

Throttle and shut-off valves type AV

for oil pressure systems

Pressure p_{max} = 500 bar
Flow Q_{max} = 100 lpm

Corner valve for direct
pipe connection

Cartridge valve



1. General information

Type AV 2.. and AV 3.. are widely used as:

- As shut-off valve, closes completely sealed in shut condition.
- As drain valve for very gentle lowering of single-acting weight-loaded hydr. cylinders.
- For precision-controlled relieving of high pressures, e.g. in test stands.
- To control working speeds by throttle.

Unit construct of all-steel with hardened, finish-ground and wear -resistant valve seat as well as hardened and finish-ground valve cone (needle valve), adjustable by screw spindle with precision thread. The valve cone projects into the valve seat hole which together form a ring-shaped aperture where the pressure drop needed for the throttling effect is produced. It must be remembered that the limited flow rate resulting from the throttle adjustment is dependent on the viscosity of the pressure oil. If for instance after a prolonged period of operation the oil viscosity becomes less on account of higher temperatures, the throughput of oil will increase with the aperture remaining the same. Consequently the working speed will increase. The throughput of oil also changes in dependence on the differential pressure but the throttling point with constant adjustment (e.g. if the back pressure changes). Therefore it is only practical to control the working speed by throttle if the speed is allowed to change in relationship to the load.

The viscosity-or differential pressure-controlled characteristics of the throttle valves are of no significance in the case of application as shut-off valve and sometimes also during simple lowering cycles. Throttle control therefore is a method of loss control, since part of the flow of oil is carried away via the pressure limiting valve where its energy component is converted into heat. As a rule speed control should only be employed in case of small performance values. It must be taken into account that in case of throttle control the oil always flows in the direction of A→B. If applied in the opposite direction, the valve cone could, in case of fine adjustment, be pulled onto the seat like a non-return valve and damaged owing to the play at the spindle fastening.

2. Available versions, main data

Version	Coding	Connection mode	Pres- sures p_{max}	Flow Q_{max} (lpm) ¹⁾	Poids approx. (kg)	Symbol
Cartridge valve	Standard	AV 2 E	Locating (hole for section 4)	500	40	0.6
		AV 3 E		400	100	1.0
	with check valve	AV 3 RE	400	100	1.2	
Corner valve for direct pipe connection	Standard	AV 2	G 1/2 Ports	500	40	0.6
		AV 3	G 3/4 conforming	400	100	1.7
	with check valve	AV 2 R	G 1/2 ISO 228/1	500	40	0.6
		AV 3 R	G 3/4 (BSPP)	400	100	1.7

¹⁾ This figures apply to a flow in throttled direction and a back pressure of approx. 10 bar

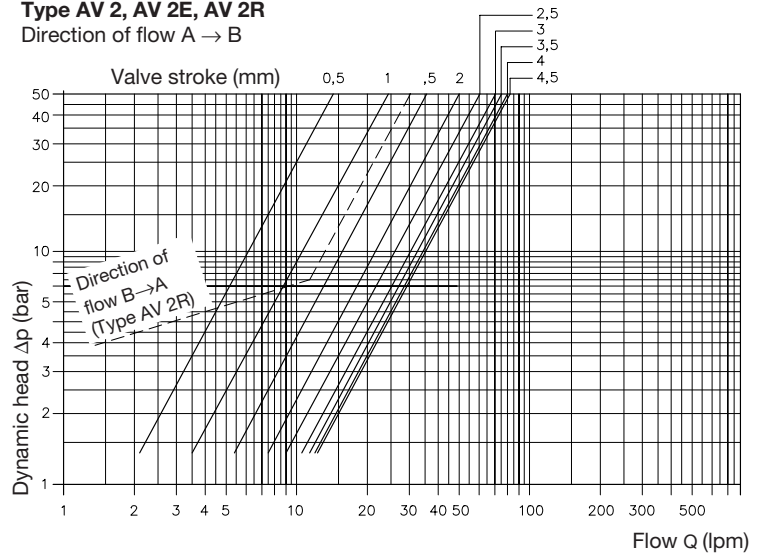
3. Additional parameter

Nomenclature, design	Throttle and shut-off valves; with or without by-pass check valve
Surface protection	All steel parts are zinc galvanized
Flow direction	A → B
Installed position	Any
Hydraulic fluid	Fluids acc. to DIN 51524 table 1 to 3; ISO VG 10 to 68 acc. to DIN 51519 Viscosity range: min. approx. 4; max. approx. 1500 mm ² /s Optimal operation range: approx. 10...500 mm ² /s Also suitable are biologically degradable pressure fluids of the type HEPG (Polyalkylenglycol) and HEES (synth. Ester) at operation temperatures up to approx. +70°C.
Temperature	Ambient: approx. -40...+80°C, fluid: -25...+80°C, pay attention to the viscosity range! Start temperature down to -40°C are allowable (Pay attention to the viscosity range during start!), as long as the operation temperature during subsequent running is at least 20K higher. Biological degradable pressure fluids: Pay attention to manufacturer's information. With regard to the compatibility with sealing materials do not exceed +70°C.

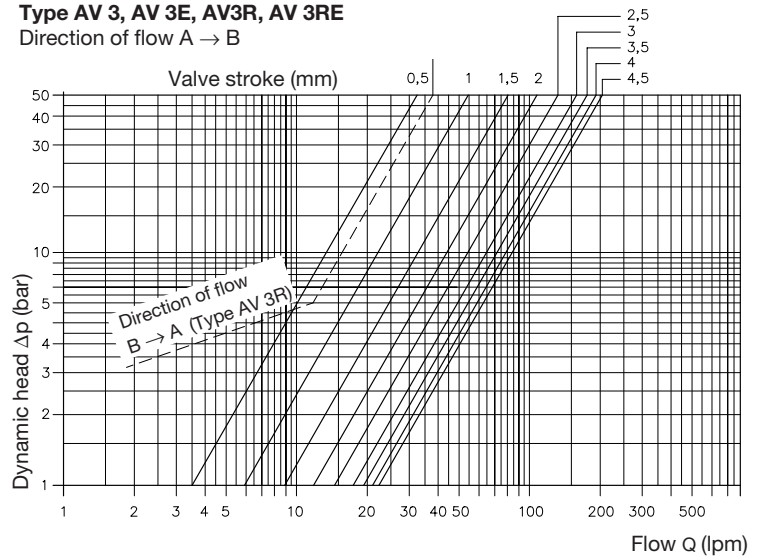
Δp-Q-Characteristics
Throttle resistances (mean values)

The coordinate charts show the relationship between the rate of flow Q (lpm) and the expected pressure drop Δp (bar) at 53 mm²/s oil viscosity and different valves strokes. In case of other viscosity's the bands of straight lines move slightly to the left (thicker oil) or to right (tinnier oil). The coordinate charts therefore only give approximate values which can be a help in determining the size of valves.

Type AV 2, AV 2E, AV 2R
Direction of flow A → B



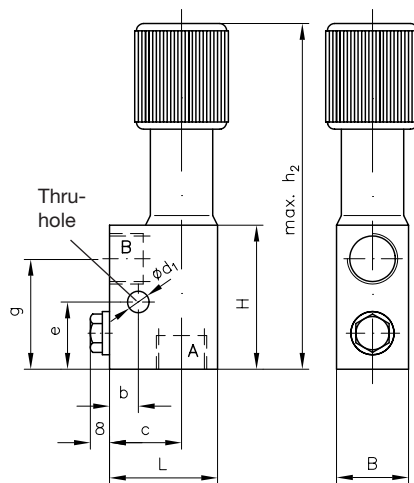
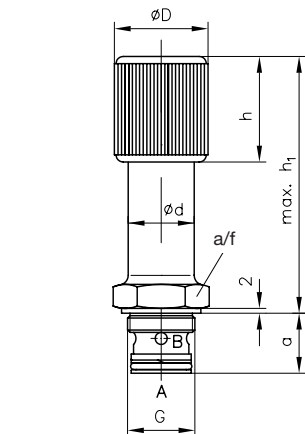
Type AV 3, AV 3E, AV3R, AV 3RE
Direction of flow A → B



4. Unit dimensions

Cartridge valve
Type AV.. (R)E

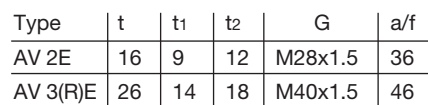
Corner valve for direct pipe connection
Type AV 2(R), AV 3(R)



Type	L	H	B	ØD	ØD ₁	a	b	c
AV 2E	45	60	30	40	25 ^{H8}	25	12	30
AV 3(R)E	60	70	40	50	36 ^{H8}	38	15	40
AV 2(R)	45	60	30	40	--	25	12	30
AV 3(R)	60	70	40	50	--	38	15	40

Type	Ød	Ød ₁	Ød ₂	e	g	h	h ₁	h ₂
AV 2E	26	9	8	28	46	45	115	145
AV 3(R)E	35	11	12	30	52	60	143	198
AV 2(R)	26	9	--	28	46	45	115	145
AV 3(R)	35	11	--	30	52	60	153	198

Type	t	t ₁	t ₂	G	a/f
AV 2E	16	9	12	M28x1.5	36
AV 3(R)E	26	14	18	M40x1.5	46



All dimensions in mm, subject to change without notice!