

Instructions manual for:

- Pulsation damping valve (PDV)
- Pulsation damping valve with damper disc (PDV-DS)



Translation of the original German instructions manual

Responsible for the document: pulsmin / H. Lütte / Seelhofstraße 24 / D-79539 Lörrach

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1. Information for the reader:

This manual contains information and rules of conduct for the safe and proper operation of the product.

Observe the following principles:

- Read the instructions before commissioning/using completely.
- Make sure that everyone who works with/or on the product has read and follows the instructions.
- Only trained and qualified personnel should install, adjust or service the valves.
- Keep the instructions during the life of the product.
- Share the instruction manual to any subsequent owner of the product.
- If you have any questions about the valves we are at your disposal. See our contact address at the found in the footer.

Your **pulsmin**

1.1 Limitation of Liability:

All information and instructions in this manual were taken into account the applicable Standards and regulations, the state of the art as well as our many years of experience and experiences.

The manufacturer is not liable for damages due to:

- Failure to follow the instructions.
- Improper use.
- Use of untrained personnel.
- Unauthorized modifications.
- Technical changes.
- Use of non-approved spare and wear parts.

The actual scope of delivery may be for special designs, the use of additional order options or due to technical changes deviate from the explanations and illustrations described here. Incidentally agreed in the delivery obligations, the general terms and conditions and the conditions of the manufacturer and the valid at the time of contracting legal regulations apply.

HINTS!



2. Input control:

Check directly after delivery, the valves for any transport damage or defects and with reference to the accompanying delivery note the number of parts.

3. Complaints:

Claims for damages relating to transport damage can only be asserted, if the delivery company is notified without delay.

For the returns (due to transport damage / repairs), prepare a damage report immediately and send the parts back to (after prior consultation with us):

pulsmin / Seelhofstraße 24 / D-79539 Lörrach

Please attach the following information to the return shipment:

- Name, address of the sender / engineer.
- Description of the damage.

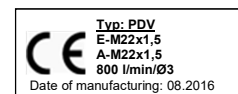
4. Warranty:

For the valves we give a guarantee period in accordance with the purchase agreement.

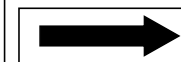
The general terms and conditions of the company pulsmin apply. (<http://www.pulsmin.com/Aqb>)

5. Nameplate:

Depending on the version, the pulsation dampers are provided with several identifications (nameplates), which allows a clear identification and reveals the most important technical data.



Max. operating pressure: 20 bar
Min./Max. operating temperature
-60 / +140°C
www.pulsmin.com



- Type: PDV = Pulsation damping valve
- Type: PDV-DS = Pulsation damping valve with damper disk
- E-MI 22x1,5 or G1 1/2" = Inlet female thread M 22x1,5 or G 1/2"
- A-MA 22x1,5 or GA 1/2" = Outlet male thread M22x1,5 or G 1/2"
- 800 l/min / Ø 3: = Suction volume flow 800 l/min / Bypass bore Ø 3 mm
- = Flow direction

6. Explanation of symbols:

Warning notes are marked by symbols. The indications are initiated by signal words which express the extent of the hazard. It is important that you follow the instructions and act carefully to avoid accidents, personal injury and property damage.

	DANGER! Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
	WARNING! Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	NOTE! Highlights useful tips and recommendations as well as information for an efficient and trouble-free operation.



Warning!

7. Intended use:

Pulsmin pulsation dampers valves are used for efficient damping of gas pulsation and rapid pressure fluctuations in piping systems between compressor and compressed air dryer. The main field of application is compressed air generation in rail vehicles. Different pulsation dampers are available for the different applications and flow rates, in conjunction with the compressor types used.

	Compressor types	
	¹⁾ Multi vane- screw compressors	²⁾ Piston compressors (oil lubricated as well as oil free)
Pulsation damping valve (PDV)	X	
Pulsation damping valve with damper disk (PDV-DS)		X

Tabelle 1

- ¹⁾ Compressors with pulsation-free pressure air delivery
²⁾ Compressors with strong gas outlet pulsation

	Suction volume flow [l/min]		
	200 – 1000	> 1000 – 2500	> 2500 – 4000
³⁾ Connection nominal width pulsation damper	G ½" or M 22x1,5	G 1"	G 1 ¼"

Table 2

8. Operating limits, medium, permissible temperatures and pressure:

- Medium: Compressed air and gases / Purity, solid contamination: Max. Grain size 50 microns, at a coarser contamination is a screen filter in front of the PVD to install!
- Medium temperature: -60 ° C to + 140 ° C
- Ambient temperature: - 60 ° C to + 140 ° C
- Perm. Pressure: Max 20 bar

9. Structure and mode of Operation / Figures 1, 2,3

9.1 Structure:

The PDV (fig. 1) consists essentially of the:

Valve housing inlet side (1), the housing outlet side (2), the valve piston (3) with valve seat (4) and the compression spring (5). The valve piston has no guide, it is held by the compression spring.

The version PDV-DS (fig. 2) is on the input side additionally provided with a damper disc (6).

9.2 Mode of action:

PDV / Fig. 1 / As a result of a sudden pressure drop on the outlet side, the valve piston closed and the further delivered compressed air passes through the bypass bore in the valve piston. This bore is designed for a pressure loss in the magnitude of the operating pressure. The PDV upstream parts do not realize the pressure drop, they work so to say in a stationary operation. After reaching an equal pressure level (inlet/outlet side of the PDV), the valve opens and the pressure loss is again negligible.

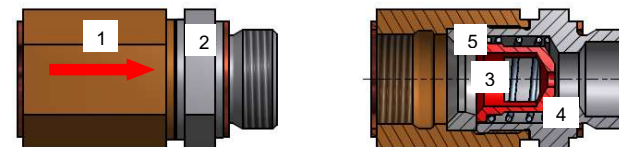


Fig. 1 / Pulsation damping valve (PDV)

PDV-DS / Fig. 2 / Function is the same as PDV, in addition, however, the gas outlet pulsation (from compressor) is damped. The effect of the damper disc is based on reflection and dissipation. The damper disc acts within the pipeline as a reflection point. The propagation of the pressure pulsation in the downstream system is prevented by reflection of the pulsation energy, at the same time "standing waves" are destroyed in the pipeline. Due to the increased fluidic friction in the holes of the damper disc, it has also a dissipative effect.

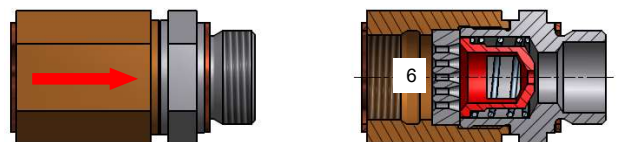


Fig. 2 / Pulsation damping valve with damper disk (PDV-DS)

10. Selection / determination of PDV / PDV-DS, valve size and diameter of the bypass bore

The selection PDV with or without DS takes place depending on the compressor type (see table 2).

The assignment of the valve size, is made via the compressor intake volume flow at maximum compressor speed (see table 1).

The diameters for bypass bore and damper disc are designed individually by pulsmin for each application.

For the design, the following data must be named when ordering:

- Kind of compressor (multi vane, screw or piston compressor)
- Max. suction volume flow compressor [l/min]
- Max. and min. operating temperature [°C]
- Max. operating pressure [barg]

10.1 Installing:



DANGER!

All installation, maintenance and repair work may only be done by electrically switched off and secured (again switch on), unpressurized system!

10.2 Installation dimensions and weight:

See ordering documents / dimension sheet.

10.3 Installation place:

The installation location of PDV / PDV-DS is between the air outlet port compressor and the air

inlet port air dryer. Preferably, the PDV / PDV-DS is to be installed directly in the compressed air inlet port of the dryer (Scheme 1).

Before installing the PDV, the pipeline must be cleaned, as welding beads, metal shavings etc. lead to malfunctions.

The compressed air line from the compressor to the PDV / dryer must be laid with a gradient in the direction of flow (Fig. 4), in order to prevent accumulation of condensate.

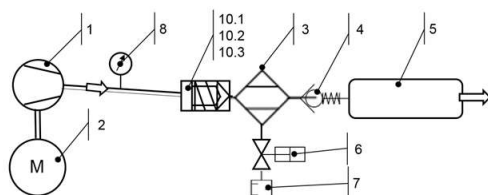
Water sacks (Fig. 5) should generally be avoided!



Fig. 4

Fig. 5

- 1 Compressor
- 2 Driving motor
- 3 Adsorption air dryer
- 4 Non return valve
- 5 Storage container
- 6 Idle.- drain valve
- 7 Silencer
- 8 Pressure gauge
- 9 -
- 10.1 PDV
- 10.2 PDV-DS
- 10.3 PDV-BP



Scheme 1

10.4 Installation position:

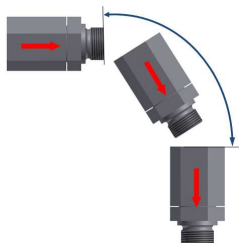


Fig. 6 / PDV / PDV-DS / allowed installation horizontal to vertical / pay attention to the flow direction!

10.5 Adjusting of the PDV / PDV-DS

PDV and PDV-DS do not require adjustment. The valves are manufactured / supplied according to the data you have specified when ordering (volume flow and desired holding pressure), see chapter 10.



Danger!

The PDV must not be opened when the system is under pressure!

11. Functional test:

To safeguard the PDV function, the function must be checked during initial installation.



The test will be done by a pressure measurement in the flow direction before the PDV. In case of a sudden pressure drop, the PDV should close, the pressure before PDV should not drop down by more than 1 - 3 bar. If the pressure drop is > 3 bar, the bypass bore is too large and the valve piston should be replaced by a piston with a smaller bore.

With closed discharge (pump up), the PDV must open again when reaching approximately the same pressure levels (before or after PDV).

12. Maintenance / wear

Due to the used materials, even against aggressive media, as well as the wear resistance, the PDV / PDV-DS / PVD-BP is maintenance-free ¹⁾

¹⁾ All components made of stainless steel (1.4301), pressure spring durable designed.

13. Remove PDV / PDV-DS



DANGER!

All installation, maintenance and repair work may only be done by electrically switched off and secured (again switch on), unpressurized system!

14. Disposal PDV / PDV-DS

PDV must be disposed in according to the respective country-specific regulations. Non-recyclable materials must be disposed in an environmentally manner.

15. Malfunctions, Troubleshooting and Remedy

The holding pressure is above the operating pressure / safety valve blows off:

Cause / Valve internal parts are added by dirt.

Remedy / Dismount and clean the valve.

Cause / Bypass bore too small.

Remedy / The inside diameter of the bypass bore and the pressure spring must be reworked to the current volume flow / pressure.

The PDV does not close:

Cause / The pressure fluctuation / pressure drop is too weak.

This phenomenon occurs when the discharge does not abruptly occur.

Remedy / Replace the compression spring in the pulsation damping valve by a weaker compression spring

Cause / The discharge outlet at the air dryer is dirty (for example, silencer)

Remedy / Clean the discharge outlet.

Subject to change without notice

EC Declaration of Incorporation



Declaration of incorporation within the meaning of EC Directive 2006/42 / EC on machinery (Annex II B)

Hereby we declare that the following incomplete machine meets all the essential requirements of the Machinery Directive 2006/42 / EC, as far as it is possible within the scope of delivery. Further, we declare that the specific technical documentation has been prepared in accordance with Part B of Annex VII to this Directive. We undertake to provide the market surveillance authorities, upon reasonable request, with the specific documents relating to the incomplete machine via our documentation department. The partly completed machine may only be commissioned if it has been determined that the machine or plant in which the incomplete machine is to be installed complies with the provisions of Machinery Directive 2006/42 / EC and the EC Declaration of Conformity in accordance with Annex II A is issued.

Manufacturer:

pulsmin

Seelhofstraße 24
D – 79539 Lörrach

Authorized Representative established in the EU:

Hansjakob Lütte
Seelhofstraße 24
D – 79539 Lörrach

Authorized representative for the technical documentation:

Hans Lütte
Seelhofstraße 24
D – 79539 Lörrach

Designation of the devices (type / model)

Pulsation absorber valve Type:
Pulsation absorber valve with damper disk:

Short name:

PDV
PDV-DS

Nominal size / max. permissible overpressure:

G ½" (M22x1,5) / 20 barg
G 1" / 20 barg
G 1 ¼" / 20 barg

The incomplete machine complies with all provisions of the directive

Machinery Directive **2006/42/EG**

Guideline **2014/68/EU**
Pressure Equipment Directive 97/23/EG

16.01.2018
Hansjakob Lütte
Geschäftsführer
pulsmin, Seelhofstraße 24, D-79539 Lörrach