

Instruction Manual KAP Compressor Units

10. AUTOMATIC CONDENSATE DRAIN

The automatic condensate drain unit is optional extra for all breathing air compressor units. As standard, the units are fitted with manual drain valves.

10.1. MARINER, K14, K15

The following description is for 4stage units. For the three-stage MP units, drain valve (3, Fig. 30) is for the oil and water separator after last stage and drain valve (4) does not exist.

The automatic condensate drain unit (Fig. 30) drains the intermediate separator(s) and the oil and water separator after the 3rd stage every 15 minutes during operation. In addition, the automatic condensate drain is designed to drain these filters after shut-down of the compressor unit, and to unload the compressor during the starting phase.

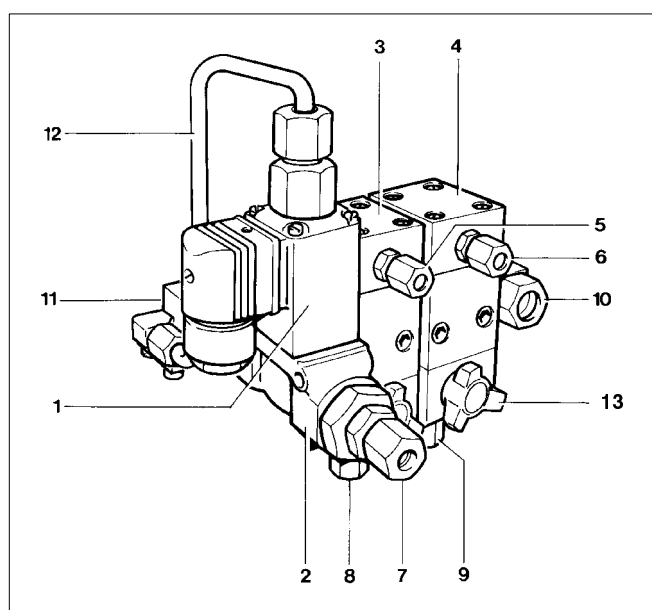


Fig. 30 Automatic condensate drain unit MP, K14, K15

- 1 Solenoid valve coil
- 2 Solenoid valve, condensate drain 2nd stage
- 3 Condensate drain valve 3rd stage
- 4 Condensate drain valve 4th stage
- 5 Control air connection from 2nd stage
- 6 Control air connection from 3rd stage
- 7 Condensate connection from intermediate separator after 2nd stage
- 8 Condensate connection from intermediate separator after 3rd stage
- 9 Condensate connection from oil and water separator
- 10 Condensate outlet (tube connector)
- 11 Condensate manifold
- 12 Vent line solenoid valve - manifold
- 13 Manual condensate drain valve

It operates electro-pneumatically and comprises the following main items:

- A solenoid valve, normally open type, functioning as condensate drain valve for the 2nd stage.
- One (for 3stage units) or two (for 4stage units) pneumatically operated condensate drain valves, normally open type, one for the intermediate separator after the 3rd stage (all 4stage blocks) and one for the oil and water separator after the last stage.

- A condensate manifold.
- A condensate separator/silencer.
- A condensate collecting tank with activated charcoal filter
- A bracket for mounting the drain unit on the compressor block or on the unit.
- An electrical timer (part of compressor control assy or mounted in a separate housing).

Operation

The normally open condensate drain valves are connected in cascade mode. The condensate from the intermediate separator after the 2nd stage is applied to the solenoid valve. The solenoid valve is normally open. The condensate from the intermediate separator after the 3rd stage and from the oil and water separator is led to the respective pneumatically operated condensate drain valve.

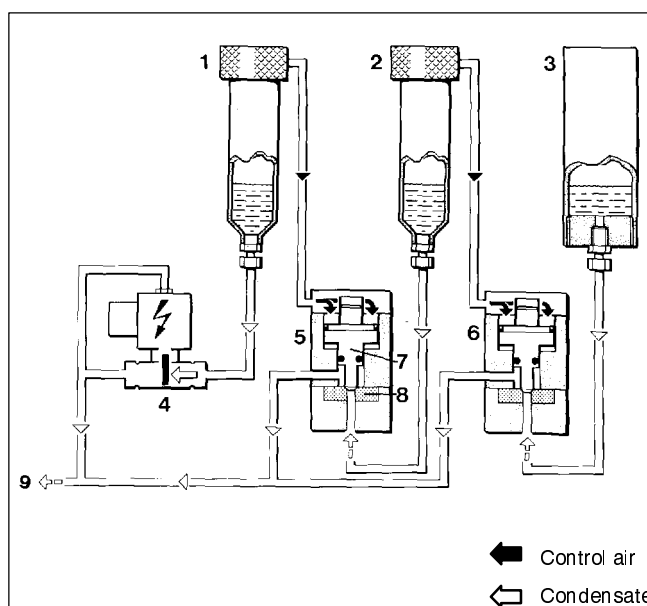


Fig. 31 Normal operation

- 1 Intermediate separator after 2nd stage
- 2 Intermediate separator after 3rd stage
- 3 Oil and water separator after 4th stage
- 4 Solenoid valve condensate drain 2nd stage
- 5 Condensate drain valve 3rd stage
- 6 Condensate drain valve 4th stage
- 7 Servo piston
- 8 Valve seat
- 9 Condensate outlet

The required control air for the 3rd/4th stage intermediate separator drain valve is taken from the intermediate separator after the 2nd stage. The control air for the oil and water separator drain valve is taken from the intermediate separator after the 3rd stage. At compressor start-up, the solenoid valve (4) is open and so are condensate drain valves (5) and (6) because there is no control air available at this moment.

At start-up of the compressor, the solenoid valve is energized and closes: due to build-up of pressure by compressor operation, control air flows into condensate drain valves (5) and (6). The servo-pistons (7) are pressed onto valve seats (8) and the condensate drain valves close.

Condensate drain

Every 15 minutes, 3/2-way solenoid valve (4) is deenergized for approx. 10 seconds by the timer.

Solenoid valve (4) opens and drains the condensate from the 2nd stage intermediate separator (1). Due to the pressure loss in intermediate separator (1) the control pressure for condensate drain valve (5) for intermediate separator (2) is also removed. The servo-piston (7) of the condensate drain valve for the intermediate separator is unloaded, and the control pressure vented through the relief port.

The piston (7) of the drain valve is raised by pressure from the intermediate separator (2), the valve opens, and condensate is drained. Because of the resulting pressure loss within the intermediate separator (2), the control pressure for the condensate drain valve (6) for the oil and water separator (3) is removed and the condensate drain valve (6) drains as described above.

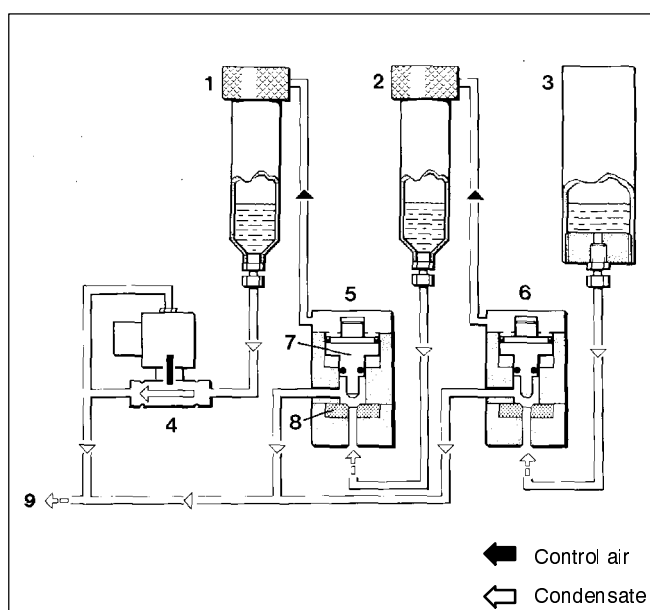


Fig. 32 Condensate drain

- 1 Intermediate separator after 2nd stage
- 2 Intermediate separator after 3rd stage
- 3 Oil and water separator after 4th stage
- 4 Solenoid valve condensate drain 2nd stage
- 5 Condensate drain valve 3rd stage
- 6 Condensate drain valve 4th stage
- 7 Servo piston
- 8 Valve seat
- 9 Condensate outlet

10.2. K180

The automatic condensate drain unit (Fig. 33) drains the intermediate separators after the 2nd and 3rd stage, and the final separator after the 4th stage every 15 minutes during operation.

In addition, the automatic condensate drain is designed to drain these filters after shut-down of the compressor unit, and to unload the compressor during the starting phase, see paras. 10.4. and 10.5.

The automatic condensate drain system operates electropneumatically and comprises the following main items:

- Three pneumatically operated condensate drain valves, one each for the intermediate separators after 2nd and 3rd stage and one for the oil and water separator after the last stage. The condensate drain valves are of the normally open type, i.e. they are closed by applying control pressure.
- A solenoid valve for control air, normally closed type, mounted on top of the condensate drain valve for the 2nd stage.
- A condensate manifold.
- A condensate separator/silencer.
- A condensate collecting tank with activated charcoal filter
- An electrical timer. The timer is mounted in the compressor control box on all units fitted with this optional extra.

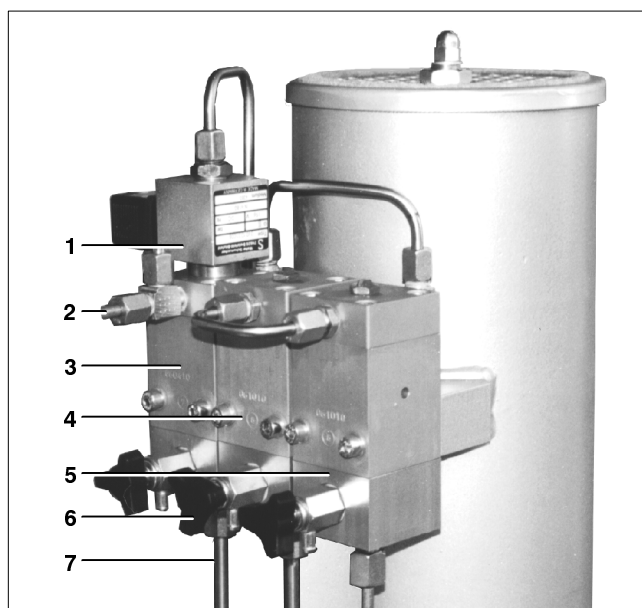


Fig. 33 Automatic condensate drain unit K180

- 1 3/2-way solenoid valve
- 2 Control medium connection
- 3 Condensate drain valve, intermediate separator 2nd stage
- 4 Condensate drain valve, intermediate separator 3rd stage
- 5 Condensate drain valve, oil and water separator 4th stage
- 6 Manual condensate drain tap
- 7 Condensate inlet connection (tube connector)

Operation

The condensate drain valves are operated pneumatically via a normally closed 3-way solenoid valve by an electrical signal.

The required control air applied to the solenoid valve is taken from the intermediate separator after the second stage.

At compressor start, condensate drain valve (5), (6) and (7) are open.

At start-up of the compressor, 3/2-way solenoid valve (4) is energized and opens. Now control pressure is applied to the condensate drain valves. The servo-pistons (8) are pressed onto valve seats (9) and the condensate drain valves close.

The compressor delivers compressed medium to the connected systems.

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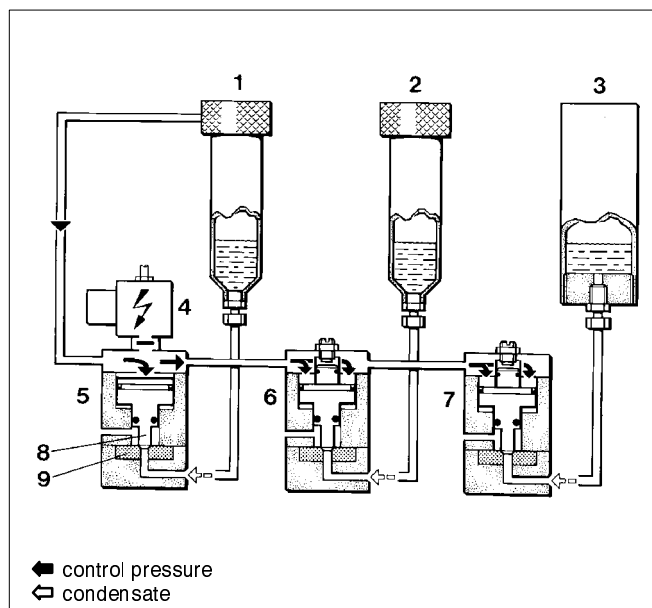


Fig. 34 Normal operation

- 1 Intermediate separator 2nd/3rd stage
- 2 Intermediate separator 3rd/4th stage
- 3 Oil and water separator after 4th stage
- 4 3/2-way solenoid valve
- 5 Condensate drain valve 2nd stage
- 6 Condensate drain valve 3rd stage
- 7 Condensate drain valve 4th stage
- 8 Servo piston
- 9 Valve seat

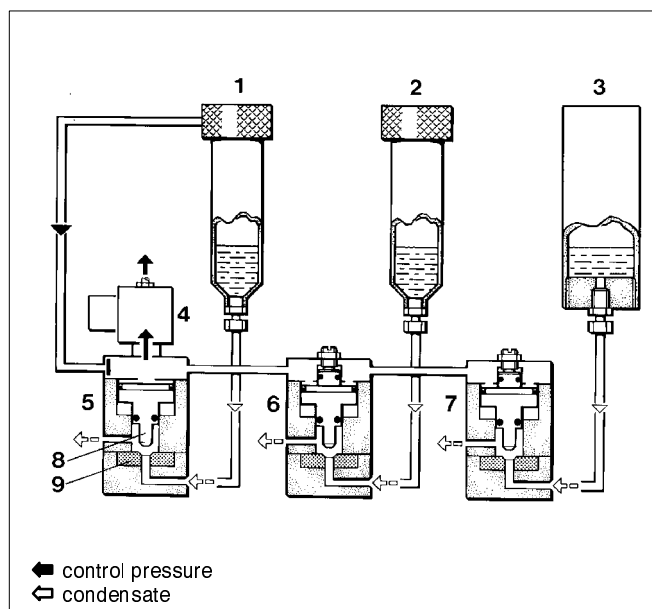


Fig. 35 Condensate drain

Condensate drain

Every 15 minutes, 3/2-way solenoid valve (4) is deenergized for approx. 6 seconds by the timer and closes. The control pressure is relieved from the servo-pistons (8) of the condensate drain valves and the pistons are raised from the valve seats (9) by the 2nd stage pressure. The condensate from the separators is drained.

10.3. ELECTRICAL CONNECTION**NOTICE**

For electrical connection of the automatic condensate drain system refer to the schematic diagrams in section F, if applicable.

NOTICE

On compressor units with COMP-TRONIC compressor control system the intervals are adjusted at the control and monitoring unit, refer to chapter A.11.

10.4. START UNLOADING

The unloading during the starting phase of the compressor is effected due to the lack of control air immediately after switching on the unit. After the compressor has attained nominal speed, control air flows to the condensate drain valves which close and the compressor starts delivering to the consuming device.

10.5. STANDSTILL DRAINAGE

At compressor shut-down, solenoid valve (4) is deenergized and opens.

The servo pistons are raised by the residual pressure within the separators. The valves open, and the separators are drained at standstill of the compressor unit.

10.6. CONDENSATE COLLECTOR

BAUER compressor units are fitted as standard with a condensate collector tank.

The outlet opening of the condensate drain manifold is connected to a condensate drain separator. It separates the condensate from the air escaping together with the condensate from the filters. The air passes through a silencer and is released into the open air, the condensate is collected in a condensate tank. An additional silencer is mounted on top of the tank. The condensate tank should be emptied at regular intervals. The maximum condensate level is marked with a black line.

NOTICE

Dispose of condensate according to local regulations!

Due care must be taken to ensure that any oil which may be drained with the condensate will not pollute the environment. For example, the drain pipe can be directed into a collecting vessel or into drain facilities incorporating oil separators.