Releasable check valve type RH

Product documentation

Operating pressure p_{max}:	700 bar
Flow rate Q_{max}:	160 lpm

D 6105
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HAWE HYDRAULIK

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Contents

1 Overview of releasable check valve type RH

Check valves with hydraulic release are a type of check valve. They block one or both hydraulic consumer lines or are used as a hydraulically actuated drain or circulation valve.
In the closed state the check valve type RH has zero leakage. Available with hydraulic release. Hydraulic release suppresses relief surges that can occur at high pressure and with a large consumer volume.

Releasable check valve type RH

Features and benefits:

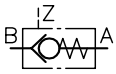
- Pressures up to 700 bar
- with hydraulic release for smooth switching

Intended applications:

- Blocking of leak-free hydraulic cylinders

2 Available versions, main data

Circuit symbol:



Order coding examples:

RH 3

Basic type and size Table 1 Basic type and size

Table 1 Basic type and size

Basic type and size		Pressure p_{max} (bar)	Flow rate Q_{max} (lpm)	Control volume (cm^3)	Ports	
Without hydraulic release	With hydraulic release				A, B	Z
RH 1	--	700	15	0.15	G 1/4 (BSPP)	G 1/4 (BSPP)
RH 2	--		35	0.22	G 3/8 (BSPP)	
RH 3	RH 3 V	500	55	0.4	G 1/2 (BSPP)	
RH 4	RH 4 V		100	1	G 3/4 (BSPP)	
RH 5	RH 5 V		160	1.8	G 1 (BSPP)	
RH 1 UNF	--	420	15	0.15	9/16-16 UNF	7/16-20 UNF
RH 3 UNF	RH 3 V UNF		55	0.4	7/8-14 UNF	
RH 4 UN	RH 4 V UN	280	100	1	1 1/16-12 UN	

3 Parameters

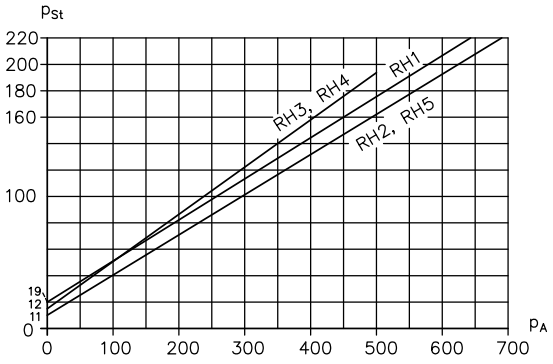
General information

Designation	Releasable check valve
Design	Spring-loaded ball seated valve, zero-leakage
Model	Pipe connection
Material	Balls made of rolling bearing steel Steel; electro-galvanised valve housing; hardened and ground functional inner parts
Attachment	Freely suspended in the pipe
Installation position	As desired
Hydraulic fluid	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^2/s opt. operation approx. 10... 500 mm^2/s. Also suitable for biologically degradable hydraulic fluids type HEPG (polyalkylene glycol) and HEES (synthetic ester) at operating temperatures up to approx. +70°C.
Cleanliness level	**ISO 4406** 21/18/15...19/17/13
Temperatures	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.

Characteristics

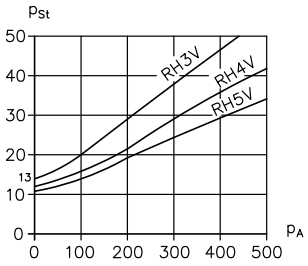
Oil viscosity approx. 60 mm²/s

To release (p_B = 0 bar)



p_{St} pilot pressure (bar); p_A pressure at port A (bar)

To release the hydraulic release



p_{St} pilot pressure (bar); p_A pressure at port A (bar)

To keep open: $p_{St} = p_B + \Delta p + k$

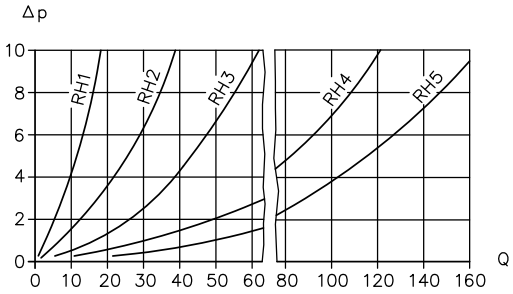
p_B (bar) = pressure on B side

Δp (bar) = Flow resistance A → B according to Δp-Q characteristics

k = 19 bar for RH 1
10 bar for RH 2
7 bar for RH 3(V)
8 bar for RH 4(V) and RH 5(V)

Δp-Q characteristics

Valid for flow direction B → A and released direction A → B
Opening pressure B → A 0.2 to 0.3 bar



Q flow rate (lpm); Δp flow resistance (bar)

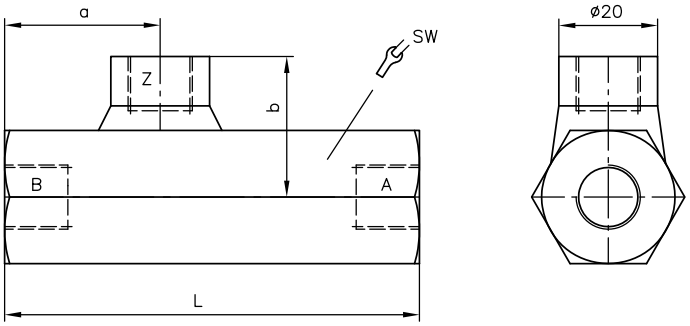
At viscosities above approx. 500 mm²/s, a larger Δp - increase is to be expected with smaller types (RH 1 to RH 3).

Weight

Type	
RH 1 .	= 0.4 kg
RH 2	= 0.4 kg
RH 3 .	= 0.6 kg
RH 4 .	= 1.3 kg
RH 5 .	= 1.8 kg

4 Dimensions

All dimensions in mm, subject to change.



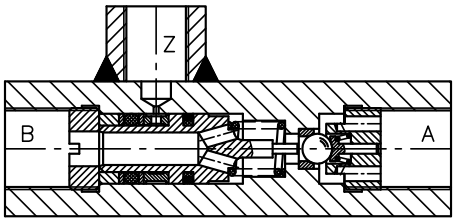
Type	Ports		L	a	b	SW
	A, B	Z				
RH 1	G 1/4 (BSPP)	G 1/4	84	31.5	27	24
RH 2	G 3/8 (BSPP)		90	32	28.5	27
RH 3 RH 3 V	G 1/2 (BSPP)		100	36.5	31	32
RH 4 RH 4 V	G 3/4 (BSPP)		126	45	35.5	41
RH 5 RH 5 V	G 1 (BSPP)		143	52	38	46
RH 1 UNF	9/16-18 UNF	7/16-20 UNF	85	32.5	27.7	1"
RH 3 UNF RH 3 V UNF	7/8-14 UNF		104	38.5	31	1 1/4"
RH 4 UN RH 4 V UN	1 1/16-12 UNF		131	47.5	35.7	1 5/8"

5 functional principle

5.1 Versions

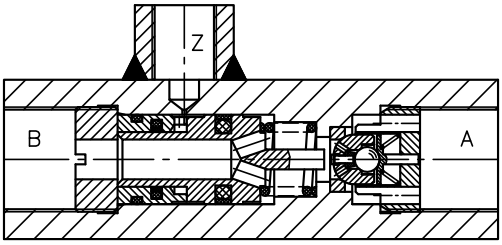
Without hydraulic release

The versions without hydraulic release have a ball as the valve element, which unblocks the full flow cross section in the case of release. The valves are suitable for all normal operating cases. A restriction in the control port dampens the control movement of the release piston, meaning that pressure surges (relief surges) are usually sufficiently suppressed. This effect can be amplified by additional throttle elements in the control line.



With hydraulic release

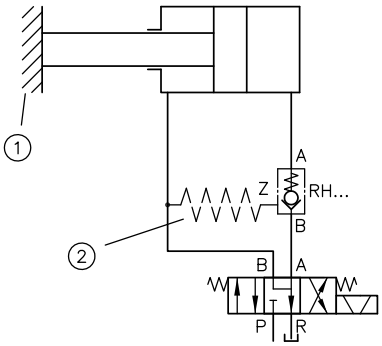
A spherically-ground valve piston (seated valve function) with a small built-in ball check valve is present instead of the ball in versions with hydraulic release. In the case of release, this is pushed open before the valve piston opens and unblocks a throttling cross-section. This ensures surge-free relief of the consumer flow rate. These valves are primarily used for high operating pressures and large consumer volumes. The hydraulic release is more effective the lower the opening speed of the control piston. This effect can be amplified by additional throttle elements in the control line. Further information Chapter 5.2, "Applications" (“Maintaining pressure”).



5.2 Applications

Maintaining pressure

Task: Protecting a pressurised cylinder chamber against pressure loss as a result of leakage of the directional spool valve.
A throttle bore is present in the control port. This is in order to prevent relief surges that may occur with large pressurised consumer volumes in the case of sudden release.
The effectiveness of the hydraulic release for types RH.. V only comes into operation if the switching speed is sufficiently slowed by the throttle elements.
This effect can be amplified by additional throttle elements in the control line.



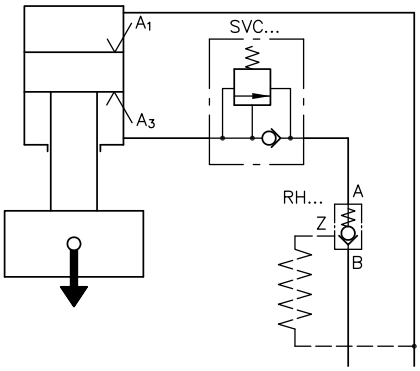
1 Rigid load resistance

2 Damping of the control line by a hydraulic throttle coil and/or an additional orifice

Holding raised loads

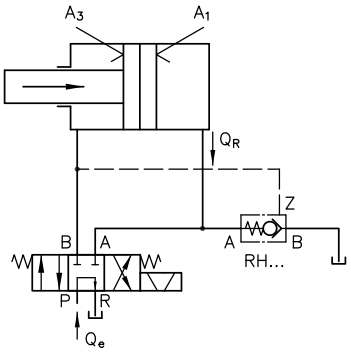
Task: Safely moving pulling loads
The load weight may cause a piston speed equal to or greater than intended by the pump delivery flow, particularly in the case of vertical cylinders or cylinders hanging downwards. As a result, the pilot pressure required for holding open in accordance with Chapter 2, "Available versions, main data" cannot be built up. As a consequence, the valve flutters due to periodic opening/closing.
Remedy depending on load conditions by using the damping effect of the control line (see above) or by braking the load using the pre-load valve (e.g. type SCV.. in accordance with D 7000/1) or throttle valve (type RD in accordance with D 7540).
Alternatively, the use of load-holding valves must be provided for (e.g. type LHK in accordance with D 7100, LHDV in accordance with D 7770, LHT in accordance with D 7918, CLHV in accordance with D 7918-VI-C, D 7918-VI-PIB)

NOTE
In some cases with cylinders that operate downwards, pressure build-ups beyond the load pressure may occur on the load side until the check valve is opened because the pilot pressure is added to this in the ratio A_1 / A_3.



Return flow relief

Task: Handling of large flow rates for rapid cylinder movement and for safeguarding against overloading the directional valves.
Is used if, when retracting the piston, the return flow $Q_R = Q_e\ A_1 / A_3$ is too large for the directional valve.
The size of the check valve is found by determining, from the directional valve data sheet, the flow resistance Δp for A $\rightarrow$ R that would occur with Qe, and you select the size from the Δp-Q characteristics of the RH valve that come closest to the Δp value (A $\rightarrow$ B) found above with the flow rate Q_R - Q_e.



6 Assembly, operation and maintenance recommendations

6.1 Intended use

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

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 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.

6.2 Assembly information

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

The product must be shut down correctly prior to dismounting (in particular in combination 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.

6.3 Operating instructions

Note product configuration and pressure / 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.

Purity and filtering of the hydraulic fluid

Fine contamination can significantly impair the function of the hydraulic component. 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.

Adhere to the cleanliness level of the hydraulic fluid in order to maintain faultless operation.
(also see cleanliness level in Chapter 3, "Parameters").

Additionally applicable document: D 5488/1 Oil recommendations

6.4 Maintenance information

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

- Releasable twin check valve type DRH: D 6110
- Releasable check valve type RHC and RHCE: D 7165
- Check valve type CRK, CRB and CRH: D 7712
- Releasable check valve type HRP: D 5116
- Pressure-limiting valve type MV, SV and DMV: D 7000/1
- Load-holding valve type LHK: D 7100
- Load-holding valve type LHDV: D 7770
- Load-holding valve type LHT: D 7918
- Load-holding valve type CLHV-C: D 7918-VI-C
- Load-holding valve type CLHV: D 7918-VI-PIB

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