

# Pressure-reducing valve, pilot-controlled VDM

## Product documentation



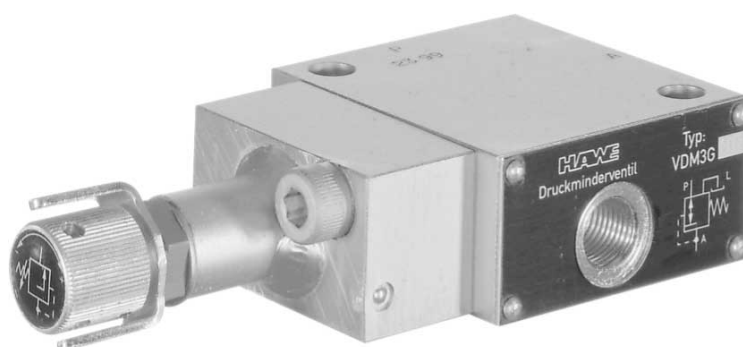
pilot-controlled

Operating pressure  $p_{\max}$ :

400 bar

Flow rate  $Q_{\max}$ :

120 lpm



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## Contents

<b>1</b>	<b>Overview: Pressure reducing valve type VDM and VDX.....</b>	<b>4</b>
<b>2</b>	<b>Available versions, main data.....</b>	<b>5</b>
<b>3</b>	<b>Parameters.....</b>	<b>7</b>
<b>4</b>	<b>Dimensions.....</b>	<b>10</b>
4.1	Pipe connection.....	10
4.2	Manifold mounting.....	11
<b>5</b>	<b>Assembly, operation and maintenance recommendations.....</b>	<b>12</b>
5.1	Intended use.....	12
5.2	Assembly information.....	12
5.2.1	Creating the mounting hole.....	12
5.3	Operating instructions.....	13
5.4	Maintenance information.....	13
<b>6</b>	<b>Other information.....</b>	<b>14</b>
6.1	Functional description.....	14

**1****Overview: Pressure reducing valve type VDM and VDX**

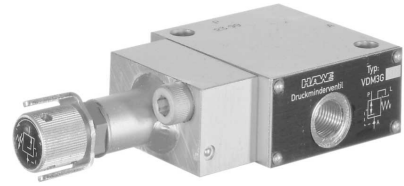
Pressure reducing valves are a type of pressure control valve. They maintain a largely constant outlet pressure even at a variable (higher) inlet pressure. The pressure reducing valve type VDM is hydraulically pilot-controlled. These valves feature an override compensation, i.e. acting like a pressure-limiting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

**Features and benefits:**

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

**Intended applications:**

- General hydraulics
- Jigs
- Test benches

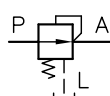


*Pressure reducing valve type VDM*

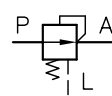
## 2 Available versions, main data

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 <a href="#">D 4350</a> 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	--	Ø13	Ø17

**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

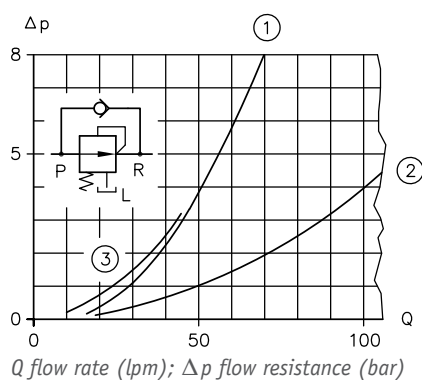
Designation	pressure reducing valve, pilot-controlled
Design	spool valve
Model	manifold mounting, pipe connection
Ports	P - pressure oil input (pump) A - reduced pressure L = drain port (unpressurised to the tank)
Material	Steel; nitrided valve housing, hardened and ground functional inner parts
Installation position	As desired
Flow direction	Work flow direction always P → A, in opposite direction free back pressure possible (see $\Delta p$ -Q characteristics), P = supply flow (primary side), A = consumer (secondary side)
Leakage oil (control oil drain)	<ul style="list-style-type: none"> <li>with all valves independently of the pressure setting approx. 0.40 lpm</li> <li>escaping at L, unpressurised to the tank</li> </ul>
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 <sup>2</sup> /s Optimal operating range: max. approx. 1500 mm <sup>2</sup> /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	<b>ISO 4406</b> <hr/> 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 mm<sup>2</sup>/s

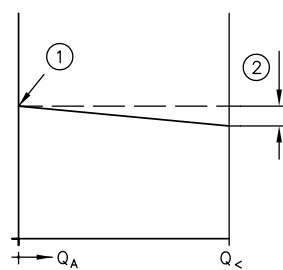
### $\Delta p$ -Q characteristics

A flow in the opposite direction  $A \rightarrow P$  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.



- 1 Size 4
- 2 Size 5
- 3 Size 3

### $\Delta p$ - $Q_A$ characteristics



- 1 Pressure setting
- 2 Pressure drop approx. 5%



## Weight

### Type

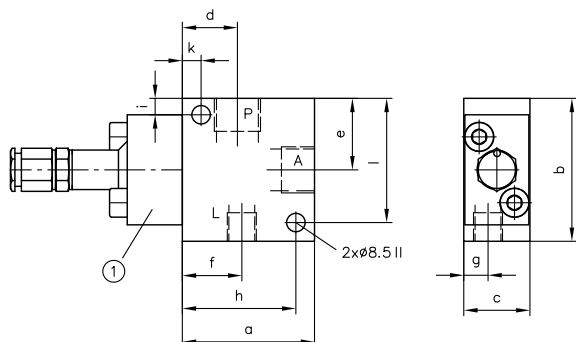
VDM 3 G, VDX 3 G	= 1.1 kg
VDM 4 G, VDX 4 G	= 1.5 kg
VDM 5 G, VDX 5 G	= 2.0 kg
VDM 4 P, VDX 4 P	= 2.0 kg
VDM 5 P, VDX 5 P	= 2.5 kg

## 4 Dimensions

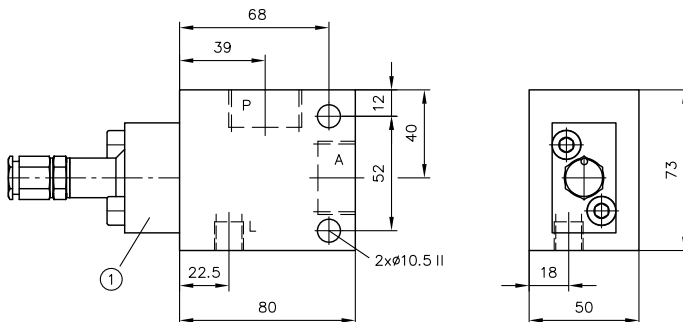
All dimensions in mm, subject to change.

### 4.1 Pipe connection

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



VDM 5 G  
 VDX 5 G



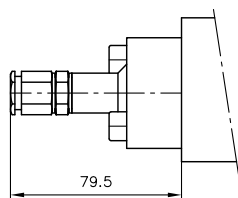
1 Pilot valves see below

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

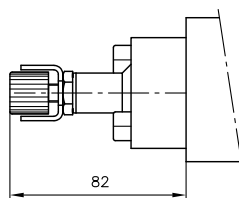
Size	Ports (ISO 228-1) (BSPP)	
	P, A	L
3	G 1/2	G 1/4
4	G 3/4	
5	G 1	

### Pilot valves

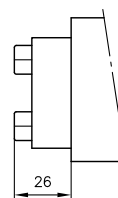
VDM  
 Fixed



Coding R

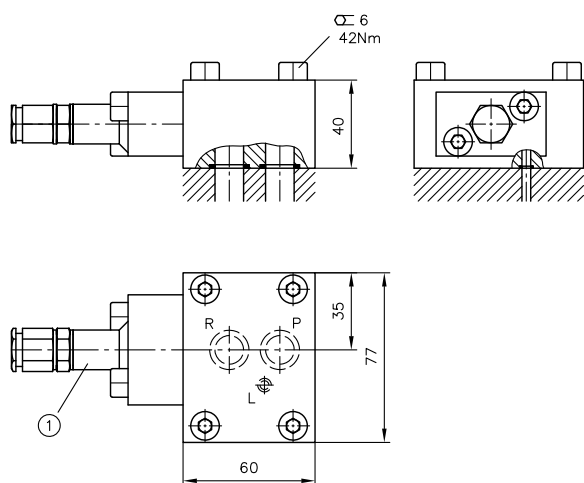


VDX

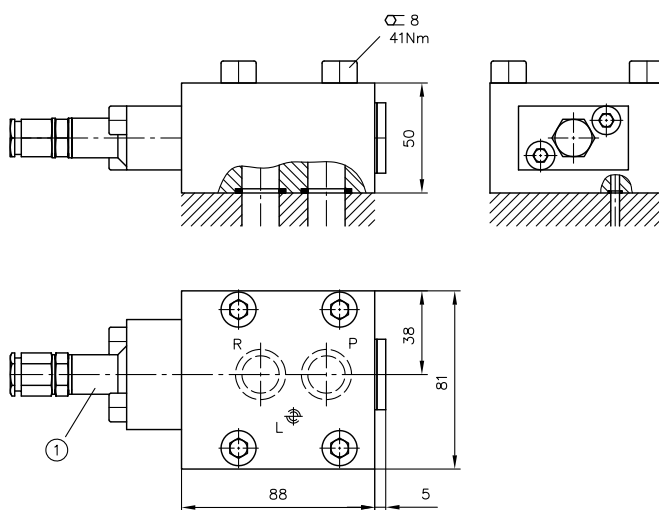


## 4.2 Manifold mounting

**VDM 4 P**  
**VDX 4 P**



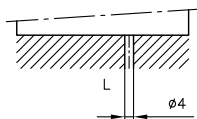
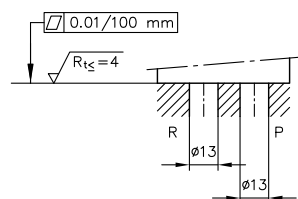
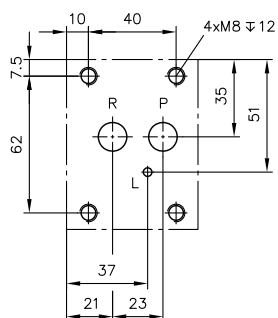
**VDM 5 P**  
**VDX 5 P**



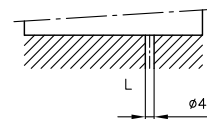
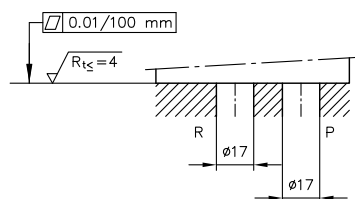
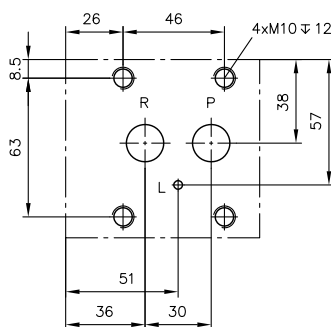
1 Pilot valves see [Chapter 4.1, "Pipe connection"](#)

### 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 intended exclusively for hydraulic applications (fluid technology).

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.
- 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****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.

- 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

Fresh hydraulic fluid from the drum does not always have the highest degree of purity. Under some circumstances the fresh hydraulic fluid must be filtered before use.

Adhere to the cleanliness level of the hydraulic fluid in order to maintain faultless operation.  
(also 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

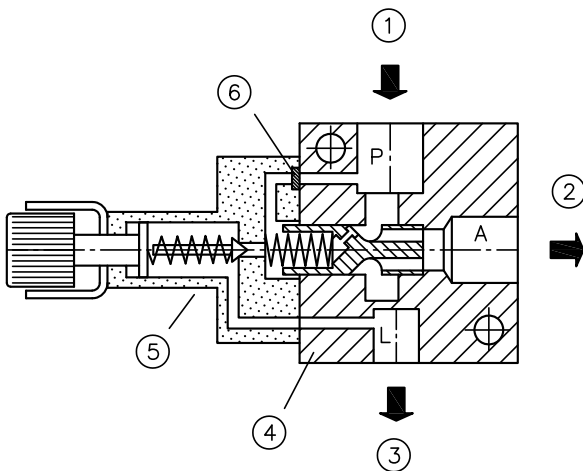
The pressure reducing valve type VDM and VDX is hydraulically pilot-controlled. It consists of a main valve and a pilot valve.

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 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