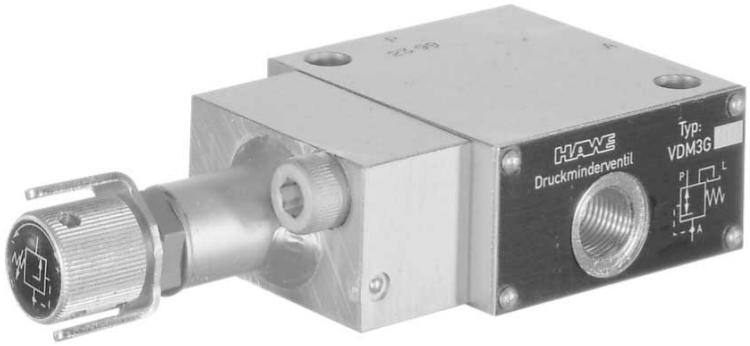
Pressure reducing valve type VDM and VDX

Product documentation

pilot-controlled

Operating pressure p_{max}:	400 bar
Flow rate Q_{max}:	120 lpm



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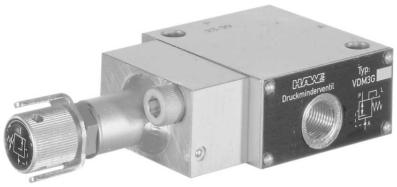
Contents

1 Overview: Pressure reducing valve type VDM and VDX

Pressure reducing valves are a type of pressure control valve. They maintain a largely constant outlet pressure even at a variable (higher) inlet pressure.
The pressure reducing valve type VDM is hydraulically pilot-controlled. These valves feature an override compensation, i.e. acting like a pressure-limiting valve if the secondary pressure exceeds the set pressure e.g. due to external forces. There is a design-related leakage flow.



Pressure reducing valve type VDM

Features and benefits:

- With safety valve function
- Various adjustment options
- Various additional functions

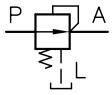
Intended applications:

- General hydraulics
- Jigs
- Test benches

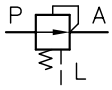
2 Available versions, main data

Circuit symbol:

VDM



VDX



Order coding example:

VDM	3	G	H	R	- 250

- **Pressure specification (bar) for max. outlet pressure**
- **Adjustment** Table 5 Adjustment
- **Pressure range** Table 4 Pressure range
- **Line connection** Table 3 Line connection
- **Size** Table 2 Size
- **Basic type** Table 1 Basic type

Table 1 Basic type

Basic type	Description
VDM	hydraulically pilot-controlled pressure reducing valve
VDX	hydraulically remote-controlled pressure reducing valve Pilot valve PG 1.. according to D 4350 to L line and then unpressurised to the tank

Table 2 Size

Coding	Flow rate Q_{max} (lpm)
3	40
4	80
5	120

Table 3 Line connection

Coding	Description	Size		
		3	4	5
G	Pipe connection	G 1/2 (BSPP)	G 3/4 (BSPP)	G 1 (BSPP)
P	Manifold mounting	--	∅13	--

Table 4 Pressure range

Coding	Adjustment area for outlet pressure (bar)	max. inlet pressure (bar)	max. pressure difference between inlet pressure and outlet pressure (bar)
N	8 ... 100	400	300
H	10 ... 400	400	300

NOTE
Always monitor the pressure gauge when setting or changing the pressure yourself!

Table 5 Adjustment

Coding	Description
No designation	Series, fixed (tool adjustable)
R	Manually adjustable

3 Parameters

General information

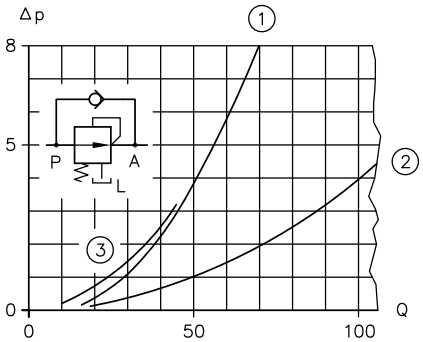
Designation	pressure reducing valve, pilot-controlled
Design	spool valve
Model	manifold mounting, pipe connection
Ports	P - pressure oil input (pump) A - reduced pressure L = drain port (unpressurised to the tank)
Material	Steel; nitrided valve housing, hardened and ground functional inner parts
Installation position	As desired
Flow direction	Work flow direction always P → A, in opposite direction free back pressure possible (see Δp-Q characteristics), P = supply flow (primary side), A = consumer (secondary side)
Leakage oil (control oil drain)	• with all valves independently of the pressure setting approx. 0.40 lpm • escaping at L, unpressurised to the tank
Hydraulic fluid	Hydraulic oil: as per Part 1 to 3; ISO VG 10 to 68 according to DIN 51 519 Viscosity range: min. approx. 4 mm^2/s Optimal operating range: max. approx. 1500 mm^2/s Also suitable for biologically degradable pressure fluids type HEPG (polyalkylene glycol) and HEES (synthetic ester) at operating temperatures up to approx. +70°C.
Cleanliness level	**ISO 4406** 21/18/15...19/17/13
Temperatures	Ambient: approx. -40 ... +80°C, Fluid: -25 ... +80°C, Note the viscosity range! Permissible temperature during start: -40°C (observe start-viscosity!), as long as the service temperature is at least 20K higher for the following operation. Biologically degradable pressure fluids: Observe manufacturer's specifications. By consideration of the compatibility with seal material not over +70°C.

Characteristics

Oil viscosity approx. 32 mm²/s

Δp-Q characteristics

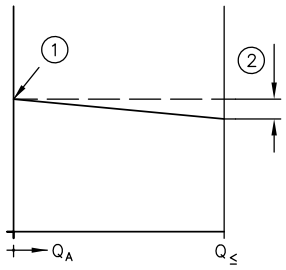
A flow in the opposite direction A → P is only possible with the pilot valve closed, i.e. below the outlet pressure set (control piston in open home position). The return flow should not be greater than approx. 50% of Q_{max} here. If reversal of the flow direction is to be expected during the control process (control piston in throttle position), the control piston would then block the return flow. In such cases or when the full return flow must be possible in control terms, a bypass check valve is required.



Q flow rate (lpm); Δp flow resistance (bar)

1 Size 4
2 Size 5
3 Size 3

Δp-Q_A characteristics



1 Pressure setting
2 Pressure drop approx. 5%

Weight

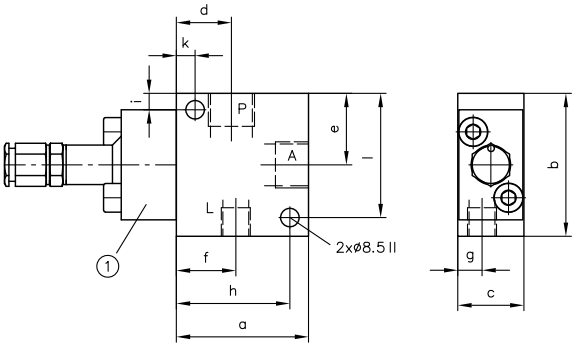
Type	
VDM 3 G	= 1.1 kg
VDM 4 G	= 1.5 kg
VDM 5 G	= 2.0 kg
VDM 4 P	= 2.0 kg

4 Dimensions

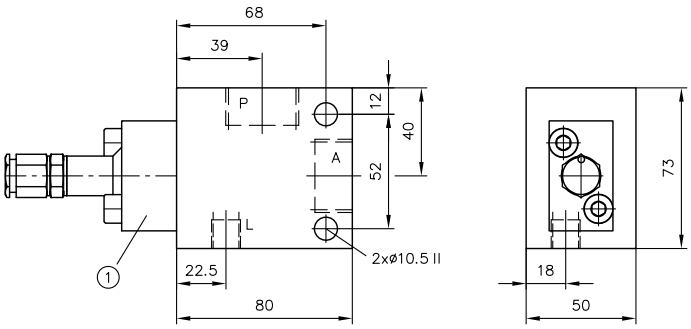
All dimensions in mm, subject to change.

4.1 Pipe connection

VDM 3 G, VDM 4 G
VDX 3 G, VDX 4 G



VDM 5 G
VDX 5 G



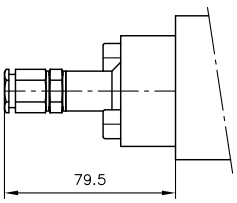
1 Pilot valves see below

Type	a	b	c	d	e	f	g	h	i	k	l
VDM 3 G	60	65	30	25	34	27	11	51.5	7.5	8.5	56.5
VDM 4 G	65	71	40	26.5	39	25	15	55	10	7	60

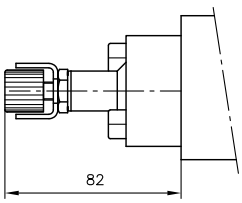
Size	Ports (ISO 228-1) (BSPP)	
	P, A	L
3	G 1/2	G 1/4
4	G 3/4	
5	G 1	

Pilot valves

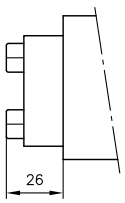
VDM
Fixed



Coding **R**

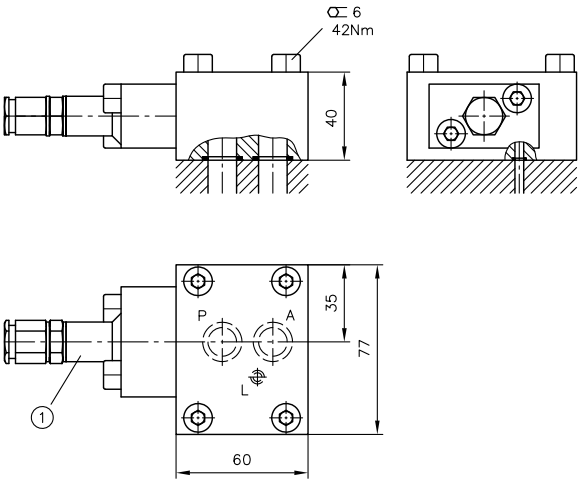


VDX

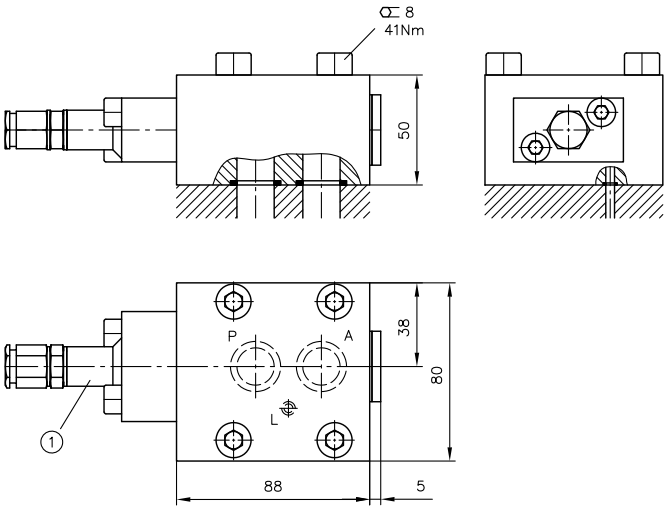


4.2 Manifold mounting

VDM 4 P
VDX 4 P



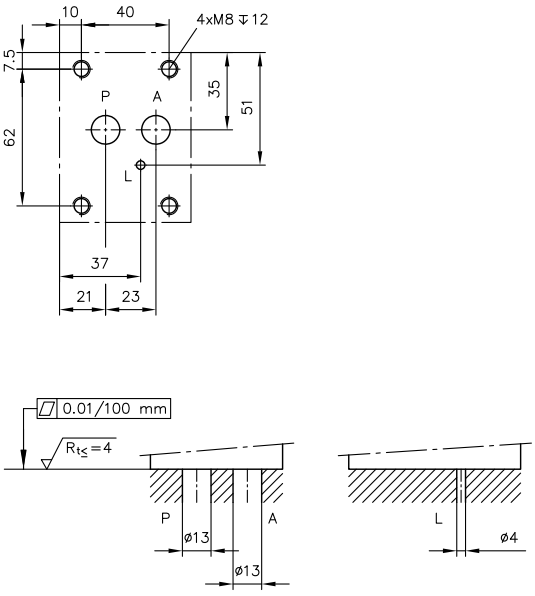
VDM 5 P
VDX 5 P



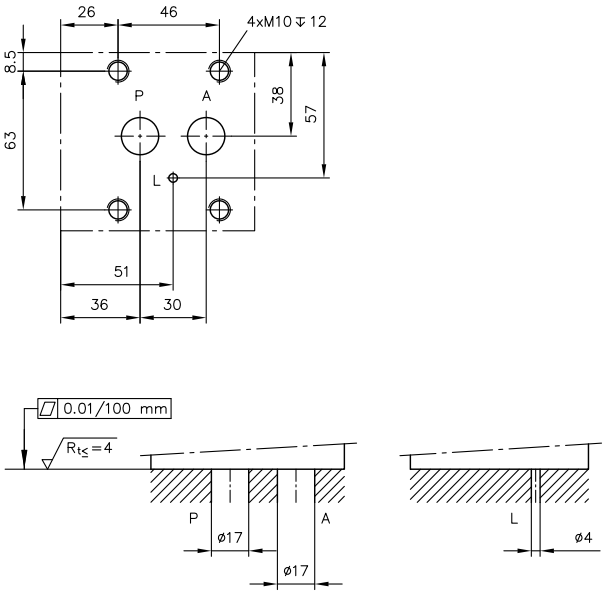
1 Pilot valves see Chapter 4.1, "Pipe connection"

Base plate hole pattern

VDM 4 P
VDX 4 P



VDM 5 P
VDX 5 P



5 Assembly, operation and maintenance recommendations

5.1 Intended use

This valve is exclusively intended for hydraulic applications (fluid engineering).

The user must observe the safety measures and warnings in this documentation.

Essential requirements for the product to function correctly and safely:

- All information in this documentation must be observed. This applies in particular to all safety measures and warnings.
- The product must only be assembled and put into operation by qualified personnel.
- The product must only be operated within the specified technical parameters. The technical parameters are described in detail in this documentation.
- All components must be suitable for the operating conditions in the event of application in an assembly.
- The operating and maintenance manual of the components, assemblies and the specific complete system must also always be observed.

If the product can no longer be operated safely:

1. Remove the product from operation and mark it accordingly.

✓ It is then not permitted to continue using or operating the product.

5.2 Assembly information

The product must only be installed in the complete system with standard and compliant connection components (screw fittings, hoses, pipes, fixtures etc.).

The product must be shut down correctly prior to dismounting (in particular in combination with hydraulic accumulators).

⚠ **DANGER**

Risk to life caused by sudden movement of the hydraulic drives when dismantled incorrectly!

Risk of serious injury or death.

- Depressurise the hydraulic system.
- Perform safety measures in preparation for maintenance.

5.2.1 Creating the mounting hole

See description in Chapter 4, "Dimensions".

5.3 Operating instructions

Note product configuration and pressure / flow rate

The statements and technical parameters in this documentation must be strictly observed.
The instructions for the complete technical system must also always be followed.

NOTE

- Read the documentation carefully before usage.
- The documentation must be accessible to the operating and maintenance staff at all times.
- Keep documentation up to date after every addition or update.

CAUTION

Risk of injury on overloading components due to incorrect pressure settings!
Risk of minor injury.

- Pay attention to the maximum operating pressure of the pump and the valves.
- Always monitor the pressure gauge when setting and changing the pressure.

Purity and filtering of the hydraulic fluid

Fine contamination can significantly impair the function of the hydraulic component. Contamination can cause irreparable damage.

Examples of fine contamination include:

- Metal chips
- Rubber particles from hoses and seals
- Dirt due to assembly and maintenance
- Mechanical debris
- Chemical ageing of the hydraulic fluid

NOTE

Neue Druckflüssigkeit vom Hersteller hat nicht unbedingt die erforderliche Reinheit.
Beim Einfüllen von Druckflüssigkeit ist diese zu filtern.

In order to maintain faultless operation, ensure that the cleanliness level of the hydraulic fluid is correct.
(See Cleanliness level in Chapter 3, "Parameters")

Additionally applicable document: D 5488/1 Oil recommendations

5.4 Maintenance information

Conduct a visual inspection at regular intervals, but at least once per year, to check if the hydraulic connections are damaged. If external leakages are found, shut down and repair the system.

Clean the device surface of dust deposits and dirt at regular intervals, but at least once per year.

6 Other information

6.1 Functional description

Function

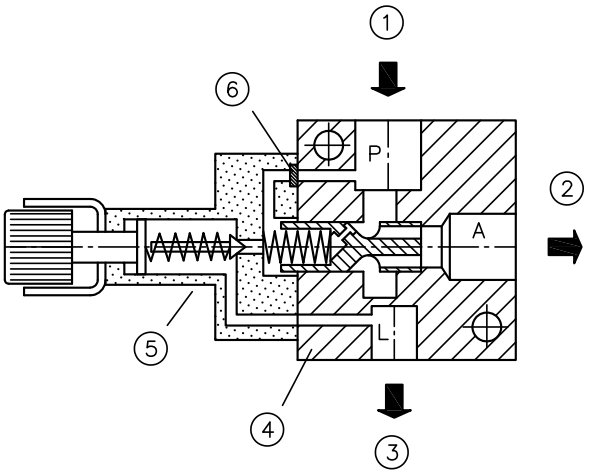
The pressure reducing valve type VDM is hydraulically pilot-controlled. It consists of a main valve and a pilot valve.

The required outlet pressure is set with the pilot valve (flange-mounted pressure-limiting valve).

In the main valve a spring-loaded piston (pressure maintenance valve) is controlled via the pilot valve. The piston continuously changes a flow cross section as a function of the inlet pressure. If the inlet pressure increases, the throttle resistance increases by the same amount. If the inlet pressure drops, the throttle resistance falls by the same amount. This maintains the outlet pressure (= difference between inlet pressure and throttle resistance) at a constant level.

The control oil flow, which is necessary for the control action of the piston, is drained externally via the pilot valve as leakage flow.

Schematic diagram



1 Input
2 Output
3 Leakage oil
4 Main valve
5 Pilot valve
6 Sealing disc

Further information

Additional versions

- Pressure-limiting valve, pilot-controlled type DV, DVE and DF: D 4350
- Pressure-reducing valve type ADM: D 7120
- Pressure-reducing valve type CDK: D 7745
- Proportional pressure-reducing valve type PDM and PDMP: D 7584/1
- Proportional pressure-limiting valve type PDV and PDM: D 7486

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