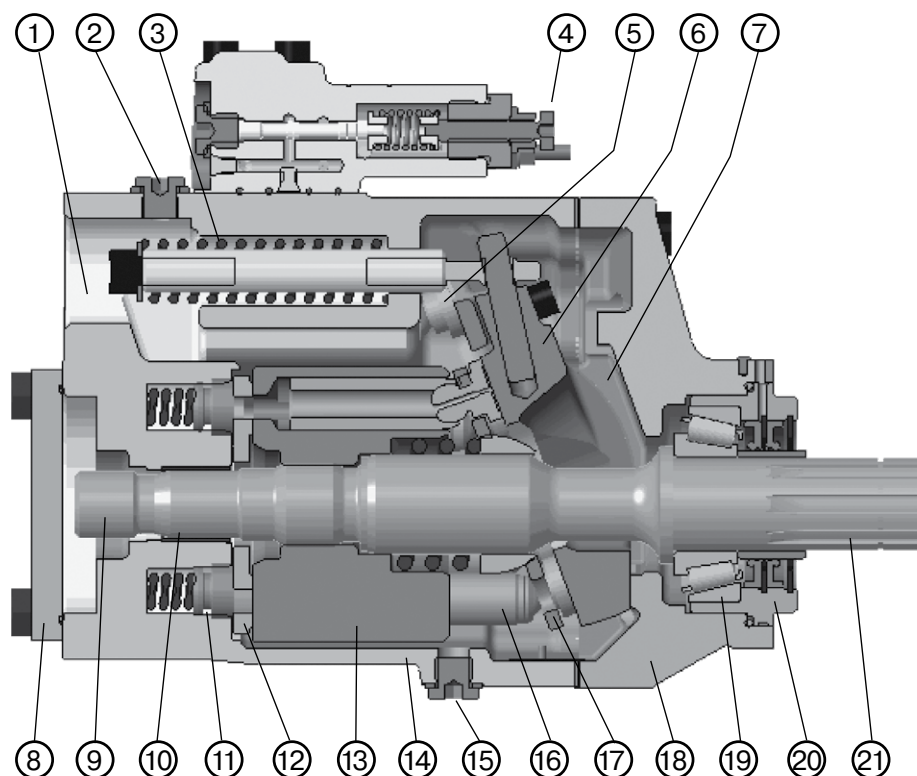
1) Max 6 seconds in any one minute.

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



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

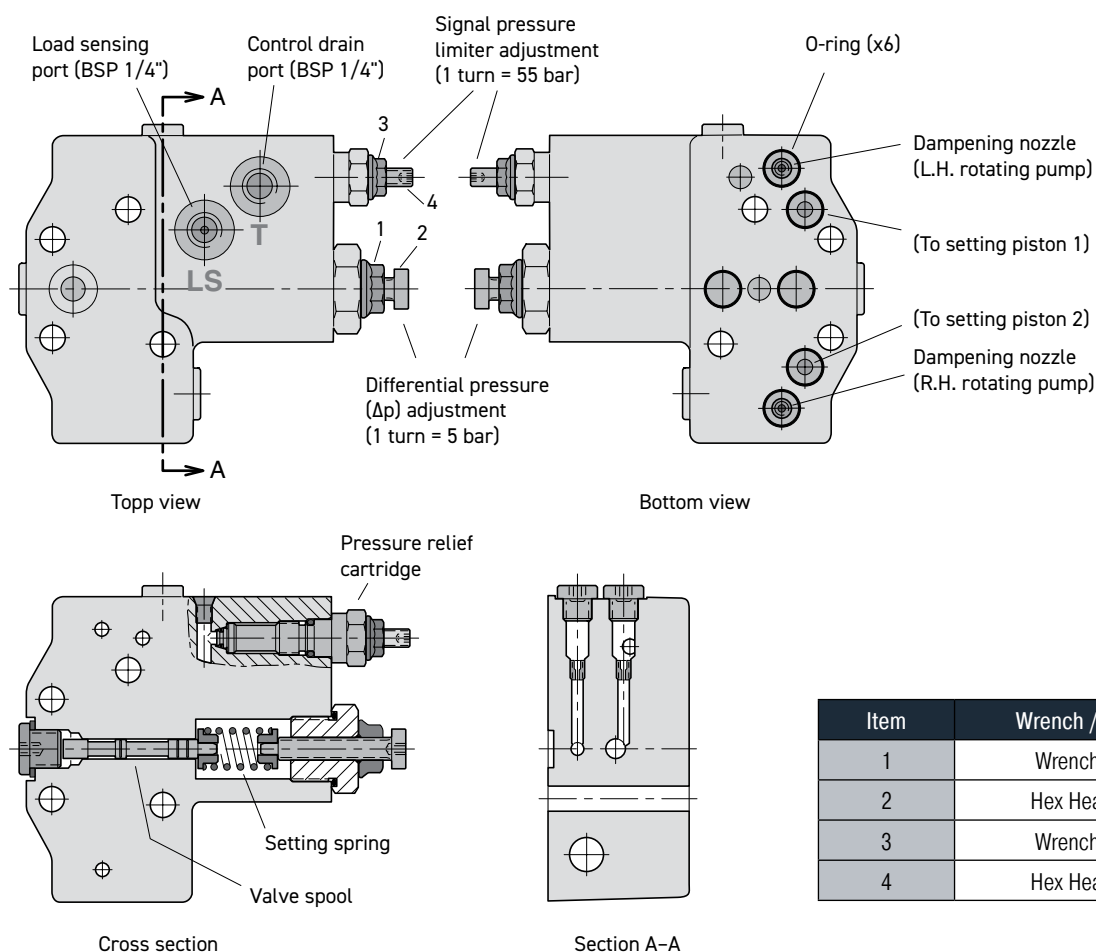


Fig. 2. LS valve block.

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.

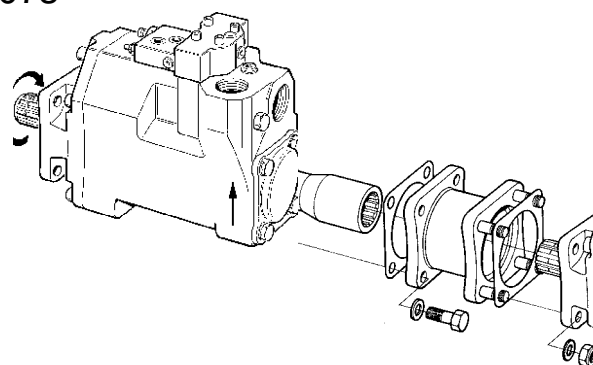


Fig. 3. Adaptor kit (P/N 379 7795) for tandem coupling.

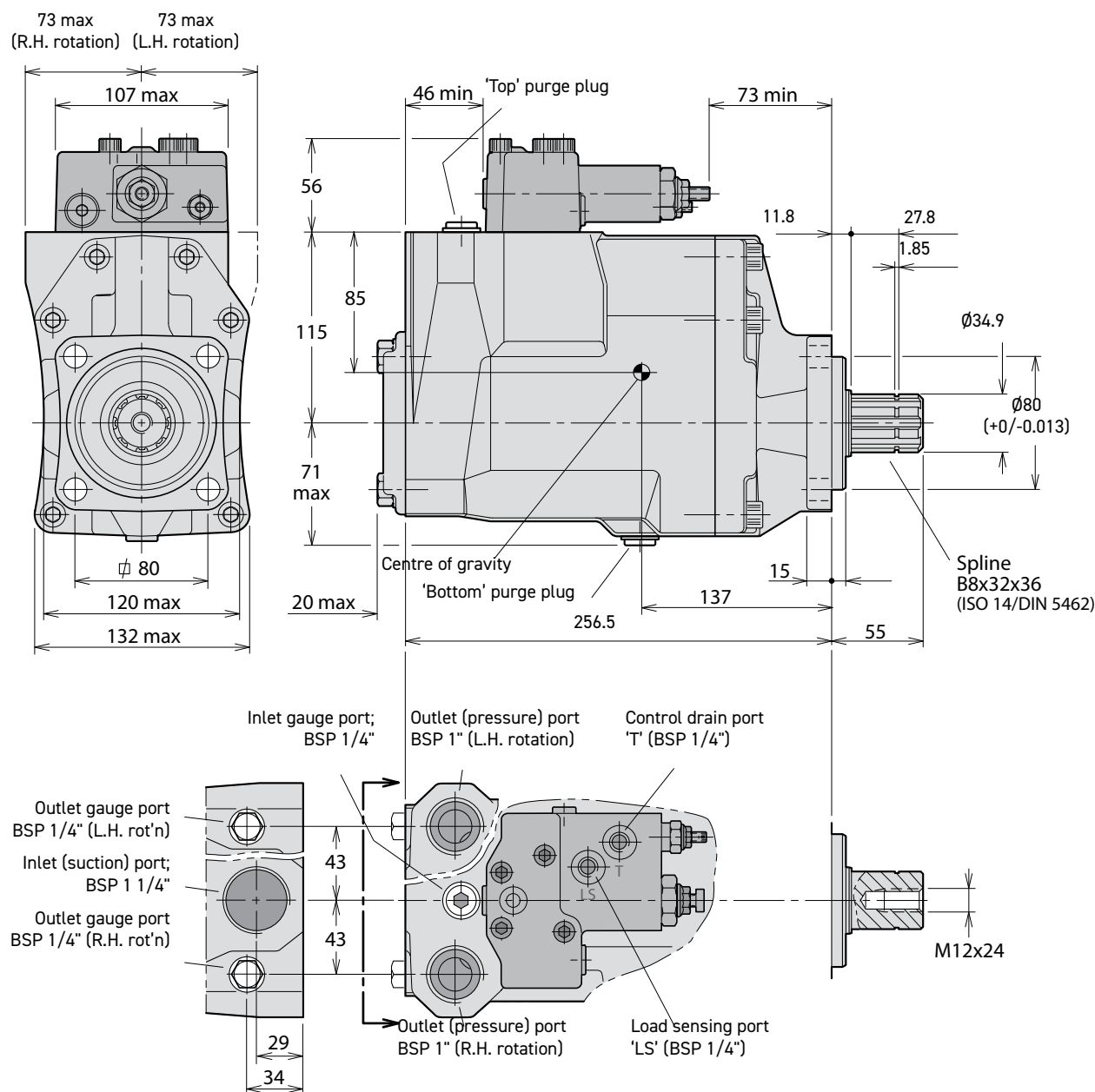
IMPORTANT

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.

INSTALLATION DIMENSIONS

VP1-045, -060 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.

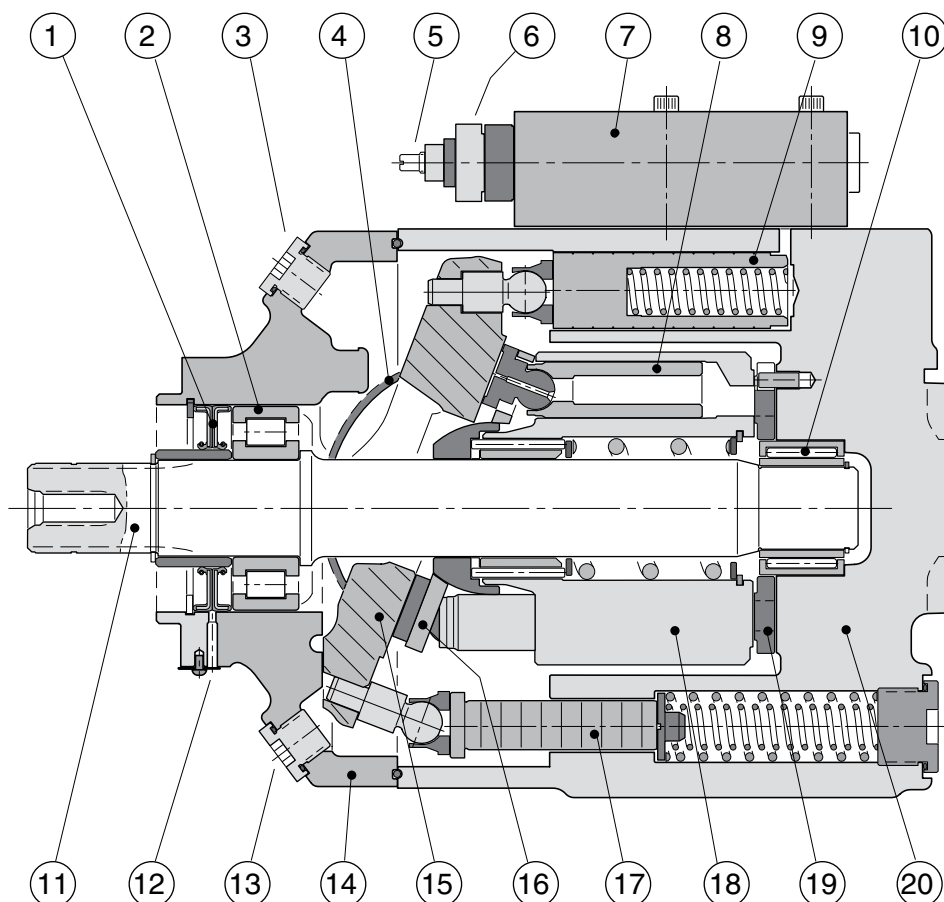
NOTE: The pump does not include a suction fitting; it must be ordered separately. See page 72ff.

TECHNICAL INFORMATION

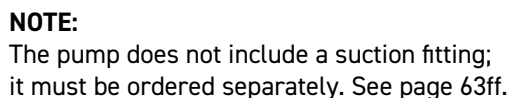
VP1-095/-110/-130

VP1-095/-110/-130 cross section

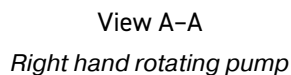
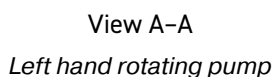
1. Shaft seal
2. Roller bearing
3. 'Upper' purge plug
4. Bearing shell
5. Setting screw (pressure relief valve)
6. Setting bushing (standby pressure)
7. Control
8. Piston with piston shoe
9. 'Upper' setting piston (control pressure)
10. Needle bearing
11. Shaft
12. Drain hole, shaft seals
13. 'Lower'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



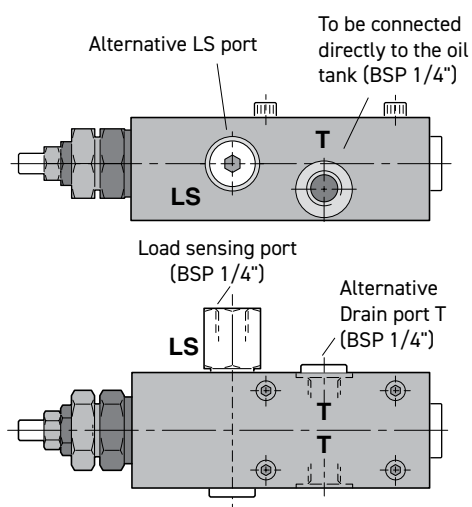
VP1-095/-110/-130



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.



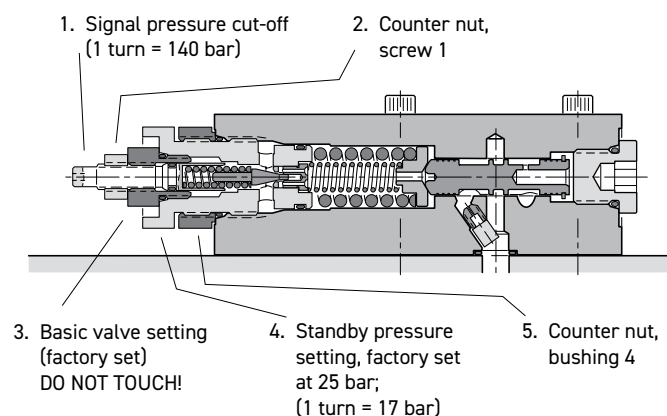
LS control (for VP1-095/-110/-130)



LS control ports.

NOTE:

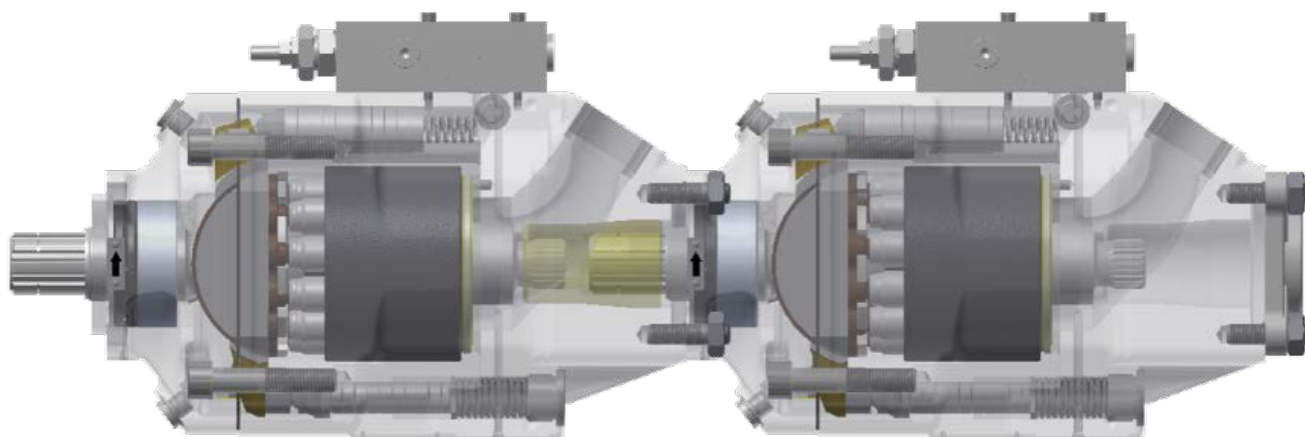
Always run a function, after adjusting the standby pressure or the max pressure setting, before you read the value.



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

TECHNICAL INFORMATION



95/110/130 With Through Drive

VP1 Axial Piston Pump: Elevate your mobile hydraulics! Unlock the full potential of your hydraulic systems with the VP1 axial piston pump. Designed specifically for open circuits in mobile hydraulics, this pump operates seamlessly according to the swash plate principle, ensuring optimal performance and efficiency.

New Feature! The VP1 is now available with an innovative thru-shaft option, allowing you to operate additional hydraulic pumps in series. This enhancement not only increases versatility but also maximizes your system's capabilities.

Upgrade to the VP1 axial piston pump today and experience the perfect blend of reliability and advanced engineering for your mobile hydraulic applications.

Features and benefits:

- Optimized power-to-weight ratio
- Slim design
- Thru-shaft compatibility
- High selfpriming speed

Intended applications:

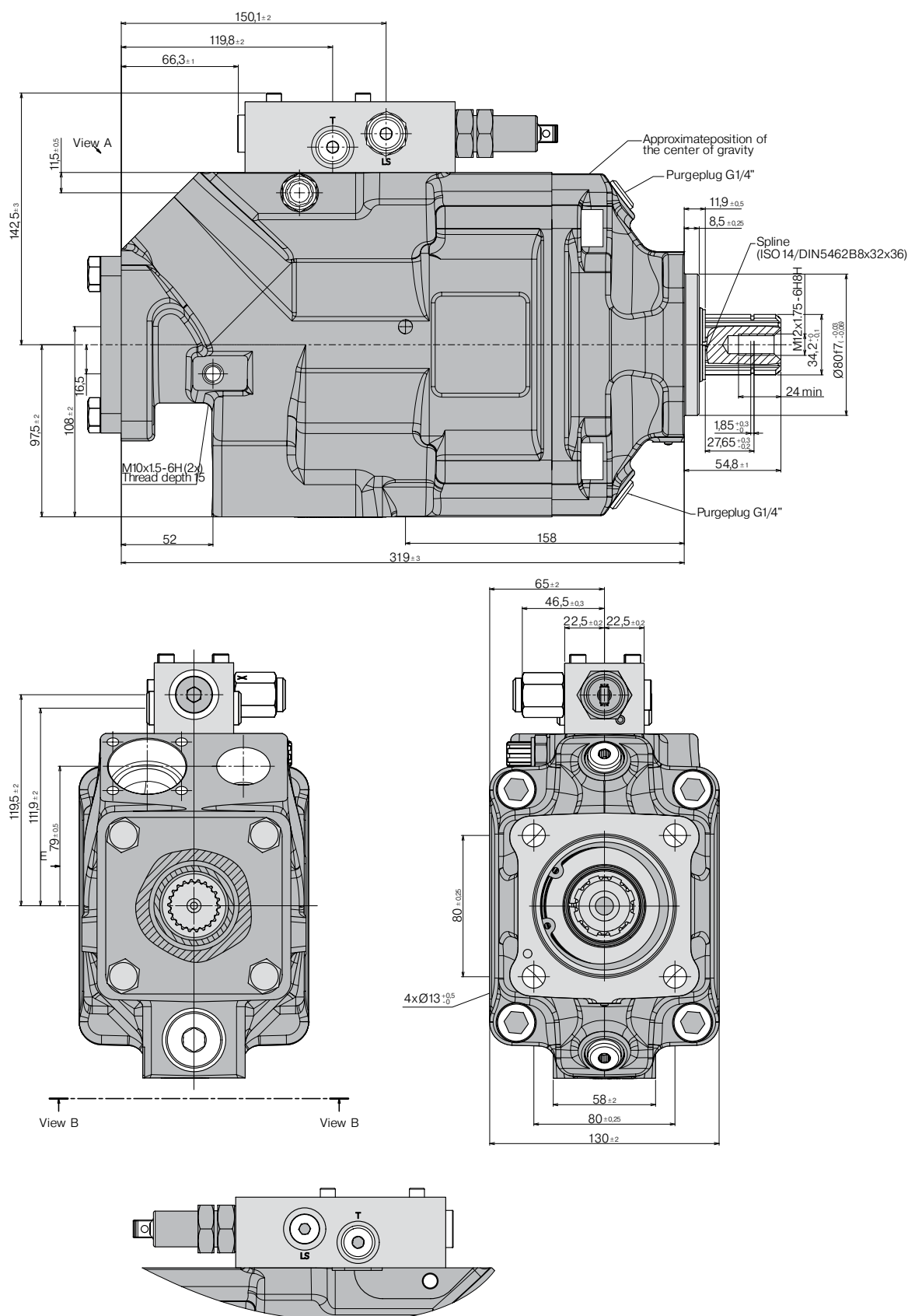
- Municipal trucks
- Loading cranes and elevating work platforms
- Tipper trucks and skip trucks
- Suction dredgers and sewer cleaning vehicles
- Refuse collection vehicles

Specifications

Frame size VP1-	095	110	130
Displacement [cm ³ /rev]	95	110	128
Max operating pressure [bar]			
continuous	400	400	400
intermittent	420	420	420
Mass moment of inertia J [kgm ²]	0.00696	0.00705	0.00705
Shaft speed [rpm]			
- short circuited pump (low press.)	3000	3000	3000
- max selfpriming speed	2300	2200	2100
Max input torque [Nm]	900	900	900
Max through drive torque [Nm]	720	720	720
Control type	LS		
Shaft end spline	DIN 5462		
Through drive spline	DIN 5462		
Mounting flange	ISO 7653-1985		
Weight (with control) [kg]	32		

INSTALLATION DIMENSIONS

95/110/130 With Through Drive



PRODUCT DESIGNATION

		Frame Size	Rotation	Ports		Interface	Housing		Paint		Special-number	Pressure cut-off	Pressure Standby		Regulator	
Ex		VP1	130	R	A	-	Z	0	-	T	-	000	-	350 / 25	-	LS

Frame Size	
Code	Dicplacement
45	45
60	60
75	75
95	95
110	110
130	130

Frame Size	
Code	Dicplacement
R	Right
L	Left

Frame Size		45	60	75	95	110	130
Code	Dicplacement						
G	BSP Therds	S	S	S	O	O	O
A	No Therds	-	-	-	S	S	S

Frame Size		45	60	75	95	110	130
Code	Interface						
Z	ISO flange & shaft. G1 thread in press. Port	S	S	S	O	O	O
C	SAE C flange & shaft. UNI thread in press. Port	-	-	-	S	S	S
B	*SAE B flange, SAE B-B shaft. UNI thread in press. Port	-	-	-	S	S	S

* 210 bar pressure cut-off limit

Frame Size		45	60	75	95	110	130
Code	Housing						
P	Through shaft	S	S	S	O	O	O
O	Singel pump	-	-	-	S	S	S

Frame Size	
Code	Paint
T	Standard Black
O	No Paint

Frame Size		45	60	75	95	110	130
Code	Regulator						
LS	Std. LS	S	S	S	S	S	S
E1	EPC1 *	O	O	O	O	O	O
E2	EPC2 **	O	O	O	O	O	O

* 24V, Normally Open, Deutsch contact
** 24V, Normally Closed, Deutsch contact

(S) = Standard (O) = Option (-) = Not Available

* Customer specific demands, please contact Parker Hannifin

SYSTEM INFORMATION

Standard model numbers

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

* LS = Hydraulic Load Sensing

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.

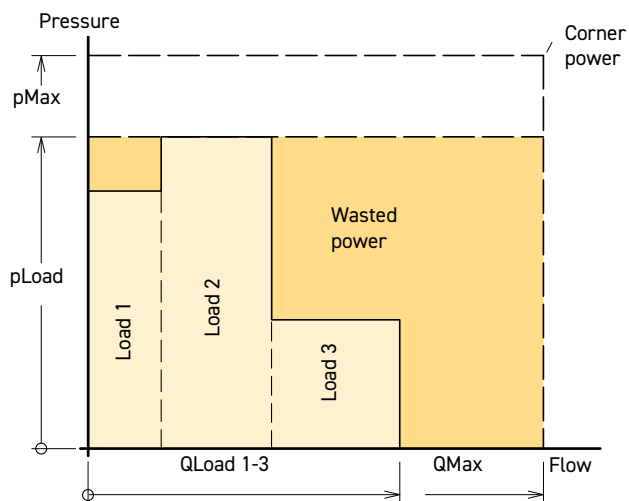


Diagram 1. Constant flow system with a fixed displacement pump.

VP1- Through Shaft

Designation VP1- Through Shaft	Ordering no. Black Paint
VP1-095-R-LS	3723519
VP1-095-L-LS	3723520
VP1-110-R-LS	3723521
VP1-110-L-LS	3723522
VP1-130-R-LS	3724134
VP1-130-L-LS	3724135

* LS = Hydraulic Load Sensing

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.

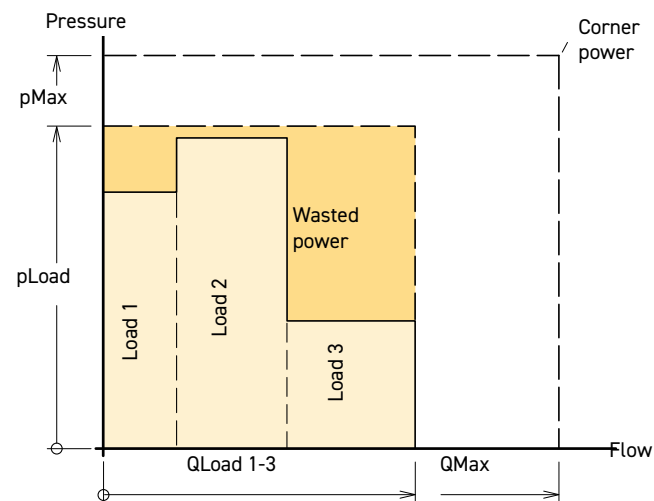


Diagram 2. Constant flow system with a variable displacement pump (e.g. VP1).

Systems comparison

System	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.

Refer to corresponding hydraulic schematic below.

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.

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.

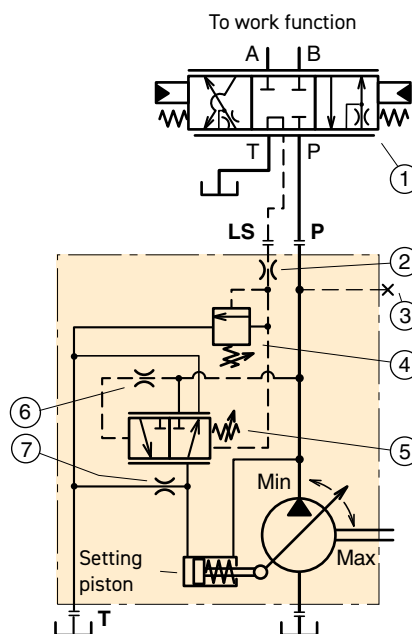
- ## Catalogue MSG30-8200/UK - Truck Hydraulics

Pressure limiter

LS load sensing valve

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 VP1-095/-110/-130



- Hydraulic Pump & Motor Europe

Specifications

Frame size VP1 with e-reg. -	045	060	075	095	110	130
Displacement [cm ³ /rev]	45	60	75	95	110	128
Max operating pressure [bar]	350					
Max Speed unloaded [rpm]	3000					
Control type	EPC					
Shaft end spline	DIN 5462					
Mounting flange	ISO 7653-1985					
Weight (with control) [kg]	27					

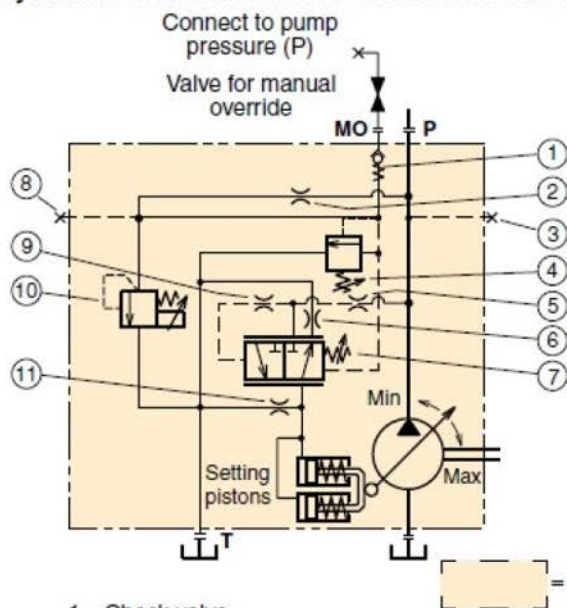
Electric Proportional Control

The VP1 with e-regulator provides the hydraulic system with the correct amount of fluid at precisely the right moment, effectively reducing energy consumption and heat generation. This means a smoother and fuel saving hydraulic system with reduced CO₂ emissions.

The VP1 with e-regulator is designed for electrical pressure control regulator. It is sturdy, yet simple, with few moving parts. The result is a reliable pump with long service life. 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.

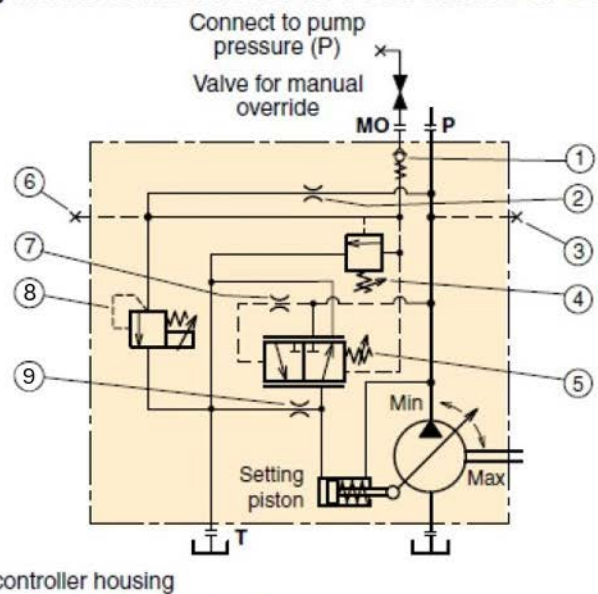
For additional information, contact Parker Hannifin.

Hydraulic schematic for VP1-045/-060/-075 EPC1



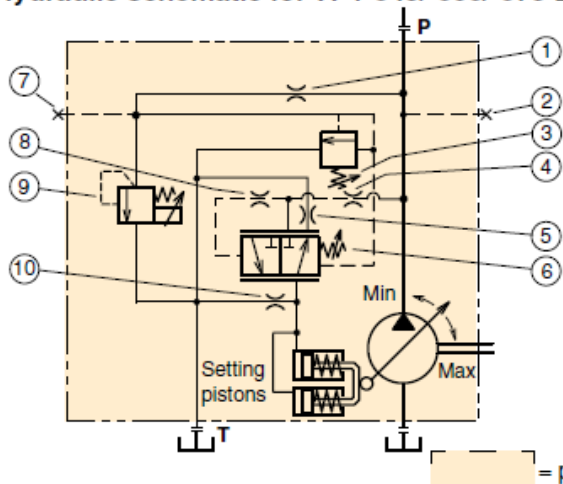
1. Check valve
2. Electric pilot valve orifice
3. Gauge port - pump pressure
4. Signal pressure limiter adjustment
5. System pressure dampening nozzle (2.0 mm)
6. Return line nozzle (0.6 mm)
7. Standby (Δp) pressure adjustment
8. Gauge port - pilot valve
9. System pressure dampening orifice (fixed)
10. Electric pilot valve
11. Bleed-off nozzle (0.6 mm).

Hydraulic schematic for VP1-095/110/130 EPC1



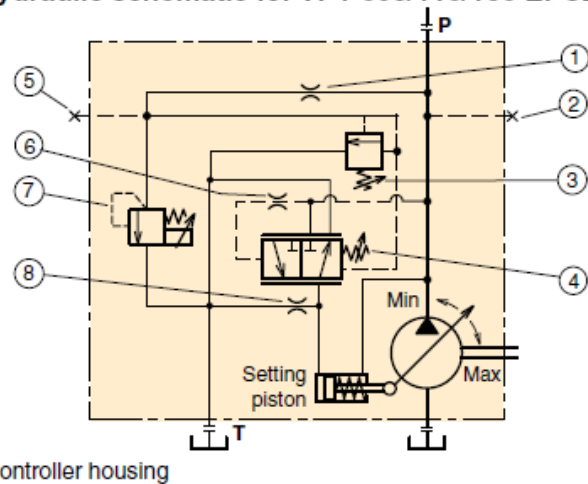
1. Check valve
2. Electric pilot valve orifice
3. Gauge port - pump pressure
4. Signal pressure limiter adjustment
5. Standby (Δp) pressure adjustment
6. Gauge port - LS-pressure
7. System pressure dampening orifice (fixed)
8. Electric pilot valve
9. Bleed-off nozzle (1.2 mm).

Hydraulic schematic for VP1-045/-060/-075 EPC2



1. Electric pilot valve orifice
2. Gauge port - pump pressure
3. Signal pressure limiter adjustment
4. System pressure dampening nozzle (2.0 mm)
5. Return line nozzle (0.6 mm)
6. Standby (Δp) pressure adjustment
7. Gauge port - LS-pressure
8. System pressure dampening orifice (fixed)
9. Electric pilot valve - negative characteristic
10. Bleed-off nozzle (0.6 mm).

Hydraulic schematic for VP1-095/110/130 EPC2



1. Electric pilot valve orifice
2. Gauge port - pump pressure
3. Signal pressure limiter adjustment
4. Standby (Δp) pressure adjustment
5. Gauge port - LS-pressure
6. System pressure dampening orifice (fixed)
7. Electric pilot valve
8. Bleed-off nozzle (1.2 mm).

INSTALLATION DIMENSIONS

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 15 ff.

Suctions fittings for VP1-045/075 see page 59.

'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")

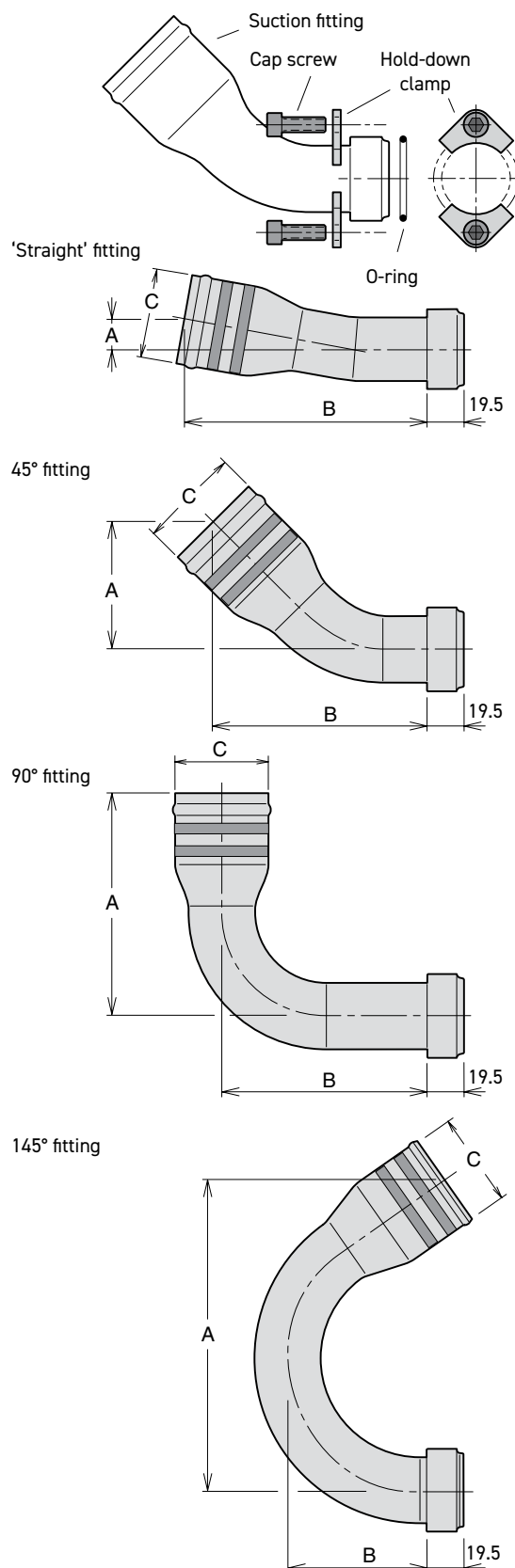
- 1) Recommended for frame size F1-25.
- 2) Recommended for frame size F1-41,-51,-61,-81, -101.
- 3) (3 clamps and 3 screws)

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 145° 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 15 ff.

45° suction fittings

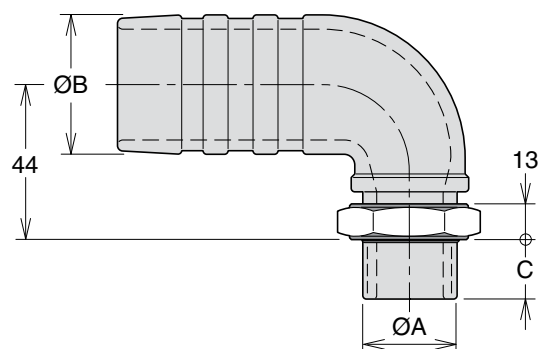
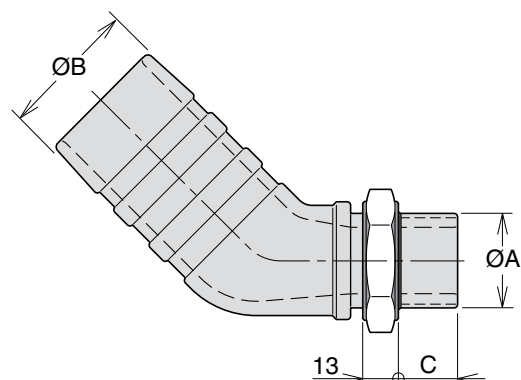
Ordering no.	ØA	ØB inch	C mm
00509035016	BSP 1" ¹⁾	2"	18
00509035116	BSP 1 ¼"	2"	18
00509021916	BSP 1 ¼"	2 ½"	18

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 ¼"	2"	18

¹⁾ Not for VP1-045/-060/-075

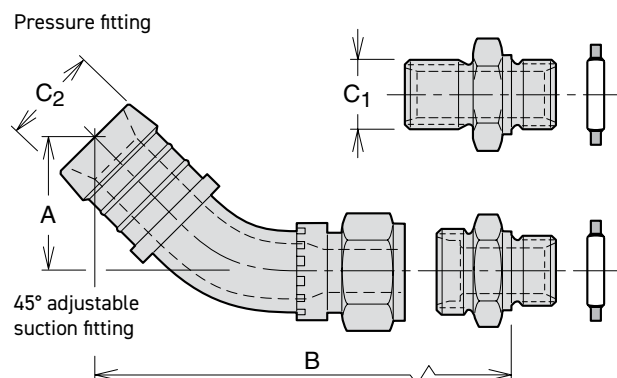


Fitting kits for VP1-045/-060/-075 pumps

Kits with 45° suction fitting

Ordering no.	C ₁	ØC ₂ inch	A mm	B mm
379 9563	BSP ¾"	2"	71	154
379 9562	BSP 1" *	2 ¾"	64	147

* Above 100 l/min



CONTENTS

Auxiliary Valves

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

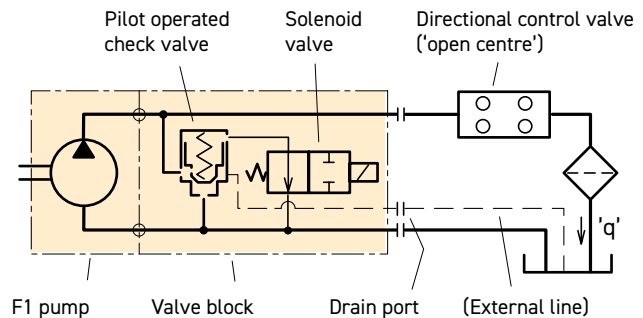
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TECHNICAL INFORMATION

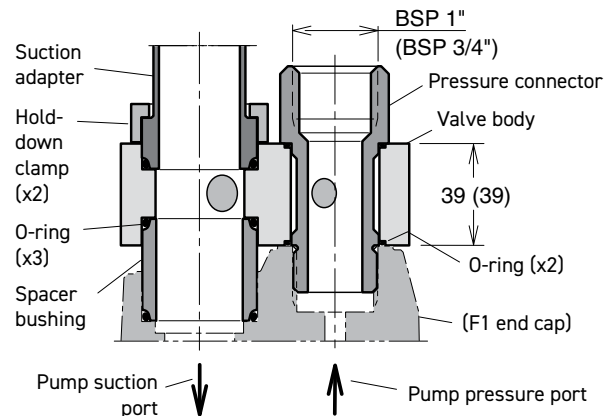
Auxiliary Valves

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 components; 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.



Bypass valve schematic.



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.

ORDERING INFORMATION AND DRAWINGS

BPV-F1 and BPV-T1 Bypass valve

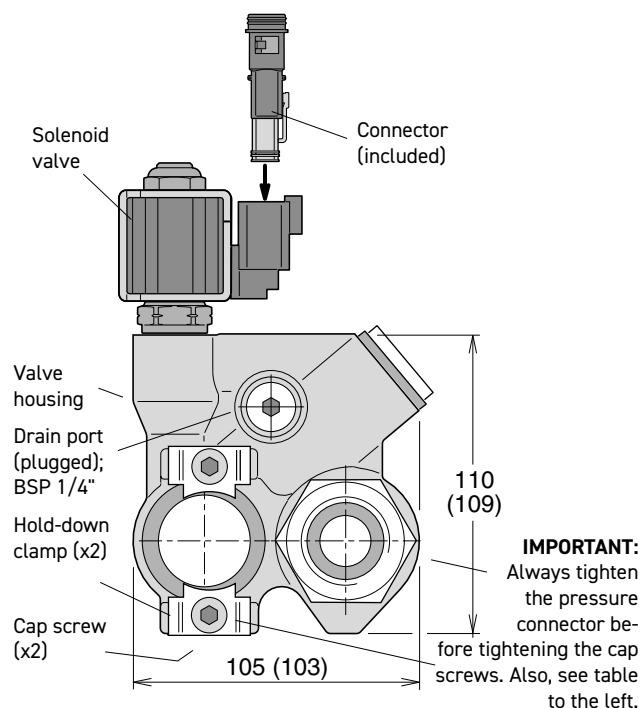
Without manual override

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	378 7201	F1-25 ²⁾ , -41, -51, -61 and T1-81	50 Nm
	12 VDC	378 7202		
	24 VDC	378 7203	F1-81, -101 and T1-121	100 Nm
	12 VDC	378 7204		
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

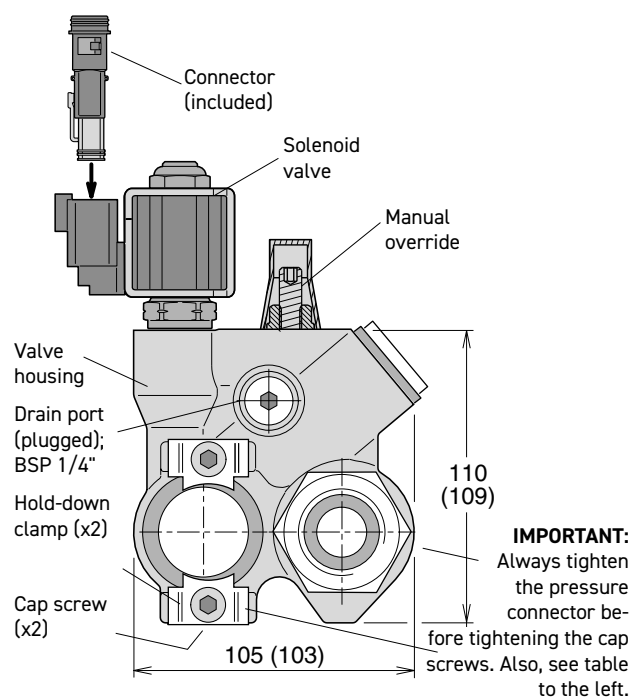
With manual override

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 04179	F1-25 ²⁾ , -41, -51, -61 and T1-81	50 Nm
	24 VDC	37804180	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.



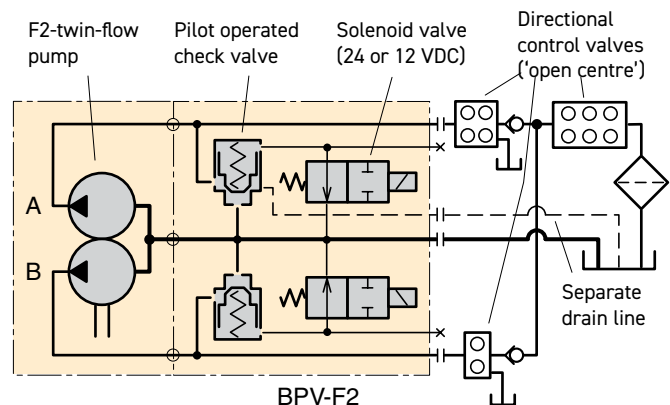
NOTE: Dimensions are shown for BPV-F1-81 (those for BPV-F1-25 are in parenthesis)

BPV-F1 installation and cross section with manual override

TECHNICAL INFORMATION

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.

ORDERING INFORMATION AND DRAWINGS

BPV-F2 Bypass valve

Without manual override

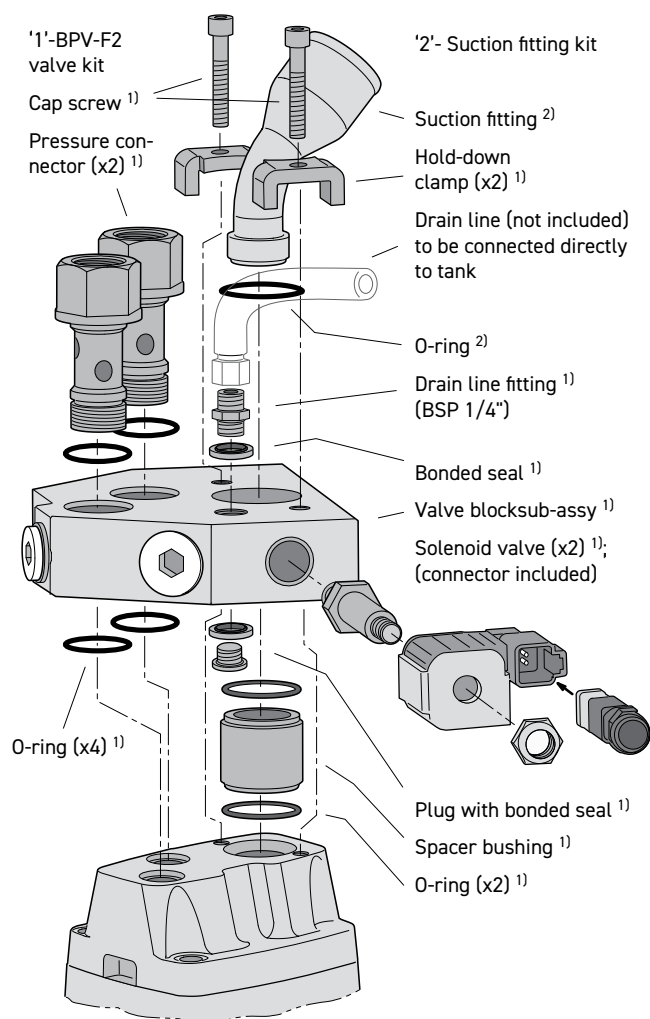
Bypass valve, type	BPV-F2
Max pressure, continuous	350 bar
intermittent	400 bar
Solenoid voltage (option)	24 VDC, (12 VDC)
Power requirement	14 W (each solenoid)
Operating mode	Activated solenoid: Check valve closed

Bypass valve ¹⁾	Voltage	Ordering number	For F2 size	Torque ³⁾
BPV-F2,	24 VDC 12 VDC	378 7424 378 7425	All Sizes	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 72).

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 72ff).

BPV-F2 Bypass valve

With manual override

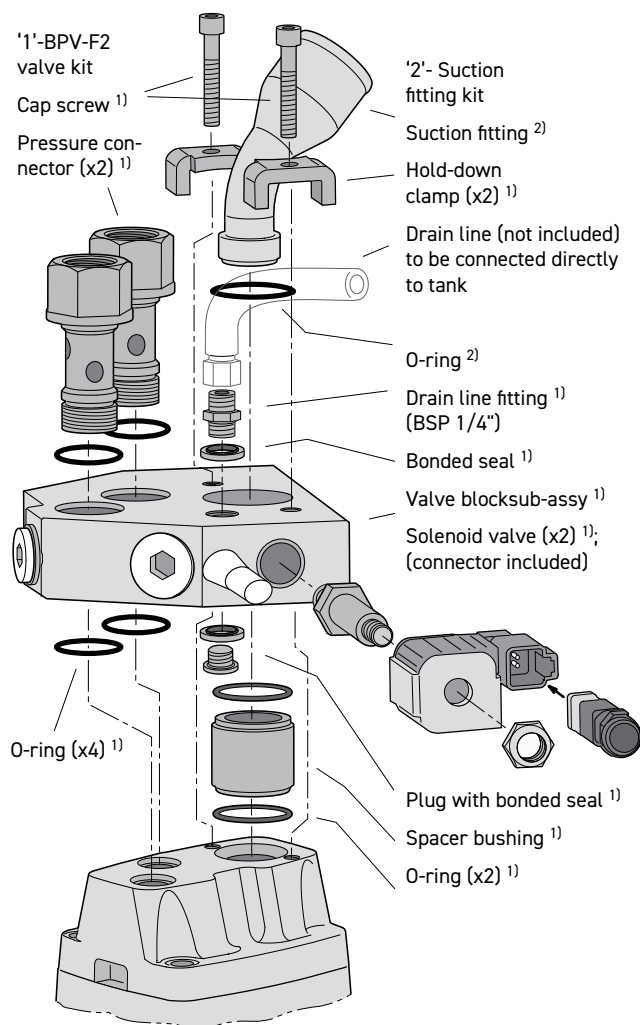
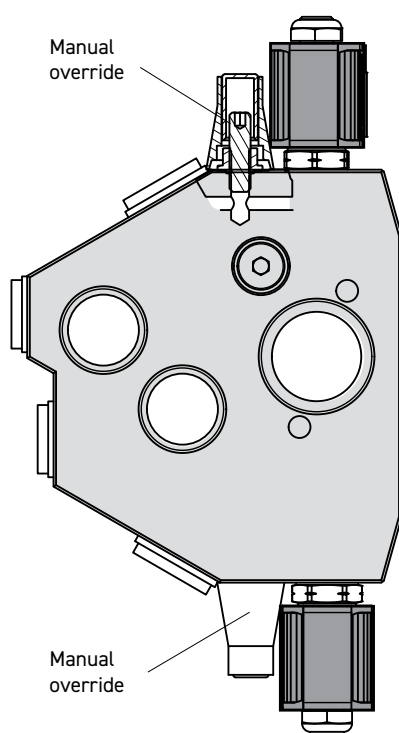
Bypass valve, type	BPV-F2
Max pressure, continuous	350 bar
intermittent	400 bar
Solenoid voltage (option)	24 VDC
Power requirement	14 W (each solenoid)
Operating mode	Activated solenoid: Check valve closed

Bypass valve ¹⁾	Voltage	Ordering number	For F2 size	Torque ³⁾
BPV-F2,	24 VDC	378 4377	All Sizes	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 72).

3) Torque pressure connector to:



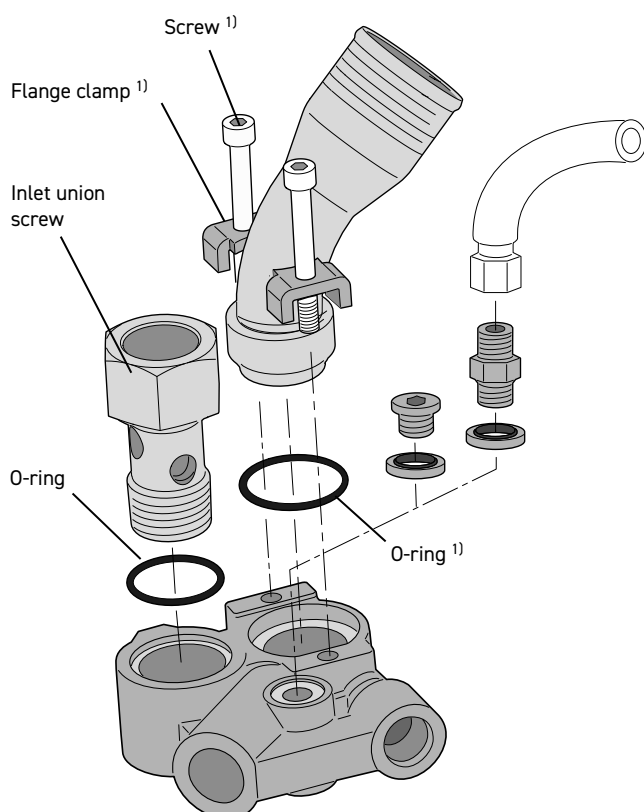
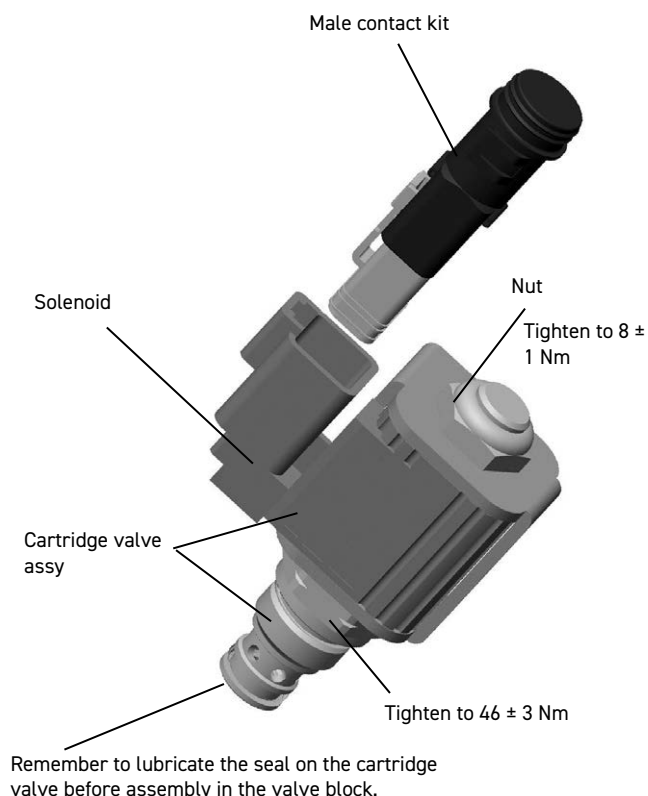
Bypass valve split view with manual override (with F2 end cap).

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 59 ff).

TECHNICAL INFORMATION

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	



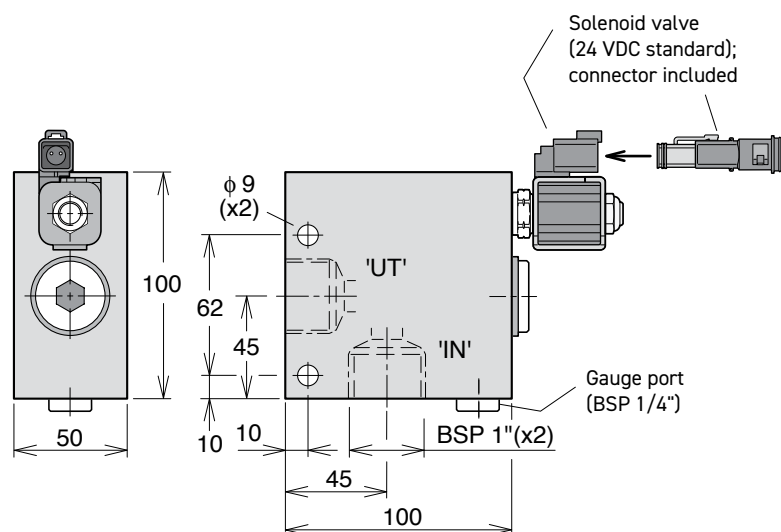
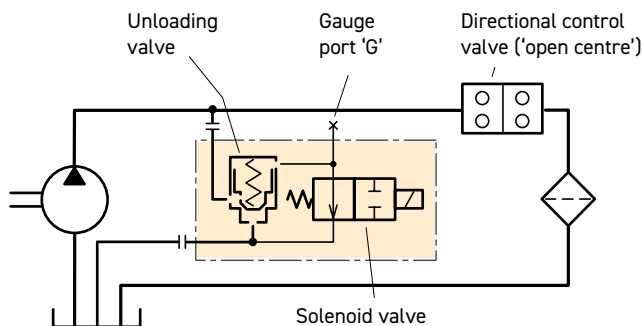
Part No	Description	Remarks
3781480	Inlet union screw	F2 (all sizes)
3781082	Inlet union screw	F1-25, -41, -51, -61 and T1-81
3781094	Inlet union screw	F1-81, -101, T1-121, and F3-81, -101
3780641	O-ring kit	For F1, T1, F2, F3 and F4 (all sizes)
3782439	Hold-down clamp Suction fitting ¹⁾	For BPV F1,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



VP1 installation on an engine PTO

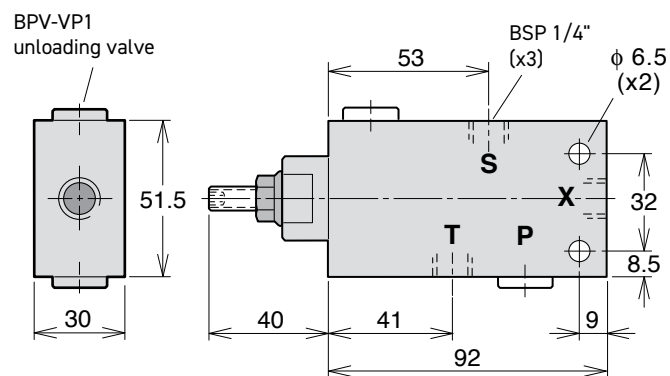
BPV-VP1 unloading valve

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.

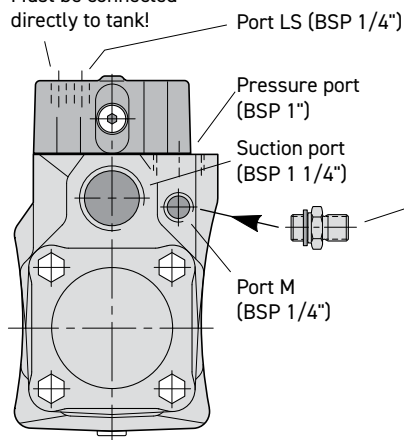


BPV-VP1 unloading valve.

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

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

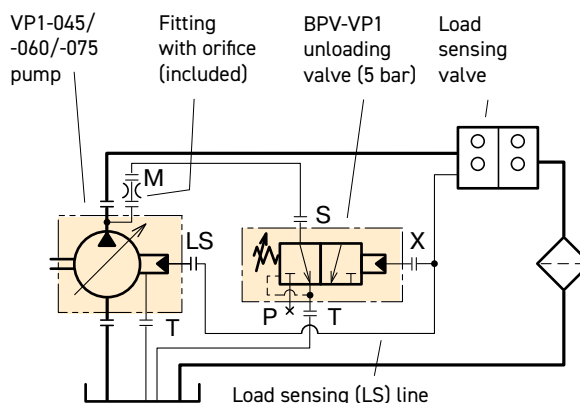
Port T (BSP 1/4")
Must be connected
directly to tank!



NOTE:

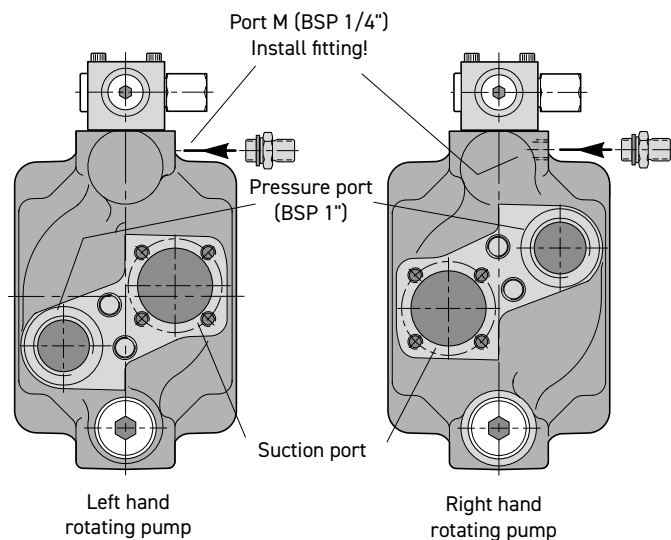
- Install the fitting (included) in port M and connect it, in turn, to port S of the unloading valve (see schematic).
- An orifice is included in the fitting. Connection on the fitting is 1/4" BSP threads. Size of orifice in the fitting is $\varnothing$ 1.5 mm.

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



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

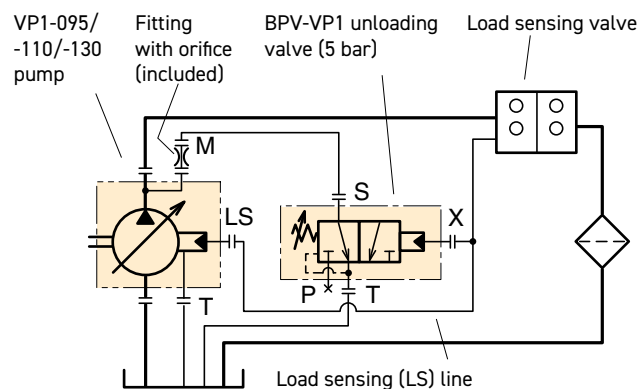
BPV-VP1 with VP1-095/-110/-130 pumps



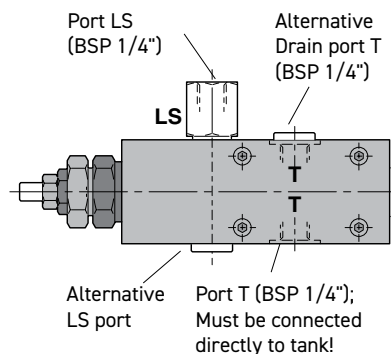
VP1-095/-110/-130 main ports (with fitting installation).

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 $\varnothing$ 1.5 mm.



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



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