

# Throttle valve and shut-off valve type CAV

## Product documentation



Screw-in valve

Operating pressure  $p_{\max}$ : 500 bar

Flow rate  $Q_{\max}$ : 50 lpm



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# 1 Throttle valve and shut-off valve type CAV overview

Throttle and shut-off valves are a type of metering valve. With the aid of these valves a pressure drop can be established between the inlet and outlet side. In this way the velocity of cylinders in accumulator circuits and the flow rate in control circuits can be regulated or a consumer line completely shut-off (e.g. to protect a pressure gauge).

The throttle and shut-off valve type CAV, as a slotted throttle, is insensitive to micro contamination. It can be screwed-in and can be integrated into control blocks. The necessary mounting holes are straightforward to make.

### Features and benefits:

- Various configurations
- Sensitive adjustment and complete shut off possible

### Intended applications:

- General hydraulic systems



*Turn knob*



*Manually adjustable version*



*Fixed (locked) version*

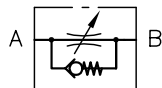
## 2 Available versions, main data

Circuit symbol:

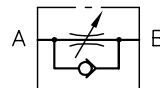
CAV..(K)



CAV..R(K)



CAV..V(K)



### 2.1 Screw-in valve

Order coding example:

CAV 2R	K
CAV 1V	

Adjustment Table 2 Adjustment

Basic type and size Table 1 Basic type and size

**Table 1 Basic type and size**

Basic type and size	Description	Pressure range $p_{max}$ (bar)	Flow rate $Q_{max}$ approx. (lpm)	Spigot screw thread, metric ISO fine thread DIN 13 T6
CAV 1	Throttle and locking direction A → B and B → A	500	30	M16x1.5
CAV 2			50	M20x1.5
CAV 1R	Throttle and locking direction B → A, free A → B		15	M16x1.5
CAV 2R			25	M20x1.5
CAV 1V	Throttle and locking direction A → B, free B → A		15	M16x1.5
CAV 2V			25	M20x1.5

**Table 2 Adjustment**

Marking	Description
None	Standard, with wing nut
K	Fixed, (locked version) tool adjustable, see <a href="#">Chapter 5.2.2, "Adjusting version CAV ..K"</a>
D	Turn knob

## 2.2 Version for pipe connection

Order coding example:

CAV 1V K - 1/4

Connection block Table 3 Connection block

Type Type according to [Chapter 2.1, "Screw-in valve"](#)



**Note**

Only for type CAV 1

### Table 3 Connection block

Marking	Connections A, B (BSPP)
- 1/4	G 1/4
- 3/8	G 3/8

## 3 Parameters

### General information

<b>Description</b>	Throttle valve and shut-off valve for screwing in
<b>Design</b>	Slotted throttle, with and without bypass check valve depending on type
<b>Model</b>	Screw-in valve, pipe connection
<b>Material</b>	Steel; nitrided valve housing, electrogalvanised sealing nuts and connection block, hardened and ground functional inner parts For screwing into a basic body made of steel, spheroidal casting or other materials (e.g. aluminium)
<b>Tightening torques</b>	See <a href="#">Chapter 4, "Dimensions"</a>
<b>Installation position</b>	As desired
<b>Flow direction</b>	As desired; locked, throttled or free, see circuit symbol, table 1 <a href="#">Chapter 2, "Available versions, main data"</a>
<b>Closed position</b>	CAV.. zero-leakage when throttle completely closed B → A (CAV ..R..) and A → B (CAV ..V..) not zero-leakage when throttle completely closed
<b>Hydraulic fluid</b>	Hydraulic oil: according to Part 1 to 3; ISO VG 10 to 68 according to DIN ISO 3448 Viscosity limits: min. approx. 4, max. approx. 1500 mm <sup>2</sup> /s opt. operation approx. 10... 500 mm <sup>2</sup> /s. Also suitable for biologically degradable hydraulic fluids type HEPG (polyalkylene glycol) and HEES (synthetic ester) at operating temperatures up to approx. +70°C.
<b>Cleanliness level</b>	<b>ISO 4406</b> <hr/> 21/18/15...19/17/13
<b>Temperatures</b>	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 flow rate**

<b>Operating pressure</b>	$p_{max} = 500 \text{ bar}$
<b>Static overload capacity</b>	approx. $2 \times p_{max}$ when tightened and locked with a sealing nut
<b>Opening pressure</b>	Type CAV 1(2) R approx. 0.2 ... 0.4 bar A - B Type CAV 1(2) V 0 bar B - A (unloaded valve plate)

**Weight**

<b>Type</b>	
CAV 1..	= 50 g
CAV 2..	= 70 g
<b>Connection blocks</b>	
- 1/4	= +260 g
- 3/8	= +260 g

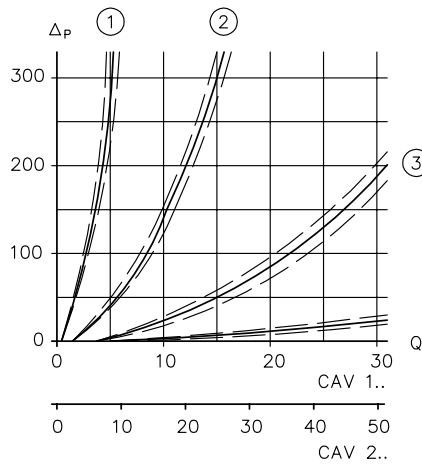
**Characteristic curves**

Oil viscosity approx. 60 mm<sup>2</sup>/s

$\Delta p$ -Q characteristics

**Throttle characteristics**

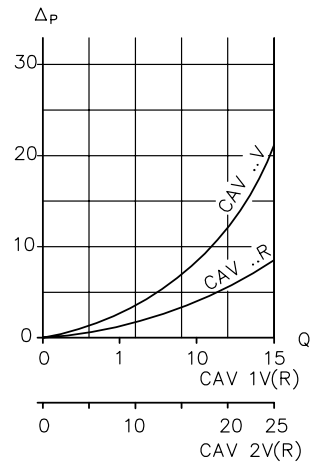
Reference values per revolution of the adjusting spindle counted from the lock-out circuit



Q flow rate (lpm);  $\Delta p$  flow resistance (bar)

- 1 1 revolution
- 2 2 revolution
- 3 3 revolution

**Free flow direction**



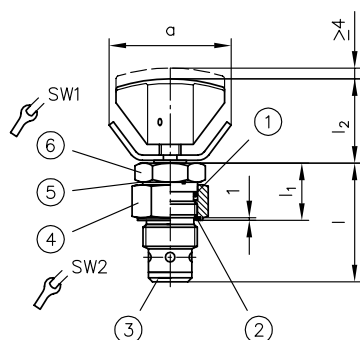


# 4 Dimensions

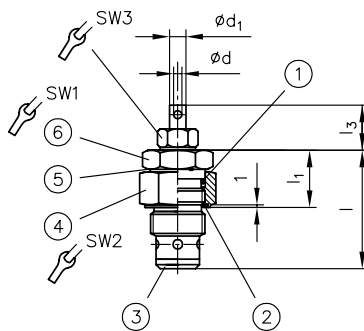
All dimensions in mm, subject to change.

## 4.1 Screw-in valve

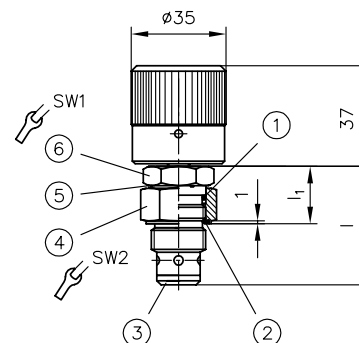
CAV 1 ...  
CAV 2 ...



CAV 1 ...K  
CAV 2 ...K

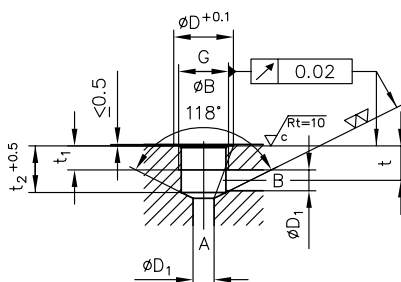


CAV 1 ...D  
CAV 2 ...D



- 1 O-ring
- 2 Fitting seal
- 3 Sealing edge
- 4 Sealing nut
- 5 Stopper
- 6 Valve housing

Mounting hole

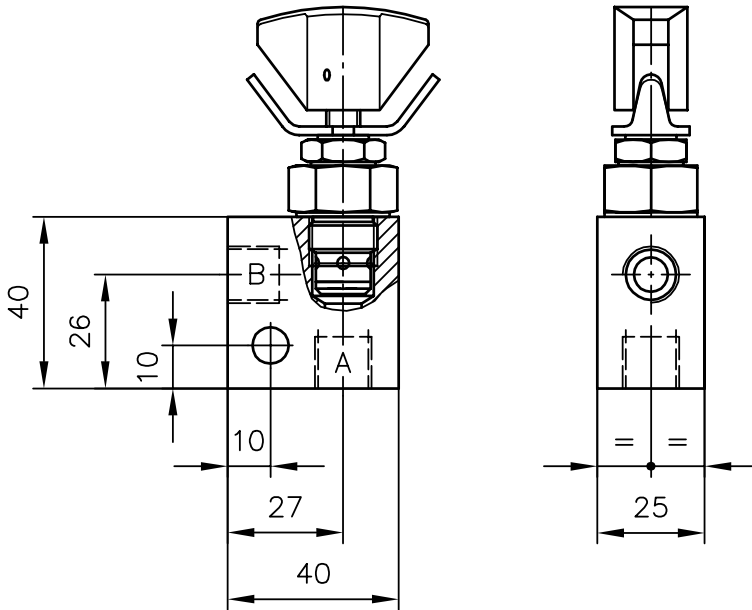


Type	$\phi D$	$\phi D_1$	a	$\phi d$	$\phi d_1$	l	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	t	t <sub>1</sub>	t <sub>2</sub>	G
CAV 1..	22	8	35	2	4.5	37	18	24	17	13	11	18	M16x1.5
CAV 2..	24	10	45	3	6	43	22	29	21	14	13	20	M20x1.5

Type	SW1	SW2	SW3	Tightening torque (Nm)		Counterbore	Fitting seal	O-ring AU 90 Sh
				Housing	Sealing nut	$\phi B_{max}$		
CAV 1..	17	22	10	40	35	$16^{+0.2}$	KANTSEAL DKAR00016-N90	14x1.78
CAV 2..	22	24	11	50	40	$20^{+0.2}$	KANTSEAL DKAR00018-N90	17.17x1.78

## 4.2 Version for pipe connection

CAV 1 ... -1/4  
CAV 1 ... -3/8



Connections A, B (BSPP)

- 1/4 = G 1/4

- 3/8 = G 3/8

**5****Assembly, operation and maintenance recommendations****5.1 Intended application**

This valve is intended exclusively for hydraulic applications (fluid engineering). The valve meets high technical safety standards and regulations for fluid.

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

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 qualified personnel.
- The product must only be operated within the specified technical parameters. The technical parameters are described in detail in this documentation.
- The operating and maintenance manual of the specific complete system must also always be observed.

If the product can no longer be operated safely:

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 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 hydraulic systems with hydraulic accumulators.

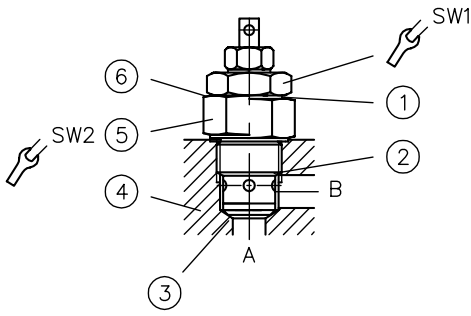
**Danger**

**Risk to life caused by sudden movement of the hydraulic drives when dismantled incorrectly!**

Risk of serious injury or death.

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

### 5.2.1 Screwing in and locking



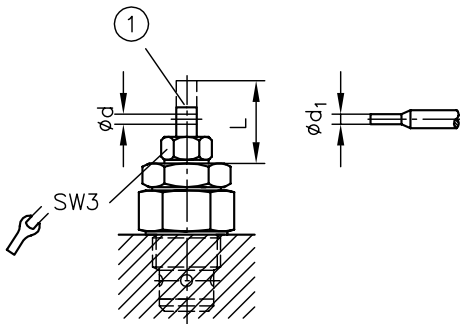
- 1 Valve housing
- 2 Locking
- 3 Sealing edge
- 4 Basic body
- 5 Lock nuts and sealing nuts
- 6 Stopper

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

Basic type and size	Valve housing		Lock nuts and sealing nuts	
	Width across flats SW1	Tightening torque (Nm)	Width across flats SW2	Tightening torque (Nm)
CAV 1..	17	40	22	35
CAV 2..	22	50	24	40

SW = a/f

### 5.2.2 Adjusting version CAV ..K



- 1 Threaded spindle

1. Loosen the lock nut
2. Using the pin tool, turn the threaded spindle into drill hole  $\varnothing d$   
Clockwise = throttling cross-section is reduced ( $\Delta p$  increases)  
Anti-clockwise = throttling cross-section ( $\Delta p$  decreases)
3. Tighten the lock nut after adjustment

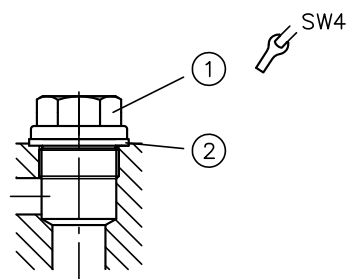
Basic type and size	L	Lock nut		Threaded spindle		
		Width across flats SW3	Tightening torque (Nm)	Thread	$\varnothing d$	$\varnothing d_1$ max.
CAV 1..	17	10	15	M6	2	1.8
CAV 2..	21	13	30	M8	3	2.8

SW = a/f

### 5.2.3 Tapped plugs

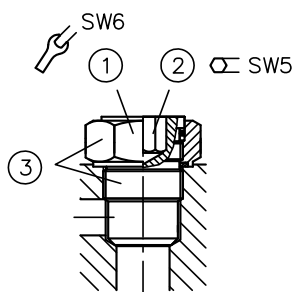
The mounting holes can be sealed with tapped plugs if necessary; for example, if the assembly of standardised basic bodies is to be carried out with or without screw-in valves as required.

#### Passage open



- 1 Tapped plug
- 2 Sealing ring

#### 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			Sealing ring	Tapped plug and locking tapped plug complete				
					Screw part			Lock nuts and sealing nuts	
	DIN 910	SW4	Tightening torque (Nm)	DIN 7603-Cu	Drawing no.	SW5	Tightening torque (Nm)	SW6	Tightening torque (Nm)
CAV 1..	M16x1.5	17	40	A16x22x1.5	Z 7712 003	8	40	22	35
CAV 2..	M20x1.5	19	50	A20x24x1.5	Z 7712 013	10	50	24	40

SW = a/f

### 5.2.4 Creating the mounting hole

See description in [Chapter 4, "Dimensions"](#).

## 5.3 Operating instructions

### Product configuration and setting the pressure and flow rate

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

#### Note

- 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

**Risk of injury due to unexpected movement processes in the machine due to incorrect flow setting!**

Risk of minor injury

- Be prepared for unexpected, fast movements. On changing the flow settings, consumers will move more slowly or more quickly.
- Always monitor the pressure gauge when setting or changing the flow.

### Purity and filtering of the hydraulic fluid

Fine contamination can significantly impair the function of a hydraulic power pack. Contamination can cause irreparable damage.

Examples of fine contamination include:

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

#### Note

Fresh hydraulic fluid from the drum does not always have the highest degree of purity. Under some circumstances the fresh hydraulic fluid must be filtered before use.

Pay attention to the cleanliness level 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.

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

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

Clean the device surface of dust deposits and dirt at regular intervals, but at least once per year.

## Further information

### Additional versions

- Pressure valve type CMV, CMVZ, CSV and CSVZ: D 7710 MV
- Pressure-controlled shut-off valve type CNE: D 7710 NE
- Check valve type CRK, CRB and CRH: D 7712
- Throttle valve and throttle check valve type CQ, CQR and CQV: D 7713
- Flow control valve type CSJ: D 7736
- Pressure-reducing valve type CDK: D 7745
- Pressure-dependent shut-off valve type CDSV: D 7876
- Shut-off valve type AVT and AVM: D 7690
- Throttle valve and shut-off valve type AV: D 4583