

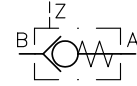
Hydraulic pilot operated check valves type RH

with central, favourable-flow design

Pressure p_{\max} = 700 bar

Flow Q_{\max} = 160 lpm

Symbol



1. General

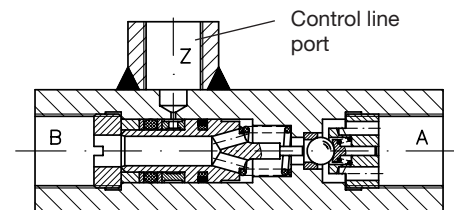
These devices belong to the category of stop valves according to DIN ISO 1219-1, with blocked flow $A \rightarrow B$, and free flow $B \rightarrow A$. The blocked flow direction $A \rightarrow B$ can be re-opened by a hydraulic control system.

Application:

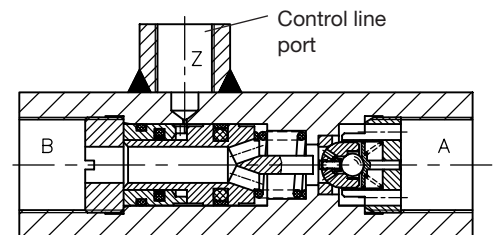
- Shutting off zero leakage hydraulic cylinders, when used together with directional spool valves (design related leakage)
- Return flow aid, when the return flow of cylinders with uneven area ratio exceeds the perm. flow rate of the connected directional valve.
- Hydraulically-actuated drain or circulation valve

These valves are available both with and without hydraulic pre-relief

The designs without pre-relief have a ball as valve element, which relatively quickly clears the full flow cross section area after deblocking. These valves are suited for most standard applications. An orifice in the control ports dampens the progression movement of the deblocking piston, adequately suppressing pressure surges (decompression shocks). If, despite this, such surges do occur during the test run, the use of a control line wound onto the throttle coil will provide such additional damping as may be necessary.



Designs with pre-relief are fitted with a spherically-ground valve piston instead of the ball (performing the function of a seated valve), plus a small, integrated ball check valve. When deblocking takes place, this ball check valve is forced up even before the valve piston opens, and clears an orifice area to provide surge-free decompression of the consumer volume. These valves are used mostly for high pressure and large consumer volume applications. The pre-relief effect is more effective, i.e. gentler, the lower the opening speed of the control piston becomes. This is achieved in this case too, as required, by means of a control line designed as a throttle coil. For further details, see section 3 (Maintaining the pressure).



2. Types available, characteristic data

Coding,
main data

Basic type	with pre-relief	Pressure p_{\max} (bar)	Flow Q_{\max} approx. (lpm)	Control volumes approx. (cm ³)	Ports ISO 228/1 (BSPP) A, B	Mass (weight) approx. (kg)
RH 1	---	700	15	0.15	G 1/4	0.4
RH 2	---		35	0.22	G 3/8	0.4
RH 3	RH 3 V	500	55	0.4	G 1/2	0.6
RH 4	RH 4 V		100	1	G 3/4	1.3
RH 5	RH 5 V		160	1.8	G 1	1.8

Design

Spring-loaded ball seated valve, zero leakage

Mounting

Any, in the pipe work

Installed position

Any

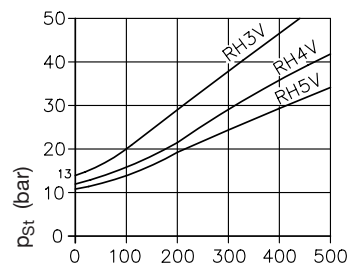
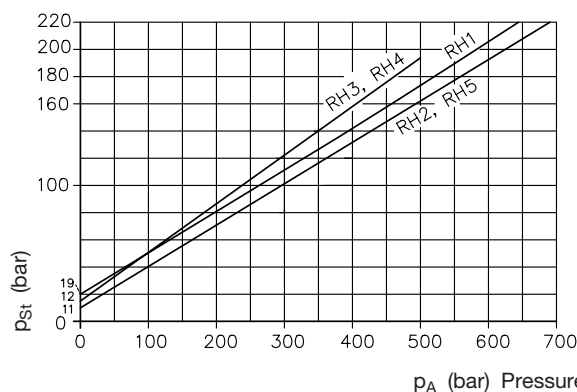
Surface coating

zinc galvanized

Control pressure p_{St} (bar)

For deblocking ($p_B = 0$ bar)

For deblocking the pre-relief



to hold open: $p_{St} = p_B + \Delta p + k$

p_B (bar) = Pressure on side B

Δp (bar) = Back pressure A \rightarrow B according to Δp -Q curve

k = 10 bar at RH 1 and RH 2
7 bar at RH 3(V)
8 bar at RH 4(V) and RH 5(V)

Pressure fluid

Hydraulic oil conforming DIN 51514 part 1 to 3: ISO VG 10 to 68 conforming DIN 51519.
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 (Polyalkylenglycol) and HEES (Synth. Ester) at service temperatures up to approx. +70°C.

Temperature

Ambient: approx. -40 ... +80°C

Fluid: -25 ... +80°C, Note the viscosity range !

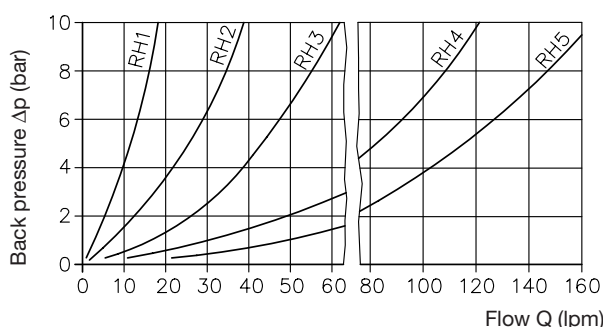
Permissible temperature during start: -40°C (observe start-viscosity!), as long as the service temperature is at least 20K higher for the following operation.

Biologically degradable pressure fluids: Observe manufacturer's specifications. By consideration of the compatibility with seal material not over +70°C.

Δp -Q curves

Apply to flow direction B \rightarrow A and deblocked direction A \rightarrow B

Opening pressure B \rightarrow A 0.2 ... 0.3 bar



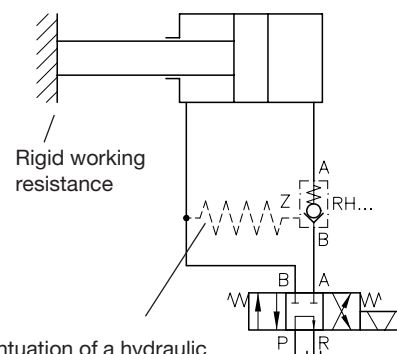
Oil viscosity during
measurement 60mm²/s

With viscosities exceeding approx. 500 mm²/s, a greater Δp rise must be taken into account with the smaller types (RH 1... RH 3).

3. Function modes

● Maintaining the pressure

Preventing a pressure loss at the pressurized cylinder side when directional spool valves with design related leakage are used. To avoid decompression shock, which can occur in particular with large pressurized oil volumes if deblocking takes place suddenly, an orifice is provided in the control port. If this throttling effect is inadequate due to special operating conditions, then a suitable large control line wound onto the throttle coil can be used to reduce the decompression shock. The primary hydraulic pre-relief on types RH..V only takes effect if the control line is designed as described in the form of a throttle coil, and is thus capable of slowing down the switching speed sufficiently.

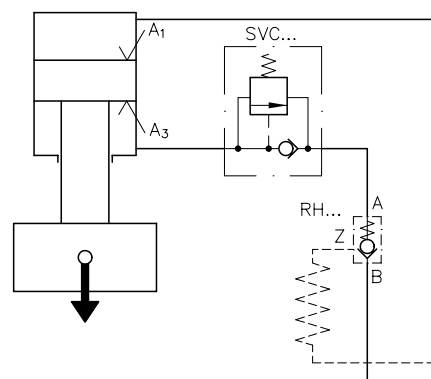


Control line attenuation of a hydraulic throttle coil
(2 ... 4 m hydraulic pipe 6x1.5 or 6x2)

● Holding raised loads

In cases involving upright cylinders or cylinders hanging downwards in particular, the weight of the load may cause a piston speed equal to or greater than that determined by the pump delivery flow. The effect of this may be that the control pressure required to keep the system open, as shown in sect. 2, cannot be built up. The result of this is valve flutter due to periodic opening and closing. Depending on the load conditions, this can be remedied by exploiting the dampening effect of the control line (as shown in sect. 3) or by braking the load by means of a sequence valve (e.g. type SVC... to D 7000/1) or a throttle valve (type RD to D 2570). See also D 7100 for special load retention valves.

Caution: There is a risk that, with cylinders working down wards, in certain circumstances pressure rises may occur on the load side which exceed the load pressure until the stop valve actuates. The reason for this is that the control pressure adds to the load side pressure in a ratio A_1/A_3 . If necessary, our Technical Department should be consulted for recommendations aimed at avoiding this.

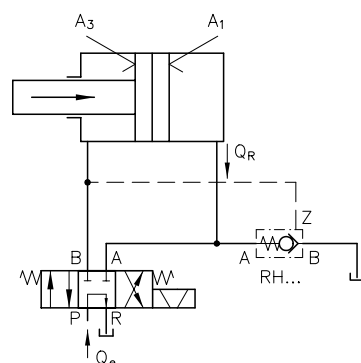


● Return relief

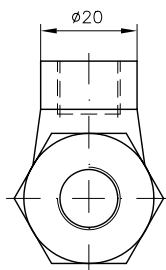
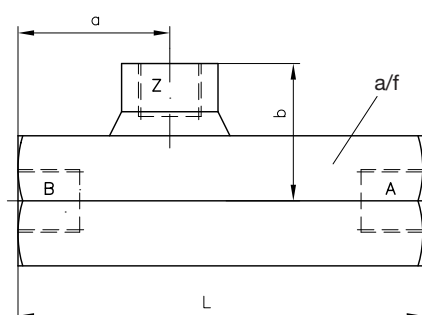
This is used if the return flow $Q_R = Q_e \frac{A_1}{A_3}$

the directional valve becomes too great when the piston moves in.

The most favourable dimension for the stop valve is determined by taking the flow resistance value Δp for $A \rightarrow R$ from the directional valve data sheet, which would occur at Q_e . Then look for the Δp -Q-characteristic for the RH valve on the reverse side of the page which most closely approximates the Δp value ($A \rightarrow B$) already found at the flow rate $Q_R - Q_e$.



4. Unit dimensions



Type	Ports ISO 228/1 (BSPP)					
	A, B	Z	L	a	b	a/f
RH 1	G 1/4	G 1/4	84	31.5	27	24
RH 2	G 3/8		90	32	28.5	27
RH 3 (V)	G 1/2		100	36.5	31	32
RH 4 (V)	G 3/4		126	45	35.5	41
RH 5 (V)	G 1		143	52	38	46

All dimensions are in mm. Subject to change without notice !