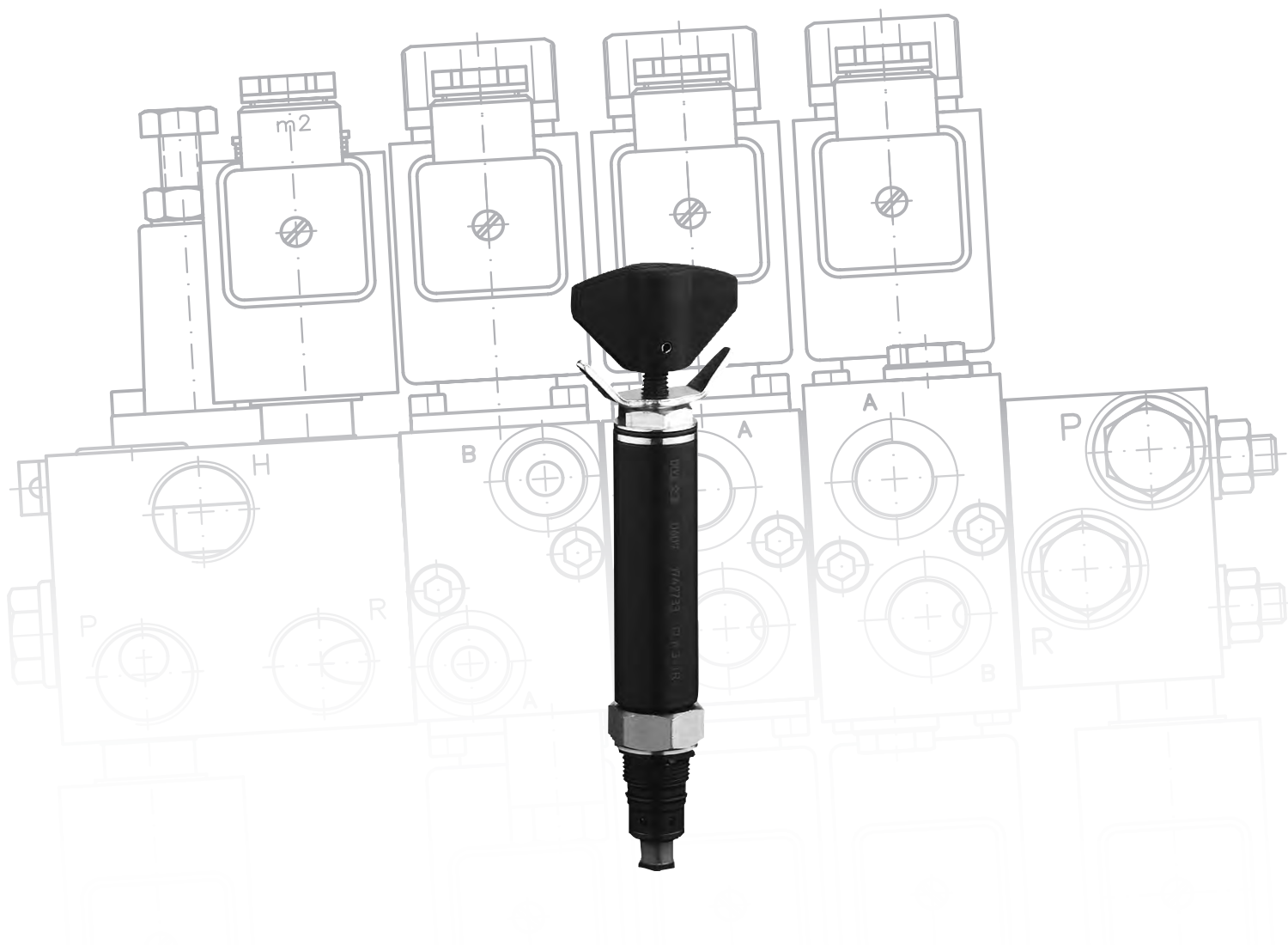
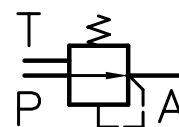


Pressure control valves type CLK

Free of leakage oil, directly controlled by overpressure function

Adjustability: With tools
Manually

$p_{\max} P$: 500 bar
 $p_{\max} A$: 380 bar
 Q_{\max} : 22 l/min



Product documentation

D 7745 L

07-2013-1.1

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1

General information pressure reducing valve type CLK

The task of pressure reducing valves is to maintain a largely constant outlet pressure despite a higher and changing inlet pressure. These valves are used when a secondary circuit has to be fed with a lower but constant pressure level by a main (primary) oil circuit with a higher and varying pressure level. The valve described here is directly controlled. Compared with conventional, piston-type pressure reducing valves suffering from leaking oil, where an additional drain port is required, this type is designed according to the two-way principle, i.e. it has zero leakage when in a closed state. Type CLK has an integrated safety valve function. A reversal of the flow direction is possible up to approx. $2 \times Q_{\max}$. These valves can be screwed into the easily produced threaded holes.



Image 1: Version with connectionblock for directpipe connection



Image 2: Basic type (cartridge valve)

Features and benefits:

- Zero leakage in closed state
- Version with integrated overpressure function

Intended applications:

- General hydraulic systems
- Jigs
- Test benches

Basic Versions:

- Type CLK 3 - Standard version, usable for all applications.
- Type CLK 32 - Version with low pressure dependence intended for varying pump pressure and use at low pressure settings (Attention: max. flow 6 lpm).
- Type CLK 35 - Version with low back pressure, but with higher sensitivity to varying pump pressure.

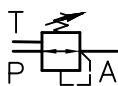
Versions with connection blocks:

- For pipe connection

2 Available versions, main data

2.1 Basic type (cartridge valve)

Symbol:



Note

The check valve function in direction A → P is not illustrated for the sake of simplicity.

Example:

CLK 3 -2			-180
CLK 32 -51	R	-1/4	-20

Pressure setting (bar) Pressure reducing valve ¹⁾

Version Table 3 Version with single connection block

Adjustment Table 2 Adjustment

Basic type and pressure range Table 1 Basic type

Table 1 Basic type

Basic type	Flow Q_{max} (lpm)	Pressure range p_A from ... to (bar)					
		-1	-11	-2	-21	-5	-51
CLK 3	12	30 ... 300	30 ... 380	20 ... 200	20 ... 250	15 ... 130	15 ... 165
CLK 32	6	18 ... 300	18 ... 380	12 ... 200	12 ... 250	8 ... 130	8 ... 165
CLK 35	22	70 ... 300	70 ... 380	50 ... 200	50 ... 250	30 ... 130	30 ... 165

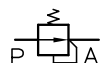
Table 2 Adjustment

Coding	Description	Symbol
No designation	Tool adjustable	
R	Manually adjustable, with lock nut	
H	Turn knob, lockable	

¹⁾ If no desired pressure specification is indicated, the valve will be set at HAWE to the max. pressure of the respective pressure range.

2.2 Version with connection block for direct pipe connection

Order example:



CLK 3	-5R	-1/4	-100
-------	-----	------	------


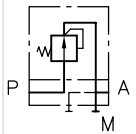
Pressure setting (bar) Pressure reducing valve ¹⁾

Version Table 3 Version with connection block for direct pipe connection

Adjustment Table 2 Adjustment, see [Chapter 2.1, "Basic type \(cartridge valve\)"](#)

Basic type and pressure range Table 1 Basic type, see [Chapter 2.1, "Basic type \(cartridge valve\)"](#)

Table 3 Designs with single connection block

Coding	Description	Symbol
No designation	Screw-in valve	
..-1/4	For pipe connection	

¹⁾ If no desired pressure specification is indicated, the valve will be set at HAWES to the max. pressure of the respective pressure range

3 Parameters

3.1.1 General

General information

Nomenclature	Directly controlled pressure reducing valve, with safety valve function		
Design	Directional ball seated valve		
Model	Screw-in valve, valve for pipe connection		
Material	Steel body gas nitrided, connection block galv. zinc plated, internal functional parts hardened and ground Balls made of bearing quality steel		
Torques	See Chapter 4, "Dimensions"		
Installation position	Any		
Port	<ul style="list-style-type: none"> ■ P = Inlet (pump or primary side) ■ A = Consumer (secondary side) ■ T = Tank (return) <p>Coding applies to circuit diagrams and assembly plans only. The coding is not stamped onto the valve housing. The ports are stamped on the versions for pipe connection and versions for manifold mounting. The coding can be found in the schematic overviews or the dimension diagrams in Chapter 4, "Dimensions".</p>		
Direction of flow	<p>P→A: Pressure reducing function A→P: this only occurs, if the pressure on the primary side is lower than on the consumer side.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>i Note A by-pass check valve is recommended if the flow A→P exaggerates the specification for $Q_{P \rightarrow A \max}$ or pressure peaks or pulsation are anticipated.</p> </div>		
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 mm²/s opt. operation approx. 10... 500 mm²/s. Also suitable are biologically degradable pressure fluids types HEPG (Poly-alkylenglycol) 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

Permissible pressure

- Pump side $p_{P \max} = 500 \text{ bar}$
- Return $p_T \leq 20 \text{ bar}$

Static overload capacity

Pressure deviation

The primary side p_P due to a internal design based ratio. The actual pressure p_V being received will vary slightly as it directly depends on the pressure at.

Basic type	Pressure range				At $p_P \pm 10 \text{ bar}$ a pressure variation p_V will be apparent at A
	-08 -081	-1 -11	-2 -21	-5 -51	
CLK 3	$\pm 1.3 \text{ bar}$	$\pm 0.9 \text{ bar}$	$\pm 0.6 \text{ bar}$	$\pm 0.4 \text{ bar}$	
CLK 32	$\pm 0.7 \text{ bar}$	$\pm 4.5 \text{ bar}$	$\pm 0.3 \text{ bar}$	$\pm 0.23 \text{ bar}$	
CLK 35	$\pm 2.7 \text{ bar}$	$\pm 1.7 \text{ bar}$	$\pm 1.2 \text{ bar}$	$\pm 0.8 \text{ bar}$	

Flow

$Q_{P \rightarrow A \max}$	= 6 lpm	(CLK 32)
	= 12 lpm	(CLK 3)
	= 22 lpm	(CLK 35)
$Q_{A \rightarrow P \max}$	= 25 lpm	See information in Chapter 3, "Parameters"
$Q_{A \rightarrow T \max}$	See characteristic curves in Chapter 3, "Parameters"	

Curves

Viscosity during measurements
approx. 60 mm²/s
 $p_A - Q_{P \rightarrow A}$ - Curves

The set pressure applies to flow $Q_{P \rightarrow A} \rightarrow 0$ lpm. With flow $Q > 0$, i.e. the consumer is moving, the pressure on the secondary side p_A will drop slightly.



Caution

Danger of injury due to incorrect pressure settings!

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

Type CLK

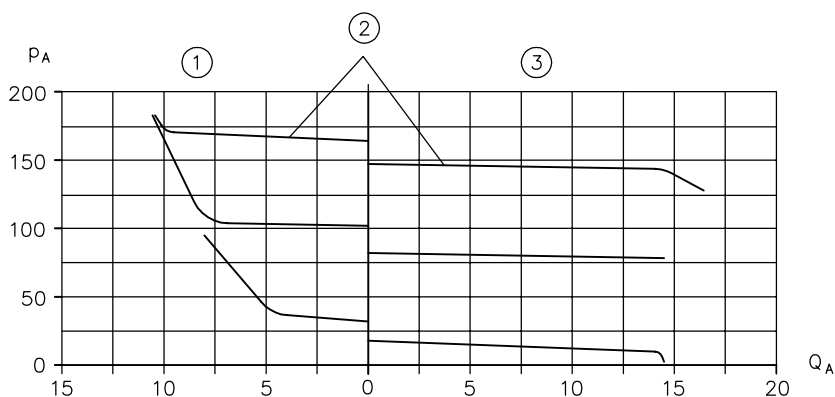


Image 3: Q_A Flow (lpm); p_A Pressure (bar)

- 1 Safety valve function
- 2 identical pressure setting
- 3 Pressure reducing function

$\Delta p - Q$ - Curve $P \rightarrow A$ or $A \rightarrow P$

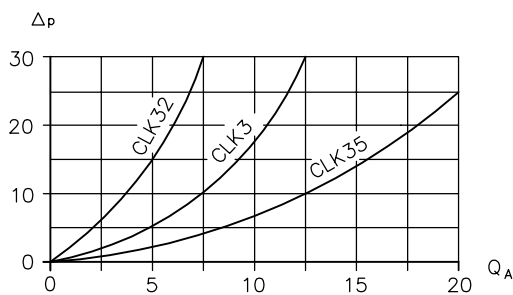


Image 4: Q_A Flow (lpm); Δp Back pressure (bar)



Note

For this purpose, please also observe the additional information under the point "Flow direction".

Mass

Basic type (cartridge valve)

Type CLK.. = 0.7 kg

Version with connection block

Type CLK..

- 1/4 = 1.3 kg

4 Dimensions

All dimensions in mm, subject to change.

4.1 Basic type (cartridge valve)

Type CLK 3..

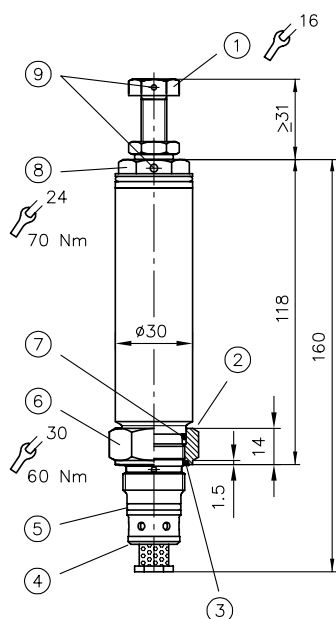


Image 5: Without coding, tool adjustable

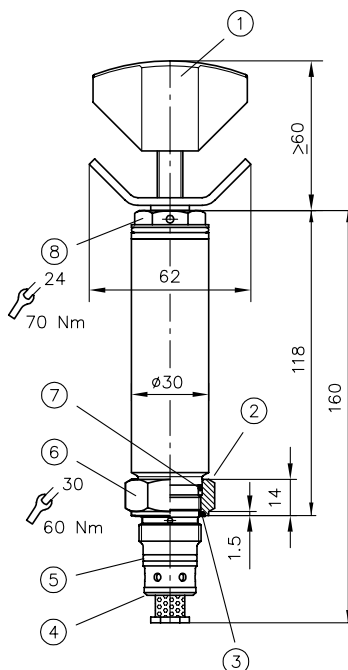


Image 6: Code R, manually adjustable

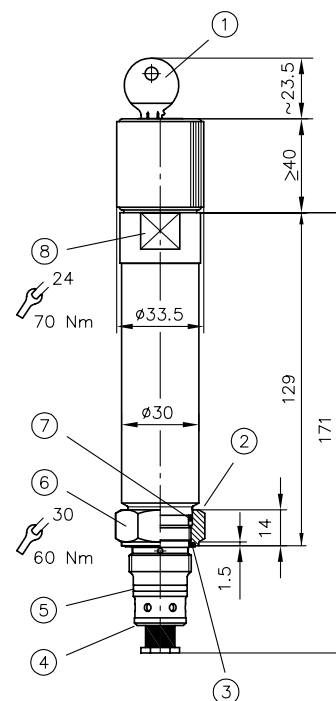


Image 7: Code H, lockable

- 1 Screw with lock nut
- 2 Travel stop
- 3 KANTSEAL DKAR00021-N90 NBR 90 Sh
23.52x26.88x1.68
- 4 Sealing edge
- 5 O-ring 18.77x1.78 P 5001
- 6 Sealing nut hole
- 7 O-ring 21.95x1.78 AU 90 Sh
- 8 Valve body
- 9 Provision for lead seal

- 1 Turn knob
- 2 Travel stop
- 3 KANTSEAL DKAR00021-N90 NBR 90 Sh
23.52x26.88x1.68
- 4 Sealing edge
- 5 O-ring 18.77x1.78 P 5001
- 6 Sealing nut hole
- 7 O-ring 21.95x1.78 AU 90 Sh
- 8 Valve body

- 1 Key (is scope of delivery)
- 2 Travel stop
- 3 KANTSEAL DKAR00021-N90 NBR 90 Sh
23.52x26.88x1.68
- 4 Sealing edge
- 5 O-ring 18.77x1.78 P 5001
- 6 Sealing nut hole a/f 30
- 7 O-ring 21.95x1.78 AU 90 Sh
- 8 Valve body a/f 24



Note

For this purpose, please also observe the information on threads and on counterboring the mounting hole requirements in the section on assembly information.

4.2 Mounting hole

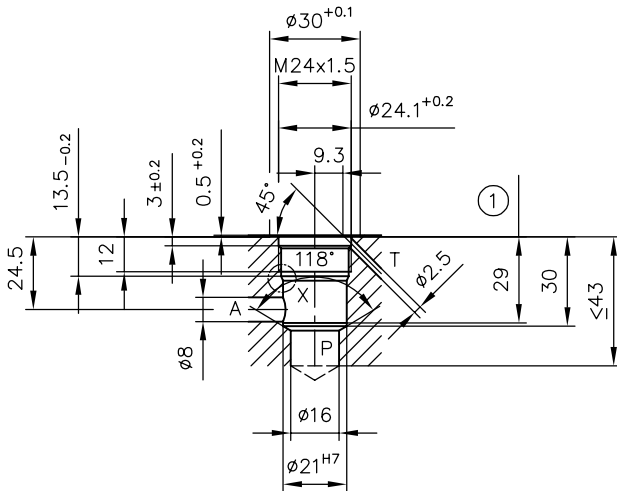


Image 8: Mounting hole Type CLK

1. Reaming depth

Detail "X"

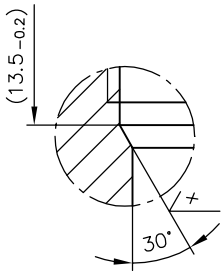


Image 9: Detail X

Counterbore $0.5^{+0.2}$ (max. $\varnothing 30^{+0.1}$), exclusively required for pressures at A in excess of 100 bar.

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 screw-in port and the internal piston.

4.3 Version with connection block for direct pipe connection

Type CLK 3...- 1/4

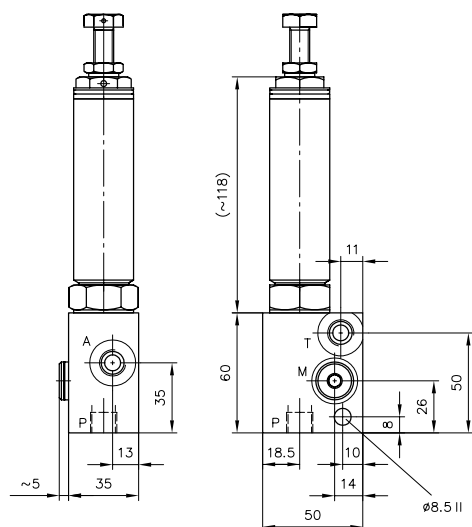


Image 10: Version with connection block for direct pipe connection

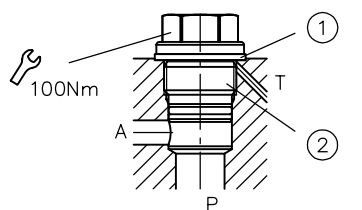
1. $\varnothing 8.5$ thru-hole

Ports conforming ISO 228/1: P, A, M, T = G 1/4 (BSPP)

4.4 Accessory - Tapped plugs

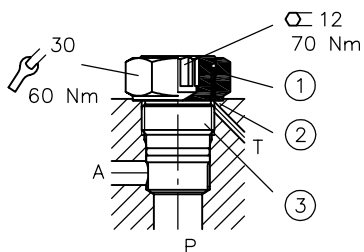
Mounting holes in the manifold may be blocked if required by tapped plugs, e.g. if uniform manufactured manifolds should be equipped with or without cartridge valves de-pending on application.

Passage open



- 1 Tapped plug M 24x1.5 DIN 910-Cu
- 2 Tapped blockage part No. 7745 405

Passage closed



- 1 O-ring 21.95x1.78 AU 90 Sh
- 2 KANTSEAL DKAR00021-N90 NBR 90 Sh 23.52x26.88x1.68
- 3 Tapped blockage/plug combination part No. 7745 455

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 reducing 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 HAWE Hydraulik.

5.2 Installation 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 dismantling; this applies in particular to systems with hydrostatic accumulators.

5.2.1 Screw in basic type (cartridge valve)

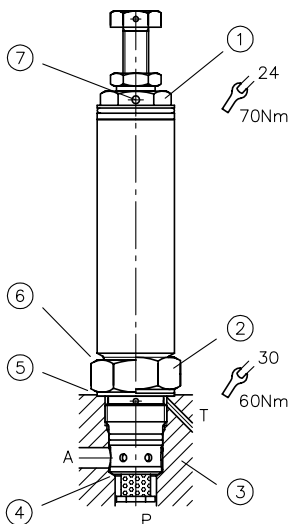


Image 11: Valve body Type CLK

1. Before screwing the valve body into the manifold slacken the counter /sealing nut until the travel stop.
2. Screw in the valve body (a/f 24) and tighten with the correct torque. The metallic sealing of the inlet to the outlet takes place at the contact area of the facial sealing edge and the stepped shoulder of the core diameter at the location thread.
3. Retighten the counter/sealing nut (a/f 30) with the correct torque.

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

5.2.2 Adjusting pressure

If no desired pressure specification is indicated, the valve will be set at HAWES to the max. pressure of the respective pressure range.

Reference values for pressure adjustment

Pressure adjustment Pressure limiting valve		Pressure adjustment Pressure limiting valve	
Coding	Δp /revolution (bar/rev)	Coding	Δp /revolution (bar/rev)
1	25	11	31
2	16	21	20
5	10	51	12



Caution

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

The product is generally set by the manufacturer, although this can also be done by the customer. If the customer is setting the product, the information in this documentation must be observed in full.

The pressure ratio as designed causes a slight change to the actual pressure p_A in conjunction with a variable pump pressure. See the pressure dependence table in the [Chapter 3, "Parameters"](#).

5.4 Maintenance information

This product is largely maintenance-free.

Check that the product is securely fastened in the mounting hole at regular intervals, but at least once per year.

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.

6.1 Planning information

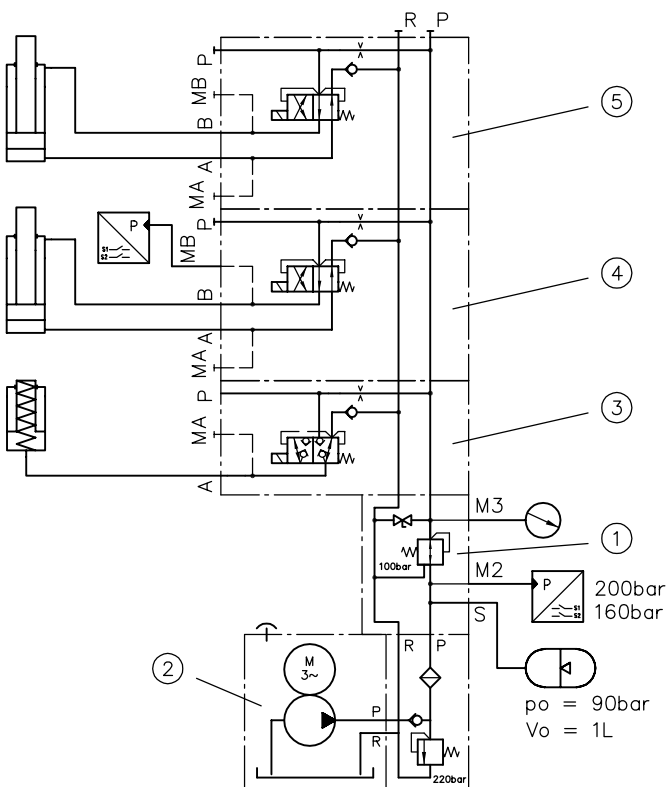
Alternations of pressure may occur due to lack of leakage in closed state (idle position) if used in circuits where the pressure is maintained over a long period without switching operations e.g. clamping of work piece pallets. The pressure will rise if the temperature rises (e.g. radiation of the sun) or additional load is induced, pressure drops if the temperature drops (stand-still over night) or the load is reduced and the pump is switched off.

These effects are particularly noticeable with short, rigid pipe connections. Hoses and additional volume (e.g. AC 13 miniature accumulator in accordance with D 7571) help to compensate such (negative) pressure fluctuations.

The effects described above are caused by the ratio of temperature induced expansion and compression coefficient (theoretical 1:10, i.e. $\Delta T = 1\text{ K} \rightarrow \Delta p \sim 10\text{ bar}$). A ratio of approx. 1:1 is realistic due to the flexibility of piping and tubing (backed by experience).

The integrated safety valve function of the pressure reducing valve is intended to prevent creeping pressure increases or pressure peaks.

6.2 Application examples



1. Type CLK 3 - 1-100
2. Pump Q = 5 lpm
3. Tool clamping (loosen)
4. Pallet clamping
5. Table clamping

Additional versions

- [Pressure reducing valve, type CDK: D 7745](#)
- [2-way pressure reducing valves type DK: D 7941](#)
- [Pressure valves type CMV, CMVZ and CSV, CSVZ: D 7710 MV](#)
- [Pressure controlled the 2-way directional valve type CNE: D 7710 NE](#)
- [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](#)
- [Two-way flow valves, type SB: D 6920](#)

Utilized at

- [Directional seated valve banks, type BVZP 1: D 7785 B](#)
- [Valve bank type BA: D 7788](#)
- [Valve bank type BVH: D 7788 BV](#)
- [Intermediate plate type NZP hole pattern conforming NG 6 \(DIN 24 340-A6\): D 7788 Z](#)

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