2-way insert valve type CVK, CVS

Product documentation

Operating pressure p_{max}:	350 bar
Flow rate Q_{max}:	1600 l/min



D 6452
04-2026 -1.2 en

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Printing date / document generated on: 2026-05-06

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1 Overview 2-way insert valve type CVK, CVS

Directional valves are designed to direct the flow of the hydraulic medium in specific directions, connecting the corresponding ports or sealing them off with zero leakage. In this way, they control the movement of the actuators in a hydraulic system.

The directional valves type CVK and CVS are 2-way insert valves. They are used as logic elements for installation in hydraulic control blocks. A control cover is required for full valve function.

The directional valve type CVK is designed as a piston valve. The directional valve type CVS is designed as a seated valve.



Directional seated valve type CVS

Features and advantages

- Compact design and high power density
- Very high flow rates possible
- Installation in special housings or control blocks

Applications

- Machine tools
- Press brakes
- Track-laying machines

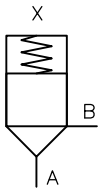
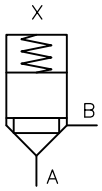
2 Available versions

Ordering example

CVS E32 | A | 08 | C | D

- D → 2.5 "Piston design"
- C → 2.4 "Surface ratio"
- 08 → 2.3 "Orifice"
- A → 2.2 "Opening pressure"
- E32 → 2.1 "Basic type and size"

2.1 Basic type and size

Type	Size *	Description	Flow rate Q_{max} (l/min)	Circuit symbol
CVK	E16	Piston valve, Surface ratio $A_A : A_X = 1 : 1$	230	
	E32		620	
CVS	E10	Seated valve, Surface ratio see Chapter 2.4	180	
	E16		280	
	E32		700	
	E40		960	
	E50		1600	

* See also Mounting hole Chapter 4.1

2.2 Opening pressure

Coding	Opening pressure A - B (bar)
A	~ 1.5
B	~ 2.5
C	without spring

2.3 Orifice

Coding	Orifice diameter ∅ (mm)
00	closed
06	0.6
08	0.8
10	1.0
12	1.2
14	1.4

2.4 Surface ratio

Only for type **CVS**.

Coding	Surface ratio A_A : A_X
A	1 : 1.1
C	1 : 2

2.5 Piston design

Only for type **CVS**.

Coding	Description
without coding	Standard design, without sealing on the piston
D	Sealing on the piston (only in conjunction with opening pressure coding **B** (~ 2.5 bar))

3 Parameters

3.1 General data

Designation	2-way insert valve
Design	Poppet or piston valve
Model	Insert valve
Installation position	As desired
Hydraulic fluid	Hydraulic fluid, according to DIN 51524 Parts 1 to 3; ISO VG 10 to 68 according to DIN ISO 3448 Viscosity range: 10 - 600 mm^2/s Other media on request
Cleanliness level	**ISO 4406** 22/19/16
Filter recommendation	Filter retention rate $\beta_{25} > 75$
Temperature	Environment: approx. -30 ... +50 °C, hydraulic fluid: -25 ... +70 °C, ensure the correct viscosity range.

3.2 Pressure and volumetric flow

Operating pressure	p_{max} = 350 bar
Flow rate	Q_{max} = 1600 l/min

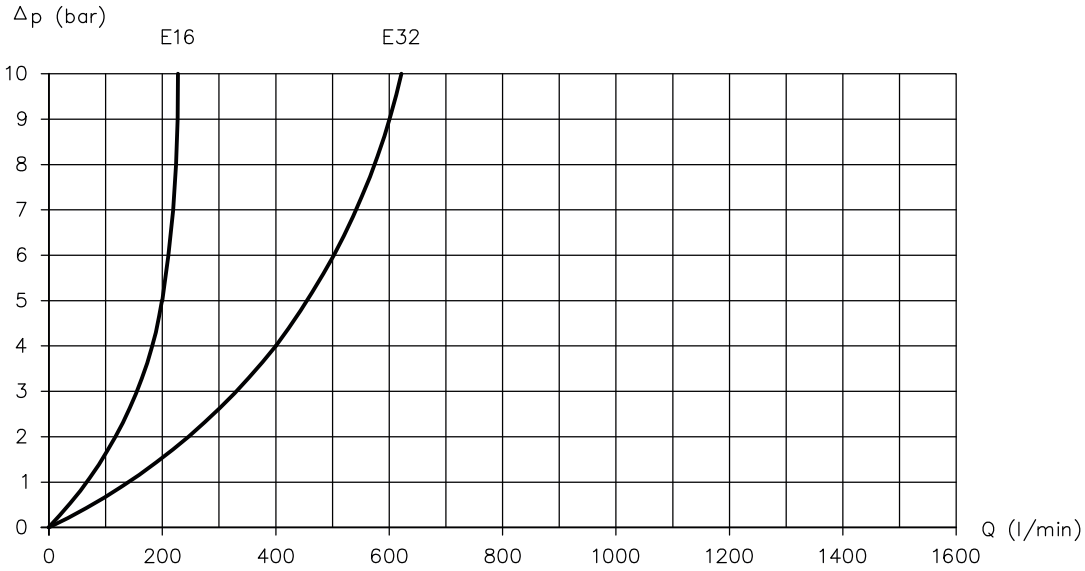
3.3 Weight

	Size	
	E10	= 0.03 kg
	E16	= 0.08 kg
	E32	= 0.25 kg
	E40	= 0.65 kg
	E50	= 1.10 kg

3.4 Characteristic lines

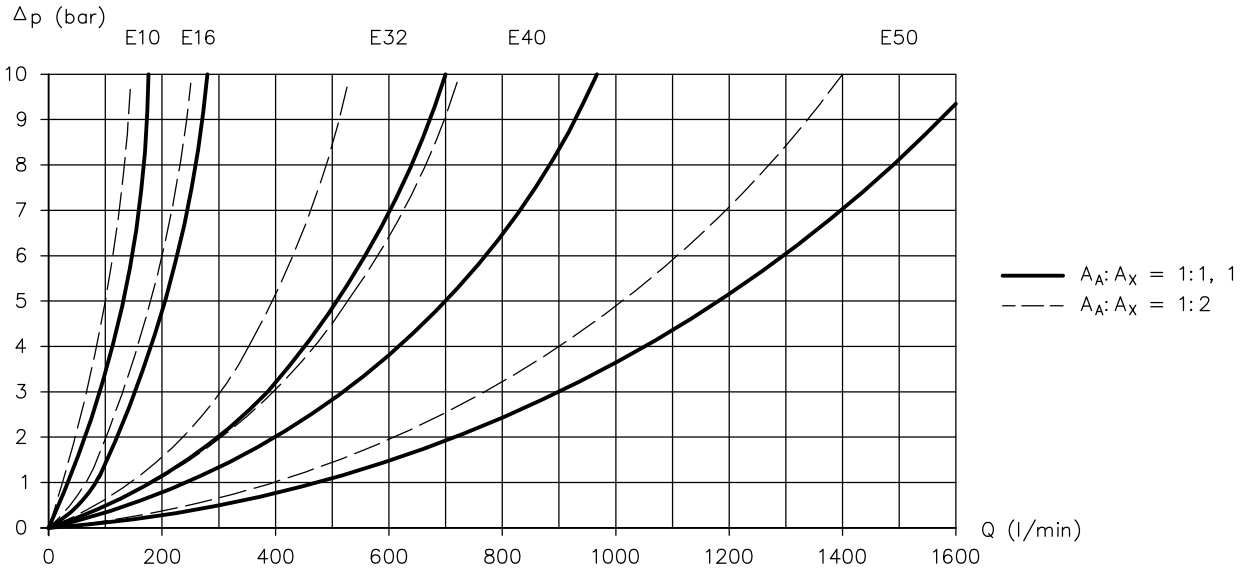
measured at +50 °C temperature of hydraulic fluid, without closing spring, viscosity 35 mm²/s, tolerance ±5 %

CVK (piston valve)



Q flow rate (l/min); Δp pressure (bar)Q flow rate (l/min); Δp pressure (bar)

CVS (seated valve)

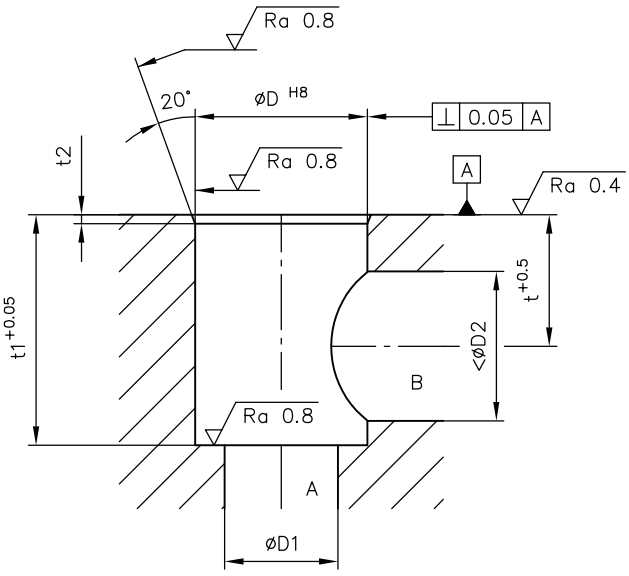


Q flow rate (l/min); Δp pressure (bar)

4 Dimensions

All dimensions in mm, subject to change.

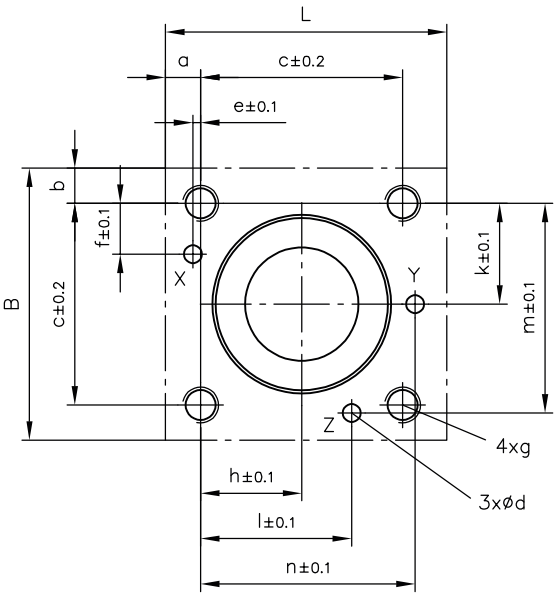
Mounting hole



Size	∅D	∅D1	∅D2	t	t1	t2
E10	20	10	14	15	25	2
E16	28	16	20	20	34	2
E32	38.1	25	33	29	50.8	2
E40	50	32	40	36	62	2
E50	62	42	50	48	80	2

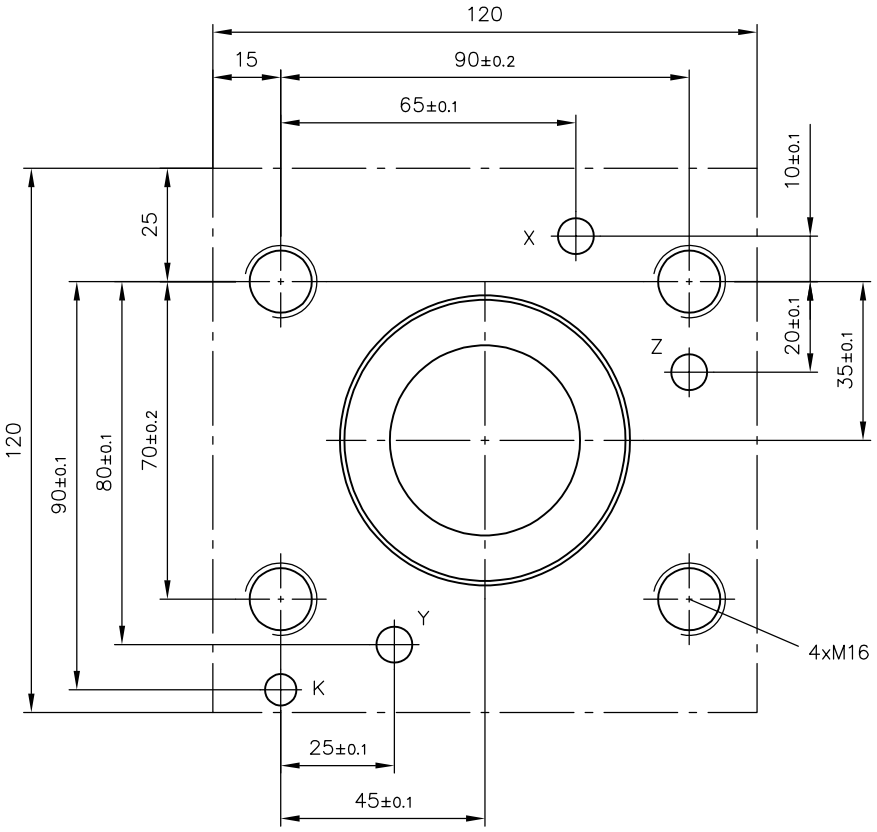
Drilling pattern for control covers

E10 - E40



Size	L	B	a	b	c	∅d	e	f	g	h	k	l	m	n
E10 - E32	62	60	7.75	7.75	44.5	max. 4	1.75	11.25	M8	22.25	22.25	33.25	46.25	47.25
E40	90	80	15	10	60	max. 6	2	15	M10	30	30	45	62	64

E50



X Preferred control oil connection
Y Drain port (control oil return)
Z Control oil connection
K Hole for positioning pin (size E50 only)

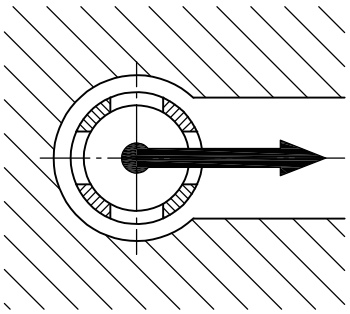
X, Y, Z = max. ∅8
K = ∅7, min. depth 8

INFORMATION

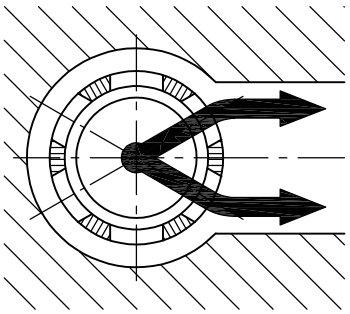
- Port X, Y, Z when using 2/2-way poppet valve type MSV, RSV (size 16 and 32) as per D 6409
- Port X and Y when using Proportional pressure relief valve typ VPDB (size 16) as per D 6386 and Proportional pressure relief valve type VPDB (size 16 and 32) as per D 6387
- Port X and Y when using Pressure relief valves VDB (size 16 and 32) as per D 6377

Preferred installation for minimal pressure drop

Hole and discharge hole aligned



Web and discharge hole aligned



5 Installation, operation and maintenance information

Observe the document B 5488 “General operating instructions for assembly, commissioning, and maintenance.”

5.1 Intended use

This product is intended exclusively for hydraulic applications (fluid technology).

The user must observe the safety measures and warnings in this document.

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 specialist personnel.
- ► The product must only be operated within the specified technical parameters described in detail in this document.
- ► All components must be suitable for the operating conditions when using an assembly.
- ► The operating instructions for 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

The product must only be installed in the complete system with standard and compliant connection components (screw fittings, hoses, pipes, fixtures etc.).

The product must be shut down correctly prior to disassembly (in particular in combination with hydraulic accumulators).

⚠ **DANGER**

Sudden movement of the hydraulic drives when disassembled incorrectly

Risk of serious injury or death

- ► Depressurise the hydraulic system.
- ► Perform safety measures in preparation for maintenance.

5.3 Operating instructions

Observe product configuration and pressure/flow rate.

The statements and technical parameters in this document must be strictly observed.
The instructions for the complete technical system must also always be followed.

NOTICE

- ► 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**

Overloading components due to incorrect pressure settings.

Minor injuries. Flyaway or bursting parts and uncontrolled leakage of hydraulic fluid.

- ▪ Pay attention to the maximum operating pressure of the pump, valves and fittings.
- ▪ 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 product. Contamination can cause irreparable damage.

Examples of fine contamination include:

- Swarf
- Rubber particles from hoses and seals
- Dirt due to assembly and maintenance
- Mechanical debris
- Chemical ageing of the hydraulic fluid

NOTICE

New hydraulic fluid from the manufacturer may not have the required purity.

Damage to the product is possible.

- ► Filter new hydraulic fluid to a high quality when filling.
- ► Do not mix hydraulic fluids. Always use hydraulic fluid that is from the same manufacturer, of the same type, and with the same viscosity properties.

For smooth operation, pay attention to the cleanliness level of the hydraulic fluid (cleanliness level see Chapter 3, "Parameters").

Additionally applicable document: D 5488/1 oil recommendations

5.4 Maintenance information

Check regularly (at least once a year) by visual inspection whether the hydraulic connections are damaged. If external leakages are found, shut down and repair the system.

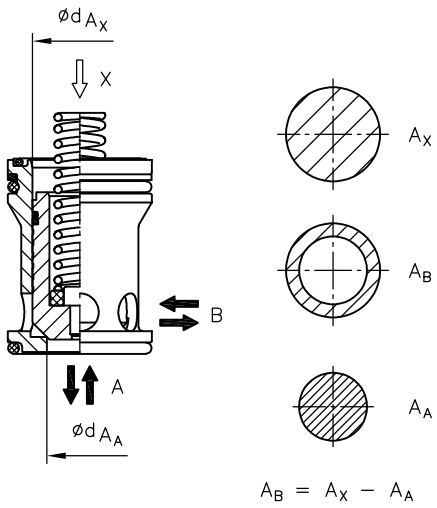
Clean the surface of the device regularly (at least once a year) (dust deposits and dirt).

6 Other information

6.1 Functional principle

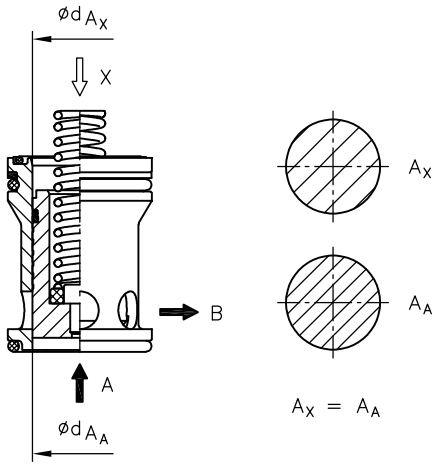
2-way insert valve, seated design

The position of the piston depends on the resulting force ratio. In the closing direction, force is exerted by the spring force and the control pressure applied to the control surface A_X. In the opening direction, the operating pressure acts on the seat surface A_A and the pressure acts on the annular surface A_B. When the valve cone is open – due to pressure relief at X – fluid can flow through ports A and B in both directions. When the piston is closed – pressurization at X – working connections A and B are sealed off from each other.



2-way insert valve, piston design

In the piston element, sealing is achieved solely by the piston clearance. Working connections A and B are not separated from each other with zero leakage. Another difference from the seated design is that the surfaces of A_A and A_X are equal.



References

Additional versions

- 2/2-way poppet valve type MSV, RSV (size 16 and 32): D 6409
- Proportional pressure relief valve typ VPDB (size 16): D 6386
- Proportional pressure relief valve type VPDB (size 16 and 32): D 6387
- Pressure relief valves VDB (size 16 and 32): D 6377
- Suction valve type NSV: D 6368

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