Service Manual

Reciprocating compressor

Premium car W

No.: 9_5796 04E

Manufacturer:

KAESER KOMPRESSOREN GmbH

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1 Regarding this document

1.1 Using the Document

The service manual is part of the machine. It describes the machine as it was at the time of first delivery after manufacture.

- ➢ Keep the service manual in a safe place throughout the life of the machine.
- ➢ Pass the manual on to the next owner/user of the machine.
- ➢ Ensure that all amendments received are entered in the manual.
- ➢ Enter details from the machine nameplate and individual items of equipment in the table in chapter 2.

1.2 Further Documents

Included with this service manual are additional documents intended to assist in the safe operation of the machine:

- Certificate of acceptance / operating instructions for the pressure vessel.
- Manufacturer's declaration / declaration of conformity in accordance with applicable directives.

Missing documents can be requested from KAESER.

- ➢ Make sure all documents are complete and observe the instructions contained in them.
- ➢ Make sure you give the data from the nameplate when ordering documents.

1.3 Copyright

1.4 Symbols and Identification

1.4.1 Warnings

Warning notices indicate three levels of danger signified by the signal word.

- DANGER
- WARNING
- CAUTION

DANGER
These show the kind of danger and its source!
The possible consequences of ignoring a warning are shown here.
The word "Danger" indicates that death or severe injury can result from ignoring the instruction.

- ➢ The measures required to protect yourself from danger are shown here.

➢ Always read and comply with warning instructions.

Signal word	Meaning	Consequences of non-observance
DANGER	Warns of an imminent threat of danger	Death or serious injury may result
WARNING	Warns of possible danger	Death or serious injury are possible
CAUTION	Warns of a possibly dangerous situation	Light injuries or material damage are possible

Tab. 1 The levels of danger and their meaning

1.4.2 Other instructions and symbols

This symbol refers to particularly important information.

Material Here you will find details on special tools, operating materials or spare parts.

Precondition Here you will find conditional requirements necessary to carry out the task.
Here conditions relevant to safety are named that will help you to avoid dangerous situations.

➢ This symbol is is placed by lists of actions comprising one stage of a task.
In lists of actions with several stages the sequence of actions is numbered.

Information referring to potential problems are identified by a question mark.
The cause is named in the help text
➢ ... and a remedy given.

This symbol refers to important information or measures concerning environmental protection.

2 Technical Specification

2.1 Nameplate

The machine's nameplate provides the model designation and important technical information.

➢ Enter here the nameplate data as a reference:

Features	Value
Reciprocating Compressor	
Material number	
Serial number	
Year of manufacture	
Maximum working pressure	
inlet volume	
Rated voltage	
Synchronous speed	
Rated power	(*) **
Ambient temperature	
* Power requirement at the compressor drive shaft (EN 1012–1)	
** Motor shaft output power (EN 60034-1 VDE 0530)	

Tab. 2 Nameplate

2.2 Options

The table contains a list of possible options.

➢ Enter options here as a reference

Option	Option code	Exists?
Silenced air filter	H9	
Air filter with plastic casing	H10	

Tab. 3 Options

2.3 Weight

The weight indicated is the maximum weight. The actual weight depends on equipment fitted.

Model	Weight [kg]
Premium car 200/30	41
Premium car 250/30	43
Premium car 300/30	45
Premium car 350/30	75

Model	Weight [kg]
Premium car 450/30	86

Tab. 4 Weight

2.4 Compressor block

Model	Theoretical displacement [l/min]	Delivery at 6 bar [l/min]	Number of cylinders
KCC 200	200	115	1
KCC 250	250	150	1
KCC 300	300	175	1
KC 350	350	230	1
KC 400	450	300	2

Tab. 5 Compressor block

2.5 Ambient Conditions

Installation	
Maximum altitude AMSL* [m]	1000
Permissible ambient temperature [°C]	5–35
* Higher altitudes are permissible only after consultation with the manufacturer.	

Tab. 6 Ambient Conditions

2.6 Pressure switch setting

Specified pressures are factory set.
Customer-specific settings may differ.

Characteristic	Value
Cut-in pressure [bar]	7
Cut-out pressure [bar]	9
Pressure differential Δp [bar]	2
Minimum setting range [bar]*	3/4
*Minimum adjustment range: Cut-in pressure/cut-out pressure	

Tab. 7 Pressure switch setting

2.7 Pressure

Characteristic	Value
Maximum working overpressure [bar]	10
Pressure relief valve activating pressure [bar]	11

Tab. 8 Pressure specifications

2.8 Sound emission

Sound power level

- in accordance with 2000/14/EG and ISO 3744

Emission sound pressure level

- calculated from the measured average sound power level (directive 2000/14/EG, Sound Measuring Standard ISO 3744) according to EN ISO 11203:1995 6.2.3d at distance d = 1 m, Q2 = measurement surface dB.

EC type approval:

- certificate no.: OR/2551/SZ03

Model	Sound pressure level [dB(A)]		Emission sound pressure level [dB(A)]	Measurement surface [dB]
	Measured	Guaranteed		
Premium car 200/30	90	97	76	13.5
Premium car 250/30	88	97	75	13.5
Premium car 300/30	91	97	77	13.5
Premium car 350/30	86	97	73	13.9
Premium car 450/30	86	97	73	13.9

Tab. 9 Sound pressure level

2.9 Motor power and speed

➢ Read off the enclosure protection rating from the motor nameplate and enter in the table:

Compressor block	Rated power [kW]	Synchronous speed [min^{-1}] (50 Hz)	Degree of protection
KCC 200	1.1	3000	
KCC 250	1.25	3000	
KCC 300	1.5	3000	
KC 350	2.2	1500	

Compressor block	Rated power [kW]	Synchronous speed [min^{-1}] (50 Hz)	Degree of protection
KC 400	2.2	1500	

Tab. 10 Power and speeds

Permissible starting frequency

➢ Read-off the permissible starting frequency of the motor from the table below.

Rated power [kW]	Permissible starting frequency [1/h]
1.1	20
1.25	20
1.5	20
2.2	20

Tab. 11 Permissible starting frequency

2.10 Compressor oil recommendations

The standard compressor oil is SAE 5 W30.

For special applications FGP oil is used and the machine carries a sticker indicating this.

Information on ordering compressor oil is found in chapter 11.

➢ Mark the oil that your compressor contains in the table below.

	Standard oil	Special oil
Oil type	SAE 5 W30	FGP
Field of application	Standard oil for all applications except in connection with foodstuffs.	Specifically for machines in applications where the compressed air may come into contact with foodstuff.
Maximum permissible oil change interval in operating hours/years.	1000/2*	1000/2*
Oil contained in my compressor		

* Cool to moderate ambient temperatures, low humidity, low to average duty cycle.

Tab. 12 Compressor oil recommendations

2.10.1 Compressor oil charge

Model	Total charge [litres]	Topping up volume [litres] (minimum–maximum)
KCC 200	0.13	0.05
KCC 250	0.13	0.05
KCC 300	0.13	0.05

Model	Total charge [litres]	Topping up volume [litres] (minimum–maximum)
KC 350	0.2	0.1
KC 400	1.0	0.2

Tab. 13 Compressor oil charge

2.11 Power Supply

Basic requirements

The machine is designed for a power supply conforming to EN 60204–1 (IEC 60204–1), section 4.3. In the absence of other user-specified conditions, the limits laid down in this standard must be adhered to.
It is recommended that the supplier and user confer and agree on the basis of the EN 60204–1, Annex B.

2.11.1 Single phase

The machine requires a symmetrical single-phase power supply.
The machine may only be operated from an earthed single-phase supply network.

Further information When connecting to a European 230 V/1/50 Hz power supply the requirements in chapter 2.12 are also to be observed.

2.11.1.1 Power supply specifications

If the machine is delivered with a Schuko plug to CEE 7/4 or CEE 7/7, the power socket may be fused at 16 A (slow blow).

➢ Consult KAESER for advice on this subject.

Other conditions would include, for example:

- higher temperature >30 °C
- cable lengths >20 m

Rated power supply: 230V±5%/1/50Hz

Model	Mains fusing [A]	Supply cable [mm²]	Current drawn [A]
Premium car 200/30	16	3 x 1.5	6.2
Premium car 250/30	16	3 x 1.5	7.4
Premium car 300/30	16	3 x 1.5	10
Premium car 350/30	16	3 x 1.5	15
Premium car 450/30	16	3 x 1.5	15

Tab. 14 Supply details 230V/1/50Hz

2.12 Network Conditions

The machines listed in the table below are intended for use in changing locations.

No interference with other devices is to be expected with network impedance less than Z_{max} [Ohm].

In general, the maximum permissible network impedance will not be exceeded if the machine is supplied at the transfer point with a rated current of $I_{äqiv}$.

2.12.1 Supply conditions at 230V/1/50Hz

Model	Starts [h]	Z_{max} [Ω]	$I_{äqiv}$ [A]
Premium car 200	6	0.303	25
	12	0.219	35
	18	0.181	50
Premium car 250	6	0.255	35
	12	0.184	50
	18	0.152	50
Premium car 300	6	0.140	63
	12	0.101	80
	18	0.083	100
Premium car 350	6	0.113	80
	12	0.082	100
	18	0.067	125
Premium car 450	6	0.113	80
	12	0.082	100
	18	0.067	125

Tab. 15 Network impedance

2.13 Machine duty cycle

Calculating the cycling period:

$$\text{Cycling time} = \text{time under load} + \text{time at standstill}$$

Calculating the duty cycle:

$$\text{Duty cycle [\%]} = \frac{\text{time under load}}{\text{time under load + standstill time}} \times 100$$

Example

$$\frac{12 \text{ minutes}}{20 \text{ minutes}} \times 100\ \% = 60\ \%$$

The following values are valid for:

- 20 °C ambient temperature
- 30 % relative humidity
- 1013 mbar air pressure

	Permissible duty cycle[2] [%]	Cycling period[1] [min]
Premium car 200/30	≤ 70	2–20
Premium car 250/30	≤ 70	2–20
Premium car 300/30	≤ 70	2–20
Premium car 350/30	≤ 70	3–30
Premium car 450/30	≤ 70	3–30

Tab. 16 Machine duty cycle

3 Safety and Responsibility

3.1 Basic Information

The machine is manufactured to the latest engineering standards and acknowledged safety regulations. Nevertheless, dangers can arise through its operation:

- danger to life and limb of the operator or third parties,
- impairments to the machine and other material assets.

DANGER
Disregard of these instructions can result in serious injury.
➢ Read the service manual carefully and take notice of the contents for safe machine operation.

➢ Use this machine only if it is in a technically perfect condition and only for the purpose for which it is intended; observe all safety measures and the instructions in the service manual.
➢ Immediately rectify (have rectified) any faults that could be detrimental to safety.

3.2 Specified Use

The machine is intended solely for generating compressed air for industrial use. Any other use is considered incorrect. The manufacturer is not liable for any damages that may result therefrom. The user alone is liable for any risks incurred.

➢ Keep to the specifications listed in this service manual.
➢ Operate the machine only within its performance limits and under the permitted ambient conditions.
➢ Do not use compressed air for breathing purposes unless it is specifically treated.
➢ Do not use compressed for any application that will bring it into direct contact with foodstuffs unless it is specifically treated.

3.3 Improper Use

➢ Never direct compressed air at persons or animals.
➢ Use hot cooling air for heating purposes only if there is no risk to the health of humans or animals. If necessary, hot cooling air should be treated by suitable means.
➢ Do not allow the machine to breath in toxic, acidic, flammable of explosive gases or vapours.
➢ Do not operate the machine in areas in which specific requirements with regard to explosion protection are in force.

3.4 User's Responsibilities

3.4.1 Observe statutory and universally accepted regulations.

This is, for example, nationally applied European directives and/or valid national legislation, safety and accident prevention regulations.

➢ Observe relevant statutory and accepted regulations during installation, operation and maintenance of the machine.

3.4.2 Qualified personnel

These are people who, by virtue of their training, knowledge and experience as well as their knowledge of relevant regulations can assess the work to be done and recognise the possible dangers involved.

Authorised operators possess the following qualifications:

- are of legal age,
- are conversant with and adhere to the safety instructions and sections of the service manual relevant to operation,
- have received adequate training and authorisation to operate electrical and compressed air devices.

Authorised installation and maintenance personnel have the following qualifications:

- are of legal age,
- have read, are conversant with and adhere to the safety instructions and sections of the service manual applicable to installation and maintenance,
- are fully conversant with the safety concepts and regulations of electrical and compressed air engineering,
- are able to recognise the possible dangers of electrical and compressed air devices and take appropriate measures to safeguard persons and property,
- have received adequate training and authorisation for the safe installation and maintenance on this equipment.

➢ Ensure that operating, installation and maintenance personnel are qualified and authorised to carry out their tasks.

3.4.3 Adherence to inspection schedules and accident prevention regulations

The machine is subject to local inspection schedules.

Examples of German operation

➢ Recurring inspections according to BGR 500, chapter 2.11.
The user must ensure that, for machines with motor power above 0.5 kW, safety devices are checked for function as required or at least annually.

➢ Keep to inspection intervals in accordance with the Ordinance on Industrial Safety and Health with maximum intervals as laid down in §15.

The inspection intervals are laid down in the technical specification for the air receiver. Inspection intervals are dependent on the pressure/volume product of the air receiver, i.e. max permissible pressure (PS) in bar, times the receiver volume (V) in litres.

Example: volume V = 90 litres, max. permissible pressure PS = 11 bar; pressure/volume product = 990.

Inspection	Inspection interval	Inspecting authority
Installation and equipment inspection	Before commissioning if pressure PS x volume V ≤ 200	Competent person (e. g. KAESER Service Technician)
	Compressors with type approval inspection (Ordinance on Industrial Safety and Health, annex 5 no. 25) PS x V ≤ 1000	Competent person (e. g. KAESER Service Technician)
	Before commissioning if PS x V > 200	Approved supervisory body
Internal inspection	Every 5 years after installation or the last inspection if PS x V ≤ 1000	Competent person (e. g. KAESER Service Technician)
	Every 5 years after installation or the last inspection if PS x V > 1000	Approved supervisory body
Strength test	Every 10 years after installation or the last inspection if PS x V ≤ 1000	Competent person (e. g. KAESER Service Technician)
	Every 10 years after installation or the last inspection if PS x V > 1000	Approved supervisory body

* The inspection interval is determined by the user in consultation with the approved supervisory body. The responsible body is to be notified not later than 6 months after the inspection carried out before commissioning (if pressure x volume V > 1000). Intervals given are the maximum in each case.

Tab. 17 Inspection intervals according to Ordinance on Industrial Safety and Health

3.5 Dangers

Basic Information

Information concerning the various forms of danger that can arise during machine operation are found here.

Basic safety instructions are found in this service manual at the beginning of each chapter in the section entitled 'Safety'.

Warning instructions are found before a potentially dangerous task.

3.5.1 Safely dealing with sources of danger

Information concerning the various forms of danger that can arise during machine operation are found here.

Electricity

- ➢ Allow only qualified and authorised electricians or trained personnel under the supervision of a qualified and authorised electrician to carry out work on electrical equipment according to electrical engineering regulations .
- ➢ Before every start-up, the user must make sure there is adequate protection against electric shock from direct or indirect contact.
- ➢ Before starting any work on electrical equipment:
  Switch off and lock out the power supply disconnecting device and check that no voltage is present.
- ➢ Switch off any external power sources.
  These could be connections to floating relay contacts or electrical machine heating, for example.
- ➢ Use fuses corresponding to machine power.
- ➢ Check regularly that all electrical connections are tight and in order.

Forces of compression

Compressed air is contained energy. Uncontrolled release of this energy can cause serious injury or death. The following information concerns work on components that could be under pressure.

- ➢ Close shut-off valves or otherwise isolate the machine from the air main to ensure that no compressed air can flow back into the machine.
- ➢ Vent all pressurized components and chambers completely.
- ➢ Do not carry out welding, heat treatment or mechanical modifications to pressurized components (e.g. pipes and vessels) as this influences the component's resistance to pressure.
  The safety of the machine is then no longer ensured.

Compressed air quality

- ➢ Never directly inhale compressed air.
- ➢ Use appropriate systems for air treatment before using the compressed air from this machine as breathing air and/or for the processing of foodstuffs.
- ➢ Use compressor oil compatible with foodstuffs if compressed air can come into contact with them.

Spring force

Springs under tension or compression represent contained energy. Uncontrolled release of this energy can cause serious injury or death.

The non-return valve is spring loaded.

- ➢ Do not open or dismantle the valve.

Rotating components

Touching the fan while the machine is running can result in serious injury.

- ➢ Do not open the enclosure while the machine is switched on.
- ➢ Switch off and lock out the power supply disconnecting device and check that no voltage is present.

- ➢ Wear close-fitting clothes and a hair net if necessary.
- ➢ Make sure all covers and safety guards are in place and secured before starting.

Heat

- ➢ Avoid contact with hot components.
  These include, for example, compressor blocks, compressed air pipes, coolers, motors and machine heaters.
- ➢ Wear protective clothing.
- ➢ If welding is carried out on or near the machine, take adequate measures to prevent sparks or heat from igniting oil vapours or parts of the machine.

Noise

- ➢ Operate the machine only with full soundproofing.
- ➢ Wear hearing protection if necessary.
  The pressure relief valve blowing off can be particularly loud.

Operating materials

- ➢ Strictly forbid fire, open flame and smoking.
- ➢ Follow safety regulations when dealing with lubricants and chemical substances.
- ➢ Avoid contact with skin and eyes.
- ➢ Do not inhale oil mist and vapours.
- ➢ Do not eat or drink while handling cooling and lubricating fluids.
- ➢ Keep suitable fire extinguishing agents ready for use.
- ➢ Use only KAESER approved operating materials.

Unsuitable spare parts

- ➢ Use only spare parts approved by the manufacturer for use in this machine.
  Unsuitable spare parts compromise the safety of the device.
- ➢ Use only genuine KAESER pressure components.

Conversion or modification of the machine

- ➢ Do not permit conversion or modification of the machine as this can compromise function and safe working.

Extension or modification of the compressed air system

- ➢ Extension or modification of the compressor station:
  Check the blow-off capacity of pressure relief valves on air receivers and compressed air lines before installing any new machines.
- ➢ If the blow-off capacity is insufficient:
  Install pressure relief valves with larger blow-off capacity.

3.5.2 Safe machine operation

Information on safe conduct when handling the machine is found here.

Transport

- ➢ Use suitable lifting gear that conforms to local safety regulations.
- ➢ Allow transport only by personnel trained in the safe movement of goods.
- ➢ Attach lifting gear only to suitable lifting points.
- ➢ Note the centre of gravity to avoid danger of the machine tipping over.
- ➢ Make sure the danger zone is clear of personnel.

Installation

- ➢ Install the machine in a suitable compressor room.
- ➢ If installed outdoors, the machine must be protected from frost, direct sunlight, dust, rain and splashing water.
- ➢ Do not operate in areas in which specific requirements with regard to explosion protection are in force.
  For instance, the requirements of ATEX directive 94/9/EC "Equipment and Protective Systems intended for use in Potentially Explosive Atmospheres".
- ➢ Ensure adequate ventilation.
- ➢ Ensure that required ambient conditions are maintained with regard to:
  - Ambient temperature and humidity
  - Clean inlet air with no damaging contaminants.
  - Inlet air free of explosive or chemically unstable gases or vapours.
  - inlet air free of acid/alkaline forming substances, particularly ammonia, chlorine or hydrogen sulphide.
- ➢ Do not position the machine in warm exhaust air from other machines.
- ➢ Ensure accessibility so that all work on the machine can be carried out without danger or hindrance.

Decommissioning, storage, disposal

- ➢ Drain out fluids and dispose of according to environmental regulations.
  These include, for example, lubricating oil and compressor oil.
- ➢ Dispose of the machine in accordance with local environmental regulations.

3.5.3 Organisational Measures

- ➢ Designate personnel and their responsibilities.
- ➢ Give clear instructions on reporting faults and damage to the machine.
- ➢ Give instructions on fire reporting and fire-fighting measures.

3.6 Safety Devices

Various safety devices ensure safe working with the machine.

- ➢ Do not change, bypass or disable safety devices.
- ➢ Check safety devices for correct function regularly.

➢ Do not remove or obliterate labels and notices.
➢ Ensure that labels and notices are clearly legible.

Further information More information on safety devices is contained in chapter4, section 4.3.

3.7 Safety Signs

The diagram shows the positions of safety signs on the machine. The table lists the various safety signs used and their meanings.

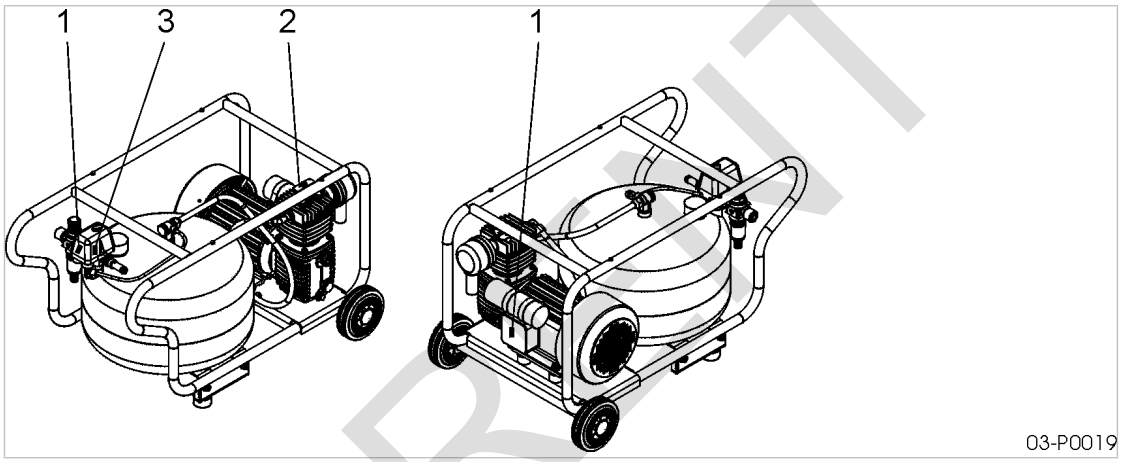


Fig. 1 Location of safety signs

Item	Sign	Meaning
1		Danger of fatal injury from electric shock! ➢ Before starting any work on electrical equipment: Switch off and lock out the power supply disconnecting device and check that no voltage is present.
2		Hot surface! Risk of burns caused by contact with hot components ➢ Do not touch the surface. ➢ Wear long-sleeved garments (not synthetics such as polyester) and protective gloves.
3		Risk of injury caused by an automatic machine start! ➢ Switch off and lock out the power supply disconnecting device and check that no voltage is present before opening any machine enclosure or guard.

Tab. 18 Safety Signs

3.8 In Emergency

3.8.1 Fire fighting

Suitable extinguishing agents

- Foam

- Carbon dioxide
- Sand or earth

Unsuitable or unsafe extinguishing agents

- Strong jet of water

1. Keep calm.
2. Give the alarm.
3. Switch off the power supply disconnecting device, if possible.
4. Move to safety
   - Warn persons in danger
   - Help incapacitated persons
   - Close the doors
5. Try to extinguish the fire if you have the skill to do so.

3.8.2 Remove any compressor oil from your person.

➢ Eye contact
Rinse thoroughly with lukewarm water and seek medical assistance.

➢ Skin contact
Wash off immediately.

3.9 Warranty

This service manual contains no independent warranty commitment. Our general terms and conditions of business apply with regard to warranty.

A condition of our warranty is that the machine is used for the purpose for which it is intended under the conditions specified.
Due to the multitude applications for which the machine is suitable the obligation lies with the user to determine its suitability for his specific application.

In addition, we accept no warranty obligation for:

- the use of unsuitable parts or operating materials,
- unauthorised modifications,
- incorrect maintenance,
- incorrect repair.

Correct maintenance and repair includes the use of original spare parts and operating materials.

➢ Obtain confirmation from KAESER that your specific operating conditions are suitable.

3.10 Environmental Protection

➢ Store and dispose of operating materials and replaced parts in accordance with local environmental protection regulations.

➢ Observe relevant national regulations.
This applies particularly to parts contaminated with compressor oil.

➢ Drain condensate into a receptacle.
Obtain advice from KAESER on suitable drains and receptacles.

➢ Do not allow operating materials to escape to the environment or into the sewage system.

4 Design and Function

4.1 Outline of the machine

4.1.1 Function

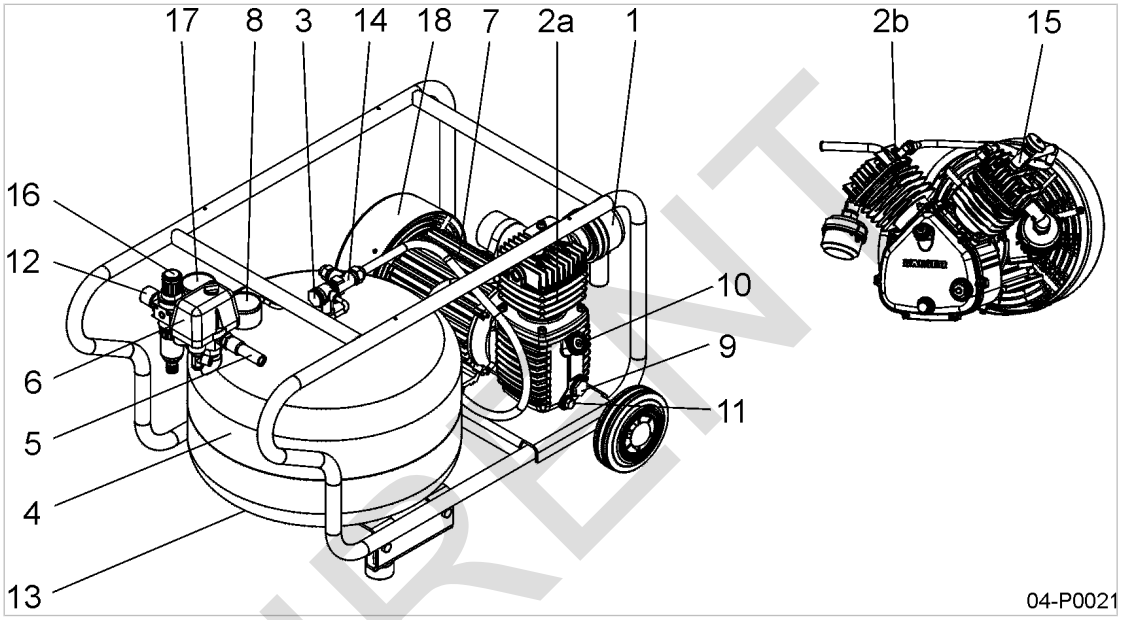


Fig. 2 Machine layout

1	Air filter	9	Oil level sight glass
2	Compressor block	10	Oil filler port
2a	1-cylinder block	11	Oil drain plug
2b	2-cylinder block	12	Compressed air connection
3	Check valve	13	Condensate drain
4	Air receiver	14	Unloading valve on the air receiver
5	Air receiver pressure relief valve	15	Unloading valve on the cylinder head
6	Pressure switch	16	Pressure regulator
7	Electric motor	17	Working pressure gauge
8	Air receiver pressure gauge	18	Fan with guard

Machine

Atmospheric air is drawn through a filter into the compression chamber of the block. The air is drawn in during the downward stroke of the piston. It is compressed during the upward stroke.

The compressed air flows through the air pipe, giving up most of its heat, then via the check valve into the air receiver. The check valve prevents reverse flow of compressed air from the air receiver to the compressor block.

4.2 Options

The options available for your machine are described below.

4.2.1 Option H9
Silenced air filter

The air filter reduces the noise level of the machine. It also cleans the inlet air.

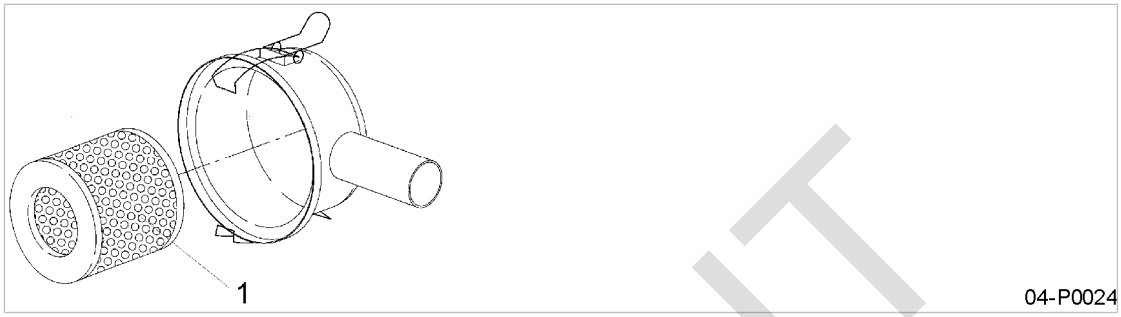


Fig. 3 Silenced air filter
[1] Air filter element

4.2.2 Option H10
Air filter with plastic casing

This air filter is suitable for unfavourable ambient conditions. It also cleans the inlet air.

Fig. 4 Air filter with plastic casing
[1] Air filter element

4.3 Safety Devices

The following safety devices are provided and may not be modified in any way.

Pressure relief valve

The pressure relief valve protects the machine from excessive pressure. It is preset at the factory.

Check valve

The check valve prevents the flow of compressed air from the air receiver back to the compressor block when the machine is stopped.

Enclosures and covers

Enclosures and covers over moving parts and electrical connections protect against accidental contact.

5 Installation and Operating Conditions

5.1 Safety

- ➢ Strictly forbid fire, open flame and smoking.
- ➢ If welding is carried out on or near the machine, take adequate measures to prevent sparks or heat from igniting oil vapours or parts of the machine.
- ➢ The machine is not explosion-proof:
  Do not operate in areas in which specific requirements with regard to explosion protection are in force.
  For instance, the requirements of ATEX directive94/9/EC "Equipment and Protective Systems intended for use in Potentially Explosive Atmospheres".
- ➢ Ensure that required ambient conditions are maintained with regard to:
  - ■ ambient temperature and humidity,
  - ■ clean inlet air with no damaging contaminants,
  - ■ inlet air free of explosive or chemically unstable gases or vapours,
  - ■ inlet air free of acid/alkaline forming substances, particularly ammonia, chlorine or hydrogen sulphide.
- ➢ Keep suitable fire extinguishing agents ready for use.

5.2 Installation conditions

Precondition The floor must be level, firm and capable of bearing the weight of the machine.

- ➢ If installed outdoors, the machine must be protected from frost, direct sunlight, dust and rain.
- ➢ Ensure adequate lighting so that all work on the machine can be carried out without danger or hindrance.

6 Installation

6.1 Safety

Here you will find instructions for safe initial start-up of the machine.

Warning instructions are located before a potentially dangerous task.

Basic safety instructions

1. Follow the instructions in chapter "Safety and Responsibility".
2. Have installation work carried out by authorized installation personnel only.
3. Before switching on, make sure that:
   - no personnel are working on the machine,
   - all panels are in place and secured.

Working on live components

1. Work on electrical equipment may only be carried out by authorized electricians.
2. Switch off and lock out the power supply disconnecting device and check that no voltage is present.

Working on pressure systems

1. Close shut-off valves or otherwise isolate the machine from the compressed air system to ensure that no compressed air can flow back into the machine.
2. Vent all pressurized components and chambers completely.
3. The pressure gauge on the machine must read 0 bar.

Working on the drive system

1. Switch off and lock out the power supply disconnecting device and check that no voltage is present.
2. Replace and secure all enclosure panels before starting the machine.

Further information See chapter 3.4.2 regarding authorized personnel.

See chapter 3.5 regarding hazards and their avoidance.

6.2 Reporting Transport Damage

1. Check the machine for visible and hidden transport damage.
2. Inform the carrier and the manufacturer in writing of any damage without delay.

6.3 Fitting the Antivibration Mounts

Antivibration mounts appropriate to the machine are delivered with the machine but not fitted.

CAUTION
There is a danger of tipping because of the centre of gravity and weight of the machine.
➢ Use slings to lift the machine.

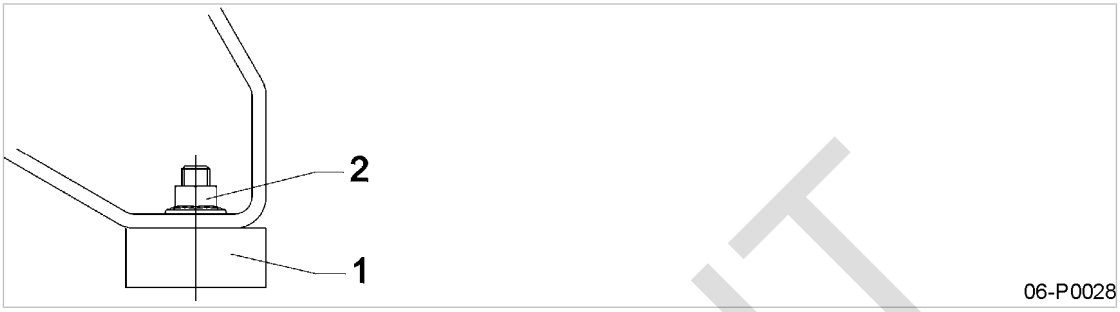


Fig. 5 Fitting the antivibration mounts
[1] Antivibration mount
[2] Hexagonal nut

➢ Remove the wooden frame from the air receiver feet.
➢ Secure the antivibration mounts to the feet with hexagon nuts.

6.4 Compressed air connection

Precondition The compressed air system is vented completely to atmospheric pressure.

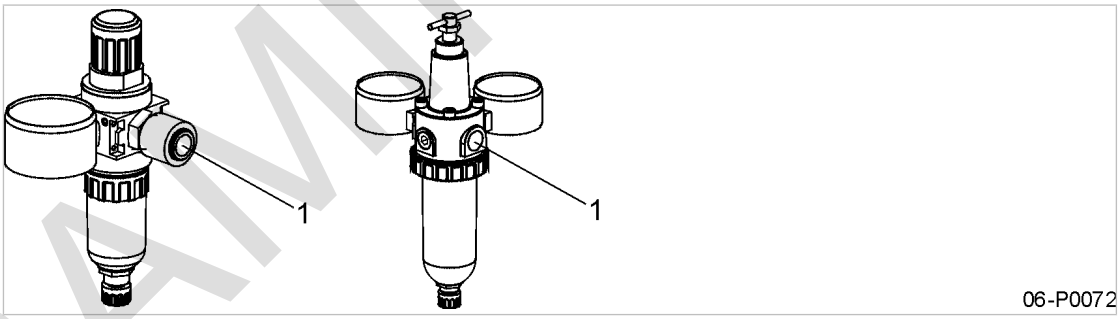


Fig. 6 Compressed air connection
[1] Compressed air connection

➢ Make the connection to the compressed air network with a prepared hose.

6.5 Connecting the Power Supply

Machines with a total power rating up to 3 kW and rated current up to 16 amps may be plugged into the mains supply.

Precondition The machine is disconnected from all power supply phases.
The disconnecting device is locked in the off position.
A check has been made that no voltage is present.

1. Carry out safety measures as stipulated in relevant regulations (IEC 364, for example or DIN VDE 0100) and in national accident prevention regulations (BGV A3 in Germany). In addition, observe the regulations of the local electricity supplier.

2. Check the permitted disconnect time for the overload protection cut-out if a fault arises.
3. Use wire conductor dimensions and fuse ratings in accordance with local regulations (VDE 0100 parts 430 and 523 in Germany, for example).

DANGER
Danger of fatal injury from electric shock!
➢ Switch off and lock out the power supply disconnecting device and check that no voltage is present.

4. Connect the machine to the power supply.

7 Initial Start-up

7.1 Safety

Here you will find instructions for safe initial start-up of the machine.

Warning instructions are located before a potentially dangerous task.

Basic safety instructions

1. Follow the instructions in chapter "Safety and Responsibility".
2. Have the initial start-up carried out by authorized installation personnel only.
3. Before switching on, make sure that:
   - no personnel are working on the machine,
   - all panels are in place and secured.

Working on live components

1. Work on electrical equipment may only be carried out by authorized electricians.
2. Switch off and lock out the power supply disconnecting device and check that no voltage is present.

Working on pressure systems

1. Close shut-off valves or otherwise isolate the machine from the compressed air system to ensure that no compressed air can flow back into the machine.
2. Vent all pressurized components and chambers completely.
3. The pressure gauge on the machine must read 0 bar.

Working on the drive system

1. Switch off and lock out the power supply disconnecting device and check that no voltage is present.
2. Replace and secure all enclosure panels before starting the machine.

Further information

See chapter 3.4.2 regarding authorized personnel.

See chapter 3.5 regarding dangers and their avoidance.

7.2 Instructions to be observed before commissioning or recommissioning

Incorrect or improper initial start-up can cause damage to the machine.

➢ Only a competent technician may carry out initial start-up.

Special measures for start-up after storage

Storage period longer than	Action
12 months	➢ Change the Compressor Oil ➢ Have the motor bearings checked by an authorized KAESER Service Technician.
36 months	➢ Have the overall technical condition checked by an authorized KAESER Service Technician.

Tab. 19 Re-commissioning after storage

7.3 Checking positioning and operating conditions

➢ Check and confirm all the items in the checklist before first start-up of the machine.

To be checked	See chapter	Confirmed?
➢ Are the operators fully conversant with safety regulations?	–	
➢ Have all the positioning conditions been fulfilled?	5	
➢ Does the power supply conform to the specifications on the name-plate?	2.1	
➢ Are the power supply cable conductor cross-sections and fuse ratings adequate?	2.11	
➢ Have all electrical connections been checked for tightness? ➢ (The check must be repeated after 50 operating hours).	–	
➢ Is the connection to the air main made with a flexible hose?	6.4	
➢ Sufficient oil in the crankcase? (oil in the sight gauge red zone) ➢ The oil must be changed after 50 operating hours	10.8	

Tab. 20 Checklist of installation conditions

7.4 Motor overload protection

The machine should only be operated with a correctly adjusted motor overload protection switch to protect the motor from overloading.

A motor overload protection switch that is set too high provides no protection. Incorrect setting can lead to irreparable damage.

7.4.1 Resetting the motor overload protection switch for single-phase motors

Single phase motors are fitted with a thermal overload protection switch that is set to a fixed value. It ensures shutdown of the machine at levels of current above the value set on the motor overload protection switch.

➤ Have the machine checked if the motor overload protection switch trips out frequently at short intervals.

Fig. 7 Generator overload protection switch
[1] Trip button

1. Switch off the mains isolating device.
2. Allow the motor to cool down.
3. Press the trip button.
4. Switch on the power supply isolating device.

7.5 Starting the machine for the first time

Precondition No personnel are working on the machine

➤ Switch on the mains isolating device and the pressure switch.
The machine switches to LOAD and delivers compressed air.

➤ Keep an eye on the machine during the first few hours of operation to ensure that it is operating correctly.

Carry (or have carried) out the following tasks after the first 50 operating hours:

➤ Check that all electrical connections are tight.

➤ Change the compressor oil.

7.6 Measuring the Air Receiver Filling Time

Measuring the time the compressor takes to fill the air receiver when new can be useful in checking the machine's performance at a later date.

Precondition Machine at operating temperature.

1. Disconnect all air consumers.
2. Switch on the power supply disconnecting device.
3. Measure the air receiver filling time.
4. Enter the filling time and machine model in the table.

Machine model	Receiver filling time from 3–8 bar [min/s]

Tab. 21 Air receiver filling time

7.7 Setting network pressure

The network pressure (working pressure) is set at the factory.

A pressure adjustment is possible to suit individual operating conditions.

The pressure setting can only be adjusted if a pressure switch is fitted and under pressure.
Maximum pressure differential: 20% of the maximum operating pressure of the air receiver.

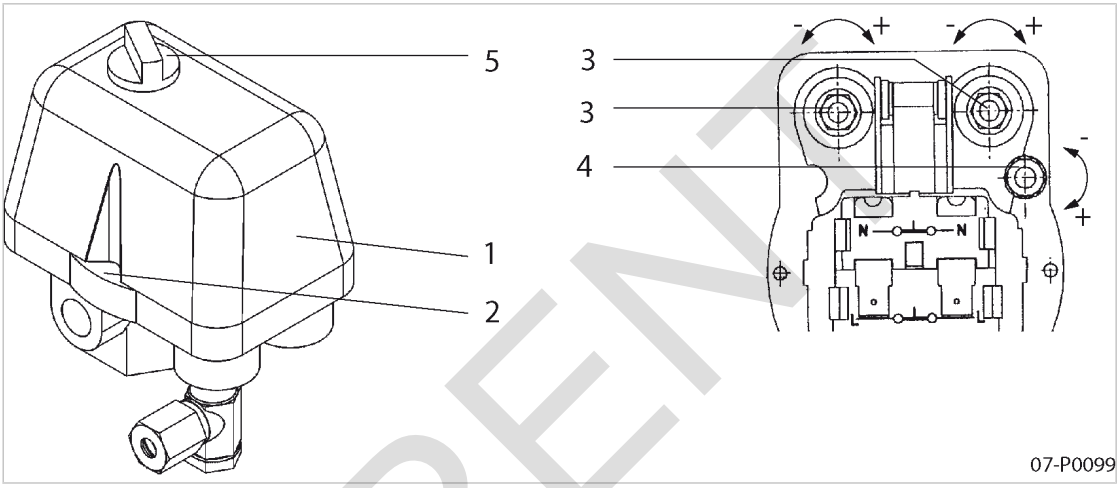


Fig. 8 Setting network pressure

1 Canopy
2 Screw
3 Adjusting screw for upper pressure (cut-out)
4 Pressure differential adjusting screw
5 «ON/OFF»switch for direct online start

DANGER
Electric shock!
Contact with live components can cause serious injury or death.
- ➢ Switch off and lock out the power supply disconnecting device and check that no voltage is present.
- ➢ Work carefully.

1. Remove the screws securing the cover.
2. Remove the cover.

WARNING
Compressed air!
- ➢ Compressed air and devices under pressure can injure or cause death if the contained energy is released suddenly.
- ➢ Do not loosen or open any component that is still under pressure.

3. Adjust the pressure switch setting according to the table.

Adjusting the setting	Function
Cut-out pressure is to be increased.	➢ Turn the adjusting screw 3 clockwise (direction: +).

Adjusting the setting	Function
Cut-out pressure is to be decreased.	➢ Turn the adjusting screw [3] anticlockwise (direction: –).
The pressure differential between cut-in and cut-out pressure is to be increased.	➢ Turn the adjusting screw [4] clockwise (direction: +).
The pressure differential between cut-in and cut-out pressure is to be decreased.	➢ Turn the adjusting screw [4] anticlockwise (direction: –).

Tab. 22 Changing the pressure switch setting

4. Replace the cover.

The motor starting frequency is to be reduced?

➢ Increase the difference between cut-in and cut-out pressure.

➢ Add a larger air receiver downstream to increase buffer capacity.

Further information The duty cycle of the machine is given in chapter 2.13.
See table 11 for the motor starting frequency.

7.8 Setting the filter regulator

The working pressure of a compressor fluctuates according to the limits set on the pressure switch. The filter regulator unit reduces this fluctuation to the required pressure and holds it constant.

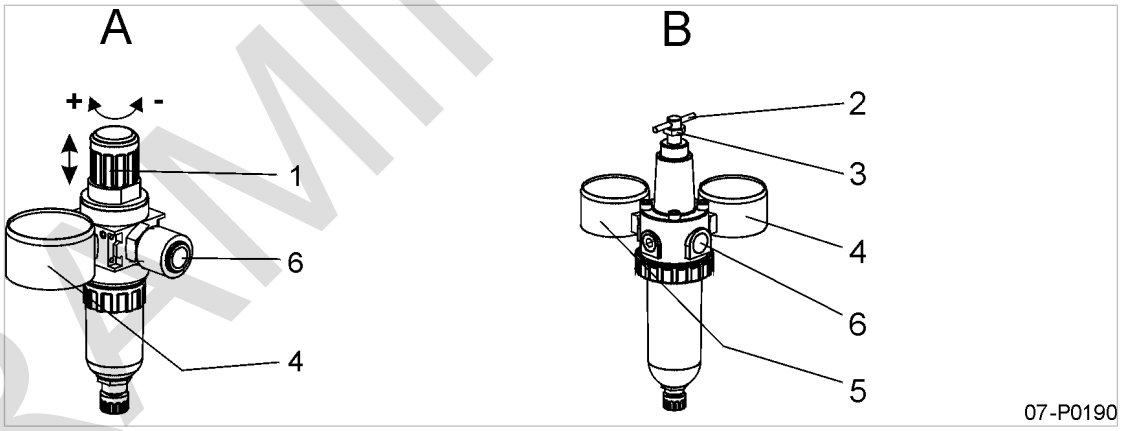


Fig. 9 Setting the filter regulator

[1] Adjusting knob
[2] Adjusting screw
[3] Locknut
[4] Pressure gauge (working pressure)
[5] Pressure gauge (air receiver pressure)
[6] Compressed air outlet

Filter regulator A	Filter regulator B
The machine is isolated from the air consumers. 1. Start the machine and run it up to cut-out pressure. 2. Lift up the adjusting knob. 3. Change the setting ■ Cut-out pressure is to be increased: Turn the adjusting screw clockwise in the + direction. ■ Cut-out pressure is to be decreased: Turn the adjusting screw anticlockwise in the - direction. 4. Push the knob down again when the required pressure is set.	The machine is isolated from the air consumers. 1. Start the machine and run it up to cut-out pressure. 2. To relieve the filter regulator, turn the adjusting screw anticlockwise until no more resistance is felt. 3. Turn the adjusting screw clockwise until the pressure gauge reads the required working pressure. 4. Tighten the locknut to fix the adjusting screw in position.

8 Operation

8.1 Switching on and off

Always switch on and off by means of the pressure switch.

Precondition
A power supply disconnecting device has been installed by the user.
No personnel are working on the machine.
All panels are in place and secured.
The machine temperature is at least +3° C.

DANGER
Automatic restart!
Serious injury is possible. The machine restarts automatically when power is restored after a power cut.
➢ Make sure that no one is working on the machine.

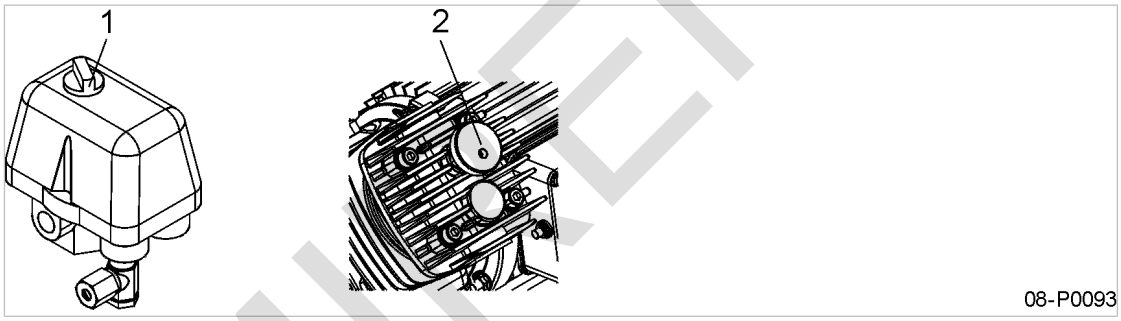


Fig. 10 Switching on and off
1 «ON/OFF» switch
2 Cylinder head unloading valve (depending on machine)

Switching on	Cold starting
1. Switch on the power supply isolating device. 2. Switch on the compressor at the pressure switch. The machine starts as soon as network pressure is lower than the cut-out pressure.	Depending on the machine, an unloading valve is fitted to the cylinder head. 1. Switch on the power supply isolating device. 2. Turn the unloading valve to the stop to ease starting. 3. Switch on the compressor at the pressure switch. The machine starts as soon as network pressure is lower than the cut-out pressure. The machine starts as soon as network pressure is lower than the cut-out pressure. 4. Close the valve again as soon as the motor has run up to speed.

Switching off

1. Switch the machine off at the pressure switch.
2. Switch off and lock out the main supply isolator.

9 Fault Recognition and Rectification

9.1 Basic Information

The alarm indications valid for your machine are dependent on the individual equipment.

1. Do not attempt fault rectification measures other than those given in this manual.
2. Inform KAESER Service if the fault cannot be rectified by the measures suggested.

9.2 Alarms

Fault	Possible cause	Action
Machine does not start.	Fuse blown or circuit breaker tripped.	Check motor connections and fuses (circuit breakers).
	Defective pressure switch contact.	Replace pressure switch.
	Motor overload protection has tripped.	Allow the motor to cool down.
	Compressor motor defective: bearing damage or winding short-circuit.	Contact KAESERservice.
	Compressor block defective.	Contact KAESERservice.
Machine starts with difficulty.	Venting valve on the pressure switch not opening.	Clean or replace the venting valve.
	Bearing damage.	Contact KAESERservice.
	Piston seized due to insufficient or incorrect oil.	Contact KAESERservice.
	Fault in the power supply.	Check power supply.
	Oil level too high.	Drain out some oil.
Machine runs hot.	Ambient temperature too high.	Reduce the ambient temperature.
	Fan cannot draw air freely.	Ensure unrestricted flow of air to the fan.
	Valve plate leaking air or coked.	Check or clean the valve plate.
	Outlet valve reed broken.	Replace valve plate.
Motor overload protection trips out after a short time.	Fault in the power supply.	Check power supply.
	Motor fault.	Contact KAESERservice.
Motor overload protection trips out after a long time.	Current too high because of low supply voltage.	Check power supply cable conductor cross-sections. Check and tighten connection terminals.

Fault	Possible cause	Action
The machine runs continuously but maximum pressure is not reached.	Air filter clogged.	Clean or change the air filter.
	Valve plate leaking air or coked.	Check or clean the valve plate.
	Outlet valve reed broken.	Replace valve plate.
	Machine leaks air.	Seal leak or replace leaking part.
	Leakage from an air consumer connected to the air system.	Check possible leakage points.
	The air demand is greater than the machine's air delivery capacity.	Use a larger machine.
Machine cuts in and out too often.	Air receiver filled with condensate.	Drain condensate.
The machine switches off and air escapes from the venting valve.	Check valve is defective.	Replace the check valve.
The venting valve loses air while the machine is running.	The venting valve is not closing.	Clean or replace the venting valve.
The pressure switch does not vent after switching off.	Venting valve dirty.	Clean or replace the venting valve.
Air leaks from the pressure switch while the machine is running.	Defective switch diaphragm.	Replace the pressure switch.
	The venting valve is not closing.	Clean or replace the venting valve.
Whistling sound from the cylinder head.	Cylinder head fixing screws loose. Gasket defective.	Tighten the cylinder head fixing screws. Replace gasket.
The pressure relief valve blows off before the cut-out pressure is reached.	Pressure switch incorrectly set.	Check pressure switch setting.
	Valve spring defective.	Replace the pressure relief valve.
	Dirt or foreign bodies on the valve seat.	Let the pressure relief valve blow off briefly.
Machine uses too much oil.	Viscosity too low.	Fill with oil specified in the service manual.
	Crankcase venting defective.	Clean or renew the crankcase vent.
	Piston rings worn or broken.	Contact KAESERservice.
Piston rings already worn or damaged after only a short operating period.	Dirty oil.	Fit finer air inlet filter.

Tab. 23 Faults and remedies

10 Maintenance

10.1 Safety

Follow the instructions below to ensure safe machine maintenance.

Warning instructions are located before a potentially dangerous task.

Basic safety instructions

1. Follow the instructions in chapter "Safety and Responsibility".
2. Maintenance work may only be carried out by authorized personnel.
3. Before switching on, make sure that:
   - no personnel are working on the machine,
   - all panels are in place and secured.

Working on live components

1. Work on electrical equipment may only be carried out by authorized electricians.
2. Switch off and lock out the power supply disconnecting (isolating) device and check that no voltage is present.

Working on pressure systems

1. Close shut-off valves or otherwise isolate the machine from the compressed air system to ensure that no compressed air can flow back into the machine.
2. Vent all pressurized components and chambers completely.
3. The pressure gauge on the machine must read 0 bar.

Working on the drive system

1. Switch off and lock out the power supply disconnecting (isolating) device and check that no voltage is present.
2. Replace and secure all enclosure panels before starting the machine.

Further information See chapter 3.4.2 regarding authorized personnel.

See chapter 3.5 regarding dangers and their avoidance.

10.2 Maintenance Schedule

10.2.1 Logging maintenance work

The maintenance intervals given are those recommended for average operating conditions.

➢ Adjust the maintenance intervals with regard to local installation and operating conditions.

➢ Keep a log of all maintenance and service work.

This enables the frequency of individual maintenance tasks and deviations from our recommendations to be determined.

Further information A prepared list is provided in chapter 10.19.

10.2.2 Regular maintenance tasks

➢ When operating conditions are unfavourable (e.g. dusty atmosphere) or when the equipment is in constant use, maintenance tasks must be carried out more frequently (shorter intervals).

Interval	Maintenance task	See chapter
Daily or every 24 operating hours	Check the oil level.	10.8
	Drain off condensate from the receiver.	10.12
	Drain condensate from the filter regulator.	10.17
Annually	Carry out air filter maintenance	10.4 / 10.5 / 10.6
	Maintain the check valve	10.14
	Check that all electrical connections are tight.	–
	Check the pressure relief valve	10.11
Variable, see table 25	Change the oil.	10.10
h = operating hours		

Tab. 24 Regular maintenance tasks

10.2.3 Oil change interval

Duty cycles and ambient conditions are important criteria for the number and length of the oil change intervals.

Advice can be obtained from KAESER Service on determining suitable changing intervals.

➢ Check operating conditions and adjust intervals as necessary; log the results in table 25 for future reference.

	Maximum permissible oil change interval [operating hours/years]	
Compressor oil	Favourable operating conditions*	My operating conditions
SAE 5 W30	1000/2	
FGP	1000/2	
* Cool to moderate ambient temperatures, low humidity, low to average duty cycle.		

Tab. 25 Oil change intervals

10.2.4 Regular service tasks

➢ Only an authorised KAESER Service Technician should carry out service work.

➢ When operating conditions are unfavourable (e.g. dusty or humid atmosphere) or when the equipment is in constant use, have the service work carried out more frequently (shorter intervals).

Interval	Service task
Every 2 years at least	Change the air filter element
Up to 3000 h	Have cylinder head and valves checked.
h = operating hours	

Interval	Service task
Up to 12,000 h	Have the machine generally overhauled.
up to 12,000 h, every three years at the latest	Have motor bearings checked.
h = operating hours	

Tab. 26 Regular service tasks

10.3 Fan guard maintenance

Clogging causes overheating and machine damage.

Regular cleaning ensures reliable cooling of the machine and the compressed air. The frequency is mainly dependent on local operating conditions.

Material
Brush
Vacuum cleaner
Face mask (as required)

Precondition
The supply disconnecting device is switched off,
the device is locked off,
a check has been made that no voltage is present.
The machine has cooled down.

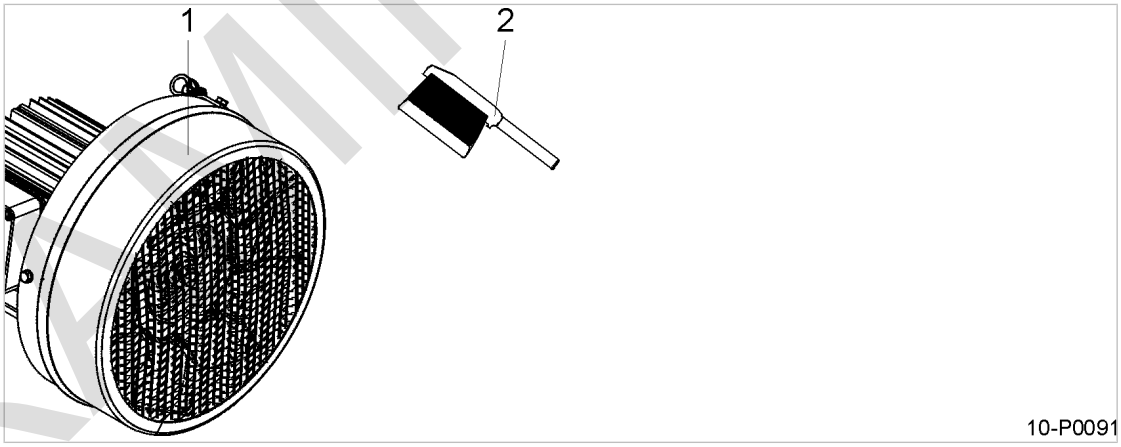


Fig. 11 Cleaning the fan guard
1 Fan with guard
2 Brush

10.3.1 Cleaning the fan guard

Do not use sharp objects to clean the fan guard. It could be damaged.

Avoid creating clouds of dust.

➢ Dry brush the fan guard and safety screen using a vacuum cleaner to suck up the dirt.

The air fan guard can't be cleaned thoroughly?

➢ Have stubborn clogging removed by an authorized KAESER Service Technician.

10.4 Air filter maintenance

The type of filter element installed in the air filter depends on the model of compressor.

Possible filter elements:

- Filter element [3a], washable but not removable.
- Foam insert [3b], washable and removable.

If the filter element [3a] is heavily clogged, clean with a solvent-based fluid or steam blaster. Observe safety regulations.

Replace the air filter [A] or filter insert [3b] if it has already been cleaned a number of times.

Material
Compressed air for blowing out
Solvent cleaner
Cleaning cloths
Spares as required

Precondition
The supply disconnecting device is switched off,
the device is locked off,
a check has been made that no voltage is present.

The machine has cooled down.

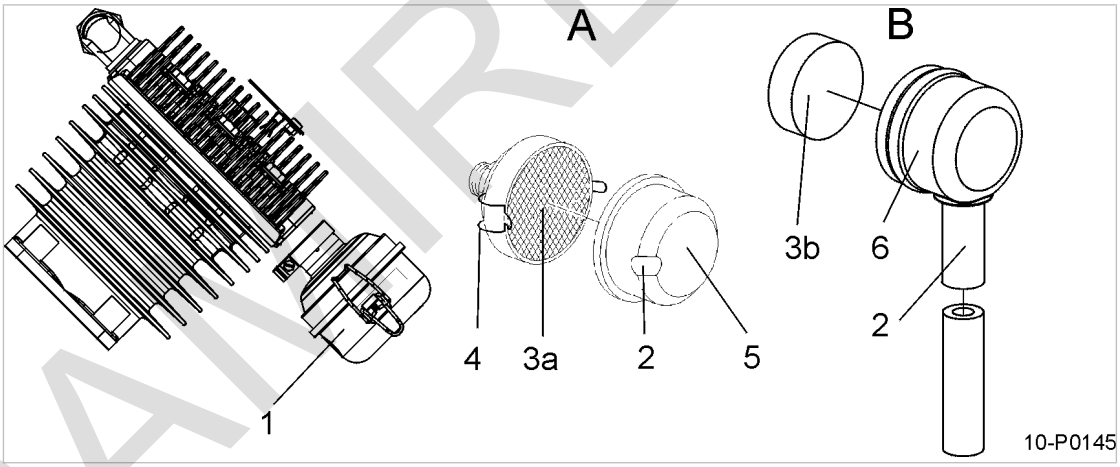


Fig. 12 Air filter maintenance

[1] Air filter
[2] Inlet air opening
[3a] Filter element
[3b] Foam filter insert
[4] Retaining clip
[5] Cover
[6] Air filter housing

Air filter A	Air filter B
1. Unscrew the air filter from the cylinder head. 2. Release the retaining clip and take off the cover. 3. Blow out the cover and filter element [3a] with dry compressed air (< 5 bar). 4. Clean the housing and sealing faces. 5. Wet the filter element lightly with oil after cleaning. 6. Position the cover over the element and close the retaining clips. 7. Mount the air filter on the cylinder head such that the inlet opening is facing downwards. 8. Switch on the power supply disconnecting device.	1. Remove the rubber cap. 2. Withdraw the filter insert [3b]. 3. Clean the filter insert with a solvent-based cleaner. 4. Clean the housing and sealing faces. 5. Insert the dried filter insert in the rubber cap and replace the cap on the filter housing. 6. Mount the air filter on the cylinder head such that the inlet opening is facing downwards. 7. Switch on the power supply disconnecting device.

10.5 Option H9 Air filter (noise absorbing) maintenance

Check that all sealing surfaces match each other. The use of an unsuitable air filter element can permit dirt to ingress the pressure system and cause damage to the machine.

Material: Compressed air for blowing out
Spares as required

Precondition: The supply disconnecting device is switched off,
the device is locked off,
a check has been made that no voltage is present.
The machine has cooled down.

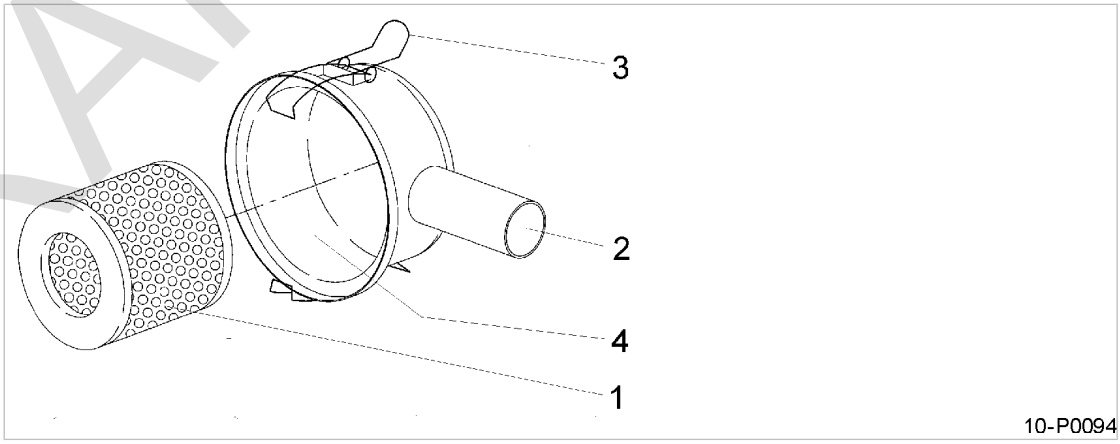


Fig. 13 Air Filter (noise absorbing) Maintenance

[1] Air filter element
[2] Inlet air opening
[3] Retaining clip
[4] Cover

Cleaning the air filter element by tapping.	Cleaning the filter element with compressed air
1. Release the retaining clip and take off the cover. 2. Withdraw the filter element. 3. Tap the element at the front a number of times with the palm of the hand. 4. Clean the housing and sealing faces. 5. Replace the filter element. 6. Position the cover and close the retaining clips. 7. Switch on the power supply disconnecting device.	1. Release the retaining clip and take off the cover. 2. Withdraw the filter element. 3. Use dry compressed air at not more than 5 bar to blow dirt from the air filter element from inside to outside. 4. Clean the housing and sealing faces. 5. Replace the filter element. 6. Position the cover and close the retaining clips. 7. Switch on the power supply disconnecting device.

10.6 Option H10 Air filter (with plastic casing)

Check that all sealing surfaces match each other. The use of an unsuitable air filter element can permit dirt to ingress the pressure system and cause damage to the machine.

Material Compressed air for blowing out
Spares as required

Precondition The supply disconnecting device is switched off,
the device is locked off,
a check has been made that no voltage is present.
The machine has cooled down.

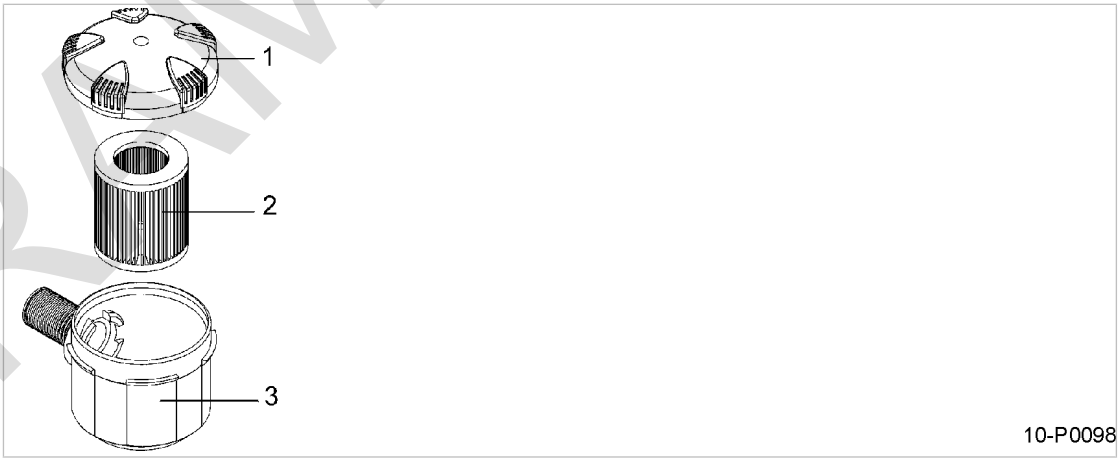


Fig. 14 Air filter (with plastic casing)
1 Cover
2 Air filter element
3 Air filter housing

Cleaning the air filter element by tapping.	Cleaning the filter element with compressed air
1. Unscrew and remove the cover. 2. Withdraw the filter element. 3. Tap the element at the front a number of times with the palm of the hand. 4. Clean the housing and sealing faces. 5. Replace the filter element. 6. Replace the cover and screw down tight. 7. Switch on the power supply disconnecting device.	1. Unscrew and remove the cover. 2. Withdraw the filter element. 3. Use dry compressed air at not more than 5 bar to blow dirt from the air filter element from inside to outside. 4. Clean the housing and sealing faces. 5. Replace the filter element. 6. Replace the cover and screw down tight. 7. Switch on the power supply disconnecting device.

10.7 Drive Motor Maintenance

The drive motor bearings are permanently greased and need no re-greasing.

➢ Have the motor bearings checked during service.

10.8 Checking the Oil Level

The oil level can be read off on the oil sight glass.

Precondition The machine is shut down.

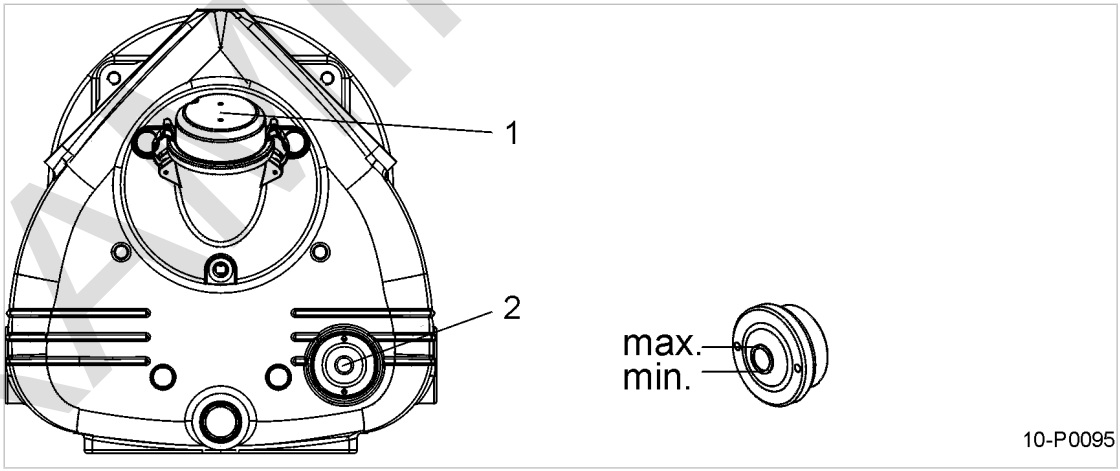


Fig. 15 Checking the Oil Level

[1] Oil filler and crankcase vent
[2] Oil sight glass

➢ Read off the oil level daily and before each start-up.

Result Top up when the compressor oil level falls to the minimum mark.

10.9 Topping up the compressor oil

Material Compressor oil

Precondition The supply disconnecting device is switched off,
the device is locked off,
a check has been made that no voltage is present.

The machine has cooled down.

CAUTION
The machine can be damaged by unsuitable oil.
- ➢ Never mix different types of oil.
- ➢ Never top up with a different type of oil to that already used in the machine.

The type of compressor oil used is listed in table 12.

1. Remove the crankcase vent from the oil filler.
2. Top up to bring the oil to the correct level.
3. Replace the crankcase vent.
4. Start the machine and check the oil level again after about 2 minutes, topping up again, if necessary.
5. Switch off the machine and check visually for leaks.

10.10 Changing the Compressor Oil

The initial charge of oil should be changed as specified in the table 24.
Drain the oil completely from the compressor block.

Change the oil immediately if it becomes milky white.
This means there is condensate in it.

Contact KAESER Service if condensate is detected in the oil.

Material Compressor oil

Oil receptacle

Precondition Machine at operating temperature.

The power supply disconnecting device is switched off.
The disconnecting device is locked in the off position.
A check has been made that no voltage is present.

CAUTION
Danger of burning from hot components and scalding from escaping oil.
- ➢ Wear long-sleeved clothing and gloves.

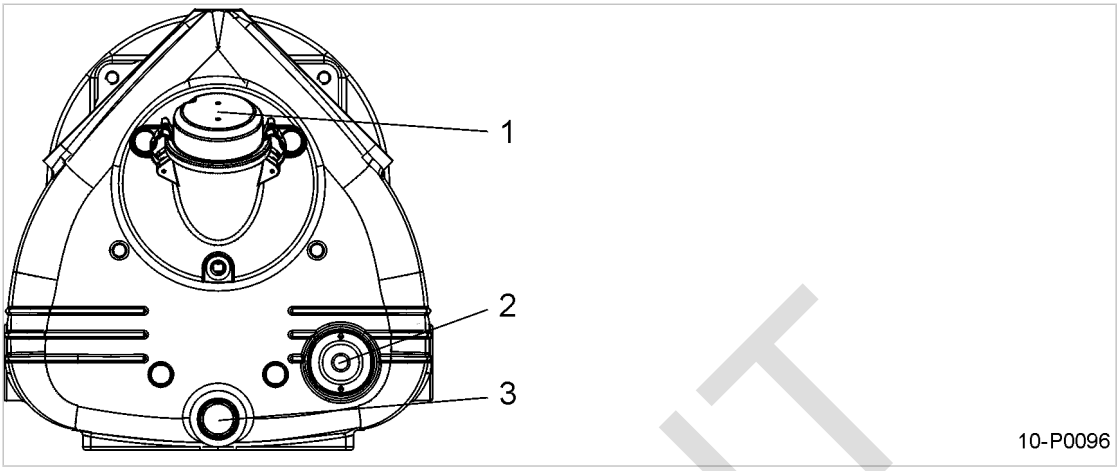


Fig. 16 Changing the compressor oil

1 Oil filler port
2 Oil sight glass
3 Oil drain plug

Draining the oil

1. Remove the crankcase vent from the oil filler.
2. Position the oil receptacle.
3. Remove the drain plug and allow oil to drain into the receptacle.
4. Replace the drain plug after making sure the gasket is not damaged.

Dispose of the old oil in accordance with valid environmental protection regulations.

Filling with oil

1. Fill with new oil to the maximum mark on the oil sight glass.
2. Replace the crankcase vent.
3. Start the machine and check the oil level again after about 2 minutes, topping up if necessary.
4. Switch off the machine and visually check for leaks.

10.11 Testing the pressure relief valve

➢ To check the valve activating pressure, it must be removed from the machine by a KAESER Service Technician and installed in a test rig.

Further information See chapter 2.7 for the activating pressure of the valve.

10.11.1 Air receiver pressure relief valve

To prevent the relief valve from sticking, activate it at regular intervals or at least once a year.

The valve opens to protect the machine if the maximum permissible working pressure is exceeded.

➢ Never operate the machine without a correctly functioning pressure relief valve.

➢ Do **not** adjust the pressure relief valve.

Precondition The machine is switched off under LOAD,
the power supply isolating device is locked off,
a check has been made that no voltage is present.

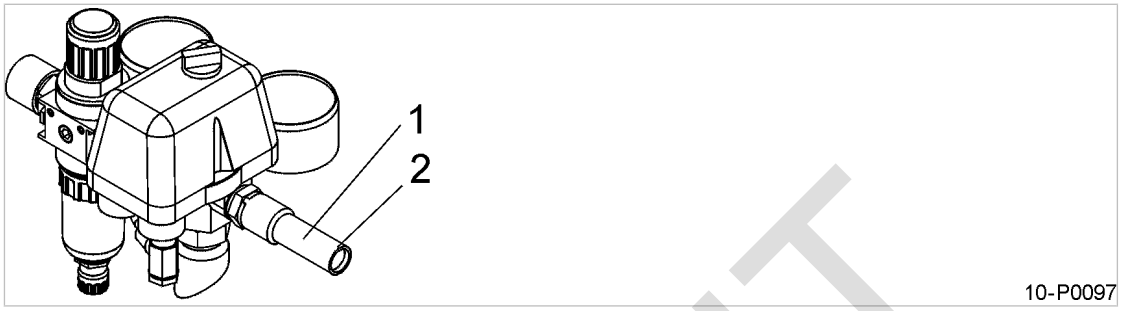


Fig. 17 Checking pressure relief valve on the air receiver
1 Pressure relief valve
2 Knurled knob

WARNING
The pressure relief valve may blow off at any time!
Excessive noise is caused when the pressure relief valve blows off!
Injury from flying particles!
- ➢ Wear ear and eye protection.
- ➢ Work carefully.

1. Close the user's shut-off valve between the machine and the air distribution network.
2. Turn the knurled knob on the pressure relief valve anticlockwise until air blows off.
3. Then turn the knurled knob back to its original position.
4. Open the user's shut-off valve between the machine and the air distribution network.

Result The machine can now be started.

Pressure relief valve does not blow off?
- ➢ Have the defective relief valve replaced by KAESER Service.

10.12 Air Receiver

Pressure vessels must be inspected at regular intervals in accordance with legal requirements.
- ➢ Observe relevant national regulations.
- ➢ Drain the condensate out daily.

10.13 Venting the machine (de-pressurising)

After being switched off, the machine is still under pressure from the air network up to the check valve.

The machine must be isolated from the air network and completely vented before undertaking any maintenance or service work on the pressure system.

Precondition The supply disconnecting device is switched off,
the device is locked off,
the absence of voltage has been verified.
The machine has cooled down.

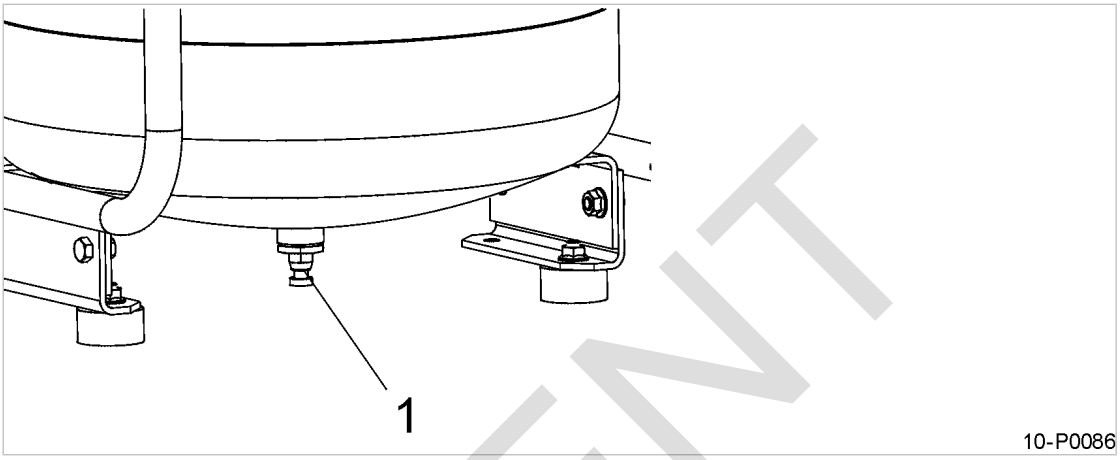


Fig. 18 Venting the machine
1 Condensate drain tap

DANGER
Compressed air!
Compressed air and devices under pressure can injure or cause death if the contained energy is released suddenly.
➢ Isolate the compressor from the air system.

1. Open the condensate drain slowly and release pressure completely.
2. Check that the air receiver pressure gauge reads 0 bar.

After automatic venting the pressure gauge does not read zero?
Shut-off valve still open.
➢ Defective condensate drain.
➢ If manual venting does **not** bring the oil separator tank pressure gauge to zero: Contact the authorised KAESER Service.

10.14 Maintaining the check valve

The check valve is installed in the air receiver inlet port. It prevents the compressed air from flowing back from the air receiver to the compressor block.

Material Compressed air for blowing out
Cleaning cloths
Spares as required

Precondition The supply disconnecting device is switched off,
the device is locked off,
the absence of voltage has been verified.
The machine is completely depressurised (pressure gauge reads 0 bar).
The machine has cooled down.

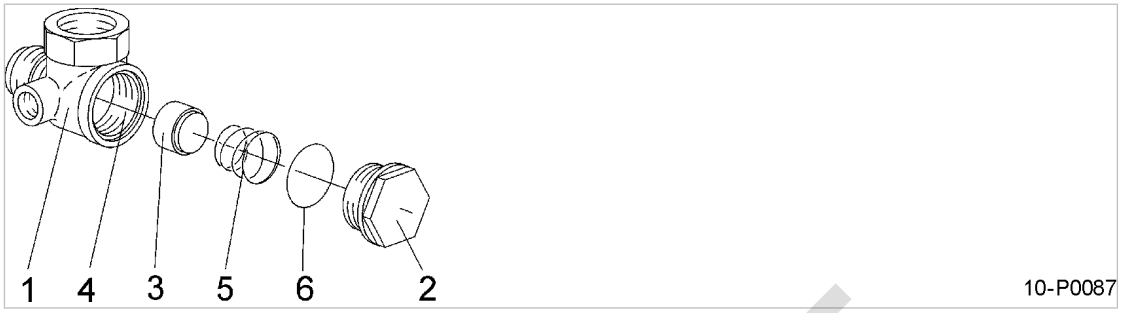


Fig. 19 Cleaning the check valve

[1]	Enclosure	[4]	Valve seat
[2]	Screw plug	[5]	Spring
[3]	Valve cone	[6]	O-ring

CAUTION
Danger of burns from hot components!
➢ Wear long-sleeved clothing and gloves.
➢ Work carefully.

1. Remove the plug.
2. Clean the valve cone and seat.

The complete valve must be replaced if the valve seat is badly worn or damaged.

3. Insert the valve cone and spring in the housing.
4. Reseal the housing with the plug and O-ring.

10.15 Maintenance of the pressure switch unloading valve

The unloading valve must be cleaned in the following circumstances:
- Machine starts with difficulty.
- The machine does not vent after switching off.

According to the pressure switch version, the unloading valve can be cleaned or must be replaced.

Material: Compressed air for blowing out
Cleaning cloths
Spares as required

Precondition: The supply disconnecting device is switched off,
the device is locked off,
the absence of voltage has been verified.
The machine is completely depressurised (pressure gauge reads 0 bar).
The machine has cooled down.

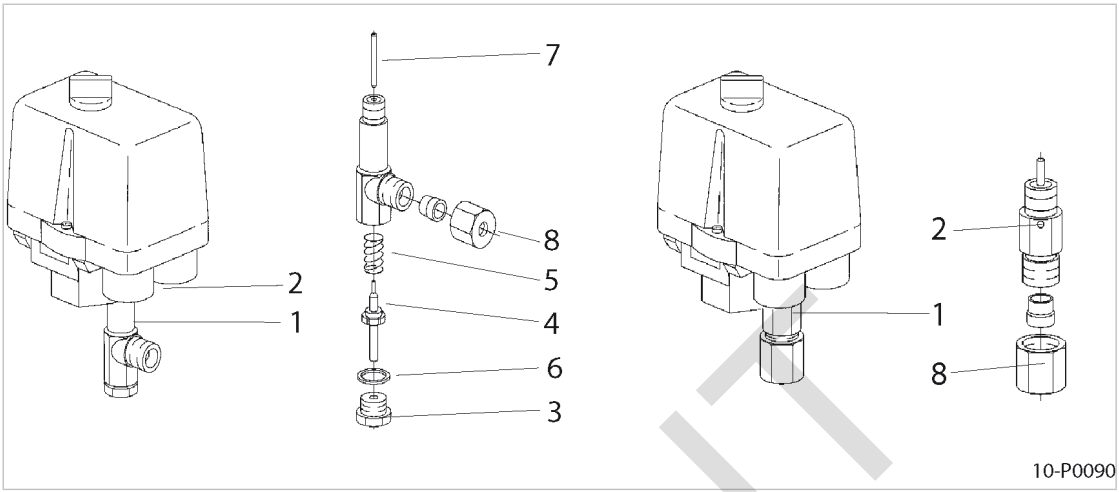


Fig. 20 Maintenance of the pressure switch unloading valve

1 Unloading valve
2 Screw
3 Screw plug
4 Valve cone
5 Spring
6 Gasket
7 Pin
8 Screw connection

The unloading valve can be cleaned	The unloading valve can only be replaced
Open the valve carefully. 1. Remove the fitting from the valve. 2. Loosen the securing screws and take off the unloading valve. 3. Remove the screw plug and take out the individual parts. 4. Extract the pin and clean it and the other parts, blowing out if necessary. 5. After reassembly insert the valve and tighten down with the screw.	1. Remove the fitting from the valve. 2. Loosen the securing screws and take off the unloading valve. 3. Insert the new unloading valve and fix with the screw.

10.16 Air receiver unloading valve maintenance

The unloading valve must be cleaned in the following circumstances:

- Machine starts with difficulty.
- The machine does not vent after switching off.

Material
Compressed air for blowing out
Cleaning cloths
Spares as required

Precondition
The supply disconnecting device is switched off,
the device is locked off,
the absence of voltage has been verified.

The machine is completely depressurised (pressure gauge reads 0 bar).

The machine has cooled down.

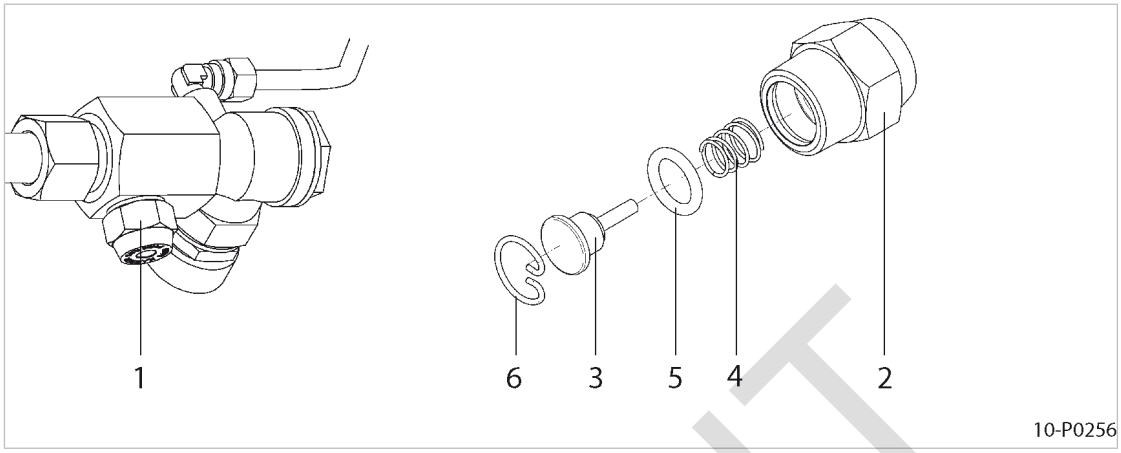


Fig. 21 Air receiver unloading valve maintenance

1	Unloading valve	4	Compression spring
2	Valve body	5	O-ring
3	Valve plunger	6	Circlip

1. Unscrew the valve body and dismantle the valve.

Open the valve carefully.

2. Remove the circlip and take out the plunger with compression spring and O-ring.
3. Clean the parts.
4. Reassemble and screw the body back into place.

10.17 Cleaning the filter regulator

Empty accumulating condensate at regular intervals, at least once a day.

Material
Compressed air for blowing out
Cleaning rags
Spare parts as required

Precondition
The power supply disconnecting device is switched off.
The disconnecting device is locked in the off position.
A check has been made that no voltage is present.
Machine is fully vented (no pressure).

➢ Drain condensate.

➢ Collect the condensate in a suitable container and dispose of in accordance with environmental regulations.

Cleaning the filter element

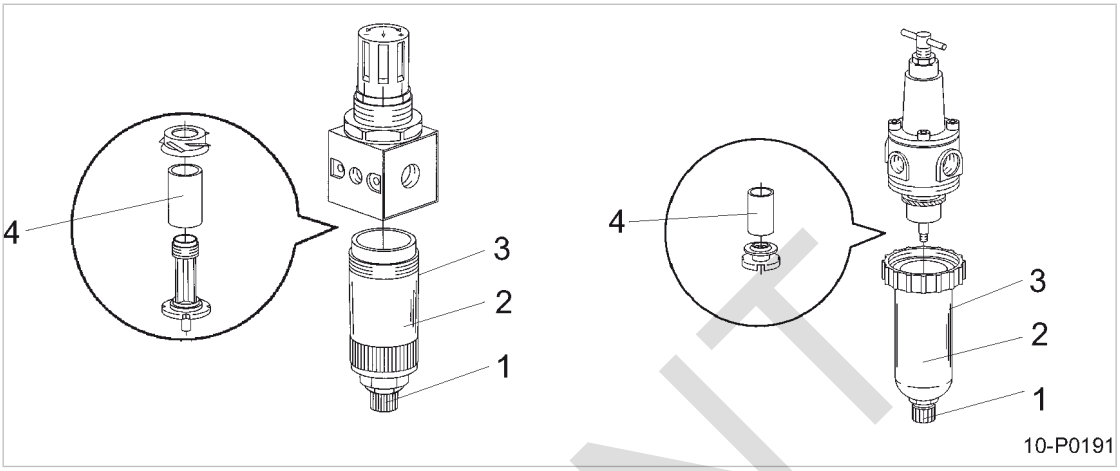


Fig. 22 Cleaning the Filter Regulator

1	Condensate outlet	3	Label (cleaning agent)
2	Housing	4	Filter element

1. Unscrew and clean the housing and filter element.

Refer to the label on the housing for selection of the cleaning agent.

2. Blow out the housing with compressed air (<5 bar).
3. Reassemble the parts and make sure they sit correctly.

10.18 Cylinder Head and Valves

The condition of the valves can be assessed by measuring the receiver charging time and comparing this with the charging time when the machine was new.

10.18.1 Checking the cylinder head and valves

Precondition Machine at operating temperature.

➢ Start the machine and measure the receiver charging time.

Result If there is a significant difference in the filling time to when the machine was new, have KAESER Service check or replace the valves.

Further information See chapter 7.6 for receiver filling time measurement.

10.19 Document maintenance and service work.

Machine number:

➤ Enter maintenance and service work carried out in the list.

Date	Maintenance task carried out	Operating hours	Signature

Tab. 27 Logged maintenance tasks

11 Spares, Operating Materials, Service

11.1 Note the Nameplate

The nameplate contains all information to identify your machine. This information is essential to us in order to provide you with optimal service.

➢ Please give the information from the nameplate with every enquiry and order for spares.

11.2 Ordering consumable parts and operating fluids/materials

KAESER consumable parts and operating materials are original Kaeser products. They are specifically selected for use in KAESER machines.

WARNING
There is risk of personal injury or damage to the machine resulting from the use of unsuitable spares or operating fluids/materials.
Unsuitable or poor quality consumable parts and operating fluids/materials may damage the machine or impair its proper function.
Damage to the machine can also result in personal injury.

➢ Use only original KAESER parts and operating fluids/materials.

➢ Have an authorised KAESER Service Technician carry out regular maintenance.

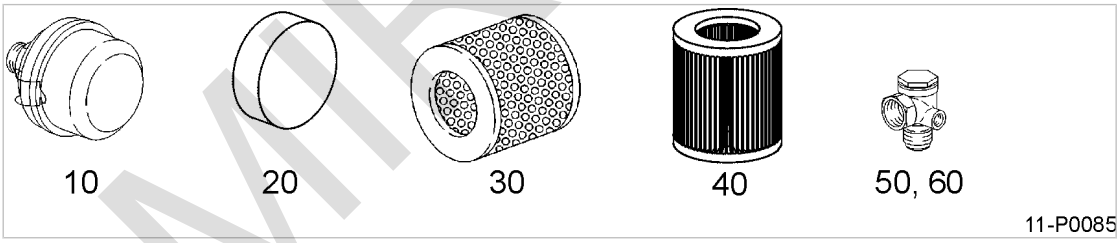


Fig. 23 Consumable parts

[10] Air filter
[20] Air filter element
[30] Air filter element (silenced)
[40] Air filter element (plastic housing)
[50] Check valve G 3/8
[60] Check valve G 1/2

Machine

Name	Quantity	Number
Air filter	1/2*	10
Air filter element	1	20
Air filter element (silenced)	1/2*	30
Air filter element (plastic housing)	1/2*	40
Check valve G 3/8	1	50
Check valve G 1/2	1	60
Compressor oil SAE 5 W30	0.5 litre	9.4943.00010
Compressor oil FGP	1,0l	9.0874.0
* depending on machine		

Tab. 28 Consumable parts

11.3 KAESER AIR SERVICE

KAESER AIR SERVICE offers:

- authorised service technicians with KAESER factory training,
- increased operational reliability ensured by preventive maintenance,
- energy savings achieved by avoidance of pressure losses,
- optimum conditions for operation of the compressed air system,
- the security of genuine KAESER spare parts,
- increased legal certainty as all regulations are kept to.

➢ Why not sign a KAESER AIR SERVICE maintenance agreement!

Result Your advantage:
lower costs and higher compressed air availability.

11.4 Service Addresses

Addresses of KAESER agents are given at the end of this manual.

11.5 Spare Parts for Service and Repair

➢ Make sure that any service or repair tasks not described in this manual are carried out by an authorized KAESER Service Technician.

12 Decommissioning, Storage and Transport

12.1 De-commissioning

De-commissioning is necessary, for example, under the following circumstances:

- the machine is temporarily not needed,
- the machine is to be moved to another location,
- the machine is to be scrapped.

Temporary de-commissioning

Precondition The machine can be started at regular intervals.

➢ Run the machine once a week under load for at least 30 minutes to ensure corrosion protection.

Long-term de-commissioning

Precondition The machine must have run for at least 30 minutes before before long-term de-commissioning.
The mains disconnecting device is switched off.
The disconnecting device is locked in the off position.
A check has been made that no voltage is present.
Machine fully vented (no pressure).

1. Allow the machine to cool down completely.
2. Spray the valves and cylinder bore with Shell Ensis 20 preserving oil.

The preserving oil does not need to be removed when re-commissioning.

3. Drain condensate.
4. Disconnect all air and electrical connections.
5. Spray all contacts and terminals with a preservative (e.g. Rivalto, W.S.X.).

12.2 Packing

A wooden crate is required for overland transport to protect the machine from mechanical damage.
Consult KAESER Service for advice on packing for sea or air transport.

Material Desiccant
Plastic sheeting
Wooden transport crate

Precondition The machine is decommissioned.
Machine is dry and cooled down.

1. Wrap the machine in plastic sheeting.
2. Place sufficient desiccant (e.g. silica gel) inside the plastic sheeting.

12.3 Storage

Moisture can lead to corrosion, particularly on the surfaces of the compressor block.
Frozen moisture can damage components, diaphragms, valves and gaskets.

Advice can be obtained from KAESER on storage and commissioning.

CAUTION
Moisture and frost can damage the machine.
- ➢ Prevent ingress of moisture and formation of condensation.
- ➢ Maintain a storage temperature of >0 °C.

➢ Store the machine in a dry, frost-proof room.

12.4 Transporting

12.4.1 Safety

Avoid damaging the machine.
➢ Transport only with the enclosure fully closed.

12.5 Disposal

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

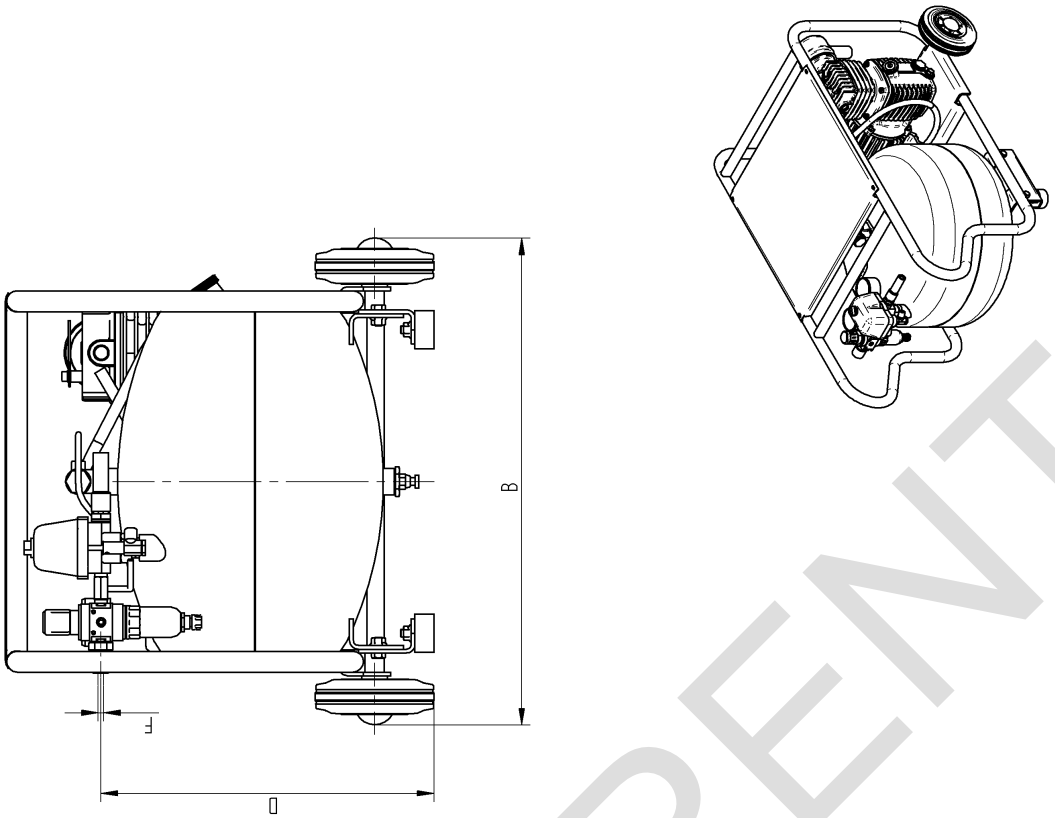
Precondition The machine is decommissioned.

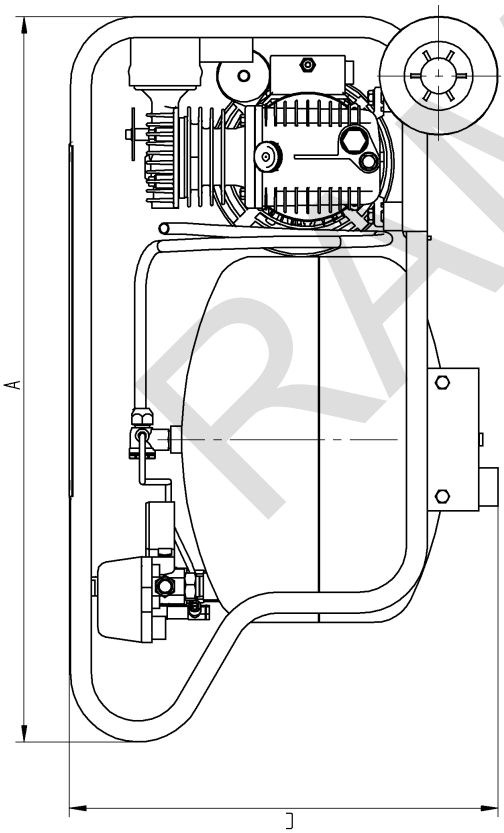
1. Completely drain the oil from the machine.
2. Remove old filters.
3. Hand the machine over to an authorized disposal expert.

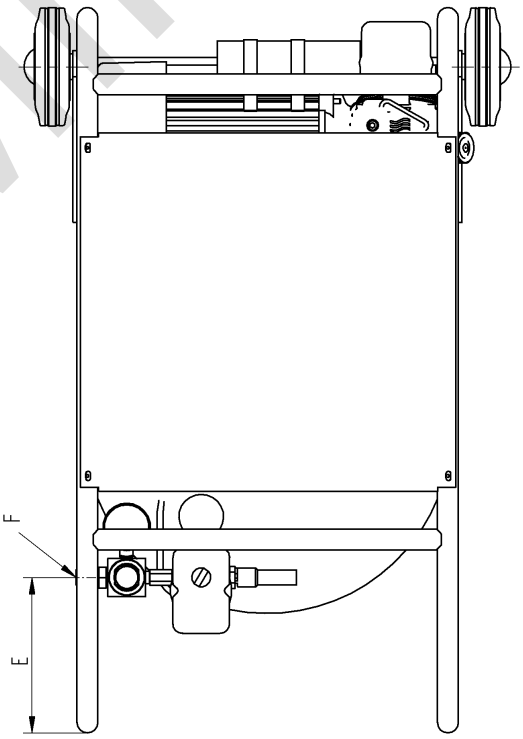
➢ Components contaminated with oil must be disposed of in accordance with local environment protection regulations.

13 Annex

13.1 Dimensional Drawing







	A	B	C	D	E	F
Premium car 200/30 W	770	510	450	350	160	Ø6/DN7,2
Premium car 250/30 W	770	510	450	350	160	Ø6/DN7,2
Premium car 300/30 W	770	510	450	350	160	Ø6/DN7,2
Premium car 350/30 W	870	560	590	450	140	Ø6/DN7,2
Premium car 450/30 W	870	560	590	450	140	Ø6/DN7,2

	Tag	Name
Gez.	21.07.2005	Oehrl1
Gepr.		
Freigeg.	21.07.2005	Schaeff1
Maßstab		Ersatz für

Premium car W

KAESER KOMPRESSOREN
K1_1825_0
10023576 D 02
A-Index

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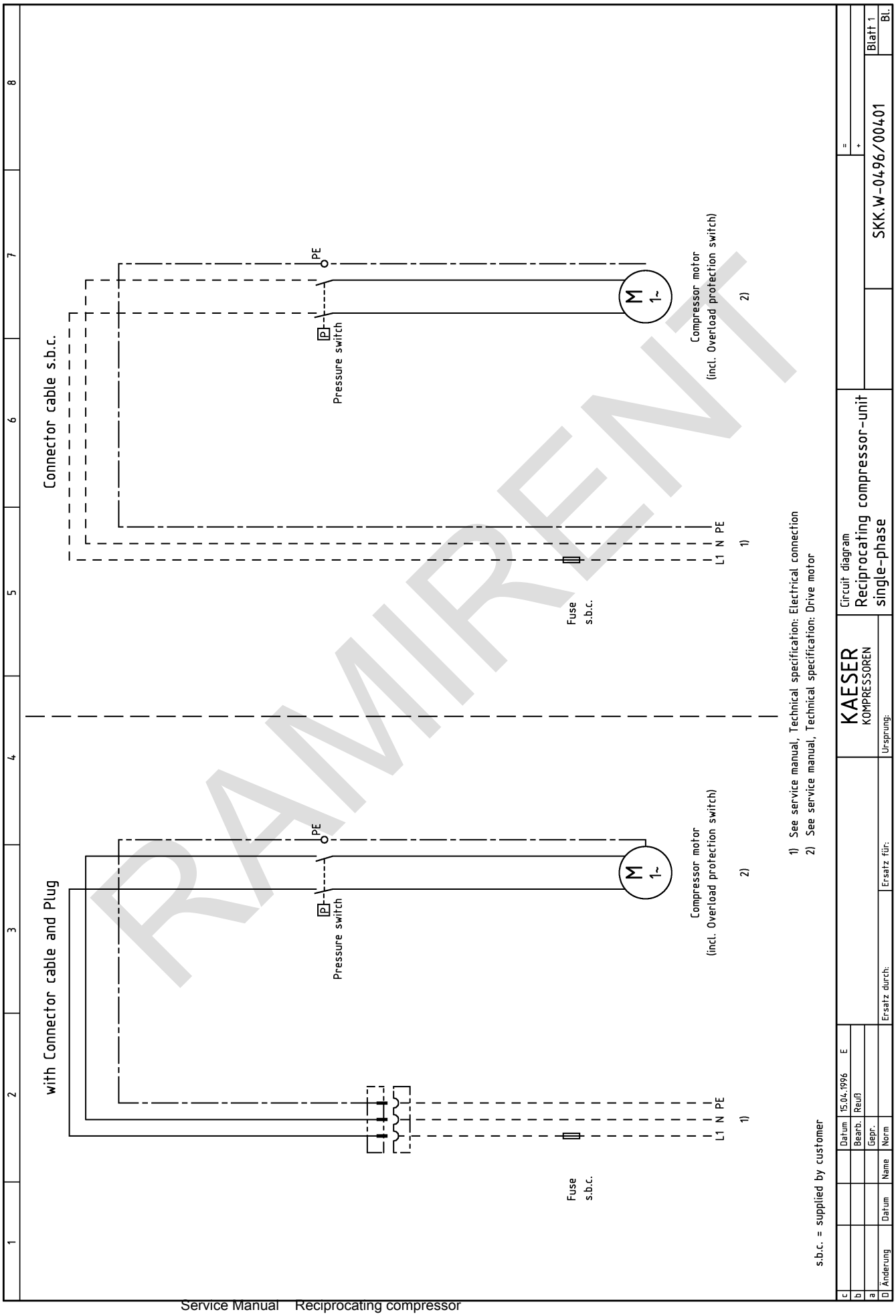
Entwicklungsbedingte Änderungen vorbehalten. Zeichnung darf nur über CAD geändert werden.

13.2 Electrical Diagram


with Connector cable and Plug
Connector cable s.b.c.
PE
Pressure switch
Compressor motor
(incl. Overload protection switch)
M
1~
2)
L1 N PE
1)
Fuse
s.b.c.
1) See service manual, Technical specification: Electrical connection
2) See service manual, Technical specification: Drive motor
s.b.c. = supplied by customer
KAESER KOMPRESSOREN
Circuit diagram
Reciprocating compressor-unit
single-phase
SKK.W-0496/00401
Blatt 1
Bl.
Datum 15.04.1996
Bearb. Reuß
Gepr.
Norm
Name
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung: