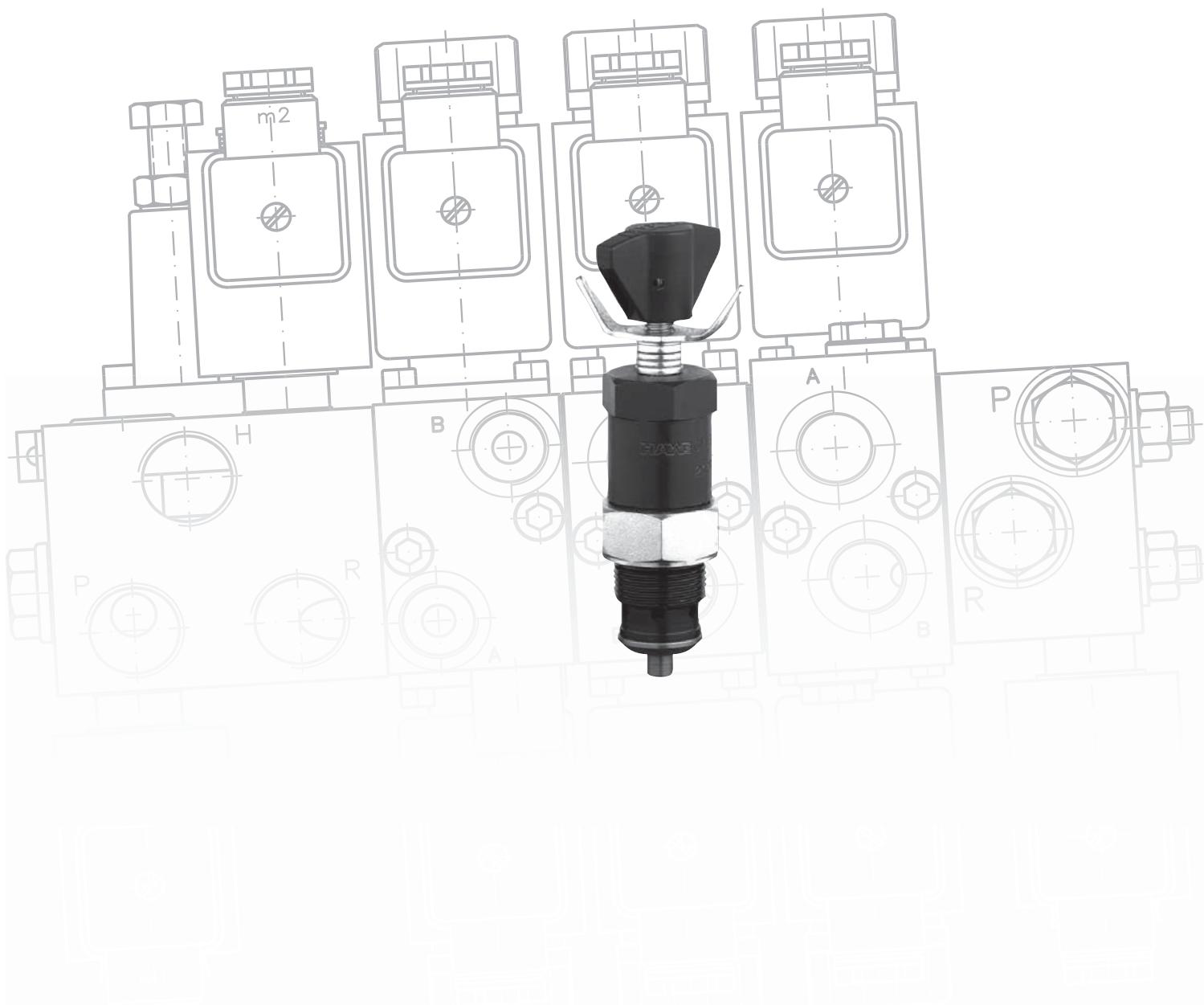
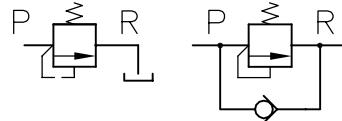


# Pressure valve type CMV, CMVZ, CSV, CSVZ

## Directly controlled, cartridge valve

Pressure  $p_{\max}$ : 500 bar  
Volume  $V_{\max}$ : 60 lpm

Switching symbol:



Product documentation

D 7710 MV

08-2013-1.2

HAWE Hydraulik SE - Streifeldstr. 25 • 81673 München

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## 1 Overview of pressure valves type CMV, CMVZ, CSV, CSVZ

Pressure valves influence the pressure in hydraulic systems. Pressure-limiting valves (safety or overpressure valve) safeguard the system against excessive pressure or limit the operation pressure. Sequence valves generate a constant pressure difference between the inlet and outlet flow, where the flow in the opposite direction (return flow) is free via a bypass check valve.

One advantage of the valves described here is the easily produced mounting hole (see dimensions). Type CMV is also available as a CE-marked pressure-limiting valve with unit approval, e.g. as a safety valve for accumulators in accordance with Pressure Equipment Directive 97/23 EC. Types CMVZ and CSVZ are not influenced by the pressure conditions downstream and are therefore suitable for use in loss-free sequence control systems.

### Features and benefits:

- Operating pressures up to 500 bar
- Various adjustment options
- Easily produced mounting hole

### Intended applications:

- General hydraulic systems
- Test benches
- Hydraulic tools

### Pressure relief valve type CMV

- It protects hydraulic systems against exceeding the max. permissible system pressure (safety valve) or serves to limit the pressure during service.

### Pressure limiting valve type CMV.. X - without dampening

- Intended for special operation conditions e.g. prevention of unintended, creeping cylinder movements due to external loads or pressure rise in otherwise blocked cylinders induced by a temperature rise.
- Very little discrepancy between opening and closing pressure (low hysteresis).

### Pre-load valve type CSV

- This valve generates a largely constant pressure difference between inlet and outlet, as long as there is a flow.
- A check valve allows free flow in the opposite direction (return flow).

### Sequence valve type CMVZ and CSVZ

- Switching pressure (opening pressure) largely independent from the pressure on the outlet side.
- For use in sequence controls.



Figure 1: Basic version  
(cartridge valve), adjustable



Figure 2: Basic version  
(cartridge valve), fixed setting

## 2 Versions available, main data

### 2.1 Basic version (cartridge valve)

Symbol:

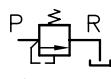


Figure 3: Type CMV

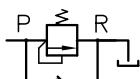


Figure 4: Type CSV

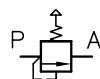


Figure 5: Type CMVZ

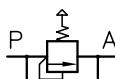


Figure 6: Type CSVZ

Order examples:

CMV 1	C	R	X	-200	-1/4
CSV 3	F			-60	

**Single connection block** Table 3 Design with single connection block

**Pressure setting** Pressure setting within the various pressure ranges

**Suffix for version X** Without dampening (for type CMV)

**Adjustment** Table 2 Adjustment

**Pressure range** Table 1 Type, size and pressure range

**Type and size** Table 1 Type, size and pressure range

**Table 1 Type, size and pressure range**

Type and size	Flow $Q_{\max}$ (lpm)	Pressure range from ... to (bar)				Description
		B	C	E	F	
CMV 1	20	100 ... 500	60 ... 315	30 ... 160	15 ... 80	Pressure limiting valve
CMV 2	40					
CMV 3	60					
CSV 2	40	100 ... 500	60 ... 315	30 ... 160	15 ... 80	Pressure sequence valve
CSV 3	60					
CMVZ 2	40	100 ... 500	60 ... 315	30 ... 160	15 ... 80	Sequence valve
CSVZ 2						

**Table 2 Adjustment**

Coding	Description	Symbols
No coding	Tool adjustable	
R	Manually adjustable, with lock nut	

## 2.2 Version with connection block

Order example:

CMVZ C R -300 -1/4

**Connection block** Table 3 Version with connection block

**Pressure setting** Pressure setting within the various pressure ranges

**Adjustment** Table 2 Adjustment

**Pressure range** Table 1 Type, size and pressure range

**Type and size** Table 1 Type, size and pressure range

**Table 3 Version with connection block**

Coding	Description	For type	Symbol (example)
No Coding	Cartridge valve		See <a href="#">Chapter 2, "Versions available, main data"</a>
- 1/4	For direct pipe connection (G 1/4 (BSPP))	CMV 1	
- 3/8	For direct pipe connection (G 3/8 (BSPP))	CMV 1 CMV 2 CMVZ 2 CSV 2 CSVZ 2	
- 1/2	For direct pipe connection (G 1/2 (BSPP))	CMV 3 CSV 3	
- P	For manifold mounting	CMV 2 CMVZ 2 CSV 2 CSVZ 2	

## 3 Parameters

### 3.1 General

Nomenclature	Directly controlled pressure valves		
Design	Ball seated valves		
Model	Screw-in valve, valve for pipe connection, valve for manifold mounting		
Material	Steel; nitrided valve housing, electrogalvanised sealing nuts and connection block, hardened and ground functional inner parts Balls made of rolling bearing steel		
Installation position	Any		
Port	<ul style="list-style-type: none"> <li>■ P = Inlet (pump side)</li> <li>■ R = Outlet (return or carry-on)</li> <li>■ (all ports pressure resistant)</li> </ul> <p>Coding applies to circuit diagrams and assembly plans only. The coding is not stamped onto the valve housing. The coding can be found in the schematic overviews or the dimension diagrams in <a href="#">Chapter 4, "Dimensions"</a>.</p>		
Pressure fluid	<p>Hydraulic oil conforming DIN 51 524 part 1 to 3; ISO VG 10 to 68 conforming DIN 51 519            Viscosity limits: min. approx. 4, max. approx. 1500 mm<sup>2</sup>/s            opt. operation approx. 10... 500 mm<sup>2</sup>/s.</p> <p>Also suitable are biologically degradable pressure fluids types HEGP (Poly-alkyleneglycol) and HEES (Synth. Ester) at service temperatures up to approx. +70°C.</p>		
Purity class	ISO 4406	NAS 1638	SAE T 490
	21/18/15...19/17/13	12 ... 8	≥ 6
Temperature	<p>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.</p>		

### Pressure and flow

Pressure	On the pump side $p_{\max} = 500$ bar
Static overload capacity	Approx. $2 \times p_{\max}$ – tightened and sealing nut locked
Flow	In accordance with <a href="#">Chapter 2, "Versions available, main data"</a> Table 1 Basic version

## Curves

Viscosity during measurements  
approx.  $60 \text{ mm}^2/\text{s}$

### Type CMV.B, CSV.B up to 500 bar

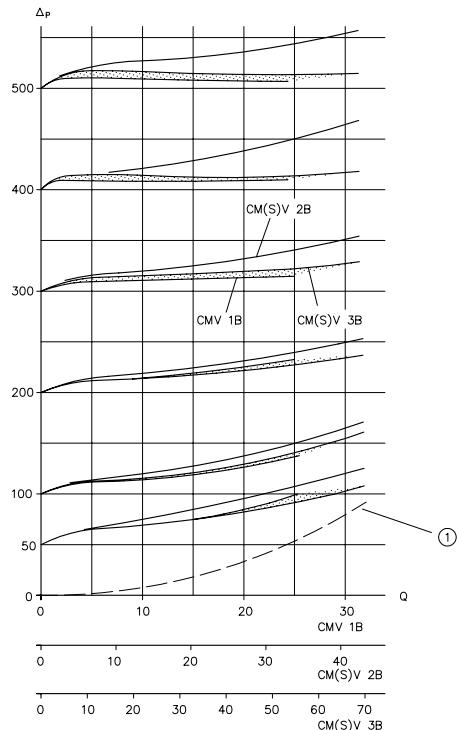


Figure 9: Q Flow (lpm);  $\Delta p$  Back pressure (bar)

### Type CMV.C, CSV.C up to 315 bar

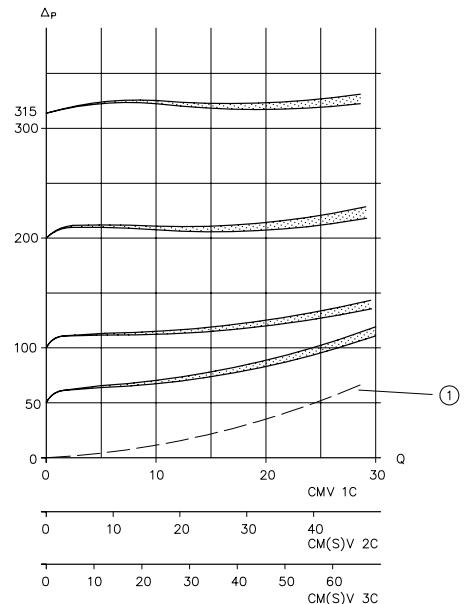


Figure 10: Q Flow (lpm);  $\Delta p$  Back pressure (bar)

- 1 Curve for the valve body, there is no setting below this curve achievable

Viscosity during measurements  
approx.  $60 \text{ mm}^2/\text{s}$

### Type CMV.E, CSV.E up to 160 bar

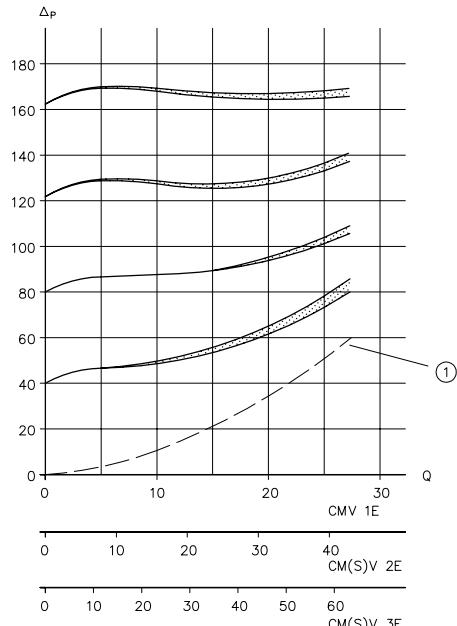


Figure 11: Q Flow (lpm);  $\Delta p$  Back pressure (bar)

### Type CMV.F, CSV.F up to 80 bar

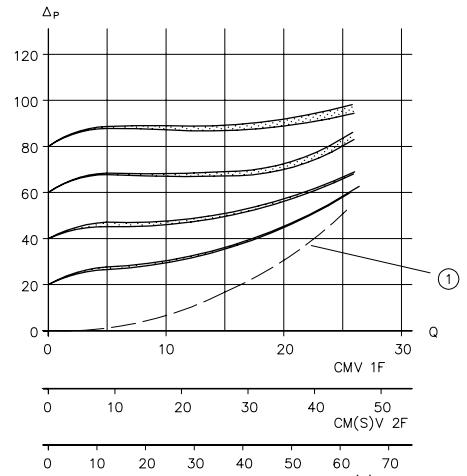


Figure 12: Q Flow (lpm);  $\Delta p$  Back pressure (bar)

- 1 Curve for the valve body, there is no setting below this curve achievable

### Type CSV

Pressure sequence valve, R→P Return flow

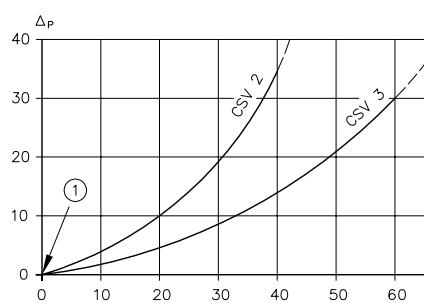


Figure 13: Q Flow (lpm),  $\Delta p$  Back pressure (bar)

1 Pressure for opening approx. 0.2 to 0.3 bar

### Type CMVZ 2, CSVZ 2

Sequence valve, relation flow to back pressure (example)

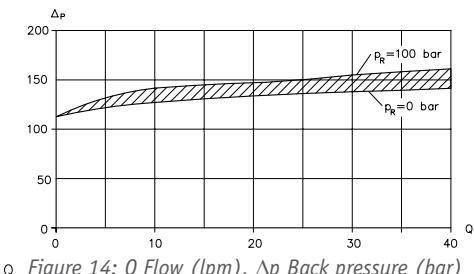


Figure 14: Q Flow (lpm),  $\Delta p$  Back pressure (bar)

## Mass

### Basic version

#### Pressure limiting valve

Type CMV 1 = approx. 90 g

Type CMV 2 = approx. 160 g

Type CMV 3 = approx. 280 g

#### Pressure sequence valve

Type CSV 2 = approx. 170 g

Type CSV 3 = approx. 300 g

#### Sequence valve

Type CMVZ 2 = approx. 170 g

Type CSVZ 2 = approx. 180 g

#### Version with connection block

- 1/4 = + 260 g

- 3/8 = + 260 g

- 1/2 = + 420 g

- P = + 260 g

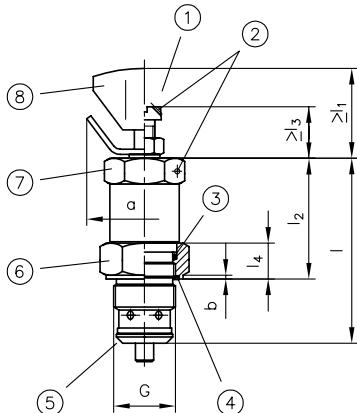
## 4

## Dimensions

All dimensions in mm, subject to change!

### 4.1 Basic version (cartridge valve)

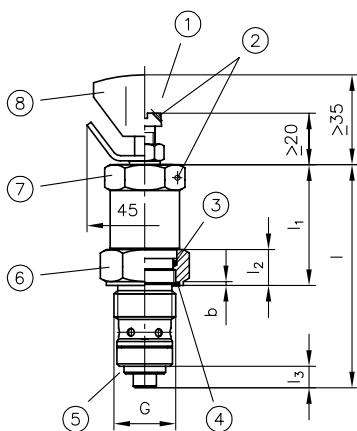
#### Pressure limiting valve CMV and sequence valve type CMVZ



- 1 Tool adjustable
- 2 Provision for lead seal
- 3 O-ring
- 4 Seal
- 5 Sealing edge
- 6 Sealing nut a/f2
- 7 Valve housing a/f1
- 8 Manually adjustable

Type and size	G	a	b	l	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>
CMV 1	M16x1.5	35	1	51	27	30	18	12
CMV 2 CMVZ 2	M20x1.5	45	1	59	35	37	20	13
CMV 3	M24x1.5	45	1.5	79	35	48	20	14

Type and size	Width across flats		Torque (Nm)		Seal	O-ring AU 90 Sh
	a/f1	a/f2	a/f1	a/f2		
CMV 1	17	22	40	35	KANTSEAL DKAR 00016-N90	14x1.78
CMV 2 CMVZ 2	22	24	50	40	KANTSEAL DKAR 00018-N90	17.17x1.78
CMV 3	27	30	70	60	KANTSEAL DKAR 00021-N90	21.95x1.78

**Pre-load valve type CSV and sequence valve type CSVZ**


Type and size	G	b	l	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>
CSV 2	M20x1.5	1	69	38.5	13	5.5
CSVZ 2						
CSV 3	M24x1.5	1.5	87	47	14	10

- 1 Tool adjustable
- 2 Provision for lead seal
- 3 O-ring
- 4 Seal
- 5 Sealing edge
- 6 Sealing nut a/f2
- 7 Valve housing a/f1
- 8 Manually adjustable

Type and size	Width across flats		Torque (Nm)		Seal	O-ring AU 90 Sh
	a/f1	a/f2	a/f1	a/f2		
CSV 2	22	24	50	40	KANTSEAL DKAR 00018-N90	17.17x1.78
CSVZ 2						
CSV 3	27	30	70	60	KANTSEAL DKAR 00021-N90	21.95x1.78

## 4.2 Mounting hole

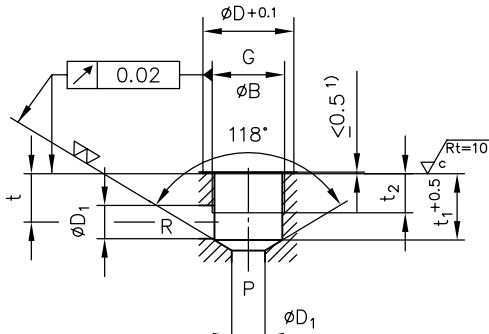


Figure 15: Mounting hole type CMV, CMVZ

The sealing of the inlet to outlet takes place at the contact area between the facial sealing edge of the screwed-in end of the valve body and the stepped shoulder of the core diameter at the location thread. The stepped shoulder is depicted with the normal 118° drill sharpening angle for steel. Therefore reaming of the hole and bevels to help the seals slip in are not necessary. The sealing of the attached valve and its fixing at the manifold body are made by a sealing nut with a special thread seal and an O-ring. Additionally the passage between port A and T is sealed at the screwin port and the internal piston.

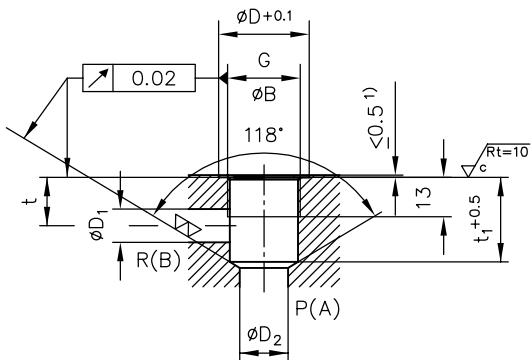


Figure 16: Mounting hole type CSV, CSVZ

Type	G	$\emptyset D$	$\emptyset D_1$	t	$t_1$	$t_2$	Thread sink $B_{max}$
CMV 1	M 16x1.5	22	8	13	18	11	$\emptyset 16^{+0.2}$
CMV 2	M 20x1.5	24	10	14	20	13	$\emptyset 20^{+0.2}$
CMVZ 2							
CMV 3	M 24x1.5	30	11	16	22	13	$\emptyset 24^{+0.2}$
Type	G	$\emptyset D$	$\emptyset D_1$	$\emptyset D_2$	t	$t_1$	Thread sink $B_{max}$
CSV 2	M 20x1.5	24	10	14	14	24	$\emptyset 20^{+0.2}$
CSVZ 2							
CSV 3	M 24x1.5	30	11	16	16	28	$\emptyset 24^{+0.2}$



### Note

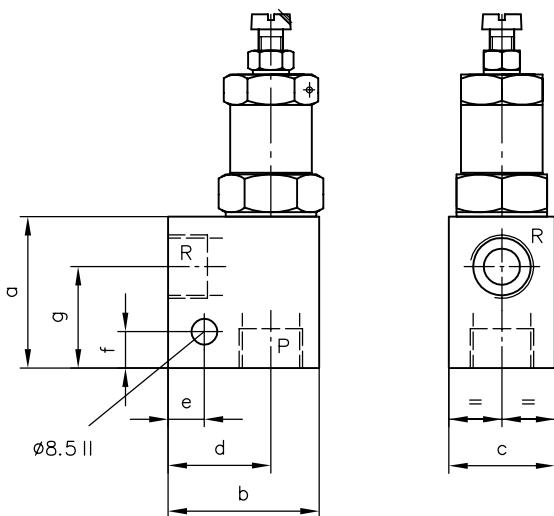
Tapped plugs for mounting hole, see version with connection block in [Chapter 4, "Dimensions"](#)

Information für counterbore see <sup>1)</sup>

<sup>1)</sup> Counterbore of at least 0.5 mm required if the pressure at connection R exceeds 100 bar!

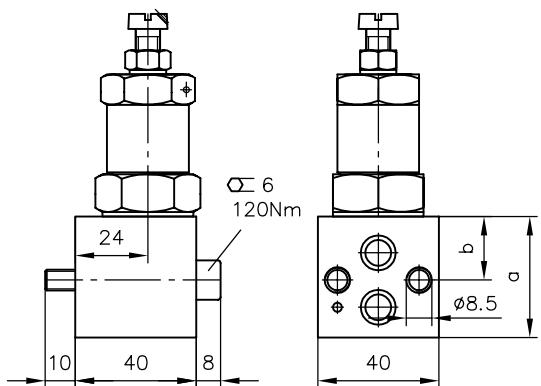
## 4.3 Version with connection block

### Direct pipe connection

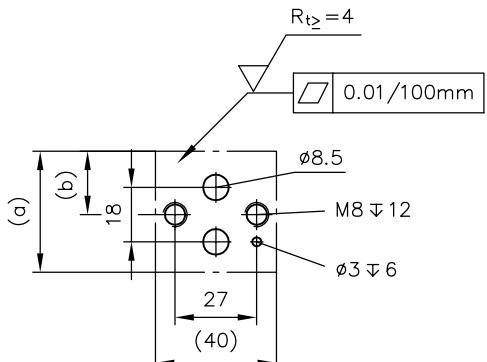


Type and size	Ports P and R (ISO 228/1) (BSPP)	a	b	c	d	e	f	g
CMV 1.. -1/4	G 1/4	40	40	25	27	10	10	26
CMV 1.. -3/8	G 3/8	40	40	25	27	10	10	26
CMV 2.. -3/8	G 3/8	45	42	32	27	12	12	30.5
CMVZ 2.. -3/8								
CMV 3.. -1/2	G 1/2	50	50	35	34	12	12	33.5
CSV 2.. -1/4	G 1/4	45	42	32	27	15	15	31
CSVZ 2.. -1/4								
CSV 2.. -3/8	G 3/8	45	42	32	27	15	15	31
CSVZ 2.. -3/8								
CSV 3.. -1/2	G 1/2	55	50	35	34	12	12	39

## Manifold mounting



Base plate hole pattern



Type	a	b	Sealing	Mounting
CMV 2	40	21	2x O-ring 10x2 NBR 90 Sh	2x Skt. head screw ISO 4762-M8x50-8.8A2K
CMVZ 2				
CSV 2	48	30	2x O-ring 10x2 NBR 90 Sh	2x Skt. head screw ISO 4762-M8x50-8.8A2K
CSVZ 2				

## 4.4 Tapped plugs

Mounting holes in the manifold may be blocked if required by tapped plugs, e.g. if uniform manufactured manifolds should be equipped with or without cartridge valves depending on application.

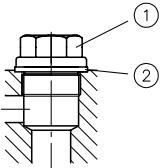


Figure 17: Passage open

- 1 Tapped plug a/f4
- 2 Seal ring

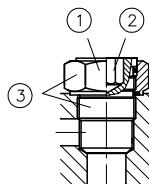


Figure 18: Passage blocked

- 1 Lock nuts and sealing nut a/f6
- 2 Screw part a/f5
- 3 Locking tapped plug complete

Type and size	Passage open			Passage blocked					
	Tapped plug			Seal ring	Tapped blockage / plug combination complete				
	DIN 910	a/f4	Torque (Nm)	DIN 7603-Cu		Tapped part		Counter / sealing nut	
CMV 1	M16x1.5	17	40	A16x22x1.5	Z 7712 003	8	40	22      35	
CMV 2 CMVZ 2	M20x1.5	19	50	A20x24x1.5	Z 7712 013	10	50	24      40	
CSV 2 CSVZ 2	M20x1.5	19	50	A20x24x1.5	Z 7715 019	10	50	24      40	
CMV 3	M24x1.5	22	70	A25x30x2	Z 7710 029	12	70	30      60	
CSV 3	M24x1.5	22	70	A25x30x2	Z 7710 029	12	70	30      60	
Mass (weight)	M16x1.5 + Seal ring = approx. 40 g M20x1.5 + Seal ring = approx. 70 g M24x1.5 + Seal ring = approx. 100 g				Z 7712 003 = approx. 60 g Z 7712 013 = approx. 85 g Z 7715 019 = approx. 95 g Z 7710 029 = approx. 140 g Z 7715 029 = approx. 150 g				

## 5 Installation, operation and maintenance information

### 5.1 Designated use

This fluid-power product has been designed, manufactured and tested using standards and regulations generally applicable in the European Union and left the plant in a safe and fault-free condition.

To maintain this condition and ensure safe operation, operators must observe the information and warnings in this documentation.

This fluid-power product must be installed and integrated in a hydraulic system by a qualified specialist who is familiar with and adheres to general engineering principles and relevant applicable regulations and standards.

In addition, application-specific features of the system or installation location must be taken into account if relevant.

This product may only be used as a pressure-limiting valve within oil-hydraulic systems.

The product must be operated within the specified technical parameters. This documentation contains the technical parameters for various product versions.



#### Note

Non-compliance will void any warranty claims made against HAUWE Hydraulik.

### 5.2 Assembly information

The hydraulic system must be integrated in the equipment with standard connection components that comply with market requirements (screw fittings, hoses, pipes, etc.). The hydraulic system must be shut down as a precautionary measure prior to dismounting; this applies in particular to systems with hydrostatic accumulators.

#### 5.2.1 Screwing in the basic version (cartridge valve)

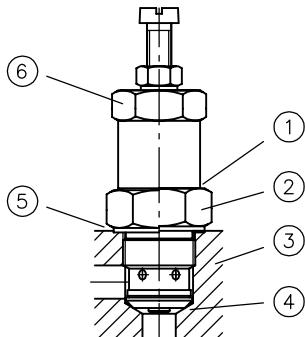


Figure 19: Screwing in the cartridge valve

- 1 Travel stop
- 2 Counter / sealing nut a/f2
- 3 Manifold
- 4 Sealing edge
- 5 to counter
- 6 Valve body a/f1

1. Before screwing in the valve body loosen the counter/sealing nut until the travel stop.
2. Screw in the valve body and tighten with the specified torque. The metallic sealing of the inlet to the outlet is formed between the facial sealing edge of the valve body and the shoulder of the stepped hole in the manifold.
3. Tighten counter/sealing nut with specified torque.

Type and size	Valve body		Counter / sealing nut	
	Width across flats a/f1	Torque (Nm)	Width across flats a/f2	Torque (Nm)
CMV 1	17	40	22	35
CMV 2	22	50	24	40
CMVZ 2				
CSV 2				
CSVZ 2				
CMV 3	24	70	30	60
CSV 3				

## 5.2.2 Set the pressure

If no pressure adjustment value is stated, the valve is set to the maximum value of the corresponding pressure range ex-works.

The following table shows the reference values.

Pressure range	Approx. pressure variation (bar) per turn		
	CMV 1	CMV 2 CMVZ 2	CMV 3 CSV 3 CSVZ 2
B	94	100	65
C	51	55	51
E	33	19	17
F	12	10	9

Pressure range B to F compare also [Chapter 2, "Versions available, main data"](#) Table 1



### Caution

#### Danger of injury due to incorrect pressure settings!

- Always monitor the pressure gauge when setting or changing the pressure.

## 5.2.3 Creating the mounting hole

See description in [Chapter 4.2, "Mounting hole"](#)

## 5.3 Operating instructions

### Product, pressure and/or flow settings

All statements in this documentation must be observed for all product, pressure and/or flow settings on or in the hydraulic system.



### Caution

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

- Always monitor the pressure gauge when setting or changing the pressure.

### Filtering and purity of the hydraulic fluid

Soiling in the fine range, e.g. abraded material and dust, or in the macro range, e.g. chips, rubber particles from hoses and seals, can cause significant malfunctions in a hydraulic system. It is also to be noted that new hydraulic fluid "from the drum" does not necessarily meet the highest purity requirements.

For trouble-free operation pay attention to the purity of the hydraulic fluid (see also purity class in [Chapter 3, "Parameters"](#)).

## 5.4 Maintenance information

This product is largely maintenance-free.

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

Check the device surfaces for dust deposits at regular intervals (but at least once per year) and clean the device if required.

## 6 Other information

### 6.1 Schematic cross-sectional drawings and symbols

Type CMV

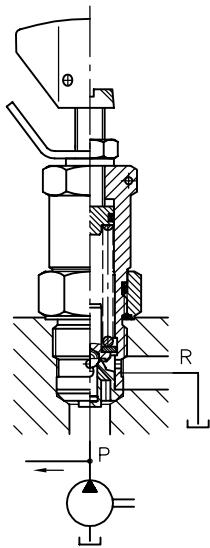


Figure 20: Type CMV

Type CSV

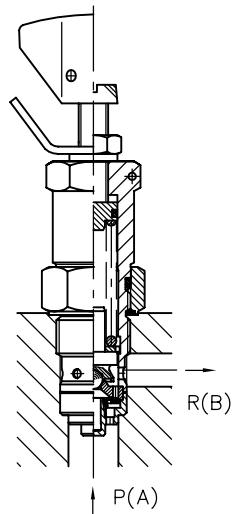


Figure 21: Type CSV

Type CMVZ  
Type CSVZ

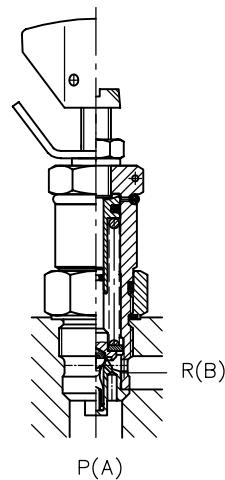


Figure 22: Type CMVZ

Figure 23: Type CSVZ



**Additional versions**

- [Safety valve type CMVX 2.. with unit approval: D 7710 TÜV](#)
- [Throttle and shut-off valves type CAV: D 7711](#)
- [Shut-off valve cartridges, type CRK, CRB and CRH: D 7712](#)
- [Pressure-dependent shut-off valve type CDSV: D 7876](#)
- [Throttle and restrictor check valves type CQ, CQR, and CQV: D 7713](#)
- [Pressure reducing valve, type CDK: D 7745](#)
- [Pressure reducing valve, type CLK: D 7745 L](#)
- [2-way flow control valve type CSJ 0: D 7736](#)
- [Pressure controlled the 2-way directional valve type CNE: D 7710 NE](#)

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