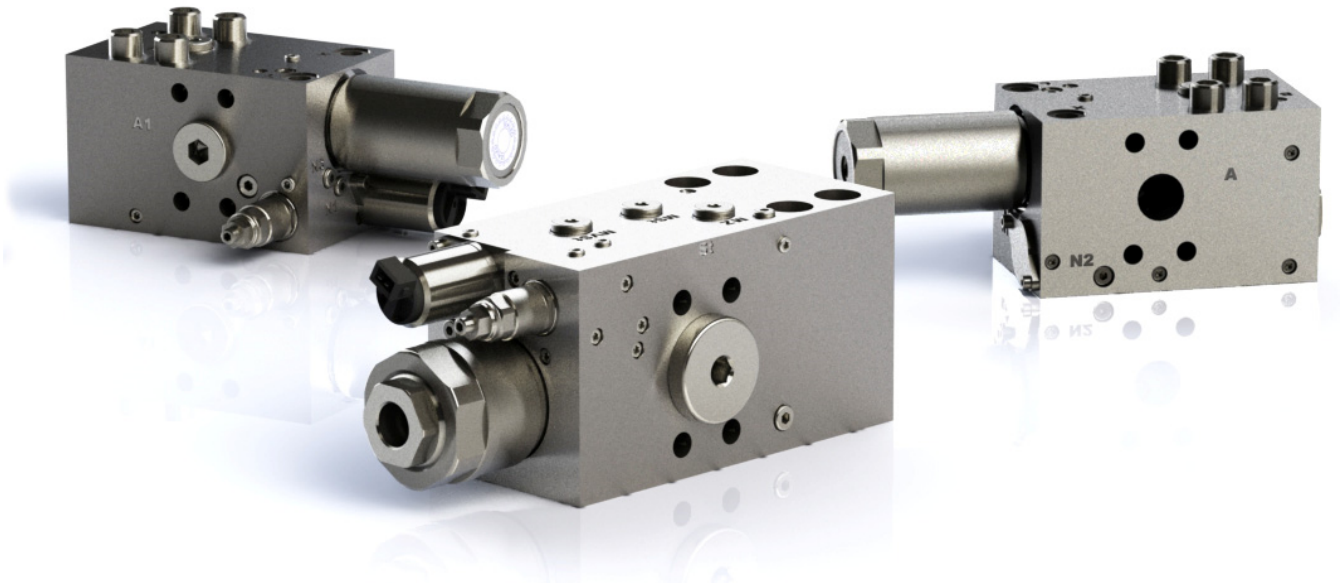
LHB-3E

Load Control Valve Boom, hydraulically- or electrical- proportional



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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 requi-red 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 move-ment 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

Die Rohrbruchsicherung ist speziell für den Auslegerzylinder / Wippzylinder eines Kranes konzipiert. Durch die Kinematik der Maschine kann der Zylinder-druck in der Abwärtsbewegung zunehmen. Bei Standard-Rohrbruchsicherungen nimmt mit dem zunehmenden Druck auch der Volumenstrom zu. Dieser Effekt wird bei dieser Rohrbruchsicherung durch zusätzliche Ventiltechnik kompensiert oder sogar überkompensiert. Diese Bauform kann hydraulisch pro-portional oder elektrisch proportional vorgesteuert werden.

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.

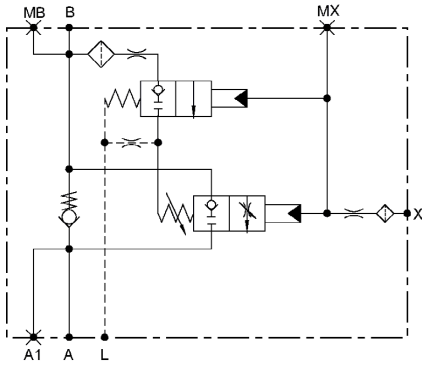
2 Function

Im ungeschalteten Zustand des Wegeventils wird der Hauptverbraucher (Verbraucher 1) angesteuert. Im geschalteten Zustand wird der neue Zusatzverbrau-cher (Verbraucher 2) betrieben. Die Umschaltung erfolgt hydraulisch oder elektrisch. In der elektrischen Ausführung wird der für den Schaltvorgang notwen-dige Steuerdruck aus einem der Hochdruck führenden Eingänge entnommen, so dass kein zusätzlicher Vorsteuerdruck bereitgestellt werden muss. Sollte anwendungsbedingt an beiden Eingängen kein Druck aufgebaut werden können, kann das Ventil in der elektrischen Ausführung nicht schalten.

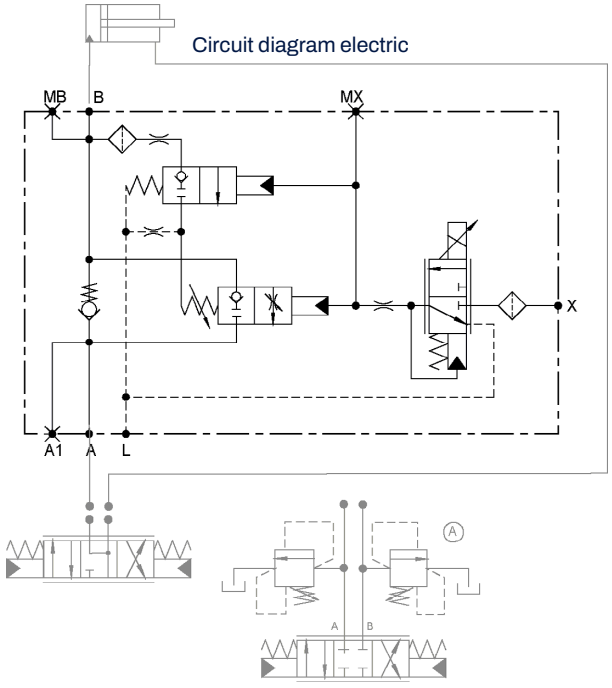
Die Eingangsleitungen 1 und 2 sind in der ungeschalteten Stellung mit den Anschlüssen 3 und 4 verbunden. In der geschalteten Stellung werden die Ein-gangsleitungen 1 und 2 mit den Anschlüssen 5 und 6 verbunden.

Es ist zu beachten, dass die jeweils nicht durchgeschalteten Ausgänge im Wegeventil 6/2 gesperrt sind und damit keine Verbindung zu einem eventuell vor-handenen Druckbegrenzungsventil in den Eingangsleitungen 1 bzw. 2 besteht.
Das 6/2 Wegeventil ist in einer optionalen Ausführung auch mit einer Übergangsstellung mit negativer Überdeckung erhältlich. Während des Schaltvorganges sind dann kurzzeitig die Anschlüsse 1, 3, 5 bzw. 2, 4, 6 verbunden. Das Umschalten von einem Verbraucher mit niedrigem Druck auf einen Verbraucher mit eingespanntem Druck kann zu einem Entspannungsschlag führen, der sich durch die negativ überdeckte Übergangsstellung reduzieren lässt.
Die Wegeventile 6/2 sind als Schieberventile aufgebaut. Sie sind damit nicht leckölfrei.

Circuit diagram hydraulic



Circuit diagram electric



2.1 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

3 Technical Data

Criterion	Units	Value
Max. operating pressure	bar	420
Max. volume flow	l/min	600
Weight	kg	SAE 1": 8,5; SAE 1 ¼ ": 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 ¼", DIN ISO 6162-2, SAE J518/2 (CODE62)
M, X		G ¼;ISO 1179-1, pmax <50 bar
L		SAE1" : G ¼ ISO 1179-1, pmax < 1 bar
		SAE 1 ¼": M14x1,5 ISO 9974-1, pmax <1 bar
Installation position		Any
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 $\beta_{10} \geq 75$

4 Ordering Information

LHB	3E			000		010/40		0
00	01	02	03	04	05	06	07	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 ¼ "	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	Maximale Senkgeschwindigkeit einstellbar		nicht verfügbar	0

Verschiedene Konfigurationen sind aus technischen Gründen leider nicht realisierbar. Bitte lassen Sie sich bei Fragen hierzu von uns beraten.

5 Description of Characteristics in Accordance with Type Code

5.1 Variants

Load compensated

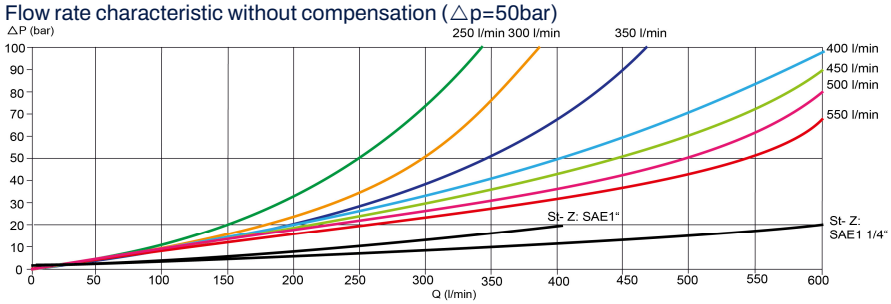
5.2 Connections

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.

5.3 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 (△p=50bar)



5.4 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").

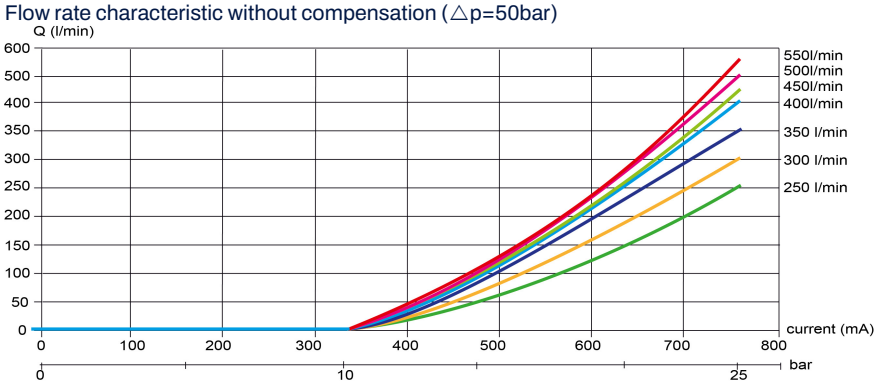
5.5 Actuation

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	Unit	Value
Limit current Ia:	A	0.75 ; PWM frequency 100 Hz
Voltage tolerances:	%	±10
Power-on time:	%	100
Protection class according to		IP 65
Connector:		AMP Junior Timer

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

Flow rate characteristic without compensation (△p=50bar)



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

5.6 Opening point set value

The start of movement is at a pilot pressure of 10 bar or with electr. Prop. Pilot control designed for 400 mA. The spool is completely open at 30 bar pilot pressure or 750 mA.
The opening point cannot be adjusted as it is tuned to the load compensation. Changes to the opening point are not permitted.

5.7 Setting compensation

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

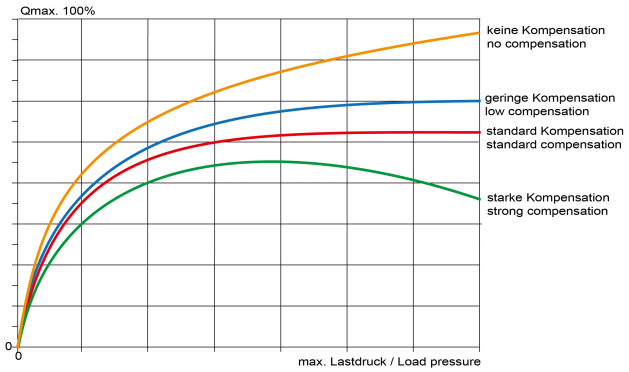
No compensation
The load pressure had no impact on the opening cross-section of the load control valve.
Higher load pressure leads to higher lowering speed.

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.

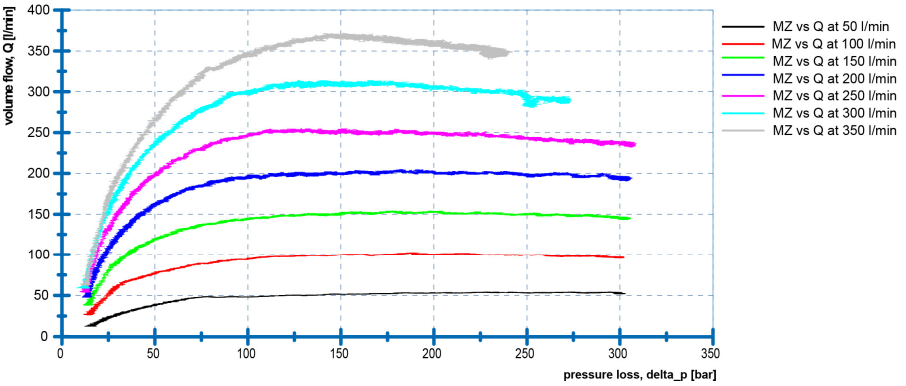
Standard compensation
The load pressure impacts the opening cross-section of the load control valve so that as of approx. 120 bar the lowering speed remains constant at the same pilot control pressure.

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.

Flow rate characteristic for maximum pilot control signal



LHB-3E SAE 1 ¼“ CD62



5.8 Lowering speed adjustable

Not available for this variant.

6 Installation

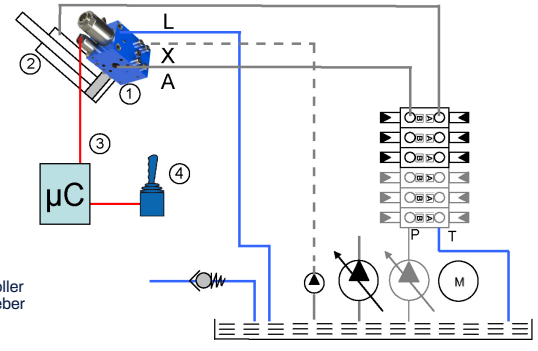
6.1 General remarks

- 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.

6.2 Connection recommendations

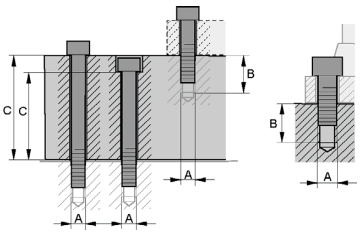
Hydraulic hoses are not to come into contact with the load control valve because otherwise they are subject to thermal damaging. Ensure that standards EN 563 and EN 982 are observed.

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.



Installation - space

- 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.
- Observe the recommended mounting screws



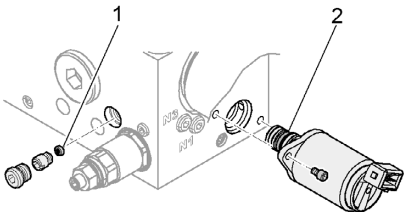
read (A)	Strength class	Thread depth (B)	Tightening torque（Nm)	C (mm)
DIN ISO 6162-2, SAE J518/2 (CODE62)				
M12	10,9	21,5	130	SAE 1“ = 89,5
M14	10,9	23,5	150	SAE 1 ¼“ = 97,5

6.3 Settings

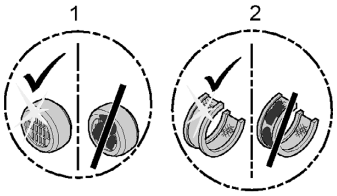
The proportional hose rupture valve is preset to 10 bar opening start. The compensation valve is matched with the opening start.

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

ohne Einstellung der max. Senkgeschwindigkeit



mit Einstellung der max. Senkgeschwindigkeit

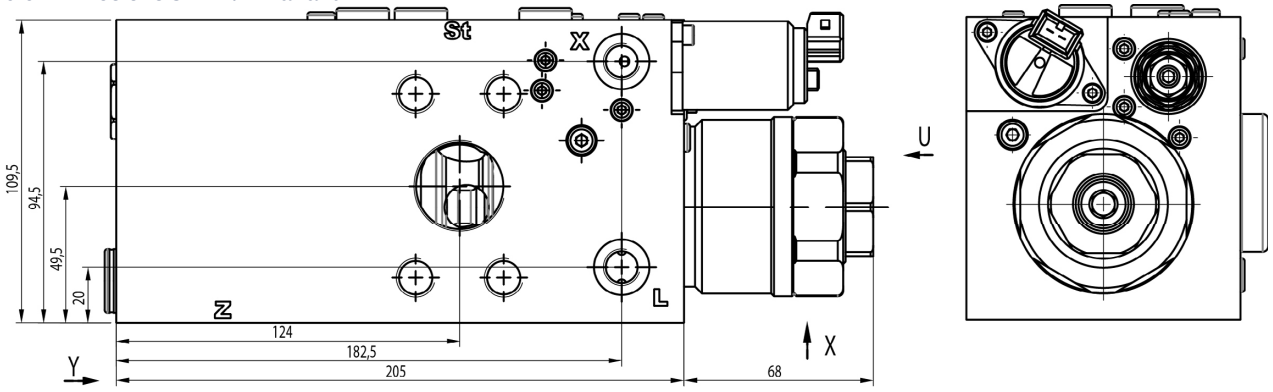


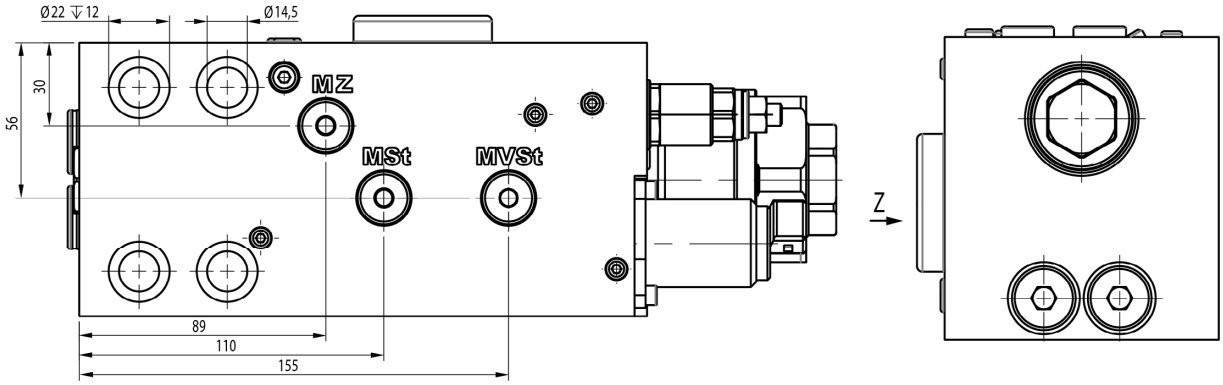
6.4 Maintenance – filter cleaning

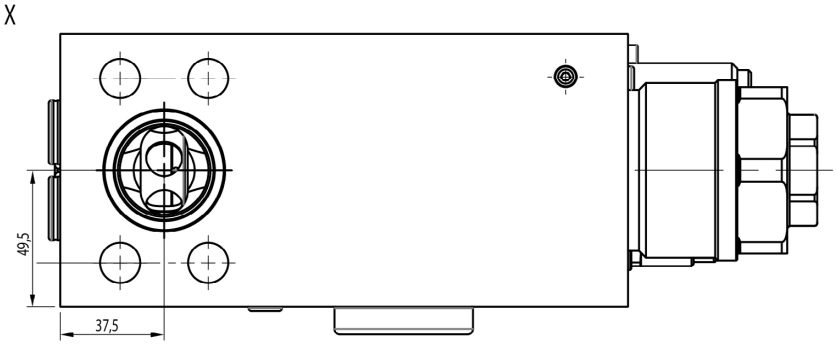
Note If the hydraulic medium becomes contaminated, the filter insert (1/2) must be checked and cleaned if necessary.

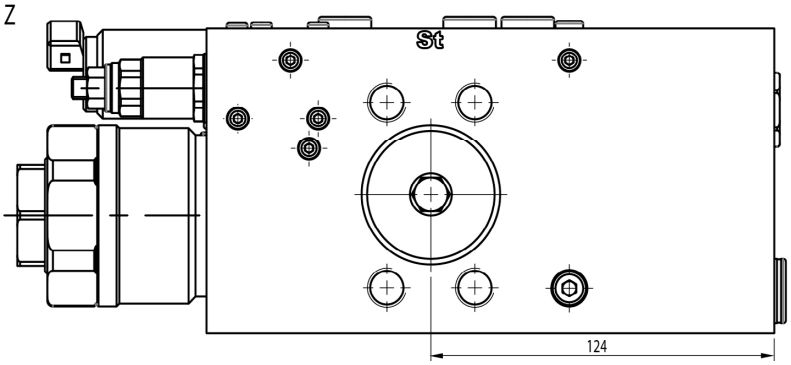
- Remove the proportional valve
- Clean the filter elements in the holes

6.5 Dimesions SAE1 ¼ ” variant

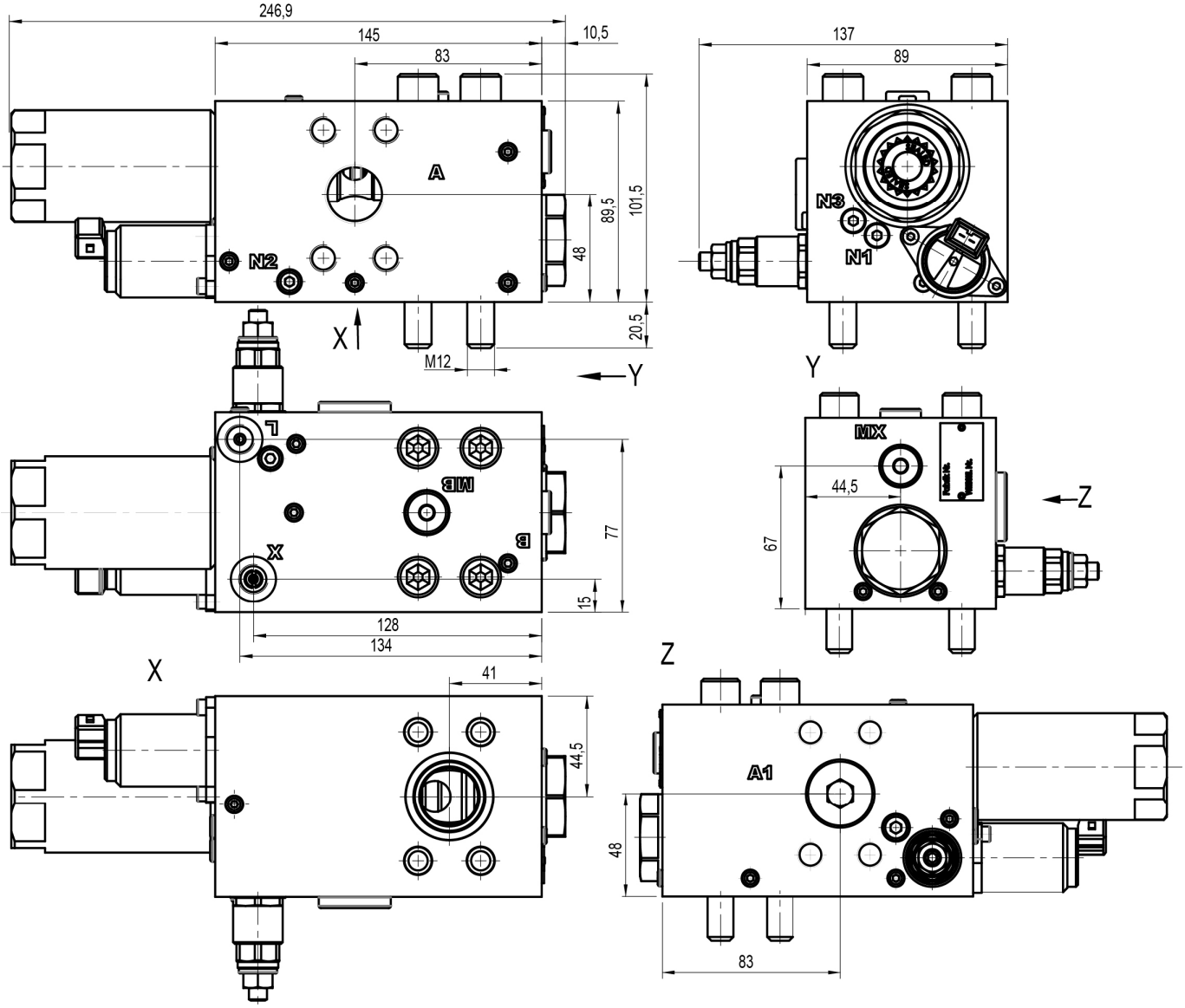






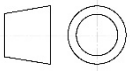


6.6 Dimension SAE 1” variant



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

Die Rohrbruchsicherung erfüllt die Anforderungen der Normen:

- 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