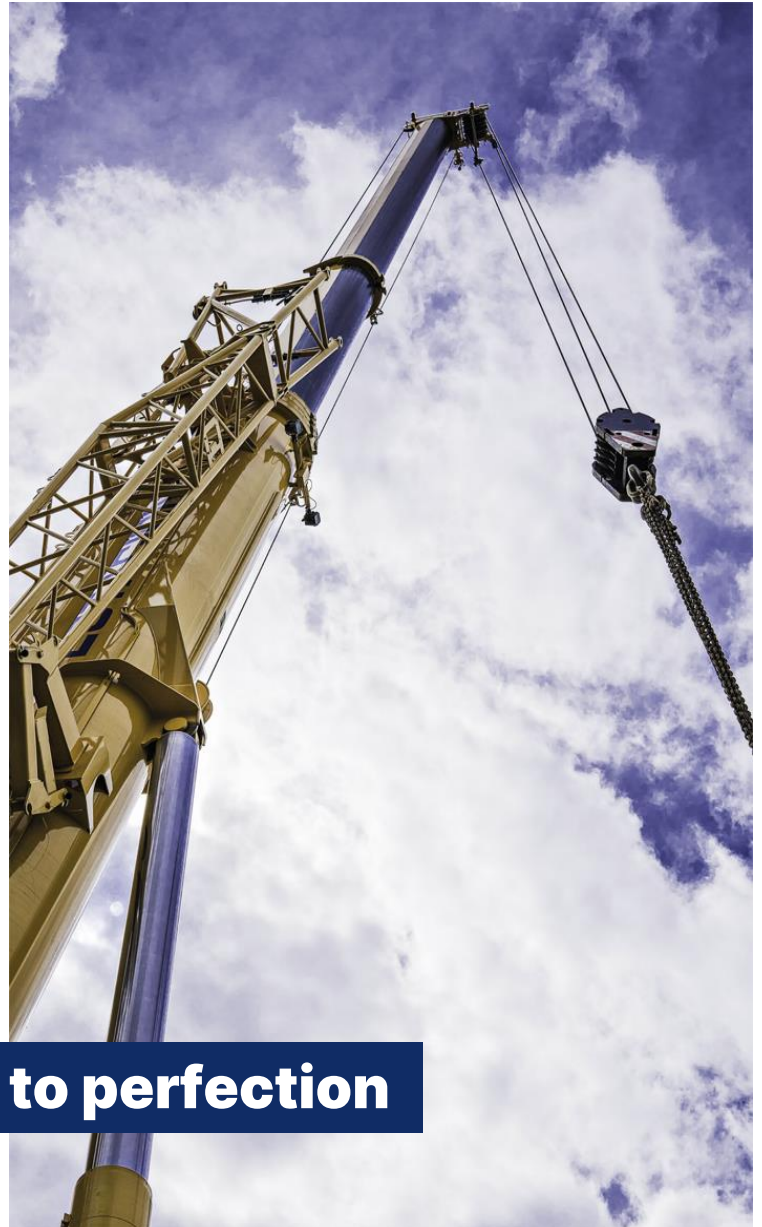
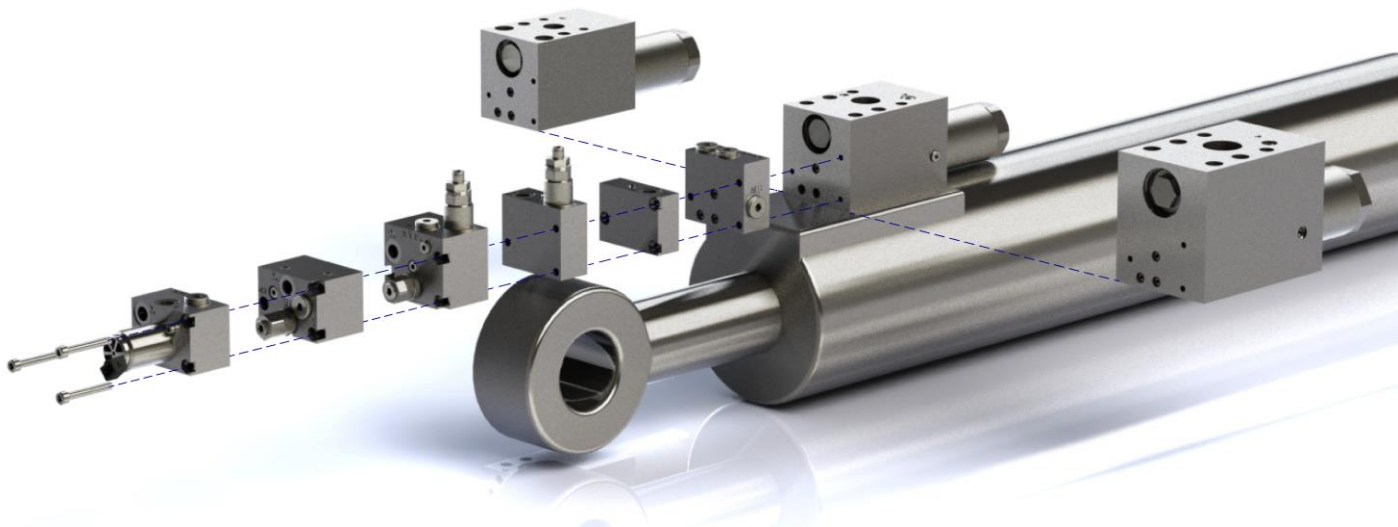


# Load Control Technology

- Lowering Valves
- Pipe Rupture Valves
- Load Holding Check Valves



**Load control to perfection**





# VISION

Our products are used around the world in machines and systems that are working on a resource-efficient future for people. Our living, our mobility and our energy generation will change. With the development and production of valve technology for demolition and recycling technology to safety valves for construction machinery and cranes, we want to be part of this change! The machines equipped with our valves should be as safe and effective and thus energy-saving as possible!

**we engineer your progress**  
**for a sustainable tomorrow**





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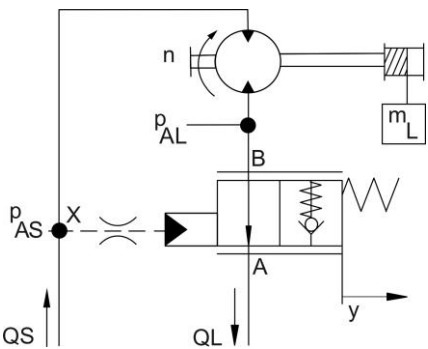
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# 1. Basics of lowering brake check valves

Lowering brake check valves have a wide variety of names such as load holding valve, lowering brake spear valve or counter pressure valve. They have the task of holding loads securely when they are at rest. In the downward movement, you prevent the hydraulic consumers from advancing in the event of a pulling or negative load. The valve only opens when the preset opening pressure is reached. The speed of the downward movement is regulated as the lowering pressure increases.

Principle of lowering brake check valves :



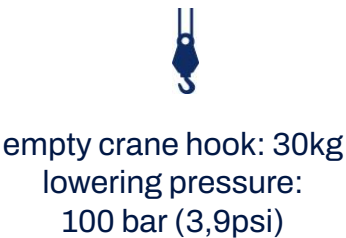
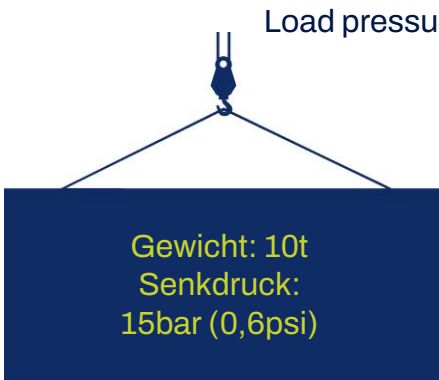
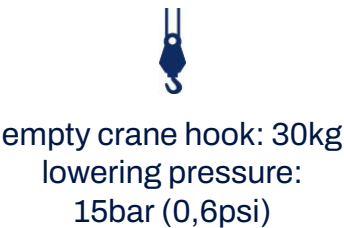
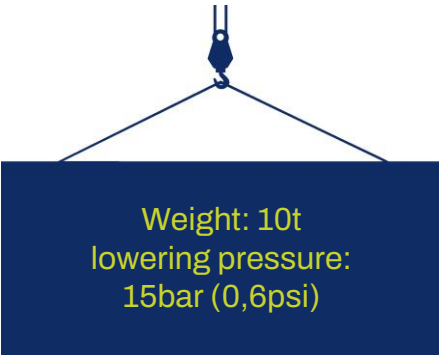
## 1.1 Structure of the lowering brake check valves

There are lowering brake check valves as screw-in variants or the function is integrated in cubic housings as a plate structure or piping housing. In almost all of these designs, the valve function is structurally solved in a valve axis. This has the advantage of requiring little space, with the disadvantage of higher dynamic pressures in the lifting direction. The valves are controlled depending on the load pressure via a defined control ratio. Here, the maximum pressure setting must be adjusted according to the control ratio.

Wessel offers this option for simple lowering brake check valve functions and, with the MotionOne, can also offer a load pressure independent lowering brake check valve with additional advantages.

difference between  
Load pressure dependent (type VAL) and load pressure independent (MotionOne)  
when lowering the load

Independent of load pressure (MotionOne) through defined control pressure / required lowering pressure



With a control ratio of 3:1 and a load pressure of 10 bar with a maximum pressure relief of 350 bar



## 1.2 MotionOne the load pressure independent lowering brake valve



- Leakage free shut off
- Vibration-free lowering of the load
- Sensitive characteristics
- Pressure loss and weight advantages
- High flexibility through different control variants
- Reliable closing of the lowering brake guaranteed by redundant springs

### Product description

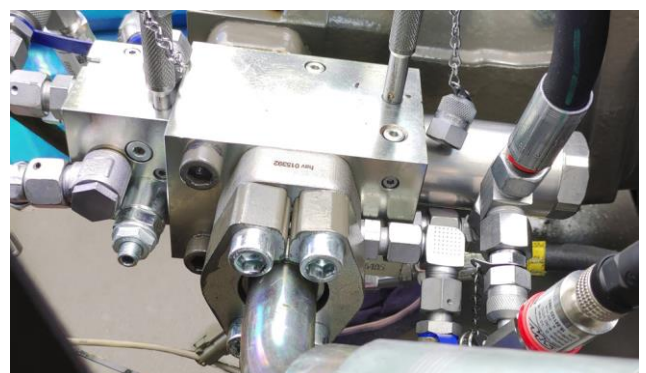
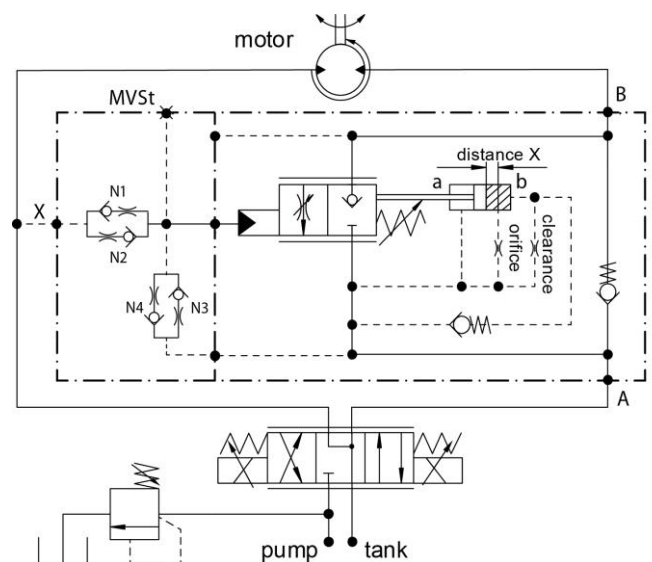
The new MotionOne lowering brake valve unifies the extensive flexibility through the modular structure, paired with an additional plus through our patented damping cartridge, in order to meet your requirements in terms of vibration damping in any form.

The MotionOne is the right choice for precise control and positioning of high loads with volume flows up to 600l/min. (158,5 gpm).

Lowering brake valves prevent hydraulic consumers from advancing in relation to the incoming volume flow. The MotionOne type valves are particularly suitable for motor, winch and cylinder applications that are prone to vibrations. They shut off the consumer without leakage and the opening takes place independently of the load pressure due to the pressure on the opposite side. Thanks to the various standard damping covers, the valve guarantees maximum flexibility during initial start-up.

The use of shuttle nozzles ensures a self-cleaning system and is therefore maintenance-free. A conventional inlet filter is therefore not required.

### Schematic

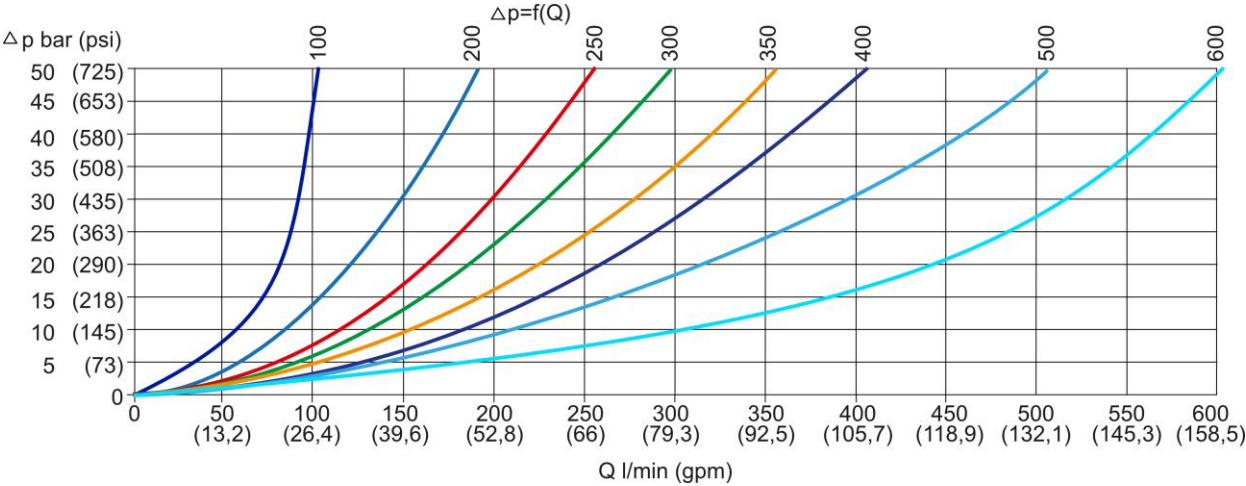




Technical Data

A,B (DIN ISO 6162-2,SAE J518/2 (CODE62)	SAE ¾"	SAE 1"	SAE 1 ¼"
Max. operating pressure B	420 bar (6090 psi)		
Max. operating pressure A	350 bar (5080 psi)		
Max. pilot pressure on port X	350 bar (5080 psi)		
Max. volume flow	350 l/min (92,5 gpm)	400 l/min (105,7 gpm)	600 l/min (158,5 gpm)
Weight (standard variant N)	4.9 kg	5.5 kg	9.3 kg

Pressure loss volume flow lowering (B → A)



Type Code example

MotionOne – 16 – N – 200- 1 – 420 – 1 – X3 (See data sheet for detailed information)

Type Code

Connections	Control variants	Special features
16 SAE 3/4"	N Cushioning only works in the opening direction, without pressure valve	X1 With pressure valve intermediate plate (up to 80 l / min) (21,1gpm)
20 SAE 1"	T Properties like type N, with additional tank connection for reduced sink pressures	X2 Measuring point MB (only available for SAE 1 1/4 ")
25-M12 SAE 1 ¼" M12	PS Properties like type N, additional secondary pressure valve (return pressure A-dependent) opens the main slide	X3 Measuring point intermediate plate (for MA, MB, MVSt)
25-M14 SAE 1 ¼" M14	PT Additional secondary pressure valve (10 l/min) (return pressure A-independent) opens to the tank connection	X4 With leakage oil connection L
	PO Properties like type N, additional secondary pressure valve (10 l / min) (return pressure A dependent) opens to the return	
	E12A Electrically proportional 12VDC, AMP Junior Timer	
	E24A Electrically proportional 24VDC, AMP Junior Timer	
	E12D Electrically proportional 24VDC, Deutsch DT04-2P	
	E24D Electrically proportional 24VDC, Deutsch DT04-2P	
	D With damping cartridge for vibration-sensitive systems. Without pressure valve	
	D+PT Properties like type D, additional secondary pressure valve (10 l / min) opens to the tank connection	
	D+PO Properties like type D, additional secondary pressure valve (10 l / min) opens to the return	
	D+PS Properties like type D, additional secondary pressure valve opens the main slide	



## 1.3 Load Holding / Load Lowering Valves Type VAL

- Holding Loads safely and controlled lowering



Single valve in a block



Double valve in a block

### Main features

- Leakage free holding function
- Controlled lowering
- Minimum flow loss
- Volume flow up to 150 L/min (39,6 gpm)

### Typical applications

- Ladekrane
- Loading cranes
- Lifting platforms
- Construction machinery
- Forrestry machinery
- Agricultural machinery

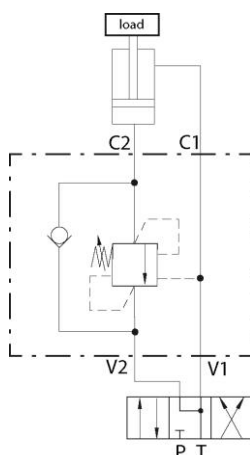


### Product description

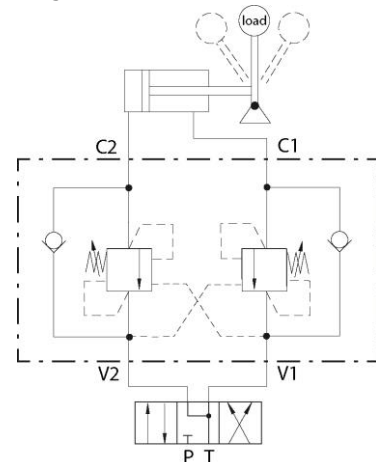
Valves of type VAL prevent moving ahead of cylinders or motors due to external loads. They block the connection to which the load pressure acts without leakage. Only when a movement is to be initiated by the inlet pressure to the opposite side of the cylinder or the motor, the valve is opened by this pressure acting as a pilot control signal, and the load is lowered in a controlled manner. In addition to the load holding and lowering function, the valves include a low-loss check valve function and a pressure-limiting function. They are usually mounted directly on the consumer or as close as possible to it.



Single valve in a block: Load holding for one direction



Double valve in a block: Load holding for both directions



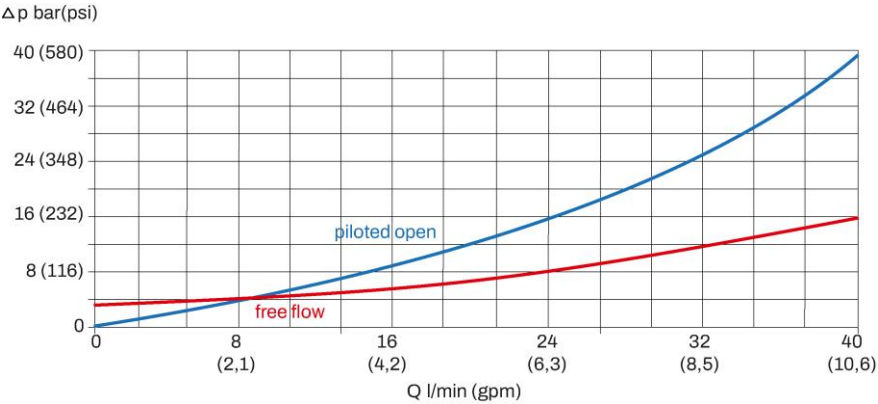


# Technical Data

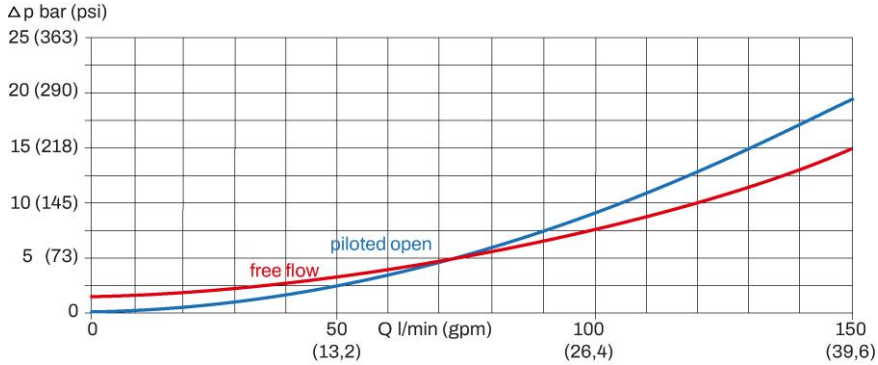
	VAL-SND311	VAL-SND34L	VAL-SND79L
Max. volume flow	90 l/min (23,8 gpm)	150 l/min (39,6 gpm)	40 l/min (10,6 gpm)
Ports	V1,V2,C1: G1/2 - M: G1/4 - C2: Ø9 oder V1,V2,C1: G3/8 - M: G1/4 - C2: Ø9	V1, V2, C1, C2: G1/2 oder V1, V2, C1, C2: G3/4	V1,V2,C1,C2: G1/4
Max. operating pressure	350 bar (5080 psi)		
Max. pressure	420 bar (6090 psi)		
Min. pressure adjustment	60 bar (870 psi) 2:1 - 4:1 100 bar (1450 psi) 7:1 - 11:1	60 bar (870 psi) 4:1 100 bar (1450 psi) 8:1	60 bar (870 psi) 4:1
Weight	2,68 kg (G1/2), 2 kg (G3/8)	2,3 kg	0,6 kg

## Characteristics

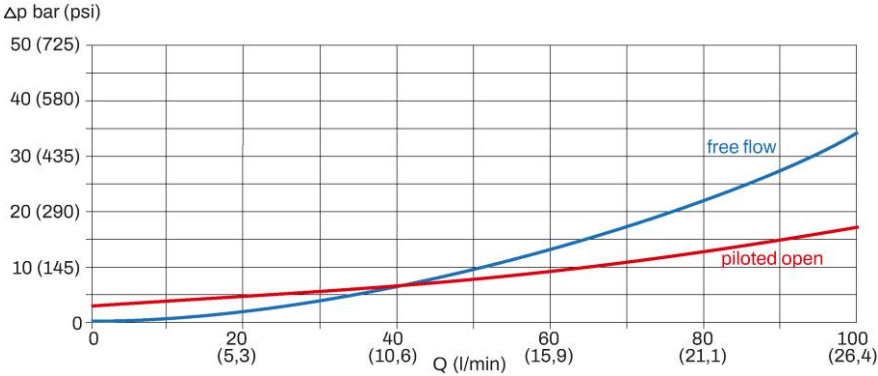
VAL-SND311  
90 l/min (23,8 gpm)



VAL-SND34L  
150 l/min (39,6 gpm)



VAL-SND79L  
40 l/min (10,6 gpm)





## 1.4 Load Holding / Load Lowering Valves Type VAL in cartridge design

- Holding Loads safely and controlled lowering

### Product description

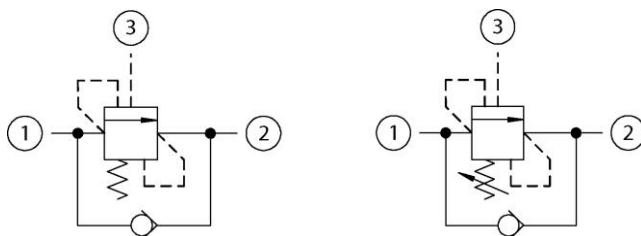
Valves of type VAL prevent moving ahead of cylinders or motors due to external loads. They block the connection to which the load pressure acts without leakage. Only when a movement is to be initiated by the inlet pressure to the opposite side of the cylinder or the motor, the valve is opened by this pressure acting as a pilot control signal, and the load is lowered in a controlled manner. In addition to the load holding and lowering function, the valves include a low-loss check valve function and a pressure-limiting function.

They are usually mounted directly on the consumer or as close as possible to it.



### Main Features

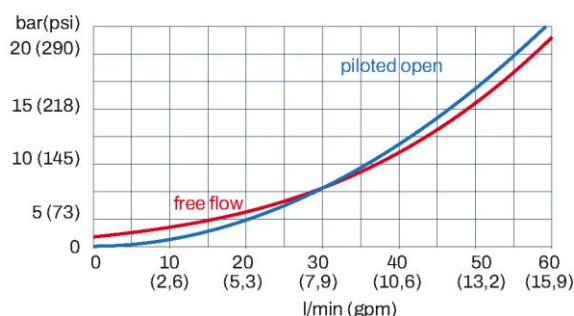
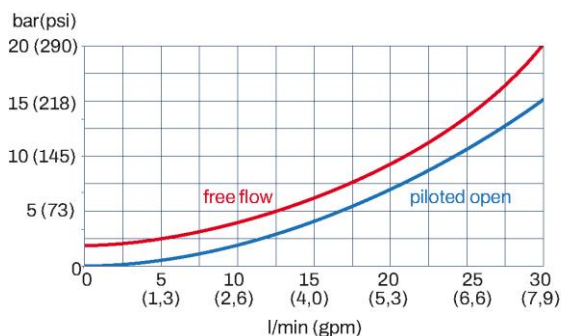
- Leakage free holding function
- Controlled lowering
- Minimum flow loss
- Volume flow up to 150 l/min (15,9 gpm)



### Technical Data

	G1/2	G3/8
Max. operating pressure	350 bar (5080 psi)	
STANDARD max. volume flow	60 l/min (15,9 gpm)	
REDUCED max. volume flow	30 l/min (7,9 gpm)	
HIGH FLOW max. volume flow	75 l/min (19,8 gpm)	
Ports	1, 2 : G1/2	3: G1/4
Weight	2,68 kg (G1/2)	2 kg (G3/8)

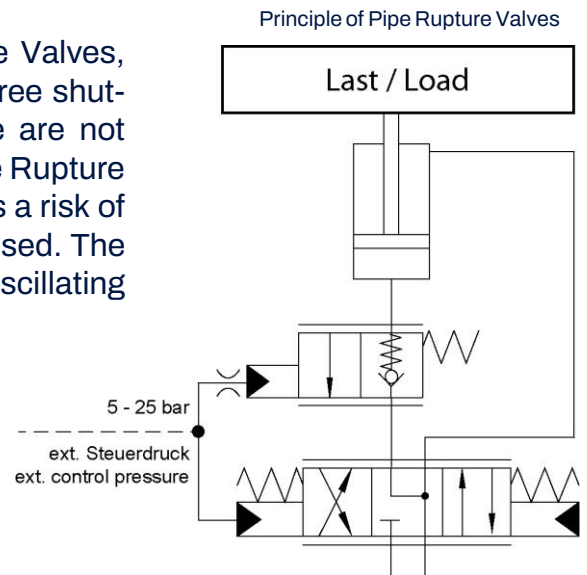
### Characteristics Performance





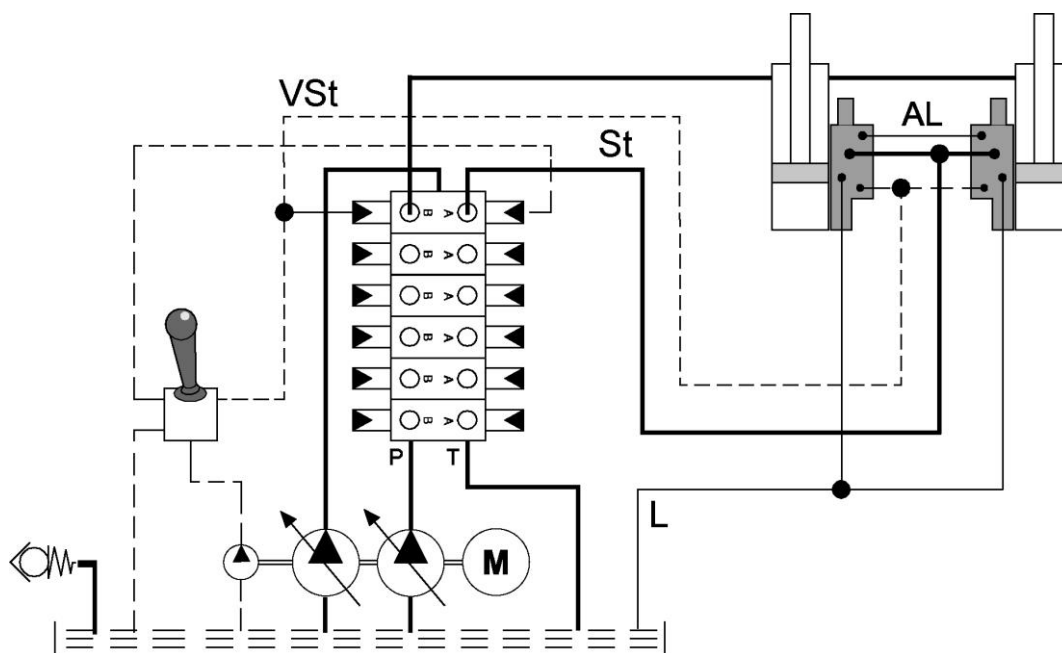
## 2. Basics Pipe Rupture Valves

Pipe Rupture Valves, also known as excavator Pipe Rupture Valves, serve as Load Holding Valves and at the same time as leak-free shut-offs. The difference to Lowering Brake Valves is that these are not activated by the lowering pressure but by a pilot pressure. Pipe Rupture Valves should only be used in cylinder applications, as there is a risk of cavitation in engine applications and damage can thus be caused. The advantage of this pipe rupture protection is the decoupling of oscillating circuits and is therefore used in very dynamic applications.



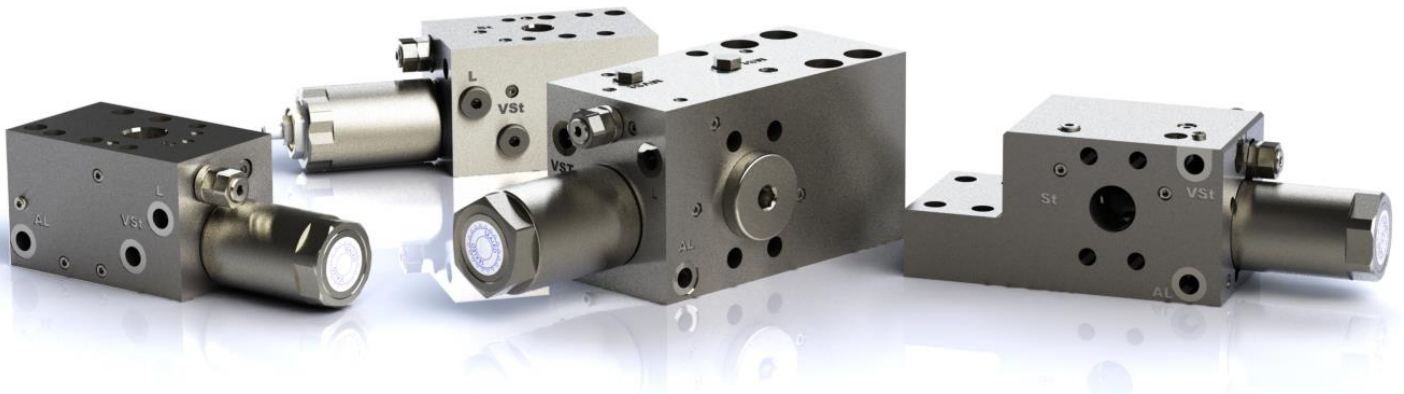
### 2.1 Design of the Pipe Rupture Valves

These Pipe Rupture Valves are mostly used in excavator applications and some have a stepped design so that you have the necessary degree of freedom when folding in the cylinders. The valves are flanged onto the cylinder and have two working connections on the side, one of which is closed. The valves also have a connection for a compensating line for tandem operation, which is required for two lifting cylinders. Wessel also offers the possibility of regeneration. That means the cylinder can be retracted without pump delivery (LHB-3R).





## 2.2 Pipe Rupture Valves LHB 4K, 4N



- Start opening independent of the load pressure
- Leakage-free
- Meets the requirements of standards: DIN24093, ISO 8643, EN 474
- Various versions available

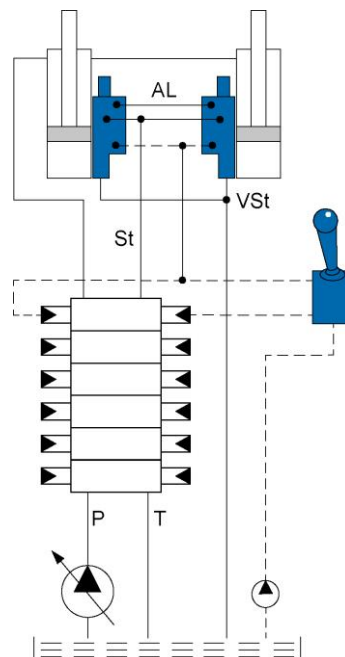
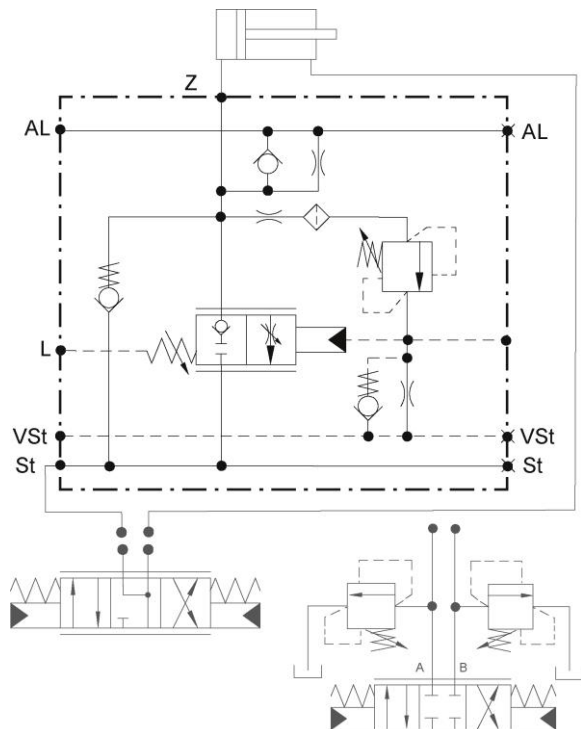
### Product description

In case of a pipe or tube rupture load control valves avoid uncontrolled movement of the cylinder.

WESSEL Pipe Rupture Valves stand for an excellent sensitivity and a very direct response to the handle's stroke. In any case they are leakage free.



### Schematic





## Type Code LHB-4K

LHB-4K	XXX	XXX			XXX	XXX	X
Product-group	Connections	Spool			Pressure limiting	Setting of opening start standard 6 bar = 006	Lowering speed adjustable
		Version SAE3/4"	Version SAE 1"	Version SAE 1 1/4"			
	SAE3/4" 05C	150 l/min (39,6 gpm)	150 l/min (39,6 gpm)	300 l/min (79,3 gpm)	250 bar (3625psi) – 420 bar 6090psi)	6 bar (87psi) – 10 bar (145 psi)	no = 0
	SAE 1" 05E	200 l/min (52,8 gpm)	200 l/min (52,8 gpm)	400 l/min (105,7 gpm)			yes = 1
	SAE 1 1/4" 05G	250 l/min (66 gpm)	300 l/min (79,3 gpm)	500 l/min (132,1 gpm)			
		300 l/min (79,3 gpm)	400 l/min (105,7 gpm)	600 l/min (158,5 gpm)			
350 l/min (92,5 gpm)							

## Technical Data LHB-4K

	SAE 3/4"	SAE 1"	SAE 1 1/4"
Weight	5,8 kg,	5,4 kg	13,8 kg
Max. operating pressure	420 bar (6090 psi)		
Max. volume flow	350 l/min (92,5 gpm)	400 l/min (105,7 pm)	600 l/min (158,5 gpm)

## Typenschlüssel LHB-4N

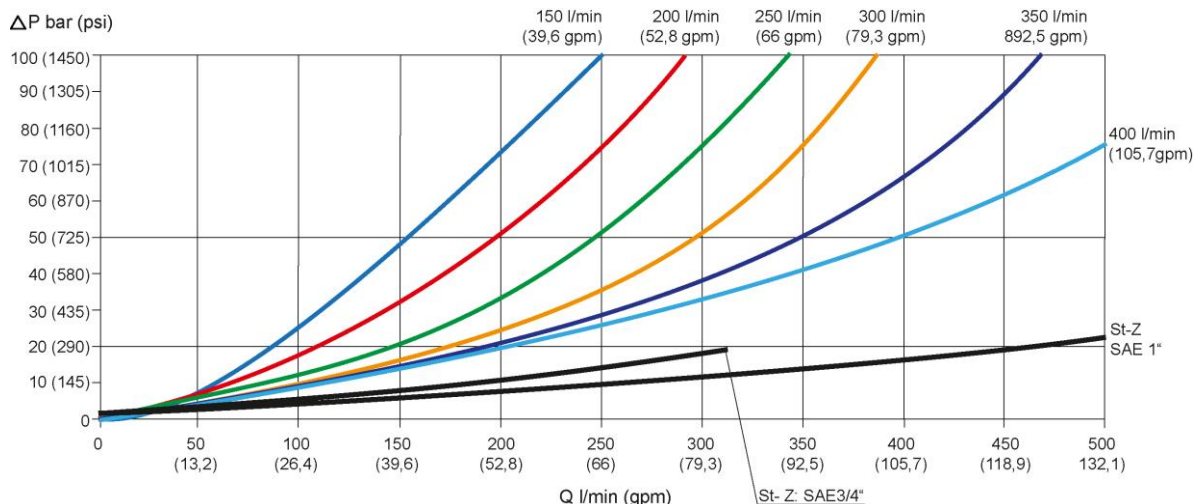
LHB-4N	XXX	XXX		XXX	X
Product-group	Connections	Spool		Pressure limiting valve	Lowering speed adjustable
	SAE3/4" = <b>05C</b>	150 l/min (39,6 gpm)	300 l/min (79,3 gpm)	250 bar (3625psi) – 420 bar (6090psi)	no = <b>0</b>
	SAE 1" = <b>05E</b>	200 l/min (52,8 gpm)	350 l/min (92,5 gpm)		yes = <b>1</b>
		250 l/min (66 gpm)	400 l/min (105,7 gpm)		

## Technical Data LHB-4N

	SAE 3/4"	SAE 1"
Weight	6,8 kg	7,8 kg
Max. operating pressure	420 bar (6090 psi)	
Max. volume flow	400 l/min (105,7 gpm)	

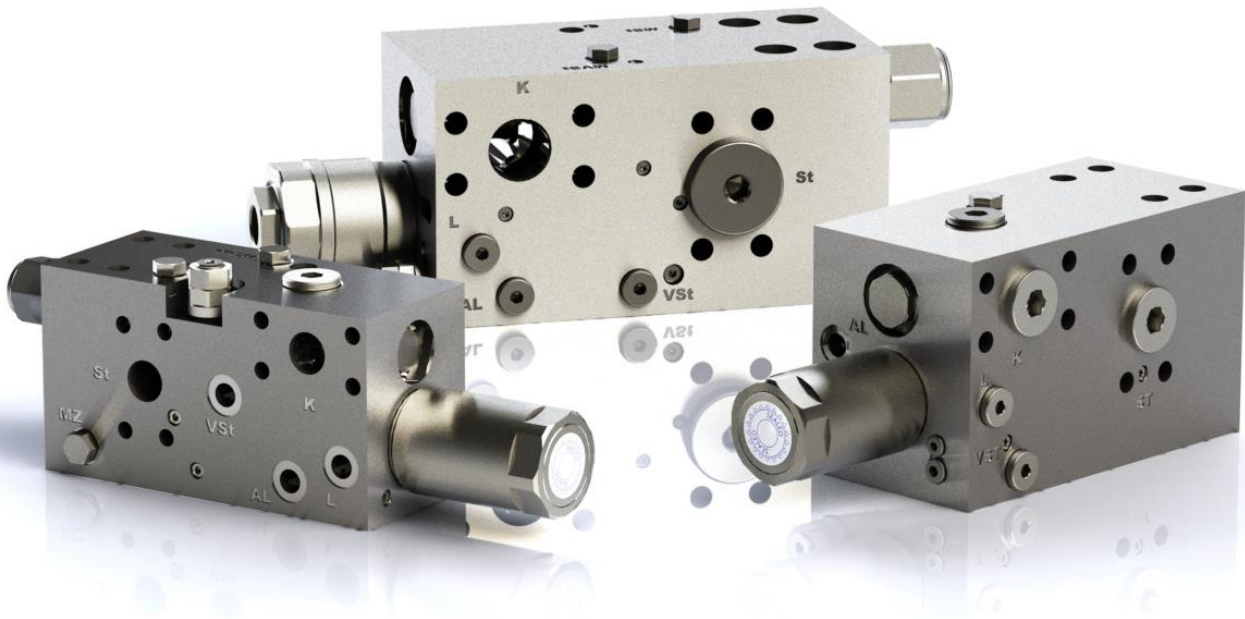
## Spool

The control slider is calculated to the maximum desired volume flow (Z → ST). Criterion: Nominal volume flow, in which a pressure loss ( $\Delta p$ ) of maximum 50 bar is generated (Z → ST).



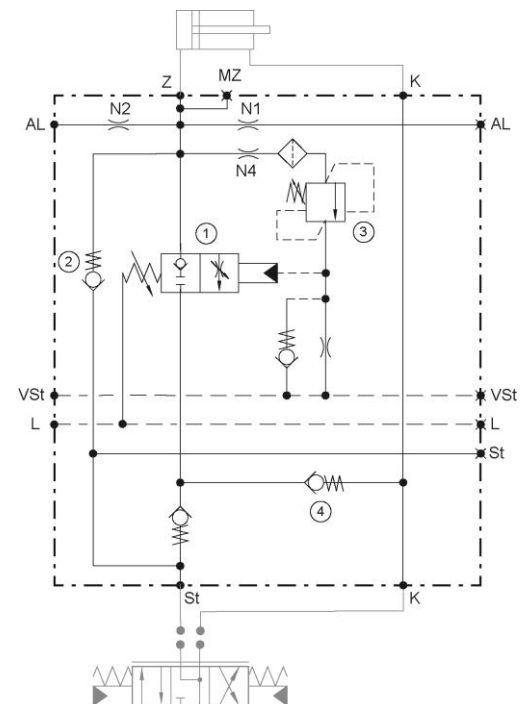


## 2.3 Pipe Rupture Valves LHB 3R with regeneration



- Surge line for parallel operation for the minimization of the cylinder pressure differences
- Pressuring limiting valve with upstream filter sieve for protecting the cylinder
- Meets the requirements of standards: DIN24093, ISO 8643, EN 474
- Can be flanged directly onto the cylinder connection
- Start opening independent of the load pressure
- Sensitive control with low hysteresis
- Load control valve piston pressure-compensated
- Leakage-free

### Schematic



### Product description

The Load Control Valves of variant LHB-3R performs an internal regeneration circuit. The returning volume flow is dammed up by an internal Check Valve and routed to the rod side of the cylinder when needed (port K). With that the lifting cylinder can be retracted without additional pump volume flow.



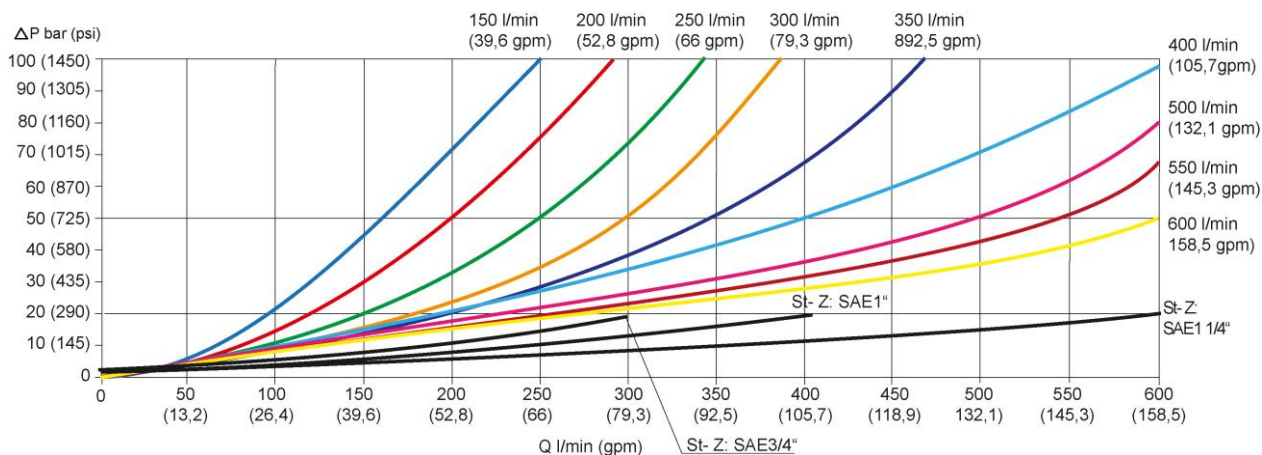
## Type Code

LHB-3R	XXX	XXX	XXX	XXX	X
Product-group	Connections	Design of the spool	Pressure limiting standard 420 bar	Setting of opening start 8bar= 008	Lowering speed adjustable
	SAE3/4" <b>05C</b>	version SAE3/4" <b>150 l/min</b> (39,6 gpm)	version SAE 1" <b>250 l/min</b> (66 gpm)	<b>200 bar (2900 psi)– 420 bar (6090psi)</b>	no = <b>0</b>
	SAE 1" <b>05E</b>	<b>200 l/min</b> (52,8 gpm)	<b>300 l/min</b> (79,3 gpm)	<b>6 bar (87psi) – 10 bar (145 psi)</b>	yes = <b>1</b>
	SAE 1 1/4" <b>05G</b>	<b>250 l/min</b> (66 gpm)	<b>350 l/min</b> (92,5 gpm)		
		<b>300 l/min</b> (79,3 gpm)	<b>400 l/min</b> (105,7 gpm)		
			<b>450 l/min</b> (118,9 gpm)		
			<b>500 l/min</b> (132,1 gpm)		
			<b>550 l/min</b> (145,3 gpm)		
			<b>600 l/min</b> (158,5 gpm)		

## Technical Data

	SAE 3/4"	SAE 1"	SAE 1 1/4"
Weight	10 kg	16 kg	
Maximum operating pressure	420 bar (6090 psi)		
Maximum flow rate	300 l/min (79,3 gpm)	400 l/min (105,7 gpm)	600 l/min (158,5 gpm)

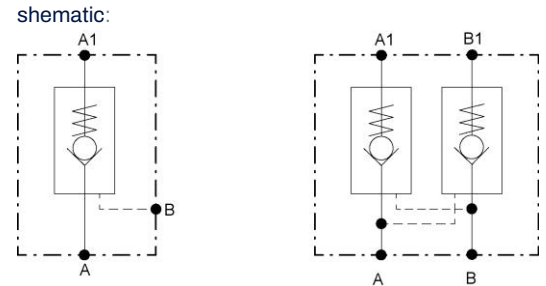
## Characteristics





### 3. Basics pilot-operated Check Valves

Check Valves, also known as Lock Valves, prevent flow in one direction. With the piloted version, the flow can flow through the valve in both directions. Check Valves are seat-tight in the blocking direction and therefore leak-free. The pilot operated non-return valves are available as screw-in versions or the function is integrated in cubic housings as a plate structure or piping housing.



#### 3.1 Screw-in versions

- Small construction
- Leak-free design - seat valve
- Available as a cartridge and in a body



#### Product description

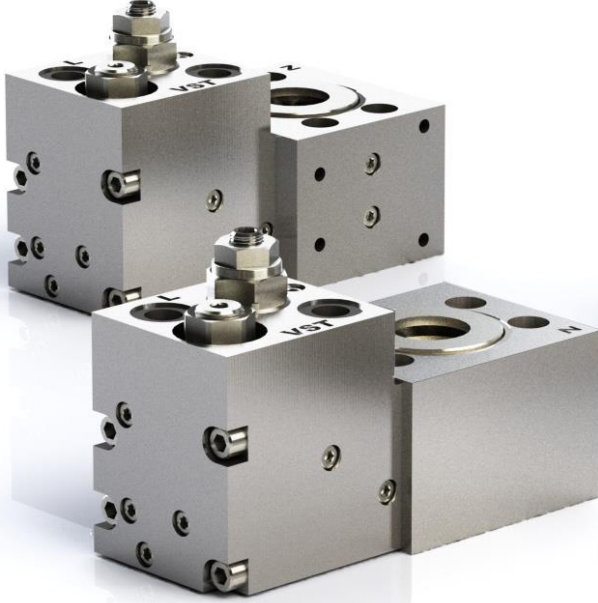
Unlockable spring loaded cone seat valve in cartridge design. Hardened components (seat and cone) guarantee a leakage-free condition in not activated state and a long service life. The valve provides protection against unintended lowering of a load in case of pipe break in the supply lines. It is used for smooth moving of support cylinders and similar applications up to 500 bar.





## 3.2 Pilot-operated Check Valves for the panel construction

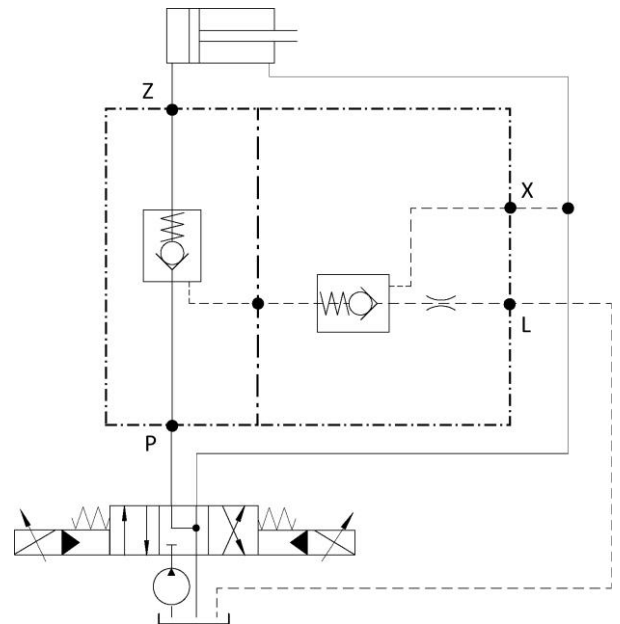
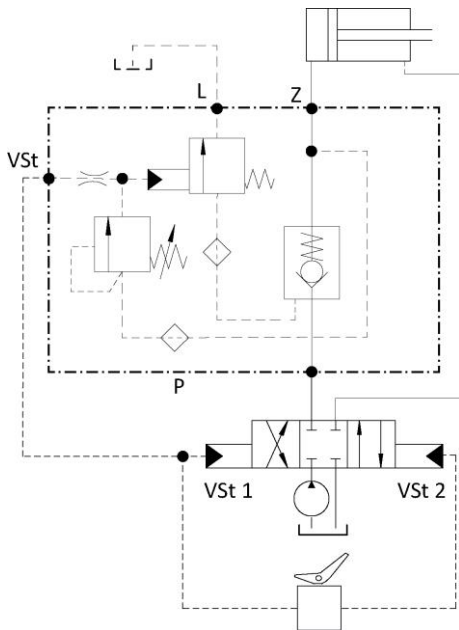
type A



type B



- Can be flanged directly on the controller
- Compact construction
- Different control options
- Good characteristics



### Product description

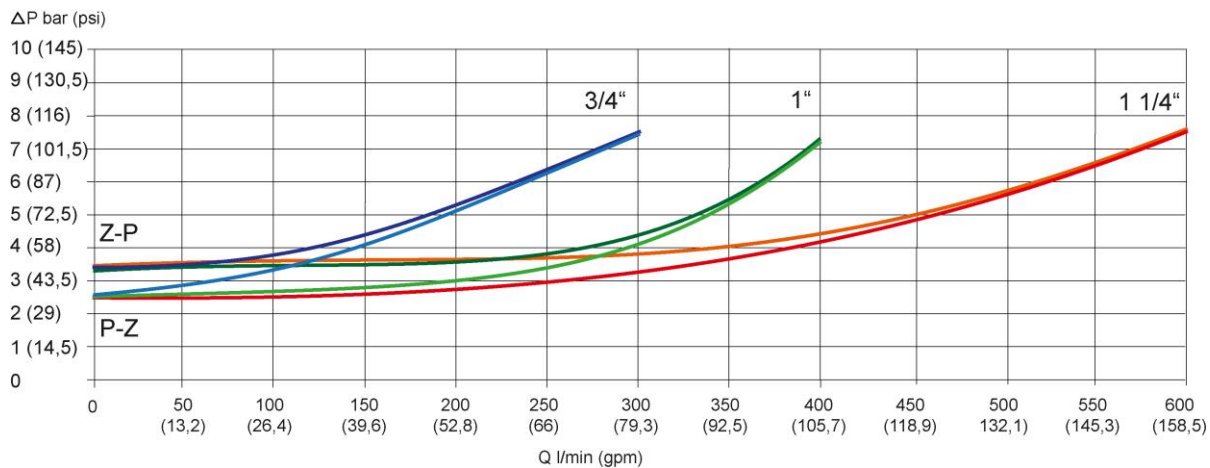
The valves are designed as seat valves with hardened components. The Check Valve can be unlocked hydraulically via pilot pressure or can also be done from the opposite side with a control ratio of 4:1. The valve is intended for direct manifold mounting on the main control valve of a construction machine. The orientation of the SAE-connection can be rotated by 90 degrees. In the variant with pilot pressure, the maximum pressure protection can be achieved via a Pressure Relief Valve.



## Technical Data

	Type A with pilot pressure control	Type B control from the opposite side
Weight:		
3/4"	3,3 kg	3,2 kg
1"	3,7 kg	3,6 kg
1 1/4"	4,5 kg	4,4 kg
Maximum input pressure:	420 bar (6090 psi)	
Adjustable attachment pressure:	400 bar (5800 psi)	
Piston ratio:	63:1	4:1 ; weitere auf Anfrage

## Characteristics







**we engineer your progress**  
**for a sustainable tomorrow**

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