

# SERVICE MANUAL

E

## **Reciprocating Compressor**

### **Model: Premium 350/40 D**

GL-Nr.: 1\_1814\_0-01 02

Part No.: 1.1814.0

Serial No.: .....

Manufacturer:

**KAESER KOMPRESSOREN GmbH**

96410 Coburg • PO Box 2143 • GERMANY • Tel. + 49-(0)9561-6400 • Fax + 49-(0)9561-640130

<http://www.kaeser.com>





# Declaration of Conformity

**KAESER  
KOMPRESSOREN**

## Specification of machine / assembly

Description Reciprocating compressor  
Model **Premium 350/40 D**  
Material No.: **1.1814.0** Serial No.: \_\_\_\_\_

## EG directives applied

98/37/CE Machinery directive  
73/23/CEE Low Voltage Directive  
87/404/CEE Directive concerning simple, unfired pressure vessels  
89/336/CEE Directive concerning electromagnetic compatibility  
2000/14/CE Directive concerning the environmental impact of noise emission in outdoor use of equipment or machinery

## Harmonised Standards applied

DIN EN 1012-1: 1996-07  
DIN EN 292-1: 1991-11  
DIN EN 292-2/A1: 1995-06  
DIN EN 294: 1992-08  
DIN EN 60204-1: 1998-11  
DIN EN 55014-1: 2002-09  
DIN EN 61000-6-2: 2002-08  
DIN EN 61000-3-2: 2001-12 <sup>1)</sup>  
DIN EN 61000-3-3: 2002-05 <sup>1)</sup>  
DIN EN 61000-3-11: 2001-04 <sup>1)</sup>

<sup>1)</sup> Insofar as the application falls within the requirements of the standard

## Conformity assessment procedure

98/37/CE: To annex II A  
2000/14/CE: Internal production control and technical documentation assessment with regular inspections according to annex VI of the Directive

## Designated place for the conformity assessment procedure for 2000/14/CE

TÜV Süddeutschland Bau und Betrieb GmbH  
Westendstr. 199  
80686 München, Germany

## EG type approval

Certificate No.: **OR/2551/SZ/03**

## Sound power level to 2000/14/EG and ISO 3744

For rated power outputs less than 15 kW

measured: **88** dB(A)

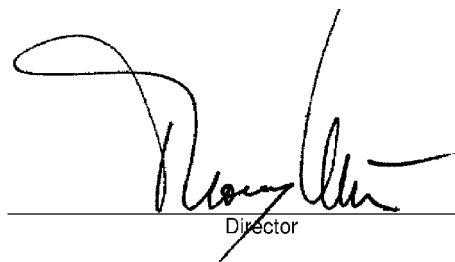
guaranteed: **99** dB(A)

**The design of the machine supplied by us corresponds to the stated Directives and Standards within the meaning of the conformity assessment procedure carried out.**

The machine design is not subject to 97/23/CE directive on pressure equipment (see separate Declaration of Conformity). Technical documents are archived with the manufacturer in accordance with 2000/14/CE.

Coburg  
Location

03.03.2003  
Date

  
Director

**KAESER KOMPRESSOREN GmbH**  
Sitz: Carl-Kaesar-Str. 26, D-96450 Coburg

Tel.: +49-9561-640 0  
Fax: +49-9561-640 130

**Geschäftsführung** Dipl.-Ing. Carl Kaeser, Dipl.-Wi.-Ing. Thomas Kaeser  
RG Coburg B 292  
USt-IdNr.: DE 132460321



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## **1 Technical Specification**

### **1.1 Compressor Unit**

Model ..... Premium 350/40 D

Maximum gauge working pressure ..... 10 bar

Weight ..... 63 kg

#### **Air receiver:**

Capacity ..... 40 l

Max. permissible gauge working pressure ..... 11 bar

#### **Drawings:**

Dimensional drawing ..... K1.1814.0

Electrical diagram ..... SKK.D–00400.00

### **1.2 Sound emission**

Guaranteed sound power level ..... 99 dB (A)  
(to 2000/14/EG Directive)

Emission sound pressure level ..... 74 dB (A)

calculated from the measured mean sound power level (Directive 2000/14/EG, basic standard for noise measurement ISO 3744) to EN ISO 11203:1995 para. 6.2.3.d at distance  $d = 1\text{m}$ ,  $Q_2 = 14,1\text{ dB (A)}$ .

### **1.3 Compressor Block**

Model ..... KC 350

Theoretical inlet capacity ..... 350 l/min

Free air delivered at 6 bar gauge working pressure ..... 230 l/min

Maximum gauge working pressure ..... 10 bar

Number of cylinders ..... 1

Speed ..... 1500 min<sup>-1</sup>

Oil capacity ..... 0,2 l

Oil top–up quantity ..... 0,1 l

### **1.4 Electrical Connection**

Mains voltage ..... 400 ± 10% V

Phases ..... 3 / N / PE

Frequency ..... 50 Hz

Max. mains fusing (slowblow or gl class) ..... 10 A

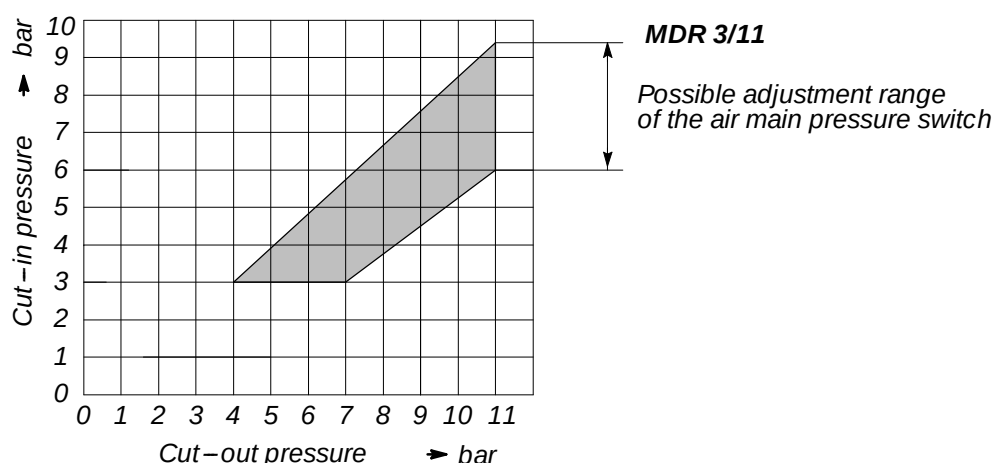
Power supply cable core cross–section ..... 4 x 1,5 mm<sup>2</sup>  
(CU multiple core cable)

Maximum rated current  $I_N$  ..... 4,6 A

### 1.5 Drive Motor

Rated power ..... 1,7 kW  
 Rated speed ..... 1500 min<sup>-1</sup>  
 Protection class ..... IP 54  
 Max. cut-in frequency ..... 30 times/hour  
 Starting ..... direct start

### 1.6 Air Main Pressure Switch Setting



#### Works settings:

Gauge cut-in pressure  $p_{\min}$  ..... 7 bar  
 Gauge cut-out pressure  $p_{\max}$  ..... 9 bar  
 Pressure difference  $\Delta p$  ..... 2 bar

### 1.7 Safety Valve Setting

Opening pressure ..... 11 bar

### 1.8 Installation Requirements

Max. height above sea level at place of installation ..... 1000 m  
 Min. ambient temperature ..... 5 °C  
 Max. ambient temperature ..... 35 °C

### 1.9 Recommended Oil

Craftsmen's compressors are filled with the highly suitable oils listed below:

| Description                                              | Oil sort of the Viscosity group VG 5, DIN 51562 | maximal permissible fluid change interval in operating hours/ years | material number 0.5 l |
|----------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------|-----------------------|
| special high performance oil for craftsmen's compressors | SAE 5 W 30                                      | 1000 / 2 *                                                          | 9.4943.00010          |

\* Cool to moderate ambient temperatures, low humidity, high duty cycle

**1.10 Air Receiver Charging Time**

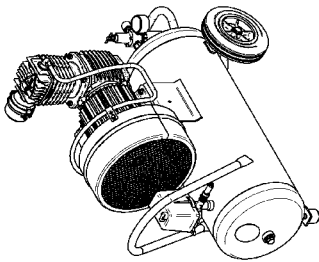
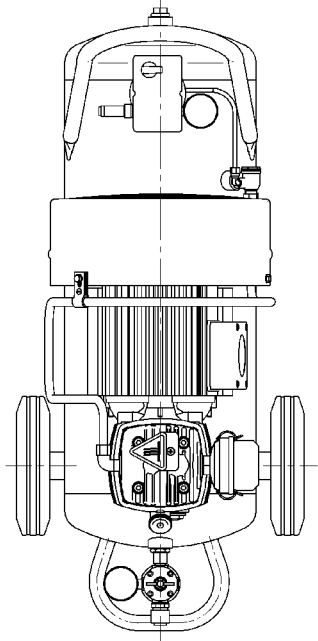
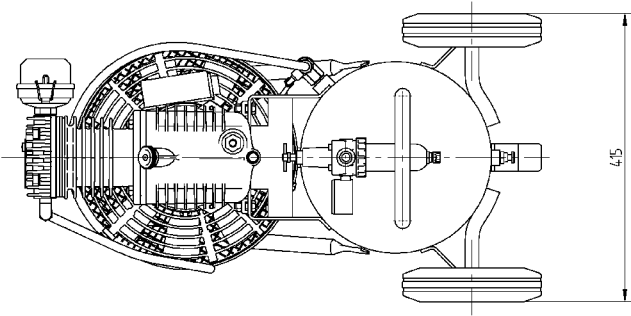
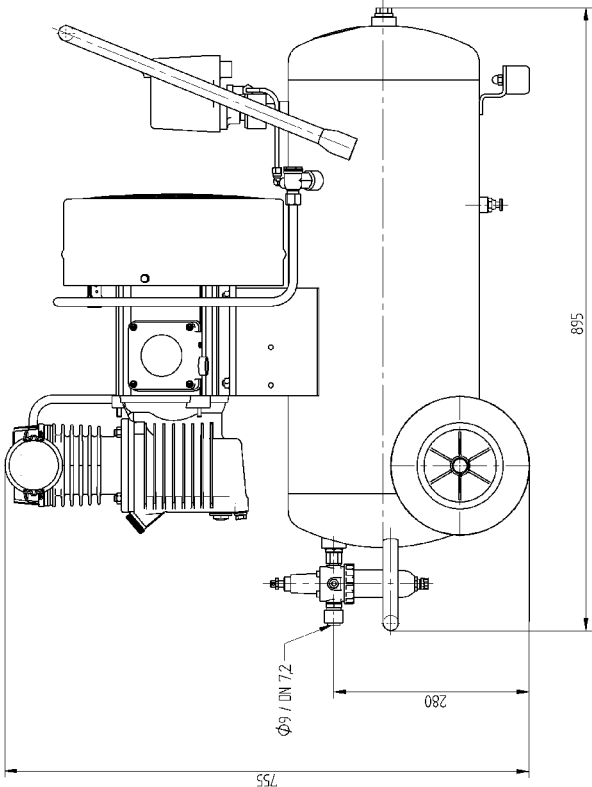
Air receiver charging time to 3 – 8 bar 0 min 50 s

**1.11 Dimensional Drawing**

(see following page)

Entwicklungsbedingte Änderungen vorbehalten. Zeichnung darf nur über CAD geändert werden.

Kopien oder sonstige Vervielfältigungen einschließlich Speicherung, Vervielfältigung oder Verbreitung unter Verletzung elektrischer Systeme dürfen nur zu dem vereinbarten Zweck anvertraut und darf zu keinem anderen Zweck verwendet werden. Die Zeichnung bleibt unser ausschließliches Eigentum. Sie wird nur zu dem vereinbarten Zweck anvertraut und darf zu keinem anderen Zweck verwendet werden. Vervielfältigung, Verbreitung, Weitergabe oder sonstiger Gebrauch ist ohne schriftliche Genehmigung des Herstellers ist ausdrücklich untersagt. Die Zeichnung ist Eigentum der KAESER KOMPRESSOREN AG und darf nicht ohne schriftliche Genehmigung der KAESER KOMPRESSOREN AG veröffentlicht werden. Weder Original, noch Vervielfältigungen dürfen Dritten ausleihend oder in sonstiger Weise zugänglich gemacht werden.



| KAESER<br>KOMPRESSOREN |          |        |          | 4-Index          |  |            |  |
|------------------------|----------|--------|----------|------------------|--|------------|--|
| Premium 350/40 D       |          |        |          | K1.1814_0        |  |            |  |
|                        |          |        |          | 10026372 D 00614 |  |            |  |
| Tag                    | 05.05.03 | Werk   | Waldmühl |                  |  |            |  |
| Gez.                   | 05.05.03 | Begr.  | 05.05.03 |                  |  |            |  |
| Freigabe               | 05.05.03 | S. 2/2 |          |                  |  |            |  |
| Min/Sec                | 1        | 5      | 10       |                  |  | Ersatz für |  |

## 2 Safety Regulations



**Disregarding this notice can result in serious injury!**

This manual should be read and the instructions it contains followed before initial start-up and before carrying out maintenance work.

The machine is constructed to the latest technological standards and to accepted safety regulations.

Despite this fact, physical danger to the user or third parties or damage to the machine and other property exists.

Use the machine as specified according to the service manual and only if it is in perfect technical order!

Repair defects that could degrade safety (or have them repaired) immediately!

### 2.1 Explanation of Symbols and References



This symbol is placed before all regulations concerning safety where danger to life and limb can occur during work. It is especially important that these regulations are observed and that extreme care is taken. For their own protection, inform all other users of these safety regulations. Observe all general safety and accident prevention regulations as well as the those laid down in this service manual.

**Attention!**

This symbol is placed by text where considerable attention must be paid to recommendations, regulations, references and the correct sequence of work so that damage and/or destruction of the compressor unit and/or other equipment is prevented.



This symbol identifies environmental care measures.



This symbol indicates operations and actions to be carried out by the operator or service technician.



This bullet identifies listings.

**Explanation of the warning label on the compressor unit:**



**Warning:**  
Do not touch hot surfaces.

## 2.2 Safety Notes



Work on power-driven equipment may only be carried out or supervised by persons trained in that particular equipment or by a specialist.

Work on electrical equipment in the compressor may only be carried out according to electrical engineering regulations by a qualified electrician, or trained personnel under the supervision of a qualified electrician.



Before work is carried out on electrical systems, carry out the following measures in the sequence shown:

Switch off all phases.

Ensure the unit cannot be switched on again.

Check that no voltage is present.



The following actions must be carried out in the order given before working on any pressurised parts or enclosures (e.g. pipes, vessels, valves).

1. Shut off and depressurize all pressurized components and enclosures
2. Secure them in the depressurized state
3. Check that they are indeed de-pressurized

**Attention!**

Any alterations or reconstruction carried out without consultation with and the previous consent of KAESER COMPRESSORS will invalidate the warranty.

**Attention!**

No welding, heat-treatment or mechanical work may be carried out on pressure retaining components, e.g. pipes, air mains, receivers, etc.



Safety devices may not be modified or deactivated.

Signs and marks of reference may not be removed or rendered unreadable.

**We also recommend observation of the following:**

- Allow no open flame and flying sparks in the place of installation.
- During any necessary welding on the compressor unit or nearby ensure that sparks or high temperatures cannot cause fire or explosion.
- Ensure that the compressor unit is supplied with clean air free of damaging components.
- The ambient temperature should not rise above or fall below the limits defined in chapter 1.8. If this is the case, special measures must be agreed between the manufacturer and the user.
- This machine is not explosion-proof.  
It may not be operated in areas in which specific requirements with regard to explosion protection are applied.  
These are, for example, the requirements for "specified use in hazardous explosive environments" according to the 94/9/EU ATEX Directive.

## **2.3 Electrical Safety**

**Attention!**

The electrical system of a compressor unit must comply with the provisions of the European Standards EN 1012 – 1 and EN 60204 – 1) and, if necessary, with the local electricity supply authority regulations.

Compressor units must be fitted with a main isolating device, the operation of which determines the start and end of the energy supply.

Main isolating devices can be main switches or plug and socket connections.

For this reason the following measures must be taken at the place of installation:

Compressor units fitted with a drive motor of drive power 3 kW or more and a current rating of 16 amperes or more must be fitted with a lockable main switch (see EN 60204 – 1, para. 5.3) and mains fuses.

The main switch must be designed according to the maximum rated current  $I_N$  (see chapter 1.4).

See chapter 1.4 for details of the cable cross-sections and mains fuses.

Compressor units fitted with a drive motor of drive power less than 3 kW and a current rating of less than 16 amperes may be fitted with a mains plug connection.

## **2.4 Spare Parts**

Safe and reliable operation of the compressor unit is guaranteed only with KAESER original spare parts.

## 2.5 Environmental Protection

### Condensate drainage



Condensate accumulating during compression must be drained via a suitable draining system and collected in disposal canisters. The condensate must be disposed of according to environmental regulations.

### Operational and repair materials, used parts



Dispose of all used materials and parts accumulating during operation, maintenance and repair of the compressor unit according to environmental care regulations!

### Disposing of the Machine

When disposing of a machine, drain out all liquids and remove dirty filters.



**Any parts contaminated with oil must be disposed of in accordance with local environment regulations.**

- ✎ Take the machine out of service (see chapter 8.1).
- ✎ Drain all oil completely from the machine (see chapter 9.6).
- ✎ Remove dirty filters.

Use the services of an approved local disposal specialist to ensure environmentally correct disposal of the empty machine.

### 3 General

**Attention!**

**The service manual must always be available at the compressor unit's place of use**

#### 3.1 Correct Use of the Compressor

The compressor unit is intended solely for the purpose of generating compressed air. Any other use is considered incorrect. The manufacturer cannot accept liability for any damage caused by such incorrect use; the user alone is liable for any risks incurred.

Correct use of the compressor also encompasses compliance with the installation, removal, commissioning, operational and maintenance conditions laid down by the manufacturer.

**Attention!**

**The equipment may only be used or serviced by persons who are authorised and trained.**

The machine is intended solely for industrial use and application in industrial facilities. Any other use or application is forbidden. The manufacturer is not liable for any damages resulting from such unspecified use or application. The user or operator alone bears the risk for such damages.

**This applies especially to the obligation**

- to become acquainted with the fundamental safety regulations that apply to compressed air engineering
- to refuse access to the machine by persons under the age of fourteen, and
- to have the technical condition of the machine inspected within the intervals prescribed for industrial use.

#### 3.2 Incorrect Use



**Never direct compressed air toward persons. Compressed air is a concentrated form of energy and as such is dangerous to life.**

**Attention!**

**Inlet air may not contain any explosive or chemically unstable gas or vapour.**

#### 3.3 Compressed Air Treatment



**Never use compressed air for breathing purposes and production methods where the air has direct contact with food without subjecting the compressed air to additional treatment.**

#### 3.4 Copyright

The copyright of this service manual is the property of the KAESER Company. This service manual is intended for operating personnel, maintenance personnel and supervisory personnel use only. It contains instructions and technical diagrams that may not be copied, either completely or partly, distributed or evaluated by unauthorised persons for the purpose of competition, or divulged to any other third party.

### **3.5 Accompanying Documents**

With this Service Manual are documents intended to assist in safe and sure operation of the compressor:

- Certificate of acceptance / operating instructions for the pressure vessel
- Conformity or Manufacturer's Declaration in accordance with applicable directives

☞ Make sure all documents are to hand and their contents understood.

Request the supply of any missing documents from KAESER.

Make sure you give the data from the nameplate.

### **3.6 Handling the Document**

The service manual is part of the machine.

☞ Keep the service manual safe throughout the life of the machine.

☞ Pass the manual on to the next owner/user of the machine.

☞ Ensure that all amendments are entered in the manual.

## **4 Transport**

### **4.1 Transport Instructions**

To prevent damage, take care that the compressor unit is only transported in the vertical position.

See chapter 1.1 for details of the weight.

### **4.2 Packaging**

A decisive factor concerning the type of packaging is the transport route.

The packaging conforms to the packaging regulations laid down by the German Federal Association of Wood, Pallet and Export packaging (HPE) and by the German Machinery and Plant Association (VDMA), if not otherwise contractually agreed.

### **4.3 Storage**

Always store the compressor, whether packaged or not, in an enclosed dry space.

The ambient temperature may not exceeds the limits of  $- 25^{\circ}\text{C}$  and  $+ 60^{\circ}\text{C}$ .

## **5 Construction and Operation**

Items in ( ) refer to components with item number in the schematic diagram of the compressor unit (see chapter 5.4).

### **5.1 Principle of Compression**

This reciprocating compressor is an air cooled, oil lubricated compressor using the principle of single stage compression

Atmospheric air is drawn into the compression chamber of the compressor block (2) through the air filter (1). Air is drawn in via the valve plate in the cylinder head during the downward motion of the piston from the top to the bottom dead centres. After the piston has reached the bottom dead centre position the air is compressed within the cylinder by the upwards motion of the piston. Simultaneously the inlet valves in the valve plate close and the discharge valves open.

The compressed air now enters the air receiver (4) via a nonreturn valve (3). The nonreturn valve prevents the compressed air from flowing back into the compressor block when the compressor unit is stopped.

### **5.2 Short Description**

The compressor block is driven by an electric motor (7). The compressor block is directly coupled to the motor via the motor shaft.

The end of the motor shaft is designed as a crankshaft. A fan supplying the necessary cooling air for the motor and the compressor block is fitted to the N–end of the motor shaft. The heat generated is dissipated via the cooling fins on the cylinder and the cylinder head.

The crankshaft is supported by roller bearings; the connecting rod is supported by shell bearings. The cylinder liner, piston, crankshaft and connecting rod are automatically splash lubricated.

To enable an unloaded start the pressure switch (6) is fitted with an unloading valve.

A nonreturn valve (3) is fitted upstream of the air receiver (4) to prevent compressed air flowing back from the air receiver.

The air receiver (4) is constructed to the regulations of the pressure vessels act and fitted with all necessary fittings such as safety valve (5), pressure gauge (8), pressure switch (6) and nonreturn valve (3).

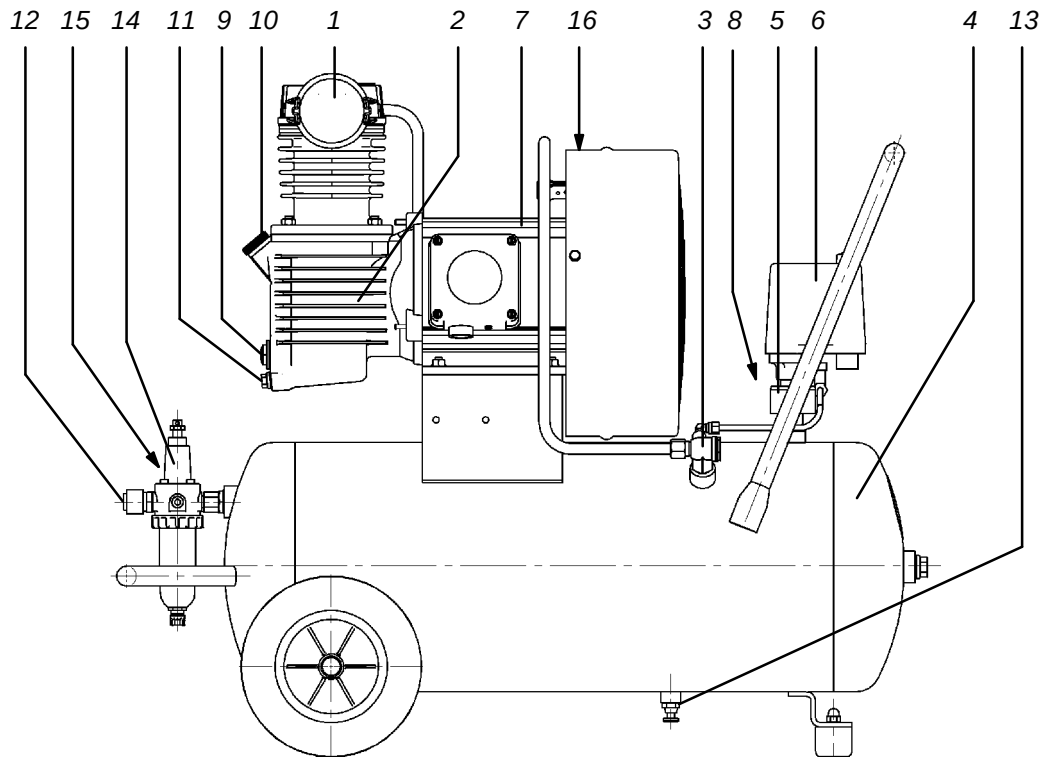
### **5.3 Compressor Control (Stop–Start Control)**

The compressor is controlled by the pressure switch.

After the compressor is first switched on the pressure switch switches the compressor, depending on the air demand, between the two operating states "load" and "standstill" within the limits  $p_{\min}$  /  $p_{\max}$ .

See chapter 1.6 for the works setting of the pressure switch.

The compressed air pipe from the compressor block up to the nonreturn valve is vented when the cut–out gauge pressure is reached to ensure an unloaded compressor start.

**5.4 Components of the Compressor Unit**

- |                                                                                                               |                                                                                          |
|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| 1 Air filter;<br>cleans the<br>inlet air                                                                      | 8 Pressure gauge;<br>indicates the current pressure<br>in the air receiver               |
| 2 Compressor block;<br>draws in the air and compresses<br>it to the discharge pressure                        | 9 Oil level sight glass                                                                  |
| 3 Nonreturn valve;<br>prevents the compressed air from<br>flowing back into the block                         | 10 Oil filler                                                                            |
| 4 Air receiver;<br>compressed air tank and<br>accumulation of condensate                                      | 11 Oil drain plug                                                                        |
| 5 Safety valve;<br>protects the air receiver, blows off<br>if the max. pressure is exceeded                   | 12 Compressed air discharge connection                                                   |
| 6 Pressure switch;<br>controls compressor stop and start                                                      | 13 Condensate drain valve                                                                |
| 7 Electric motor;<br>drives the compressor block,<br>fan on N shaft end provides<br>the necessary cooling air | 14 Pressure reduction valve;<br>reduces the pressure to the<br>required working pressure |
|                                                                                                               | 15 Pressure gauge on reduction valve;<br>indicates the working pressure                  |
|                                                                                                               | 16 Direction of rotation arrow                                                           |

## **6 Installation**

### **6.1 Installation Instructions**

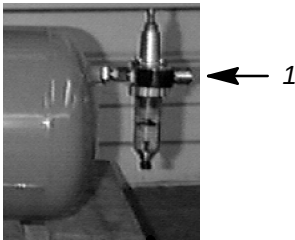
To ensure sufficient ventilation, the compressor unit must be installed with a minimum distance of 0.5 metres to the wall.

Safe operation of the compressor unit is only ensured if the ambient temperature remains within the limits stated in chapter 1.8).

If the compressor is used in the open, take care that it is protected against the direct rays of the sun and against the ingress of dust and rain.

### **6.2 Connection of the Compressed Air Supply**

The compressor unit is piped ready for use.



#### *1 Compressed air discharge connection*

A compressed air connection is provided for the consumers. The consumers are connected via a flexible hose and a quick release hose coupling.

### 6.3 Electrical Connection



The connection to the power supply and the protective measures necessary are to be carried out to the provisions of the European Standards EN 1012 – 1 and EN 60204 – 1 and to the regulations of the local Electricity Supply Authority by an authorised electrician.

**Attention!**

For this reason, the following measures must be carried out at the place of installation:

Compressor units fitted with a drive motor of drive power 3 kW or more and a current rating of 16 amperes or more must be fitted with a lockable main switch (see EN 60204 – 1, para. 5.3) and mains fuses.

Compressor units must be fitted with a main isolating device, the operation of which determines the start and end of the energy supply.

Main isolating devices can be main switches or plug and socket connections.

The main switch must be designed to according to the maximum rated current  $I_N$  (see chapter 1.4).

Compressor units fitted with a drive motor of drive power less than 3 kW and a current rating of less than 16 amperes may be fitted with a mains plug connection.

- The electrical installation of the compressor unit must be carried out according to the electrical diagram (see chapter 11.1). The connection to the power supply is made with a mains plug.

**Attention!**

The supply cable and fuses are selected to DIN VDE 0100, sect. 430 and 523 for an ambient temperature of 30 °C. Under other operating conditions such as a higher ambient temperature or longer supply cables (longer than 50 metres) the cross-section of the supply cables and the fuses must be checked and selected according to DIN VDE 0100 and to the regulations of the local electricity supply authority.

See chapter 1.4 for details of the cable cross-sections and mains fuses.

## 7 Putting into Operation

### 7.1 Points to be Observed before Putting into Operation

Every compressor unit is given a test run in the factory and carefully checked before shipment. The test run confirms that the compressor unit conforms to the specification data and runs perfectly. However, independent of the checks made at the factory, the compressor unit could be damaged during transport. For this reason, we recommend that the compressor unit is examined for such possible damage. Observe the compressor unit carefully during the first hours of operation for any possible malfunction.

**Attention!**

**Work on power driven systems may only be carried out by trained or specialised personnel.**

**Work on the electrical system and equipment of the compressor unit may only be carried out by a skilled electrician or by instructed personnel under the supervision and guidance of a skilled electrician and in accordance with electrical engineering rules and regulations.**

**Attention!**

**Important functional components in the compressor unit such as the nonreturn valve and safety valve are set up and fitted at the factory to precise setting up regulations. Changes are not permitted without previous consultation with KAESER.**



**The nonreturn valve and the safety valve are spring loaded.**

**Points to be observed before starting the compressor unit:**



**ANY NON – OBSERVANCE OF THESE OR OTHER REFERENCES (WARNING; ATTENTION) CAN LEAD TO ACCIDENTS CAUSING INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT.**

**The machine restarts automatically after a power failure provided the air main pressure is lower than the cut–out pressure level set on the air main pressure switch.**

- It is expected that the operator employs safe working methods and that all valid and, if applicable, all local operating and safety regulations are complied with when operating the machine.
- The user of this machine is responsible for its safe operating condition.
- Do not operate this machine in spaces where high dust pollution, poisonous or inflammable vapours or gases could exist.
- Do not connect the machine to a supply voltage other than that stated on the nameplate.
- Do not install the machine in a space subject to freezing temperatures, whereby the air temperature conditions at the compressor's air inlet must be complied with (see chapter 1.8).
- Check the level of the oil in the compressor block. If necessary, top up according to the oil recommendations (see chapter 1.9).

### 7.2 Direction of Rotation Check

- Check the direction of rotation by switching on the compressor for a short period. If the direction of rotation does not coincide with the arrow located on the fan guard, change over terminals L1 and L2.

### 7.3 Setting up the Overload Protection Trigger



Before any adjustments are carried out to the compressor package break the power supply by operating and locking out the main isolating device (main switch or mains plug) to prevent an accidental compressor start.

**Attention!**

Three-phase motors may only be run with a correctly adjusted overload protection trigger.

The motor overload protection trigger is set at the factory with the standard setting.

**Compressor drive motor: direct on-line start**

The compressor unit starts directly on line and is controlled by a pressure switch combination. The pressure switch switches the compressor unit on and off within preset pressure limits and the integral thermal overload protection trigger ensures that the compressor unit is shut down if the current flowing exceeds the preset value.

**Setting:** rated motor current (see motor nameplate).

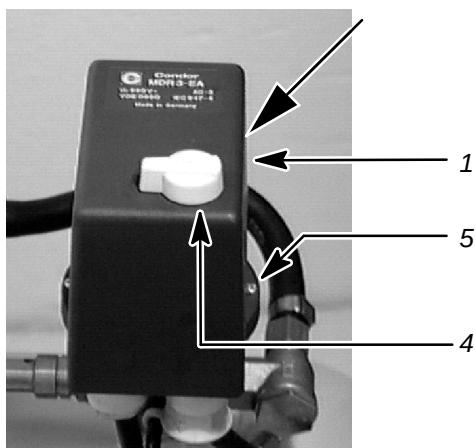
The setting can be up to 10% higher than the rated motor current to prevent voltage fluctuations triggering the overload protection trigger.

If the thermal overload protection has triggered and shut down the compressor unit the ON/OFF switch switches to the "OFF" position. Start the compressor unit again by setting the switch to the "AUTO" position.

**Attention!**

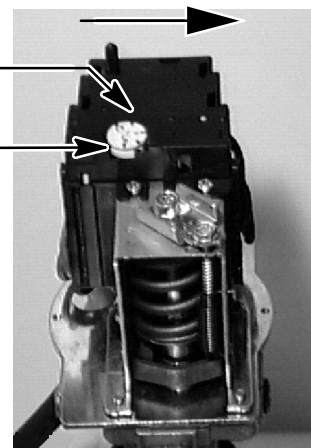
If the compressor unit does not immediately start, wait until the drive motor has cooled down.

If the motor overload protection triggers several times in sequence, other causes may be responsible for triggering the overload protection (e.g. low insulation of the motor windings or cables, seized motor.) If this occurs, have a specialist check the compressor and motor to find the cause of the problem.



- 1 Cover
- 2 Dial
- 3 Mark (▼)

- 4 ON/OFF switch
- 5 Screw



If necessary adjust the motor overload protection trigger setting as follows:

- ✚ Shut down the compressor.



Break the power supply by operating and locking out the main isolating device (main switch or mains plug) to prevent an accidental compressor start.

- ✎ Loosen the screws (5) to the right and left of the cover (1).
- ✎ Remove the cover (1) of the pressure switch.
- ✎ Turn the dial (2) with a screwdriver so that the mark (▼) coincides with the value of the rated motor current on the dial (2).



Replace the cover (1) after every adjustment of the pressure switch and before starting the compressor unit.

- ✎ Replace the cover (1).

## 7.4 Setting up the Pressure Switch



Break the power supply by operating and locking out the main isolating device (main switch or mains plug, see chapter 2.3) to prevent an accidental compressor start before any adjustments are carried out to the compressor unit.

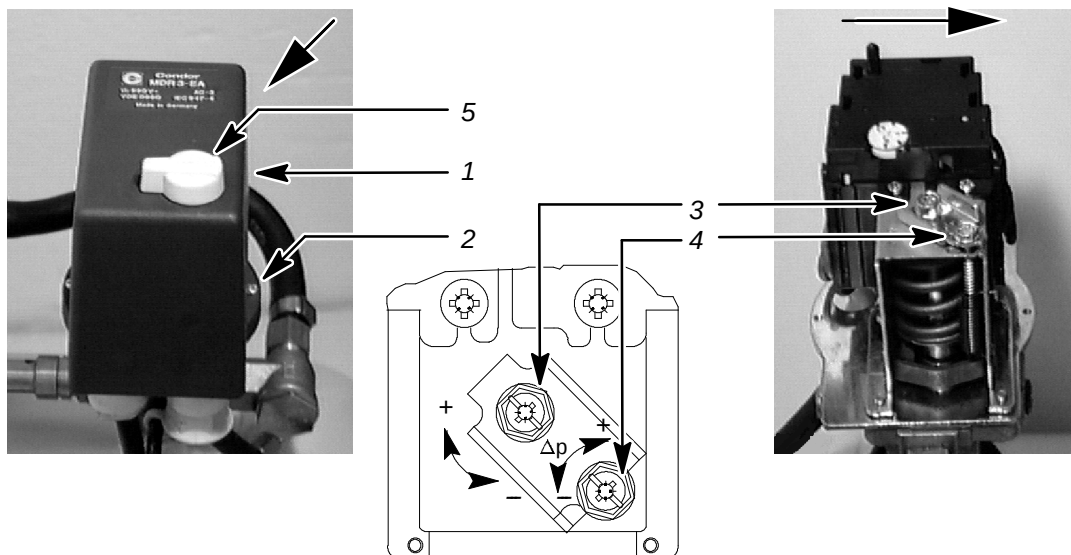
See chapter 1.6 for the factory setting of the pressure switch and the pressure diagram.

### Attention!

The pressure setting can only be changed with the pressure switch fitted and under pressure.

### Attention!

Do not set the maximum cut-out pressure higher than the maximum gauge working pressure (see chapter 1.1).



- 1 Cover
- 2 Screw
- 3 "Upper switching point" (Cut-out pressure) adjusting screw
- 4 Pressure difference adjusting screw
- 5 ON/OFF – Switch (OFF/AUTO)

- ✎ Shut down the compressor unit (see chapter 8.1).



Break the power supply by operating and locking out the main isolating device (main switch or mains plug) to prevent an accidental compressor start.

- ✎ Unscrew the screws (2) to the right and left of the cover (1).
- ✎ Remove the cover (1) of the pressure switch.
- ✎ Carry out the adjustment of the pressure switch.



**Replace the cover (1) after every adjustment of the pressure switch and before starting the compressor unit.**

- ✎ Replace the cover (1).

**To increase the cut-out pressure:**

- ✎ Turn the screw (3) clockwise in the "+" direction.

**To decrease the cut-out pressure:**

- ✎ Turn the screw (3) counterclockwise in the "-" direction.

**To increase the pressure difference between the cut-in and cut-out pressures:**

- ✎ Turn the screw (4) clockwise in the "+" direction.

**To decrease the pressure difference between the cut-in and cut-out pressures:**

- ✎ Turn the screw (4) counterclockwise "-" direction.

#### **7.4.1 Cut-in frequency of the compressor unit from "standstill" to "load"**

The cut-in frequency of the compressor unit from "standstill" to "load" can be changed within a limited range by changing the switching difference. To change the cut-in frequency the pressure switch must be adjusted (see chapter 7.4).

**Attention!**

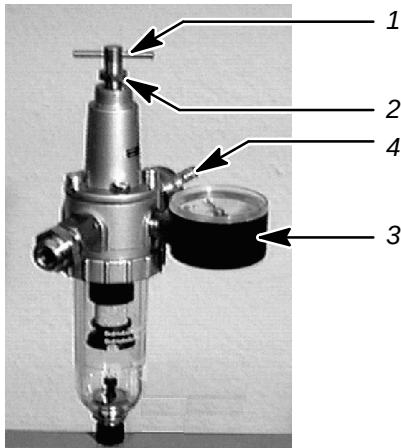
**See chapter 1.5 for the maximum cut-in frequency from "standstill" to "load" per hour.**

- Increasing the switching difference causes a decrease in the cut-in frequency.
- Decreasing the switching difference causes an increase in the cut-in frequency.

## 7.5 Setting up the Pressure Reducer

The working pressure of a compressor unit fluctuates according to the pressure limits set on the pressure switch (see chapter 1.6).

The pressure reducer reduces this fluctuating working pressure to the working pressure required and holds it constant.



- 1 *Regulating screw*
- 2 *Locking nut*
- 3 *Pressure gauge (working pressure)*
- 4 *Compressed air discharge*

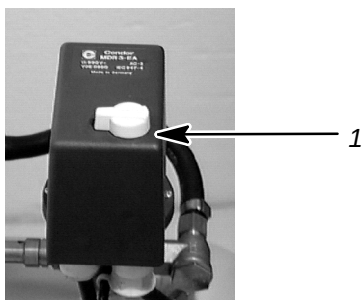
- ☞ Switch on the compressor unit and allow it to run without any consumers until the cut-out pressure is reached.
- ☞ Turn the regulating screw (1) anticlockwise until no more resistance is felt. This measure unloads the pressure reducer.
- ☞ Turn the regulating screw (1) clockwise until the required pressure is indicated on the pressure gauge (3).
- ☞ Lock the regulating screw (1) to this position with the locking nut (2).

## 8 Operation

### 8.1 Starting and Stopping the Compressor Unit

#### Starting the compressor unit

- ✎ Operate the main isolating device (main switch or plug, see chapter 2.3).



1 ON/OFF switch

“0” position = OFF  
“I” position = AUTO

- ✎ Switch on the compressor unit at the pressure switch (turn switch to position “I”).

#### Shutting down the compressor unit

- ✎ Switch off the compressor unit at the pressure switch (turn switch to position “0”).
- ✎ Operate and lock out the main isolating device to isolate the compressor from the mains power supply.

### 8.2 Faults and their Removal



**Always comply with all general and local safety regulations when carrying out faultfinding and repair.**

#### Restarting after a fault:

see chapter 7.”Initial Start–up”

#### Explanation of symbols in the following faultfinding help:

- \* 1 – have checked by a specialist.
- \* 2 – contact KAESER service support.

#### 8.2.1 Compressor does not start

##### Possible cause:

No motor power supply, fuses blown.  
Contact in pressure switch defective.  
Motor overload protection triggered.

##### Remedy:

Replace the fuses; \* 1.  
Renew the pressure switch; \* 1.  
Check the setting (see chapter 7.3); \* 1.

**8.2.2 Compressor starts with difficulty****Possible cause:**

Unloading valve at the pressure switch not opening.

Damaged bearings.

Pistons siezed  
(no oil or wrong oil).

Power supply fault (2 –phase running).

Oil level too high.

**Remedy:**

Renew the unloading valve (see chapter 9.11); \* 1.

Renew the bearings or fit an exchange compressor; \* 2.

\* 2.

Check the power supply (fuses); \* 1.

Reduce the oil level to the maximum mark on the oil level sight glass (see chapter 9.3).

**8.2.3 Compressor overheating****Possible cause:**

Ambient temperature too high  
(over 40 ° C).

Wrong direction of rotation  
(observe the direction arrow).

The fan cannot draw in air freely.

Valve plate leaking, coked or the valve reeds are broken.

**Remedy:**

Lower the ambient temperature (see chapter 1.8).

Change over L1 and L2 terminals (see chapter 7.2); \* 1.

Ensure that inlet air is available for the fan.

Check, decoke or renew valve plate; \* 1 and \* 2.

**8.2.4 The motor overload protection triggers after a short period****Possible cause:**

Power supply fault (2 –phase running).

Defective motor.

**Remedy:**

Check the power supply (fuses); \* 1.

Change the motor; \* 1 und \* 2.

**8.2.5 The motor overload protection triggers after a long period****Possible cause:**

Setting too low.

Current too high because of low supply voltage.

**Remedy:**

Check the setting (see chapter 7.3); \* 1.

Check the cross –section of power supply cable (see chapter 6.3); \* 1.

Check the power supply terminals; tighten the screws.

**8.2.6 Compressor runs continuously, discharge pressure not reached****Possible cause:**

Air filter clogged.

Valve plate leaking, coked or valve reeds broken.

Pressure losses within the unit.

Air demand higher than the capacity of the compressor.

Losses at the consumer / in the air main.

**Remedy:**

Clean or renew the air filter (see chapter 9.7); ✱ 1.

Check, decoke or renew valve plate; ✱ 1 and ✱ 2.

Brush soapy water on piping and fittings, seal leaks, renew leaking parts; ✱ 1.

Extend the compressed air supply.

Check for possible leakage points.

**8.2.7 Compressor cutting in too often****Possible cause:**

Air receiver filled with condensate up to the discharge cock.

**Remedy:**

Drain the condensate (observe environmental care regulations), carry out routine maintenance regularly (see chapter 9.4); ✱ 1.

**8.2.8 Compressor shuts down, air escapes constantly at the unloading valve****Possible cause:**

Defective nonreturn valve.

**Remedy:**

Renew the seal or renew the valve cone (see chapter 9.8); ✱ 1.

**8.2.9 Air escapes from the unloading valve when the compressor is running****Possible cause:**

Unloading valve not closing (dirty or defective).

**Remedy:**

Renew the unloading valve (see chapter 9.11); ✱ 1.

**8.2.10 Unloading valve not unloading after shut-down****Possible cause:**

Dirty unloading valve.

**Remedy:**

Renew the unloading valve (see chapter 9.11); ✱ 1.

**8.2.11 Air escapes from the pressure switch****Possible cause:**

Defective diaphragm.

Unloading valve does not close.

**Remedy:**

Renew the pressure switch; ✱ 1.

Renew the unloading valve; ✱ 1.

**8.2.12 Whistling noises at the cylinder head****Possible cause:**

Loose cylinder head bolts or defective gaskets.

**Remedy:**

Tighten the bolts or renew the gaskets; ✱ 1 and ✱ 2.

**8.2.13 Safety valve blowing off prematurely****Possible cause:**

Safety valve blows, even though the cut-out pressure is not yet reached.

Defective valve spring.

Safety valve was opened, dirt particles stuck in valve seat.

**Remedy:**

Check that the pressure gauge functions correctly, replace if necessary.  
Check the pressure setting.

Renew the safety valve; ✱ 1.

Open the safety valve completely for a short period to allow it to blow itself clean.

**8.2.14 Oil consumption of compressor too high****Possible cause:**

Viscosity of oil too low.

Defective crankcase venting plug.

Piston rings worn or damaged.

Piston rings worn or damaged after only a short period.

**Remedy:**

Fill with correct oil  
(see chapter 1.9); ✱ 1.

Clean or renew the crankcase venting plug;  
✱ 1.

Renew piston rings and cylinder; ✱ 2.

Renew piston rings and cylinder; ✱ 2.  
(ensure that the inlet air is clean, e.g. by using an air filter with a higher grade of filtration).

## **9 Maintenance**

### **9.1 Observe the following during all maintenance and servicing.**



Disregarding these notes and/or improper handling may result in serious injury.

Work on power-driven equipment may only be carried out or supervised by persons trained in that particular equipment or by a specialist.

Work on electrical equipment in the machine may only be carried out according to electrical engineering regulations by a qualified electrician, or trained personnel under the supervision of a qualified electrician.

Before starting any maintenance work switch off at the main switch and lock off to secure against unwanted or accidental switching on.

Make sure the machine is shut-off or isolated from the air main during maintenance work to ensure that no compressed air flows back from the main.

Before switching on again ensure that all maintenance personnel are clear of the machine, that all panels are replaced and all access doors closed.



The following points must be observed when handling lubricating and cooling materials:

Avoid contact with skin and eyes.  
Do not inhale vapours and oil mist.  
Do not eat or drink when handling such materials.  
Fire, open flame and smoking are strictly forbidden.



Ensure that all lubricants, consumable materials and replacement parts accumulating during operation and servicing of the compressor package are disposed of according to environmental regulations.

## 9.2 Regular Maintenance Work

| Interval                               | Maintenance tasks                                        | see chapter |
|----------------------------------------|----------------------------------------------------------|-------------|
| Daily                                  | Check the crankcase oil level.                           | 9.3         |
|                                        | Drain condensate from the air receiver.                  | 9.4         |
|                                        | Drain condensate from the pressure regulator             | 9.5         |
| 50 h after initial start – up          | Check all electrical terminals and tighten if necessary. | 7.1         |
|                                        | Change the compressor oil                                | 9.6         |
| Every 500 h<br>At least once a year    | Check and clean the air filter *                         | 9.7         |
|                                        | Check and clean the check valve *                        | 9.8         |
|                                        | Check the pressure relief valve                          | 9.9         |
| Every 1000 h<br>at least every 2 years | Change the compressor oil *                              | 9.6         |
| Every 3,000 h                          | Check correct function of the cylinder head and valves   | 9.12        |
| Every 10,000 h                         | Change the motor bearings                                | 9.10        |
|                                        | Carry out a general compressor overhaul                  | 9.12        |

\* Maintenance interval may change depending on model, installation, motor starting frequency and ambient conditions.

It is recommended that a log is kept of maintenance work done.

See chapter 9.14 for a sample list of maintenance tasks.

### 9.3 Checking the Oil Level and Topping Up (Compressor Block)

Check the oil level at the oil level sight glass daily and before each start.

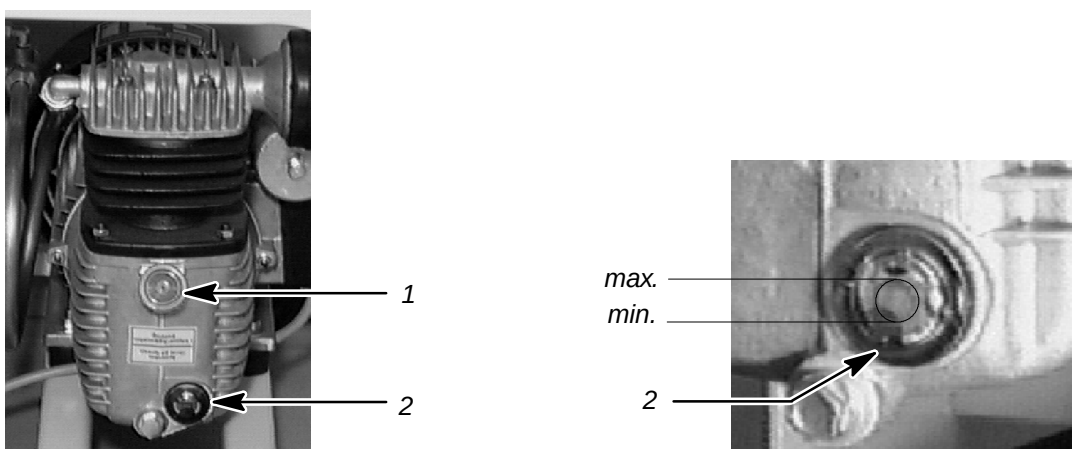
**Attention!**

If the oil level has sunk to the lower mark, top up the oil immediately according to the oil recommendations (see chapter 1.9).

Never top up to a level exceeding the maximum oil mark on the oil level sight glass.

**Attention!**

When topping up the oil always use a strainer or pour the oil directly from the new oil can.



- 1 Oil filler with crankcase venting plug
- 2 Oil level sight glass

✚ Shut down the compressor (see chapter 8.1).



**Break the power supply by operating and locking out the main isolating device (main switch or mains plug) to prevent an accidental compressor start.**

✚ Remove the crankcase venting plug (1) from the oil filler.

**Attention!**

**As the oil must flow through the crankcase first, the maximum oil level is reached after a few minutes have elapsed.**

- ✚ Fill with oil until the maximum oil level mark is reached. See chapter 1.3 for the quantity of oil required for topping up from the minimum mark to the maximum mark.
- ✚ Replace the crankcase venting plug in the oil filler.

## 9.4 Air Receiver

**Attention!**

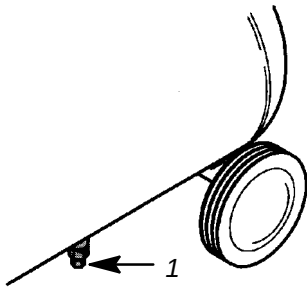
The provisions of the Pressure Vessels Act must be conformed with.

The relevant regulations of the country concerned must also be observed.

Drain the condensate collecting in the air receiver daily with the condensate drain valve (1).



**Drain the condensate into a suitable container and dispose of according to environmental care regulations!**



1 Condensate drain cock

## 9.5 Cleaning the Pressure Reducer and Filter

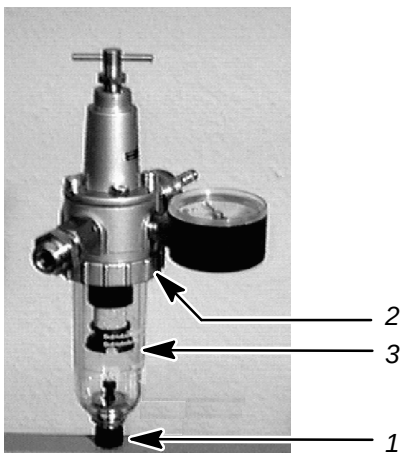
### 9.5.1 Condensate drainage

Drain the condensate regularly, at least daily.



**Drain the condensate into a disposal canister and dispose of according to environmental care regulations.**

- ✎ Loosen the knurled screw (1) using an Allen key and drain off the condensate into a disposal canister.
- ✎ Tighten the knurled screw (1) again using an Allen key.



- 1 Knurled nut with Allen key socket
- 2 Clamping ring
- 3 Label for cleaning agent instructions

### 9.5.2 Cleaning the filter

- ✎ Shut down the compressor unit (see chapter 8.1).



**Break the power supply by operating and locking out the main isolating device (main switch or mains plug) to prevent an accidental compressor start.**

- ✎ Drain the condensate (see chapter 9.5.1).
- ✎ Remove the filter bowl by unscrewing the clamping ring (2).
- ✎ Take out and clean the O-ring.

**Attention!**

**Observe the instructions concerning the cleaning agent stated on the label (3) attached to the filter bowl.**

- ✎ Clean the filter bowl.

**Attention!**

**Take care that the O-ring is correctly seated during reassembly.**

- ✎ Screw the filter bowl back on again.

## 9.6 Oil Change (Compressor Block)

Change the oil with the compressor unit at normal operating temperature.

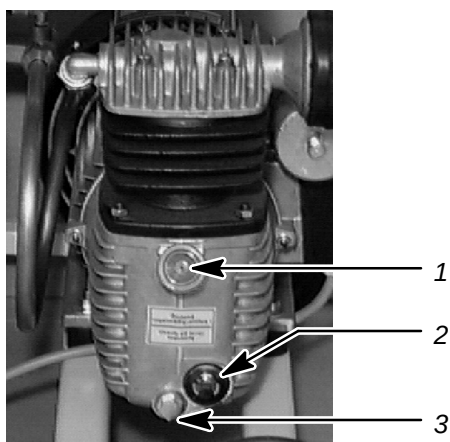


**Danger of scalding by hot oil**  
**Danger of burns from hot components**

Change the oil after approximately the first 50 service hours.

Change the oil further: see chapter 9.2.

If, under unsuitable operational conditions condensed water is observed in the oil, recognisable by the milky colour in the oil level sight gauge (2), carry out an oil change immediately.



- 1 Oil filler
- 2 Oil level sight glass
- 3 Oil drain plug

✚ Shut down the compressor (see chapter 8.1).



**Break the power supply by operating and locking out the main isolating device (main switch or mains plug) to prevent an accidental compressor start.**

✚ Remove the crankcase venting plug (1) from the oil filler.

✚ Prepare a container to catch the oil.



**Collect the used oil and dispose of according to environmental care regulations!**

✚ Unscrew the oil drain plug (3) and drain the oil into the container.

✚ Flush out the crankcase with a small quantity of new oil.

✚ Screw the oil drain plug back into the crankcase.

**Attention!**

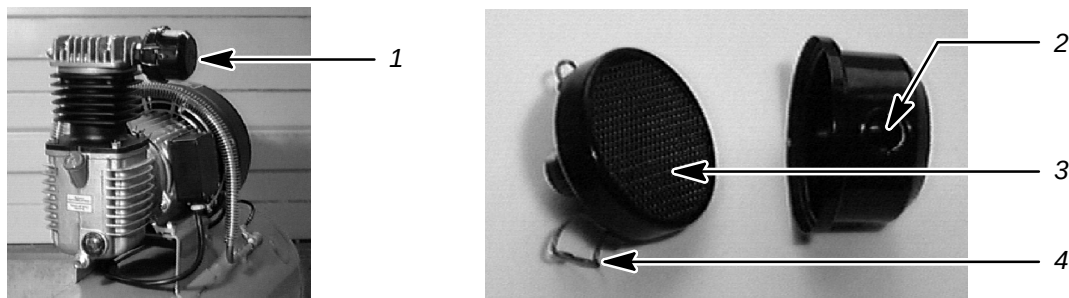
**When topping up the oil always use a strainer or pour the oil directly from the new oil can.**

✚ Fill up with new oil (see chapter 9.3).

### 9.7 Clean or Renew the Air Filter

The filter cartridge (3) of the air filter (1) consists of oil wetted knitted coconut fibre.

Clean the filter cartridge (3) at the latest after 500 service hours. If the cartridge is heavily contaminated or has been cleaned often, renew the air filter complete.



- 1 Air filter
- 2 Air inlet
- 3 Filter cartridge
- 4 Spring clips

✚ Shut down the compressor (see chapter 8.1).



**Break the power supply by operating and locking out the main isolating device (main switch or mains plug) to prevent an accidental compressor start.**

✚ Unscrew the air filter (1) from the cylinder head.

✚ Unhook the spring clips (4) and open the filter cap.

**Attention!**

**Clean the filter with diesel fuel in the open air. Observe the regulations concerning the handling of combustible fluids.**

✚ Clean the filter cap, especially the sealing surfaces.

✚ Wash out the filter cartridge (3) with diesel fuel or clean with a steam jet.

✚ When the filter cartridge (3) is dry wet lightly with oil.

**Attention!**

**When screwing on the air filter take care that the air inlet in the filter cap (2) is facing downwards.**

✚ Screw on the air filter (1), fit the cap.

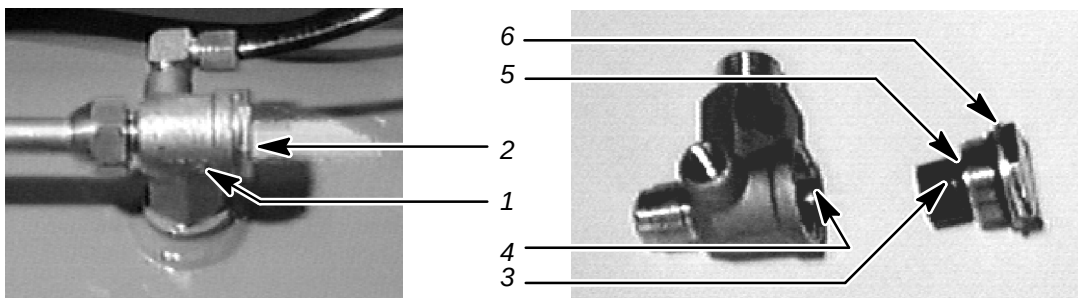
**Attention!**

**If the cartridge is heavily contaminated or has been cleaned often, renew the air filter complete.**

### 9.8 Clean or Renew the Nonreturn Valve

The nonreturn valve is fitted to the inlet port of the compressed air line on the air receiver. It prevents the compressed air flowing back from the air receiver into the compressor block.

Check and, if necessary, clean the nonreturn valve every 500 service hours.



- 1 Nonreturn valve
- 2 End plug
- 3 Valve cone

- 4 Valve seat
- 5 Spring
- 6 Sealing ring

✚ Shut down the compressor (see chapter 8.1).



**Break the power supply by operating and locking out the main isolating device (main switch or mains plug) to prevent an accidental compressor start.**

✚ Isolate the compressor unit from the air main (close the user's shut-off valve).

✚ Vent the air receiver with the condensate drain cock (see chapter 9.4).



**Do not open the end plug in the valve housing until the pressure gauge indicates zero.**

✚ Unscrew the end plug (2) in the valve housing.

✚ Clean the valve cone (3) and valve seat (4).

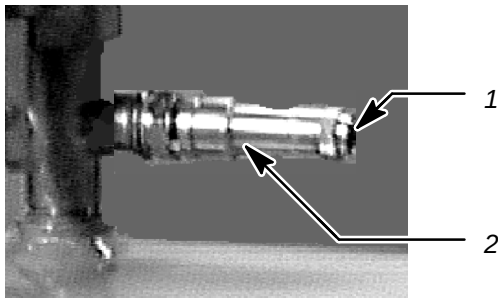
✚ Renew the valve cone (3), the spring (5) and the sealing ring (6) if they are heavily worn or damaged.

✚ Reassemble in the reverse order.

### 9.9 Checking the Safety Valve

If the maximum permissible gauge working pressure in the air receiver is exceeded, the safety valve (2) opens and blows off the excess air to protect the compressor unit and the consumers connected to the air mains.

To prevent the valve seat from sticking, open the safety valve every 500 service hours or at least annually.



- 1 Knurled ring
- 2 Safety valve

**Attention!**

**It is essential to wear ear protection when testing the pressure relief valve because of the loud noise produced by escaping air.**

✚ Switch the compressor off (see chapter 8.1).



**Isolate from the power supply by means of the main switch or by withdrawing the mains plug and lock out the switch to prevent an inadvertent start.**

✚ Turn the knurled screw on the pressure relief valve anticlockwise until air escapes and then turn back again.

**Attention!**

**A defective pressure relief valve must be renewed completely.**

**Attention!**

**Tampering with the pressure relief valve and damaging the lead seal is forbidden and will invalidate all liability.**

### 9.10 Maintenance of the Motor Bearings

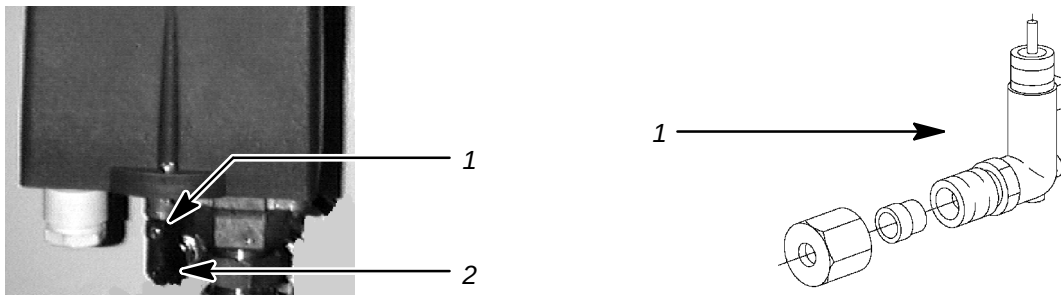
- The motor bearings are permanently greased.
- Under normal operating conditions, with ambient temperatures around 25 °C, the motor bearings should be renewed approximately every 10 000 service hours.
- The wear on the bearings increases with higher ambient temperatures. With very high ambient temperatures of around 35 °C renew the bearings approximately every 6000 hours.
- Change the motor bearings every 3 years independent of service hours.

**Attention!**

**The bearings must be changed by KAESER–Service when the above maintenance is due.**

### 9.11 Renewing the Unloading Valve of the Pressure Switch

If a dirty unloading valve causes the compressor unit to start with difficulty, it must be renewed.



- 1 Unloading valve  
2 Hex socket head bolt

✚ Shut down the compressor unit (see chapter 8.1).



**Break the power supply by operating and locking out the main isolating device (main switch or mains plug) to prevent an accidental compressor start.**

- ✚ Isolate the compressor unit from the air main (close the user's shut-off valve).
- ✚ Vent the air receiver with the condensate drain valve (see chapter 9.4).
- ✚ Unscrew the hoses from the pressure switch.
- ✚ Unscrew the hex socket head bolt (2) and take out the unloading valve (1).
- ✚ Fit a new unloading valve.
- ✚ Start the compressor unit (see chapter 8.1).
- ✚ Check for leaks, e.g. brush on soapy water.

### 9.12 Check or Renew the Cylinder Head and Valves (Compressor Block)

Check the cylinder head and the valves for correct function after 3000 service hours.

**Attention!**

**If faults are obvious on the cylinder head or the valves, these parts must be repaired or renewed by KAESER Service.**

Have the compressor generally overhauled by KAESER Service after 10000 service hours.

### 9.13 Checking Compressor Unit Performance

The effective compressor unit performance can be determined by measuring the charging time of the air receiver.

✚ Shut down the compressor unit (see chapter 8.1).



**Break the power supply by operating and locking out the main isolating device (main switch or mains plug) to prevent an accidental compressor start.**

- ✚ Isolate the compressor from the air main (close the user's shut-off valve).
- ✚ Vent the air receiver with the condensate drain cock and then close the cock again (see chapter 9.4).
- ✚ Close the shut-off valve on the air receiver.
- ✚ Start the compressor unit (see chapter 8.1) and simultaneously measure and compare the charging time taken to achieve the gauge pressure stated in the technical specification (see chapter 1.10).

**Model:** .....

**Serial number:** .....

[illegible]

## 10 Spare Parts and After Sales Service

### 10.1 Service Parts and Expendable Parts

| Name            | No. off | Part number |
|-----------------|---------|-------------|
| Air filter      | 1 off   | 6.0173.1    |
| Nonreturn valve | 1 off   | 8.0263.3    |

|                                                                                   |                                                                                                                                  |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
|  | <b>KAESER KOMPRESSOREN GmbH</b><br>Carl-Kaeser-Str. 26, 96450 Coburg<br>GERMANY Telefon + 49 95 61 64 00<br>Fax + 49 95 61 01 30 |
|                                                                                   | Model .....                                                                                                                      |
|                                                                                   | Part No. ....                                                                                                                    |
|                                                                                   | Serial No. ....                                                                                                                  |
|                                                                                   | Year of production .....                                                                                                         |
|                                                                                   | Max. working press. (g) ..... bar                                                                                                |
|                                                                                   | Free air delivered ..... l/min ... ( .. bar)                                                                                     |
|                                                                                   | Rated voltage .....                                                                                                              |
|                                                                                   | Rated motor speed ..... rpm                                                                                                      |
|                                                                                   | Rated power ..... kW                                                                                                             |
| Ambient temperature ..... °C / ..... °C                                           |                                                                                                                                  |

### 10.2 Ordering Spare Parts

When ordering spare parts always state (see nameplate):

- Compressor model
- Year of manufacture
- Part number
- Serial number

**Important for all queries:**

✍ Enter the data from the nameplate of the compressor unit in the nameplate illustrated above.

**Always** quote the data on the nameplate when ordering spare parts or making enquiries.

**Attention!**

**Do not fit inferior consumable or spare parts. Use only original parts supplied by the compressor manufacturer.**

We must point out that maintenance parts, spare parts and accessories not delivered by KAESER are also not tested and cleared by us. The fitting and/or use of such products can, under certain circumstances, change the design characteristics of the compressor unit negatively and therefore affect the active and/or passive safety of the unit. The use of such parts or accessories exempts KAESER from all liabilities and warranties for consequential damage caused by such parts or accessories.

## **11     Appendix**

### **11.1    Electrical Diagram**

(see following page)

