BAUER KOMPRESSOREN

Operating Manual

High Pressure Compressor Units

Series K22 to K28

90 to 500 bar

INTRODUCTION

This manual contains operating instructions and maintenance schedules for the high pressure compressor units of the model range

K22 to K28

Model: _____

Serial no.: _____

WARNING

! Pneumatic high pressure system !

The machine has been built in accordance with the EC machine regulations 2006/42/EG. Specifications on the noise level in accordance with the machine and product safety law as of 01.05.2004 and the EC machine regulations, chapt. I, section 1.7.4. The machine has been built according to the highest standard of technology and the generally acknowledged safety standards. Nevertheless, operation could still cause danger for the operating personnel or third parties, or result in damage to the machine and other values. The machine may only be used to produce compressed air as specified in this manual. Other use is strictly prohibited.

K22–28/01/10

Edition January 2010

INTRODUCTION

NOTICE

Layout and use of instruction manuals

Working with pneumatic high pressure systems cannot always be considered safe and one should possess a minimum knowledge of how to operate them. For this reason, please read this instruction manual before operating your unit, to get to know the components and processes.

This instruction manual is made up according to the building block principle. It is divided into 7 sections, whose content varies according to the type of unit, standard or special and of course the accustomized extras, which are available for all our units in large numbers. With this kind of subdivision system, all sections should be in existence, in order to give a complete picture. In other words: even if one particular component is not part of the unit, the relative section will still be kept, although only a notice may be printed there. On the other hand, other sections could be represented more than once if certain units require this. In such a case one only has to refer to the applicable section, all superfluous ones can be removed. This is quite simple due to the ring binding system.

Please note that the circuit diagrams in section F, unless otherwise stated, are the standard circuit diagrams for your specific unit. So please always refer to the circuit diagram enclosed in the compressor unit control box, in which any possible changes are registered.

The same thing applies for the spare parts lists in section G. To avoid misunderstanding when ordering spare parts, we advise you to remove the parts that are not applicable. The spare parts lists that apply to the relative unit are listed in the section Index.

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Change notice

Change no.	Change date and changes
0	Basic edition January 1995
1	March 1996
2	September 2000
3	January 2003
4	February 2007; service manual
5	May 2009; new B-Control
6	January 2010; EU machine directive 2006/42/EG

Dear Customer

We are happy to give you advice on any questions regarding your BAUER compressor and help as soon as possible with any arising problems.

You can contacts us Mondays to Thursdays from 08^{00} to 16^{30}, Fridays from 08^{00} to 15^{00} on phone no. (089) 78049-0.

If you call the following extensions directly, it will save you time.

Do you want to order spare parts?
☞ **Customer Services** Tel: (089) 78049-129 or -149
Fax: (089) 78049-101

Do you have problems with maintenance or repair work?
☞ **Technical Customer Services** Tel: (089) 78049-176 or 246
Fax: (089) 78049-101

Do you need further information regarding your unit, accessories, prices etc.?
☞ **Sales Department:**
Breathing air compressors Tel: (089) 78049-138, -154, -185 or -202
Industrial and gas compressors Tel: (089) 78049-174, -170 or -205
Fax: (089) 78049-103

Are you interested in training courses?
☞ **Training Manager** Tel: (089) 78049-175
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Description

Section B
Installation, Taking into operation

Section C
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Section D
Maintenance, Repair

Section E
Storage, Preservation

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Spare Parts Catalogue

A. DESCRIPTION

1. GENERAL

1.1. PURPOSE AND SHORT DESCRIPTION

This instruction manual describes the compressor units of the **K22 to K28** model range. It includes breathing air as well as industrial air and gas compressor units.

The **breathing air** compressor units (KAP series) are used as stationary filling stations for the compression of breathing air in the high pressure ranges PN 200 and/or PN 300, mainly for filling bottles for diving or fire fighting applications.

The **industrial** compressor units (I series) compress air for industrial application in the high pressure range up to max. 350 bar. Models I 25.9 and I 25.18 have a maximum operating pressure of 500 bar.

The **gas** compressor units (G, C and GI series) are designed for compression of various kinds of gas in the high pressure range. The maximum operating pressure of the compressors in the GI and C series is 350 bar with the exception of the GI 25.9 and GI 25.18 units which have a maximum operating pressure of 500 bar. For the G units, with the exception of the G 25.9 unit, the operating pressure is restricted to 220 bar, the G 25.9 unit has a maximum final pressure of 350 bar.

The compressor units are manufactured with optional frame designs and different drive inputs:

STANDARD: without base frame;
SUPER-SILENT: with fully enclosed, sound-proof housing.

The noise level of the Standard unit is between 85 and 95 dB(A),[a] depending on the model.
The noise level of the Super-Silent unit is between 80 and 90 dB(A).

The units are equipped differently according to the application:

Industrial and gas compressor units are equipped as standard with oil and water separator after the last stage, TÜV approved final pressure safety valve, automatic condensate drain, as well as pressure maintaining/non-return valve and outlet armatures and fittings. They can also be optionally equipped with fully or semi-automatic **B-CONTROL** compressor control with electronic monitoring unit, and with the optional, wall mountedindustrial filter systems **IP100** to **IP140** and SECURUS monitoring system. For gas compressor units, filter systems **GP100** to **GP140** are available.

Breathing air units are equipped as standard with filter system **P80** to **P120** - according to air delivery - as well as with an automatic condensate drain. These units can optionally be equipped with fully or semi-automatic **B-CONTROL** compressor control, as described in the following. Filling panels and condensate collecting tanks are also optional extras.

1.2. DESIGN AND MODE OF OPERATION

1.2.1. Design

The compressor unit comprises the following major assemblies:

- Compressor block
- Drive motor
- Frame and (for Super-Silent models) housing
- Instrument panel
- Automatic condensate drain
- Filling panel[b]
- Filter set[c]
- Electric control with electronic monitoring system[b]

The design of the compressor units is shown in Fig. 3 to Fig. 9. For special equipment according to order see diagrams and parts lists in sections F and G.

1.2.2. Mode of operation; flow diagram

The path of the medium through the compressor is shown in the flow diagram. For flow diagram refer to section F of this manual.

a) according to CAGI-PNEUROP standard

b) optional extra for breathing air units according to order

c) standard for breathing air units: optional extra for industrial and gas units according to order

Fig. 1 Breathing air compressor unit; shown: KAP 22.0, standard version

1 B-Control panel with emergency OFF button
2 Compressor control unit
3 Final pressure safety valve
4 Intake filter
5 Automatic condensate drain unit
6 Pressure maintaining/non-return valve with outlet shut-off valve
7 Final separator
8 Instrument panel base frame
9 Transportation bracket
10 Main switch

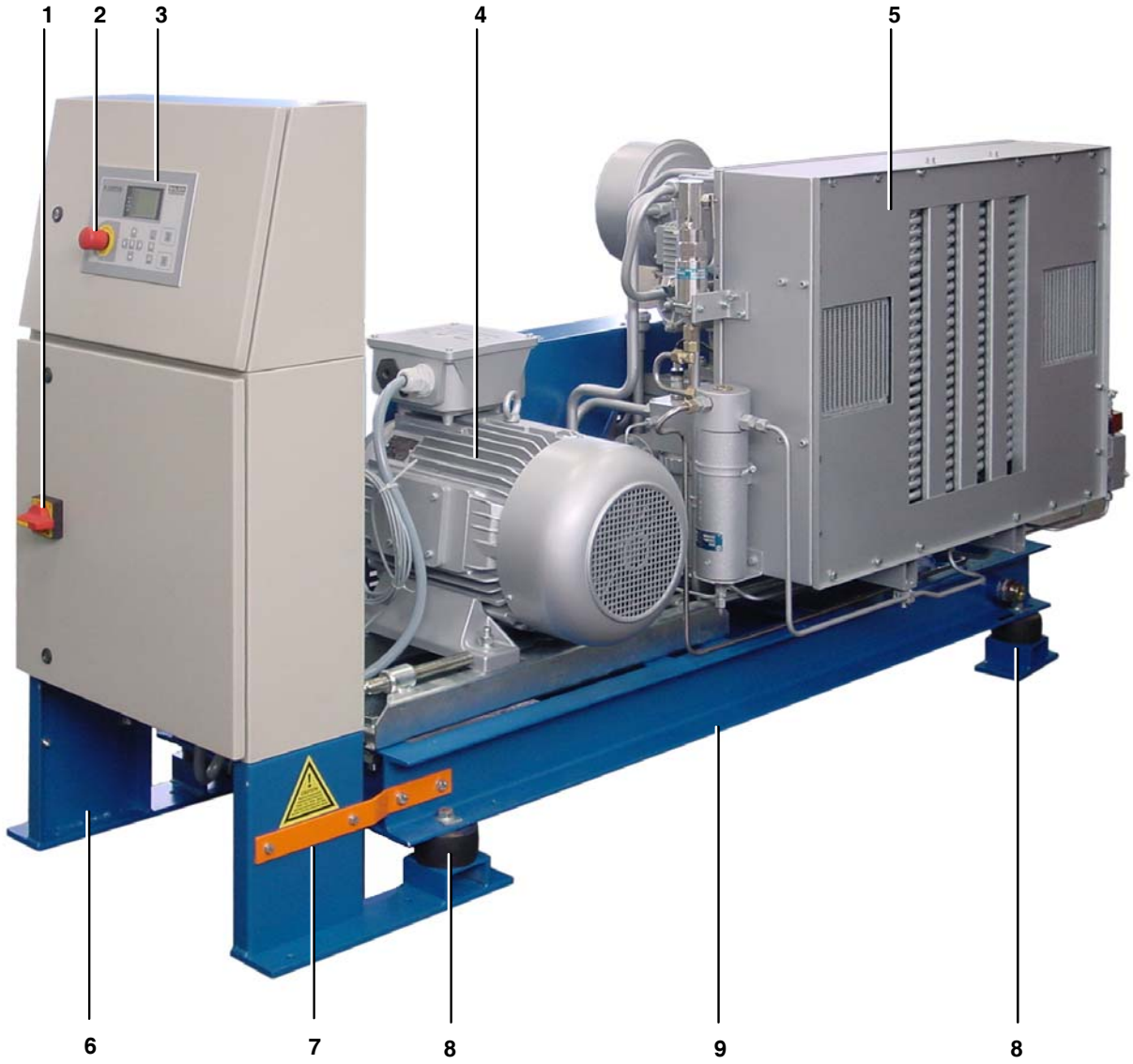


Fig. 2 Breathing air compressor unit; shown: KAP 23.0, standard version

1 Main switch
2 Emergency OFF button
3 B-Control display
4 Electric drive motor
5 Compressor block cooler assy
6 Base frame
7 Transportation bracket
8 Shock-mount
9 Anti-vibration frame

Fig. 3 Industrial gas compressor unit, standard version; shown: GI 22.0

1 B-Control panel with emergency OFF button
2 Compressor control unit
3 Gas intake manifold
4 Intake shut-off solenoid valve
5 Final pressure safety valve
6 Intake filter
7 Automatic condensate drain unit
8 Pressure maintaining/non-return valve with outlet shut-off valve
9 Condensate outlet
10 Final separator
11 Instrument panel base frame
12 Transportation bracket
13 Main switch

Fig. 4 Industrial compressor unit, standard version; shown: I 23.0

1 Main switch
2 Emergency OFF button
3 B-Control display
4 Electric drive motor
5 Compressor block cooler assy
6 Base frame
7 Transportation bracket
8 Shock-mount
9 Anti-vibration frame

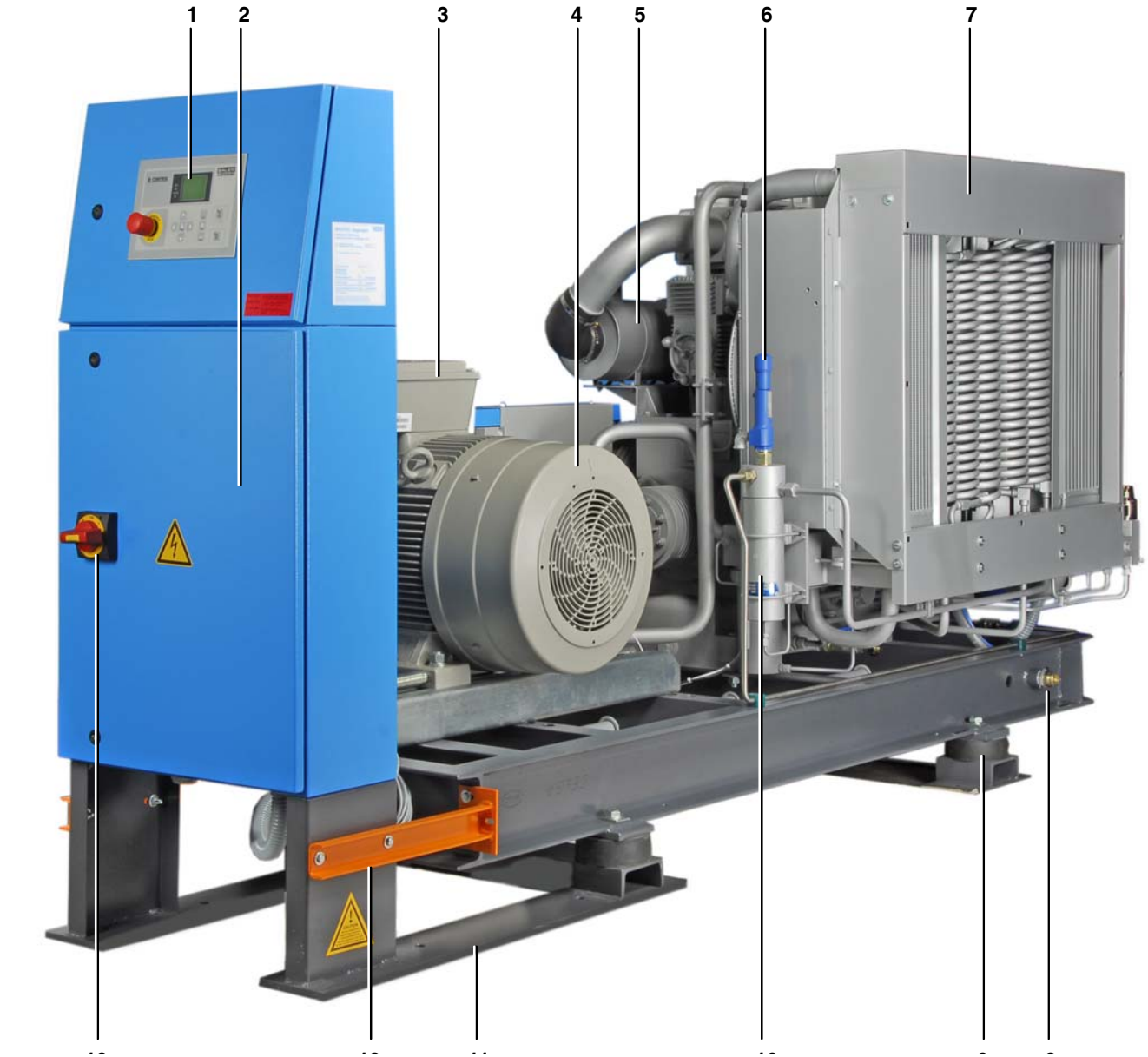


Fig. 5 Industrial compressor unit, standard version; shown: I 25.0

1 B-Control panel with emergency OFF button
2 Compressor control unit
3 Motor terminal box
4 Electric drive motor
5 Intake filter
6 Final pressure safety valve
7 Compressor block, cooler assy
8 Condensate outlet
9 Shock-mount
10 Final separator
11 Instrument panel base frame
12 Transportation bracket
13 Main switch

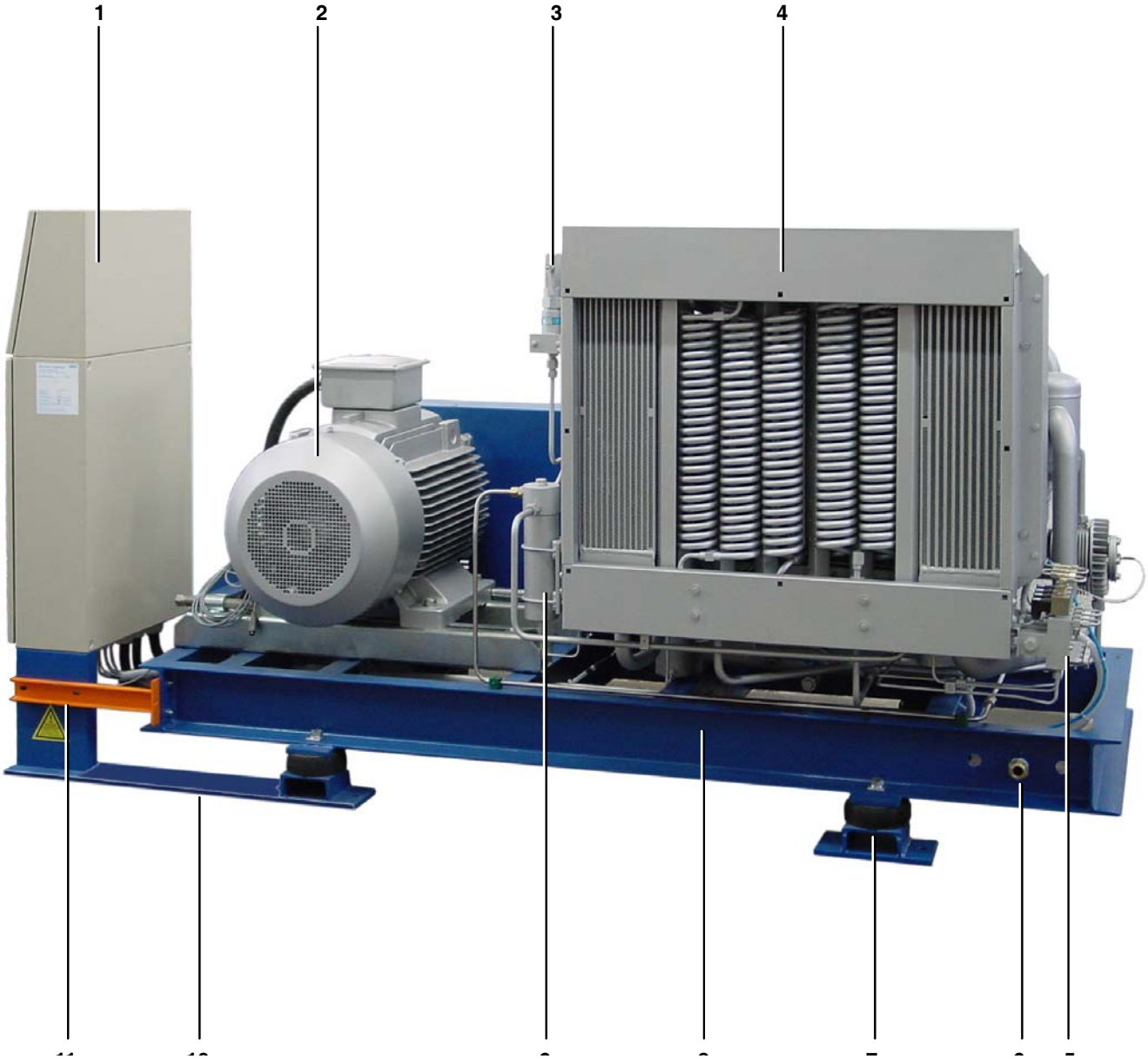


Fig. 6 Industrial compressor unit, standard version; shown: I 28.0

1 Compressor control unit
2 Electric drive motor
3 Final pressure safety valve
4 Compressor block, cooler assy
5 Automatic condensate drain unit
6 Condensate outlet
7 Shock-mount
8 Anti-vibration frame
9 Final separator
10 Instrument panel base frame
11 Transportation bracket

Fig. 7 Industrial gas compressor unit, standard version; shown: G 25.9

1 B-Control panel with emergency OFF button
2 Compressor control unit
3 Motor terminal box
4 Electric drive motor
5 Intake filter
6 Final pressure safety valve
7 Final separator
8 Compressor block, cooler assy
9 Condensate outlet
10 Gas feedback connector
11 Shock-mount
12 Instrument panel base frame
13 Transportation bracket
14 Main switch

Fig. 8 Industrial compressor unit K22-K23, Super-Silent version

1 B-Control panel with emergency OFF button
2 Cooling air outlet duct
3 Compressor block access door
4 Oil drain plug
5 Main switch
6 Pressure maintaining/non-return valve with outlet shut-off valve

Fig. 9 Industrial compressor unit K25-K28, Super-Silent version

1 Condensate outlet
2 Oil drain plug
3 Compressor block access door
4 Drive motor access door
5 Air outlet
6 B-Control panel with emergency OFF button
7 Main switch

1.2.3. Compressor block

The compressor block is the heart of every compressor unit. **BAUER** compressor blocks are particularly suitable for continuous operation because of their rugged design and the corrosion resistant intermediate separator and cooler assemblies. Smooth running is a particular feature of this **BAUER** design. The balance of masses of the 1st rank is zero. The moving parts of the driving gear are all equally balanced. This results in a vibration-free running. The driving gear is fitted with three bearings. It is here that the energy saving cylinder roller bearings are put to use. The upper and lower connecting rod bearings are also roller bearings. This allows for an even longer life which lasts at least 30,000 operating hours.

Gas Compressor blocks

For gas compression, the compressor blocks are modified as follows:

- The inner surface of the crankcase is coated with a special varnish.
- The control gas vent opening of the automatic condensate drain unit is fed back via the gas-tight condensate collector into the intake manifold.[a)]
- Oil filler neck and oil dipstick are sealed gas-tight[b)] .
- The crankcase vent opening is encapsulated and connected to the intake port by means of a feedback line. A crankcase relief valve protects the compressor block against over-pressure.[b)]
- The intake port is equipped with a gas-tight intake filter which is also designed to compensate for intake pulsations.
- The safety valves are gas-tight, their blow-off line is fed back to the intake manifold.[b)]

Compressor block IK22.0

Compressor block **IK22.0** is used to compress air in the high pressure ranges 225 bar and 330 bar. The maximum permissible operating pressure for industrial application is 350 bar.

The compressor block is of a 4-stage, 3-cylinder design, whereby the 1st and 2nd stages are together in one stepped cylinder. The three cylinders are arranged in a W shape: the stepped cylinder for the 1st/2nd stage in the centre, the 3rd stage cylinder on the right as seen from the flywheel, the 4th stage cylinder on the left.

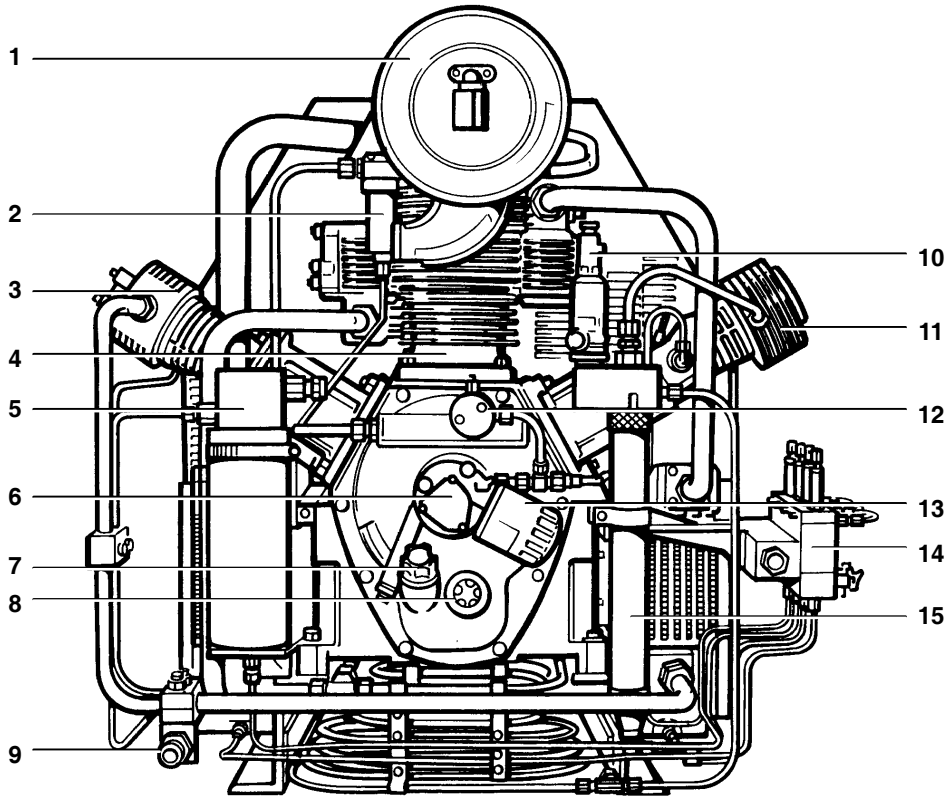
The 1st/2nd and 4th stage cylinders are lubricated by means of the forced-feed lubrication system, the 3rd stage cylinder is splash-lubricated.

The design of the compressor block is shown in Fig. 10 and Fig. 11.

For the mode of operation refer to the flow diagram in sec. F.

a) not on GI models

b) G and C versions, only



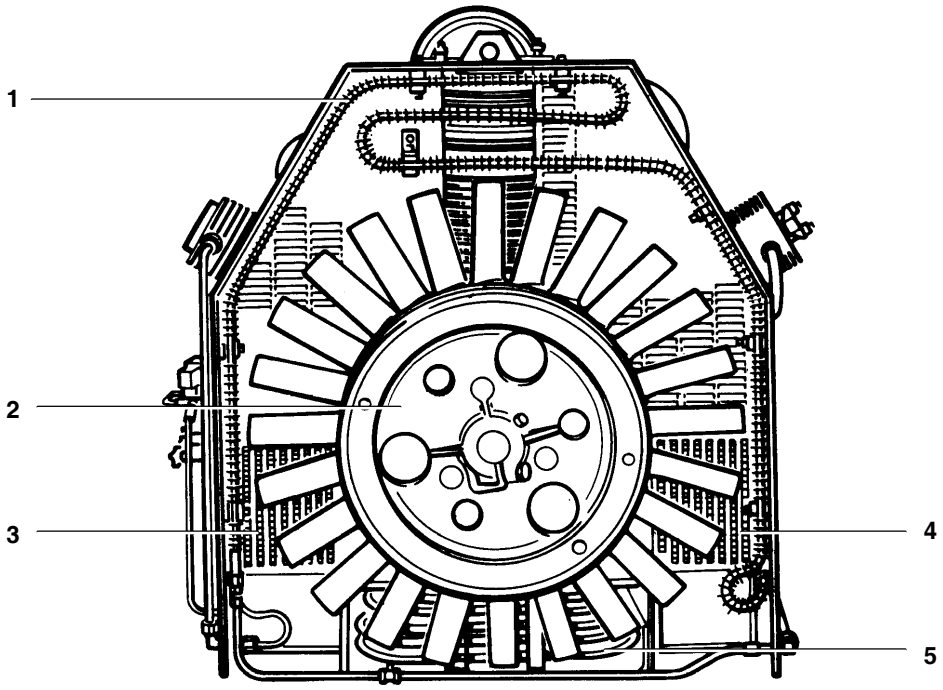
1 Intake filter with maintenance indicator
2 Oil separator, crankcase vent line
3 Cylinder 3rd stage
4 Cylinder 1st/2nd stage
5 Oil and water separator, 4th stage
6 Oil pump
7 Oil filler
8 Oil sight gauge
9 Oil drain plug
10 Final pressure safety valve
11 Cylinder, 4th stage
12 Oil injection nozzle
13 Oil filter
14 Automatic condensate drain unit
15 Intermediate filter, 3rd stage

Fig. 10 Compressor block K22.0, front view

Compressor blocks IK22.0 GI, IK22.0 G and C

Compressor block **IK22.0 GI** is used to compress nitrogen in the high pressure ranges. The maximum permissible operating pressure (setting of the final pressure safety valve) is 350 bar. Compressor blocks **IK22.0 G** and **IK22.0 C** are used to compress helium and argon up to a maximum operating pressure of 220 bar or, with special equipment to compress natural gas up to 350 bar.

Design and lubrication are the same as for the K22.0 block.



1 After-cooler, 4th stage
2 Fanwheel
3 Inter-cooler, 2nd stage
4 Inter-cooler, 1st stage
5 Inter-cooler, 3rd stage

Fig. 11 Compressor block K22.0, rear view[a)]

a) fanwheel protection removed

Compressor block K23.0

Compressor block **K23.0** is used to compress air in the high pressure ranges 225 bar and 330 bar. The maximum permissible operating pressure for industrial application is 350 bar.

The compressor block is of a 4-stage, 3-cylinder design whereby 1st and 2nd stages are together in a common stepped cylinder. The three cylinders are arranged in a T shape: the 1st/2nd stage cylinder vertically in the middle, the 3rd stage cylinder on the right as seen from the flywheel and the 4th stage cylinder on the left.

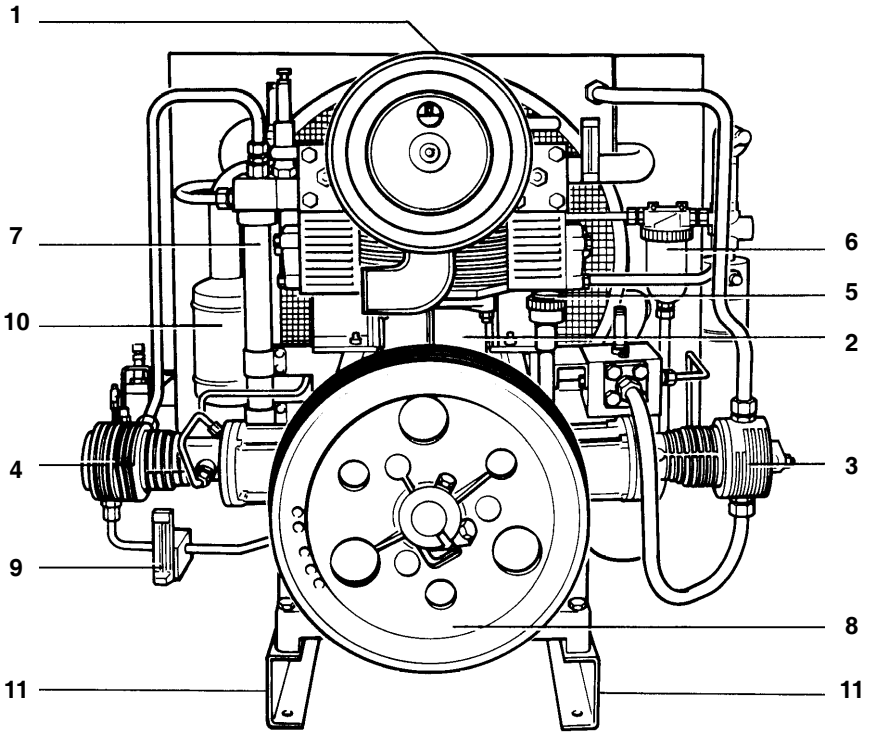
The 1st/2nd and the 4th stage cylinders are lubricated by means of the forced-feed lubrication system, the 3rd stage cylinder is splash-lubricated.

The design of the compressor block is shown in Fig. 12 and Fig. 13.

Compressor blocks IK23.0 GI, IK23.1 G and C

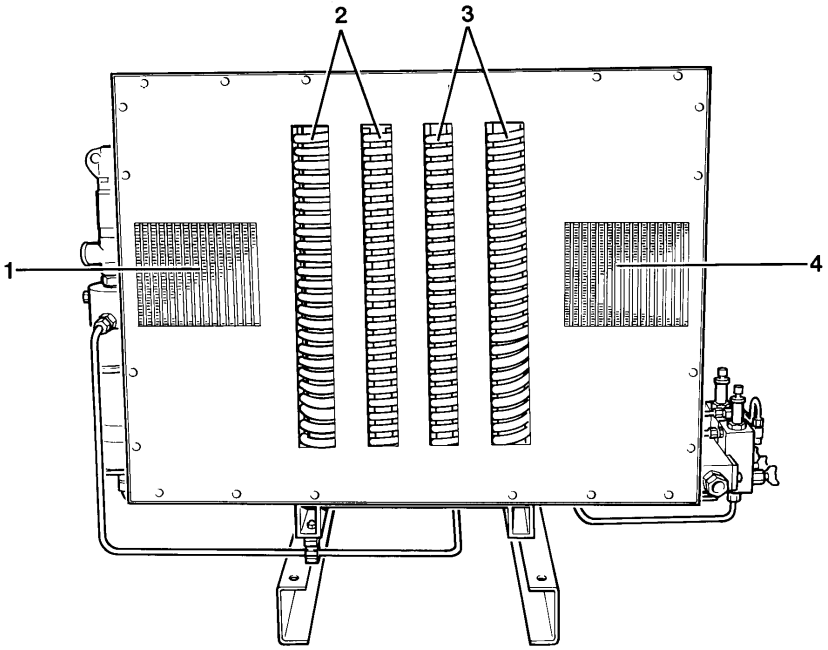
Compressor block **IK23.0 GI** is used to compress nitrogen in the high pressure ranges. The maximum permissible operating pressure is 350 bar. The compressor blocks **IK23.1 G** and **IK23.1 C** are used to compress helium and argon up to a maximum operating pressure of 220 bar and, with special equipment, the C models compress natural gas up to 350 bar.

Design and lubrication are the same as for the K23.0 block.



1 Intake filter
2 Cylinder, 1st/2nd stage
3 Cylinder, 3rd stage
4 Cylinder, 4th stage
5 Oil dipstick/filler neck
6 Oil separator
7 Intermediate separator, 3rd stage
8 Flywheel
9 Temperature gauge, 4th stage
10 Condensate separator, 1st stage
11 Transportation bracket

Fig. 12 Compressor block K23.0, front view



1 Inter-cooler, 2nd stage
2 Inter-cooler, 3rd stage
3 After-cooler, 4th stage
4 Inter-cooler, 1st stage

Fig. 13 Compressor block K23.0, rear view

Compressor blocks K25.0 and K28.0

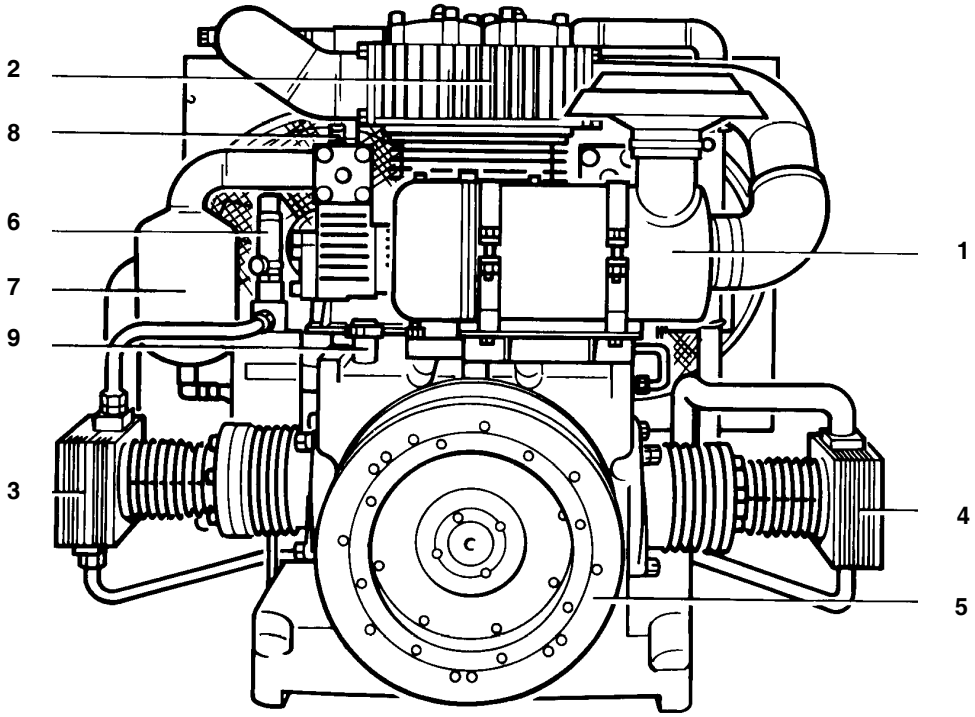
Compressor blocks **IK25.0** and **IK28.0** are used to compress air in the high pressure range. The maximum permissible operating pressure is 350 bar.

The cylinders are lubricated by means of the forced-feed lubrication system.

Compressor blocks IK25.0 GI, IK28.0 GI and C

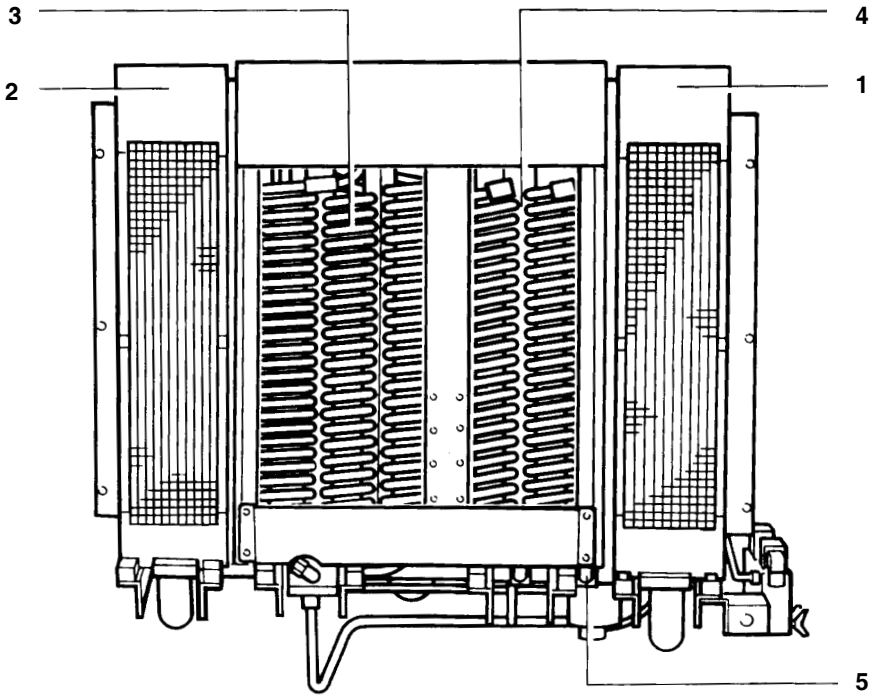
Compressor blocks **IK25.0 GI** and **IK28.0 GI** are used to compress nitrogen in the high pressure range. The maximum permissible operating pressure is 350 bar. Compressor blocks **IK25.0 C** and **IK28.0 C** are used to compress natural gas up to 350 bar.

Design and lubrication are the same as for the K25.0 block.



1 Intake filter
2 Cylinder, 1st/2nd stage
3 Cylinder, 4th stage
4 Cylinder, 3rd stage
5 Flywheel
6 Safety valve, 3rd stage
7 Condensate separator, 1st stage
8 Safety valve, 1st stage
9 Oil filler/dipstick

Fig. 14 Compressor block K25.0/K28.0, front view



1 Inter-cooler, 1st stage
2 Inter-cooler, 2nd stage
3 Inter-cooler, 3rd stage
4 After-cooler
5 Air outlet

Fig. 15 Compressor block K25.0/K28.0, rear view (cooler side)

Compressor blocks IK25.9 GI, IK25.18 GI, and IK25.9 G

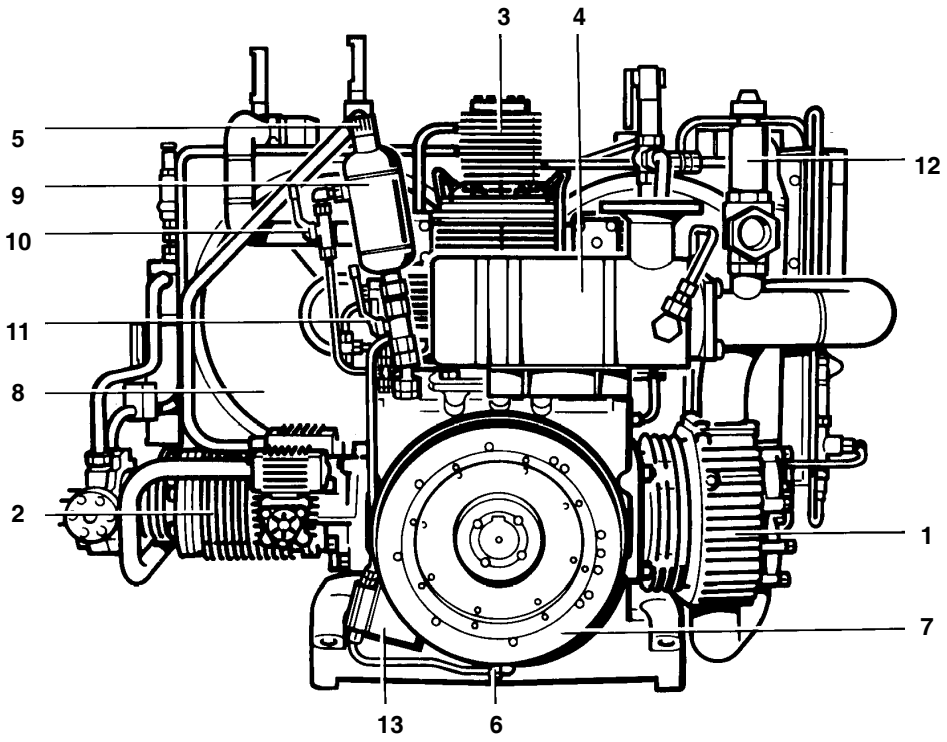
Compressor blocks **IK25.9 GI** and **IK25.18 GI** are used for compression of nitrogen in the high pressure range. The maximum permissible operating pressure is 500 bar.

Compressor block **IK25.9 G** is used for the compression of helium and argon up to a maximum operating pressure of 220 bar.

The compressor block is of a 5-stage, 3-cylinder design whereby the 2nd and 5th stages are together in a common stepped cylinder and the 3rd and 4th stages are together in a common stepped cylinder. The three cylinders are arranged in a T shape: the 2nd/5th stage cylinder is positioned vertically in the middle, the 1st stage cylinder is on the right as seen from the flywheel and the 3rd/4th stage cylinder is on the left.

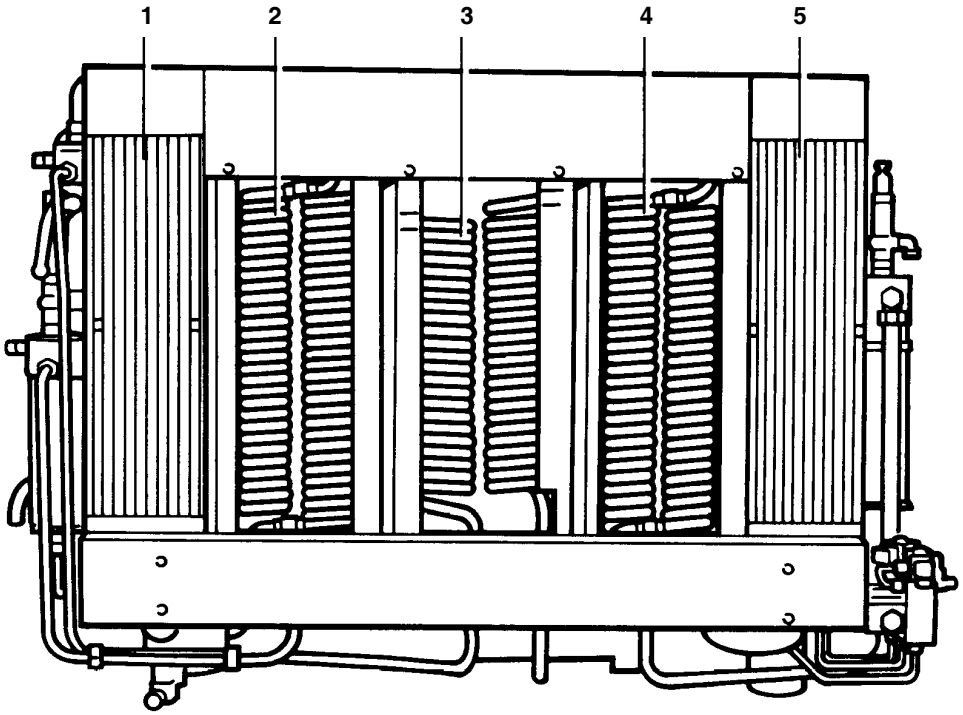
The 2nd/5th and 3rd/4th stage cylinders are lubricated by means of the forced-feed lubrication system. The 1st stage cylinder is splash-lubricated.

For gas compression, the compressor blocks are modified as follows:



1 Cylinder, 1st stage
2 Cylinder, 3rd/4th stage
3 Cylinder, 2nd/5th stage
4 Intake filter
5 Oil filler neck
6 Oil drain plug
7 Flywheel
8 Fanwheel
9 Oil reservoir
10 Shut-off valve, cranckase vent line
11 Shut-off valve, oil reservoir
12 Safety valve, gas intake pipe
13 Oil sight gauge

Fig. 16 Compressor block IK25.9 GI, IK25.18 GI, flywheel side



1 Inter-cooler, 1st/2nd stage
2 Inter-cooler, 4th/5th stage
3 After-cooler
4 Inter-cooler, 3rd/4th stage
5 Inter-cooler, 2nd/3rd stage

Fig. 17 Compressor block IK25.9 GI, IK25.18 GI, cooler side

2. LUBRICATION SYSTEM

2.1. FUNCTIONAL DESCRIPTION

2.1.1. K22 and K23

The compressor is provided with a forced-feed lubrication system. Fig. 18 shows the mode of operation.

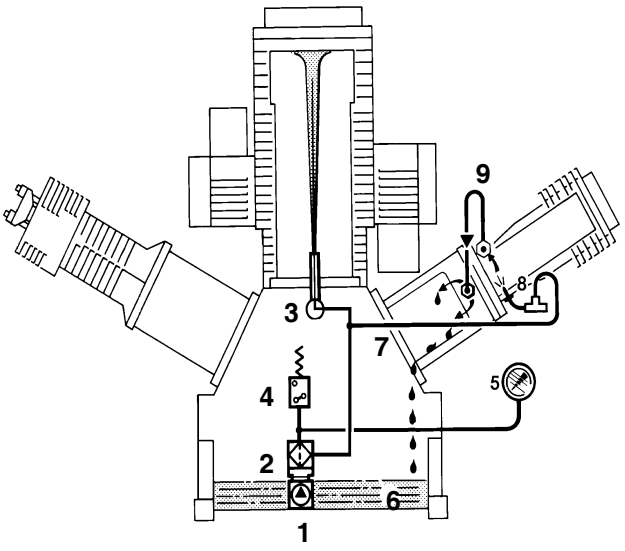


Fig. 18 Lube oil circuit, K22

1 Oil pump with regulating valve
2 Oil filter
3 Injection pipe
4 Oil pressure switch
5 Oil pressure gauge
6 Oil sump
7 Pipe to 4th stage cylinder
8 Oil jet
9 Feedback line

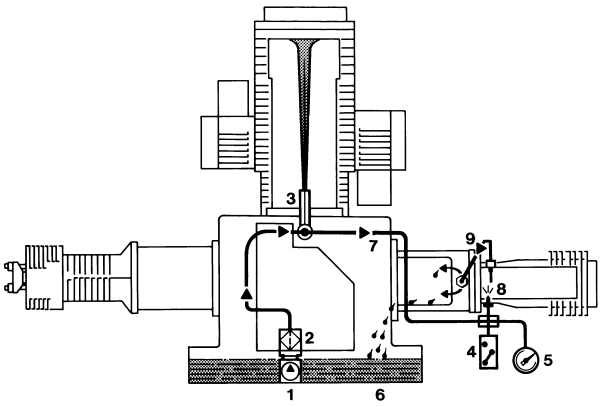


Fig. 19 Lube oil circuit, K23

The oil pump (1) equipped with a regulating valve is directly coupled to the crankshaft. The oil pump draws the oil from the crankcase oil sump (6) and pumps it through oil filter (2). This filter is fitted with a changeable cartridge which efficiently eliminates even the finest particles ⟨≥10µ⟩ from the oil.

After the oil filter (2) the oil flow is split: through injector (3) the oil enters the stepped piston of the 1st/2nd stage. It is sprayed from below against the piston head of the stepped piston where it is atomized and lubricates piston and cylinder. Drip oil reaches the rotating crankshaft with its connecting rods where it is agitated to lubricate the moving parts of the compressor. Through pipe (7) the oil is forced via oil jet (8) to the 4th stage cylinder where it lubricates piston and cylinder. From there the oil flows back through feedback line (9) into the oil sump.

The oil pressure in the lubricating system is indicated on pressure gauge (5) and monitored by oil pressure switch (4). If the oil pressure falls below 0.8 bar (12 psi), the monitoring unit shuts off the compressor.

2.1.2. K25, K28

The compressor is provided with a forced-feed lubrication system. Fig. 20 shows the mode of operation.

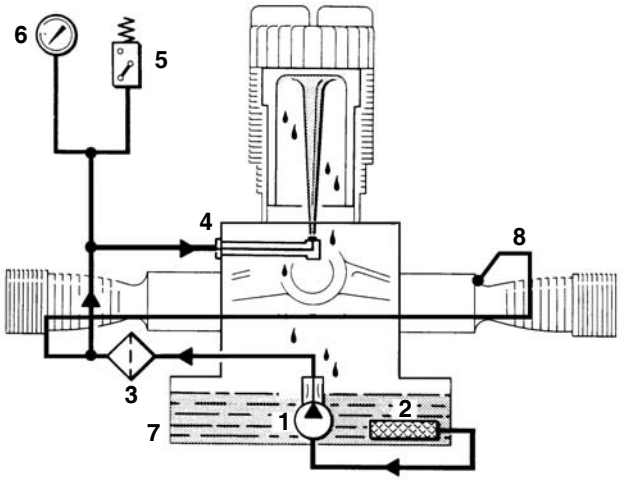


Fig. 20 Lube oil circuit, K25, K28

1 Oil pump with regulating valve
2 Oil strainer
3 Oil filter
4 Injection pipe
5 Oil pressure switch
6 Oil pressure gauge
7 Oil sump

The oil pump equipped with a regulating valve (1) is driven by the crankshaft through pinion gears. Through strainer (2) the oil pump draws the oil from the crankcase oil sump (7) and pumps it through oil filter (3). This filter is fitted with a changeable cartridge which efficiently eliminates even the finest particles ⟨≥10µ⟩ from the oil.

After the oil filter (3) the oil flow is split: through injector (4) the oil enters the stepped piston of the 1st/2nd stage. It is

sprayed from below against the piston head of the stepped piston where it is atomized and lubricates piston and cylinder. Drip oil reaches the rotating crankshaft with its connecting rods where it is agitated to lubricate the moving parts of the compressor. Through oil jet (8) the oil is forced to the 4th stage cylinder where it lubricates piston and cylinder.

The oil pressure in the lubricating system is indicated on pressure gauge (6) and monitored by oil pressure switch (5). If the oil pressure falls below 1.8 bar (26 psi), the oil pressure switch reports the failure to the monitoring unit which in turn shuts off the compressor.

2.1.3. K25.9, K25.18

The compressor is provided with a forced-feed lubrication system. Fig. 21 shows the mode of operation.

The oil pump equipped with a regulating valve (1) is driven by the crankshaft through pinion gears. Through strainer (2) the oil pump draws the oil from the crankcase oil sump (9) and pumps it through oil filter (3). This filter is fitted with a changeable cartridge which efficiently eliminates even the finest particles (≥10µ) from the oil. After the oil filter the oil flow is split: through injection pipe (4) the oil enters the crankcase. It is sprayed against the rotating crankshaft with its connecting rods where it is agitated to lubricate the moving parts of the compressor.

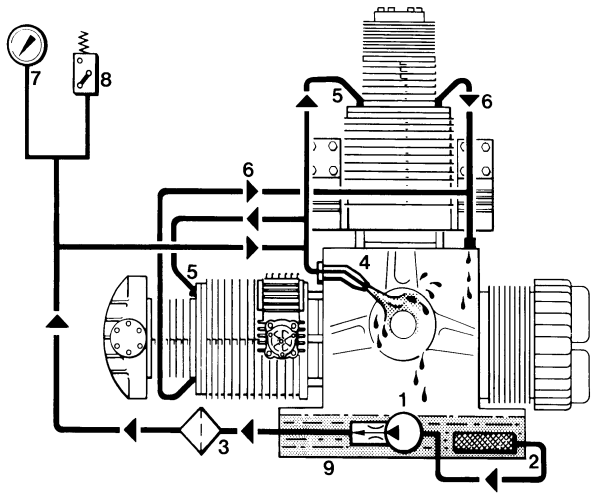


Fig. 21 Lube oil circuit, K25.9, K25.18

1 Oil pump with regulating valve
2 Oil strainer
3 Oil filter
4 Injection pipe
5 Oil jet
6 Feedback line
7 Oil pressure gauge
8 Oil pressure switch
9 Oil sump

The other lines lead to oil jets (5) in the 4th and 5th stage cylinders which lubricate the high pressure pistons with piston rings.Through feedback lines (6) the oil is routed back into the oil sump. The oil pressure in the lubricating system is indicated on pressure gauge (7) and monitored by oil pressure switch (8). If the oil pressure falls below 1.8 bar (26 psi), the oil pressure switch reports the failure to the monitoring unit which in turn shuts off the compressor.

2.2. TYPE OF OIL

For proper care and maintenance of the compressor, using the correct oil is of vital importance. Depending on the application of the compressor, the requirements placed on the oil are:

- low deposits
- no carbonizing effect, especially in the valves
- good anti-corrosive properties
- emulsification of the condensate in the crankcase
- for breathing air application, also physiological and toxicological suitability.

Due to the thermal load on the compressor only high quality oil should be used. You are recommended to restrict oils to those which have been approved by us and are listed in our lubricating oil list. This list is available through our Technical Service Department.

The current oil list is provided in section F. Order this list regularly through the BAUER Technical Service Department.

For operation under difficult conditions such as continuous running and/or high ambient temperatures we recommend the use of BAUER high performance compressor oils, only, according to the oil list. These oils are tested in our compressors and have proved excellent quality under ambient temperatures between +5 °C (41 °F) and +45 °C (113 °F). For lower temperatures, a heating device is required which is capable of pre-heating the crankcase up to +5 °C (41 °F).

All our compressor units are delivered ex-works with lubricating oil N28355 or N26303 (natural gas compressors).

For operation under less severe conditions we can also recommend mineral compressor oils which are suitable for operation under ambient temperatures between +5 °C (41 °F) and +35 °C (95 °F). Here also, pre-heating is required for lower temperatures.

2.2.1. Changing the oil type

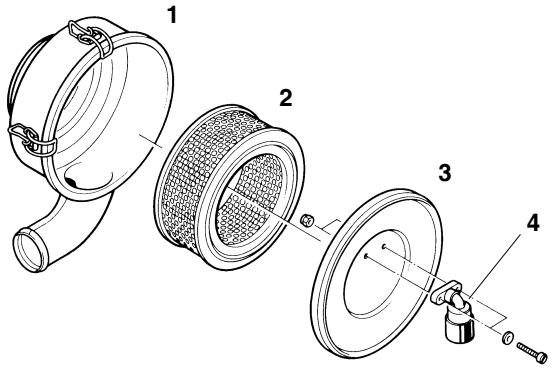
When changing the oil type the instructions given in section D-2. must be observed!

3. INTAKE FILTER

3.1. AIR COMPRESSORS

Dry micronic filters are used to filter intake air, see Fig. 22 and Fig. 23. They are fitted with replaceable filter cartridges.

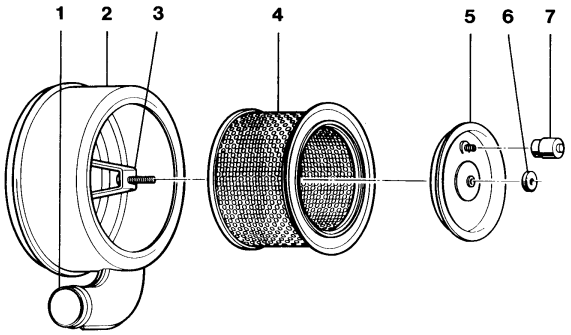
3.1.1. K22



1 Filter housing
2 Filter element
3 Cover
4 Service indicator

Fig. 22 Intake filter K22

3.1.2. K23



1 Air intake port
2 Filter housing
3 Bracket
4 Filter element
5 Cover
6 Knurled nut
7 Service indicator

Fig. 23 Intake filter K23

3.1.3. K25, K28

The intake filter is a dry filter (Donaldson system) as shown in Fig. 24.

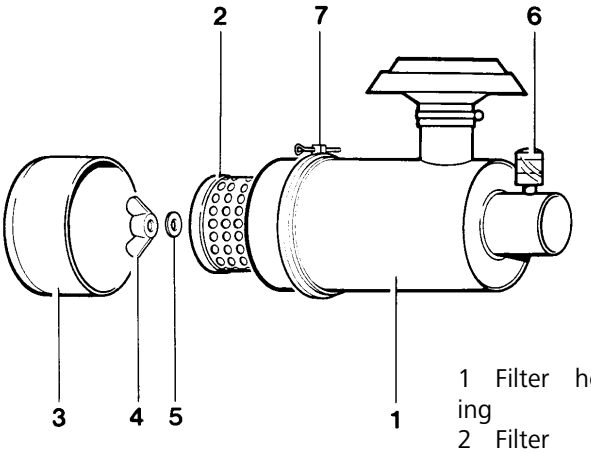


Fig. 24 Intake filter K25, K28

1 Filter housing
2 Filter element
3 Dust collector
4 Wing nut
5 Sealing ring
6 Vacuum gauge
7 Clamp screw

3.2. GAS COMPRESSORS

3.2.1. Intake pressure reduction

The gas compressor draws the medium to be compressed from a line system, a gas balloon, or from gas bottles.

In order for the compressor to work satisfactorily, it is essential to supply the medium at a constant pressure. Therefore, a pressure reducer in the intake line is necessary if the supply pressure is above atmospheric pressure or fluctuating (e.g. when emptying gas bottles). For max. intake pressure see technical data, 1.3. Depending on the model and order, the units are fitted with a 1 or 2 stage pressure reduction system. An intake expansion tank between pressure reducer and compressor may also be necessary. It compensates for the pressure surges caused by the piston of the 1st stage. On **BAUER** gas compressor units this is effected by a special intake filter with gas-tight housing, see Fig. 26 and flow diagram in section F.

Pneumatic monitoring of the intake pressure is carried out by means of a safety valve S6 with a blow-off pressure setting of 0.5 bar connected to the gas intake manifold. In addition, the intake pressure is monitored by minimum pressure switch D7 and maximum pressure switch D8.

On G and C models, the blow-off line of final pressure safety valve S5 and the collection line from intermediate safety valves S1 to S3 - the latter through non-return valve R1.2 with intermediate pressure switch D10 - are led back to the intake filter.

3.2.2. Supply of the medium

There are three possible methods of supplying the medium to the compressor.

Two-stage intake pressure reduction with supply from storage bottles, high pressure systems.
Supply pressure: 201 to 16 bar absolute (2,915 to 232 psia).

The medium flows through gas inlet connection A to pressure reducers J1 and J2 which reduce the bottle pressure in two stages to an intake pressure of approx. 1 bar abs. (14.5 psia).

Bottle pressure, or supply pressure is indicated on pressure gauge M6. When supplying the system from bottles, pressure switch D9 prevents the bottles from being completely emptied. It shuts the compressor down if bottle pressure falls below 3 bar abs.

The pressure reduction system is protected by safety valve S8 and the pressure is indicated on pressure gauge M9. The intake pressure is monitored by a minimum pressure switch D7 and a maximum pressure switch D8, and is indicated on pressure gauge M7. The medium flows over non-return valve to the intake expansion tank.

One-stage intake pressure reduction with supply from low pressure systems.
Supply pressure: below 16 bar absolute (232 psia).

The medium flows through gas inlet connection A to dome pressure reducer J5 which reduces the supply pressure to an intake pressure of approx. 1 bar abs. (14.5 psia). The control pressure for J5 is set with pressure reducer J3, protected by safety valve S8 and indicated on pressure gauge M9.

Supply pressure is indicated on pressure gauge M6.

The intake pressure is monitored by a minimum pressure switch D7, and a maximum pressure switch D8, and is indicated on pressure gauge M7. The medium flows over non-return valve R1 to the intake expansion tank.

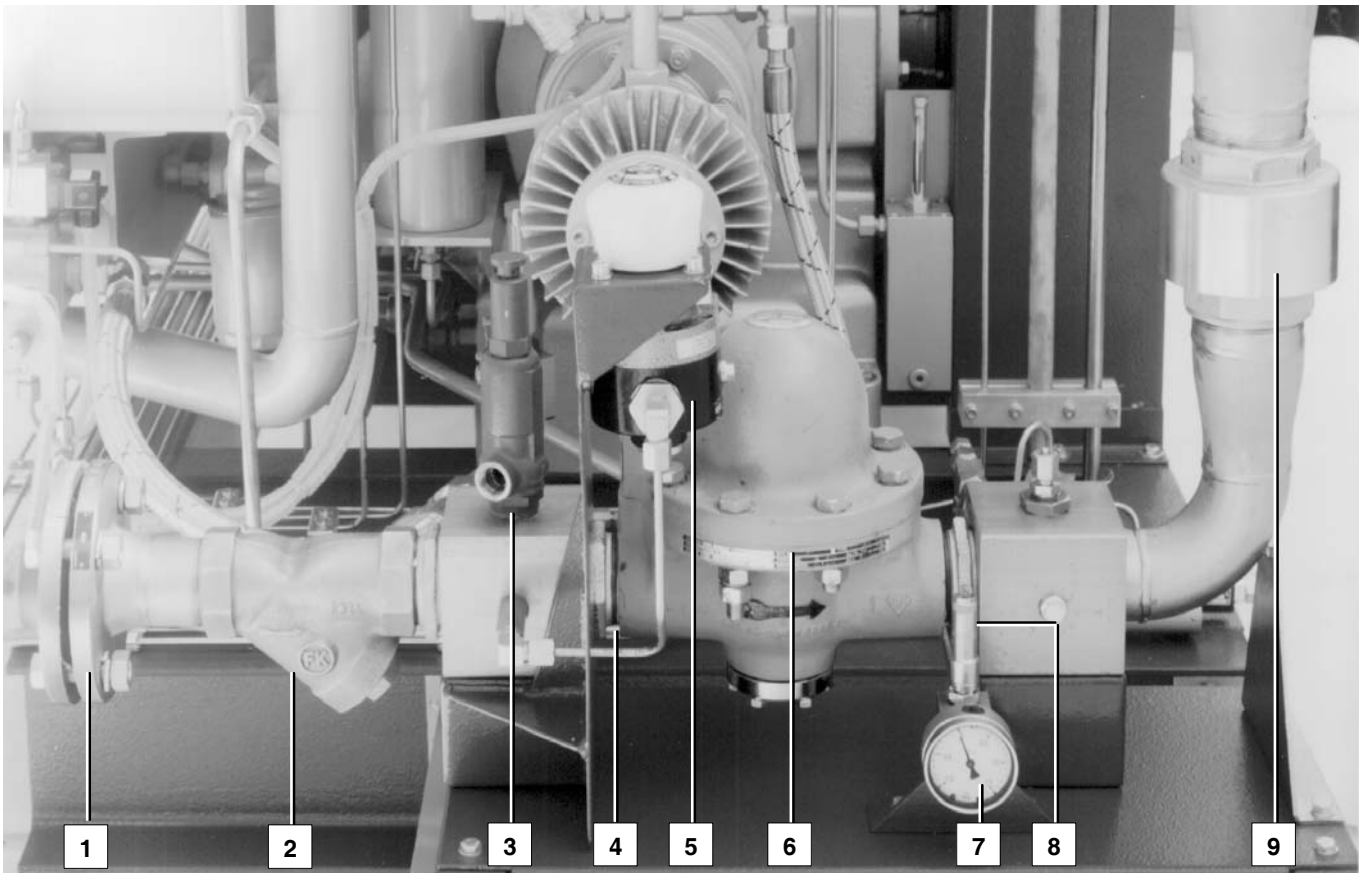


Fig. 25 One stage intake pressure reduction, shown: GI 28.0

1 Gas intake A
2 Particle filter A3
3 Safety valve, inlet pressure S7
4 Control line
5 Control pressure reducer J3
6 Dome pressure reducer J5
7 Pressure gauge, control pressure M9
8 Safety valve, control pressure S8.1
9 Non-return valve R1

3.2.3. Atmospheric intake pressure with supply from gas balloons or cryostats.

The medium flows through gas inlet connection A directly to the compressor. Supply pressure is indicated on pressure gauge M6.

The intake pressure is monitored by a minimum pressure switch D7 and a maximum pressure switch D8 and is indicated on pressure gauge M7. The medium flows over non-return valve R1 to the intake expansion tank.

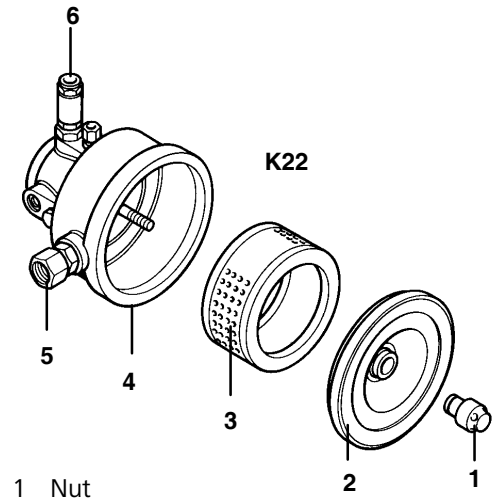
WARNING

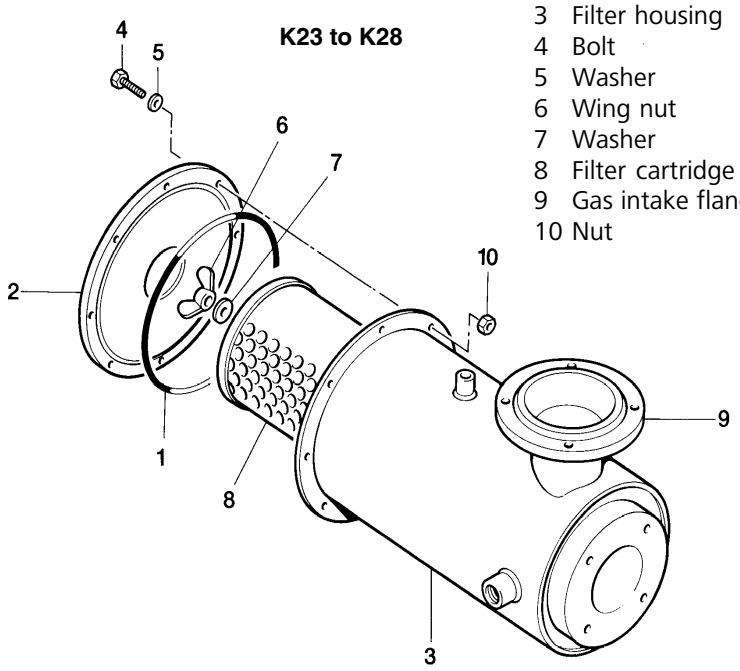
- EXPLOSIVE GAS UNITS ONLY - Before taking unit into operation, unit must be evacuated and flushed with its own gas or nitrogen for safety purposes according to applicable regulations.

Under no circumstances must the compressor be operated with intake shut-off solenoid valve closed or intake line closed by other means. Do not override monitoring unit to restart compressor before fault has been cleared. Otherwise EXPLOSION MAY OCCUR due to air/gas mixture being formed by air drawn in through seals and pistons from crankcase.

3.2.4. Gas intake filter

A dry micronic filter with gas-tight housing is used to filter the gas taken in by the compressor, Fig. 26. Depending on the compressor model, the filter is mounted either directly at the intake port of the 1st stage valve head, or on the frame and connected through a hose to the 1st stage valve head.





1 Nut
2 Cover
3 Filter cartridge
4 Filter housing
5 Gas intake
6 Safety valve

1 O-ring
2 Cover
3 Filter housing
4 Bolt
5 Washer
6 Wing nut
7 Washer
8 Filter cartridge
9 Gas intake flange
10 Nut

Fig. 26 Gas intake filter

4. INTERMEDIATE SEPARATORS

Intermediate separators are mounted on the compressor block after 2nd and 3rd stages, and on 5-stage blocks after 4th stage. These separators are designed to remove water and oil accumulating due to cooling the compressed medium down after the compression process.

4.1. K22

Separation is achieved by means of a helical insert (2, Fig. 27) in the separator after 3rd stage. On this block, condensate collectors are mounted on the coolers for the 1st and 2nd stage which are also drained by the automatic condensate drain unit.

4.2. K23

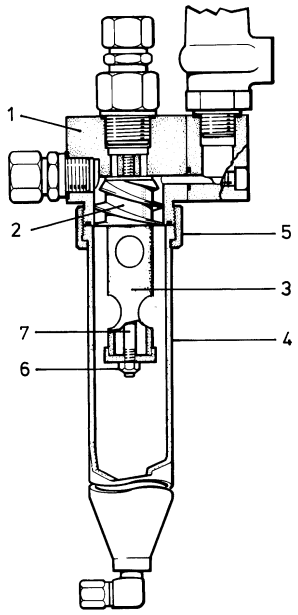
Separation of the oil and water is achieved by means of centrifugal action provided by a helical insert (1, Fig. 28 and Fig. 27).

On compressor block K23 an additional condensate separator is provided after the 1st stage.

4.3. K25, K28

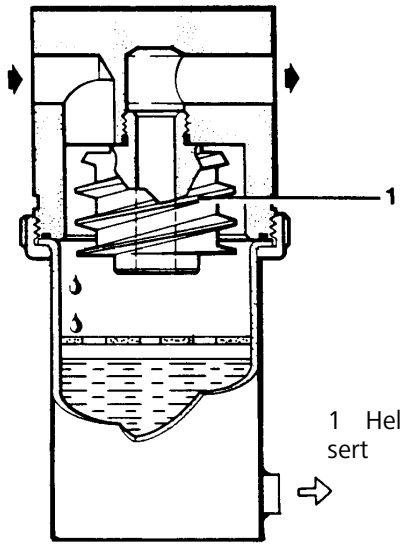
Separation of the oil and water is achieved by means of centrifugal action provided by a helical insert (1, Fig. 29 und Fig. 30).

An additional condensate separator is provided after the 1st stage.



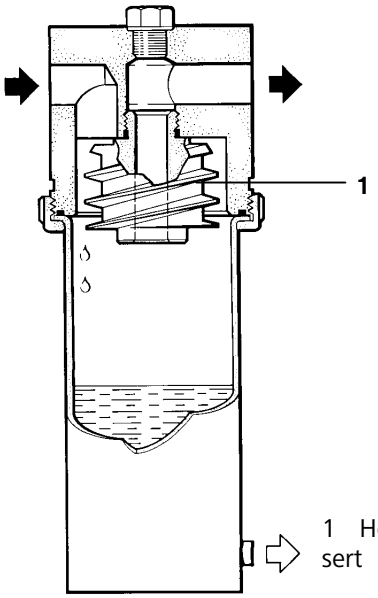
1 Filter head
2 Helical insert
3 Distance tube
4 Filter housing
5 Cap nut
6 Fastening nut
7 Stud

Fig. 27 Intermediate separator 3rd stage, K22/23



1 Helical insert

Fig. 28 Intermediate separator 2nd stage, K23



1 Helical insert

Fig. 29 Intermediate separator 2nd stage, K25/28

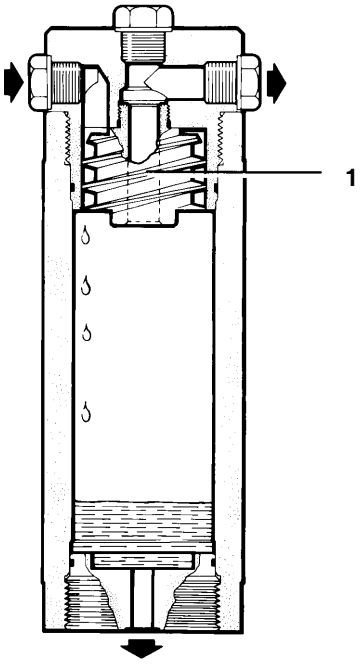


Fig. 30 Intermediate separator 3rd stage, K25/28 or 3rd and 4th stage K25.9 and K25.18

5. FINAL SEPARATOR / FILTER SYSTEM

5.1. OIL AND WATER SEPARATOR

All compressor blocks are equipped as standard with a final separator which is mounted directly on the block.

5.1.1. Compressor blocks up to 350 bar final pressure

The compressed medium leaving the final stage is cooled in the after-cooler to approx.10 to 15 °C (18-27 °F) above ambient temperature and then enters the oil and water separator, see Fig. 31.

Separation is achieved by means of the action provided by a centrifugal insert (1).

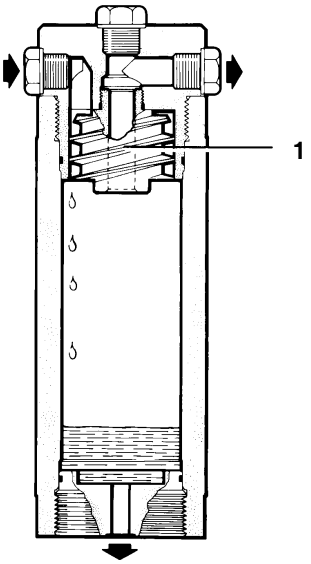
5.1.2. Compressor blocks up to 500 bar final pressure

The compressed medium leaving the final stage is cooled in the after-cooler to approx.10 to 15 °C (18-27 °F) above ambient temperature and then enters the oil and water separator, see Fig. 32. The oil and water separator is standard equipment for all industrial compressor units. Separation is achieved by means of the action provided by a vortex plate (1).

The oil and water separator is subject to dynamic load. It is designed to withstand up to 360,000 load cycles for a pressure variation of 500 bar. 1 load cycle = 1 pressurization, 1 depressurization. When the maximum number of load cycles has been reached, the oil and water separator must be changed.

The maximum recommended amount of four load cycles per hour should not be exceeded.

If it is possible to regulate the operation of the unit to such a degree as to achieve four load cycles per hour, in our opinion this would be an optimum between usage and actual life.



1 centrifugal insert

Fig. 31 Final separator 4th stage

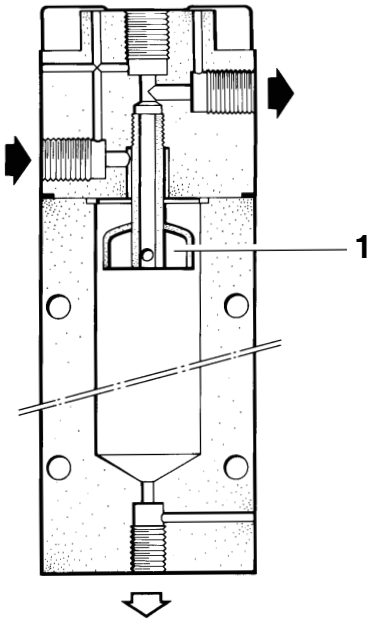


Fig. 32 Oil and water separator, units up to 500 bar

5.2. OIL AND WATER SEPARATOR (FILTER SYSTEMS)

In addition to the final separator on the compressor block, the following filter systems are equipped with their own oil and water separator which is mounted on the unit with the other filters.

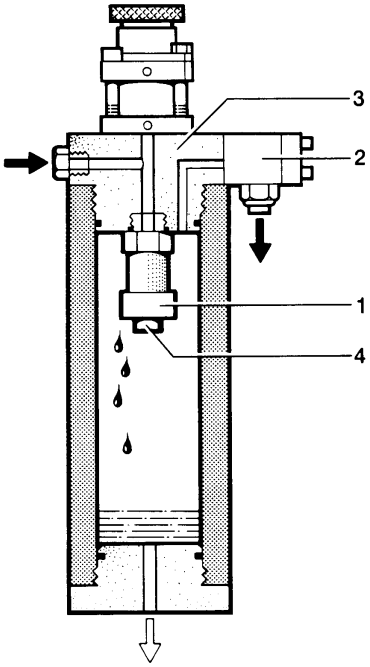


Fig. 33 Oil and water separator, air units

The oil and water separator is equipped with a sintered metal micro-cartridge which reliably removes liquid oil and water particles.

The oil and water separator is subject to dynamic load. It is designed to withstand up to 85,000 load cycles for a pressure variation of 350 bar. 1 load cycle = 1 pressurization, 1 depressurization. When the maximum number of load cycles has been reached, the oil and water separator must be changed.

The maximum recommended amount of four load cycles per hour should not be exceeded.

If it is possible to regulate the operation of the unit to such a degree as to achieve four load cycles per hour, in our opinion this would be an optimum between usage and actual life.

5.3. FILTER SYSTEMS P80, P100, P120 und P140 (OPTION)

Unlike other filter systems the **SECURUS** filter system ensures continuous monitoring of the breathing air purification parameters while the air is still in the regeneration process. The influences of

- ambient temperature
- ambient humidity
- temperatures of the compressor and regeneration system are taken into consideration.

The exchangeable **SECURUS** cartridges are designed for

- drying of air
- adsorption of aromatic components (aerosols)
- partial conversion of CO into CO_2
- partial adsorption of CO_2

The quality of the breathing air produced conforms to the national and international

- DIN EN 12021
- STANAG 1079 MW
- British Standard 4001
- US CGA Spec. G.7.1
- Canada CSA Standard Z 180.1
- Australian Army Standard 5017

It is impossible to exceed the cartridge utilization time since a preliminary warning message indicates the approaching saturation of the cartridge. Depending on the size of compressor used, the prewarning message will appear between 1 and 7 hours prior to cartridge saturation. If the cartridge is not replaced after indication of the preliminary warning message, the **SECURUS** filter system will automatically shut down the compressor as soon as the cartridge has been exhausted. The compressor cannot be turned on as long as no cartridge has been inserted.

The **SECURUS** filter system operates in the FAIL-SAFE mode: the compressor will be shut down if the circuit between the control unit and the sensor is interrupted.

As soon as the preliminary warning message appears or, at the latest, after the B-Control unit has shut down the system, the cartridges of all filters within the systems must be changed, see chapters D-5.2.4. and D-5.2.5. For description and operation of the B-Control system see chapter A-11.

5.3.1. Description

The breathing air filter system (Fig. 34) consists of:

- Oil and water separator
- Non-return valve between separator and purifier
- 2 drying filters (exception: P81, P121 = 1 drying filter)
- Final purifier
- **SECURUS** sensor head
- CO filter a)
- Venting valve with pressure gauge
- Pressure maintaining/non-return valve

The system is integrated into the compressor unit, i.e. the filters and other components are mounted on the frame, the pressure gauges are on the filling panel or mounted on a console and connected to the unit on installation. If the **SECURUS** monitoring system is provided, the breathing air regeneration process and the degree of dryness of the air are continuously monitored during the regeneration process by measuring the cartridge saturation within the filter cartridge.

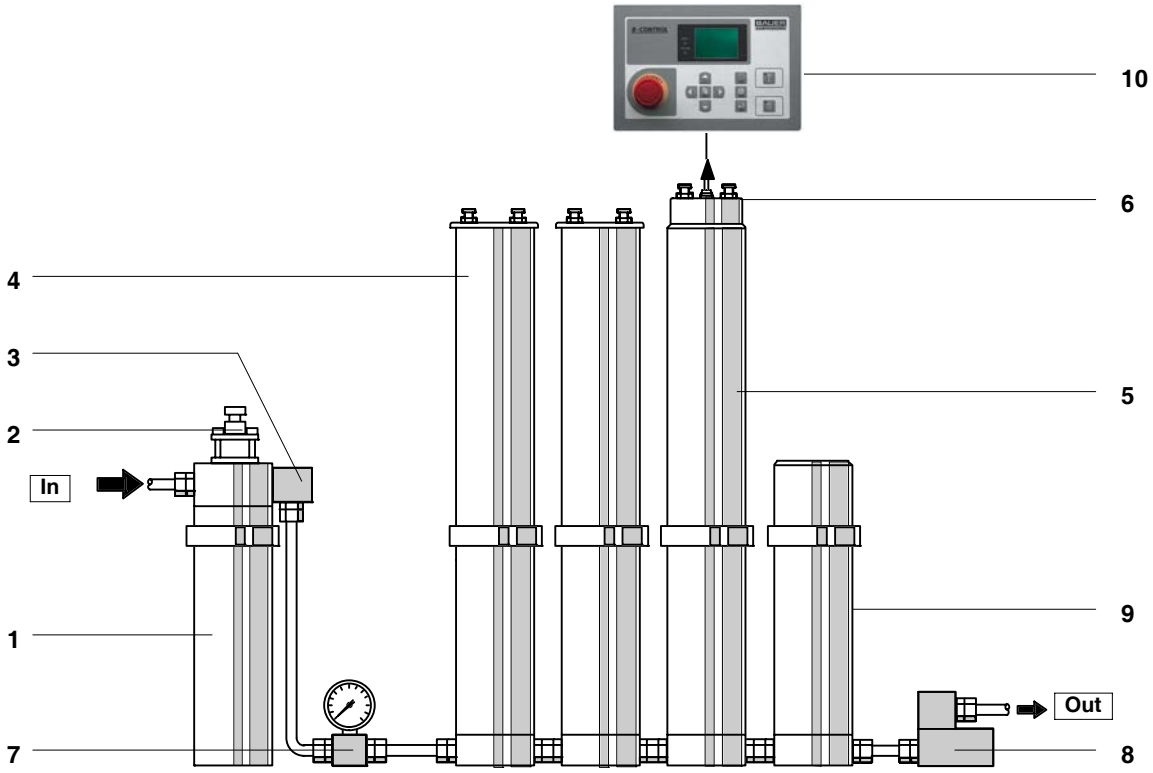


Fig. 34 Filter system P100 with **SECURUS** monitoring device

1 Oil and water separator
2 Final pressure safety valve
3 Non-return valve
4 Drying filter
5 Final purifier
6 **SECURUS** sensor head
7 Venting valve with pressure gauge
8 Pressure maintaining/non-return valve
9 CO filter a)
10 B-Control control panel

a) optional extra

5.3.2. Technical data

a. General

Service pressure, max.	350 bar
Flow rate	P80: max. 1000 l/min. P100: max. 1000 l/min. P120: max. 2200 l/min. P140: max. 3500l/min.
Regenerated volume of air, referred to 1 bar abs., 20 °C, flow rate 200 l/min. against 200 bar	P80: 3513 m^3 P100: 5414 m^3 P120: 10645 m^3 P140: 16421 m^3
Operating temperature range	+5 ... +50°C (41 ... 122°F)
Residual water contents	< 10 mg/m^3
Residual oil vapour contents	< 0.1 mg/m^3
Residual CO contents	< 5 ppm_V
Residual CO_2 contents	< 500 ppm_V
Pressure dew point	-20 °C, 3 mg/m^3 at 300 bar
Solid particles, max. concentration	5 mg/m^3
Particle size	<5 µ

b. High pressure filter assemblies

Oil and water separator P80, P100

External diameter	95 mm
Length	300 mm
Water volume	0,54 l
Weight	9 kg
Tube connections	G 1/4”
Max. no. of load cycles	Refer to pressure vessels instruction manual

Oil and water separator P120, P140

External diameter	100 mm
Length	835 mm
Water volume	2,85 l
Weight	10,2 kg
Tube connections	G 3/8”
Max. no. of load cycles	Refer to pressure vessels instruction manual

Final purifier P80, P100

External diameter	100 mm
Length	835 mm
Water volume	2.85 l
Weight	10.6 kg
Tube connections	G 3/8”

Final purifier P120, P140

External diameter	175 mm
Length	900 mm
Water volume	9.85 l
Weight	28 kg
Tube connections	G 1/2″

c. Filter cartridges for P filter systems

Order no.	Denomination	Filter system	Cartridge contents [a)]	Elimination	Length inch
058823	Multiplex	P80/P100	AC	H2O/oil	27″
058825	Multiplex	P80/P100	MS/MS/MS/MS	H2O	27″
058826	Multiplex	P80/P100	MS/MS/AC/MS	H2O/oil	27″
060036	Multisec	P80/P100	MS/MS/AC/MS/SEC	H2O/oil	27″
063282	Multiplex	P80/P100	HP/HP/HP/HP	CO	10″
068622	Multiplex	P80/P100	AC/MS	oil/H2O	27″
090984	Multisec	P80/P100	AC/MS/SEC	oil/H2O	27″
067097	Supersec	P120/P140	MS/AC/MS/MS/SEC	H2O/oil	27″
067099	Super-Jumbo	P120/P140	MS/MS/MS/MS	H2O	27″
067812	Super-Jumbo	P120/P140	AC	oil	27″
065562	Multiplex	P120/P140	HP/HP/HP/HP	CO	27″
068067	Multisec	P120/P140	MS/MS/MS/MS/SEC	H2O	27″

d. Electrical specifications

See chapter A-11.

a) SM = Sintered metal cartridge, MS = Molecular sieve, AC = Activated charcoal, HP = Hopcalite, SEC = Securus

6. PRESSURE MAINTAINING/NON-RETURN VALVE

6.1. COMPRESSOR UNITS UP TO 350 BAR FINAL PRESSURE

A pressure maintaining and a non-return valve are provided downstream of the filter system. Refer to flow diagram in section F. The combined pressure maintaining/non-return valve is mounted on the frame of the compressor unit for Standard models or on the instrument panel for Super-Silent units.

The pressure maintaining valve ensures that pressure is built up in the filters even from the start of delivery, thus achieving a constant, optimum filtration. It will also guarantee proper working conditions for the final stage cylinder.

On units equipped with a filter system, an additional non-return valve is mounted after the oil and water separator - flanged directly to the filter head. It prevents already filtered medium from flowing back from the downstream filters when draining condensate from the oil and water separator.

The adjustment of the pressure maintaining valve depends on the operating pressure of the unit:

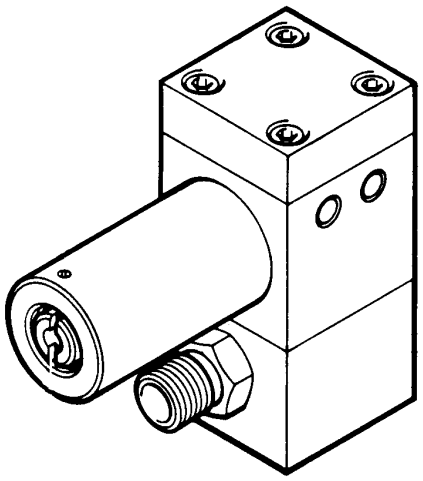


Fig. 35 Pressure maintaining valve, 350 bar units

Operating pressure of the unit	Adjusted opening pressure
75 - 90 bar	100 bar
220 - 350 bar	150 bar

6.2. COMPRESSOR UNITS UP TO 500 BAR FINAL PRESSURE

On units with a max. operating pressure of 500 bar the pressure maintaining/non-return valve KB 068275-341 (Fig. 36) is used. It is adjusted to **280 ±10 bar**.

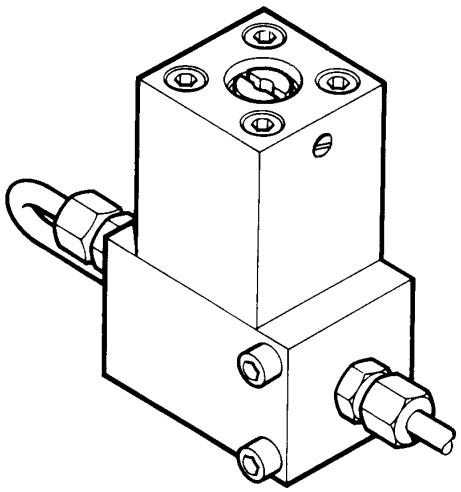


Fig. 36 Pressure maintaining valve, 500 bar units

7. SAFETY VALVES

All compressor stages are protected by safety valves.

The safety valves are adjusted as follows:

All safety valves are sealed at the factory and adjusted to the corresponding pressure. The safety valve for protection of the **last stage** (final pressure safety valve) is adjusted according to order, see 14., Technical data, but maximally to the values given above.

On breathing air units the final pressure is limited to the filling pressure of 225 or 330 bar.

Compressor block	1st stage	2nd stage	3rd stage	4th stage	5th stage
K22.0, K22.0 GI	5 bar	20 bar	90 bar	365 bar	---
K22.0 G	5 bar	24 bar	80 bar	365 bar	---
K22.0 C	5 bar	24 bar	100 bar	365 bar	---
K23.0, K23.0 GI	5 bar	24 bar	80 bar	365 bar	---
K23.1 G	5 bar	24 bar	80 bar	225 bar	---
K23.1 C	7 bar	26 bar	100 bar	365 bar	---
K25.0, K25.0 GI	5 bar	24 bar	80 bar	365 bar	---
K25.0 C	5.4 bar	26 bar	105 bar	365 bar	---
K28.0, K28.0 GI	5 bar	24 bar	80 bar	365 bar	---
K28.0 C	5.4 bar	28 bar	115 bar	365 bar	---
K25.9, K25.9 GI	5 bar	24 bar	70 bar	170 bar	500 bar
K25.9 G	5 bar	24 bar	70 bar	190 bar	365 bar
K25.18, K25.18 GI	5 bar	24 bar	70 bar	170 bar	500 bar
K25.18 G	5 bar	24 bar	80 bar	200 bar	365 bar

8. PRESSURE GAUGES

The intermediate pressures, the final pressure and the oil pressure can be monitored by means of the pressure gauges on the instrument panel. During operation the gauges should indicate the correct pressures.

8.1. INTERMEDIATE PRESSURE GAUGES

Intermediate pressure gauges are standard equipment for all compressor units. During operation the correct pressures as shown in chapter 1.3, Technical Data, should be indicated.

8.2. FINAL PRESSURE GAUGE

The final pressure gauge shows a mark indicating the maximum operating pressure.

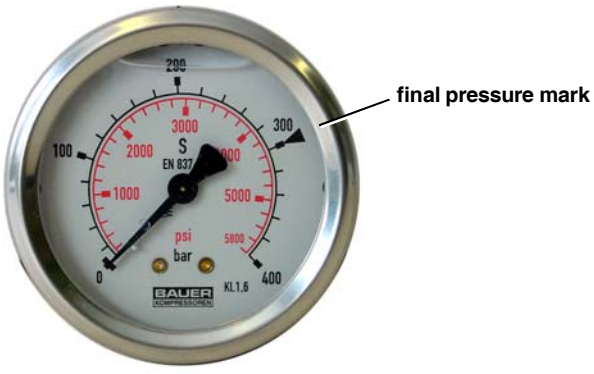


Fig. 37 Final pressure gauge

For digital final pressure indication see chapter A-11.

8.3. OIL PRESSURE GAUGE

The instrument panel also includes the oil pressure gauge. Correct oil pressure indication for **K22 and K23** blocks should read approx. **2.5 bar,** for **K25 and K28** blocks approx. **3.5 bar.** If not, check the lube oil circuit or adjust the oil pressure. See chapter D-2.

For oil pressure monitoring, see chapter A-11.

8.4. INTAKE PRESSURE GAUGE

Gas compressor units have an additional pressure gauge for the pressure applied to the first stage of the compressor. The intake over-pressures listed in para. 1.3, Technical Data, must not be exceeded.

For intake pressure monitoring, see chapter A-11.

8.5. INLET PRESSURE/BOTTLE PRESSURE GAUGES

Gas compressor units with intake pressure reduction are equipped with a pressure gauge indicating the intake pressure applied to the compressor unit. For two-stage intake pressure reductions an additional pressure gauge for the intermediate pressure between 1st and 2nd stage of the reduction line is provided. Refer to gas flow diagram in the annex, section F. For intake pressure reduction see chapter A-3.

9. VALVES

9.1. FUNCTIONAL DESCRIPTION

Note that the valves are operated by the flow of the medium. On the suction stroke, the intake valves open and the medium flows into the cylinders. At the start of the compression stroke the intake valve closes and the medium opens the pressure valve, Fig. 38.

For the description of the individual valves of all compressor blocks, see chapter D-9.

The valve heads of the individual stages form the top part of the cylinders. The intake and pressure valves are fitted inside the valve heads.

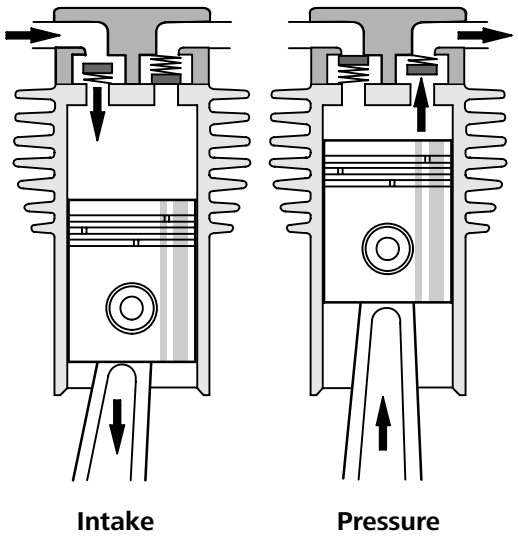


Fig. 38 Valve operation

10. AUTOMATIC CONDENSATE DRAIN

10.1. PURPOSE AND SHORT DESCRIPTION

The automatic condensate drain unit (Fig. 39) drains the intermediate separators and the oil and water separator every 15 minutes during operation. In addition, the automatic condensate drain is designed to drain these filters after shutdown of the compressor unit, and to unload the compressor during the starting phase, see section 10.4. and 10.5.

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

- Four or five pneumatically operated condensate drain valves, one each for the intermediate separators and for the oil and water separator after the last stage. The condensate drain valves for the intermediate separators are of the normally open type, the one for the oil and water separator after the last stage is closed without control medium being applied (normally closed type).
- Four or five solenoid valves for control medium, normally closed type, mounted on top of the condensate drain valves.
- A condensate manifold.
- An electrical timer for every drain valve. The timers do not operate synchronously i.e. 1st, 2nd, 3rd and 4th stage are drained periodically at equal time intervals, but not at the same time.

On units with B-CONTROL compressor control the timers are integrated and the intervals are set with the control panel, see section A-11.

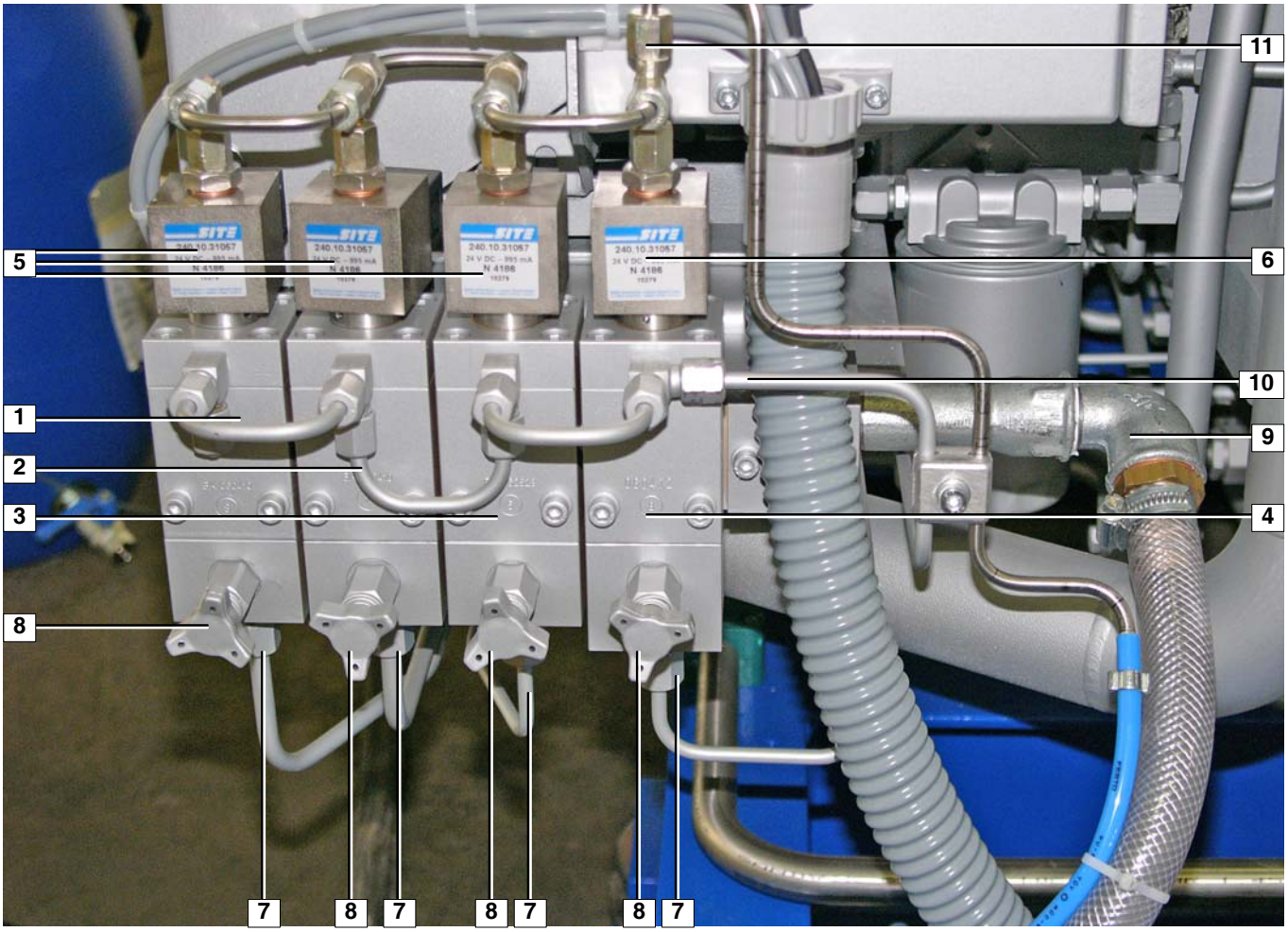


Fig. 39 Automatic condensate drain unit, 4-stage units

1 Condensate drain valve, intermediate separator 1st stage
2 Condensate drain valve, intermediate separator 2nd stage
3 Condensate drain valve, intermediate separator 3rd stage
4 Condensate drain valve, oil and water separator (compressor block)
5 3/2-way solenoid valve, 1st, 2nd and 3rd stage
6 3/2-way solenoid valve, 4th stage
7 Condensate inlet connection (tube connector)
8 Manual condensate drain tap
9 Condensate outlet (tube connector)
10 Control medium connection
11 Control medium feedback

10.2. OPERATION

The condensate drain valves are operated pneumatically via a normally closed 3-way solenoid valve by an electrical signal. The required control medium applied to the solenoid valve is taken from the intermediate separator after the second stage.

At compressor start-up, condensate drain valves (1), (2) and (3) are open, (4) is closed by spring pressure.

After start-up of the compressor, i.e. after the star-delta starter has switched from star to delta phase, 3/2-way solenoid valves (5) are energized and open, 3/2-way solenoid valve (6) is not energized and remains closed. So the control medium is applied to condensate drain valves (1), (2) and (3), only. The servo-pistons (7) are pressed onto the valve seats (8) and the condensate drain valves close.

The condensate drain valve (4) is not pressurized by the control medium. It remains closed by spring pressure and due to the pressure build-up of the compressor.

The compressor delivers compressed medium to the connected systems.

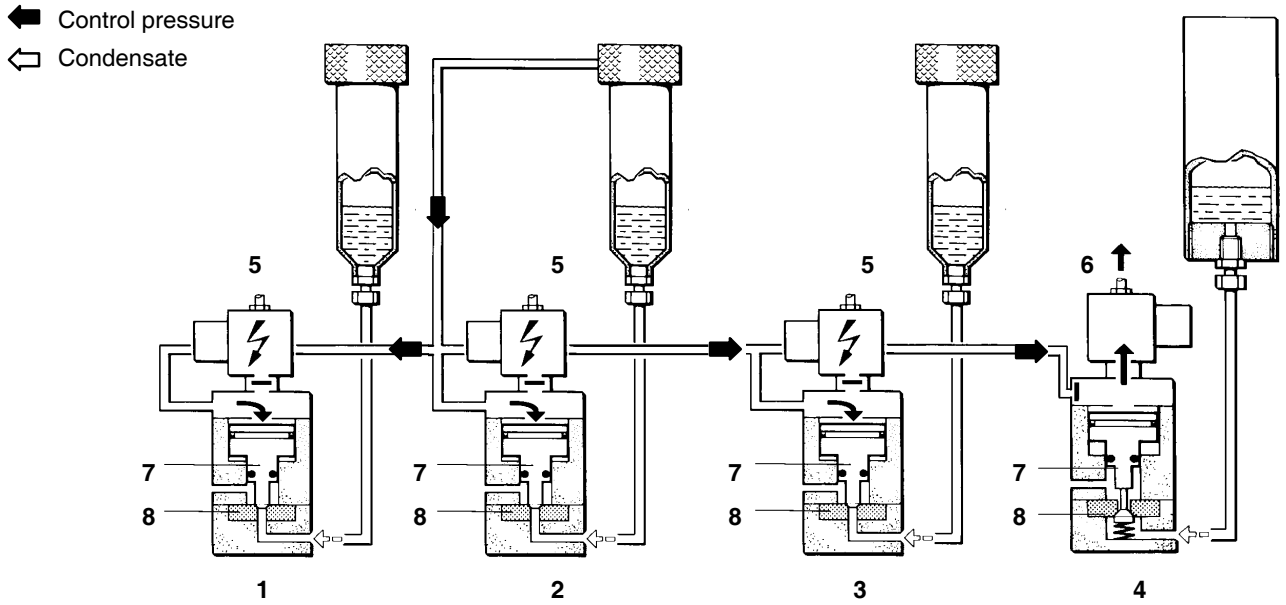


Fig. 40 Automatic condensate drain unit at normal operation

1 Condensate drain valve 1st stage
2 Condensate drain valve 2nd stage
3 Condensate drain valve 3rd stage
4 Condensate drain valve 4th stage
5 3/2-way solenoid valve, 1st/2nd/3rd stage
6 3/2-way solenoid valve, 4th stage
7 Servo-piston
8 Valve seat

10.3. CONDENSATE DRAIN

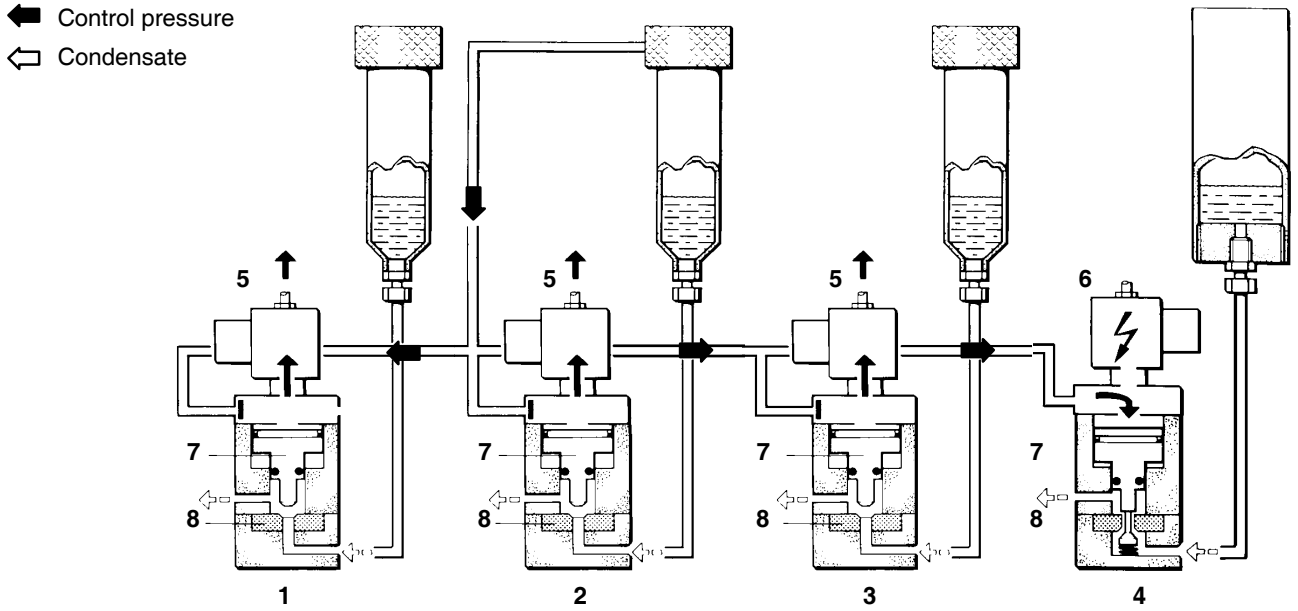


Fig. 41 Automatic condensate drain unit at condensate drain

Every 15 minutes, but independently from each other, 3/2-way solenoid valves (5) are deenergized for approx. 6 seconds by the timers and close. The control pressure is relieved from the servo-pistons (7) of the condensate drain valves (1), (2) and (3) and the pistons are raised from the valve seats (8) by the 2nd stage pressure. The condensate from the intermediate separators is drained.

After 6 seconds, the solenoid valves open again, and open the control pressure path from the 2nd stage. The servo-pistons are pressed down again and the valves close.

Also every 15 minutes, and also independently from solenoid valves (5), 3/2-way solenoid valve (6) is energized for approx. 3 seconds by the fourth timer and opens. The control pressure pushes down the servo-piston (7) of the condensate drain valve (4), the piston is raised from valve seat (8) and the condensate from the oil and water separator after the last stage is drained.

After the 3 seconds, the solenoid valve closes again and shuts off the control medium path from the 2nd stage separator. The servo-piston is unloaded, the control pressure vented through the relief port of the solenoid valve. The piston of the drain valve is raised by the pressure from the last compression stage and the valve closes again for nomal operation.

10.4. START UNLOADING

The unloading of the compressor during the starting phase of the compressor is effected due to the lack of control medium immediately after switching on the unit. After the compressor has attained nominal speed, control medium starts to flow through open solenoid valves (5) to the condensate drain valves. These close and the compressor starts delivering to the consuming device.

10.5. STANDSTILL DRAINAGE

At compressor shut-down, solenoid valves (5) are deenergized, open and vent condensate drain valves (1) (2) and (3). The valve pistons are raised by the residual pressure within the filters and separators. The valves open, and the filters are drained at standstill of the compressor unit.

For drainage of the 4th stage, please take note of chapter 10.7.

10.6. CONDENSATE DRAIN PIPING

Dispose of the 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.

When laying the condensate drain piping, ensure that the cross-section of the downstream condensate piping is greater than the cross-section of the compressor unit condensate outlet coupling. If this is not the case, drainage of the condensate would be impeded, resulting in damage to the unit.

Condensate tank:

The condensate tank is an optional extra for all compressor units.

Gas feedback system:

Gas units (except for GI models) are equipped as standard with a gas feedback system with condensate separator. See section B.

10.7. ELECTRICAL CONNECTION

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

The condensate drain interval is adjusted in the factory to 15 minutes. If the regular operating time of the compressor unit is under 15 minutes, adjust the timer for the last stage (normally K10.4) accordingly to ensure regular draining of the oil and water separator. Otherwise due to shutting off the unit, e.g. every 10 minutes, the timer would be reset each time causing the 15 minutes period to be started again. Condensate drain would never be reached which could result in flooding of the separator and damage to the connected systems.

On units with B-Control compressor control unit the intervals are set on the control panel, see section A-11. This control unit also ensures drainage of the last stage separator at unit shut-down.

10.8. CONDENSATE COLLECTOR

BAUER industrial compressor units are equipped as standard with a condensate collecting system (Fig. 42). It serves as a central collector of the accumulated condensate and separates the condensate from the air.

The condensate collecting tank is equipped with a mechanical level indicator for optical pre-warning for exchange when due. In addition, the compressor can be automatically switched off by a max. level contact, or an alarm system provided by the customer can be activated. The separated air is passed through activated charcoal so that only clean and odourless air is delivered, in accordance with TRG regulations.

The condensate tank is fitted to the condensate outlet connector through by hose. The G 3/4" inlet connector is used for Verticus compressor units. Refer to drawing in the annex.

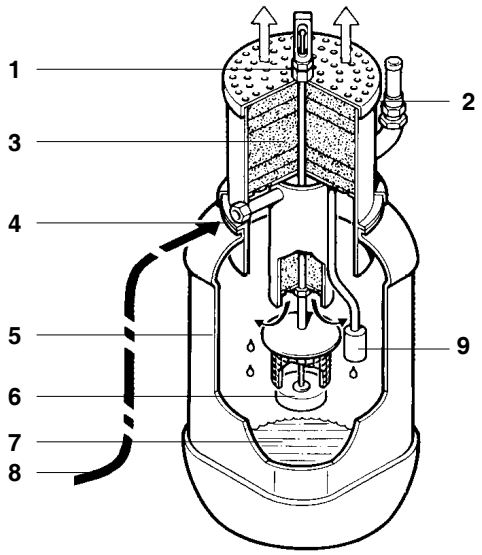


Fig. 42 Condensate collector

1 Level indicator
2 Safety valve
3 Activated charcoal filling
4 Condensate inlet
5 Plastic tank
6 Float
7 Condensate
8 Hose from compressor unit
9 Level switch

Electrical connection

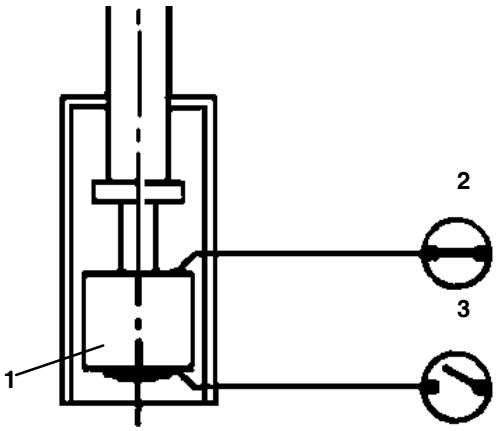


Fig. 43 Float switch orientation

If the BAUER compressor unit is fitted with a compressor control system including a BC2 electronic monitoring unit, the level indicator cable must be connected to the BC2 oil pressure monitoring contact. For all compressor units fitted with the B-Control compressor control system, a new EPROM chip is delivered with the condensate collecting system. The switch cable is then connected to one of the digital inputs X15 to X22 and X25 to X32.

Pin 1: signal input
Pin 2: power supply +5 V

When mounting the switch coil (1, Fig. 43), observe the symbols on the upper and lower switch surfaces. On one side there is an open switch symbol (3), on the other side a closed one (2). On all BAUER compressor control systems, the switch operates with a normally closed contact (empty container = switch closed). In this case the closed switch symbol must be on the upper side, see Fig. 43.

Contact function can be changed by mounting the switch coil upside down.

Function

The condensate is drained by the automatic condensate drain unit and passed to the outlet connector at the frame. The hose of the collecting system is connected there.

The condensate enters the system at connector (1, Fig. 44) and is routed through pipe (2) down into the collecting vessel (3). This pipe is filled with steel wool (4). The air entering together with the condensate, passes through the activated charcoal filling (5) in filter head (6) into the open air. The charcoal is covered with layers of fleece (7). Tank and filter head are connected to each other by a clamp (8). The system is protected by a safety valve (9) if pressure rises above 0.2 bar for any reason. The condensate level is indicated by a sight gauge (11) and monitored electrically by float switch (10).

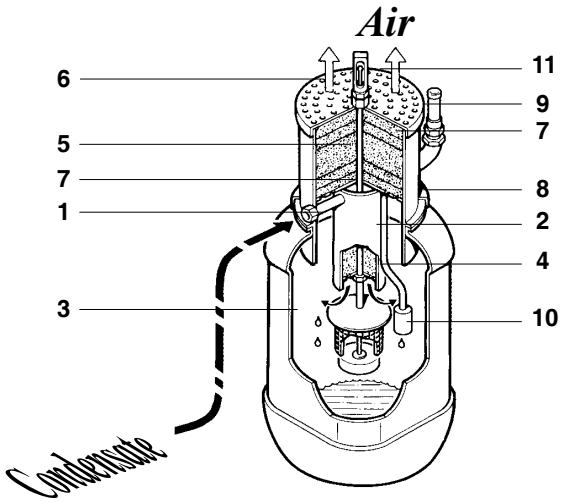


Fig. 44 Condensate collector, function

Technical data

Tank capacity:	approx. 60 litres
Condensate capacity:	approx. 40 litres
Activated charcoal contents:	3,700 g
Connecting hose length:	1,150 mm
Dimensions:	approx. 410 x 330 x 1,000 mm (W x D x H)

For details refer to drawing 072288-342.

11. ELECTRICAL SYSTEM

11.1. GENERAL

This section describes the standard electric control and electronic monitoring system of the compressor unit. The electric control unit is an optional extra for all compressor units, i.e. the amount of built-in components varies depending on order.

For schematic diagrams, see section F.

The electrical equipment of the compressor unit consists of:

- drive motor M1
- electric control system

To start the electric motor and enable the functioning of the controls as well as the monitors, the following components are essential:

- main switch Q1 and
- main fuse, both to be installed by the customer.

11.2. EMERGENCY SHUTDOWN

Every unit has an "Emergency Shutdown" push button. Pressing this push button interrupts the control voltage and the unit shuts down.

11.3. COMPRESSOR CONTROLLER B-CONTROL (OPTIONAL)

The electric control is placed in the control room at the right side of the compressor building.

WARNING **The unit is only allowed to operate with the switch cabinet doors closed!**

For schematic diagrams refer to section F.

The values indicated in the following description are merely samples from one of many different configuration possibilities. Therefore, the values indicated on the compressor unit may be different from the ones shown here.

11.3.1. Description

The **BAUER B-Control** is a free-programmable electronic compressor control system. Communication with the user takes place via a modern LCD touchscreen display and 10 touch keys. The control system is specially designed for **BAUER** compressors.

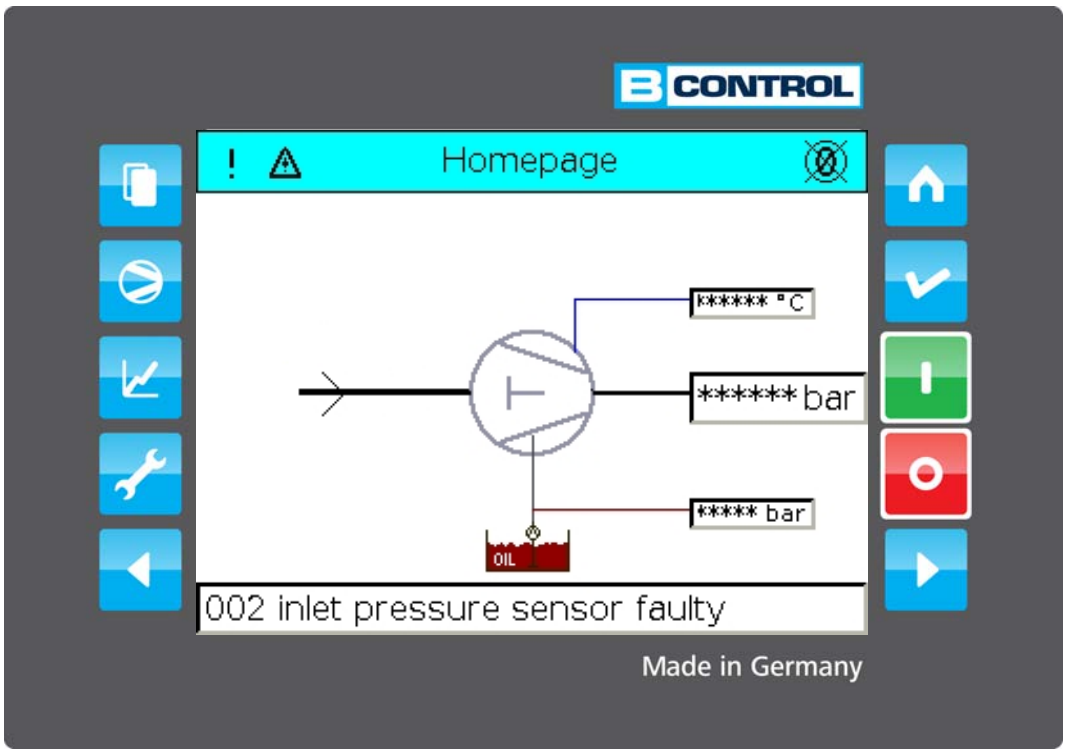


Fig. 45 B-Control control panel and display

11.3.2. HARDWARE AND CONNECTIONS

For reference to the hardware and connections refer to the schematic diagrams in section F.
For more detailed information about the control system, refer to the circuit diagramme that comes with the unit.

The configuration of the software with respect to the hardware is performed in the configuration file. This file is automatically generated at factory start-up, and normally does not need any further modification. If a change should become necessary due to modifications on the compressor unit, please contact the **BAUER** after-sales service dept.

11.3.3. Control and Monitoring Elements

The control and monitoring panel features an LCD touch-screen display, 8 soft touch keys and one fwd and one back key to control the compressor and the display.

The function of the control keys is as follows:

F1 Displays main menue

F2 Displays compressor 1 details

F3 Displays compressor 2 details

F4 Dispenser

F5 Displays home page

F6 Reset / Back to previous page

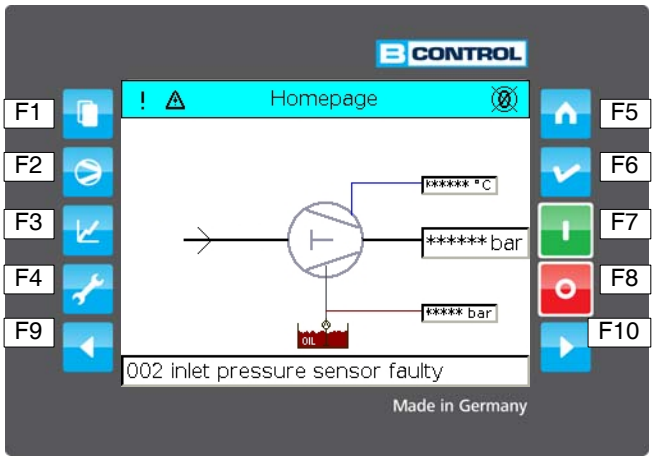
F7 Compressor ON

F8 Compressor OFF

F9 Back / up in menue

F10 Fwd / down in menue

After 5 min. of no action the display returns to the homepage and logs out.



F1 Main menue
F2 Compressor 1 data
F3 Compressor 2 data
F4 Dispenser
F9 Back/ up
F5 Home page
F6 Reset / page back
F7 ON
F8 OFF
F10 Fwd / down
11 Touchscreen display
Fig. 46 Operating and display elements

11.3.4. Menu and Navigation

The LCD display contains all the important information on the present condition of your **BAUER** compressor.

Home page

When switching on the compressor unit, or by pressing the F5 key, the home page (Fig. 47) is displayed, giving the most important general data in a very clear presentation. This way you can find out the actual compressor status.

The exclamation mark ! in the headline shows a warning, which has not been acknowledged yet if flashing, which has been acknowledged if steady.

The triangle warning sign ⚠ shows that there is a fault, which has not been acknowledged yet if flashing, which has been acknowledged if steady.

The circled 0 marked with a cross on the right of the headline means that both compressors are disabled. The O not marked means unit is ready for operation. A I in the circle means compressor is in stand-by. Rotating arrows around the circle show that unit is running.

The state of compressor 1 and compressor 2 is indicated by two circled symbols (I) and (II) showing that both compressors are in stand-by. If marked with a cross, the respective compressor is disabled. Arrows around the circle mean unit is running. An arrow towards the circle → means that compressor I or II is master, the other one is slave.

Beside of the compressor symbol the following values are shown:

- temperature of the last compressor stage
- final pressure 1
- final pressure 2
- oil pressure

The footer contains information from the alarm list. Clicking on the footer causes the alarm list being displayed as shown in Fig. 48. Green ticked circles indicate that the messages are acknowledged, small flags indicate not acknowledged as shown in Fig. 49.

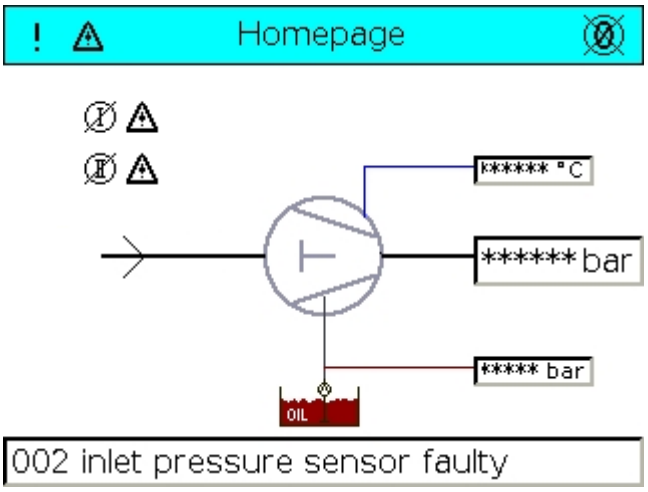


Fig. 47 Home page

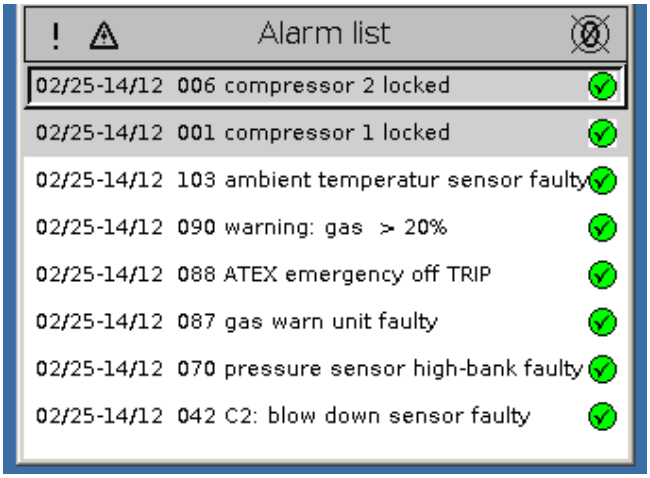


Fig. 48 Alarm list, acknowledged

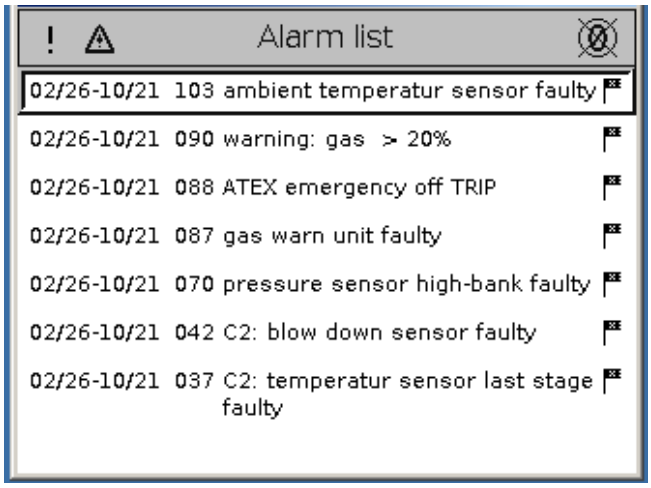


Fig. 49 Alarm list, not acknowledged

A click on the Bauer Kompressoren symbol causes the compressor station data incl. the serial no. and software version being displayed as shown in Fig. 50.

Main menu

With F1 the display changes to the main menu (Fig. 51).

The main menu is divided into 10 sub-menues (#4 is not assigned at the present):

- Homepage
- Values
- Trend
- Setup
- Logbook
- Log in
- Operation
- Maintenance
- Setup
- Logbook

Homepage is as shown in Fig. 47.

Fig. 50 Compressor station data

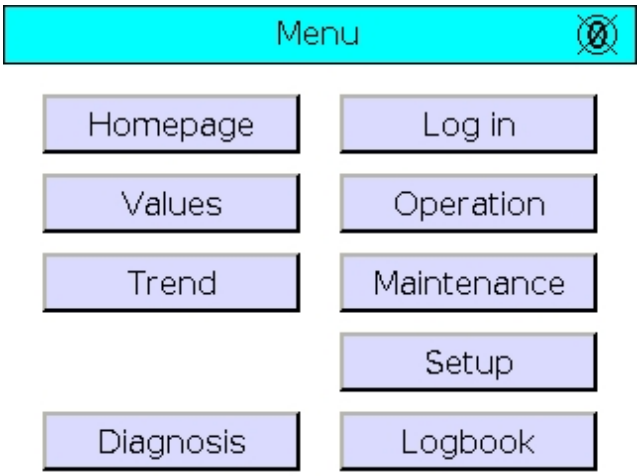


Fig. 51 Main menue

The actual values pages show the current operating data for the compressor, i.e. monitored pressures and temperatures as indicated (Fig. 52).

Page 2 shows the intermediate pressure of stage 1 to 4, blow-down pressure and the dewpoint of the compressed medium. (Fig. 53).

The arrows at the bottom navigate to the following or previous page.

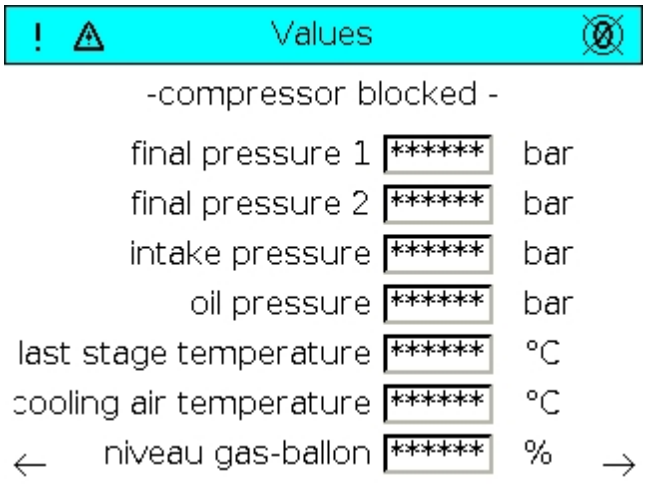


Fig. 52 Act. values 1

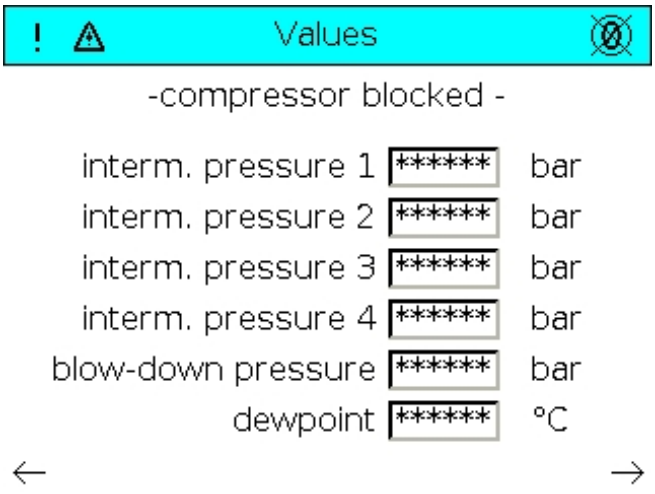


Fig. 53 Act. values 2

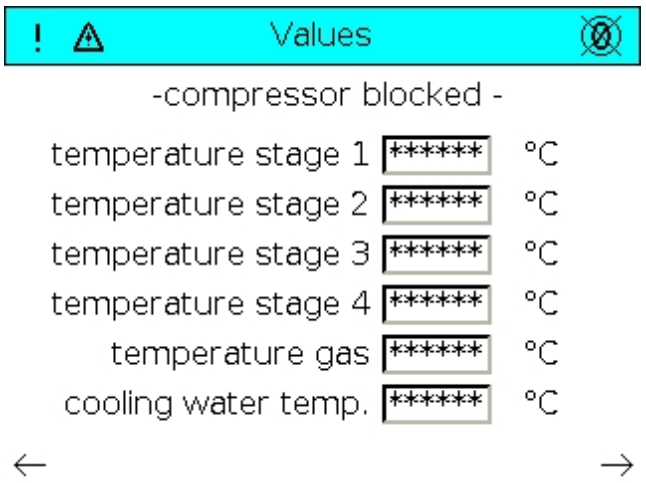


Fig. 54 Act. values 3

The **Trend** page gives a graphical diagramme of the pressure trends for high, mid and low storage bank, and the ON and OFF periods of the compressor (bottom graph).

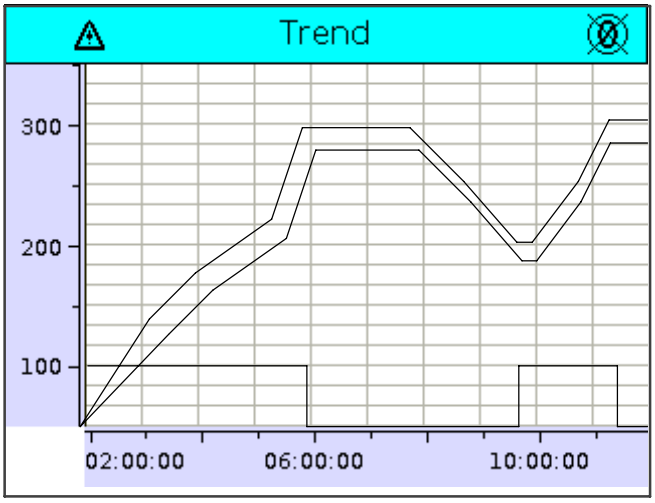


Fig. 55 Trend page

The **Diagnosis** page (Fig. 56) shows values for different signal channels. They are of interest for the service engineer, only.

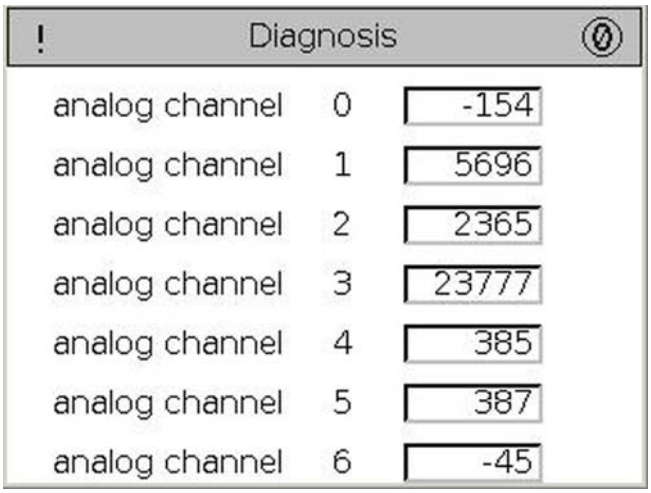


Fig. 56 Diagnosis page

The **Login** page (Fig. 57) enables the operator or maintenance personnel to enter higher levels that need authorization to take any action.

To enter a specific level (Fig. 59), enter the appropriate code and press enter (Fig. 58).

Without entering the correct code, all parameters in any menue shown in dark grey cannot be changed.

There are 5 different levels which require different codes:

Operation level

Maintenance level

Configuration level

B-Manager level

Programming level

The code for the operation level is 1000. All other codes are listed in a file delivered with the compressor unit.

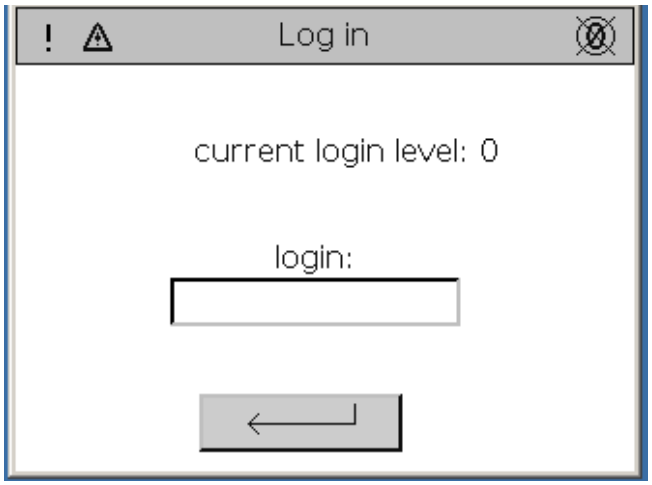


Fig. 57 Login page

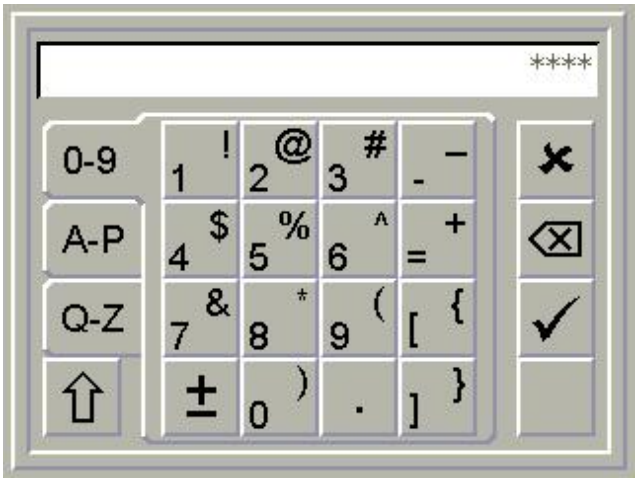


Fig. 58 Key panel

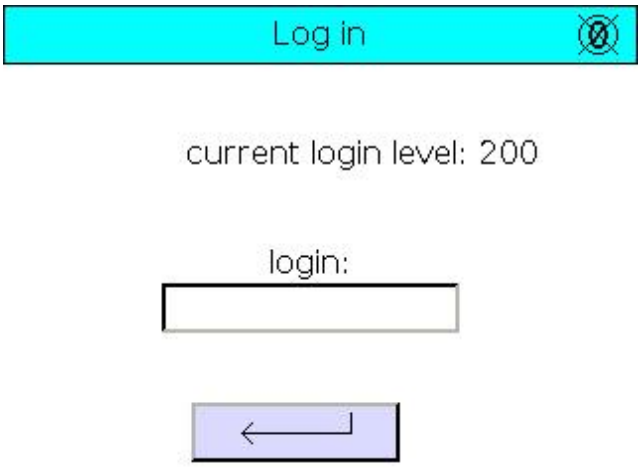


Fig. 59 Login codelevel 200

Operation menu page (Fig. 60)

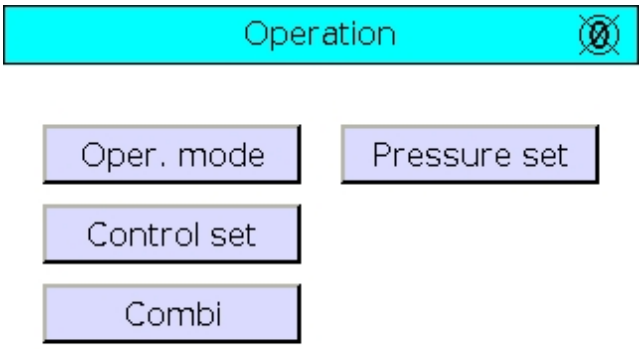


Fig. 60 Operation menu

contains four pages for setting the following parameters:

Operation mode

Control settings

Combined operation mode

Pressure settings

The operation mode page (Fig. 61) enables to choose between different operation modes. The following operation modes can be selected: Combined-, fully automatic, or semi automatic operation.

Combined operation

If combined operation mode is selected the compressor units will be controlled by the adjusted data from push button combi.

Fully automatic operation

After manual start of the compressor unit, the operation is controlled by the adjusted final pressure. As soon as the final pressure is reached, the compressor will be switched to standby. Automatic restart is effected if the pressure decreases below the adjusted switch-on pressure (i.e. final pressure minus adjusted hysteresis). The process will continue until the compressor is switched off manually.

Semi automatic operation

After manual start of the compressor unit, the operation is controlled by the adjusted final pressure. When one or both final pressures (depending on the configuration setting) is reached, the compressor will be switched off. Restarting is performed manually.

Safety valve test mode

The compressor is started manually and will not be switched off until the "0" key is pressed. The final pressure sensors are disabled and the compressor will operate against the safety valves. By this a safety valve blow off test can be performed in a simple way.

Use this operation mode under survey, only.

Leak test mode

In the leak test mode, the compressor is started manually and will switch off automatically after having reached the final pressure. During this mode, venting of the condensate drain valves is disabled. The compressor remains under pressure. By this an air tightness or leak test can be performed in a simple way.

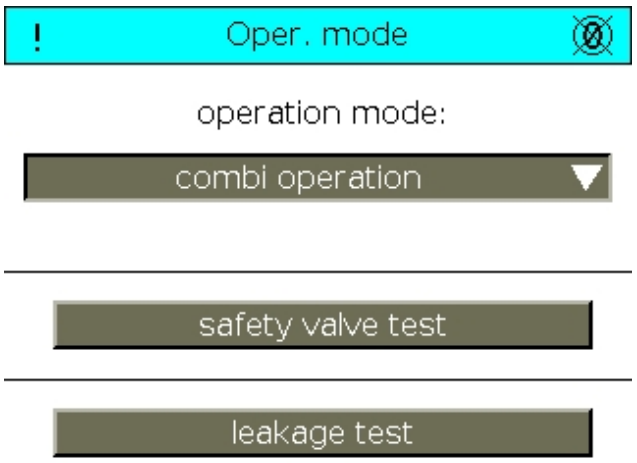


Fig. 61 Operation modes

On the **control settings** page (Fig. 62) will be defined the regulation settings to control the compressor.

Controlpoint 1, controlpoint 2: Selection between final pressure 1, final pressure 2, intake pressure, gas balloon analog, gas balloon digital. The values for final pressure 1 and 2 will be adjusted at the pressure setting page.

Intake pressure, gas balloon analog, gas balloon digital will be used for gas compressor units only.

Connection between controlpoint 1 and 2: Selection between AND and OR, i.e. fi one controlpoint or both controlpoints have to be reached to start or stop the compressor.

Advice: White coloured fields are selected values, light grey coloured fields are changeable values and the dark gery coloured fields are fixed and cannot be changed in current code level.

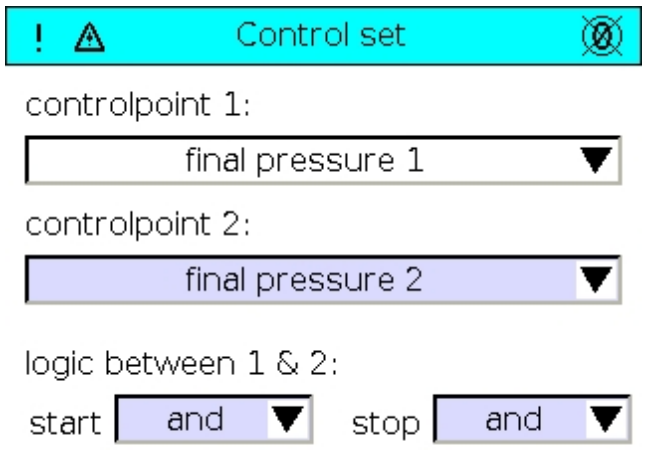


Fig. 62 Control settings

At the **combined operation mode** page (Fig. 63) you can define the status of the compressor units and the operating time of each compressor.

The control panel can be adjusted to master or slave. The numbers of active slave and passive slave compressors as well as the cycle time will be defined in the further fields.

The cycle time defines the runtime (in hours) of each compressor. The master and slave function will be switched when the defined runtime is over.

Operating hours comparison:

Select yes or no to enable or respectively to deactivate the operating hours loadequalisation. This effects that the compressor runtime will be compared and a balanced working load will be reached.

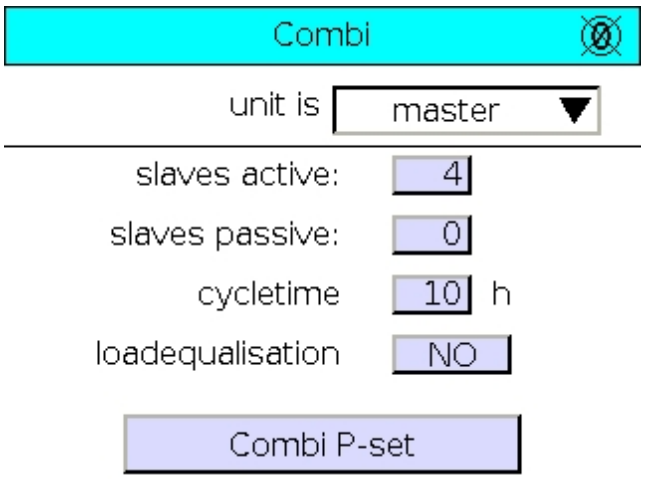


Fig. 63 Combined operation mode

The pressure settings to start and stop the basic load and peak load compressor will be adjusted on page Combi P-set (Fig. 64).

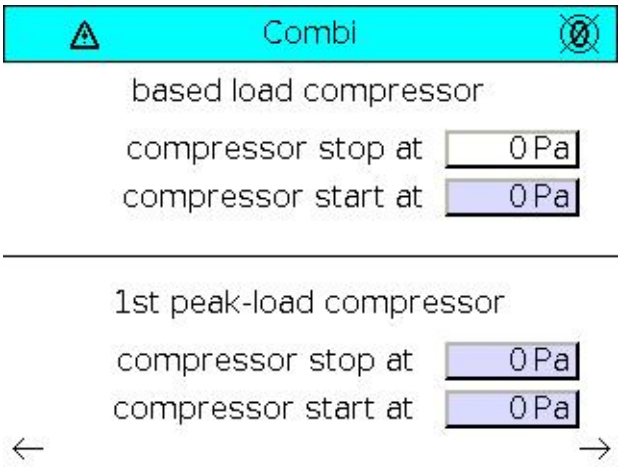


Fig. 64 Combi P-set

The **pressure setting** page (Fig. 65) shows the adjusted shut-off and switch on pressure.

The compressor wil be shut-off when the final pressure is achieved. Decrease the pressure under the adjusted value the compressor will be switched on.

The **Maintenance** page (Fig. 66) shows the maintenance parameter for the respective compressor 1 or 2:

the total operating hours, the start cycles, and the target and elapsed hours for the maintenance work to be performed:

main service (every 4000 operating hours)

intake filter service (cleaning, every 2000 operating hours)

oil change (every 2000 operating hours)

valve check (every 2000 operating hours) and

final separator change (indicated cycles x 10 = after 65000 cycles)

Highlighted fields are white , light grey fields are values which can be changed, dark grey fields are fixed.

The **Setup** page (Fig. 67) provides various parameters to be set:

Language: choose between German, English and Russian

Sensor parameter setting

B-Messenger setup

Bus-Com. setting

Backup setting

Condensate drain valves setting

Display setup

System setup

The setting values for the compressor units are listed in the adjusting procedure which is delivered with the unit.

Scrolling through the **sensors** pages (Fig. 68) enables setting of parameters for

final pressure, intake pressure, oil pressure, dew point, intermediate pressures, gas balloon and blow-down pressure as well as the temperature sensors for the last stages, cooling air-, cooling water temperature and gas outlet temperature. Not applied sensors are marked as logged out.

MBU is the minimum adjustable value, MBO the maximum adjustable value. The actual value is displayed under the = sign. The required switch-off pressure is set in the lower right field.

The **valves** menu (Fig. 69) allows setting of the condensate drain valves and the intake valve.

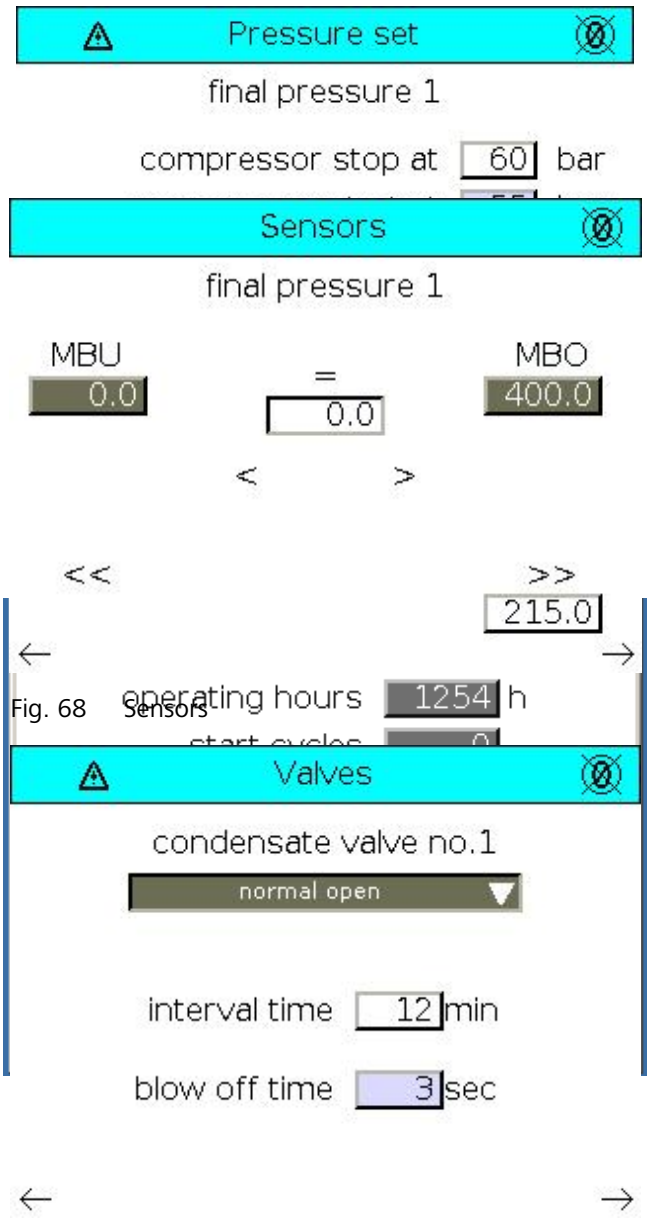


Fig. 68 Sensors

Fig. 69 Valves

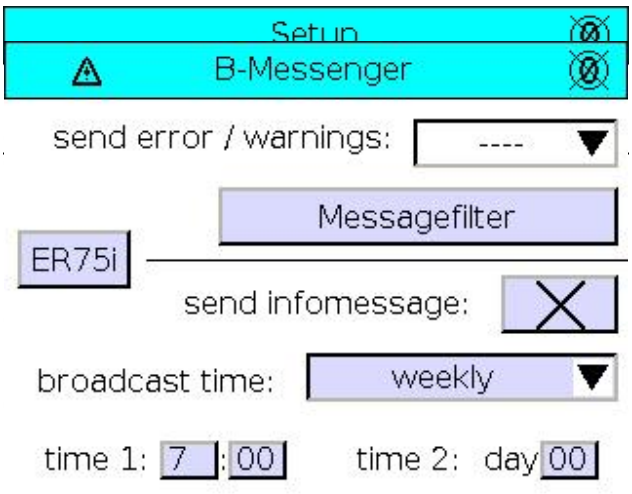


Fig. 67 Setup page

The condensate valves can be set according to the type, either normally open or closed. The interval times are set individually for each drain valve, the normal blow-off time is 3 seconds.

For the gas intake valve, the open and close delay times are adjustable.

On the **B-Messenger** page (Fig. 70) the broadcasting of errors and warnings can be enabled or disabled.

Fault/Warning signal broadcasting selection:

---- (none)

B-Messenger or

ER75i

The broadcast time is adjustable between daily, weekly or monthly. Two times can be set for daily broadcast. For weekly and monthly broadcast the day and one time is adjustable.

The message filter (Fig. 71) allows to select the type of errors and warnings of the B-Manager to be broadcasted by selecting the message and disabling it.

The default setting is enable all.

The field **ER75i** (Fig. 72) is the alternative fault sensor. Information about the compressor unit can be entered, e.g.: unit description, type, location, operator etc.

On the following pages phone numbers for the case of error, warning and maintenance can be entered.

The **Bus-Com.** page (Fig. 73) enables the selection between different Bus-data lines. These data lines are necessary for the communication between compressor unit and the superordinated control.

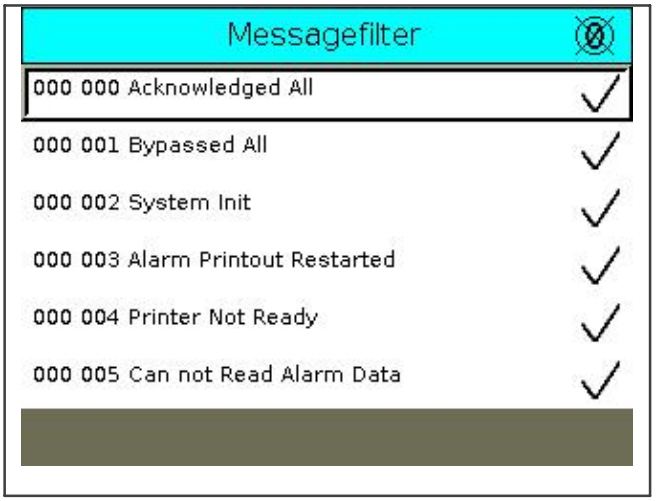


Fig. 71 Messagefilter

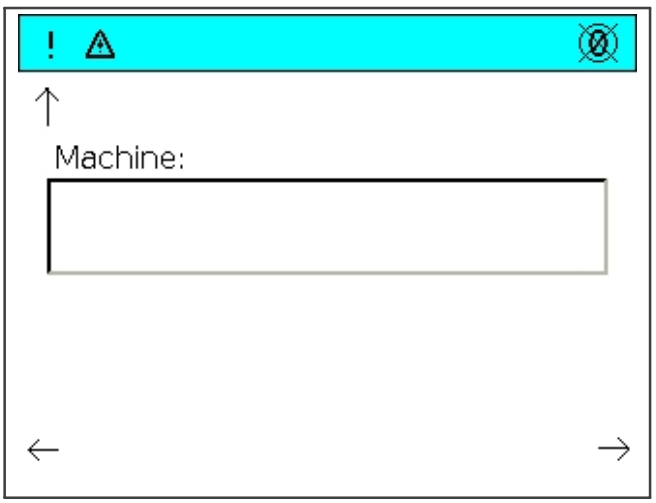


Fig. 72 ER75i

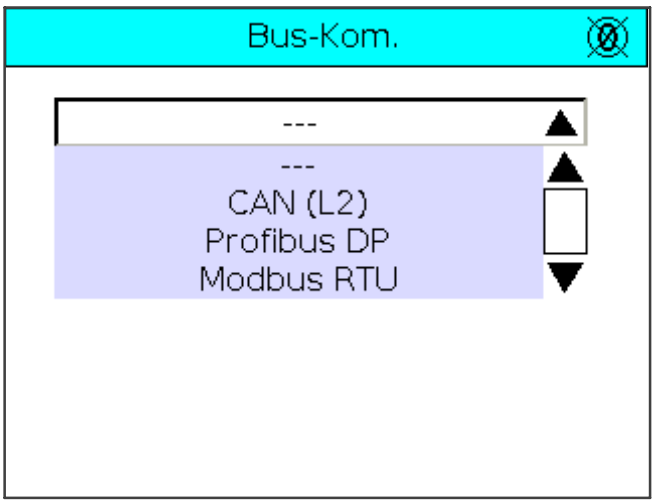


Fig. 73 Bus-Com.

The **backup**, **display setup** and **set time** pages are self-explanatory.

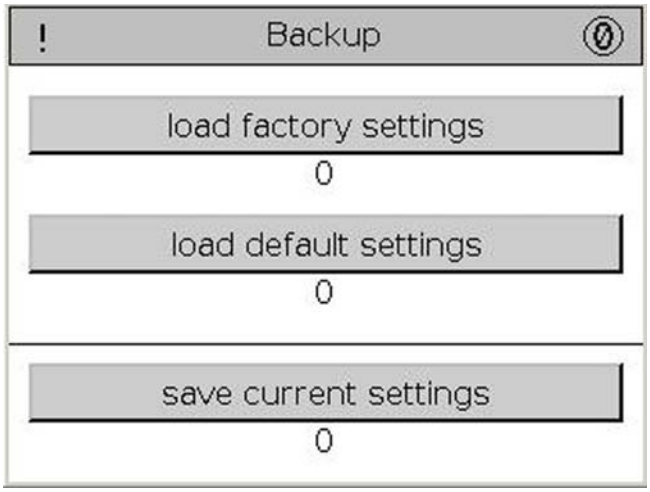


Fig. 74 Backup

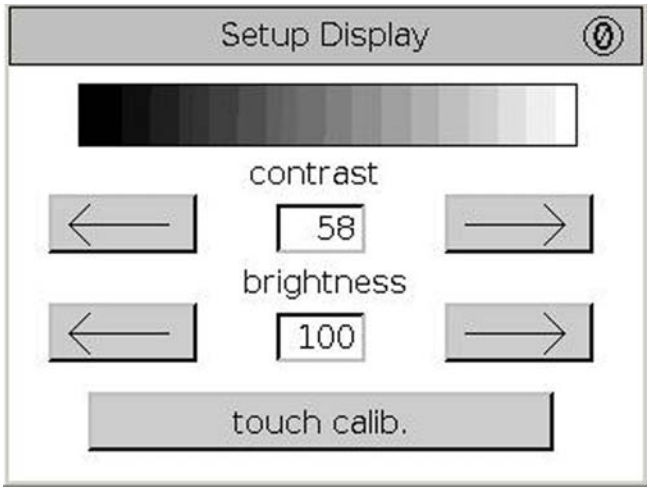


Fig. 75 Setup display

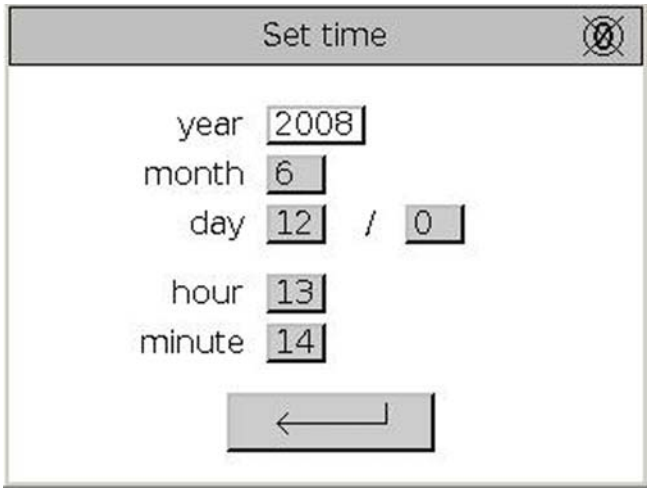


Fig. 76 Set date and time

The **Logbook** page (Fig. 77) shows all entries for actions taken.

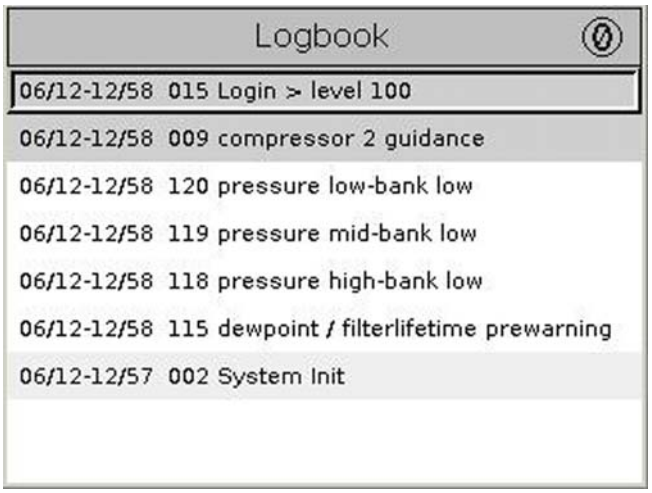


Fig. 77 Logbook page

11.4. COMPRESSOR CONTROL UNIT "B-CONTROL HW" (Optional)

11.4.1. General

This section describes the optional electric control system **B-Control HW**, i.e. without the programmable B-Control module. Since the electric control unit is an optional extra for all compressor units, the amount of built-in components varies depending on order.

For schematic diagrams, see section F.

The electrical equipment of the compressor unit consists of:

- drive motor M1
- electric control system, containing:
  - final pressure switch S10
  - switch box containing air break contactor K1 or star-delta contactor K1-K3 with time relay K4 for drive motor
  - timer(s) K10 for automatic condensate drain
  - service switch S3
  - cycle counter P14

To start the electric motor and enable the functioning of the controls as well as the monitors, the following components are essential:

- main switch Q1 and
- main fuse, both to be installed by the customer.

11.4.2. Semi-automatic compressor control

Unit switches off automatically when the final pressure is reached in the pressure system connected to the compressor. Restart the unit manually by pressing operation button 1 on the control and monitoring unit.

11.4.3. Fully automatic compressor control

Unit switches off automatically when the final pressure is reached in the pressure system connected to the compressor. Restart of the unit is performed automatically if pressure drops to the lower set value. Operation switch S2.1 and main switch S0 must be switched on.

11.4.4. Pressure switch S10

Switching **on** and/or **off** of the compressor unit is controlled by pressure switch S10. The upper threshold value is adjustable as follows.

OFF max. = 500 bar (7,100 psi)[a)] **OFF**
min. = 50 bar (710 psi)

11.4.5. Service switch

The switch is labelled S3. It is mounted on the switch box. In position "0" the compressor operates normally, i.e. the unit is switched OFF automatically by the pressure switch. In position "1" the pressure switch S10 is overridden.

Use this switch position for servicing purposes only, e.g. checking the blow-off pressure of the safety valves. The unit will not shut off automatically when switch is in this position.

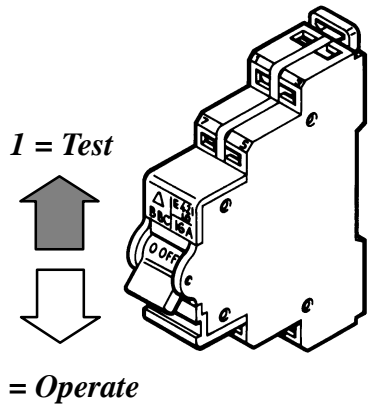


Fig. 78 Service switch

11.4.6. Cycle counter

The cycle counter is also mounted in the switch box and labelled P14. It counts the electrical control pulses for the automatic condensate drain solenoid valve and hence the accumulated amount of load cycles of the installed oil and water separator after the last compressor stage.

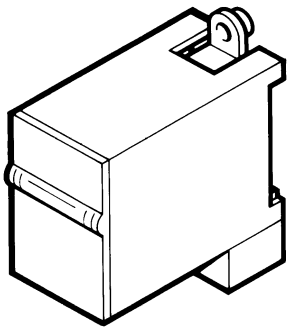


Fig. 79 Cycle counter

1 count corresponds to 1 load cycle
(1 pressurization, 1 depressurization).

a) Maximum possible operating pressure; for maximum allowable operating pressure, refer to Technical Data, 1. 3.

11.4.7. Timer(s) for automatic condensate drain unit

Depending on the type of condensate drain unit, one or more timers K10 are fitted. For functional description refer to chapter A.10.

12. COMPRESSOR DRIVE SYSTEM

The compressor is driven by the drive motor through between two and six V-belts. The electric motor is mounted on rails and is adjustable for V-belt tension.

13. COOLING SYSTEM

On installation of the unit ensure that there is sufficient cooling air supply. Refer to section B.

For maximum ambient temperature, see Technical Data, chapter A-14.

13.1. K22

The cylinders of the compressor block, the intermediate coolers and the after-cooler are air-cooled.

For this purpose, the compressor is equipped with a fanwheel which draws the cooling air **through the fanwheel cover** from the surroundings. The fanwheel is driven by the crankshaft.

13.2. K23

The cylinders of the compressor block, the intermediate coolers and the after-cooler are air-cooled.

For this purpose, the compressor is equipped with one fanwheel which draws the cooling air from the surroundings **from the flywheel side**. The fanwheel is driven by the crankshaft through a V-belt.

13.3. K25 AND K28

The cylinders of the compressor block, the intermediate coolers and the after-cooler are air-cooled.

For this purpose, the compressor is equipped with two fanwheels which draw the cooling air from the surroundings **from the flywheel side**. The fanwheels are driven by the crankshaft through two V-belts.

14. TECHNICAL DATA

14.1. BREATHING AIR COMPRESSOR UNITS

Compressor unit	**KAP 220-20**
Serial no.	_____
Medium	breathing air
Delivery[a)]	650 l/min (23 c.f.m.)
Req'd drive input	14.5 kW
Compressor speed	980 min^{-1}
Operating pressure	225/330 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	490 kg
Compressor block	**K22.0, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	130 mm
Cylinder bore 2nd stage	130/110 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	16 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.5 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	10 ... 15 bar
Safety valve setting 2nd stage	20 bar
Intermediate pressure 3rd stage	65 ... 70 bar
Safety valve setting 3rd stage	90 bar
Compressor block oil capacity	8 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	15 kW
Rated current	approx. 30 A (for 400 V)
Size	160 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**KAP 220-25**
Serial no.	_____
Medium	breathing air
Delivery[a)]	800 l/min (28 c.f.m.)
Req'd drive input	17.9 kW
Compressor speed	1,180 min^{-1}
Operating pressure	225/330 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	510 kg
Compressor block	**K22.0, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	130 mm
Cylinder bore 2nd stage	130/110 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	16 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.5 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	10 ... 15 bar
Safety valve setting 2nd stage	20 bar
Intermediate pressure 3rd stage	65 ... 70 bar
Safety valve setting 3rd stage	90 bar
Compressor block oil capacity	8 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	18.5 kW
Rated current	approx. 35 A (for 400 V)
Size	160 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**KAP 220-30**
Serial no.	_____
Medium	breathing air
Delivery[a)]	950 l/min (34 c.f.m.)
Compressor speed	1320 min^{-1}
Req'd drive input	20.5 kW
Operating pressure	225/330 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	570 kg
Compressor block	**K22.0, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	130 mm
Cylinder bore 2nd stage	130/110 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	16 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.5 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	10 ... 15 bar
Safety valve setting 2nd stage	20 bar
Intermediate pressure 3rd stage	65 ... 70 bar
Safety valve setting 3rd stage	90 bar
Compressor block oil capacity	8 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	22 kW
Rated current	approx. 44 A (for 400 V)
Size	180 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**KAP 220-30-420**
Serial no.	_____
Medium	breathing air
Delivery[a)]	880 l/min (31 c.f.m.)
Compressor speed	1180 min^{-1}
Req'd drive input	19 kW
Operating pressure	350-420 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	570 kg
Compressor block	**K22.0, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	130 mm
Cylinder bore 2nd stage	130/110 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	16 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.5 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	10 ... 15 bar
Safety valve setting 2nd stage	20 bar
Intermediate pressure 3rd stage	65 ... 70 bar
Safety valve setting 3rd stage	90 bar
Compressor block oil capacity	8 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	22 kW
Rated current	approx. 44 A (for 400 V)
Size	180 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**KAP 23.0-40**
Serial no.	_____
Medium	breathing air
Delivery[a)]	1300 l/min (46 c.f.m.)
Operating pressure	225/330 bar
Compressor speed	1200 min^{-1}
Req'd drive input	28 kW
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	760 kg
Compressor block	**K23.0, mod. 13**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	160 mm
Cylinder bore 2nd stage	160/130 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	18 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.5 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	17 ... 20 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	68 ... 73 bar
Safety valve setting 3rd stage	80 bar
Compressor block oil capacity	11 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	30 kW
Rated current	approx. 60 A (for 400 V)
Size	200 L
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**KAP 23.0-50**
Serial no.	_____
Medium	breathing air
Delivery[a)]	1480 l/min (52 c.f.m.)
Compressor speed	1400 min^{-1}
Req'd drive input	34 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	780 kg
Compressor block	**K23.0, mod. 13**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	160 mm
Cylinder bore 2nd stage	160/130 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	18 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.5 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	17 ... 20 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	68 ... 73 bar
Safety valve setting 3rd stage	80 bar
Compressor block oil capacity	11 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	37 kW
Rated current	approx. 72 A (for 400 V)
Size	200 L
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

14.2. INDUSTRIAL HIGH PRESSURE AIR COMPRESSOR UNITS

Compressor unit	**I 22.0-15**
Serial no.	_____
Medium	air
Delivery[a)]	650 l/min (23 c.f.m.)
Operating pressure	90 ... 350 bar
Compressor speed	980 min^{-1}
Req'd drive input	14.5 kW
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	490 kg
Compressor block	**K22.0, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	130 mm
Cylinder bore 2nd stage	130/110 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	16 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.5 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	10 ... 15 bar
Safety valve setting 2nd stage	20 bar
Intermediate pressure 3rd stage	65 ... 70 bar
Safety valve setting 3rd stage	90 bar
Compressor block oil capacity	8 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	15 kW
Rated current	approx. 30 A (for 400 V)
Size	160 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**I 22.0-18,5**
Serial no.	_____
Medium	air
Delivery[a)]	800 l/min (28 c.f.m.)
Compressor speed	1180 min^{-1}
Req'd drive input	17.9 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	bar
Weight, standard unit approx.	510 kg
Compressor block	**K22.0, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	130 mm
Cylinder bore 2nd stage	130/110 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	16 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.5 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	10 ... 15 bar
Safety valve setting 2nd stage	20 bar
Intermediate pressure 3rd stage	65 ... 70 bar
Safety valve setting 3rd stage	90 bar
Compressor block oil capacity	8 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	18.5 kW
Rated current	approx. 35 A (for 400 V)
Size	160 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**I 22.0-22**
Serial no.	_____
Medium	air
Delivery[a)]	930 l/min (33 c.f.m.)
Compressor speed	1320 min^{-1}
Req'd drive input	20.5 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	570 kg
Compressor block	**K22.0, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	130 mm
Cylinder bore 2nd stage	130/110 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	16 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.5 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	10 ... 15 bar
Safety valve setting 2nd stage	20 bar
Intermediate pressure 3rd stage	65 ... 70 bar
Safety valve setting 3rd stage	90 bar
Compressor block oil capacity	8 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	22 kW
Rated current	approx. 44 A (for 400 V)
Size	180 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**I 22.0-22-420**
Serial no.	_____
Medium	air
Delivery[a)]	800 l/min (28 c.f.m.)
Compressor speed	1180 min^{-1}
Req'd drive input	19 kW
Operating pressure	350-420 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	570 kg
Compressor block	**K22.0, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	130 mm
Cylinder bore 2nd stage	130/110 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	16 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.5 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	10 ... 15 bar
Safety valve setting 2nd stage	20 bar
Intermediate pressure 3rd stage	65 ... 70 bar
Safety valve setting 3rd stage	90 bar
Compressor block oil capacity	8 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	22 kW
Rated current	approx. 44 A (for 400 V)
Size	180 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**I 23.0-30**
Serial no.	_____
Medium	air
Delivery[a)]	1300 l/min (46 c.f.m.)
Compressor speed	1200 min^{-1}
Req'd drive input	28 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	760 kg
Compressor block	**K23.0, mod. 13**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	160 mm
Cylinder bore 2nd stage	160/130 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	18 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.5 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	17 ... 20 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	68 ... 73 bar
Safety valve setting 3rd stage	80 bar
Compressor block oil capacity	11 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	30 kW
Rated current	approx. 60 A (for 400 V)
Size	200 L
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**I 23.0-37**
Serial no.	_____
Medium	air
Delivery[a)]	1480 l/min (52 c.f.m.)
Compressor speed	1400 min^{-1}
Req'd drive input	34 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	780 kg
Compressor block	**K23.0, mod. 13**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	160 mm
Cylinder bore 2nd stage	160/130 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	18 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.5 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	17 ... 20 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	68 ... 73 bar
Safety valve setting 3rd stage	80 bar
Compressor block oil capacity	11 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	37 kW
Rated current	approx. 72 A (for 400 V)
Size	200 L
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**I 25.0-45**
Serial no.	_____
Medium	air
Delivery[a)]	1900 l/min (67 c.f.m.)
Compressor speed	1180 min^{-1}
Req'd drive input	41 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1750 kg
Compressor block	**IK25.0, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	185 mm
Cylinder bore 2nd stage	185/160 mm
Cylinder bore 3rd stage	45 mm
Cylinder bore 4th stage	22 mm
Piston stroke	90 mm
Intermediate pressure 1st stage	3 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	15 ... 16 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	68 ... 72 bar
Safety valve setting 3rd stage	80 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	45 kW
Rated current	approx. 85 A (for 400 V)
Compressor speed	1465 min^{-1}
Size	225 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**I 25.9-45**
Serial no.	_____
Medium	air
Delivery[a)]	1900 l/min (67 c.f.m.)
Compressor speed	1180 min^{-1}
Req'd drive input	42 kW
Operating pressure	350 ... 500 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1900 kg
Compressor block	**IK25.9, mod. 3**
No. of stages	5
No. of cylinders	3
Cylinder bore 1st stage	185 mm
Cylinder bore 2nd stage	170/130 mm
Cylinder bore 3rd stage	140/130 mm
Cylinder bore 4th stage	28 mm
Cylinder bore 5th stage	16 mm
Piston stroke	90 mm
Intermediate pressure 1st stage	3 ... 4 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	16 ... 18 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	50 ... 55 bar
Safety valve setting 3rd stage	70 bar
Intermediate pressure 4th stage	155 ... 160 bar
Safety valve setting 4th stage	170 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	45 kW
Rated current	approx. 85 A (for 400 V)
Compressor speed	1465 min^{-1}
Size	225 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**I 25.18-55**
Serial no.	_____
Medium	air
Delivery[a)]	2300 l/min (81 c.f.m.)
Compressor speed	1100 min^{-1}
Req'd drive input	51 kW
Operating pressure	350 ... 500 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1950 kg
Compressor block	**IK25.18, mod. 3**
No. of stages	5
No. of cylinders	3
Cylinder bore 1st stage	215 mm
Cylinder bore 2nd stage	170/130 mm
Cylinder bore 3rd stage	140/130 mm
Cylinder bore 4th stage	28 mm
Cylinder bore 5th stage	16 mm
Piston stroke	90 mm
Intermediate pressure 1st stage	3 ... 4 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	16 ... 18 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	50 ... 55 bar
Safety valve setting 3rd stage	70 bar
Intermediate pressure 4th stage	155 ... 160 bar
Safety valve setting 4th stage	170 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	55 kW
Rated current	approx. 105 A (for 400 V)
Compressor speed	1475 min^{-1}
Size	250 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**I 28.0-55**
Serial no.	_____
Medium	air
Delivery[a)]	2500 l/min (88 c.f.m.)
Compressor speed	830 min^{-1}
Req'd drive input	50 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1860 kg
Compressor block	**IK28.0, mod. 3**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	215 mm
Cylinder bore 2nd stage	215/185 mm
Cylinder bore 3rd stage	50 mm
Cylinder bore 4th stage	24 mm
Piston stroke	125 mm
Intermediate pressure 1st stage	3 ... 4.2 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	15 ... 17 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	67 ... 75 bar
Safety valve setting 3rd stage	90 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	55 kW
Rated current	approx. 105 A (for 400 V)
Compressor speed	1475 min^{-1}
Size	250 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**I 28.0-75**
Serial no.	_____
Medium	air
Delivery[a)]	3500 l/min (125 c.f.m.)
Compressor speed	1180 min^{-1}
Req'd drive input	72 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1950 kg
Compressor block	**IK28.0, mod. 3**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	215 mm
Cylinder bore 2nd stage	215/185 mm
Cylinder bore 3rd stage	50 mm
Cylinder bore 4th stage	24 mm
Piston stroke	125 mm
Intermediate pressure 1st stage	3 ... 4.2 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	15 ... 17 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	67 ... 75 bar
Safety valve setting 3rd stage	90 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	75 kW
Rated current	approx. 140 A (for 400 V)
Compressor speed	1480 min^{-1}
Size	280 S
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

14.3. INDUSTRIAL MEDIUM PRESSURE AIR COMPRESSOR UNITS

Compressor unit	**E 22.0-11**
Serial no.	_____
Medium	air
Delivery[a)]	650 l/min (23 c.f.m.)
Compressor speed	900 min^{-1}
Req'd drive input	10.4 kW
Operating pressure	75 ... 90 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	480 kg
Compressor block	**K22.0, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	130 mm
Cylinder bore 2nd stage	130/110 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	16 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.5 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	10 ... 15 bar
Safety valve setting 2nd stage	20 bar
Intermediate pressure 3rd stage	65 ... 70 bar
Safety valve setting 3rd stage	90 bar
Compressor block oil capacity	8 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	11 kW
Rated current	approx. 22 A (for 400 V)
Compressor speed	2900 min^{-1}
Size	160 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**E 22.0-15**
Serial no.	_____
Medium	air
Delivery[a)]	800 l/min (28 c.f.m.)
Compressor speed	1100 min^{-1}
Req'd drive input	13 kW
Operating pressure	75 ... 90 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	490 kg
Compressor block	**K22.0, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	130 mm
Cylinder bore 2nd stage	130/110 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	16 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.5 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	10 ... 15 bar
Safety valve setting 2nd stage	20 bar
Intermediate pressure 3rd stage	65 ... 70 bar
Safety valve setting 3rd stage	90 bar
Compressor block oil capacity	8 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	15 kW
Rated current	approx. 30 A (for 400 V)
Size	160 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**E 22.0-18,5**
Serial no.	_____
Medium	air
Delivery[a)]	950 l/min (34 c.f.m.)
Compressor speed	1300 min^{-1}
Req'd drive input	15.7 kW
Operating pressure	75 ... 90 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	510 kg
Compressor block	**K22.0, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	130 mm
Cylinder bore 2nd stage	130/110 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	16 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.5 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	10 ... 15 bar
Safety valve setting 2nd stage	20 bar
Intermediate pressure 3rd stage	65 ... 70 bar
Safety valve setting 3rd stage	90 bar
Compressor block oil capacity	8 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	18.5 kW
Rated current	approx. 35 A (for 400 V)
Size	160 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**E 25.0-30**
Serial no.	_____
Medium	air
Delivery[a)]	1600 l/min (56 c.f.m.)
Compressor speed	1000 min^{-1}
Req'd drive input	26 kW
Operating pressure	75 ... 90 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1650 kg
Compressor block	**IK25.0, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	185 mm
Cylinder bore 2nd stage	185/160 mm
Cylinder bore 3rd stage	45 mm
Cylinder bore 4th stage	22 mm
Piston stroke	90 mm
Intermediate pressure 1st stage	3 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	15 ... 16 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	68 ... 72 bar
Safety valve setting 3rd stage	80 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	30 kW
Rated current	approx. 60 A (for 400 V)
Size	200 L
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**E 25.0-37**
Serial no.	_____
Medium	air
Delivery[a)]	2000 l/min (71 c.f.m.)
Compressor speed	1250 min^{-1}
Req'd drive input	33 kW
Operating pressure	75 ... 90 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1720 kg
Compressor block	**IK25.0, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	185 mm
Cylinder bore 2nd stage	185/160 mm
Cylinder bore 3rd stage	45 mm
Cylinder bore 4th stage	22 mm
Piston stroke	90 mm
Intermediate pressure 1st stage	3 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	15 ... 16 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	68 ... 72 bar
Safety valve setting 3rd stage	80 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	37 kW
Rated current	approx. 72 A (for 400 V)
Size	200 L
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**E 28.0-45**
Serial no.	_____
Medium	air
Delivery[a)]	2500 l/min (88 c.f.m.)
Compressor speed	800 min^{-1}
Req'd drive input	40 kW
Operating pressure	75 ... 90 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1780 kg
Compressor block	**IK28.0, mod. 3**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	215 mm
Cylinder bore 2nd stage	215/185 mm
Cylinder bore 3rd stage	50 mm
Cylinder bore 4th stage	24 mm
Piston stroke	125 mm
Intermediate pressure 1st stage	3 ... 4.2 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	15 ... 17 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	67 ... 75 bar
Safety valve setting 3rd stage	90 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	45 kW
Rated current	approx. 85 A (for 400 V)
Compressor speed	1465 min^{-1}
Size	225 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**E 28.0-55**
Serial no.	_____
Medium	air
Delivery[a)]	3300 l/min (117 c.f.m.)
Compressor speed	1050 min^{-1}
Req'd drive input	53 kW
Operating pressure	75 ... 90 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1860 kg
Compressor block	**IK28.0, mod. 3**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	215 mm
Cylinder bore 2nd stage	215/185 mm
Cylinder bore 3rd stage	50 mm
Cylinder bore 4th stage	24 mm
Piston stroke	125 mm
Intermediate pressure 1st stage	3 ... 4.2 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	15 ... 17 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	67 ... 75 bar
Safety valve setting 3rd stage	90 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	55 kW
Rated current	approx. 105 A (for 400 V)
Compressor speed	1475 min^{-1}
Size	250 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

14.4. INDUSTRIAL HIGH PRESSURE GAS COMPRESSOR UNITS FOR NITROGEN

Compressor unit	**GI 22.0-15**
Serial no.	_____
Medium	nitrogen
Delivery[a)]	650 l/min (23 c.f.m.)
Intake pressure	$1^{\pm 0.1}$ bar abs.
Compressor speed	980 min^{-1}
Req'd drive input	14.5 kW
Operating pressure	90 to 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	490 kg
Compressor block	**IK22.0 GI, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	130 mm
Cylinder bore 2nd stage	130/110 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	16 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.3 to 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	11 to 15 bar
Safety valve setting 2nd stage	20 bar
Intermediate pressure 3rd stage	62 to 83 bar
Safety valve setting 3rd stage	90 bar
Direction of rotation (viewed from fanwheel side)	anti-clockwise
Compressor block oil capacity	8 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2.0 to 5.0 bar
Max. ambient temperature	+5 to +45 °C
Max. permissible inclination of compressor[b)]	10°
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	15 kW
Rated current	approx. 30 A (for 400 V)
Size	160 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**GI 22.0-18.5**
Serial no.	_____
Medium	nitrogen
Delivery[a)]	800 l/min (28 c.f.m.)
Intake pressure	$1^{\pm 0.1}$ bar abs.
Compressor speed	1180 min^{-1}
Req'd drive input	17.9 kW
Operating pressure	90 to 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	510 kg
Compressor block	**IK22.0 GI, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	130 mm
Cylinder bore 2nd stage	130/110 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	16 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.3 to 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	11 to 15 bar
Safety valve setting 2nd stage	20 bar
Intermediate pressure 3rd stage	62 to 83 bar
Safety valve setting 3rd stage	90 bar
Direction of rotation (viewed from fanwheel side)	anti-clockwise
Compressor block oil capacity	8 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2.0 to 5.0 bar
Max. ambient temperature	+5 to +45 °C
Max. permissible inclination of compressor[b)]	10°
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	18.5 kW
Rated current	approx. 35 A (for 400 V)
Size	160 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**GI 22.0-22**
Serial no.	_____
Medium	nitrogen
Delivery[a)]	930 l/min (33 c.f.m.)
Intake pressure	$1^{\pm 0.1}$ bar abs.
Compressor speed	1320 min^{-1}
Req'd drive input	20.5 kW
Operating pressure	90 to 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	570 kg
Compressor block	**IK22.0 GI, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	130 mm
Cylinder bore 2nd stage	130/110 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	16 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.3 to 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	11 to 15 bar
Safety valve setting 2nd stage	20 bar
Intermediate pressure 3rd stage	62 to 83 bar
Safety valve setting 3rd stage	90 bar
Direction of rotation (viewed from fanwheel side)	anti-clockwise
Compressor block oil capacity	8 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2.0 to 5.0 bar
Max. ambient temperature	+5 to +45 °C
Max. permissible inclination of compressor[b)]	10°
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	22 kW
Rated current	approx. 44 A (for 400 V)
Size	180 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**GI 23.0-30**
Serial no.	_____
Medium	nitrogen
Delivery[a)]	1300 l/min (46 c.f.m.)
Intake pressure	$1^{\pm 0.1}$ bar abs.
Compressor speed	1200 min^{-1}
Req'd drive input	28 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	760 kg
Compressor block	**IK23.0 GI, mod. 9**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	160 mm
Cylinder bore 2nd stage	160/130 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	18 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.5 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	17 ... 20 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	68 ... 73 bar
Safety valve setting 3rd stage	80 bar
Compressor block oil capacity	11 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	30 kW
Rated current	approx. 60 A (for 400 V)
Size	200 L
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**GI 23.0-37**
Serial no.	_____
Medium	nitrogen
Delivery[a)]	1480 l/min (52 c.f.m.)
Intake pressure	$1^{\pm 0.2}$ bar abs.
Compressor speed	1400 min^{-1}
Req'd drive input	34 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	780 kg
Compressor block	**IK23.0 GI, mod. 9**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	160 mm
Cylinder bore 2nd stage	160/130 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	18 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	2.5 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	17 ... 20 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	68 ... 73 bar
Safety valve setting 3rd stage	80 bar
Compressor block oil capacity	11 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	37 kW
Rated current	approx. 72 A (for 400 V)
Size	200 L
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**GI 25.0-45**
Serial no.	_____
Medium	nitrogen
Delivery[a)]	1900 l/min (67 c.f.m.)
Intake pressure	$1^{\pm 0.1}$ bar abs.
Compressor speed	1180 min^{-1}
Req'd drive input	41 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1750 kg
Compressor block	**IK25.0 GI, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	185 mm
Cylinder bore 2nd stage	185/160 mm
Cylinder bore 3rd stage	45 mm
Cylinder bore 4th stage	22 mm
Piston stroke	90 mm
Intermediate pressure 1st stage	3 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	15 ... 16 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	68 ... 72 bar
Safety valve setting 3rd stage	80 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	45 kW
Rated current	approx. 85 A (for 400 V)
Compressor speed	1465 min^{-1}
Size	225 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**GI 25.9-45**
Serial no.	_____
Medium	nitrogen
Delivery[a)]	1900 l/min (67 c.f.m.)
Intake pressure	$1^{\pm 0.1}$ bar abs.
Compressor speed	1180 min^{-1}
Req'd drive input	42 kW
Operating pressure	350 ... 500 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1900 kg
Compressor block	**IK25.9 GI, mod. 3**
No. of stages	5
No. of cylinders	3
Cylinder bore 1st stage	185 mm
Cylinder bore 2nd stage	170/130 mm
Cylinder bore 3rd stage	140/130 mm
Cylinder bore 4th stage	28 mm
Cylinder bore 5th stage	16 mm
Piston stroke	90 mm
Intermediate pressure 1st stage	3 ... 4 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	16 ... 18 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	50 ... 55 bar
Safety valve setting 3rd stage	70 bar
Intermediate pressure 4th stage	155 ... 160 bar
Safety valve setting 4th stage	170 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	45 kW
Rated current	approx. 85 A (for 400 V)
Compressor speed	1465 min^{-1}
Size	225 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**GI 25.18-55**
Serial no.	_____
Medium	nitrogen
Delivery[a)]	2300 l/min (80 c.f.m.)
Intake pressure	$1^{\pm 0.1}$ bar abs.
Compressor speed	1100 min^{-1}
Req'd drive input	51 kW
Operating pressure	350 ... 500 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1950 kg
Compressor block	**IK25.18 GI, mod. 3**
No. of stages	5
No. of cylinders	3
Cylinder bore 1st stage	215 mm
Cylinder bore 2nd stage	170/130 mm
Cylinder bore 3rd stage	140/130 mm
Cylinder bore 4th stage	28 mm
Cylinder bore 5th stage	16 mm
Piston stroke	90 mm
Intermediate pressure 1st stage	3 ... 4 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	16 ... 18 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	50 ... 55 bar
Safety valve setting 3rd stage	70 bar
Intermediate pressure 4th stage	155 ... 160 bar
Safety valve setting 4th stage	170 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	55 kW
Rated current	approx. 105 A (for 400 V)
Compressor speed	1475 min^{-1}
Size	250 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**GI 28.0-55**
Serial no.	_____
Medium	nitrogen
Delivery[a)]	2500 l/min (88 c.f.m.)
Intake pressure	$1^{\pm 0.1}$ bar abs.
Compressor speed	830 min^{-1}
Req'd drive input	50 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1860 kg
Compressor block	**IK28.0 GI, mod. 3**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	215 mm
Cylinder bore 2nd stage	215/185 mm
Cylinder bore 3rd stage	50 mm
Cylinder bore 4th stage	24 mm
Piston stroke	125 mm
Intermediate pressure 1st stage	3 ... 4.2 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	15 ... 17 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	67 ... 75 bar
Safety valve setting 3rd stage	90 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	55 kW
Rated current	approx. 105 A (for 400 V)
Compressor speed	2950 min^{-1}
Size	225 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**GI 28.0-75**
Serial no.	_____
Medium	nitrogen
Delivery[a)]	3500 l/min (125 c.f.m.)
Intake pressure	$1^{\pm 0.1}$ bar abs.
Compressor speed	1180 min^{-1}
Req'd drive input	72 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1950 kg
Compressor block	**IK28.0 GI, mod. 3**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	215 mm
Cylinder bore 2nd stage	215/185 mm
Cylinder bore 3rd stage	50 mm
Cylinder bore 4th stage	24 mm
Piston stroke	125 mm
Intermediate pressure 1st stage	3 ... 4.2 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	15 ... 17 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	67 ... 75 bar
Safety valve setting 3rd stage	90 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	75 kW
Rated current	approx. 140 A (for 400 V)
Compressor speed	2950 min^{-1}
Size	280 S
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

14.5. INDUSTRIAL HIGH PRESSURE GAS COMPRESSOR UNITS FOR HELIUM, ARGON UP TO 220 BAR

Compressor unit	**G 22.0-18,5**
Serial no.	_____
Medium	argon, helium
Delivery[a)]	720 l/min (25 c.f.m.)
Intake pressure	$1^{\pm 0.1}$ bar abs.
Compressor speed	1050 min^{-1}
Req'd drive input[b)]	14 kW
Operating pressure	90 ... 220 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	540 kg
Compressor block	**IK22.0 G, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	130 mm
Cylinder bore 2nd stage	130/110 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	16 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	3 ... 4 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	13 ... 15 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	65 ... 70 bar
Safety valve setting 3rd stage	90 bar
Direction of rotation (viewed from fanwheel side)	anti-clockwise
Compressor block oil capacity	8 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[c)]	10°
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	18.5 kW
Rated current	approx. 35 A (for 400 V)
Size	160 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217
Correction factor: delivery of helium = delivery of air x 0.95
delivery of argon = delivery of air x 1.04

b) Drive input measured with medium air at max. final pressure.
Correction factor: drive input with helium = drive input with air x 1.06
drive input with argon = drive input with air x 1.15

c) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**G 23.1-22**
Serial no.	_____
Medium	argon, helium
Delivery[a)]	840 l/min (30 c.f.m.)
Intake pressure	$1^{\pm 0.1}$ bar abs.
Compressor speed	990 min^{-1}
Req'd drive input	16.4 kW
Operating pressure[b)]	90 ... 220 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	740 kg
Compressor block	**IK23.1 G, mod. 10**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	150 mm
Cylinder bore 2nd stage	150/130 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	18 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	3 ... 4 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	13 ... 15 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	65 ... 70 bar
Safety valve setting 3rd stage	80 bar
Direction of rotation (viewed from fanwheel side)	anti-clockwise
Compressor block oil capacity	11 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[c)]	10°
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	22 kW
Rated current	approx. 44 A (for 400 V)
Size	180 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217
Correction factor: delivery of helium = delivery of air x 0.95
delivery of argon = delivery of air x 1.04

b) Drive input measured with medium air at max. final pressure.
Correction factor: drive input with helium = drive input with air x 1.06
drive input with argon = drive input with air x 1.15

c) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**G 23.1-30**
Serial no.	_____
Medium	argon, helium
Delivery[a)]	1060 l/min (37 c.f.m.)
Intake pressure	$1^{\pm 0.2}$ bar abs.
Compressor speed	1250 min^{-1}
Req'd drive input[b)]	20.7 kW
Operating pressure	90 ... 220 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	790 kg
Compressor block	**IK23.1 G, mod. 10**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	150 mm
Cylinder bore 2nd stage	150/130 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	18 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	3 ... 4 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	13 ... 15 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	65 ... 70 bar
Safety valve setting 3rd stage	80 bar
Direction of rotation (viewed from fanwheel side)	anti-clockwise
Compressor block oil capacity	11 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[c)]	10°
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	30 kW
Rated current	approx. 60 A (for 400 V)
Size	200 L
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217
Correction factor: delivery of helium = delivery of air x 0.95
delivery of argon = delivery of air x 1.04

b) Drive input measured with medium air at max. final pressure.
Correction factor: drive input with helium = drive input with air x 1.06
drive input with argon = drive input with air x 1.15

c) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**G 25.9-45**
Serial no.	_____
Medium	argon, helium
Delivery[a)]	1900 l/min (67 c.f.m.)
Intake pressure	$1^{\pm 0.1}$ bar abs.
Compressor speed	1180 min^{-1}
Req'd drive input[b)]	36 kW
Operating pressure	90 ... 220 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1780 kg
Compressor block	**IK25.9 G, mod. 3**
No. of stages	5
No. of cylinders	3
Cylinder bore 1st stage	185 mm
Cylinder bore 2nd stage	170/130 mm
Cylinder bore 3rd stage	140/130 mm
Cylinder bore 4th stage	28 mm
Cylinder bore 5th stage	16 mm
Piston stroke	90 mm
Intermediate pressure 1st stage	3 ... 4 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	16 ... 18 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	50 ... 55 bar
Safety valve setting 3rd stage	70 bar
Intermediate pressure 4th stage	155 ... 160 bar
Safety valve setting 4th stage	170 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[c)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	45 kW
Rated current	approx. 85 A (for 400 V)
Compressor speed	1465 min^{-1}
Size	225 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217
Correction factor: delivery of helium = delivery of air x 0.95
delivery of argon = delivery of air x 1.04

b) Drive input measured with medium air at max. final pressure.
Correction factor: drive input with helium = drive input with air x 1.06
drive input with argon = drive input with air x 1.15

c) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

14.6. INDUSTRIAL HIGH PRESSURE GAS COMPRESSOR UNITS FOR HELIUM, ARGON UP TO 350 BAR

Compressor unit	**G 25.9-45**
Serial no.	_____
Medium	argon, helium
Delivery[a)]	1650 l/min (58 c.f.m.)
Intake pressure	$1^{\pm 0.1}$ bar abs.
Compressor speed	1050 min^{-1}
Req'd drive input[b)]	34 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1780 kg
Compressor block	**IK25.9 G, mod. 3**
No. of stages	5
No. of cylinders	3
Cylinder bore 1st stage	185 mm
Cylinder bore 2nd stage	170/130 mm
Cylinder bore 3rd stage	140/130 mm
Cylinder bore 4th stage	28 mm
Cylinder bore 5th stage	16 mm
Piston stroke	90 mm
Intermediate pressure 1st stage	3 ... 4 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	16 ... 18 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	50 ... 55 bar
Safety valve setting 3rd stage	70 bar
Intermediate pressure 4th stage	155 ... 160 bar
Safety valve setting 4th stage	170 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[c)]	10° to all sides
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	45 kW
Rated current	approx. 85 A (for 400 V)
Compressor speed	1465 min^{-1}
Size	225 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217
Correction factor: delivery of helium = delivery of air x 0.95
delivery of argon = delivery of air x 1.04

b) Drive input measured with medium air at max. final pressure.
Correction factor: drive input with helium = drive input with air x 1.06
drive input with argon = drive input with air x 1.15

c) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

14.7. INDUSTRIAL HIGH PRESSURE GAS COMPRESSOR UNITS FOR COMPRESSED NATURAL GAS (CNG)

Compressor unit	**C 22.0-18,5**
Serial no.	_____
Medium	natural gas
Delivery[a)]	890 l/min (31 c.f.m.)
Intake pressure	$1^{+0.3}$ bar abs.
Gas condition	relative humidity max. 65%
Compressor speed	960 min^{-1}
Req'd drive input	17.4 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	580 kg
Compressor block	**IK22.0 C, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	130 mm
Cylinder bore 2nd stage	130/110 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	16 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	3 ... 4 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	13 ... 15 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	65 ... 70 bar
Safety valve setting 3rd stage	80 bar
Direction of rotation (viewed from fanwheel side)	anti-clockwise
Compressor block oil capacity	8 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10°
Drive motor	**3 phase squirrel cage motor E Ex de II CT3**
Operating voltage	400 V, 50 Hz
Power	18.5 kW
Compressor speed	2940 min^{-1}
Rated current	approx. 50 A
Size	180 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**C 22.0-22**
Serial no.	_____
Medium	natural gas
Delivery[a)]	1060 l/min (37 c.f.m.)
Intake pressure	$1^{+0.3}$ bar abs.
Gas condition	relative humidity max. 65%
Compressor speed	1150 min^{-1}
Req'd drive input	20.4 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	600 kg
Compressor block	**IK22.0 C, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	130 mm
Cylinder bore 2nd stage	130/110 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	16 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	3 ... 4 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	13 ... 15 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	65 ... 70 bar
Safety valve setting 3rd stage	80 bar
Direction of rotation (viewed from fanwheel side)	anti-clockwise
Compressor block oil capacity	8 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10°
Drive motor	**3 phase squirrel cage motor**
Operating voltage	400 V, 50 Hz
Power	22 kW
Rated current	approx. 44 A (for 400 V)
Size	180 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**C 23.1-30**
Serial no.	_____
Medium	natural gas
Delivery[a)]	1400 l/min (50 c.f.m.)
Intake pressure	$1^{+0.3}$ bar abs.
Gas condition	relative humidity max. 65%
Compressor speed	1150 min^{-1}
Req'd drive input	27.5 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	800 kg
Compressor block	**IK23.1 C, mod. 10**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	150 mm
Cylinder bore 2nd stage	150/130 mm
Cylinder bore 3rd stage	36 mm
Cylinder bore 4th stage	18 mm
Piston stroke	80 mm
Intermediate pressure 1st stage	3 ... 4 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	13 ... 15 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	65 ... 70 bar
Safety valve setting 3rd stage	80 bar
Direction of rotation (viewed from fanwheel side)	anti-clockwise
Compressor block oil capacity	11 l
Oil type	see chap. 2 lubrication
Lube oil pressure	2 ... 3 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10°
Drive motor	**3 phase squirrel cage motor E Ex de II CT3**
Operating voltage	400 V, 50 Hz
Power	30 kW
Rated current	approx. 60 A (for 400 V)
Compressor speed	2900 min^{-1}
Size	200 L
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**C 25.0-37**
Serial no.	_____
Medium	natural gas
Delivery[a)]	1750 l/min (62 c.f.m.)
Intake pressure	$1^{+0.3}$ bar abs.
Gas condition	relative humidity max. 65%
Compressor speed	835 min^{-1}
Req'd drive input	34 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1700 kg
Compressor block	**IK25.0 C, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	185 mm
Cylinder bore 2nd stage	185/160 mm
Cylinder bore 3rd stage	45 mm
Cylinder bore 4th stage	22 mm
Piston stroke	90 mm
Intermediate pressure 1st stage	3 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	15 ... 16 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	68 ... 72 bar
Safety valve setting 3rd stage	80 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor E Ex de II CT3**
Operating voltage	400 V, 50 Hz
Power	37 kW
Rated current	approx. 72 A (for 400 V)
Compressor speed	2900 min^{-1}
Size	200 L
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**C 25.0-45**
Serial no.	_____
Medium	natural gas
Delivery[a)]	2200 l/min (78 c.f.m.)
Intake pressure	$1^{+0.3}$ bar abs.
Gas condition	relative humidity max. 65%
Compressor speed	1050 min^{-1}
Req'd drive input	43 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	1730 kg
Compressor block	**IK25.0 C, mod. 5**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	185 mm
Cylinder bore 2nd stage	185/160 mm
Cylinder bore 3rd stage	45 mm
Cylinder bore 4th stage	22 mm
Piston stroke	90 mm
Intermediate pressure 1st stage	3 ... 3.5 bar
Safety valve setting 1st stage	5 bar
Intermediate pressure 2nd stage	15 ... 16 bar
Safety valve setting 2nd stage	24 bar
Intermediate pressure 3rd stage	68 ... 72 bar
Safety valve setting 3rd stage	80 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor E Ex de II CT3**
Operating voltage	400 V, 50 Hz
Power	45 kW
Rated current	approx. 85 A (for 400 V)
Compressor speed	2950 min^{-1}
Size	225 M
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**C 28.0-75**
Serial no.	_____
Medium	natural gas
Delivery[a)]	3650 l/min (129 c.f.m.)
Intake pressure	$1^{+0.3}$ bar abs.
Gas condition	relative humidity max. 65%
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	2100 kg
Compressor block	**IK28.0 C, mod. 3**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	215 mm
Cylinder bore 2nd stage	215/185 mm
Cylinder bore 3rd stage	50 mm
Cylinder bore 4th stage	24 mm
Piston stroke	125 mm
Compressor speed	935 min^{-1}
Req'd drive input	73 kW
Intermediate pressure 1st stage	3.5 ... 4.5 bar
Safety valve setting 1st stage	5.4 bar
Intermediate pressure 2nd stage	17 ... 24 bar
Safety valve setting 2nd stage	28 bar
Intermediate pressure 3rd stage	75 ... 90 bar
Safety valve setting 3rd stage	115 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor E Ex de II CT3**
Operating voltage	400 V, 50 Hz
Power	75 kW
Rated current	approx. 140 A (for 400 V)
Compressor speed	1480 min^{-1}
Size	280 S
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

14. TECHNICAL DATA

Compressor unit	**C 28.0-90**
Serial no.	_____
Medium	natural gas
Delivery[a)]	4550 l/min (160 c.f.m.)
Intake pressure	$1^{+0.3}$ bar abs.
Gas condition	relative humidity max. 65%
Compressor speed	1120 min^{-1}
Req'd drive input	89 kW
Operating pressure	90 ... 350 bar
Pressure setting, final pressure safety valve	_____ bar
Pressure setting, final pressure switch	_____ bar
Weight, standard unit approx.	2150 kg
Compressor block	**IK28.0 C, mod. 3**
No. of stages	4
No. of cylinders	3
Cylinder bore 1st stage	215 mm
Cylinder bore 2nd stage	215/185 mm
Cylinder bore 3rd stage	50 mm
Cylinder bore 4th stage	24 mm
Piston stroke	125 mm
Compressor speed	935 min^{-1}
Req'd drive input	73 kW
Intermediate pressure 1st stage	3.5 ... 4.5 bar
Safety valve setting 1st stage	5.4 bar
Intermediate pressure 2nd stage	17 ... 24 bar
Safety valve setting 2nd stage	28 bar
Intermediate pressure 3rd stage	75 ... 90 bar
Safety valve setting 3rd stage	115 bar
Compressor block oil capacity	30 l
Oil type	see chap. 2 lubrication
Lube oil pressure	3 ... 4 bar
Max. ambient temperature	+5 ... +45 °C
Max. permissible inclination of compressor[b)]	10° to all sides
Drive motor	**3 phase squirrel cage motor E Ex de II CT3**
Operating voltage	400 V, 50 Hz
Power	90 kW
Rated current	approx. 170 A
Compressor speed	1480 min^{-1}
Size	280S
Type of construction	B3
Type of enclosure	IP55

Subject to change without prior notice

a) according to ISO 1217

b) This value is only valid if the oil level of the compressor in normal position corresponds to the upper mark of the oil dipstick and may not be exceeded.

Section A
Description

Section B
Installation, Taking into operation

Section C
Operation

Section D
Maintenance, Repair

Section E
Storage, Preservation

Section F
Diagrams, Drawings

Section G
Spare Parts Catalogue

B. INSTALLATION, OPERATION

1. INSTALLATION OF THE COMPRESSOR UNIT

The compressor frame is isolated with regard to the base frame of the compressor unit by anti-vibration mounts and thus a machine base or special means of securing the compressor are not necessary.

For installation observe the following:

1.1. COMPRESSOR ROOM CONDITIONS

- The compressor room must be clean, dust-free, dry and as cool as possible.
- The floor must be capable of taking the load of the system weight.
- Avoid direct exposure to sunlight; if possible, choose north side of building.
- Additional heat producing units or line systems should not be installed in the same room or should be well isolated.
- Ensure adequate ventilation. Remember: room temperature = cooling air temperature ! Min. = +5 °C, max. = +45 °C. Fig. 80.

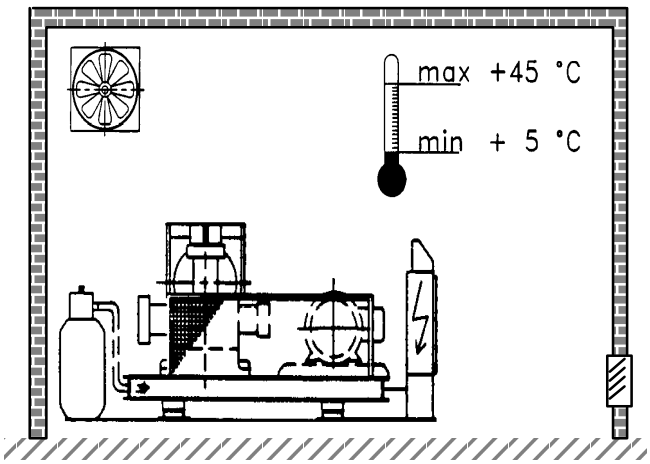


Fig. 80 Room temperature

1.2. LOCATING THE UNIT

- Install unit level. Refer to Technical Data in section A-1. for max. allowable inclination.
- All connections to external pressure line systems should be fitted in a way to allow sufficient movement of the anti-vibration frame and isolators. Rigid connections would result in damage of the connection line within a short time due to fatigue breakage, i.e. a connecting hose should be used to link the compressor unit to the line system, or one or two loops be formed into stainless steel
- If possible install unit in such a manner that the compressor fan can draw fresh air from outside, for instance through an opening in the wall as low as possible.
- Ensure that an adequate exhaust air opening is provided, as high as possible.
- Locate compressor as close to the air intake opening as possible.
- Locate unit so as to absolutely avoid intake of warm or hot cooling air.
- Observe the minimum distances as listed in the table overleaf.

Compressor units of the **standard model** range delivered **without base frame** are fitted with orange painted transportation brackets to secure the instrument panel to the frame.

Before taking the unit into operation it is absolutely essential to remove the transportation brackets from frame and instrument panel, see Fig. 81. Re-install brackets for stabilization before moving the unit at all.

Secure the anti-vibration mount supports to the floor using 4 bolts each.

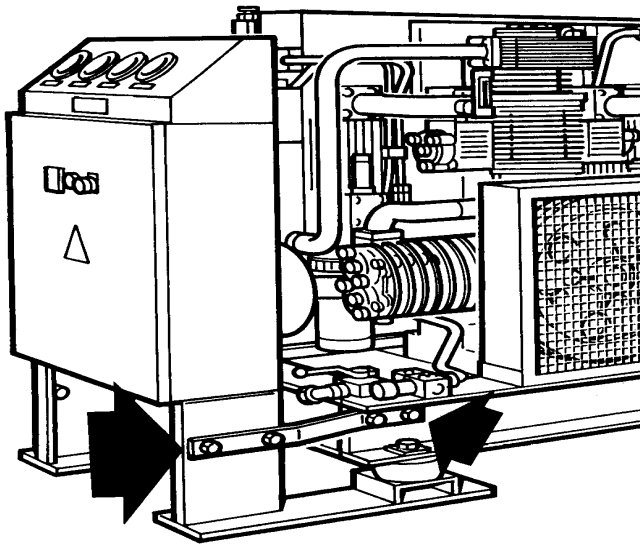


Fig. 81 Transportation brackets

1.3. COOLING AIR FLOW

- Observe the direction of the cooling air flow. The K22 compressor draws in cooling air from the cooler side. The K23, K25 and K28 compressors draw in cooling air from the flywheel side, refer to Fig. 82 and Fig. 83! Refer to the drawing for your compressor unit which is included in section F. of this manual.

- Super-Silent units are equipped additionally with electric blowers. These units are also available with cooling air ducts or can be fitted with them.
- When locating the compressor in small rooms and/or if natural ventilation cannot be gauranteed, measures must be taken to provide artificial ventilation (this also applies when other systems having high heat radiation are operating in the same room). For the units described in this manual with drive powers above 15 kW natural ventilation will not be sufficient.

  The principle is: forced ventilation is obligatory if room temperature exceeds the permissible ambient temperature stated in the Technical Data table in section A.

In this case, there are several types of artificial ventilation.

1.3.1. Types of artificial ventilation

- Free air flow effected by a blower
- Ventilation by means of an air channel with or without additional blower[a)]
- Ventilation by means of an air channel with circulating flap and additional blower[a)]
- Ventilation by means of an air channel with heat exchanging device

Free air flow effected by a blower

The hot cooling air is blown out by a blower. Air ducts for intake and outlet air are not required.

As no air ducts are mounted for this method, it should be noted for installation that the blower is mounted as close as possible to the compressor cooling air outlet, and as high as possible. The air intake opening should be arranged so as to ensure unobstructed air intake by the compressor.

The necessary cooling air flow is calculated to an appoximate value by using the following formula:

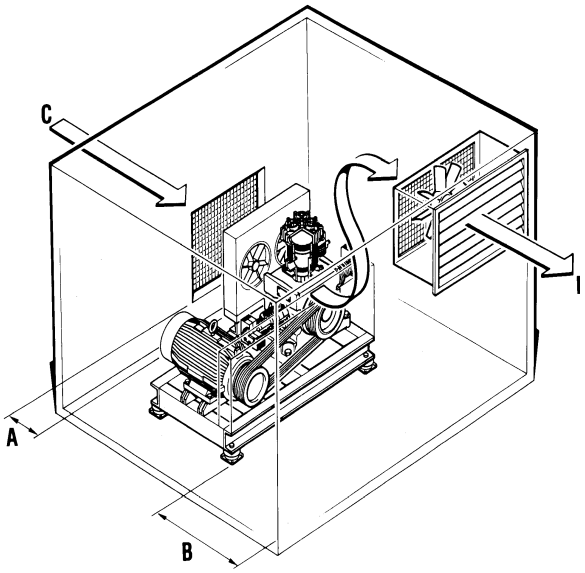


Fig. 82 Installation, K22 units

A Minimum distance from wall, intake side: 0.5 m
(may be ignored if locating the unit in front of an opening)
B Minimum distance from wall, exhaust side: 0.75 m
(may be ignored if locating the unit in front of an opening)
C Intake opening: 1.2 m^2
D Exhaust opening; fan capacity required at a resistance height of approx. 10 mm W.G.:
15 kW: 4,500 m^3/h
18.5 kW: 5,500 m^3/h
22 kW: 6,500 m^3/h
30 kW: 9,000 m^3/h
37 kW: 11,000 m^3/h

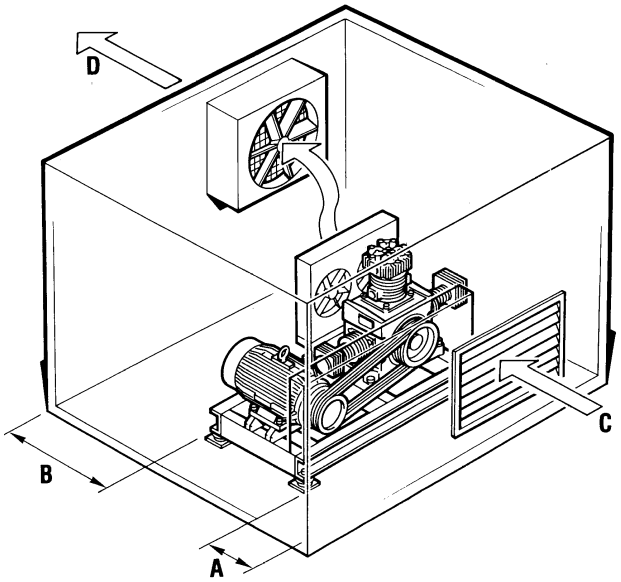


Fig. 83 Installation, K23, K25, and K28 units

a) ATTENTION: Ensure that the max. counter-pressure in the intake and outlet channels Δ_p = 0.5 mbar = 5 mm W.G. (measured at a distance of 1 m) is not exceeded.

A Minimum distance from wall, intake side: 0.5 m
(may be ignored if locating the unit in front of an opening)
B Minimum distance from wall, exhaust side: 0.75 m
(may be ignored if locating the unit in front of an opening)
C Intake opening: 2.1 m^2
D Exhaust opening; fan capacity required at a resistance height of approx. 10 mm W.G.:
30 kW: 9,000 m^3/h
37 kW: 11,000 m^3/h
45 kW: 13,500 m^3/h
55 kW: 16,500 m^3/h
75 kW: 22,500 m^3/h
90 kW: 27,000 m^3/h

Air channel ventilation

For calculation of the cooling air duct cross section the following formula can be used:

The recommended cooling air flow is approx. 3 to 5 m/s, but max. 10 m/s.

Example: I 22.0-22, drive power 22 kW:

Cooling air volume =360 x 22 = 7,920 m^3/h

Cross section =

For more details on the installation of compressor units refer to our Installation Manual available through BAUER Sales Dept. P.O. box 710260 D-81452 Munich.

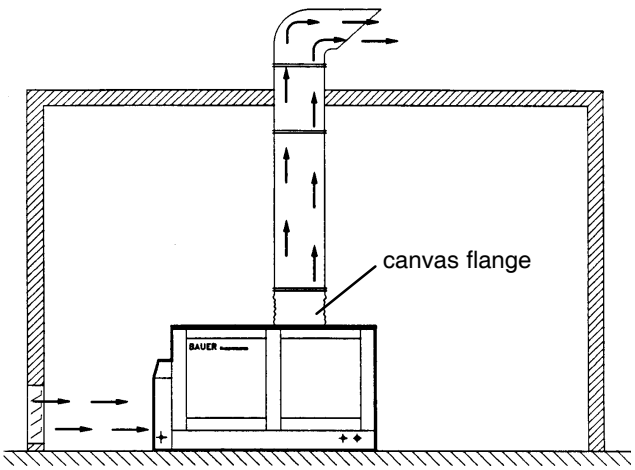
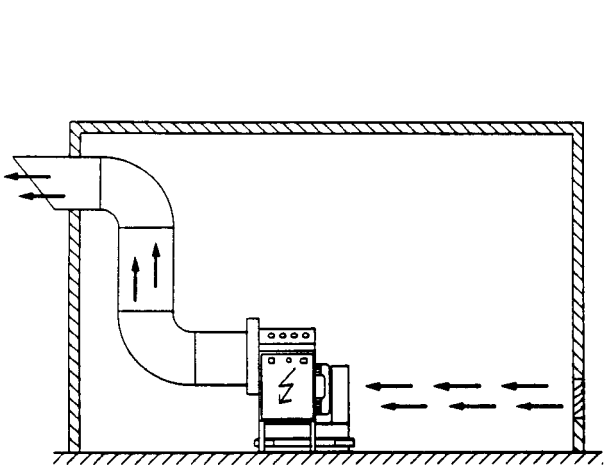
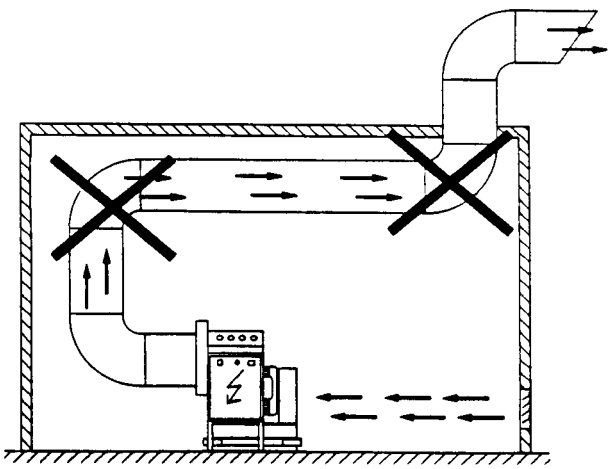


Fig. 84 Air channel ventilation

Fig. 85 to Fig. 88 show installation examples with artificial ventilation:

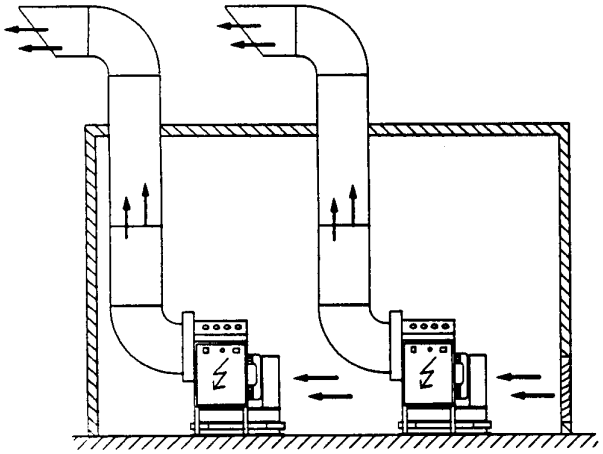


Correct: counter-pressure less than 5 mm W.G.

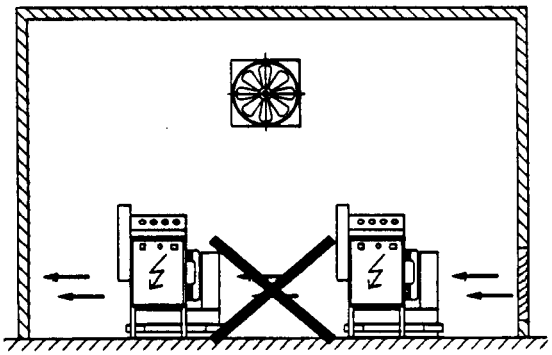


Incorrect: counter-pressure more than 5 mm W.G.

Fig. 85 Installation example 1

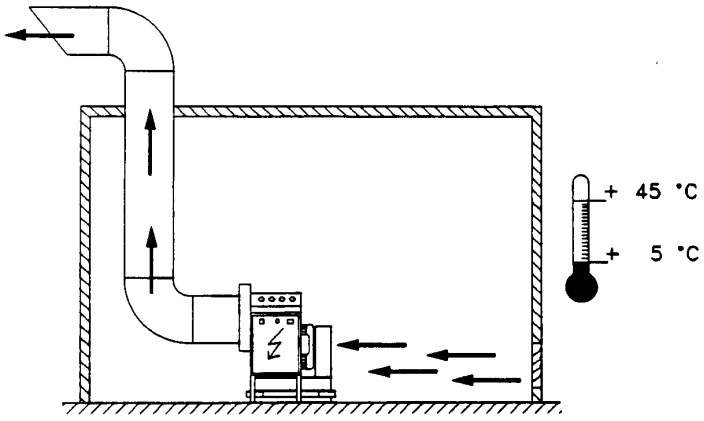


Correct: separate air duct for each compressor, therefore the units do not affect one another

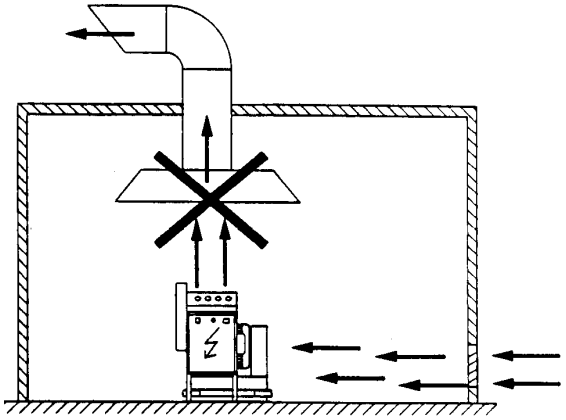


Incorrect: interaction between the units, results in heating up of the second unit

Fig. 86 Installation example 2

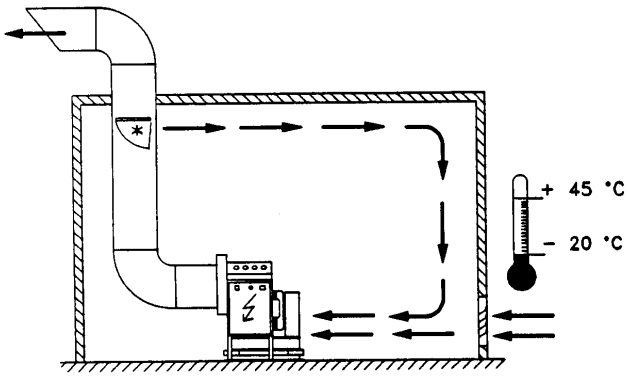


Correct: guided air

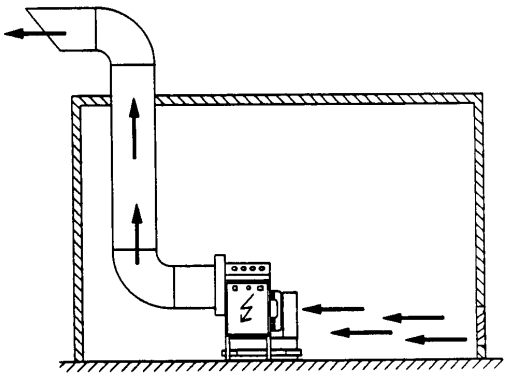


Incorrect: Unguided hot air, not suitable for high drive powers

Fig. 87 Installation example 3



Correct: In low ambient temperatures cooling should be effected by means of circulation



Incorrect: cooling air taken in from outside, danger of low operating temperature

Fig. 88 Installation example 4

2. ELECTRICAL INSTALLATION

For installation of electrical equipment observe the following:

- In section F. you will find the standard schematic diagrams valid for the compressor unit. To connect the compressor control system, use only the diagram contained in the control box of the unit, because any deviations from the standard diagrams according to order are marked there.
- Observe regulations of local electricity supply company.
- Connection should be carried out by an expert only.
- Ensure correct installation of protective conductor.
- Check conformity of motor and control device tension and frequency with those of electric network.
- The necessary cabling, main fuse and a main switch are to be provided by the customer. Fusing according to the electricity supply company's regulations.
- Adjust motor protection, thermal overload relay. For start over contactor adjust to motor amperage rating. For start via star-delta contactor adjust to motor amperage rating x 0.58.
  For example: motor amperage rating = 10 Amp.:
  Adjust relay to 10 x 0.58 = 5.8 Amp.
- Fuse motor correctly (see following table; use slow-blow fuses, only).

FUSE TABLE

Motor type	Voltage	V	125	220	240	400	415	440	500	600	660
3 phase, 15 kW (star-delta starting)	current	A	--	63	63	**35**	35	35	25	25	20
3 phase, 15 kW (direct starting)	current	A	--	80	80	**50**	35	35	35	35	25
3 phase, 18.5 kW (star-delta starting)	current	A	--	80	63	**50**	50	35	35	25	25
3 phase, 18.5 kW (direct starting)	current	A	--	100	80	**63**	50	50	50	35	35
3 phase, 22 kW (star-delta starting)	current	A	--	80	80	**50**	50	50	50	35	35
3 phase, 22 kW (direct starting)	current	A	--	100	100	**63**	63	63	50	35	35
3 phase, 30 kW (star-delta starting)	current	A	--	125	100	**63**	63	63	50	50	35
3 phase, 30 kW (direct starting)	current	A	--	125	125	**80**	80	80	63	63	50
3 phase, 37 kW (star-delta starting)	current	A	--	160	125	**80**	80	80	63	50	50
3 phase, 37 kW (direct starting)	current	A	--	160	160	**100**	100	80	80	63	63
3 phase, 45 kW (star-delta starting)	current	A	--	160	160	**100**	100	80	80	63	63
3 phase, 55 kW (star-delta starting)	current	A	--	200	200	**125**	---	100	100	80	63
3 phase, 75 kW (star-delta starting)	current	A	--	250	250	**160**	160	160	125	100	100
3 phase, 90 kW (star-delta starting)	current	A	--	315	250	**200**	200	160	160	125	125

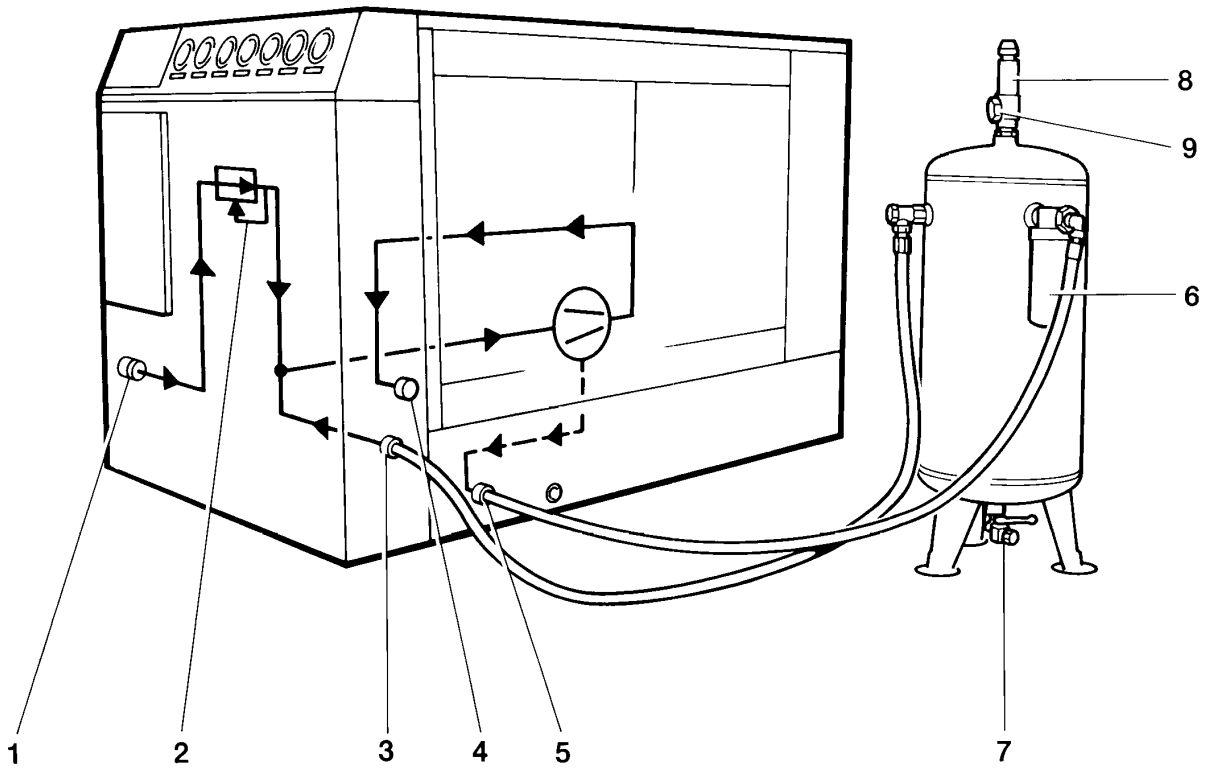
2.1. UNLOADED OPERATION (OPTION)

On units with unloaded operation option, which are not delivered ex-works with a buffer tank, please note that the air discharged from the relief valve and when the compressor shuts down is discharged at a relatively high pressure and is contaminated with water and oil.
When installing the unit, suitable pressure lines to lead away the contaminated air and possibly a silencer must be provided.
A 100 litre buffer tank is available as an accessory and can be fitted as required. It is also possible to dismantle the built-in silencer on the tank and to connect it to a pressure line in order to install it in the open air.

3. CONNECTING THE GAS RECOVERY SYSTEM (Gas Compressors, only)

Compressor units in the G and C ranges are equipped as standard with a gas feedback system, to minimize gas losses during the regular condensate drain process. Fig. 89 shows a typical setup.

The gas enters the compressor unit at a gas inlet connector (1). If required, an intake pressure reducer (2) is connected into this line. The compressed gas is available at outlet connector (4). The condensate flows from outlet connector (5) into separator (6) and from there into the collector tank. It can be drained manually with tap (7). The gas escaping together with the condensate is fed back into the unit via gas feedback connector (3). The arrangement of the connectors varies according to the model range. Generally it should be noted that the thinner hose is connected to the condensate outlet (5) while the thicker hose is the feedback hose that leads from the gas tank back to inlet connector (3). The safety valve (8) for the gas recovery system is mounted on top of the gas tank. From this valve, the gas cannot be recovered. In case of over-pressure, it escapes into the open air through opening (9).



1 Gas inlet
2 Pressure reducer
3 Gas feedback
4 Gas outlet (operating pressure)
5 Condensate outlet
6 Condensate separator
7 Drain valve
8 Safety valve, 1 bar
9 Safety valve blow-off opening

Fig. 89 Connecting the condensate separator

4. TAKING UNIT INTO OPERATION

4.1. PREPARATION FOR OPERATION

All compressor units are tested prior to delivery to the customer, so after correct installation of the unit there should be no problems putting it into operation, observing the following points:

For explosive gas units, before taking into operation the unit must be evacuated and flushed with its own gas or nitrogen for safety purposes according to applicable regulations.

Under no circumstances must the compressor be operated with intake shut-off valve closed or intake line closed by other means. EXPLOSION MAY OCCUR due to air/gas mixture being formed by air drawn in through seals and pistons from crankcase.

- Prior to **first** operation read Instruction Manual carefully. Make sure that all persons handling the compressor and the filling station are familiar with the function of all controls and monitors. Observe the warnings in chapter C-1.1.
- Depending on the model range, some compressor units are delivered **without** oil in the crankcase. In this case, the first filling quantity is delivered separately in the consignment. Prior to **first** operation fill with oil according to chapter D-2. If taking unit into operation after a standstill period of 2 years or more, change compressor oil. When using a mineral oil, change oil after 1 year.
- Prior to **first** operation or operation subsequent to maintenance or repairwork, turn the compressor manually using the flywheel to ensure that all parts are turning free. Check that all fastening bolts and threaded pipes are secure and sealed, if necessary tighten them to the correct torque value.
- **Immediately** after switching on the system for the first time check the direction of rotation of the motor for compliance with the arrow on the unit. If motor turns in the wrong direction, the phases are not connected properly. Shut down unit immediately and interchange two of the three phase leads in the switch box. **Never** change leads at the **motor** terminal board.
- Prior to **first** operation or operation subsequent to repair work, operate unit for at least 10 minutes with open condensate valves (pressureless) to ensure proper lubrication of all parts before pressure is built up. To keep drain valves open, loosen screw (3, Fig. 90) on coil (1) and pull plug (2) from solenoid valve.

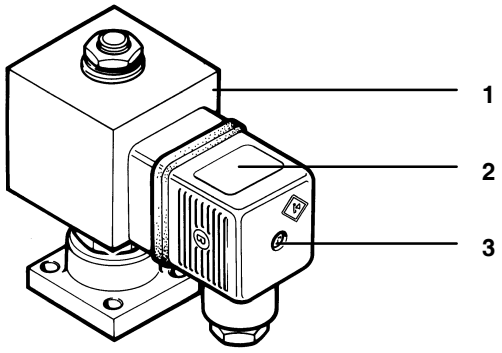


Fig. 90 Solenoid valve plug

- Prior to **first** operation or operation subsequent to repair work, operate compressor to final pressure and check unit for leaks.
- Prior to **each** operation check the oil level according to chapter D-2 and determine whether maintenance is necessary in accordance with chapter D-1.
- Open the outlet valve, this must be open during operation. Close only for servicing the compressor to avoid gas escaping from connected receivers.
- **Every time** the unit is started up check all systems for proper operation. If any malfunction is observed stop unit **immediately** and find the cause of the fault or call the service department.

4.2. OPERATION

Refer to section C.

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C. OPERATION

1. SAFETY MEASURES

1.1. NOTES AND WARNING SIGNS

Notes and warning signs displayed on compressors according to model, application or equipment.

WARNING

Hot surfaces, do not touch!

Danger of burning by touching cylinders, cylinder heads and pressure lines of individual compressor stages.

WARNING

High voltage!

Life threatening danger of electric shock. Maintenance work on electric units or operating equipment may only be carried out by a qualified electrician or by a person instructed and supervised by a qualified electrician according to electrical regulations.

WARNING

Automatic compressor control, unit may start-up without warning!

Before carrying out maintenance and repair work, switch off at the main switch or disconnect from the mains and ensure unit will not restart.

MANDATORY

Instructions must be read by persons operating the machinery!

The instruction manual supplied and all other applicable instructions, regulations etc. must be read and understood by operating personnel before using the machine.

MANDATORY

Hearing protectors must be worn!

Hearing protectors must be worn when working on a machine which is running.

NOTE

Ensure correct direction of rotation!

When switching on the machine, check the arrow to ensure correct direction of rotation of the drive motor.

1.2. IDENTIFYING THE SAFETY NOTICES

Important instructions concerning the endangerment of personnel, technical safety and operating safety will be specially emphasized by placing the following signs before the instructions.

This notice is used with maintenance work and operating procedures and must be adhered to exactly in order to avoid endangering personnel.

This notice must be complied with in order to avoid damage to or destruction of the machine or its equipment.

This notice advises of technical requirements which the operator must take particular note of.

1.3. FUNDAMENTAL SAFETY NOTICES

1.3.1. Authorized use

- The machine / unit is built according to state of the art technology and established safety technical regulations. Nevertheless, its use can cause danger to life and limb of the operator or third parties or damage to the machine and other equipment.
- Operate the machine / unit only in technically perfect condition in accordance with regulations and safety and danger notices detailed in the instruction manual! In particular, immediately correct faults (or have them corrected) which can impair safety!
- The machine / unit is exclusively for the compression of mediums (air/gas) specified in section A, chapter 1.3. “Technical data”. Any other medium or use outside that specified is not authorized. The manufacturer / supplier is not liable for damage resulting from this. The user alone is responsible for this risk. Authorization for use is also under the condition that the instruction manual is complied with and inspection and maintenance requirements are enforced.

1.3.2. Organizational measures

- Keep the instruction manual to hand near the machine / unit at all times in the relevant holder.
- In addition to the instruction manual, observe and comply with universally valid legal and other obligatory regulations regarding accident prevention and environment protection. See chapter 1.4. This can involve, for example, contact with hazardous substances or the provision / wearing of personal protective equipment.

- In addition to the instruction manual, provide supplementary instructions for supervision and monitoring duties taking into consideration exceptional factors e.g. with regard to organization of work, production, personnel employed.
- Personnel engaged to operate the machine must have read the instruction manual before beginning work, especially the safety notices chapter. When work is already underway it is too late. This is particularly relevant for temporary personnel, e.g. maintenance personnel.
- At the very least, supervise temporary personnel's work in accordance with the instruction manual, taking into account safety and danger factors.
- Personnel may not wear long hair loose, loose clothing or jewellery, including rings. There is a danger of injury through, for example, these getting caught or being pulled into the equipment.
- As far as necessary or according to regulations, use personal protective equipment.
- Observe all safety and danger notices on the machine / unit.
- Keep all safety and danger notices on the machine / unit complete and in readable condition.
- If there are any modifications to the machine / unit or operating conditions which may affect safety, stop the machine / unit immediately and inform the department / person responsible of the fault.
- No modifications may be made to the machine / unit which could impair safety without first obtaining permission from the suppliers. This is also the case with regard to installation and adjustment of safety devices and valves as well as welding of piping and reservoirs.
- Spare parts must always comply with the technical requirements specified by the manufacturer. This is always guaranteed with original spare parts.
- Do not carry out programme changes (software) to the programmable control system.
- Piping must be thoroughly checked (pressure and visual inspection) by the operator at appropriate time intervals, even if no safety related faults have been noticed.
- Intervals stipulated or given in the instruction manual for recurring checks / inspections must be adhered to.
- It is absolutely essential that the workplace is appropriately equipped for maintenance measures.
- Make sure location and operation of fire extinguishers is known.
- Pay attention to fire warning and fire fighting procedures.

1.3.3. Qualifications, fundamental duties

- Work on / with the machine / unit may only be carried out by reliable personnel. Observe the legal minimum age permissible.
- Only employ trained personnel, clearly establish responsibility of personnel for operation, maintenance and repairwork.
- Ensure that only trained personnel work with the machine.
- Establish the responsibilities of the machine operator and establish a procedure for him to inform a third person of unfavourable safety conditions.
- People who are being trained or introduced to the job should only be allowed to work with the machine / unit under constant supervision of an experienced person.
- Work on the electrical equipment of the machine / unit may only be carried out by a qualified electrician or by an instructed person under the direction and supervision of a qualified electrician according to electrotechnical regulations.
- Work on gas equipment may only be carried out by qualified personnel.

1.3.4. Safety notices for operation

- Do not carry out any work if safety is questionable.
- Meet all requirements demanding that the machine / unit is only operated in safe and good working order. Only operate the machine if all protective and safety equipment, e.g. all detachable protective equipment, emergency shut-down devices, soundproofing is provided and in good working order.
- At least once every day, check the machine / unit externally for damage and faults. Inform the department / person responsible immediately if anything is not as is should be (including operation). If necessary, shut the machine down immediately and make it safe.
- If there are any malfunctions, shut the machine / unit down immediately and make it safe. Correct faults immediately (or have them corrected).
- Observe switching on and off processes and monitoring indications according to the instruction manual.
- Before switching on / starting up the machine / unit, ensure that no one can be put at risk through running the machine / unit.
- Carry out the setting, maintenance and inspection processes at the intervals specified in the instruction manual, including replacement of parts / equipment. This work may only be carried out by qualified personnel.

- Before carrying out any exceptional work or repairwork, operating personnel should be informed. Call the supervisor.
- For all work concerning operation, change in production, conversion or regulating of the machine / unit and its safety measures such as inspection, maintenance and repairwork, observe the switching on and off processes in the instruction manual and the notices for maintenance work.
- Clear and make the maintenance area safe as far as necessary.
- If the machine / unit is completely switched off for maintenance and repairwork, ensure that it is protected from unexpected start-up. Turn off main control device and remove the key and / or display a warning sign on the main switch.
- When replacing individual parts and larger assembly groups, they must be carefully fastened to the lifting device so that there is no risk of danger. Use only suitable and technically perfect lifting devices and equipment with sufficient lifting power and strength. Do not linger or work under suspended loads.
- Only entrust an experienced person with the fixing of loads and guiding of crane drivers. The person guiding must remain within sight or in contact with the operator.
- For assembly work above body height, use appropriate safety approved equipment, e.g. ladders and platforms. Do not climb on machine parts. For maintenance work at high levels, wear a safety harness.
- Clean oil, fuel or care products from the machine, in particular the connections and screw joints, before carrying out maintenance / repairwork. Do not use aggressive cleaning fluid. Use a fibre-free cleaning cloth.
- Before cleaning the machine with water or jet of steam (high pressure cleaner) or detergent, cover / seal all openings which for safety and/or operating reasons no water / steam / detergent may penetrate. Electric motor and switch cabinets are particularly at risk.
- When cleaning the operating room, ensure that the temperature sensors of the fire alarm and sprinkler system do not come into contact with hot cleaning fluid, in order to avoid triggering the sprinkler system.
- Completely remove all covers / seals after cleaning.
- After cleaning, check all pressure lines for leaks, loose connections, wear and damage. Immediately eliminate any faults.
- Always retighten any screw connections loosened for maintenance or repairwork.
- If it is necessary to remove safety devices for maintenance and repairwork, these must be replaced and checked immediately after completion of the maintenance or repairwork.
- Ensure safe and environmentally friendly disposal of consumables and old parts.

1.3.5. Particular areas of danger

- Use only original fuses with specified current rating. If there is a failure in the electric energy supply, shut the machine / unit down immediately.
- Work on electric units or operating equipment may only be carried out by a qualified electrician or by a person under the instruction and supervision of a qualified electrician according to electric technical regulations.
- Machines and unit parts which must undergo inspection, maintenance and repairwork, must be disconnected from the mains supply, if specified. Parts which have been disconnected must first be checked for voltage, then earthed and short-circuited and isolated from live neighbouring parts.
- The electrical equipment of a machine / unit must be regularly checked. Defects, such as loose screw connections or burnt wires, must be rectified immediately.
- If work is to be carried out on live parts, work with a second person who can operate the emergency off switch or the main switch in the case of an emergency. Close off the work area with a red and white safety chain and a warning sign. Only use voltage isolated tools.
- Only carry out welding, burning and grinding work on the machine / unit when specifically approved. There can, for example, be a risk of fire or explosion.
- Before carrying out welding, burning or grinding work, clean the machine / unit and surrounding area from dust and flammable material and ensure there is adequate ventilation (danger of explosion!).
- When working in small rooms, observe any national regulations.
- Only personnel with particular knowledge and experience with pneumatics may carry out work on pneumatic equipment.
- Check all pressure lines, hoses and screw connections regularly for leaks and visible damage. Immediately repair any damage. Escaping air or gas under pressure can cause injury and fire.
- Depressurize system and pressure lines before commencing repairwork.
- Pressurized air lines must be laid and mounted by qualified personnel. Connections must not be mixed up. Fittings, length and quality of the piping must correspond to requirements.
- Soundproofing equipment on the machine / unit must be in place and functional during operation.
- The stipulated hearing protectors must be worn.

- With regard to oil, grease and other chemical substances, observe the relevant safety regulations for the product.
- For loading, only use lifting device and equipment with sufficient lifting power and strength.
- Appoint trained guide personnel for lifting operations.
- Machines may only be lifted with a lifting device and by trained personnel according to instructions in the instruction manual (fixing points for fixing equipment etc.).
- Use only suitable transporters with sufficient carrying power.

Secure the load properly. Use suitable fixing points.

- If necessary, provide machine / unit with transportation brackets. Display the appropriate notice. Remove transportation brackets in the correct manner before taking into operation.
- Parts which need to be dismantled for transport purposes must be carefully replaced and secured before taking into operation.
- Even when moving the machine / unit only slightly, the machine / unit must be disconnected from all external energy sources. Before putting into use again, reconnect the machine to the mains according to regulations.
- When taking back into operation, proceed according to the instruction manual.

1.3.6. Notices of danger regarding pressure vessels

- Never open or loosen pressure vessel lids or pipe connection parts under pressure; always depressurise the vessel or the unit.
- Never exceed the permissible operating pressure of the vessels!
- Never heat the vessels or any of their parts above the stated, maximum operating pressure.
- Always exchange damaged pressure vessels completely. Individual parts that are subject to pressure loads cannot be purchased as spare parts, since the vessels are tested as a complete part and the documentation considers them as a whole (see pressure vessel documentation, serial-numbers!).
- Always pay attention to the permissible operating mode of the pressure vessels.

  We differentiate:

  - vessels for static load

  - vessels for dynamic load

  Vessels for static load:

  These pressure vessels are permanently under virtually constant operating pressure; the fluctuations of pressure are very small.

  Vessels for this type of load are not marked in a particular way and may be used as long as the vessel inspections, carried out regularly, do not uncover any safety-relevant deficiencies.

  We recommend that aluminium vessels should be exchanged after 15 years at the latest.

  Vessels for dynamic load:

  These pressure vessels may also be used under conditions of changing operating pressure. The pressure may vary between the atmospheric and the maximum admissible operating pressure.

  The pressure vessel documentation and the appropriate notes in the operating manual particularly characterise vessels of this type as being adequate for dynamic loads. In the technical information for these vessels you will find specifications concerning their permissible operating period.

  Due to the variation of the operating pressure, these vessels are subject to a so-called dynamic load, which puts the vessels under great stress. The change between two different pressures is called a load change or cycle. In the technical information for these vessels you will find specifications concerning the permissible number of cycles depending on the fluctuation of the operating pressure.

  Having reached half the permissible number of cycles, the vessel has to be submitted to an internal check, in which the critically stressed areas of the vessels are examined by means of suitable testing methods, in order to ensure the operating safety.

  After having reached the total permissible number of load cycles, the vessel must be exchanged and scrapped.

  Record the number of load cycles in writing if you do not have an automatic cycle-counter.

  We recommend that aluminium vessels should be exchanged after 15 years at the latest.

  Please pay attention to and follow these measures, for your own safety and that of you employees and customers!

  In order not to unnecessarily load the pressure vessels additionally, the non-return valves, that are meant to avoid a drop in pressure, and also the pressure maintaining valves, which should reduce big pressure fluctuations as well, should be checked regularly for internal and external tightness and functionality.

- Check the pressure vessels regularly on the inside and outside for damage from corrosion.

- Be particularly careful with second-hand pressure vessels, when their previous operating mode is not specifically clarified.

1.4. SAFETY REGULATIONS (EC; partly Germany, only)

A compressor is identified by German law as being a filling system if pressure cylinders are filled by the system, especially when these cylinders are made available for third parties. The start-up and operation of compressor systems for use as filling stations is governed by the following regulations:

a- Pressure vessel directive (Directive 97/23/EC) of 29.05.1997

b- Operating safety regulations (BetrSichV) of 27.09.2002

c- Machine safety law (GSG) of 11.05.2001

d- 14th regulation to machine safety law (14. GSGV - pressure vessel regulation) of 03.10.2002

e- Technical regulations for pressure gases (TRG 400, 401, 402, 730).

If a high pressure compressor is used for filling pressure vessels or for the supply of pneumatic systems, the following regulations apply:

f- Accident Prevention Regulations (UVV):

- **BGV A1 of 01. January 2004**

Copies of the above regulations are available through the usual outlets, e.g. in Germany from:

Carl Heymanns Verlag
Luxemburger Str. 449
50939 Köln

Beuth-Vertrieb GmbH
Burggrafenstr. 4 - 7
10787 Berlin

The manufacturer has complied with all applicable regulations and the unit is prepared accordingly. If desired, we offer at our Munich site a partial acceptance test according to § 14 BetrSichV. Please contact our Technical Service Department with regard to this. They can also supply our leaflet **"IMPORTANT NOTES FOR CERTIFICATION"**.

According to the operation safety regulations (BetrSichV), all compressor units which will be used as filling stations must undergo an acceptance test by a professional at their location before bringing them into service. If pressure vessels (bottles) are to be filled by the compressor for a third party then the appropriate permission must be obtained from the responsible authority before the acceptance test. As a rule, this is the factory inspectorate. The procedure for obtaining permission is according to TRG 730, guidelines for permission to set up and operate filling stations. The test certificates and documents delivered with the compressor are important and may be requested during the procedure for obtaining permission. In addition, the documents belonging to the unit are important for recurrent inspections and should therefore be carefully kept.

Inspections in accordance with the regulations for prevention of accidents will be carried out by the manufacturer or by a specialist.

No guarantees whatsoever are valid for damage caused or favoured by the non-consideration of these directions for use.

We strongly emphasize these regulations.

2. OPERATION

2.1. PREPARATION FOR OPERATION

The compressors described in this manual are not suitable for compression of oxygen. EXPLOSION occurs if an oil lubricated compressor is operated with pure oxygen or gases with an oxygen content of more than 21%!

- Make sure that all persons handling the compressor and the filling station are familiar with the function of all controls and monitors. In particular, observe the safety warnings in chapter C-1.
- Prior to **each** operation check the oil level according to chapter D-2 and determine whether additional maintenance is necessary in accordance with section D.
- **Every time** the unit is started up check all systems for proper operation. If any malfunction is observed stop unit **immediately** and find the cause of the fault or call the service department.

During operation the shut-off valve must be open. Close valve only for maintenance work on the unit to avoid loss of air or gas from connected systems.

2.2. STARTING THE UNIT

The following steps describe the action taken by the operator, only. Description, function and adjustments for the B-CONTROL compressor control system are found in chapter A-11.

For all alarm and warning indications of the B-CONTROL compressor control system refer also to chapter A-11.

In order to start the compressor unit, the customer provided main switch must be on.

Place main switch at the compressor unit to 1. This will activate the B-CONTROL compressor control unit. The home page appears on the screen (Fig. 91).

For all further messages, settings, and operation instructions refer to chapter A.11.

- At the control panel press the green I (ON) key, the compressor should start.

This requires that there is no fault and the emergency OFF button is not pressed. In this case a message would occor on the display. If the emergency OFF button was pressed, it must be reset by turning cw, and then the reset key F6 at the display has to be touched.

2.3. SWITCHING THE UNIT OFF

- switch off compressor unit by touching the red O (OFF) key at the control panel.
- place main switch to O (OFF).

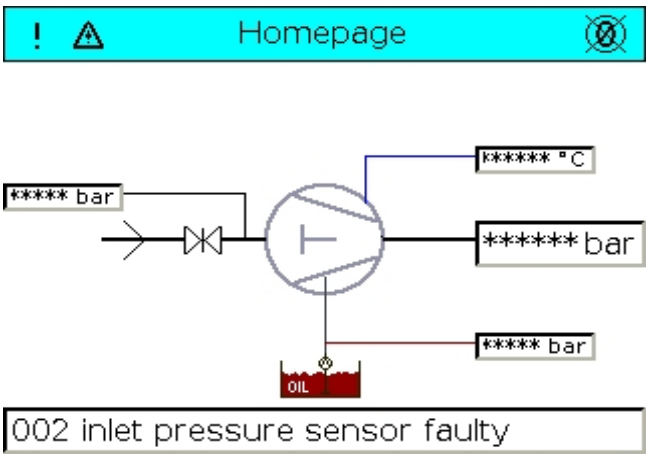

Fig. 91 Home page

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D. MAINTENANCE, REPAIR

1. GENERAL

1.1. MAINTENANCE RECORD

We recommend that all maintenance work is recorded in the service booklet delivered with every compressor unit, showing the date and details of the work carried out. This will help to avoid expensive repairwork caused by missed maintenance work. If it is necessary to claim against the warranty, it will help to have proof that regular maintenance work has been carried out and that the damage has not been caused by insufficient maintenance. Please refer to section 23 of our general terms and conditions.

1.2. MAINTENANCE WORK

WARNING **Always shut down and decompress the complete system prior to carrying out any work on the compressor.**

WARNING **Always disconnect the system from mains supply prior to carrying out any work on compressor systems with electric drive motor.**

WARNING **Never repair pressure lines by soldering or welding.**

Check the complete system for leakage from time to time by brushing all fittings and couplings with soapy water or spraying with leak test spray. Repair any leakage.

Only use original spare parts for maintenance or repair work.

For filter cartridge change intervals refer to chapter D-5 !

The used cartridge must be disposed of according to local regulations.

1.3. MAINTENANCE INTERVALS

All maintenance intervals refer to normal operating conditions. Operating the compressor under extreme conditions like high temperatures, humidity, continuous operation may shorten the intervals significantly. If in doubt, please contact our service dept.

The maintenance schedule is contained in the service manual delivered with every compressor unit.

2. LUBRICATION SYSTEM

2.1. OIL CHANGE INTERVALS

Oil type	Change interval
Mineral oils	every 1,000 operating hours, at least annually
Synthetic oils	every 2,000 operating hours, at least biennially

2.2. OIL CAPACITY

Compressor block	Oil capacity
K22	approx. 8 litres
K23	approx. 11 litres
K25	approx. 30 litres
K28	approx. 30 litres

2.3. OIL PACKAGES

BAUER compressor oil is available in various quantities, refer to oil list in section F.

2.4. CHANGING THE OIL TYPE

To avoid severe damage to the compressor unit when changing the oil type, the following measures should be strictly adhered to:

- Drain oil completely while still warm.
- Check valves, coolers, separators, purifiers, and all pneumatic tubes and hoses for deposits.

If deposits are detected, perform the following:

- Change or clean valves, coolers, separators, purifiers, and all pneumatic tubes and hoses from deposits.
- Change oil filter
- Fill compressor with the new oil.

- After approx. 100 operating hours check lubricating oil for degree of contamination, and change oil and oil filter again if necessary.
- Perform subsequent oil changes according to para. 2.1.
- Refill compressor with same oil, only.

2.5. MAINTENANCE WORK K22

2.5.1. Oil level check

Check oil level every day prior to putting compressor into operation. The oil level is visible at the oil sight gauge (4, Fig. 92) next to the filler plug (3) on the crankcase. Refill if no oil is visible.

2.5.2. Oil change

- Run compressor warm.
- Unscrew the oil filler (3).
- Remove the oil plug on the crankcase housing or, on units with an oil drain hose, remove hose union nut from the frame or housing.
- Drain the oil into a suitable container. Reinstall plug.
- Replace filter (6), see 2.5.4.
- Fill with fresh oil until oil reaches the top of the sight gauge (4).
- Wait a few minutes before putting unit into operation. During operation, check oil pressure on gauge. Gauge should read **1,5 to 3 bar**.

2.5.3. Oil pump

The compressor is fitted with a gear pump with integrated pressure relief valve (2, Fig. 92). The pressure is set to 2.5 bar (35 psi). In case of malfunction the oil pump cannot be repaired but must be replaced as a complete unit.

2.5.4. Oil filter

To reduce the wear to the compressor internal parts, the oil pump is fitted with a full-flow oil filter (6, Fig. 92). The filter element should be changed with every oil change. Refer to chapter D-1. for intervals.

Filter element removal

- Unscrew filter element from the oil pump.
- Lubricate the sealing ring of the new filter element and screw filter on until the seal touches the surface. From this position tighten the filter another half turn by hand. Never over-tighten or use tools for installation.

2.5.5. Oil separator

The compressor block is equipped with an oil separator in the crankcase vent line. It separates liquid oil particles from the crankcase vent line which are fed back into the oil sump through line. The vent line is connected to the intake manifold by line.

The oil separator requires no regular maintenance.

2.5.6. Oil injection line

Lubrication of the compressor internal parts is controlled by the oil injection line (1, Fig. 92). Prolonged running with contaminated oil and/or oil filter will lead to clogging of the jet, reducing the oil flow to the rotating parts of the compressor.

Removal

- Disconnect pressure tube by undoing the connector cap nuts.
- Remove two self-locking nuts securing the jet assembly to the crankcase and pull out oil jet.

Cleaning

- Wash the jet assembly in petroleum to remove deposits. Remove old sealing compound from crankcase and injector sealing surfaces.

Assembly

- Install a new O-ring seal and apply a thin layer of silicone rubber compound on the sealing surface on reassembly.

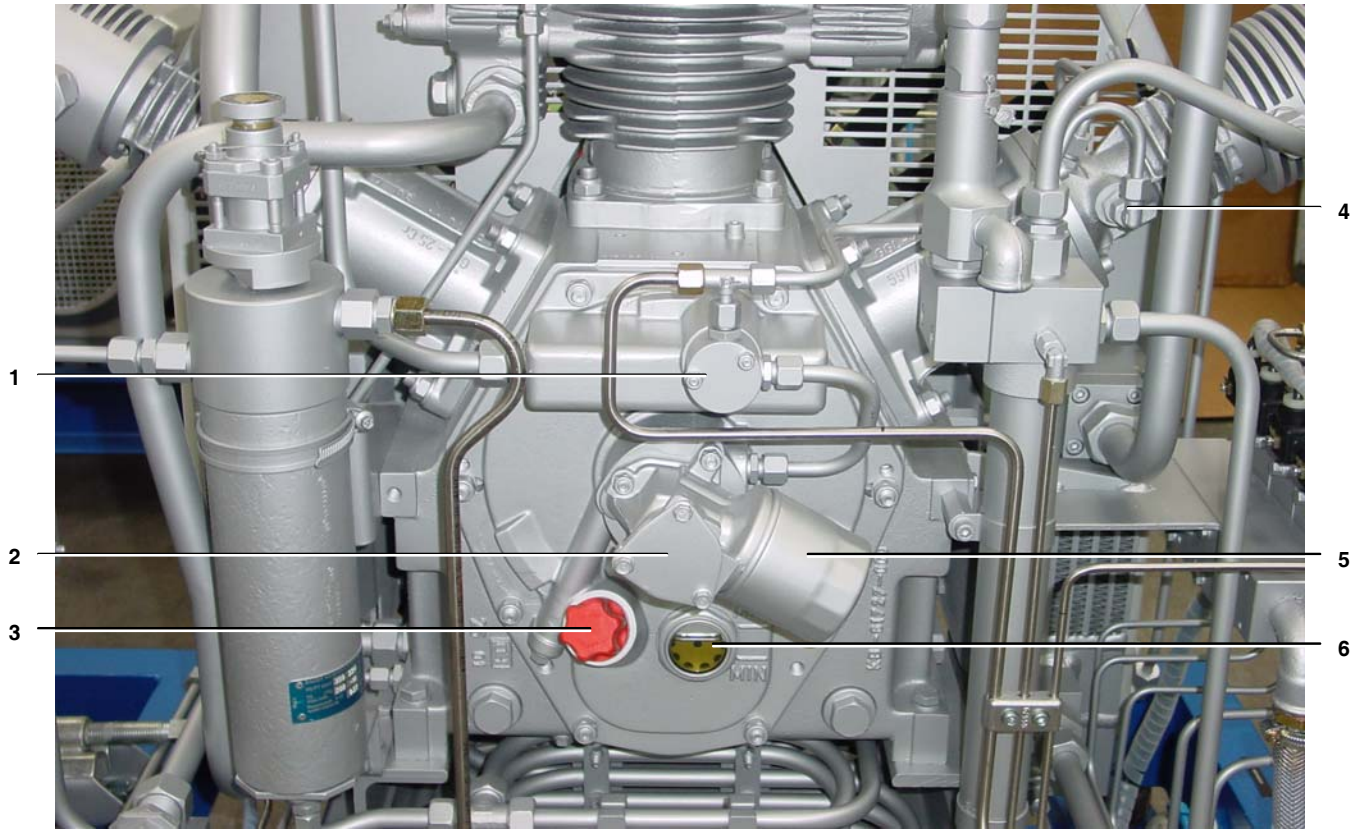


Fig. 92 Lubricating system K22.0

1 Oil injection pipe
2 Oil pump
3 Oil filler
4 Injection nozzle
5 Oil filter
6 Oil sight gauge

2.6. MAINTENANCE WORK K23

2.6.1. Oil level check (air compressors)

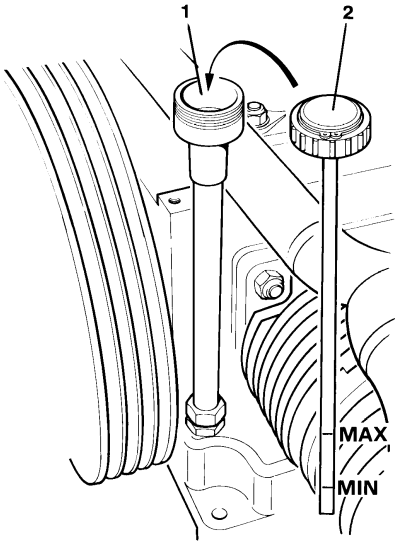


Fig. 93 Dipstick markings

Check oil level every day prior to putting compressor into operation. Check using oil dipstick (2). Wipe off dipstick with a lint-free cloth and note oil level which must be between minimum and maximum notches, see Fig. 93. Be sure that dipstick is fully screwed on filler neck (1) to ensure correct reading.

Oil level must not exceed maximum as this will cause excessive lubrication of compressor and result in valves sooting up.

2.6.2. Oil level check (gas compressors)

Gas compressors are fitted with an oil refill system to enable refilling while the compressor is running and to prevent air entering the crankcase when refilling.

Check the oil level at sight gauge (1, Fig. 94) prior to starting the compressor. Oil level should always be within upper and lower mark. Note that the oil level must on no account exceed the maximum mark otherwise the compressor will be over-lubricated, resulting in carbonized valves.

To refill oil proceed as follows:

- Close shut-off valve (3, Fig. 95). Position as shown.
- Remove cap (1).
- Fill reservoir (2) **completely** with oil to avoid air being trapped and entering the crankcase.
- Replace cap and tighten by hand.
- Open valve. Let oil pour into crankcase, check level with the sight gauge. As long as cap (1) is not removed, valve may stay open.

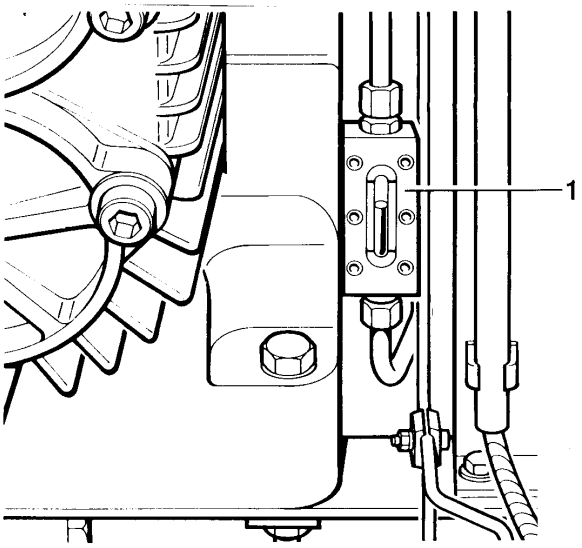


Fig. 94 Oil level sight gauge

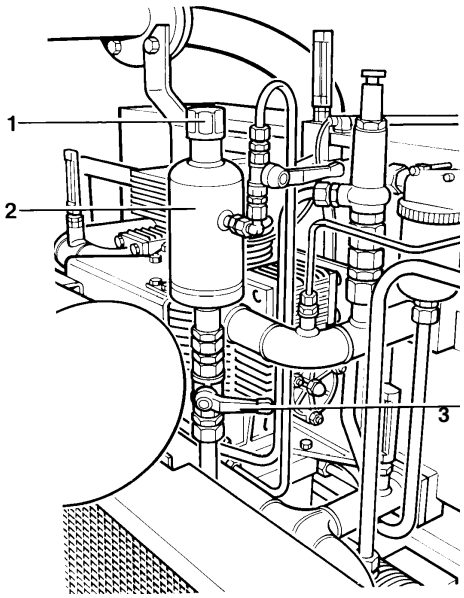


Fig. 95 Oil refill system

2.6.3. Oil change

Change oil also prior to laying up the compressor. When changing oil, also change the lubricating oil filter.

- Run compressor warm.
- Unscrew the oil dipstick.
- Remove the oil plug on the crankcase housing or on units with an oil drain hose remove hose union nut from the frame or housing.
- Drain the oil into a suitable container. Change gasket and reinstall plug.
- Remove oil filter cartridge and replace with a new cartridge, part no. N15839.

- Fill with fresh oil until the upper mark of the oil dipstick is reached.
- Wait a few minutes before putting unit into operation. During operation, check oil pressure on gauge. Gauge should read **1,5 to 3 bar**.

2.6.4. Oil pump

The compressor is fitted with a gear pump with integrated pressure relief valve. The pressure is set to 2.5 bar (35 psi). In case of malfunction the oil pump cannot be repaired but must be replaced as a complete unit.

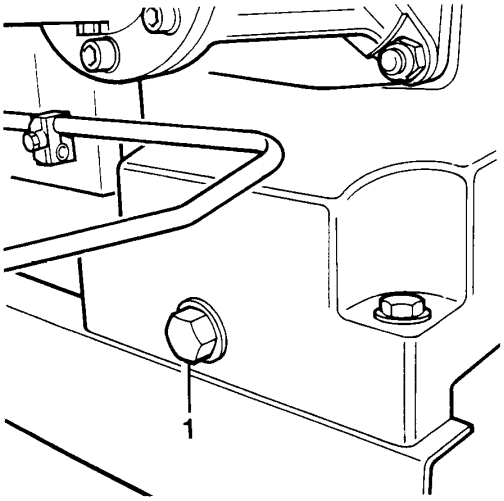


Fig. 96 Oil drain plug

2.6.5. Oil filter

To reduce the wear to the compressor internal parts, the oil pump is fitted with a full-flow oil filter. The filter element should be changed with every oil change.

- Unscrew filer element (2, Fig. 97) from the oil pump (1).
- Lubricate the sealing ring of the new filter element with fresh compressor oil and screw filter on until the seal touches the surface. From this position tighten the filter another half turn by hand. Never over-tighten or use tools for installation.

2.6.6. Oil separator

The compressor block is equipped with an oil separator in the crankcase vent line (Fig. 98).

It separates liquid oil particles from the crankcase vent line (1) which are fed back into the oil sump through line (3).

The vent line is connected to the intake manifold by line (2).

The oil separator requires no regular maintenance.

2.6.7. Oil jet

The lubrication of the compressor internal parts is controlled by the oil jet (Fig. 99). Prolonged running with contaminated oil and/or oil filter will lead to clogging of the jet, reducing the oil flow to the rotating parts of the compressor.

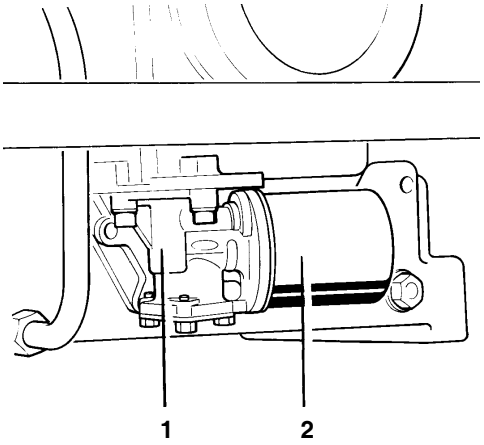


Fig. 97 Oil pump and oil filter

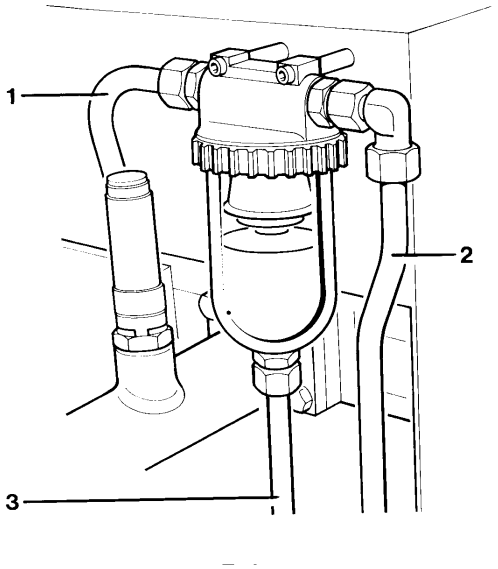


Fig. 98 Oil separator

Removal

- Disconnect pressure line from oil jet (3) by undoing cap nuts (1).
- Remove two self-locking nuts (2) securing the jet assembly to the crankcase and pull out oil jet.

Cleaning

- Wash the jet assembly in petroleum to remove deposits. Remove old sealing compound from crankcase and jet sealing surfaces.

Assembly

- Install a new O-ring seal and apply a thin layer of silicone rubber compound on the sealing surface on reassembly.

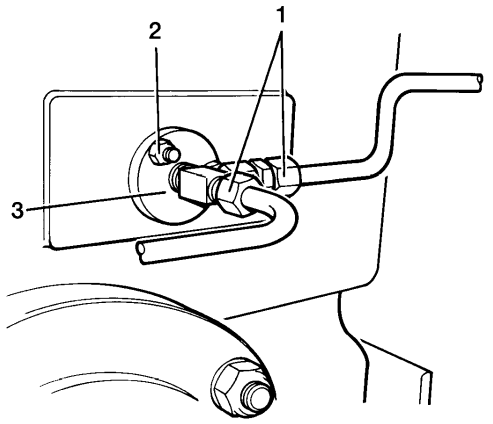


Fig. 99 Oil jet

2.7. MAINTENANCE WORK K25, K28

2.7.1. Oil level check (air compressors)

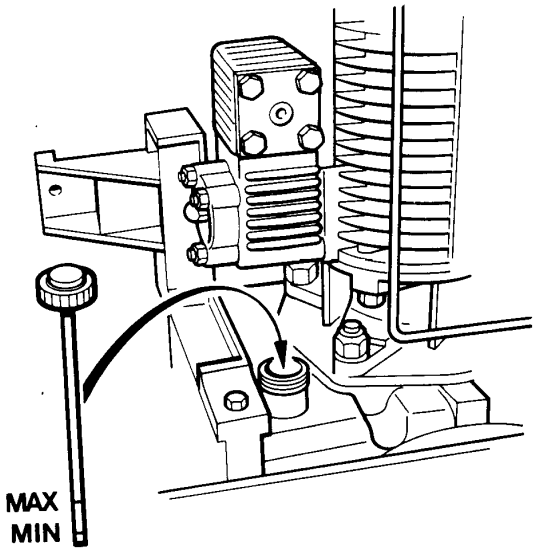


Fig. 100 Dipstick markings

Check oil level every day prior to putting compressor into operation. Check using oil dipstick. Wipe off dipstick with a lint-free cloth and note oil level which must be between minimum and maximum notches, see Fig. 100. Make sure that the dipstick is completely screwed in before the oil level is checked.

Oil level must not exceed maximum as this will cause excessive lubrication of compressor and result in valves sooting up.

2.7.2. Oil level check (gas compressors)

Gas compressors are fitted with an oil refill system to enable refilling while the compressor is running and to prevent air entering the crankcase when refilling with oil.

Check the oil level at sight gauge (1, Fig. 101) prior to starting the compressor. Oil level should always be within upper and lower mark. Note that the oil level must on no account exceed the maximum mark otherwise the compressor will be over-lubricated, resulting in carbonized valves.

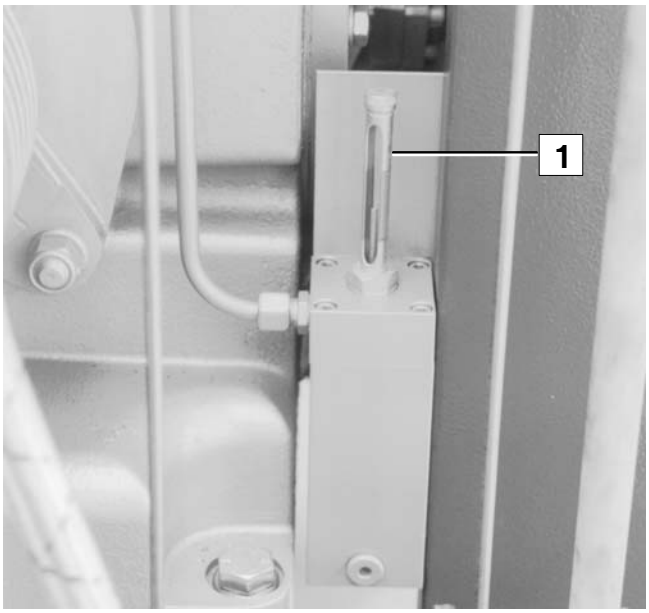


Fig. 101 Oil level sight gauge

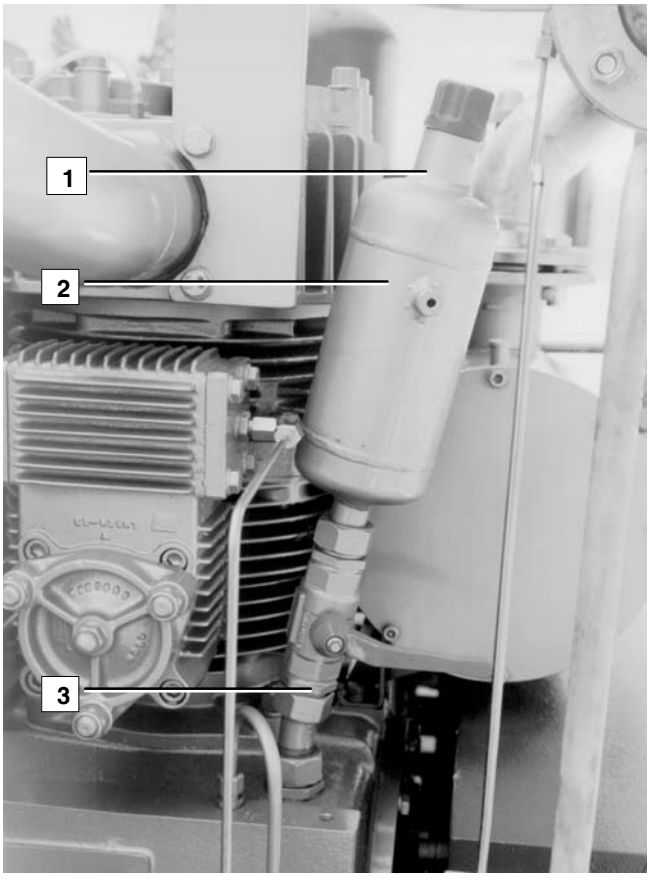


Fig. 102 Oil refill system

To refill oil proceed as follows:

- Close shut-off valve (3, Fig. 102). Position as shown.
- Remove cap (1).
- Fill reservoir (2) **completely** with oil to avoid air being trapped and entering the crankcase.
- Replace cap and tighten by hand.
- Open valve. Let oil pour into crankcase, check level at sight gauge. As long as cap (1) is not removed, valve may stay open.

2.7.3. Oil change

Change oil also prior to laying up the compressor. When changing oil, also change the lubricating oil filter.

- Run compressor warm.
- Unscrew the oil dipstick or on gas units unscrew the cap on the oil reservoir.
- Remove the oil plug (1, Fig. 103) on the crankcase housing or on units with an oil drain hose remove hose union nut from the frame or housing.
- Drain the oil into a suitable container. Change gasket and reinstall plug.
- Remove oil filter cartridge according to 2.7.5. and replace with a new cartridge, part no. N 2620.
- Fill with fresh oil until the upper mark of the oil dipstick is reached.
- Wait a few minutes before putting unit into operation. During operation, check oil pressure on gauge. Gauge should read 3 to 4 bar (43 to 57 psi).

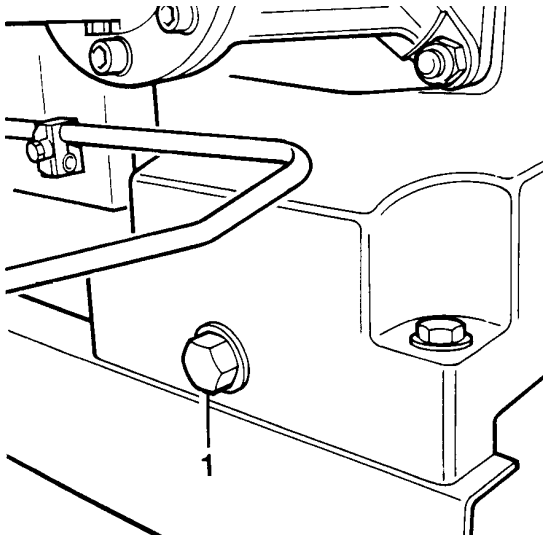


Fig. 103 Oil drain plug

2.7.4. Oil pump

The pressure regulating valve of the oil pump is adjustable. The pressure is set at the factory to 3.5 bar (50 psi). In case of malfunction the oil pump cannot be repaired but must be replaced as a complete unit.

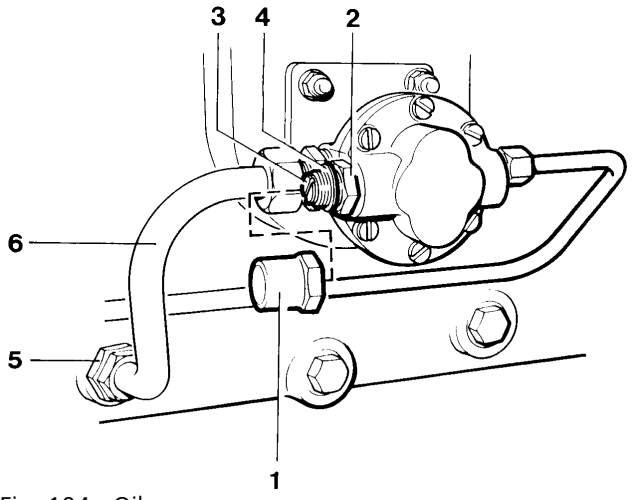


Fig. 104 Oil pump

Oil pressure setting

Refer to Fig. 104 and proceed as follows:

- Remove cap nut (1).
- Loosen lock nut (2) and turn adjustment screw (3) clockwise to increase pressure, counter-clockwise to reduce pressure.
  OIL PRESSURE should be **3.5 bar (50 psi)** at nominal compressor speed.
- Lock screw with nut in new position.
- Start compressor to verify the new setting.
- Readjust if necessary.
- Fit cap with a new copper washer (4) when setting is according to specification.

2.7.5. Oil filter

To reduce the wear to the compressor internal parts, the oil pump is fitted with a full-flow oil filter. The filter element should be changed with every oil change. Refer to chapter D-1. for intervals.

Filter element removal

- Unscrew filer element (1, Fig. 105).
- Lubricate the sealing ring of the new filter element and fill filter with fresh oil.

- Screw filter on until the seal touches the surface. From this position tighten the filter another half turn by hand. Never over-tighten or use tools for installation.

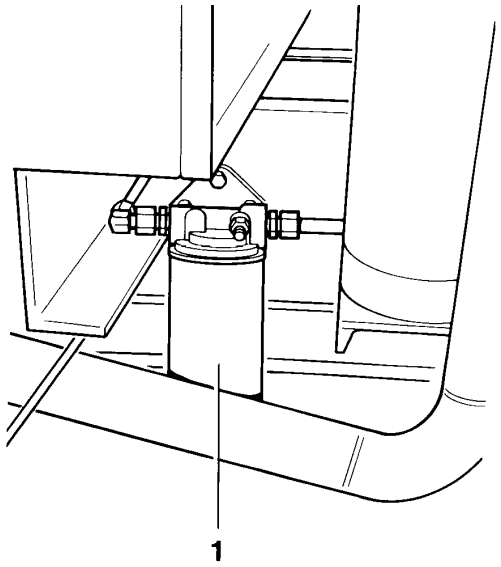


Fig. 105 Oil filter

2.7.6. Oil jet

The lubrication of the compressor internal parts is controlled by the oil jet (Fig. 106). Prolonged running with contaminated oil and/or oil filter will lead to clogging of the jet, reducing the oil flow to the rotating parts of the compressor.

Removal

- Disconnect pressure line from oil jet (3) by undoing cap nut (1).
- Remove two self-locking nuts (2) securing the jet assembly to the crankcase and pull out oil jet.

Cleaning

- Wash the jet assembly in petroleum to remove deposits. Remove old sealing compound from crankcase and jet sealing surfaces.

Assembly

- Install a new O-ring seal and apply a thin layer of silicone rubber compound on the sealing surface on reassembly.

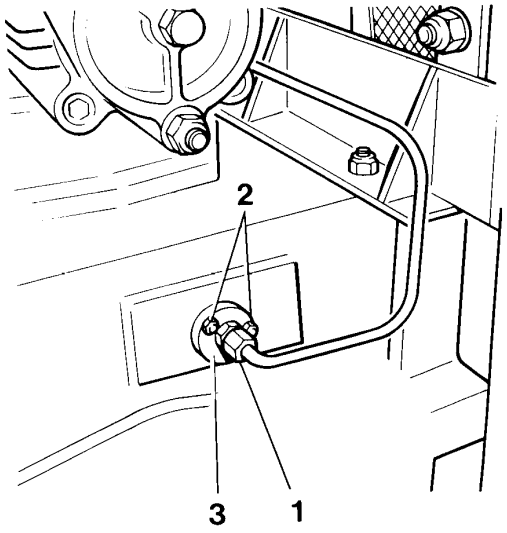


Fig. 106 Oil jet

2.7.7. Oil strainer

To prevent larger particles from entering the oil pump, the suction line is equipped with an oil strainer (5, Fig. 104).

Removal

- Drain the compressor oil by removing plug on crankcase or unit frame.
- Remove oil suction line by disconnecting the swivel nuts at both ends of the line (6).
- Unscrew oil strainer (5).

Cleaning

- Clean the oil strainer in petroleum and dry with clean, compressed air.

Assembly

- Always use a new sealing ring on reassembly.

3. INTAKE FILTER

3.1. AIR COMPRESSORS

3.1.1. K22

The vacuum in the intake filter is monitored by the vacuum indicator (4) or (7). When the maximum permissible vacuum pressure is reached, the indicator changes to red. If the filter is clogged the min/max pressure monitor can also switch off the unit by means of the electronic monitoring system. See section A-11. In this case, the filter element (2) or (4) must be changed as follows.

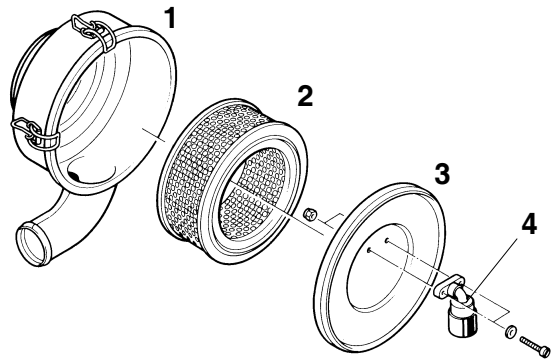
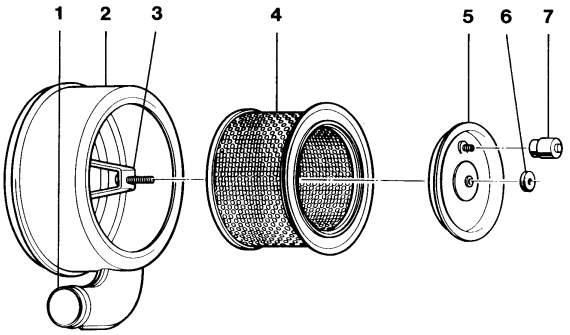


Fig. 107 Intake filter K22

- Open the clips and remove cover (3).
- Remove filter element (2).
- Clean the inside of the filter housing with a damp cloth, take care to prevent any dust entering the intake manifold.
- Replace the filter element: use **part no. N3029**, only.
- Mount cover and fasten with the clips.
- Reset vacuum gauge by pressing the button.

3.1.2. K23

- Remove knurled nut (6).
- Remove cover (5) from filter housing (2).
- Remove filter element (4).
- Clean the inside of the filter housing with a damp cloth, take care to prevent any dust entering the intake manifold.
- Replace the filter element. Use **part no. N18906**, only.
- Mount cover and fasten with the knurled nut.
- Reset vacuum gauge by pressing the button.

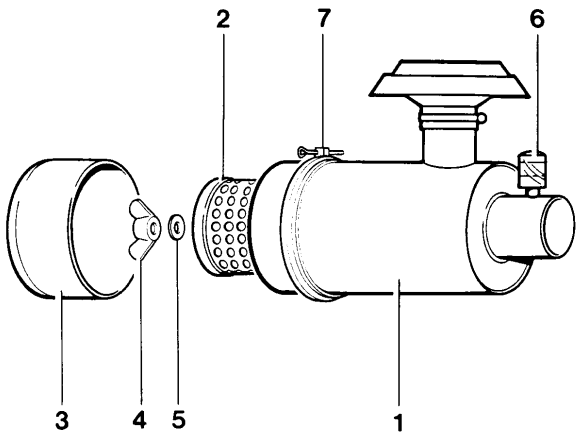


1 Air intake port
2 Filter housing
3 Bracket
4 Filter element
5 Cover
6 Knurled nut
7 Vacuum indicator

Fig. 108 Intake filter K23

3.1.3. K25, K28

The dust pot (3, Fig. 109) needs emptying at regular intervals, (at least annually), even weekly or daily under heavy dust conditions. When emptying the dust collector, the filter element should be left untouched, it is sufficient to merely check the hand-tightness of the wing nut on the filter element. Check, however, whether any large particles obstruct the outside of the filter element and, if so, remove them.



1 Filter housing
2 Filter element
3 Dust pot
4 Wing nut
5 Sealing ring
6 Vacuum indicator
7 Clamp screw

Fig. 109 Intake filter K25, K28

The filter element must be changed when the maximum permissible vacuum pressure is reached. In this case, the vacuum indicator (6) changes from green to red. If the filter is clogged the min/max pressure monitor can also cause shut-down of the unit through the electronic monitoring system. See also section A-11.

Change the filter element as follows:

- Remove clamp screw (7).
- Remove dust pot (3).
- Remove wing nut (4) which secures the filter element. Be careful not to lose the sealing ring (5) underneath the wing nut.
- Remove micronic filter element (2) from the housing.

3.2. GAS COMPRESSORS

3.2.1. K22

The filter element must be changed at regular intervals. The intervals depend on the gas supplied to the compressor, however change filter element at least annually. Observe the minimum intervals according to maintenance schedule in chapter D.1.

To change the filter element, unscrew nut (1), remove cover (2) from filter housing. Remove micronic filter element (3) from filter housing. Clean the inside of the filter housing with a damp cloth, take care to prevent any dust from entering the intake port. Fit a new filter element. Use only original spare cartridges part no. **N3029**! Replace O-ring in the housing.

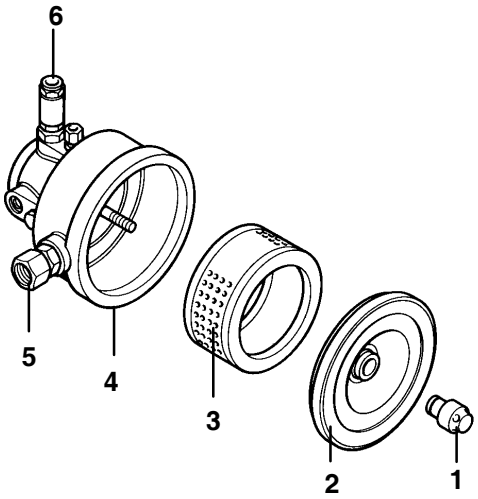


Fig. 110 Intake filter, K22 gas compressor

3.2.2. K23, K25, K28

The filter element (8, Fig. 111) must be changed at regular intervals. The intervals depend on the gas supplied to the compressor. The minimum intervals shown in the maintenance schedule in chapter D-1. are therefore only a guide. We recommend that the filter element is changed at least annually. If the filter is clogged the min/max pressure monitor can also switch off the unit by means of the electronic monitoring system!

Change filter as follows:

- Remove cover (2).
- Remove wing nut (6) which secures the filter element. Be careful not to lose the sealing ring (7) underneath the wing nut.
- Clean the inside of the filter housing with a damp cloth, take care to prevent any dust from entering the intake port.
- Fit a new filter element. Use part no. **N7698** only!
- Reset vacuum indicator by pressing the rubber cap on the gauge, indicator should change from red to green.

- Remove micronic filter element (8) from the housing. Clean the inside of the filter housing with a damp cloth, take care to prevent any dust from entering the intake port. Fit a new filter element. Use part no. **N7698** only!

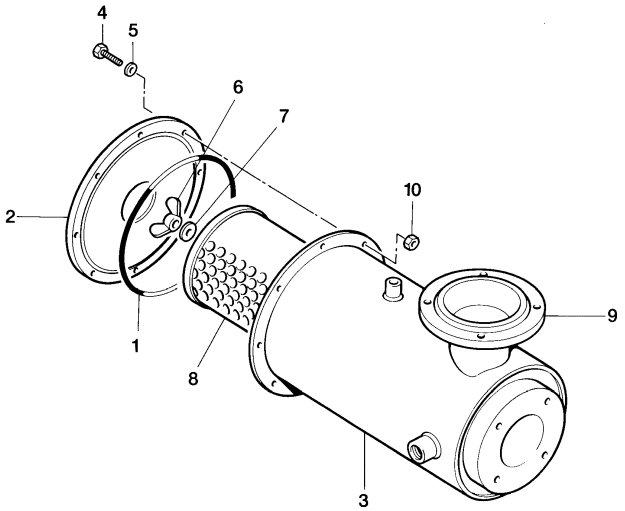


Fig. 111 Intake filter, K23, K25, K28 gas compressors

4. INTERMEDIATE SEPARATORS

The intermediate separators are drained regularly by the automatic condensate drain unit. They need no further regular maintenance.

5. FINAL SEPARATOR / FILTER SYSTEM

5.1. OIL AND WATER SEPARATOR (COMPRESSOR BLOCK)

The final separator is maintenance-free.

The condensate produced by the re-cooling after the compression process is drained regularly by the automatic condensate drain system.

5.2. FILTER SYSTEM

5.2.1. General instructions

Please observe the following:

- **Depressurize** system before starting any maintenance work. The filter line can be vented manually with the venting valve, wait until the pressure gauge reads zero.
- **Dry** inside of filter housing with a clean cloth before installing new cartridge and check for corrosion.
- **Lubricate** threads and O-rings as well as end of cartridge with both o-rings with white petrolatum. Apply sparingly. See chapter 16.
- **Observe** number of operating hours as indicated on hour meter to ensure exact attention to the maintenace intervals.
- **Leave** cartridge in the filter as long as unit is out of service.
- **Change** cartridge before reactivating a compressor unit which has been out of service for more than 6 months.
- **Keep** all condensate drain valves and shut-off valves closed. Keep a minimum pressure of approx. 50 to 80 bar (700 to 1,100 psig) within the system to prevent moisture entering the compressor piping and filter system.

5.2.2. Oil and water separator (filter systems P80, P100)

Lifetime

The final separator is subject to dynamic load. Its lifetime is restricted to a certain number of cycles. (1 load cycle = 1 pressurization, 1 depressurization) The cycles are counted by the cycle counter in the compessor control box. After the max. number of load cycles have been reached, the separator must be exchanged.This oil and water separator is designed to withstand up to 85,000 load cycles.

For the max. number of load cycles refer to pressure vessels operating instructions in section F.

Sintered metal element

Condensate drain

See chapter D-10.

5.2.3. Oil and water separator (filter systems P120, P140)

Lifetime

The final separator is subject to dynamic load. Its lifetime is restricted to a certain number of cycles. (1 load cycle = 1 pressurization, 1 depressurization) The cycles are counted by the cycle counter in the compessor control box. After the max. number of load cycles have been reached, the separator must be exchanged.This oil and water separator is designed to withstand up to 85,000 load cycles.

For the max. number of load cycles refer to pressure vessels operating instructions in section F.

Sintered metal element

The sintered filter micro-cartridge requires periodic maintenance. For maintenance intervals see section D-1.

To remove the micro-cartridge

- Remove tubes connected to filter head (2, Fig. 112).
- Unscrew filter head (3) and remove.
- Unscrew micro-cartridge (1) from filter head (3).
- Remove centre-screw (4) to remove filter elements.
- Clean sintered filter elements using hot soapy water and blow dry with clean compressed air.

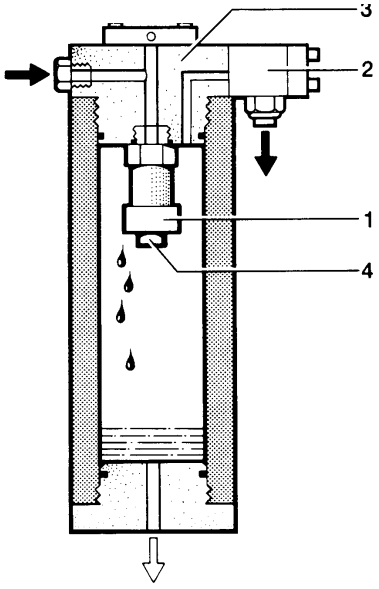


Fig. 112 Oil and water separator (filter system)

Condensate drain

See chapter D-10.

5.2.4. Cartridge change, filter systems P80, P100

- On filter systems with **SECURUS** monitoring, unscrew nut and pull off cable plug.
- Unscrew the filter head (1, Fig. 113) with the special spanner (2) supplied with the unit.
- Pull out used cartridge by means of its clip (3).

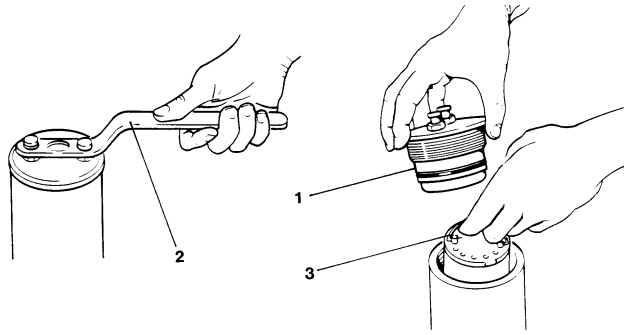


Fig. 113 Cartridge change, filter systems P80, P100

- Remove new cartridge from packing and protective caps from both ends of cartridge.
- Insert new cartridge into housing and push down firmly.
- Replace filter head, screw in by hand and tighten with the special spanner.

5.2.5. Cartridge change, filter systems P120, P140

- Depressurize system completely and disconnect from electrical supply.
- Remove filter head with special spanner supplied with the unit (1, 2, Fig. 114).
- Screw cartridge removal tool supplied with the unit (3, 4) onto cartridge and pull out cartridge (5).
- Clean filter housing.
- Remove protective caps from both ends of new cartridge.
- Lubricate threads and O-ring with Never-Seez White NSW-14 (part no. N18112) or white petrolatum (DAB9).
- Insert cartridge into filter housing and press down firmly.
- Screw in filter head with special spanner. Torquing is not required since sealing is effected by means of an O-ring.

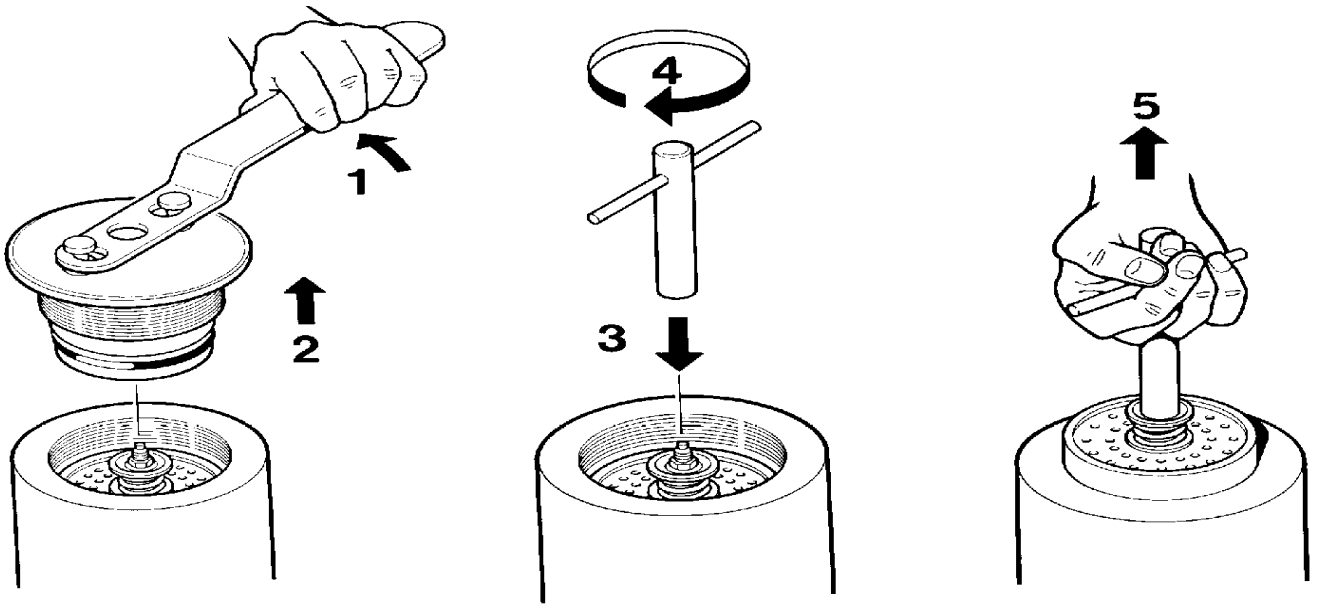


Fig. 114 Cartridge change, filter systems P120, P140

5.2.6. SECURUS filter replacement intervals

To determine the number of operating hours as well as number of bottle fillings see diagrams on pages D-16 and D-17 and the examples below. Please note that the temperature in the separator is 10 °C higher than ambient temperature.

The entities in the diagrams on pages D-16 and D-17 are based on estimated filter cartridge lifetime; on systems equipped with SECURUS monitoring unit, the actual saturation of the cartridge is reported by the electronic monitor.

The following examples refer to the diagrams on pages D-16 and D-17.

Examples:

A. Number of operating hours for a compressor unit with 1000 l/min delivery, operating pressure 200 bar, ambient temperature 20 °C with filter system P120 (see sheet 1/2).

- Choose separator temperature 30 °C for 200 bar (example) on right hand vertical axis.
- Follow the bold horizontal line across the graph to the intersection with the line for the P120 filter system.
- Follow the vertical line down from the intersection point to the 1000 l/min mark.
- Result: approx. 180 operating hours.

B. Number of bottle fillings for a 10 litre bottle with P120 filter system, ambient temperature 20 °C (see sheet 2/2):

- Choose separator temperature 30 °C (example) on right hand vertical axis.
- Follow the bold horizontal line across the graph to the intersection with the line for the P120 filter system.
- Follow the vertical line down from the intersection point to the 10 litre bottle mark.
- Result: approx. 5200 bottle fillings.

Saturated cartridges are classed as special waste and must be disposed of according to applicable federal and national regulations (in Germany: according to DIN safety regulations sheet, point 5.5)

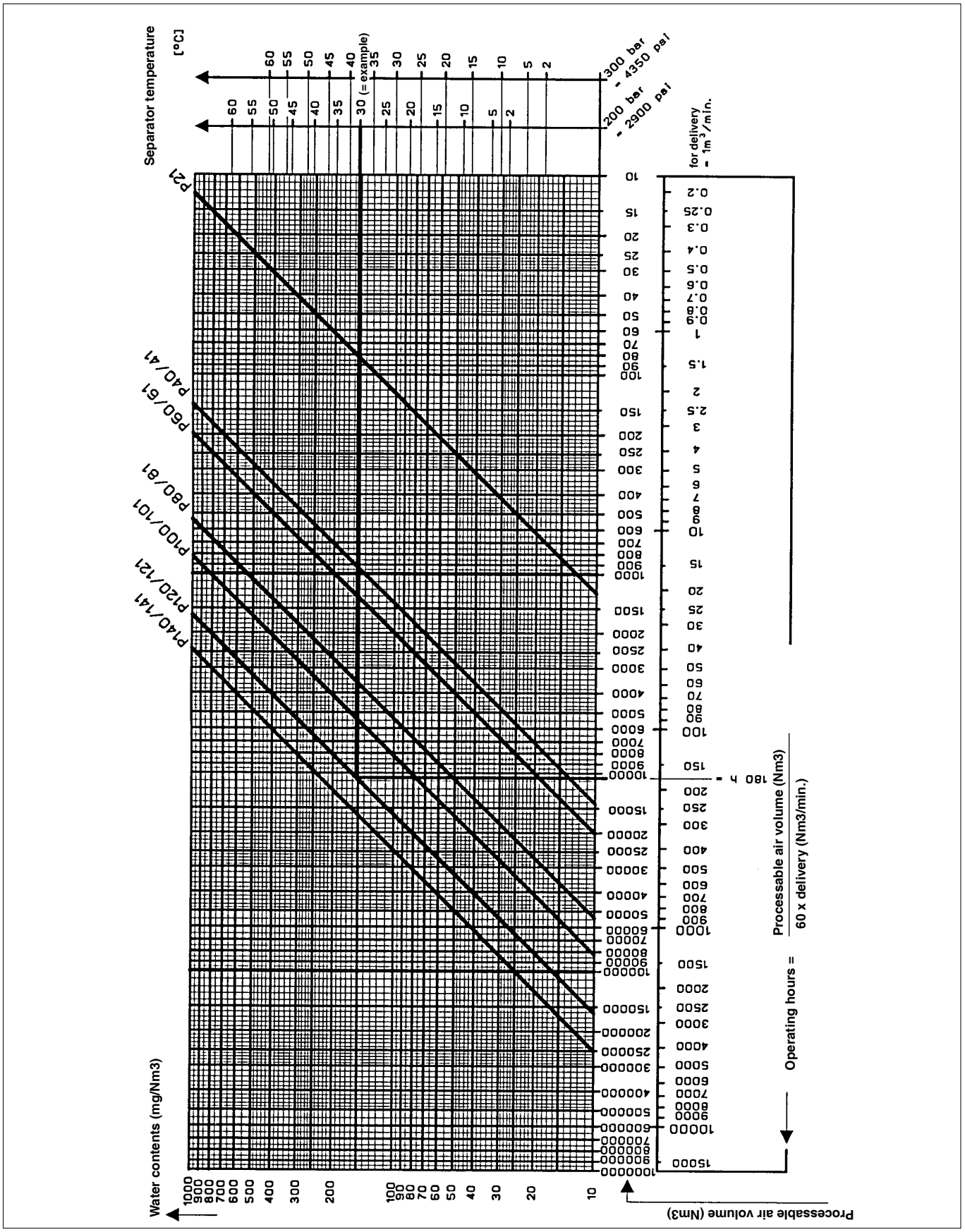


Fig. 115 Processing capacity of P-filter systems (sheet 1 of 2)

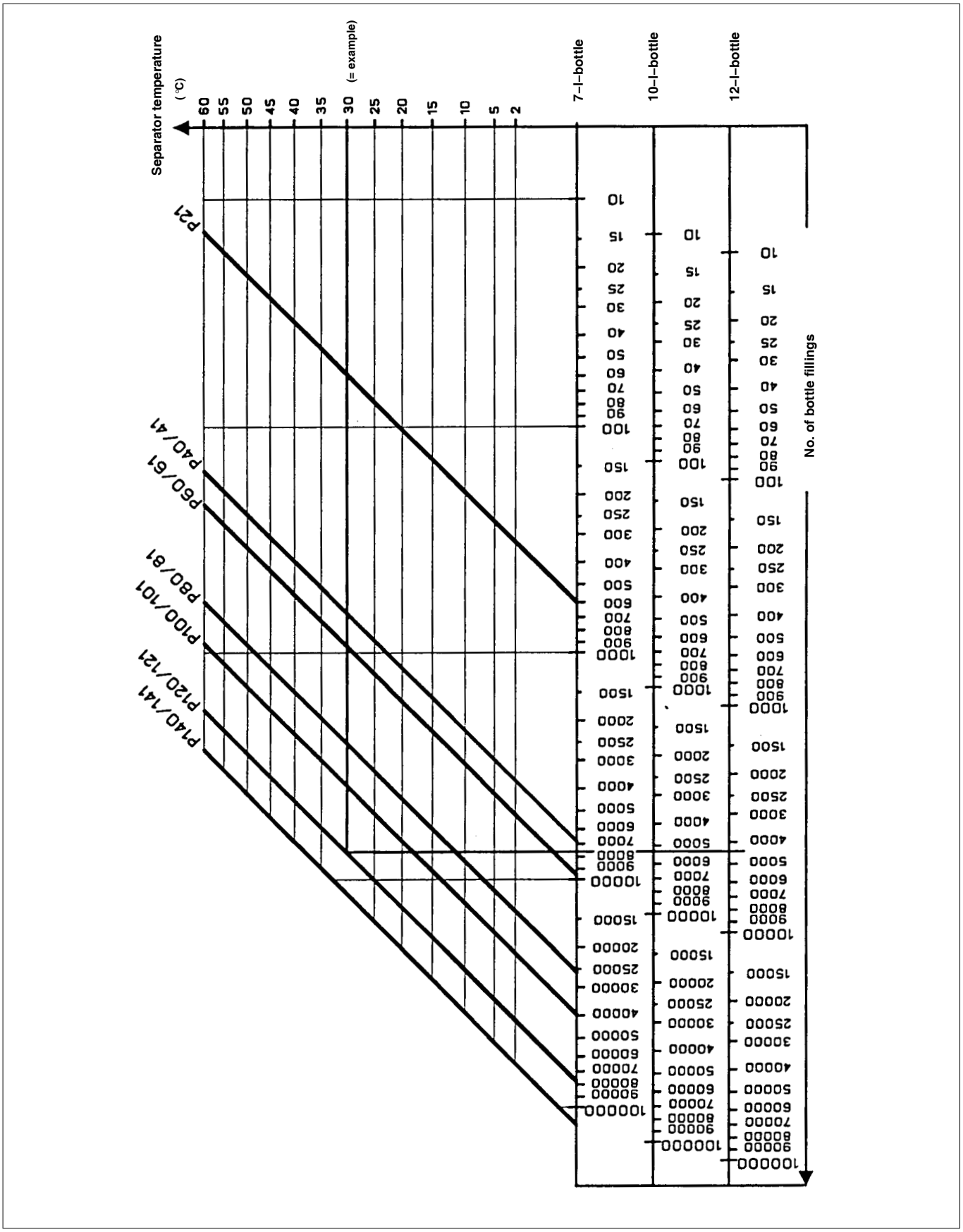


Fig. 116 Processing capacity of P-filter systems (sheet 2 of 2)

6. PRESSURE MAINTAINING / NON-RETURN VALVE

6.1. MAINTENANCE

The pressure maintaining valve is adjusted to **150 ±10 bar**.

The opening pressure can be adjusted by loosening set screw (2, Fig. 117 or Fig. 118) and then adjusting screw (1) to the required pressure.

Clockwise = increase pressure
Anti-clockwise = decrease pressure

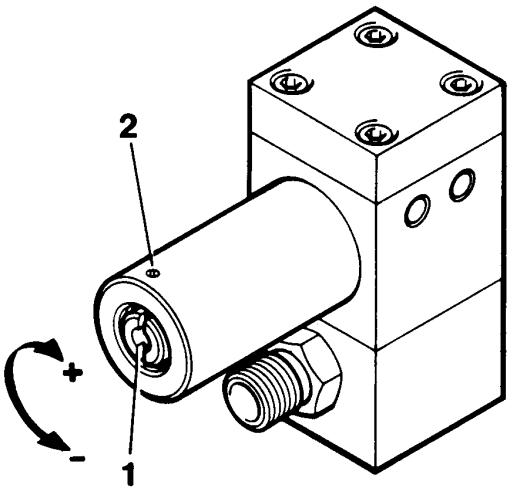


Fig. 117 Pressure maintaining valve, 350 bar units

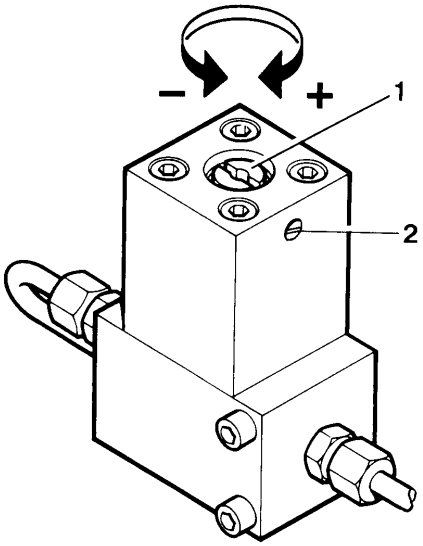


Fig. 118 Pressure maintaining valve, 500 bar units

7. SAFETY VALVES

7.1. OPERATING CHECK

The safety valve for the last stage, that is, the final pressure safety valve has to be checked regularly. See chapter D-1. For this purpose the safety valves can be vented manually.

We recommend that a final pressure setting of 80% should not be exceeded, to avoid damaging the safety valve

This merely ensures that the valve works and will release pressure in case of a malfunction. To check the blow-off pressure value, refer to 7.2.

7.1.1. Breathing air units 220, 330 bar, industrial air units 350 bar

The final pressure safety valve is mounted on the final separator. According to the type, either lift the lever (A, Fig. 119) or turn the knurled knob (B) to the right until the valve blows off.

7.1.2. Industrial air units 350 - 500 bar and gas units

On high pressure units 350 to 500 bar, the final pressure safety valve is not on the separator but mounted separately in the unit. This valve can be vented by moving the lever sideways (Fig. 120).

7.1.3. Industrial air units 75- 90 bar

Depending on the safety valve model, either lift knurled knob or turn cap on the valve conterclockwise until valve blows off (Fig. 121).

We recommend that a final pressure setting of 80% should not be exceeded, to avoid damaging the safety valve

7.2. BLOW-OFF PRESSURE CHECK

Check blow-off pressure of the final pressure safety valve regularly, see maintenance schedule chapter D-1. Pump unit to final pressure with shut-off valve closed until safety valve blows off. Check blow-off pressure of safety valve at pressure gauge.

On compressors fitted with a factory-installed **B-Control** compressor control unit, set unit in menu "operation\operation mode" to "safety valve test = yes" to override pressure switch(es). Refer to chapter A-11.

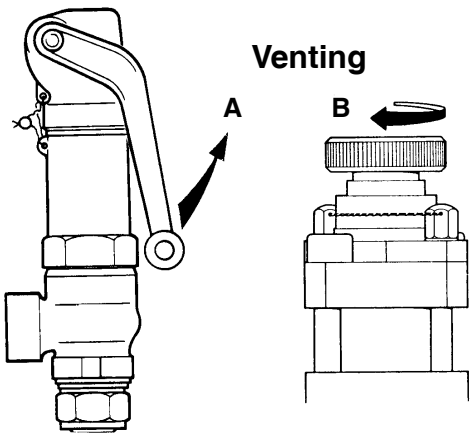


Fig. 119 Final pressure safety valve, 350 bar units

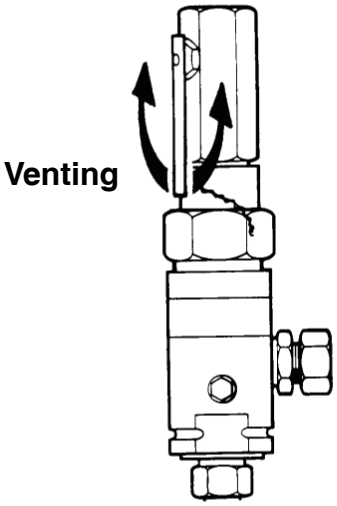


Fig. 120 Final pressure safety valve, 500 bar units

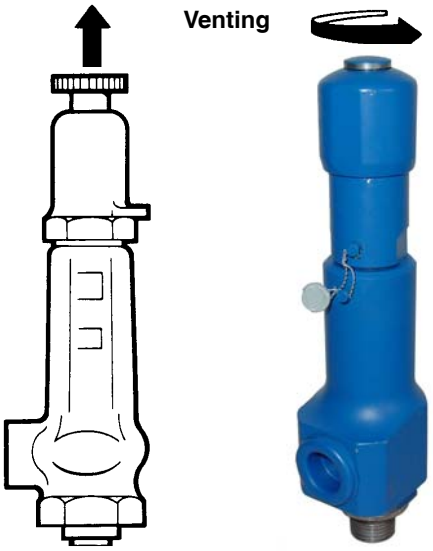


Fig. 121 Final pressure safety valve, medium pressure

8. PRESSURE GAUGES

If the values listed in section A-14. are exceeded and the safety valve of the corresponding stage blows off, this is an indication that the downstream compressor stage is not working properly. See section D-9.

If a pressure gauge indicates excessive pressure, and the corresponding safety valve does not blow off or indicates the pressure as being too low, check the pressure gauge for proper operation.

We recommend that pressure gauges are checked from time to time. For this purpose we have developed a special test pressure gauge with an adaptor which immediately recognizes any deviations in readings.

See High Pressure Accessories Catalogue no. 8550/7.92.

Slight deviations during operation are normal and can be ignored. Excessive inaccuracy will require the pressure gauge to be readjusted or sent back for repair.

9. VALVES

9.1. GENERAL INSTRUCTIONS FOR CHANGING THE VALVES

- **Always replace** valves as a complete set.
- **Carefully clean** dirty valves. Never use a sharp tool for this purpose. Soak the valves in diesel oil or petroleum and clean with soft brush.
- **Check** individual components for excessive wear. If the valve seat and valve disks are dented, replace the valves.
- **Lubricate** valves before installing with Weicon AS 040, order no. N19753, or equivalent.
- **Valve head screws** must be tightened with a torque wrench (see tightening torque values section D-16.).
- **Check** the valve space in the valve heads for dirt and clean, if necessary.
- **Use only** satisfactory gaskets and O-rings on reassembly.
- **Observe** the correct sequence when fitting together again.
- **After finishing** all maintenance work on the valves, turn the compressor manually using the flywheel and check whether all items have been correctly installed.
- **30 minutes after restarting** the compressor unit stop unit, let it cool down to ambient temperature and retighten valve studs and cap nuts. Otherwise valves could work loose due to setting of the gaskets.
- **Remove and check** the valves every **1000 operating hours.**
- **Replace** the valves every **2000 operating hours** to avoid fatique failure.

9.2. VALVE CHANGE

Changing the valves should be performed by trained personnel, only.

Valve change is described in the workshop manual which is available through the **BAUER** technical service.

10. AUTOMATIC CONDENSATE DRAIN

10.1. GENERAL

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.

Dispose of the condensate according to local regulations!

The condensate drain valves for the intermediate separators and for the oil and water separator are provided with manual drain valves to check correct operation of the automatic system.

The automatic condensate drain system must be serviced as follows:

- Open all manual drain valves on the separators one after the other, once a week.

This must be carried out immediately after the automatic system has drained the condensate. Observe the drainage of condensate when opening the manual drain valves. If the system drains a lot of condensate this is a sign that the system or the corresponding condensate drain valves are not working properly. Find the fault and remedy accordingly. If hardly any condensate emerges, the automatic system is operating properly. For fault correction, see section D-15. “Trouble-shooting”.

10.2. ACTIVATED CHARCOAL ELEMENT MAINTENANCE

(Units with 40 ltrs. condensate collector, only)

Replace the activated charcoal in the filter of the condensate collecting tank according to maintenance schedule in D.1.

Item	Part no.	Qty. rq'd
Activated charcoal	N65	3700 g
Fleece	72207	4

10.3. FLOAT SWITCH MAINTENANCE

(40 ltrs. condensate collector, only)

The float switch should be cleaned at regular intervals to prevent sticking of the switch due to oil residues.

11. ELECTRICAL SYSTEM

On compressor units with factory-installed electric compressor control system, check all screw-type teminals regularly, at least annually, especially the power relay terminals.

All spring-loaded terminals are maintenance-free.

Besides that, the operator is responsible to ensure that all required safety checks acc. to BGV and DIN VDE are carried out.

12. COMPRESSOR DRIVE SYSTEM

12.1. ELECTRIC DRIVE MOTOR

The drive motor normally needs no servicing except outer cleaning from time to time. Depending on manufacturer and model, greasing of the bearings may be necessary. Observe respective notes on the motor.

12.2. FLYWHEEL

The flywheel is fastened to the shaft by a taper-lock bushing, see Fig. 122. To change the flywheel, remove the taper-lock bushing (2) from flywheel (1) by undoing three allen studs (3) and pull off bushing by screwing in one of the studs in one of the normally not used thread holes (4).

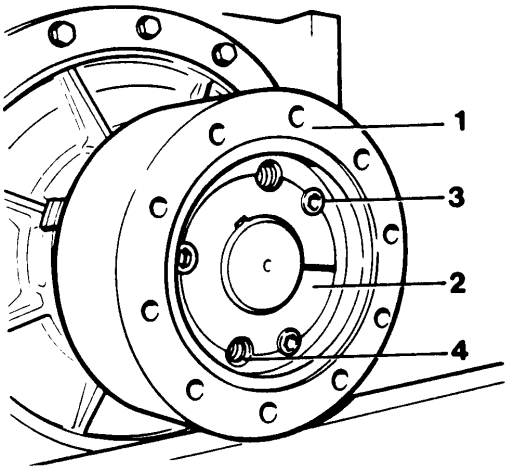


Fig. 122 Removing the flywheel

12.3. CHECKING THE DRIVE BELT

The best tension for a belt drive is the lowest possible, where the belts under full load do not slip. A rough value for this is when the belt deflects **20 to 40 mm** when pressed with thumb pressure between the two pulleys (Fig. 123). For this test, loosen guide pulleys according to para. 12.6.

- Readjust V-belts after the first 25 operating hours.
- Check V-belts for damage or wear according to chapter D-1.
- If necessary, replace.

12.4. V-BELT TENSION ADJUSTMENT (ELECTRIC UNITS)

- Slightly loosen motor mounting nuts (1, Fig. 124).
- Adjust motor by turning the square adjustment screw (2) until the belt tension is correct. For best results we recommend our v-belt tension meter, part no. N25238.
- Tighten motor mounting nuts.
- Run motor for approx. 5 minutes. Stop motor, check V-belt tension, and readjust if required.
- Check that after tension adjustment and tightening the motor mounting nuts, both pulleys are in a straight line to avoid excessive wear of the V-belt.
- Hold a straight edge against compressor pulley as shown in Fig. 125: edge must touch motor pulley at four points.

Improper v-belt tension and adjustment of the pulleys will result in extreme v-belt abrasion and premature wear.

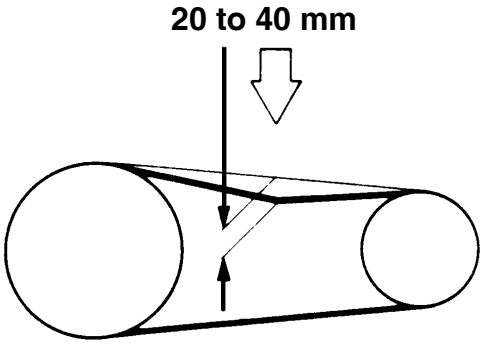


Fig. 123 Checking V-belt tension

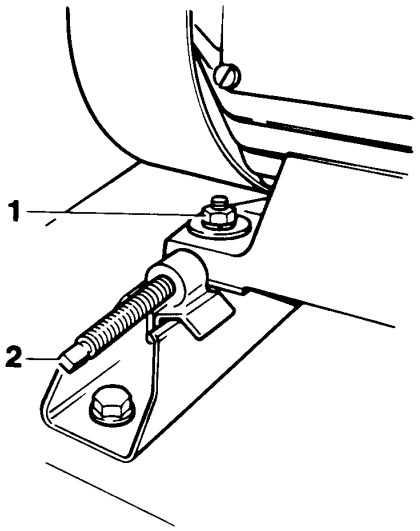


Fig. 124 Motor adjustment

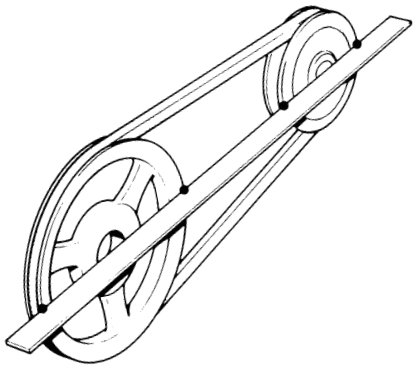


Fig. 125 V-belt pulley adjustment

12.5. V-BELT TENSION ADJUSTMENT (DIESEL UNITS)

- On diesel driven compressors, the engine is mounted on fixed supports. Therefore, here the compressor block has to be moved to tighten the V-belts. On some units, connecting lines have to be removed before the block can be adjusted.
- Slightly loosen compressor mounting nuts.
- Adjust compressor until the belt tension is correct.
- Tighten compressor mounting nuts.
- Run compressor for approx. 5 minutes. Stop engine, check V-belt tension and readjust if required.
- Check that, after tension adjustment and tightening the motor mounting nuts, both pulleys are in a straight line to avoid excessive wear of the V-belt.
- Hold a straight edge against compressor pulley as shown in Fig. 125: edge must touch motor pulley at four points, or have the same distance from both edges of motor pulley if both pulleys do not have the same width.

12.6. GUIDE PULLEY ADJUSTMENT

Guide pulleys are used for long V-belts. They should be used for guidance only, not to adjust V-belt tension. Adjust V-belt tension prior to guide pulleys according to para. 12.4. or 12.5.

- Slightly loosen idler mounting nut(s) (1, Fig. 126).
- Adjust pulley until V-belt has correct guidance. On double pulley systems (Fig. 126) adjust equally in both directions.
- Tighten idler mounting nuts.

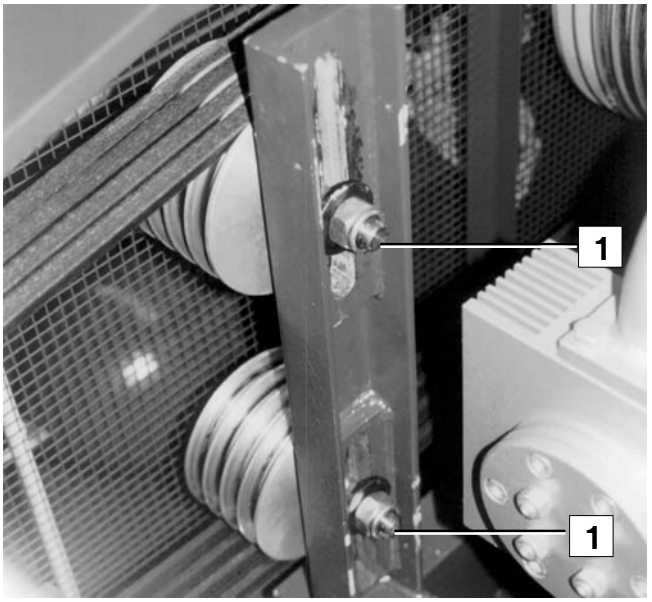


Fig. 126 Double pulley system

13. COOLING

The compressor's coolers, in particular the honeycomb coolers, can only provide optimal cooling if the cooling ribs are clean and unobstructed.

It is therefore absolutely essential that they are regularly checked and cleaned. The condition of the coolers depends, to a large extent, on the operating conditions.

Clean the coolers according to the maintenance intervals, see chapter D-1.

13.1. EXTERIOR CLEANING

Clean the coolers by blowing them with compressed air. If there is stubborn or oily dirt, use a high pressure cleaner or a steam jet blower with a suitable detergent. Make sure that the nozzle is not set to a concentrated jet, in order to avoid damaging the coolers.

13.2. INTERIOR CLEANING

It is necessary to dismantle the coolers to clean the interior. Use a suitable corrosive agent. For more detailed information, please contact our Technical Service Department

14. REPAIR INSTRUCTIONS

Preventive maintenance usually involves replacing the valves, gaskets and sealing rings as well as carry-ing out the maintenance work.

Repair work can be carried out on the compressor block to a certain extent but a certain experience and skill is necessary. It should be noted, however, that

- no repair should be carried out on the crankdrive nor on the bearings

- safety valves are not repaired but always replaced completely.

For all further repair instructions refer to applicable workshop manual.

14.1. WORKSHOP INSTRUCTIONS

14.1.1. Cylinders and pistons

The 1st/2nd stage piston is a double acting differential piston with piston rings:

The 3rd stage piston is also a differential piston, the lower part is the guide piston and the upper part is the compression piston with piston rings.

The 4th stage piston is a two part differential piston. The guide piston, like the 3rd stage piston, does not have piston rings and the upper compression piston works in a cylinder liner and has 8 chromium-plated piston rings.

The compression piston is guided by a retainer which in turn is connected to the guide piston.

Piston and cylinder liner must always be replaced together. The 4th stage piston's piston rings cannot be replaced. If the piston rings are worn, replace them as a set with the cylinder liner.

When carrying out maintenance work on pistons and piston rings, make sure that the piston rings are replaced in the correct order, refer to the parts list.

When locating the piston rings, make sure that the "TOP" mark faces upwards, but **not,** however, on the two lower taper faced rings of the 1st stage. In this case, the "TOP" mark must face **downwards.**

14.1.2. Piston ring gap

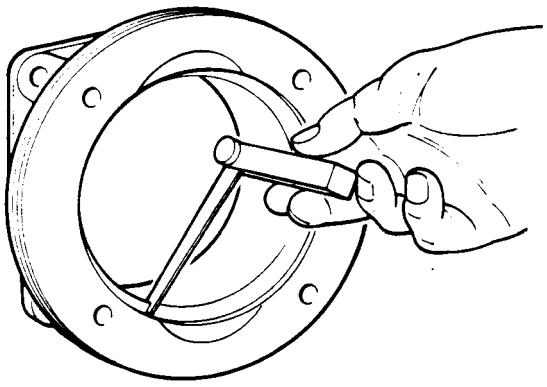


Fig. 127 Checking the piston ring gap

If output drops and excessive piston ring wear and high oil consumption is suspected, check the piston ring gap as follows:

- Remove the piston with piston rings.
- Remove the piston rings from the piston.
- Insert the piston rings in the corresponding cylinder approx. 10 mm (3/8") from the top edge. Check the piston ring gap with a feeler gauge, see Fig. 127.
- Change the piston rings if permissible values are exceeded.

Max. allowable piston ring gap	
Cylinder ∅	Gap
215 mm	= 1.35 mm
185 mm	= 1.20 mm
170 mm	= 1.10 mm
160 mm	= 1.05 mm
150 mm	= 1.00 mm
140 mm	= 0.95 mm
130 mm	= 0.90 mm
50 mm	= 0.50 mm
45 mm	= 0.45 mm
36 mm	= 0.40 mm
28 mm	= 0.37 mm
24 mm	= 0.35 mm
22 mm	= 0.33 mm
18 mm	= 0.30 mm
16 mm	= 0.30 mm

15. TROUBLE-SHOOTING

Trouble	Cause	Remedy
Drive Motor (electric)		
Motor will not start	Electric circuitry faulty	Before attempting to make any repairs, check all fuses, terminal connections, wire leads, make sure that motor data complies with mains supply
Drive Motor (petrol or diesel)		
Motor will not start	See motor instruction manual	See motor instruction manual
Compressor Block		
Oil foam in the crankcase	Last stage piston worn	Operate compressor with final stage valve head removed. If oil flows continuously out of cylinder, replace piston and liner
	Last stage outlet valve defective	Replace
Compressor does not attain final pressure	Condensate drain valve(s) and/or fittings leaking, see also Trouble-shooting - Automatic Condensate Drain	Tighten and reseal, replace if necessary
	Premature opening of final safety valve	Clean final safety valve and readjust
	Piston rings worn	Replace
	Excessive piston clearance	Check piston ring gap and replace if necessary
	No filter cartridge in filter housing or o-rings leaking	Check for cartridge and o-rings. Fit cartridge or replace o-rings. Chapter D5.
Compressor output insufficient	Pipes leaking	Re-tighten
Safety valves between individual stages releasing pressure	Intermediate pressure too high	Check valves - see D-9 - Service and clean valves
	Valves not closing properly	
Compressor running too hot	Insufficient supply of fresh cooling air	Check location max. ambient temperature + 45 °C (110 °F)
	Cooler dirty	Clean exterior of cooler
	Cooler blocked	Clean interior of cooler
	Intake or outlet valve not closing properly	Check and clean valves, replace as necessary
	Wrong direction of rotation	See arrow on compressor and remedy accordingly
Electric Control System		
Control does not switch on	No control voltage	Check feed line
	Control fuse defective	Replace fuse, eliminate cause
	Control current line cut off, line or terminal loose	Tighten terminal
	Thermal overload triggered	Clear faults as described in the following
Thermal overload relay for drive motor triggered	Current consumption too high	Check compressor drive
	Overload relay set too low	Correct setting
Control does not switch off, final pressure safety valve blows off	Final pressure switch set too high	Correct setting
	Final pressure safety valve defective	Replace safety valve
Automatic Condensate Drain		
Drain valves do not close	No control air	Check control air line
	Drain valves leaking	Dismantle drain valve and clean
Drain valves do not open	Condensate drain valve piston jammed	Dismantle drain valve, clean or replace valve

Trouble	Cause	Remedy
Solenoid valve does not close	Solenoid valve faulty	Check solenoid valve and replace if necessary
	No electrical signal	Check for voltage from timer
Solenoid valve does not open	Solenoid valve faulty	Check solenoid valve and replace if necessary
	Continuous electrical signal	Check electrical control circuit and timer
Unsatisfactory drainage (lot of condensate from manual valves)	Nozzles in 3rd and/or 4th stage drain valves clogged	Remove nozzles, clean

16. TABLES

16.1. TIGHTENING TORQUE VALUES

Unless otherwise specified in text, the following torque values apply. All valve head screws require torque wrench tightening! The indicated torque values are valid for bolts in greased condition. Replace self-retaining nuts on reassembly.

Bolt or screw	Thread	Max. torque
Hex and allen head	M 6	10 Nm (7 ft.lbs)
Hex and allen head	M 8*	25 Nm* (18 ft.lbs)
Hex and allen head	M 10	45 Nm (32 ft.lbs)
Hex and allen head	M 12	75 Nm (53 ft.lbs)
Hex and allen head	M 14	120 Nm (85 ft.lbs)
Hex and allen head	M 16	200 Nm (141 ft.lbs)
Pipe connections (swivel nuts):		Finger-tight + 1/2 turn

16.2. TORQUE SEQUENCE

Tighten valve head and cylinder bolts/nuts equally in the sequence shown in Fig. 128.

Be sure to tighten all parts in **cold** condition only.

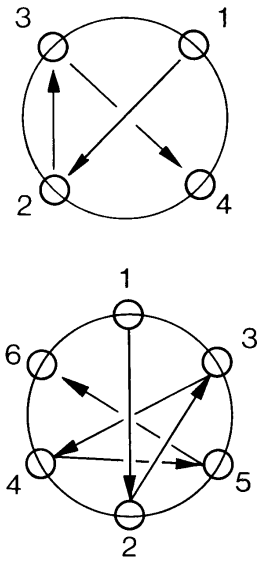


Fig. 128 Torque sequence

* Exception: mounting bolts of final pressure safety valve: 10 Nm

16.3. LUBRICATION CHART

Usage	Lubricants
Rubber and plastic parts, filter housing threads	WEICON WP 300 WHITE part no. N19752 or BAUER special lubricant P/N 072500
Sealing rings	BAUER special lubricant P/N 072500
Shaft seal (seal) Shaft seal (shaft)	BAUER special lubricant P/N 072500 Klüber SK 01-205
Screws, bolts, threads	WEICON ANTI-SEIZE AS 040 P part no. N19753 or equivalent compound with copper or MoS_2 additives

For all lubricating oils refer to chapter 2 or lubricating oil list available through **BAUER** Service Department.

16.4. ADHESIVE AND SEALANT CHART

Usage	Adhesives and Sealants
Screws, Studs	Loctite 2701
Seal for conical threads	Loctite 243
Metal - metal seals High temperature connections, e.g. valve heads, cylinders	Temperature resistant compound, e.g. WACKER E10, part no. N18247
Paper gaskets	Loctite FAG 2

16.5. TESTING AGENTS

Usage	Testing agents
Tube connectors, tubes	Leakage test spray, part no. FM0089

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E. STORAGE, PRESERVATION

1. GENERAL

If the compressor is put out of service for more than six months, the unit should be preserved in accordance with the following instructions:

Make sure the compressor is kept indoors in a dry, dust free room. Only cover the compressor with plastic if it is certain that no condensation will form under the sheet. Nevertheless, the sheet should be removed from time to time and the unit cleaned on the outside.

If this procedure cannot be followed and/or the compressor is going to be taken out of service for more than 2 years, please contact our Technical Service Department for special instructions.

2. PREPARATION

Before preserving the compressor unit, run it warm and when it reaches the specified service pressure, keep it running for approx. 10 minutes.

Then carry out the following:

- Check all pipes, filters and valves (also safety valves) for leakage.
- Tighten all couplings, as required.
- After 10 minutes, open the filling valves or the outlet valve and run the compressor at the set minimum pressure (pressure maintaining valve, see chapter 6) for approx. 5 minutes.
- After these 5 minutes, shut the system down. Drain condensate from separators. Depressurize unit. Shut filling valves/outlet valve.
- Open filters and grease threads.

On units equipped with a filter system please observe the following:

- **Ensure that filter cartridges remain in filters!** This will prevent oil entering filling lines as a result of preservation procedures.
- Remove intake filter from manifold and all intake lines from valve heads.
- Let compressor unit cool down.

3. PRESERVING THE COMPRESSOR

- Turn the compressor on and spray a small amount (approx. 10 cm^3 of compressor oil into the valve head inlet port while the compressor is running. Do not let the compressor warm up too much, to keep oil sticky.
- Shut compressor unit off.
- Close all valves.
- Place the dust cap onto the inlet port.

4. PRESERVING THE MOTOR/ENGINE

Preserve the motor/engine according to the instructions of the motor/engine manufacturer.

5. PREVENTIVE MAINTENANCE DURING STORAGE

Run the compressor **once every 6 months** as described in the following:

- Remove the dust cap from the inlet port and insert the intake filter.
- Open the filling valves or the outlet valve and let the unit run for approx. 10 minutes or until the pressure gauges indicate the correct values.
- Stop the compressor.
- Open condensate drain valves and release compressed air. Close condensate drain valves again.
- Carry out preservation procedure according to para.3.

5.1. CHANGING THE LUBE OIL FOR PRESERVING

- After prolonged storage, the oil will age in the compressor and engine. It should be drained after **2 years** at the latest and replaced with fresh oil.
- The stated period can only be attained when the crankcase is sealed during the preservation period in accordance with the preservation requirements.
- After changing the oil, turn the compressor and the engine or run them for the required period. See paras. 3. and 4.
- Check the lubrication of the compressor when putting the unit into operation once every six months or when turning the compressor.

The oil pump is functioning properly when oil can be seen flowing through the sight glass of the oil pressure regulator and if the oil pressure gauge indicates the prescribed pressure.

6. REACTIVATING THE COMPRESSOR UNIT

- Remove the dust cap from the inlet port and insert the intake filter.
- Check the oil level of the compressor.
- Check the motor/engine according to the manufacturer's instructions.
- Only applicable for units equipped with a filter system: open the purifier and change all filter cartridges.
- Run the compressor warm with open filling valves or outlet valve for approx. 10 minutes.

- Check the oil pressure on the pressure gauge or the oil flow in the sight glass. If there is any fault, check the lubrication of the compressor.
- After 10 minutes, close the filling valves or the outlet valve and run the unit up to final pressure until the final pressure safety valve blows. To do so, override the pressure switch, if installed on the unit. On compressors fitted with a factory-installed **B-CONTROL** compressor control unit, the unit has to be set to "Saftey valve check" in "Operation mode" menue. Refer to chapter A.11.
- Check the inter-pressure safety valves for leakage.
- Establish cause of any fault from the trouble-shooting table, section D-15., and remedy.
- Stop the system when running properly, the compressor is then ready for operation.

7. TRANSPORTATION

- Packing and/or receptacle must be easy to handle and in such a condition as to protect their content during transportation.
- Loose parts as tools and accessories have to be packed in a suitable individual packing.
- Moving parts have to be fixed at the unit.
- Electric and electronic parts and their connections have to be protected against humidity and mechancial damage.

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F. DIAGRAMS, DRAWINGS

1. FLOW DIAGRAMS (STANDARD)

Flow diagrams	Dwg. No.
Flow diagram KAP 22	74559
Flow diagram KAP 23	74559
Flow diagram I 22	65416
Flow diagram I 23	65416
Flow diagram I 25, I 28	66136
Flow diagram G, C 22	65341
Flow diagram G, C 23, G, C 25, G 28	65333
Pneumatic parts list, valid for all flow diagrams	76360

2. UNIT DRAWINGS (STANDARD)

Unit drawings	Dwg. No.
Compressor unit KAP 22 Standard	82176
Compressor unit KAP 22 Super-Silent	80277
Compressor unit KAP 23 Standard	82173
Compressor unit KAP 23 Super-Silent	81633
Compressor unit I 22, E 22 Standard	82176
Compressor unit I 22, E 22 Super-Silent	80277
Compressor unit I 23, E 23 Standard	82173
Compressor unit I 23, E 23 Super-Silent	81633
Compressor unit I 25, I 28, E 25, E 28 Standard	
Compressor unit I 25, I 28, E 25, E 28 Super-Silent	
Compressor unit G, C 22 Standard	
Compressor unit G, C 22 Super-Silent	
Compressor unit G, C 23 Standard	
Compressor unit G, C 23 Super-Silent	
Compressor unit G, C 25, G 28 Standard	
Compressor unit G, C 25, G 28 Super-Silent	

3. LISTS

Lists	List No.
Lubricating oil list, English	70851

4. SCHEMATIC DIAGRAMS

Schematic diagram	**Dwg.-No.**
Schematic diagrams	according to order
Electric parts list, valid for all schematic diagrams	76360

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G. PARTS LISTS

1. COMPRESSOR UNITS

1.1. COMPRESSOR UNIT KAP 220

Applicable parts lists:	Code
Compressor block K22.0	A6.5
Filter system	B__
Automatic condensate drain	C42
Instrument panel, standard	D11
Instrument panel, standard with base frame and Super-Silent	D8
Frame, standard	E16
Frame, Super-Silent	E12
Drive system	F18
Accessories[a)] :	
Filter system P80	G3
Filter system P100	G4
Filling panel	G14
Storage bottle batteries	G7
Condensate collecting system	G44
Compressor control unit	

1.2. COMPRESSOR UNITS I 22.0, E 22.0

Applicable parts lists:	Code
Compressor block K22.0	A6.5
Filter system	B__
Automatic condensate drain	C42
Instrument panel, standard	D11
Instrument panel, Super-Silent	D8
Frame, standard	E16
Frame, Super-Silent	E12
Drive system	F18
Accessories[a)] :	
Filter system P100	G4
Storage bottle batteries	G7
Condensate collecting system	G44
Compressor control unit	

a) Optional extra according to order

1.3. COMPRESSOR UNIT KAP 23

Applicable parts lists:	Code
Compressor block K23.0	A5.14
Filter system	B__
Automatic condensate drain	C45
Instrument panel, standard	D11
Instrument panel, Super-Silent	D8
Frame, standard	E16
Frame, Super-Silent	E12
Drive system	F18
Accessories[a] :	
Filter system P120	G11
Filling panel	G14
Storage bottle batteries	G7
Condensate collecting system	G44
Compressor control unit	

1.4. COMPRESSOR UNITS I 23.0, E 23.0

Applicable parts lists:	Code
Compressor block K23.0	A5.14
Filter system	B__
Automatic condensate drain	C45
Instrument panel, standard	D11
Instrument panel, Super-Silent	D8
Frame, standard	E16
Frame, Super-Silent	E12
Drive system	F18
Accessories[a] :	
Filter system P120	G11
Storage bottle batteries	G7
Condensate collecting system	G44
Compressor control unit	

a) Optional extra according to order

1.5. COMPRESSOR UNITS I 25.0, E 25.0

Applicable parts lists:	Code
Compressor block K25.0	A7.5
Filter system P121	B__
Automatic condensate drain	C47
Instrument panel, standard	D11
Instrument panel, Super-Silent	D8
Frame, standard	E16
Frame, Super-Silent	E12
Drive system	F18
Accessories[a]:	
Filter system P120	G11
Storage bottle batteries	G7
Condensate collecting system	G44
Compressor control unit	

1.6. COMPRESSOR UNIT I 25.9

Applicable parts lists:	Code
Compressor block K25.9	A16.2
Filter system	B__
Automatic condensate drain	C50
Instrument panel, standard	D11
Instrument panel, Super-Silent	D8
Frame, standard	E16
Frame, Super-Silent	E12
Drive system	F18
Accessories[a]:	
Storage bottle batteries	G7
Condensate collecting system	G44
Compressor control unit	

a) Optional extra according to order

1.7. COMPRESSOR UNIT I 25.18

Applicable parts lists:	Code
Compressor block K25.18	A12.3
Filter system	B__
Automatic condensate drain	C50
Instrument panel, standard	D11
Instrument panel, Super-Silent	D8
Frame, standard	E16
Frame, Super-Silent	E12
Drive system	F18
Accessories[a] :	
Storage bottle batteries	G7
Condensate collecting system	G44
Compressor control unit	

1.8. COMPRESSOR UNITS I 28.0, E 28.0

Applicable parts lists:	Code
Compressor block K28.0	A8.4
Filter system	B__
Automatic condensate drain	C47
Instrument panel, standard	D11
Instrument panel, Super-Silent	D8
Frame, standard	E16
Frame, Super-Silent	E12
Drive system	F18
Accessories[a] :	
Filter system P140	G12
Storage bottle batteries	G7
Condensate collecting system	G44
Compressor control unit	

a) Optional extra according to order

1.9. COMPRESSOR UNITS GI 22.0, G 22.0, C 22.0

Applicable parts lists:	Code
Compressor block K220 G	A45.5
Filter system	B__
Automatic condensate drain	C42
Instrument panel, standard	D11
Instrument panel, Super-Silent	D8
Frame, standard	E16
Frame, Super-Silent	E12
Drive system	F18
Accessories[a]:	
Filter system P100	G4
Storage bottle batteries	G7
Condensate collecting system, gas-tight	G8

1.10. COMPRESSOR UNITS GI 23.0, G 23.1, C 23.1

Applicable parts lists:	Code
Compressor block K23.0 G, C	A52.11
Compressor block K23.0 GI	A44.13
Filter system	B__
Automatic condensate drain	C45
Instrument panel, standard	D11
Instrument panel, Super-Silent	D8
Frame, standard	E16
Frame, Super-Silent	E12
Drive system	F18
Accessories[a]:	
Filter system P120	G11
Storage bottle batteries	G7
Condensate collecting system, gas-tight	G8

a) Optional extra according to order

1.11. COMPRESSOR UNITS GI 25.0, C 25.0

Applicable parts lists:	Code
Compressor block K25.0 G	A46.5
Filter system	B__
Automatic condensate drain	C47
Instrument panel, standard	D11
Instrument panel, Super-Silent	D8
Frame, standard	E16
Frame, Super-Silent	E12
Drive system	F18
Accessories[a] :	
Filter system P120	G11
Storage bottle batteries	G7
Condensate collecting system	G44
Compressor control unit	

1.12. COMPRESSOR UNITS GI 25.9, G 25.9

Applicable parts lists:	Code
Compressor block K25.9 G	A49.3
Filter system	B__
Automatic condensate drain	C47
Instrument panel, standard	D11
Instrument panel, Super-Silent	D8
Frame, standard	E16
Frame, Super-Silent	E12
Drive system	F18
Accessories[a] :	
Storage bottle batteries	G7
Condensate collecting system, gas-tight	G8
Compressor control unit	

1.13. COMPRESSOR UNIT GI 25.18

Applicable parts lists:	Code
Compressor block K25.18 GI	A53.2
Filter system	B__
Automatic condensate drain	C50
Instrument panel, standard	D11
Instrument panel, Super-Silent	D8
Frame, standard	E16
Frame, Super-Silent	E12
Drive system	F18
Accessories[a] :	
Storage bottle batteries	G7
Condensate collecting system, gas-tight	G8
Compressor control unit	

1.14. COMPRESSOR UNITS GI 28.0, C 28.0

Applicable parts lists:	Code
Compressor block K28.0	A47.3
Filter system	B__
Automatic condensate drain	C47
Instrument panel, standard	D11
Instrument panel, Super-Silent	D8
Frame, standard	E16
Frame, Super-Silent	E12
Drive system	F18
Accessories[a] :	
Filter system P140	G12
Storage bottle batteries	G7
Condensate collecting system, gas-tight	G8
Compressor control unit	

a) Optional extra according to order

Lubricating oil list

BAUER KOMPRESSOREN

1. GENERAL

After extensive tests with many different kinds of lubricants, we have decided to authorize the following brands of oil for use in **BAUER** compressors under the given operating conditions.

This list is up to date at the time of printing and will be reviewed continuously. Should your list or your instruction manual be older, please request the latest edition from **BAUER** Customer Services. When using any of the oils listed below, please follow the oil change intervals and the oil filling level described for the equivalent **BAUER** compressor oil in the instruction manual of your unit.

Oil type			Use						Ambient temperature
Brand name	Designation	Type	A Breathing air	N Nitrox	I Industrial air	G Helium, Argon	C CNG	GI Nitrogen	
BAUER KOMPRESSOREN	Special Compressor oil Part no. N28355 b) c)	S	+	+	+	+	–	+	+5 ... +45 °C
BAUER KOMPRESSOREN	Special Compressor oil Part no. N22138 a)	M	+	–	+	–	–	–	+5 ... +45 °C
BAUER KOMPRESSOREN	Special Compressor oil Part no. N26303 b)	S	–	–	–	–	+	–	+5 ... +45 °C
BAUER KOMPRESSOREN	Special Compressor oil Part no. N30387 b)	S	–	–	–	–	–	+	+10 ... +45 °C *

Oil type

S	synthetic oil
M	mineral oil

Application

A	approved for breathing air application with BAUER air purification systems
N	approved for nitrox application with BAUER membrane unit
I	suitable for industrial air compressor units
G	suitable for gas compressor units for dry and highly pure gases
C	suitable for compressed natural gas compressors (CNG filling stations)
GI	suitable for gas compressor units for nitrogen
a)	oil change every 1000 operating hours
b)	oil change every 2000 operating hours
c)	oil change every 1000 operating hours in case of nitrox application

Suitability

+	= suitable
◆	= partly suitable
–	= not suitable

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Lubricating oil list

2. TYPE OF OIL

Due to the thermal load on the compressor only high quality oil should be used. You are recommended to restrict oils to those which have been approved by us and are listed in the instruction manual or in the lubricating list on page 1.

Our compressor units are delivered ex works with lubricating oil filled into the crankcase or as consignment, depending on the model, as follows:

Breathing air compressor units:	BAUER Special Compressor oil, part no. N28355
Nitrox compressor units:	BAUER Special Compressor oil, part no. N28355
Industrial air and gas compressor units:	BAUER Special Compressor oil, part no. N28355
CNG compressor units:	BAUER Special Compressor oil, part no. N26303
Nitrogen compressor units:	BAUER Special Compressor oil, part no. N30387*

For operation under difficult conditions, such as continuous running and/or high ambient temperatures, we only recommend the BAUER special synthetic compressor oils acc. to the list on the previous page. These have proved excellent quality under ambient temperatures between +5 °C and +45 °C. For lower temperatures a compressor heating device is required which is capable of pre–heating the unit up to +5 °C.

For operation under less severe conditions, and for intermittent operation, i.e. when the compressor is not used for longer periods between the operating periods, we also recommend the use of the mineral oil acc. to the list on the previous page. This oil is suitable for ambient temperatures between +5 °C and +45 °C. Here also, a pre–heating device will be required if ambient temperatures should fall below +5 °C.

2.1. Changing the Oil Type

CAUTION

To avoid severe damage to the compressor unit when changing to another oil type, the following measures should be strictly adhered to.

- Drain mineral oil while still warm.
- Check valves, coolers, separators, purifiers and all pneumatic tubes and hoses for deposits.

If deposits are present, perform the following steps:

- Remove deposits or change valves, coolers, separators, purifiers and all pneumatic tubes and hoses.
- Change oil filter, if applicable.
- Fill compressor with the new oil.
- After approx. 100 operating hours, replace oil filter again (if applicable). and change oil.
- Top up with same oil type.

3. OIL CHANGE

Mineral oil	every 1000 operating hours, at least annually
Synthetic oil	every 2000 operating hours, at least every two years
Oil change volume	see compressor unit operating manual

BAUER compressor oil is available in the following quantities:

Oil quantity ▼ Oil type ▶	Synthetic oil N28355	Synthetic oil N26303	Mineral oil N22138	Synthetic oil N30387*
1 ltr. bottle	part no. N28355–1	part no. N26303–1	part no. N22138–1	part no.N 30387–1
5 ltr. container	part no. N28355–5	part no. N26303–5	part no. N22138–5	part no.N 30387–5
20 ltr. container	part no. N28355–20	part no. N26303 –20	part no. N22138–20	part no.N 30387–20

* Compressor oil N30387 is suitable for ambient temperatures between +10 °C and +45 °C. For lower temperatures a compressor heating device is required which is capable of pre–heating the unit up to +10 °C.

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