

**Purpose**

Their purpose is to generate the compressed air required as a function of the total of all consumers of compressed air in a vehicle.

WABCO-Compressors are used as single-stage piston compressors. They are used in vehicles with air brake systems and applicable accessories.

**Distinguishing Marks**

Number of Cylinders: Single or Twin Cylinder

Fastening: Foot or Flange Fixation

Drive: V-belt or Gear Drive

Working Pressure: standard-pressure or high-pressure controlled

Cooling: Air Cooling, Water or Oil Cooling

Lubrication: Pressure Lubrication or Splash Lubrication, supplied from engine or replenishment by hand

Through-Drive: with or without Through-Drive for side units (e.g. Hydraulic Pump for Hydro-Steering)

**Design types:**

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**1. Monoblock Compressors**

(Cylinder and Crankcase-Block are one Component)

**a. Single Cylinder** with circulation system lubrication and oil pressure port

Swept Volume Variants from 106 cm<sup>3</sup> to 293 cm<sup>3</sup> are available. A couple of bodies have been made for receiving and driving an hydraulic pump.

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**b. Single Cylinder** with circulation system lubrication and oil pressure port (CP) as well as control port and idle valve for PR-system

Compared with conventional compressors the PR-system offers a visible reduction of the idle losses by deviding the air delivery.

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c. **Twin Cylinder** with circulation system lubrication and oil pressure port

Swept Volume Variants from 400 cm<sup>3</sup> to 704 cm<sup>3</sup> are available. Some variations also with the PR-system mentioned on the previous side.

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## 2. Older Compressors

a. **Single Cylinder** (Cylinder and crankcase in separat construction) with circulation system lubrication (**CP**) or splash lubrication, replenished by hand.

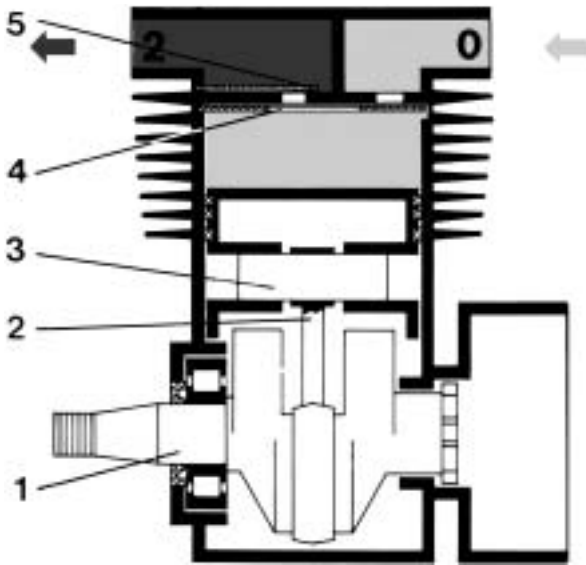
Swept Volume Variants from 96 cm<sup>3</sup> to 293 cm<sup>3</sup> are available.

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b. **Twin Cylinder** (Cylinder and crankcase in separat construction) with circulation system lubrication (**CP**) or splash lubrication, replenished by hand.

### Operation of a Compressor



The compressor is driven by the engine via a V-belt and a V-belt pulley or a toothed wheel. The crankshaft (1) connected with the piston (3) via the connecting rod (2) controls the piston (3) from the upper to the bottom dead centre (or vice versa). As the piston (3) moves downwards, valve (4) opens as a consequence of the ensuing suction. Through an upstream filter the compressor takes in air. When the bottom dead centre has been reached, the valve (4) closes. The air taken in is compressed by the subsequent upward motion of the piston (3). The compression pressure opens the valve (5) and the compressed air generated reaches the connected air reservoirs via the components of the air compression system.

### Maintenance

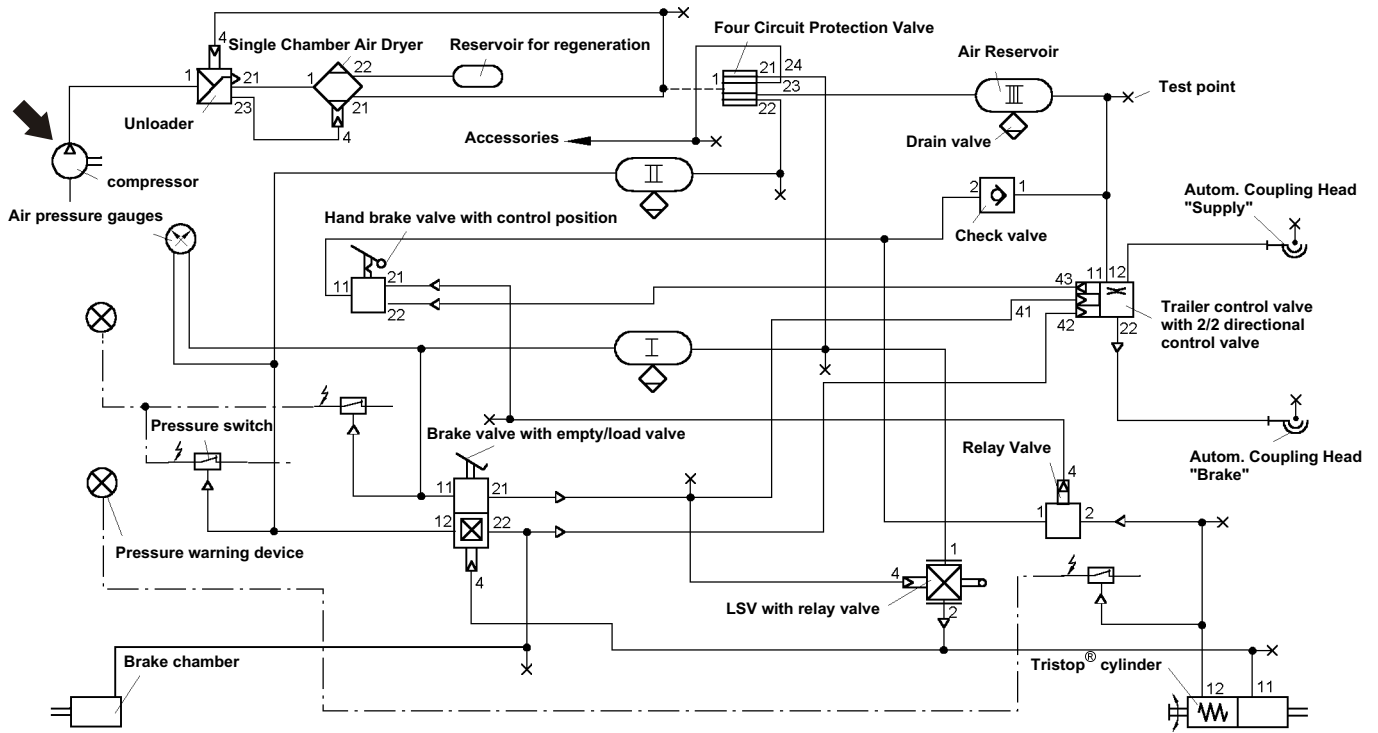
For Compressors with splash lubrication relating to oil change intervals and oil quality, the maintenance notes of the vehicle manufacturer have to be observed.

At belt driven compressors you also have to check the tightening of the drive belt regularly.

### Testing

The delivery performance (replenish time) must be tested referring to the information from the vehicle manufacturer. If adequate test levels are not known, the replenish time required by law (EC regulation Braking System) must be observed.

Schematic for Testing and Installation



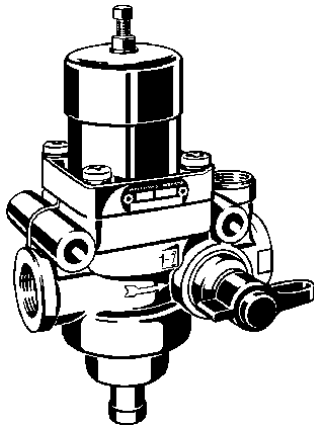
**Purpose**

Scope of Application: Within the compressed air generating system between the compressor and the air reservoir.

Purpose: The combined unloader monitors the reservoir pressure and causes the compressor to cut in or out. A built-in filter cleans the compressed air. Additional pilot connections control an automatic anti-freeze pump and an air dryer.

**Design types**

**975 300**



**a. Combined Unloader** with or without a tyre inflation connector. Some variants have a safety valve which opens between 9.5 and 10.5 bar. The tyre inflation connector can also be used as a filling connector.

**975 303**



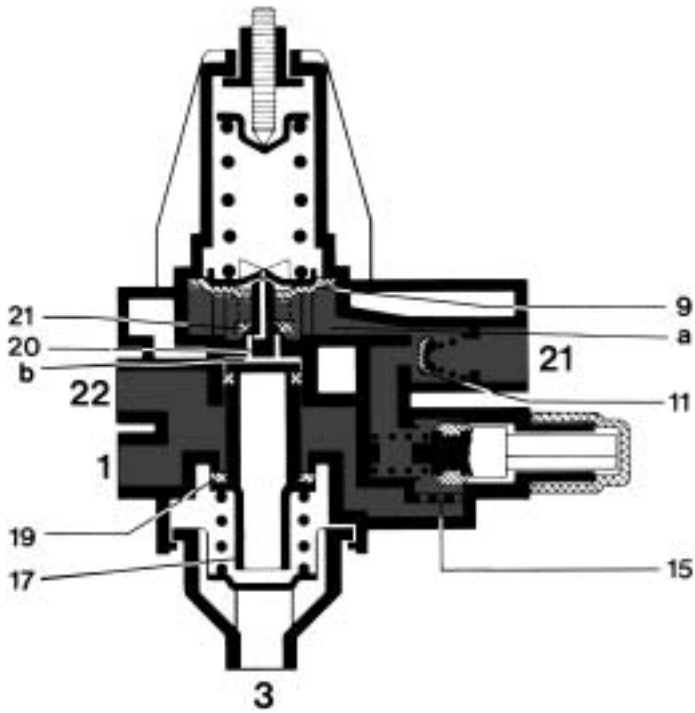
**b. Combined unloader** with an integrated safety valve. The various product lines refer to different cut-out pressures. The unloader is supplied with or without a tyre inflation connector and noise muffler. Port **(22)** is provided for controlling an automatic anti-freeze pump. Unloaders with ports **(4)** and **(23)** are used with air dryers. The port **(23)** is also used for controlling compressors with PR-system.

**Please note**

The unloader can also be integrated in the air dryer as a functional unit (Description see chapter 6 Air Dryer).

## Operation of Combined Unloader 975 303

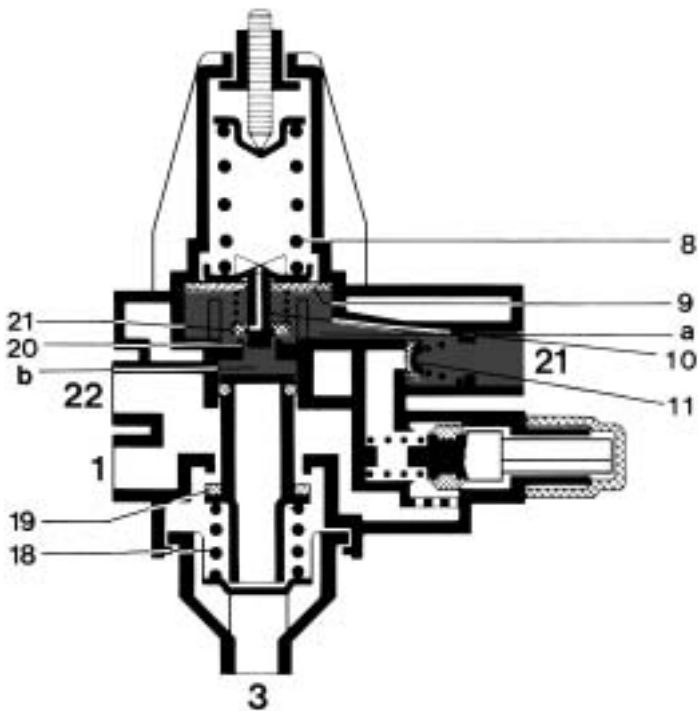
### a. Delivery Position



The compressed air entering at Port (1) flows via the closed idle valve (19), the filter (15) and the opened check valve (11) into port (21), and from there to the air reservoirs.

At the same time the pressure beneath the diaphragm (9) in chamber (a) rises. The inlet valve (21) is closed. The chamber (b) above the valve body (17) is kept pressureless via the opened outlet valve (20).

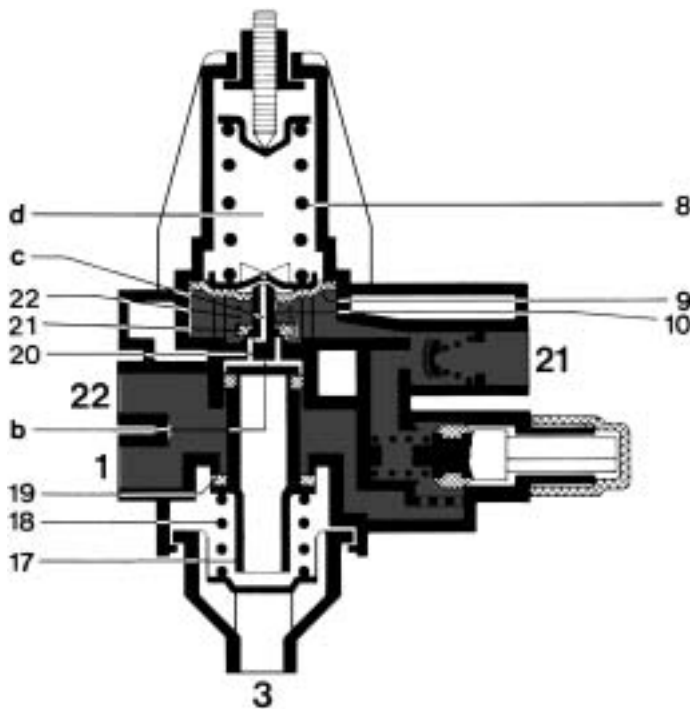
### b. Idle Position



If the pressure in chamber (a) is greater than the cut-out pressure set on the spring (8), the diaphragm (9) is raised together with the valve body (10). This allows the outlet valve (20) to close and the inlet valve (21) to open. The pressure in chamber (a) can now reach chamber (b), thus opening the idle valve (19) against the force of the spring (18).

At the same time the check valve (11) closes due to the fall in pressure in port (1). The compressed air delivered by the compressor escapes to atmosphere via the blow-off nozzle (3).

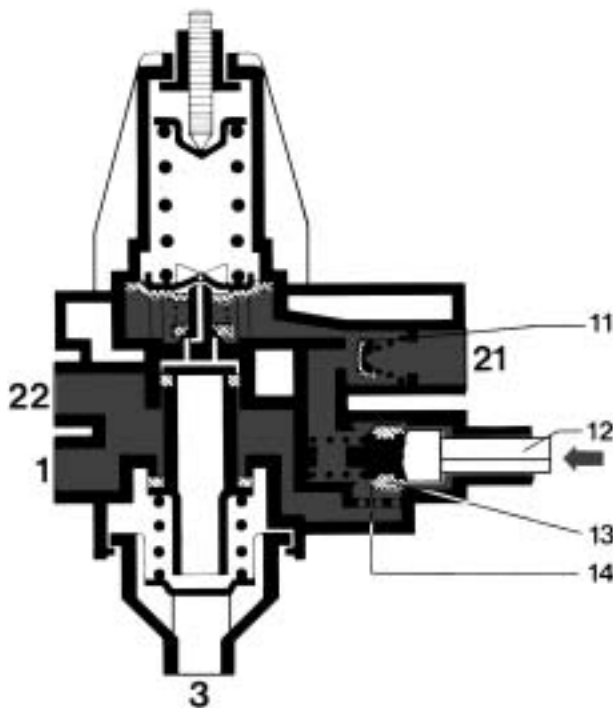
c. Automatic reversal of the unloader



As the pressure in the reservoirs falls, the spring (8) is again capable, depending on the operating range of the unloader, to push the diaphragm (9) with the valve body (10) downwards. Thus the spring (22) can close the inlet valve (21). The valve body (10) is then lifted off the remaining sealing surface of the inlet valve (21), opening the outlet valve (20). Since the pressure in chamber (b) is reduced via hole (c) and chamber (d) which is connected with the blow-off nozzle (3), the spring (18) will raise the valve body (17) and close the idle valve (19). The compressor once again returns to its delivery position.

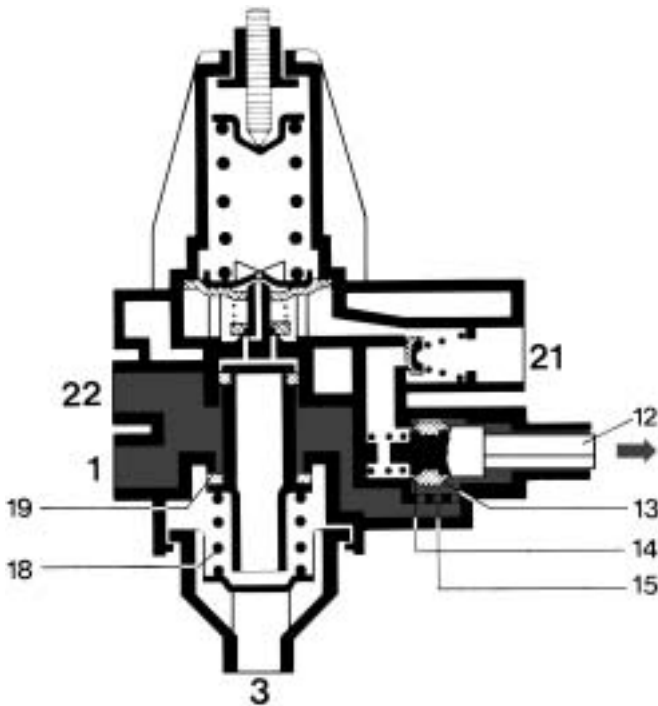
The operating range of the unloader essentially results from the difference in the surfaces of the diaphragm (a), the inlet valve (21) and the outlet valve (20) in terms of the delivery and idling ranges of the unloader.

d. Filling Position



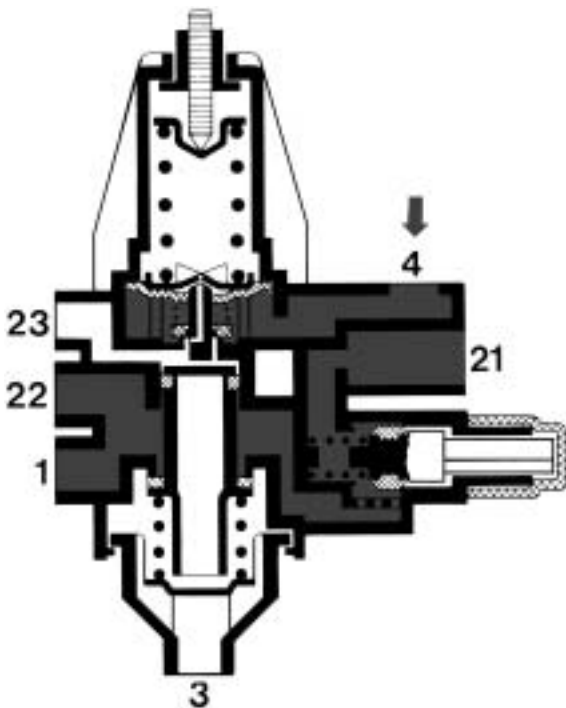
If pin (12) is actuated by no more than approx. half the total stroke by screwing on a filling hose, the tyre inflation connector can be used as a filling connector. Since the valve surfaces (13) and (14) are open on both sides, the compressed air entering in the direction shown by the arrow flows through the opening check valve (11) and via port (21) to the air reservoirs. When the maximum reservoir pressure has been reached, the unloader switches the compressor to "idle" as described above under "b".

## e. Tyre Inflation Position



If the tyre inflation connector is used to inflate a tyre, pin (12) can be used at full stroke by screwing on the inflation hose. This causes the valve surface (14) to close. The pressure from the compressor then flows out of the unloader via the closed idle valve (19), the filter (15) and the opened valve surface (13) in the direction of the arrow, and into the tyre. The idle valve (19) now acts as a safety valve. As soon as the pressure exceeds 12.0+2.0 bar, for instance, it opens automatically against the force of the spring (18).

## f. Combined Unloaders for Controlling Air Dryers



Because of the way the air dryers work, it is mainly unloaders with no check valves which are used for this purpose. On these unloaders, the pilot connection (4) is connected with the reservoir pressure (\*). Between ports (21) and (4) there is no direct connection. For controlling the regeneration phase, single chamber air dryers (\*) also require port (23).

(\* ) see installation diagram "Air Dryers".



**Maintenance**

The filter (15) should be cleaned every 3 months. To take out the filter, simply unscrew the tyre inflation connector or the screw plug. After cleaning, re-install in reverse order.

**Testing**

Follow the vehicle manufacturer's instructions

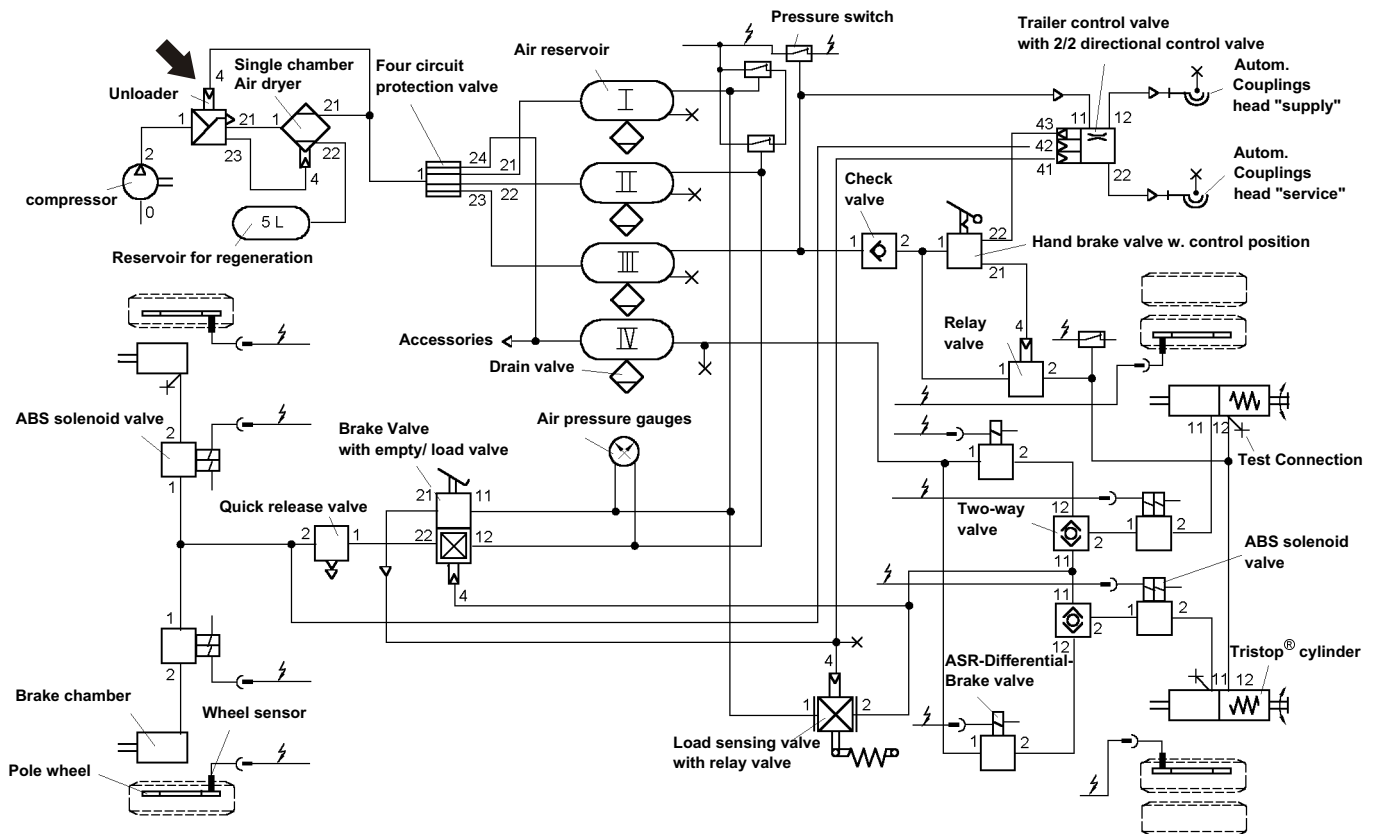
- e.g. cut-out pressure: 8.1 ± 0.2 bar
- operating range: 0.6 ± 0.4 bar
- cut-in pressure: ≥ 6.9 bar
- Response level: 12.0 <sup>+2.0</sup> bar

**Please note**

Within the tolerance range, the cut-out pressure of the unloader is adjusted using the 3 mm hexagon socket screw (5). To do so, the guide (6) should be held with a 13 mm spanner.

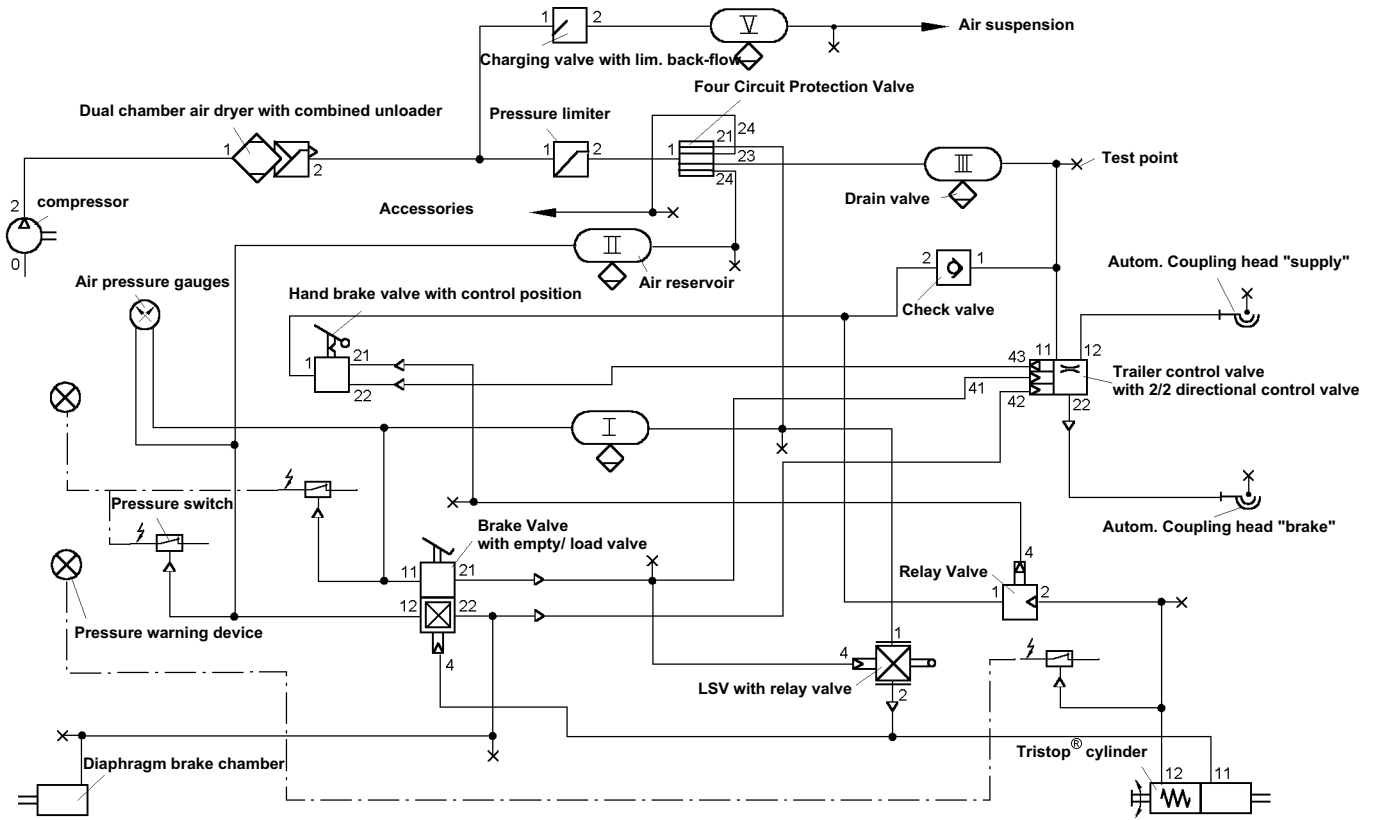
By changing the position of the guide (6), the operating range of the unloader is set at the factory in terms of the tolerance range.

**Schematic for Testing and Installation**



Schematic for Testing and Installation

Vehicles with air suspension and pressure limiting valve



**Purpose**

Their purpose is to clean the air taken in by the compressor.

Intake filters are fitted at port (0) upstream from the compressor unless the compressor is connected to the engine's air filter.

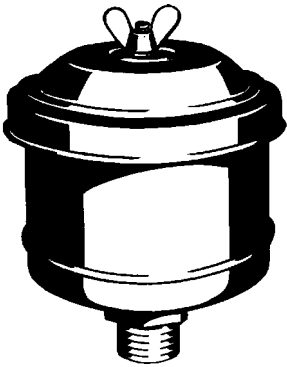
**Design types:**

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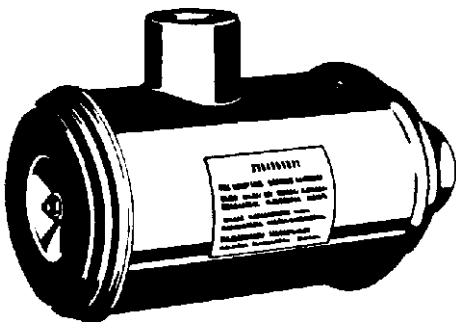


a. **Wet Air Filters** are simple, robust air cleaners for medium requirements. They contain an oil-wetted filter element.

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b. **Oil Bath Air Filters** have a very high trapping rate of between approx. 98 and 99 %. They require little maintenance.



c. **Dry Air Filters** are state-of-the-art and require the least of maintenance. They are capable of achieving a dust trapping rate of close to 100 %. They are, however, not included in our product range.

**Maintenance**

Follow the vehicle manufacturer's instructions.

## Purpose

Line filters were often used **in vehicles without air dryer**. It is used for cleaning the air delivered by the compressor and to precipitate the humidity it contains.

## Design types

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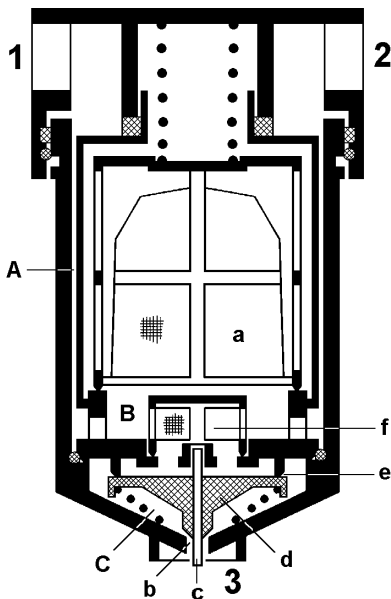
Line filters with integrated filter and automatic drain valve.

The drain valve operates at a fall in pressure of:

0.25 to 0.4 bar (432 511 000 0)

0.6 to 0.8 bar (432 511 001 0)

## Operation



The air entering at port (1) flows through annular gap A into Chamber B. As it passes through the gap A, the air cools and some of the water vapour it contains will condensate. The air then flows through filter (a) to port (2).

At the same time, the pressure in chamber (B) opens inlet (e) of valve body (d), and the condensates runs via the filter (f) into chamber (C). As the pressure in chamber (B) falls, inlet (e) closes and outlet (b) opens. The condensate is now blown outside by the pressure in chamber (C). When the pressures in Chambers B and C are balanced, outlet (b) closes.

The Pin (C) can be used to check whether the automatic drain valve is working properly.

## Maintenance

Regular cleaning of the filter plate (see the vehicle manufacturer's maintenance intervals).