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1 General Description

If loads are to be raised and lowered using hydraulic winch drives, a load holding valve should be installed on the winch motor for safety reasons.

These load holding valves are suitable for motor applications. They guarantee a leak-free shut-off of the consumer. The opening is not influenced by the load pressure and is controlled by opposing side pressure. This prevents the consumer from getting ahead of the incoming volume flow. The valves are suitable for applications that are subject to oscillation, such as e.g. winch drives and are characterized by their high sensitivity and the direct joystick response.

A load holding valve of type LHW-3D is flanged directly on both ports of the hydraulic motor and is especially suitable for series A2 FM motors from manufacturer Rexroth

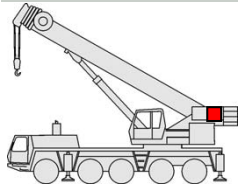
Advantages

- Quick installation
- Optimal dampening for tough application
- Directional valve for controlling a stop brake
- Adapting the dampening characteristics does not influence the start of opening

1.1 Applications

The WESSEL Load Holding Valve Winch enables low-loss load lifting by a check valve. The valve prevents any fast movement caused by the load as opposed to the incoming oil flow. The load can be locked without any oil leaking and lowering is controlled.

1.2 Mounting Location (Recommendation)



The Load Holding Valve Winch is flanged directly onto the winch-hydraulic motor with connections B and D.

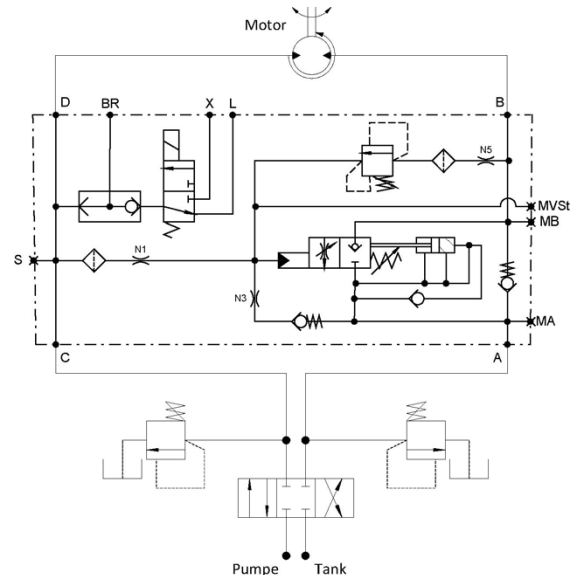
1.3 Function

The lines from the winch control valve are connected with connection A (Lifting) and C (Lowering) of the load control valve.

For lifting the load the flow is directed from port A via a check valve to the winch with only low losses. In idle position the load is locked without any leakage. To lower the load the valve is opened by increasing pressure at port C. The opening pressure level can be adjusted. Lowering the load is done very precisely and independent of the load. By this also heavy loads can be lowered smoothly without any jerking. The damped control of the valve guarantees oscillation-free operation.

The valve is equipped with a pressure relief valve, which restricts the maximum pressure on the consumer. Note that the specified pressure corresponds with the opening pressure of the pressure valve. Make sure that the lifting and lowering lines do not cause excessive pressure losses.

The output BR can be used to open a mechanical holding brake. The pressure signal on BR corresponds to the pressure on the lowering-line to the motor. By means of an internal electrical directional valve, an additional signal from port X to port BR can be activated and thus also open the brake.



1.4 Characteristics

- Oscillation-free load lowering
- Extremely precise and fine characteristics, especially at low lowering speeds
- Leakage free load retention
- Robust valve construction with redundant spring system ensures the greatest safety
- Directional valve 3/2 for external control of the stop brake
- Damped opening of the control piston

2 Technical Data

Criteria	Unit	Value		
A, B, C, D		SAE ¾"	SAE 1"	SAE 1 ¼"
		(DIN ISO 6162-2, SAE J518/2 (CODE62))		
Maximum operating pressure C,D	bar	350		
Maximum operating pressure A, B	bar	420		
Pressure setting		See type code feature 04: Pressure setting		
Maximum volume flow		See type code feature 03: Spool		
Weight	kg	12,5		16,2

Connection	Connection size	Unit	Maximum operating pressure
MA, MB	G 1/4 ISO 1179-1	bar	420
S, MVSt, X, BR	G 1/4 ISO 1179-1	bar	350
L	G 1/4 ISO 1179-1	bar	< 0,5
Installation position			any

Hydraulics	
Hydraulic fluid	Mineral oil (HL, HLP) conforming with DIN 51524, other fluids upon request
Hydraulic fluid temperature range	-20 – +80 °C
Environmental temperature	< +50 °C
Viscosity range	2,8 – 500 mm ² /s
Contamination grade	Filtering conforming with NAS 1638, class 9, with minimum retention rate $\beta_{10} \geq 75$

Elektrics	
Supply voltage	24 VDC
Voltage tolerances	±10 %
Power-on time	100 %
Maximum current	0,83A bei 100% ED
Nominal current	0,83A
Coil resistance	29 Ohm bei 20°C
Protection class in accordance with DIN 40050	IP 65
Electrical connector	Angle plug-in connector ISO 4400 / DIN EN 43650

3 Ordering Information

3.1 Type Code

LHW	3D				HYP03B			24S001
00	01	02	03	04	05	06	07	08
00	Product group							LHW
01	Design		double flange					3D
02	Connections	motor / cylinder ISO 6162-2 (SAE J518 Code62) metric	SAE 3/4"					05C
			SAE 1"					05E
			SAE 1 1/4"					05G
03	Spool	Design of the spool optimized for the specified volume flow. Specification in l/min	SAE 3/4"					200
			SAE 3/4", SAE 1"					250
			SAE 3/4", SAE 1", 1 1/4"					300
			SAE 3/4", SAE 1", 1 1/4"					350
			SAE 1", 1 1/4"					400
			SAE 1 1/4"					500
			SAE 1 1/4"					550
SAE 1 1/4"					600			
04	Pressure setting		opening level of the pressure valve at a volume flow of 10lpm. Specification in bar					350
05	Activation		Hydraulically proportional					HYP03B
06	Damping	minor damping					01	
		medium damping					02	
		strong damping					03	
07	Opening pressure		Pressure at port C, standard 13 bar = 013					XXX
08	Directional valve for mechanical brake		24VDC switching Hirschmann cranked plug					24S001

XXX – fixed features XXX – customer selectable features ■ available ○ not available

Some theoretical configurations might be not feasible for technical reasons. For relating questions please ask for our advice.

3.2 Currently available Versions

The versions listed below are available standard-versions. Further versions in the range of the above mentioned features are available on request.

Designation	Type Code	Part No.
LHW-3D SAE3/4 CD62 300LPM 420BAR	LHW -3D -05C -300 -350 -HYP03B -02 -015 -24S001	536.364.001.9
LHW-3D SAE1 CD62 320LPM 420BAR	LHW -3D -05E -350 -350 -HYP03B -01 -011 -24S001	537.364.002.9
LHW-3D SAE1 1/4 CD62 550LPM 420BAR	LHW -3D -05G -550 -420 -HYP03B -02 -013 -24S001	538.364.001.9

4 Description of Features according to Type Code

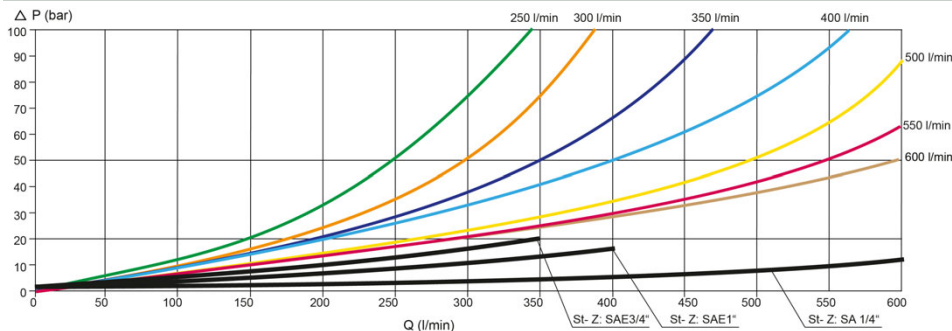
4.1 Feature 1: Design

Design with double flange. Thus flangeable directly onto both ports of the hydromotor

4.2 Feature 2: Connections

The Load Holding Valve Winch is flanged directly onto the motor (winch) with connections B and D.

4.3 Feature 3: Spool



4.4 Feature 4: Pressure setting

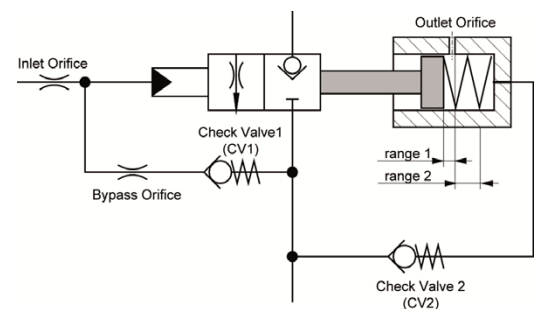
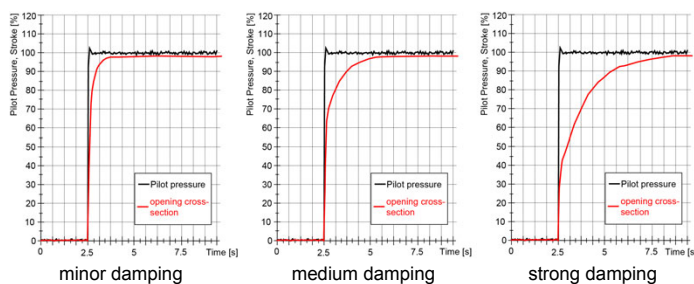
The pressure limiting valve is used for cutting down the dynamic load on the motor caused by pressure spikes. Make sure to always set that valve sufficiently higher than the maximum operating pressures. Pressure limiting valves have a hysteresis: Be aware that the pressure limiting valve closes at a lower pressure than it had opened. Otherwise this can lead to an uncontrolled lowering when the pressure relief function is actuated due to loads close to the opening point of the pressure valve.

4.5 Feature 5: Activation

The valve must not be activated from externally. For lifting the load the flow is directed from port A via a check valve to the winch with minimum losses. In idle position the load is locked without any leakage. To lower the load the valve is opened internally by increasing pressure at port C.

4.6 Feature 6: Damping System

Inlet and outlet orifices dampen the opening of load holding valves. WESSEL load holding valves are additionally equipped with a stroke-dependent cushioning. Small openings (range 1) with low damping are realized via an additional drain orifice. The further opening (range 2) is made with progressively increasing damping characteristics. A check-valve (CV 2) guarantees that the valve closes quickly.



4.7 Feature 7: Opening pressure

The valve is opened by the motor inlet pressure (lowering pressure).

The opening pressure defines the pressure which opens the leakage free seat valve. For WESSEL load holding valves the opening pressure is independent of the load pressure!

4.8 Feature 8: Directional valve for mechanical brake

By pressure in the internal connection from port C to port D, a pressure signal at port BR is provided via a shuttle valve. This signal can be used to open a mechanical brake. Alternatively, an appropriate signal can be introduced via port X into the load holding valve and activated on port BR by an electrically switching directional valve 3/2.

5 Installation

5.1 General Instructions

- Observe all installation and safety information of the construction machine manufacturer.
- Only technically permitted changes are to be made on the construction machine.
- The user has to ensure that the device is suitable for the respective application.
- Application exclusively for the range of application specified by the manufacturer.
- Before installation or deinstallation, the hydraulic system is to be depressurized.
- Settings are to be made by qualified personnel only.
- Opening is only to be performed with the approval of the manufacturer, otherwise the warranty is invalidated.
- The included connection recommendations are not guaranteed. The functionality and the technical specifications of the construction machine must be checked.

5.2 Connection Proposal

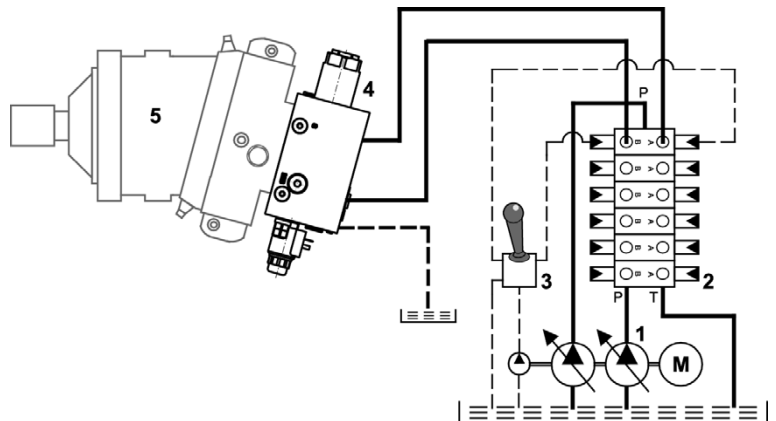
The connection flange corresponds with the working connections of the hydromotor Bosch Rexroth A2FM or A2FE.

SAE 1": NG 80/90

SAE 1 1/4": NG 107,125,160,180 with rear flanges.

SAE 3/4": NG 45, 56, 63

- Pump
- Main control valve
- Pilot control unit
- Load holding valve
- Hydromotor



5.3 Mounting - Installation Space

- Observe the connections
- Observe the strength category and torque (see appendix) of the fastening bolts
- Do not damage seals and flange surface
- The air must be exhausted from the hydraulic system

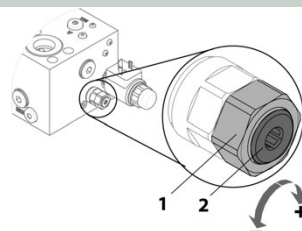
The lift-line from the main control valve of the machine is connected to connection A of the brake valve. The lowering-line is connected to connection C. The brake valve is flanged with connections B and D on the winch motor.

Make sure that the seals are seated correctly on both sides. The user is responsible for maintaining the specified tightening torques for the connecting bolts. The valve must be mounted so that there are no forces other than those from the motor (winch) applied.

	SAE	Strength class	Thread A	Thread depth B	C	Tightening torque Nm
	ISO 6162-2 P19M / SAE J518-2 CD62					
	3/4"	10.9	M10	18	98	70
ISO 6162-2 P25M / SAE J518-2 CD62						
	1"	10.9	M12	23	99	130
ISO 6162-2 P32M / SAE J518-2 CD62 (previous Norm)						
	1 1/4"	8.8	M14	23,5	99	150

5.4 Setting the pressure relief for the attachment

- Undo the counter-nut (1).
- Set screw (2) – 1 turn = 1mm = 83 bar
- Pressure valve setting 350 bar factory setting
- Tighten the counter-nut (1)



5.5 Setting the Opening pressure

CAUTION!

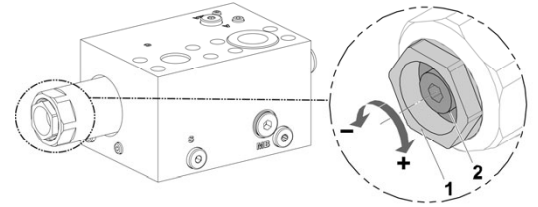
The opening point of the load holding valve is specified in Feature 7, adjusted at port C. Due to the pressure dividing function the pressure at MVSt is at a lower level than specified in Feature 7.



Changes to the settings are only to be performed by authorized and trained personnel. The user is responsible for any changes made to the valve.

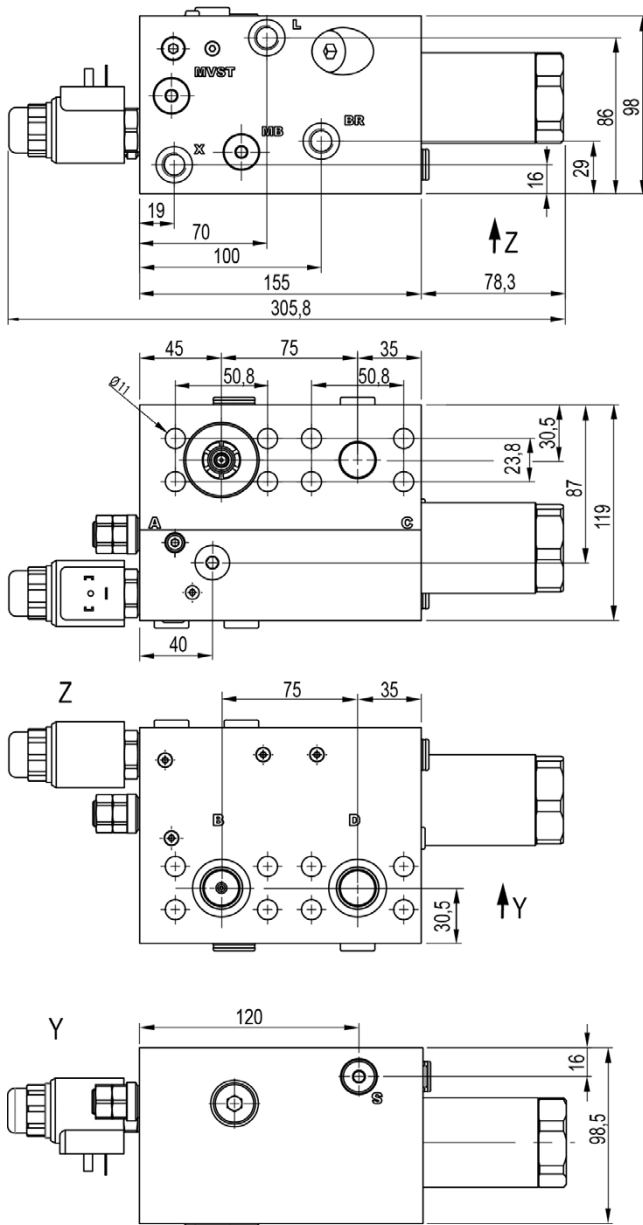
A setting below of 11 bar is not permitted measured at MVSt.

- Undo the counter-nut (1).
- Opening point Increase: Turn the set-screw (2) to the right (+).
- Tighten counter-nut (1) (10Nm).

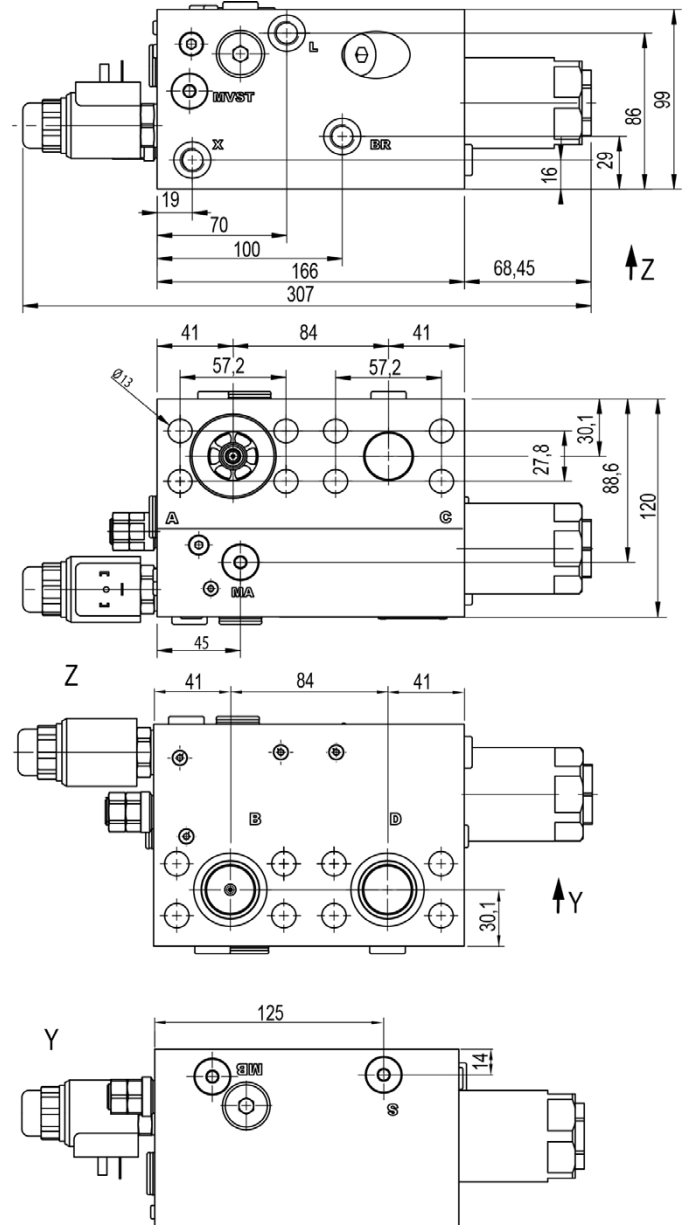


5.6 Dimensions

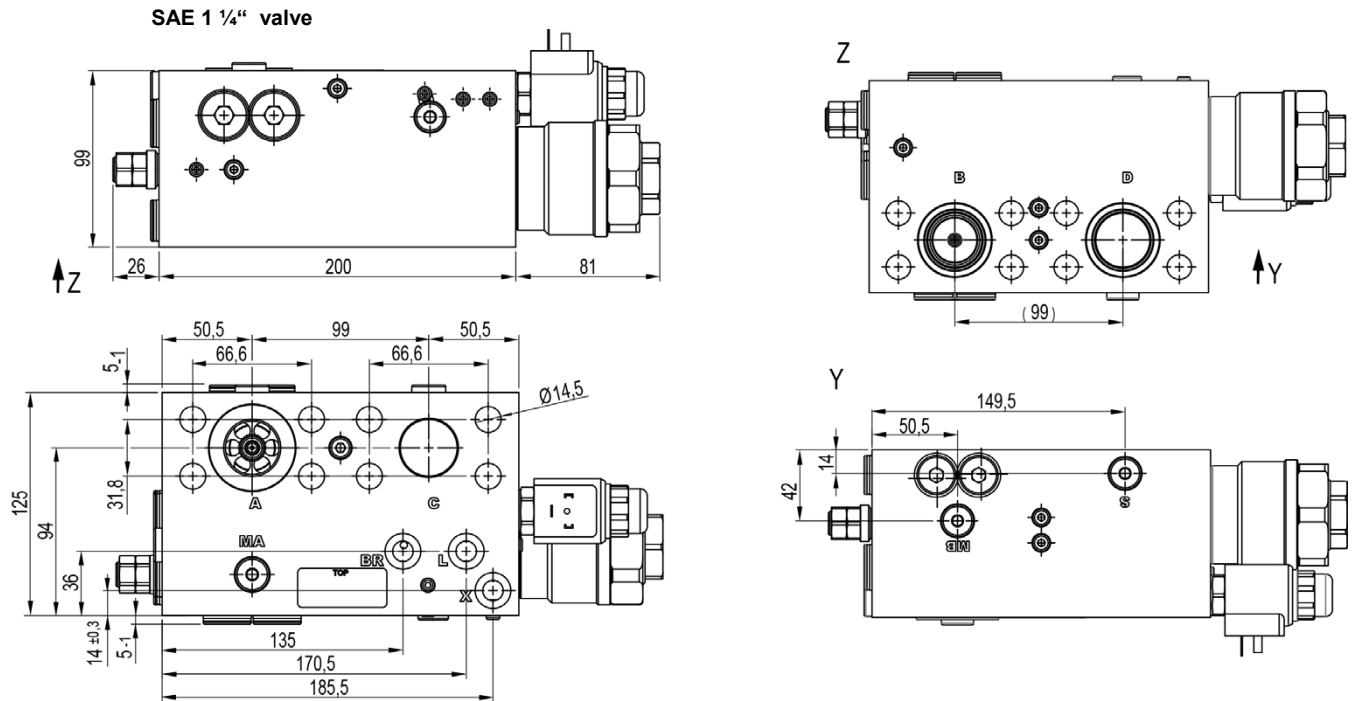
SAE 3/4" Valve



SAE 1" Valve



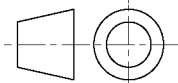
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6 Notes, Standards and Safety Instructions

6.1 General Instructions

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



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

6.2 Standards

The following standards are to be observed because of the surface temperatures on the valve:

- EN 563, Temperatures on surfaces that can be touched.
- EN 982, Safety-technical requirements for fluid-technical systems and their components.

6.3 Safety requirements

- 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!
- Note: 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!