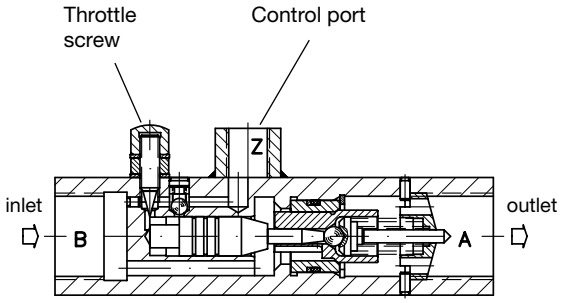
Check valves with hydraulic release type RHV with pre-relieving feature

Pressure p_{max} = 500 bar
Flow Q_{max} = 200 lpm

1. General

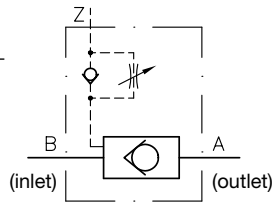
These valves are check valves according to ISO 1219-1 that are employed to block (zero leakage) spool valve controlled hydraulic cylinders and/or to prevent decompression shocks (pressure surges), in particular when relieving large volumes at high pressures. This is accomplished when the valve is released hydraulically by pre-relieving it through a small ball type check valve and, as the aperture of the main valve (conical piston valve) continues to widen, through a relief site ground on its cylindrical segment. The pre-relieving system must be effective for an appropriate interval depending on the size and pressure of the consumer unit volume to be decompressed. This interval can be set by means of a throttling screw on the control piston.
The control pressure (port Z) to open the main valve must be 1.8 times higher than the pressure apparent at A, due to the design related internal area ratios. Hence, in the conventional arrangement on double-acting hydraulic cylinders with a rod located only at one side, the valve can only be used on the piston side, but not on the piston rod side (see example sect. 5). More-over, the area ratio of the connected cylinder must be at least 1,8 : 1 or more. This valve is not suitable for use with hydraulic cylinders featuring a continuous piston rod.



2. Types available, main data

Coding	Pressure p_{max} (bar)	Flow Q_{max} (lpm)	Control volume (cm^3)	Necessary control pressure p_{St} (bar) to release (open)		to keep main valve open
				Pre-relieving	Main valve	
RHV 3	500	60	1.2	0.17 p_A + 2	1.8 Δp_V + 3	1.8 Δp_H + p_B + 3
RHV 4		100	1.6	0.13 p_A + 2		
RHV 5		150	2.8	0.08 p_A + 2		
RHV 6		200	4.5	0.06 p_A + 2		

Symbol



p_A (bar) Pressure at A
Δp_V (bar) Flow resistance pre-relieving system (see sect. 3)
Δp_H (bar) Flow resistance of the released main valve (see sect. 3)
p_B (bar) Pressure at B, e.g. flow resistance of the pipe connected at B etc.

HAWE HYDRAULIK
HAWE HYDRAULIK SE
STREITFELDSTR. 25 • 81673 MÜNCHEN
D 3056
Check valve with hydraulic release type RHV
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3. Other characteristic data

Nomenclature, design	Check valve with hydraulic release
Installed position	Any
Port coding	A = Outlet B = Inlet

Mass (weight)

Type	RHV 3	RHV 4	RHV 5	RHV 6
approx. (kg)	0.9	1.2	2.2	3.4

Pressure fluid

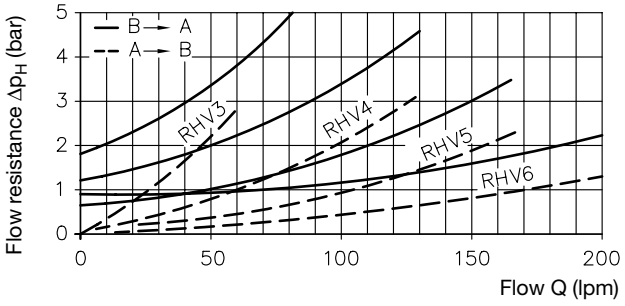
Hydraulic oil conforming DIN 51 524 part 1 to 3; ISO VG 10 to 68 conforming DIN 51 519
Viskosity limits: min. approx. 4; max. approx. 1500 mm²/sec
opt. operation: approx. 10 ... 500 mm²/sec
Also suitable for biological degradable pressure fluids types HEPG (Polyalkylenglycol) and HEES (Synth. Ester) at service temperatures up to approx. +70°C

Temperature range

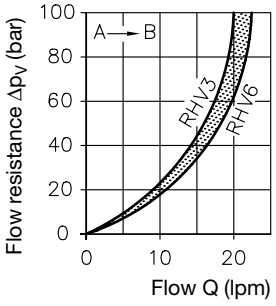
Ambient: approx. -40 ... +80 C
Fluid: -25 ... +80°C, note the viscosity range
Permissible temperature during start: -40°C (observe start-viscosity!), as long as the service temperature is at least 20K higher for the following operation. Biological degradable pressure fluids: Observe manufacturer's specifications. Considering the compatibility with seal material not over +70°C.

Δp-Q-characteristics

Flow resistance Δp_H main valve



Flow resistance Δp_V pre-relieving system

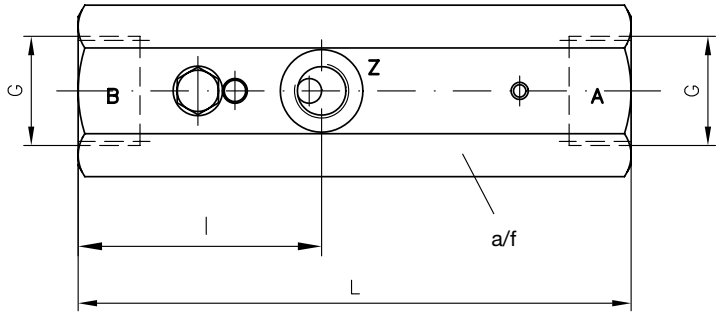


—— B → A
------ A → B (hydr. released)

Oil viscosity during measurement approx. 53 mm²/sec

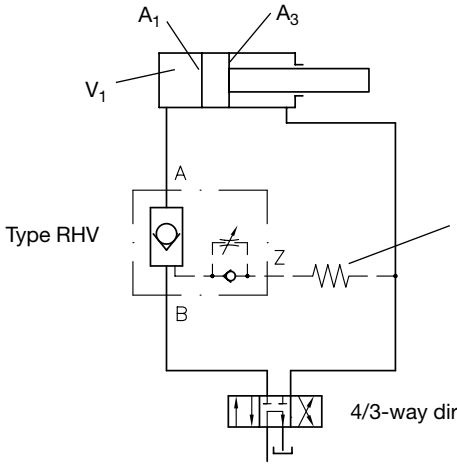
4. Unit dimensions

All dimensions in mm, subject to change without notice!



Type	L	l	a/f	Ports acc. to DIN ISO 228/1 (BSPP) G	Z
RHV 3	134	59	36	G 3/4	G 1/4
RHV 4	144	61	41	G 1	
RHV 5	166	59	55	G 1 1/4	
RHV 6	186	69	65	G 1 1/2	

5. Example circuit



Type RHV

Area ratio of hydraulic cylinder

$$\frac{A_1}{A_3} \geq \frac{1{,}8}{1}$$

Throttle coil

DIN 2391
6 x 1.5
approx. 1 to 1.5 m long

Pre-relieving system:
The setting of the opening time by means of the throttle at Z can be supported by a throttle coil in the control line, advisable at high pressure and with a large V_1.

4/3-way directional valve