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1 Product Description

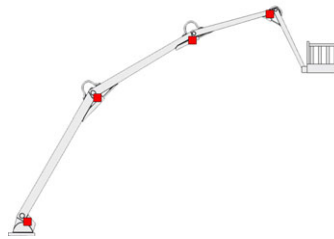
WESSEL lowering brake check valves secure booms against unintentional extending and retracting of the cylinders during hose or pipe breaks. WESSEL lowering brake check valves are designed leakage-free and thereby hold the cylinder in a defined position. Multi-section booms, which are moved by cylinders, often tend to oscillate. In case of insufficient damping, oscillations can be caused by the control of a cylinder. Due to the excellent damping characteristics of these valves, vibration can almost be avoided. Valves of variant 3N are designed as flangeable valves. They are mounted by means of four bolts directly onto the cylinder port to be protected.

1.1 Application

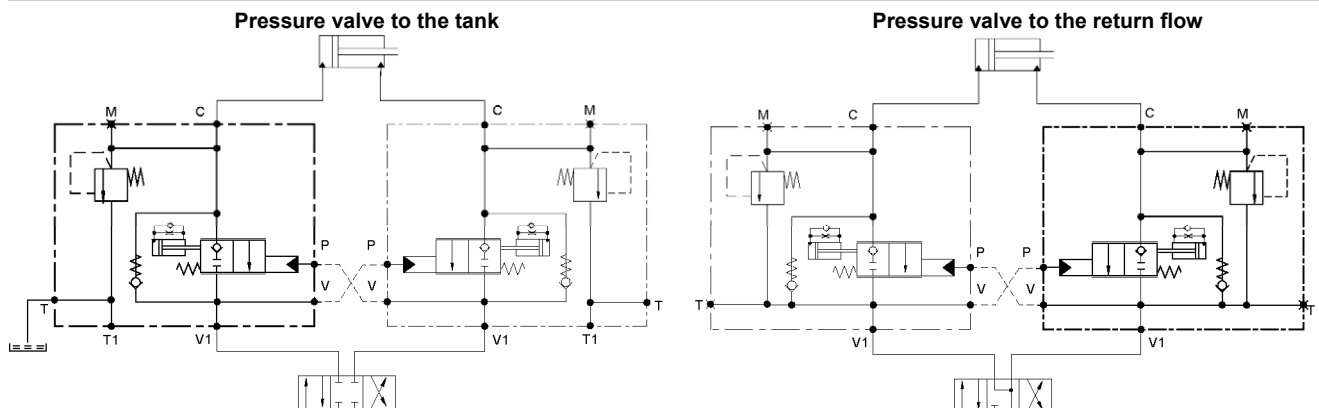
Lowering brake check valves for vibration sensitive cylinder applications with flow rates up to 60 l/min and maximum pressure up to 450 bar. Application examples are Multi-section booms, which are moved by cylinders, concrete pump booms or work platforms.

1.2 Mounting location (Recommendation)

The valves are mounted directly onto the cylinder connection of the boom that requires securing. Each cylinder needs two valves.



2 Function



In general, both cylinder connections are secured with a separate lowering brake valve type LHC. The hydraulic oil from the control valve is routed via the check valve to the cylinder connection. The pressure rises since the opposite side is still closed. As soon as the opening pressure for the lowering brake valve piston is reached the opposite side is opened and the oil can flow from the second cylinder chamber via the control valve to the tank. A path- and direction-dependent dampening causes a vibration-free movement of the actuated cylinder. The pressure limiting valve is arranged in parallel to the lowering brake valve piston. The pressure valve can be directed either to a separate tank connection, or via return line to the control valve.

2.1 Characteristics

- Leakage free seat in hardened steel housing
- Load pressure independent opening of the control valve
- Cylinder matched throttle cross sections of the control piston
- Strong damping characteristics
- Separate pressure limiting valve: Opening level is selectable independent of the pressure valve setting.
- Directly flanged to the cylinder

3 Technical Data

3.1 General

Criterion	Units	Value
Cylinder connection C		Ø11 – pmax < 450bar
Max. operating pressure	bar	450
Max. volume flow	l/min	60
Weight	kg	2.5
Opening pressure of lowering brake valve	bar	32 bar
Connection		
T,V		see type code
T1,V1		G 3/8, ISO 1179-1, T1 pmax < 10bar, V1 pmax < 350bar
P		G 1/4, ISO 1179-1, pmax < 350bar
M		G 1/4, ISO 1179-1, pmax < 450bar

3.2 Hydraulics

Criterion	Units	Value
Hydraulic fluid		Mineral oil (HL, HLP) conforming with DIN 51524, other fluids upon request
Pressure fluid temperature range	°C	-20 – +80
Ambient temperature:	°C	-30 – +50
Viscosity range	mm ² /s	2.8 – 500
Contamination grade		Filtering conforming with NAS 1638, class 9, with minimum retention rate $\beta_{10} \geq 75$

4 Ordering Information

4.1 Type code

LHC	3N							
00	01	02	03	04	05	06	07	08
00	Product group	Load Control Valve Cylinder						LHC
01	Variant	Flanged directly to the cylinder						3N
02	Connection T (spring cap)		Closed	000				
			AD16S	10R				
			AD12L	10F				
			M14x1.5	01D				
			G 3/8	03C				
	G 1/4	03B						
03	Connection V (spring cap)		Closed	000				
			AD12S	10P				
			AD6S	10M				
			AD12L	10F				
			M14x1.5	01D				
	G 3/8	03C						
	G 1/4	03B						
04	Nominal volume flow	Layout of the control valve optimized for the indicated volume flow	6 l/min	06				
			10 l/min	10				
			20 l/min	20				
			25 l/min	25				
			40 l/min	40				
	60 l/min	60						
05	Pressure setting	Opening level of the internal pressure limiting valve	>200 ≤450	XXX				
06	Damping		Standard damping	01				
			Strong damping	02				
07	Pressure valve outlet port	Tank port T, T1	T1, V1 closed - V, T open	T0				
			T1 closed - V, V1, T open	T1				
		Return line V, V1	T, T1, V1 closed - V open	V0				
			T, T1 closed - V, V1 open	V1				

XXX – predetermined characteristics XXX – characteristics selectable by customer ■ available ○ not available

Different configurations are unfortunately not implementable for technical reasons. Please let us know if you have questions.

4.2 Versions currently available

The versions listed below are available as standard. Further versions as part of the options given on the type code can be configured upon request.

00	01	02	03	04	05	06	07	Designation	Part No.
LHC	3N	03C	03C	10	370	02	T1	T= G3/8, V= G3/8,10 l/min, 370 bar, DBV → T=T1, strong damping	561.000.001.9
LHC	3N	03C	03C	20	370	02	T1	T= G3/8, V= G3/8,20 l/min, 370 bar, DBV → T=T1, strong damping	561.000.002.9
LHC	3N	03C	03C	40	370	02	T1	T= G3/8, V= G3/8,40 l/min, 370 bar, DBV → T=T1, strong damping	561.000.003.9
LHC	3N	03C	03C	60	370	02	T1	T= G3/8, V= G3/8,60 l/min, 370bar, DBV → T=T1, strong damping	561.000.004.9
LHC	3N	03B	03B	20	400	02	T1	T= G3/8", V= G3/8,40 l/min, 400 bar, DBV → T=T1, strong damping	561.000.005.9
LHC	3N	03B	03B	20	400	02	T1	T= G1/4", V= G1/4",20 l/min, 400 bar, DBV → T=T1, strong damping	561.000.006.9
LHC	3N	03C	03B	06	280	02	T1	T= G1/4", V= G1/4",06 l/min, 280 bar, DBV → T=T1, strong damping	561.000.007.9
LHC	3N	03C	03C	25	350	02	T1	T= G3/8", V= G3/8,25 l/min, 350 bar, DBV → T=T1, strong damping	561.000.008.9
LHC	3N	03C	03C	60	370	02	T1	T= G3/8", V= G3/8,60 l/min, 370 bar, DBV → T=T1, strong damping	561.000.009.9
LHC	3N	03C	03C	60	420	02	T1	T= G3/8", V= G3/8,60 l/min, 420 bar, DBV → T=T1, strong damping	561.000.010.9

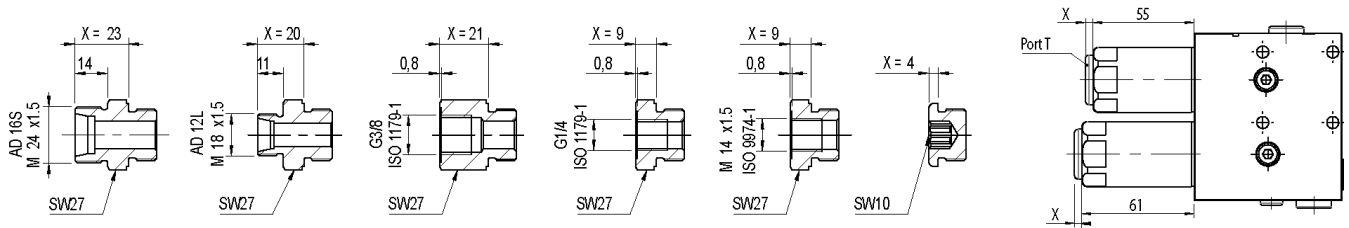
5 Description of Characteristics according to Type Code

5.1 Characteristic 1: Variant

Mounting directly on the cylinder connection using 4 bolts.

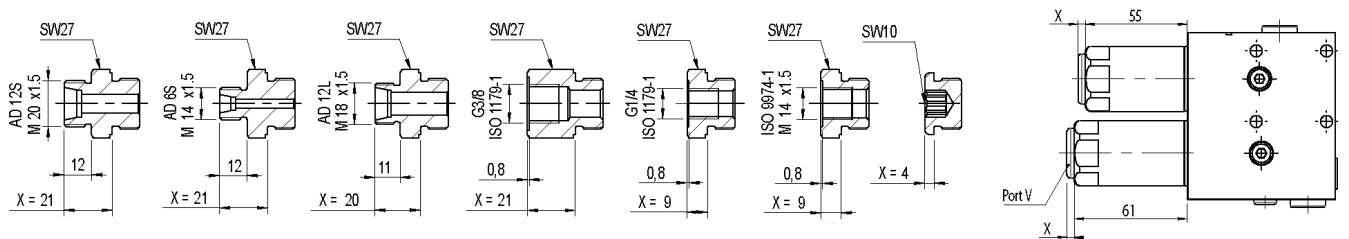
5.2 Characteristic 2: Connection T at spring cap

The connection at the spring cap can be selected in the following dimensions:



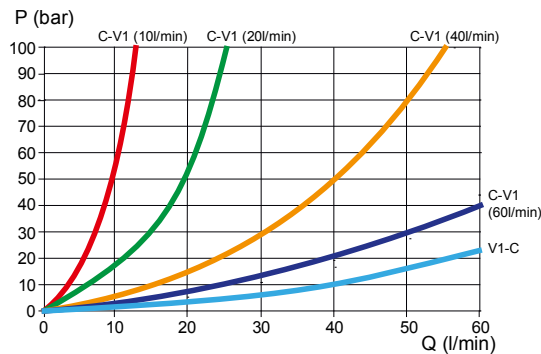
5.3 Characteristic 3: Connection V at spring cap

The connection at the spring cap can be selected in the following dimensions:



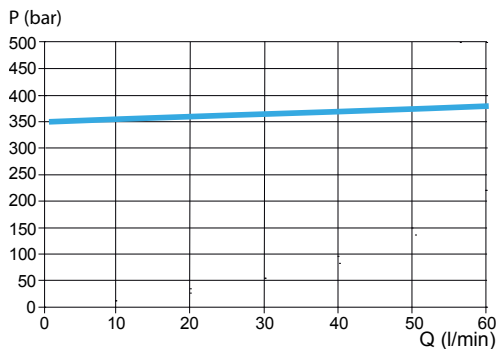
5.4 Characteristic 4: Nominal volume flow

Indicates the recommended maximum volume flow from connection C (cylinder) to connection V or V1.



5.5 Characteristic 5: Pressure setting

Indicates the set opening start of the pressure limiting valve +/- 5 bar. The value is permanently set and can not be changed.

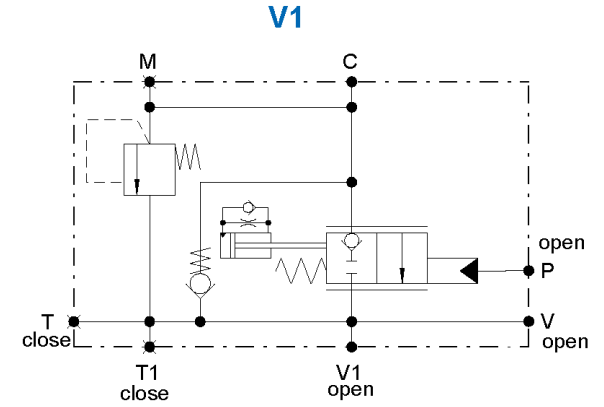
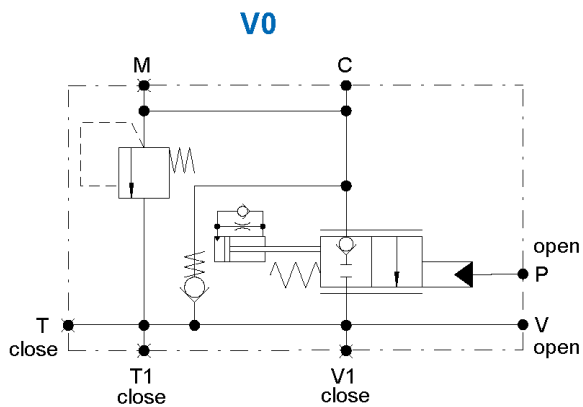
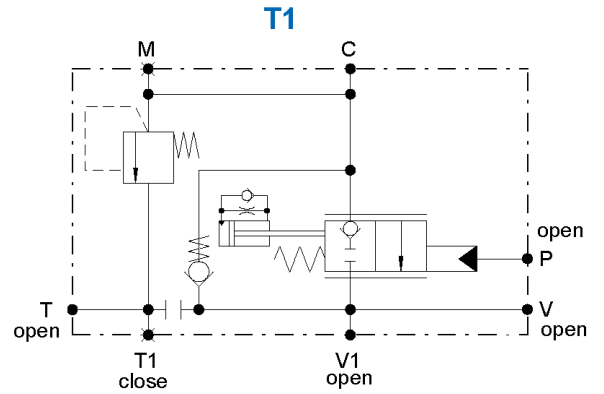
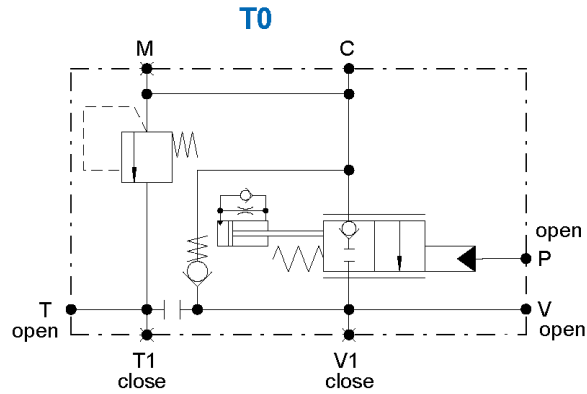


5.6 Characteristic 6: Damping

Using Code 01, the valve opens with the common orifice-damping.

With Code 02 a damping cartridge is installed that first performs opening via an orifice and thereafter a strong progressive damping. Closing the valve by removing the inlet pressure is always fast.

5.7 Characteristic 7: Pressure valve outlet port



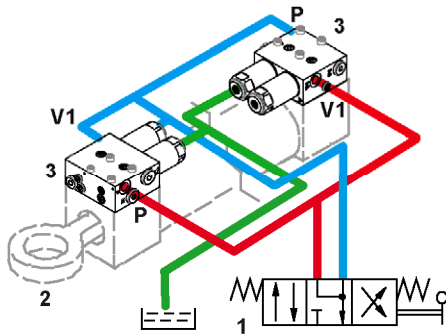
6 Installation

6.1 General remarks

- Observe all installation and safety information of the machine manufacturer.
- Only technically permitted changes may be made on the machine.
- The user has to ensure that the device is suitable for the respective application.
- Use exclusively for the range of application specified by the manufacturer.
- Depressurize the hydraulic system prior to installation or dismantling.
- May only be adjusted by technical staff.
- May only be opened with the approval of the manufacturer, otherwise the warranty is invalidated.
- The enclosed connection recommendation is without guarantee. The functionality and the technical specifications of the machine require checking.

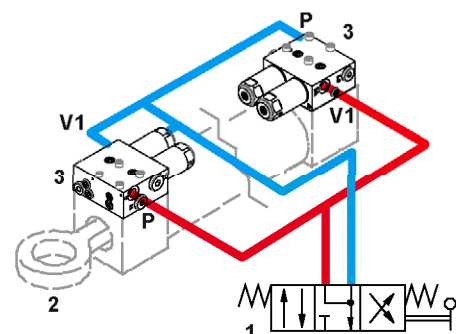
6.2 Connection recommendations

Pressure valve outlet to tank



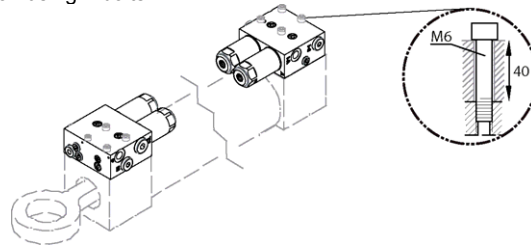
G1/4 - 55Nm
G3/8 - 80Nm
M14x1,5 - 55Nm
M18x1,5 - 90Nm

Pressure valve outlet to return line

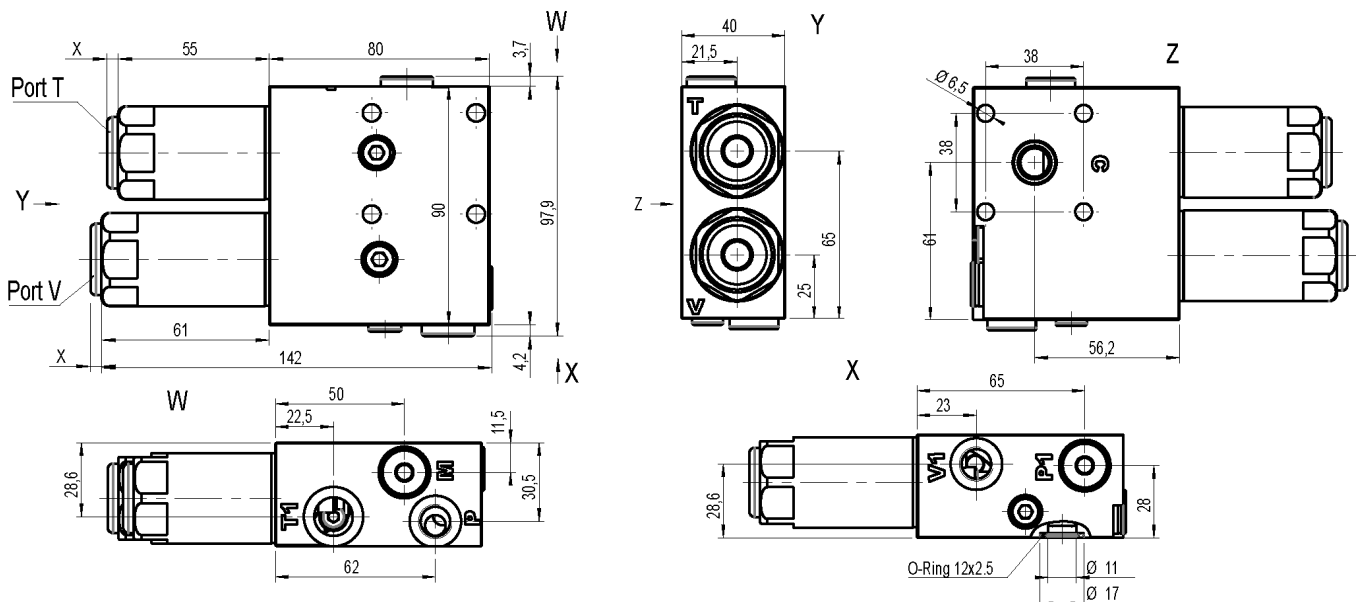


6.3 Installation - installation space

Mounting directly on the cylinder connection using 4 bolts.



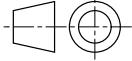
6.4 Dimensions



7 Notes, Standards and Safety Requirements

7.1 General remarks

- The views in drawings are shown in accordance with the European standard projection variant



- A comma (,) is used as a decimal point in drawings
- All dimensions are given in mm

7.2 Standards

The following standards must be observed when installing and operating the valve:

- DIN EN ISO 13732-1:2008-12, Temperatures on accessible surfaces
- DIN EN ISO 13849 "Safety of machinery – Safety related parts of control"
 - WESSEL-HYDRAULIK GmbH guarantees utilization of standard and proven safety principles in accordance with ISO 13849-2: 2003, Tables C.1 and C.2 for the construction of the valve described here.
 - WESSEL-HYDRAULIK GmbH has a certified quality management system in accordance with DIN EN ISO 9001.
 - **The MTTFd value can be adopted from machine manufacturers with 150 years of experience for the described valve!**
 - Notice: The user is therefore responsible for complying with the fundamental and proven safety principles according to ISO 13849-2: 2003, Tables C.1 and C.2 for the implementation and operation of the hydraulic component!

8 Accessories