Trailer brake valve with adjustable predominance 971 002

Application

Vehicles with conventional two-lien brake control (not Trailer EBS).

Purpose

To control the dual-line air braking system of the trailer.

Maintenance

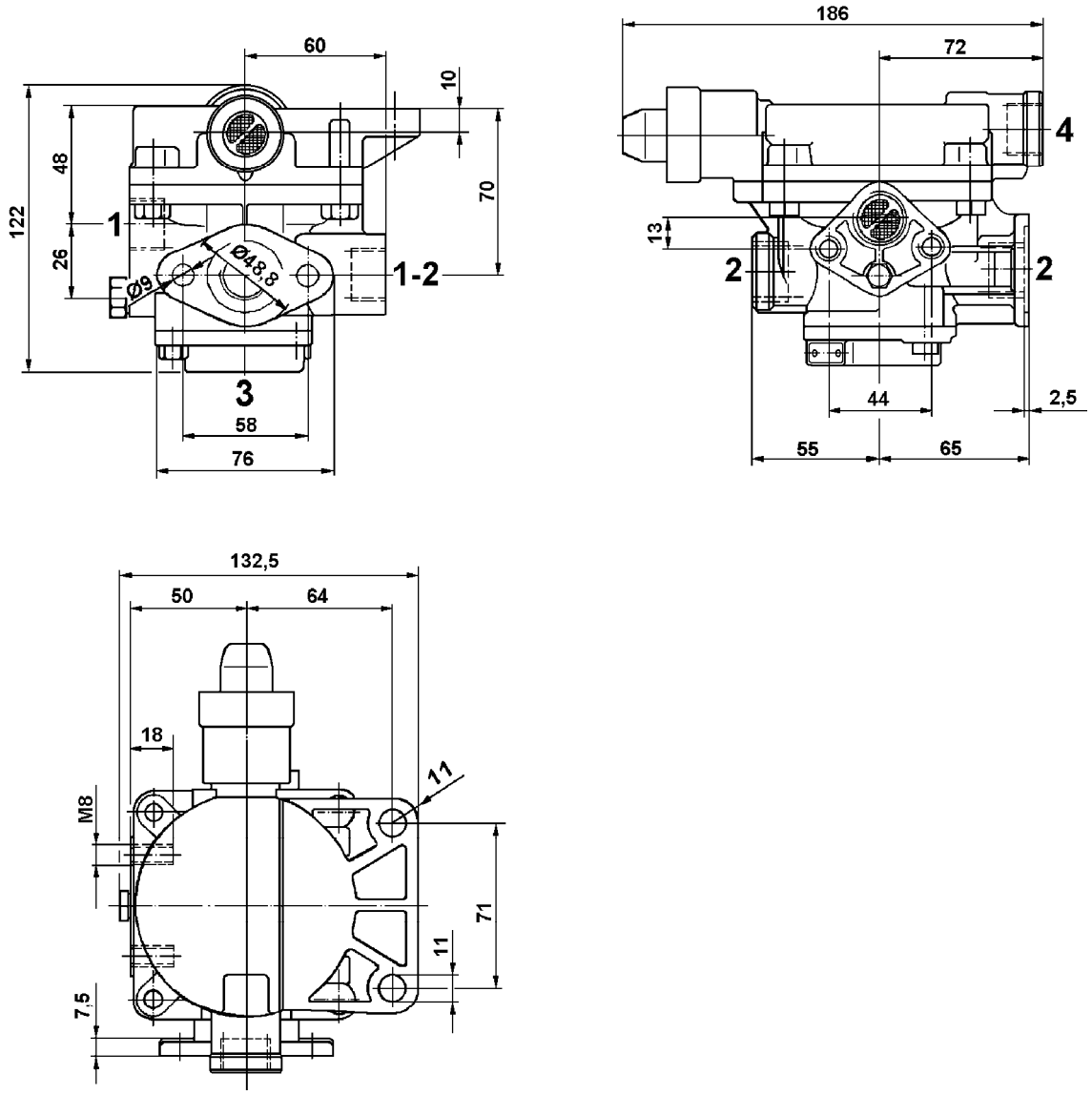
– Check the status of the filters in connection 4 and 1.
  ➔ Replace the filter if necessary.

Installation recommendation

– Install the trailer brake valve vertically so that vent 3 faces downward.
– Fasten the trailer brake valve with two M10 bolts.

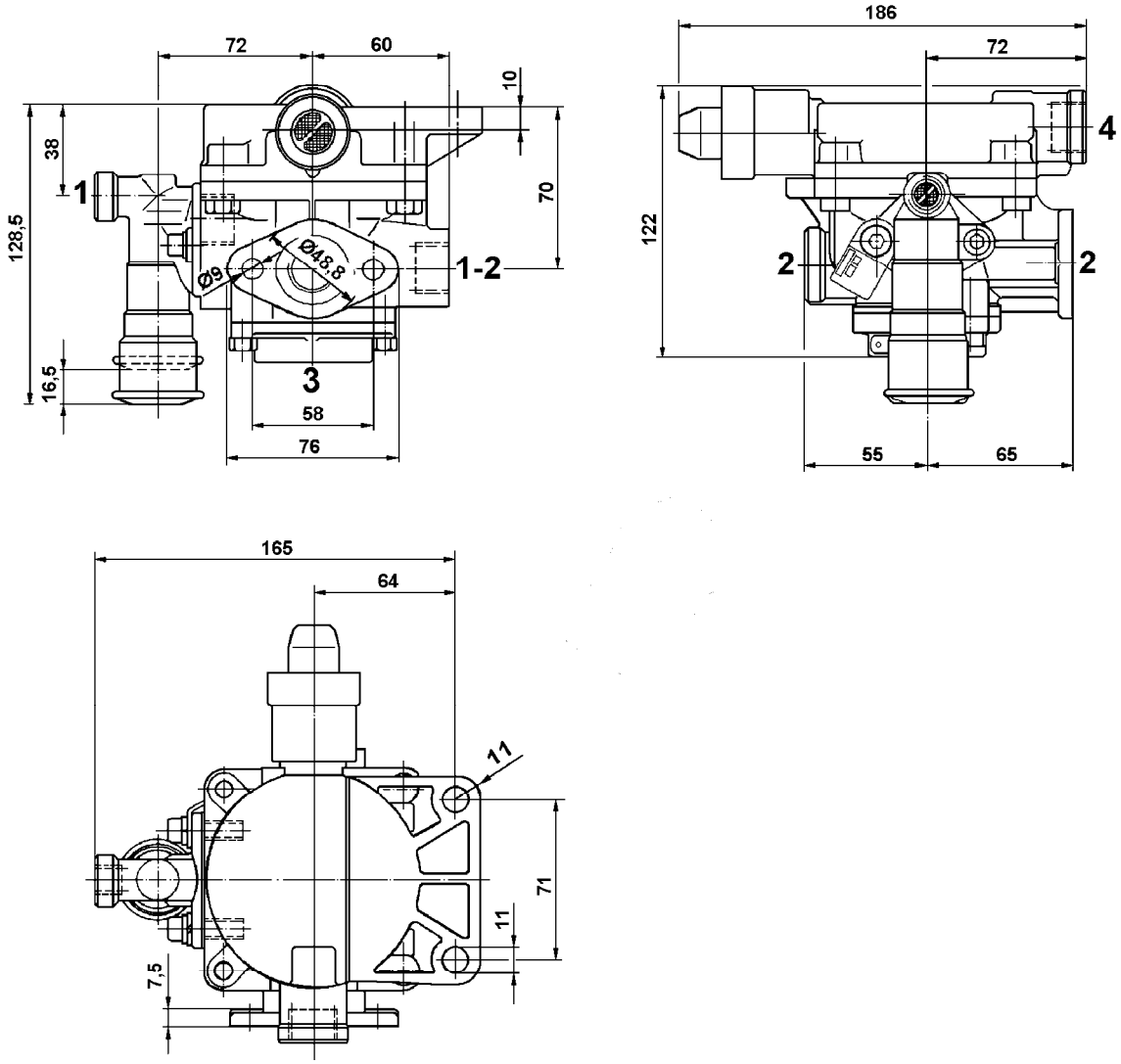
Installation dimensions

971 002 150 0



Connections						Port threads
1	Energy supply	**1-2**	Energy supply or delivery (Reservoir)	**4**	Control port	M 22x1.5 - 15 deep
2	Energy delivery	**3**	Exhaust			

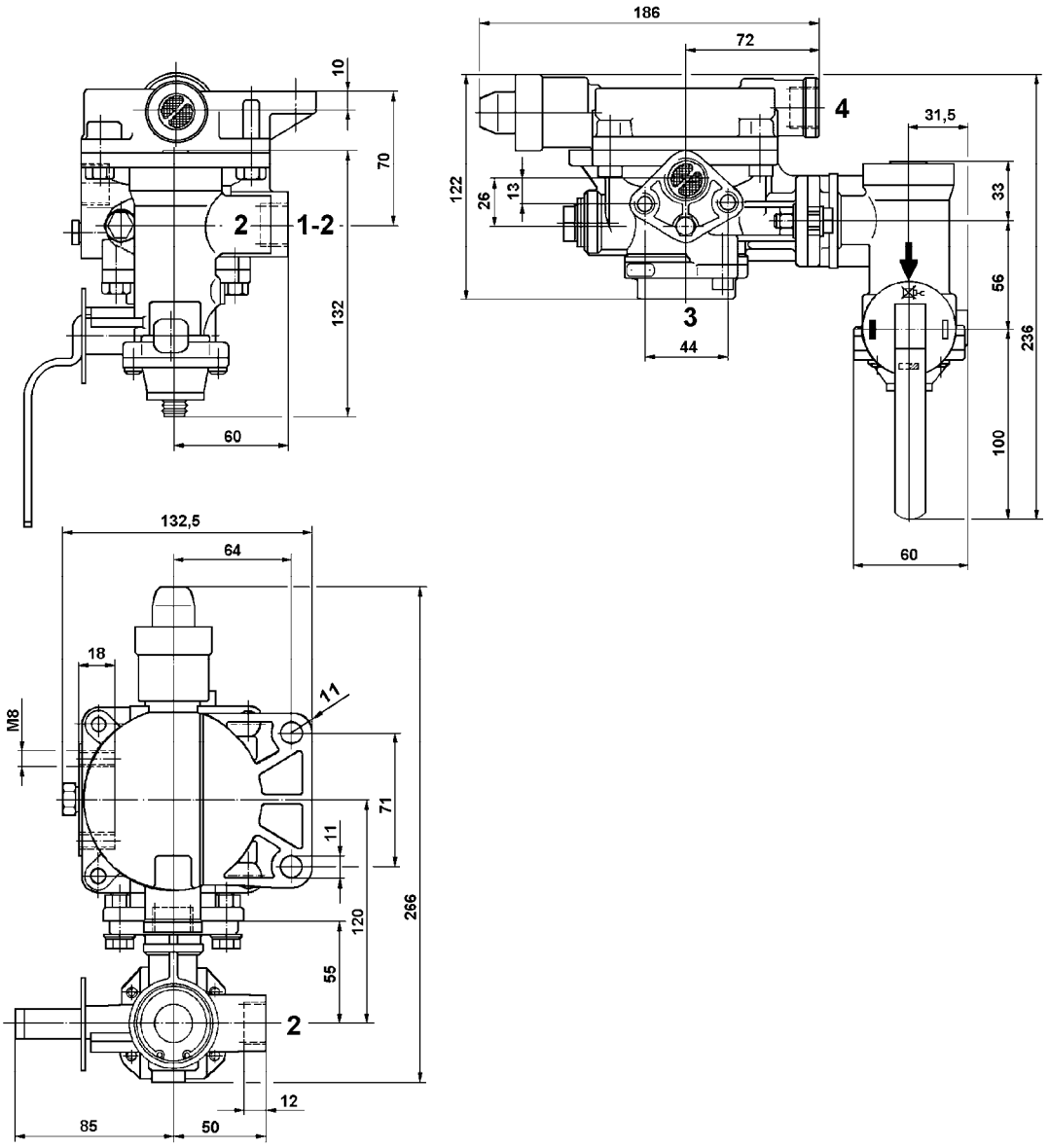
971 002 531 0: Combination trailer brake valve 971 002 150 0 with release valve 963 001 012 0



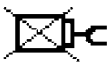
Connections						Port threads	
1	Energy supply	**1-2**	Energy supply or delivery (Reservoir)	**4**	Control port		M 22x1.5 - 15 deep
2	Energy delivery	**3**	Exhaust			**1**	M 16x1.5 - 13 deep

When not in use, second port 2 must be closed using	Order number
Screw plug M 22x1.5 Seal washer A 22x27 DIN 7603-Al	893 010 070 4 811 401 080 4

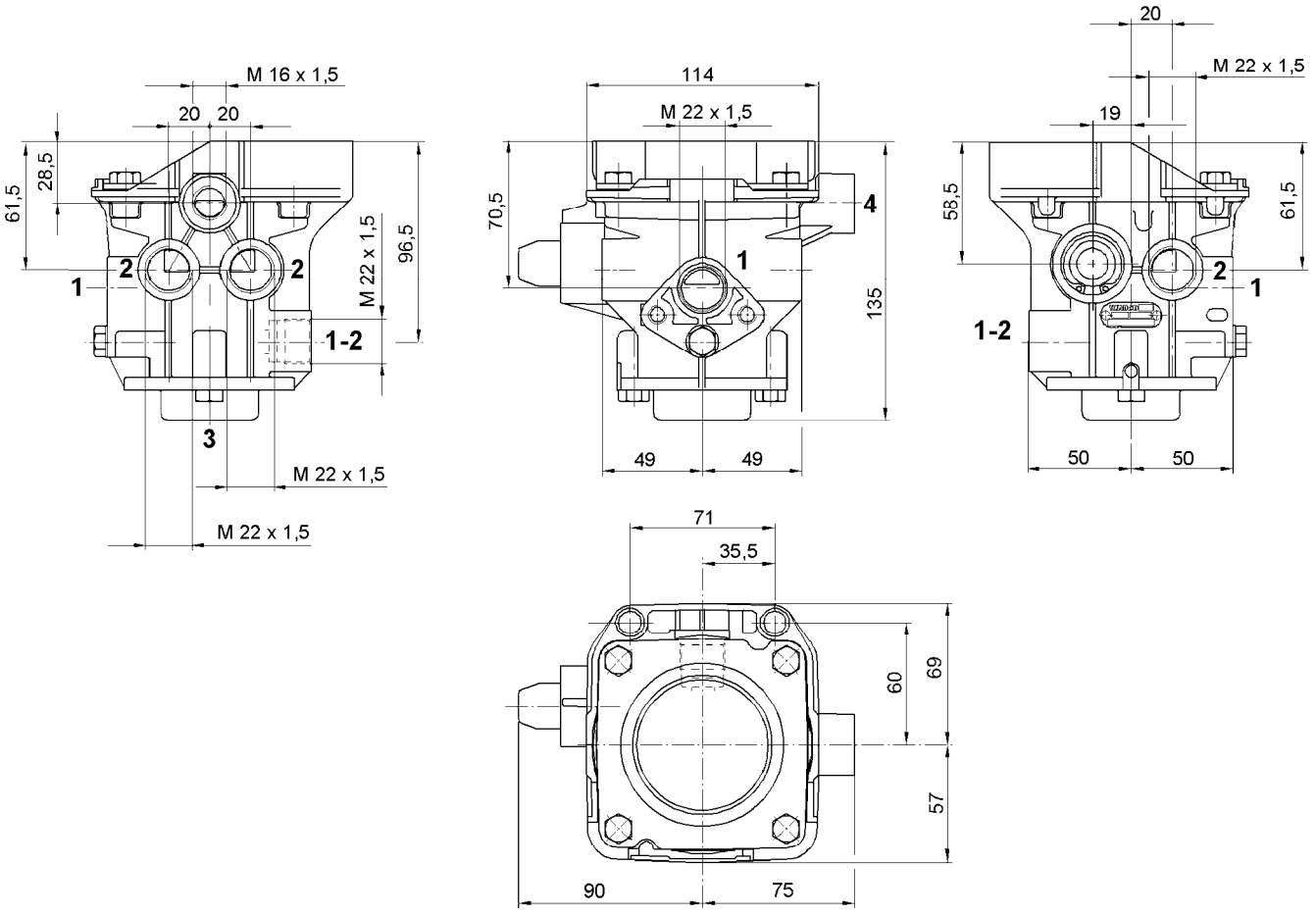
971 002 570 0: Combination trailer brake valve 971 002 150 0 with load sensing valve 475 604 011 0



Connections						Port threads
1	Energy supply	**1-2**	Energy supply or delivery (Reservoir)	**4**	Control port	M 22x1.5 - 15 deep
2	Energy delivery	**3**	Exhaust			

Symbolism	
	Release position
	Blank
	“Partially laden“
	Fully laden

971 002 300 0



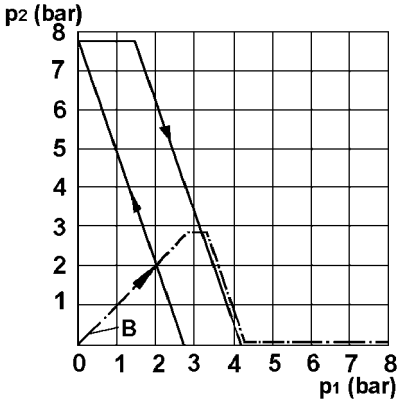
Connections									
1-2	Energy supply or delivery (Reservoir)	**1**	Energy supply	**2**	Energy delivery	**3**	Exhaust	**4**	Control port

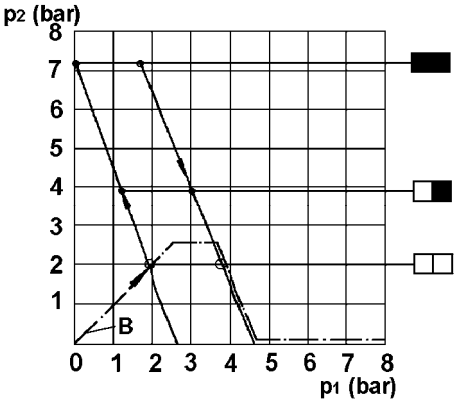
Technical data

Order number	971 002 150 0 Ratio-version with 3 ports for energy delivery	971 002 300 0	971 002 301 0
Max. operating pressure	10 bar	8.5 bar	
Factory setting of predominance	0 bar		without
Dead volume	0.205 litre	–	
Operating temperature range	-40 °C to +80 °C		
Port 4	–	M 16x1.5	
Weight	1.8 kg	1.4 kg	

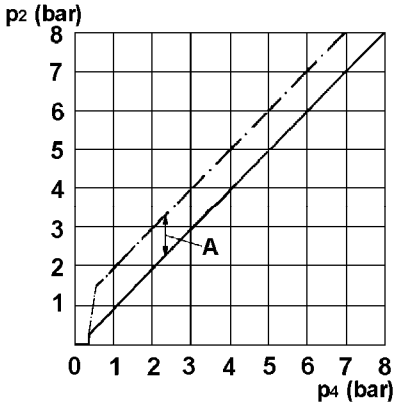
Diagram

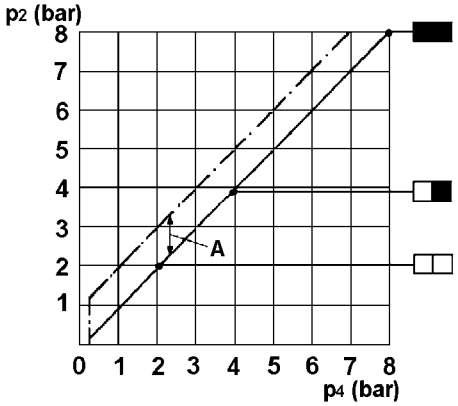
Automatic braking





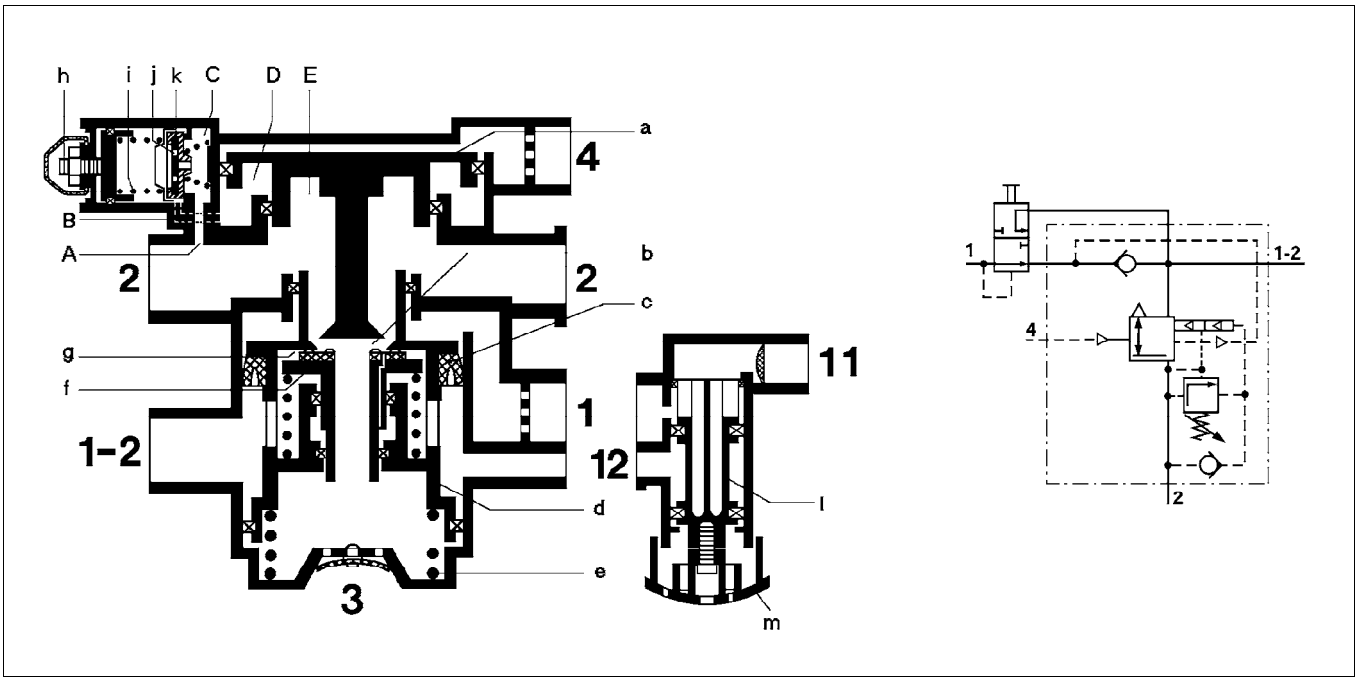
Service brake application





Legend									
p_1	Input pressure	p_2	Output pressure	p_4	Control pressure	**A**	Range of adjustment	**B**	Initial fill

Operation of the trailer brake valve



Compressed air passes from the tractor through the supply line hose coupling to port 1, passes grooved ring (c) and continues through port 1-2 to the trailer reservoir.

Upon actuation of the tractor brakes, compressed air flows via the hose coupling in the control line and port 4 to the upper side of piston (a). The piston (a) is forced down and by seating on valve (f) closes outlet (b) and opens inlet (g). Compressed air from the trailer reservoir port 1-2 now flows via ports 2 to the downstream brake valves and into chamber C via passage A and pressure builds up against valve (k).

As soon as the pressure in chamber (C) predominates, valve (k) opens against the force of pressure spring (i). The air flows into chamber (D) via passage (B), acting on the underside of piston (a). As a result of the compounding of forces in chambers (D) and (E), the pilot pressure acting on the upper side of piston (a) is overcome and piston (a) is forced up.

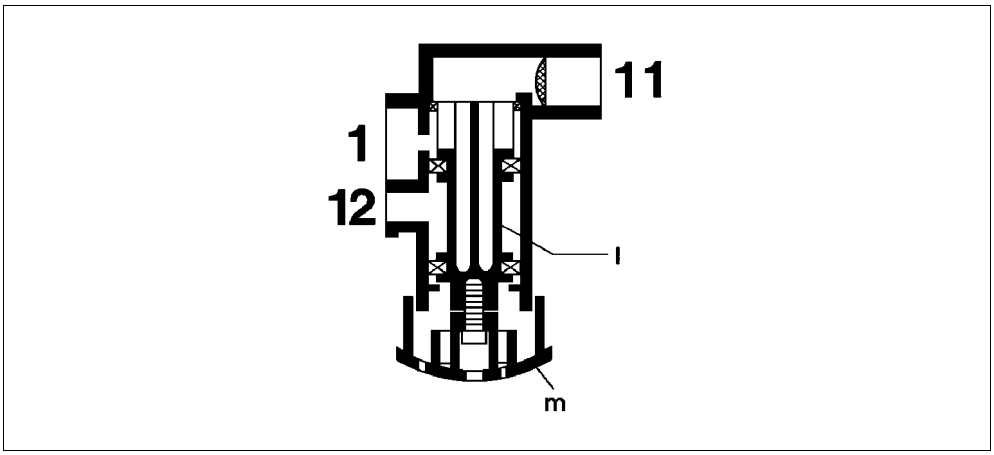
In the case of partial brake application, valve (f) closes inlet (g) and a neutral position is reached. In the case of full brake application, inlet (g) is kept open by piston (a) over the entire braking process.

A maximum predominance of 1 bar can be established between ports 2 and 4 by means of adjusting the tension of pressure spring (i) using set screw (h).

When the tractor brakes are released, port 4 is vented and the pressure in ports 2 forces piston (a) upward to the top of its stroke. Inlet (g) is closed and outlet (b) is opened. The compressed air at ports 2 is exhausted to atmosphere through valve (f) and vent 3. Due to the drop in pressure in chamber (C), the compressed air in chamber (D) flows via bores (j) of valve (k) into chamber (C) and on to exhaust 3.

When the trailer is uncoupled or in the event of a rupture in the supply line, port 1 is exhausted and the pressure acting on the upper side of piston (d) is reduced. The load in pressure spring (e) and the supply pressure at port 1-2 forces up piston (d) and valve (f) closes outlet (b). As piston (d) continues to move up, it moves away from valve (f) and inlet (g) opens. The supply pressure at port 1-2 flows to the downstream brake valves via ports 2 at a 1:1 ratio.

Operation of the trailer brake valve



When using the relay emergency valve in combination with load sensing valves or manually adjustable load-apportioning valves that have no release position, Trailer Brake Valve 963 001 … 0 allows the trailer to be moved even when it is not attached to a motor vehicle. For this purpose, piston (l) is pushed in to the stop by hand via actuation button (m). This closes the passage from port 11 of the trailer brake valve to port 1 of the relay emergency valve and a connection between port 1 of the relay emergency valve and port 12 of the trailer release valve is established. Pressure from the trailer reservoir at port 12 flows through port 1 of the relay emergency valve, causing it to reverse into the driving position and the brake actuators are exhausted.

If, when the trailer is once again attached to a motor vehicle, the piston (l) has not been fully pulled out manually, the supply pressure from the motor vehicle entering via port 11 will push it out. The release valve is then once more in its normal position where a connection is established between port 11 of the release valve and port 1 of the relay emergency valve.

Trailer brake valve 971 002 152 0

Application

Application especially in long semitrailers with multiple axles.

Purpose

Control of the two-line semitrailer brake systems when actuating the braking system of the towing vehicle. Triggering of the automatic semitrailer braking with partial or total pressure drop in the supply line.

Maintenance

– Check the status of the filters in connection 4 and 1.
  ➔ Replace the filter if necessary.

Installation recommendation

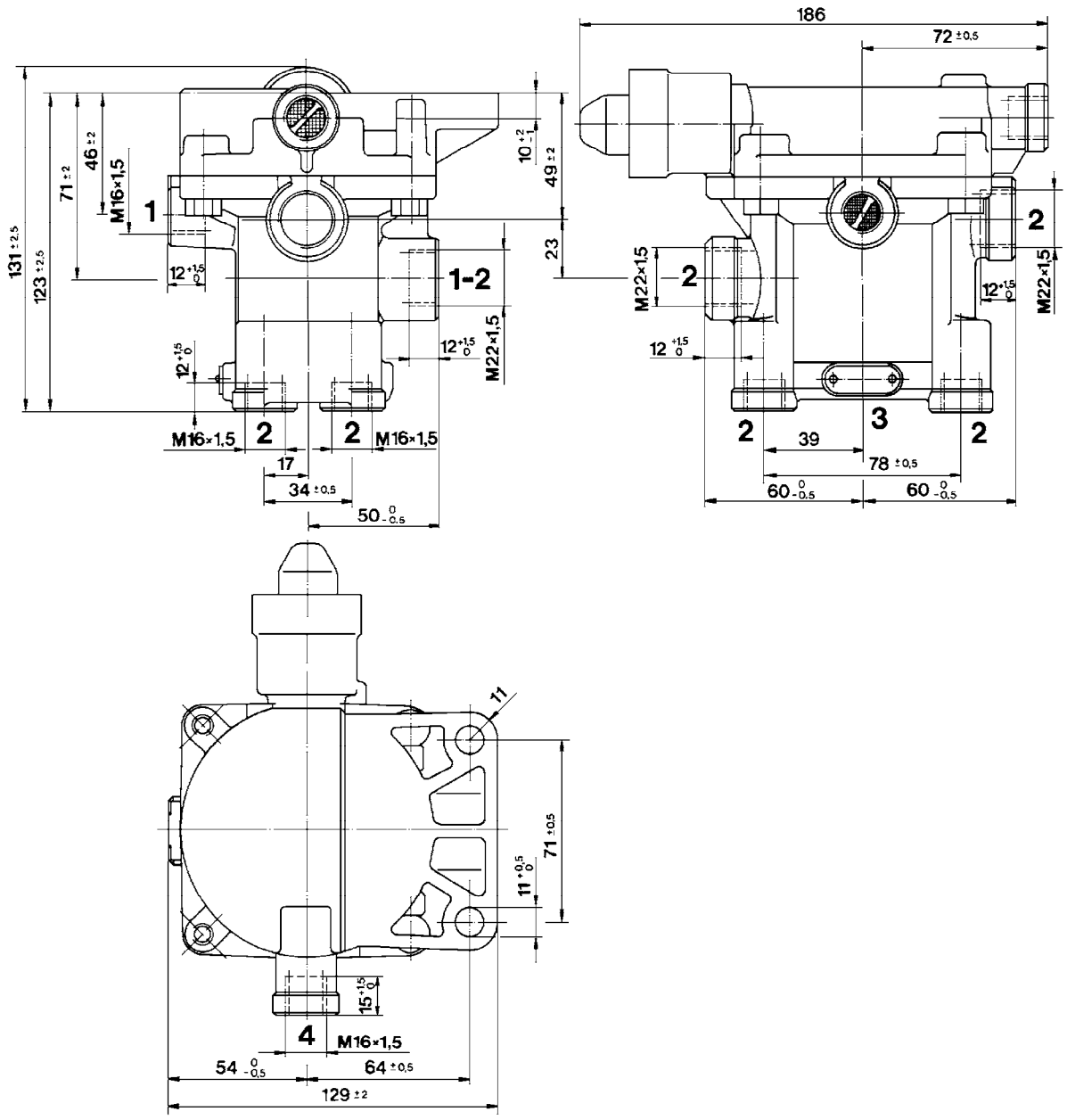
– Install the trailer brake valve vertically so that vent 3 faces downward.
– Fasten the trailer brake valve with two M10 bolts.
  The connection from connection 1-2 to the supply reservoir should be kept as short as possible and have the largest cross-section possible.

On 3-axle semitrailers connect the four down-facing connections 2 (with thread M 16x1.5) directly with the four brake cylinders on the 1st and 2nd axles with hoses. Connect the 5th connection 2 (thread M 22x1.5) via a common line and then via separated hoses with the cylinders on the third axle.
On 2-axle semitrailers, connect the connection 2 with thread M 22x1.5 using a screw plug.
On 1-axle semitrailers, you must close off two other connection 2 with screw plugs M 16x1.5.

– Install a trailer brake valve in the supply line between the hose coupling and the trailer brake valve.
– Install the LSV controller in the brake line before connection 4 of the trailer brake valve.

Installation dimensions

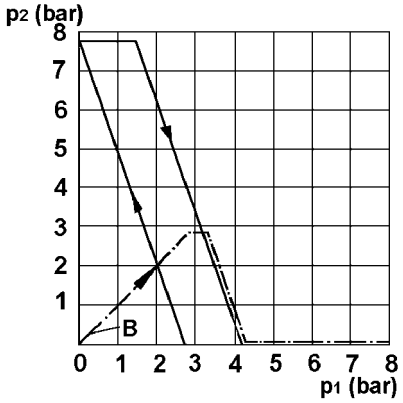
971 002 152 0



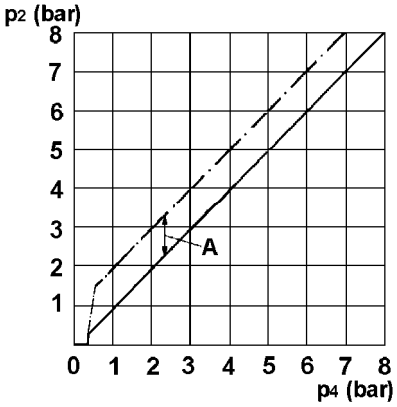
Connections									
1-2	Energy supply or delivery (Reservoir)	**1**	Energy supply	**2**	Energy delivery	**3**	Exhaust	**4**	Control port

Pressure diagrams

Automatic braking



Service brake application

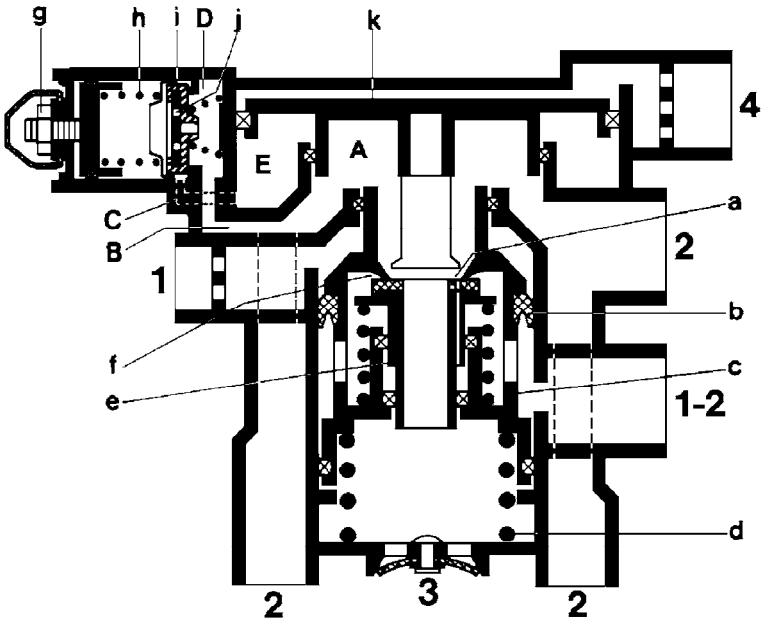


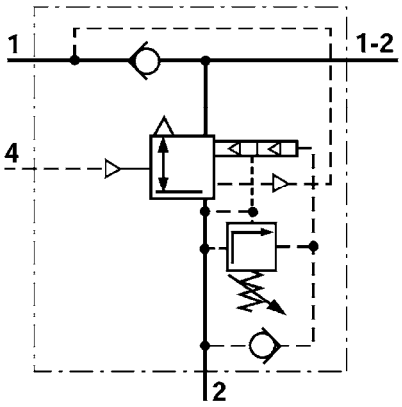
Legend									
p_1	Input pressure	p_2	Output pressure	p_4	Control pressure	**A**	Range of adjustment	**B**	Initial fill

Technical data

Order number	971 002 152 0
Max. operating pressure	10 bar
Dead volume	0.205 Litres
Operating temperature range	-40 °C to +80 °C
Weight	1.66 kg

Operation





Service brake application

Compressed air passes from the tractor through the supply line hose coupling to port 1, passes grooved ring (b) and continues through port 1-2 to the semitrailer reservoir. At the same time, piston (c) applied with supply pressure, moves down against the force of the compressed spring (d) and takes the valve (e) with it. Outlet (a) opens and connections 2 are connected with vent 3.

Upon actuation of the tractor brakes, compressed air flows via the hose coupling in the control line and port 4 to the upper side of piston (k). The piston (k) is forced down and by seating on valve (e) closes outlet (a) and opens inlet (f). The compressed air from the supply reservoir of the semitrailer (connection 1-2) now flows via connections 2 to the downstream brake cylinders. At the same time, compressed air flows through channel B into chamber D and builds up force on valve (i).

As soon as the pressure in chamber D predominates, valve (i) opens against the force of pressure spring (h). The air flows into chamber E via passage C, acting on the underside of piston (k). As a result of the compounding of forces in chambers A and E, the control pressure acting on the upper side of piston (k) is overcome and piston (k) is forced up.

In the case of partial brake application, valve (e) closes inlet (f) and a neutral position is reached. In the case of full brake application, inlet (f) is kept open by piston (k) over the entire braking process.

A maximum predominance of 1 bar can be established between ports 2 and 4 by means of adjusting the tension of pressure spring (h) using set screw (g).

When the tractor brakes are released, port 4 is vented and the pressure in ports 2 forces piston (f) upward to the end of its stroke. In this instance, inlet (f) is closed and outlet (a) is opened. The compressed air at ports 2 is exhausted to atmosphere through the centre hold of valve (e) and vent 3. Due to the drop in pressure in chamber A, the compressed air in chamber E flows via bores (j) of valve (i) back into chamber D and on to vent 3.

Automatic braking

When disconnected or in the event of a rupture in the supply line, port 1 is exhausted and the pressure acting on the upper side of piston (c) is reduced. The piston (c) is forced upward by the force of the compression spring (d) and the supply reservoir pressure on port 1-2. The valve (e) closes outlet (a). As piston (c) continues to move up, it moves away from valve (e) and inlet (f) opens. The full reservoir pressure is sent via ports 2 to the brake cylinders.

If there is a rupture in the brake line, the automatic braking is triggered, as described earlier, because the defective brake line drops the pressure in the supply in combination with the trailer brake valve, as soon as the towing vehicle brakes.