

Auxiliary Valves

**Bypass Valves for
F1, F2, T1 and VP1
pumps**

Contents

Bypass valve:

- BPV-F1 -25 and -81
- BPV-F2
- BPV-F1/-T1
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- BPV-VP1

Unloading valve:

- ES line mounted unloading valve

Accessories

- MB-F2-H1 torque limiting valve

BPV-F1-25 and -81 bypass valve

- The bypass valve is mainly utilized 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 engaged 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 utilized 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*.

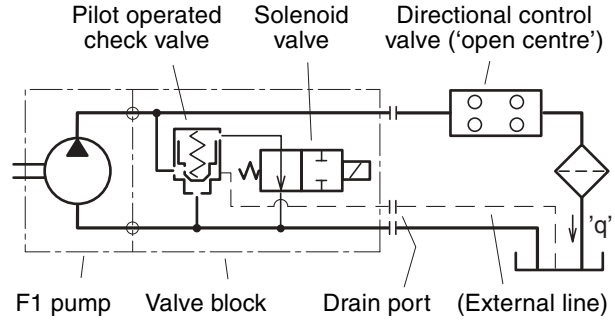
IMPORTANT INFORMATION

- In order to prevent heat build-up in the pump during transportation, it is important that at least 5 l/min comes out of the filter at 'q' (refer to the schematic). This applies to an 'open center' system when the valve is in the bypass mode (non-activated solenoid).
- *Please note:*
 - a) If the flow at 'q' is less than 5 l/min (caused e.g. by a high pressure drop in the main system) when the valve is in the bypass mode, or
 - b) if the hydraulic system is of the 'closed center' type, then
an external drain line **must be installed** from the bypass valve drain port directly to tank as shown in the schematic; a drain kit is available (see below).

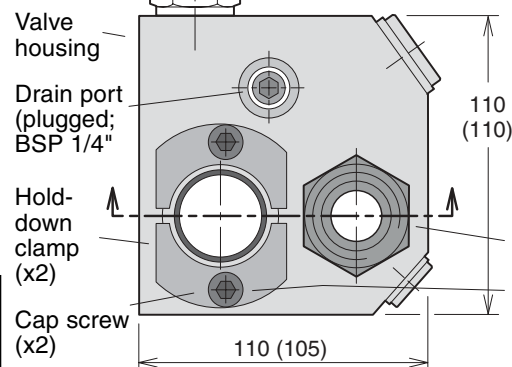
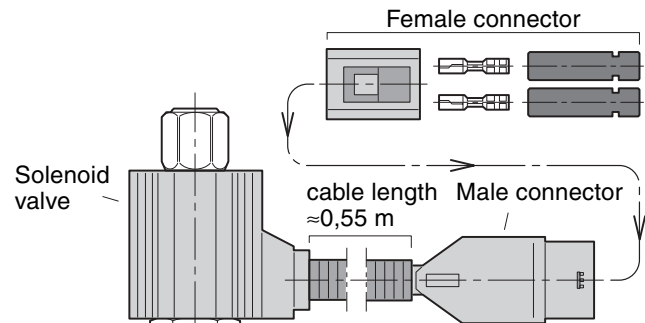
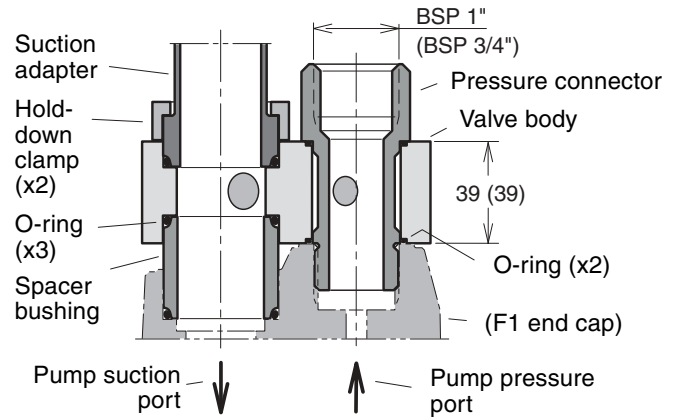
Bypass valve, type **BPV-F1-25/-81**

Max pressure, continuous [bar]	350
intermittent [bar]	400
Solenoid voltage [VDC]	24
Power requirement [W]	17
Operating mode	Activated solenoid: Check valve closed

Bypass valve kits	Ordering number	For F1 size	Torque press. connector to:
BPV-F1-25, 24 VDC	378 1401	-25/-41/	50 Nm
12 VDC	378 1318	-51/-61	
BPV-F1-81, 24 VDC	378 1402	-81/-101	100 Nm
12 VDC	378 1319		
O-ring kit	378 0641	Contains all five O-rings (as illustrated to the right); included in all valve kits	
Drain fitting kit	378 1640	Contains a drain line fitting and a bonded seal.	



Bypass valve schematic.



IMPORTANT: Always tighten the pressure connector before tightening the cap screws. Also see table to the left.

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

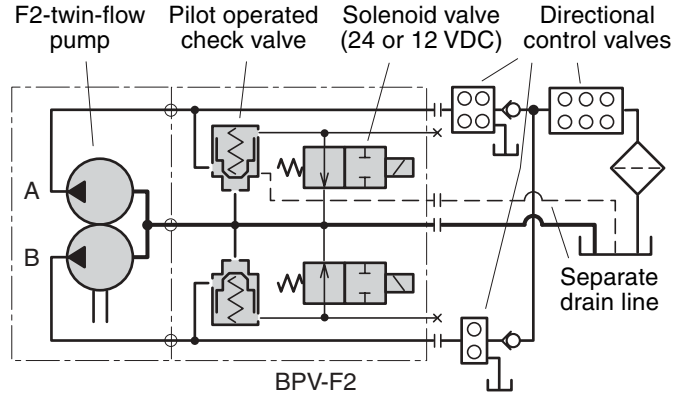
Bypass valve installation and cross section.

BPV-F2 bypass valve

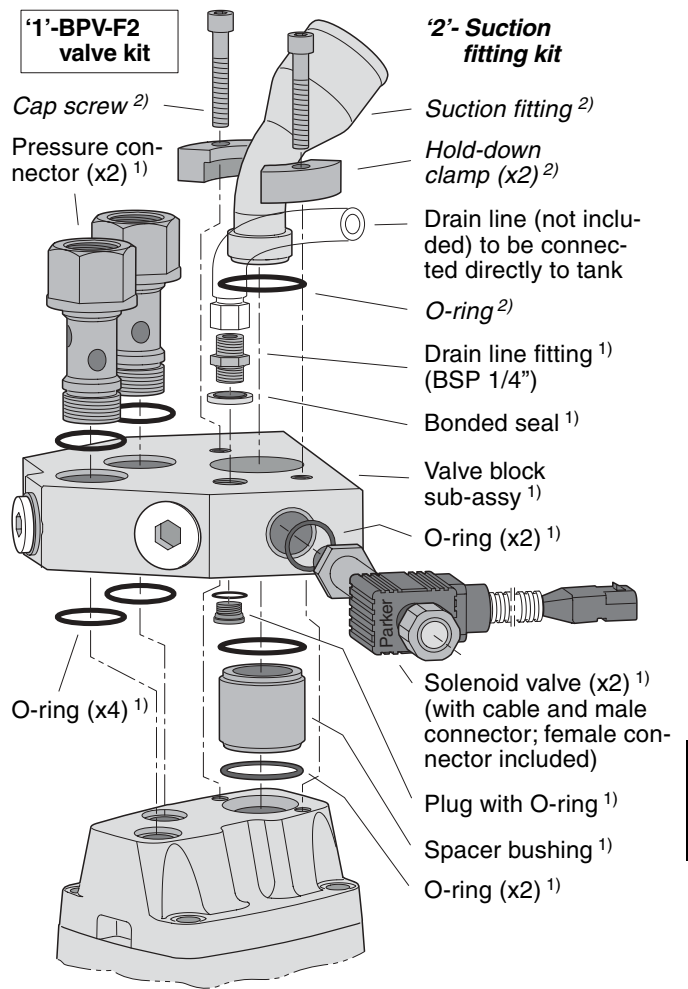
- An F2 twin pump fitted with a bypass valve can be utilized in applications where the pump is operating constantly i.e. when the pump is driven from the crankshaft through a propshaft, or when it is installed on a PTO. In addition, it can be used when, temporarily, one of the two circuits is not required; the power loss is thus reduced as the non-required flow is not forced through lines and 'open center' valves.
- In most cases, the bypass valve allows the pump to be driven at max engine rpm during transportation at a minimum load. This prevents pump cavitation and high heat generation which may otherwise be encountered at large flows.
- 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).

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.



Bypass valve circuit schematic (example).



Bypass valve split view (with F2 end cap).

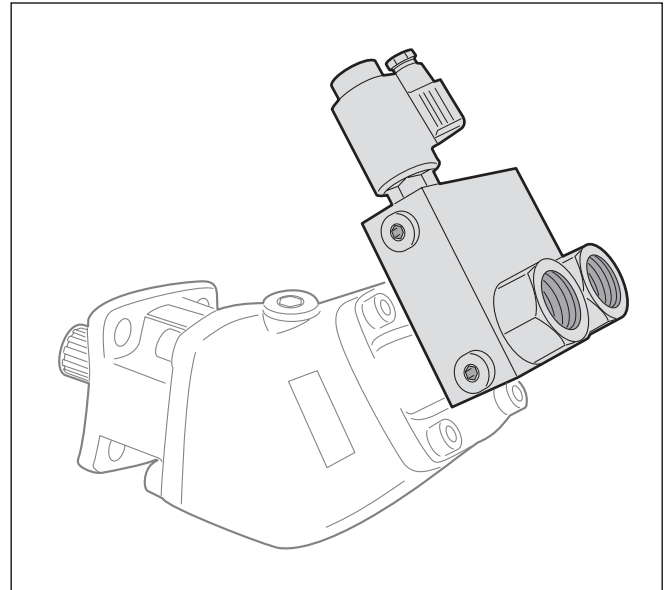
NOTE: A suction fitting kit (parts designated '2' in the split view) is **not** included with the F2 pump; it must be ordered separately (refer to chapter 9).

Bypass valve, type	BPV-F2	
Max operating pressure [bar]	350	
Solenoid voltage [VDC] standard (optional)	24 (12)	
Power requirement [W]	17 (each solenoid)	
Operating mode	Activated solenoid: Check valve closed	
Bypass valve kits	Ordering number	Torque press. connector to:
BPV-F2, 24 VDC	378 1459	50 Nm
12 VDC	378 1567	
O-ring kit	378 0641	Contains all five O-rings (as illustrated to the right); included in all valve kits

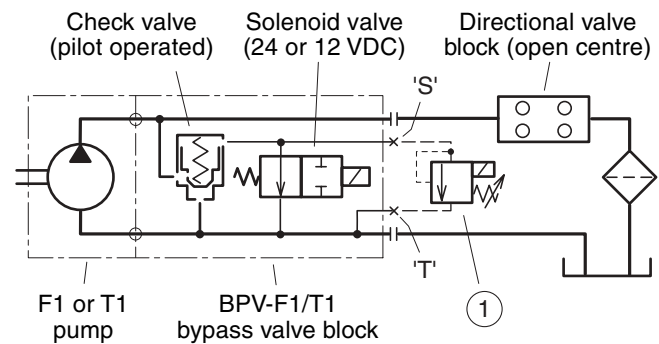
1)The BPV-F2 valve kit contains parts designated '1' in the split view to the right.
 2) Contains all O-rings shown in the split view .

BPV-F1/-T1 bypass valve

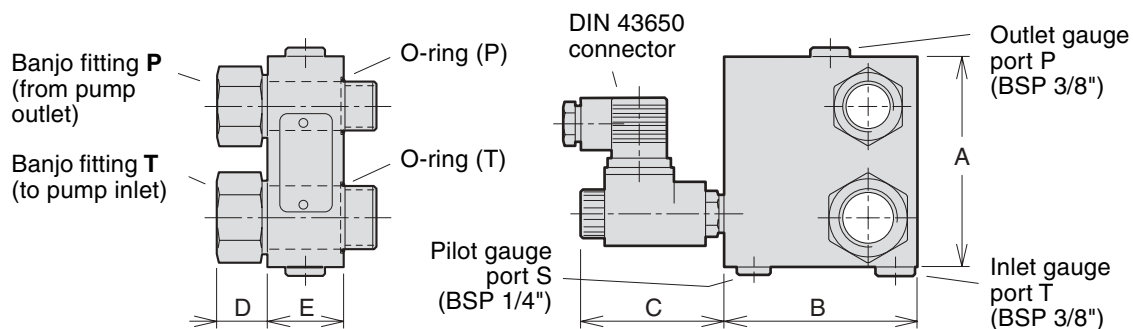
- An F1 or T1 pump supplied with a bypass valve can be utilized in applications where the pump is operating constantly i.e. when the pump is driven from the crankshaft through a propshaft or belt, or when it is installed on a PTO.
- In most cases, the bypass valve allows the pump to be driven at max engine rpm during transportation at no load. This prevents pump cavitation and high heat generation which may otherwise be encountered at large flows.
- The BPV valve connects the outlet and inlet ports of the pump, and only a small oil flow goes through the system to tank.
- The valve is installed directly on top of the pump port surface with 'banjo' fittings.
- As the BPV valve is symmetrical it can be 'turned 180°' to suit either left hand or right hand pump rotation, or to prevent interference with chassis components.
- The valve can only be engaged or disengaged (through the 12 or 24 VDC solenoid) at no-load system pressure.



Bypass valve, type	BPV-F1/-T1
Max operating pressure [bar]	350
Solenoid voltage [VDC] standard (optional)	24 (12)
Power requirement [W]	17
Operating mode	Activated solenoid: Check valve closed



1. To limit system pressure, a 1/4" relief valve (not included) can be installed between pilot gauge port S and inlet gauge port T.



Bypass valve designation	Ordering number		Dimensions [mm]					BSP thread		Torque [Nm]	
	24 VDC	12 VDC	A	B	C	D	E	T	P	T	P
BPV-F1-20/30	379 2123	—	105	100	74	26	40	3/4"	1/2"	50	50
BPV-F1-40/60	370 8086	379 7508	115	100	74	26	40	1"	3/4"	50	50
BPV-F1-80	379 1962	379 7509	130	100	74	26	40	1 1/4"	1"	100	100
BPV-F1-110	370 8088	379 8775	140	100	74	26	40	1 1/4"	1"	100	100
BPV-T1-50	379 4472	—	115	100	74	26	40	1"	3/4"	50	50
O-ring kit	379 9883	Contains banjo fitting O-rings for the above valves.									

BPV-T1-51/81 and -121 bypass valve

- The bypass valve is mainly utilized in applications where the T1 pump is driven from the crankshaft through a cardan shaft, or when it is installed on an engine PTO.
- The BPV bypass valve should be engaged 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 utilized for either left 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*.

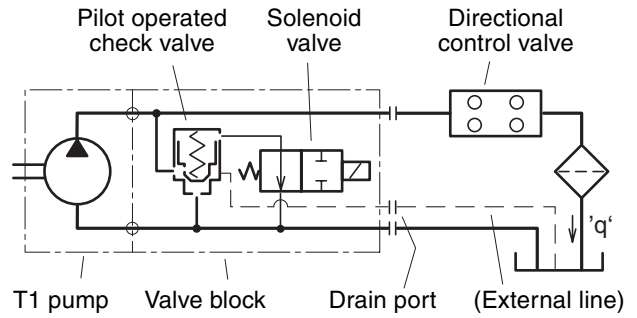
IMPORTANT INFORMATION

- In order to prevent heat build-up in the pump during transportation, it is important that at least 5 l/min comes out of the filter at 'q' (refer to the schematic). This applies to an 'open center' system when the valve is in the bypass mode (non-activated solenoid).
- *Please note:*
 - a) If the flow at 'q' is less than 5 l/min (caused e.g. by a high pressure drop in the main system) when the valve is in the bypass mode, or
 - b) if the hydraulic system is of the 'closed center' type (with a shunt), then
 an external line **must be installed** from the bypass valve drain port directly to tank as shown in the schematic; a drain fitting kit is available (below).

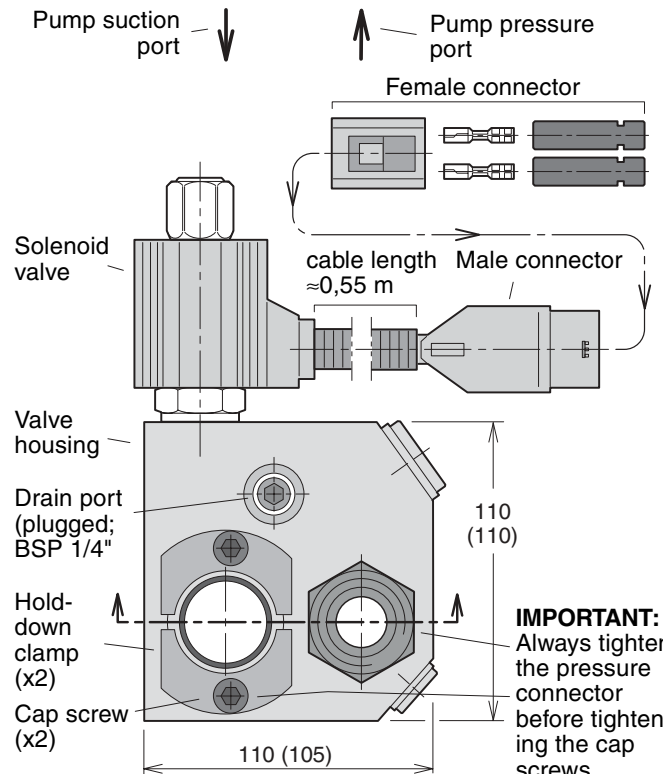
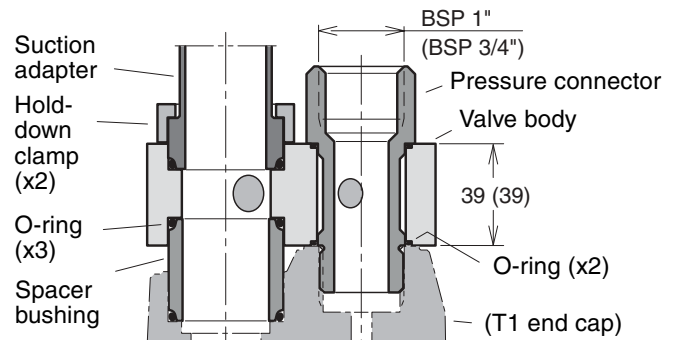
Bypass valve, type **BPV-T1-51/81 and -121**

Max pressure, continuous [bar]	200
intermittent [bar]	350
Solenoid voltage [VDC]	24 or 12
Power requirement [W]	17
Operating mode	Activated solenoid: Check valve closed

Bypass valve kits	Ordering number	Torque pressure connector to:	
BPV-T-51/81, 24VDC	378 1401	50 Nm	Also see fig. to the right
12VDC	378 1318	" "	
BPV-T1-121, 24VDC	378 1402	100 Nm	"
12VDC	378 1319	" "	
O-ring kit	378 0641	Contains all five O-rings (as illustrated to the right); included in all valve kits	
Drain fitting kit	378 1640	Contains a drain line fitting and a bonded seal.	



Bypass valve schematic.



IMPORTANT: Always tighten the pressure connector before tightening the cap screws. Also see table to the left.

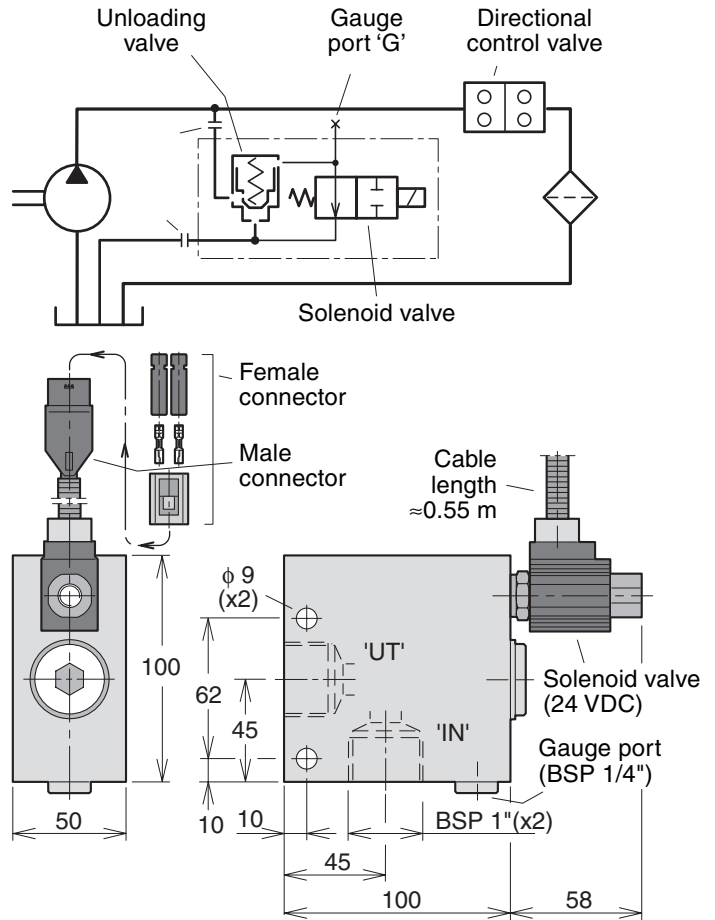
NOTE: Dimensions are shown for BPV-T1-121 (those for BPV-T1-81 are in paranthesis)

Bypass valve installation and cross section.

BPV-L line mounted bypass valve

- The unloading valve is utilized 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]	17
Operating mode	Activated solenoid: Check valve closed
Ordering number	378 1487

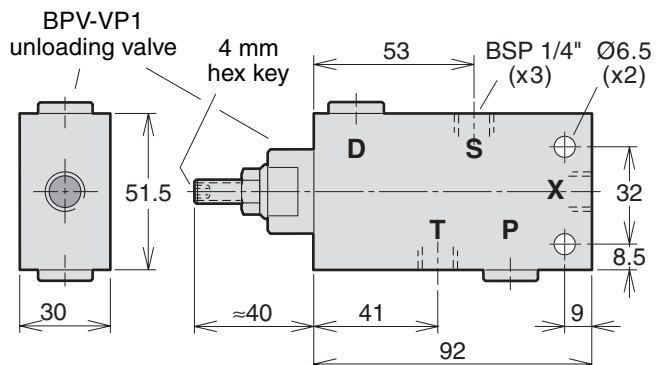
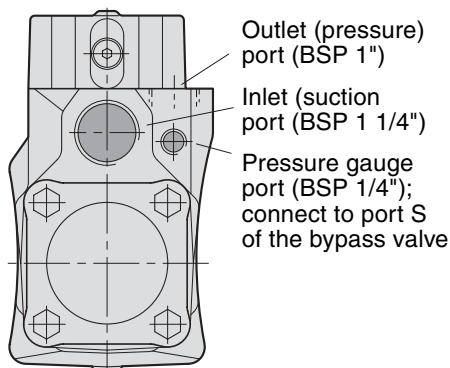
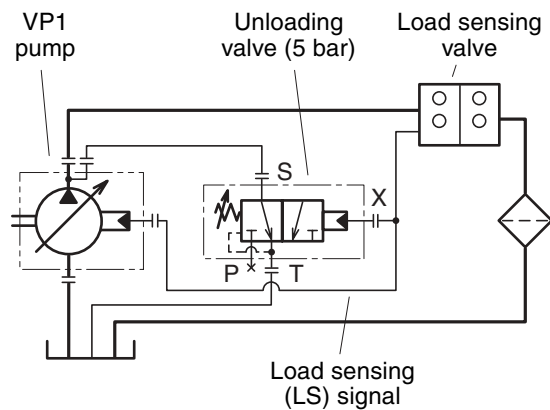


BPV-VP1 unloading valve

The BPV-VP1 unloading valve is utilized in hydraulic systems where the pump is operating constantly. The valve, which requires no additional control valve, allows the pump to operate on- or off-load up to its max selfpriming speed.

The valve protects the pump from overheating in the off-load mode by allowing a small flow through the pump (refer to the schematic to the right). When a load sensing valve function is engaged, the bypass flow is cut off (as port 'X' is being pressurized).

Valve type	Ordering number	Rated flow [l/min]	Max press. [bar]
BPV-VP1	379 8799	20	350



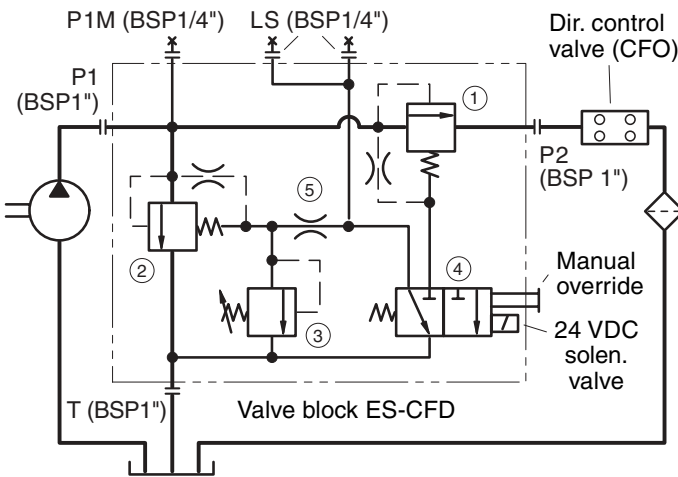
ES line mounted unloading valve

- The ES unloading valve is intended for hydraulic circuits with a fixed or variable displacement pump. The valve is available in two versions:
 - ES-CFO (for a system with a fixed displacement pump and a directional valve type CFO)
 - ES-LS (for a load sensing system with a variable displacement pump and a dir. control valve type LS).
- The valve block installs with M10 screws (alt. with M8 screws and nuts); main ports are BSP 1".
- The ES valve has a built-in, adjustable pressure relief valve (3).
- ES-CFO system function: When the solenoid is non-active (refer to the schematic below left) the entire pump flow goes through port T to tank and port P2 is blocked. An activated solenoid allows flow through the valve from P1 to P2.

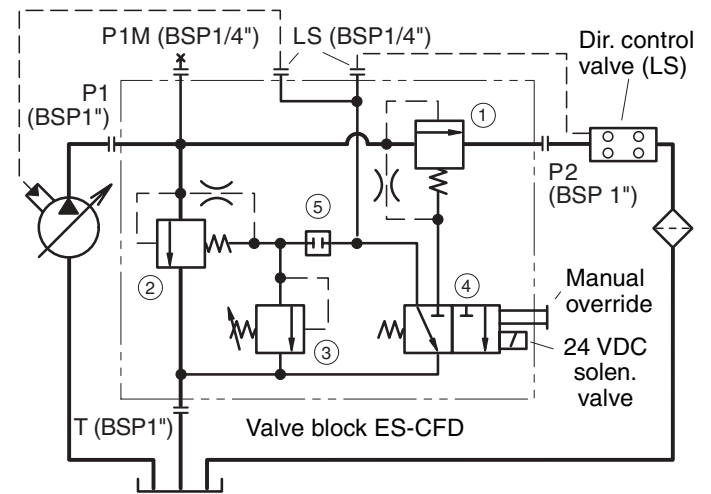
- ES-LS system function: When the solenoid is being de-activated, the pump goes to min displacement and the reduced flow is directed through port T to tank; port P2 is blocked (refer to the schematic below right). When the solenoid is activated, the required pump flow goes through the valve from P1 to P2.

Unloading valve design.	ES-CFO	ES-LS
Max operating press. [bar]	350	
Max flow [l/min]	200	
Solenoid voltage [VDC]	24*	
Required power [W]	12	
Non-activated solenoid:	P1-to-T1	
Activated solenoid:	P1-to-P2	
Ordering number	376 6684	376 7031

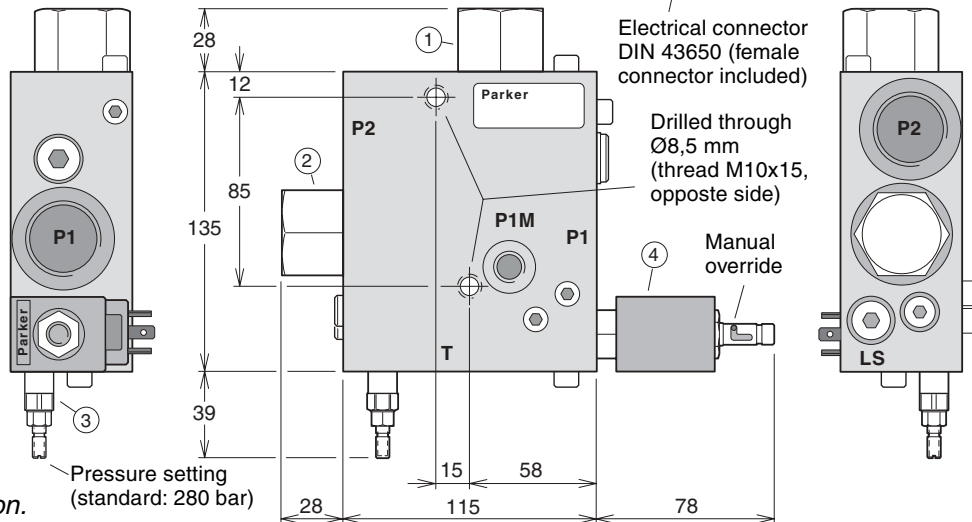
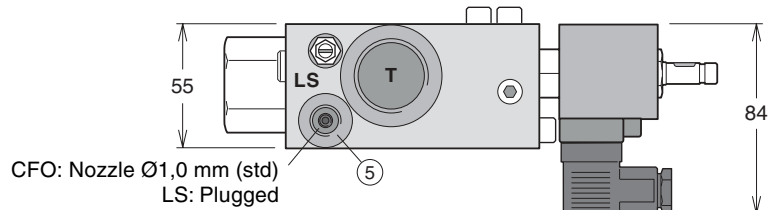
* A 12 VDC solenoid is optional; contact Parker Hannifin.



Hydraulic schematic - CFO system (example).



Hydraulic schematic - LS system (example).



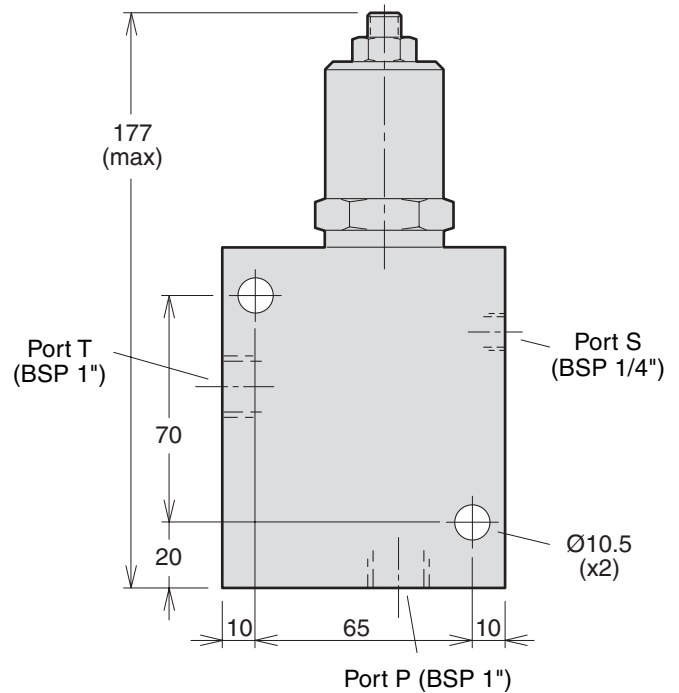
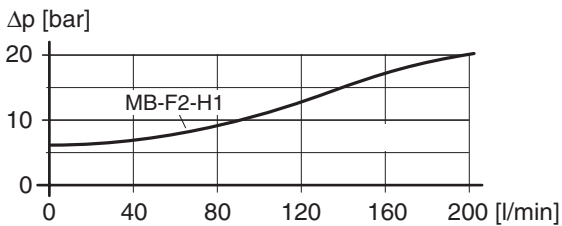
Installation information.

MB-F2-H1 torque limiting valve

The torque limiting valve protects the PTO output shaft (which drives the hydraulic pump) from being overloaded. When the set pressure in the system is reached, the flow from the pump circuit connected to the valve is being unloaded; refer to the schematic.

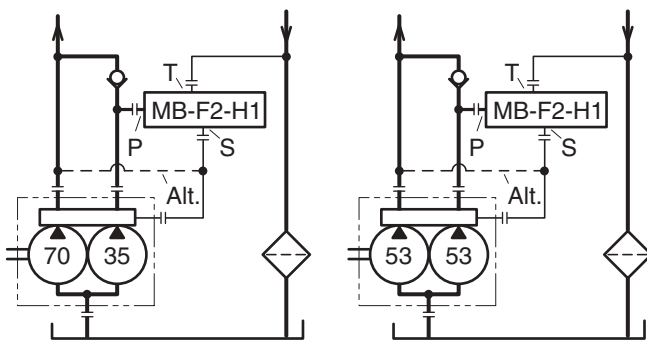
Pressure drop

The diagram below shows pressure drop (P-to-T) vs. flow when the set pressure is reached and the valve unloads one of the pump flows to tank.



Application examples

The following schematics show how the MB valve can be connected to the F2.



MB-F2-H1 valve for system pressures to 350 bar (application examples)

Torque limiting valve	MB-F2-H1
Max pressure [bar]	350
Adjustment range [bar]	150 – 350
Ordering number	378 0202