Pressure reducing valves type VDM

hydraulically piloted

Flow Q_{max} = 120 lpm
Pressure p_{max} = 400 bar

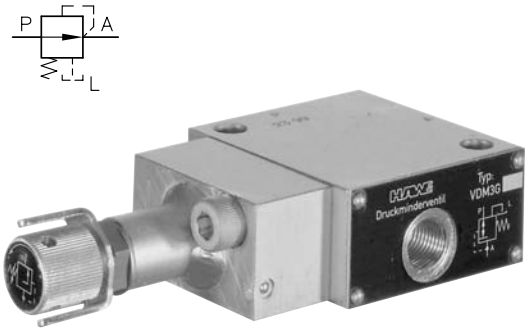
1. General and description

Pressure reducing valves are pressure valves, which are used to keep the outlet pressure constant within narrow limits, even with a varying but higher inlet pressure (DIN ISO 1219).
They are used in hydraulic circuits in which for operational reasons a secondary circuit with a lower pressure value branches off an existing oil circuit without affecting the higher pressure. This means that the pressure set at the pressure reducing valve (outlet pressure) remains constant irrespective of a further increase in the main circuit (inlet pressure).

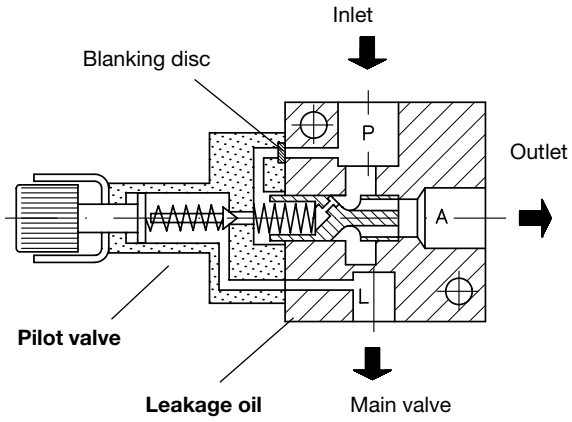
- **Function**
  The pressure reducing valve described here is hydraulically pilot operated. It comprises the main valve which has as its main functional component a spring-loaded piston known as a metering orifice. This piston is controlled by a flanged-on pressure limiting where the valve (pilot valve) required outlet pressure is actually set. The piston continuously alters the cross-section of the passage through the main valve as a function of the inlet pressure, so that the throttle resistance of this will rise or fall by the same amount as the increase or decrease in the input pressure. This way the outlet pressure, which represents the difference between inlet pressure and throttle resistance, is kept constant. The control flow which is needed for the control movement of the piston is led off as leakeage oil flow to the outside via the pilot valve.

- **Construction**
  The main and pilot valve are made completly of steel. The main functional components, such as the piston and liner of the main valve and the seating and valve cone of the pilot valve, are hardened and ground.

Photo shows version for direct pipe connection



Simplified illustration



2. Types available, main data

Example: **VDM 3 GHR - 250**

Pressure specification (bar) for max. outlet pressure

Table 1: Basic type

Coding	Description and symbol
VDM	Hydraulic pilot-operated pressure reducing valve; L (control oil run-off) non-pressurized to the tank
VDX	Hydraulic remote-control-led pressure reducing valve; Pilot control valve PG 1.. acc. to D 4350 connected to port L and ongoing non-pressurized to the tank

Table 2: Size

Coding	**3**	**4**	**5**
Flow Q_{max} (lpm)	40	70	120

Table 3: Hydraulic connection

Coding	Connection mode	Size 3	4	5
G	Direct pipe connection	G 1/2	G 3/4	G 1
		DIN ISO 228/1 (BSPP)		
P	Manifold mounting	---	See dimensional drawings	

Table 4: Pressure range (bar)

Coding	Adjust. range for outlet pressure	Max. inlet pressure	Max. pressure diff. between inlet and outlet pressure
N	8 ... 100	400	300
H	10 ... 400	400	300
Note: Only set or adjust the pressure while monitoring the pressure			

Table 5: Adjustability in operation (always applies to the outlet pressure)

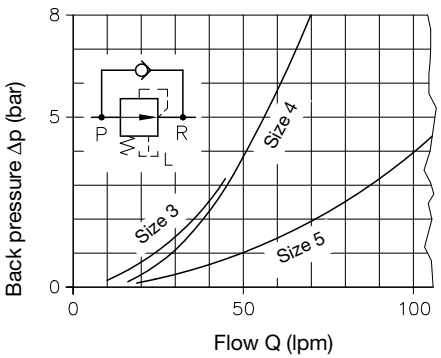
without	Standard, tool adjustable
R	Manually adjustable
F	Spherical push button

3. Hydraulic data

Design	Pressure reducing valve, spool valve design
Mounting type	Manifold mounting or via mounting holes, depending on type (see section 5)
Installation position	Any
Flow direction	Operating direction always P→A, free reverse flow is possible (see Δp-Q characteristic), P = Inlet (primary side), A = Consumer (secondary side)
Leakage oil (Control oil run-off)	On all valves approx. 0.40 lpm, irrespective of the pressure setting. Emerges at L. Run non-pressurized to the tank.
Pressure fluid	Hydraulic oil conf. DIN 51524 part 1 to 3: ISO VG 10 to 68 conf. DIN 51519 Viscosity limits: min. approx. 4, max. approx. 1500 mm²/s Also suitable for biological degradable pressure fluids types HEPG (Polyalkylenglycol) and HEES (Synth. Ester) at service temperatures up to approx. +70 °C
Temperature	Ambient: approx. -40 ... +80 °C Fluid: -25 ... +80°C, Note the viscosity range ! Permissible temperature during start: -40°C (Note start-viscosity!), as long as the service temperature is at least 20K higher for the following operation. Biological degradable pressure fluids: Note manufacturer's specifications. By consideration of the compatibility with seal material not over +70 °C.
Mass (weight) approx. kg	VDM 3G .. = 1.1 VDM 4P .. = 2.0 for VDX... also 0.3 kg VDM 4G .. = 1.5 VDM 5P .. = 2.5 (weight share for PG 1 acc. to D 4350) VDM 5G .. = 2.0

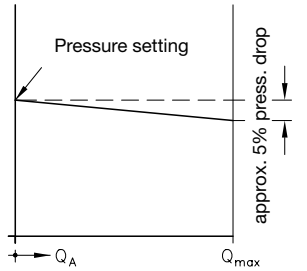
Δp-Q-characteristics

A flow in the reverse direction A→P is only possible if the pilot control valve is closed, i.e. below the set outlet pressure (control piston in open basic position) . The reflux should not be greater than approx. 50 % of Q_{max} here. If a reversal of the flow direction can be expected during the adjustment operation (control piston in throttle position), the control piston would block the reflux. In such cases or if full reflux must be possible for control reasons, it is necessary to install a bypass check valve.



Oil viscosity during the measurement 32 mm²/s

Δp - Q_A - characteristic

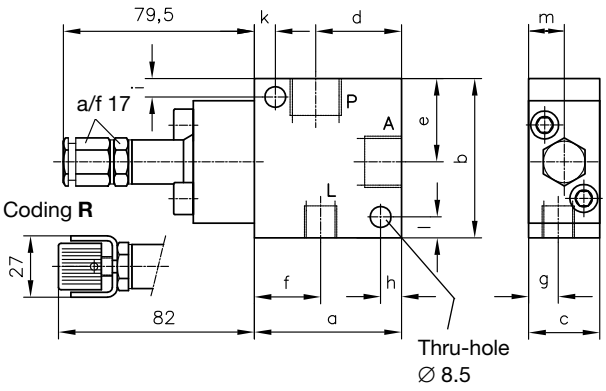


4. Unit dimensions

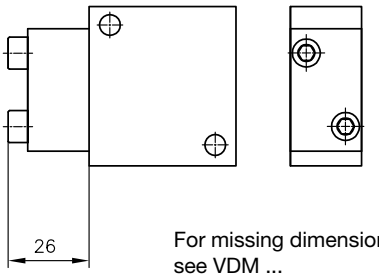
All dimensions are in mm, subject to change without notice!

4.1 Valve for direct pipe connection

Type VDM 3G and VDM 4G

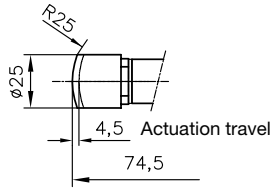


Type VDX 3G and VDX 4G



For missing dimensions, see VDM ...

Coding **F** (spherical push button)

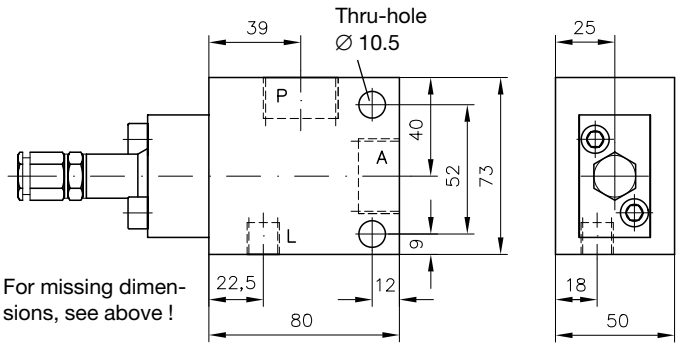


Coding	Pressure alternation per turn [1]
N	≈ 20 bar
H	≈ 70 bar

[1] Test rig pump Q_e = 2.5 lpm

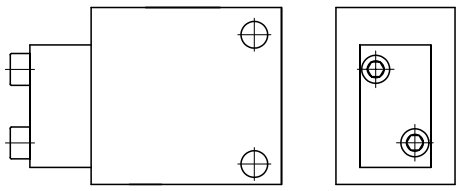
Type	a	b	c	d	e	f	g	h	i	k	l	m	Ports acc. to DIN ISO 228/1 (BSPP)	
													P and A	L
VDM 3G	60	65	30	35	34	27	11	8.5	7.5	8.5	8.5	15	G 1/2	G 1/4
VDM 4G	65	71	40	38.5	39	26	15	10	10	7	11	20	G 3/4	G 1/4

Type VDM 5G



For missing dimensions, see above !

Type VDX 5G



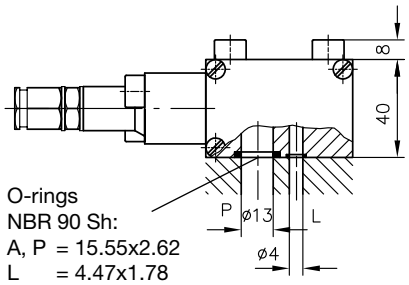
For missing dimensions, see VDM 5G !

Ports acc. to DIN ISO 228/1 (BSPP):

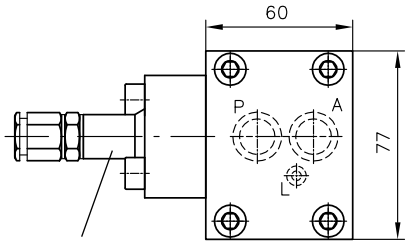
P and A = G 1
L = G 1/4

4.2 Manifold mounting

Type VDM 4P

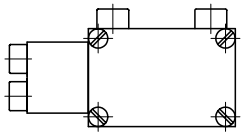


O-rings
NBR 90 Sh:
A, P = 15.55x2.62
L = 4.47x1.78



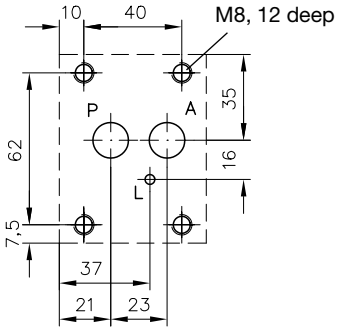
For missing dimensions
of the pilot valve, see
sect. 4.1 !

Type VDX 4P

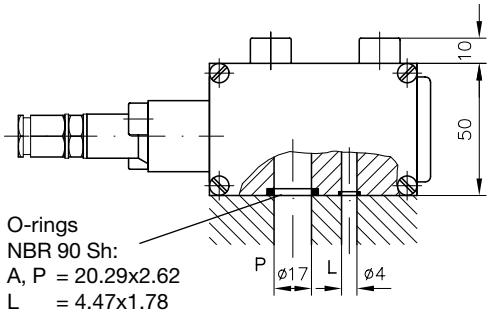


For missing dimensions, see VDM 4P

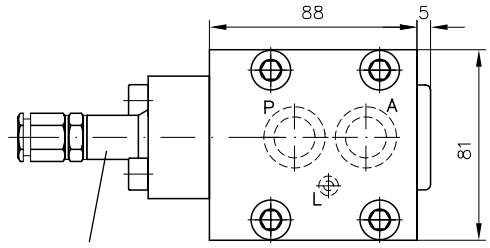
Hole pattern of the manifold (top view)



Type VDM 5P

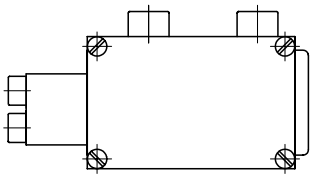


O-rings
NBR 90 Sh:
A, P = 20.29x2.62
L = 4.47x1.78



For missing dimensions
of the pilot valve, see
sect. 4.1 !

Type VDX 5P



For missing dimensions, see VDM 5P

Hole pattern of the manifold (top view)