

Service Manual

Reciprocating compressor

Premium compact W

No.: 9_9418 21 E

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1 Regarding this document

1.1 Using this document

1 Regarding this document

1.1 Using this document

The operating manual is a component of the product. It describes the machine as it was at the time of first delivery after manufacture.

- Keep the operating manual in a safe place throughout the life of the machine.
- Supply any successive owner or user with this operating manual.
- Please insert any amendment or revision of the operating manual sent to you.
- Enter details from the machine nameplate and individual items of equipment in the table in chapter 2.

1.2 Further documents

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

- 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

This service manual is copyright protected. Queries regarding use or duplication of the documentation should be referred to KAESER. Correct use of information will be fully supported.

1.4 Symbols and labels

- Please note the symbols and labels used in this document.

1.4.1 Warnings

Warning notices indicate dangers that may result in injury when disregarded.

Warning notices indicate three levels of danger identified by the corresponding signal word:

Signal term	Meaning	Consequences of non-compliance
DANGER	Warns of an imminent threat of danger	Will result in death or severe injury
WARNING	Warns of possible danger	May result in death or severe injury
CAUTION	Warns of a potentially dangerous situation	May result in a moderate physical injury

Tab. 1 Danger levels and their definition (personal injury)

Warning notices preceding a chapter apply to the entire chapter, including all sub-sections.

Example:

1 Regarding this document

1.4 Symbols and labels



DANGER

These show the kind of danger and its source.

The possible consequences of ignoring a warning are shown here.

If you ignore the warning notice, the "DANGER" signal word indicates a lethal or severe injury will occur.

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

Warning notes referring to a sub-section or the subsequent action are integrated into the procedure and numbered as an action.

Example:



1. **WARNING!**

These show the kind of danger and its source.

The possible consequences of ignoring a warning are shown here.

If you ignore the warning notice, the "WARNING" signal word indicates that a lethal or severe injury may occur.

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

2. Always read and comply with warning instructions.

1.4.2 Potential damage warnings

Contrary to the warnings shown above, damage warnings do not indicate a potential personal injury.

Warning notices for damages are identified by their signal term.

Signal term	Meaning	Consequences of non-compliance
NOTE	Warns of a potentially dangerous situation	Damage to property is possible

Tab. 2 Danger levels and their definition (damage to property)

Example:



NOTICE

These show the kind of danger and its source.

Potential effects when ignoring the warning are indicated here.

- The protective measures against the damages are shown here.

- Carefully read and fully comply with warnings against damages.

1.4.3 Other alerts and their symbols



This symbol identifies particularly important information.

1 Regarding this document

1.4 Symbols and labels

- 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.
- Option H1** ➤ This symbol denotes lists of actions comprising one stage of a task.
Operating instructions with several steps are numbered in the sequence of the operating steps.
Information relating to one option only are marked with an option code (e.g., H1 indicates that this section applies only to machines with screw-in machine feet).
-  Information referring to potential problems are identified by a question mark.
The cause is named in the help text ...
➤ ... as is a solution.
-  This symbol identifies important information or measures regarding the protection of the environment.
- Further information** Further subjects are introduced here.

2 Technical Specifications

2.1 Nameplate

2 Technical Specifications

2.1 Nameplate

The model designation and important technical information are given on the machine's nameplate.

➤ Enter here the nameplate data as a reference:

Feature	Value
Reciprocating compressor	
Material no.	
Serial no.	
Year of manufacture	
Maximum working pressure	
Inlet volume	
Electrical connection	
Synchronous speed	
Rated power	
Ambient temperature	

Tab. 3 Nameplate

2.2 Mass

The values shown are maximum values. The actual weight depends on equipment fitted.

Premium compact	Mass [kg]
160/4	31
200/4	32
250/4	33
300/4	34

Tab. 4 Mass

2.3 Compressor block

Premium compact	Compressor block type	Theoretical displacement [l/min]	FAD at 6 bar [l/min]	Number of cylinders
160/4	KCC 160	160	98	1
200/4	KCC 200	200	115	1
250/4	KCC 250	250	150	1
300/4	KCC 300	300	175	1

Tab. 5 Compressor block

2 Technical Specifications

2.4 Ambient conditions

2.4 Ambient conditions

Installation	
Maximum altitude amsl* [m]	1000
Permissible ambient tem- perature [°C]	5–35

* Higher altitudes are permissible only after consultation with the manufacturer.

Tab. 6 Ambient conditions

2.5 Pressure switch setting

Specified pressures are factory set.

Customer-specific settings may differ.



The air receiver is permanently in a pressure band of 20%. Hence, the pressure difference may **not** exceed 20%.

Premium compact	Cut-in pressure [bar]	Cut-out pressure [bar]	Pressure differ- ential Δp [bar]	Setting range* [bar]
160/4	16	20	4	2 / 5
200/4	7	9	2	3 / 4
250/4	7	9	2	3 / 4
300/4	7	9	2	2 / 4

* Minimum adjustment range: Cut-in pressure / cut-out pressure

Tab. 7 Pressure switch setting

2.6 Pressure

Premium compact	Maximum working overpressure [bar]	Pressure relief valve activating pressure [bar]
160/4	20	20
200/4	10	11
250/4	10	11
300/4	10	11

Tab. 8 Pressure specifications

2.7 Sound emission

Sound power level

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

2 Technical Specifications

2.8 Motor power and speed

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 $d = 1 \text{ m}$, $Q_2 = \text{Logarithmic surface ratio: dB}$.

EC type approval:

- Certificate No.: OR/2551/SZ03

Premium compact	Sound pressure level [dB(A)]		Emission sound pressure level [dB(A)]	Logarithmic surface ratio [dB]
	Measured	Guaranteed		
160/4	85	97	72	13.2
200/4	85	97	74	13.2
250/4	86	97	75	13.2
300/4	86	97	75	13.2

Tab. 9 Sound pressure level

2.8 Motor power and speed

- Read off the enclosure protection class from the motor nameplate and enter in the table.

Premium compact	Compressor block type	Rated power [kW]	Synchronous speed [rpm] (50 Hz)	Enclosure protection
160/4	KCC 160	1.1	3000	
200/4	KCC 200	1.1	3000	
250/4	KCC 250	1.25	3000	
300/4	KCC 300	1.5	3000	

Tab. 10 Power and speed

Permissible starting frequency

- The permissible starting frequency of the motor is listed in the table below:

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

Tab. 11 Permissible starting frequency

2.9 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.

2 Technical Specifications

2.10 Electrical connection

➤ 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

2.9.1 Compressor oil charge

Compressor block type	Total charge [litres]	Topping up volume [litres] (minimum–maximum)
KCC 160	0.13	0.05
KCC 200	0.13	0.05
KCC 250	0.13	0.05
KCC 300	0.13	0.05

Tab. 13 Compressor oil charge

2.10 Electrical connection

Basic requirements

The machine is designed in accordance with the conditions for an electrical power supply specified in EN 60204-1 (IEC 60204-1) section 4.3.

If no other conditions are specified by the operator, the thresholds described in this standard must be adhered to.

It is recommended that the user and the supplier reach an agreement on the basis of EN 60204-1, Annex B.

Check and adjust for other deployment conditions before commissioning.



If the machine is supplied with a mains cable and a plug, the power socket may be fused at the nominal current of the plug device.

2.10.1 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 230V/1/50Hz rated voltage the requirements in chapter 2.11 are also to be observed.

2 Technical Specifications

2.10 Electrical connection

2.10.1.1 Power supply specifications

Conductor cross-sections (copper multicore) and fusing (fuses, class gG) are given according to DIN VDE 0100-430 (IEC 60364-4-43 and IEC 60364-4-473) and DIN VDE 0298-4 (HD 384.5.523 S2) for ambient temperatures from 30 °C.



► For other application conditions, check conductor diameters and change accordingly.

Other conditions would include, for example:

- higher temperature >30 °C
- Cable length >20 m

Mains frequency: 50 Hz

Rated voltage: 110V±5%/1/50Hz

Premium compact	Backup fuse [A]	Supply cable [mm ²]	Current drawn [A]
160/4	16	3 x 1.5	13.0
200/4	16	3 x 1.5	13.0
250/4	20	3 x 2.5	15.5

Tab. 14 Supply details 110V/1/50Hz

Rated voltage: 230V±5%/1/50Hz

Premium compact	Backup fuse [A]	Supply cable [mm ²]	Current drawn [A]
160/4	10	3 x 1.5	6.2
200/4	10	3 x 1.5	6.2
250/4	10	3 x 1.5	7.4
300/4	16	3 x 1.5	10

Tab. 15 Supply details 230V/1/50Hz

Mains frequency: 60 Hz

Rated voltage: 110V±5%/1/60Hz

Premium compact	Backup fuse [A]	Supply cable [mm ²]	Current drawn [A]
160/4	16	3 x 1.5	13.2
200/4	16	3 x 1.5	13.2
250/4	20	3 x 2.5	15.6

Tab. 16 Supply details 110V/1/60Hz

Rated voltage: 115V±5%/1/60Hz

Premium compact	Backup fuse [A]	Supply cable [mm ²]	Current drawn [A]
250/4	25	3 x 4	15.6

Tab. 17 Supply details 115V/1/60Hz

2 Technical Specifications

2.11 Mains conditions

Rated voltage: 127V±5%/1/60Hz

Premium compact	Backup fuse [A]	Supply cable [mm ²]	Current drawn [A]
160/4	16	3 x 1.5	11.3
200/4	16	3 x 1.5	11.3

Tab. 18 Supply details 127V/1/60Hz

Rated voltage: 220V±5%/1/60Hz

Premium compact	Backup fuse [A]	Supply cable [mm ²]	Current drawn [A]
160/4	10	3 x 1.5	6.5
200/4	10	3 x 1.5	6.5

Tab. 19 Supply details 220V/1/60Hz

Rated voltage: 230V±5%/1/60Hz

Premium compact	Backup fuse [A]	Supply cable [mm ²]	Current drawn [A]
250/4	16	3 x 1.5	7.8
300/4	20	3 x 2.5	11.2

Tab. 20 Supply details 230V/1/60Hz

2.11 Mains 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_{equiv} .

2.11.1 Mains conditions at 230V/1/50Hz

Premium compact	Max. permissible motor starts [1/h]*	Highest permissible system impedance Z_{\max} [Ω]**	Rated current I_{equiv} [A]
160/4	20	0.244	32
200/4	20	0.244	32
250/4	20	0.292	32
300/4	20	0.112	80

* For exceeding the maximum permissible motor starts, please consult the manufacturer.

** Specification related to the sum of impedances in external and neutral lines.

Tab. 21 Network impedance

2.12 Machine duty cycle

Calculating the cycling period

2 Technical Specifications

2.12 Machine duty cycle

Cycling time = time under LOAD + time at standstill

Calculating the duty cycle:

$$\text{Duty cycle [\%]} = \frac{\text{time at LOAD}}{\text{time at LOAD} + \text{standstill period}} \times 100$$

Example:

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

The following values are valid for:

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

Premium compact	Permissible duty cycle [%]	Cycle time [min]
160/4	≤ 70	3–20
200/4	≤ 70	3–20
250/4	≤ 70	3–20
300/4	≤ 70	3–20

Tab. 22 Machine duty cycle

3 Safety and Responsibility

3.1 Basic instructions

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.



Disregard of warning or safety instructions can cause serious injuries!

- 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.
- Do not touch hot components during operation or after shutdown. Wait until they have cooled before touching!
These components include, for example, cylinder heads, compressed air lines, coolers, motors and machine heating systems.
- Always switch off the compressor and disconnect it from the mains power supply when not in use.
- In order to prevent injury, keep children away from the compressor work area and its associated compressed air equipment.
- Children are not allowed to operate the compressor.
- 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 take in toxic, acidic, flammable or 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.

3 Safety and Responsibility

3.5 Dangers

- 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 $V \leq 200$	Competent person (e. g. KAESER Service Technician)
	Compressors with type approval inspection (Ordinance on Industrial Safety and Health, annex 5 no. 25) PS x $V \leq 1000$	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 $V \leq 1000$	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 $V \leq 1000$	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. 23 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

Touching voltage carrying components can result in electric shocks, burns or death.

- Allow only qualified and authorized electricians or trained personnel under the supervision of a qualified and authorized electrician to carry out work on electrical equipment according to electrical engineering regulations.
- Before commissioning or re-commissioning the machine, 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 isolator and check that no voltage is present.
- Switch off any external power sources.
These could be connections to floating relay contacts or the electrical machine heating, for example.
- Use fuses corresponding to machine power.
- Check regularly that all electrical connections are tight and in proper condition.

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 distribution network to ensure that no compressed air can flow back into the machine.
- De-pressurise all pressurised components and enclosures.
- 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

The composition of the compressed air must be suitable for the actual application in order to preclude health and life-threatening dangers.

- 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 foodstuff-compatible cooling oil whenever compressed air is to come into contact with foodstuffs.

Spring forces

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

Solenoid valves and check valves are spring-loaded.

- Do not open or dismantle any valves.

Rotating components

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

3 Safety and Responsibility

3.5 Dangers

- Do not open the enclosure while the machine is switched on.
- Switch off and lock out the power supply disconnecting device and verify the absence of any voltage.
- Wear close-fitting clothes and a hair net if necessary.
- Make sure all covers and safety guards are in place and secured before re-starting.

Temperature

High temperatures are generated during compression. Touching hot components may cause injuries.

- 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

The enclosure absorbs the machine noise to a tolerable level. This function will be effective only if the enclosure is closed.

- Operate the machine only with intact sound insulation.
- Wear hearing protection if necessary.
The pressure relief valve blowing off can be particularly loud.

Operating fluids/materials

The used operating fluids and materials can cause adverse health effects. Suitable safety measures must be taken in order to prevent injuries.

- Strictly forbid fire, open flame and smoking.
- Follow safety regulations when dealing with oils, 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

Unsuitable spare parts compromise the safety of the machine.

- Use only spare parts approved by the manufacturer for use in this machine.
- Use only genuine KAESER pressure components.

Conversion or modification of the machine

Modifications, additions to and conversions of the machine can result in unpredictable dangers.

- Do not convert or modify the machine!
- Obtain written approval by the manufacturer prior to any technical modification or expansion of the machine.

Extending or modifying the compressed air system

If dimensioned appropriately, pressure relief valves reliably prevent an impermissible rise in pressure. New dangers may arise if you modify or extend the compressed air station.

- When extending or modifying the compressed air system.
Check the blow-off capacity of pressure relief valves on air receivers and compressed air lines before installing a new machine.
- If the blow-off capacity is insufficient:
Install pressure relief valves with larger blow-off capacity.

3.5.2 Safe machine operation

The following is information supporting you in the safe handling of the machine during individual product life phases.

Personal protective equipment

When working on the machine you may be exposed to dangers that can result in accidents with severe adverse health effects.

- Wear protective clothing as necessary.

Suitable protective clothing (examples):

- Safety work wear
- Protective gloves
- Safety boots
- Eye protection
- Ear protection

Transport

The mass and size of the machine require safety measures during its transport to prevent accidents.

- Use suitable lifting gear that conforms to local safety regulations.
- Allow transportation only by personnel trained in the safe movement of loads.
- Attach lifting gear only to suitable lifting points.
- Be aware of the centre of gravity to avoid tipping.
- Make sure the danger zone is clear of personnel.
- Do not step onto machine components to climb up the machine.

Assembly

- Use only electrical cables that are suitable and approved for the surroundings and electrical loads applied.
- Never dismantle compressed air pipes until they are fully vented.
- Only use pressure lines that are suitable and approved for the maximum working pressure and the intended medium.
- Do not allow connection pipes to be placed under mechanical stress.
- Do not induce any forces into the machine via the connections, so that the compressive forces must be balanced by bracing.

3 Safety and Responsibility

3.5 Dangers

Installation

A suitable installation location for the machine prevents accidents and faults.

- Install the machine in a suitable compressor room.
- Ensure sufficient and suitable lighting such that the display can be read and work carried out comfortably and safely.
- Ensure accessibility so that all work on the machine can be carried out without danger or hindrance.
- 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.
- Place the machine in such a manner that the working conditions in its environment are not impaired.
- Comply with limit values for ambient temperature and humidity.
- The intake air must not contain any damaging contaminants,
Damaging contaminants are for instance: explosive or chemically instable gases and vapours, acid or base forming substances such as ammonia, chlorine or hydrogen sulfide.
- Do not position the machine in the warm exhaust air flow from other machines.
- Keep suitable fire extinguishing agents ready for use.

Commissioning, operation and maintenance

During commissioning, operation and maintenance you may be exposed to dangers resulting from, e.g., electricity, pressure and temperature. Careless actions can cause accidents with severe adverse effects for your health.

- Allow maintenance work to be carried out only by authorised personnel.
- Wear close-fitting, flame-resistant clothing. Wear protective clothing as necessary.
- Switch off and lock out the power supply disconnecting (isolating) device and check that no voltage is present.
- Check that there is no voltage on potential-free contacts.
- Close shut-off valves or otherwise isolate the machine from the compressed air network to ensure that no compressed air can flow back into the machine.
- De-pressurise all pressurised components and enclosures.
- Allow the machine to cool down.
- Do not open the cabinet while the machine is switched on.
- Do not open or dismantle any valves.
- Use only spare parts approved by KAESER for use in this machine.
- Carry out regular inspections:
for visible damages,
of the safety installation,
of the mains power switch,
of parts needing monitoring.
- Pay particular attention to cleanliness during all maintenance and repair work. Cover components and openings with clean cloths, paper or tape to keep them clean.

3 Safety and Responsibility

3.6 Safety Devices

- Do not leave any loose components, tools or cleaning rags on or in the machine.
- Components removed from the machine can still be dangerous.
Do not attempt to open or destroy any components taken from the machine.

De-commissioning, storage and disposal

Improper handling of old operating fluids and components represent a danger for the environment.

- Drain off fluids and dispose of them 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.

3 Safety and Responsibility

3.8 Information signs

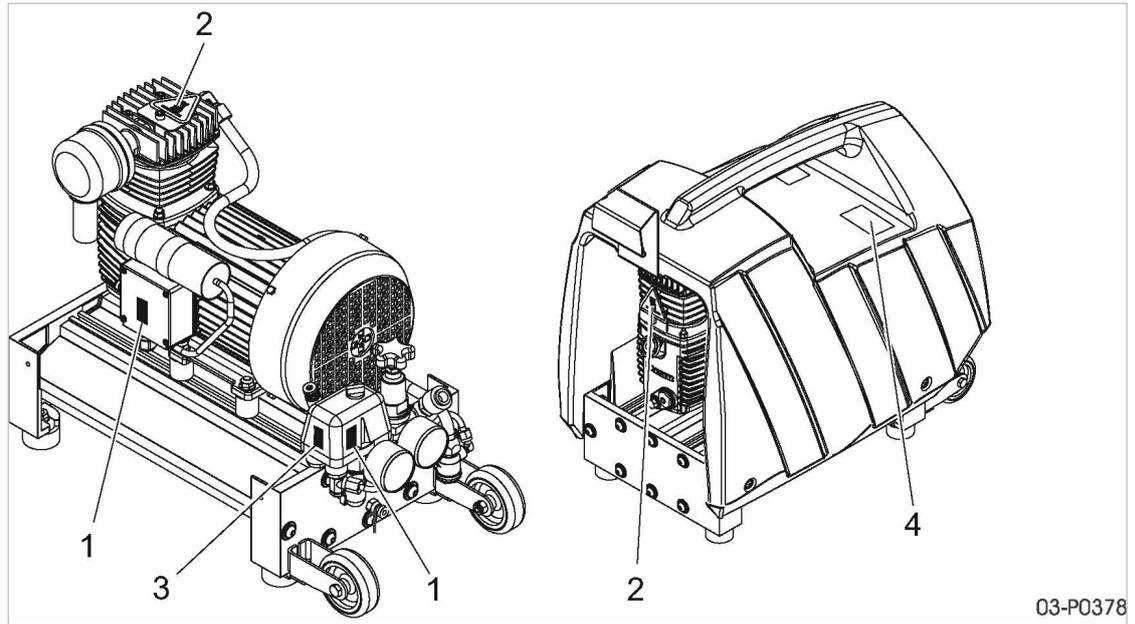


Fig. 1 Location of safety signs

Item	Sign	Meaning
1		<p>Danger of fatal injury from electric shock!</p> <ul style="list-style-type: none"> ➤ Before beginning any work on electrical equipment: Switch off the mains disconnecting device, lock it in the off position and check that the machine is free of voltage.
2		<p>Hot surface!</p> <p>Risk of burns caused by contact with hot components</p> <ul style="list-style-type: none"> ➤ Do not touch the surface. ➤ Wear long-sleeved garments (not synthetics such as polyester) and protective gloves.
3		<p>Risk of injury caused by an automatic machine start!</p> <ul style="list-style-type: none"> ➤ Switch off and lock out the mains isolating devices and check that no voltage is present before opening any machine enclosure or guard.
4		<p>Weight</p> <p>Danger of injury from lifting or carrying the machine.</p> <ul style="list-style-type: none"> ➤ At least two persons should be used to carry the machine.

Tab. 24 Safety signs

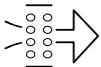
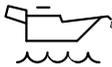
3.8 Information signs

The table lists the various information signs used and their meanings.

Sign	Meaning
	Take heed of safety instructions and the service manual.

3 Safety and Responsibility

3.9 In emergency

Sign	Meaning
	Maintain the air filter regularly.
	Drain the condensate daily. If automatic condensate drainage is fitted, check the function at regular intervals.
	Check the oil level regularly and change the oil at the correct intervals.

Tab. 25 Information signs

3.9 In emergency

3.9.1 Correct fire fighting

Suitable measures

Calm and prudent action can save lives in the event of a fire.

- Keep calm.
- Give the alarm.
- Shut off supply lines if possible.
Power supply disconnecting device (all phases)
Cooling water (if present)
- Warn and move endangered personnel to safety.
- Help incapacitated persons.
- Close the doors.
- When trained accordingly: Attempt to extinguish the fire.

Extinguishing substances

- Suitable extinguishing media:
Foam
Carbon dioxide
Sand or soil
- Unsuitable extinguishing media:
Strong jet of water

3.9.2 Treating injuries from handling cooling oil

Eye contact:

Compressor oil can cause irritation.

- Rinse open eyes thoroughly for a few minutes under running water.
- Seek medical help if irritation persists.

Skin contact:

Compressor oil may irritate after prolonged contact.

3 Safety and Responsibility

3.10 Warranty

- Wash thoroughly with skin cleaner, then with soap and water.
- Contaminated clothing should be dry-cleaned before reuse.

Inhalation:

Oil mist may make breathing difficult.

- Clear air passages of oil mist.
- Seek medical help if difficulty with respiration continues.

Ingestion

- Wash out the mouth immediately.
- Do not induce vomiting.
- Seek medical aid.

3.10 Warranty

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

A condition of our warranty is that the machine is used solely for the purpose for which it is intended and 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.

Furthermore, we accept no warranty obligation for:

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

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

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

3.11 Environment protection

The operation of this machine may cause dangers for the environment.

- Do not allow compressor oil to escape to the environment or into the waste water system.
- Store and dispose of operating materials and replaced parts in accordance with local environment protection regulations.
- Observe national regulations.
This applies particularly to parts contaminated with compressor oil.

4 Design and Function

4.1 Outline of the machine

4 Design and Function

4.1 Outline of the machine

4.1.1 Machine structure

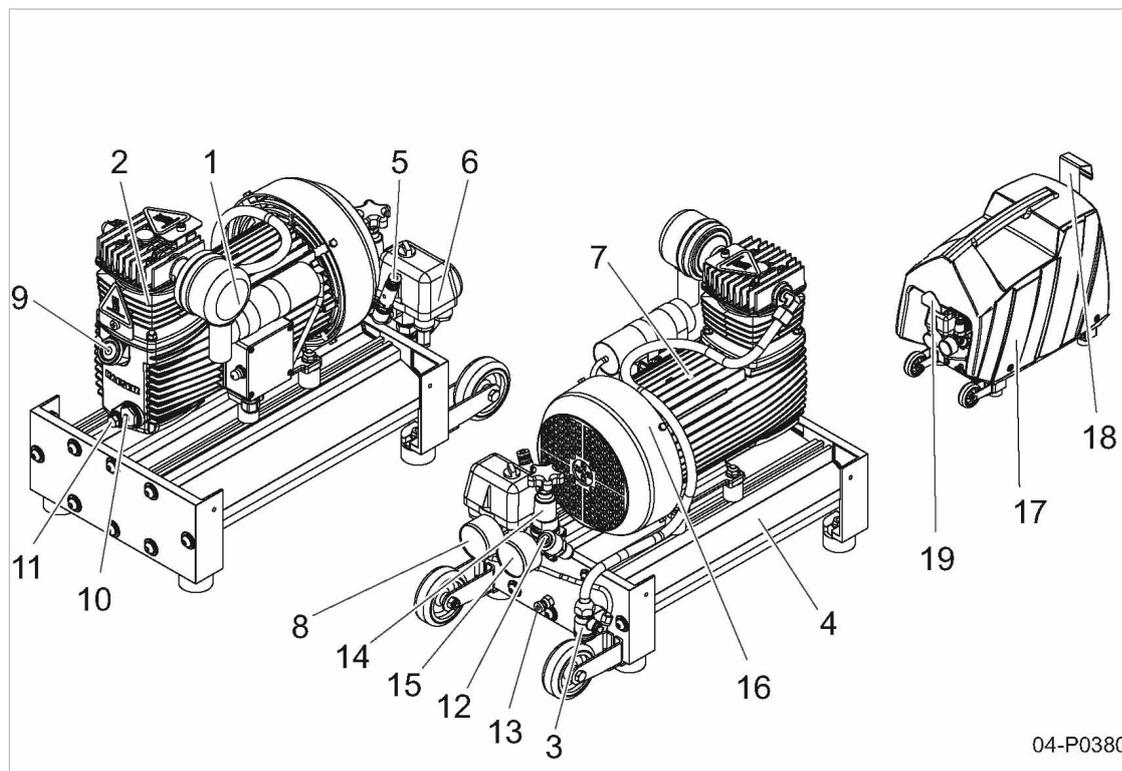


Fig. 2 Machine overview

- | | | | |
|---|------------------------------------|---|---------------------------|
| ① | Air filter | ⑪ | Oil drain plug |
| ② | Compressor block | ⑫ | Compressed air connection |
| ③ | Check valve | ⑬ | Condensate drain tap |
| ④ | Air receiver | ⑭ | Pressure regulator |
| ⑤ | Air receiver pressure relief valve | ⑮ | Working pressure gauge |
| ⑥ | Pressure switch | ⑯ | Fan with cowl |
| ⑦ | Electric motor | ⑰ | Plastic canopy |
| ⑧ | Air receiver pressure gauge | ⑱ | Handle with hose hook |
| ⑨ | Oil sight glass | | |
| ⑩ | Oil filler port | | |

4.1.2 Machine function

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 Design and Function

4.2 Operating modes and control modes

4.2 Operating modes and control modes

4.2.1 Machine operating modes

There are two operating modes:

- **LOAD**
The airend delivers compressed air.
The compressor motor runs under full load.
- **READY**
No air is compressed. A check valve prevents compressed air flowing back into the compressor block. The compressor block is vented.
The drive motor is stopped.

4.2.2 Control modes

- **Pressure switch:**
According to the set switching points, the pressure switch toggles the machine between operating modes LOAD and READY.

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 factory set.

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 Ensuring safety

The conditions in which the machine is installed and operated have a decisive effect on safety. Warning instructions are located before a potentially dangerous task.



Disregard of warning instructions can cause serious injuries!

Please take note of all safety instructions

Disregard of safety notes can cause unforeseeable dangers!

- 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.
- Do not store inflammable material in the vicinity 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 directive 94/9/EC "Equipment and Protective Systems intended for use in Potentially Explosive Atmospheres".
- Ensure sufficient and suitable lighting such that the display can be read and work carried out comfortably and safely.
- Keep suitable fire extinguishing agents ready for use.
- Ensure that required ambient conditions are maintained.

Required ambient conditions may be:

- Maintain ambient temperature and humidity
- Ensure the appropriate composition of the air within the machine room:
 - clean with no damaging contaminants (e.g., dust, fibres, fine sand)
 - free of explosive or chemically unstable gases or vapours
 - free of acid/alkaline forming substances, particularly ammonia, chlorine or hydrogen sulfide.

5.2 Installation conditions

Precondition The floor must be level, firm and capable of bearing the mass 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 Ensuring safety

Follow the instructions below for safe installation.

Warning instructions are located before a potentially dangerous task.



Disregard of warning instructions can cause serious injuries!

Complying with safety notes

Disregard of safety notes can cause unforeseeable dangers!

- Follow the instructions in chapter 3 'Safety and Responsibility'.
- Installation work may only be carried out by authorised personnel.
- Make sure that no one is working on the machine.
- Ensure that all service doors and panels are locked.

When working on live components

Touching voltage carrying components can result in electric shocks, burns or death.

- Work on electrical equipment may only be carried out by authorised electricians.
- Switch off and lock out the power supply disconnecting (isolating) device and check that no voltage is present.
- Check that there is no voltage on potential-free contacts.

When working on the compressed air system

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

- Isolate the machine from the air main by closing the user's shut-off valves.
- Vent all pressurized components and enclosures.
- Verify the absence of pressure using a suitable measuring device (pressure gauge).
- Do not open or dismantle any valves.

When working on the drive system

Touching voltage carrying components can result in electric shocks, burns or death.

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

Further information Details of authorised personnel are found in chapter 3.4.2.

Details of dangers and their avoidance are found in chapter 3.5.

6 Installation

6.2 Reporting Transport Damage

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 Connecting the machine with the compressed air network

Precondition The compressed air system is vented completely to atmospheric pressure.
Verify the absence of pressure using a suitable measuring device (pressure gauge).

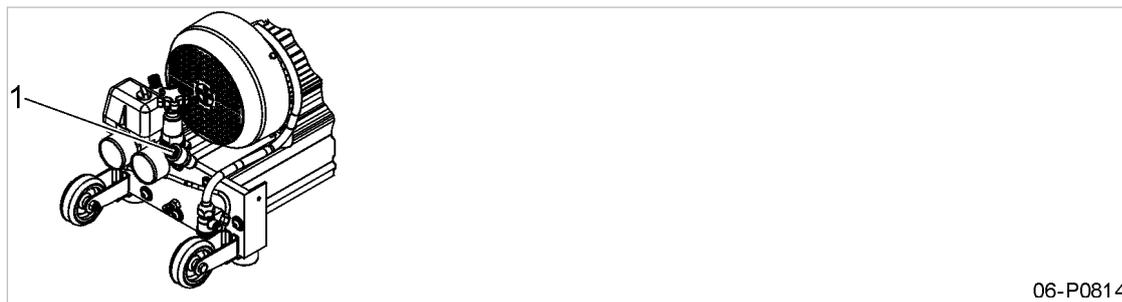


Fig. 3 Compressed air connection

- ① Compressed air connection

➤ Make the connection to the air main by a flexible pressure line.

6.4 Connecting the machine to 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 power supply is switched off,
the device is locked off,
the absence of any voltage has been verified.

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). Also observe the regulations of the local power utility company.
2. Test the overcurrent protection cut-out to ensure that the time it takes to disconnect in response to a fault is within the permitted limit.
3. Select supply cable conductor cross-sections and fusing in accordance with local regulations.
4. **DANGER!**
Danger of fatal injury from electric shock!
➤ Switch off and lock out the power supply isolating device and check that no voltage is present.
5. Connect the machine to the power supply.



7 Initial Start-up

7.1 Ensuring safety

Follow the instructions below for safe installation.

Warning instructions are located before a potentially dangerous task.



Disregard of warning instructions can cause serious injuries!

Complying with safety notes

Disregard of safety notes can cause unforeseeable dangers!

- Follow the instructions in chapter 3 'Safety and Responsibility'.
- Installation work may only be carried out by authorised personnel.
- Make sure that no one is working on the machine.
- Ensure that all service doors and panels are locked.

When working on live components

Touching voltage carrying components can result in electric shocks, burns or death.

- Work on electrical equipment may only be carried out by authorised electricians.
- Switch off and lock out the power supply disconnecting (isolating) device and check that no voltage is present.
- Check that there is no voltage on potential-free contacts.

When working on the compressed air system

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

- Isolate the machine from the air main by closing the user's shut-off valves.
- Vent all pressurized components and enclosures.
- Verify the absence of pressure using a suitable measuring device (pressure gauge).
- Do not open or dismantle any valves.

When working on the drive system

Touching voltage carrying components can result in electric shocks, burns or death.

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

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

Further information Details of authorised personnel are found in chapter 3.4.2.

Details of dangers and their avoidance are found in chapter 3.5.

7 Initial Start-up

7.2 Instructions to be observed before commissioning or re-commissioning

7.2 Instructions to be observed before commissioning or re-commissioning

Incorrect or improper commissioning can cause injury to persons and damage to the machine.

- Commissioning may only be carried out by authorized installation and service personnel who have been trained on this machine.

Special measures for re-commissioning after storage

Storage period longer than:	Remedy
12 months	<ul style="list-style-type: none">➤ Change the compressor oil.➤ Have the motor bearings checked by an authorized KAESER Service Technician.
36 months	<ul style="list-style-type: none">➤ Have the overall technical condition checked by an authorized KAESER Service Technician.

Tab. 26 Re-commissioning after storage

7.3 Checking installation and operating conditions

- Check and confirm all the items in the checklist before commissioning the machine.

To be checked	see chapter	Confirmed?
<ul style="list-style-type: none">➤ Are the operators fully conversant with safety regulations?	–	
<ul style="list-style-type: none">➤ Have all the positioning conditions been fulfilled?	5	
<ul style="list-style-type: none">➤ Does the rated voltage conform to the specifications on the name-plate?	2.1	
<ul style="list-style-type: none">➤ Are the power supply cable conductor cross-sections and fuse ratings adequate?	2.10	
<ul style="list-style-type: none">➤ Have all electrical connections been checked for tightness?➤ Has the inspection been repeated after 50 operating hours following the initial commissioning?	–	
<ul style="list-style-type: none">➤ Is the connection to the air network made with a flexible hose?	6.3	
<ul style="list-style-type: none">➤ Sufficient oil in the crankcase? (oil in the sight gauge red zone)➤ The oil must be changed after 50 operating hours	10.6	

Tab. 27 Checklist of installation conditions

7.4 Motor overload protection

The machine should only be operated with a correctly adjusted motor protection device 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 motor damage.

7 Initial Start-up

7.5 Measuring the air receiver charging time

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.



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

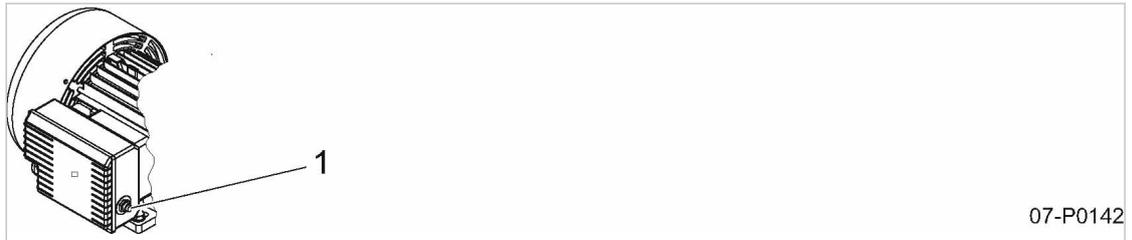


Fig. 4 Motor overload protection switch

- ① Trip button

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

7.5 Measuring the air receiver charging 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 isolating device.
3. Measure the air receiver charging time.
4. Enter the charging time and machine model in the table.

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

Tab. 28 Air receiver charging time

7.6 Setting the 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 under pressure is fitted.
Maximum pressure differential: 20% of the maximum operating pressure of the air receiver.

7 Initial Start-up

7.6 Setting the network pressure

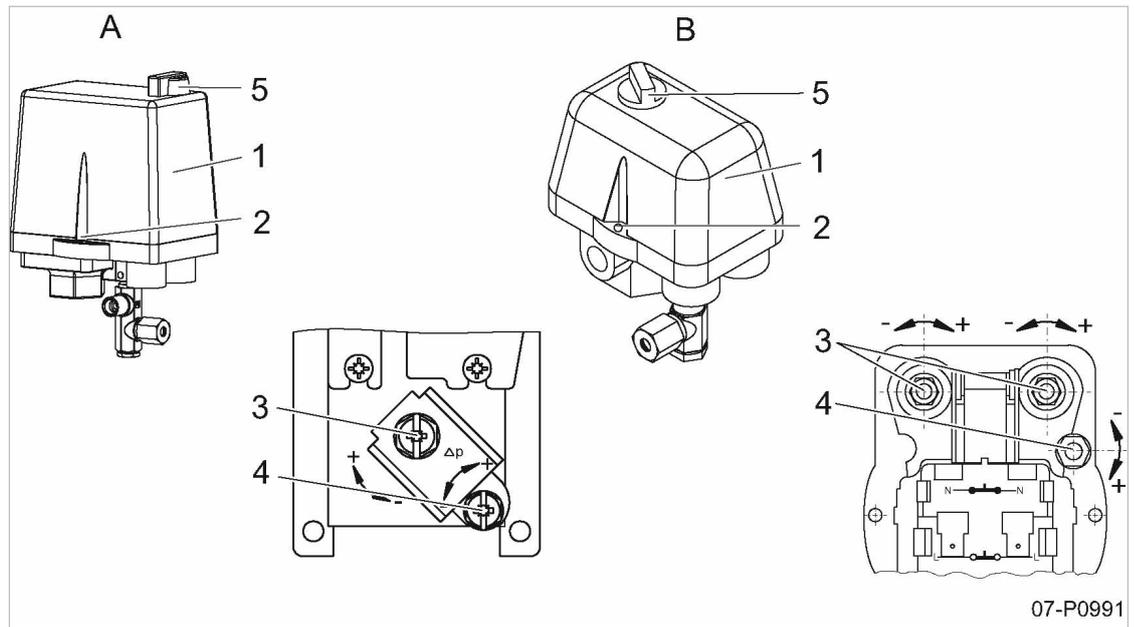


Fig. 5 Setting the network pressure

- | | |
|--|---|
| ① Canopy | ⑤ «ON/OFF» switch for direct online start |
| ② Screw | ① Premium compact 160/4 |
| ③ Adjusting screw for upper pressure (cut-out) | ② Premium compact 200/4 / 250/4 / 300/4 |
| ④ Pressure differential adjusting screw | |



- DANGER!**
Dangerous voltage!
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.

- Remove the screws securing the cover.
- 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.

- 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 (in the + direction).
Cut-out pressure is to be decreased.	➤ Turn the adjusting screw ③ anticlockwise (in the - direction).
The pressure differential between cut-in and cut-out pressure is to be increased.	➤ Turn the adjusting screw ④ clockwise (in the + direction).

7 Initial Start-up

7.7 Setting the pressure regulator

Adjusting the setting	Function
The pressure differential between cut-in and cut-out pressure is to be decreased.	► Turn the adjusting screw ④ anticlockwise (in the - direction).

Tab. 29 Changing the pressure switch setting

6. 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 2.12.
See table 11 for the motor starting frequency.

7.7 Setting the pressure regulator

The working pressure of a compressor fluctuates according to the limits set on the pressure switch. The pressure regulator unit reduces this fluctuation to the required pressure and holds it constant. A pressure adjustment is possible to suit individual operating conditions.



Pressure setting can only be adjusted when a pressure switch is fitted and under pressure.
Maximum range of adjustment: 0.5 bar – 20 bar

Precondition The machine is isolated from the air consumers.

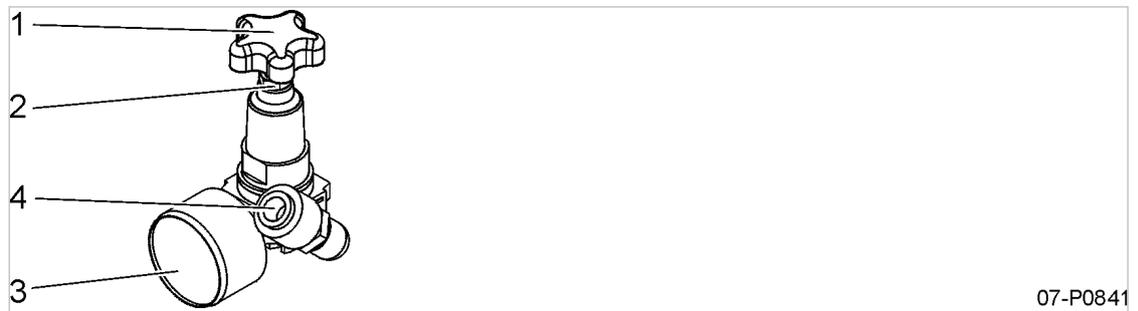


Fig. 6 Setting the pressure regulator

- | | |
|------------------|-------------------------------------|
| ① Adjusting knob | ③ Pressure gauge (working pressure) |
| ② Locking collar | ④ Compressed air outlet |

1. Start the machine and run it up to cut-out pressure.
2. To relieve the filter regulator, turn the adjusting knob anticlockwise until no more resistance is felt.
3. Turn the adjusting knob clockwise until the pressure gauge reads the required working pressure.
4. Tighten the locknut to fix the adjusting knob in position.

8 Operation

8.1 Switching on and off

Always switch the machine on and off with the ON/OFF switch. The «ON/OFF» switch is located on the pressure switch.

Precondition A power supply disconnecting device has been installed by the user.
The plastic canopy is in place.

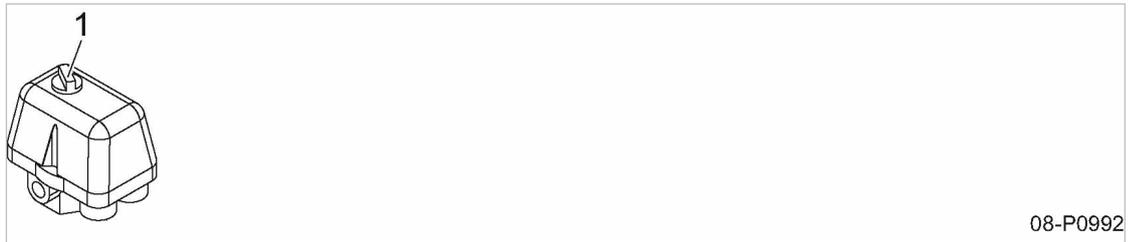


DANGER

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.



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Fig. 7 Switching on and off

① «ON/OFF» switch

Switching on



1. **WARNING!**

Compressed air!

Serious injury is possible.

- Never direct compressed air at persons or animals.
- Make sure that no one is working on the machine.

2. Switch on the power supply isolating device.

3. Switch on the compressor at the pressure switch.

The compressor motor starts so long as the network pressure is lower than the setpoint (cut-out pressure).

Switching off

1. Switch the machine off at the pressure switch.

2. Switch off and lock out the power supply isolating device.

9 Fault Recognition and Rectification

9.1 Basic instructions

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. In all other cases, have the fault rectified by an authorised KAESER Service Technician.

9.2 Alarms

Alarm	Possible cause	Remedy
Machine does not start.	A fuse has blown and the machine is shut down.	Check motor connections and fuses (circuit breakers).
	Defective pressure switch contact.	Replace the pressure switch.
	Motor overload protection has tripped.	Allow the motor to cool down.
	Compressor motor defective: Bearing damage or winding short-circuit.	Contact KAESER Service.
	Compressor block defective.	Contact KAESER Service.
Machine starts with difficulty.	Venting valve on the pressure switch not opening.	Maintain or replace the unloading valve.
	Bearing damage.	Contact KAESER Service.
	Piston seized due to insufficient or incorrect oil.	Contact KAESER Service.
	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.
	Valves* or valve plate between cylinder head and cylinder are leaking or dirty.	Contact KAESER Service.
	Outlet valve reed broken.	Contact KAESER Service.
Motor overload protection trips out after a short time.	Fault in the power supply.	Check power supply.
	Motor fault.	Contact KAESER Service.
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.

* depending on machine

9 Fault Recognition and Rectification

9.2 Alarms

Alarm	Possible cause	Remedy
The machine runs continuously but maximum pressure is not reached.	Air filter clogged.	Maintain or replace the air filter.
	Valves* or valve plate between cylinder head and cylinder are leaking or dirty.	Contact KAESER Service.
	Outlet valve reed broken.	Contact KAESER Service.
	Machine leaks air.	Seal the leaks or replace the components.
	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 defective.	Replace the check valve.
The venting valve loses air while the machine is running.	The venting valve is not closing.	Maintain or replace the unloading valve.
The pressure switch does not vent after switching off.	Venting valve dirty.	Maintain or replace the unloading 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.	Maintain or replace the unloading valve.
Whistling sound from the cylinder head.	Cylinder head fixing screws loose.	Tighten the cylinder head fixing screws.
	Gasket defective.	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 safety relief valve.
	Dirt or foreign bodies on the valve seat.	Let the pressure relief valve blow off briefly.
Pressure relief valve on the air cooler blows off prematurely.	Cooler clogged. Cooler pipe blocked with scale.	Cooler maintenance.
Machine uses too much oil.	Viscosity too low.	Fill with oil specified in the service manual.
	Crankcase vent defective.	Maintain or replace crankcase vent.
	Piston rings worn or broken.	Contact KAESER Service.
Piston rings worn or damaged after a short operational period.	Dirty oil.	Fit finer air inlet filter.
* depending on machine		

Tab. 30 Alarms and remedies

10 Maintenance

10.1 Ensuring safety

Follow the instructions below for safe installation.

Warning instructions are located before a potentially dangerous task.



Disregard of warning instructions can cause serious injuries!

Complying with safety notes

Disregard of safety notes can cause unforeseeable dangers!

- Follow the instructions in chapter 3 'Safety and Responsibility'.
- Allow maintenance work to be performed by authorised personnel only.
- Make sure that no one is working on the machine.
- Ensure that all service doors and panels are locked.

When working on live components

Touching voltage carrying components can result in electric shocks, burns or death.

- Work on electrical equipment may only be carried out by authorised electricians.
- Switch off and lock out the power supply disconnecting (isolating) device and check that no voltage is present.
- Check that there is no voltage on potential-free contacts.

When working on the compressed air system

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

- Isolate the machine from the air main by closing the user's shut-off valves.
- Vent all pressurized components and enclosures.
- Verify the absence of pressure using a suitable measuring device (pressure gauge).
- Do not open or dismantle any valves.

When working on the drive system

Touching voltage carrying components can result in electric shocks, burns or death.

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

Further information Details of authorised personnel are found in chapter 3.4.2.

Details of dangers and their avoidance are found in chapter 3.5.

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 10.15.

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 h	Check the oil level.	10.6
	Drain off condensate from the receiver.	10.10
Annually	Carry out air filter maintenance	10.4
	Maintain the check valve.	10.12
	Check that all electrical connections are tight.	–
	Check the pressure relief valve.	10.9
Variable, see table 32	Change the cooling oil.	10.8

h = operating hours

Tab. 31 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 32 for future reference.

	Maximum permissible oil change interval [operating hours/years]	
	Favourable operating conditions*	My operating conditions
Compressor oil		
SAE 5 W30	1000/2	
FGP	1000/2	

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

Tab. 32 Oil change intervals

10 Maintenance

10.3 Fan cowl maintenance

10.2.4 Regular service tasks

- Only an authorized 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.
Up to 12,000 h	Have the machine generally overhauled.

h = operating hours

Tab. 33 Regular service tasks

10.3 Fan cowl maintenance

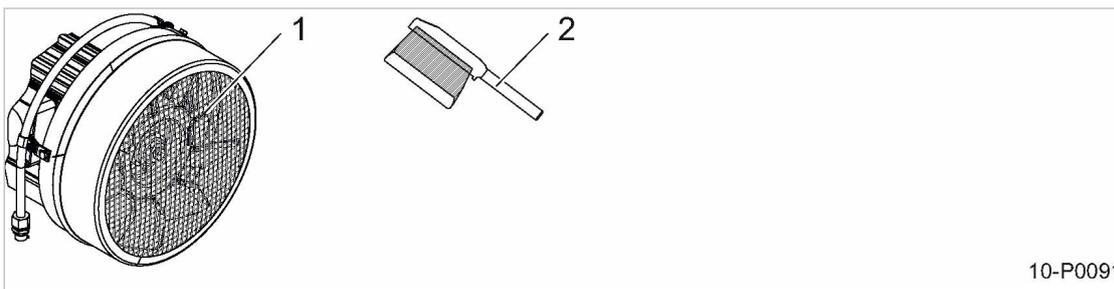


Clogging causes overheating and machine damage.

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
As required: Respiratory protection

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.



10-P0091

Fig. 8 Cleaning the fan cowl

- ① Fan with cowl
- ② Brush

10.3.1 Cleaning the fan cowl

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

Avoid creating clouds of dust.

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

10 Maintenance

10.4 Air filter maintenance



The fan cowl can't be cleaned thoroughly?

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

10.4 Air filter maintenance

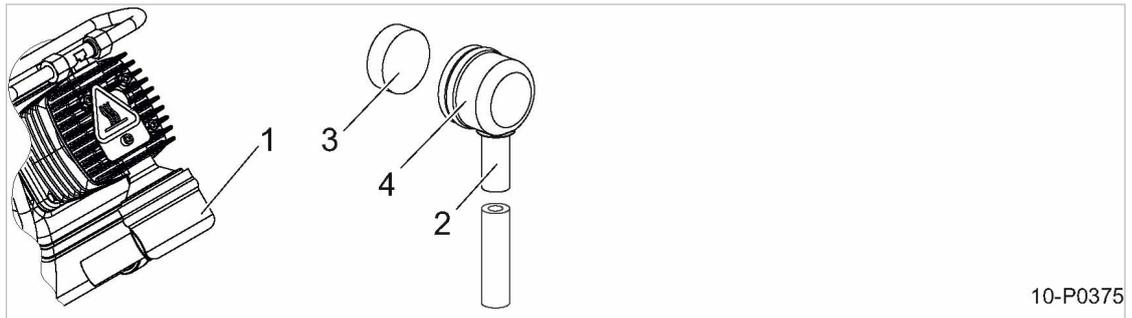
The air filter element is made of foam.



Replace the element if it has already been cleaned a number of times.

Material Compressed air for blowing out
Solvent cleaner
Spares as required

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



10-P0375

Fig. 9 Air filter maintenance

- | | | | |
|---|-------------------|---|--------------------|
| ① | Air filter | ③ | Air filter element |
| ② | Inlet air opening | ④ | Air filter housing |

1. Take off the filter housing.
2. Withdraw the filter insert.
3. Clean the filter insert with a solvent-based cleaner.
4. Clean the housing and sealing faces.
5. Insert the dried filter element in the housing and replace the housing on the cylinder head.
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 Drive motor maintenance

The drive motor bearings are permanently greased. Re-greasing is not necessary.

- Have the motor bearings checked by KAESER Service.

10 Maintenance

10.6 Checking the oil level

10.6 Checking the oil level

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

Precondition The machine is switched off.

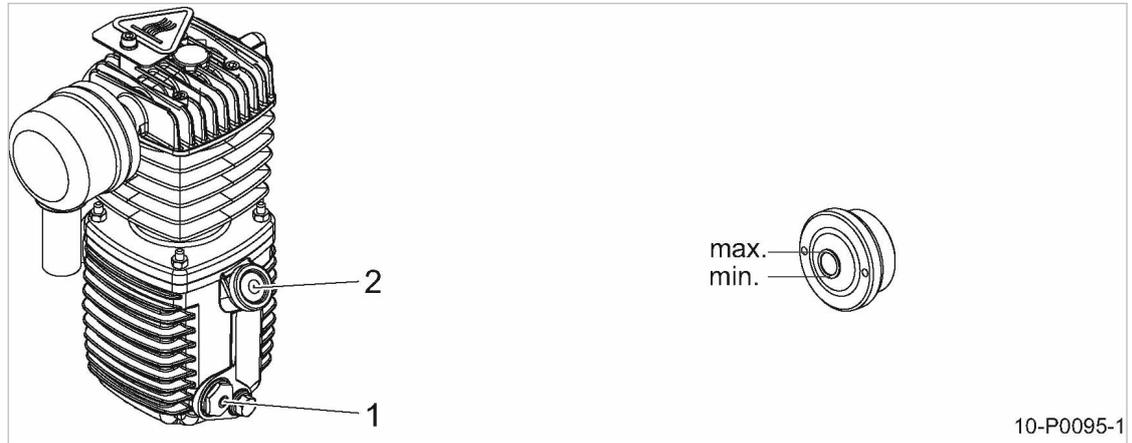


Fig. 10 Checking the oil level

- ① Oil sight glass
- ② Oil filler and crankcase vent

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

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

10.7 Topping up the compressor oil

Material Compressor oil

Precondition The supply disconnecting device is switched off.
The disconnecting 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.

10 Maintenance

10.8 Changing the compressor oil



Fig. 11 Topping up the compressor oil

① Crankcase vent

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.

10.8 Changing the compressor oil

Change the initial charge of oil as specified in table 31 .
Always drain the oil completely from the compressor block.



Change the oil immediately if it becomes milky.
This indicates a high condensate content.
Contact KAESER Service if condensate is detected in the oil.

Material Compressor oil
Oil receptacle

Precondition Machine at operating temperature.
The supply disconnecting device is switched off,
the device is locked off,
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.

10 Maintenance

10.9 Checking the pressure relief valve



Fig. 12 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 again, if necessary.
4. Switch off the machine and check visually for leaks.

10.9 Checking the pressure relief valve

- To test the pressure relief valve, it must be removed from the machine by a KAESER Service Technician and installed on a test rig.

Further information Details about the activating pressure of the pressure relief valve are found in chapter 2.6.

10.9.1 Air receiver pressure relief valve

To prevent the pressure relief valve's seat from sticking, activate the valve at regular intervals or at least once a year.

10 Maintenance

10.10 Air receiver maintenance



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 Machine under LOAD deactivated.
The power supply isolating device is switched off, the device is locked off, the absence of any voltage has been verified.



Fig. 13 Checking pressure relief valve on the air receiver

- ① Pressure relief valve
- ② Knurled knob



1. **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 with caution.
2. Close the user's shut-off valve between the machine and the air main.
3. Turn the knurled knob on the pressure relief valve anticlockwise until air blows off.
4. Then turn the knurled knob back to its original position.
5. 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.

10.10 Air receiver maintenance

Material Collection chamber

Checking the air receiver

Pressure vessels must be inspected at regular intervals in accordance with legal requirements.

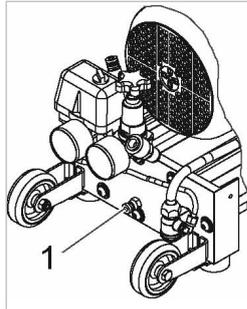
- Observe relevant national regulations.

Draining condensate

Some of the moisture contained in the compressed air precipitates out in the air receiver.

10 Maintenance

10.11 Venting the machine (de-pressurising)



10-P0667-8

Fig. 14 Draining condensate

① Condensate drain tap

➤ Drain the condensate out daily.



Drain the condensate into a suitable receptacle and dispose of according to environmental regulations.

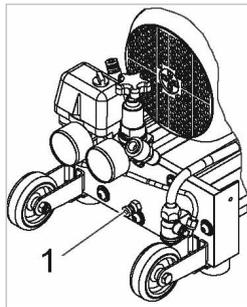
10.11 Venting the machine (de-pressurising)

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 power supply isolating device is switched off, the device is locked off, the absence of any voltage has been verified. The machine has cooled down.



10-P0667-8

Fig. 15 Venting the machine

① Condensate drain tap



1. **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.

2. Open the condensate outlet slowly to release pressure.

3. Verify the absence of pressure using a suitable measuring device (pressure gauge).



The machine is not de-pressurised after having been vented?

Shut-off valve still open.

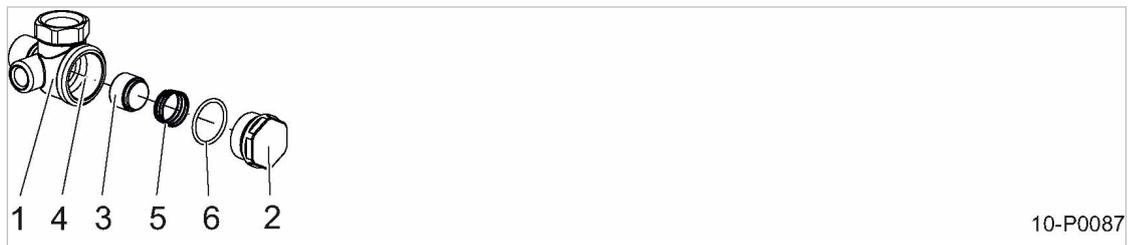
- Defective condensate drain.
- If manual venting does not attain de-pressurisation: Contact the authorised KAESER Service.

10.12 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 power supply isolating device is switched off, the device is locked off, the absence of any voltage has been verified.
The machine is fully vented (no pressure).
Verify the absence of pressure using a suitable measuring device (pressure gauge).
The machine has cooled down.
User's shut-off valve between the machine and the air network is closed.



10-P0087

Fig. 16 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 with caution.

- Remove the plug.
- Clean the valve cone and seat.



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

- Insert the valve cone, spring and O-ring in the valve seat.
- Close the check valve with screw plug and O-ring.

10 Maintenance

10.13 Maintenance of the pressure switch unloading valve

10.13 Maintenance of the pressure switch unloading valve

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

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 power supply isolating device is switched off, the device is locked off, the absence of any voltage has been verified.
The machine is fully vented (no pressure).
Verify the absence of pressure using a suitable measuring device (pressure gauge).
The machine has cooled down.

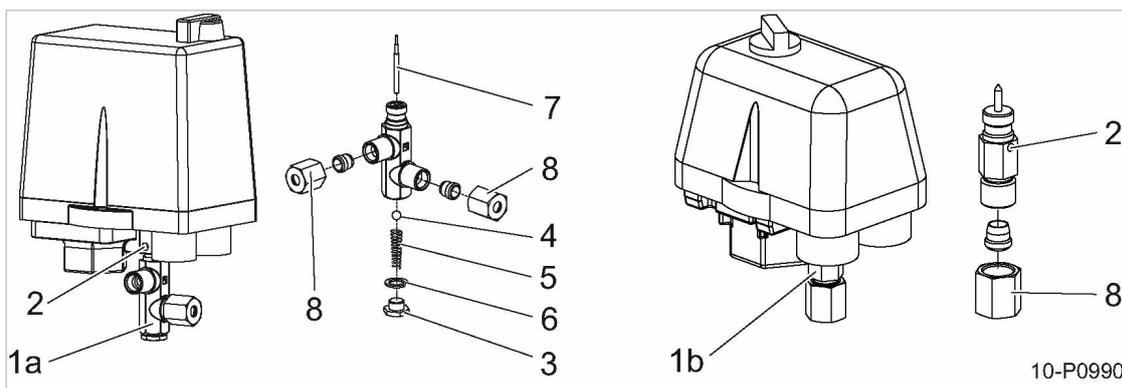


Fig. 17 Maintenance of the pressure switch unloading valve

- | | |
|---|------------------|
| 1a) The unloading valve can be cleaned. | 5) Spring |
| 1b) The unloading valve must be replaced. | 6) Gasket |
| 2) Screw | 7) Pin |
| 3) Screw plug | 8) Screw fixings |
| 4) Ball | |

Unloading valve (1a) can be cleaned	Unloading valve (1b) must be replaced
<p>○ I</p> <p>Open the valve carefully.</p> <ol style="list-style-type: none"> 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 unloading valve and tighten down with the screw. 	<ol style="list-style-type: none"> 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.

10.14 Cylinder head and valves

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

Precondition Machine at operating temperature.

➤ Start the machine and measure the receiver charging time.

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

Further information See chapter 7.5 for air receiver charging time measurement.

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 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.

Personal injury may result from machine damage.

- Use only original KAESER parts and operating fluids/materials.
- Have an authorised KAESER Service Technician carry out regular maintenance.

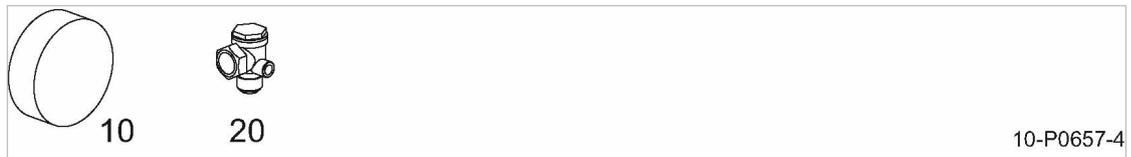


Fig. 18 Consumable parts

10 Air filter element

20 Check valve

Machine

Name	Quantity	Number
Air filter element	1	10
Check valve	1	20
Compressor oil SAE 5 W30	0.5l	9.4943.00010
Compressor oil FGP	1.0l	9.0874.0

Tab. 35 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,

11 Spares, Operating Materials, Service

11.4 Service Addresses

- The security of genuine KAESER spares.
- Increased legal certainty as all regulations are kept to.
- It make sense to sign a KAESER AIR SERVICE maintenance agreement.
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 Spares for service and repair



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

12 Decommissioning, Storage and Transport

12.1 Decommissioning

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 sufficient corrosion protection.

Long-term de-commissioning

Precondition The machine must have run for at least 30 minutes before before long-term de-commissioning.

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

The machine is fully vented (depressurized).

Verify the absence of pressure using a suitable measuring device (pressure gauge).

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



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

3. Drain all 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.

Other measures must be taken for the transport of machines by sea or air. Please contact KAESER Service for more information.

Material Desiccant
Plastic sheeting
Wooden crate

Precondition The machine is decommissioned.

Machine is dry and cooled down.

1. Wrap the machine fully in plastic sheeting.
2. Place sufficient desiccant (e.g. silica gel) inside the plastic sheeting.
3. Protect the machine in a wooden crate against mechanical damages.

12.3 Storage

Moisture can lead to corrosion, particularly on the surfaces of the compressor block.

Frozen moisture can damage components, valve diaphragms and gaskets.



Please consult with KAESER if you have questions to the appropriate storage and commissioning.



1. **NOTICE!**
Moisture and frost can damage the machine!
 - Prevent ingress of moisture and formation of condensation.
 - Maintain a storage temperature of >0 °C.
2. Store the machine in a dry, frost-proof room.

12.4 Transporting

12.4.1 Safety

Avoid damaging the machine.



1. **CAUTION!**
Danger of injury from heavy weight!
 - Only lift or carry the machine briefly and only if body condition allows.
 - Observe local accident prevention regulations
2. If necessary, use two people to carry the machine.



A handle and wheels are provided to assist in transporting.

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

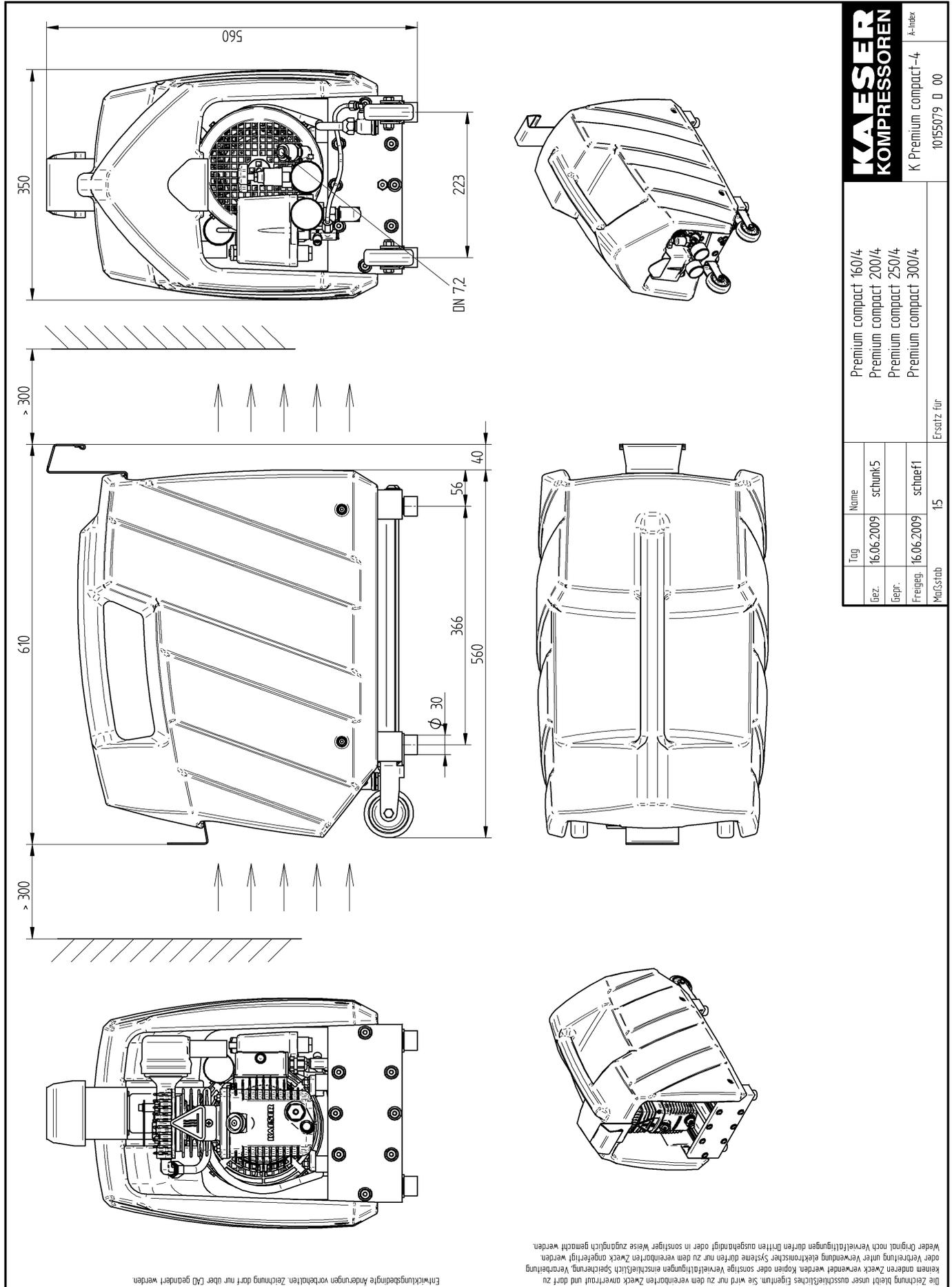
13.1 Dimensional Drawing

13 Annex

13.1 Dimensional Drawing

13 Annex

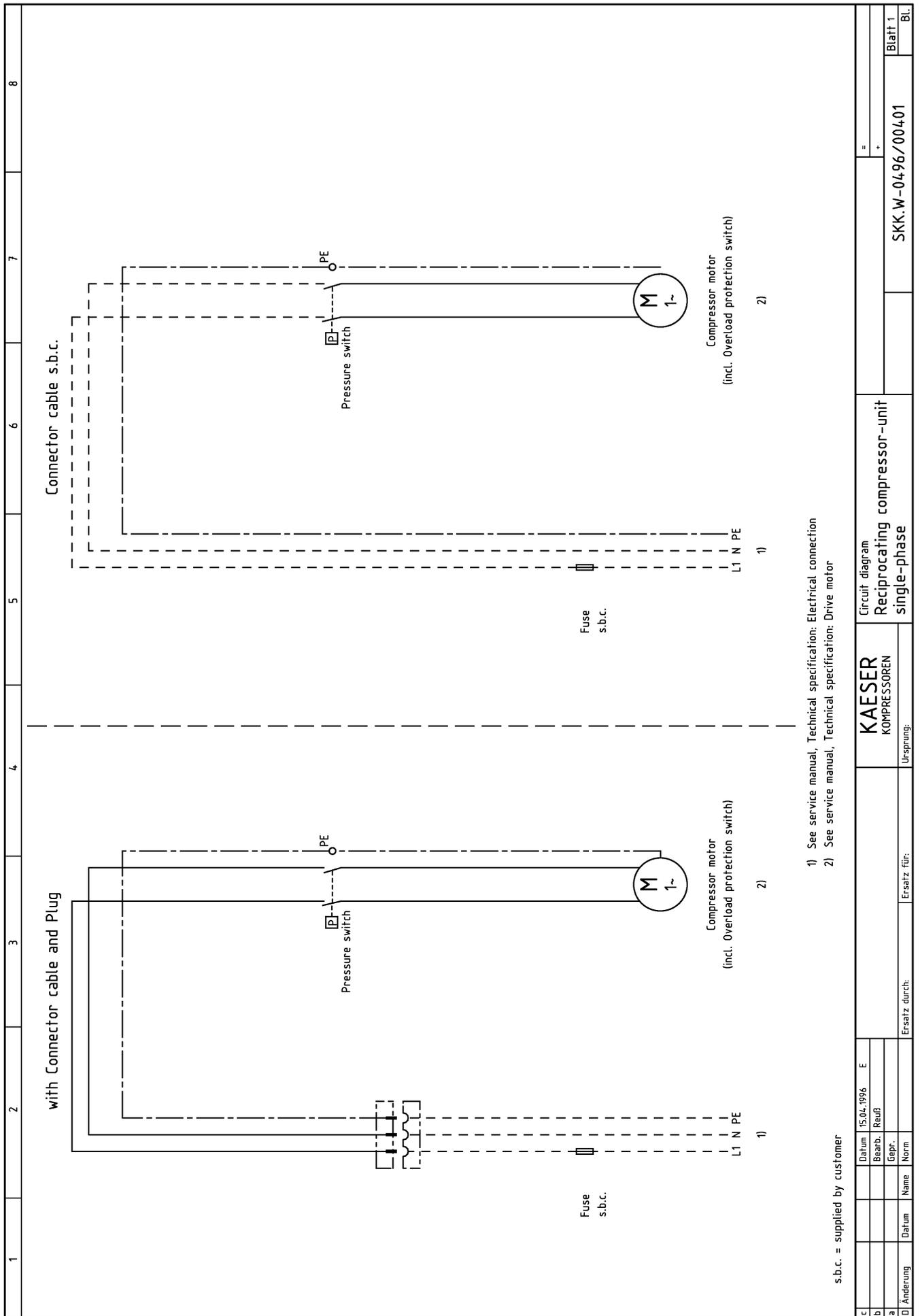
13.1 Dimensional Drawing



13.2 Electrical Diagram

13 Annex

13.2 Electrical Diagram



13 Annex

13.2 Electrical Diagram
