

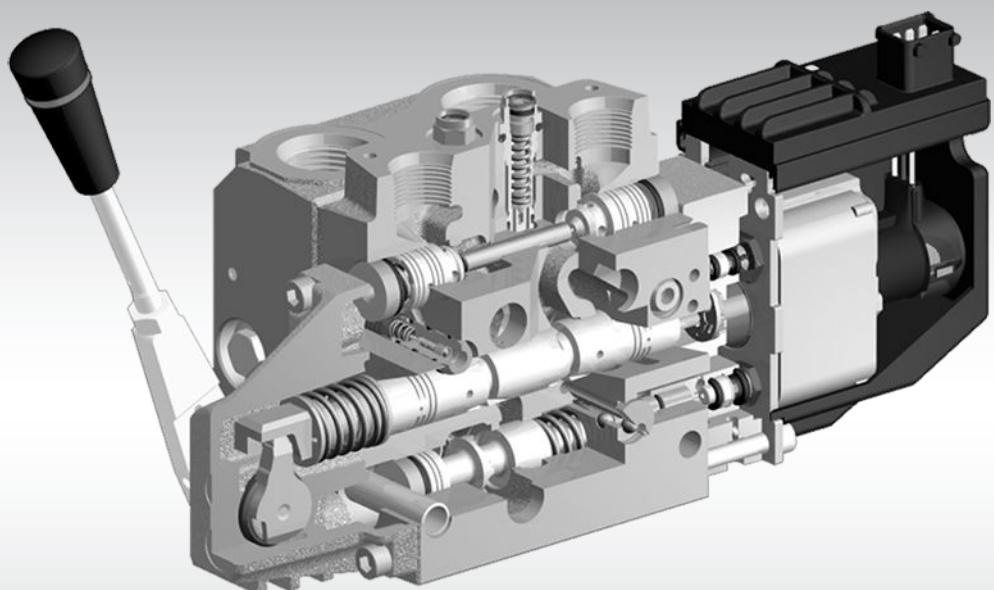
MAKING MODERN LIVING POSSIBLE



Technical Information

PVBZ, Basic Module

PVP with Integrated HPCO



Revision history*Table of revisions*

Date	Changed	Rev
May 2014	Converted to Danfoss layout – DITA CMS	CB
January 2010	Drawings change page 4, 13	CA
Sep 2009	First edition	AA

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Introduction

PVBZ

With the introduction of basic module PVBZ, Danfoss can now supply basic modules with integrated pilot operated check valves.

The PVBZ load compensated module is developed for applications, where integrated pilot operated check valves in the work ports are required to limit the work port leakage down to a minimum (below 1 cm³ [0.06 in³] per minute).

The new PVBZ basic module can only be mixed with basic modules PVB and PVP pumpside modules mentioned in this Tech Note and offers the following features:

- Integrated pilot operated check valves for low internal leakage
- Integrated thermal relief valve
- Standard 4/3 spools
- 4/4 float spools
- Interchangeable spools

PVP with Integrated HPCO

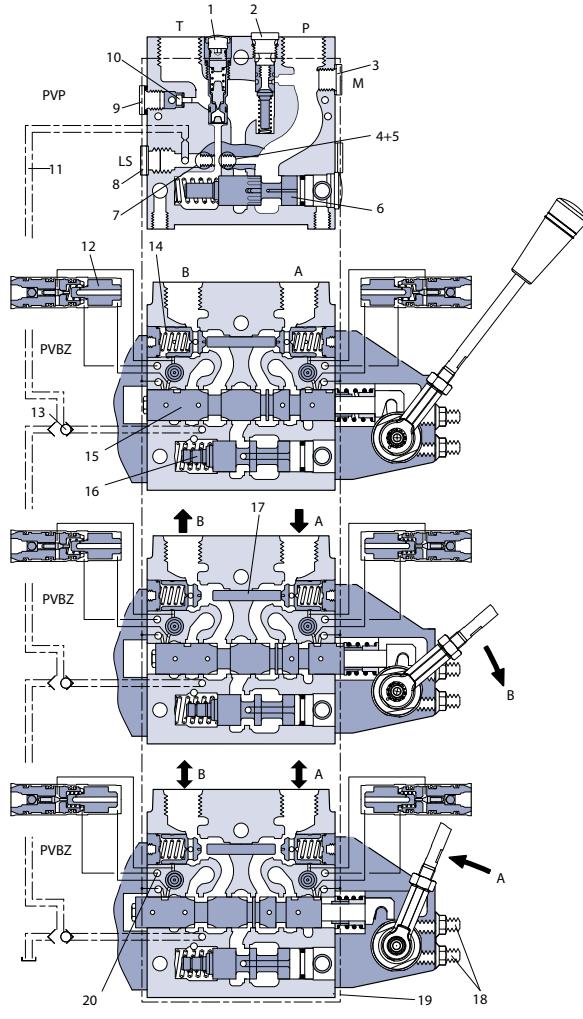
Together with the introduction of PVBZ (and PVB with separate tank line T0)

Danfoss can now also supply PVG 32 valves with integrated HPCO functionality (High Pressure Carry Over).

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 new PVP pump side module with integrated HPCO function can only be mixed with PVB, PVBZ and PVST mentioned in this Tech Note and offers the following features:

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

Function
Sectional view

Legend:

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

Function

(157B: 5130, 5131, 5330 and 5331 only)

Function

When main spools (15) are in neutral position, the pilot operated check valves (hereafter POC) are kept closed by a spring plus the work port load, which is directed to the spring side of the POC (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 POC 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 POC is released to a separate tank T0 (20) via a seat valve and allow the POC to open and let return flow pass across the main spool back to tank.

For float function, both POC are released to tank at the same time like described above.

In some applications with 3/3 spools and low load pressure (eg. Hitch applications), it is necessary to force open the POC by a pin (17). This pin is actuated by means of pump pressure on the A portside.

PVBZ modules cannot be option mounted (PVM on B - Port side).

The separate tank connection T0 is needed to ensure proper performance of the POC's regardless of the pressure in main tank line T. It is therefore necessary to connect the T0 port (9) in the Inlet PVP directly to the oil reservoir with a separate hose.

Thermal relief valves (157B6261, 157B6262, 157B6266 157B6661, 157B6662 and 157B6666) can be integrated to ensure that unintended high pressure between POC and cylinder/motor is not built up by means of external heat source. The setting of the thermal relief is fixed to 276 bar [4003 psi], max. capacity 1 l/min [0.264 US gal/min].

If tank connection T0 is not used, plug (10) must be removed. Pos 10 is not part of 157B5132, 157B5133, 157B5332 and 157B5333 and therefore T0-port (9) in 157B5132, 157B5133, 157B5332 and 157B5333 must always be connected to tank. PVBZ can only be used in combination with PVB and PVP mentioned in this Tech Note.

When using PVB, PVBZ and PVP (157B5140, 157B5142, 157B5340 and 157B5342 only) with separate tank line T0 it is possible to pressurize the tank port in PVP having HPCO function.

Return flow from A and B ports of PVG 32 must be guided to tank via separate tank port in the end plate PVST (157B2500 and 157B2520).

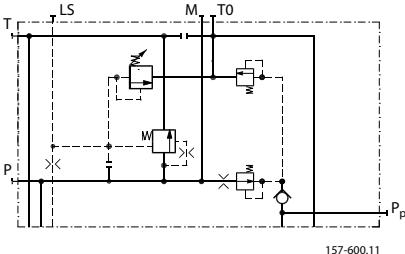
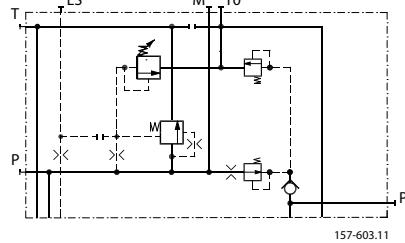
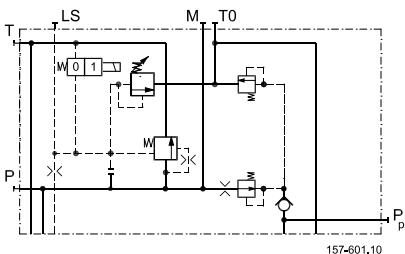
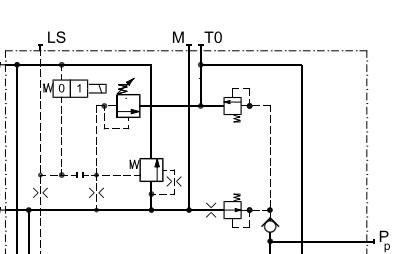
T0 tank port in PVP 157B5140, 157B5142, 157B5340 and 157B5342 must always be connected to tank, see [hydraulic diagram](#) and [PVG 32 Specification Example for Valve Group with HPCO](#) for according specification.

Technical Data

Technical data

Max. pressure	Port P, continuous	210 bar	[3045 psi]
	Port A/B	210 bar	[3045 psi]
	Port T, static/dynamic	25 bar/40 bar	[365/580 psi]
Oil flow, rated	Port P	140 l/min	[37 US gal/min]
	Port A/B, with press. comp.	100 l/min	[26.4 US gal/min]
	Port A/B , without press. comp.	125 l/min	[33 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 mm²/s [102 SUS]; A/B → T		1 cm ³ /min	[0.06 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	

PVP Pump Side Module with T0
PVP, pump side modules with T0 code numbers

Symbol	PVP description	Code number	
		BSP version	SAE version
	Open centre pump side module for pumps with fixed displacement External T0; possible to connect T0 to internal tank With pilot supply for electrical actuation	157B5130	157B5330
	Closed centre pump side module for pumps with variable displacement External T0; possible to connect T0 to internal tank With pilot supply for electrical actuation	157B5131	157B5331
	Open centre pump side module for pumps with fixed displacement External T0 With pilot supply for electrical actuation and connection for pilot oil pressure. Facility for LS unloading valve, PVPX	157B5132	157B5332
	Closed centre pump side module for pumps with variable displacement External T0 With pilot supply for electrical actuation and connection for pilot oil pressure. Facility for LS unloading valve, PVPX	157B5133	157B5333

PVP Pump Side Module with T0

Symbol	PVP description	Code number	
		BSP version	SAE version
	Open centre pump side module for pumps with fixed displacement External T0 With pilot supply for electrical actuation Blocked T line for HPCO	157B5140	157B5340
	Open centre pump side module for pumps with fixed displacement External T0 With pilot supply for electrical actuation and connection for pilot oil pressure. Facility for LS unloading valve, PVPX Blocked T line for HCPO	157B5142	157B5342

P and T-port connection: G 3/4 [1 1/16 in-12]

PVBZ Basic Module with T0
PVBZ basic modules with T0 code numbers
PVBZ basic modules with T0, with thermal relief valve

Symbol	PVBZ description Max. work port pressure 210 bar [3045 psi]	Code No. 157B....	
		BSP	SAE
	With compensator and thermal relief valve With pilot operated check valves on work port B Compensated work port flow A/B = 100 l/min [26.4 US gal/min]	6261	6661
	With compensator and thermal relief valve With pilot operated check valves on work port A and B Compensated work port flow A/B = 100 l/min [26.4 US gal/min]	6262	6662
	With compensator and thermal relief valve With pilot operated check valves on work port A and B LS_A/B shuttle valve for float and shuttle pin Compensated work port flow A/B = 100 l/min [26.4 US gal/min]	6266	6666

PVBZ Basic Module with T0
PVBZ basic module with T0, without thermal relief valve

Symbol	PVBZ description Max. work port pressure 210 bar [3045 psi]	Code No. 157B....	
		BSP	SAE
	Without thermal relief valve Without compensator and load drop check valve With pilot operated check valves on work port B	6051	6451
	Without thermal relief valve Without compensator and load drop check valve With pilot operated check valves on work port A and B	6052	6452
	Without thermal relief valve With compensator With pilot operated check valves on work port B Compensated work port flow A/B = 100 l/min [26.4 US gal/min]	6251	6651
	With compensator With pilot operated check valves on work port A and B Compensated work port flow A/B = 100 l/min [26.4 US gal/min]	6252	6652

A and B-port connection: G 1/2 [7/8 in – 14].

Seal kit for PVBZ: 157B6989

PVB Basic Module with T0
PVB basic modules with T0 code numbers

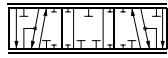
Symbol	PVB description	Code number 157B.....			
		W/O PVLP 63		With PVLP 63	
		BSP	SAE	BSP	SAE
	Without load drop check valve and pressure compensator. Can be used where load holding valves prevent oil from floating back through the channel P.	6010	6410	-	-
	Load drop check valve	6110	6909	6140	6904
	With compensator valve	6210	6922	6240	6906
	With compensator valve Adjustable LS A/B limiting valves. External LS connection port A/B. Also used for float position spools.	6213	6613	6243	6643

A and B-port connection: G 1/2 [7/8] in – 14].

Standard Spools for PVBZ
End Plate PVST

Code number 157B		BSP G 1/2	SAE 7/8 in - 14
	PVST without active elements Tank port connection V310064.A	2500	2520

Standard FC-spoils for PVBZ (Electrical and Mechanical Actuation)

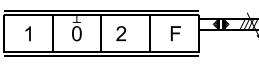
Code number 157B....	Pressure compensated flow l/min [US gal/min]					
Symbol	5 [1.3]	10 [2.6]	25 [6.6]	40 [10.6]	65 [17.2]	100 [26.4]
 157-636.11 4-way, 3-position	9405	9400	9401	9402	9403	9404

Standard Float Spools for PVBZ (Electrical Actuation)

Code number 157B....	Pressure compensated flow l/min [US gal/min]					
Symbol	5 [1.3]	10 [2.6]	25 [6.6]	40 [10.6]	65 [17.2]	100 [26.4]
 157-635.11 4-way, 3-position Float P > A > F	9415	9410	9411	9412	9413	9414

Float spools to be used in combination with PVBZ modules, 157B6266 and 157B6666 only.

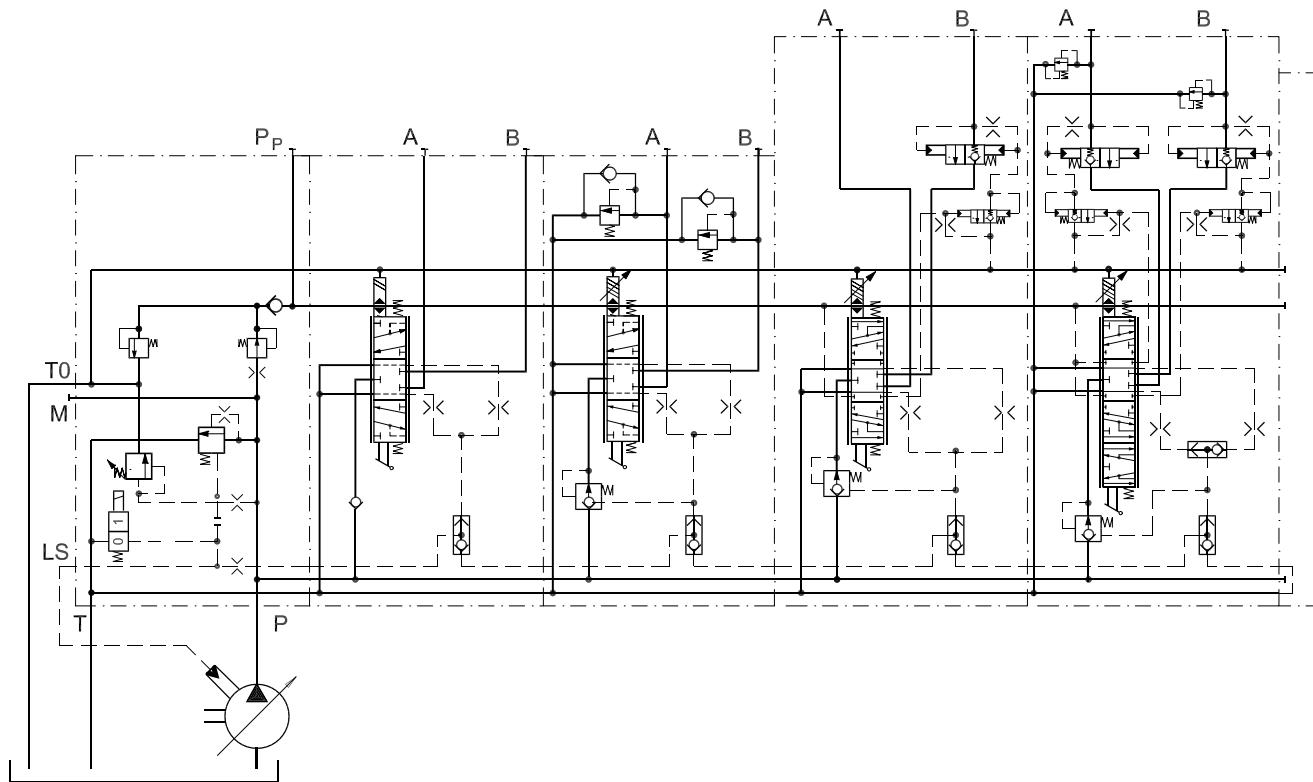
PVEH-F electrical actuation

Symbol	Description	Code number
 157-190.10	PVEH-F Proportional high, Active fault monitoring, Multivoltage 11 - 32 V Float P > A > F	157B4338*

* 6-pin AMP connector including 4 m [13 ft] cable can be ordered using code No. 157B4974.

Hydraulic Diagram

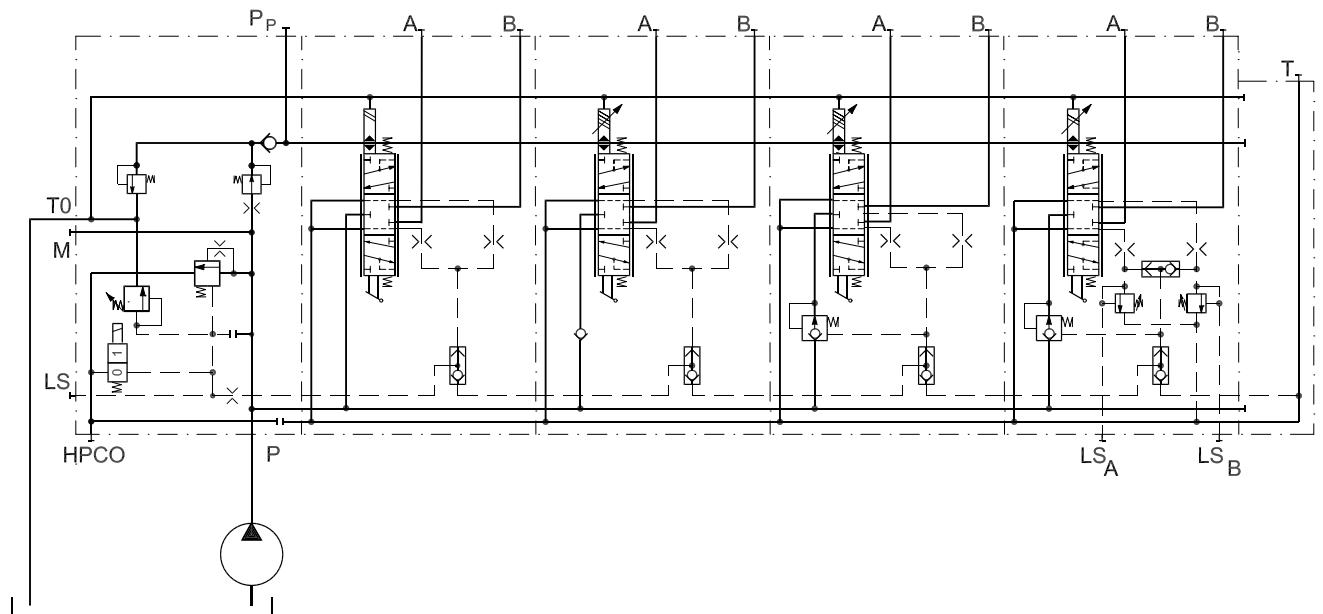
PVG 32 with basic modules PVBZ, including integrated pilot operated check valves



157-637.11

Hydraulic Diagram

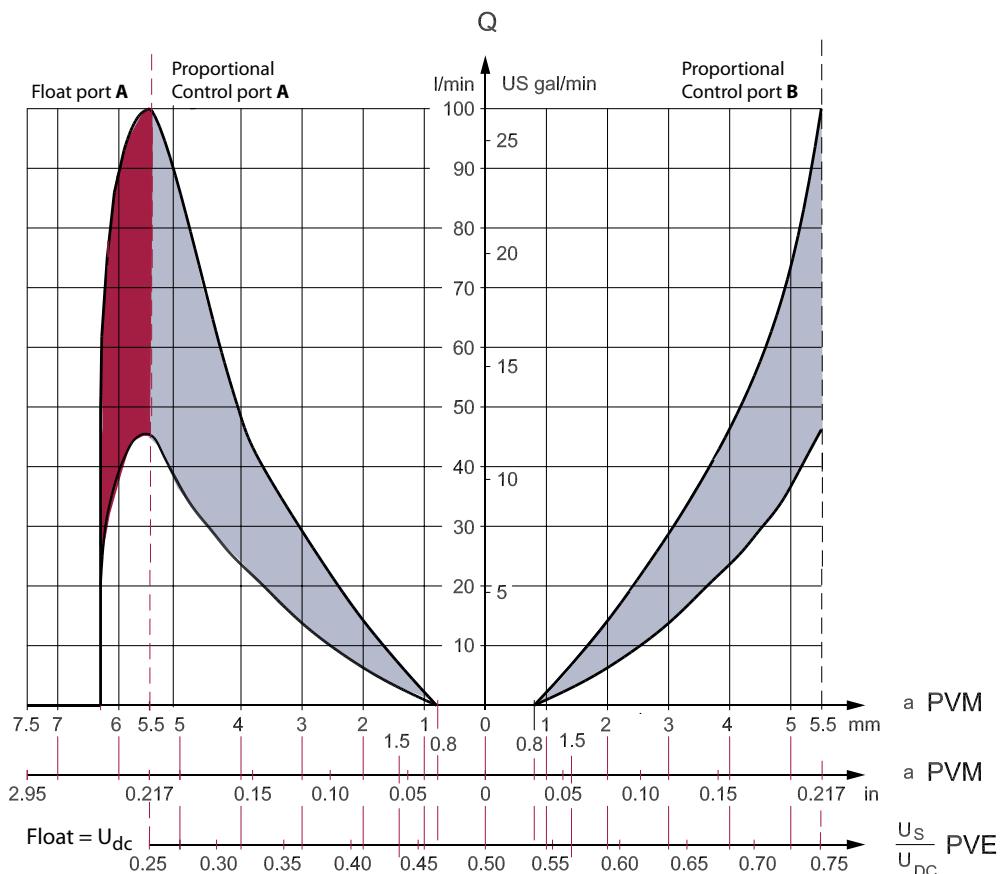
PVG 32 with integrated HPCO (High Pressure Carry Over)



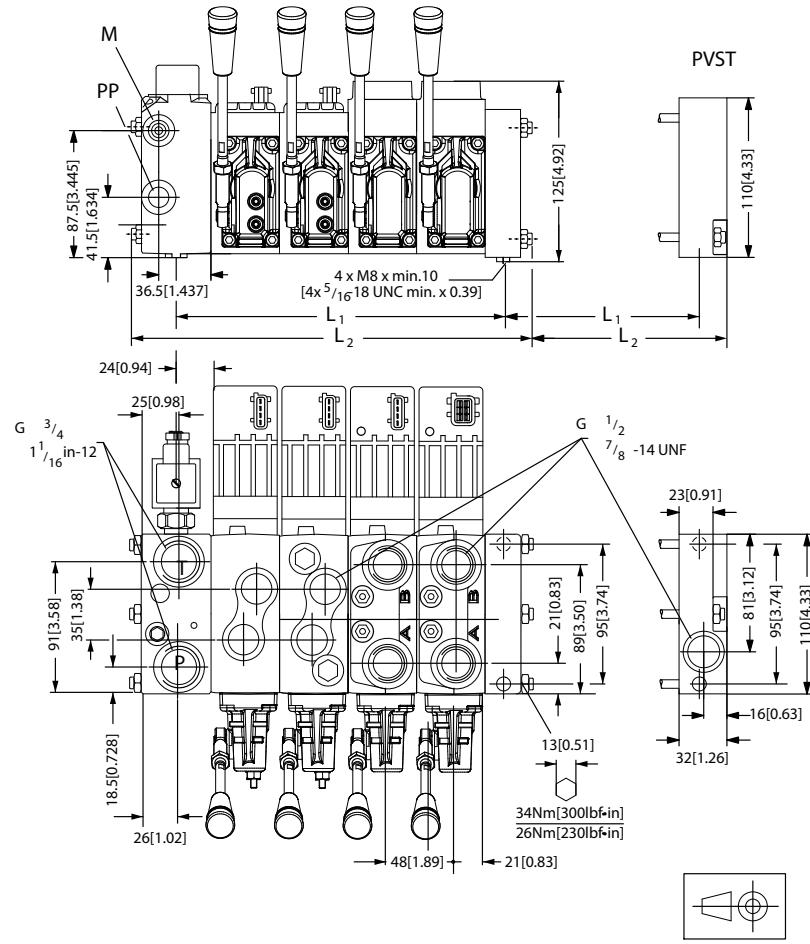
157-675.12

Actuation, PVEH-F

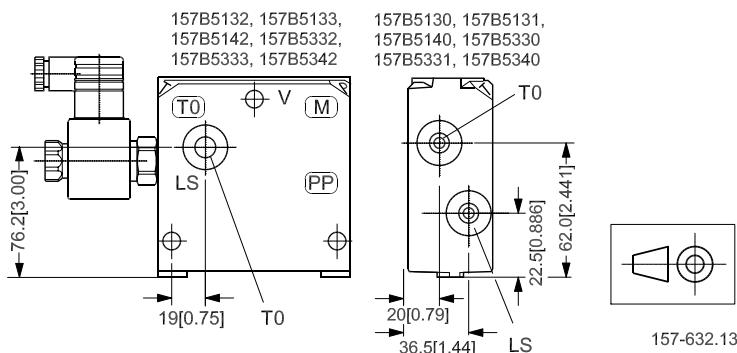
	Function	U_S (pin 1)	Float (pin 5)
	Neutral	$0.5 \times U_{DC}$	0
	$Q: \rightarrow A$	$(0.5 \rightarrow 0.25) \times U_{DC}$	0
	$Q: \rightarrow B$	$(0.5 \rightarrow 0.75) \times U_{DC}$	0
	Float	None or any voltage U_{DC}	U_{DC}



Dimensions



V310127.A



Port connections T0, M, PP, LS: G 1/4 [1/2 in - 20]

To have easier access to fittings when building valve groups with a mix of PVB and PVBZ, it is recommended to group PVB and PVBZ - see also [PVG 32 with basic modules PVBZ, including integrated pilot operated check valves](#) on page 14.

PVB	1	2	3	4	5	6	7	8	9	10
L1 mm [in]	82 3.23	130 5.12	178 7.01	226 8.90	274 10.79	322 12.68	370 14.57	418 16.46	466 18.35	514 20.24

Dimensions

PVB	1	2	3	4	5	6	7	8	9	10
L2 mm [in]	140 5.51	189 7.44	238 9.37	287 11.30	336 13.23	385 15.16	434 17.09	483 19.02	532 20.95	581 22.87

Specification sheet examples

PVG 32 Specification Example for Valve Group with PVBZ

PVG 32
Specification Sheet

Subsidiary/Dealer		PVG No.					
Customer		Customer No.					
Application		Revision No.					
Function	A-Port	O 157B 5142 p = 210	157B4236 bar 157B	B-Port			
	a 157B 3171	1 157B 6010	157B 7001	13	157B 4901	c	
	b 157B	LS _A	bar	LS _B	bar	157B b	
	a 157B 3171	2 157B 6110	157B 7002	13	157B 4734	c	
	b 157B	LS _A	bar	LS _B	bar	157B b	
	a 157B 3193	3 157B 6210	157B 7003	13	157B 4034	c	
	b 157B	LS _A	bar	LS _B	bar	157B b	
	a 157B 3193	4 157B 6213	157B 7024	13	157B 4834	c	
	b 157B	LS _A 50	bar	LS _B 150	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 157B2500					
		12 157B8004					
Filled in by					Date		

Specification sheet examples

PVG 32 Specification Example for Valve Group with HPCO

PVG 32
Specification Sheet

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

Function	A-Port	0 157B 5142 p = 210	157B4236 bar 157B	B-Port
a 157B 3171	1 157B 6010	157B 7001	13	157B 4901 c
	LS _A bar	LS _B bar		157B b
a 157B 3171	2 157B 6110	157B 7002	13	157B 4734 c
	LS _A bar	LS _B bar		157B b
a 157B 3193	3 157B 6210	157B 7003	13	157B 4034 c
	LS _A bar	LS _B bar		157B b
a 157B 3193	4 157B 6213	157B 7024	13	157B 4834 c
	LS _A 50 bar	LS _B 150 bar		157B b
a 157B	5 157B	157B	13	157B c
	LS _A bar	LS _B bar		157B b
a 157B	6 157B	157B	13	157B c
	LS _A bar	LS _B bar		157B b
a 157B	7 157B	157B	13	157B c
	LS _A bar	LS _B bar		157B b
a 157B	8 157B	157B	13	157B c
	LS _A bar	LS _B bar		157B b
a 157B	9 157B	157B	13	157B c
	LS _A bar	LS _B bar		157B b
a 157B	10 157B	157B	13	157B c
	LS _A bar	LS _B bar		157B b
Remarks		11 157B2500		
		12 157B8004		

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