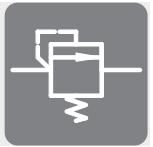


Pressure valve type CMV, CMVZ, CSV and CSVZ

Product documentation



Directly controlled, screw-in valve

Operating pressure p_{\max} : 500 bar

Flow rate Q_{\max} : 60 lpm



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

Pressure-limiting valves and sequence valves are types of pressure control valves. Pressure-limiting valves safeguard the system against excessive system pressure or limit the operation pressure. Sequence valves generate a constant pressure difference between the inlet and outlet flow.

Type is a directly controlled valve that is damped as standard. Type CMVZ and CSVZ is not influenced by the pressure conditions downstream and is therefore suitable for use in loss-free sequence control systems.

Valve type CMV and CSV can be screwed-in and can be integrated into control blocks. The necessary mounting holes are straightforward to make.

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 (reflux).

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



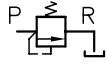
Figure 2: Basic version (cartridge valve), fixed setting

2 Available versions, main data

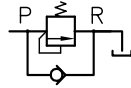
2.1 Basic version (screw-in valve)

Circuit symbol:

CMV



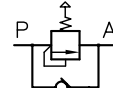
CSV



CMVZ



CSVZ



Order coding 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 Basic type, size and pressure range

Basic type and size Table 1 Basic type, size and pressure range

Table 1 Basic type, size and pressure range

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

Table 2 Adjustment

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

2.2 Version with single connection block

Order coding example:

CMVZ C R -300 -1/4

Single connection block Table 3 Version with single connection block

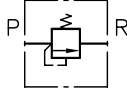
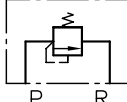
Pressure setting Pressure setting within the various pressure ranges

Adjustment Table 2 Adjustment

Pressure range Table 1 Basic type, size and pressure range

Basic type and size Table 1 Basic type, size and pressure range

Table 3 Version with single connection block

Coding	Description	For type	Symbol (example)
No Coding	Cartridge valve		See Chapter 2, "Available versions, main data"
- 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

General information

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"> ▪ P = Inlet (pump side) ▪ R = Outlet (return or carry-on) ▪ (all ports pressure resistant) <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 Chapter 4, "Dimensions".</p>
Hydraulic fluid	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 ² /s opt. operation approx. 10... 500 mm ² /s. Also suitable are biologically degradable pressure fluids types HEPG (Poly-alkylenglycol) and HEES (Synth. Ester) at service temperatures up to approx. +70°C.
Cleanliness level	ISO 4406 <u>21/18/15...19/17/13</u>
Temperature	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.

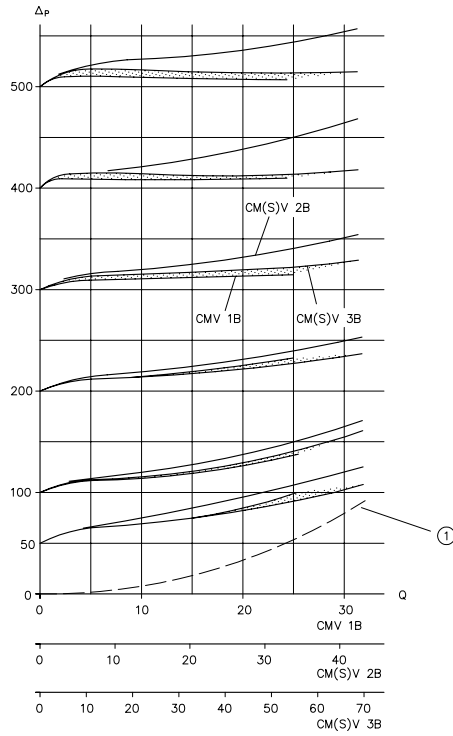
Pressure and volumetric flow

Operating pressure	On the pump side $p_{\max} = 500$ bar
Static overload nominal volume	Approx. $2 \times p_{\max}$ – tightened and sealing nuts locked
Volumetric flow	In accordance with Chapter 2, "Available versions, main data" Table 1 Basic version

Curves

Oil viscosity approx. 60 mm²/s

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



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

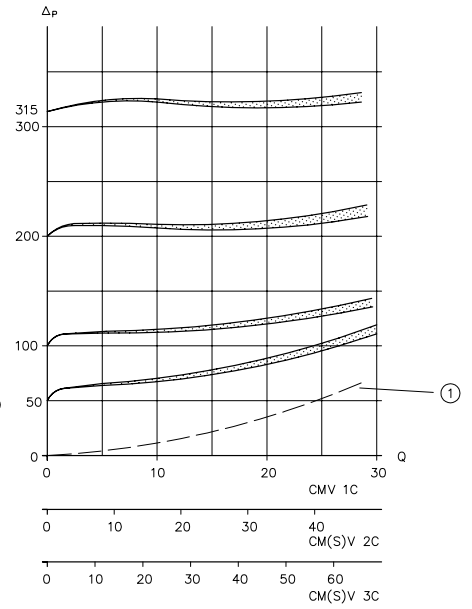
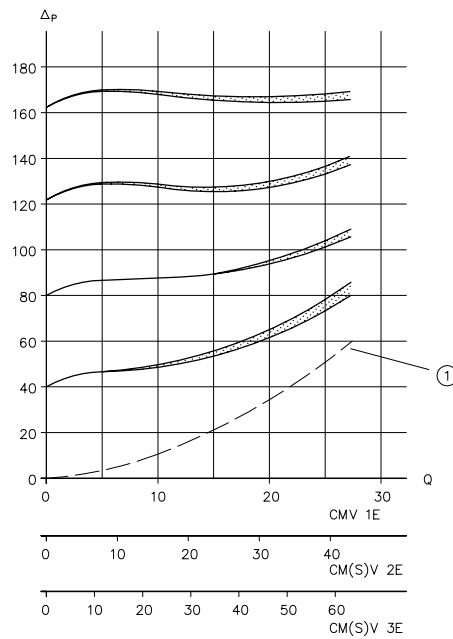


Figure 3: Q volumetric flow (lpm); Δp Flow resistance (bar)

1 Inherent characteristic curve, no setting possible below this curve

Oil viscosity approx. 60 mm²/s

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



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

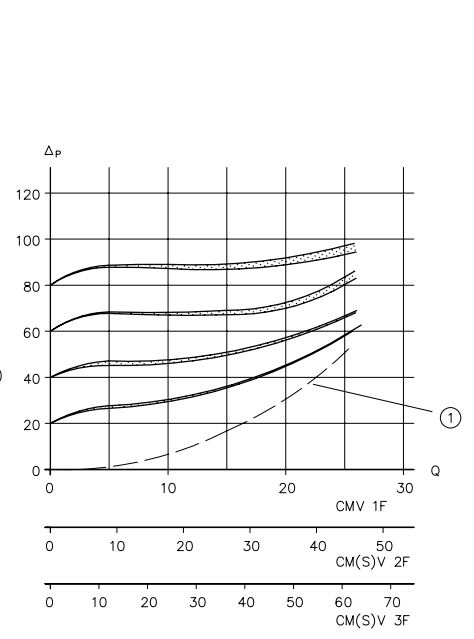


Figure 4: Q flow rate (lpm); Δp flow resistance (bar)

1 Inherent characteristic curve, no setting possible below this curve

Type CSV

Sequence valves, R→P return flow

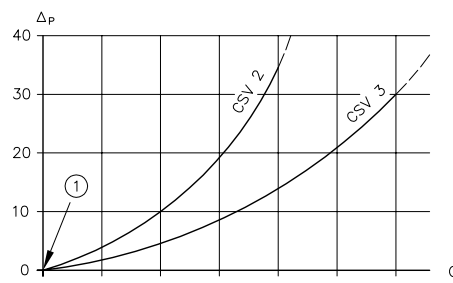
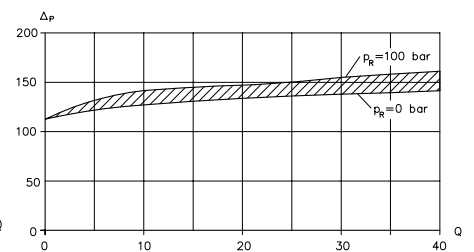


Figure 5: Q flow rate (lpm), Δp flow resistance (bar)

1 Opening pressure approx. 0.2 ... 0.3 bar

Type CMVZ 2, CSVZ 2

Control valve, as a function of return pressure (example)



Weight

Pressure-limiting valve

Type

CMV 1	= 90 g
CMV 2	= 160 g
CMV 3	= 280 g

Sequence valve

Type

CSV 2	= 170 g
CSV 3	= 300 g

Control valves

Type

CMVZ 2	= 170 g
CSVZ 2	= 180 g

Version with single connection block

Type

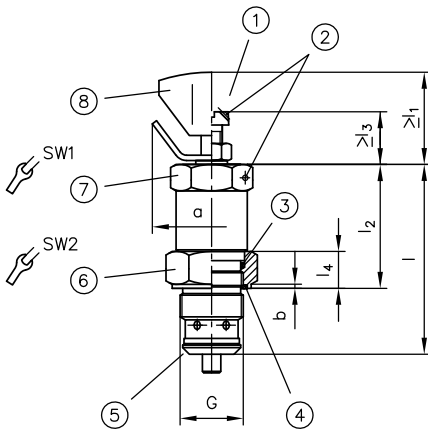
- 1/4	= + 260 g
- 3/8	= + 260 g
- 1/2	= + 420 g
- P	= + 260 g

4 Dimensions

All dimensions in mm, subject to change.

4.1 Basic version (screw-in valve)

Pressure limiting valve CMV and sequence valve type CMVZ



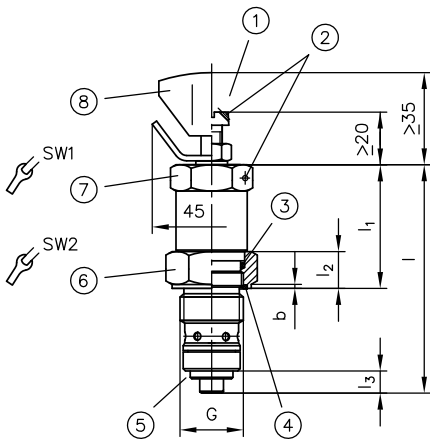
- 1 Fixed
- 2 Sealing option
- 3 O-ring
- 4 Fitting seal
- 5 Sealing edge
- 6 Sealing nut
- 7 Valve housing
- 8 Adjustable

$$SW = a/f$$

Basic type and size	G	a	b	l	l ₁	l ₂	l ₃	l ₄
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

	Width across flats		Torque (Nm)		Seal	Sealing 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



- 1 Fixed
- 2 Sealing option
- 3 O-ring
- 4 Fitting seal
- 5 Sealing edge
- 6 Sealing nut
- 7 Valve housing
- 8 Adjustable

SW = a/f

Basic type and size	G	b	l	l ₁	l ₂	l ₃
CSV 2	M20x1.5	1	69	38.5	13	5.5
CSVZ 2	M20x1.5	1	69	38.5	13	5.5
CSV 3	M24x1.5	1.5	87	47	14	10

	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	22	24	50	40	KANTSEAL DKAR 00018-N90	17.17x1.78
CSV 3	27	30	70	60	KANTSEAL DKAR 00021-N90	21.95x1.78

4.2 Mounting hole

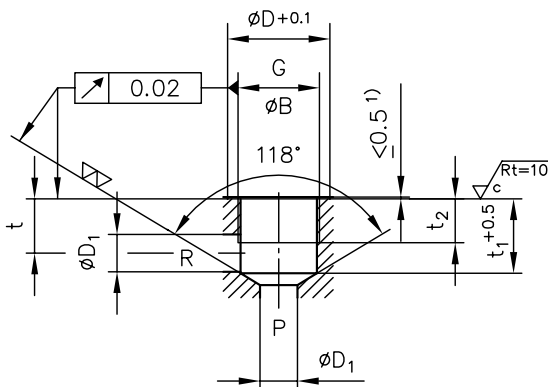
The sealing of the inlet to outlet takes place at the contact area between the facial sealing edge of the screwed-in end of the valve body and the stepped shoulder of the core diameter at the location thread.

The stepped shoulder is depicted with the normal 118° drill tip angle for steel.

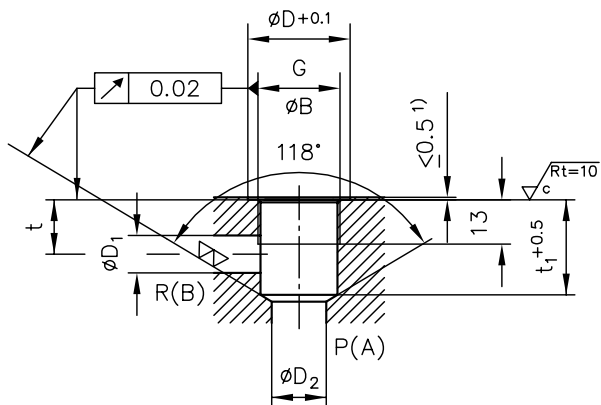
Therefore reaming of the hole and bevels to help the seals slip in are not necessary.

The sealing of the attached valve and its fixing at the manifold body are made by a sealing nut with a fitting seal and an O-ring. Additionally the passage between port A and T is sealed at the screw-in port and the internal piston.

Type CMV, CMVZ



Type CSV, CSVZ



Type	G	ØD	ØD ₁	ØD ₂	t	t ₁	t ₂	Thread counterbore ØB _{max}
CMV 1	M16x1.5	22	8	--	13	18	11	16 ^{+0.2}
CMV 2 CMVZ 2	M20x1.5	24	10	--	14	20	13	20 ^{+0.2}
CMV 3	M24x1.5	30	11	--	16	22	13	24 ^{+0.2}
CSV 2 CSVZ 2	M20x1.5	24	10	14	14	24	--	20 ^{+0.2}
CSV 3	M24x1.5	30	11	16	16	28	--	24 ^{+0.2}



Note

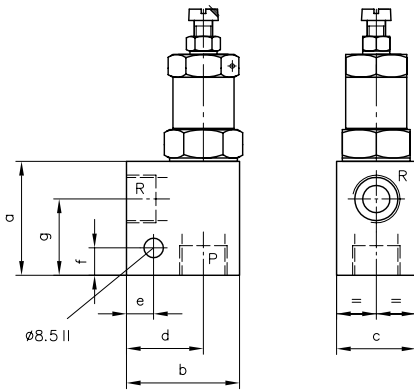
For tapped plugs for the mounting holes, see [Chapter 4, "Dimensions"](#).

Information für counterbore see ¹⁾

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

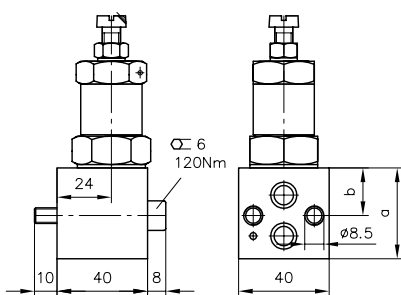
4.3 Version with single connection block

Direct pipe connection

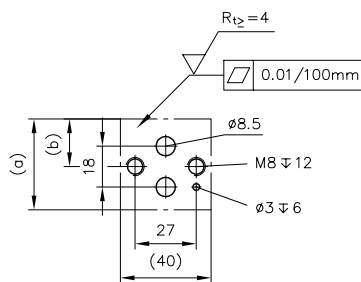


Type	Ports P and R (BSPP)	a	b	c	d	e	f	g
CMV 1.. -1/4	G 1/4	40	40	25	27	10	10	26
CMV 1.. -3/8	G 3/8	40	40	25	27	10	10	26
CMV 2.. -3/8 CMVZ 2.. -3/8	G 3/8	45	42	32	27	12	12	30.5
CMV 3.. -1/2	G 1/2	50	50	35	34	12	12	33.5
CSV 2.. -1/4 CSVZ 2.. -1/4	G 1/4	45	42	32	27	15	15	31
CSV 2.. -3/8 CSVZ 2.. -3/8	G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

Manifold mounting



Base plate hole pattern

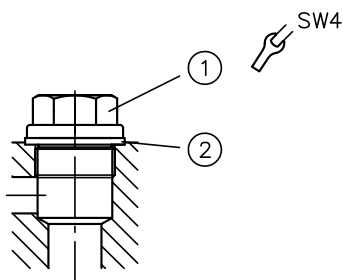


Type	a	b	Sealing	Mounting
CMV 2 CMVZ 2	40	21	2x Sealing ring 10x2 NBR 90 Sh	2x Skt. head screw ISO 4762-M8x50-8.8A2K
CSV 2 CSVZ 2	48	30	2x Sealing ring 10x2 NBR 90 Sh	2x Skt. head screw ISO 4762-M8x50-8.8A2K

4.4 Tapped plugs

The mounting holes can be sealed with tapped plugs if necessary; for example, if the assembly of standardised basic bodies is to be carried out with or without screw-in valves as required.

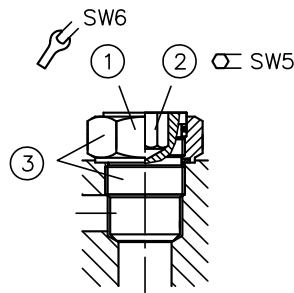
Passage open



- 1 Tapped plug
- 2 Sealing ring

SW = a/f

Passage blocked



- 1 Lock nuts and sealing nuts
- 2 Screw part
- 3 Tapped plug and locking tapped plug complete

Type and size	Passage open			Passage blocked					
	Tapped plug			Seal ring	Tapped blockage / plug combination complete				
				DIN 7603-Cu	Tapped part			Counter / sealing nut	
	DIN 910	a/f4	Torque (Nm)		Drawing No.	a/f5	Torque (Nm)	a/f6	Torque(Nm)
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
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					

5.1 Designated use

This fluid-power product has been designed, manufactured and tested acc. to 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 staff who is familiar with and observes the 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 data. This documentation contains the technical parameters for various product versions.

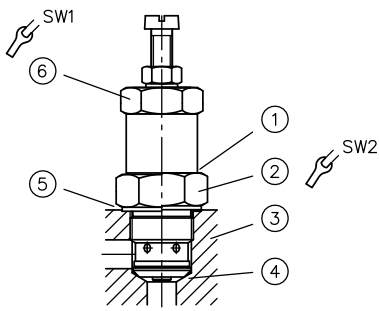
**Note**

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

5.2 Assembly information

The hydraulic system 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 correctly prior to dismantling; this applies in particular to systems with hydraulic accumulators.

5.2.1 Screwing in the basic version (screw-in valve)



- 1 Stopper
- 2 Lock nuts and sealing nuts
- 3 Basic body
- 4 Sealing edge
- 5 Locking
- 6 Valve housing

SW = a/f

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 the counter/sealing nut to the specified torque.

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

5.2.2 Setting 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 CSV 2 CSVZ 2	CMV 3 CSV 3
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, "Available versions, main data"](#) Table 1



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.

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!

Risk of minor injury.

- Always monitor the pressure gauge when setting and 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.

Pay attention to the purity of the hydraulic fluid in order to maintain faultless operation (also see cleanliness level in [Chapter 3, "Parameters"](#)).

5.4 Maintenance information

This product is largely maintenance-free.

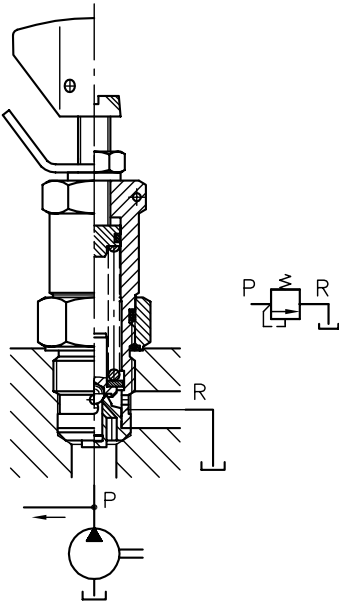
Conduct a visual inspection to check the hydraulic connections for damage at regular intervals, but at least once per year. If external leaks are found, shut down and remedy.

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

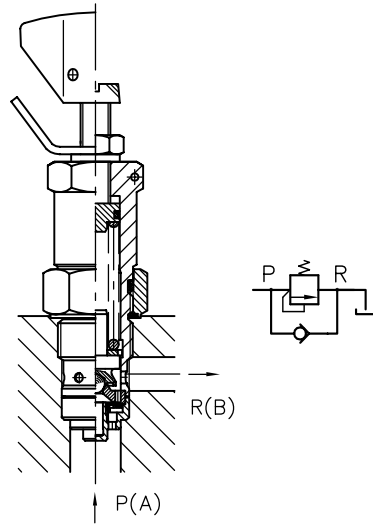
6 Other information

6.1 Schematic sectional drawings and circuit symbols

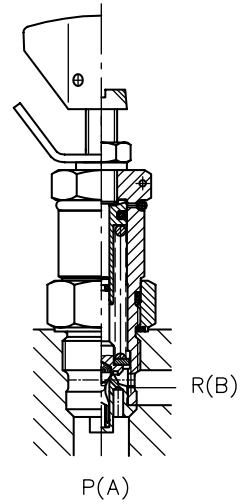
Type CMV



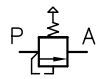
Type CSV



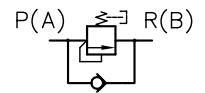
Type CMVZ
Type CSVZ



CMVZ



CSVZ



Further information

Additional versions

- Pressure-limiting valve, with unit approval type CMVX: D 7710 TUV
- Throttle valve and shut-off valve CAV: D 7711
- Check valve type CRK, CRB and CRH: D 7712
- Pressure-dependent shut-off valve type CDSV: D 7876
- Throttle valve and throttle check valve type CQ, CQR and CQV: D 7713
- Pressure-reducing valve type CDK: D 7745
- Pressure-reducing valve type CLK: D 7745 L
- Flow control valve type CSJ: D 7736
- Pressure-controlled shut-off valve type CNE: D 7710 NE