

# Operator Manual

## Screw Compressor

**SM** Tri-Voltage, SIGMA CONTROL BASIC

9\_5869 33 USE

Manufacturer:

**KAESER KOMPRESSOREN SE**

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Original instructions  
/KKW/SSM 2.13 en Z1 SBA-SCHRAUBEN-TRI-VOLTAGE-SCB

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# 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

Further documents included with this operator manual are:

- Certificate of acceptance / operating instructions for the pressure vessel

Missing documents can be requested from KAESER.

- Make sure all documents are complete and observe the instructions contained in them.
- Make sure you provide 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 disregard
DANGER	Warns of an imminent danger	Will result in death or severe injury
WARNING	Warns of a potentially imminent 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**

*The type and source of the imminent danger is shown here!*

*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** *The type and source of the imminent danger is shown here!*  
*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 disregard
NOTE	Warns of a potentially dangerous situation	Damage to property is possible

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

Example:

### **NOTICE**

*The type and source of the imminent danger is shown here!*

*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.

- 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.  
The conditions relevant to safety shown here 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 machine mountings). Option codes used in this operator manual are explained in chapter 2.2.
-  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 Data

### 2.1 Nameplate

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

The nameplate is located on the outside of the machine:

- above the cooler,  
or
- on the rear of the machine.

➤ Enter here the nameplate data as a reference:

Characteristic	Value
Screw Compressor	
Part no.	
Year	
Serial no.	
psig	
cfm	
Voltage	
Hz/RPM	
Package FLA	
Phase	
HP	
Wiring Diagram	
FOR SERVICE, REFER TO EQUIPMENT NUMBER	

Tab. 3 Nameplate

### 2.2 Options

The table contains a list of possible options.

➤ Enter options here as a reference:

Option	Option code	Available?
MODULATING control	C1	
IT-three-phase network	C35	—
Bolt-down machine feet	H1	
Air-cooling	K1	✓
Transformer power supply for refrigerated dryer	T2	—
Refrigerated dryer	T3	—
installed: ✓		
not available: —		

Option	Option code	Available?
Prepared for heat recovery	W1	
installed: ✓		
not available: —		

Tab. 4 Options

## 2.3 Weight

The weight given is the maximum. Actual weights of individual machines are dependent on equipment fitted.

	SM 7.5	SM 10	SM 15
Weight [lb]	441	463	485

Tab. 5 Machine weight

## 2.4 Temperature

	SM 7.5	SM 10	SM 15
Minimum cut-in temperature [°F]	40	40	40
Typical airend discharge temperature during operation [°F]	149 – 200	149 – 200	149 – 200
Maximum. airend discharge temp. (automatic shut-down) [°F]	230	230	230

Tab. 6 Temperature

## 2.5 Ambient conditions

	SM 7.5	SM 10	SM 15
Maximum elevation amsl [ft]	3000	3000	3000
Permissible ambient temperature [°F]	40 – 115	40 – 115	40 – 115
Cooling air temperature [°F]	40 – 115	40 – 115	40 – 115
Intake air temperature [°F]	40 – 115	40 – 115	40 – 115

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

Tab. 7 Ambient conditions

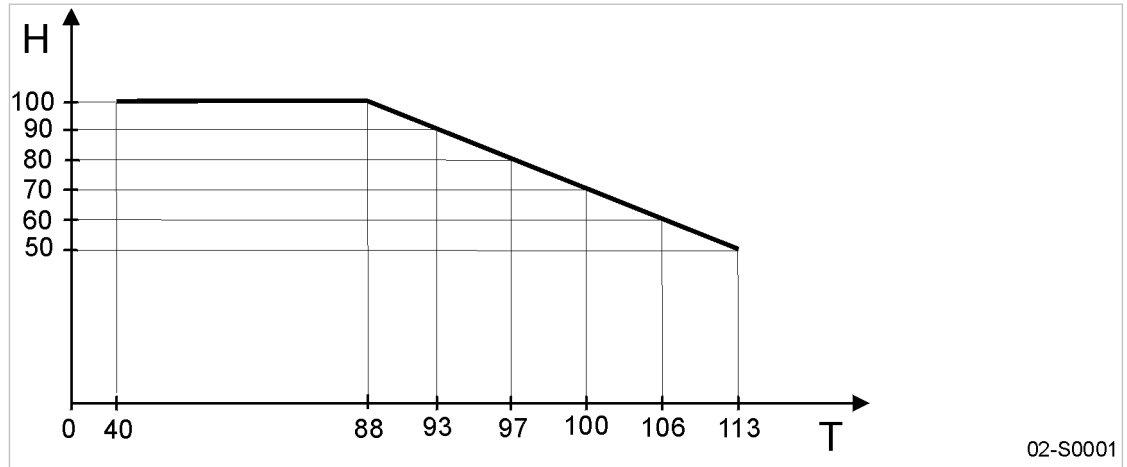


Fig. 1 Maximum relative humidity of intake air

- T** Intake air temperature [°F]
- H** Maximum relative humidity of intake air [%]

## 2.6 Ventilation

The values given are minimum guide values.

	SM 7.5	SM 10	SM 15
Inlet aperture $\square$ see figure 10 [ft <sup>2</sup> ]	2.2	2.7	3.2
Forced ventilation with exhaust fan: Flow rate [cfm] at 0.0145 psi	1530	1825	2178

Tab. 8 Overview Ventilation

## 2.7 Pressure

Maximum working pressure: see nameplate

Safety relief valve activating pressure [psig]:

Maximum working pressure [psig]	SM 7.5	SM 10	SM 15
125	150	150	150
160	230	230	230
217	232	232	232

Tab. 9 Safety relief valve activating pressure



## 2.8 Delivery

### Free air delivery [cfm]

Max. working pressure [psig]	SM 7.5	SM 10	SM 15
125	32	42	53
160	27	35	44
217	19	27	34

Free air delivery as per ISO 1217:2009, Annex C

Tab. 10 Free air delivery

## 2.9 Cooling Oil Recommendation

A sticker showing the type of oil filled is located near the oil separator filler.

Information for ordering cooling oil can be found in chapter 11.

### 2.9.1 Basic Information

Lubrication of an air compressor is essential to reliable operation. Carbon and varnish can form in compressor cooling oils. These deposits block the flow of lubricant and cause excessive wear and failure of moving parts. Contamination of the lubricant can allow the formation of acids, causing extensive internal corrosion. Water may be condensed decreasing the lubricity.

Lubricants in rotary compressors do much more than lubricate. During the compression process, it acts as a sealant in the airend which is important for maximum efficiency. The lubricant also absorbs much of the heat of compression to cool the airend and reduce the temperature of the compressed air. It's not enough that a compressor cooling oil lubricates well, it must stand up to the heat, pressure and contaminants that are present in every air compressor.

### 2.9.2 KAESER Lubricants

KAESER synthetic lubricants should be stored in a protected location to prevent contamination. Do not re-use drums; flush and send to reconditioner.

Although the KAESER synthetic is not highly flammable, it will burn. While KAESER synthetic compressor cooling oil is less flammable than equal viscosity mineral oils, it cannot be classified as a fire-resistant fluid. It has a flash point above 460 °F. Since the user has total control over the conditions of the compressor lubricant, he assumes total responsibility for its safe usage.

Material Safety Data Sheets are available for each lubricant from your authorized KAESER Service representative.

Regardless of the lubricant selected, the KAESER SIGMA lubricants will separate readily from water. If condensate occurs it can easily be removed. Let the compressor sit so that any water can drain back to the separator tank and separate to the bottom. See chapter 10.16 proper draining procedure.

KAESER has several lubricants available that are specially formulated to match these demands. They feature excellent lubricity, outstanding demulsibility (ability to separate from water), and long life.

#### M-SERIES

- M-Series SIGMA compressor cooling oils are **semi-synthetic** lubricants.
- M-Series SIGMA compressor cooling oils are the highest quality petroleum lubricants. M-460 is specially blended to provide reliable performance in KAESER screw compressors.

#### S-SERIES

- S-Series SIGMA compressor cooling oils are **synthetic** lubricants.
- S-Series SIGMA compressor cooling oils are formulated from the most advanced synthetic lubricants. These "synthetic" lubricants begin as high quality petroleum feed stock. They are then refined, processed and purified into fluids with very consistent molecular structure. These oils are carefully blended to produce extremely consistent lubricants with superior properties. SIGMA synthetic lubricants feature all the advantages of both PAO and diester fluids.
- S-460 lubricant is recommended for compressors operating in ambient temperatures between 40 °F and 105 °F.

#### Specialty KAESER LUBRICANTS

- S-680 lubricant may be used when ambient temperatures are always between 70 °F and 105 °F.
- FG-460 synthetic hydrocarbon based food grade lubricant is designed for use in rotary screw compressors in the application where incidental food contact may occur with the discharge air. This lubricant meets the requirements of the FDA Regulation 21 CFR §178.3570 and is USDA H-1 approved and NSF certified. FG-460 is approved for canning, food packing, meat and poultry processing and other applications where incidental food contact may occur.

## 2.10 Cooling oil charge

For machines with the Option W1, the volume required additionally for the heat recovery must be added to the charge.

	SM 7.5	SM 10	SM 15
Fluid volume* [qt]	4.2	4.2	4.2
Topping up volume [qt] (minimum–maximum)	0.26	0.26	0.26

\* Plus the oil volume of the heat recovery system.

Tab. 11 Cooling oil charge (Option K1)

#### Option W1 Heat recovery

The additional volume corresponds to the oil volume of the heat exchanger and the connecting lines:

	SM 7.5	SM 10	SM 15
Additional charge volume [qt]*			

\* Enter the volume required by your heat recovery system.

Tab. 12 Cooling oil charge (Option W1)

## 2.11 Motors and power

### 2.11.1 Compressor motor

	SM 7.5	SM 10	SM 15
Rated power [hp]	7.5	10	15
Enclosure protection	TEFC	TEFC	TEFC

Tab. 13 Compressor motor

#### Rated speed [rpm]:

Maximum working over-pressure [psig]	SM 7.5	SM 10	SM 15
125	3530	3535	3560
160	3530	3535	3560
217	3530	3535	3560

Tab. 14 Compressor motor: Rated speed

## 2.12 Noise emission

	SM 7.5	SM 10	SM 15
Noise emission [dB(A)]	66	67	68

Sound pressure level as per ISO 2151 and the basic standard ISO 9614-2, tolerance:  $\pm 3$  dB(A) at maximum machine working pressure

Tab. 15 Noise emission

## 2.13 Power Supply

### Basic requirements

The machine is designed for an electrical supply according to National Electric Code (NEC) NEC-670, particularly NFPA 79, edition 2014, section 4.3. In the absence of any user-specified alternatives, the limits given in these standards must be adhered to. Consult manufacturer for any other specific power supply.

### Three-phase

Do **NOT** operate package on any unsymmetrical power supply. Also do **NOT** operate package on power supplies like, for example, a three-phase (open) delta or three-phase star with non-grounded neutral.

The machine requires a symmetrical three-phase power supply transformer with a WYE configuration output as shown in Figure 2 and Figure 3. In a symmetrical three phase supply the phase angles and voltages are all the same.

Other power supplies are not suitable.

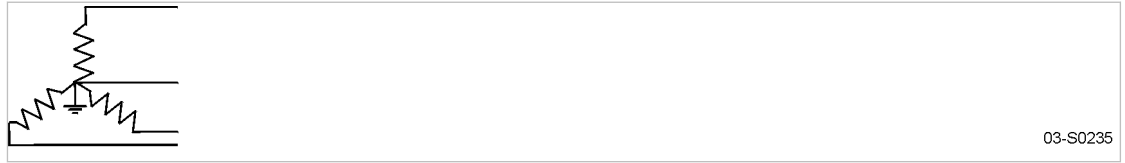


Fig. 2 Three-phase star (wye); 4 wire; grounded neutral

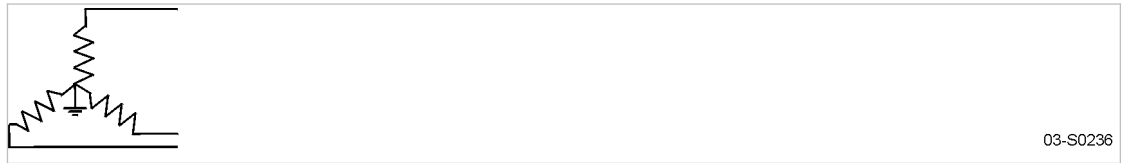


Fig. 3 Three-phase star (wye); 3 wire; grounded neutral

Further information Please contact an authorized KAESER service representative for options.  
 The electrical diagram 13.4 contains further specifications for electrical connection.

## 2.14 Power supply specifications

The following multi-strand copper core wires are given according to 2014 NEC 310.15, Table 310.16 for 104°F ambient temperature.

If other local conditions prevail, like for example high temperature, the cross section should be checked and adjusted according to 2014 NEC 110.14©, 220.3, 310.15, Table 310.16, 430.6, 430.22, 430.24 and other local codes.

Dual element time delay fuses are selected according to 2014 NEC 240.6, 430.52 and tables 430.52, 430.248 and 430.250.

We strongly suggest using a separate copper conductor for the equipment GROUNDING. NEC Table 250.122 will point out the "minimum size", however, we recommend a ground conductor the same size as the power leads, if local codes allow.

### Rated power supply 208V / 3-ph / 60Hz

	SM 7.5	SM 10	SM 15
Pre-fuse [A]	30	45	60
Supply	4xAWG8	4xAWG6	4xAWG4
Consumption [A]	23	32	40

Tab. 16 Supply details 208V / 3ph / 60Hz

### Rated power supply 230V / 3-ph / 60Hz

	SM 7.5	SM 10	SM 15
Pre-fuse [A]	30	45	50
Supply	4xAWG8	4xAWG6	4xAWG4
Consumption [A]	22	30	38

Tab. 17 Supply details 230V / 3ph / 60Hz

**Rated power supply 460V / 3-ph / 60Hz**

	SM 7.5	SM 10	SM 15
Pre-fuse [A]	15	20	25
Supply	4xAWG14	4xAWG12	4xAWG10
Consumption [A]	11	15	19

Tab. 18 Supply details 460V / 3ph / 60Hz

**2.15 Option W1**  
**Available heat capacity**


The quality of the heat transfer medium and its required flow rate depend on the type of heat exchanger used.

Maximum permissible pressure loss in the cooling air circuit: 8.7 psig

Maximum heat capacity available*	SM 7.5	SM 10	SM 15
[kW]	4.2	6.2	8.3
[MJ/h]	15	22	30
[kcal/h]	3615	5336	7146

\* with the thermostatic valve set to open at 176°F.

Tab. 19 Heat capacity (Option W1)

## 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,
- damages 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 operator 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 from incorrect use. 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 air for any application that will bring it into direct contact with food products unless it is specifically treated.

### 3.3 Improper use

Improper usage can cause damage to property and/or (severe) injuries.

- Only use the machine as intended.
- 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 take in toxic, acidic, flammable or explosive gases or vapors.
- 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 recognize the possible dangers involved.

Authorized operators possess the following qualifications:

- are of legal age,
- are conversant with and adhere to the safety instructions and sections of the operator manual relevant to operation,
- have received adequate training and authorization to operate electrical and compressed air devices.
- Additional qualifications for compressors with refrigerated dryers:
  - Adequate training and authorization on refrigeration devices.

Authorized 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 operator manual applicable to installation and maintenance,
  - are fully conversant with the safety concepts and regulations of electrical and compressed air engineering,
  - are able to recognize the possible dangers of electrical and compressed air devices and take appropriate measures to safeguard persons and property,
  - have received adequate training and authorization for the safe installation and maintenance on this equipment.
  - Additional qualifications for compressors with refrigerated dryers:
    - fully conversant with the safety concepts and regulations concerning refrigeration devices,
    - must be able to recognize the possible dangers of refrigeration devices and take appropriate measures to safeguard persons and property.
- Ensure that operating, installation and maintenance personnel are qualified and authorized to carry out their tasks.

### 3.4.3 Adherence to inspection schedules and accident prevention regulations

The machine may be subject to local inspection schedules.

## 3.5 Dangers

### Basic instructions

The following describes the various forms of danger that can occur during machine operation.

Basic safety instructions are found in this operator 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

The following describes the various forms of danger that can occur during machine operation.

**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 ensure 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 verify the absence of any voltage.
- 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.
- Depressurize all pressurized components and enclosures.
- Do not carry out welding, heat treatment or mechanical modifications on 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 food products.
- Use food-grade cooling oil whenever compressed air is to come into contact with food products.

**Spring forces**

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

Minimum pressure / check valves, safety relief valves and inlet valves are powerfully spring-loaded.

- Do not open or dismantle any valves.

**Rotating components**

Touching the fan wheel, the coupling or the belt drive while the machine is switched on can result in serious injury.

- Do not open the enclosure while the machine is activated.
- 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 airends or blocks, oil and compressed air lines, coolers, oil separator tanks, 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 vapors 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 blowing-off of the safety relief valve 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 or vapor.
- 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 replacement parts on pressure bearing parts.

#### **Conversion or modification of the machine**

Modifications, additions to and conversions of the machine or the controller 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, the controller, or the control programs.

**Extending or modifying the compressor station**

If dimensioned appropriately, safety 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 safety relief valves on air receivers and compressed air lines before installing a new machine.
- If the blow-off capacity is insufficient:  
Install safety 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 workwear
- Protective gloves
- Safety boots
- Eye protection
- Ear protection

**Transporting**

The weight 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 center 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**

- Only 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.

**Positioning**

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 regarding explosion protection are in force.
- 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 vapors, acid or base forming substances such as ammonia, chlorine or hydrogen sulfide.
- Do not position the machine in warm cooling outlet air 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 authorized personnel.
- Wear close-fitting, flame-resistant clothing. Wear protective clothing as necessary.
- Switch off and lock out the power supply isolating device and verify the absence of voltage.
- Check that there is no voltage on floating relay 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-pressurize all pressurized 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 safety installations,
  - of the EMERGENCY STOP push button,
  - of any components requiring 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.
- 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, compressor oil and cooling water.
- Have refrigerant disposed of by authorized bodies only.
- Dispose of the machine in accordance with local environmental regulations.

### 3.5.3 Organizational 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.

### 3.5.4 Danger Areas

The table gives information on the areas dangerous to personnel.

Only authorized personnel may enter these areas.

Activity	Danger area	Authorized personnel
Transport	Within a 10 ft radius of the machine.	Installation personnel for transport preparation. No personnel during transport.
	Beneath the lifted machine.	No personnel!
Installation	Within the machine. Within 3 ft radius of the machine and its supply cables.	Installation personnel
Operation	Within a 3 ft radius of the machine.	Operating personnel
Maintenance	Within the machine.	Maintenance personnel
	Within a 3 ft radius of the machine.	

Tab. 20 Danger Areas

## 3.6 Safety devices

Various safety devices ensure safe working with the machine.

- Do not change, bypass or disable safety devices.
- Regularly check safety devices for their correct function.
- 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 chapter 4, section 4.3.

### 3.7 Working life of safety functions

The safety-relevant components of the safety functions are designed for a working life of 20 years. The working life starts with original machine commissioning, and is not extended by times during which the machine is not in use.

The following components are affected:

- Resistance thermometer (Pt100 sensor for measuring the compression discharge temperature)
- EMERGENCY STOP push button
- Main contactor
- Door interlock switch

1. The components of the safety functions must be replaced by an authorized KAESER service representative after a working life of 20 years.
2. Have an authorized KAESER service representative check the reliability of the safety functions.

### 3.8 Safety Signs

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

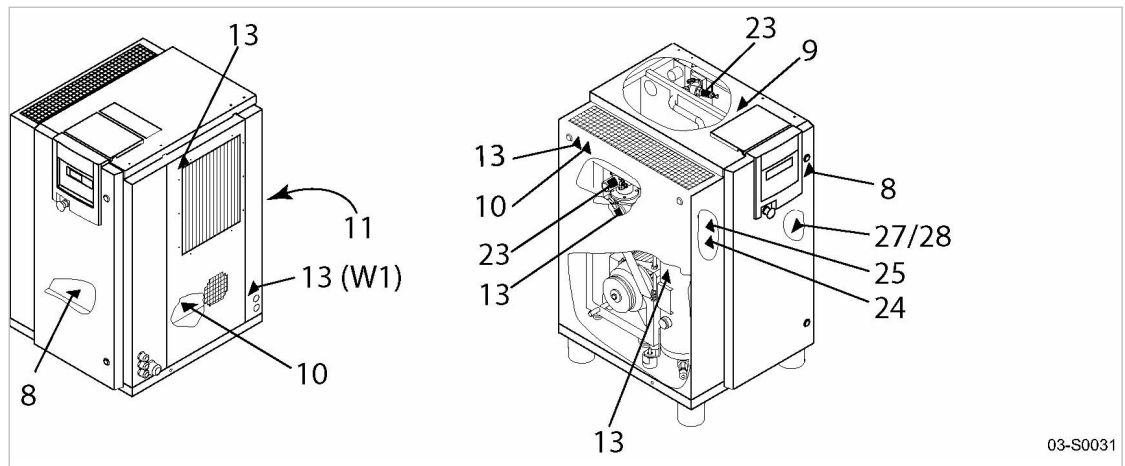













Fig. 4 Location of safety signs

Item	Symbol	Meaning
8		<p>Danger of fatal injury from touching electrically live components!</p> <p>➤ Switch off and lock out the power supply disconnecting device and check that no voltage is present.</p>

Item	Symbol	Meaning
9		<p>Personal injury or damage to the machine by incorrect operation!</p> <ul style="list-style-type: none"> <li>➤ Read and understand the service manual and all safety signs before switching on this machine.</li> </ul>
		<p>Machine starts automatically! Severe injury could result from rotating components, electrical voltage, and air pressure.</p> <ul style="list-style-type: none"> <li>➤ Switch off and lock out the power supply disconnecting device and check that no voltage is present.</li> </ul>
10		<p>Rotating parts! Severe injury could result from touching the fan blades or v-belt drive while it is rotating.</p> <ul style="list-style-type: none"> <li>➤ Never switch the machine on without guard in place over the fan blade.</li> <li>➤ Switch off and lock out the power supply disconnecting device and check that no voltage is present.</li> </ul>
11		<p>Injury and/or contamination can result from breathing compressed air! Contamination of food can result from using untreated compressed air for food processing!</p> <ul style="list-style-type: none"> <li>➤ Never breathe untreated compressed air.</li> <li>➤ Air from this compressor must meet OSHA 29 CFR1910.134 and FDA 21 CFR178.3570 standards, if used for breathing or food processing. Use proper compressed air treatment.</li> </ul>
13		<p>Hot surface can cause burns!</p> <ul style="list-style-type: none"> <li>➤ Let the machine cool down.</li> <li>➤ Work carefully.</li> <li>➤ Wear long-sleeved garments (not synthetics such as polyester) and protective gloves.</li> </ul>
23		<p>Serious injury or death can result from loosening or opening component that is under pressure and heavily spring loaded!</p> <ul style="list-style-type: none"> <li>➤ Do not open or dismantle the valve.</li> <li>➤ Contact authorized KAESER service representative.</li> </ul>
24		<p>Serious injury or death can result from loosening or opening component under pressure!</p> <ul style="list-style-type: none"> <li>➤ De-pressurize all pressurized components and enclosures.</li> <li>➤ Secure that machine keeps depressurized.</li> <li>➤ Check that machine is depressurized.</li> </ul>
25		<p>Loud noise and oil mist when safety relief valve opens! Ear damage and burns can result.</p> <ul style="list-style-type: none"> <li>➤ Wear ear protection and protective cloths.</li> <li>➤ Close all maintenance doors and cover panels.</li> </ul>
27		<p>Risk of electric shock!</p> <p>If the interrupter has tripped current-carrying components of the controller should be examined and replaced if damaged to reduce the risk of fire or electric shock.</p>

Item	Symbol	Meaning
28		<p>Risk of electric shock!</p> <p>To maintain overcurrent short-circuit, and ground-fault protection, the manufacturer's instructions for setting the interrupter must be followed to reduce the risk of fire or electric shock.</p>

Tab. 21 Safety signs

## 3.9 Emergency situations

### 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.
  - Main disconnecting device (all poles)
  - Cooling water (if present)
  - Heat recovery (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

Cooling oil can cause irritation.

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

#### Skin contact

Cooling oil may irritate after prolonged contact.

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

**Inhalation**

Cooling 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 operator 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,
- unauthorized 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.

**3.11 Environmental protection**

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

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



## 4 Design and Function

### 4.1 Enclosure

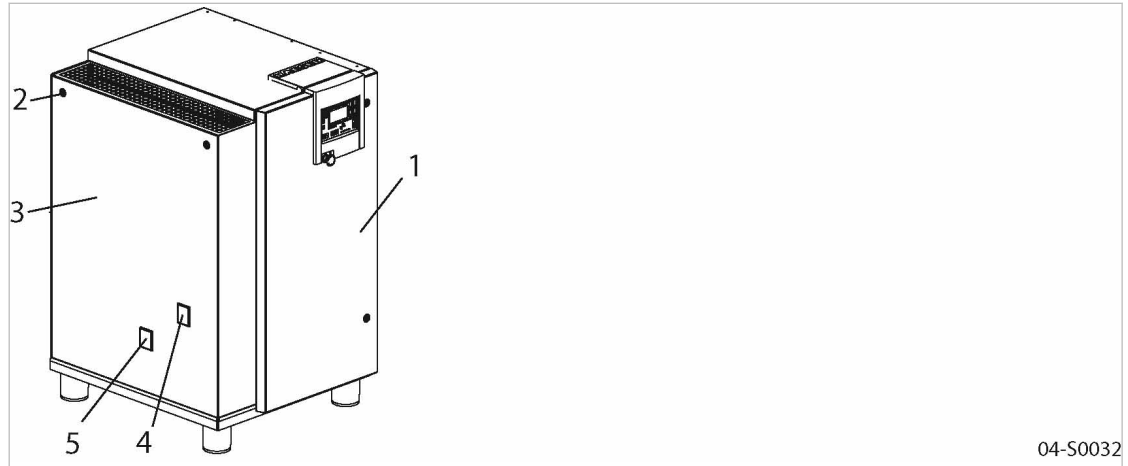


Fig. 5 Enclosure overview

- |   |                      |   |                                  |
|---|----------------------|---|----------------------------------|
| ① | Control cabinet door | ④ | Sight glass: Oil level indicator |
| ② | Latch                | ⑤ | Sight glass: V-belt tension      |
| ③ | Panel (removable)    |   |                                  |

When closed, the enclosure serves various functions:

- Sound insulation
- Protection against contact with components
- Cooling air flow

The enclosure is not suitable for the following uses:

- Walking on, standing or sitting on.
- As resting place or storage of any kind of load.

Safe and reliable operation is only assured with the enclosure closed.

Access doors are hinged to swing open and removable panels can be lifted off.  
Latches are released by a key supplied with the machine.

## 4.2 Machine function

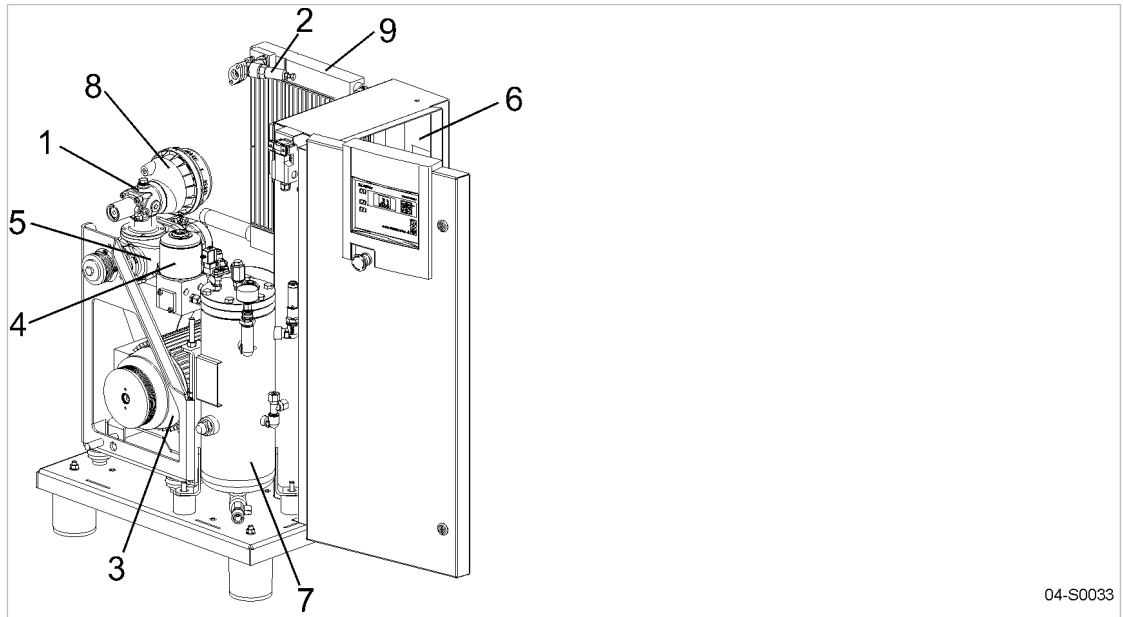


Fig. 6 Machine layout

- |   |                              |   |                    |
|---|------------------------------|---|--------------------|
| ① | Inlet valve                  | ⑥ | Control cabinet    |
| ② | Minimum pressure/check valve | ⑦ | Oil separator tank |
| ③ | Compressor motor             | ⑧ | Air filter         |
| ④ | Oil filter                   | ⑨ | Oil/air cooler     |
| ⑤ | Airend                       |   |                    |

Ambient air is cleaned as it is drawn in through the filter ⑧.

The air is then compressed in the airend ⑤.

The airend is driven by an electric motor ③.

Cooling oil is injected into the airend. It lubricates moving parts and forms a seal between the rotors themselves and between them and the airend casing. This direct cooling in the compression chamber ensures a very low airend discharge temperature.

Cooling oil recovered from the compressed air in the oil separator tank ⑦ gives up its heat in the oil cooler ⑨. The oil then flows through the oil filter ④ and back to the point of injection. Pressure within the machine keeps the oil circulating. A separate pump is not necessary. A thermostatic valve maintains optimum cooling oil temperature.

Compressed air, freed of cooling oil in the oil separator tank ⑦, flows through the minimum pressure / check valve ② into the air cooler ⑨. The minimum pressure / check valve ensures that there is always a minimum internal pressure sufficient to maintain cooling oil circulation in the machine.

The aftercooler brings down the compressed air temperature to 9 °F to 18 °F above ambient. Most of the moisture carried in the air is removed in the aftercooler.

## 4.3 Safety devices

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

- EMERGENCY STOP control device:  
The EMERGENCY STOP button shuts down the compressor immediately. The motor is stopped. The pressure system is vented.

- Safety relief valve:  
The safety relief valve protects the system against excessive pressure. It is factory set.
- Safety pressure monitor (Machine with refrigerated dryer):  
The safety pressure monitor protects the refrigerant circuit against excessive pressure. It cannot be set.
- Door interlock switch:  
The machine will stop automatically if a safety interlocked door or panel is opened or removed.
- Housing and covers for moving parts and electrical connections:  
Protect against accidental contact.

## 4.4 Operating modes and control modes

### 4.4.1 Machine operating modes

#### STOP

The machine is connected to the power supply.  
The *Controller voltage* LED lights green.  
The machine is switched off. The *ON*LED is extinguished.

#### READY

The machine has been activated with «ON»:

- The *ON*LED lights green.
- The drive motor is stopped.
- The inlet valve is closed.
- The minimum pressure/check valve isolates the oil separator tank from the air system.
- The venting valve is open.

The compressor motor starts as soon as pressure is demanded.  
In addition, timer and/or remote control may affect the start of the motor.

#### LOAD

The compressor motor runs under load.

- The inlet valve is open.
- The compressor block delivers compressed air to the system.

#### IDLE

The compressor motor runs unloaded with low power consumption.

- The inlet valve is closed.
- The minimum pressure/check valve isolates the oil separator tank from the air system.
- The venting valve is open.

A small volume of air circulates through the bypass bore in the inlet valve, through the compressor block and back to the inlet valve via the venting line.

4.4.2 Control modes

Using the selected control mode, the controller switches the machine between its various operational states in order to maintain the gauge working pressure between the set minimum and maximum values, regardless of the drawn compressed air volume. The control mode also rules the degree of energy efficiency of the machine.

The shortest possible times for the various parameters is preset by the factory to ensure that the compressor motor earlier and more frequently is at standstill. If you want to change these parameters, select the shortest possible times in order for the machine working energy-efficiently.

The machine-dependant venting time between the LOAD and READY operating modes ensures load changes at minimum material stresses.

The following control modes can be set:

- DUAL
- QUADRO

Supplementary mechanical flow rate regulation:

- Option C1 ■ MODULATING control

Energy-efficient control modes for various applications:

Application	Recommended control mode
Compressed air station with one machine or several machines supplying similar volumes.	QUADRO
Machine for peak load in a compressed air station	DUAL
Machine for intermediate load in a compressed air station	QUADRO
Machine for basic load in a compressed air station	QUADRO

Tab. 22 Energy-saving control modes

The SIGMA CONTROL BASIC controller is factory set to QUADRO control mode unless specifically ordered otherwise.

**DUAL**

In the DUAL control mode, the machine is switched back and forth between LOAD and IDLE to maintain the machine working pressure between the preset minimum and maximum values. When maximum pressure is reached, the machine switches to IDLE. When the preset *idling time* has elapsed, the machine switches to READY.

**QUADRO**

Unlike DUAL control mode, in QUADRO the machine will switch between LOAD to READY after short periods of being in IDLE.

Following extended times in the various operating modes, the machine switches from LOAD to READY.

In this event, the controller considers the time in READY mode as *standstill time*. The time in LOAD and IDLE operating modes are taken as *minimum runtime*.

Option C1 MODULATING control

The MODULATING control is an additional mechanical regulation. It continuously changes the flow rate within the machine's control range.

A control valve, the proportional controller, changes the degree of opening of the inlet valve when the machine transports compressed air into the air network (LOAD)

The load and power consumption of the drive motor rises and falls with the air demand.

## 4.5 Operating panel SIGMA CONTROL BASIC

### Keys

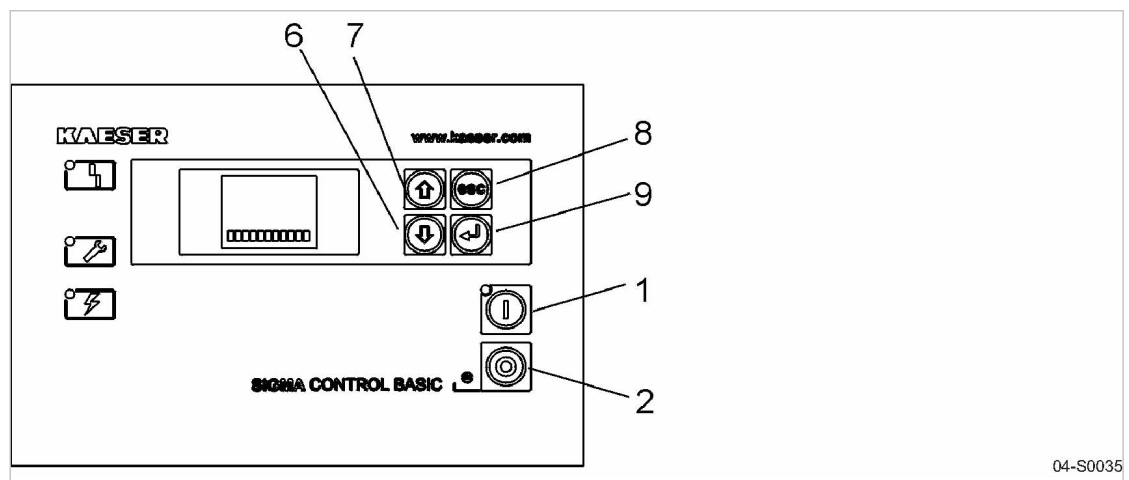


Fig. 7 Keys – overview

Position	Name	Function
1	«ON»	Switch on the machine.
2	«OFF»	Switches the machine off. Resets alarms (acknowledge). Resets the maintenance interval counter.
6	«Down»	Scrolls down the parameter list. Reduces a parameter value.
7	«Up»	Scrolls up the parameter list. Increases a parameter value.
8	«Cancel»	Exits the edit mode without saving.
9	«Accept»	Enters edit mode. Exits the edit mode and saves. Acknowledge the message. Only affects the value in the third line of the display.

Tab. 23 Keys

Indicators

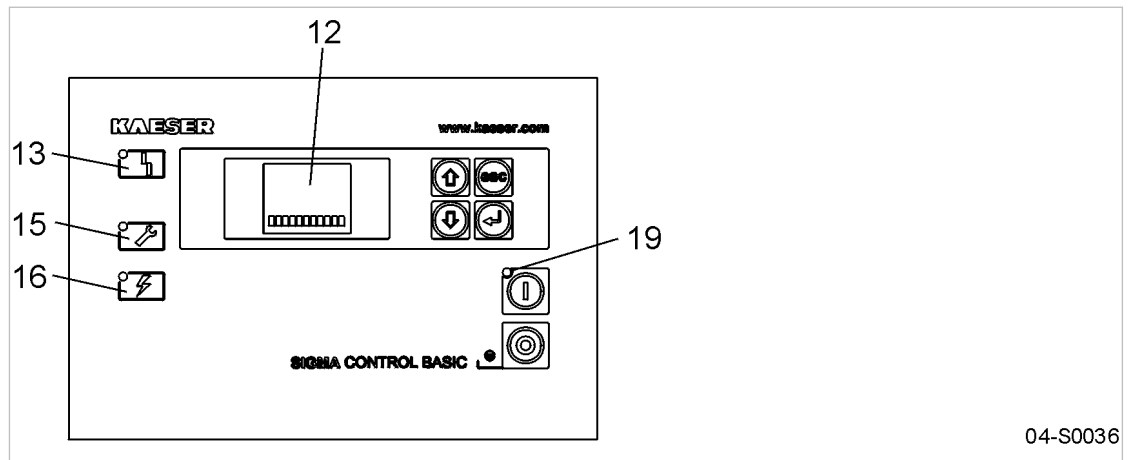


Fig. 8 Indicators – overview

Position	Name	Function
12	Display	Alphanumeric display with 4 lines.
13	<i>Fault</i>	Flashes red when an alarm occurs. Lights continuously when acknowledged.
15	<i>Warning</i>	Lights yellow for: <ul style="list-style-type: none"> <li>■ maintenance work due,</li> <li>■ Warning messages</li> </ul>
16	<i>Controller voltage</i>	Lights green when the power supply is switched on.
19	<i>ON</i>	Lights green when the machine switched on.

Tab. 24 Indicators

## 4.6 Functional description – SIGMA CONTROL BASIC

### 4.6.1 Display layout

x x . x b a r	Line 1
y y ° C	Line 2
z 0 0 0 0 h	Line 3
1 2 3 4 5 6 7 8 S p T i	Line 4

Line	Indication	Meaning
1	xx.x	Current system pressure in bar, psi or MPa.
2	yy	Current airoend discharge temperature (ADT) in °C or °F.
3	z	Display of parameters and their settings (see table 26)
4	1, 2, ...	Error code for alarm and warning messages (see table 33 and table 34).
	➔	Operating state: LOAD
	➡	Operating state: IDLE

Tab. 25 Display

**4.6.2 Parameters**

Parameter	Meaning
0	<p><b>Operating hours counter</b></p> <p>Displays the total time the drive motor was switched on.</p> <p>Only authorized KAESER service representative has the right to change this parameter.</p>
1	<p><b>Load hours counter</b></p> <p>Shows the total time the drive motor has run under LOAD.</p> <p>Only authorized KAESER service representative has the right to change this parameter.</p>
2	<p><b>Maintenance counter</b></p> <p>Displays the number of operating hours until the next scheduled maintenance is due. SIGMA CONTROL BASIC counts down the operating hours from a default value. The warning message <i>S</i> is displayed when the counter reaches zero. The maintenance interval counter must be reset to its default value after the maintenance work has been carried out. The interval starts anew.</p> <p>A password is required to change this parameter.</p>
3	<p><b>Relief valve test mode</b></p> <p>This function switches the activating pressure check mode for the safety relief valve on and off.</p> <p>The warning message <i>i</i> is displayed when the check mode is switched on.</p> <p>A password is required to change this parameter.</p> <p>See chapter 10.10 for the password and to carry out the check.</p>
4	<p><b>Temperature display unit</b></p> <p>The airod outlet temperature can be displayed in either °C or °F.</p>
5	<p><b>Pressure display unit</b></p> <p>The current working pressure can be displayed in bar, psi or MPa.</p>
6	<p><b>Control modes</b></p> <p>Factory setting: OFF</p> <p>This parameter changes the control mode:</p> <ul style="list-style-type: none"> <li>■ OFF: QUADRO</li> <li>■ ON: DUAL</li> </ul>
7	<p><b>Refrigerated dryer control mode</b></p> <p>Factory setting: OFF</p> <p>This parameter changes the dryer control mode:</p> <ul style="list-style-type: none"> <li>■ OFF: TIMER</li> <li>■ ON: CONTINUOUS</li> </ul>

Parameter	Meaning
8	<p><b>Switching the refrigerated dryer on/off</b></p> <p>Factory setting: ON (Option T3)</p> <p>This parameter switches the dryer permanently on or off:</p> <ul style="list-style-type: none"> <li>■ OFF: refrigerated dryer off</li> <li>■ ON: refrigerated dryer on</li> </ul> <p>A password is required to change this parameter. In machines without a refrigerated dryer, the parameter is factory set to OFF.</p>
C	<p><b>System set point pressure: Switching differential</b></p> <p>The switching differential determines the distance between cut-in and cut-out pressure (system set point pressure: switching point) and thus the switching frequency from LOAD to IDLE.</p> <p>Setting range [psi]: -1.5 to -72.5</p>
D	<p><b>System set point pressure: Switching point</b></p> <p>The switching point corresponds to the working pressure of the air system and the cut-out pressure of the machine.</p> <p>Setting range [psi]: 80 to maximum operating pressure</p>
E	<p><b>Maximum possible set point pressure setting</b></p> <p>Only an authorized KAESER service representative has the right to change this parameter.</p>
F	<p><b>Main contactor: Maximum permitted number of switching cycles reached</b></p> <p>This parameter (value: OFF) and the <i>S</i> warning message are displayed as soon as the maximum permitted number of switching cycles is reached.</p> <p>A password is required to change this parameter.</p> <p>Replace the main contactor and reset the parameter:</p> <ul style="list-style-type: none"> <li>■ OFF: Maximum permitted number of switching cycles reached</li> <li>■ ON: The counter is reset and the <i>S</i> warning message is acknowledged.</li> </ul>
G	<p><b>Options</b></p> <p>The displayed values inform authorized KAESER service representative concerning the controller's internal machine configuration.</p>

Tab. 26 Parameters


Further information For changing or adjusting parameters, please see chapter 8.4.

### 4.6.3 Messages

#### Alarm message

 An alarm shuts the machine down automatically. The red LED  (Fig. 8) flashes.

#### Warning message

 The yellow LED  (Fig. 8) lights up to issue a warning.



## 4.7 Floating relay contacts

Floating relay contacts are provided for the transfer of signals and messages. Information on location, loading capacity and type of message or signal is found in the electrical diagram.



If the floating relay contacts are connected to an external voltage source, voltage may be present even when the machine is isolated from the power supply.

## 4.8 Remote LOAD / IDLE switching

The controller enables the remote control of the LOAD phase by an external floating relay contact.

### Connections

Delivery condition

- The connections in the controller are provided with a jumper.
- With the jumper in place, the controller toggles the machine between LOAD and IDLE.



➤ Re-instate this delivery condition when the machine is not to be controlled remotely.

### Function

- Contact closed: LOAD
- Contact open: IDLE

When the contact closes the machine switches to LOAD. When the contact opens the machine switches to IDLE.

At the end of the idling period, the machine switches to READY and is in stand-by. The length of the idling period depends on the control mode selected.

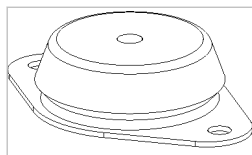
If the «ON» key is pressed while the remote contact is open, the machine remains in stand-by and starts as soon as the remote contact closes.

## 4.9 Options

The options available for your machine are described below.

### 4.9.1 Option H1 Machine mountings

These mountings allow the machine to be anchored firmly to the floor.



04-S0034

Fig. 9 Machine mountings

### 4.9.2 Option W1 Prepared for external heat recovery

The cooling oil circuit includes 2 valves regulating the cooling oil temperature:

- Thermostatic valve, machine
- Thermostatic valve, heat recovery system

The thermostatic valves ensure that the cooling oil is kept at the ideal temperature for machine operation.

The thermostatic valve of the heat recovery system opens first so that surplus heat is released into the heat recovery system. If the heat recovery system cannot carry away enough heat, the thermostatic valve of the machine opens to allow hot oil through the oil cooler circuit.



Condition:

Combination valve opening temperature = thermostatic valve opening temperature

The heat available for recovery depends on the individual operating conditions of the machine.

Connections are provided for an external system to recover surplus heat.

The thermostatic valve of the heat recovery system does not function when the machine is delivered. The necessary working element must be installed when installing the heat recovery system.

If necessary, the operating element in the machine's thermostatic valve can be exchanged for one with a higher opening temperature. The opening temperature depends on operating and ambient conditions.

Working elements are marked with their opening temperature [°C].



If the cooling oil temperature is too low, condensate can form and damage the machine.

- Consult an authorized KAESER service representative on components and layout to ensure proper functioning of the cooling and heat recovery systems.

## 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!

#### Complying with safety warnings

Disregard of safety warnings 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 vapors 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.
- 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, fibers, fine sand).
  - Free of explosive or chemically unstable gases or vapors.
  - Free of acid/alkaline forming substances, particularly ammonia, chlorine or hydrogen sulfide.

### 5.2 Installation conditions

#### 5.2.1 Determining location and clearances

The machine is intended for installation in an appropriate machine room. Information on distances from walls and ventilation of the machine room is provided below.



The distances quoted are recommended distances and ensure unhindered access to all machine parts.

- Please consult KAESER if you cannot comply with these recommendations.

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

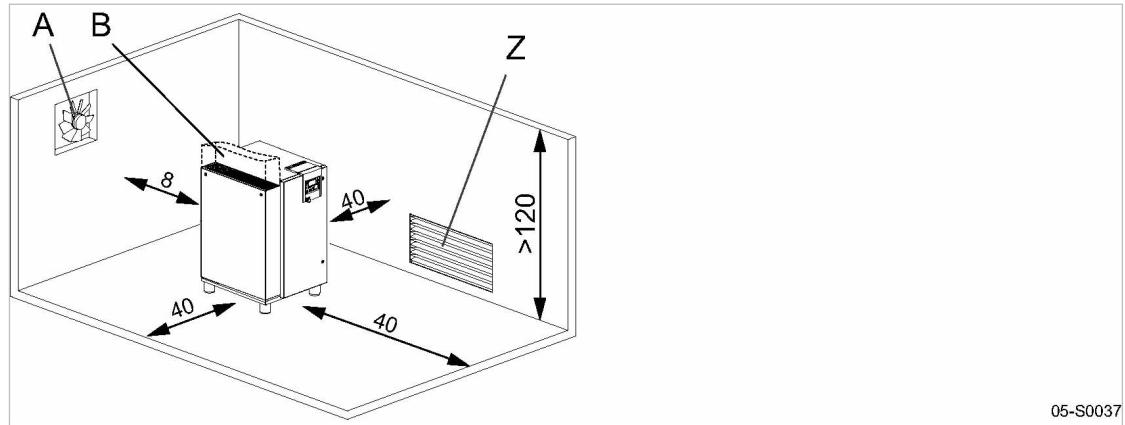


Fig. 10 Recommended machine placement and dimensions [in.]

- (A) Exhaust fan
- (B) Exhaust air duct
- (Z) Air inlet aperture

1. **NOTICE** *Ambient temperature too low.*  
Frozen condensate and highly viscous cooling oil can cause damage when starting the machine.
  - Make sure that the temperature of the machine is at least 37°F before starting.
  - Heat the machine room adequately or install an auxiliary heater.
2. Ensure adequate lighting so that all work on the machine can be carried out without danger or hindrance.
3. Ensure that the indicators can be read without glare and that the controller display cannot be damaged by direct sunlight (UV radiation).
4. Ensure that all intake and exhaust apertures of the enclosure remain opened.
5. If installed outdoors, the machine must be protected from frost, direct sunlight, dust and rain.

### 5.2.2 Ensuring the machine room ventilation

Adequate ventilation of the machine room does several tasks:

- It prevents subatmospheric pressure in the machine room.
- It evacuates the exhaust heat of the machine and thus ensures the required operating conditions.



➤ Consult with KAESER if you cannot ensure the conditions for an adequate ventilation of the machine room.

1. Ensure that the flow volume of fresh air is at least the same as the volume taken by the machine and exhaust fan from the machine space.
2. Make sure that the machine and exhaust fan can only operate when the inlet aperture is actually open.
3. Keep the inlet and exhaust apertures free of obstructions so that the cooling air can flow freely through the room.
4. Ensure clean air in order to support the proper functioning of the machine.

### 5.2.3 Exhaust duct design

The machine can only overcome the air resistance at the cooling air inlet and exhaust determined by the duct design. Any additional air resistance will reduce airflow and deteriorate machine cooling.

- Consult an authorized KAESER SERVICE representative before deciding on:
  - Design of the exhaust air ducting
  - Connection between the machine and the exhaust air duct
  - Length of the ducting
  - Number of duct bends
  - Design of flaps or shutters



Use only motorized ventilation flaps and louvers on variable frequency drive (SFC) machines. Flaps or shutters that are opened by the action of airflow against the force of gravity do not open sufficiently at low compressor drive motor speeds.

Further information Further information on the design of exhaust air ducts can be found in chapter 13.3.

## 5.3 Operating the machine in a compressed air system

When the machine is connected to a compressed air system, the system operating pressure must not exceed 232 psig.

Initial charging of a fully vented air system creates a very high rate of airflow through the air treatment devices. These conditions are detrimental to correct air treatment. Air quality suffers. To ensure the desired air quality when charging a vented air system, we recommend the installation of an air main charging system.

- Consult an authorized KAESER service representative for advice on this subject.

## 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 authorized 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 authorized electricians.
- Switch off and lock out the power supply isolating device and verify the absence of voltage.
- Check that there is no voltage on floating relay 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.

- 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.
- Depressurize all pressurized components and enclosures.
- Check all hose couplings in the compressed air system with a hand-held pressure gauge to ensure that they all read 0 psig.
- 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 wheel, the coupling or the belt drive while the machine is switched on can result in serious injury.

- Switch off and lock out the power supply isolating device and verify the absence of voltage.
- Do not open the cabinet while the machine is switched on.

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

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

## 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



- Condensate in the compressed air network can damage the pipework:
- Install only corrosion-resistant pipes.
  - Use fluoroelastomers as sealing material for seals.
  - Note the electro-chemical voltage sequence.
  - Consult with KAESER for suitable materials for the compressed air network.

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

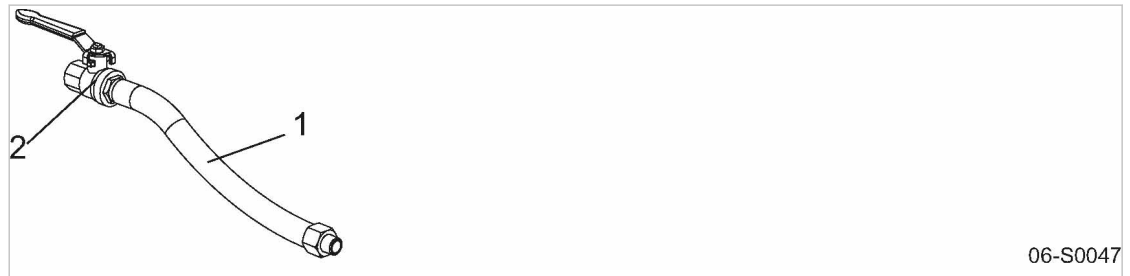


Fig. 11 Compressed air pipework

- ① Flexible pressure hose
- ② Shut-off valve



- Do not induce any forces into the machine for which the compressive forces must be balanced by bracing.

1. **⚠ WARNING** *Serious injury or death can result from loosening or opening components under pressure.*
  - *Vent all pressurized components and chambers completely.*
2. A shut-off valve must be installed by the user in the connection line.
3. Connect a flexible pressure hose.

Further information The dimensional drawing in chapter 13.3 provides the size and position of the connection ports.

## 6.4 Connecting the remote LOAD-IDLE control

Material Screwdriver: DIN 5264 A – 0.4x2.5 mm  
Flexible conductor: 0.5–1.5 mm<sup>2</sup> (maximum length 330 ft; recommended: NYSLYÖ 2x1.0 mm<sup>2</sup>)

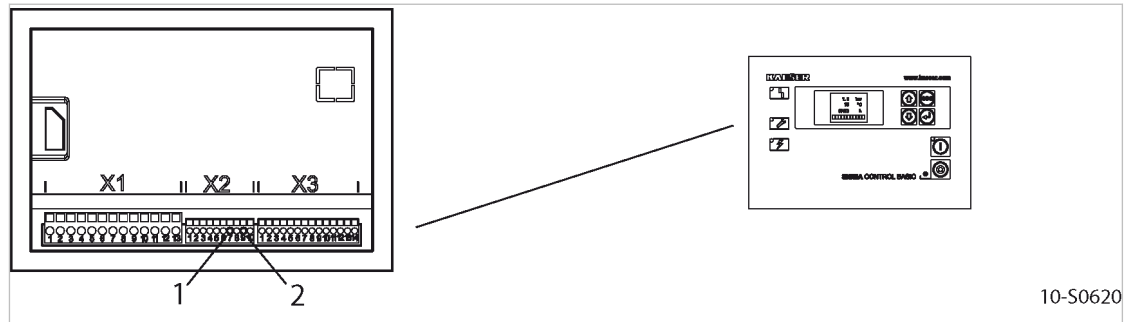


Fig. 12 Connections SIGMA CONTROL BASIC

- ① Input I4: Pin 7
- ② Supply 24 VDC: Pin 9

1. Lay the cable in a manner that it is not stressed when the control cabinet door is opened.
2. Strip 8 mm of insulation from the ends of the conductors.
3. Use a screwdriver to open the spring-loaded terminals and insert the ends of the conductors in the square openings above the corresponding terminals.
4. Secure the cable so there is no tension on the X2 plug.
5. Seal the cable gland against ingress of dirt or moisture.

## 6.5 Making the Power Supply Connection



The machine is **not** wired ready for operation!

This is a Tri-Voltage machine.

The machine can be set up to one of the following supply voltages:

- 208V
- 230V
- 460V

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

1. Have the electrical connections carried out by authorized personnel only.
2. Carry out protection measures as stipulated in relevant regulations (IEC 364 for example) and in national accident prevention regulations. In addition, the regulations of the local electricity supplier must be observed.
3. 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.
4. Use supply conductors and fuses in accordance with local regulations.
5. The user must provide the machine with a lockable supply disconnecting device. This could be, for example, a switch-disconnector with fuses. If a circuit breaker is used it must be suitable for the motor starting characteristics.
6. Check that the correct taps on the control voltage transformer are connected according to the supply voltage.  
If this is not correct, change the connection to suit the power supply voltage.



7. **⚠ DANGER** *Danger of fatal injury from electric shock!*
  - *Switch off and lock out the supply disconnecting device and check that no voltage is present.*
8. If necessary: Set up the machine for the correct power supply voltage as described in chapter 6.5.1.
9. Connect the power supply.

Further information The electrical diagram 13.4 contains further specifications for electrical connection.

### 6.5.1 Changing main voltage connections

Machine set up for [V]	208	230	460
Machine may be modified [V]	230	208	208
	460	460	230

Tab. 27 Voltage selection

The following parts have to be considered for making the change:

- Motor connection terminals in the control cabinet
- Drive motor overload protection relay
- Control transformer
- Transformer for the refrigerated dryer (only if present).

Material The required jumpers (also known as 'bridges' or 'links') are provided in the control cabinet.

Precondition A check has been made to ensure no voltage is present.

#### Changing the drive motor connection

- Open the control cabinet and connect the motor in accordance with the electrical diagram.

#### Adjusting the overload protection cutout

- Check the overload protection relay setting.

	SM 7.5	SM 10	SM 15
208V, 3-ph, 60Hz [A]	15	20	25
230V, 3-ph, 60Hz [A]	14	19	24
460V, 3-ph, 60Hz [A]	7	10	12

Tab. 28 Overload protection cutout settings.

#### Connecting the control transformer

The primary winding of the control transformer is not connected. The machine will not run without connecting the control transformer according to the power supply.

- Open the control cabinet and connect the control transformer in accordance with the electrical diagram.

**Connecting the dryer transformer (option T2) for models equipped with a refrigerated dryer only**

Power for the refrigeration dryer (if one is present) is provided by a transformer.

The primary winding of the dryer transformer is not connected. The refrigerated dryer will not run without connecting the control transformer according to the power supply.



Do only use terminal 0V—208V—230V—460V (primary side of the transformer) for changing the main voltage connection. Do not change the terminal 0V—230V. This terminal is readily wired.

- Open the control cabinet and connect the transformer in accordance with the electrical diagram.

**6.6 Options****6.6.1 Option H1****Anchoring the machine**

- Use appropriate fixing bolts to anchor the machine.

Further information Details of the fixing holes are contained in the dimensional drawing in chapter 13.3.

**6.6.2 Option W1****Connecting the external heat recovery system**

An unsuitable heat exchanger or incorrect installation may influence the cooling oil circuit within the compressor. Damage to the machine will follow.

- Consult KAESER on a suitable heat exchanger and have an authorized KAESER service representative do the installation.

## 7 Initial Start-up

### 7.1 Ensuring safety

Here you will find instructions for a safe commissioning of the machine. 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'.
- Commissioning tasks may only be carried out by authorized 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 authorized electricians.
- Switch off and lock out the power supply isolating device and verify the absence of voltage.
- Check that there is no voltage on floating relay 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.

- 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-pressurize all pressurized components and enclosures.
- Check all hose couplings in the compressed air system with a hand-held pressure gauge to ensure that they all read 0 psig.
- 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 wheel, the coupling or the belt drive while the machine is switched on can result in serious injury.

- Switch off and lock out the power supply isolating device and verify the absence of voltage.
- Do not open the cabinet while the machine is switched on.

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

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

## 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
3 months	➤ Manually fill the airend with cooling oil.
12 months	<ul style="list-style-type: none"> <li>➤ Change the oil filter.</li> <li>➤ Change the oil separator cartridge.</li> <li>➤ Change the cooling oil.</li> <li>➤ Have the motor bearings checked by an authorized KAESER service representative.</li> </ul>
36 months	➤ Have the overall technical condition checked by an authorized KAESER service representative.

Tab. 29 Re-commissioning after storage

## 7.3 Checking installation and operating conditions

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

To be checked	See chapter	Confirmed?
➤ Are the operators completely familiar with safety regulations?	–	
➤ Have all the positioning conditions been fulfilled?	5	
➤ Is a user's lockable power supply disconnecting device installed?	6.5	
➤ Are the tolerance limits of the power supply within the permissible tolerance limits of the rated voltage (machine)? (see nameplate in the control cabinet)	13.4	
➤ Are the power supply cable conductor cross-sections and fuse ratings adequate?	2.14	
➤ Is the drive motor overload protection switch set according to the power supply voltage?	7.4	
➤ Have all electrical connections been checked for tightness?	–	
➤ Has the inspection been repeated after 50 operating hours following the initial commissioning?		
➤ Has the connection to the air system been made with a shut-off valve and a flexible hose?	6.3	
➤ Has the drive belt tension been checked?	10.9	
➤ Is there sufficient cooling oil in the separator tank?	10.13	
➤ Is there sufficient cooling oil in the airend?	7.5	

To be checked	See chapter	Confirmed?
➤ Is the machine firmly anchored to the floor? (Option H1)	6.6.1	
➤ Are door interlock switches aligned and their function checked?	7.9	
➤ Are all access doors closed and latched and removable panels in place and secured?	–	

Tab. 30 Installation conditions checklist

## 7.4 Setting the overload protection relay

Electrical diagram 13.4 gives the location of the overload protection relay.

With star-delta starting, the phase current is fed via the overload protection relay. This phase current is 0.58-times the rated motor current.

To prevent the overload protection relay from being triggered by voltage fluctuations, temperature influences or component tolerances, the setting can be higher than the arithmetical phase current.

- Check the overload protection relay setting.



The overload protection relay shuts the machine down despite being correctly set?

- Contact an authorized KAESER service representative.

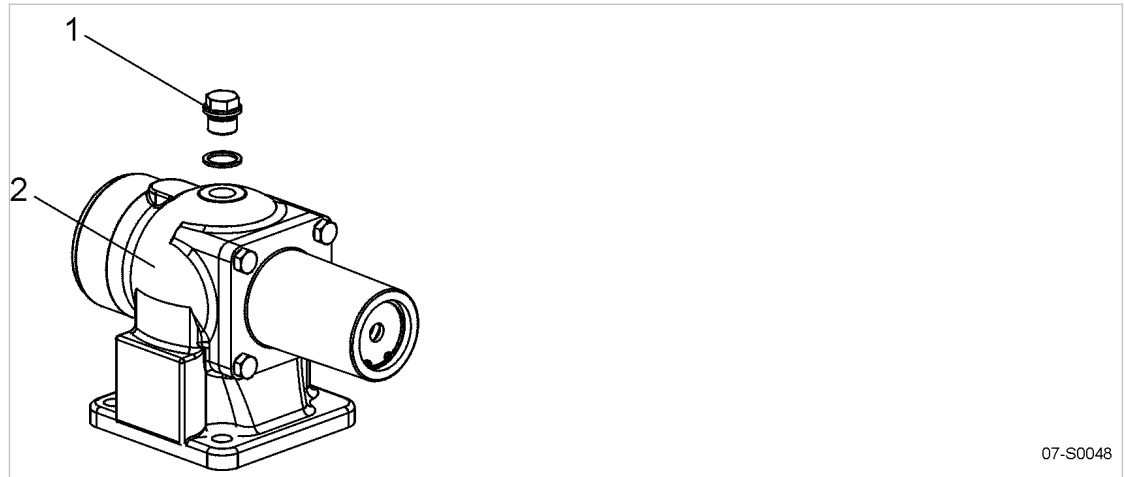
## 7.5 Pouring cooling oil into the airend

Before starting the compressor for the very first time and before re-starting after a shutdown period of more than 3 months it is necessary to manually add a quantity of cooling oil into the airend. In order to avoid that the cooling oil exceeds the permissible level, drain the required quantity from the de-pressurized oil separator tank.

Chapter 10.16 provides detailed information on how to drain cooling oil from the oil separator tank.

Material 0.5 qt. cooling oil

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



07-S0048

Fig. 13 Inlet valve filling port

- ① Screw plug
- ② Inlet valve

1. Unscrew the filler plug from the inlet valve.
2. Pour the stipulated amount of cooling oil into the airend and replace the filler plug.
3. Turn the airend manually by means of the belt pulley to distribute the oil.

## 7.6 Option C1

### Activating and deactivating the MODULATING control

Use a shut-off valve to activate and deactivate the MODULATING control. If the MODULATING control is deactivated, the machine always delivers the maximum possible compressed air quantity in LOAD mode.

MODULATING control	Shut-off valve
Switch on	open
Switch off	close

Tab. 31 MODULATING control: Setting the shut-off valve

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

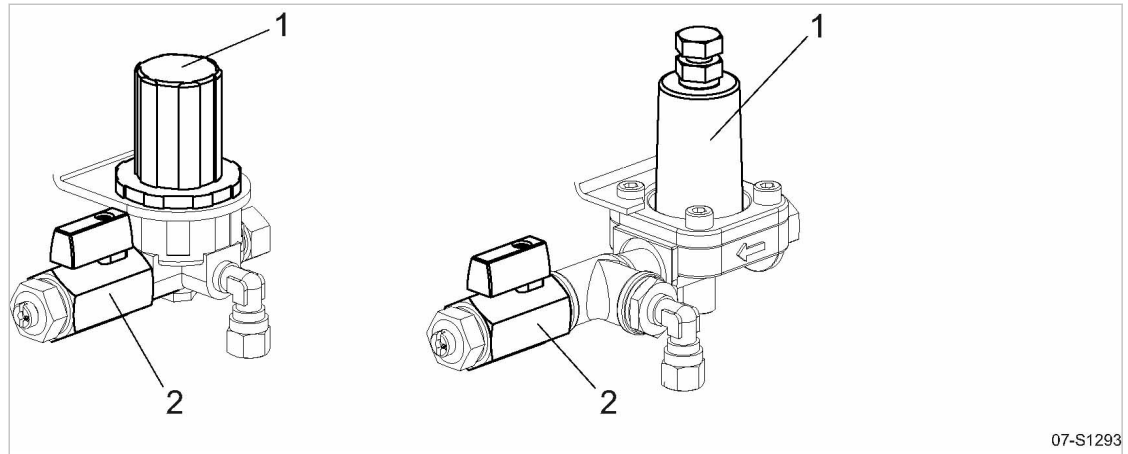


Fig. 14 MODULATING control: Setting the shut-off valve

- ① Control valve (proportional control)
- ② Shut-off valve

➤ Open or close the control valve, depending on the required control mode.



The regulating valve is factory set. The setting should not be changed without consultation with an authorized KAESER service representative.

## 7.7 Starting the machine for the first time

**Precondition** No personnel are working on the machine.  
All access doors are closed.  
All removable panels are in place and secured.

1. Open the user's shut-off valve to the air network.
2. Switch on the power supply disconnecting device.  
After the controller has carried out a self-test, the green *Controller On* LED is lit continuously.
3. Press the «ON» key.  
The green *ON* LED lights continuously.  
The compressor motor runs up and after a short time the machine switches to LOAD and delivers compressed air.



- Watch for any faults occurring in the first hour of operation.
- After the first 50 operating hours, check all electrical connections and tighten where necessary.



- Does the machine stop when the compressor motor rotates in the wrong direction?
- Switch off and lock out the power supply disconnecting device and verify the absence of voltage.
  - Changeover phase lines L1 and L2.
  - Acknowledge any existing alarm messages and switch the machine on again.

## 7.8 Setting the network set point pressure

The set point pressure (cut-out pressure) is factory set at the maximum permissible working pressure of the compressor.

Adjustment is necessary for individual operating conditions.



Do not set the set point pressure of the machine higher than the maximum working pressure of the compressed air system.

The machine may not toggle more than twice per minute between LOAD and IDLE.

To improve the switching frequency:

- Increase the difference between cut-in and cut-out pressure.
- Add a larger air receiver downstream to increase buffer capacity.

### System set point pressure: Switching point

1. Scroll with the arrow keys until the parameter D "set point pressure: switch point" is displayed in line 3.
2. Press and hold «Enter» for at least 3 seconds until the cursor flashes.
3. Use the arrow keys to set the desired switching point and confirm with the «Enter» key.

### System set point pressure: Switching differential

This switching differential is factory set. Adjust this parameter if the motor starting frequency is too high.

1. Scroll with the arrow keys until the parameter C "set point pressure: switching differential" is displayed in line 3.
2. Press and hold «Enter» for at least 3 seconds until the cursor flashes.
3. Use the arrow keys to set the desired differential and confirm with «Enter».

## 7.9 Checking the Door Interlock Switch

The interlock switch stops the machine as soon as a door or access panel is opened. Check the interlock switch function on commissioning.



The door interlock switch is an important safety device.

The machine may only be operated with a correctly functioning interlock switch.



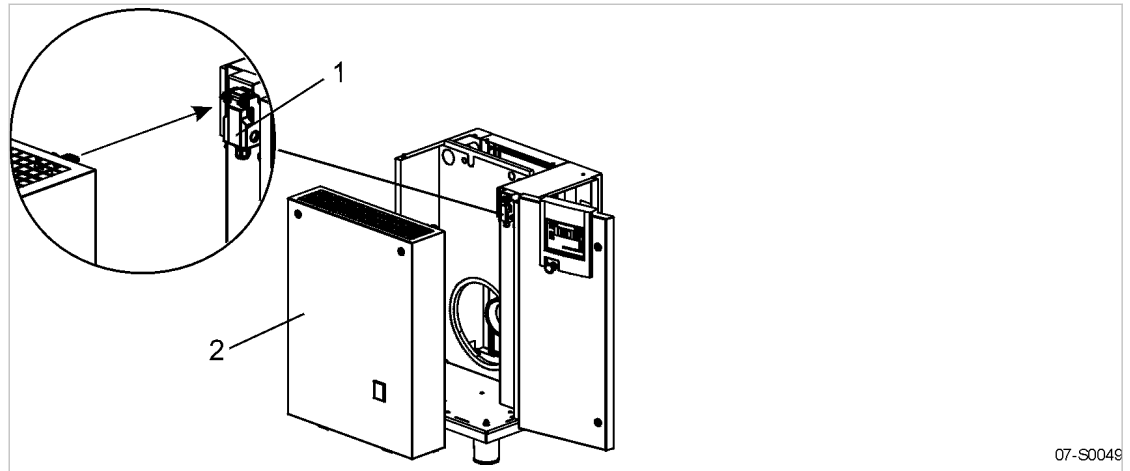


Fig. 15 Interlock switch position

- ① Door interlock switch
- ② Panel

1. Open the access panel ② while the machine is running.  
The machine switches off automatically. The controller displays an alarm message.
2. Close the panel and acknowledge the alarm.



The machine does not switch off automatically?.

- Have the interlock switch checked by an authorized KAESER service representative agent.

## 8 Operation

### 8.1 Switching on and off

Always switch the machine on with the «ON» key and off with the «OFF» key.

A power supply disconnecting device needs to be installed by the user.

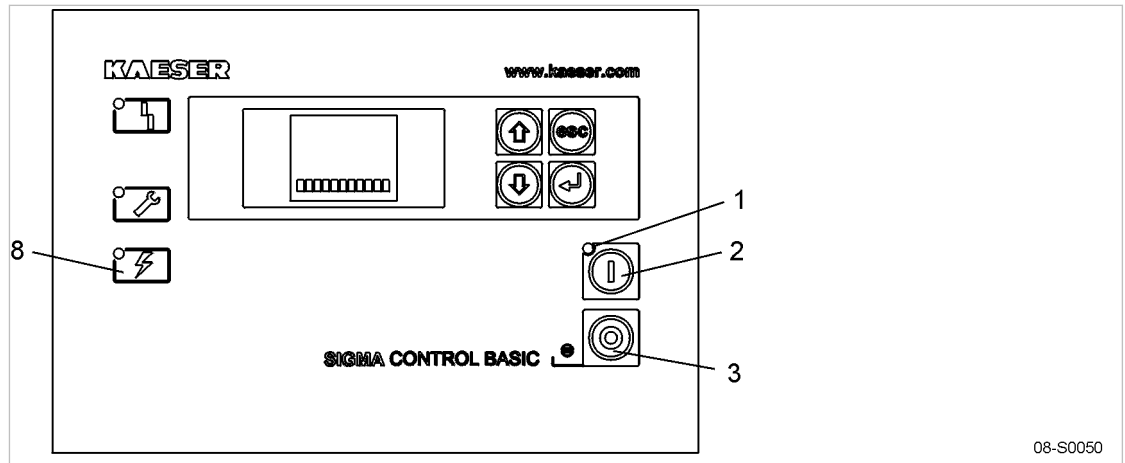


Fig. 16 Switching on and off

- |   |               |   |                           |
|---|---------------|---|---------------------------|
| ① | ONLED (green) | ③ | «OFF» key                 |
| ② | «ON» key      | ⑧ | Controller on LED (green) |

#### 8.1.1 Switching on

**Precondition** No personnel are working on the machine.  
All access doors and panels are closed and secure.

1. Switch on the power supply disconnecting device.  
After the controller has carried out a self-test, the green *Controller on* LED is lit continuously.
2. Press the «ON» key.  
The green *ON*LED lights continuously.



If a power failure occurs, the machine is **not** prevented from restarting automatically when power is resumed.  
It can restart automatically as soon as power is restored.

**Result** The compressor motor starts as soon as system pressure is lower than the set point pressure (cut-off pressure).

### 8.1.2 Switching off

Depending on current operating condition, the machine shuts down after a protective run-on period.

LOAD	IDLE
The machine switches to IDLE. The <i>Machine ON</i> LED flashes. The drive motor comes to a stop after about 15 seconds. The <i>ON</i> LED extinguishes.	The motor stops immediately. The <i>ON</i> LED extinguishes.

Tab. 32 Switching off with/without run-on time

1. Press the «OFF» key.  
The machine is ready to operate as soon as the *ON*LED is extinguished. The machine can be restarted.
2. Switch off and lock out the power supply disconnecting device.  
The machine is switched off and disconnected from the power supply supply. The *Controller on* LED extinguishes.

## 8.2 Switching off in an emergency and switching on again

The EMERGENCY STOP push button is located below the control panel.

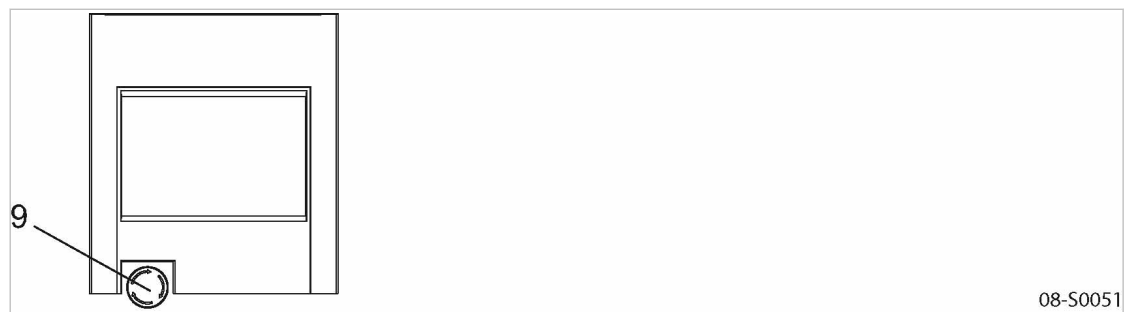


Fig. 17 Switching off in an emergency

⑨ EMERGENCY STOP push button

### Switching off

- Press the EMERGENCY STOP push button.

**Result** The EMERGENCY STOP push button remains latched after actuation.  
The compressor's pressure system is vented and the machine is prevented from automatically re-starting.

### Switching on

**Precondition** The fault has been rectified

1. Turn the EMERGENCY STOP push button in the direction of the arrow to unlatch it.
2. Acknowledge any existing alarm messages.

Result The machine can now be started again.

### 8.3 Acknowledging alarm and warning messages

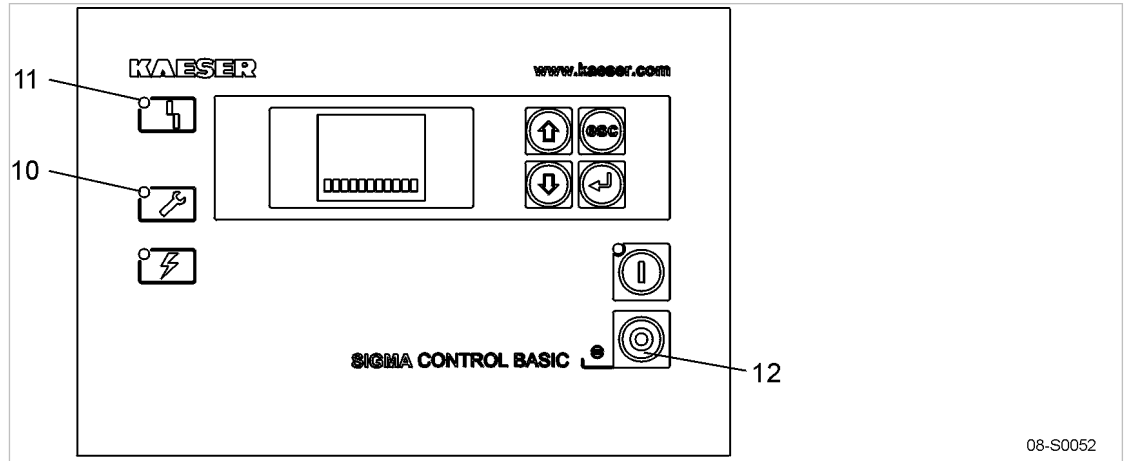


Fig. 18 Acknowledging messages

- 10 Warning LED (yellow)
- 11 Alarm LED (red)
- 12 «Acknowledge» key

#### Alarm message

Messages are displayed on the "new value" principle:

- Message received: LED flashes
- Message acknowledged: LED lights
- Message gone: LED extinguished

or

- Message received: LED flashes
- Message gone: LED flashes
- Message reset: LED extinguished

- Rectify the fault and acknowledge the message with the «acknowledge» key.  
alarm LED extinguishes.  
The machine is now ready to start again.

#### Warning message

- Message coming: LED flashes
- Message gone: LED extinguished
- Rectify fault or carry out maintenance.  
The Warning LED extinguishes as soon as the cause of the warning is rectified.

## 8.4 Setting parameters

If a password is needed it is requested automatically.  
Every action can be cancelled with the «escape» key.



If no key is pressed for ten seconds in the edit mode, the display automatically returns to the previous mode.  
Restarting the controller is not necessary. Edited parameters are immediately effective.  
Network pressure and airtend discharge temperature are neither updated nor displayed while in the edit mode.

### Entering the edit mode

1. Scroll with the «UP»/«DOWN» keys until the desired parameter appears in line 3.
2. Depress the «enter» key for at least 3 seconds.

**Result** Depending on the parameter, either the displayed value or the first character of the required password flashes.

### Changing a parameter that is not password protected

**Precondition** The current parameter setting flashes.

- Use the «UP»/«DOWN» keys to change the value of the parameter and confirm with «enter».

### Changing a password protected parameter

Some parameters can only be edited after a password has been entered.  
Password: BASIC



This password will be automatically reset if no key is pressed within 5 minutes.

**Precondition** The first character flashes.

1. Select the first character with the «UP»/«DOWN» key and confirm with «enter».  
The next character flashes.
2. Repeat until all characters have been entered.  
When the correct password is entered the parameters are displayed.
3. Use the «UP»/«DOWN» keys to change the value of the parameter and confirm with «enter».

## 9 Fault Recognition and Rectification

### 9.1 Basic instructions

The following tables are intended to assist in locating faults.

Error messages are classified in these categories:

- Fault on the machine: red LED flashes - see chapter 9.2.
- Warning: yellow LED lights- see chapter 9.3.
- Other faults: no indication - see chapter 9.4.




The messages valid for your machine are dependent on the controller and individual equipment.



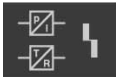

1. Do not attempt fault rectification measures other than those given in this manual!
2. In all other cases:  
Have the fault rectified by an authorized KAESER service representative.

### 9.2 Alarm messages (machine shut down)

The fault code appears in the 4th line of the display field.

A sticker with symbols on the machine explains the fault code.

Fault code	Sign	Meaning	Remedy
1		EMERGENCY STOP push button actuated. Interlocked access door open or panel (if present) removed.	<ul style="list-style-type: none"> <li>➤ Unlatch the EMERGENCY STOP push button.</li> <li>➤ Close the access door or fit the panel.</li> </ul>
2		Motor alarm. Overload protection of drive or fan motor (if fitted). On machines with frequency-controlled drive: Alarm in the frequency converter.	<ul style="list-style-type: none"> <li>➤ Check the setting of the overload protection cut-out / motor overload protection switch.</li> <li>➤ Changing the oil separator cartridge</li> <li>➤ Check minimum pressure/check valve.</li> <li>➤ Have the frequency converter checked by an authorized KAESER service representative.</li> </ul>
3		There is build-up of back pressure: <ul style="list-style-type: none"> <li>■ incorrect direction of motor rotation</li> <li>■ drive belts parted</li> <li>■ No venting at READY</li> <li>■ Pressure switch defective.</li> </ul> Brief interruption of power supply.	<ul style="list-style-type: none"> <li>➤ Changeover phase lines L1 and L2.</li> <li>➤ Replace drive belts.</li> <li>➤ Have the pressure switch checked by an authorized KAESER service representative.</li> </ul>





Fault code	Sign	Meaning	Remedy
4		Maximum permissible airdend discharge temperature exceeded.	<ul style="list-style-type: none"> <li>➤ Clean the cooler.</li> <li>➤ Maintain sufficient distance between the cooling air inlet and exhaust openings and any wall. Check the cooling oil level.</li> <li>➤ Ensure that the permissible room temperature is not exceeded.</li> <li>➤ Change the oil filter.</li> </ul>
5		Fault in the refrigerated dryer.	<ul style="list-style-type: none"> <li>➤ Clean the refrigerant liquefier.</li> <li>➤ Ensure adequate ventilation.</li> <li>➤ Install a ventilator fan.</li> </ul>
6		Defective analog input (pressure or temperature sensor).	<ul style="list-style-type: none"> <li>➤ Check lines and connections.</li> </ul>
7		Maximum permissible temperature of the controller housing exceeded.	<ul style="list-style-type: none"> <li>➤ Ensure adequate ventilation.</li> <li>➤ Ensure that the permissible room temperature is not exceeded.</li> </ul>
8	–	Reserved	–

Tab. 33 Alarms and remedies

## 9.3 Warning messages

The fault code appears in the 4th line of the display field.

An adhesive label at the machine explains the fault code using symbols.

Fault code	Symbol	Meaning	Remedy
S		Maintenance counter has elapsed.	<ul style="list-style-type: none"> <li>➤ Carry out maintenance.</li> </ul>
p		Back pressure present.	<ul style="list-style-type: none"> <li>➤ Check direction of drive motor rotation.</li> </ul>
T		Machine below minimum permissible starting temperature.	<ul style="list-style-type: none"> <li>➤ Increase room temperature.</li> </ul>
i		Safety relief valve check mode switched on.	<ul style="list-style-type: none"> <li>➤ Check safety relief valve.</li> <li>➤ Deactivate check mode.</li> </ul>

Tab. 34 Warning messages

**9.4 Other Faults**

Fault	Possible cause	Remedy
Machine does not run.	Control transformer not wired.	Connect control transformer in accordance with the electrical diagram.  Machine with refrigeration dryer: Connect dryer transformer in accordance with the electrical diagram.
Machine runs but produces no compressed air.	Inlet valve not opening or only opening partially.	Call authorized KAESER Service representative.
	Venting valve not closing.	Call authorized KAESER Service representative.
	Leaks in the pressure system.	Check piping and connections for leaks and tighten any loose fittings.
	Air consumption is greater than the capacity of the compressor.	Check the air system for leaks. Shut down the consumer(s).
	Hose coupling or maintenance hose still plugged into the quick-release coupling on the oil separator tank.	Remove coupling or maintenance hose.
Cooling oil runs out of the air filter.	Oil level in the oil separator tank too high.	Drain off oil until the correct level is reached.
	Inlet valve defective.	Call authorized KAESER Service representative.
Compressor switches between LOAD and IDLE more than twice per minute.	Air receiver too small.	Increase size of air receiver.
	Airflow into the compressed air network restricted.	Increase air pipe diameters. Check filter elements.
	The differential between cut-in and cut-out pressure too is small.	Check switching differential.
Cooling oil leaking into the floor pan.	Hose coupling or maintenance hose still plugged into the quick-release coupling on the oil separator tank.	Remove coupling or maintenance hose.
	Oil cooler leaking.	Call authorized KAESER Service representative.
	Leaking joints.	Tighten joints. Replace seals.



<b>Fault</b>	<b>Possible cause</b>	<b>Remedy</b>
Cooling oil consumption too high.	Unsuitable oil is being used.	Use SIGMA FLUID cooling oil.
	Oil separator cartridge split.	Change the oil separator cartridge.
	Oil level in the oil separator tank too high.	Drain off oil until the correct level is reached.
	Oil return line clogged.	Check dirt trap in the return line.

Tab. 35 Other faults and actions

# 10 Maintenance

## 10.1 Ensuring safety

Follow the instructions below to ensure safe machine maintenance.  
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”.
- Maintenance work may only be carried out by authorized personnel.
- Use the safety sign below to advise others that the machine is currently being serviced:

Sign	Meaning
	<p><b>⚠ WARNING</b></p> <p>Serious injury or death can result from activating the machine during service!</p> <ul style="list-style-type: none"> <li>➤ Do <b>not</b> activate the machine.</li> </ul>

Tab. 36 Warn others that the machine is being serviced.

- Before switching on, make sure that nobody is working on the machine and all access doors and panels are closed and 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 authorized electricians.
- Switch off and lock out the power supply disconnecting device and verify the absence of voltage.
- Check that there is no voltage on floating relay 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.

- 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.
- Depressurize all pressurized components and enclosures.
- Check all hose couplings in the compressed air system with a hand-held pressure gauge to ensure that they all read 0 psig.
- 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 wheel, the coupling, or the drive while the machine is switched on can result in serious injury.

- Switch off and lock out the power supply disconnecting device and verify the absence of voltage.
- Do not open the cabinet while the machine is switched on.

Further information Details of authorized personnel are found in chapter 3.4.2.  
Details of dangers and their avoidance are found in chapter 3.5.

## 10.2 Following the maintenance plan

### 10.2.1 Logging maintenance work



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

- In adverse conditions, perform maintenance work at shorter intervals.

Adverse conditions are, e.g.:

- high temperatures
- too much dust
- high number of load changes
- low load

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

- Documenting 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 Resetting maintenance interval counters

SIGMA CONTROL BASIC is equipped with a maintenance interval counter. The maintenance interval counter counts down the operating hours to the next maintenance task.

The counting down of the maintenance interval indicator shows when the next maintenance action is due.

Reset the counter to the original value once the task has been carried out.

1. Select parameter 2 (maintenance interval counter) with the «UP»/«DOWN» keys.
2. Depress the «Enter» key for at least 3 seconds.
3. When the cursor flashes, confirm the offered value with the «Enter» key.

### 10.2.3 Regular maintenance tasks

The table below lists maintenance tasks required.

- Take note of the controller's service messages and carry out tasks punctually, taking ambient and operating conditions into account.

Interval	Maintenance task	see chapter
Weekly	Check the cooling oil level.	10.13
	Cooler: Check the filter mat	10.3
	Control cabinet: Check the filter mat	10.4
up to 1000 h	Maintain the drive belt.	10.9
	Check the air filter.	10.7
	Cooler: Clean the filter mat.	10.3
	Control cabinet: Clean the filter mat.	10.4
	Clean the cooler.	10.5
Display: SIGMA CONTROL BASIC	Cooler: Change the filter mat.	10.3
	Control cabinet: Change the filter mat.	10.4
	Change the air filter.	10.7
Display: SIGMA CONTROL BASIC at least annually	Change the oil filter.	10.17
	Change the oil separator cartridge.	10.18
Variable, see table 38	Change the cooling oil.	10.16
up to 12000 h	Replace the drive belt.	10.9
Annually	Check that all electrical connections are tight.	–
	Check the safety relief valve.	10.10
	Check the function: Safety shut-down due to excessive airend discharge temperature	10.11
	Check the EMERGENCY STOP push button.	10.12
	Check the function: Safety shutdown when opening the machine	7.9
	Check the cooler for leaks.	10.5
	Maintain the heat recovery system.	10.6

h = operating hours

Tab. 37 Regular maintenance tasks

### 10.2.4 Cooling oil changing interval

Machine utilization and ambient conditions are important criteria for the number and length of the change intervals.



An authorized KAESER service representative will support you in determining appropriate intervals and provide information on the possibilities of oil analysis.

- Please observe national regulations regarding the use of cooling oil in oil-injected screw compressors.
- Check operating conditions and adjust intervals as necessary.

#### KAESER LUBRICANTS

SIGMA Lubricant	Description	Maximum Recommended Change Interval	
		First oil change	Subsequent oil change
M-460	ISO 46 Semi-Synthetic Lubricant	2000 Hours	3000 Hours
S-460	ISO 46 Synthetic Lubricant	6000 Hours	8000 Hours
S-680	ISO 68 Synthetic Lubricant	6000 Hours	8000 Hours
FG-460	ISO 46 Food Grade Synthetic Fluid	2000 Hours	3000 Hours

Tab. 38 Oil change intervals lubricants

#### 10.2.5 Regular service tasks

The table below lists service tasks required.

- Only an authorized KAESER service representative should carry out service work.
- Have service tasks carried out punctually taking ambient and operating conditions into account.

Interval	Service task
Up to 12000 h	Service valves.
Up 12000 h, every 4 years at the latest	Replace the compressor motor bearings.
Up to 36000 h Every 6 years at the latest.	Have the pipes and hose lines replaced.
Up to 36000 h	Replace the control cabinet fan.
After 20 years at the latest	Replace safety-relevant components of the safety devices.

h = operating hours

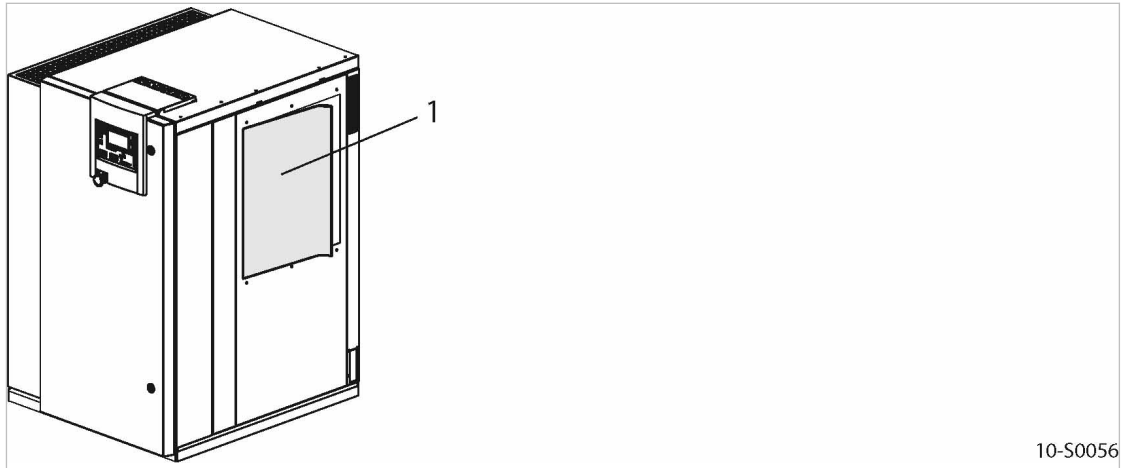
Tab. 39 Regular service tasks

### 10.3 Cooler: Cleaning or Renewing the Filter Mats

The filter mats help to keep the cooler clean. If the filter mats are clogged, adequate cooling of the components is no longer ensured.

**Material** Filter mats:  
Warm water and household detergent  
Spare parts (as required)

**Precondition** The machine is switched off.



10-S0056

Fig. 19 Filter mat for the air and oil cooler

① Filter mat

No tools are needed to remove the filter mat.

1. Carefully remove the filter mat from the retaining frame.
2. Beat the mat or use a vacuum cleaner to remove loose dirt. If necessary, wash with lukewarm water and household detergent.
3. Change the filter mat if cleaning is not possible or if the change interval has expired.
4. Carefully insert the filter mat in the retaining frame.

## 10.4 Control cabinet: Clean or renew the filter mat

A filter mat is placed behind every ventilation grill. Filter mats protect the control cabinet from ingress of dirt. If the filter mats are clogged, adequate cooling of the components is no longer ensured. In such a case, clean or replace the filter mats.

**Material** Warm water and household detergent  
Spare parts (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.

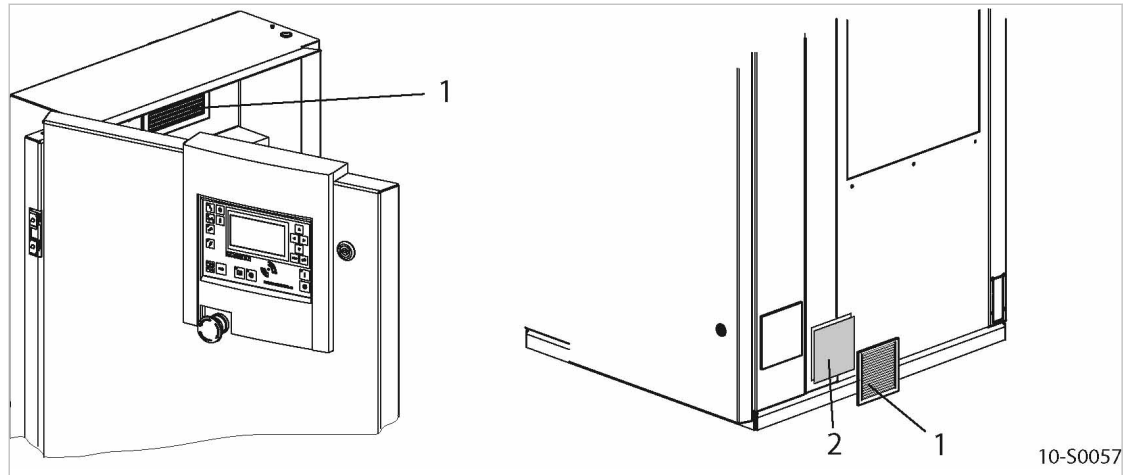


Fig. 20 Switching cabinet ventilation

- ① Ventilation grill
- ② Filter mat

1. Carefully remove the ventilation grill and take out the filter mat.
2. Beat the mat or use a vacuum cleaner to remove loose dirt. If necessary, wash with lukewarm water and household detergent.
3. Change the filter mat if cleaning is not possible or if the change interval has expired.
4. Insert the filter mat in the frame and latch in the ventilation grill.

## 10.5 Cooler maintenance

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

A leaking cooler results in loss of cooling oil and compressed air.

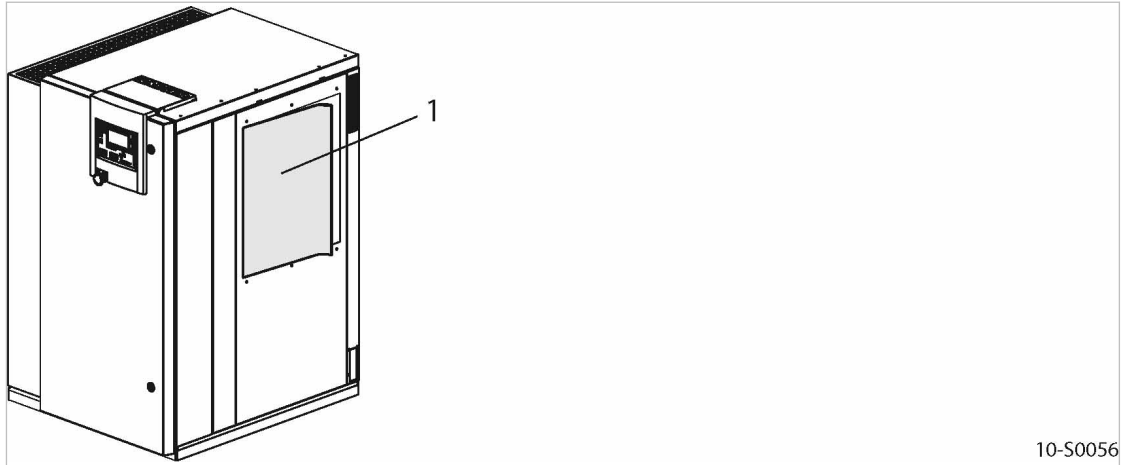


Clogged coolers are indicative of unfavorable ambient conditions. Such ambient conditions clog the cooling air ducts in the machine's interior and the engines resulting in increased wear and tear.

- Have the authorized KAESER service representative clean the cooling air ducts.

**Material** Brush and vacuum cleaner  
Face mask (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-S0056

Fig. 21 Filter mat for the air and oil cooler

- ① Filter mat

### Cleaning the cooler

A filter mat helps to keep the cooler clean. Despite this fact, the cooler will clog over a period of time.

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

Avoid creating clouds of dust.

1. Carefully remove the filter mat from the retaining frame.
2. Dry brush the oil and air coolers and use a vacuum cleaner to suck up the dirt.
3. Carefully insert the filter mat in the retaining frame.



The air and oil coolers can no longer be properly cleaned?

- Have severe clogging removed by an authorized KAESER service representative.

### Checking the cooler for leaks

- Visual inspection: Did cooling oil escape?



Is a cooler leaking?

- Have the defective cooler repaired immediately by an authorized KAESER service representative.

## 10.6 Option W1 Maintaining the external heat recovery system

Deposits in the heat exchanger can significantly reduce its capacity to transfer heat.

Check the heat exchanger regularly for leaks and contamination. Frequency of checking is dependant on the characteristics of the heat transfer medium.

- Have the external heat recovery system checked annually by an authorized KAESER service representative.



## 10.7 Air Filter 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.

The air filter element cannot be cleaned.

Material Replacement part

Precondition The power supply disconnecting (isolating) device is switched off, the disconnect device is locked in the off position, a check has been made that no voltage is present. The machine has cooled down.

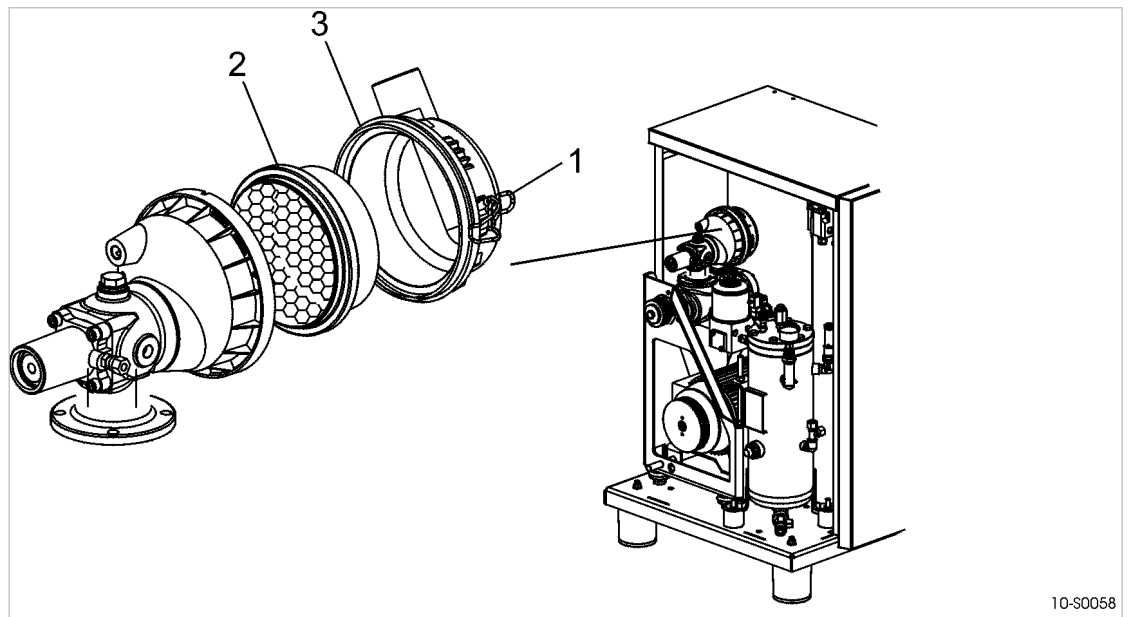


Fig. 22 Air filter maintenance

- ① Snap fastener
- ② Air filter element
- ③ Air filter housing

1. Release the spring clips and remove the element.
2. Clean all parts and sealing surfaces.
3. Insert the new element in the housing.
4. Clip the air filter housing onto the inlet valve.

## 10.8 Compressor motor maintenance

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

- Have the motor bearings checked by an authorized KAESER service representative.

## 10.9 Drive belt maintenance

Material Spare parts (if 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.

### **⚠ WARNING**

*Touching the moving drive belt may result in severe bruising or even loss of limb or extremities.*

- *Switch off and lock out the power supply isolating device and verify the absence of voltage.*

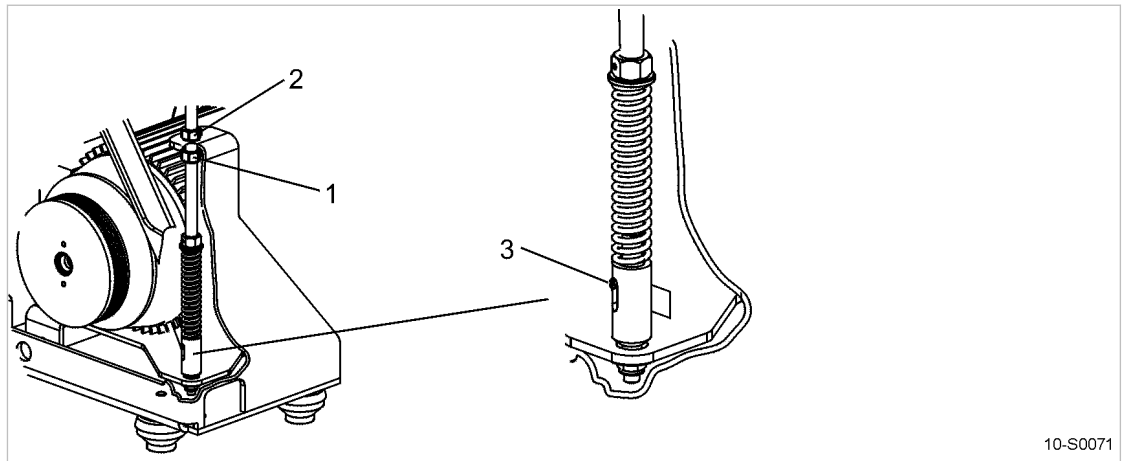


Fig. 23 Drive belt maintenance

- ① Clamping nut
- ② Clamping nut
- ③ Marker pin (shown as: belt tensioning required)

### Checking the belt tension and adjustment

The tensioning device uses spring force to apply correct tension to the belt.

Adjust the tension when the marker pin reaches the **top** end of the elongated hole.

The marker pin can be seen through a viewing window from outside. This means that belt tension can be checked without opening the machine.

1. Loosen the locking nut ②.
2. Use the adjusting nut ① to adjust the spring tension until the marker pin reaches the lower end of the elongated hole.
3. Tighten the locking nut ②.

### Visually check for damages.

1. Turn the pulley by hand so that all of the belt can be inspected for damage.
2. In case of damage: Replace the drive belt immediately.

**Changing the belt**

1. Loosen the locking nut ②.
2. Turn adjusting nut ① to loosen the tension on the belt until it can be removed from the pulley.
3. Install the new belt and use the adjusting nut ① to adjust tension until the marker pin reaches the lower end of the elongated hole.
4. Tighten the locking nut ②.

**10.10 Testing the safety relief valve**

In order to check the safety relief valve, the machine's working pressure is raised above the blowoff pressure of the valve.

The controller is switched to safety relief valve checking mode to carry out this check. This checking mode is intended for machines with maximum permissible working pressure less than 217 psig. Safety relief valves in machines with permissible working pressures higher than 217 psig must be removed from the machine and tested on a special rig.



Blow off protection and air system pressure monitoring are switched off during the test.

- Never operate the machine without correctly functioning safety relief valves.
- Relief valves on machines with maximum permissible working pressure of 217 psig should be tested only by an authorized KAESER service representative.



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

**Preparation for the test**

Precondition The machine is switched off.

1. Close the user's shut-off valve between the machine and the air distribution network.
2. Read off the activating pressure on the valve.  
(the activating pressure is usually to be found at the end of the part identification)
3. Scroll to parameter 3 "Safety relief valve check mode" with the arrow keys and confirm by depressing the «Enter» key for at least three seconds.
4. Enter the password ""BASIC" and confirm with the «Enter» key.
5. Use the arrow keys to select parameter "on" and confirm.

**Carrying out the check**

The machine starts in IDLE as soon as it is switched on.

As long as the «ON» key is depressed and held, the machine will run in LOAD operating mode and pressure builds up in the oil separator tank. As soon as the «ON» key is released, the machine switches back to IDLE and switches automatically to STANDSTILL when the idling period has elapsed.

Precondition The machine is switched off.

**10.11 Check the safety shut-down due to excessive aircend discharge temperature.**

1. **⚠ WARNING** *The safety relief valve may blow off at any time!  
Excessive noise is caused when the safety relief valve blows off!  
There is danger of scalding from hot oil.  
There is danger of injury from bursting components and compressed air!*
  - *Close all access doors and replace and secure all removable panels.*
  - *Wear ear and eye protection.*
  - *Abort the test if the working pressure reaches 10 % above the blowoff pressure of the valve.*
2. Press the «ON» key for short time.  
The machine starts in IDLE.
3. Observe the pressure indication on the SIGMA CONTROL BASIC keep the «ON» key pressed.
4. Stop the test as soon as the safety relief valve blows off or working pressure rises to 10 % above the activating pressure of the safety relief valve.
5. If necessary, vent the machine and replace the defective safety relief valve.

**Returning the machine to operational**

1. Call up the edit mode again and enter the password "BASIC".
2. Use the arrow keys to set the parameter to "off" and confirm with the enter key.
3. Open the user's shut-off valve between the machine and the air distribution network.

**10.11 Check the safety shut-down due to excessive aircend discharge temperature.**

The machine should shut down if the aircend discharge temperature reaches a maximum of 230 °F.

- Have the safety shutdown function checked by an authorized KAESER service representative.

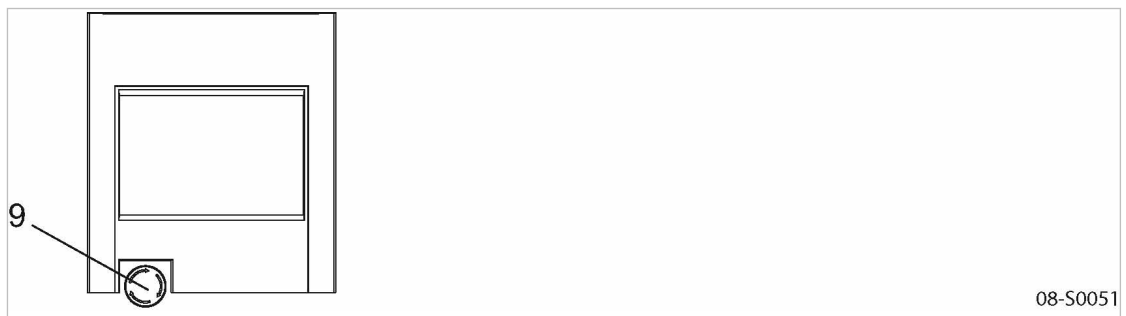
**10.12 Testing the EMERGENCY STOP push button**

Fig. 24 Testing the EMERGENCY STOP push button

- ⑨ EMERGENCY STOP push button

Precondition The compressor motor is running.

1. Press the EMERGENCY STOP push button.

The compressor motor stops, the pressure system is vented, and the machine is prevented from automatically restarting.



The compressor motor does not stop?

The safety function of the EMERGENCY STOP push button is no longer ensured.

- Shut down the machine immediately and call an authorized KAESER service representative.

2. Turn the EMERGENCY STOP push button in the direction of the arrow to unlatch it.
3. Acknowledge the alarm message.

### 10.13 Checking the cooling oil level

The sightglass allows a risk-free reading of the cooling oil level. The oil indicator should be fully filled with oil when the machine is at standstill. The correct oil level cannot be seen.

The ideal situation is with the oil level around the optimum mark when the machine is running.

Operating state	Minimum oil level	Maximum oil level
LOAD		

Tab. 40 Permissible cooling oil level under LOAD



In frequency-controlled compressors (SFC) the oil level indicator is only accurate when the machine is running at or near maximum speed.

The lower the pressure at the compressed air outlet, the higher the speed.

Precondition The machine has been running at least 5 minutes under LOAD.

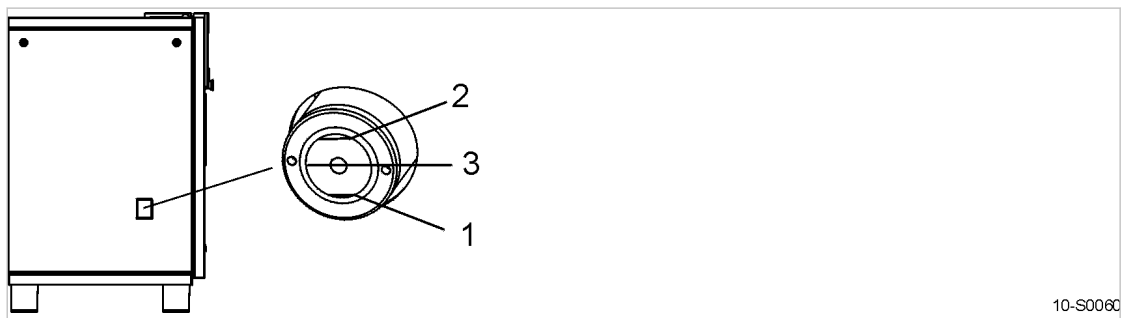


Fig. 25 Checking the cooling oil level

- ① Minimum oil level
- ② Maximum oil level
- ③ Optimum oil level

- Check the oil level with machine running under LOAD.

Result As soon as the minimum level is reached: Replenish the cooling oil.

## 10.14 Venting the machine (de-pressurizing)

Venting takes place in three stages:

- Isolate the compressor from the air system.
- Vent the oil separator tank.
- Manually vent the air cooler.



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

**Material** The maintenance hose with hose coupling and shut-off valve needed for venting is stowed beneath the oil separator tank.

**Precondition** The power supply disconnecting device is switched off, The device is locked off, A check has been made that no voltage is present.

### **CAUTION**

*Escaping oil mist is damaging to health.*

- Do not direct the maintenance hose at persons while venting.
- Do not inhale the oil mist.

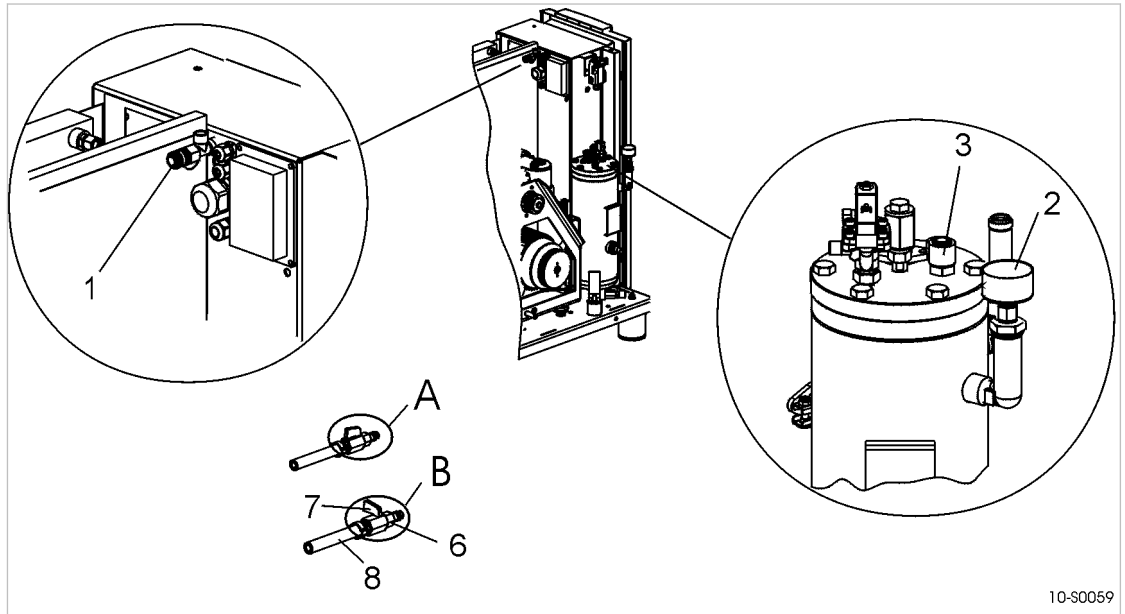


Fig. 26 Venting the machine

- |   |  |   |                       |
|---|--|---|-----------------------|
| ① | Hose coupling (air cooler venting)         | ⑦ | Shut-off valve        |
| ② | Pressure gauge                             | Ⓐ | Shut-off valve open   |
| ③ | Hose coupling (oil separator tank venting) | Ⓑ | Shut-off valve closed |
| ④ | Male hose fitting                          | ⑧ | Maintenance hose      |

### Isolating the machine from the air system

- Close the user's shut-off valve between the machine and the air distribution network.



If no shut-off valve is provided by the user, the complete air distribution network must be vented.

#### Venting the oil separator tank

The oil circulation vents automatically as soon as the machine is stopped.

- Check that the oil separator tank pressure gauge reads 0 psig.



The pressure gauge does not read 0 psig after automatic venting?

- Make sure that the user's shut-off valve is closed or that the complete air system is vented.
- With the shut-off valve closed, insert the male hose fitting (6) into the hose coupling (3).
- Slowly open the shut-off valve (7) to release pressure.
- Disconnect the male hose fitting (6) and close the shut-off valve (7).
- If manual venting does **not** bring the oil separator tank pressure gauge to zero: Contact an authorized KAESER service representative.

#### Manually venting the air cooler



After shutting down the compressor and venting the oil separator tank, the machine is still under pressure from the air system or the section from the shut-off valve to the minimum pressure/check valve.

1. With the shut-off valve closed, insert the male hose fitting (6) into the hose coupling (1).
2. Slowly open the shut-off valve (7) to release pressure.
3. Disconnect the male hose fitting (6) and close the shut-off valve (7).

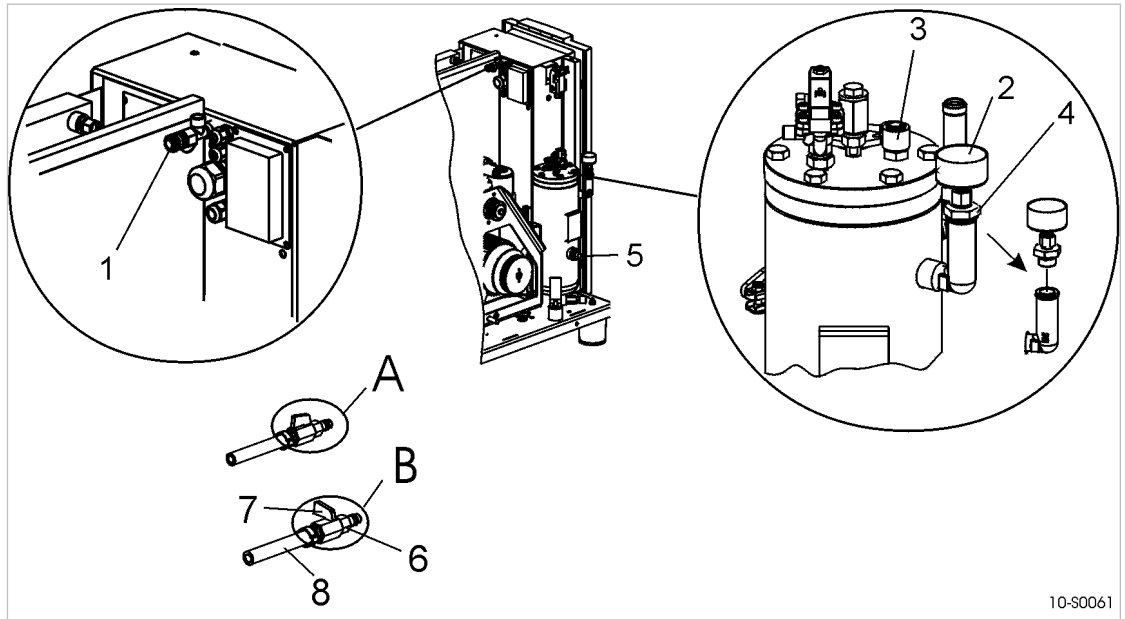
## 10.15 Replenishing the cooling oil



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

**Material** The maintenance hose with hose coupling and shut-off valve needed for venting is stowed beneath the oil separator tank.

**Precondition** The power supply disconnecting device is switched off,  
The device is locked off,  
A check has been made that no voltage is present.



10-S0061

Fig. 27 Replenishing the cooling oil

- |   |  |   |                       |
|---|--|---|-----------------------|
| ① | Hose coupling (air cooler venting)         | ⑥ | Male hose fitting     |
| ② | Pressure gauge                             | ⑦ | Shut-off valve        |
| ③ | Hose coupling (oil separator tank venting) | Ⓐ | Shut-off valve open   |
| ④ | Oil filler port with plug                  | Ⓑ | Shut-off valve closed |
| ⑤ | Cooling oil level indicator                | ⑧ | Maintenance hose      |

1. Vent the machine as described in section 10.15.1.
2. Fill with cooling oil and test run as described in section 10.15.2.

### 10.15.1 Venting the machine (de-pressurizing)

Venting takes place in three stages:

- Isolate the compressor from the air system.
- Vent the oil separator tank.
- Manually vent the air cooler.

#### **⚠ CAUTION**

*Escaping oil mist is damaging to health.*

- *Do not direct the maintenance hose at persons while venting.*
- *Do not inhale the oil mist.*

#### Isolating the machine from the air system

- Close the user's shut-off valve between the machine and the air distribution network.



If no shut-off valve is provided by the user, the complete air distribution network must be vented.



#### Venting the oil separator tank

The oil circulation vents automatically as soon as the machine is stopped.

- Check that the oil separator tank pressure gauge reads 0 psig.



The pressure gauge does not read 0 psig after automatic venting?

- Make sure that the user's shut-off valve is closed or that the complete air system is vented.
- With the shut-off valve closed, insert the male hose fitting (6) into the hose coupling (3).
- Slowly open the shut-off valve (7) to release pressure.
- Disconnect the male hose fitting (6) and close the shut-off valve (7).
- If manual venting does **not** bring the oil separator tank pressure gauge to zero: Contact an authorized KAESER service representative.

#### Manually venting the air cooler



After shutting down the compressor and venting the oil separator tank, the machine is still under pressure from the air system or the section from the shut-off valve to the minimum pressure/check valve.

1. With the shut-off valve closed, insert the male hose fitting (6) into the hose coupling (1).
2. Slowly open the shut-off valve (7) to release pressure.
3. Disconnect the male hose fitting (6) and close the shut-off valve (7).

### 10.15.2 Topping off with cooling oil and trial run

#### Replenishing the cooling oil

A sticker on the oil separator tank specifies the type of oil used.

1. **▲ WARNING** *Compressed air!*  
*Compressed air and devices under pressure can injure or cause death if the contained energy is released suddenly.*
  - *De-pressurize all pressurized components and enclosures.*
2. **■ NOTICE** *The machine could be damaged by unsuitable oil!*
  - *Never mix different types of oil.*
  - *Never top off with a different type of oil than has already been used in the machine.*
3. Slowly unscrew the filler plug (4).
4. Top off to bring the oil to the correct level.
5. Replace the filler plug's sealing ring if necessary and screw the plug into the filler neck.

#### Starting the machine and carrying out a trial run

1. Close all access doors, replace and secure all removable panels.
2. Open the user's shut-off valve between the machine and the air distribution network.
3. After approx. 10 minutes of operation: Check the cooling oil level and top off if necessary.
4. Switch off the machine and check for leaks.

## 10.16 Changing the cooling oil



Drain the oil completely from the following components:

- Oil separator tank
- Thermostatic valve (Option W1)

Always change the oil filter and oil separator cartridge when changing the oil.

Compressed air helps to expel the oil. This compressed air can be taken either from the compressor itself or from an external source.

An external source of compressed air is necessary in the following cases:

- The machine is not operational.
- The machine is to be restarted after a long period of standstill.



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

### Material

Cooling oil

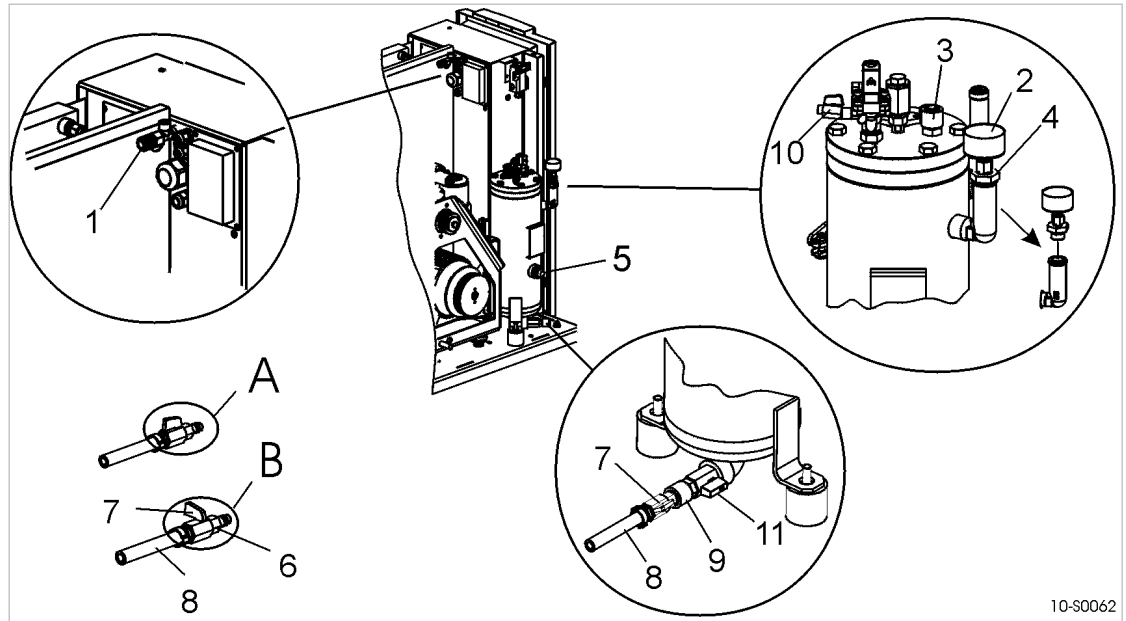
Oil receptacle

The maintenance hose with hose coupling and shut-off valve is stowed beneath the oil separator tank.

### CAUTION

*There is risk of burns from hot components and oil!*

➤ *Wear long-sleeved clothing and protective gloves.*



10-S0062

Fig. 28 Changing the cooling oil, oil separator tank

- |   |  |   |                               |
|---|--|---|-------------------------------|
| ① | Hose coupling (air cooler venting)         | A | Shut-off valve (open)         |
| ② | Pressure gauge                             | B | Shut-off valve (closed)       |
| ③ | Hose coupling (oil separator tank venting) | ⑧ | Maintenance hose              |
| ④ | Oil filler port with plug                  | ⑨ | Hose coupling (oil drainage)  |
| ⑤ | Cooling oil level indicator                | ⑩ | Shut-off valve (venting line) |
| ⑥ | Male hose fitting                          | ⑪ | Shut-off valve (oil drainage) |
| ⑦ | Shut-off valve                             |   |                               |

Changing the oil with internal pressure	Oil change with an external compressed air source
<p>The machine has been running at least 5 minutes in LOAD mode.</p> <p>The machine is fully vented, the pressure gauge on the oil separator tank reads 0 psig.</p> <ol style="list-style-type: none"> <li>1. Close the shut-off valve ⑩ in the venting line.</li> <li>2. Start the machine and watch the oil separator tank pressure gauge ② until it reads 43–73 psig.</li> <li>3. Switch off the machine.</li> <li>4. Wait at least 2 minutes to allow the oil to flow back to the separator tank.</li> </ol>	<p>The power supply disconnecting device is switched off, the device is locked off, the absence of any voltage has been verified.</p> <p>The machine is fully vented, the pressure gauge on the oil separator tank reads 0 psig.</p> <p>An external source of compressed air is available.</p> <ol style="list-style-type: none"> <li>1. Close the shut-off valve ⑩ in the venting line.</li> <li>2. With the shut-off valve closed, insert the male hose fitting ⑥ into the hose coupling ③.</li> <li>3. Connect the maintenance hose to the external air supply.</li> <li>4. Open the shut-off valve ⑦ until the pressure gauge on the oil separator tank reads 43–73 psig.</li> <li>5. Close the shut-off valve ⑦ and remove the male hose fitting from the coupling.</li> </ol>

**Draining the oil from the separator tank**



Contact KAESER Service if condensate is detected in the cooling oil.  
It is necessary to adapt the airend discharge temperature to individual ambient conditions.

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

1. Have an oil receptacle ready.
2. With the shut-off valve closed, insert the male hose fitting ⑥ into the hose coupling ⑨.
3. Place the other end of the maintenance hose in the oil receptacle and secure it in place.
4. Open the shut-off valve ⑪.
5. Slowly open the shut-off valve ⑦ in the maintenance hose and allow oil and air to drain completely.  
Pressure gauge on the oil separator tank indicates 0 psig.
6. Close the shut-off valve ⑪ and unplug the male hose fitting.

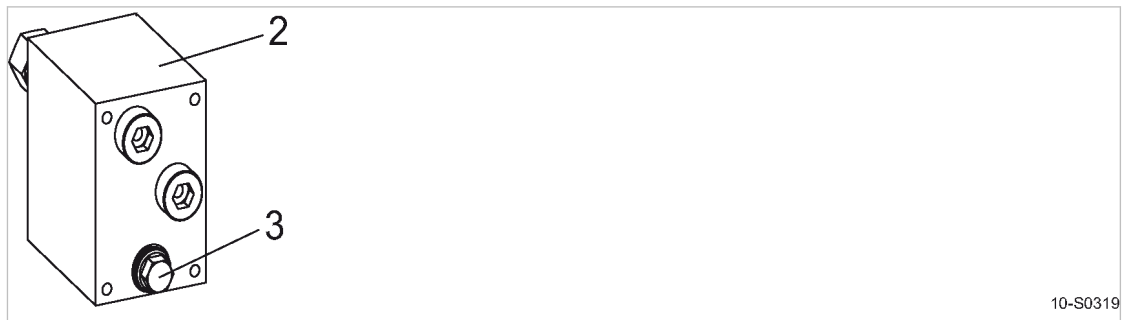


➤ Dispose of used oil in accordance with environmental protection regulations.

**Option W1 Draining the oil from the thermostatic valve**

A drain plug is provided to drain oil from the thermostatic valve. If the machine is connected to an external heat recovery system, oil should also be drained from the heat exchanger at a suitable point.

**Precondition** The external heat recover system is depressurized.



10-S0319

Fig. 29 Changing the cooling oil, heat recovery system

- ② Thermostatic valve
- ③ Screw plug

1. Have an oil receptacle ready.
2. Remove the drain plug ③ and allow the oil to drain completely.
3. Replace the plug ③.

**Filling with cooling oil**

1. **⚠ WARNING** *Compressed air!*  
*Compressed air and devices under pressure can injure or cause death if the contained energy is released suddenly.*
  - *Vent all pressurized components and enclosures.*
2. Slowly unscrew the filler plug (4) (see illustration 28).
3. Fill with cooling oil.
4. Check the filler plug and ring seal for damage and screw the plug back in again.

**Starting the machine and performing a trial run**

1. Close all access doors, replace and secure all removable panels.
2. Open the user's shut-off valve between the machine and the air distribution network.
3. Switch on the power supply and reset the maintenance interval counter.
4. Start the machine and check the oil level again after about 10 minutes, topping off if necessary.
5. Switch off the machine and check for leaks.

**10.17 Changing the oil filter**

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

Material Spares

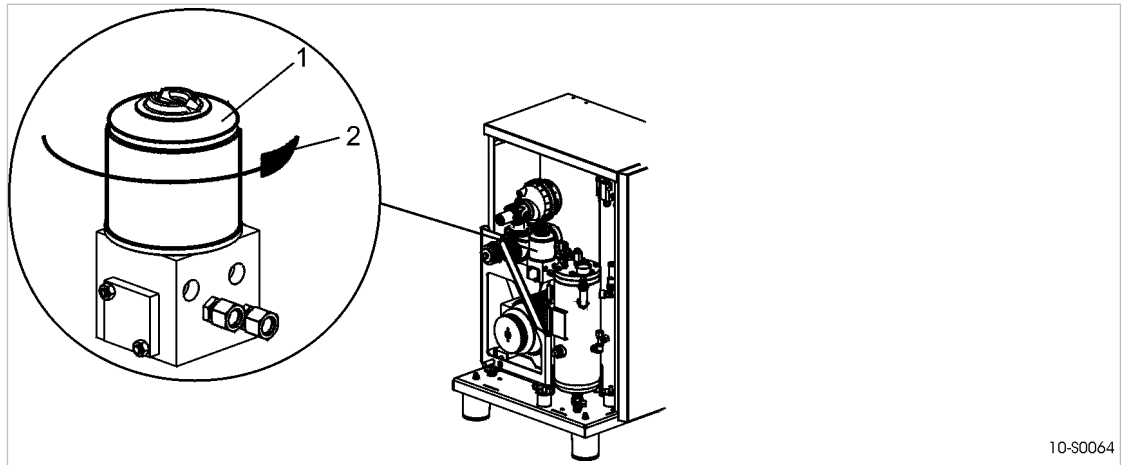
Cooling oil receptacle

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,  
the pressure gauge on the oil separator tank reads 0 psig.

**⚠ CAUTION**

*There is risk of burns from hot components and oil!*

- *Wear long-sleeved clothing and gloves.*



10-S0064

Fig. 30 Changing the oil filter

- ① Oil filter
- ② Direction to unscrew

#### Changing the oil filter

1. **⚠ WARNING** *Compressed air!*  
*Compressed air and devices under pressure can injure or cause death if the contained energy is released suddenly.*
  - *Depressurize all pressurized components and enclosures.*
2. Unscrew the oil filter anti-clockwise, catch oil spillage and dispose of in accordance with environmental protection regulations.
3. Lightly oil the new filter's gasket.
4. Turn the oil filter clockwise by hand to tighten.



- Dispose of parts and materials contaminated with oil in accordance with environmental protection regulations.

#### Starting the machine and carrying out a trial run

1. Close all access doors, replace and secure all removable panels.
2. Open the user's shut-off valve between the machine and the air distribution network.
3. Switch on the power supply and reset the maintenance interval counter.
4. After approx. 10 minutes of operation: Check the cooling oil level and top up if necessary.
5. Switch off the machine and check visually for leaks.

## 10.18 Changing the oil separator cartridge



The oil separator cartridge cannot be cleaned.

The life of the oil separator cartridge is influenced by:

- contamination in the air drawn into the compressor,
- Adherence to the changing intervals for:
  - Cooling oil
  - Oil filter
  - Air filter



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

Material Spares  
Cleaning cloth

Precondition The 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.  
The machine is fully vented,  
the pressure gauge on the oil separator tank reads 0 psi.

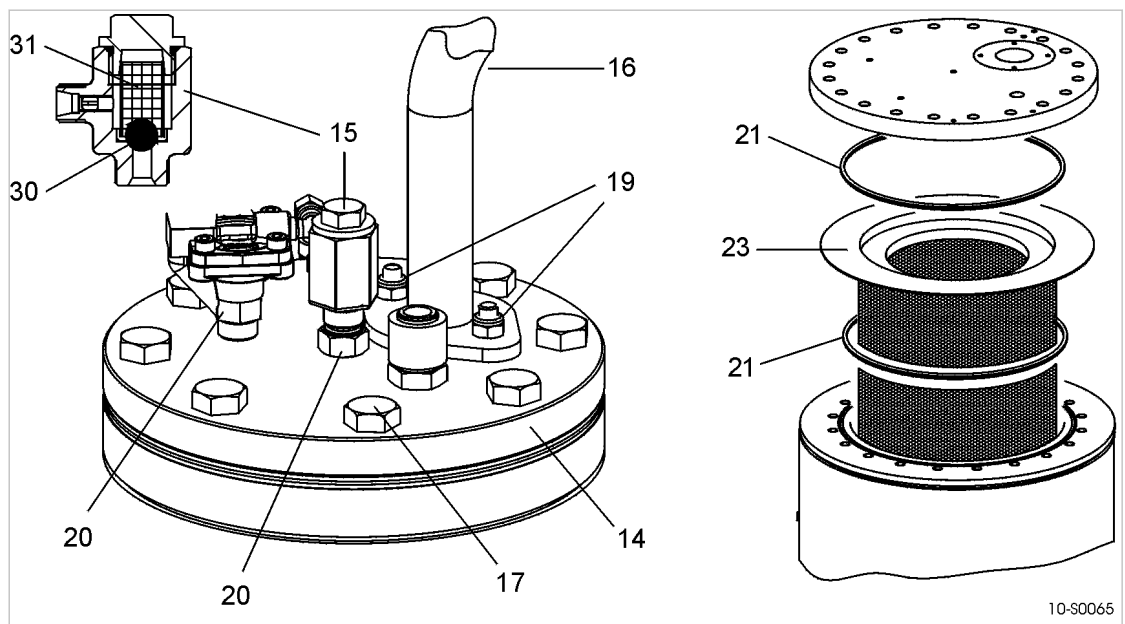


Fig. 31 Changing the oil separator cartridge

- |                       |  |
|-----------------------|--|
| (14) Cover            | (20) Screw connection                    |
| (15) Dirt trap        | (21) seal                                |
| (16) Air pipe         | (23) Oil separator cartridge             |
| (17) Retaining screw  | (30) Ball (functioning as a check valve) |
| (19) Self-locking nut | (31) Strainer                            |

**Changing the oil separator cartridge**

1. **⚠ WARNING** *Compressed air!*  
*Compressed air and pressurized devices can cause serious injury or death if the contained energy is suddenly released.*
  - Vent all pressurized components and chambers completely.

2. Unscrew the fitting (20) and carefully put the parts to one side, then pull out the copper pipe at item (15).
3. Unscrew the nut (19) and turn the air pipe (16) to one side.
4. Remove the cover fixing screws (17) and carefully remove the cover (14).
5. Take out the old oil separator cartridge (23) together with the gaskets (21) and dispose of according to environmental protection regulations.
6. Clean all sealing faces.
7. Insert the new oil separator cartridge with gaskets and refix the cover.
8. Renew the O-ring and strainer in the dirt trap (15).



- Make sure the ball (30) is properly seated.  
The ball prevents cooling oil being pressed into the separator cartridge.

9. Attach the air pipe to the cover (14) with a new, self-locking nut.
10. Replace and tighten all fittings.



- Dispose of parts and materials contaminated with oil in accordance with environmental protection regulations.

**Start the machine and carry out a trial run**

1. Close all access doors, replace and secure all removable panels.
2. Open the user's shut-off valve between the machine and the air distribution network.
3. Switch on the power supply and reset the maintenance interval counter.
4. After approx. 10 minutes of operation: Switch off the machine and check visually for leaks.





## 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 inquiry and order for spare parts.

### 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.

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.

#### **⚠ WARNING**

*There is risk of personal injury or damage to the machine resulting from the use of unsuitable spares or operating fluids/materials.*

- *Use only original KAESER parts and operating fluids/materials.*
- *Have an authorized KAESER service representative carry out regular maintenance.*

#### Machine

Name	Number
Air filter element	1250
Filter mat (cooler)	1050
Filter mat (control cabinet)	1100
Oil filter	1200
Oil separator cartridge	1450
Cooling oil	1600
Drive belt	1801

Tab. 42 Consumable parts

### 11.3 KAESER AIR SERVICE

KAESER AIR SERVICE offers:

- authorized KAESER service representatives 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

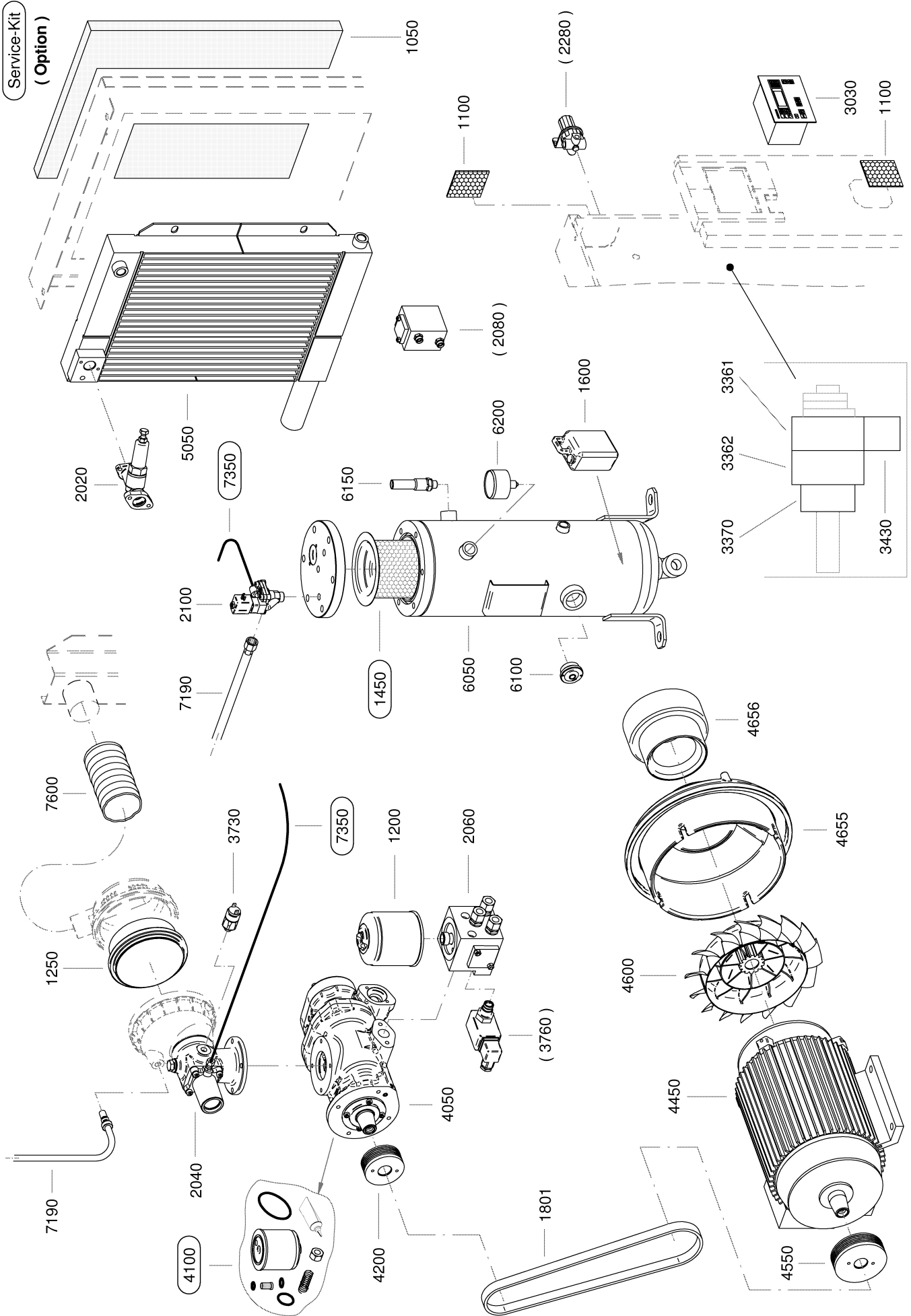
Addresses of KAESER representatives are given at the end of this manual.

## 11.5 Spare Parts for Service and Repair

With the help of this parts list you can plan your material requirement according to operating conditions and order the spare parts you need.



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



SEG-3354\_01

<b>Legend</b>	<b>KAESER</b>
SM 7.5/10/15	SEL-2531_01USE

Item	Description	Option
1050	Filter mat, cooling air	
1100	Filter mat, control cabinet	
1200	Oil filter	
1250	Air filter element	
1450	Oil separator cartridge	
1600	Sigma Fluid *)	
1801	Drive belt	
2020	Minimum pressure/check valve	
2022	Maintenance kit, MP/CV	
2024	Overhaul kit, MP/CV	
2040	Inlet valve	
2042	Maintenance kit, inlet valve	
2044	Overhaul kit, inlet valve	
2060	Combination valve	
2062	Maintenance kit, combi. valve	
2064	Overhaul kit, combination valve	
2080	Thermostatic valve (heat rec.)	X
2082	Maintenance kit, thermostatic valve	
2084	Overhaul kit, thermostatic valve	
2100	Venting/control valve	
2102	Maintenance kit, VC valve	
2104	Overhaul kit, VC valve	
2280	Proportional controller	X
3030	SIGMA CONTROLLER	
3361	Mains contactor	
3362	Delta contactor	
3370	Star contactor	
3430	Overload protection cutout	
3730	Rotating direction breaker	
3732	Protective cap	
3760	Pressure differential switch	X
4050	SIGMA airend	
4100	Airend installation kit	
4200	Crankshaft pulley	
4450	Drive motor	
4451	Bearing set, drive motor	
4550	Drive motor pulley	
4600	Drive motor blower wheel	
4655	Motor cooling air flow guide	
4656	Foam roller	
5050	Cooler	
6050	Oil separator tank	
6100	Oil level indicator	
6150	OST pressure relief valve	
6200	Oil sep. tank pressure gauge	
7190	Hose line	
7350	Control line kit	
7600	Inlet hose	

Please quote the part number and serial number of the machine together with the item number and the description of the part when ordering.

Before and during all work, be sure to read and follow the safety and service instructions in the machine's service manual.

\*) See cooling fluid recommendations

## 12 Decommissioning, Storage and Transport

### 12.1 Decommissioning

Decommissioning 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 decommissioning

Precondition The machine can be started at regular intervals.

- Run the machine once a week for at least 30 minutes under LOAD to ensure sufficient protection against corrosion.

#### Long-term decommissioning

Precondition Immediately prior to decommissioning, run the machine under LOAD for at least 30 minutes.

The power supply disconnecting device is switched off,  
the device is locked off,  
the absence of voltage has been verified,  
the machine is fully vented (no pressure).

1. Allow the machine to completely cool down.
2. Disconnect all air and electrical connections.

### 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 an authorized KAESER service representative for more information.

Material Desiccant  
Plastic sheeting  
Wooden crate

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

1. Place sufficient desiccant silica gel or desiccant clay in the machine.
2. Wrap the machine fully in 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 airend and in the oil separator tank.

Frozen moisture can damage components, valve diaphragms and gaskets.

The following measures also apply to machines not yet commissioned.



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  $>32$  °F.
2. Store the machine in a dry, frost-proof room.

## 12.4 Transport

### 12.4.1 Safety

Weight and center of gravity determine the most suitable method of transportation. The center of gravity is shown in the drawings in chapter 13.3.



➤ Please consult with KAESER if you intend to transport the machine in freezing temperatures.

**Precondition** Transport only by forklift truck or lifting gear only by personnel trained in the safe transportation of loads.

- Make sure the danger area is clear of personnel.

### 12.4.2 Transport with a forklift truck

**Precondition** The forks are fully under the machine.

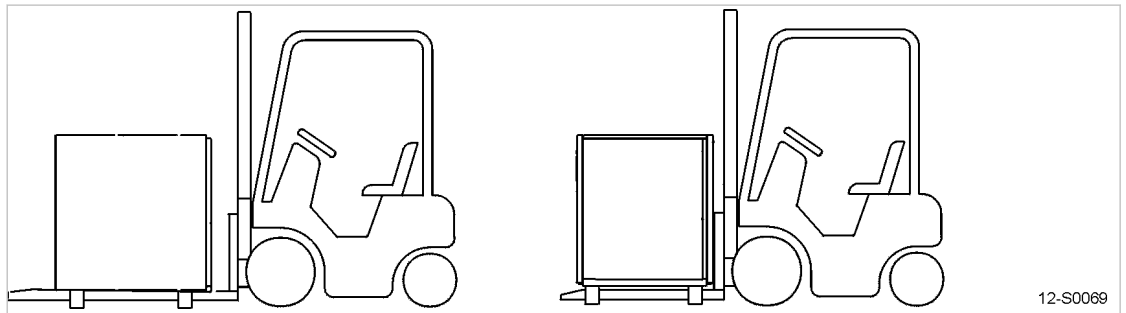


Fig. 32 Transport with a forklift truck

- Drive the forks completely under the machine or pallet and lift carefully.

### 12.4.3 Transport with a crane

Suitable lifting gear ensures correct transportation.

The lifting slings must be fed under the machine.

The slings may not bear on the side of the machine enclosure.

Examples of unsuitable fixing points:

- Pipe sockets
- Flanges

- Attached components such as cyclone separators, condensate drains, or filters
- Rain protection covers



➤ Please consult with KAESER if you have questions regarding the appropriate lifting gear.

**Precondition** The lifting gear complies with local safety regulations.  
No pressure should bear on the sides of the machine cabinet.

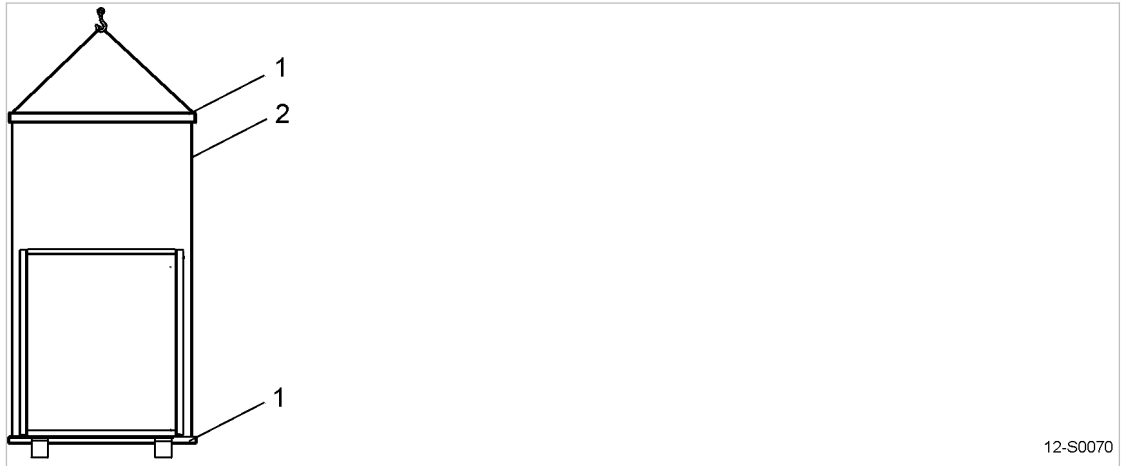


Fig. 33 Transport with a crane

- ① Lifting gear
- ② Slings

1. **NOTICE** *The machine can be damaged by incorrect attachment of the lifting gear!*
  - Do not attach the lifting gear to any of the machine components.
2. Use the lifting gear correctly and lift the machine carefully.

## 12.5 Disposal

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

**Precondition** The machine is decommissioned.

1. Completely drain the cooling oil from the machine.
2. Remove used filters and the oil separator cartridge.
3. Hand the machine over to an authorized disposal expert.



➤ Parts contaminated with cooling oil must be disposed of in accordance with local environment protection regulations.

### Compressors with refrigeration dryers

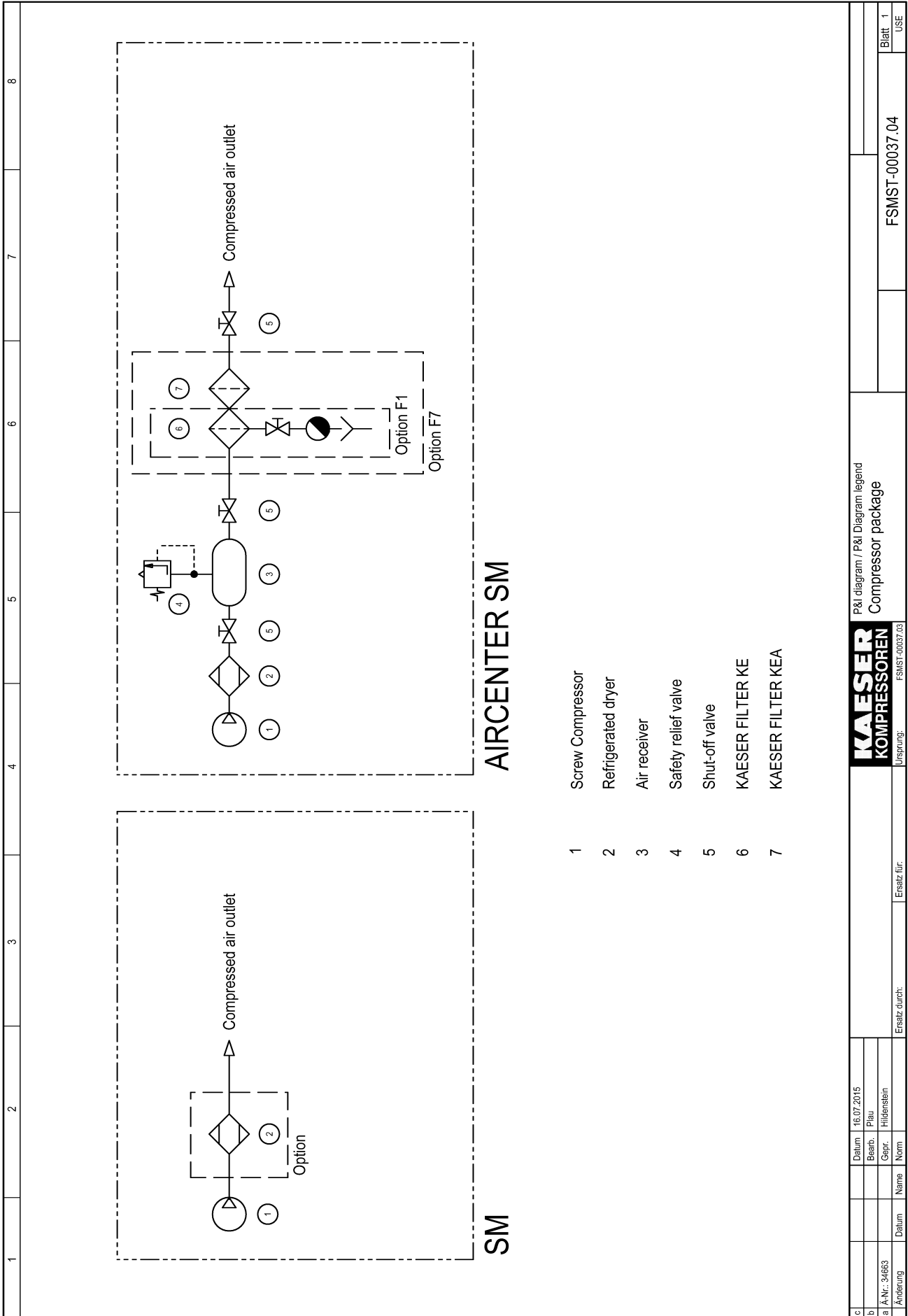
The refrigerant circuit still contains both refrigerant and oil.

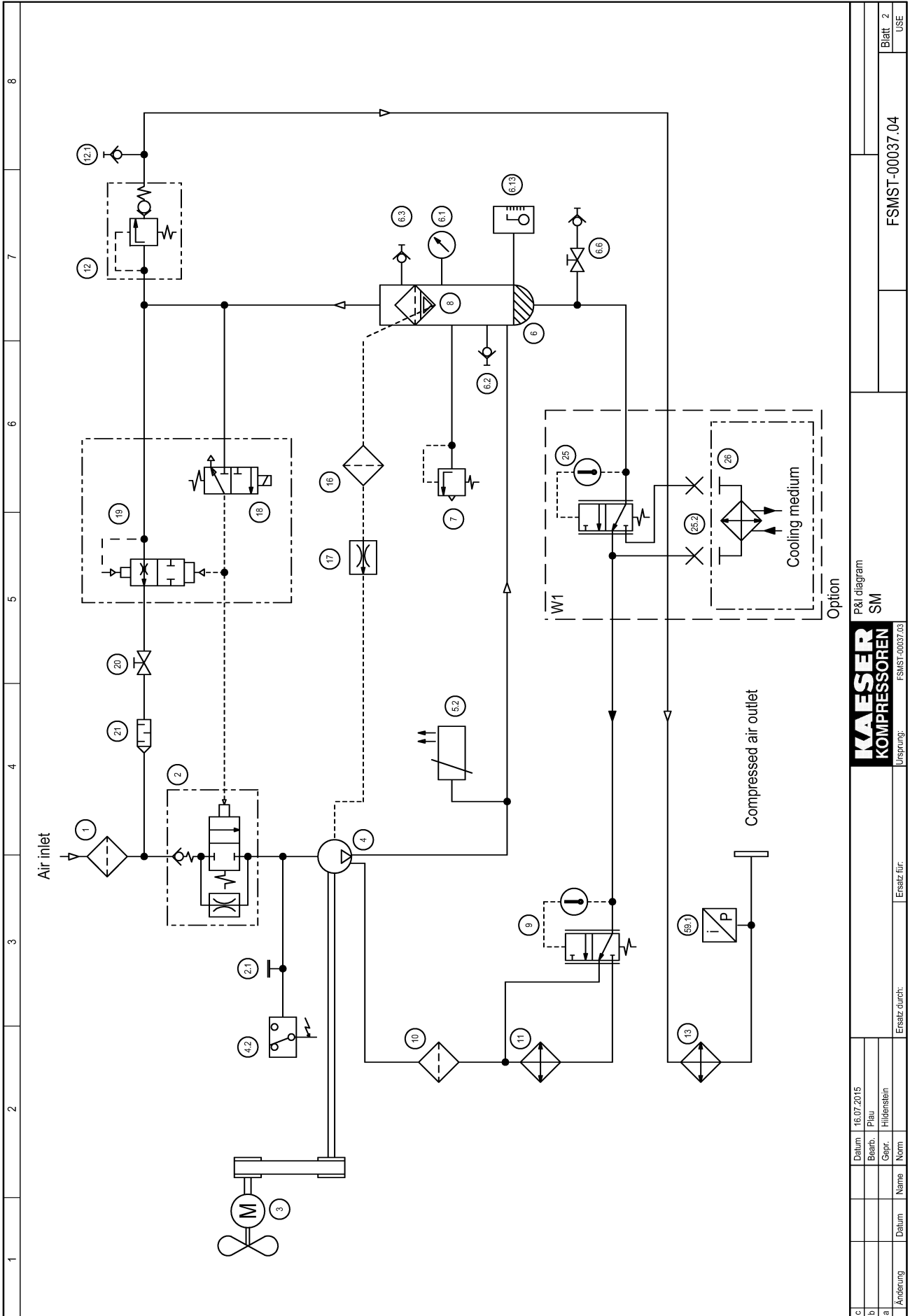
➤ Refrigerant and oil must be drained and disposed of by authorized personnel.



## **13 Annex**

### **13.1 Pipeline and instrument flow diagram (P+I diagram)**



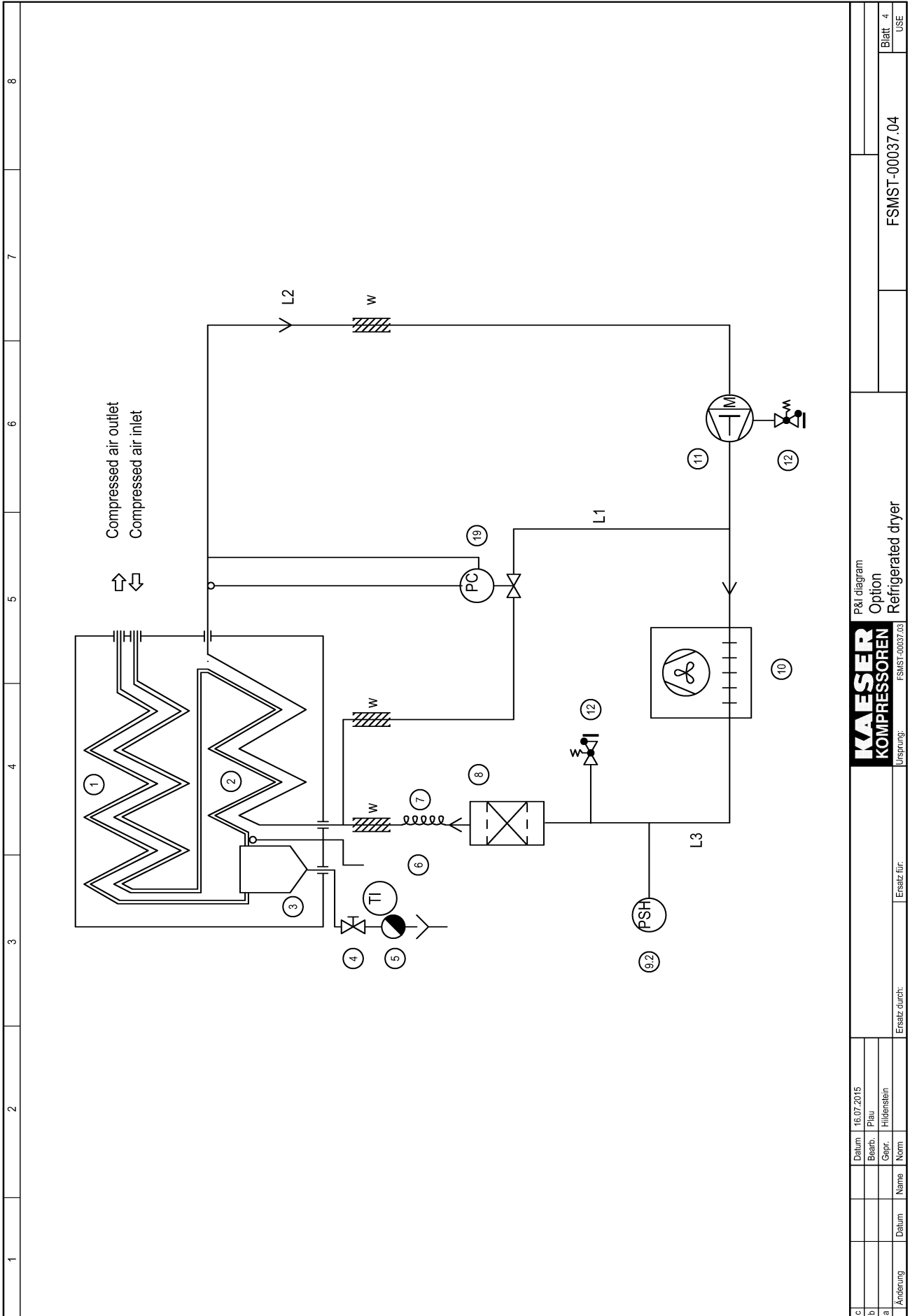


c		Datum	16.07.2015	P&I diagram		Blatt 2	
b		Bearb.	Plau	SM		USE	
a		Gepr.	Hildenstein	FSMST-00037.04		USE	
Änderung		Datum	Name	Ersatz durch:		Ersatz für:	
				Ursprung: FSMST-00037.03		FSMST-00037.04	

1	2	3	4	5	6	7	8
1	Air filter						
2	Inlet valve						
2.1	Oil filler with screw plug						
3	Compressor motor						
4	Airend						
4.2	Pressure switch - Wrong direction of rotation						
5.2	Pt100-sensor						
6	Oil separator tank						
6.1	Pressure gauge						
6.2	Hose coupling (Oil end)						
6.3	Hose coupling (Air end)						
6.6	Shut-off valve with hose coupling - Oil drain device						
6.13	Oil level indicator						
7	Safety relief valve						
8	Oil separator cartridge						
9	Thermostatic valve						
10	Oil filter						
11	Oil cooler						
12	Minimum pressure check valve						
12.1	Hose coupling						
13	Air cooler						
16	Dirt trap						
17	Nozzle						
18/19	Combined control/venting valve						
18	Control valve						
19	Venting valve						
20	Shut-off valve - Venting line						
21	Silencer						
25	Thermostatic valve - Heat recovery system						
25.2	Screw plug						
26	Heat recovery system						
59.1	Pressure transducer - Network pressure						
Option							
W1	Heat recovery system, external						

c		Datum	16.07.2015	P&I Diagram legend		Blatt 3	
b		Bearb.	Plau	SM		USE	
a		Gepr.	Hildenstein	FSMST-00037.04		FSMST-00037.04	
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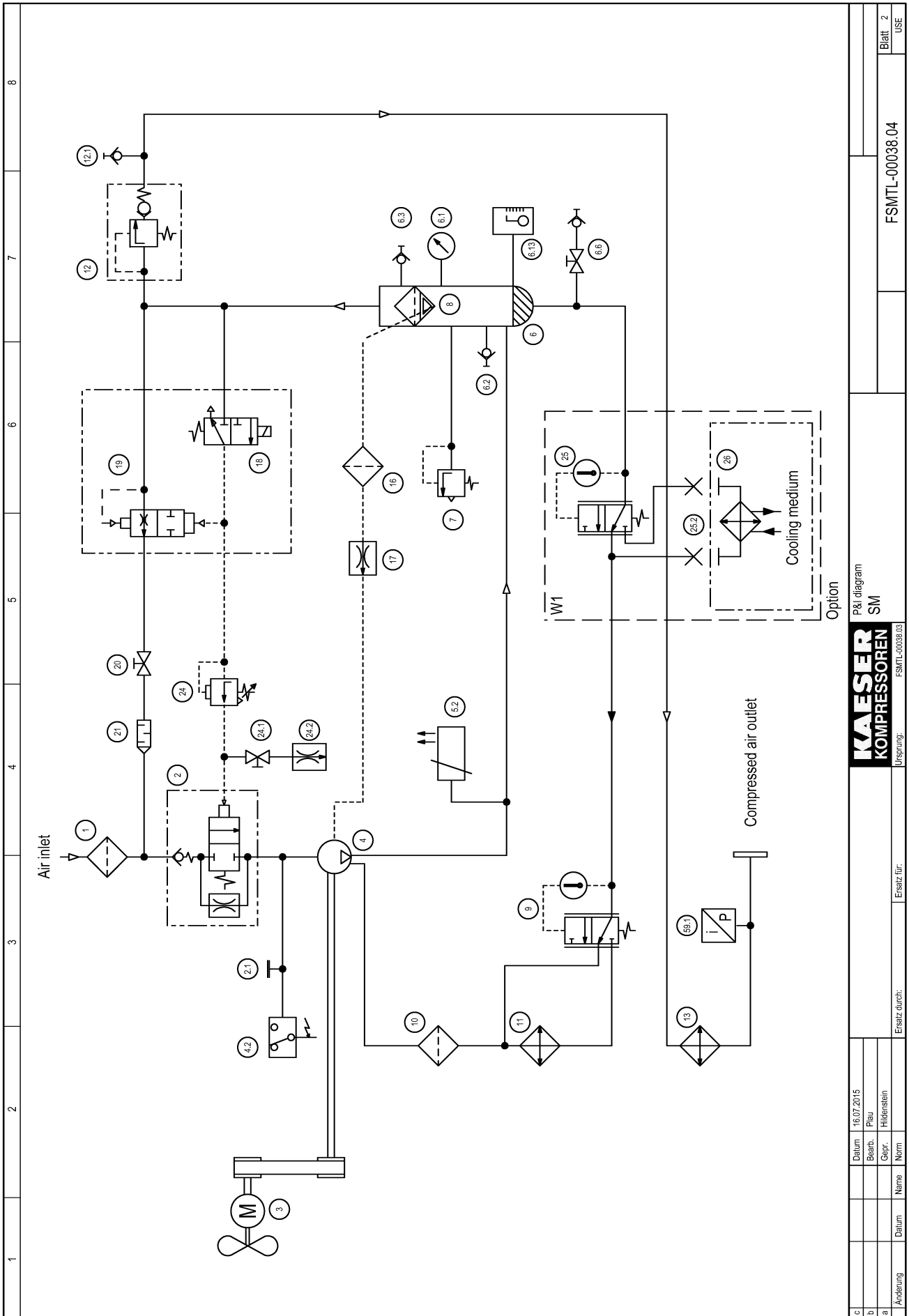




**13.2 Option C1****Pipe and Instrument Flow Diagram (P+I diagram): MODULATING control mode**

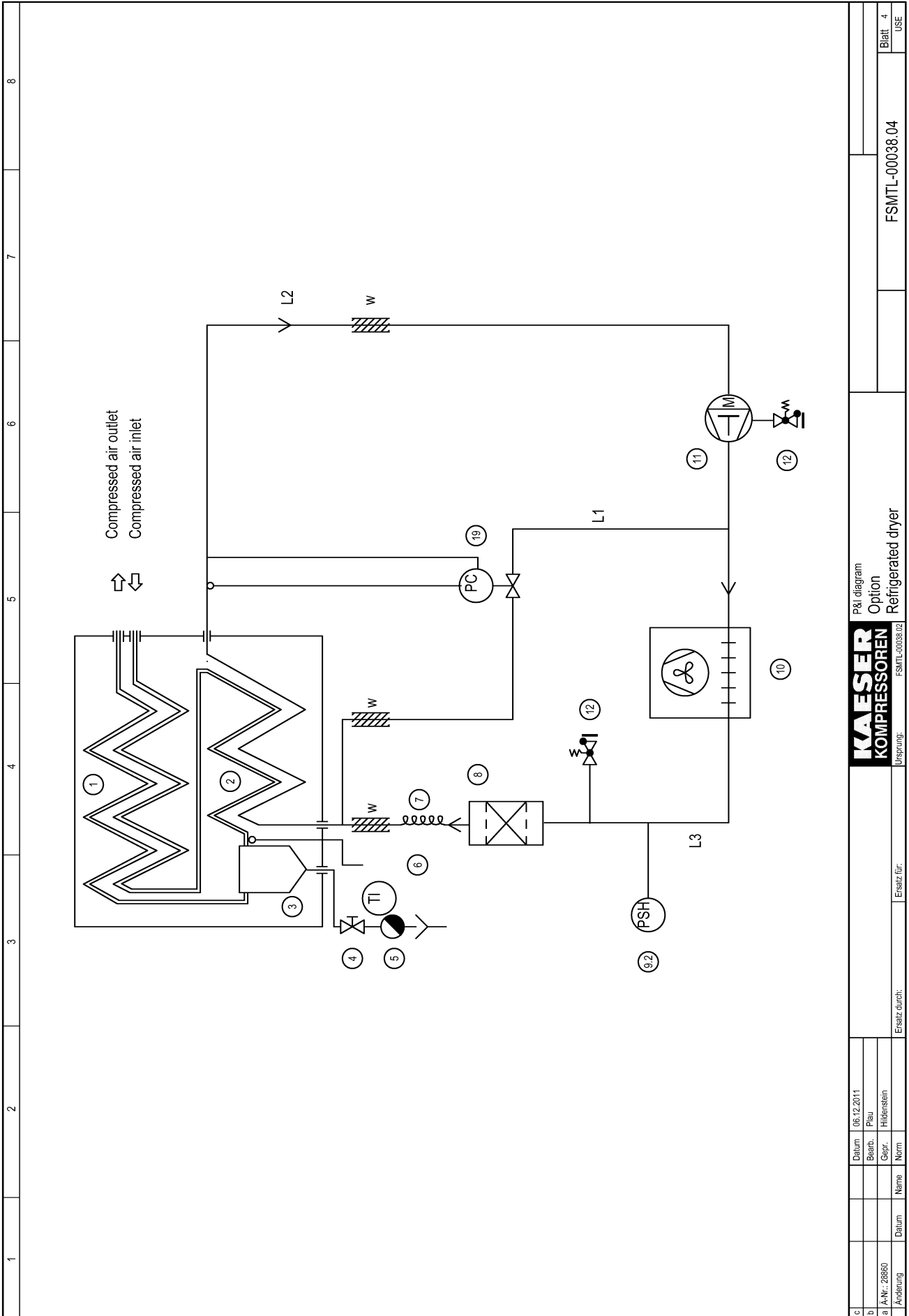






c	Datum	16.07.2015	P&I diagram		FSMTL-00038.04	Blatt 2	USE
b	Bearb.	Plau	SM				
a	Gepr.	Hildenstein	SM				
Änderung	Datum	Name	Norm	Ersatz für:	Ursprung:	FSMTL-00038.03	
				Ersatz durch:			





P&I diagram  
Option  
Refrigerated dryer

**KAESER**  
KOMPRESSOREN

Ursprung: FSMTL-00038.02

Ersatz für:

Ersatz durch:

Datum	06.12.2011
Bearb.	Plau
Gepr.	Hildenstein

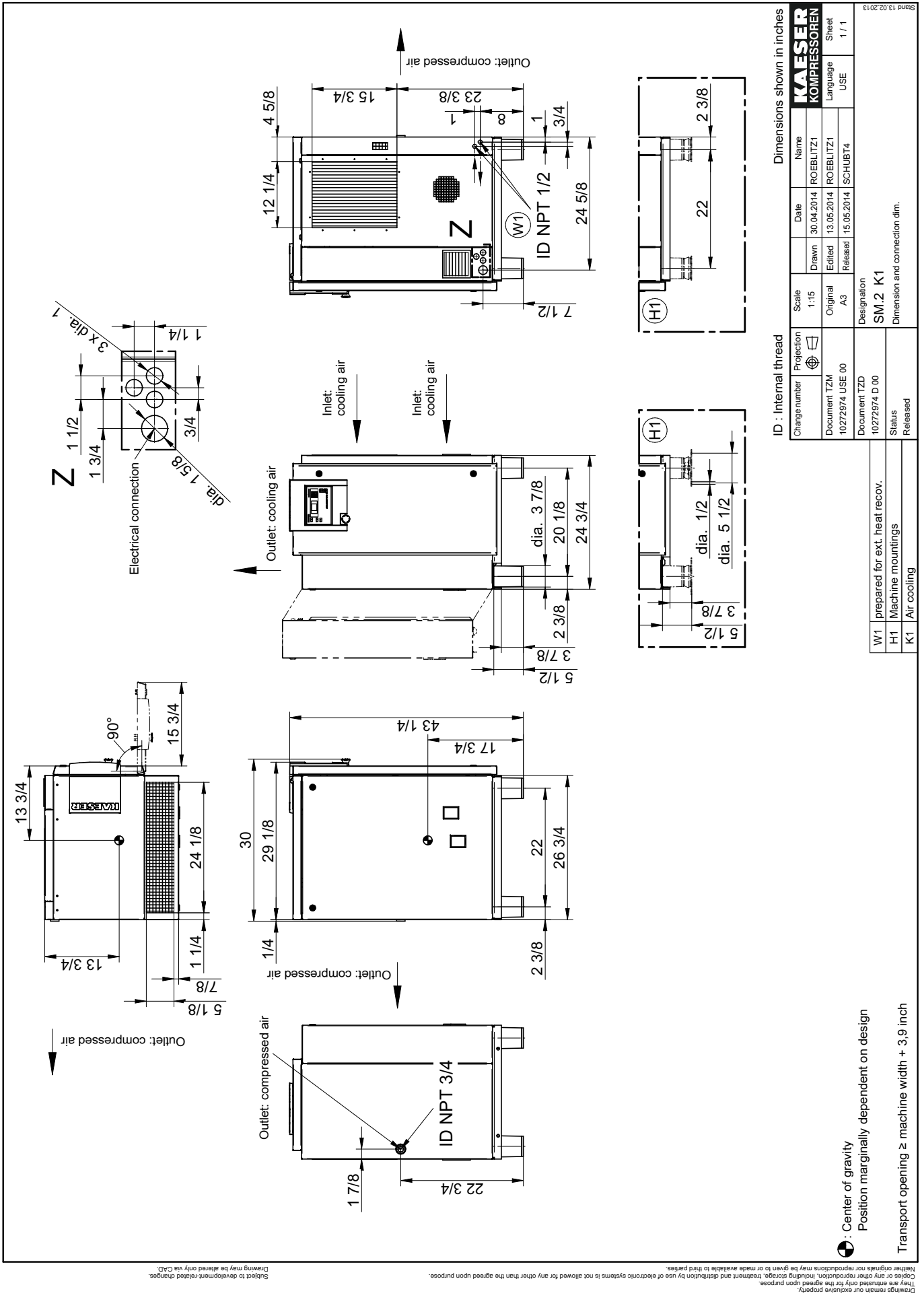
Änderung	Datum	Name	Norm

FSMTL-00038.04

Blatt 4  
USE



### 13.3 Dimensional drawing



Dimensions shown in inches

Change number		Projection	Scale	Date	Name
10272974 USE 00	TZM	1:15	Original	30.04.2014	ROEBLITZ1
10272974 USE 00	TZD	A3	Released	13.05.2014	ROEBLITZ1
10272974 D 00				15.05.2014	SCHUBT4

Designation: SM.2 K1  
Dimension and connection dim.

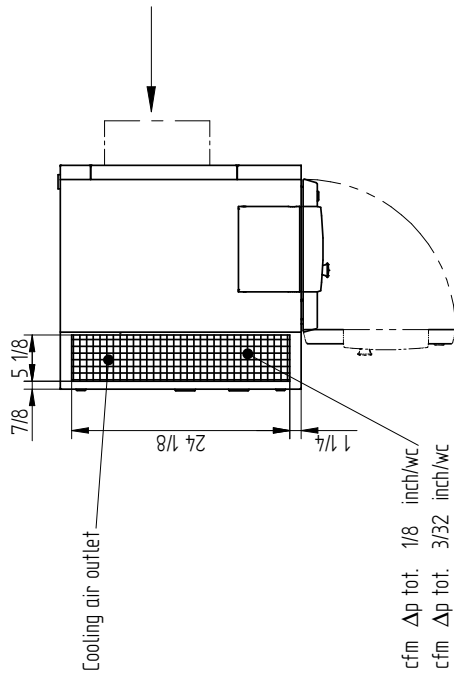
Change number	Projection	Status
W1	prepared for ext. heat recov.	Released
H1	Machine mountings	Released
K1	Air cooling	Released

Change number	Projection	Status
W1	prepared for ext. heat recov.	Released
H1	Machine mountings	Released
K1	Air cooling	Released

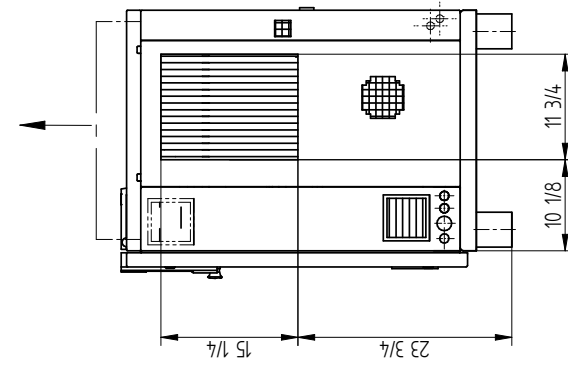
Center of gravity  
Position marginally dependent on design  
Transport opening ≥ machine width + 3,9 inch

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Total permissible pressure loss for installed ducting



SM 7,5/10/SFC8: V = 1295 cfm  $\Delta p$  tot. 1/8 inch/wc.  
SM 15: V = 1295 cfm  $\Delta p$  tot. 3/32 inch/wc



All dimensions are in inches!

Titel		Änderungs-Nr.		Maßstab		Name	
00				Original		Dumleley	
Dokument-Nr.		Freigegeben		Datum		Sprache	
10197228 00		17.05.2011		17.05.2011		USE	
Techn. Dienst Nr.		Bezeichnung		Gezeichnet		Geprüft	
T11464.00		SM 7,5/10/15		Schubart		Beit	
		SFC 8					

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verbreiten Zweck angefertigt werden. Weiteres Vervielfältigen oder in sonstiger Weise zugänglich gemacht werden  
kann nur mit schriftlicher Genehmigung der KAESER AG. Die KAESER AG übernimmt keine Haftung für Schäden oder Verluste, die aus dem Gebrauch dieser Zeichnung resultieren.  
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## 13.4 Electrical Diagram



1	2	3	4	5	6	7	8	
<p style="text-align:center;"><b>ATTENTION !!!</b></p> <p>The unit is non-functional when delivered. Before connecting the electrical supply, please follow the advice contained in the 'Installation' chapter and the wiring diagram of the service manual.</p>			<p style="text-align:center;"><b>Wiring Diagram</b></p> <p style="text-align:center;"><b>compressor series SM</b></p> <p style="text-align:center;">with SIGMA CONTROL BASIC</p> <p style="text-align:center;">208V±10% 3ph 60Hz      230V±10% 3ph 60Hz</p> <p style="text-align:center;">460V±10% 3ph 60Hz</p> <p style="text-align:center;"><b>Tri-Voltage</b></p> <p style="text-align:center;"><b>Power supply:</b></p> <p style="text-align:center;"><b>WYE system with center point solidly grounded</b></p>					<p style="text-align:center;"><b>manufacturer:</b></p> <p style="text-align:center;"><b>KAESER COMPRESSORS</b></p> <p style="text-align:center;"><b>96450 COBURG</b></p> <p style="text-align:center;"><b>GERMANY</b></p>
<p style="text-align:center;"><b>ATTENTION !!!</b></p> <p>The document gives collective information on power supply voltages and frequencies for all machines. The voltage and frequency and local conditions under which any particular machine may be used are given on the nameplate of the machine and in the accompanying service manual.</p>			<p>The drawings remain our exclusive property. They are entrusted only for the agreed purpose. Copies or any other reproductions, including storage, treatment and dissemination by use of electronic systems must not be made for any other than the agreed purpose. Neither originals nor reproductions must be forwarded or otherwise made accessible to third parties.</p>					
c	Datum	01.10.2015	USE		cover page			
b	Bearbeiter	Stiller			compressor series SM			
a	Geprüft	Bühner			DSM.B-U3103.00			
A. Änderung	Datum	Name	Norm	Ersatz durch:		=	+	
							page	1
							1. Bl.	1



1	2	3	4	5	6	7	8	
<p><b>general instructions</b> ATTENTION !!! Install supplies, grounding and shock protection to local safety regulations. Do not make or break live plug-in connectors.</p>		<p><b>control cabinet wiring for non-designated conductors</b></p> <p>primary circuits ungrounded: black, UL-Style 1015, CSA-TEW primary circuits grounded: grey, UL-Style 1015, CSA-TEW control voltage AC 115V ungrounded: red, 18AWG UL-Style 1015, CSA-TEW control voltage AC 115V grounded: white, 18AWG UL-Style 1015, CSA-TEW control voltage AC 15V: brown, 18AWG UL-Style 1015, CSA-TEW control voltage DC ungrounded: blue, 18AWG UL-Style 1015, CSA-TEW control voltage DC grounded: white/blue, 18AWG UL-Style 1015, CSA-TEW external voltage: orange, 16AWG UL-Style 1015, CSA-TEW measuring circuits: violet, 18AWG UL-Style 1015, CSA-TEW ground conductor: green/yellow, UL-Style 1015, CSA-TEW</p>		<p>option F1 / F7 = KAESER FILTER KE / KEA option T3 = option refrigeration dryer</p>		<p>control cabinet wiring for non-designated conductors</p> <p>primary circuits ungrounded: black, UL-Style 1015, CSA-TEW primary circuits grounded: grey, UL-Style 1015, CSA-TEW control voltage AC 115V ungrounded: red, 18AWG UL-Style 1015, CSA-TEW control voltage AC 115V grounded: white, 18AWG UL-Style 1015, CSA-TEW control voltage AC 15V: brown, 18AWG UL-Style 1015, CSA-TEW control voltage DC ungrounded: blue, 18AWG UL-Style 1015, CSA-TEW control voltage DC grounded: white/blue, 18AWG UL-Style 1015, CSA-TEW external voltage: orange, 16AWG UL-Style 1015, CSA-TEW measuring circuits: violet, 18AWG UL-Style 1015, CSA-TEW ground conductor: green/yellow, UL-Style 1015, CSA-TEW</p>		
<p>general instructions compressor series SM</p>								
<p><b>KAESER KOMPRESSOREN</b> Ursprung:</p>								
<p>Datum: 01.10.2015</p>		<p>Ersatz durch:</p>		<p>Ersatz für:</p>		<p>USM.B-U3103.00</p>		
<p>Bearbeiter: Siller</p>		<p>Geprüft: Böhmer</p>		<p>Norm:</p>		<p>= +</p>		
<p>Abänderung:</p>		<p>Datum:</p>		<p>Name:</p>		<p>page 1</p>		
<p>C</p>		<p>a</p>		<p>b</p>		<p>3 Bl.</p>		

1	2	3	4	5	6	7	8
<p><b>electrical equipment identification</b></p> <p><b>general components</b></p> <ul style="list-style-type: none"> <li>-B25 overload relay compressor motor</li> <li>-1FU,-2FU primary control fuse</li> <li>-3FU secondary control fuse</li> <li>-K20 SIGMA CONTROL BASIC</li> <li>-M1 compressor motor</li> <li>-Q1 main contactor</li> <li>-Q2 delta contactor</li> <li>-Q3 wye contactor</li> <li>-S1 EMERGENCY STOP pushbutton</li> <li>-S5 door safety interlock switch</li> <li>-T11 control transformer</li> </ul> <p><b>option T3 - refrigeration dryer</b></p> <ul style="list-style-type: none"> <li>-4FU,-5FU primary control fuse</li> <li>-6FU secondary control fuse</li> <li>-K13 condensate drain, option F1 / F7</li> <li>-K34 condensate drain</li> <li>-M30 compressor motor</li> <li>-M31 vent motor</li> <li>-Q30 motor starter</li> <li>-T30 transformer</li> </ul> <p><b>terminal strips/plug-in connections</b></p> <ul style="list-style-type: none"> <li>-X0 terminal strip, power supply</li> <li>-X1 terminal strip, motor</li> <li>-X11 terminal strip, control</li> <li>-X31 terminal strip refrigeration dryer, option T3</li> <li>-1X31,-2X31 connector plug refrigeration dryer, option T3</li> </ul> <p><b>sensors/actuators</b></p> <ul style="list-style-type: none"> <li>-B1 pressure transducer, air main pressure</li> <li>-B2 safety air pressure switch-direction of rotation</li> <li>-B30 safety pressure controller, option T3</li> <li>-B40 temperature probe, airtend discharge temperature</li> <li>-K1 control valve</li> </ul>							
<p><b>KAESER KOMPRESSOREN</b> Ursprung:</p> <p>electrical equipment identification compressor series SM</p> <p>USM.B-U3103.00</p>							
c		Datum		01.10.2015		=	
b		Bearbeiter		Stiller		+	
a		Geprüft		Bühner		page 2	
C		Änderung		Datum		Norm	
		Ersatz durch:		Ersatz für:		3 Bl.	

model	electrical component parts list				=	+	USM.B-U3103.00	page	3	Bl.
	SM 7.5/SM 7.5T	SM 10/SM 10T	SM 15/SM 15T							
machine power supply TRI-VOLTAGE	208 V ±10 %, 60 Hz 230 V ±10 %, 60 Hz 460 V ±10 %, 60 Hz	208 V ±10 %, 60 Hz 230 V ±10 %, 60 Hz 460 V ±10 %, 60 Hz	208 V ±10 %, 60 Hz 230 V ±10 %, 60 Hz 460 V ±10 %, 60 Hz							
motors -M1	7,5 hp	10 hp	15 hp							
supply terminals -X0 Siemens	---	---	7.3140.05070 3RV2935-5E							
terminal strips -X0	7.6836.00640 Wieland	7.6836.00640 Wieland	7.6836.00170 Wieland							
-X11	7.6836.00180 Wieland	7.6836.00180 Wieland	7.6836.00180 Wieland							
option T3 -X11/-X31	7.6836.00190 Wieland	7.6836.00190 Wieland	7.6836.00190 Wieland							
contactor -Q1	7.8740.00370 3RT2026-1AK60	7.8740.00390 3RT2028-1AK60	7.8740.00400 3RT2035-1AK60							
auxiliary switch	7.8740.05010 3RH2911-1HA11	7.8740.05010 3RH2911-1HA11	7.8740.05010 3RH2911-1HA11							
interference suppressor Siemens	7.8740.05140 3RT2926-1CC00	7.8740.05140 3RT2926-1CC00	7.8740.05150 3RT2936-1CC00							
contactor -Q2	7.8740.00370 3RT2026-1AK60	7.8740.00390 3RT2028-1AK60	7.8740.00400 3RT2035-1AK60							
interference suppressor Siemens	7.8740.05140 3RT2926-1CC00	7.8740.05140 3RT2926-1CC00	7.8740.05150 3RT2936-1CC00							
contactor -Q3	7.8740.00350 3RT2024-1AK60	7.8740.00370 3RT2026-1AK60	7.8740.00370 3RT2026-1AK60							
interference suppressor Siemens	7.8740.05140 3RT2926-1CC00	7.8740.05140 3RT2926-1CC00	7.8740.05140 3RT2926-1CC00							
contactor -Q30	7.8740.00310 3RT2016-1AK61	7.8740.00310 3RT2016-1AK61	7.8740.00310 3RT2016-1AK61							
option T3	7.8740.05130 3RT2916-1CC00	7.8740.05130 3RT2916-1CC00	7.8740.05130 3RT2916-1CC00							
interference suppressor Siemens	7.8740.05130 3RT2916-1CC00	7.8740.05130 3RT2916-1CC00	7.8740.05130 3RT2916-1CC00							
overload relay -B25 Siemens	7.8741.00070 3RB3026-1QBO 6-25 A setting: 14 A (208 V) setting: 14 A (230 V) setting: 7 A (460 V)	7.8741.00070 3RB3026-1QBO 6-25 A setting: 20 A (208 V) setting: 19 A (230 V) setting: 9 A (460 V)	7.8741.00090 3RB3036-1UB0 12-50 A setting: 26 A (208 V) setting: 25 A (230 V) setting: 13 A (460 V)							
fuses -1FU/-2FU Gould	7.3316.1 ATQR 1 1/2 (1,5 A, 600 V)	7.3316.1 ATQR 1 1/2 (1,5 A, 600 V)	7.3316.1 ATQR 1 1/2 (1,5 A, 600 V)							
fuses -3FU Gould	7.3161.00390 ATQR 1 (1 A, 600 V)	7.3161.00390 ATQR 1 (1 A, 600 V)	7.3161.00390 ATQR 1 (1 A, 600 V)							
fuses -4FU/-5FU option T3 Gould	7.3161.00340 ATDR 6 (6 A, 600 V)	7.3161.00340 ATDR 6 (6 A, 600 V)	7.3161.00340 ATDR 6 (6 A, 600 V)							
fuses -6FU option T3 Gould	7.3161.00370 ATDR 4 (4 A, 600 V)	7.3161.00370 ATDR 4 (4 A, 600 V)	7.3161.00370 ATDR 4 (4 A, 600 V)							
fuse socket -1FU...6FU Wöhner	7.3320.00060 AMBUS EASYSWITCH	7.3320.00060 AMBUS EASYSWITCH	7.3320.00060 AMBUS EASYSWITCH							
transformer -T11	7.6844.00010 B0609053 160 VA	7.6844.00010 B0609053 160 VA	7.6844.00010 B0609053 160 VA							
fuse Block	7.6849.0 T3,15H / 3,15 A, 250 V	7.6849.0 T3,15H / 3,15 A, 250 V	7.6849.0 T3,15H / 3,15 A, 250 V							
transformer -T30 option T3 Block	7.2292.10100 B0602018 (4,0 A)	7.2292.10100 B0602018 (4,0 A)	7.2292.10100 B0602018 (4,0 A)							
connection -W11 Siemens	10 AWG black 600 V, 90°C	10 AWG black 600 V, 90°C	---							
connection -W13 Siemens	10 AWG black 600 V, 90°C	10 AWG black 600 V, 90°C	8 AWG black 600 V, 90°C							
connection -W14 Siemens	7.6861.0 3RV1915-1AB	7.6861.0 3RV1915-1AB	10 AWG black 600 V, 90°C							
cables -W19.1/2	13x1x4 mm <sup>2</sup> 750 V, 120°C	13x1x4 mm <sup>2</sup> 750 V, 120°C	13x1x6 mm <sup>2</sup> 750 V, 120°C							
compressor control -K20 Siemens	7.8700.0 SIGMA CONTROL BASIC	7.8700.0 SIGMA CONTROL BASIC	7.8700.0 SIGMA CONTROL BASIC							
EMERGENCY STOP pushbutton -S1	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV							
auxiliary contact Schlegel	7.3218.0 / MTHOO	7.3218.0 / MTHOO	7.3218.0 / MTHOO							
control cabinet KAESER	7.7680.0	7.7680.0	7.7680.0							
control panel KAESER	220529.0	220529.0	220529.0							

electrical component parts list  
compressor series SM

**KAESER**  
KOMPRESSOREN  
Ursprung:

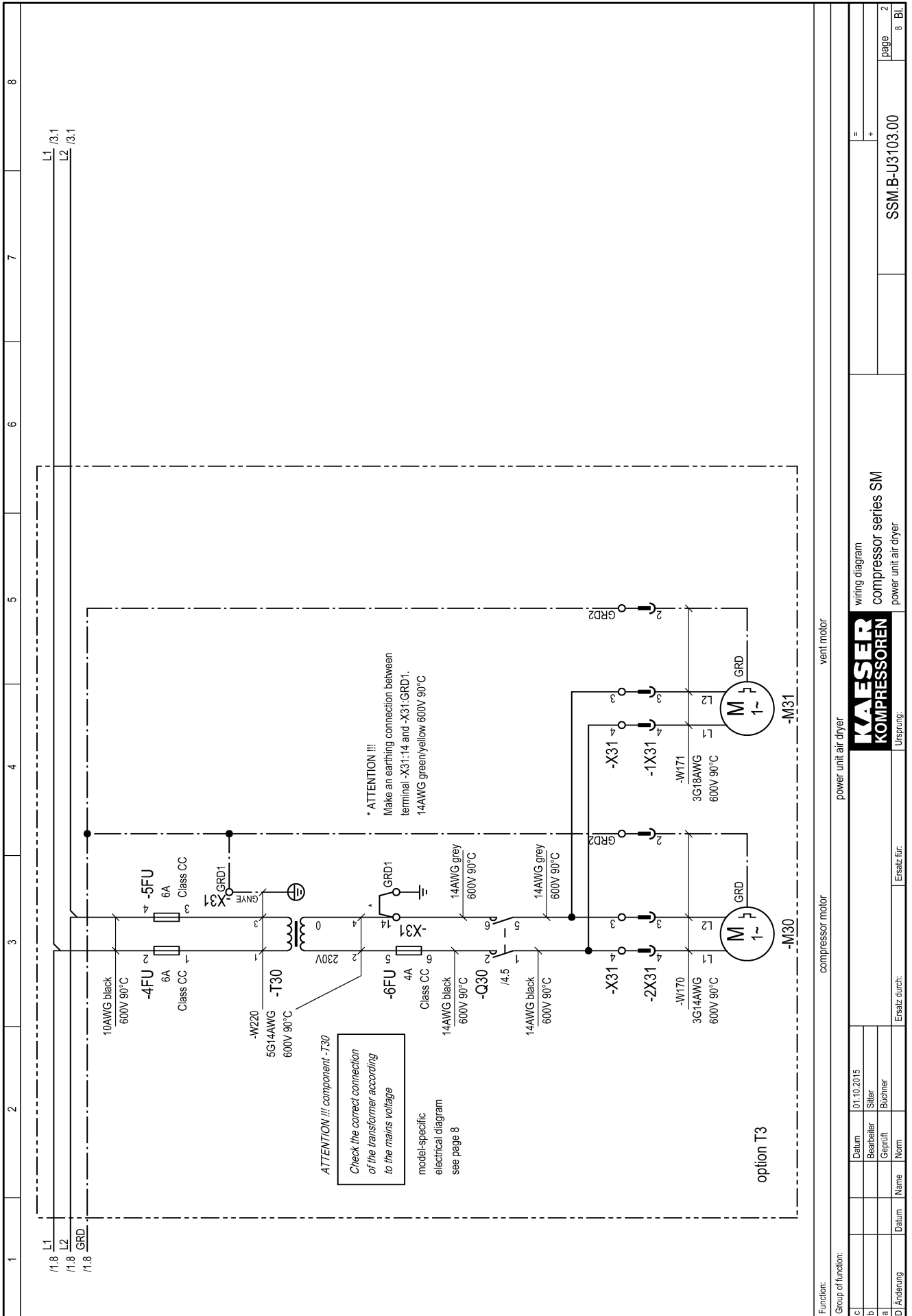
Ersatz für:

Ersatz durch:

01.10.2015  
Datum  
Siller  
Bühner  
Geprüft  
Norm

Name  
Datum

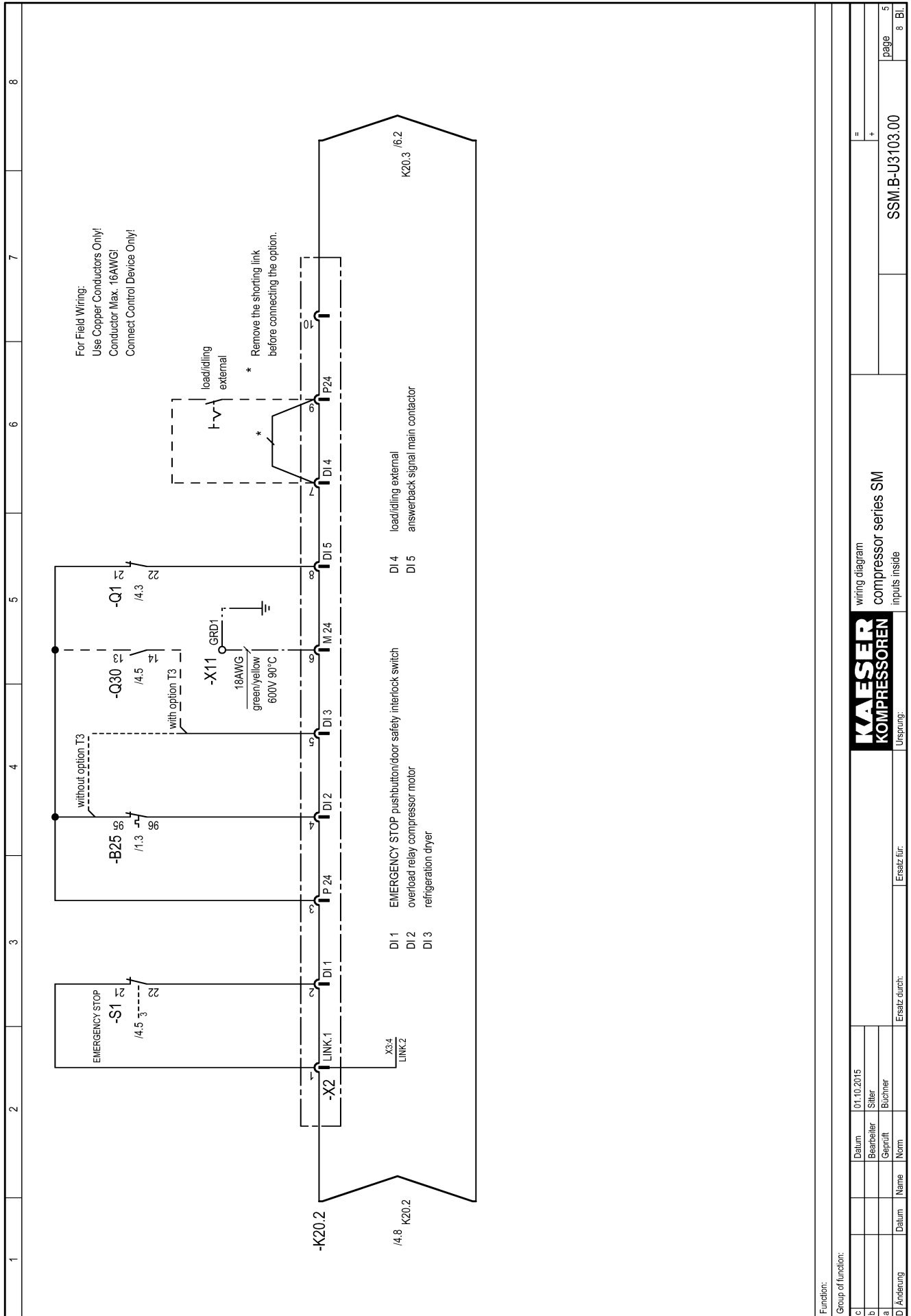












Function:

Group of function:	
c	Datum 01.10.2015
b	Bearbeiter Siller
a	Geprüft Böhmer
D	Änderung Datum Name Norm

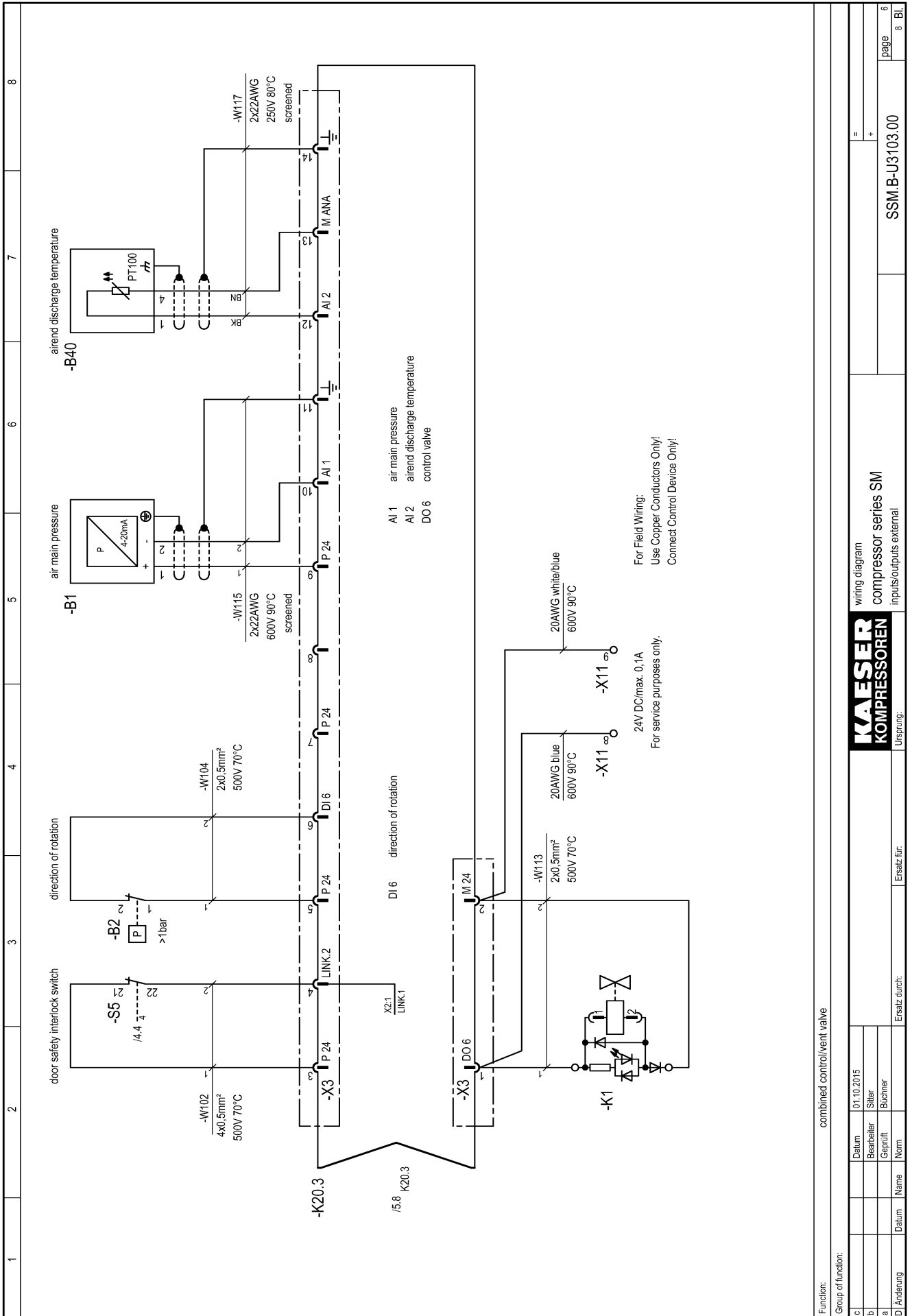
wiring diagram  
compressor series SM  
inputs inside

**KAESER**  
KOMPRESSOREN  
Ursprung:

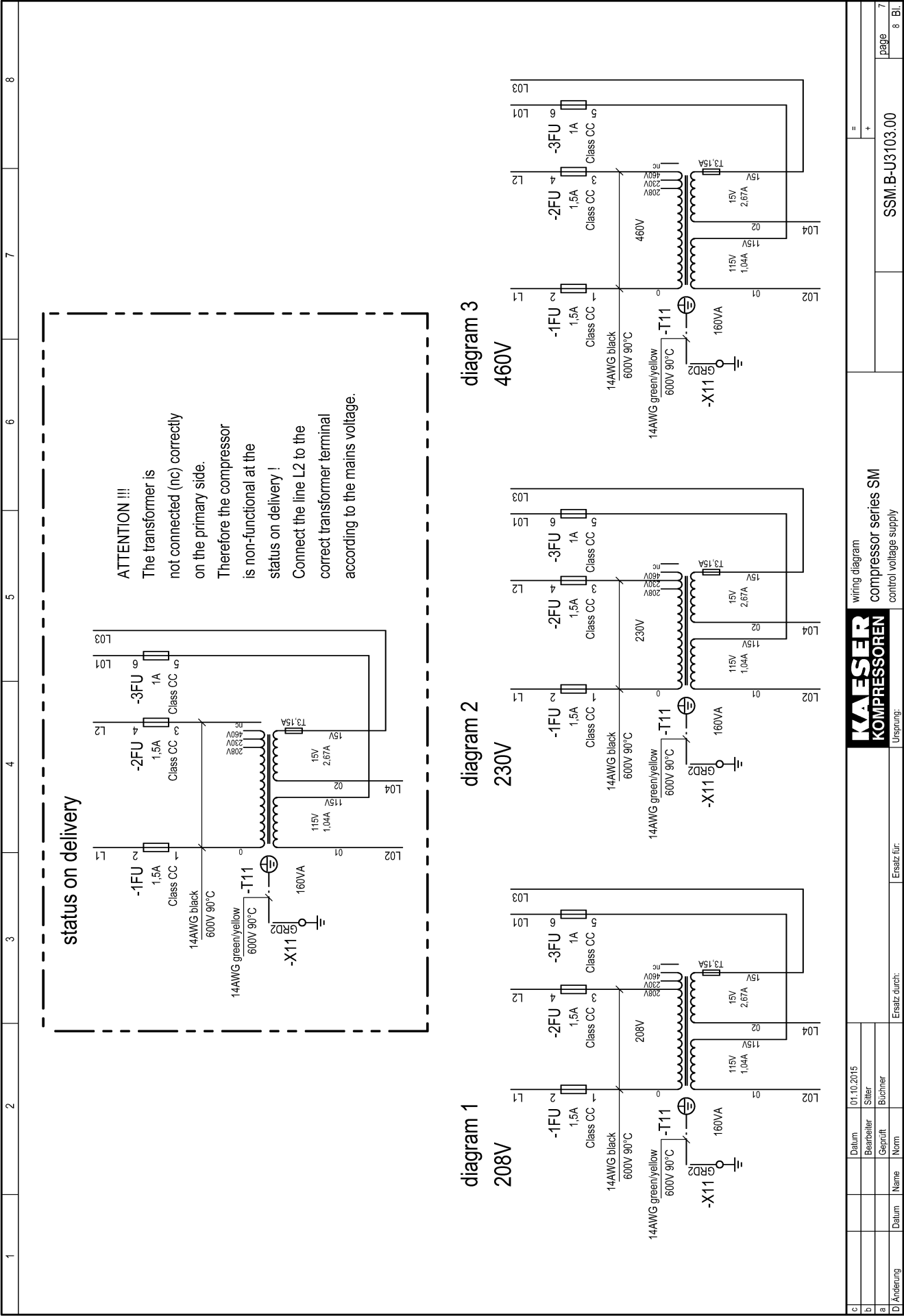
Ersatz durch: Ersatz für:

Datum	01.10.2015
Bearbeiter	Siller
Geprüft	Böhmer
Norm	

Ersatz durch:	
Ersatz für:	



Date		01.10.2015	
Bearbeiter		Stiller	
Geprüft		Böhrner	
Name		Ersatz durch:	
Datum		Ersatz durch:	
Name		Ersatz durch:	
Ursprung:		SSM.B-U3103.00	
wiring diagram		page 6	
compressor series SM		8 Bl.	
inputs/outputs external			



status on delivery

**ATTENTION !!!**  
The transformer is not connected (nc) correctly on the primary side. Therefore the compressor is non-functional at the status on delivery! Connect the line L2 to the correct transformer terminal according to the mains voltage.

diagram 1

diagram 2

diagram 3

c	Datum	01.10.2015	wiring diagram		SSM.B-U3103.00	page 7
b	Bereitler	Sittler	compressor series SM			
a	Geprüft	Bühner	control voltage supply			
D	Änderung	Datum	Name	Norm	Ersatz durch:	
				Ursprung:		

1	2	3	4	5	6	7	8
<div style="border: 1px dashed black; padding: 10px;"> <p style="text-align: center;"><b>status on delivery</b></p> <p style="text-align: center;"><b>ATTENTION !!!</b> The transformer is not connected (nc) correctly on the primary side. Therefore the compressor is non-functional at the status on delivery ! Connect the line L1 to the correct transformer terminal according to the mains voltage.</p> </div>							
<p><b>diagram 1</b> 208V</p>							
<p><b>diagram 2</b> 230V</p>							
<p><b>diagram 3</b> 460V</p>							
<p style="text-align: right;">wiring diagram compressor series SM transformer diagrams</p>							
<p><b>KAESER</b> KOMPRESSOREN</p>							
<p>Ursprung: SSM.B-U3103.00</p>							
<p>Ersatz durch:      Ersatz für:      Datum: 01.10.2015</p>							
<p>Beauftragter:      Sitzer</p>							
<p>Geprüft:      Böhmer</p>							
<p>Datum:      Name:      Norm:      =</p>							
<p>D. Änderung:      +</p>							
<p>page 8</p>							
<p>8 Bl.</p>							











