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1 Product Description

In case of a pipe or tube rupture load control valves avoid uncontrolled movement of the cylinder. In some countries these valves are required by law when a construction machine is used for load lifting purposes. They also serve for an exact and stable positioning of the boom and enable sensitive and even movement processes. Pipe rupture valves can compensate for leakages on the main control valves in older construction machines. 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.

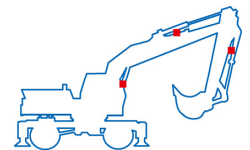
This pipe rupture valves can be controlled in a hydraulically proportional or electrical-proportional manner and automatically limits the descending speeds for high loads.

1.1 Application

The pipe rupture valves is specially designed for the boom cylinder/rocker cylinder of a crane. Through the kinematics of the machine, the cylinder pressure can increase in the downward movement. In standard variants, the volume flow also increases with the increasing pressure. This effect is compensated or even overcompensated for this hose rupture valve through additional valve technology. Proportional control of this variant is possible through hydraulics or electronically.

1.2 Mounting location

The load control valve is installed in the line to be protected between the main control valve and the hydraulic cylinder and is flanged directly on the cylinder. Additional pipework and piping between load control valve and cylinder is not permissible.



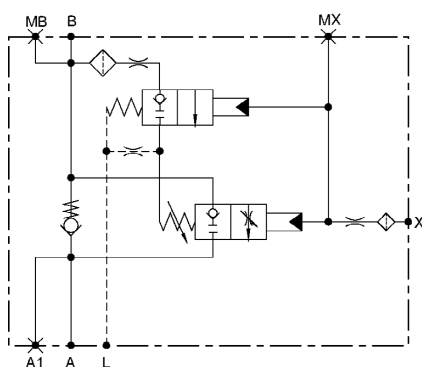
1.3 Characteristics

- Meets the requirements of standards: DIN24093, ISO 8643, EN 474
- Start opening independent of the load pressure
- Sensitive control with low hysteresis
- Leakage-free
- Rupture valve piston pressure-compensated
- Can be flanged directly onto the cylinder connection
- Electrically proportional or hydraulic actuation
- Proportional valve and compensation valve protected by a filter
- Setting options for the opening start and the height of the compensation

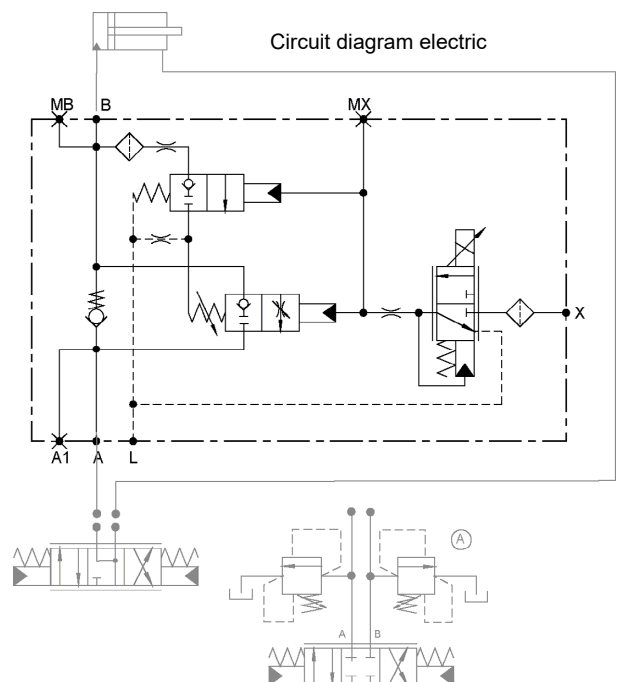
1.4 Function

The pipe rupture valves is flanged on the bottom side of the cylinder and is closed in the idle position leakage-free. When the cylinder is extended, the hydraulic fluid from connection A is conveyed freely to the cylinder connection B via a check valve. For retraction, the pilot control pressure in connection X is given directly to the actuator face of the load control valve either via a proportional signal (hydraulically proportional actuation) or via an electrically controlled proportional valve. The lowering movement is thus initiated. By increasing the pilot control pressure or respectively the flow at the proportional valve, the released opening cross-section increases. During lowering, the return pressure at connection A should be as small as possible so that a speed increase does not take place during a hose or pipe break. The internal compensation valve reduces the opening cross-section with increasing load pressure so that a speed increase does not occur with the lowering of a boom and the pressure increase caused by the kinematics. A downstream pressure restriction valve is required when the main directional control valve has a closed middle position (A). The load control valve itself is pressure-compensated so that from the return pressure no closing force acts on the pipe rupture valves.

Circuit diagram hydraulic



Circuit diagram electric



2 Technical Data

| Criterion | Units | Value |
|-----------------------------------|--------------------|---|
| Max. operating pressure | bar | 420 |
| Max. volume flow | l/min | 600 |
| Weight | kg | SAE 1": 8,5; SAE 1 1/4": 13,0 |
| Opening point set value | bar / mA | 10 / 400 |
| Full opening | bar | Opening pressure + leak oil pressure + 20 |
| Connection | | |
| Z, ST | | SAE 1", SAE 1 1/4", DIN ISO 6162-2, SAE J518/2 (CODE62) |
| M, X | | G 1/4; ISO 1179-1, pmax <50 bar |
| L | | SAE1" : G 1/4 ISO 1179-1, pmax < 1 bar SAE 1 1/4": M14x1,5 ISO 9974-1, pmax <1 bar |
| Installation position | | Any |
| Hydraulic fluid | | |
| Hydraulic fluid | | Mineral oil (HL, HLP) conforming with DIN 51524, other fluids upon request |
| Hydraulic fluid temperature range | °C | -20 – +80 |
| Ambient temperature: | °C | < +50 |
| Viscosity range | mm ² /s | 2.8 – 500 |
| Contamination grade | | Filtering conforming with NAS 1638, class 9, with minimum retention rate $\beta_{10} \geq 75$ |

3 Ordering Information

| | | LHB 00 | 3E 01 | 05E 02 | 000 04 | 010/400 06 | 0 08 | |
|----|-----------------------------------|---|---|------------------|------------------|----------------------|----------------|------------|
| 00 | Product group | Load Control Valve Boom | | | | | | LHB |
| 01 | Variant | Load compensated | | | | | | 3E |
| 02 | Connections | Cylinder ,main control valve | SAE 1" - DIN ISO 6162-2,SAE J518/2 (CODE62) | | | | 05E | |
| | | | SAE 1 1/4" - DIN ISO 6162-2,SAE J518/2 (CODE62) | | | | 05G | |
| 03 | Spool | Design of the spool optimized for the specified volume flow; version SAE 1" | from 250 l/min to 400 l/min | | | | 250 | |
| | | | | | | | 300 | |
| | | | | | | 350 | | |
| | | | | | | 400 | | |
| | | Design of the spool optimized for the specified volume flow; version SAE 1 1/4" | from 400 l/min to 550 l/min | | | | 400 | |
| | | | | | | | 450 | |
| | | | | | | | 500 | |
| | | | | | | 550 | | |
| 04 | Pressure setting | No internal pressure control, intermediate plate necessary! | | | | | | 000 |
| 05 | Actuation | Hydraulically proportional, connection G1/4 | | | | HYP03B | | |
| | | Electrically proportional, 24 Volt, AMP Junior Timer | | | | 24P002 | | |
| 06 | Opening point set value | Valve opens when pilot control pressure is approx. 10 bar | | | | | | 010 |
| | | Valve opens when electrical pilot signal is approx. 400 mA | | | | | | 400 |
| 07 | Setting compensation | No compensation | | | | | | 00 |
| | | Low compensation: Load pressure acts slightly volume-flow-increasing | | | | | | 01 |
| | | Standard compensation, at load pressures > 120 bar volume flow constant | | | | | | 02 |
| | | Strong compensated, at load pressures > 120 bar volume flow reduced | | | | | | 03 |
| 08 | Maximum lowering speed adjustable | Not available | | | | | | 0 |

XXX – permanently 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 Description of Characteristics in Accordance with Type Code

4.1 Characteristic 2: Connections

Load compensated

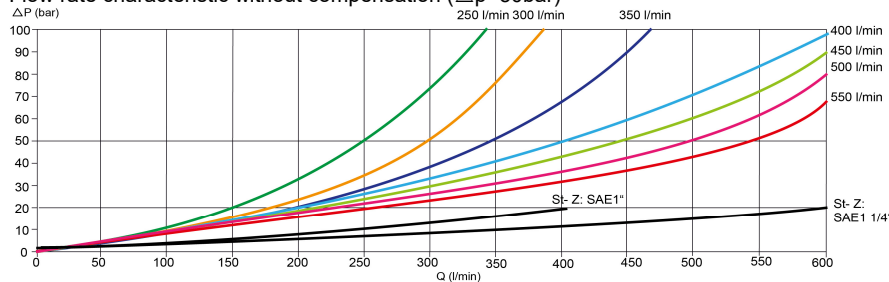
4.2 Characteristic 2: Connections

The valves are flanged directly on the cylinder to be protected (connection Z). The supply line from the control valve takes place via the connection ST. Both connections are designed the same size.

4.3 Characteristic 3: Spool

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

Flow rate characteristic without compensation ($\Delta p=50\text{bar}$)



4.4 Characteristic 4: Pressure setting

This hose rupture valve is designed without a pressure restriction valve for safety reasons:

If a pressure restriction valve opens, this could lead to the uncontrolled lowering of the boom. The maximum load pressure should thus be designed so that there is also sufficient safety against the bursting of the cylinder during dynamic processes and the maximum pressure of the hose rupture valve is not exceeded.

Through solar irradiation, a pressure increase can occur through the heating of the cylinder. If the cylinder is not protected by a thermal pressure restriction valve, this effect can be avoided through a pressure restriction valve intermediate plate ("sunshine valve").

4.5 Characteristic 5: Actuation

The valve can be proportionally controlled through hydraulics or electronically.

For safety reasons, we recommend only making the pilot control pressure available via a further external directional valve when an activation of the consumer is to follow.

Hydraulically proportional:

The actuation takes place at connection X. The pilot control signal leads between 10 bar and 30 bar to the valve opening and may not exceed 50 bar.

Electrically proportional:

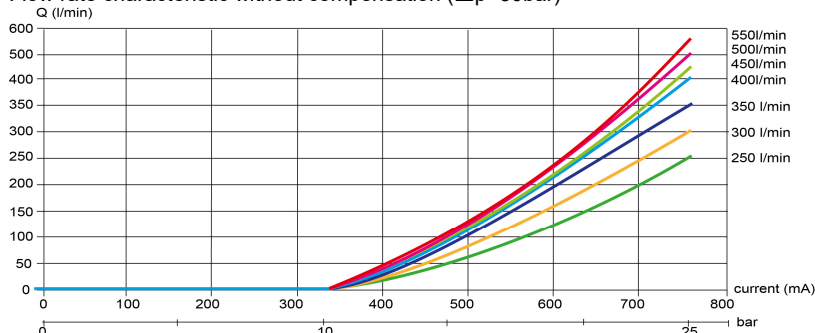
The valve must be supplied at connection X with a pilot control pressure of at least 30 max. 50 bar.

For the electrical actuation of the valve, using a current-regulated, pulse-width modulated amplifier card, restricting current to I2 is recommended. The hydraulic hysteresis achieves minimum values at a modulation frequency of 100 Hz. A modification may be necessary depending on the hydraulic natural frequency.

| Criterion | Units | Value |
|--|-------|-----------------------------|
| Limit current I _a : | A | 0.75 ; PWM frequency 100 Hz |
| Voltage tolerances: | % | ±10 |
| Power-on time: | % | 100 |
| Protection class according to DIN 40050: | | IP 65 |
| Connector: | | AMP Junior Timer |

| Criterion | Units | Value |
|----------------------------|-------|-------------|
| Insulation material class: | | H |
| Power-on time: | % | 100 |
| R20: | ς | 21,2 +/- 5% |
| I1: | mA | 300 +/- 10% |
| I2: | mA | 750 +/- 10% |

Flow rate characteristic without compensation ($\Delta p=50\text{bar}$)

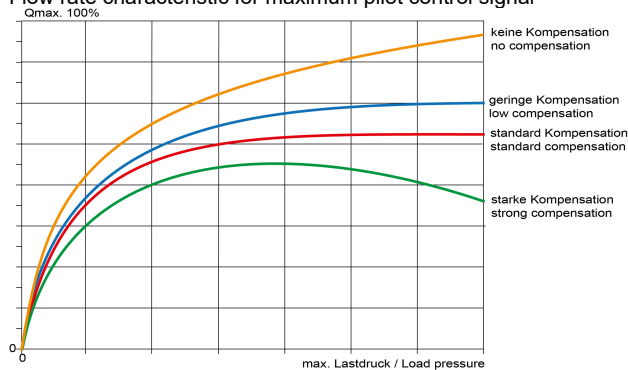


Through the compensation (see characteristic 7), the load results in smaller opening cross-sections than expected due to the pilot control pressure / current!

4.6 Characteristic 6: Setting compensation

Compensation of the impact of load pressure on the lowering speed. The setting is preset in the factory and cannot be changed.

Flow rate characteristic for maximum pilot control signal



No compensation

The load pressure had no impact on the opening cross-section of the load control valve. Higher load pressure leads to higher lowering speed.

Low compensation

The load pressure only has a slight impact on the opening cross-section of the load control valve. Higher load pressure – slightly higher lowering speed.

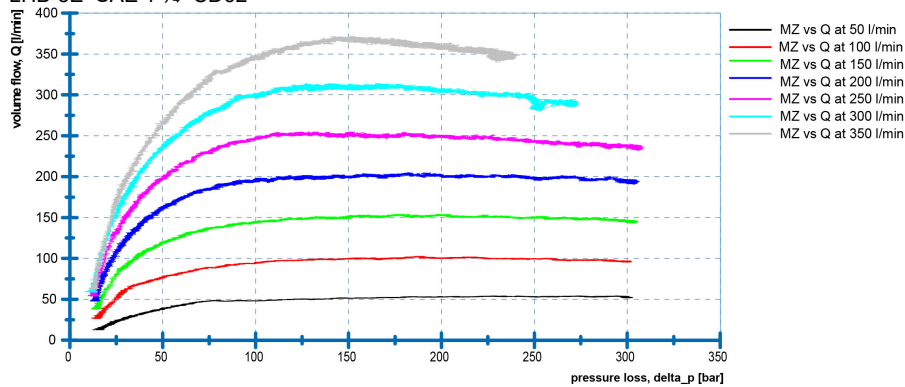
Standard compensation

The load pressure impacts the opening cross-section of the load control valve so that as of approx. 120 bar the lowering speed remains constant at the same pilot control pressure.

Strong compensation

The load pressure closes the opening cross-section of the load control valve so far that as of approx. 120 bar the further increase in the load pressure leads to a reduction in the lowering speed.

LHB-3E SAE 1 ¼" CD62



4.7 Characteristic 8: Lowering speed adjustable

Not available for this variant.

5 Installation

5.1 General remarks

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 dismantling, the hydraulic system is to be depressurized.

Settings are to be made by qualified personnel only.

May only be opened 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.

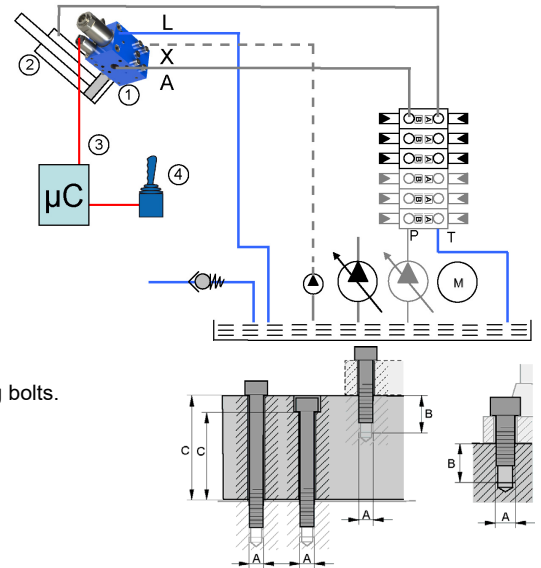
5.2 Connection recommendations

Hydraulic hoses are not to come into contact with the load control valve because otherwise they are subject to thermal damaging. Ensure that standards EN 563 and EN 982 are observed.



- 1 LHB-3E
- 2 Zylinder
- 3 Mikrocontroller
- 4 Joystick/Geber

It is recommended to depressurize the X connection with an additional valve to be integrated into the pilot control circuit when the load control valve is not actuated.



5.3 Montage - Bauraum

Observe the connection labels.

Observe the strength category and torsional moment (see appendix) of the fastening bolts.

Do not damage seals and flange surface.

The air must be exhausted from the hydraulic system.

| read (A) | Strength class | Thread depth (B) | Tightening torque (Nm) | C (mm) |
|-------------------------------------|----------------|------------------|------------------------|-------------------|
| DIN ISO 6162-2, SAE J518/2 (CODE62) | | | | |
| M12 | 10,9 | 21,5 | 130 | SAE 1" = 89,5 |
| M14 | 10,9 | 23,5 | 150 | SAE 1 1/4" = 97,5 |

5.4 Settings

The proportional hose rupture valve is preset to 10 bar opening start. The compensation valve is matched with the opening start.



ATTENTION

Do not change either of the set values. A complete evaluation is required for the use of this valve in a new application..

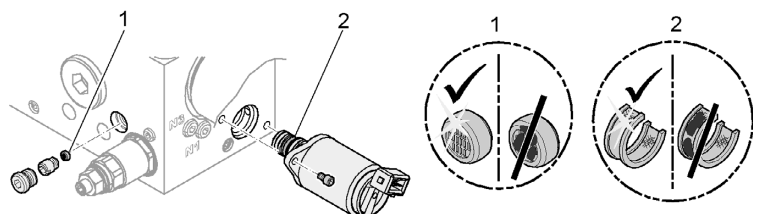
5.5 Maintenance – filter cleaning



NOTE

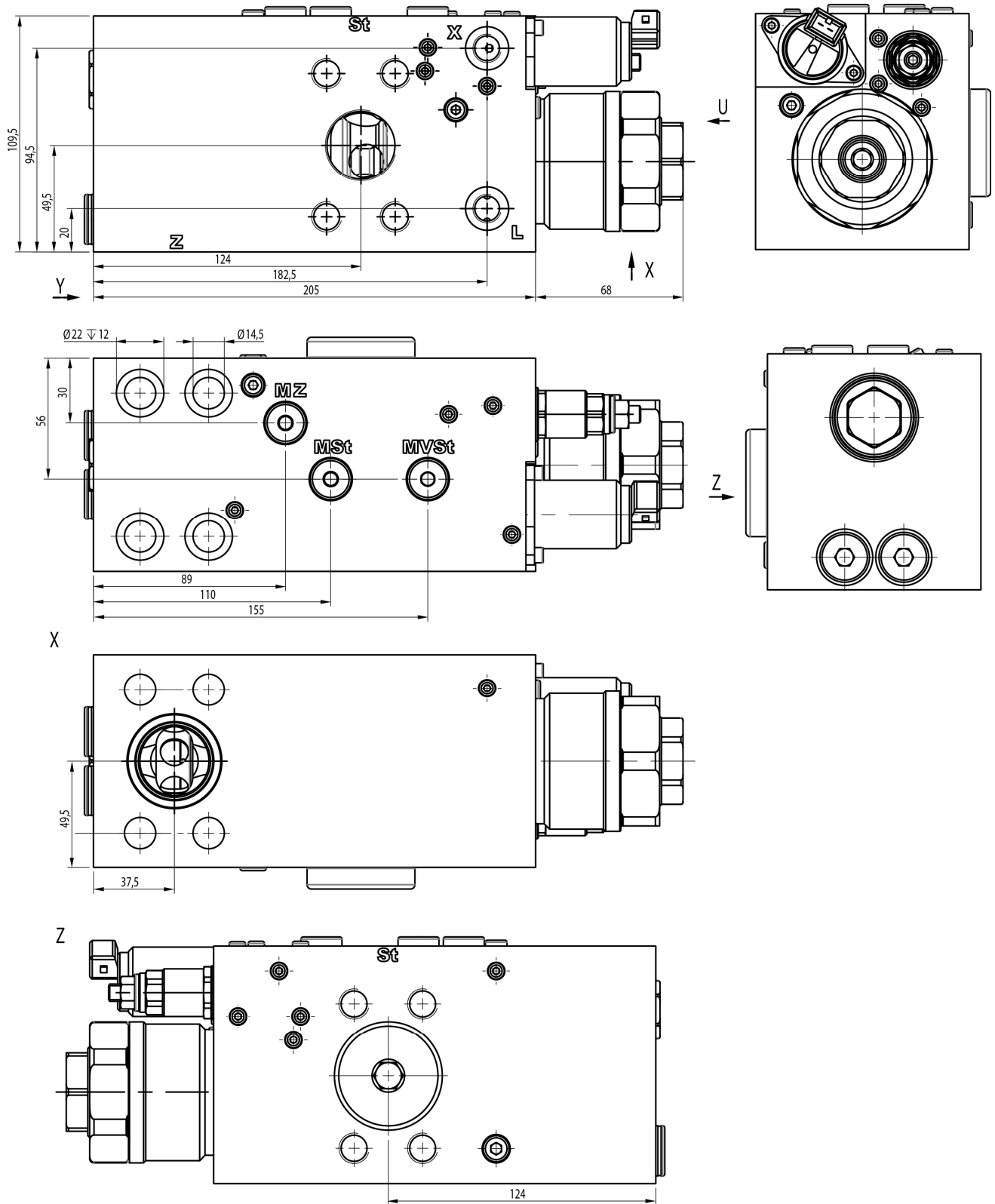
If the hydraulic medium becomes contaminated, the filter insert (1/2) must be checked and cleaned if necessary.

- Remove the proportional valve
- Clean the filter elements in the holes

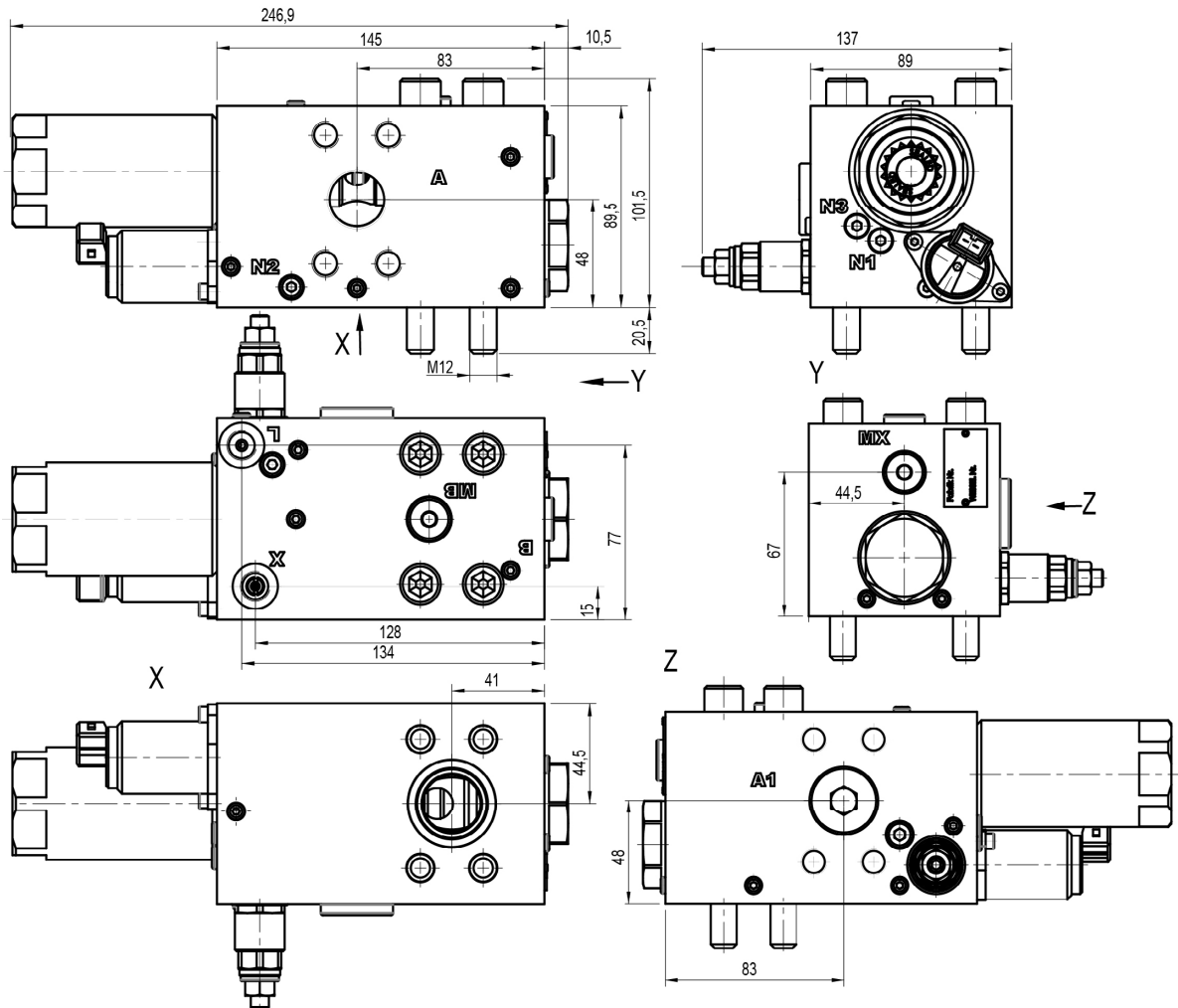


6 Dimensions

6.1 Abmessungen SAE1 1/4" Variante



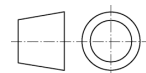
6.2 Abmessungen SAE1" Variante



7 Notes, Standards and Safety Requirements

7.1 General remarks

- 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



7.2 Standards

The load control valve complies with standards:

- DIN 24093
- ISO 8643
- EN 474

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

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

7.3 Safety requirements

- WESSEL-HYDRAULIK GmbH bestätigt die Verwendung der grundlegenden und bewährten Sicherheitsprinzipien nach ISO 13849-2: 2003, Tabellen C.1 und C.2 für die Konstruktion des hier beschriebenen Ventils.
- WESSEL-HYDRAULIK GmbH besitzt ein zertifiziertes Qualitätsmanagementsystem nach DIN EN ISO 9001.
- Der MTTFd-Wert für das beschriebene Ventil kann vom Maschinenhersteller mit 150 Jahren angenommen werden!
- Hinweis: Der Anwender ist dafür verantwortlich, dass die grundlegenden und bewährten Sicherheitsprinzipien nach ISO 13849-2: 2003, Tabellen C.1 und C.2 für die Implementierung und den Betrieb des hydraulischen Bauteils erfüllt werden!

8 Accessories