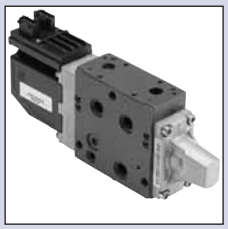
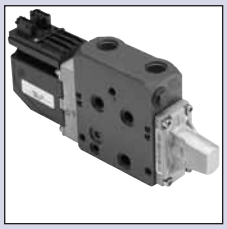
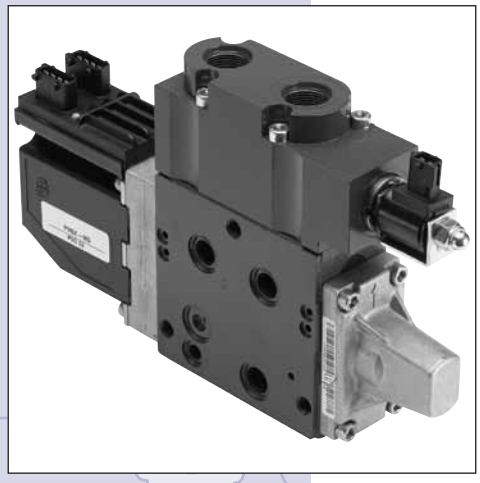
SAUER DANFOSS

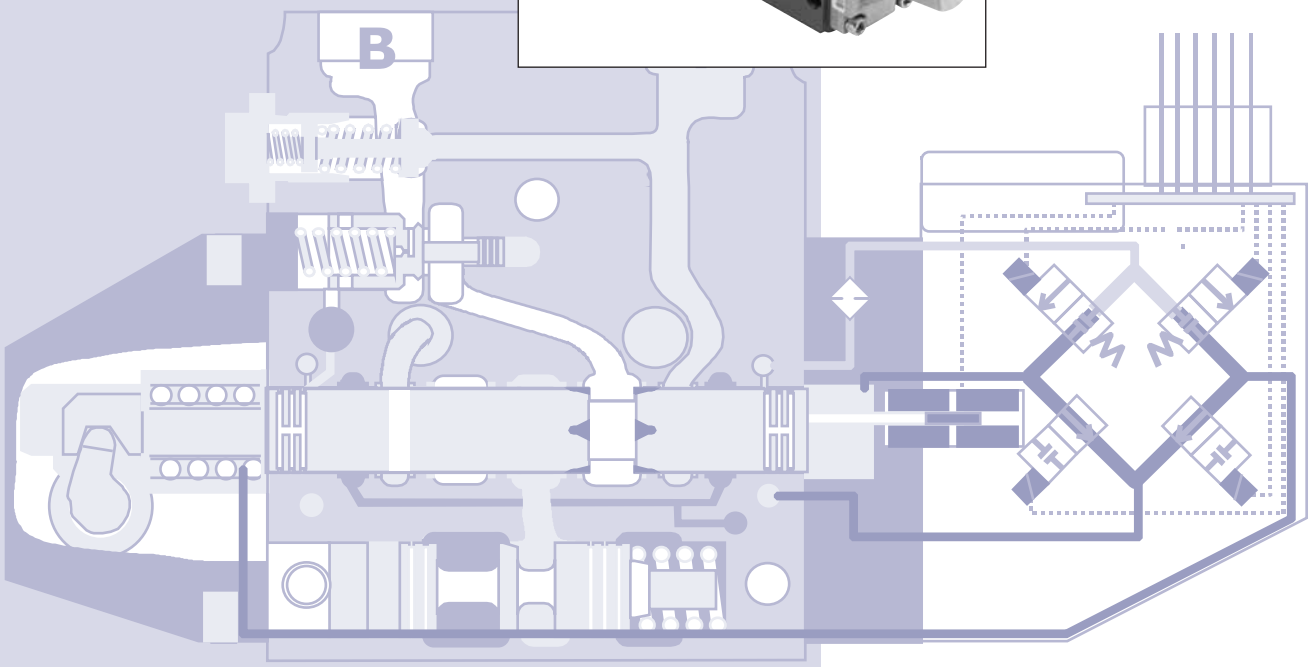
PVG 32
Metric Ports

Technical Information









Revision History

Table of Revisions

Date	Page	Changed	Rev
Dec 2010	40	New back cover	AC
Mar 2012	All	Layout changes, and change in the table, page 21.	AD

Literature References

List of technical documents associated with these products:

1) PVG32 Proportional valve: 520L0344
2) Hitch Control System Description: 11036124
3) Data sheet PVBZ: 520L0681
4) Data sheet PVBZ-HS: 520L0956
5) Data sheet PVBZ-HD: 11035599
6) Instruction PVC: 520L0572
7) PVE series 4 for PVG: 520L0553
8) PVED-CC: 520L0665
9) Data sheet PLUS+1™ MC024-010 and MC024-012 Controllers: 520L0712
10) Hitch Control Application Block User Manual: 11033753

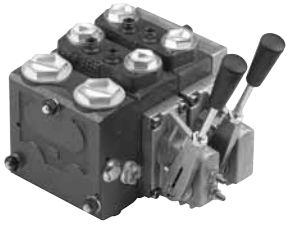
Front cover illustrations: F301 054, P301 595, P301 597, P301 598
Drawing: V310080.A

PVG 32 AG Modules - Metric Ports
Technical Information
Contents

PVG Product Image and Introduction

Introduction

The PVG 32 valve was originally launched with a range of high-performance electrical actuators in 1988. During recent years, several AG (agricultural) customer projects have motivated several innovations, and today our valve program offers components and features as compiled in this Technical Information or referred to in listed literature references.



F301 300

Metric ports:
We have developed a range of modules with metric ports. These modules comprise of various inlets, working modules for auxiliary functions, hitch modules, special top mounted modules and endplates. The range of our PVE - Series 4 is used as actuation.

Target applications:
The target application area for this product range is mainly Agriculture – especially complete EH valve solutions for tractors, but also other applications can benefit from the new features offered.

Short Overview

Besides the inlets suited for fixed as well as for LS-controlled variable piston pumps, you will find a range of valve modules listed. These valves enable you to assemble a valve solution using EH Aux valves and hitch valves for tractors.

The PVE Series 4 generation with either analogue and digital pilot heads offers multiple possibilities of customizing valves for individual needs – ranging from simple analogue versions to fully ISOBUS compliant actuators with numerous variants in between, analogue as well as digital.

Hitch Control

Together with the introduction of this product range, Sauer-Danfoss has developed a hitch control SW block available in our PLUS+1™ GUIDE which on base of a PLUS+1 controller can offer a Hitch control system for tractors.

These components allow for design of hitch systems that incorporate intuitive control as well as a number of innovative new solutions. The components available offer significant advantages in controlling both the single and double acting systems, including easy understanding of both Force and Slip control. In addition to performing state of the art operation of hitch, the software block contains logic that ensures the full potential of the Sauer-Danfoss hitch valves are exploited.

The technical information references mentioned describes the Sauer-Danfoss concept behind the operation of a hydraulic hitch system, and the different types of systems and components available from Sauer-Danfoss.

Function

When main spools (15) are in neutral position, the pilot operated check valves (hereafter PO Check valves) are kept closed by a spring plus the work port load, which is directed to the spring side of the PO Check valves (14) via a small orifice.

If a main spool is actuated to have flow out of the B port, the meter out flow forces the respective PO Check valves valve to open. At the same time, pilot pressure is guided via the main spool to the back side of a small pilot valve (12) on the A port side. This will ensure that the load pressure behind the PO Check valves is released to a separate tank T0 (20) via a seat valve and allow the PO Check valves to open and let return flow pass across the main spool back to tank.

For float function, both PO Check valves are released to tank at the same time as described above.

In some applications with low load pressure, it is necessary to force open the PO Check valves by a pin (17). This pin is actuated by means of pump pressure on the A port side.

PVBZ modules cannot be optionally mounted (PVM on A - Port side only).

The separate tank connection T0 is needed to ensure proper performance of the PO Check valvess regardless of the pressure in main tank line T. It is therefore necessary to connect the T0 port in the Inlet PVP direct to the oil reservoir with a separate hose, see dimensional drawing examples.

All the valve modules in this Technical Information have a T0 gallery!

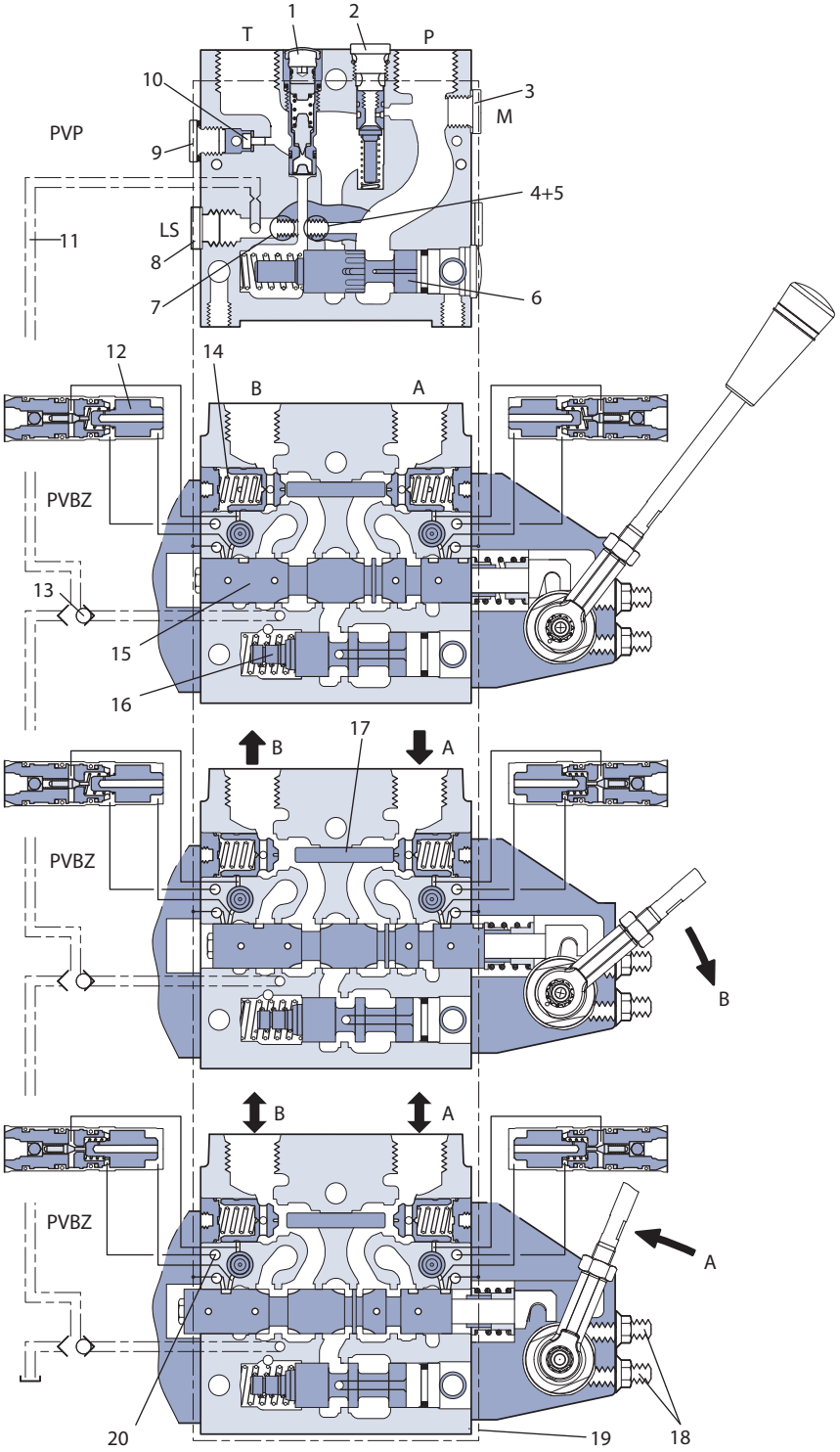
When using PVP with HPCO function (T port can be pressurised) please make sure to lead return flow from the A and B ports to tank via a separate tank port in the end plate PVST.

Warning

⚠ Warning

All makes and all types of directional control valves – inclusive proportional valves – can fail and cause serious damage. It is therefore important to analyse all aspects of the application.
Because the proportional valves are used in many different operation conditions and applications, the manufacturer of the application is responsible for making the final selection of the products- and assuring that all performance, safety and warning requirements of the application are met.
The process of choosing the control system – and safety level – could e.g. be governed by ISO 13849 (Safety related parts of control system).

Sectional Drawing



1 Pressure relief valve
2 Pressure reduction valve for pilot oil supply
3 Pressure gauge connection
4 Plug, open centre
5 Orifice, closed centre
6 Pressure adjustment spool
7 Plug, closed centre
8 LS connection
9 T0 connection
10 Plug - to be removed for internal T0 (157B5130, 157B5131, 157B5330 and 157B5331 only)
11 LS signal
12 Pilot valve for PO Check valves
13 Shuttle valve
14 Pilot operated check valve, PO Check valves
15 Main spool
16 Compensator
17 Shuttle pin
18 Max. oil adjustment screws for ports A and B
19 Pilot supply for PVE
20 Separate tank line, (T0)

PVG32 Valve Group

Max. pressure	Port P continuous		250 bar	[3625 psi]
	Port A/B		280 bar	[4061 psi]
	Port A/B without P/O checks		280 bar	[4061 psi]
	Port T, static/dynamic		25 / 40 bar	[362 / 580 psi]
	Port T Hitch Single-Acting Module		25 bar	[362 psi]
Oil flow, rated	Port P		140 l/min	[37.0 US gal/min]
	Port A/B, with press. comp.		100 l/min	[26.4 US gal/min]
Spool travel, standard			± 7 mm	[±0.28 in]
Spool travel, float position spool	Proportional range		± 5.5 mm	[±0.22 in]
	Float position		7.5 mm	[±0.30 in]
Dead band, flow control spool	Standard		± 0.8 mm	[±0.03 in]
Max. internal leakage at 200 bar [2900 psi] and 21 mm^2/s [102 SUS]	A/B → T	PVBZ with PO Check valves	1 cm^3/min	[0.06 in^3/min]
		PVBZ with PO Check valves and PVLP	6 cm^3/min	[0.37 in^3/min]
		PVB with PVLP	25 cm^3/min	[1.53 in^3/min]
Oil temperature (inlet temperature)	Recommended temperature		30 → 60°C	[86 → 140°F]
	Min. temperature		-30°C	[–22°F]
	Max. temperature		+90°C	[194°F]
Ambient temperature			-30 → +60°C	[–22 → +140°F]
Oil viscosity	Operating range		12 - 75 mm^2/s	[65 - 347 SUS]
	Min. viscosity		4 mm^2/s	[39 SUS]
	Max. viscosity		460 mm^2/s	[2128 SUS]
Filtration	Max. contamination (ISO 4406)		18/16/13	18/16/13

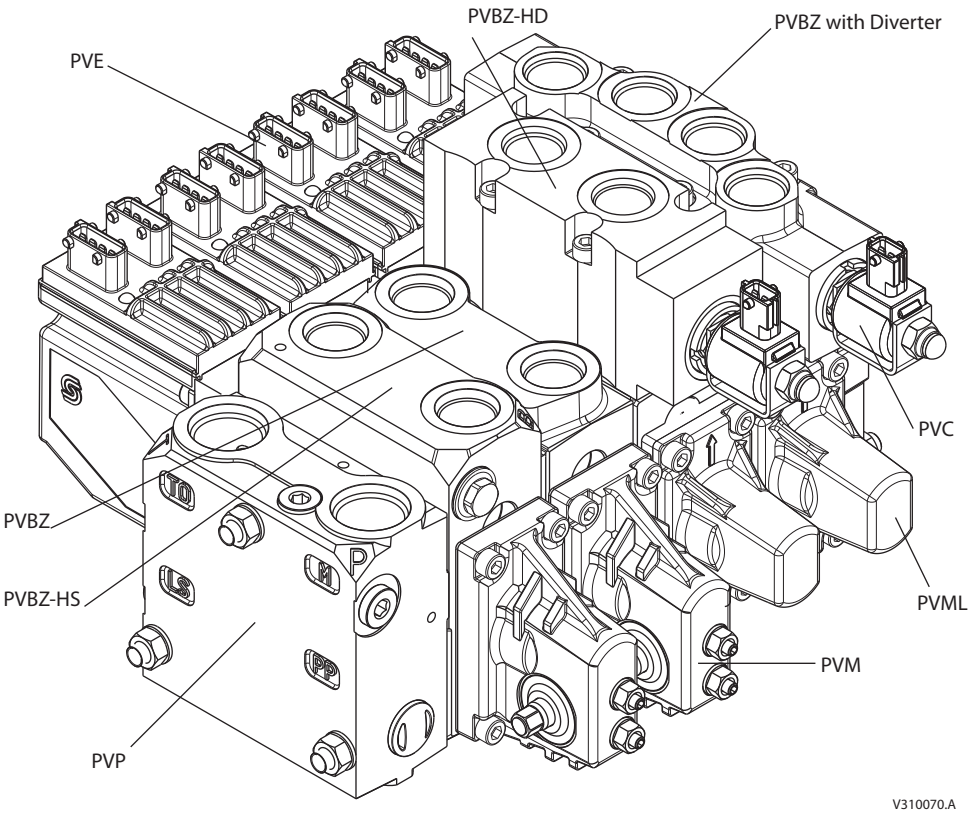
6/2 Diverter Valve PVBD

Max pressure PVBZ module with mounted diverter PVBD	Port A/B	280 bar [4061 psi]
Oil flow, rated PVBZ module with mounted diverter PVBD	Max recommended	80 l/min [21.1 US gal/min]

Multi-Valve Single- / Double-Action

Max pressure PVBZ module with mounted multi valve	Port A/B	280 bar [4061 psi]
Oil flow, rated PVBZ module with mounted multi valve		100 l/min [26.4 US gal/min]

PVG32 Group Valve



Basic Module Type PVBZ for EH Auxiliary Valve Functions

Introduction

The PVBZ valve is a load and pressure compensated valve module with two pilot operated check valves (PO Check valves) in the A- and B-ports. These are limiting the work port leakage to a very low limit, below 1 ccm/min.
PVBZ modules will always have 2 PO Check valves one in each work port.
Besides compensation, the pressure compensator can limit the work port pressure blow up to 4 - 5 bar.

The special PVBZ load compensated module was developed for applications that require integrated pilot operated check valves in the work ports that required to limit the port leakage to zero. See "Technical Data".

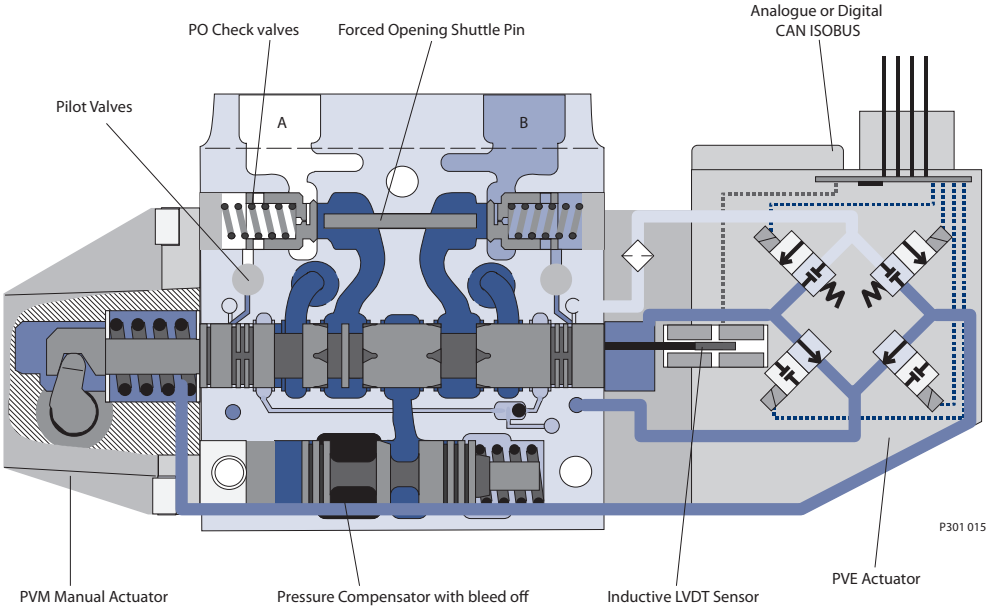
The new PVBZ basic module can be mixed with basic modules PVB (with additional tank line T0) and offers the following features:

Features

- Integrated pilot operated check valves for limited internal leakage
- Can be mixed with PVB with T0 gallery
- LS a/b shuttle for float spools
- Standard 4/4 float spools
- Integrated thermo relief valve as option (modules with threaded ports only)
- Manifold version for Sauer-Danfoss designed valves or customer designed quick coupler block
- Compensator with bleed off
- Auxiliary valve on tractors for function control on implements; cylinder positioning and speed control of hydraulic motors.

Basic Module – Type PVBZ

PVG 32
PVBZ Module



Specifications

Product Parameters

Maximum pressure	Port P continuous	250 bar [3625 psi]
	Port A/B	280 bar [4061 psi]
Oil flow, rated	Port A/B, with press. comp.	100 l/min [26.4 US gal/min]
Spool travel, standard		± 7 mm [±0.28 in]
Spool travel, float position spool	Proportional range	± 5.5 mm [±0.22 in]
	Float position	7.5 mm [±0.30 in]
Dead band,flow control spool	Standard	± 0.8 mm [±0.03 in]
Max. internal leakage at 150 bar [2175 psi] and 21 mm²/s [102 SUS]	A/B → T	1 cm³/min [0.06 in³/min]

PVBZ with Optional Diverter Feature PVBD

Introduction

The utilization of a PVBZ module can be further enhanced by adding a diverter valve. Mounted on top of the PVBZ valve slice, a 6/2 PVBD diverter valve can direct valve flow to either of two set of ports (A1/B1 or A2/B2). The PVBD diverter spool (shift spool) is actuated by the PVC solenoid valve by means of pilot pressure.

Principle description of PVBD diverter:

- PVC off: The shift spool is held in position (flow to A1/B1) by the spring in the right hand side (opposite the PVC). The spring chamber is always connected to the T0 gallery in the PVBZ body.

- PVC on: Pilot pressure is led into the chamber next to the PVC. A limited flow is passing through the shift spool and the two orifices and into the spring chamber connected to T0. Pressure-drop across the orifices creates the shift force moving the shift spool towards the spring. As a result, port A2/B2 becomes active.

Leakage (along the spool clearance) from pressurized work ports A1/B1 or A2/B2 will always be drained to T0 either directly in the spring chamber or through the shift spool. This secures safe positioning of the shift spool as leakage never will build up pressure up in the control chambers.

Safety recommendation: Shift of the diverter should only be possible when the main spool is in neutral. This has to be ensured through a proper set-up in the controller/MMI hardware.

Features

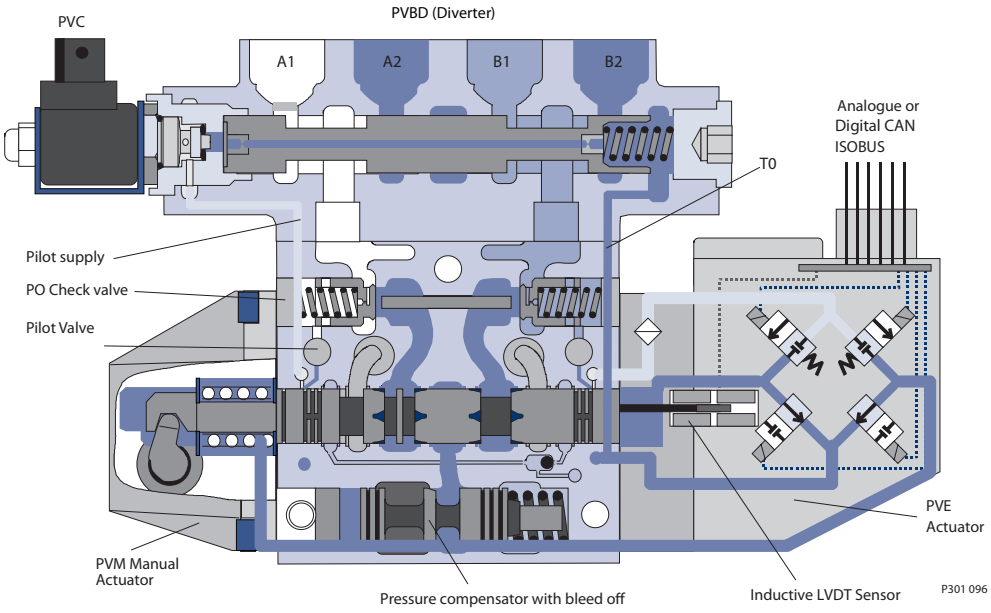
- Enlarge the application range (2 functions)

- To be mounted on top of PVB or PVBZ modules

- Pilot operated with PVC

- Auxiliary valve on tractors for function control on implements: cylinder positioning when the demand on neutral port leakage is limited.

PVG 32 PVBZ Module



Specifications

Product Parameters

Max. pressure Port A/B		280 bar [4061 psi]	
Oil flow rated Max recommended		80 l/min [21.1 US gal/min]	
Leakage levels * A1, A2, B1, B2 port		10 ml/min @ 70 bar 30 ml/min @ 210 bar	
Pressure drop* A/B to A1/B1 or A2/B2 or vice versa		0.5 bar @ 40 l/min 2.0 bar @ 80 l/min	[7.3 psi @ 10.6 US gal/min] [29 psi @ 21.1 US gal/min]
Pilot oil consumption	PVC off PVC on	0.0 l/min 0.3 l/min	
Environmental specifications	Temperature Oil viscosity etc.	As for PVBZ	
PVC solenoid (NC)	Connector type Zener diode included	AMP JPT 2 Pin	
Safety recommendations		**Shift of the diverter should only be possible when the main spool is in neutral.**	

PVG 32 Hitch Valves

General Introduction

Two types of hitch valves are available for hitch or similar applications. The two valve options offered are the PVBZ-HS single acting and the PVBZ-HD double acting. The PVBZ-HS matches the market standard whereby implements are raised hydraulically and lowered only by the pull of gravity. The PVBZ-HD has the unique ability to raise and lower either as single- or double-acting.

The benefits of the PVBZ-HD reflect a departure from old hitch norms - increased comfort when attaching implements due to the same speed up and down and safer detachment of heavy implements from the driver's seat.

The full benefit of the possibilities with the PVBZ-HD is easily obtained by use of the PLUS+1 hitch core application block. The core application block shifts the valve between single- and double-acting hitch according to the most suitable operation. The operator will not have to select the operation but will notice the benefits during normal operation of the hitch. Work-modes are single-acting as it is standard today, but manual operation up and down are double-acting to increase comfort, functionality and safety.

For further info and more details please see the Sauer-Danfoss Hitch system description see literature reference page 2.

Basic Module Type PVBZ-HS (Hitch Single-Acting)

Introduction

Single acting PVBZ-HS slice for standard hitch application.
It has its own tank port to direct the return flow directly into the tank with a minimum of back pressure. This prevents tank-line pressure influence, especially when lowering the un-loaded (empty) hitch under cold conditions (high oil viscosity).
Similar to the auxiliary slice, the single acting PVBZ-HS slice is a pressure-compensated valve slice with one P/O check valve on B-port only. The same technology as in the PVBZ module is used.

Besides the flow paths, the spool is directing the pilot pressure to the pilot valve for P/O check valve pressure release as well as to the shuttle pin in order to force the P/O popped to open under low load conditions. This ensures a fully open flow path in lower mode.

The B-port is normally equipped with a PVLP shock valve.

PVBZ-HS incorporates a compensator with bleed-off to prevent pressure building up between the pump gallery and the work ports.

A special 3/3 spool with optimized flow characteristics, both in meter-out as well as in meter-in direction, has to be controlled by a high performance actuator.

Features

- Low leakage work port
- Separated tank port
- Integrated PVLP shock/anti cavitation valves
- Can be mixed with PVB/ PVBZ with T0 gallery
- Compensator with bleed off
- Rear-Hitch on tractors
- Header control on combines and harvesters

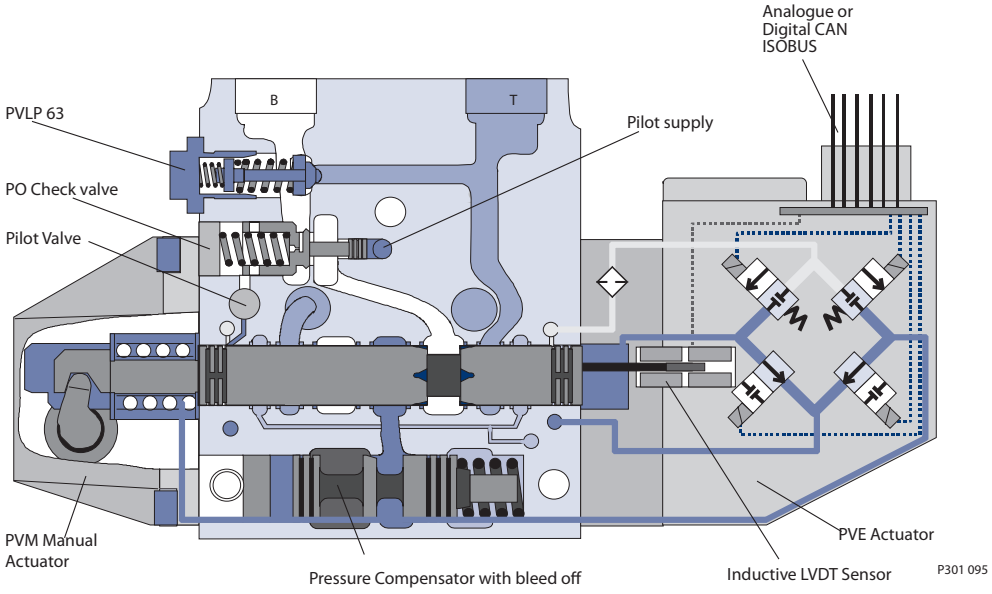
Safety Recommendations for the OEM and User

To avoid unintended raise of the empty hitch the tank port on PVBZ-HS always has to be connected direct to tank without any restriction or pressure build up possibilities. This also ensures lowering in lower mode under cold conditions (high viscosity oil).

In case of manual actuation of the Hitch function (limp home mode) the power supply to the PVE has to be disabled before the PVM (hexagon) can be actuated.
The OEM /end user needs to be aware of the dangerous operation when performing manual raise/lowering of the hitch and be close to the hitch arms.

Basic Module Type PVBZ - HS (Hitch Single-Acting)

PVG 32 Hitch Single-Acting Valve Module



Specifications

Product Parameters

Maximum pressure	Port P continuous	250 bar [3625 psi]
	Port B	280 bar [4061 psi]
	Port T, static/dynamic	25 bar/40 bar [365/580 psi]
Oil flow, rated, Port B, with press. comp.		100 l/min [26.4 US gal/min]
Spool travel, standard		± 7 mm [±0.28 in]
Dead band, flow control spool, standard		± 0.8 mm [±0.03 in]
Max. internal leakage at 150 bar [2175 psi] and 21 mm²/s [102 SUS]	B → T, with PVLP:	6.0 cm³/min [0.37 in³/min]

Basic Module Type PVBZ-HD (Hitch for Double-Acting)

Introduction

The double-acting hitch slice consists of the PVBZ valve-section with a flanged-on single/double-acting selector (multi-valve) actuated by a PVC valve.

By energizing or de-energizing the PVC, the multi-valve shifts the slice between single- or double-acting work-modes. This is of great benefit in hitch applications both for rear and front hitches. When the slice is operating as single-acting, the A-port is connected to tank in the PVBZ body.

The PVBZ base of the PVBZ-HD has similar features as the PVBZ valve-slice. That is PO Check valves for low leakage as well as compensator with bleed-off to eliminate pressure build-up between compensator and work-ports.

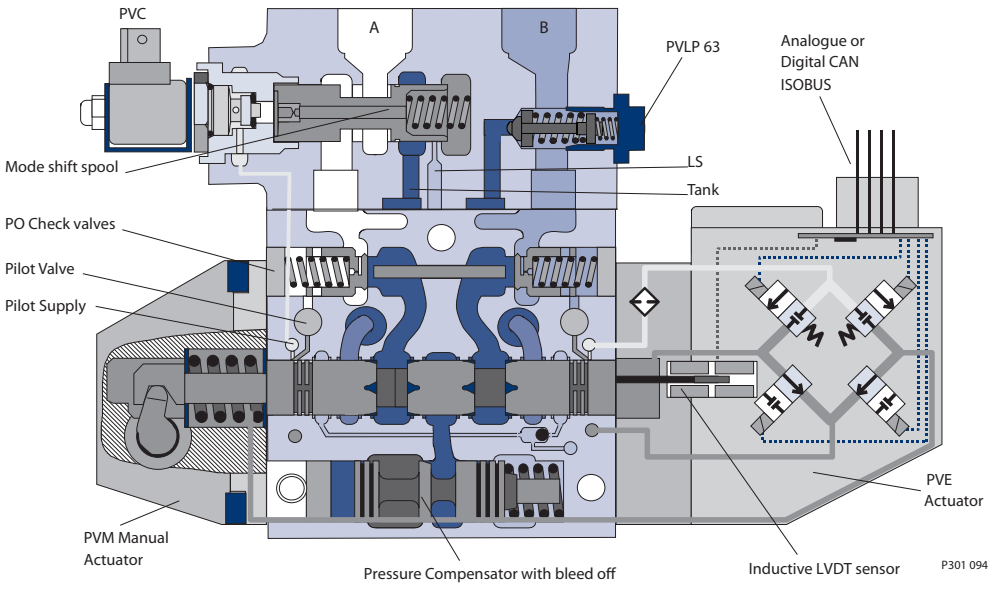
The flanged on multi-valve contains the shifting spool to switch port A between T and port A of the PVBZ. It also contains a PVLP shock/suction valve on port B.

The change between single- and double-acting modes is operated independently of valve-flow command.

Features

- Low leakage work port (B-port)
- Standard 4/4 float spools to be used
- Electrical mode shift into pure 3/3 single acting functionality of double acting cylinder
- Integrated PVLP shock/anti cavitation valves (B-port)
- Single and Double Acting (see Hitch Control System Description for detailed set-up and benefits)
- Compensator with bleed off
- Rear and front hitch linkages on medium and higher performance tractors.
- Header control on combines and harvesters.

PVG-32 Hitch Double-Acting Valve Module with Multivalve



Specifications

Product Parameters

Maximum pressure	Port P continuous	250 bar [3625 psi]
	Port A/B	280 bar [4061 psi]
Oil flow, rated	Port A/B, with press. comp.	100 l/min [26.4 US gal/min]
Pilot oil consumtion	PVC off PVC on	0.0 l/min 0.3 l/min
Environmental specifications	Temperature oil viscosity etc.	As for PVBZ
PVC solenoid (NC)	Connector type Zener diode included	AMP JPT 2 Pin

PVP with integrated HPCO

Introduction

Together with the introduction of PVBZ (and PVB with separate tank line T0) Sauer-Danfoss can now also supply PVG 32 valves with integrated HPCO functionality (**H**igh **P**ressure **C**arry **O**ver).

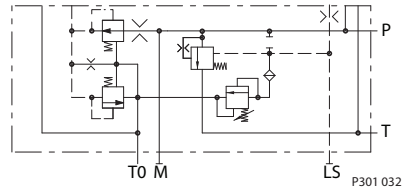
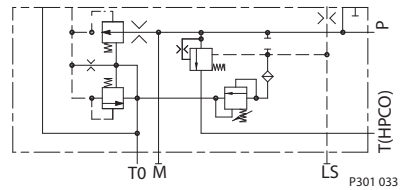
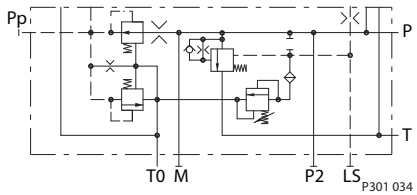
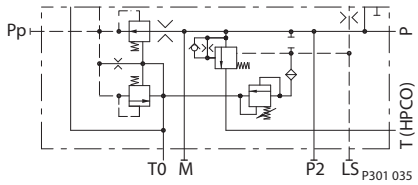
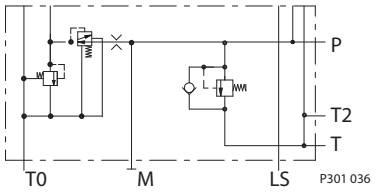
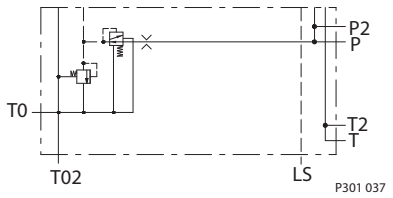
The HPCO function will guide the pump flow not used in the PVG 32 valve group via the HPCO port to for example a directional valve.

The PVP pump side module with integrated HPCO function can only be mixed with PVB, PVBZ and PVST mentioned in this Tech Note.

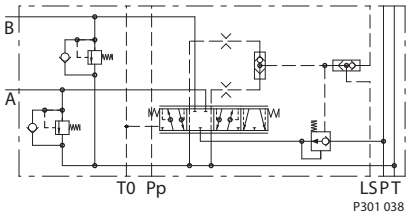
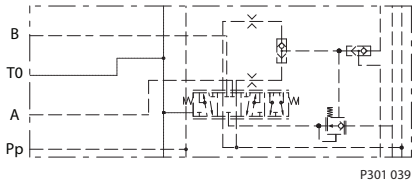
Features

- HPCO functionality
- Prioritized flow for PVG 32
- Reduced plumbing

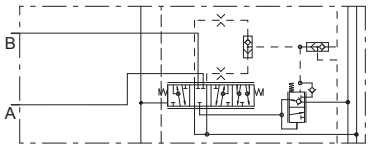
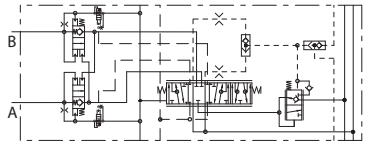
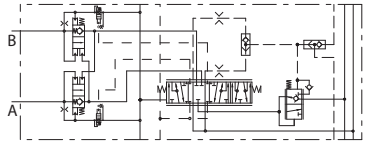
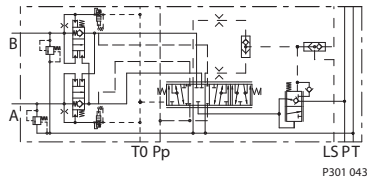
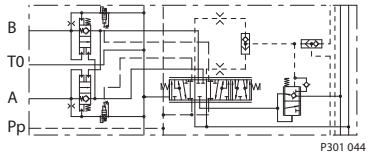
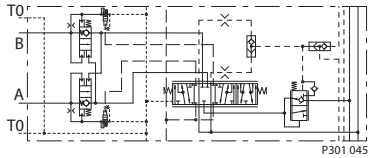
Versions and Code Numbers, Inlet Moduls

Symbol	Description PVP / PVPV	Port dimensions	T0 facility	Code number	
				ISO 6149	DIN 3851
	PVP open centre pump side module for pumps with fixed displacement. External T0 With pilot supply for electrical actuation.	Pport: M 27x2 Tport: M 27x2 Mport: M 14x1.5 LSport: M 14x1.5 T0port: M 14x1.5	Yes	11072195	
	PVP open centre pump side module for pumps with fixed displacement. External T0. With pilot supply for electrical actuation. Prepared for HPCO - use Tport. *Note: PVG group requires PVST (endplate with T port).*	Pport: M 27x2 Tport: M 27x2 (HPCO) Mport: M 14x1.5 LSport: M 14x1.5 T0port: M 14x1.5	Yes	157B5961	
	PVP open centre pump side module for pumps with fixed displacement External T0 With pilot supply for electrical actuation. Measure port for pilot supply.	Pport: M 22x1.5 P2port: M 16x1.5 Tport: M 22x1.5 Mport: M 10x1.0 LSport: M 12x1.5 T0port: M 16x1.5 Ppilotport: M 10x1.0	Yes		157B5964
	PVP open centre pump side module for pumps with fixed displacement. External T0 With pilot supply for electrical actuation. Prepared for HPCO - use Tport *Note: PVG group requires PVST (endplate with T port)*	Pport: M 22x1.5 P2port: M 16x1.5 Tport: M 22x1.5 (HPCO) Mport: M 10x1.0 LSport: M 12x1.5 T0port: M 16x1.5 Ppilotport: M 10x1.0	Yes		157B5965
	PVPV closed centre pump side module for pumps with variable displacement. External T0. With pilot supply for electrical actuation. Prepared for PVLP.	Pport: M 33x2 Tport: M 33x2 T2port: M 14x1.5 Mport: M 14x1.5 LSport: M 14x1.5 T0port: M 16x1.5	Yes	157B5969	
	PVPV closed centre pump side module for pumps with variable displacement. External T0 With pilot supply for electrical actuation.	Pport: M 27x2 P2port: M 14x1.5 Tport: M 27x2 T2port: M 14x1.5 LSport: M 14x1.5 T0port: M 14x1.5 T02port: M 14x1.5	Yes	11003806	
	PVPV closed centre pump side module for pumps with variable displacement. External T0 without pilot supply	Pport: M27x2 P2port: M14x1.5 Tport: M27x2 T2port: M14x1.5 LSport: M14x1.5 T0port: M16x1.5 T02port: M14x1.5	Yes	11055758	

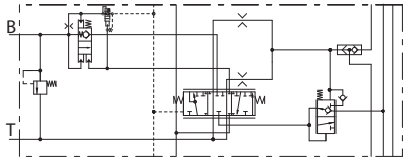
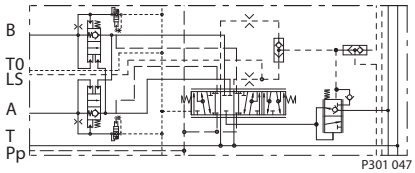
Versions and Code Numbers, PVB Basic Modules

Symbol	Description PVB / PVBZ	Port Dimen-sions	T0 facility	Code Number without thermal relief valve		Code Number with thermal relief valve		Code Number Manifold Versions
				ISO 6149	DIN 3851	ISO 6149	DIN 3851	
	PVB with compensator T0 facility LS a/b shuttle valve prepared for PVLP shock valves	M22 x 1.5	Yes	157B6850				
	PVB with compensator T0 facility LS a/b shuttle valve prepared for manifold PVBD	Manifold PVBD	Yes					157B6969

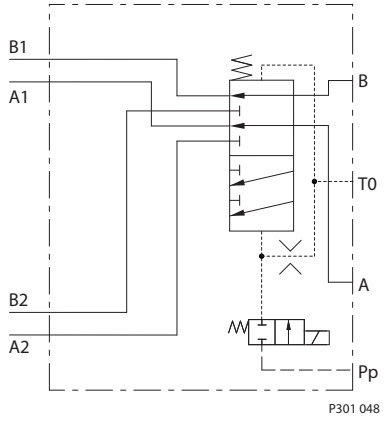
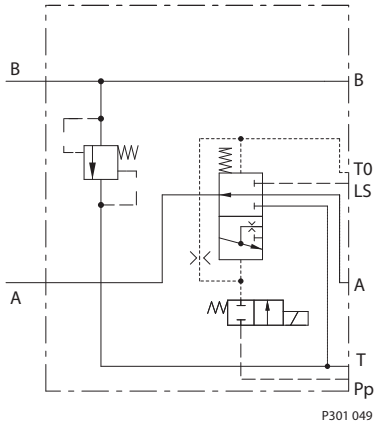
Versions and Code Numbers, PVBZ Auxiliary Modules

Symbol	Description PVB / PVBZ	Port	T0 facility	Code Number without thermal relief valve		Code Number with thermal relief valve		Code Number Manifold Versions
				ISO 6149	DIN 3851	ISO 6149	DIN 3851	
	PVBZ as PVB Compensator w. bleed off and check valve T0 facility LS a/b shuttle valve	M22 x 1.5	Yes	157B6955				
	PVBZ 2 PO Check valves. Shuttle pin. Compensator w. bleed off and check valve T0 facility LS a/b shuttle valve	M22 x 1.5	Yes	157B6957				
	PVBZ 2 PO Check valves. Shuttle pin. Compensator w. bleed off and check valve T0 facility LS a/b shuttle valve	M22 x 1.5	Yes		11024817			
	PVBZ 2 PO Check valves. Shuttle pin. Compensator w. bleed off and check valve T0 facility LS a/b shuttle valve	M22 x 1.5	Yes			157B6954		
	PVBZ 2 PO Check valves. Shuttle pin. Compensator w. bleed off and check valve T0 facility LS a/b shuttle valve LS return manifold PVBD	Manifold PVBD	Yes					157B6958
	PVBZ 2 PO Check valves. Shuttle pin. Compensator w. bleed off and check valve T0 facility LS a/b shuttle valve LS return Quick coupler block manifold	Manifold Special interface	Yes					11005475

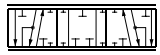
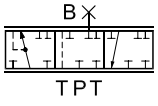
Versions and Code Numbers, PVBZ-HS, PVBZ-HD Modules

Symbol	Description PVBZ	Port Dimensions	Code Numbers		Code Numbers Manifold versions
			ISO 6149	DIN 3851	
	PVBZ-HS with PO Check valve in B port. Compensator w. bleed off and check valve T0 facility Valve for 3/3 spool - single acting only! B-port prepared for PVLP Own T port - enables lowering of no loaded actuator.	B-port M22 x 1.5 T-port M22 x 1.5	157B6968		
	PVBZ with PO Check valves. Shuttle pin Compensator w. bleed off and check valve T0 facility LS a/b shuttle valve LS return manifold for multi valve => PVBZ-HD				11032961

Versions and Code Numbers, PVBD Diverter, Multi Valve for PVBZ-HD

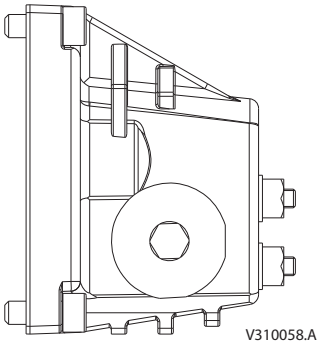
Symbol	Description PVB /PVBZ	Port Dimesions	Code Numbers	
			ISO 6149	DIN 3851
	PVBD 6/2 shift valve. Valve shifts between A1 & B1 / A2 & B2 Actuated with PVC solenoid, which is included Port pressure max. 280 bar PVC NC 12 VDC 14 bar Connector type: AMP JPT 2 PIN	M22 x 1.5	157B1501	
	Multivalve for PVBZ 11032961 Valve shifts A-port between PVBZ A or tank gallery, i.e. shifts between single and double acting actuation. B-port prepared for PVLP Actuated with PVC solenoid, which is included. Port Pressure max. 280 bar PVC NC 12 VDC 14 bar Connector type: AMP JPT 2 PIN	M22 x 1.5	11027604	

Versions and Code Numbers, PVBS Spools

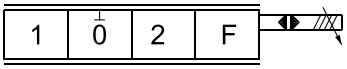
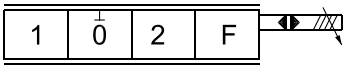
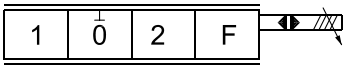
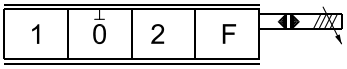
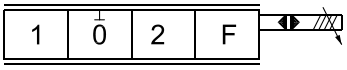
Symbol	Description PVBS	Pressure compensated flow l/min					
		5	10	25	40	65	100
 157-636.11	Standard FC-spools for PVBZ (Electrical and Mechanical actuation) Tension bar for PVM Check valves in spool 4-way, 3-position Deadband: 0,8 mm For PVBZ with LS A/B shuttle	11051945	11019630	11019631	11019633	11019634	11019635
 157-635.11	Standard FC -spools for PVBZ and PVBZ-HD (Electrical and Mechanical actuation) Tension bar for PVM Check valve in spool 4-way, 4-position Float >A>F Deadband: 0,8 mm For PVBZ with LS A/B shuttle	157B9415	157B9410	157B9411	157B9412	157B9413	157B9414
 157-635.11	Standard FC float spools for PVBZ (Electrical actuation) Tension bar for PVML Check valve in spool 4-way, 4-position Float >A>F Deadband: 0,8 mm For PVBZ with LS A/B shuttle						157B9434
P -> B / B -> T					**50/30**	**75/50**	**100/65**
 157-29.10	Standard FC spools for PVBZ-HS (Electrical and Mechanical actuation) Tension bar for PVM 3-way, 3-position Deadband: 0,8 mm				11023550	11023551	11023552

PVM

Mechanical actuation with flow adjustable screws without base, arm and button

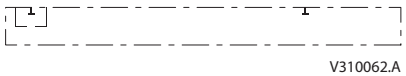
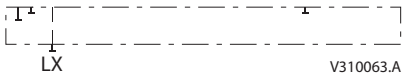
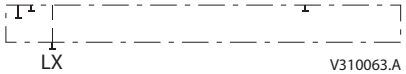
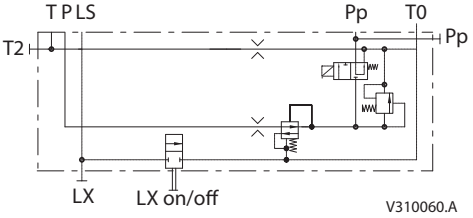
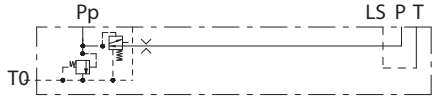

V310058.A

Versions and Code Numbers, PVE Recommendations

Symbol	Description PVE *	Code Number	
		AMP	Deutsch
 157-190.10	PVEH-F Ratiometric proportional high active fault monitoring multivoltage 11-32, hysteresis: 4% rated Float P>A>F by additional input signal. Recommended use: PVB_ PVBZ with float spools.	157B4338	
 157-190.10	PVEP-F PWM proportional high active fault monitoring multivoltage 11-32, hysteresis: 5% rated Float P>A>F by additional input signal. Recommended use: PVB_ PVBZ with float spools.		157B4753
 157-190.10	PVED-CC CanBus proportional high programmable multivoltage 11-32, hysteresis: ~ 0% Recommended use: PVB_ PVBZ with float spools.	157B4943	157B4944
 157-190.10	PVED-CC CanBus proportional high programmable multivoltage 11-32, hysteresis: 4% rated Recommended use: PVBZ-HS or PVBZ-HD hitch valves	11026781	11015692
 157-190.10	PVEP Proportional actuation active fault monitoring		11034832

* For further information see PVE series 4 Technical Information: 520L0553

Versions and Code Numbers, End Plates are Compatible within the Metric Valve 32 Program

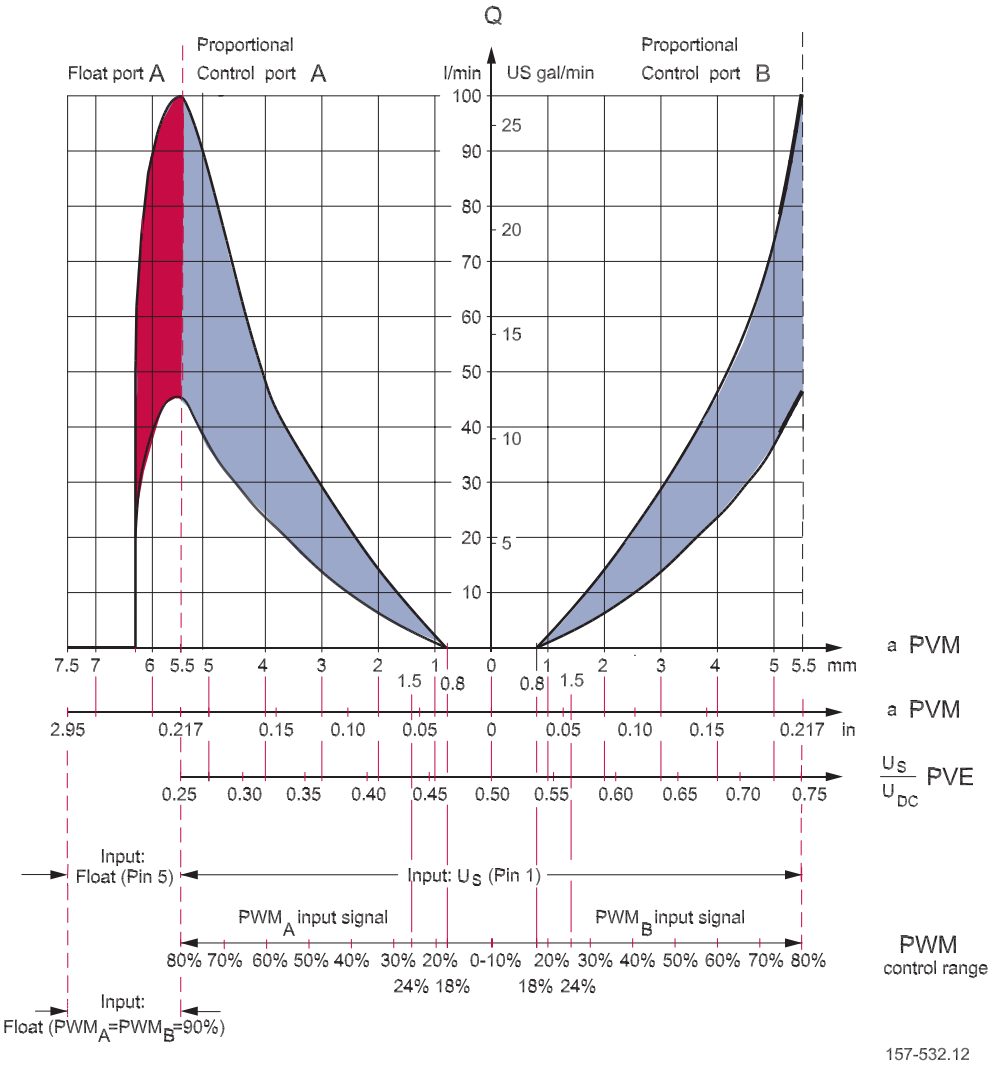
Symbol	Description PVS	Port Dimensions	Code Numbers	
			ISO	DIN
 V310062.A	PVS aluminum Without active elements No connections		157B2000	157B2000
 LX V310063.A	PVS aluminum Without active elements LX connection	LX-port: M12x1.5		157B2913
 V310062.A	PVSI steel Without active elements No connections		157B2014	157B2014
 LX V310063.A	PVSI steel Without active elements LX connection	LX-port: M12x1.5	157B2910	
 T V310064.A	PVST steel Without active elements T-port M8 for mounting	T-port: M22x1.5	11004462	157B2912
 T P LS Pp T0 T2 Pp LX LX on/off V310060.A	PVSI Steel With pilot supply for electrical actuation and pilot dump. LX-connection LX on/off 350 bar 12 VDC	LXport: M14x1.5 T2port: M22x1.5 Ppport: M14x1.5	11050065	
 Pp LS P T T0 V310076.A	PVSI Steel 350 bar With pilot supply for electrical actuation	T0port: M14x1.5	157B2917	

Float Spools, PVBZ

Characteristics; oil flow vs. spool travel and voltage

The spools have 5.5 mm spool travel in direction B and 7.5 mm travel in direction A:

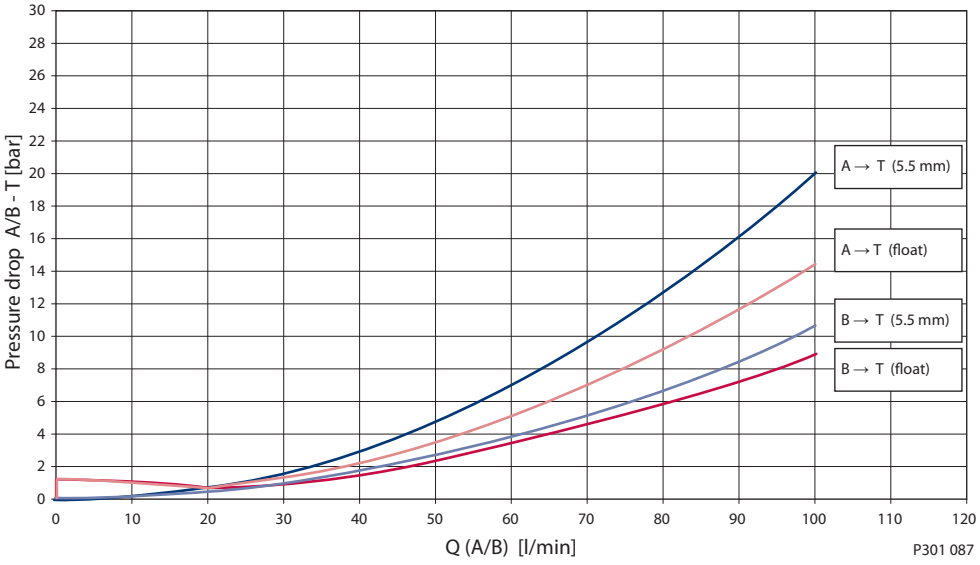
- 5.5 mm spool displacement in direction A gives max. oil flow to port A
- 5.5 mm spool displacement in direction B gives max. oil flow to port B
- 7.5 mm spool displacement in direction A gives completely open float position A/B → T



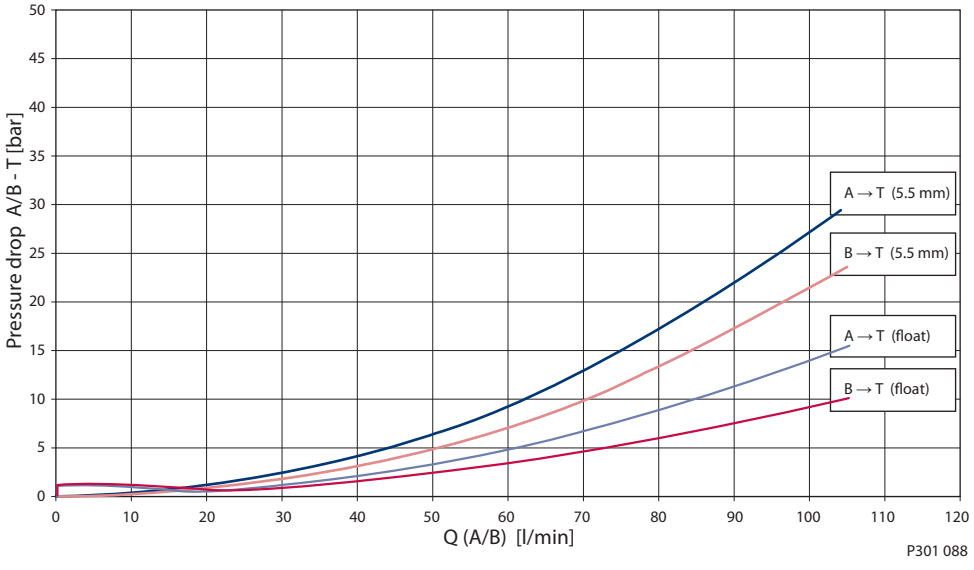
Pressure Drop Characteristics of Float Spools

A/B → T at max. spool travel 5.5 mm (A or B) or 7.5 mm float position. Shown curves are typical average values of return pressure drops on 1. Position in a PVBZ module (157B5957) to the T-port (M27) on a PVPV inlet.

Pressure drop A/B → T characteristic for PVBS 1157B9414 and PVBS 157B9434

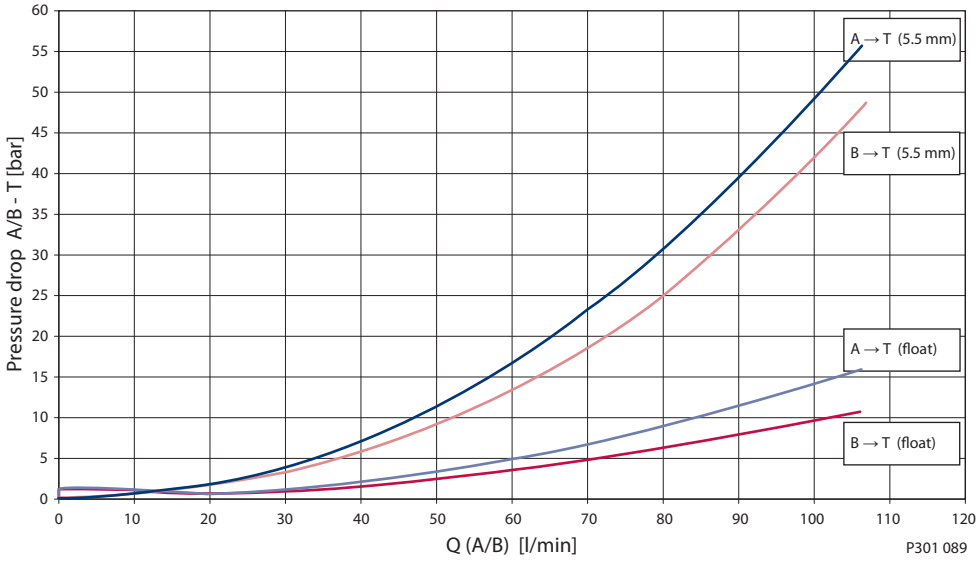


Pressure drop A/B → T characteristic for PVBS 157B9413

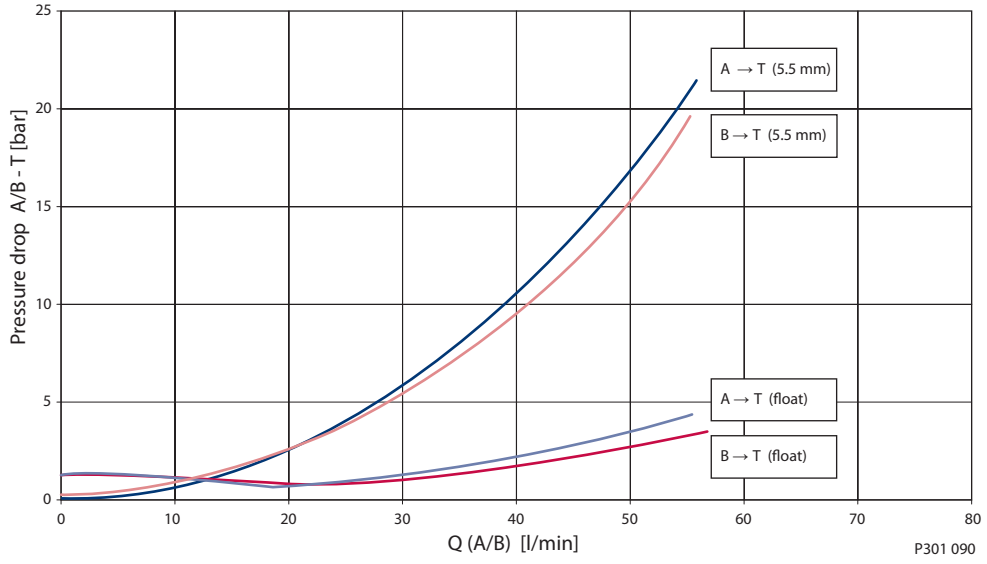


Pressure Drop Characteristics of Float Spools (continued)

Pressure drop A/B → T characteristic for PVBS 157B9642

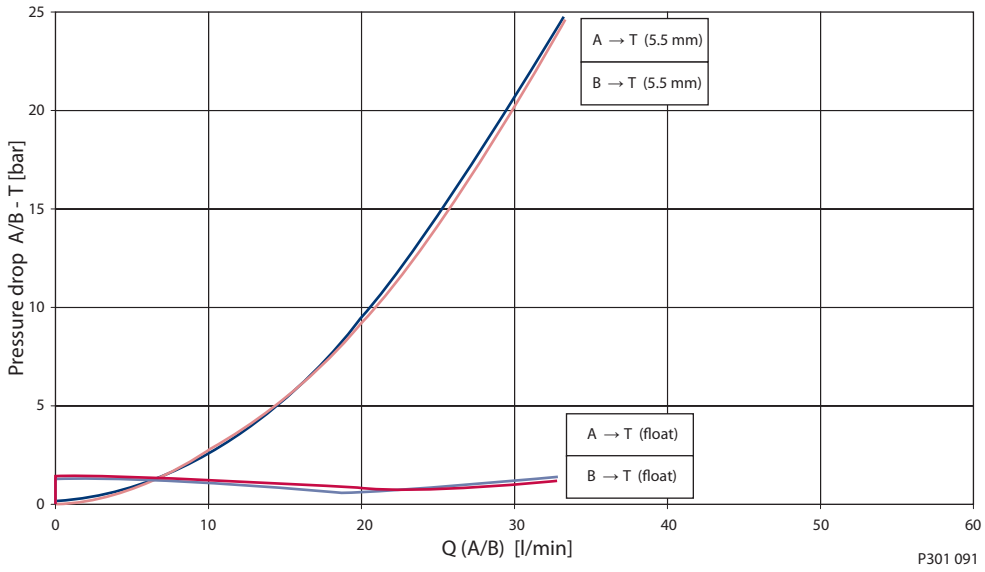


Pressure drop A/B → T characteristic for PVBS 157B9411

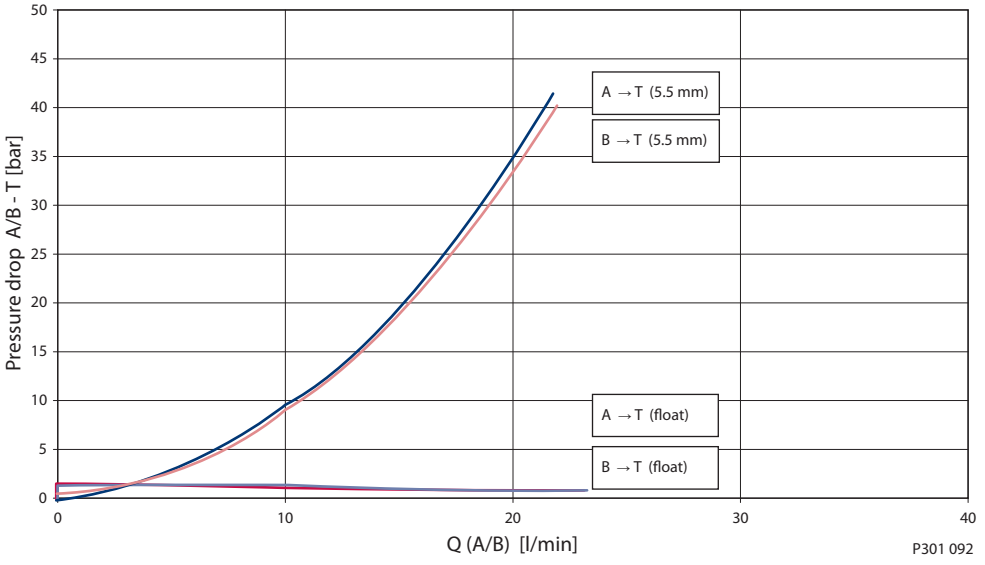


Pressure Drop Characteristics of Float Spools (continued)

Pressure drop A/B → T characteristic for PVBS 157B9410

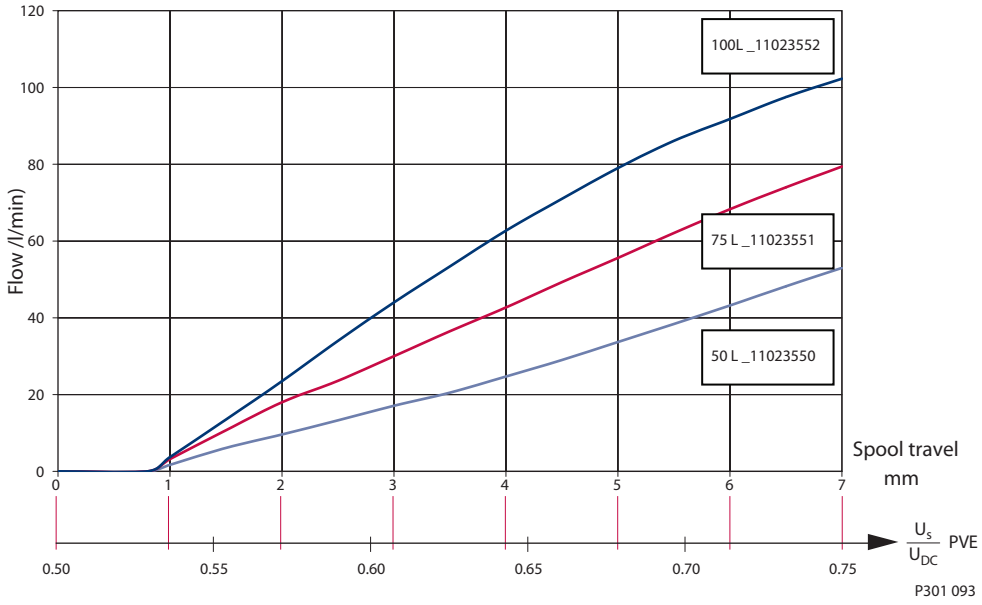


Pressure drop A/B → T characteristic for PVBS 157B9415



Single Acting Spools Characteristics for PVBZ-HS

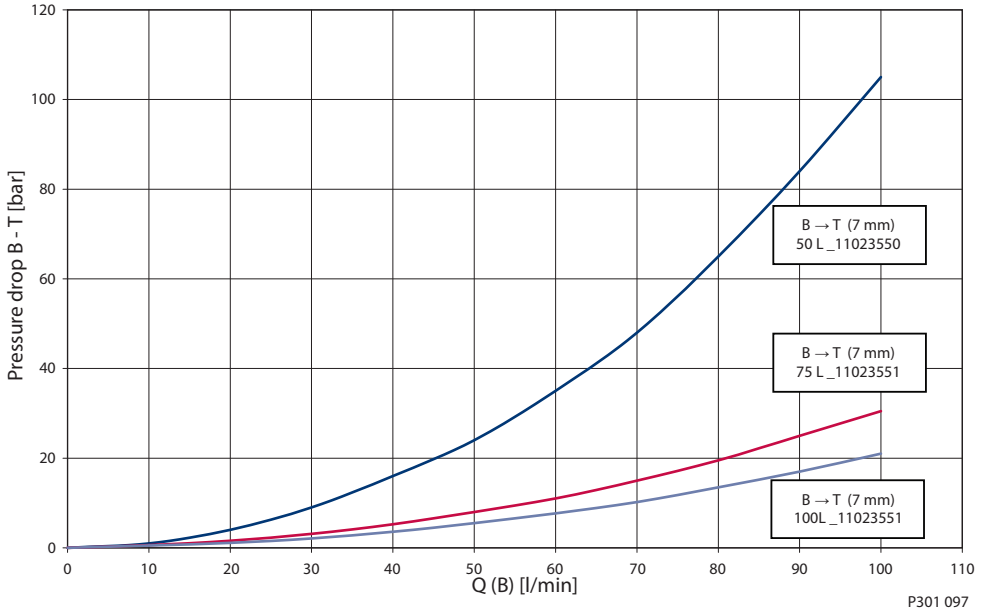
3/3 spools characteristic for PVBZ-HS 157B9411; Oil flow, spool travel and voltage



B → T at max. spool travel 7.0 mm. Shown curves are typical average values of return pressure drops on 1. Position in a PVBZ_HS module to the T-port (M27) on a PVPV inlet.

Pressure Drop Characteristics in Lower Mode Position, Max. Spool Travel

Pressure drop B → T characteristic for PVBS 111023550, 111023551 and 111023552



Pressure Drop Characteristics

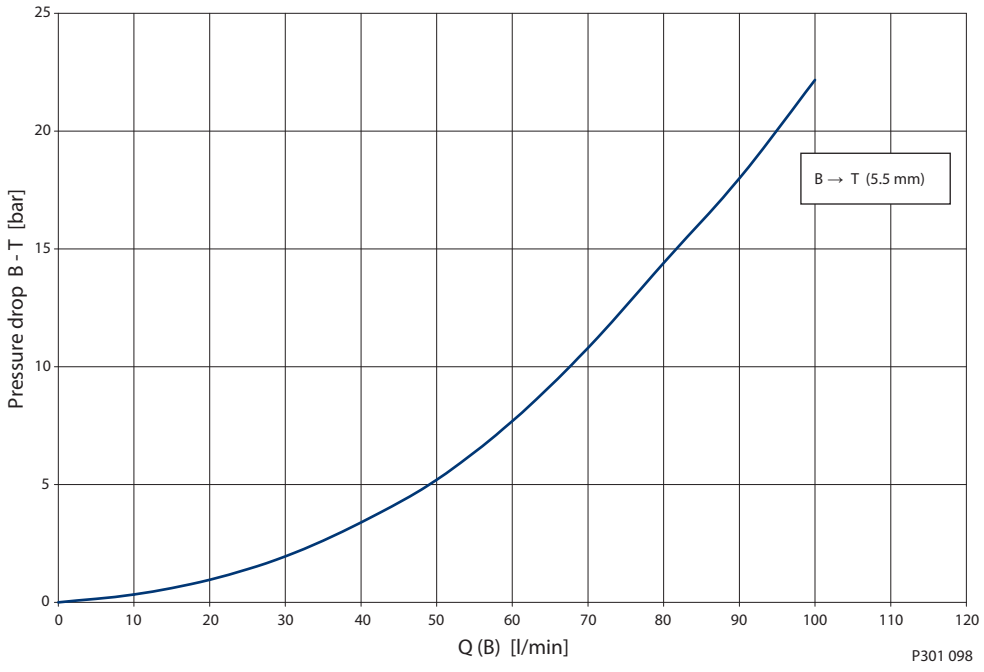
Spools Characteristics for PVBZ-HD

Normally float spools as for PVBZ basic modules are recommended for the PVBZ-HD solution. See activation characteristics on page 22.

Pressure drop characteristics for the PVBZ-HD valve are shown in the following example using a 100l float spool code no.: 157B9414 at the respective spool travel and multi-valve mode position.

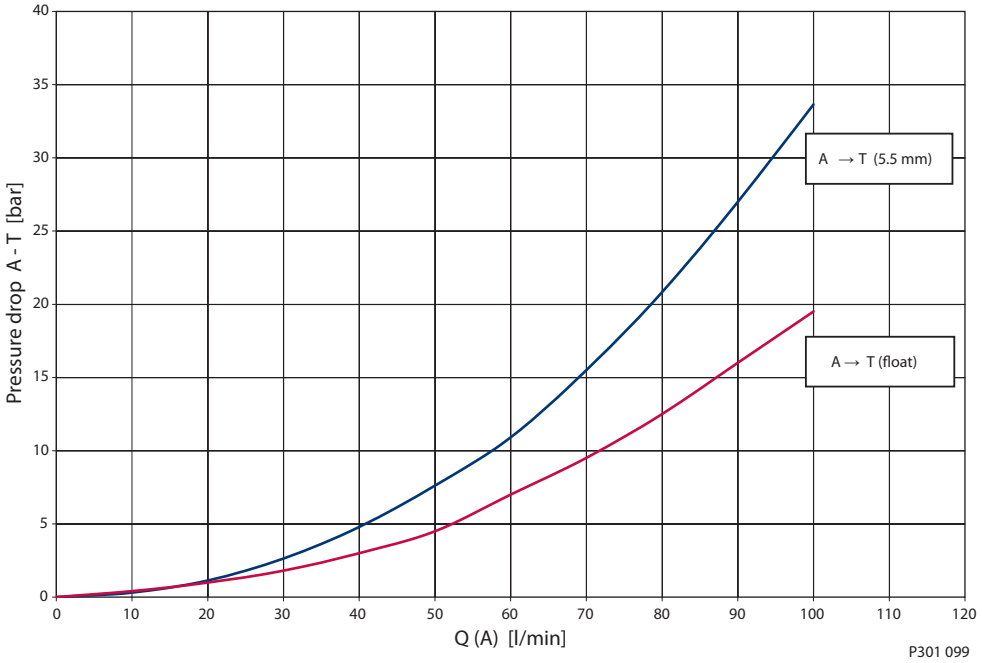
Shown curves are typical average values of return pressure drops on 1. Position in a PVBZ-HD module to the T-port (M27) on a PVPV inlet.

Pressure drop B → T characteristic for PVBS 157B9414; PVBZ-HD double acting mode

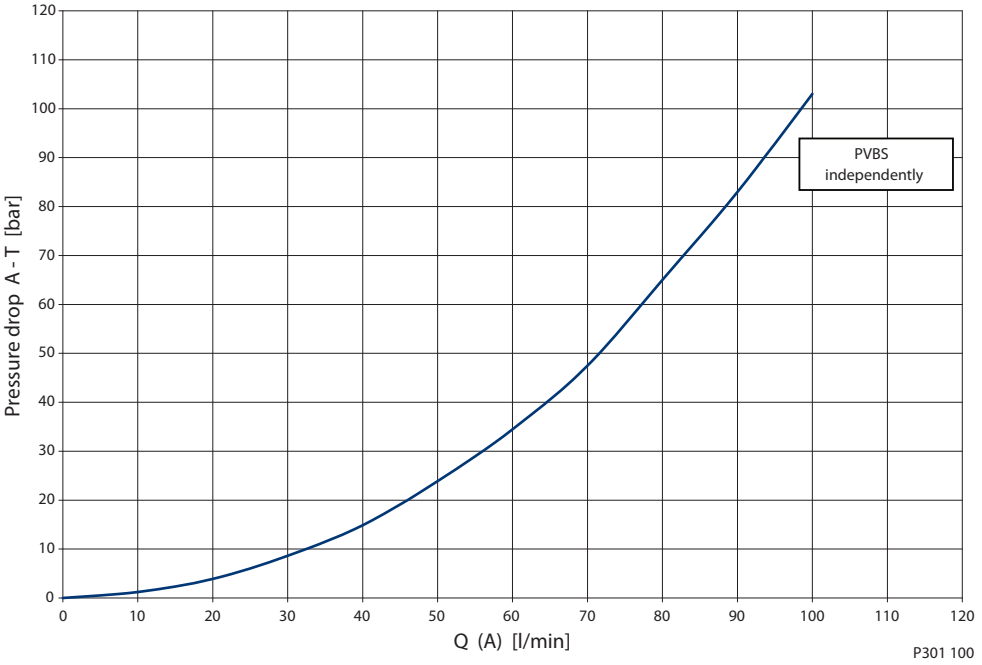


pools Characteristics for PVBZ-HD (continued)

Pressure drop A → T characteristic for PVBS 157B9414; PVBZ-HD double acting mode

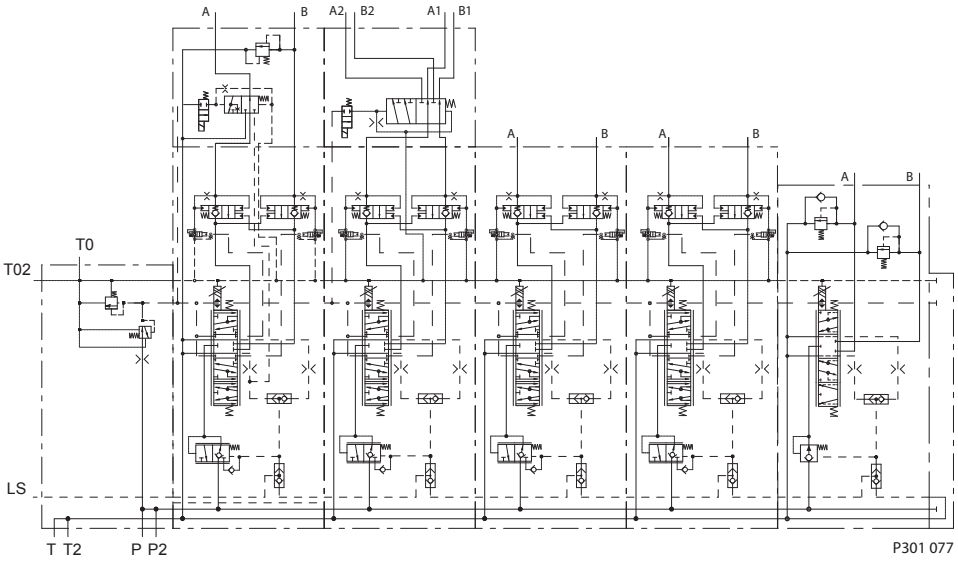


Pressure drop A → T characteristic; PVBZ-HD single acting mode



Drawings for 5-section group

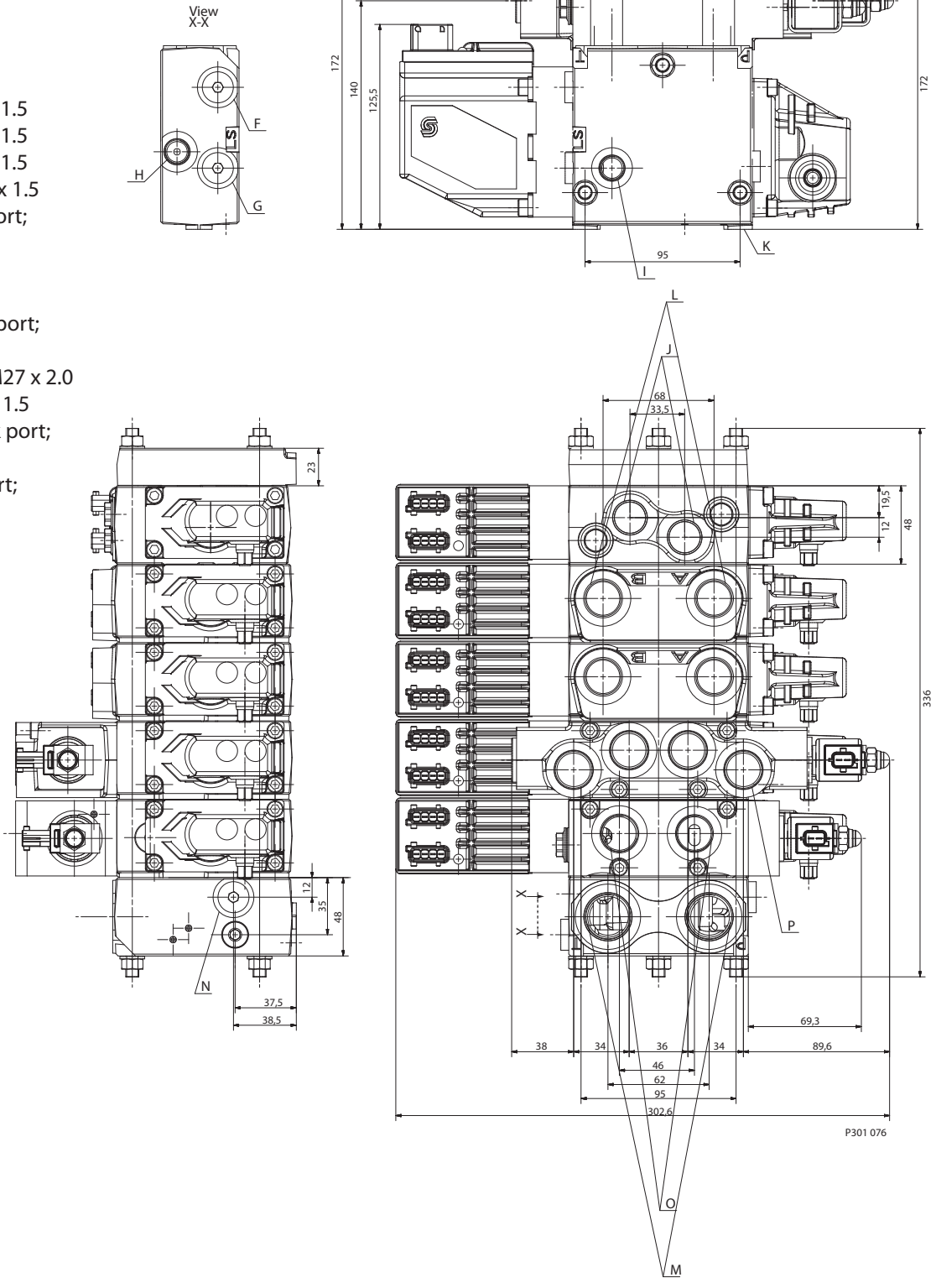
- PVG 32: 5 section valve group, example with 1 Hitch double acting (PVBZ-HD), 1 Aux. valve PVBZ with PVBD diverter valve slice, 2 Aux. Valve PVBZ and 1 Aux. valve PVB.
- To be supplied with LS variable piston pump.
- PVED-CC with APM-JPT connector.



PVPV	PVBZ-HD	PVBZ-PVBD	PVBZ	PVBZ	PVB	PVS
11003806	11032961 11027604	157B6958 157B1503	157B6957	157B6957	157B6850	157B2000

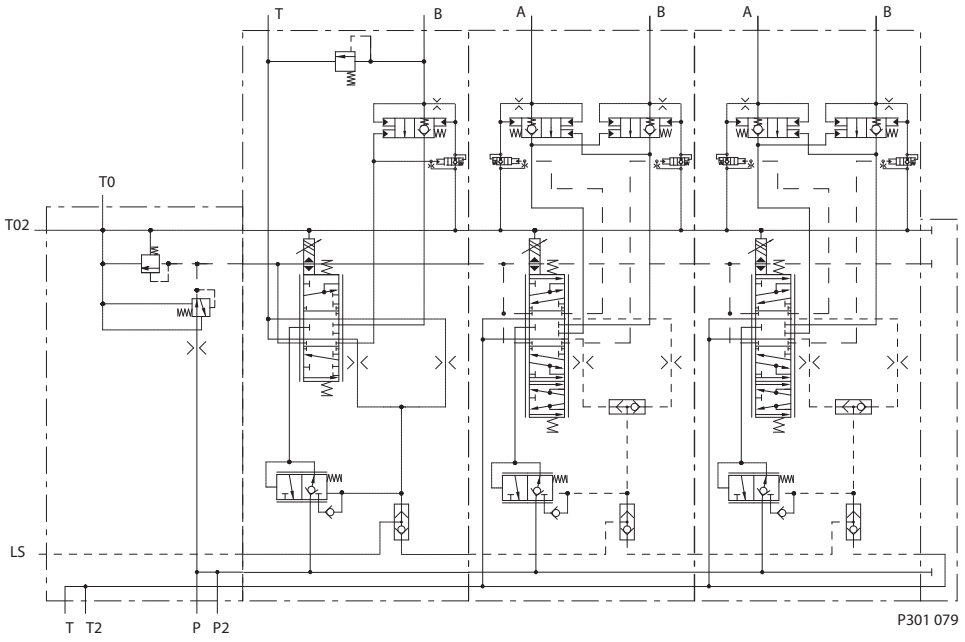
Drawings for 5-section group

F: Port T2; M14 x 1.5
G: Port T0; M14 x 1.5
H: Port LS; M14 x 1.5
I: Port T02; M14 x 1.5
J: PVB A and B port; M22 x 1.5
K: Fixing holes; M8 x min. 10
L: PVBZ A and B port; M22 x 1.5
M: Port P and T; M27 x 2.0
N: Port P2; M14 x 1.5
O: PVBZ-HD work port; M22 x 1.5
P: PVBD work port; 4 x M22 x 1.5



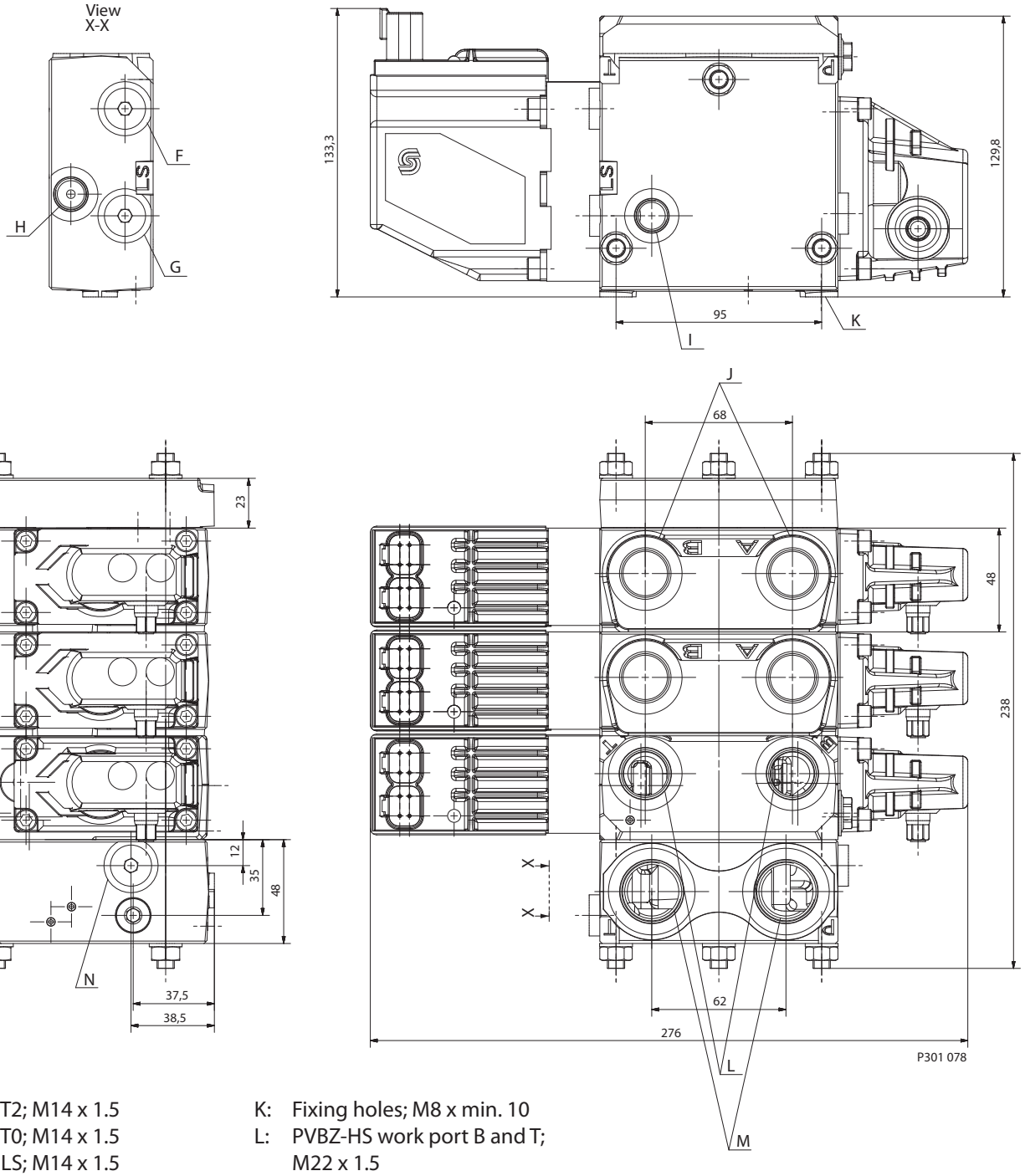
Drawings for 3-section group

- PVG 32: 3 section valve group, example with 1 Hitch single acting (PVBZ-HS) and 2 Aux. valve slices.
- To be supplied with LS variable piston pump.
- PVED-CC with Deutsch DT connector.



PVPV	PVBZ-HS	PVBZ	PVBZ	PVS
11003806	157B6968	157B6957	157B6957	157B2000

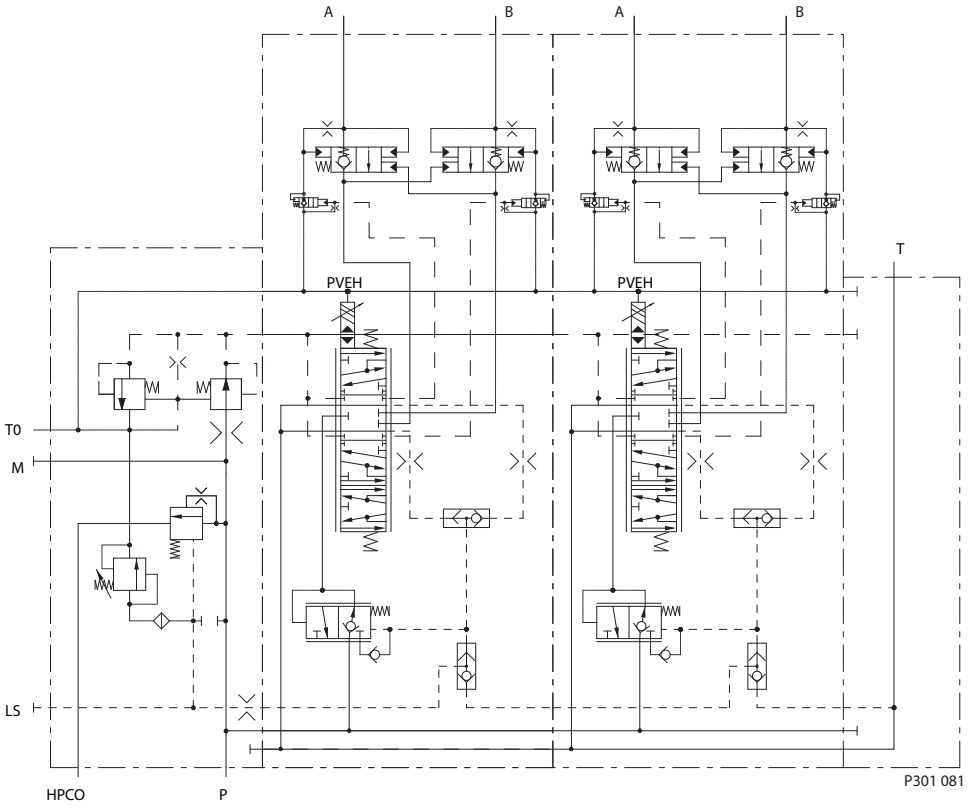
Drawings for 3-section group



F: Port T2; M14 x 1.5
G: Port T0; M14 x 1.5
H: Port LS; M14 x 1.5
I: Port T02; M14 x 1.5
J: Port A and B; M22 x 1.5
K: Fixing holes; M8 x min. 10
L: PVBZ-HS work port B and T; M22 x 1.5
M: Port P and T; M27 x 2.0
N: Port P2; M14 x 1.5

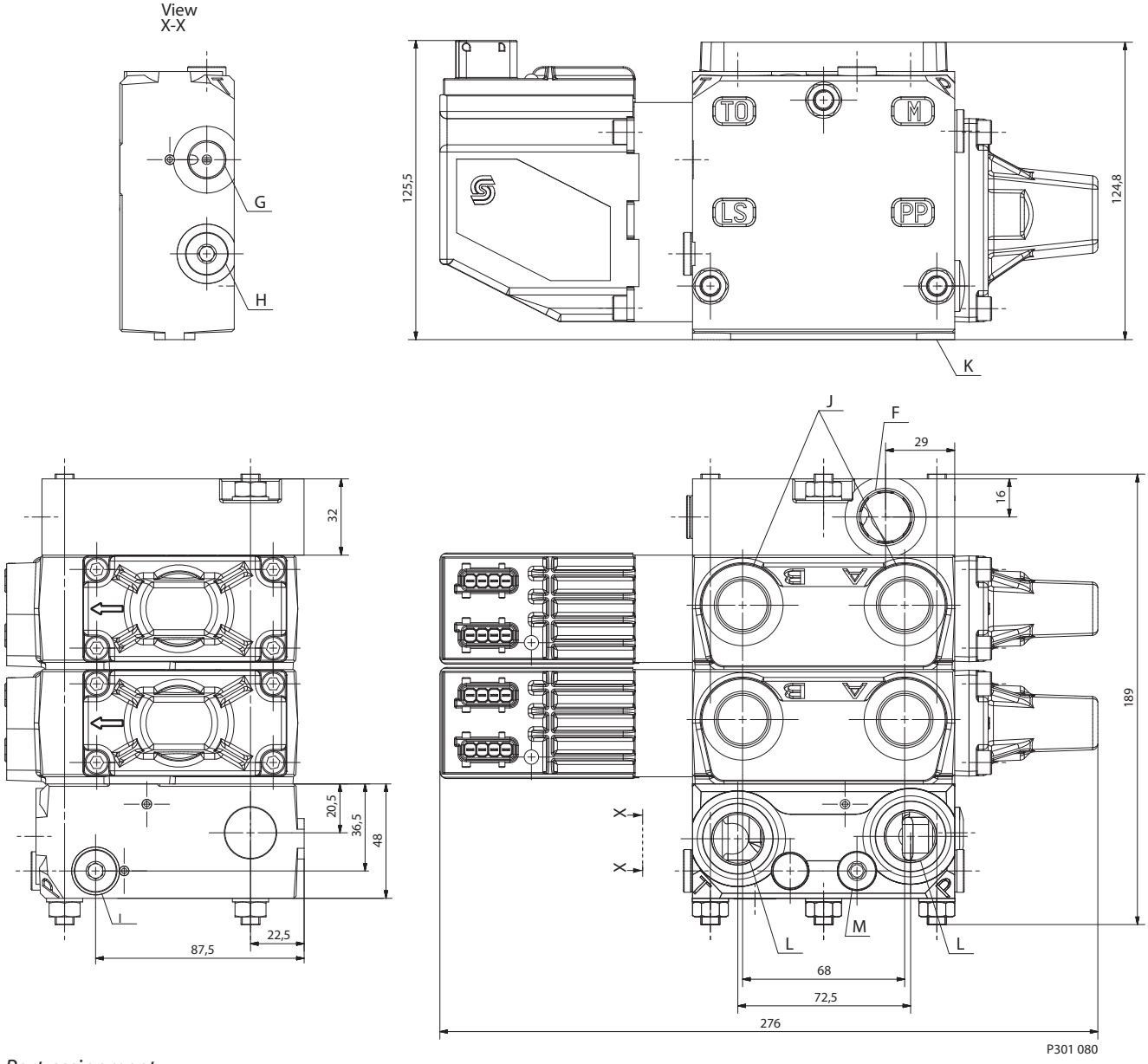
Drawings for 2-section group

- PVG 32: 2 section valve group, typical example for Loader application for tractors.
- To be supplied with fixed pump. The PVP inlet has HPCO feature, consequently the PVT has tank port.
- PVED-CC with APM-JPT connector.



PVP	PVBZ	PVBZ	PVST
157B5961	157B6957	157B6957	11004462

Drawings for 2-section group



Port assignment:

F: Port T; M22 x 1.5
G: Port T0; M14 x 1.5
H: Port LS; M14 x 1.5
I: Port M gauge; M14 x 1.5
J: Port A and B; M22 x 1.5
K: Fixing holes; M8 x min. 10
L: Port P & HPCO; M27 x 2.0
M: Pressure relief valve

Order Specification

PVG 32
Specification Sheet

Subsidiary/Dealer		**PVG No.**	
Customer		**Customer No.**	
Application		**Revision No.**	

Function	A-Port				B-Port	
		0 157B	157B			
		p =	bar	157B		
	a 157B	**1** 157B	157B	**13**	157B	**c**
	b 157B		LS_A bar	LS_B bar	157B	**b**
	a 157B	**2** 157B	157B	**13**	157B	**c**
	b 157B		LS_A bar	LS_B bar	157B	**b**
	a 157B	**3** 157B	157B	**13**	157B	**c**
	b 157B		LS_A bar	LS_B bar	157B	**b**
	a 157B	**4** 157B	157B	**13**	157B	**c**
	b 157B		LS_A bar	LS_B bar	157B	**b**
	a 157B	**5** 157B	157B	**13**	157B	**c**
	b 157B		LS_A bar	LS_B bar	157B	**b**
	a 157B	**6** 157B	157B	**13**	157B	**c**
	b 157B		LS_A bar	LS_B bar	157B	**b**
	a 157B	**7** 157B	157B	**13**	157B	**c**
	b 157B		LS_A bar	LS_B bar	157B	**b**
	a 157B	**8** 157B	157B	**13**	157B	**c**
	b 157B		LS_A bar	LS_B bar	157B	**b**
	a 157B	**9** 157B	157B	**13**	157B	**c**
	b 157B		LS_A bar	LS_B bar	157B	**b**
	a 157B	**10** 157B	157B	**13**	157B	**c**
	b 157B		LS_A bar	LS_B bar	157B	**b**
Remarks		**11** 157B				
		12 157B				

Filled in by	Date

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Separate specification pads with 50 sheets are available under the literature no. **520L0515**.

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