

Operator Manual

Refrigerated Dryer

TBH

No.: 901738 07 USE

PRELIMINARY
Subject to Revision

Manufacturer:

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Original instructions
/KKW/DTBH 2.07 en Z1 SBA-TROCKNER-TXH

20201112 121524

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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 operating manual are:

- Declaration of Conformity in accordance with applicable directives.

Missing documents can be requested from KAESER.

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

1.3 Copyright

This operator 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 danger potentially resulting in personal injury, if the measures specified are not taken.

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

Signal term	Meaning	Consequences of non-compliance
DANGER	Warns of imminent danger	Will very likely result in death or severe injury
WARNING	Warns of potentially imminent danger	May result in death or severe injury
CAUTION	Warns of a potentially dangerous situation	May result in 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.

The word "DANGER" indicates that death or severe injury can very likely result from ignoring the warning.

➤ *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 a step.

Example:

1. **⚠ WARNING** *The type and source of the imminent danger is shown here!*
The possible consequences of ignoring a warning are shown here.
The word "WARNING" indicates that death or severe injury may result from ignoring the warning.
➤ *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 potential personal injury.

Damage warnings have only one danger level, identified by this signal term:

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

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

Example:

NOTICE

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 alert notes and their symbols



This symbol indicates particular 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 conditional requirements relevant to safety shown here will help you to avoid dangerous situations.
- Option K6 ➤ This symbol is placed by 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., K6 means that this section applies only to machines with electronic condensate drain with floating contact).
Option codes used in this operating manual are explained in chapter 2.2.
-  Information referring to potential problems is identified by a question mark.
The cause is specified 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 model designation and important technical information are given on the machine's nameplate. The nameplate is located on the outside of the machine.



- ▶ If required, use an adhesive label with text in the user's language.
- ▶ Enter the data from the nameplate here as a reference.

Feature	Value
Refrigerated dryer	
Material no.	
Serial no.	
Year of manufacture	
Max. working pressure	
Air inlet temperature	
Ambient temperature	
Full load current	
Electrical connection	
Electrical diagram	
Option(s)	
Refrigerant system	
Refrigerant	
Refrigerant charge	
Max. system pressure HP*	
Max. system pressure LP**	
Tested for pressure tightness	
* High pressure	
** Low pressure	

Tab. 3 Nameplate

2.2 Options

The table contains a list of possible options. The options for this machine are shown near the nameplate.

- ▶ Enter options here as a reference:

Option	Option code	Provided?
Floating contact: "Pressure dew point warning"	C36	
Provided: ✓		
Not available: —		

Option	Option code	Provided?
Electronic condensate drain	K5	
Electronic condensate drain, floating contact	K6	
Provided: ✓		
Not available: —		

Tab. 4 Options

2.3 Weight

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

	TBH 14	TBH 16	TBH 23
Weight [lb.]	73	84	101

Tab. 5 Weight

2.4 Ambient conditions

	TBH 14	TBH 16	TBH 23
Maximum elevation AMSL ¹⁾ [ft.]	3000	3000	3000
Permissible ambient temperature [°F]	38 – 122	38 – 122	38 – 122

¹⁾ Higher elevations are permissible only after consultation with the manufacturer.

Tab. 6 Ambient conditions

2.5 Compressed air system

	TBH 14	TBH 16	TBH 23
Pressure drop ¹⁾ [psi]	3.19	3.48	3.34
Flow rate ¹⁾ [cfm]	42	57	78
115V/1/60Hz Cooling air flow rate [cfm]	383	335	335
230V/1/60Hz Cooling air flow rate [cfm]	383	230	335
Pressure dew point ¹⁾ [°F]	43	46	43
Max. working pressure [psig]	230	230	230

¹⁾ According to ISO 7183 Option A2:

- Reference point: 14.5 psia, 68 °F, 0 % relative humidity:
- Operating state: Gauge working pressure 100 psig, compressed air inlet temperature 100 °F, 100 % relative humidity, cooling air inlet temperature 100 °F

	TBH 14	TBH 16	TBH 23
Min. compressed air inlet temperature [°F]	38	38	38
Max. compressed air inlet temperature [°F]	134	134	134

¹⁾ According to ISO 7183 Option A2:

- Reference point: 14.5 psia, 68 °F, 0 % relative humidity:
- Operating state: Gauge working pressure 100 psig, compressed air inlet temperature 100 °F, 100 % relative humidity, cooling air inlet temperature 100 °F

Tab. 7 Compressed air system

2.6 Refrigerant system

The refrigerated dryer contains a refrigerant that is classified as a fluorinated greenhouse gas. This refrigerant is required for the dryer to function.

	TBH 14	TBH 16	TBH 23
Refrigerant	R-513A	R-513A	R-513A
Global warming potential (GWP)	631	631	631
230V/1/60Hz Charge quantity ¹⁾ [lb]	0.64	0.97	1.08
115V/1/60Hz Charge quantity ¹⁾ [lb]	0.71	0.95	1.15
230V/1/60Hz Charge quantity as CO ₂ equivalent [t]	0.2	0.3	0.3
115V/1/60Hz Charge quantity as CO ₂ equivalent [t]	0.2	0.3	0.3
Max. working pressure HP side [psig]	326	326	326
Max. working pressure LP side [psig]	305	305	305
Pressure cut out: Cut-out pressure [psig]	326	326	326

¹⁾ Volume of fluorinated greenhouse gases for which the refrigerant system was designed.

Tab. 8 Refrigerant system

2.7 Noise emission [dB(A)]

	TBH 14	TBH 16	TBH 23
Sound pressure level [dB(A)]	<70	<70	<70

Noise pressure level as per EN ISO 11203 and the basic standard ISO 9614-2, with

Measurement distance: $d = 1 \text{ m}$

Logarithmic surface ratio: $Q_2 = 13.4 \text{ dB(A)}$

Uncertainty: $\pm 3 \text{ dB(A)}$

Tab. 9 Noise emission

2.8 Power supply

The machine is designed for an electrical supply according to National Electric Code (NEC) NEC-670, particularly NFPA 79, edition 2015, 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.

Other electrical supplies are not permitted.

See electrical diagrams in chapter 13.3 for further information.

2.9 Power supply specifications

The following multi-strand copper core wires are given according to 2017 NEC 310.15 and table 310.15(B)(16) adjusted for 40 °C ambient temperature.

If other local conditions prevail, like for example high temperature, the cross section should be checked and adjusted according to 2017 NEC 110.14(C), 220.3, 310.15, table 310.15(B)(2)(a), table 310.15(B)(3)(a), 430.6, 430.22, 430.24, 670.4(A) and other local codes.

Dual element time delay fuses are selected according to 2017 NEC 240.6, 430.52 and tables 430.52, 430.248 and 430.250.

It is recommended to use a ground conductor the same size as the current carrying conductors, if local codes allow. Neither the minimum ground wire size as pointed out in 2017 NEC table 250.122 nor using conduit as the sole ground connection is recommended.

Further information The wiring diagram in chapter 13.3 contains further details of the electric supply connection data.

Rated voltage: 115V \pm 10%/1/60Hz

	TBH 14	TBH 16	TBH 23
Power consumption [hp]*	0.64	0.78	0.99
Maximum power consumption [hp]	0.78	1.07	1.34
Pre-fuse [A]	15	15	15
Supply per phase and ground	14AWG	14AWG	14AWG

* Output data for reference conditions according to DIN ISO 7183 Option A2: Ambient temperature 100 °F, compressed air inlet temperature 100 °F, working pressure 100 psig

	TBH 14	TBH 16	TBH 23
Full load current [A]	6.3	8.4	4.2

* Output data for reference conditions according to DIN ISO 7183 Option A2: Ambient temperature 100 °F, compressed air inlet temperature 100 °F, working pressure 100 psig

Tab. 10 Supply data 115V / 1 / 60Hz

Rated voltage: 230V±10%/1/60Hz

	TBH 14	TBH 16	TBH 23
Power consumption [hp]*	0.48	0.60	0.76
Maximum power consumption [hp]	0.67	0.80	1.05
Pre-fuse [A]	15	15	15
Supply per phase and ground	14AWG	14AWG	14AWG
Full load current [A]	2.7	4.0	4.2

* Output data for reference conditions according to DIN ISO 7183 Option A2: Ambient temperature 38 °C, compressed air inlet temperature 38 °C, working pressure 100 psig

Tab. 11 Supply data 230V / 1 / 60Hz

3 Safety and Responsibility

3.1 Basic instructions

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

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



Disregard of warning or safety instructions can cause serious injuries!

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

3.2 Specified use

The machine is intended solely to dry 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.

- Comply with the specifications shown 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.
- Do not use untreated compressed air for breathing purposes.
- 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 includes, for example, nationally implemented European directives and/or applicable 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 familiar with and adhere to the safety instructions and sections of the service 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,
 - must have read, are familiar with, and adhere to the safety instructions and sections of the service manual applicable to installation and maintenance,
 - are completely familiar with the safety concepts and regulations of electrical, refrigeration, and compressed air engineering,
 - are able to recognize the possible dangers of electrical, refrigeration, and compressed air devices and take appropriate measures to safeguard persons and property,
 - have received adequate training in and authorization for the safe installation and maintenance of this machine.
 - completely familiar 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.

3.5 Dangers

Basic information

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

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

Warning instructions are found before a potentially dangerous task.

3.5.1 Safely dealing with sources of danger

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 make sure there is adequate protection against electric shock from direct or indirect contact.
- Before starting any work on electrical equipment:
Switch off and lock out the power supply disconnecting device and verify the absence of voltage.
- Switch off any external power sources.
These may include devices connected to the floating relay contacts.
- 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 to pressurized components (e.g. pipes and vessels) as this influences the component's resistance to pressure. The safety of the machine is then no longer ensured.

Rotating components

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

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

Temperature

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

- Avoid contact with hot components.
These include, for example, the refrigerant condenser.
- Wear protective clothing.
- If welding is carried out on or near the machine take adequate measures to ensure that no parts of the machine can ignite because of sparks or heat.

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 refrigerant and chemical substances.
- Avoid contact with skin and eyes.

- Do not inhale refrigerant mist and vapours.
- Do not eat or drink while handling refrigerant.
- Keep suitable fire extinguishing agents ready for use.
- Allow only qualified specialists to work on refrigerant circuits.
- Use only KAESER approved operating materials.

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.

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 can result in unpredictable hazards.

- 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.

3.5.2 Safe machine operation

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

Transport

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.

Installation

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

- Install the machine in a suitable compressor room.
- Ensure sufficient and suitable lighting such that the display can be read and work carried out comfortably and safely.
- Ensure accessibility so that all work on the machine can be carried out without danger or hindrance.

- If installed outdoors, the machine must be protected from frost, direct sunlight, dust, rain, and splashing water.
- Do not operate in areas in which specific requirements with regard to explosion protection are in force.
- 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.
- Ensure clean compressed air without damaging components.
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 the warm exhaust air flow from other machines.
- Keep suitable fire extinguishing agents ready for use.

Commissioning, operation, and maintenance

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

- Allow maintenance work to be carried out only by authorized personnel.
- Switch off and lock out the power supply disconnecting (isolating) device and check that no voltage is present.
- Check that the floating relay contacts are voltage-free.
- 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.
- 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.

Decommissioning, storage, and disposal

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

- Drain all fluids from the machine, e.g. refrigerant, and dispose of in accordance with local environmental regulations.
- Do not damage the refrigerant circuit.
- Give refrigerant only to authorized bodies for disposal.
- 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	Authorised 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.	Installation personnel
	Within 3 ft. radius of the machine and its supply cables.	
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. 12 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 4.5.

3.7 Safety signs

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

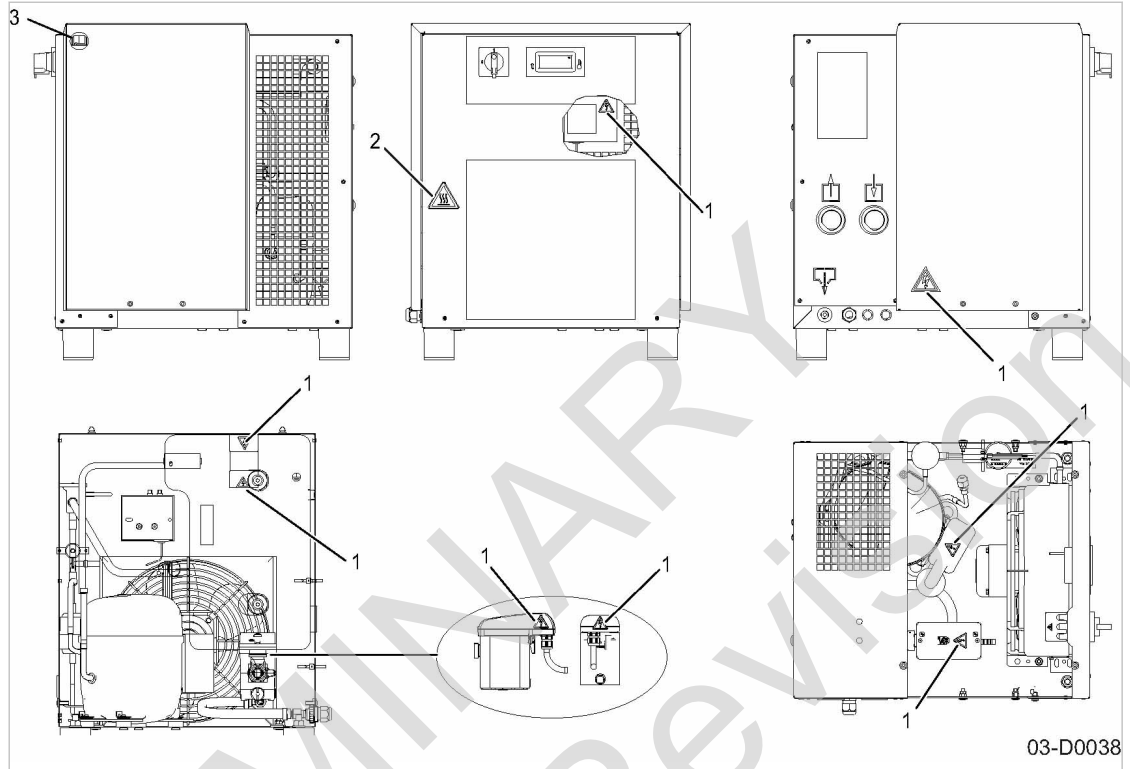


Fig. 1 Location of safety signs

Location	Sign	Meaning
1		<p>Danger of fatal injury from electric shock!</p> <ul style="list-style-type: none"> ➤ Before starting any work on electrical equipment: Switch off and lock out/tag out the power supply disconnecting device and verify the absence of any voltage.
2		<p>Hot surface!</p> <p>Risk of burns caused by contact with hot components.</p> <ul style="list-style-type: none"> ➤ Do not touch the surface. ➤ Wear long-sleeved garments (no synthetics such as polyester) and protective gloves.
3		<p>Personal injury or damage to the machine due to incorrect operation!</p> <ul style="list-style-type: none"> ➤ Prior to working on the compressed air system: read and understand the operating instructions and all safety signs.

Tab. 13 Safety signs

3.8 Emergency situations

3.8.1 Correct fire fighting

Suitable measures

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

- Keep calm.

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

Extinguishing substances

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

3.8.2 Treating injuries from handling refrigerant**Eye contact:**

Severe eye irritation, watering, reddening, and swelling of the eyelids.
Risk of caustic burns and frostbite.

- Open eyelids wide to allow product to evaporate.
- Hold the eyelid wide and rinse the eye with running water.
- Consult an ophthalmologist if you experience lasting pains.

Skin contact:

Initially a sensation of chill, skin may redden subsequently.
Risk of frostbite.

- Allow the product to evaporate.
- Rinse with lukewarm water.
- Consult a physician if experiencing lasting pain or reddened skin.

Inhalation:

At high concentrations, risk of cardiac irregularity (arrhythmia).
At very high concentration, risk of asphyxia caused by oxygen deficiency.

- Remove victim to the fresh air.
- If necessary: respiration with respirator or administration of oxygen.
- Consult a physician if experiencing breathing or nerve complaints.

3.9 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.

3.10 Environment protection

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

- Do not allow refrigerants to escape into the environment or the sewage system.
- Store and dispose of operating materials and replaced parts in accordance with local environmental protection regulations.
- Observe national regulations.

This applies in particular to parts contaminated with refrigerant.

4 Design and Function

4.1 Enclosure

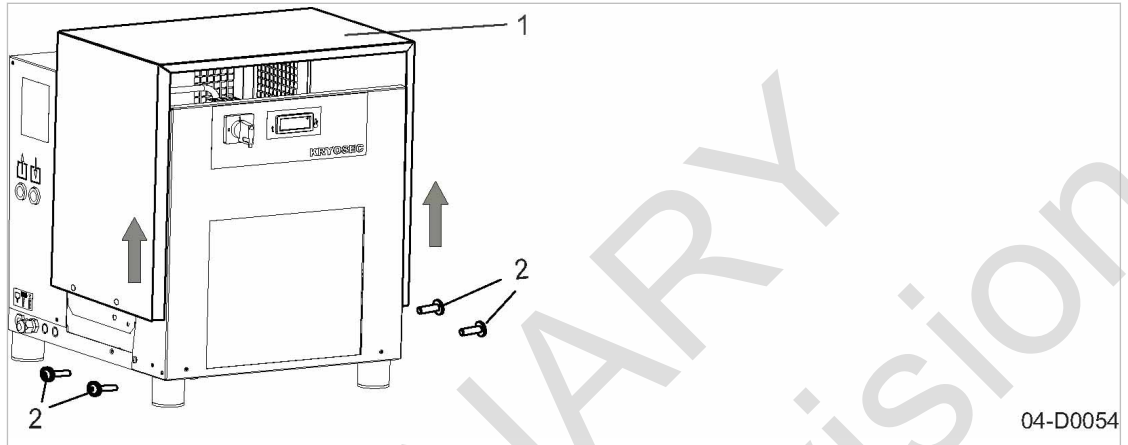


Fig. 2 Enclosure overview

- ① Enclosure
- ② Screw

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 on, or sitting on
- Loads of any kind should not be placed or stored on the machine

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

To open, remove the screws and take off the enclosure.

4.2 Machine function

The refrigerated dryer cools the compressed air. As the compressed air cools its capacity to retain moisture reduces and the surplus is precipitated out as condensate. This condensate is separated and automatically drained off.

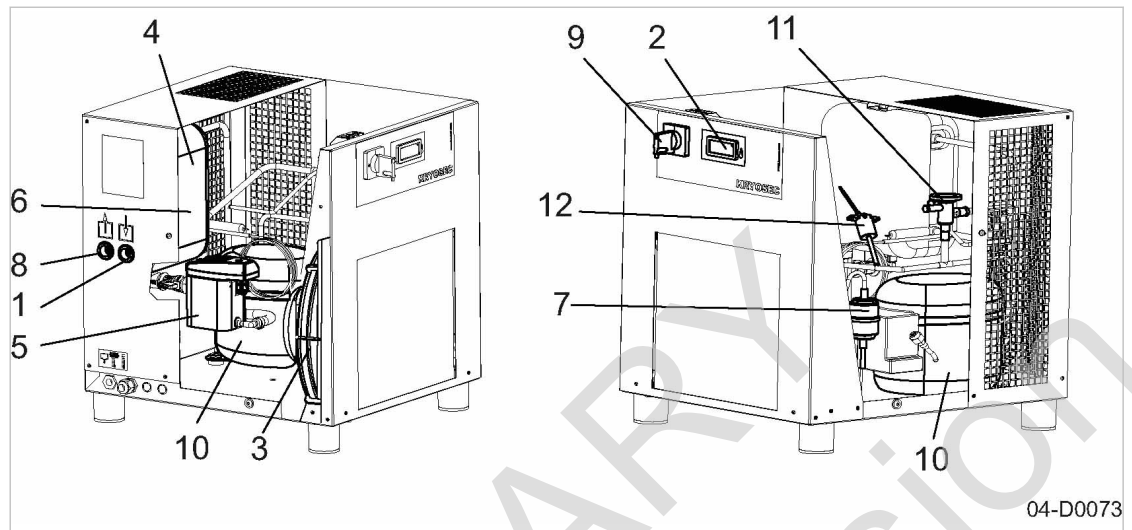


Fig. 3 Machine overview

- | | |
|------------------------------------|-------------------------------------|
| ① Compressed air inlet | ⑦ Filter dryer |
| ② Pressure dew point trend display | ⑧ Compressed air outlet |
| ③ Refrigerant condenser | ⑨ Power supply disconnecting device |
| ④ Heat exchanger | ⑩ Refrigerant compressor |
| ⑤ Condensate drain | ⑪ Hot gas bypass regulator |
| ⑥ Condensate separator | ⑫ Pressure cut out |

Stage 1:

Warm compressed air entering the first section of the heat exchanger gives up some of its heat to the chilled and dried compressed air leaving the dryer.

Stage 2:

Further air cooling takes place in the second part of the heat exchanger through which refrigerant flows. The refrigerant gives up its heat to the surroundings in the refrigerant condenser.

Stage 3:

A maintenance-free separation system separates the condensate generated from the compressed air as it is chilled. The automatic condensate drain reliably drains the condensate.

Stage 4:

The dry, chilled air takes in some heat from the inflowing warm compressed air in the first part of the heat exchanger. The relative humidity of the compressed air drops as a result.

4.3 Option K6 Condensate drain keys and LED's



Fig. 4 Eco-drain keys and LED's

The operating states of the condensate drain are displayed at the housing:

Display	Name	Function
1	<i>Power</i>	Ready to operate: Voltage is applied.
2	«TEST»	Testing the valve function: Push the «TEST» key for at least 2 seconds. Test the alarm function: Push the «TEST» key for at least 1 minute.
3	<i>Fault/alarm</i>	Fault occurred. <i>Alarm</i> LED flashes. Valve opens and closes repeatedly in an attempt to clear the fault.

Tab. 14 Condensate drain – keys and LED's

4.4 Pressure dew point display

This display provides information on the pressure dew point of the dryer.

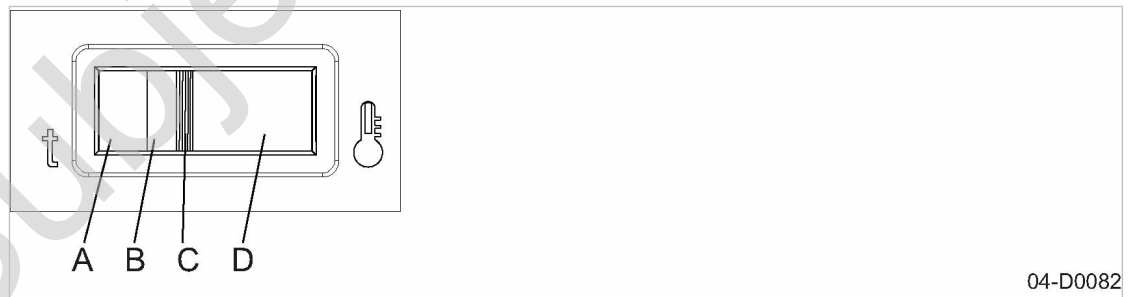


Fig. 5 Pressure dew point display

Zone	Color	Meaning
A	Blue	Pressure dew point too low

Zone	Color	Meaning
B	Green	Optimal pressure dew point
C	Green/red	Pressure dew point rising
D	Red	Pressure dew point too high (fault)

Tab. 15 Dew point display

Pressure dew point	Consequences
Too low	Condensate can freeze in the heat exchanger.
Normal	Optimum operating conditions reached.
Raised	Optimum air drying no longer achieved.
Too high	Air no longer or insufficiently dried. Downstream piping and consumers no longer protected from condensate occurring.

Tab. 16 Pressure dew point and consequences

4.5 Safety devices

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

- Power supply disconnecting device:
The power supply disconnecting device cuts power (all poles) from the machine. The power supply disconnecting device can be locked.
- Pressure control:
The pressure control shuts down the machine if the pressure of the refrigerant exceeds the permitted maximum. The switch is factory set.
- Enclosures and covers over moving parts and electrical connections:
These protect against accidental contact.

4.6 Options

The options available for your machine are described below.

4.6.1 Option C36 Pressure dew point warning

This floating relay contact switches as soon as the pressure dew point exceeds the permissible range. It is automatically reset when the pressure dew point drops back to an acceptable range.

4.6.2 Option K5 Electronic condensate drain

A sensor captures the filling level in the condensate drain. Condensate will be drained when the condensate drain is filled. When the condensate drain is empty, the outlet line is closed in a timely manner, to prevent unnecessary pressure drops.

4.6.3 Option K6**Electronic condensate drain with floating relay contact**

A sensor captures the filling level in the condensate drain. Condensate will be drained when the condensate drain is filled. When the condensate drain is empty, the outlet line is closed in a timely manner, to prevent unnecessary pressure drops.

In the event of a fault, the system may forward a message. The floating relay contact switches as soon as the *Fault/Alarm* LED displays a fault.

4.7 Accessories**4.7.1 Bypass line**

The refrigerated dryer can be isolated from the air main with the bypass line. The compressed air supply is maintained, however, no drying takes place.

Further information Further information on installation of a bypass line can be found in chapter 6.7.

4.7.2 Transformer

The transformer enables the connection of the machine to different power supply voltages.

Further information The wiring diagram shipped with the transformer contains further details of the power supply connection.

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 ensure that no parts of the machine can ignite because of sparks or heat.
- 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 is given below.



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

- Please consult KAESER if these distances cannot be adhered to.

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

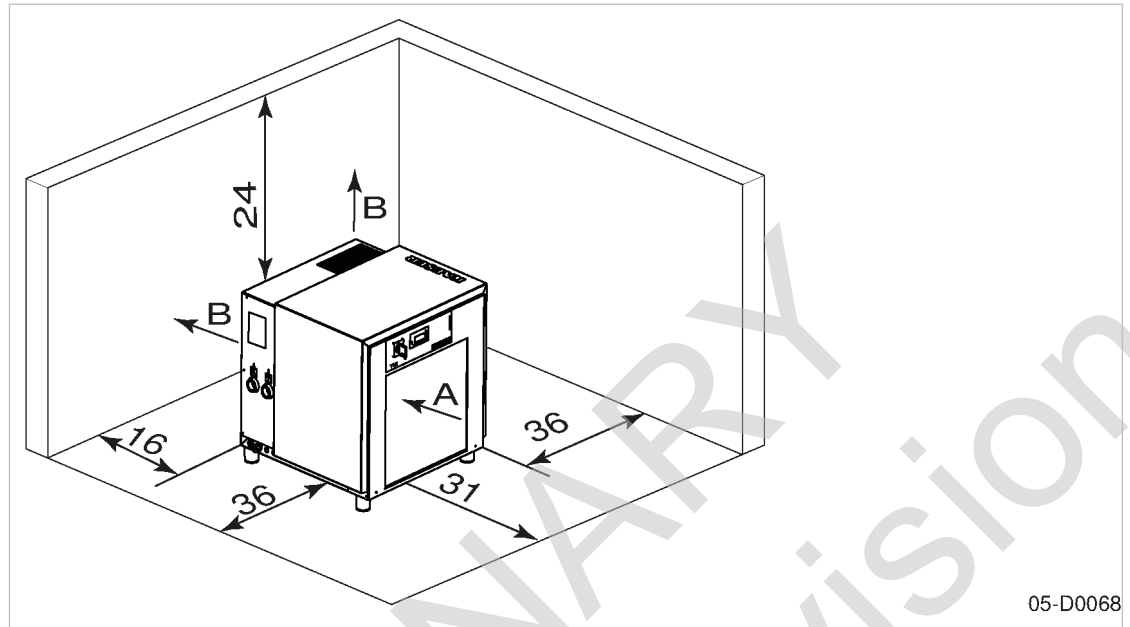


Fig. 6 Recommended machine placement and dimensions [in.]

- (A) Inlet: Cooling air
- (B) Outlet: Cooling air

1. **NOTICE** *Ambient temperature too low!*
Frozen condensate can damage the machine when starting.
 - *Switch the machine on only when the minimum switch-on temperature is reached.*
2. Consult KAESER for measures where there is a risk of frost.
3. Ensure that all intake and exhaust apertures of the enclosure remain opened.
4. Ensure adequate lighting so that all work on the machine can be carried out without danger or hindrance.
5. If installed outdoors, protect the machine against frost, direct sunlight, dust, and rain.

5.2.2 Ensuring the machine room ventilation

Adequate ventilation of the machine room fulfils several functions:

- It prevents a vacuum 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 adequate ventilation of the machine room.

1. Ensure that the flow rate of fresh air is at least the same as the flow rate taken by the machine and exhaust fan from the machine room.
2. Keep the inlet and exhaust apertures free of obstructions so that the cooling air can flow freely through the room.
3. Do not install the machine in the exhaust air flow from other machines.
4. Ensure clean air in order to support the proper functioning of the machine.

5.3 Operating the machine in a compressed air network

If the machine is supplying an air network, the system operating pressure may 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 network, we recommend the installation of an air main charging system.

- Consult KAESER for advice on this subject.

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6 Installation

6.1 Ensuring safety

Follow the instructions below for safe installation.

Warning instructions are displayed prior to a potentially dangerous task.



Disregarding warning instructions can cause serious injuries!

Compliance with safety instructions

Ignoring safety instructions can cause unforeseeable dangers.

- Follow the instructions in chapter 3 "Safety and Responsibility".
- Have the installation carried out only by personnel trained in refrigeration engineering.
- 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/tag out the power supply disconnecting device and verify the absence of voltage.
- Check that the floating relay contacts are voltage-free.

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 instructions 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.
- Fully vent all pressurized components and enclosures.
- Do not open or dismantle any valves.

When working on the drive system

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

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

- Switch off and lock out/tag out the power supply disconnecting device and verify the absence of any 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 Creating the machine to the compressed air network



Condensate in the compressed air network can damage the piping:

- Install only corrosion-resistant piping.
- Use fluoroelastomers as sealing material for seals.
- Observe the electro-chemical voltage sequence.
- Consult with KAESER concerning suitable materials for the compressed air network.

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

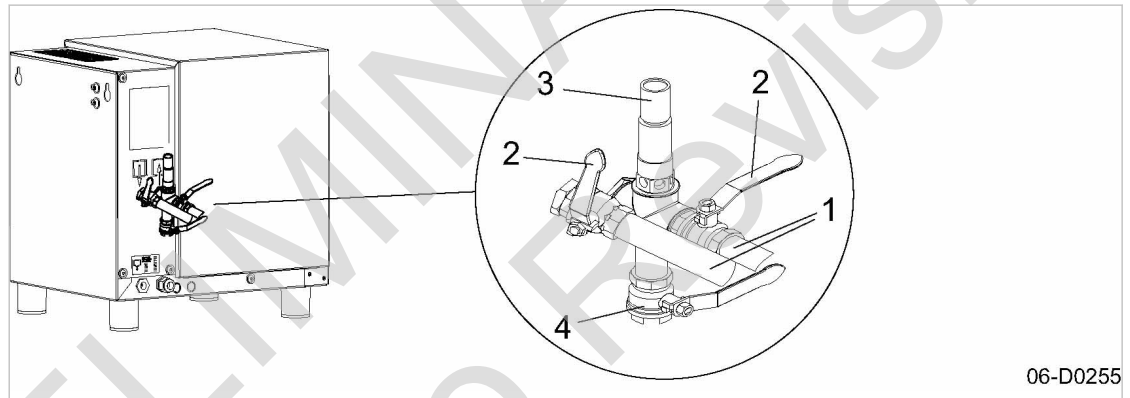


Fig. 7 Compressed air connection

- | | |
|-----------------------|------------------------------------|
| ① Compressed air line | ③ Safety relief valve (user) |
| ② Shut-off valve | ④ Venting line with shut-off valve |

1. **⚠ WARNING** *Serious injury or death can result from loosening or opening components under pressure!*
 - Fully vent all pressurized components and enclosures.
2. **📄 NOTICE** *The machine's compressed air system is not protected against overpressure exceeding 232 psig.*
 - The user must install a safety relief valve.
 - The user must install a venting line with shut-off valve.
3. **📄 NOTICE** *An excessive tightening torque may cause the tearing of the connections.*
 - Use a torque wrench to connect the machine to the compressed air network. Do not exceed a tightening torque of 28.5 lbf-ft.
4. Fit shut-off valves in the compressed air inlet and outlet.

Further information The dimensional drawing in chapter 13.1 gives the size and location of the connection ports.

6.4 Connecting the condensate drain

A threaded hose connection is provided to attach a condensate line.



The condensate must be able to drain freely.

- Only machines with 232 psig maximum permissible working pressure may be connected to the condensate collection line.

Fig. 8 illustrates a recommended installation.

Condensate flows downward into the condensate collection line. This prevents condensate flowing back to the machine.

If condensate flows at several points into the condensate collection line, you must install shut-off valves in the condensate lines to shut the condensate lines off before commencing maintenance work.

Condensate line

Feature	Value
Max. length ¹⁾ [in.]	49
Max. delivery head [in.]	16
Material (pressure-resistant, corrosion-proof)	Copper Stainless steel Plastic Hose line

¹⁾ For longer lengths, please contact the manufacturer before installation.

Tab. 17 Condensate line

Condensate collection line

Feature	Value
Gradient [%]	>1
Max. length ¹⁾ [in.]	65
Material (pressure-resistant, corrosion-proof)	Copper Stainless steel Plastic Hose line

¹⁾ For longer lengths, please contact KAESER before installation.

Tab. 18 Condensate collection pipe

Compressed air flow rate ¹⁾ [cfm]	Line cross-section ["]
<350	3/4
350 – 730	1
731 – 1410	1 1/2
>1410	2

¹⁾ Compressed air flow rate as guide for the condensate volume to be expected

Tab. 19 Condensate collection line: Line cross-section

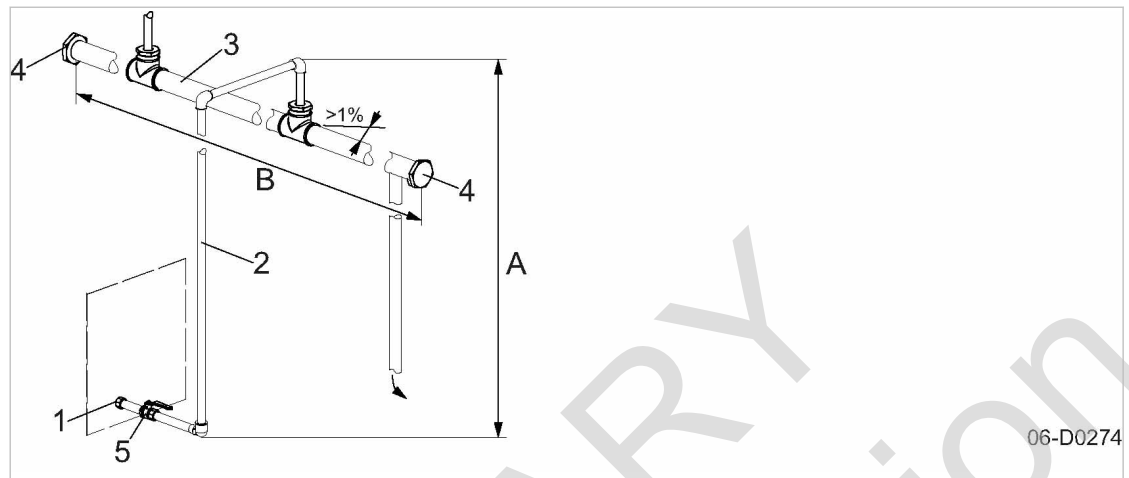


Fig. 8 Connecting the condensate drain

- | | | | |
|---|----------------------------|---|--|
| ① | Threaded connection | ⑤ | Shut-off valve |
| ② | Condensate line | ① | Delivery head |
| ③ | Condensate collection line | ② | Length of the condensate collection line |
| ④ | Screw plug | | |

Depending on the machine model, you may have several condensate drains.

➤ Directly connect every condensate drain to the condensate collection line.



➤ Collect the condensate in a suitable container and dispose of it in accordance with applicable environmental regulations.

Further information The dimensional drawing in chapter 13.1 provides the size and position of the connection port.

6.5 Connecting the machine to the power supply

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

The tolerance limits of the power supply voltage are within the permissible tolerance limits of the nominal voltage (machine).

1. The power supply must only be connected by authorized installation personnel or an authorized electrician.
2. Carry out safety measures as stipulated in relevant regulations and in national accident prevention regulations. In addition, observe the regulations of the local electricity supplier.
3. Test the overload protection cut-out to ensure that the time it takes to disconnect in response to a fault is within the permitted limit.
4. Select supply cable conductor cross-sections and fusing in accordance with local regulations.
5. If necessary, change the connections to the control transformer (accessory) tapplings to suit the power supply.

6. **⚠ DANGER** *Danger of fatal injury from electric shock!*
 - *Switch off and lock out/tag out the power supply disconnecting device and verify the absence of voltage.*
7. Connect the machine to the power supply.

Further information The wiring diagram in chapter 13.3 contains further details regarding the electrical power supply connection.

6.6 Option

6.6.1 Option K6

Connecting floating contacts to the condensate drain

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

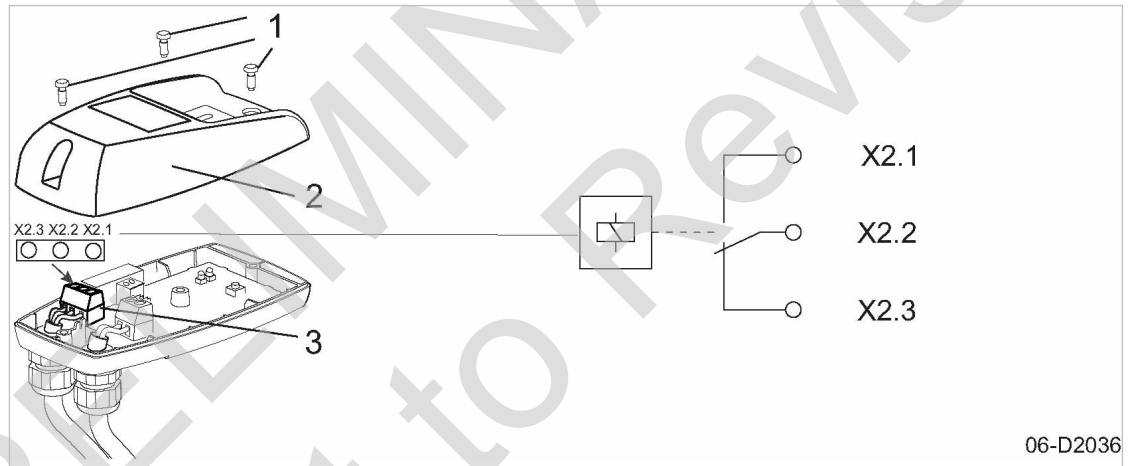


Fig. 9 Option K6: Connecting floating contacts to the condensate drain

- ① Screw
- ② Cover top
- ③ Connection for floating contacts

➤ Remove the screws and remove the cover top.

Further information Connect the lines for external fault messages to the connection for floating contacts in accordance with the wiring diagram in chapter 13.3.

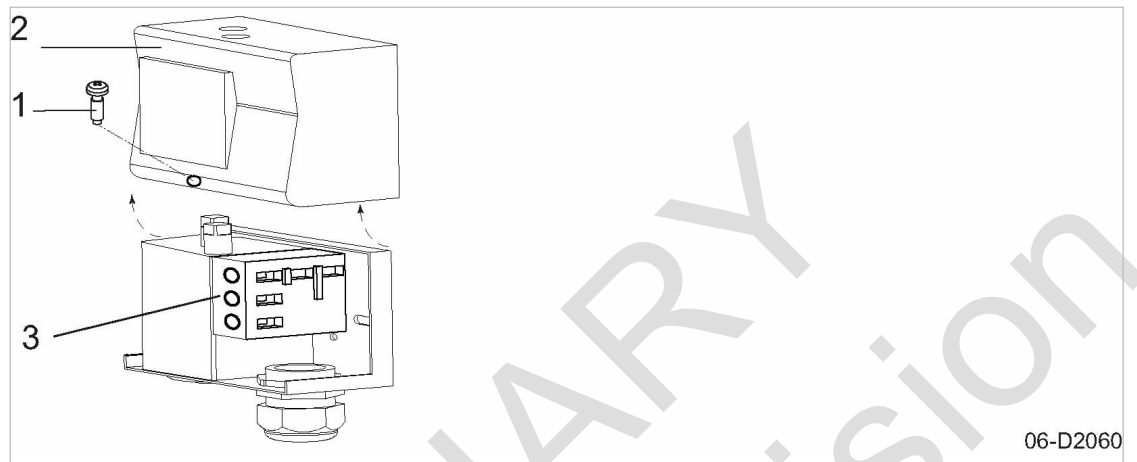
6.6.2 Option C36**Connecting floating relay contacts to the thermostat**

Fig. 10 Connecting floating relay contacts to the thermostat

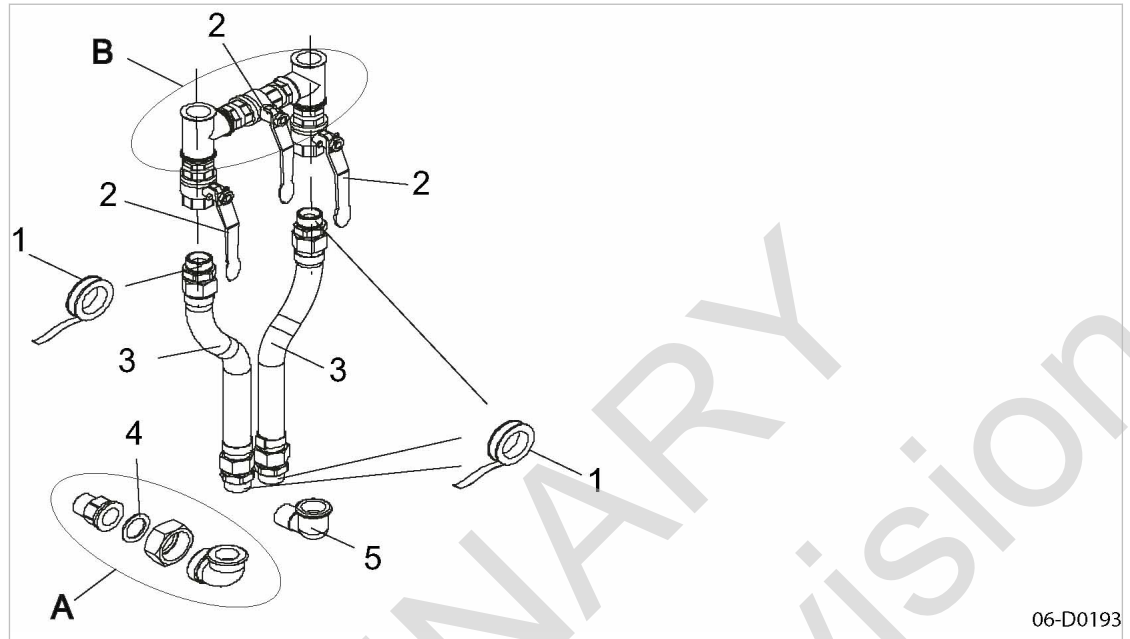
- ① Screw
- ② Enclosure
- ③ Terminal

➤ Remove the screw and remove the enclosure.

Further information Connect the conduits for external fault messages to the terminal as per the wiring diagram in chapter 13.3.

6.7 Installing the bypass line (accessory)

The bypass line is delivered pre-assembled. The dimensional drawing in chapter 13 includes additional installation information.



06-D0193

Fig. 11 Bypass line

- | | | | |
|---|----------------|---|--------------------------|
| ① | Sealing tape | ⑤ | Elbow |
| ② | Shut-off valve | Ⓐ | Elbow fitting |
| ③ | Hose line | Ⓑ | Bypass line (pre-fitted) |
| ④ | Gasket | | |

1. Close the user's shut-off valves.
2. Attach the elbow ⑤ with sealing tape ① onto the compressed air inlet.
3. Fit the components of the elbow fitting Ⓐ with gasket ④ at the compressed air outlet.
4. Wrap sealing tape ① around the hose lines ③ and affix to the bypass line Ⓑ and elbow fitting Ⓐ.
5. Screw one connection of the hose line ③ to the elbow ④.
6. Check the proper assembly of the bypass line.
7. Close all access doors.
8. Open the user's shut-off valves ②.
9. Start the machine and check the bypass line screw connections for leaks.

7 Initial Start-up

7.1 Ensuring safety

Instructions for Safe Initial Start-up of the Machine.

Warning instructions are found before a potentially dangerous task.



Disregarding warning instructions can cause serious injuries!

Basic safety instructions

- Follow the instructions in chapter 3 'Safety and Responsibility'.
- Have installation work carried out by authorized installation personnel only.
- Make sure that no personnel is working on the machine.
- Ensure that all access doors and panels are closed and secure.

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 potential-free contacts.

Working on pressure system

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

- Close shut-off valves or otherwise isolate the machine from the compressed air system to ensure that no compressed air can flow back into the machine.
- Vent all pressurized components and chambers immediately.
- Do not open or dismantle any valves.

Working on the drive system

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

Touching the fan 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.

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.

7 Initial Start-up

7.3 Checking installation and operating conditions

- 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 or standstill longer than:	Remedy
12 months	<ul style="list-style-type: none"> ➤ Check condensate drainage. ➤ Check the refrigerant condenser. ➤ Check the electrical equipment. ➤ Check all pipes, hoses and fittings for leaks and any visible damage. Correct any defects immediately.
36 months	<ul style="list-style-type: none"> ➤ Have the overall technical condition checked by an authorized KAESER service representative.

Tab. 20 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 the applicable safety regulations?	–	
➤ Have all the installation conditions been fulfilled?	5	
➤ Are the tolerance limits of the power supply within the permissible tolerance limits of the rated voltage (machine)? (see wiring diagram)	2.1	
➤ Are the cable cross-sections and fuse ratings adequate?	2.9	
➤ Have all electrical connections been checked for tightness?	–	
➤ Has the inspection been repeated after 50 operating hours following the initial commissioning?		
➤ Has a safety relief valve been installed by the user?	6.3	
➤ Has a shut-off valve been fitted to the compressed air connections?	6.3	
➤ Is the condensate drain connected?	6.4	
➤ Is the connection to the air network made with a flexible hose?	6.3	
➤ Are all removable panels and canopy closed and secured?	–	

Tab. 21 Installation conditions checklist

7.4 Starting the machine for the first time

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

1. Open the shut-off valves to the air network.
2. Switch on the machine.

The refrigerant compressor starts running. Compressed air will be cooled as soon as the thermal mass is sufficiently cooled.

3. Watch for any malfunctions occurring in the first few hours of operation.

PRELIMINARY
Subject to Revision

8 Operation

8.1 Switching on and off

Always use the «power supply disconnecting device» to switch the machine on and off.

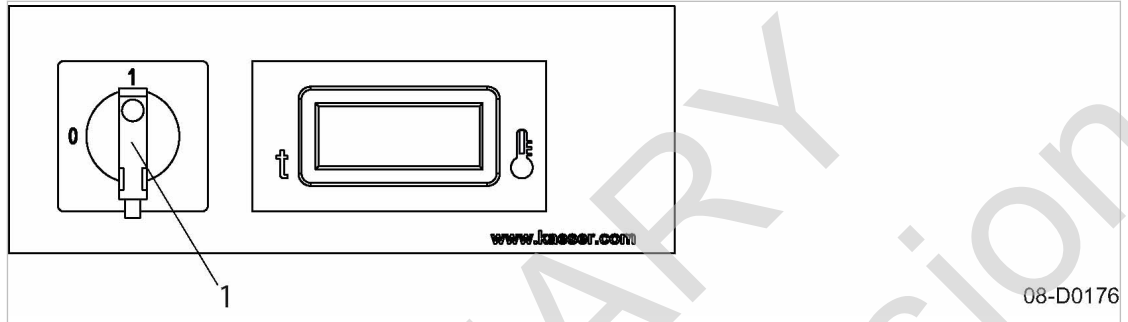


Fig. 12 Switching on and off

① «Power supply disconnecting device»

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.
2. Wait 10–15 minutes, then open the shut-off valves to the air network.



If a power failure occurs, the machine is **not** prevented from restarting automatically when power is resumed.
The refrigerant compressor can automatically start when power is resumed and when the cut-in temperature is reached in the thermal mass.

8.1.2 Switching off

1. Switch off and lock out/tag out the power supply disconnecting device.
2. Close the shut-off valves to the air network.

Result The machine is switched off (all poles) and disconnected from the power supply.

8.2 RESETTING the machine

If the safety pressure switch has shut down the machine, it can only be restarted when the RESET key is pressed.

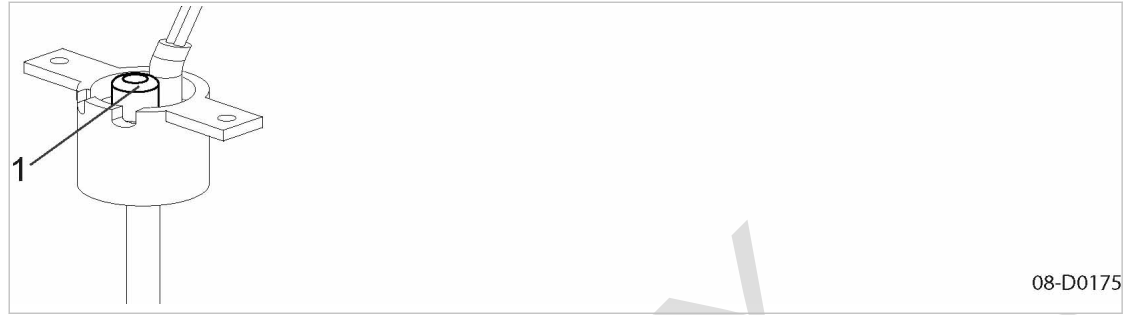


Fig. 13 Pressure control

① «RESET»

➤ Press the «RESET» key.

Result The machine is ready for operation again and can now be started.

PRELIMINARY
Subject to Revision

9 Fault Recognition and Rectification

9.1 Basic instructions

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

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

9.2 Faults

Fault	Possible cause	Remedy
Water in the compressed pressure system	Compressed air inlet and outlet reversed.	Check the compressed air connections.
	The condensate is not draining out of the system.	Check and clean the condensate drain and line. Exchange the condensate drain service unit.
High pressure drop	Compressed air system frozen.	Switch off the machine and increase the ambient temperature.
	Continuous air loss from the condensate drain.	Maintain the condensate drain.
Pressure dew point too high	Ambient or compressed air inlet temperature too high.	Check that installation conditions are OK.
	Low refrigerant level.	Contact an authorized KAESER service representative.
	Dirt collecting in the compressed air system.	Contact an authorized KAESER service representative.
The pressure cut out shuts down the machine	Ambient or compressed air inlet temperature too high.	Check that installation conditions are OK.
	Refrigerant condenser dirty.	Clean the refrigerant condenser.

Tab. 22 Faults and troubleshooting

10 Maintenance

10.1 Ensuring safety

Follow the instructions below for safe maintenance of the machine.
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!

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

When working on live components

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

- Work on electrical equipment may only be carried out by authorized electricians.
- Switch off and lock out the power supply disconnecting device and check that no voltage is present.
- 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 while the machine is switched on can result in serious injury.

- Switch off and lock out the power supply disconnecting device and check that no voltage is present.
- 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 Regular maintenance tasks

The refrigeration circuit is fully hermetically sealed and needs no maintenance. Repairs may only be carried out by certified personnel.

The table below lists the required maintenance tasks.

- Carry out maintenance tasks, or have them carried out, punctually as determined by ambient and operating conditions:

Interval	Maintenance task	See chapter
Weekly	Check the condensate drain.	10.4.1 / 10.5.1
Monthly	Clean the refrigerant condenser.	10.3
Quarterly	Check lines, hoses and screw connections for leaks.	–
Annually	Check refrigerant circuit for leaks.	–
	Check that all electrical connections are tight.	–
	Have the pressure control checked by an authorized KAESER service representative.	–
Up to 6000 h, at the latest every 2 years	Condensate drain: Change the service unit.	10.4.2 / 10.5.2

Tab. 23 Regular maintenance tasks

10.3 Clean the refrigerant condenser

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

Material Compressed air for blowing out
Vacuum cleaner
Cleaning cloth

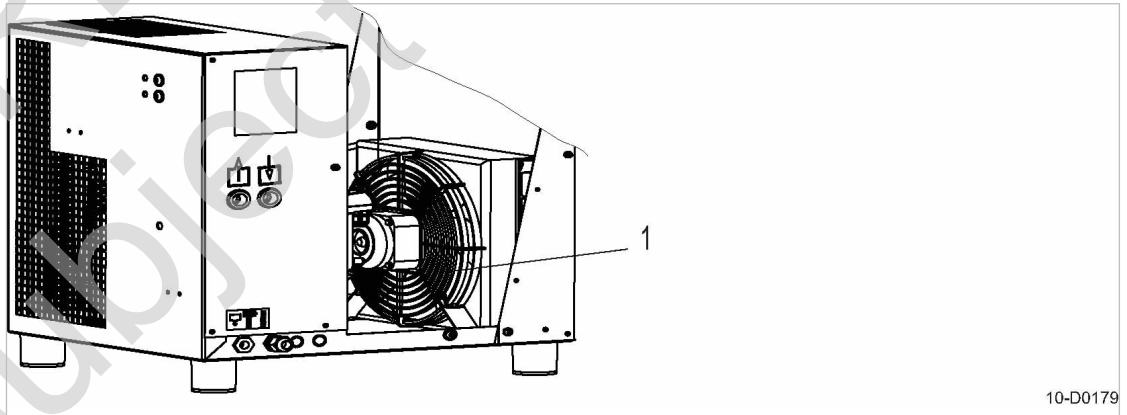


Fig. 14 Clean the refrigerant condenser

- ① Refrigerant condenser

Precondition The power supply disconnecting device is switched off, lock out/tag out the device, the absence of any voltage has been verified.

1. Use compressed air (<30 psig) to blow the refrigerant condenser clean at regular intervals and vacuum the dust.
2. Have stubborn clogging removed by an authorized KAESER service representative.

10.4 Option K5

Maintaining the condensate drain

10.4.1 Checking the condensate drain

Precondition The power supply disconnecting device is switched on.
Machine is pressurized.

1. Switch off the power supply disconnecting device.
The machine is disconnected from the power supply.
2. After approx. 60 s, lightly touch the condensate line at the condensate outlet with one hand.
3. Switch on the power supply disconnecting device with the other hand.

Result The draining function of the condensate drain is automatically triggered when the power supply disconnecting device is switched on.
As soon as the condensate drain opens, you will feel two bursts at the condensate line.
Replace the service unit if you do **not** experience a burst or if there are **constant** bursts during the manual test.

10.4.2 Replacing the service unit

The condensate drain cannot be cleaned. The service unit must be replaced if condensate no longer drains.

Material KAESER service unit
Screwdriver
Sealing tape to seal the screw-in part
As required: O-ring 16x2 (5.1519.0)

⚠ CAUTION

Danger of burns from hot components near the condensate drain!

➤ *Work with caution.*

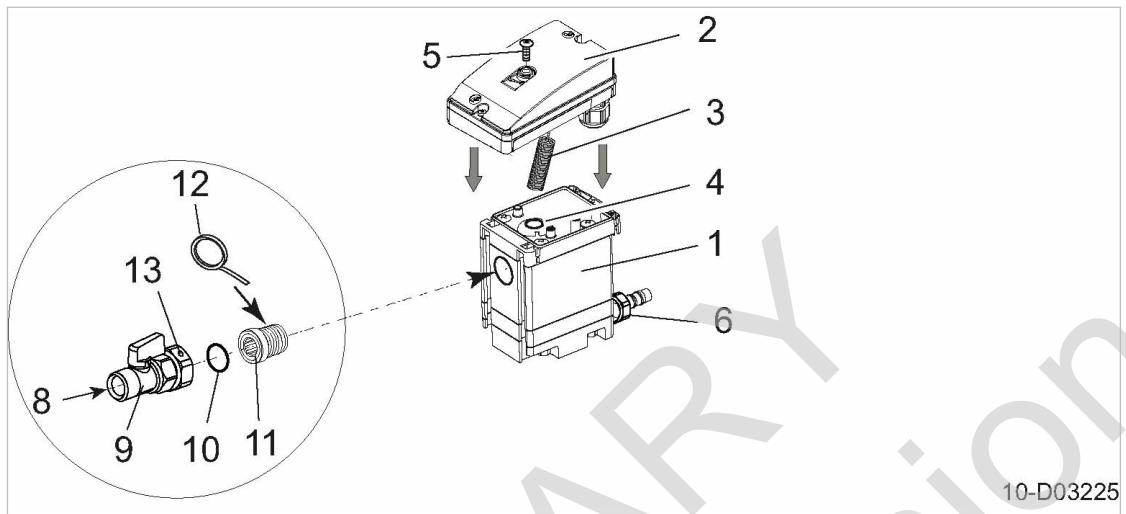


Fig. 15 Replace the service unit

- | | | | |
|---|--|---|------------------------------|
| ① | Service unit | ⑧ | Condensate inlet |
| ② | Control unit | ⑨ | Shut-off valve |
| ③ | Sensor | ⑩ | O-ring |
| ④ | Sensor opening | ⑪ | Screw-in part |
| ⑤ | Screw | ⑫ | Sealing tape |
| ⑥ | Screw connection (for condensate line) | ⑬ | Clamping nut with vent holes |

Removing the service unit

- ⚠ WARNING** *Serious injury or death can result from loosening or opening components under pressure!*
 ➤ *Fully vent all pressurized components and enclosures.*
- Switch off and lock out/tag out the power supply disconnecting device and check that no voltage is present.
- Close the user's shut-off valves at the compressed air connections (see chapter 6.4).
- Close the shut-off valve ⑨ upstream of the condensate drain.
- Unscrew the screw connection ⑥ at the condensate drain.
- Carefully loosen the clamping nut ⑬ at the shut-off valve ⑨ until remaining residual air has escaped through the venting holes.
- Unscrew the screw-in part ⑪ from the service unit and place aside.
- Unscrew screw ⑤ of control unit ② with the screwdriver.
- Remove the control unit ② from the service unit ①.

Installing the service unit

Use only KAESER service units to ensure correct function of the condensate drain.

Precondition Make sure that the top of the service unit and the contact springs ⑦ are clean and dry.

- Carefully insert the sensor ③ of the control unit ② in the opening ④ of the service unit.
- Install service unit with the screw ③ on the control unit ②.
- At the screw-in part ⑪, replace old sealing material with new sealing tape ⑫.
- Install the screw-in part in the service unit.
- If necessary, insert a new O-ring ⑩.

6. Tighten the clamping nut (13) at the shut-off valve (9).
7. Open the shut-off valve (4) upstream of the condensate drain.
8. Attach the condensate line.
9. Close the housing and lock removable panels.
10. Open the shut-off valve upstream of the condensate drain and at the air connections.
11. Switch on the power supply disconnecting device.

10.5 Option K6 Maintaining the condensate drain

10.5.1 Check condensate drain

Precondition The power supply disconnecting device is switched on.
Machine is pressurized.
The *Power* LED lights.



Fig. 16 Check condensate drain

- ① *Power* LED
- ② «TEST» key
- ③ *Alarm* LED

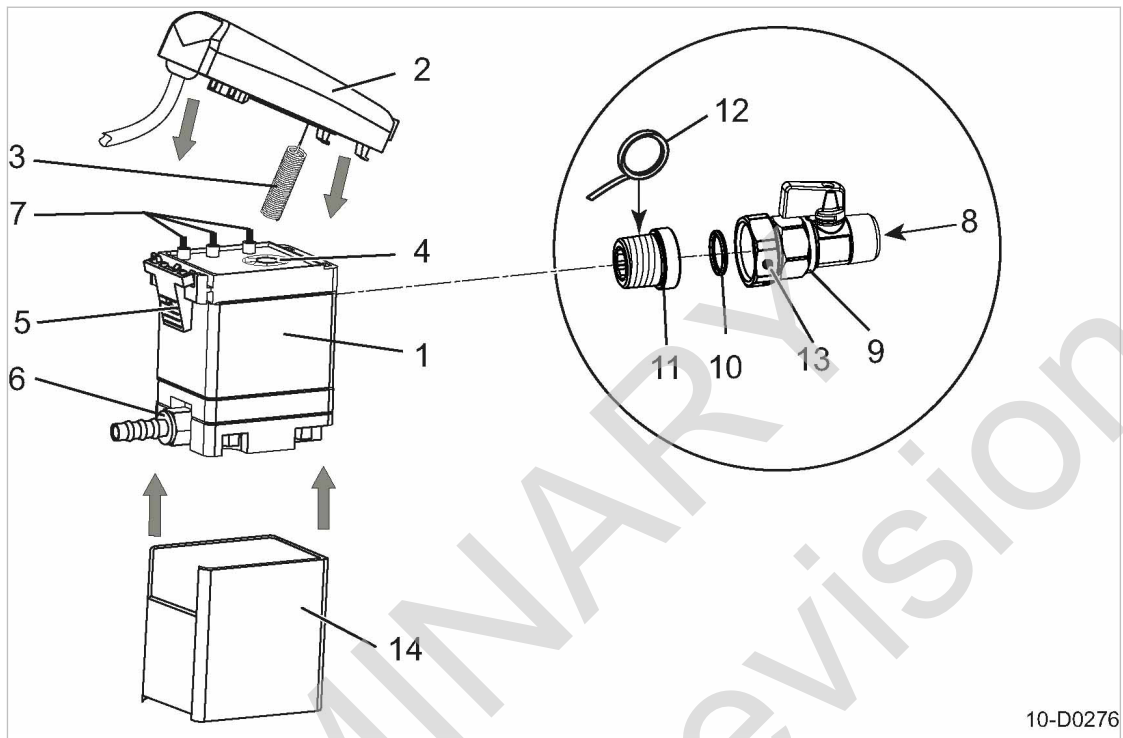
1. **⚠ CAUTION** *Danger of burns from hot components near the condensate drain!*
➤ *Work with caution.*
2. With one hand, lightly touch the condensate line at the condensate drain.
3. With your other hand, push and hold the «TEST» key at the condensate drain for at least 2 seconds.

Result As soon as the condensate drain opens, you will feel a short burst at the condensate line.
Replace the service unit if you do **not** experience a burst during manual test.

10.5.2 Changing the service unit

The condensate drain cannot be cleaned. The service unit must be changed if condensate does not drain.

Material Sealing tape
If required: O-ring 16x2 (5.1519.0)



10-D0276

Fig. 17 Change the service unit

- | | | | |
|---|---|---|------------------------------|
| ① | Service unit | ⑧ | Condensate inlet |
| ② | Control unit | ⑨ | Shut-off valve |
| ③ | Sensor | ⑩ | O-ring |
| ④ | Sensor opening | ⑪ | Screw-in part |
| ⑤ | Snap fastener | ⑫ | Sealing tape |
| ⑥ | Screw connection (for condensate drain) | ⑬ | Clamping nut with vent holes |
| ⑦ | Contact springs | ⑭ | Insulation |

Removing the service unit

1. **▲ WARNING** *Serious injury or death can result from loosening or opening components under pressure!*
➤ *Fully vent all pressurized components and enclosures.*
2. Close the shut-off valve ⑨ upstream of the condensate drain.
3. Unscrew the fitting ⑥ at the condensate line.
4. Press the snap fastener and carefully remove the control module ② from the service unit ①.
5. Carefully loosen the union nut ⑬ at the shut-off valve ⑨ until remaining residual air has escaped through the venting bores.
6. Unscrew the screw-in part ⑪ from the service unit ① and place aside.
7. Remove the insulation ⑭ from the service unit.

Installing the service unit

Use only KAESER service units to ensure the correct function of the condensate drain.

Precondition Make sure that the top of the service unit and the contact springs are clean and dry.

1. Fit the insulation ⑭ to the service unit ①.

2. Carefully insert the control module sensor (3) in the opening (4) of the service unit.
3. Place the snap fastener (5) of the control module (2) into the service unit eyes.
4. Press the control module to the service unit until the snap fastener can be heard to click into place.
5. At the screw-in part (11), replace old sealing material with new sealing tape.
6. Install the screw-in part (11) in the service unit.
7. If necessary, insert a new O-ring.
8. Tighten the union nut (13) at the shut-off valve (9).
9. Attach the condensate hose.
10. Open the shut-off valve (9) upstream of the condensate drain.

PRELIMINARY
Subject to Revision

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 spares.

11.2 Ordering consumable parts and operating fluids/materials

KAESER consumable parts and operating fluids/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 spare parts or operating fluids/materials.

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

Name	Quantity	Number
Condensate drain: Service unit	1	9602

Tab. 24 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 Spares 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.

PRELIMINARY
Subject to Revision

Legend		KAESER KOMPRESSOREN
Refrigeration dryer TBH 14		SEL-3866_02 E
Item	Description	Option
1555 *)	Filter dryer	
1690 *)	Refrigerant compressor oil	
1700 *)	Refrigerant	
1707 *)	Acid test, refrigerant	
2500 *)	Hot gas bypass controller	
2520 *)	Capillary tube	
2540 *)	Refrigerant filling port	
3100	Main switch	
3254	Condens. drain, connect. cable	
3258	Refr.compress.connecting cable	
3440	Switch set	
3731 *)	Safety pressure switch	
3965	Temperature indicator	
3976	Thermostat	X
4010 *)	Refrigerant compressor	
5120	Double nipple	
5121	Double nipple	
5148	Elbow fitting	
5500 *)	Heat exchanger	
5510 *)	Refrigerant condenser cpl.	
7365	Condensate drain line	
8986	Fixing kit	
9025	Heat exchanger insulation	
9067	Counternut	
6501	Condensate drain, dryer	
9602	Condensate drain service-unit	
9881	Adapter	
9882	Adapter	

Legend		KAESER KOMPRESSOREN
Refrigeration Dryer TBH 16		SEL-3867_02 E
Item	Description	Option
1555 *)	Filter dryer	
1690 *)	Refrigerant compressor oil	
1700 *)	Refrigerant	
1707 *)	Acid test, refrigerant	
2500 *)	Hot gas bypass controller	
2520 *)	Capillary tube	
2540 *)	Refrigerant filling port	
3100	Main switch	
3254	Condens. drain, connect. cable	
3258	Refr. compress connecting cable	
3440	Switch set	
3731 *)	Safety pressure switch	
3965	Temperature indicator	
3976	Thermostat	X
4010 *)	Refrigerant compressor	
5120	Double nipple	
5121	Double nipple	
5148	Elbow fitting	
5500 *)	Heat exchanger	
5510 *)	Refrigerant condenser cpl.	
7365	Condensate drain line	
8986	Fixing kit	
9025	Heat exchanger insulation	
9067	Counternut	
6501	Condensate drain, dryer	
9602	Condensate drain service-unit	
9881	Adapter	
9882	Adapter	

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!

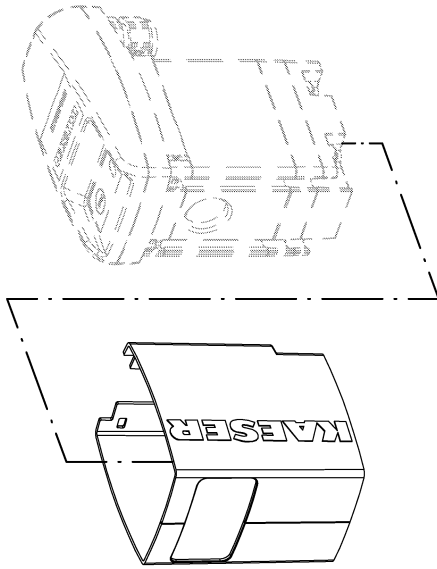
*) The replacement of the spare parts described requires an authorized and certified refrigerant technician

Legend		KAESER KOMPRESSOREN
Refrigeration dryer TBH 23		SEL-3868_02 E
Item	Description	Option
1555 *)	Filter dryer	
1690 *)	Refrigerant compressor oil	
1700 *)	Refrigerant	
1707 *)	Acid test, refrigerant	
2500 *)	Hot gas bypass controller	
2520 *)	Capillary tube	
2540 *)	Refrigerant filling port	
3100	Main switch	
3254	Condens. drain, connect. cable	
3258	Refr.compress.connecting cable	
3440	Switch set	
3731 *)	Safety pressure switch	
3965	Temperature indicator	
3976	Thermostat	X
4010 *)	Refrigerant compressor	
5120	Double nipple	
5121	Double nipple	
5148	Elbow fitting	
5500 *)	Heat exchanger	
5510 *)	Refrigerant condenser cpl.	
7365	Condensate drain line	
8986	Fixing kit	
9025	Heat exchanger insulation	
9067	Counternut	
6501	Condensate drain, dryer	
9602	Condensate drain service-unit	
9881	Adapter	
9882	Adapter	

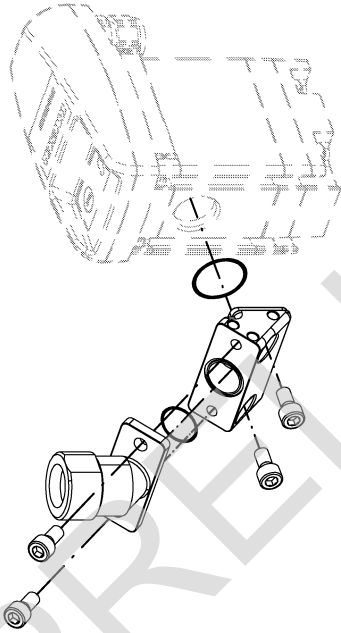
Please quote the part number and serial number of the machine together with the item number and the description of the part when ordering.

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

*) The replacement of the spare parts described requires an authorized and certified refrigerant technician

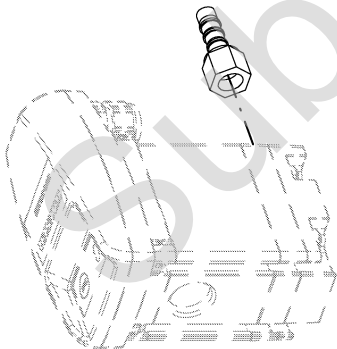


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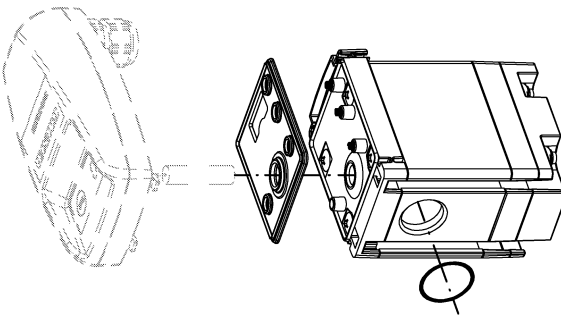
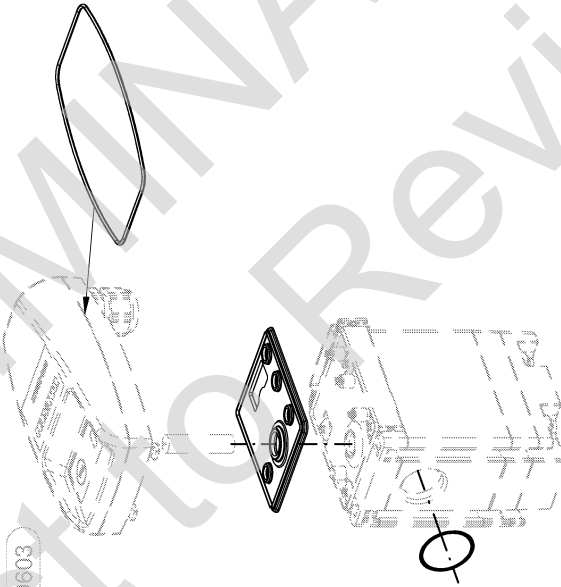
(6515)

9603



6307

9602



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KAESER
KOMPRESSOREN

Einzelteil mit	Name	Datum	Original	Erstellt mit
Service spare part drawing / Service Ersatzteil-Zeichnung	Documen-Nr.	108.12.2014	Original	Blatt 12
SEGA-Nummer	As	108.12.2014	Original	Blatt
SEG-5572_01	Service-Kil (Option) / Subassembly / Untergruppe	14.12.2017	Original	1 von 1

Legend		KAESER KOMPRESSOREN
Condensate drain		SEL-3875_01 E
Item	Description	Option
6307	Hose connection	
6515	Adapter condensate inlet	X
9022	Panelling	X
9602	Condensate drain service-unit	
9603	Condensate drain gasket kit	
<p>Please quote the part number and serial number of the machine together with the item number and the description of the part when ordering.</p> <p>Before and during all work, be sure to read and follow the safety and service instructions in the machine's service manual!</p>		

PRELIMINARY
Subject to Revision

12 Decommissioning, Storage and Transport

12.1 Putting out of operation

This is necessary under the following circumstances:

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

Temporary de-commissioning

1. Switch the machine off and shut off all connecting lines.
2. Drain condensate from the condensate drain.

Long-term de-commissioning

Precondition 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 (depressurized).

1. Drain condensate from the condensate drain.
2. Allow the machine to completely cool down.
3. Disconnect all supply lines.

12.2 Storage

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

Frozen moisture can damage components such as diaphragms, valves, and gaskets.



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

Precondition Condensate drain and condensate lines are completely empty.

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.

12.3 Transport

12.3.1 Safety

Weight and center of gravity determine the most suitable method of transportation. The center of gravity is shown in the drawing in chapter 13.1.



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

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

- Ensure the danger area is clear of personnel.

12.3.2 Transport with a forklift truck

Precondition The forks are fully under the machine.



Fig. 18 Transporting with a forklift truck

1. Take note of the center of gravity.
2. Drive the forks completely under the machine or pallet and lift carefully.

12.3.3 Transport with a crane

Only suitable and approved load-carrying and attachment devices ensure proper transport of the machine with a crane. Suitable crossbeams ensure sufficient distance of the attachment resources from the machine housing to prevent damage.

The machine is not equipped with fixing points.

Examples of unsuitable fixing points:

- Pipe sockets
- Flanges
- Attached components such as condensate drains.



- Consult KAESER if you require suitable load-carrying and attachment devices or have questions regarding the correct use.

Precondition Load-carrying and attachment devices meet the local safety regulations.

The crane, load-carrying and attachment devices or the lifted machine do not endanger personnel.

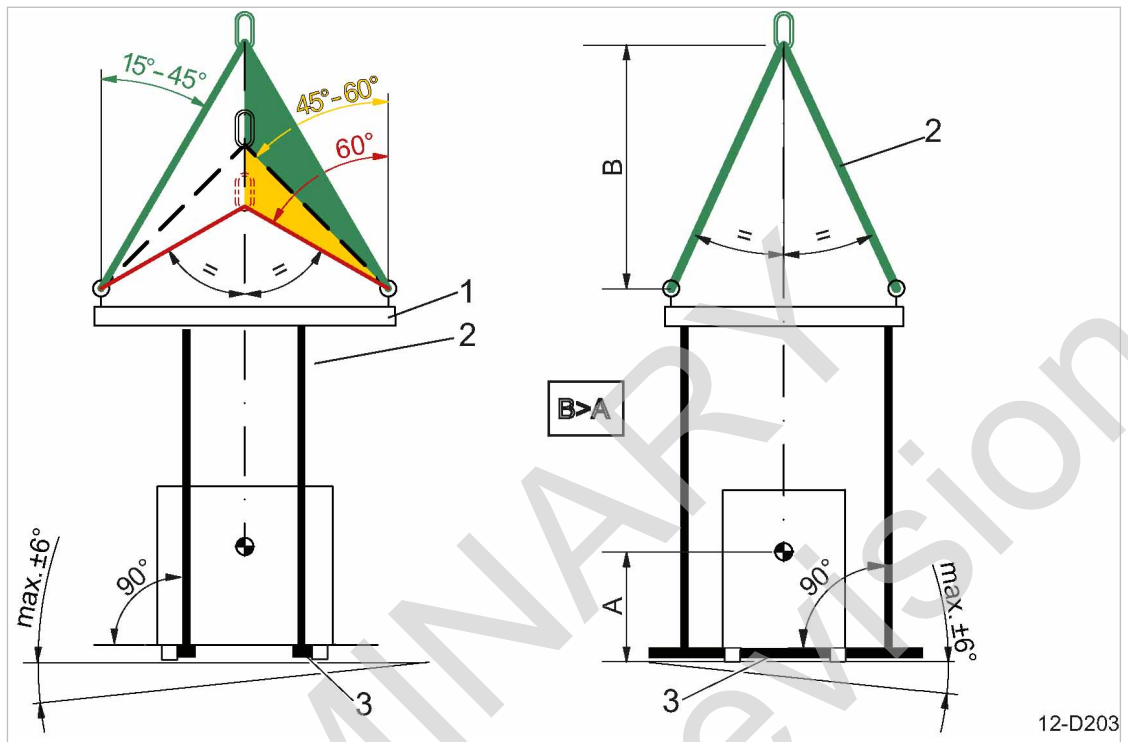


Fig. 19 Transport with a crane

- ① Load carrying devices
- ② Attachment resources

1. **⚠ WARNING** Risk of accident caused by incorrect use of lifting gear and attachment devices!
 - Comply with permissible load limits.
 - Comply with specific safety information of used load-carrying and attachment devices.
2. Properly use load-carrying and attachment devices:
 - Ensure proper distribution of the fastening points relative to the centre of gravity position (symmetrical load distribution).
 - Ensure equal slope angles of 15° to 45° for attachment devices with multiple strands.
 - Slope angles between 45° and 60° may be unsuitable.
 - Slope angles larger than 60° are prohibited.
 - Ensure the maximum incline of 6° of the machine to the horizontal.
 - Ensure sufficient distance of the attachment devices to the machine.
 - Ensure a positive stability height: Dimension B > Dimension A
 - Do not attach the attachment devices to any machine component.
3. Carry out a lifting test:
Slightly lift the machine to check whether machine remains in horizontal position and does not teeter.
4. Transport the machine only after a successful lifting test.

12.4 Disposal

The sealed refrigerant circuit still contains both refrigerant and oil.

1. De-commission the machine.
2. Hand the machine over to an authorized disposal expert.



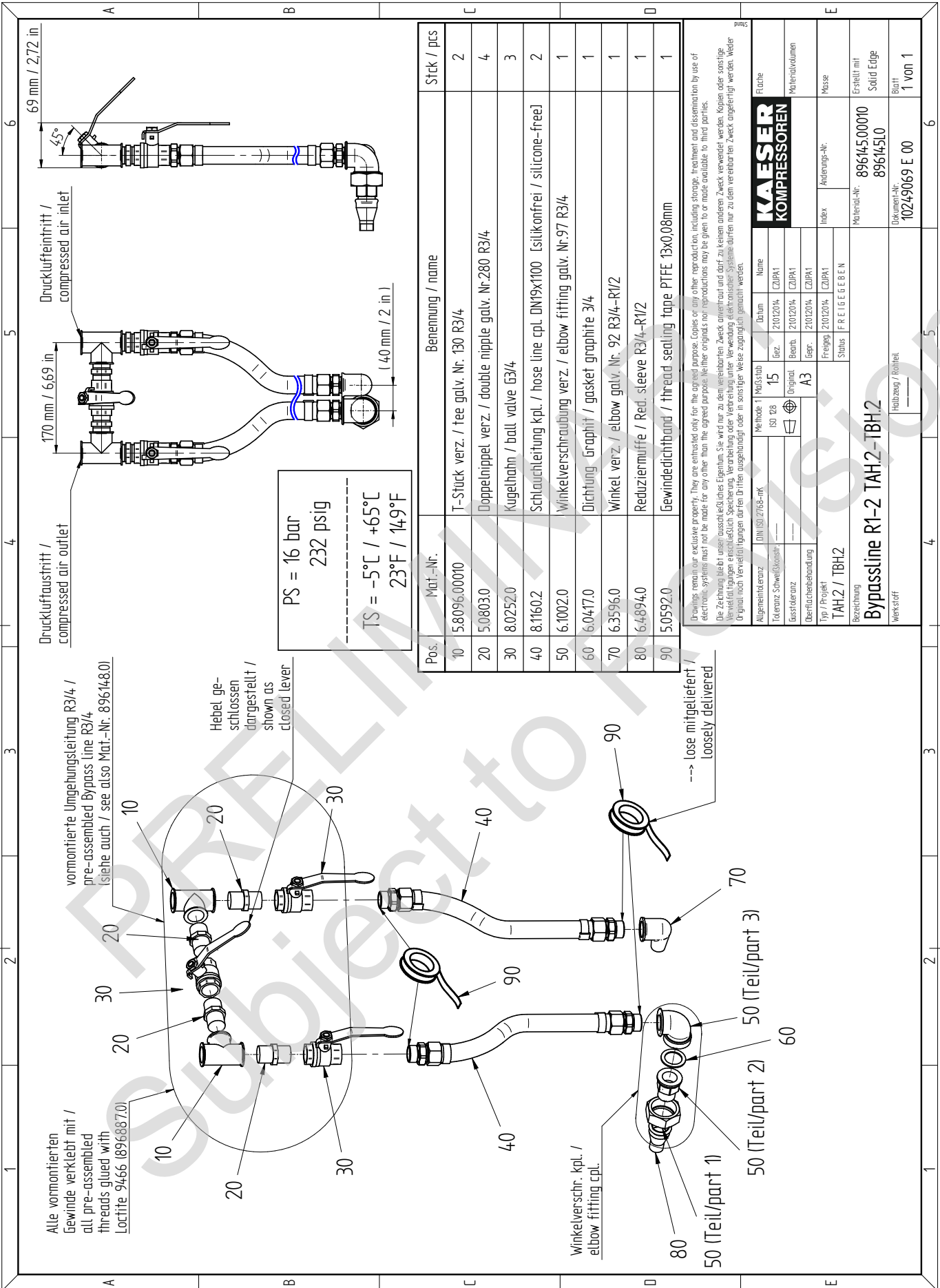
- Refrigerant and oil must be drained and disposed of by an authorized body.

PRELIMINARY
Subject to Revision

13 Annex

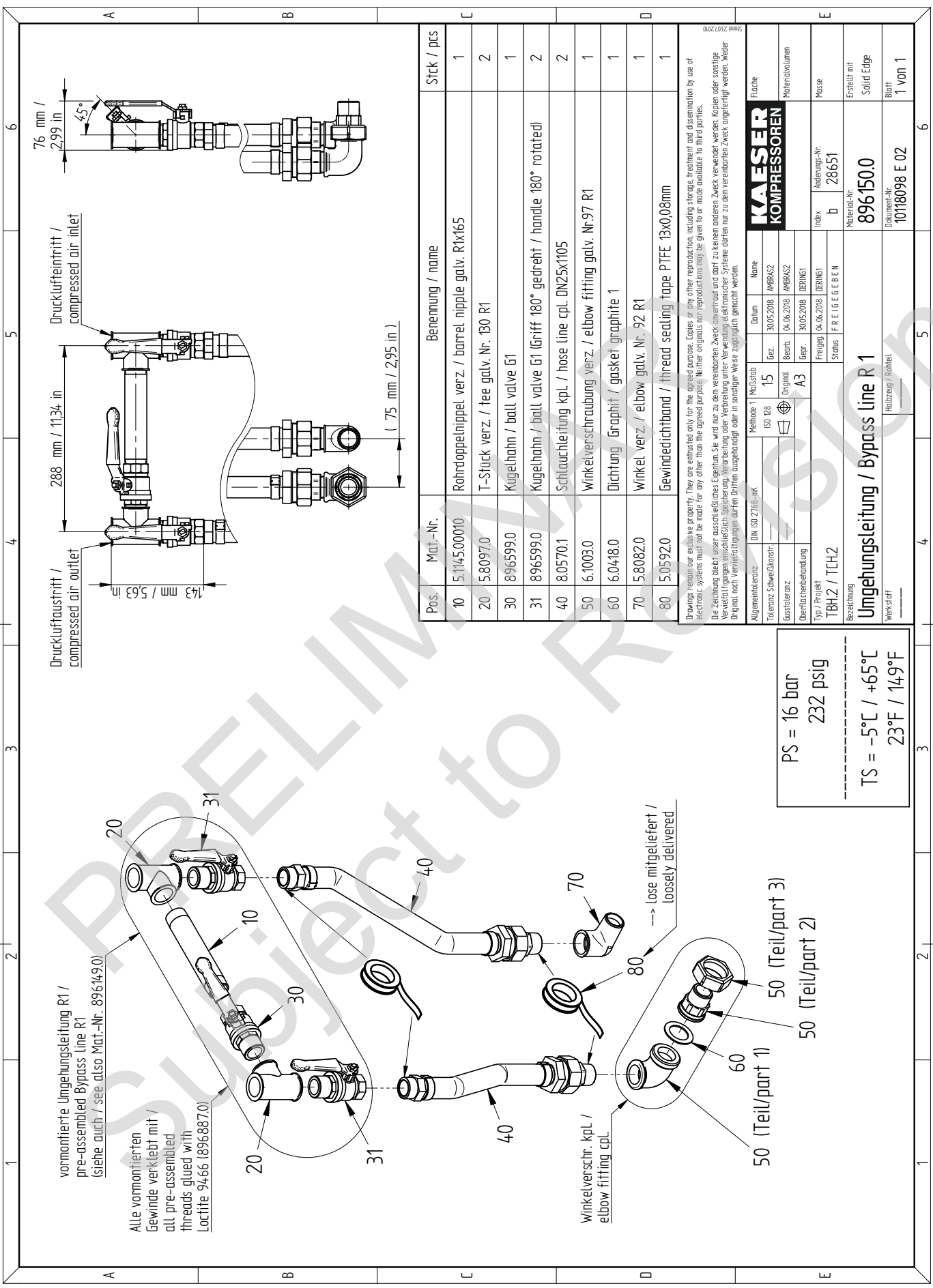
13.1 Dimensional drawing

PRELIMINARY
Subject to Revision



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Algemeinteilenummer	DN100/2768-mk	Methode	1 Maßstab	Name	Fläche
Toleranz Schweißkonstr.	15	ISO 228	15	Gez.	210/204, CZ/PK1
Übersicht	Original	Gez.	210/204, CZ/PK1	Beih.	210/204, CZ/PK1
Oberflächenbehandlung	A3	Gez.	210/204, CZ/PK1	Freiges.	210/204, CZ/PK1
Typ / Produkt	TAH.2 / TBH.2	Status	FR E I G E B E N	Material-Nr.	89614500010
Bezeichnung	Bypassline R1-2 TAH2-TBH.2	Material-Nr.	896145L0	Erstellt mit	Solid Edge
Werkstoff	Halbzug / Rohteil	Blatt	1 von 1	Material-Nr.	10249069 E 00



Druckluftausstritt / compressed air outlet
288 mm / 11.34 in.
143 mm / 5.63 in.

Drucklufteintritt / compressed air inlet
76 mm / 2.99 in.
45°

vormontierte Umgehungsleitung R1 / pre-assembled Bypass line R1 (siehe auch / see also Mat.-Nr. 896/49.0)

Alle vormontierten Gewinde verklebt mit / all pre-assembled threads glued with Loctite 94-66 (896/887.0)

Winkelversch. kpl. / elbow fitting cpl.

loose mitgeliefert / loosely delivered

50 (Teil/part 1)
50 (Teil/part 2)
50 (Teil/part 3)

Pos.	Mat.-Nr.	Benennung / name	Stück / pcs
10	5.1145.00010	Rohrdoppelnippel verz. / barrel nipple galv. R1x165	1
20	5.8097.0	T-Stück verz. / tee galv. Nr. 130 R1	2
30	8.96599.0	Kugelhahn / ball valve G1	1
31	8.96599.0	Kugelhahn / ball valve G1 (Griff 180° gedreht / handle 180° rotated)	2
40	8.0570.1	Schlauchleitung kpl. / hose line cpl. DN25x105	2
50	6.1003.0	Winkelverschraubung verz. / elbow fitting galv. Nr.97 R1	1
60	6.0418.0	Dichtung Graphit / gasket graphite 1	1
70	5.8082.0	Winkel verz. / elbow galv. Nr. 92 R1	1
80	5.0592.0	Gewindedichtband / thread sealing tape PTFE 13x0,08mm	1

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Allgemeinbezeichnung: DIN ISO 2768-mK		Methode 1 Maßstab		Name	
Toleranz Schweißkonstr.:	ISO 228	15	30.05.2018	AM86ASZ	Fläche
Erstentwurf:	Digital	Beinh.	04.06.2018	AM86ASZ	Materialnummern
Oberflächenbehandlung:	A3	Gepr.	30.05.2018	BERING1	Index
Typ / Projekt:	TBH.2 / TCH.2	Freigez.	04.06.2018	BERING1	Material-Nr.
Bezeichnung:	Umgehungsleitung / Bypass line R 1	Status:	F R E I G E B E N		
Werkstoff:	Halbzweig / Rohreit	Material-Nr.	896/1500		
		Dokument-Nr.	1018098 E 02		
		Blatt	1 von 1		

PS = 16 bar
232 psig

TS = -5°C / +65°C
23°F / 149°F

13.2 Pipeline and instrument flow diagram (P+I diagram)

PRELIMINARY
Subject to Revision

13.3 Electrical Diagram

PRELIMINARY
Subject to Revision

1	2	3	4	5	6	7	8	
<p style="text-align: center;">Wiring Diagram refrigeration dryer series TBH</p> <p>Power supply: 230V ±10% 60Hz, 1ph, solidly grounded midpoint of phase 115V ±10% 60Hz, 1ph, solidly grounded end of phase</p> <p style="text-align: right;">manufacturer: KAESER COMPRESSORS 96450 COBURG GERMANY</p>								
<p>ATTENTION !!! 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>								
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c	Datum	05.10.2016	USE	cover page				=
b	Bearbeiter	Sitter		refrigeration dryer series TBH				+
a	Geprüft	Gegner						1
A	Änderung	Datum	Name	Ersatz für:				1 Bl.
				Ersatz für:				DTBH-U3010.01

1	2	3	4	5	6	7	8	
<p>general instructions</p> <p>ATTENTION !!! Install supplies, grounding and shock protection to local safety regulations.</p>								
<p>option C36 = warning pressure dew point</p> <p>option K5 = condensate drain</p> <p>option K6 = condensate drain, volt-free contact</p>								
<p>-B30 safety air pressure switch (Pressure limiter)</p> <p>-B39 temperature switch</p> <p>-K33 condensate drain</p> <p>-M30 Refrigerant compressor with overload protection</p> <p>-M31 vent motor with overload protection</p> <p>-Q0 manual motor controller</p>								
c	Datum	05.10.2016	general instructions					=
b	Bearbeiter	Sitter	refrigeration dryer series TBH					+
a	Geprüft	Gegner	UTBH-U3010.01					1
C.Änderung	Datum	Name	Ersatz für:					1 Bl.

