Service manual

Booster

N 253–G

Number: 9_5862_01 USE

Original instructions
/KKW/PN253 1.00 en 01 SBA-NV-AGGREGAT

KAESER COMPRESSORS

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1 Regarding this Document

1.1 Using the Document

The service manual is part of the machine.

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

1.2 Further documents

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

- certificate of acceptance / operating instructions for compressed air aftercooler,
- manufacturer's declaration / declaration of conformity in accordance with applicable directives.

Missing documents can be requested from KAESER.

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

1.3 Copyright

1.4 Symbols and markings

1.4.1 Warning notices

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

- DANGER
- WARNING
- CAUTION

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

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

➢ Always read and comply with warning instructions.

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

Tab. 1 The levels of danger and their meaning

1.4.2 Other notices and symbols

This symbol refers to particularly important information.

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

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

Option H1 ➢ This symbol is placed by lists of actions comprising one stage of a task. In lists of actions with several stages the sequence of actions is numbered.
This symbol is placed by lists of actions comprising one stage of a task.
In lists of actions with several stages the sequence of actions is numbered. Information that refers to only one option is marked with an indicator (e.g.: H1 means that this section is only valid for machines with adjustable machine feet).

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

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

Further information Here, your attention is drawn to further topics.

2 Technical Data

2.1 Nameplate

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

➢ Enter the data from the nameplate here as a reference.

Feature	Value
Model	
Part no.	
Year	
Serial no.	
Initial press.: psig	
Displ.: psig	
MWP: psig	
Voltage	
Hz/RPM	
Package FLA	
Phase	
HP	
Drive Motor FLA	
FOR SERVICE, REFER TO EQUIPMENT NUMBER	

Tab. 2 Nameplate

2.2 Weight

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

Typ	Weight [lb]
N 253–G	628/1047*
* Machine with sound enclosure	

Tab. 3 Machine weights

2.3 Compressor block

Typ		N 253			
Inlet pressure [psig]		75	110	145	190

Typ		N 253			
Capacity [cfm] at various discharge pressure [psig]	145	45.9	68.9	—	—
	215	43.4	61.4	88.3	—
	290	40.6	55.4	85.1	112.3
	360	37.1	51.2	81.2	107.0
	435	—	50.1	78.0	101.4
	500	—	49.8	75.2	100.3
	580	—	—	72.4	99.6
	650	—	—	68.2	96.1
Number of cylinders	2				

Tab. 4 Compressor block specification

2.4 Ambient conditions

Typ		N 253–G			
Cooling medium for the aftercooler	Air-cooled				
Permissible ambient temperature** [°F]	35-105				
Maximum elevation [ft.]	3000				
Inlet pressure [psig]		75	110	145	190
ΔT compressed air [K] / ambient at final pressure [psig] and inlet temperature 10K above permissible ambient temperature.	145	4	6	—	—
	215	4	6	9	—
	290	4	6	11	19
	360	4	6	12	21
	435	—	6	13	22
	500	—	6	13	22
	580	—	—	14	22
	650	—	—	14	22
Cooling air requirement [cfm] at ΔT 10K	1324(10.0hp) 1942(15.0hp)				

* Higher elevation permissible only after consultation with the manufacturer

** The permissible duty cycle of the machine must be reviewed by the manufacturer for higher ambient temperatures (see chapter 2.10).

Tab. 5 Ambient conditions

2.4.1 Ventilation apertures

Typ	Ventilation apertures (Z) [sq.ft]
N 253–G	10.75

Tab. 6 Ventilation apertures

2.5 Pressure

Maximum working pressure: see nameplate

Maximum working pressure [psig]	Safety relief valve blow-off setting [psig]
145	160
215	290
290	233
360	406
435	479
500	551
580	638
650	696

Tab. 7 Aftercooler safety relief valve blow off pressures

Maximum working pressure [psig]	Safety relief valve blow-off setting [psig]
145–650	232

Tab. 8 Venting line relief valve blow off pressures

Further information See chapter 13.4 for safety relief valve data.

2.6 Sound pressure level

Operational state

- Operating mode LOAD at rated speed, rated air flow and nominal pressure.

Measurement conditions

- Free-field measurement to CAGI/PNEUROP PN8 NTC 2.3
- Measurement distance: 1 m

Model	Sound pressure level [dB(A)]	Sound pressure level with enclosure [dB(A)]
N 253–G	76	66

Tab. 9 Sound pressure level

2.7 Motor and power

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

Typ		N 253–G			
Inlet pressure [psig]		75	110	145	190
Rated motor power / motor shaft power [hp] at final pressure [psig]	145	10.0 / 3.5	10.0 / 3.6	—	—
	215	10.0 / 4.0	10.0 / 5.2	10.0 / 4.8	—
	290	10.0 / 5.0	10.0 / 6.5	10.0 / 6.4	10.0 / 5.8
	360	10.0 / 6.5	15.0 / 7.6	10.0 / 7.8	15.0 / 8.2
	435	—	15.0 / 8.5	15.0 / 8.7	15.0 / 9.2
	500	—	15.0 / 12.6	15.0 / 9.4	15.0 / 10.0
	580	—	—	15.0 / 10.2	15.0 / 11.0
	650	—	—	15.0 / 10.9	15.0 / 11.9
Rated speed [rpm] 60Hz	3600				
Enclosure protection					

Tab. 10 Motor data

Permissible motor starts

➢ Take the permissible motor starts from the table below.

Typ	N 253–G	
Rated power [hp]	10	15
Permissible motor starts [1/h]	15	15

Tab. 11 Permissible motor starts

Compressor

➢ Take the rated compressor speed from the table below.

Typ	N 253
Rated speed [rpm]	1120

Tab. 12 Compressor data

2.8 Compressor oil recommendations

The standard compressor oil is VDL 150.

For special applications FGP, S 150 or LSF 150 compressor oil is used and the machine carries a sticker indicating this.

Information on ordering compressor oil is found in chapter 11.

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

	Standard oil	Special oil		
Oil type	VDL 150	FGP	S 150	LSF 150
Description	Mineral oil	Synthetic oil	Synthetic oil	Silicone-free mineral oil
Application	Standard oil for all applications except in connection with foodstuffs.	Specifically for machines in applications where the compressed air may come into contact with foodstuff.	Special oil for machines under high operational demand	For silicone-free applications except in connection with foodstuff processing.
Maximum permissible oil change interval in operating hours/years.	1000/1*	2000/1*	2000/1*	1000/1*
Oil contained in my compressor				

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

Tab. 13 Compressor oil recommendations

2.8.1 Compressor oil charge

Typ	Total charge [qt]	Topping up volume [qt] (minimum–maximum)
N 253	1.6	0.2

Tab. 14 Compressor oil charge

2.9 Power Supply

Basic requirements

The machine is designed for an electrical supply according to National Electric Code (NEC) NEC-670, particularly NFPA 79, edition 2007, 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.

2.9.1 Power Supply Specifications

The following multi-strand copper core wires are given according to 2008 NEC 310.15, Table 310.16 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 2008 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 2008 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: 230V±10%/3/60Hz star-delta

Typ	N 253–G	
Rated power [hp]	10	15
Pre-fuse [A]	—	50
Supply	—	4xAWG10
Consumption [A]	—	39.2

Tab. 15 Rated power supply: 230V/3/60Hz star-delta

Rated power supply: 460V±10%/3/60Hz star-delta

Typ	N 253–G	
Rated power [hp]	10	15
Pre-fuse [A]	—	25
Supply	—	4xAWG10
Consumption [A]	—	19.6

Tab. 16 Rated power supply: 460V/3/60Hz star-delta

Rated power supply: 380V±10%/3/60Hz star-delta

Typ	N 253–G	
Rated power [hp]	10	15
Pre-fuse [A]	—	35
Supply	—	4xAWG8
Consumption [A]	—	23.8

Tab. 17 Rated power supply: 380V/3/60Hz star-delta

Rated power supply: 575V±10%/3/60Hz star-delta

Typ	N 253–G	
Rated power [hp]	10	15
Pre-fuse [A]	15	20
Supply	4xAWG14	4xAWG12
Consumption [A]	10.0	15.5

Tab. 18 Rated power supply: 575V/3/60Hz star-delta

Rated power supply: 230V±10%/3/60Hz direct-online-starting

Typ	N 253–G	
Rated power [hp]	10	15

Typ	N 253–G	
Pre-fuse [A]	—	60
Supply	—	4xAWG4
Consumption [A]	—	39.2

Tab. 19 Rated power supply: 230V/3/60Hz direct-online-starting

Rated power supply: 460V±10%/3/60Hz direct-online-starting

Typ	N 253–G	
Rated power [hp]	10	15
Pre-fuse [A]	—	30
Supply	—	4xAWG10
Consumption [A]	—	19.2

Tab. 20 Rated power supply: 460V/3/60Hz direct-online-starting

2.10 Machine duty cycle

The permissible duty cycle of the machine is related to compression ratio (final pressure P2 absolute / inlet pressure P1 absolute), ambient temperature and the compressed air inlet temperature.

Maximum compression ratio 4.5:1

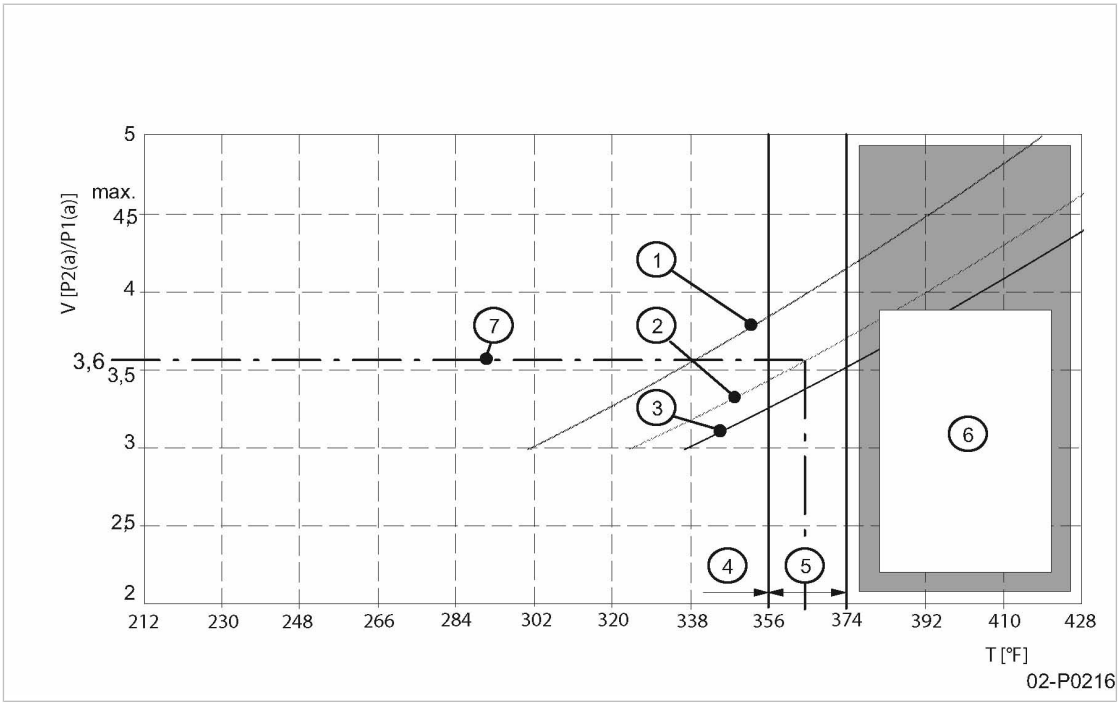


Fig. 1 Machine duty cycle

Ⓥ Compression ratio
Ⓣ Temperature
① Ambient temperature 86 °F, inlet temperature 95 °F
② Ambient temperature 104 °F, inlet temperature 113 °F
③ Ambient temperature 113 °F, inlet temperature 122 °F
④ Duty cycle up to 100 %
⑤ Duty cycle up to 80 %
⑥ prohibited zone
⑦ Example (inlet pressure 174 psig, discharge pressure 653 psig)

Duty cycle = the proportion of time on load to the total duration of an operating cycle.

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

Example:
Inlet pressure: 174 psig
Discharge pressure: 653 psig
Compression ratio: 667 psi(a) / 189 psi(a) = 3.6
Ambient temperature: 104 °F, inlet temperature: 113 °F

$$\frac{24 \text{ minutes}}{30 \text{ minutes}} \times 100 \text{ \%} = 80 \text{ \%}$$

3 Safety and Responsibility

3.1 Basic Information

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

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

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

➢ Use this machine only if it is in a technically perfect condition and only for the purpose for which it is intended; observe all safety measures and the instructions in the service manual.

➢ Immediately rectify (have rectified) any faults that could be detrimental to safety.

3.2 Specified Use

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

➢ Keep to the specifications listed in this service manual.

➢ Operate the machine only within its performance limits and under the permitted ambient conditions.

➢ Do not use compressed air for breathing purposes unless it is specifically treated.

➢ Do not use compressed for any application that will bring it into direct contact with food products unless it is specifically treated.

3.3 Improper Use

➢ Never direct compressed air at persons or animals.

➢ Use hot cooling air for heating purposes only if there is no risk to the health of humans or animals. If necessary, hot cooling air should be treated by suitable means.

➢ Do not allow the machine to breath in toxic, acidic, flammable of explosive gases or 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.

➢ 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.

Authorized installation and maintenance personnel have the following qualifications:

- are of legal age,
- have read, are familiar with and adhere to the safety instructions and sections of the service manual applicable to installation and maintenance,
- are fully familiar 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.

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

3.4.3 Adhere to Inspection Schedules and Accident Prevention Regulations.

The machine is subject to local inspection schedules.

➢ Ensure that local inspection schedules are adhered to.

3.5 Dangers

Basic Information

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

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

Warning instructions are found before a potentially dangerous task.

3.5.1 Safely dealing with sources of danger

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

Electricity

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

Forces of compression

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

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

Compressed air quality

- ➢ Never directly inhale compressed air.
- ➢ Use appropriate systems for air treatment before using the compressed air from this machine as breathing air and/or for the processing of food products.
- ➢ Use food-grade cooling oil whenever compressed air is to come into contact with food products.

Spring force

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

Solenoid valves and inlet valves are powerfully spring-loaded.

- ➢ Do not open or dismantle valves.

Rotating components

Touching the fan while or the belt drive 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 check that no voltage is present.
- ➢ Wear close-fitting clothes and a hair net if necessary.
- ➢ Make sure all covers and safety guards are in place and secured before starting.

Temperature

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

Noise

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

Operating materials

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

Unsuitable spare parts

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

Conversion or modification of the machine

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

Extending or modifying the compressor station

- ➢ If a compressor station is to be extended or changed,
  check the blow-off capacity of the safety relief valves on air receivers and compressed air lines before installing the new machines.
- ➢ Safety relief valves of insufficient blow off capacity
  must be replaced by valves with a higher capacity.

3.5.2 Safe machine operation

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

Transport

- ➢ Use suitable lifting gear that conforms to local safety regulations.

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

Installation

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

Decommissioning, storage, disposal

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

3.5.3 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 areas dangerous to personnel.

Only authorized personnel may enter these areas.

Function	Danger area	Authorized personnel
Transporting	10 ft perimeter around the machine	Installation personnel for transporting preparation. No personnel during transporting.
	Beneath the lifted machine.	No personnel!
Installation	Within the machine. Within 3 ft radius of the machine and its power supply cables.	Installation personnel

Function	Danger area	Authorized personnel
Operation	Within a 3 ft radius of the machine.	Operating personnel
Maintenance	Within the machine. Within a 3 ft radius of the machine.	Maintenance personnel

Tab. 21 Danger areas

3.6 Safety Devices

Various safety devices ensure safe working with the machine.

- ➢ Do not change, bypass or disable safety devices.
- ➢ Check safety devices for correct function regularly.
- ➢ Do not remove or damage labels and notices.
- ➢ Ensure that labels and notices are clearly legible.

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

3.7 Safety signs

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

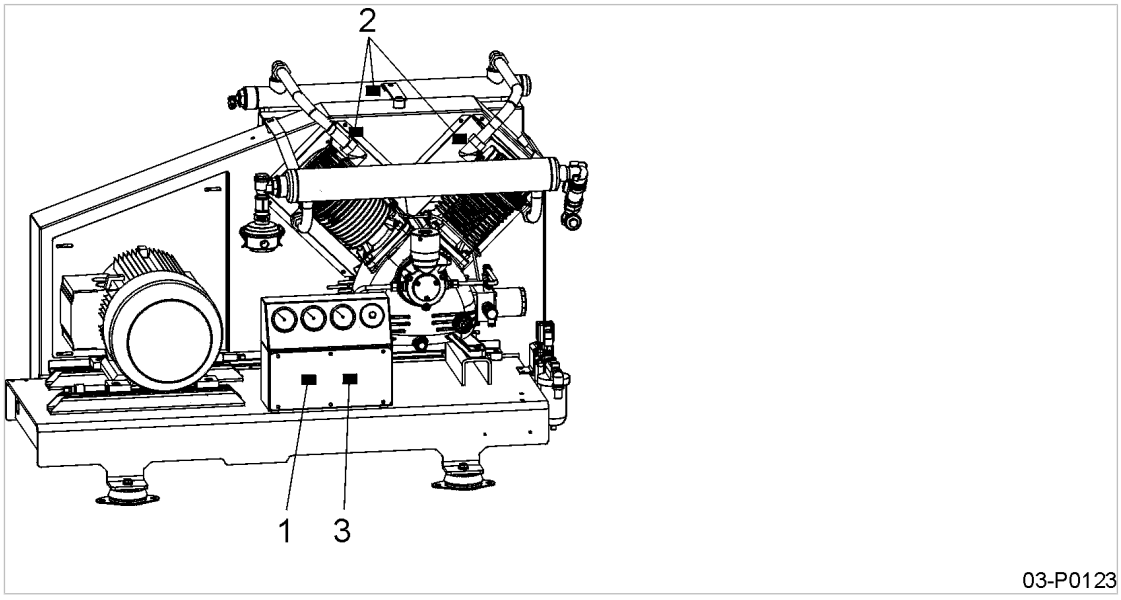


Fig. 2 Location of safety signs

Item	Sign	Meaning
1		Danger of fatal injury from electric shock! ➢ Before beginning any work on electrical equipment: Switch off the mains disconnecting device, lock it in the off position and check that the machine is free of voltage.

Item	Sign	Meaning
2		Hot surface! Risk of burns caused by contact with hot components ➢ Do not touch the surface. ➢ Wear long-sleeved garments (not synthetics such as polyester) and protective gloves.
3		Risk of injury caused by an automatic machine start! ➢ Switch off and lock out the mains isolating devices and check that no voltage is present before opening any machine enclosure or guard.

Tab. 22 Safety signs

3.8 In Emergency

3.8.1 Fire fighting

Suitable extinguishing agents

- Foam
- Carbon dioxide
- Sand or dirt

Unsuitable or unsafe extinguishing agents

- Strong jet of water

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

3.8.2 Remove any compressor oil from your person.

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

➢ Skin contact
Wash off immediately.

3.9 Warranty

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

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

In addition, we accept no warranty obligation for:

- the use of unsuitable parts or operating materials,
- 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 Environmental Protection

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

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

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

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

4 Design and Function

4.1 Outline of the machine

4.1.1 Main components

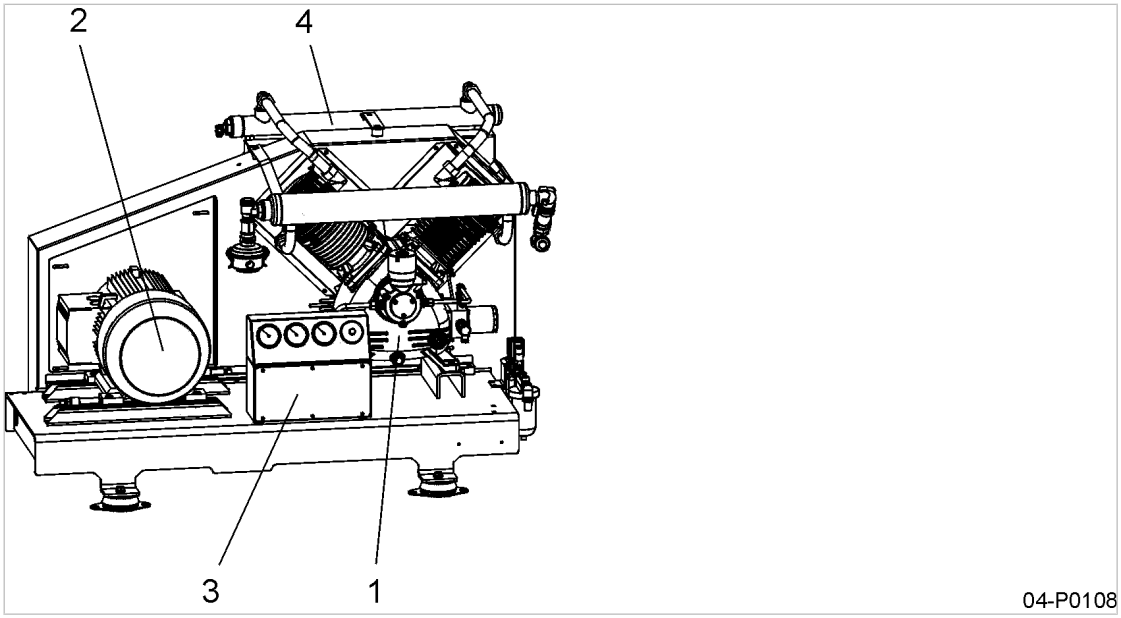


Fig. 3 Major components

1 Compressor block
2 Drive motor
3 Terminal box
4 Compressed air after-cooler

4.1.2 Machine function

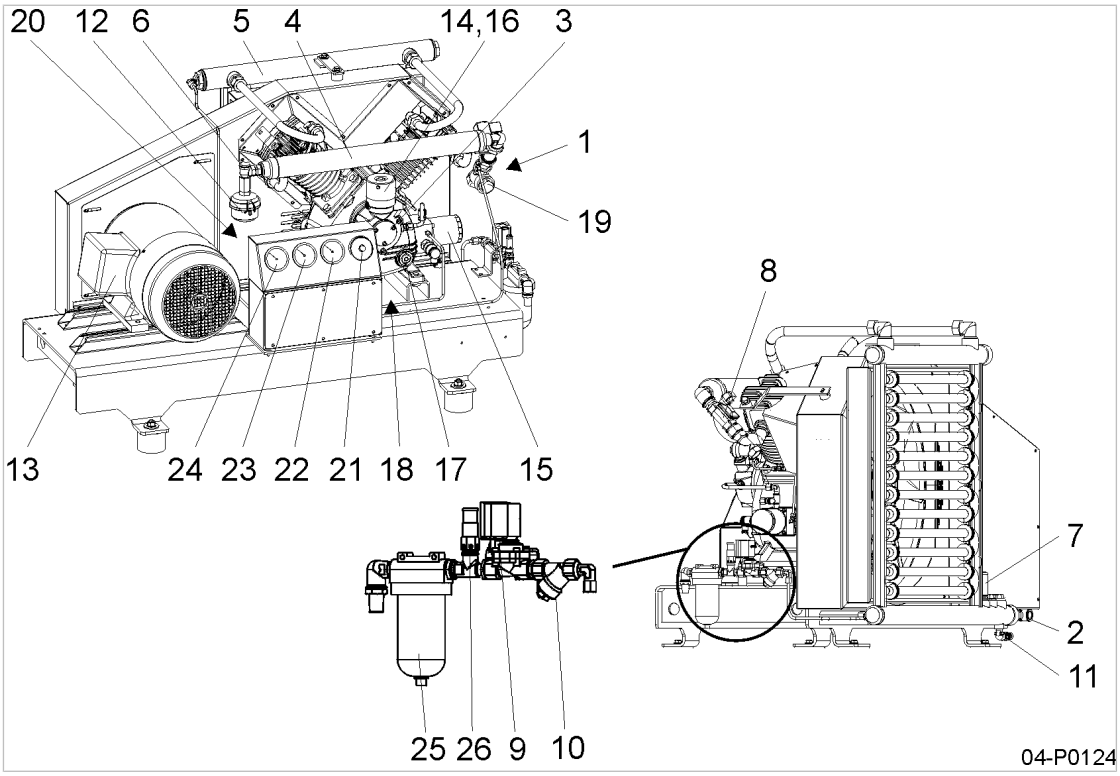


Fig. 4 Machine layout

1 Low-pressure compressed air inlet
2 High-pressure compressed air outlet
3 Compressor block
4 Collector pipe
5 Compressed air after-cooler
6 Check valve
7 Safety relief valve
8 Solenoid valve on the compressed air inlet.
9 Solenoid valve for venting
10 Dirt trap in the venting line.
11 Condensate drainage
12 Air filter
13 Electric motor
14 Crankcase vent with oil filter
15 Oil filter in the crankcase
16 Oil filler port
17 Oil level sight glass
18 Oil drain plug
19 Dirt trap on the compressed air inlet.
20 Dirt trap in the oil circulation
21 Temperature gauge switch (compressed air outlet temperature)
22 Oil pressure gauge
23 Initial pressure gauge
24 Final pressure gauge
25 Filter
26 Safety relief valve

Machine

Air from a low-pressure compressed air network is drawn through the inlet port and collecting pipe into the machine's compression chamber. It is drawn in through the valve plate in the cylinder head during the downward travel of the piston from the top dead centre to the bottom dead centre positions. The air drawn into the compression chamber is compressed by the piston's upward stroke. When the pressure in the chamber exceeds that in the exhaust port, the exhaust valve opens.

The compressed air passes through the aftercooler to the compressed air outlet.

4.1.3 Brief description of function

The compressor block is driven by an electric motor via V-belts.

The block has two cylinders.

The belt pulley on the compressor crankshaft also serves as a fan to blow a stream of cooling air over the machine. Cooling fins on the cylinder and cylinder head dissipate heat.

Two solenoid venting valves are installed to allow an unloaded compressor start.

- A solenoid valve (closed when de-energized) prevents the flow of low pressure air into the machine during standstill.
- A second valve (open when de-energized) vents pressure in the pipe between the machine outlet and the user's check valve during STANDSTILL.

Points needing lubrication are supplied by an oil pump. In a parallel circuit oil is pumped through a filter and returned to the crankcase. A pressure switch shuts down the machine if the oil pressure is too low.

A pressure switch ensures that the compressor only runs within the permitted inlet pressure range.

A filter is installed in the venting line. Controlled by a solenoid valve (open when de-energized), accumulating liquid (condensate and dirt) is trapped in the filter bowl. A safety relief valve is installed to protect the filter.

4.2 Operating modes and control modes

4.2.1 Operating modes

The machine operates in the following modes:

- LOAD:
  The solenoid inlet valve is open and the solenoid venting valve is closed. The airend delivers compressed air to the distribution network.
  The drive motor runs under full load.
- IDLE:
  The inlet solenoid valve is closed. The check valve isolates the machine from the compressed air network. The aftercooler vents via the solenoid venting valve.
  A small volume of air circulates from the air filter on the inlet collector pipe into the compressor block and through the solenoid venting valve back to the atmosphere.
  The compressor motor runs without load and draws little current.
- STANDSTILL:
  The inlet solenoid valve is closed. The check valve isolates the machine from the compressed air network. The aftercooler is vented by the solenoid venting valve.
  The drive motor is stopped.

4.2.2 Controller

Using the selected control mode, the controller switches the compressor between its various operational states in order to maintain system pressure between the set minimum and maximum values.

4.3 Safety devices

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

Safety relief valve

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

Enclosures and covers

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

4.3.1 Safety and regulating devices

The following safety and regulating devices are to be installed by the user.

Safety relief valve

The safety relief valve protects the user's air receiver against excessive pressure.

Check valve

The sizing of the check valve is dependent on the maximum working pressure and the cross-section of the connection between the compressor and the air network.

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

Install the check valve between the compressed air outlet and the user's shut off valve.

Provide means of venting in the pipeline between the machine and the check valve and between the check valve and the user's shut-off valve.

Pressure switch

A pressure switch must be provided that controls the compressor within permitted pressure limits and regulates system pressure in the network.

- Cut out: at the latest when the maximum working pressure is reached.
- Cut in: at a pressure related to the compressor's permissible duty cycle.

Pressure gauge

The pressure gauge monitors the pressure in the user's air receiver.
The gauge should be chosen according to the maximum working pressure.

Motor protection

The motor protection device shuts down the machine:

- in the case of a phase drop-out overload,
- if the ambient temperature becomes too high,
- if the compressor block seizes
- if the power supply voltage fluctuates outside limits.

Three-phase motors may only be used with a correctly set motor protection switch or overload contactor.
Operation **without** a protection device invalidates the warranty.

Pressure switch monitoring inlet pressure

Monitoring of inlet pressure is mandatory.
Install an inlet pressure switch to ensure safe operation of the compressor.

Possible installation locations for the initial pressure switch are:

- in a sufficiently large suction line,
- in the upstream air receiver

Safety signs

The machine has been delivered with all necessary safety signs.
After installation in a system, the user is obliged to add any necessary system-related safety signs.

4.3.2 Installation example

Example of safety devices installed by the user.

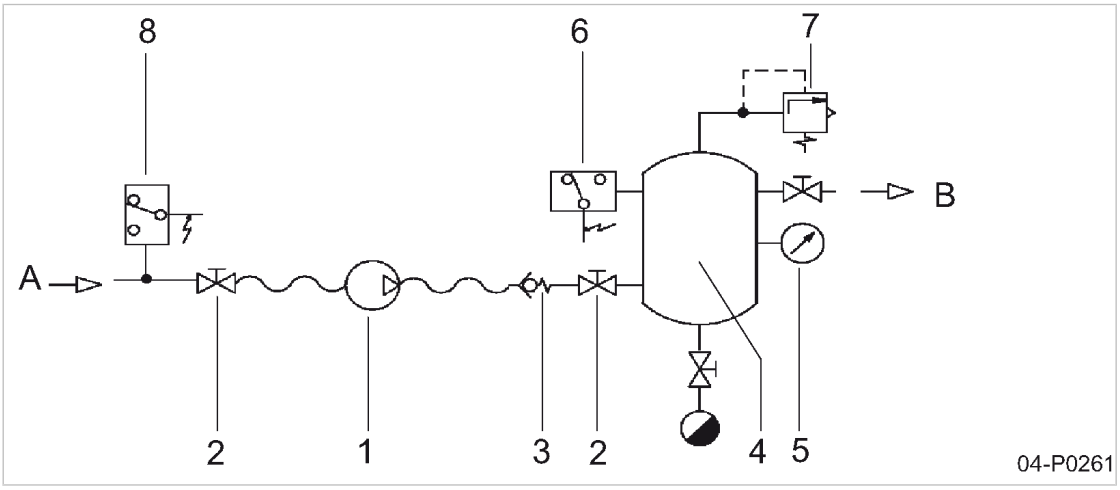


Fig. 5 Installation example

A	Connection to the low-pressure network	4	Air receiver
B	Connection to the high pressure network	5	Pressure gauge
1	Machine	6	Pressure switch
2	Shut-off valve (must be open when the machine is operating)	7	Safety relief valve
3	Check valve	8	Pressure switch monitoring inlet pressure

4.4 Accessories

To reduce the machine's noise emission, it can be retrospectively fitted with a sound enclosure.

Further information Instructions on installation of a sound enclosure can be found in chapter 6.7.

5 Installation and Operating Conditions

5.1 Safety

- ➢ Strictly forbid fire, open flame and smoking.
- ➢ If welding is carried out on or near the machine, take adequate measures to prevent sparks or heat from igniting oil vapors or parts of the machine.
- ➢ The machine is not explosion protected.
  Do not operate in areas in which specific requirements regarding explosion protection are in force.
- ➢ Ensure that required ambient conditions are maintained with regard to:
  - Ambient temperature and humidity
  - Clean compressed inlet air from the low pressure network with no damaging contaminants
  - Compressed inlet air from the low-pressure network free of explosive or chemically unstable gases and vapors
  - Compressed inlet air from the low-pressure network free of acid/alkaline forming substances, particularly ammonia, chlorine or hydrogen sulfide
- ➢ Keep suitable fire extinguishing agents ready for use.

5.2 Installation conditions

5.2.1 Determining location and clearances

The clearances given are recommended and ensure unhindered access to all machine parts.

➢ Please consult KAESER if they cannot be kept to.

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

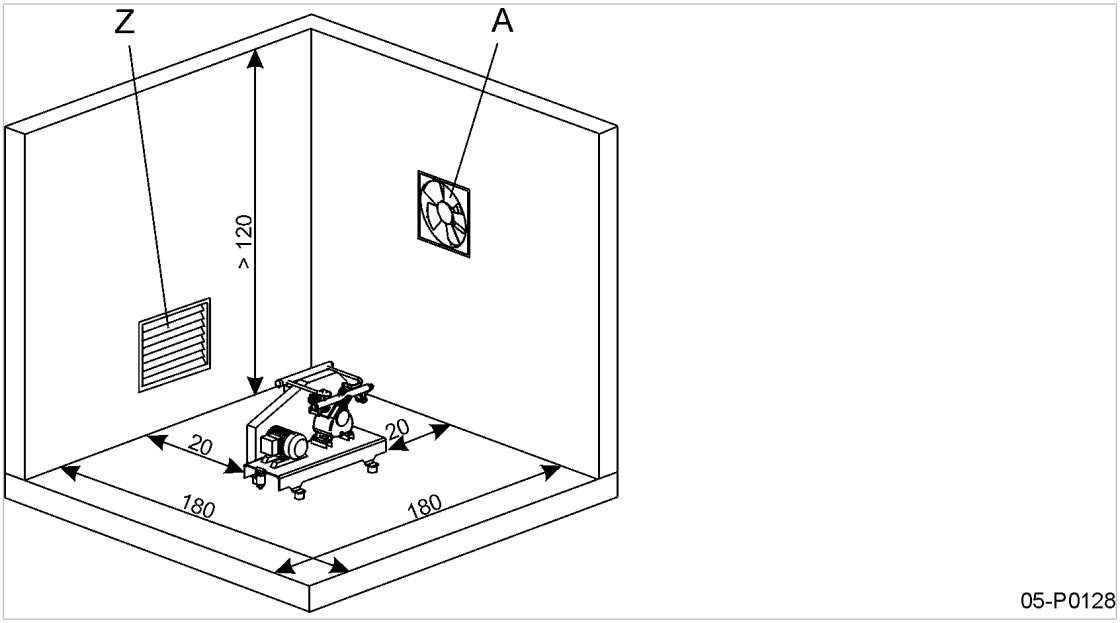


Fig. 6 Recommended machine placement and dimensions [mm]

[A] Exhaust fan
[Z] Inlet air aperture

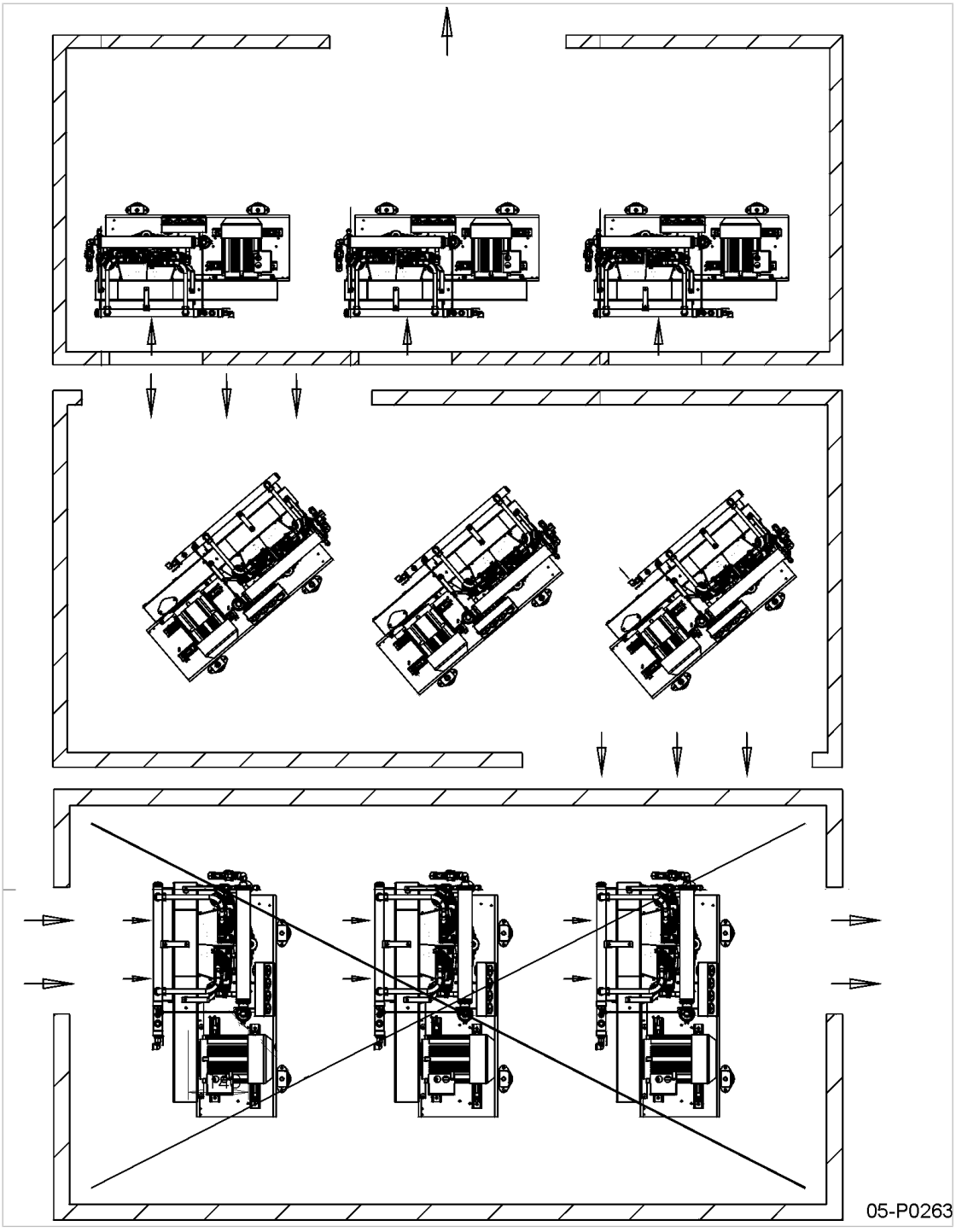


Fig. 7 Installation recommendations with other machines

CAUTION
Ambient temperature too low.
The reduced lubrication properties of oil that is too viscous can result in damage when starting the machine.

- ➢ Make sure that the temperature of the machine is at least +35°F before starting.
- ➢ Make sure the compressor room is adequately heated.

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

If the machine is installed together with other plant (compressors, refrigeration dryers, etc.), then **under no circumstances** may hot cooling air from other plant be directed to the cooling air inlet end of the compressor.
Hot air can cause damage to the machine.

5.2.2 Prevention of thermal problems

The following should be noted to prevent thermal problems:

- Make sure ventilation apertures are adequate.
- Ensure correct location of the apertures (constant airflow).
- Ensure correct machine positioning (all machines must be able to draw in cool fresh air).
- Ensure that hot exhaust air leaves the room by the shortest direct path.
- Do not exceed the permissible duty cycle.

➢ Do not hesitate to contact KAESER for advice in this respect.

5.2.3 Ensure adequate ventilation.

1. Ensure that the volume of air flowing into the compressor room is at least equivalent to that being removed by the exhaust fan.
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.

Further information See chapter 2.4.1 for ventilation aperture dimensions.

5.2.4 Operation in a compressed air network

When the machine is connected to an air network, the network working pressure must not exceed the permissible inlet and working pressures of the machine.

➢ Do not hesitate to contact KAESER for advice in this respect.

6 Installation

6.1 Safety

Here you will find instructions for safe commissioning of the machine.

Warning instructions are located before a potentially dangerous task.

Basic safety instructions

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

Working on live components

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

Working on pressure system

1. Isolate the machine from the air main by closing the user's compressed air inlet and outlet shut-off valves.
2. Vent all pressurized components and chambers completely.
3. Initial and final pressure gauges must read zero.

Working on the drive system

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

Further information

See chapter 3.4.2 regarding authorized personnel.

See chapter 3.5 regarding dangers and their avoidance.

6.2 Reporting Transport Damage

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

6.3 Fitting the antivibration mounts

CAUTION

There is a danger of tilting because of the high centre of gravity and weight of the machine.

➢ Drive a fork lift carefully under the machine and lift slightly.

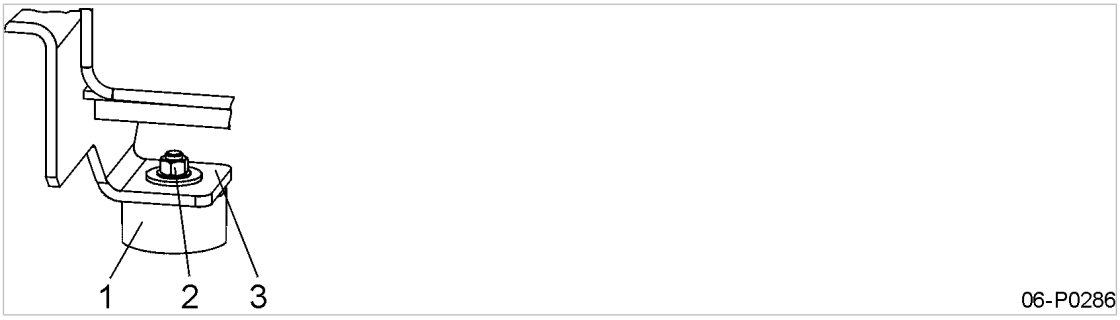


Fig. 8 Fitting the antivibration mounts

1 Antivibration mount
2 Hexagon nut
3 Base plate feet

1. Remove the wooden frame from the base plate.
2. Lift the machine
3. Secure the antivibration mounts to the base plate feet with hexagon nuts.
4. Lower the machine.

6.4 Compressed air connection

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

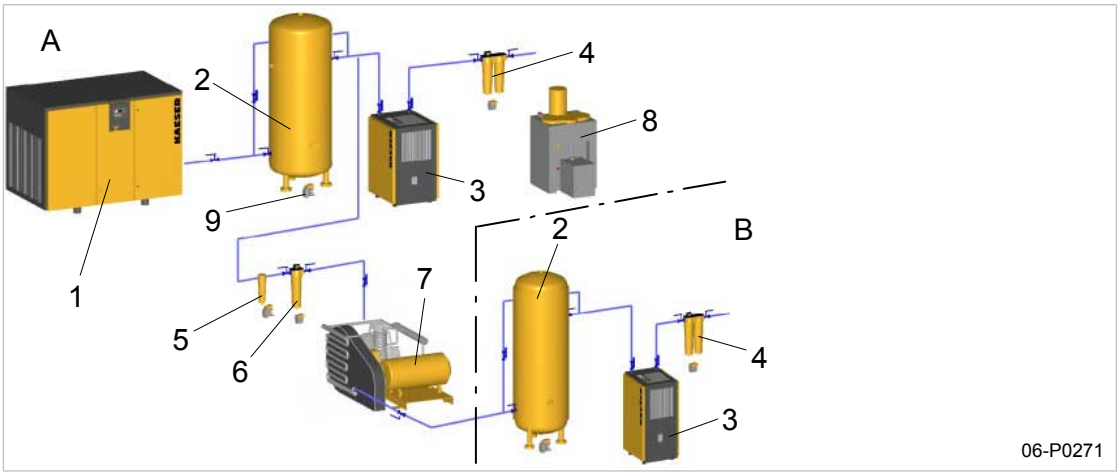


Fig. 9 Compressed air connection diagram

A Low pressure network (73- 190 psig)
B High pressure network (up to 650 psig)
1 Rotary screw compressor
2 Air receiver
3 Refrigeration dryer
4 Microfilter combination
5 Optional cyclone separator
6 Microfilter
7 Booster
8 AQUAMAT condensate treatment system
9 ECO–DRAIN condensate drain

6.4.1 Connecting to the low-pressure network

Use a swan neck pipe to connect to the low-pressure network.

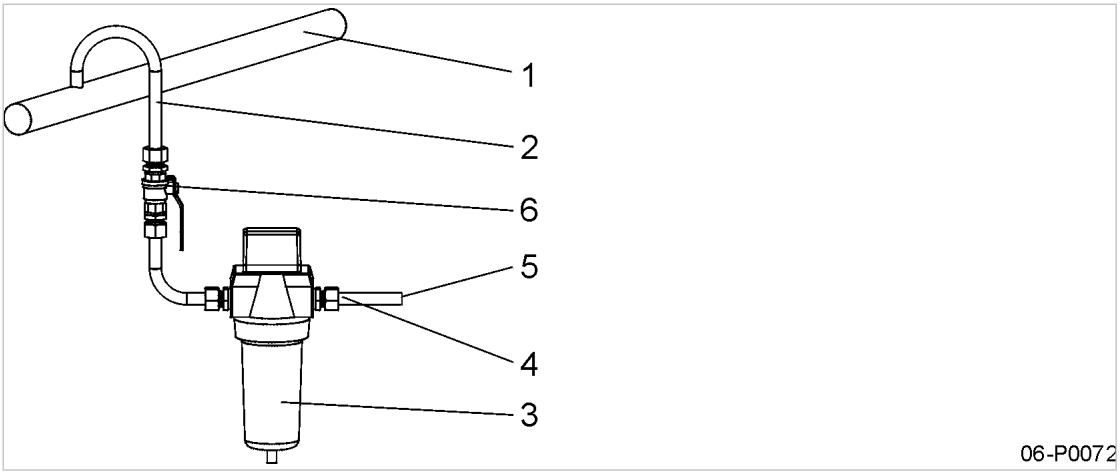


Fig. 10 Connection to the low-pressure network

1 Compressed air line
2 Low pressure network
3 Microfilter
4 Prepared hose line
5 Machine (low-pressure compressed air inlet)
6 User's shut-off valve

➢ A microfilter must be installed to ensure safe operation of the machine.

This removes condensate and dirt from the inlet air.

➢ Installing a hose connection between the microfilter and the machine.

Inlet air quality at the machine:

- Max. moisture: 100 %
- Particles: ≤ 1 µm
  The machine must run in IDLE for approximately 3 minutes before shutdown to ensure that the inlet pipe is dry (IDLE control is compulsory).

If the machine draws in dried air, a period of IDLE running is **not** essential.

6.4.2 Connecting to the high-pressure network

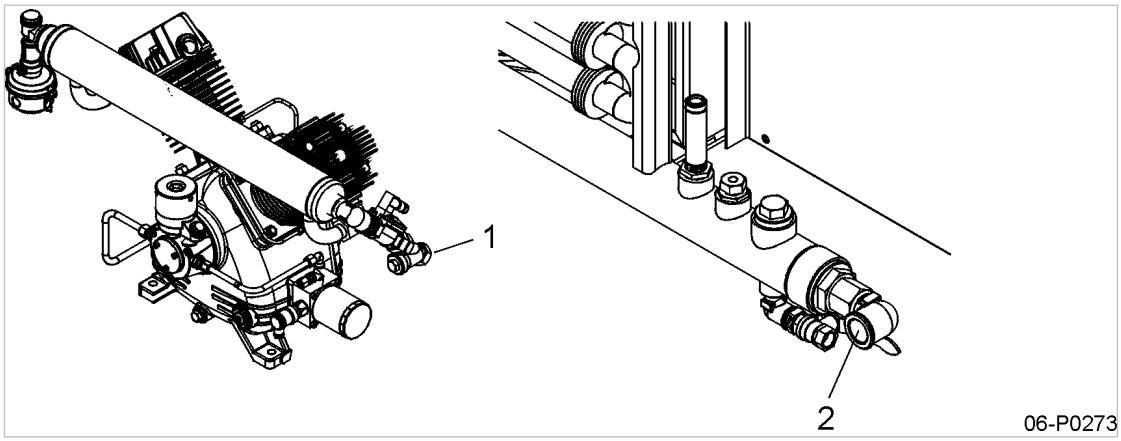


Fig. 11 Connection to the high-pressure network
[1] Machine (low-pressure compressed air inlet)
[2] Machine (high-pressure compressed air inlet)

➢ Use a hose to connect to the high-pressure network.

6.5 Connecting the power supply

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

1. Have the power supply connected only by authorized installation personnel or an authorized electrician.
2. Carry out safety measures as stipulated in relevant regulations (IEC 364, for example or DIN VDE 0100) 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. Use conductor dimensions and fuse ratings in accordance with local regulations (NEC, OSHA, for example).
5. The user must provide the machine with a lockable power supply disconnecting device. This could be, for example, a load disconnect switch with fused input. If a circuit breaker is used it must be suitable for the motor starting characteristics.

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

6. Connect the machine to the power supply. See chapter 13.3.

The electrical diagram of the controller is included with the star-delta switchgear.

6.6 Controller design

Explanation of abbreviations in the following text.

Abbreviation	Explanation
p	Pressure in the inlet line
p_{ON}	Inlet pressure switch cut-in setting (user's)
p_{OFF}	Inlet pressure switch cut-out setting (user's)
p_{min}	Air network pressure switch cut-in setting (user's)
p_{max}	Inlet pressure switch cut-out setting (user's)

Tab. 23 Pressure switch abbreviations

Use a controller designed to EN 60 204 for the connection to the power supply.

The machine is fitted with a normally closed solenoid valve in the compressed air outlet and a normally open solenoid valve in the venting line.

The following components are already wired in the terminal box fixed to the machine (see diagram in chapter 13.3).

Five cables are fed into the terminal box:

- Oil pressure switch (17.4 psi).
- Inlet pressure switch (to be installed by user).
- Solenoid valve on the compressed air inlet.
- Solenoid valve in the venting line.
- Temperature gauge switch with floating relay contacts.

One cable is fed out of the terminal box:

- Cable for oil pressure switch, inlet pressure switch (user's), solenoid valves in the air inlet and venting line.

The additional electrical components required for the controller should be designed according to the corresponding motor power.

DANGER
Danger of fatal injury from electric shock!

➢ Switch off and lock out the power supply disconnecting device and check that no voltage is present.

➢ The motor and cables from the terminal box are wired in the controller.

In such a case, the following must be noted:

- The oil pressure switch (17.4 psi) must be bridged in the motor run-up phase and must switch the machine off at an oil pressure of < 14.5 psi.
- The user's inlet pressure switch must switch the machine ON at a pressure higher than p_{ON} and to IDLE at a pressure lower than p_{OFF}.

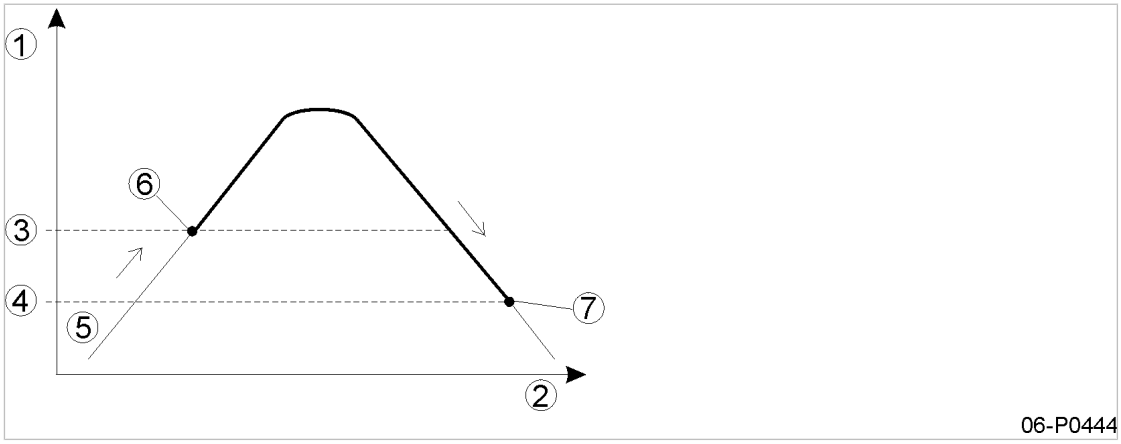


Fig. 12 Inlet pressure switch diagram

1 Inlet pressure p (bar)
2 t = time
3 p_{ON}
4 p_{OFF}
5 IDLE
6 LOAD operation possible
7 IDLE operation possible

➢ Set the user's inlet pressure switch according to operating requirements.

CAUTION

➢ The ratio of inlet to final pressure should not be higher than 1:4.5

➢ Check the relationship between inlet and final pressure.

If the pressure in the inlet pipe falls below p_{OFF} under LOAD, the user's inlet pressure switch will switch the machine to IDLE.
If, during IDLE, the inlet pressure falls below p_{OFF}, the machine will only switch to LOAD again when pressure p_{ON} is reached.

➢ Set the pressure switch according to the table below.

Initial pressure switch (installed by user)	Network pressure switch (fitted by the user)	Machine
$p > p_{ON}$	$p_{min} < p < p_{max}$	Runs up
$p > p_{OFF}$	$p < p_{max}$	Runs under LOAD
$p > p_{OFF}$	$p = p_{max}$	Switches to IDLE
$p > p_{OFF}$	$p = p_{min}$	Switches to LOAD *
$p < p_{OFF}$	$p_{min} < p < p_{max}$	Switches to IDLE *

Example of a machine with 145 psig inlet pressure and 650 psig final pressure.

p_{ON} = 145 psig

p_{OFF} = 138 psig

p_{min} = 609 psig

p_{max} = 650 psig

* It is useful to allow for these controller alarms by indicating them with a signal.

Initial pressure switch (installed by user)	Network pressure switch (fitted by the user)	Machine
$p < p_{ON}$	$p_{min} < p < p_{max}$	Remains in or switches to IDLE *

Example of a machine with 145 psig inlet pressure and 650 psig final pressure.

p_{ON} = 145 psig

p_{OFF} = 138 psig

p_{min} = 609 psig

p_{max} = 650 psig

* It is useful to allow for these controller alarms by indicating them with a signal.

Tab. 24 Pressure switch settings

6.7 Retrofitting the sound enclosure (accessory)

The sound enclosure is supplied already assembled.

➢ It must be dismantled for fitting to the machine.

6.7.1 Dismantling the sound enclosure

Note how the parts fit together.

➢ Open the snap fasteners and dismantle the enclosure.

6.7.2 Fitting the rear panel

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

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

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

The machine has cooled down.

User's shut-off valves on the compressed air inlet and outlet are closed.

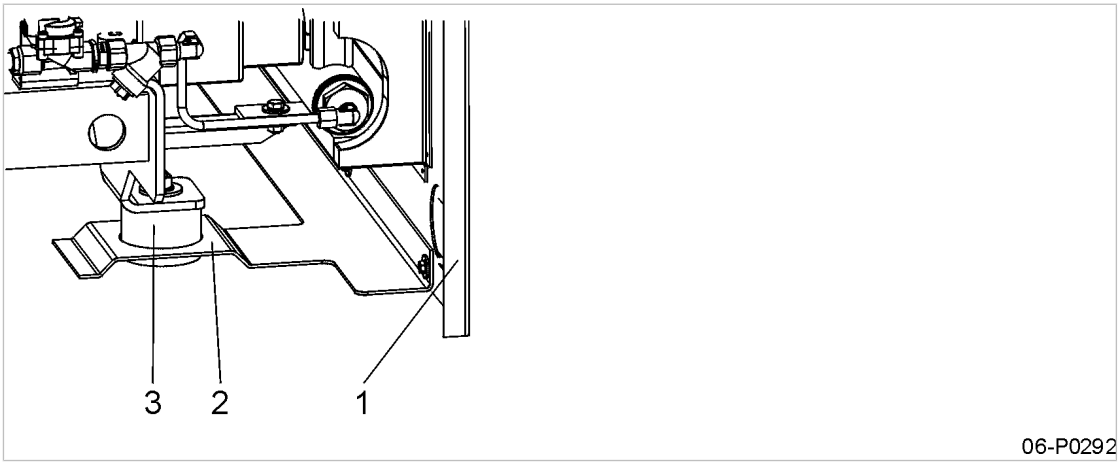


Fig. 13 Fitting the rear panel

[1] Rear panel
[2] Antivibration mount bracket
[3] Anti-vibration mount

1. Position the rear panel with the brackets for the antivibration mounts in its final machine location.
2. Use an appropriate lifting device to lift the machine onto the recesses for the antivibration mounts (fan guard to the rear).
3. Fix the rear left panel to the rear right with snap fasteners.

DANGER
Electric shock!
➢ There is a danger of fatal injury caused by contact with live components.

4. Lead the power supply cables through the rear panel and connect up according to the electrical diagrams.

6.7.2.1 Fitting the sound enclosure

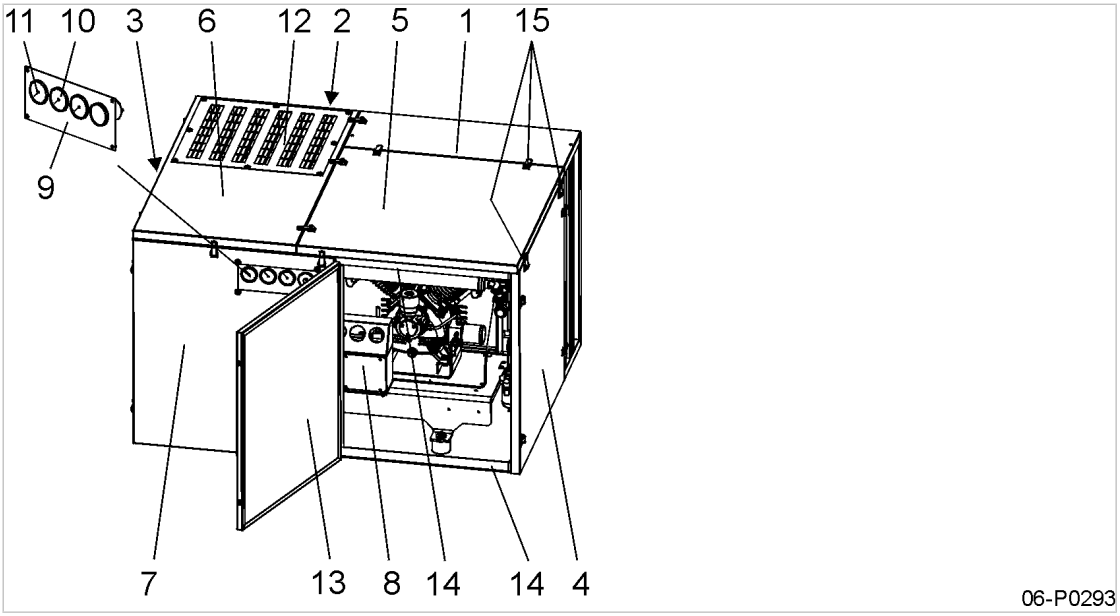


Fig. 14 Fitting the sound enclosure

1. Right rear panel with inlet duct
2. Left rear panel
3. Left side panel
4. Right side panel
5. Right cover panel
6. Left cover panel
7. Front panel
8. Terminal box
9. Instrument panel
10. Inlet pressure gauge
11. Final pressure gauge
12. Exhaust duct with axial fan
13. Door
14. Elbow
15. Snap fastener

1. Use the copper pipe to connect the high-pressure gauge (final pressure p2) on the compressed air cooler (see P & I diagram for the connection point).
2. Feed a hose through the aperture in the right rear panel and connect the machine to the low-pressure network.
3. Feed a hose through the aperture in the left rear panel and connect the machine to the high-pressure network.
4. Position the side panels to the rear panel and secure with the snap fasteners.
5. Screw the upper and lower angle strips to the side panels.
6. Place the front panel in position and fix to the side panels with snap fasteners. In addition, screw to the upper and lower angle strips.
7. Mount the control panel to the front panel and connect the inlet pressure gauge to the initial pressure switch.
8. Connect the high-pressure gauge (final pressure p2) to the copper pipe.
9. Position the left and right top panels and secure with snap fasteners.
10. Connect the exhaust dust with the axial fan and connect according to the electrical diagram.
11. Mount the door.
12. Connect the machine to an external controller.

The machine does not start?

➢ Check the axial fan plug contact.

7 Initial Start-up

7.1 Safety

Here you will find instructions for safe commissioning of the machine.

Warning instructions are located before a potentially dangerous task.

Basic safety instructions

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

Working on live components

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

Working on pressure system

1. Isolate the machine from the air main by closing the user's compressed air inlet and outlet shut-off valves.
2. Vent all pressurized components and chambers completely.
3. Initial and final pressure gauges must read zero.

Working on the drive system

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

Further information

See chapter 3.4.2 regarding authorized personnel.

See chapter 3.5 regarding dangers and their avoidance.

7.2 Instructions to be observed before commissioning or recommissioning

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

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

Special measures for start-up after storage

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

Tab. 25 Re-commissioning after storage

7.3 Checking installation and operating conditions

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

To be checked	See chapter	Confirmed?
➢ Are the operators fully familiar with safety regulations?	–	
➢ Have all the positioning conditions been fulfilled?	5	
➢ Is a user's lockable power supply disconnecting device installed?	6.5	
➢ Does the power supply conform to the specifications on the name-plate?	2.1	
➢ Are the power supply cable conductor cross-sections and fuse ratings adequate?	2.92.9.1	
➢ Have all electrical connections been checked for tightness? ➢ (The check must be repeated after 50 operating hours)	–	
➢ Have shut-off valves been installed on the inlet and outlet?	6.4	
➢ Is the connection to the air main made with a flexible hose?	6.4	
➢ V-belt tension checked? ➢ (The check must be repeated after 24 operating hours)	10.16	
➢ Is there sufficient oil in the crankcase? (with the machine switched off, the oil level should be 6 - 8 mm below the sight glass red zone)	10.6	
➢ Motor protection set correctly with regard to the power supply?	7.4	
➢ Has a check been made that no other compressed air components are located in the machine's hot exhaust air flow?	5.2.2	
➢ Are all access doors closed and latched and all removable panels in place and secured? (sound enclosure)	–	

Tab. 26 Checklist of installation conditions

7.4 Motor protection

The machine may only be used with a correctly set motor protection device.

A motor protection device that is set too high cannot properly protect the motor and may result in irreparable damage.

The motor overload protection switch is to be installed in the user's controller and set-up correspondingly.

7.4.1 Checking the motor protection device

1. Read the rated motor current from the nameplate and calculate the correct protection setting.
2. Check the motor protection setting.
3. Adjust the protection setting, if necessary.

Direct online starting	Star-delta starting
The machine starts under direct online starting. The overload protection device setting can be 10 % higher than the rated motor current to prevent it from being triggered by voltage fluctuations, temperature influences or component tolerances. 1. Switch the machine on from the external control unit. Was the machine shut down by the motor protection cut-out? ➢ Allow the motor to cool down. ➢ Switch the machine on again. See chapter 8	In the star-delta configuration the phase current is fed via the motor overload protection device. This phase current is 0.58 times the rated motor current (see motor nameplate). The overload protection device setting can be 10 % higher than the rated phase current to prevent it from being triggered by voltage fluctuations, temperature influences or component tolerances. 1. Switch the machine on from the external control unit. Was the machine shut down by the motor protection cut-out despite correct setting? ➢ Contact KAESER Service.

7.5 Checking direction of rotation

The machine is designed for a clockwise phase sequence.

1. Check the direction of phase rotation with a phase sequence meter.
2. If the direction is incorrect, reverse supply phases L1 and L2.

You have no phase sequence meter?

➢ Switch the machine on and off again the moment the drive motor begins to turn.

➢ Check the direction of rotation against the arrow on the belt guard.

➢ If the direction is incorrect, reverse L1 and L2.

7.6 Installing the inlet pressure switch

Safe operation of the machine is only guaranteed with inlet pressure monitoring.

Inlet pressure monitoring must be installed in the inlet pipe or on the air receiver upstream.

7.6.1 Permissible frequency of switching from STANDSTILL to LOAD

Limited adjustment of the switching frequency from STANDSTILL to LOAD is possible by adjusting the switching differential.

Pressure setting can only be adjusted when a pressure switch is fitted and under pressure.

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

WARNING
Compressed air!
Compressed air and devices under pressure can injure or cause death if the contained energy is released suddenly.
- ➢ 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.

➢ Change the initial pressure switch setting.

See manufacturer's specification and pressure diagram for the pressure switch setting.

Further information For maximum permissible number of switches per hour from STANDSTILL to LOAD see chapter 2.7.

7.7 Starting the machine for the first time

Precondition No personnel are working on the machine
All panels are in place and secured

1. Open the user's shut-off valves on the compressed air inlet and outlet.
2. Switch on the power supply disconnecting device.
3. Switch on the external controller.
   The machine switches to LOAD and delivers compressed air.

➢ Observe the machine during the first few hours of operation to detect any malfunction.

Carry out the following tasks after the first 50 operating hours:

- ■ Check that all electrical connections are secure.

7.8 Measuring the air receiver filling time

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

Precondition Machine at operating temperature.

1. Close the shut-off valve to the air main.
2. Switch on the power supply disconnecting device.
3. Switch on the external controller.
4. Measure the air receiver charging time.
5. Enter the charging time, the receiver size and machine model in the table.

Machine model	Air receiver size (gal)	Receiver charging time from initial pressure ..... to final pressure ..... psig [min/s].

Tab. 27 Air receiver charging time

8 Operation

8.1 Switching on and off with the external controller

Always switch the machine on and off from the external controller.

DANGER
Automatic restart!
Serious injury is possible. The machine restarts automatically when power is restored after a power cut.
The machine starts automatically when pressure in the high-pressure network falls below cut-in pressure.

➢ Make sure that no one is working on the machine.

➢ Switch the machine on and off according to the start configuration.

8.1.1 Direct online starting

Precondition
A power supply disconnecting device has been installed by the user.
No personnel are working on the machine.
All panels are in place and secured.
The machine temperature is at least +35° F.

Switching on

1. Switch on the supply disconnecting device.
2. Switch on the machine from the external controller.

If a power failure occurs, the machine is not prevented from re-starting automatically.
It can restart automatically as soon as power is restored.

The machine can start when the inlet pressure higher is than the cut-out pressure of the inlet pressure switch.

Switching off

1. Switch the machine off from the external controller.
2. Switch off and lock out the power supply disconnecting device.

8.1.2 Star-delta starting

Precondition
A power supply disconnecting device has been installed by the user.
No personnel are working on the machine.
All panels are in place and secured.
The machine temperature is at least +35° F.

Switching on

1. Switch on the power supply disconnecting device.

2. Switch on the machine from the external control unit.

If a power failure occurs, the machine is not prevented from re-starting automatically.
It can restart automatically as soon as power is restored.

The drive motor can start when the low-pressure network pressure is higher than cut-out pressure.

Switching off

1. Switch the machine off from the external controller.
2. Switch off and lock out the power supply disconnecting device.

8.1.3 Shutdown by safety devices

Shutdown caused by the oil pressure switch

➢ The machine is shut down when the oil pressure upstream of the filter is too low.

Shutdown caused by the temperature gauge switch

➢ The machine is shut down when the maximum permissible compressed air discharge temperature is exceeded.

Operating mode changed by the user's inlet pressure switch

➢ If there is insufficient inlet pressure (< p_{OFF}) the machine is switched to IDLE to prevent overheating. See chapter 6.6.

9 Fault Recognition and Rectification

9.1 Basic Information

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

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

9.2 Faults

Fault	Possible cause	Action
Machine does not start.	Fuse blown or circuit breaker tripped.	Check motor connections and fuses (circuit breakers).
	Defective contact in the user's pressure switch.	Replace pressure switch.
	Motor overload protection has tripped.	Allow the motor to cool down.
	Drive motor defective: bearing damage or windings shorted.	Call KAESER Service.
	Airend defective.	Call KAESER Service.
	Controller defective.	Call KAESER Service.
	The axial extractor fan plug-in contact is not plugged in.	Plug in the contact.
	The temperature gauge switch has shut down the machine	Reduce the ambient temperature.
The machine runs but stops after a short time.	Oil pressure switch shuts down the machine.	Replace the oil pressure switch.
	Oil pump defective.	Call KAESER Service.
The machine runs but switches to IDLE after a short time. Inlet pressure switch has tripped.	Inlet pressure too low.	Check the inlet pressure switch.
	Inlet pipe cross-section too small.	Fit larger pipe.
Machine starts with difficulty.	The solenoid valve is not opening.	Check the connection to the solenoid valve.
		Change the solenoid valve.
	Bearing damage.	Call KAESER Service.
	Piston seized due to insufficient or incorrect oil.	Call KAESER Service.
	Fault in the power supply.	Check power supply.
	Oil level too high.	Drain out some oil.

Fault	Possible cause	Action
Machine runs hot.	Ambient temperature too high.	Reduce the ambient temperature.
	Inlet pressure too low.	Check the inlet pressure switch.
	Compression ratio too high.	Reduce the compression ratio.
	Wrong direction of rotation.	Swap the L1 and L2 connections to the drive motor.
	Fan cannot draw air freely.	Ensure unrestricted flow of air to the fan.
	The sound enclosure extractor fan airflow is obstructed.	Ensure unrestricted flow of air from the extractor fan.
	Valve plate leaking air or coked.	Check or clean the valve plate.
	Outlet valve reed broken.	Replace valve plate.
Motor overload protection trips out after a short time.	Fault in the power supply.	Check power supply.
	Motor fault.	Call KAESER Service.
Motor overload protection trips out after a long time.	Current too high because of low supply voltage.	Check power supply cable conductor cross-sections. Check and tighten connection terminals.
The machine runs continuously but maximum pressure is not reached.	Valve plate leaking air or coked.	Check or clean the valve plate.
	Outlet valve reed broken.	Replace valve plate.
	Machine leaks air.	Seal leak or replace leaking part.
	Leakage from an air consumer connected to the air system.	Check possible leakage points.
	The air demand is greater than the machine's air delivery capacity.	Increase the inlet pressure within permissible limits or install a larger machine.
	Solenoid valve blows off continuously. Solenoid coil is defective.	Change the solenoid valve.
Machine cuts in and out too often.	External air receiver filled with condensate.	Drain condensate.
Whistling sound from the cylinder head.	Cylinder head fixings loose. Gasket defective.	Tighten cylinder head fixings. Replace gasket.
The safety relief valve blows off before the cut-out pressure is reached.	User's pressure switch incorrectly set.	Check pressure switch setting.
	Valve spring defective.	Replace the safety relief valve.
	Dirt or foreign bodies on the valve seat.	Let the safety relief valve blow off briefly.
Machine uses too much oil.	Viscosity too low.	Fill with oil specified in the service manual.
	Crankcase venting defective.	Clean or renew the crankcase vent.
	Piston rings worn or broken.	Call KAESER Service.

Fault	Possible cause	Action
Liquid leaks out from the filter damper.	Filter element clogged.	Check and empty the filter.

Tab. 28 Faults and remedies

10 Maintenance

10.1 Safety

Follow the instructions below to ensure safe machine maintenance.

Warning instructions are located before a potentially dangerous task.

Basic safety instructions

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

Working on live components

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

Working on pressure system

1. Isolate the machine from the air main by closing the user's compressed air inlet and outlet shut-off valves.
2. Vent all pressurized components and chambers completely.
3. Initial and final pressure gauges must read zero.

Working on the drive system

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

Further information
See chapter 3.4.2 regarding authorized personnel.
See chapter 3.5 regarding dangers and their avoidance.

10.2 Maintenance Schedule

10.2.1 Logging maintenance work

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

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

➢ Keep a log of all maintenance and service work.

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

Further information
A prepared list is provided in chapter 10.19.

10.2.2 Regular maintenance tasks

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

Interval	Maintenance task	See chapter
Daily or every 24 operating hours	Check the oil level.	10.6
Weekly	Check and empty the filter.	10.12
Every 1000 h	Maintain the check valve	10.14
	Dirt trap maintenance	10.11
	Maintain the aftercooler and check for leaks.	10.4
Every 2000 h	Change the crankcase oil filter.	10.10
	Change the oil filter in the crankcase vent.	10.9
Annually	Check that all electrical connections are tight.	–
	Check the safety relief valve.	10.13
	Carry out air filter maintenance	10.3
	Check V-belt tension.	10.16
	Check and clean the dirt trap.	10.11
Every 3000 h	Change the microfilter element	10.18
Every 12000 h	Change the solenoid valve	10.15
	Change the V-belts.	10.16
Variable, see table 30	Change the cooling oil.	10.8
h = operating hours		

Tab. 29 Regular maintenance tasks

10.2.3 Oil change interval

Duty cycles and ambient conditions are important factors influencing the number and length of the oil change intervals.

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

➢ Check operating conditions and adjust intervals as necessary; log the results in table 30 for future reference.

	Maximum permissible oil change interval [operating hours/years]	
Compressor oil	Favorable operating conditions*	My operating conditions
VDL 150	1000/1	
FGP	1000/2	
S 150	2000/1	
* Cool to moderate ambient temperatures, low humidity, low to average duty cycle.		

	Maximum permissible oil change interval [operating hours/years]	
Compressor oil	Favorable operating conditions*	My operating conditions
LSF 150	1000/1	

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

Tab. 30 Oil change intervals

10.2.4 Regular service tasks

- ➢ Only an authorized KAESER Service Technician should carry out service work.
- ➢ When operating conditions are unfavorable (e.g. dusty or humid atmosphere) or when the equipment is in constant use, have the service work carried out more frequently (shorter intervals).

Interval	Service task
Up to 4000 h	Check cylinder head and valves
Up to 12,000 h	General machine overhaul
Up to 12,000 h, at the latest every 3 years	Check motor bearings
up to 36,000 h, at the latest every 6 years	Have hose lines checked.

h = operating hours

Tab. 31 Regular service tasks

10.3 Air filter maintenance

The air filter insert is made of wire mesh.

Material
Compressed air for blowing out
Solvent cleaner
Spares as required

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

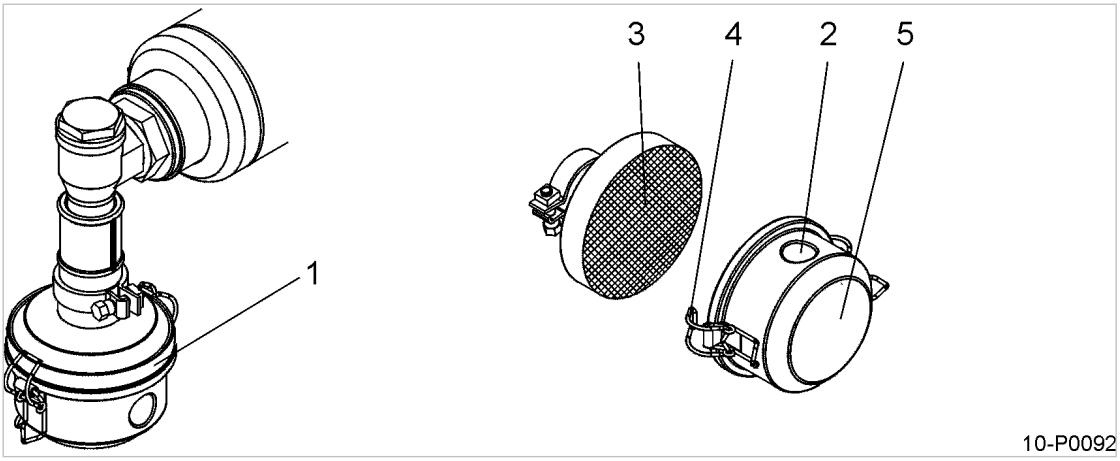


Fig. 15 Air filter maintenance

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

1. Unscrew the air filter from the collector pipe.
2. Release the retaining clip and take off the cover.
3. Blow out the cover and the insert with dry compressed air (< 5 bar).
4. Clean the housing and sealing faces.
5. Wet the wire mesh insert lightly with oil after cleaning.

If the insert is heavily clogged, clean with a solvent-based fluid or steam blaster. Observe safety regulations.

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

6. Position the cover over the insert and close the retaining clips.
7. Attach the filter to the collecting pipe again.

The filter air inlet must face downwards.

8. Switch on the power supply isolating device.

10.4 Cleaning the aftercooler and checking for leaks

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

Clogging causes overheating and machine damage.

Material
Brush
Vacuum cleaner
Face mask (as required)

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

The machine has cooled down.

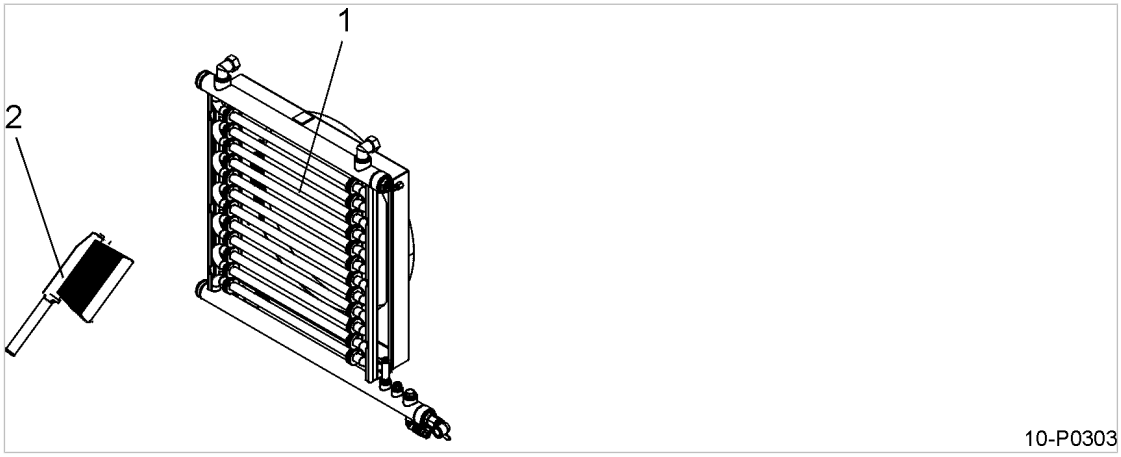


Fig. 16 Cleaning the air aftercooler

1 Aftercooler
2 Brush

10.4.1 Cleaning the air aftercooler

Do not use sharp objects to clean the aftercooler. It could cause damage.

Avoid creating clouds of dust.

➢ Dry brush the oil cooler and use a vacuum cleaner to suck up the dirt.

The air cooler can't be cleaned thoroughly?

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

10.4.2 Checking the aftercooler for leaks

Pay especial attention to aging and corrosion of the cooler materials under long term operating conditions.
Condensate can escape from a leak point.

If there is a leak in the cooler, stop the machine immediately and repair the leak.

➢ Have an authorized KAESER Service Technician check the aftercooler for leaks at least every two years.

10.5 Drive Motor Maintenance

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

➢ Have the motor bearings checked during service.

10.6 Checking the oil level

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

Precondition The machine is running.

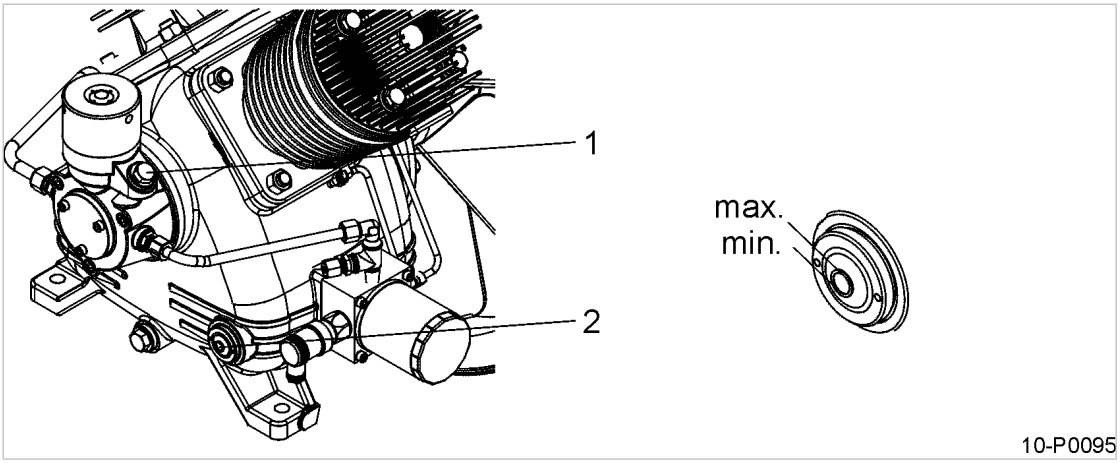


Fig. 17 Checking the oil level
1 Oil filler plug
2 Oil sight glass

➢ Check the oil level with machine running.

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

10.7 Topping up the compressor oil

Material Compressor oil

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

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

The type of compressor oil used is listed in table 13.

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

10.8 Changing the compressor oil

The initial charge of oil should be changed as specified in the table 29.
Drain the oil completely from the compressor block.

Change the oil immediately if it becomes milky.
It is contaminated with condensate.

Contact KAESER Service if condensate is detected in the oil.

Material Compressor oil

Oil receptacle

Precondition Machine at operating temperature.

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

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

Fig. 18 Changing the compressor oil
1 Oil filler plug
2 Oil sight glass
3 Oil drain plug

Draining the oil

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

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

Filling with oil

1. Fill with fresh compressor oil.
2. Replace the filler plug afterwards.
3. Start the machine and check the oil level again after about 2 minutes, topping up again, if necessary.
4. Switch off the machine and check visually for leaks.

10.9 Changing the oil filter element in the crankcase vent

Material Filter element

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

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

Do not use the machine without the crankcase venting function.

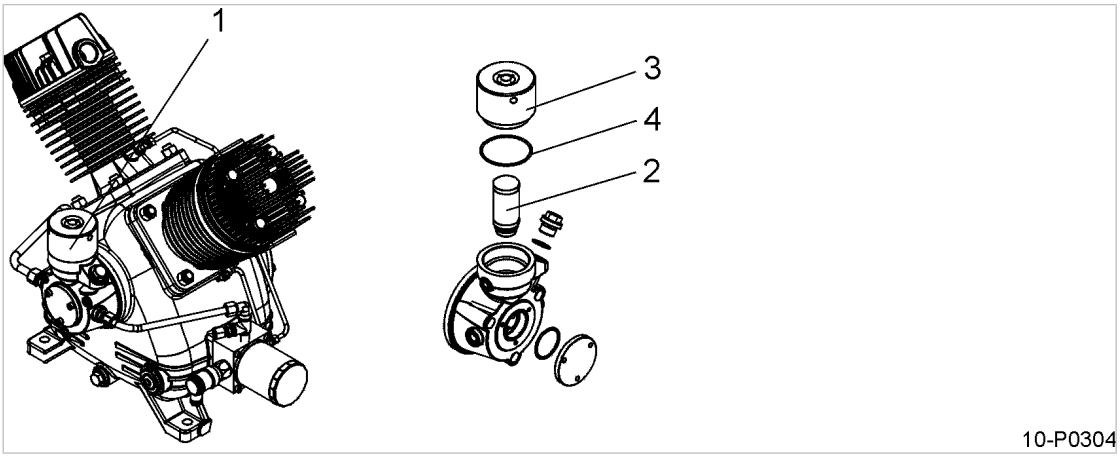


Fig. 19 Changing the filter element in the crankcase vent

1	Crankcase vent	3	Venting cap
2	Filter element	4	O-ring

1. Unscrew the vent cap from the crankcase vent.

CAUTION
Escaping oil mist is damaging to health.
➢ Do not inhale oil mist and vapors.
➢ Avoid contact with skin and eyes.

2. Remove the old filter element.

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

3. Insert the new filter element.
4. Replace the cap in the crankcase vent and check that the O-ring is properly seated.
5. Start the machine and run it for 2 minutes, then stop it and visually check for leaks.

10.10 Changing the crankcase oil filter

Material
Oil filter
Oil receptacle
Cleaning cloths

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

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

➢ Change the oil filter for the first time after 1000 operating hours, along with the oil.
A further oil filter change is necessary:
- after 2000 operating hours, or
- after every second oil change.

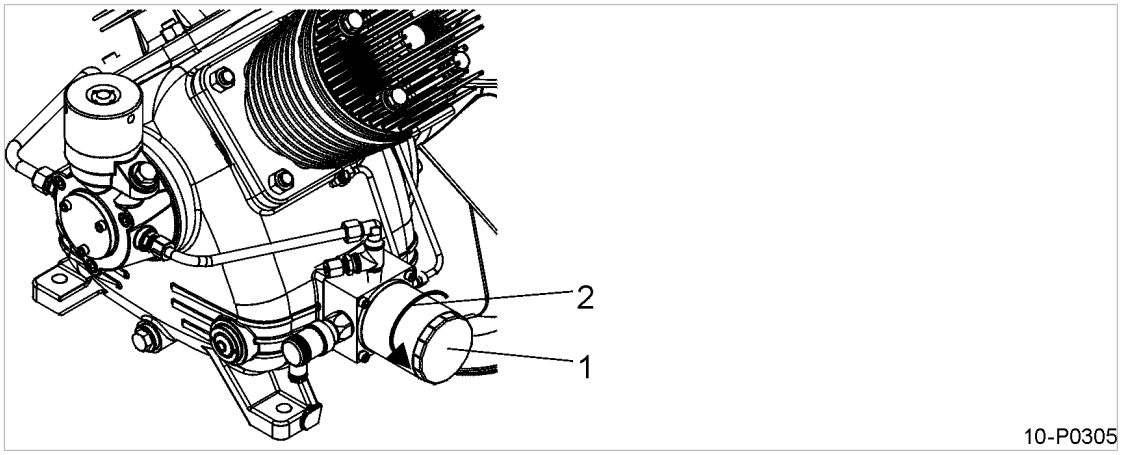


Fig. 20 Changing the crankcase oil filter
[1] Oil filter
[2] Direction of rotation to unscrew the filter

CAUTION
Escaping oil mist is damaging to health.
➢ Do not inhale oil mist and vapors.
➢ Avoid contact with skin and eyes.

1. Unscrew the oil filter counterclockwise; catch oil spillage and dispose of correctly.
2. Clean sealing faces with a clean rag.
3. Lightly oil the new filter's gasket.

Screw on the new filter with the hand only. Do not use a tool.

4. Turn the oil filter clockwise by hand to tighten.
5. Start the machine and run it for 2 minutes, then stop it and visually check for leaks.

10.11 Dirt trap maintenance

Material Compressed air for blowing out
Cleaning agents

Precondition The supply disconnecting device is switched off,
the device is locked off,
a check has been made that no voltage is present.
The machine is completely depressurised (inlet and outlet pressure gauges read 0 bar).
The machine has cooled down.
User's inlet and outlet shut-off valves closed.

10.11.1 Dirt traps in the inlet and venting lines.

Clean the dirt trap at least once a year.

The dirt trap strainer must be cleaned:

- when a fault occurs in IDLE, or
- when a fault occurs in unloaded starting.

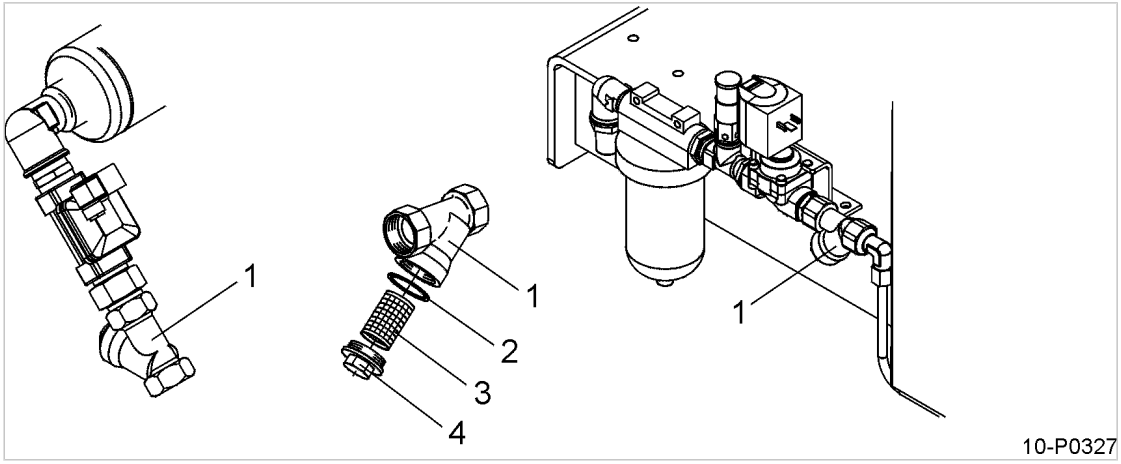


Fig. 21 Dirt traps in the inlet and venting lines.

1 Dirt trap
2 Gasket or O-ring
3 Dirt trap strainer
4 Screw plug

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

1. Remove the plug and clean the gasket or O-ring.
2. Remove the dirt trap strainer and blow clean.
3. Re-assemble all parts with gasket or O-ring.
4. Start the machine and run it for 2 minutes, then stop it and visually check for leaks.

10.11.2 Dirt trap in the crankcase.

Clean the dirt trap at least once a year.

The dirt trap strainer must be cleaned:

- if a fault occurs because of insufficient oil pressure.

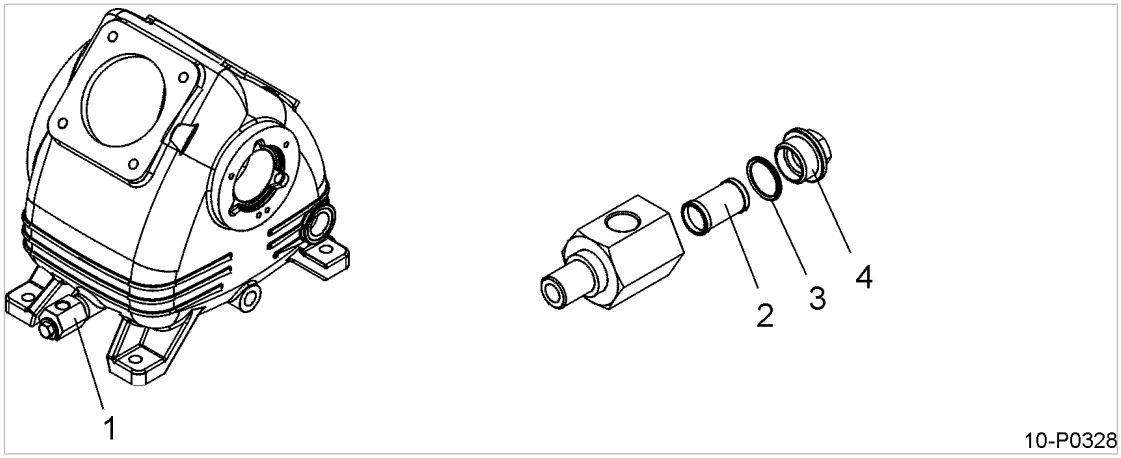


Fig. 22 Dirt trap in the crankcase.

[1] Dirt trap
[2] Dirt trap strainer
[3] O-ring
[4] Screw plug

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

1. Remove the plug and clean the O-ring.
2. Remove the dirt trap strainer and clean.
3. Re-assemble the dirt trap and plug with the O-ring.
4. Start the machine and run it for 2 minutes, then stop it and visually check for leaks.

10.12 Checking and emptying the sinter filter

The damper must be able to blow off freely to ensure proper operation of the machine.

Connection of a pipe downstream of the filter is not allowed.

Material Compressed air for blowing out
Receptacle
Spares as required

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

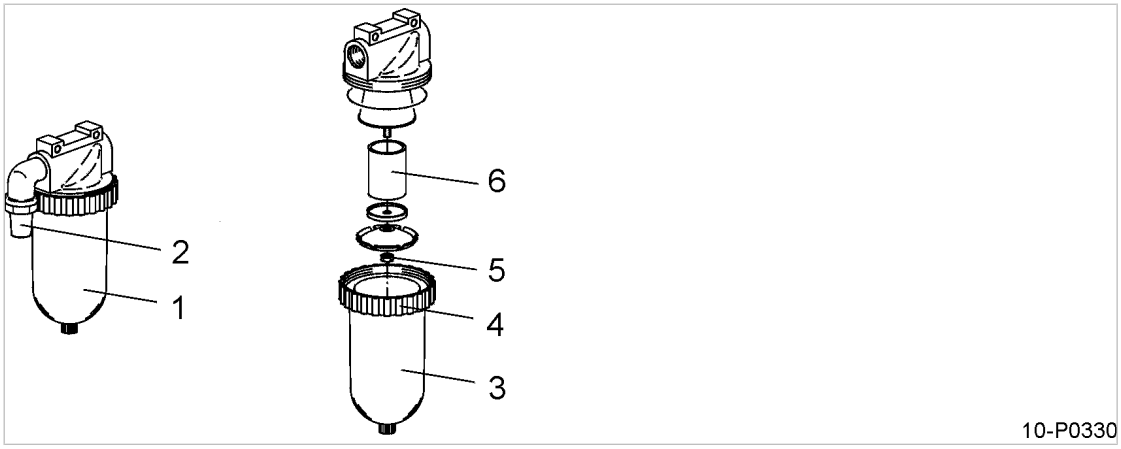


Fig. 23 Checking and Emptying the Filter

1	Filter	4	Fitting
2	Damper	5	Nut
3	Container	6	Sinter filter insert

Check the container weekly and empty regularly; clean the sinter filter insert as required.

The bowl must be emptied immediately if liquid is seen to drip from the damper.

1. Prepare the receptacle.
2. Loosen the fitting and remove the bowl.
3. Empty the bowl into the receptacle and flush out with warm water.

Dispose of the liquid in accordance with valid environmental protection regulations.

1. Blow out the damper with compressed air (< 73 psi).
2. Remove the nut and sinter filter insert.
3. Blow the insert clean from inside to outside.
4. Reassemble in the reverse order.
5. Start the machine and run it for 2 minutes, then stop it and visually check for leaks.

10.13 Pressure relief valve checking

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

Further information See chapter 2.5 for the activating pressure of the valve.

10.13.1 Pressure relief valve in the aftercooler venting line

The pressure relief valve should be activated at regular intervals or at least once a year to prevent it from sticking.

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

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

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

Precondition Machine running under LOAD.

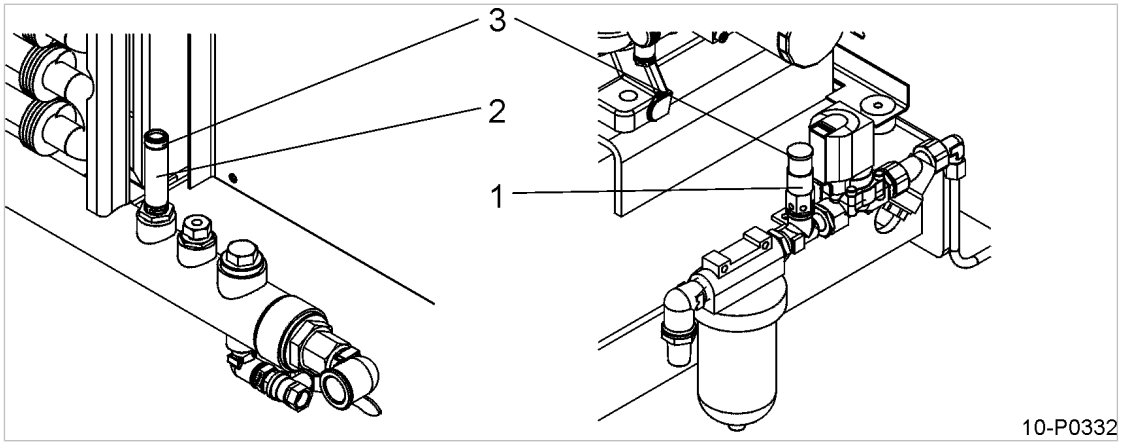


Fig. 24 Pressure relief valve checking

1. Pressure relief valve in the venting line.
2. Pressure relief valve on the aftercooler
3. Knurled knob

WARNING
The pressure relief valve may blow off at any time!
Excessive noise is caused when the pressure relief valve blows off!
There is danger of injury from bursting components and compressed air!

➢ Wear ear and eye protection.

1. Turn the knurled knob on the relief valve counterclockwise until air blows off.
2. Then turn the knurled knob back to its original position.

Do not turn the knurled knob too far.

➢ Have a defective relief valve replaced by a KAESER Service Technician.

10.14 Maintaining the check valve

The check valve is mounted on the collecting pipe. It prevents compressed air escaping to the atmosphere when the machine is running.

Material Compressed air for blowing out
Cleaning cloths
Spares as required

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

The machine is completely depressurized (pressure gauge reads 0 psig).

The machine has cooled down.

User's inlet and outlet shut-off valves closed.

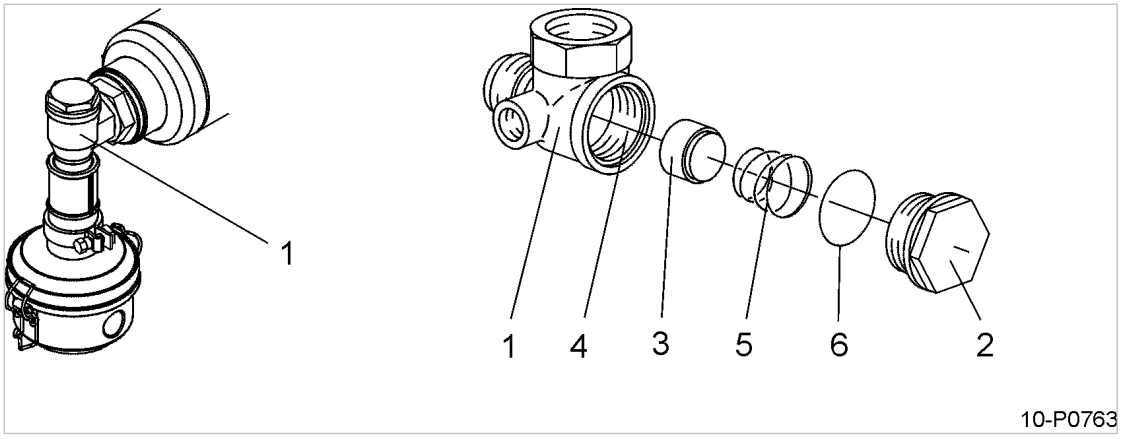


Fig. 25 Cleaning the check valve

1	Check valve	4	Valve seat
2	Screw plug	5	Spring
3	Valve cone	6	O-ring

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

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

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

3. Insert the valve cone, spring and O-ring in the valve seat.
4. Replace the plug.

10.15 Solenoid valve maintenance

Ingress of dirt during operation can prevent the valve from sealing. To ensure trouble-free operation, the solenoid valve should be replaced every 12,000 operating hours.

Material Spares

Precondition The power supply disconnecting device is switched off,
the device is locked off,
a check has been made that no voltage is present.
The machine is completely depressurized (inlet and outlet pressure gauges read 0 psig).
The machine has cooled down.
User's inlet and outlet shut-off valves closed.

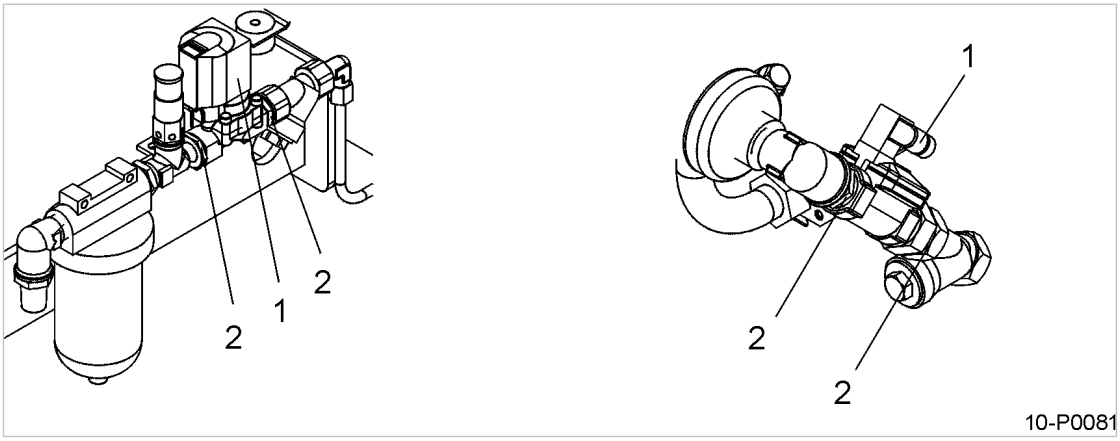


Fig. 26 Replacing the Solenoid Valve

[1] Connecting socket
[2] Fitting

1. Disconnect the connecting socket from the valve.
2. Undo the fitting.
3. Remove the valve.

When fitting the solenoid valve make sure the direction of flow is correct as indicated by the arrow on the body.
Do not use the solenoid as a lever.

4. Screw the fitting into the new solenoid valve using PTFE sealing tape.
5. Install the new solenoid valve in the compressed air line and plug in the machine.
6. Open the user's inlet and outlet shut-off valves.
7. Start the machine and visually check for leaks.

10.16 V-belt maintenance

Replacement V-belts must be of exactly the same length (a set) and absolutely impervious to oil. For this reason we recommend that only genuine KAESER V-belts are used.
V-belts must be changed as a set.

Material Set of V-belts

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

The machine is completely depressurized (inlet and outlet pressure gauges read 0 bar).

The machine has cooled down.

User's inlet and outlet shut-off valves closed.

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

➢ Switch off and lock out the power supply disconnecting (isolating) device and check that no voltage is present.

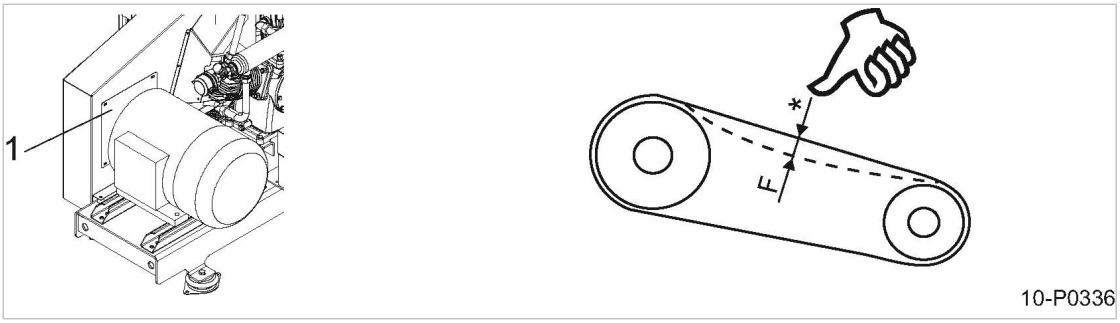


Fig. 27 Check the V-belt tension

[1] Guard plate
[F] Force

Make a visual check for damage.

1. Remove the guard plate.
2. Turn the pulley by hand so that all of the belt can be inspected for damage.
3. Change any damaged belts immediately.

Checking the belt tension and adjustment

1. Remove the guard plate.
2. Push the belt with the thumb.

The belts should be tensioned if they can be deflected more than 1-2 cm.

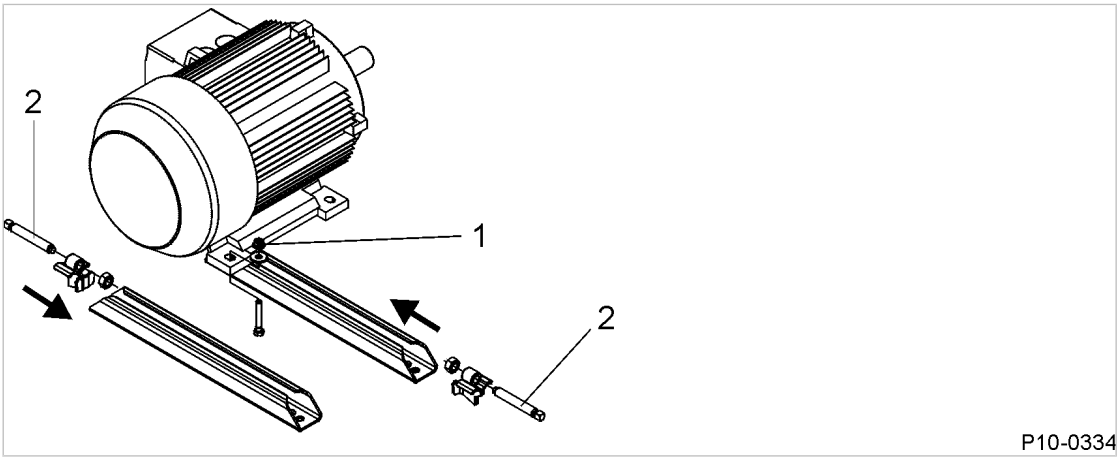


Fig. 28 Tensioning the belts

[1] Hexagon nut
[2] Square-headed bolt

1. Loosen the hexagon nuts on the motor feet and the square-headed screws in the tensioning rails.
2. Push the motor to tension the belts so that there is only 1-2 cm movement in the belt.
3. Re-tighten the hexagon nuts on the motor mounts and the square-headed screws in the tensioning rails.
4. Replace the guard plate.

Changing the V-belts

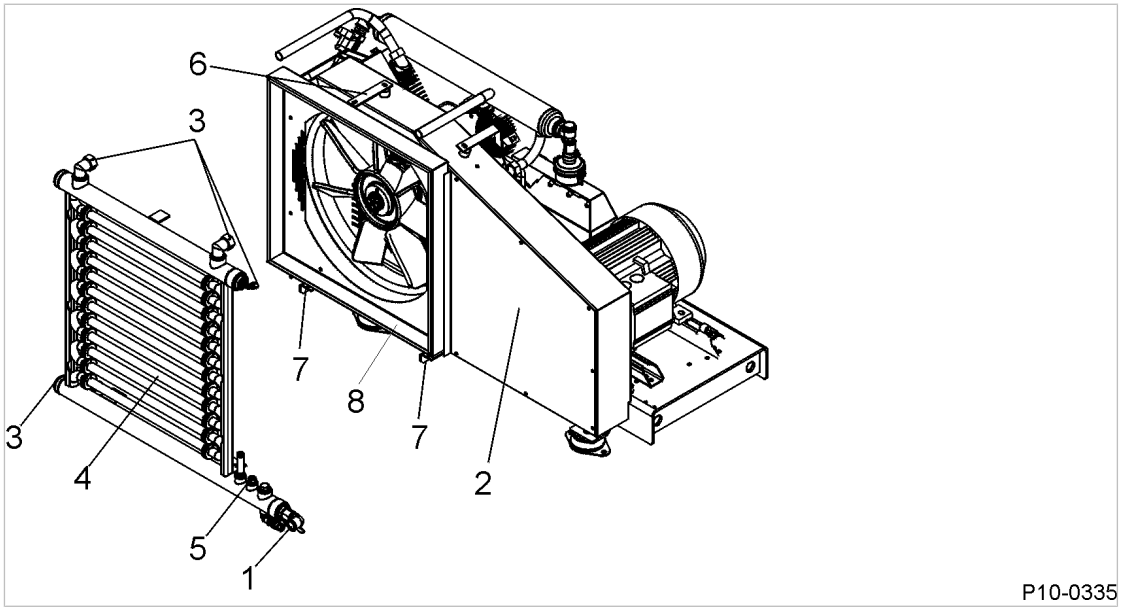


Fig. 29 Changing the V-belts

1	Air network connection	5	Temperature gauge switch sensor
2	Outer belt guard	6	Bracket
3	Fittings	7	Bracket
4	Air cooler	8	Air inlet duct

1. Take off the outer belt guard and loosen the air cooler fittings.
2. Unscrew the temperature gauge switch sensor from the air cooler.
3. Detach the air cooler from the supporting bracket.
4. Unscrew the air duct from the belt guard outer part.
5. Loosen the hexagon nuts on the motor feet and the square-headed screws in the tensioning rails.
6. Push the motor back towards the compressor block until the belts can be slipped off the pulleys.
7. Lay the new V-belts loosely over the motor and compressor block pulleys.
8. Shift the motor to tension the belts so that there is only 1-2 cm movement in the belt.
9. Re-tighten the hexagon nuts on the motor mounts and the square-headed screws in the tensioning rails.
10. Reassemble in the reverse order.
11. Check tension after the new belts have been in operation for 24 hours.
12. Open the user's inlet and outlet shut-off valves.

10.17 Cylinder head and valves

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

10.17.1 Checking the cylinder head and valves

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

Precondition Machine at operating temperature.

1. User's air inlet and outlet shut-off valves open.
2. Start the machine and measure the receiver charging time.

Result The valves should be checked for coking if there is a significant difference between the measured charging time and the charging time when the machine was new.

Further information See chapter 7.8 for air receiver charging time measurement.

10.17.2 Cleaning the cylinder head and valves

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

Precondition The supply disconnecting device is switched off,
the device is locked off,
a check has been made that no voltage is present.
The machine is completely depressurised (inlet and outlet pressure gauges read 0 bar).
The machine has cooled down.
User's inlet and outlet shut-off valves closed.

1. Remove the cylinder head screws and lift off the head.
2. Clean the cylinder head and valves.
3. After cleaning the cylinder head and valves, mount the head with the gasket and tighten the fixings diagonally.

Tightening torque of the cylinder head fixings

Model	Head fixing screw M_A [Nm]
N 253–G	23

Tab. 32 Head fixing tightening torque

10.17.3 Start the machine and carry out a trial run

1. Open the user's inlet and outlet shut-off valves.
2. Switch on the machine.
3. Switch off the machine and check visually for leaks.

Significant malfunction in cylinder head and valves?
Severe coking
➢ Have a KAESER Service technician renew the cylinder head and valves.

10.18 Changing the microfilter element

Depending on the purity of the low-pressure inlet air it may be necessary to install a microfilter in the inlet line.

Material: Filter element

Precondition: Microfilter installed

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

The machine is completely depressurized (inlet and outlet pressure gauges read 0 bar).

User's inlet and outlet shut-off valves closed.

WARNING
Compressed air!

- ➢ Compressed air and devices under pressure can cause injure or death if the contained energy of the air is released suddenly or uncontrolled.
- ➢ 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.

➢ Change the filter element according to the manufacturer's instructions.

10.19 Document maintenance and service work.

Machine number:

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

Date	Maintenance task carried out	Operating hours	Signature

Tab. 33 Logged maintenance tasks

11 Spares, Operating Materials, Service

11.1 Note the nameplate

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

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

11.2 Ordering consumable parts and operating fluids/materials

KAESER consumable parts and operating fluids/materials are all genuine KAESER parts. They are selected for use in KAESER machines.

WARNING
There is risk of personal injury or damage to the machine resulting from the use of unsuitable spare parts or operating materials.
Unsuitable or poor quality consumable parts and operating fluids/materials may damage the machine or impair its proper function.
In the event of damage, personal injury may result.

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

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

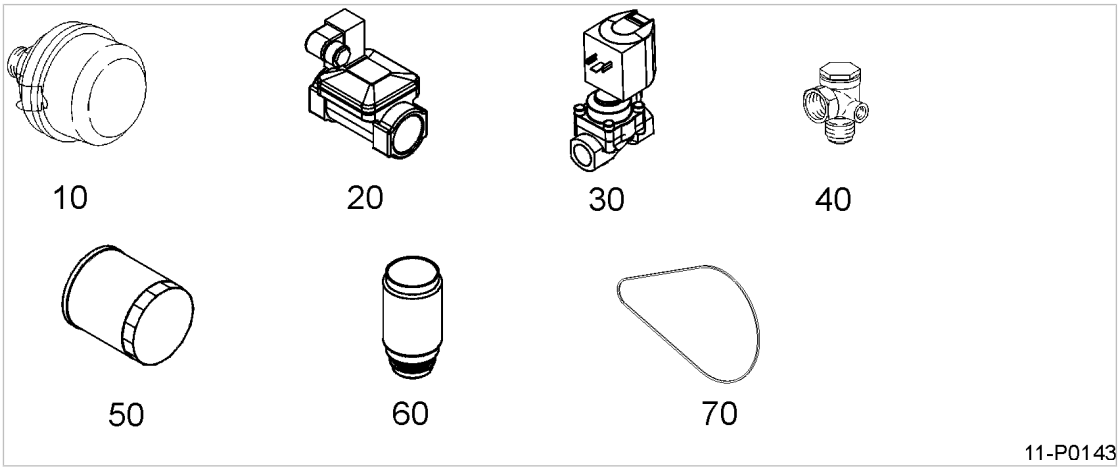


Fig. 30 Consumable parts

[10] Air filter
[20] Solenoid valve on the compressed air inlet
[30] Solenoid valve for venting
[40] Check valve
[50] Crankcase oil filter
[60] Filter element in the crankcase vent
[70] Set of V-belts

Machine

Name	Quantity	Number
Air filter	1	10
Solenoid valve on the compressed air inlet	1	20
Solenoid valve for venting	1	30
Check valve	1	40

Name	Quantity	Number
Crankcase oil filter	1	50 / 6.1901.10010
Filter element in the crankcase vent	1	60 / 9.2147.0
Set of V-belts	1	70
Compressor oil VDL 150	1.0 litre	9.0894.0
Compressor oil FGP	1.0 litre	9.0874.0
Compressor oil S 150	1.0 litre	9.0846.00010
Compressor oil LSF 150	1.0 litre	9.5412.00010

Tab. 34 Consumable parts

11.3 KAESER AIR SERVICE

KAESER AIR SERVICE offers:

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

➢ Why not sign a KAESER AIR SERVICE maintenance agreement!

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

11.4 Service Addresses

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

11.5 Spare Parts for Service and Repair

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

12 Decommissioning, Storage and Transport

12.1 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 under load for at least 30 minutes to ensure corrosion protection.

Long-term decommissioning

Precondition The machine must have run for at least 30 minutes before before long-term de-commissioning.
The machine (supply disconnecting device) is isolated from the mains,
it is locked off,
a check has been made that no voltage is present.
The machine is completely depressurised (inlet and outlet pressure gauges read 0 bar).
User's compressed air inlet and outlet shut-off valves closed.

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

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

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

12.2 Packing

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

Material Desiccant
Plastic sheeting
Wooden transport crate

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

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

12.3 Storage

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

Advice can be obtained from KAESER on storage and commissioning.

CAUTION
Moisture and frost can damage the machine.
- ➢ Prevent ingress of moisture and formation of condensation.
- ➢ Maintain a storage temperature of >32 °F.

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

12.4 Transporting

12.4.1 Safety

Weight and center of gravity determine the most suitable method of transport.

Precondition Transport only by fork truck or lifting gear with personnel trained in the safe transport of goods.

➢ Make sure the danger zone is clear.

12.4.2 Transporting with a forklift truck

Precondition Machine must stand on a suitable transport medium (pallet).

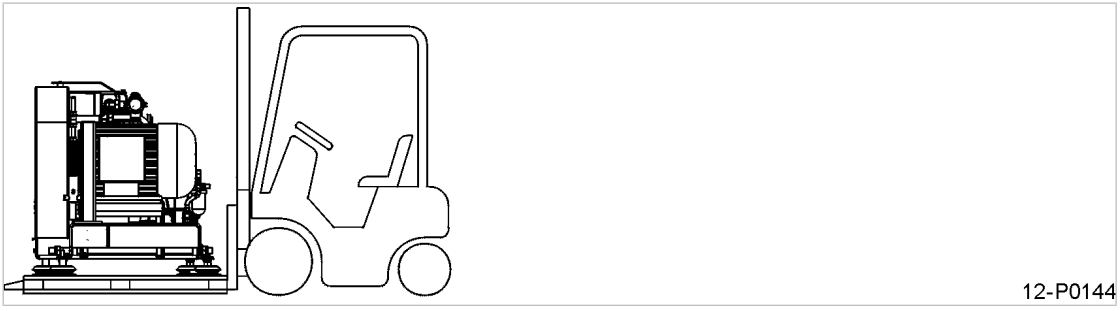


Fig. 31 Transporting with a forklift truck

➢ Drive the forks completely under the pallet and lift carefully.

12.4.3 Transporting with a crane

A suitable lifting frame ensures correct transportation.
The lifting slings must be fully under the machine.

Precondition The lifting frame complies with local safety regulations.

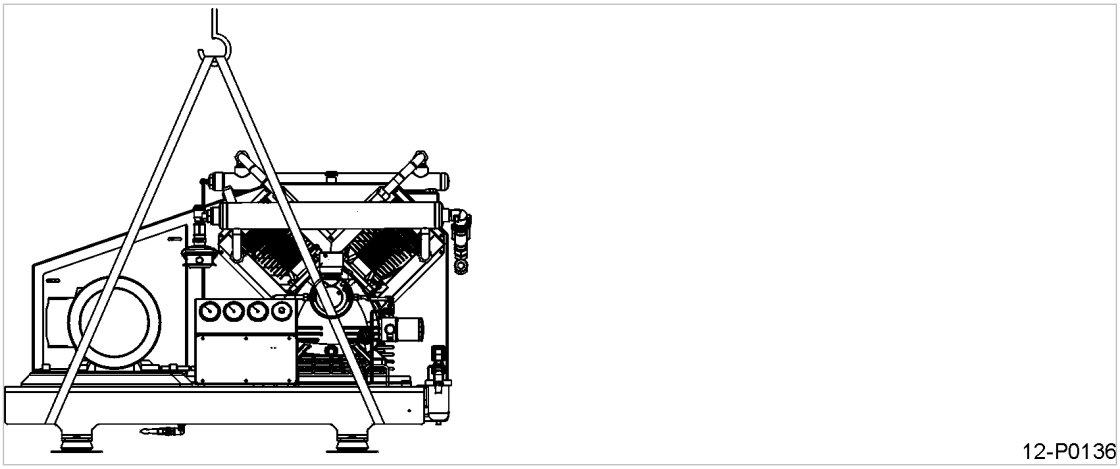


Fig. 32 Transporting with a crane

CAUTION
The machine can be damaged by incorrect attachment of the lifting gear.
- ➢ Do not attach the lifting gear to any of the machine components.
- ➢ The manufacturer can advise on the use of suitable lifting gear.

➢ Use the lifting gear correctly and lift the machine carefully.

12.5 Disposal

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

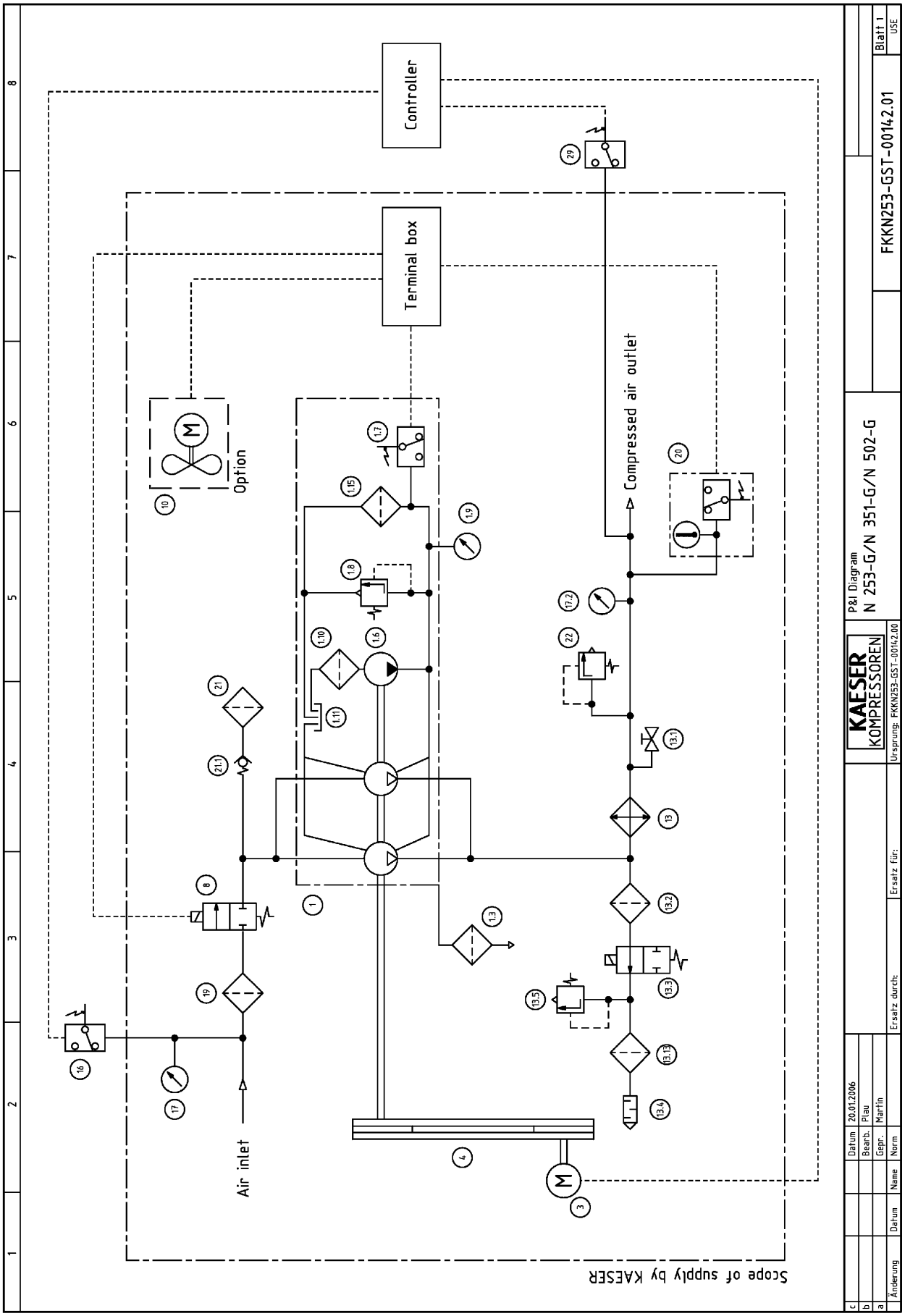
Precondition The machine is decommissioned.

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

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

13 Annex

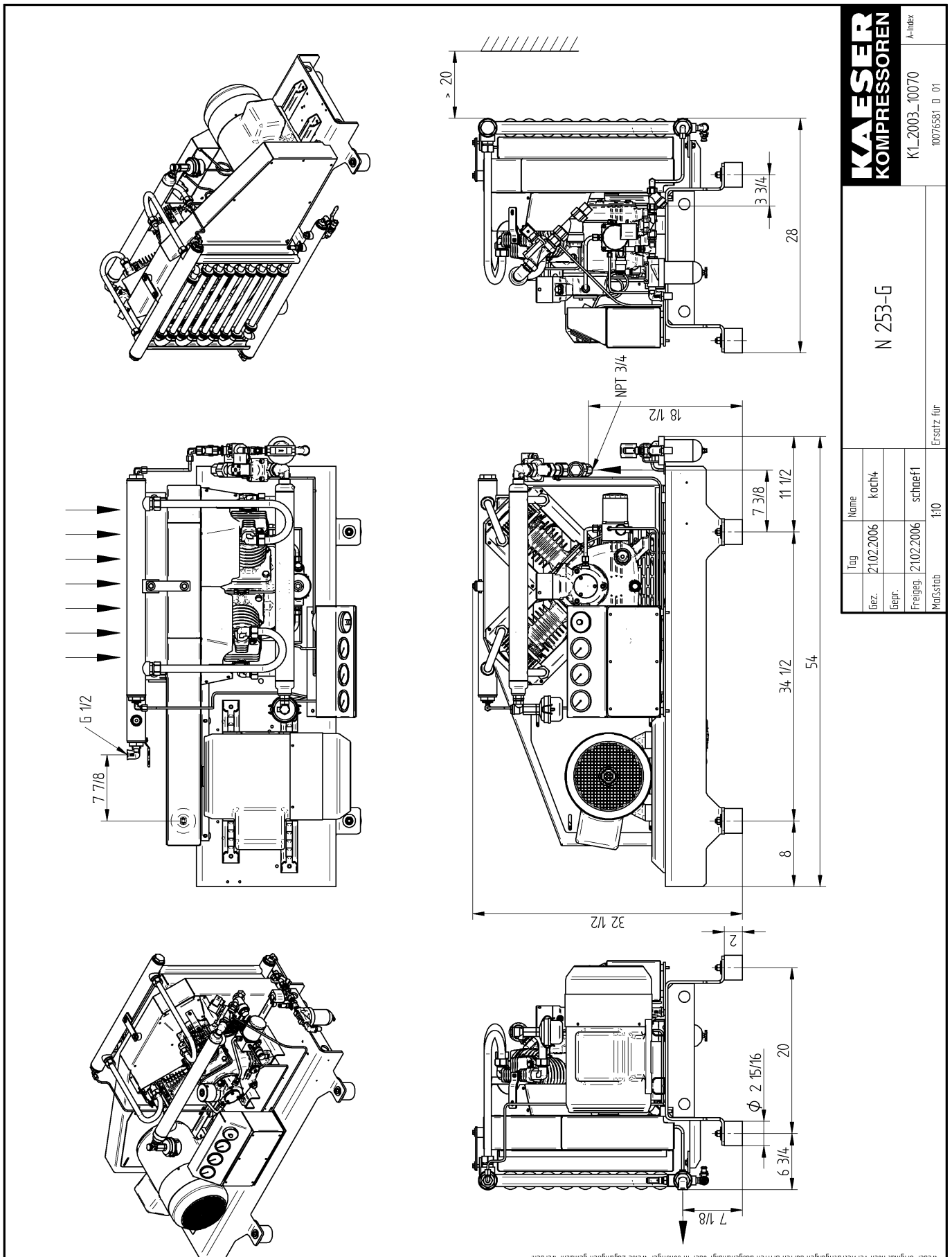
13.1 Pipeline and instrument flow diagram (P+I diagram)

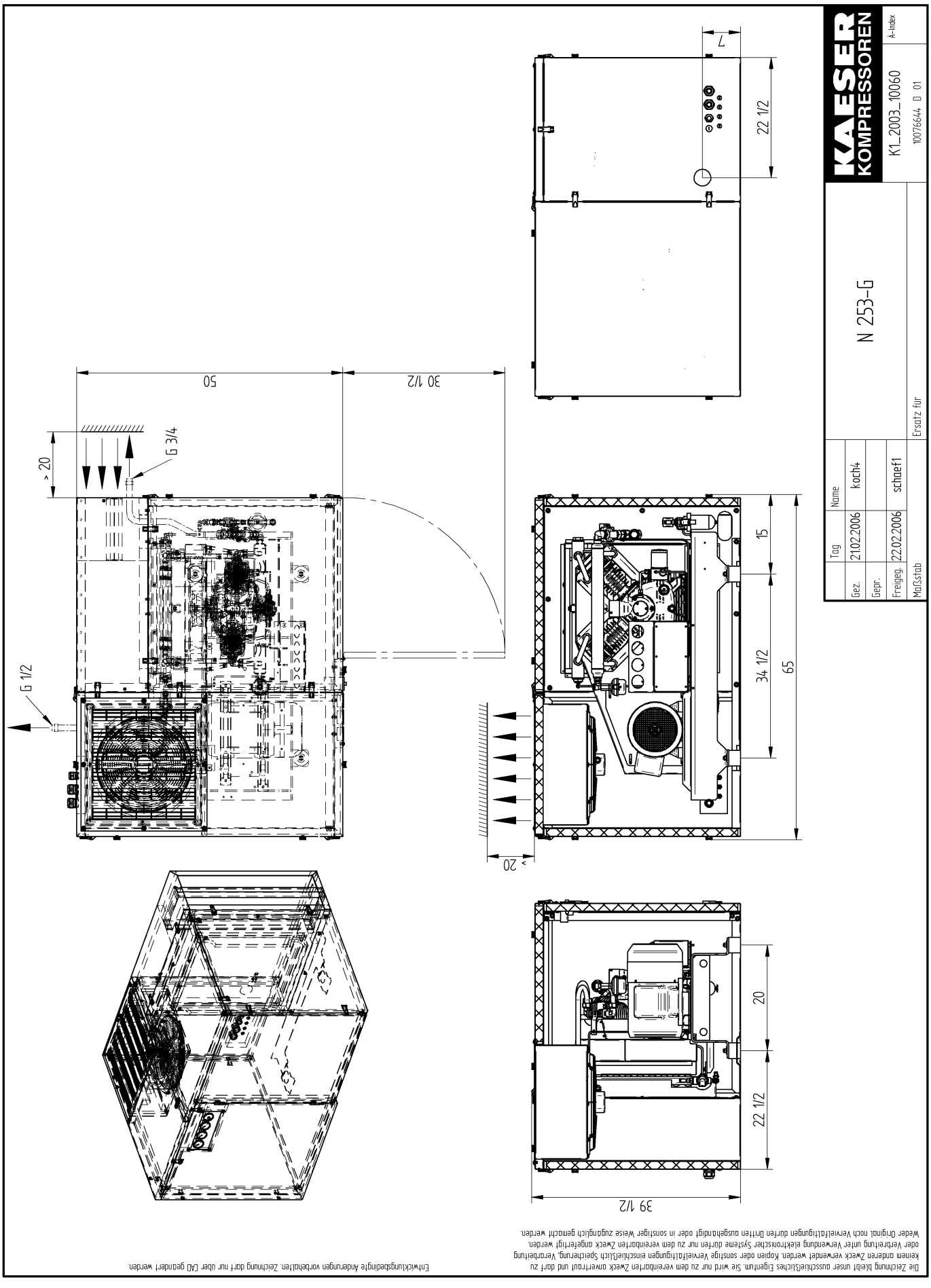

Controller
Terminal box
Option
Compressed air outlet
Air inlet
Scope of supply by KAESER
P&I Diagram
N 253-G/N 351-G/N 502-G
FKKN253-GST-00142.01
KAESER KOMPRESSOREN
Ursprung: FKKN253-GST-00142.00
Ersatz für:
Ersatz durch:
Datum 20.01.2006
Bearb. Plau
Gepr. Martin
Norm
Name
Datum
Änderung
Blatt 1
USE

1	Piston pumpblock
1.3	Crankcase vent with oil filter
1.6	Oil pump
1.7	Pressure switch - Oil pressure
1.8	Overflow valve
1.9	Pressure gauge
1.10	Dirt trap
1.11	Crankcase
1.15	Oil filter - Oil pump
3	Drive motor
4	Flywheel
8	Solenoid valve (closed when de-energised)
10	Fan motor
13	Air aftercooler
13.1	Shut-off valve - Condensate drain
13.2	Dirt trap
13.3	Solenoid valve (open when de-energised)
13.4	Silencer
13.5	Safety relief valve
13.13	Filter
16	Pressure switch - Initial pressure
17	Pressure gauge - Initial pressure
17.2	Pressure gauge - Final pressure
19	Dirt trap
20	Temperature gauge switch + Indication
21	Air filter - Inlet air in idle mode
21.1	Check valve
22	Safety relief valve
29	System air pressure switch

c				Datum	20.01.2006		KAESER KOMPRESSOREN	P&I Diagram legend N 253-G/N 351-G/N 502-G	
b				Bearb.	Plau				
a				Gepr.	Martin				
	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung: FKKN253-GST-00142.00	FKKN253-GST-00142.01 Blatt 2 USE

13.2 Dimensional Drawing


KAESER KOMPRESSOREN
K1_2003_10070
A-Index
10076581 D 01
N 253-G
Tag
Name
Gez. 21.02.2006 koch4
Gepr.
Freigeg. 21.02.2006 schaef1
Maßstab 1:10
Ersatz für
> 20
3 3/4
28
NPT 3/4
18 1/2
7 3/8
11 1/2
34 1/2
54
8
32 1/2
G 1/2
7 7/8
2
Φ 2 15/16
20
6 3/4
7 1/8
Die Zeichnung bleibt unser ausschließliches Eigentum. Sie wird nur zu dem vereinbarten Zweck anvertraut und darf zu keinem anderen Zweck verwendet werden. Kopien oder sonstige Vervielfältigungen einschließlich Speicherung, Verarbeitung oder Verbreitung unter Verwendung elektronischer Systeme dürfen nur zu dem vereinbarten Zweck angefertigt werden. Weder Original noch Vervielfältigungen dürfen Dritten ausgehändigt oder in sonstiger Weise zugänglich gemacht werden.
Entwicklungsbedingte Änderungen vorbehalten. Zeichnung darf nur über CAD geändert werden.


KAESER KOMPRESSOREN
K1_2003_10060
10076644 D 01
A-Index
N 253-G
Ersatz für
Name
Tag
Gez. 21.02.2006 koch4
Gepr.
Freigeg. 22.02.2006 schaef1
Maßstab
7
22 1/2
50
30 1/2
G 3/4
> 20
G 1/2
15
34 1/2
65
> 20
20
22 1/2
39 1/2
Die Zeichnung bleibt unser ausschließliches Eigentum. Sie wird nur zu dem vereinbarten Zweck anvertraut und darf zu keinem anderen Zweck verwendet werden. Kopien oder sonstige Vervielfältigungen einschließlich Speicherung, Verarbeitung oder Verbreitung unter Verwendung elektronischer Systeme dürfen nur zu dem vereinbarten Zweck angefertigt werden. Weder Original noch Vervielfältigungen dürfen Dritten ausgehändigt oder in sonstiger Weise zugänglich gemacht werden.
Entwicklungsbedingte Änderungen vorbehalten. Zeichnung darf nur über CAD geändert werden.

13.3 Electrical Diagram

Wiring Diagram

booster compressor

with START-Control

terminalbox

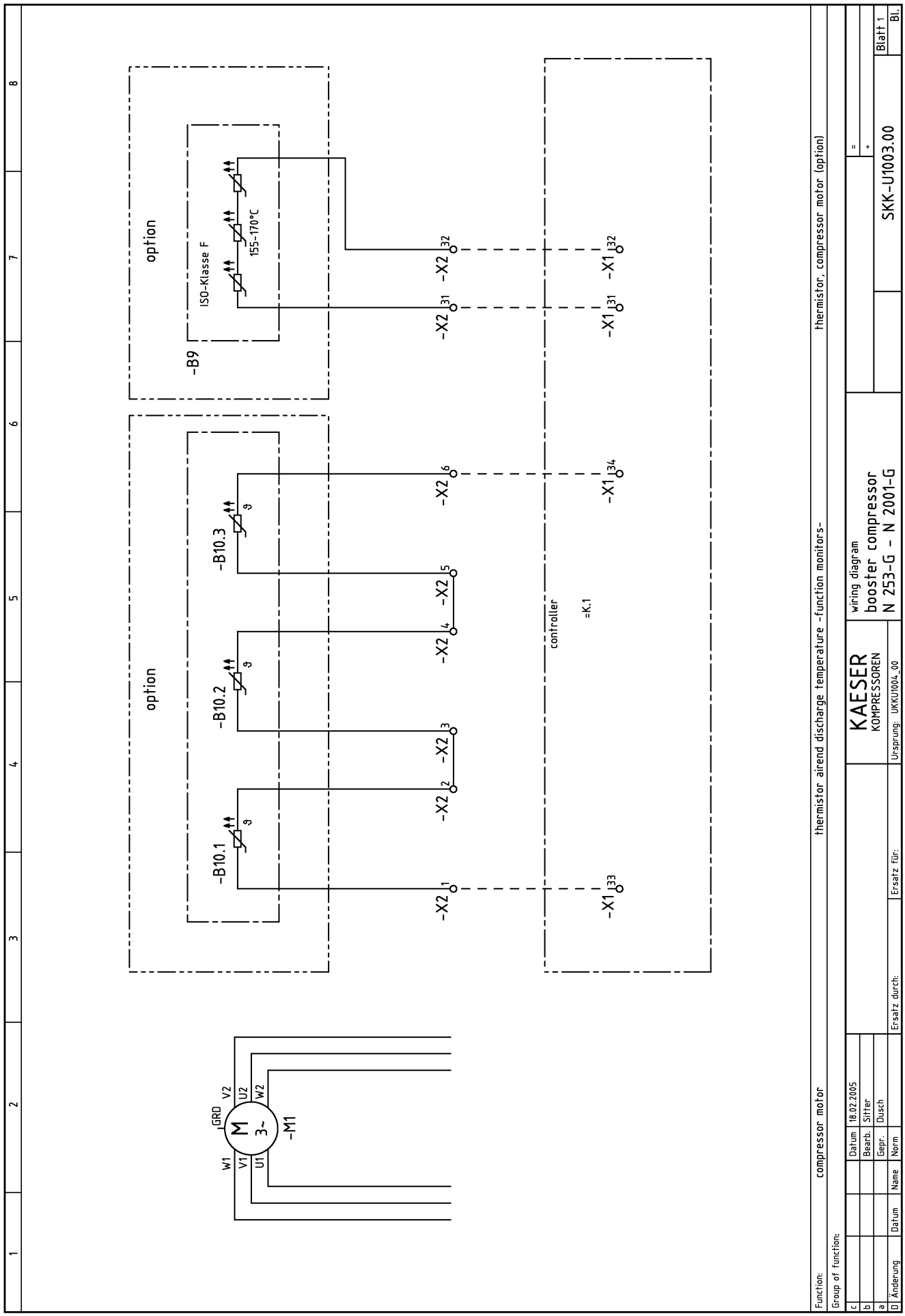
N 253-G, N 351-G, N 502-G, N 753-G - N 2001-G

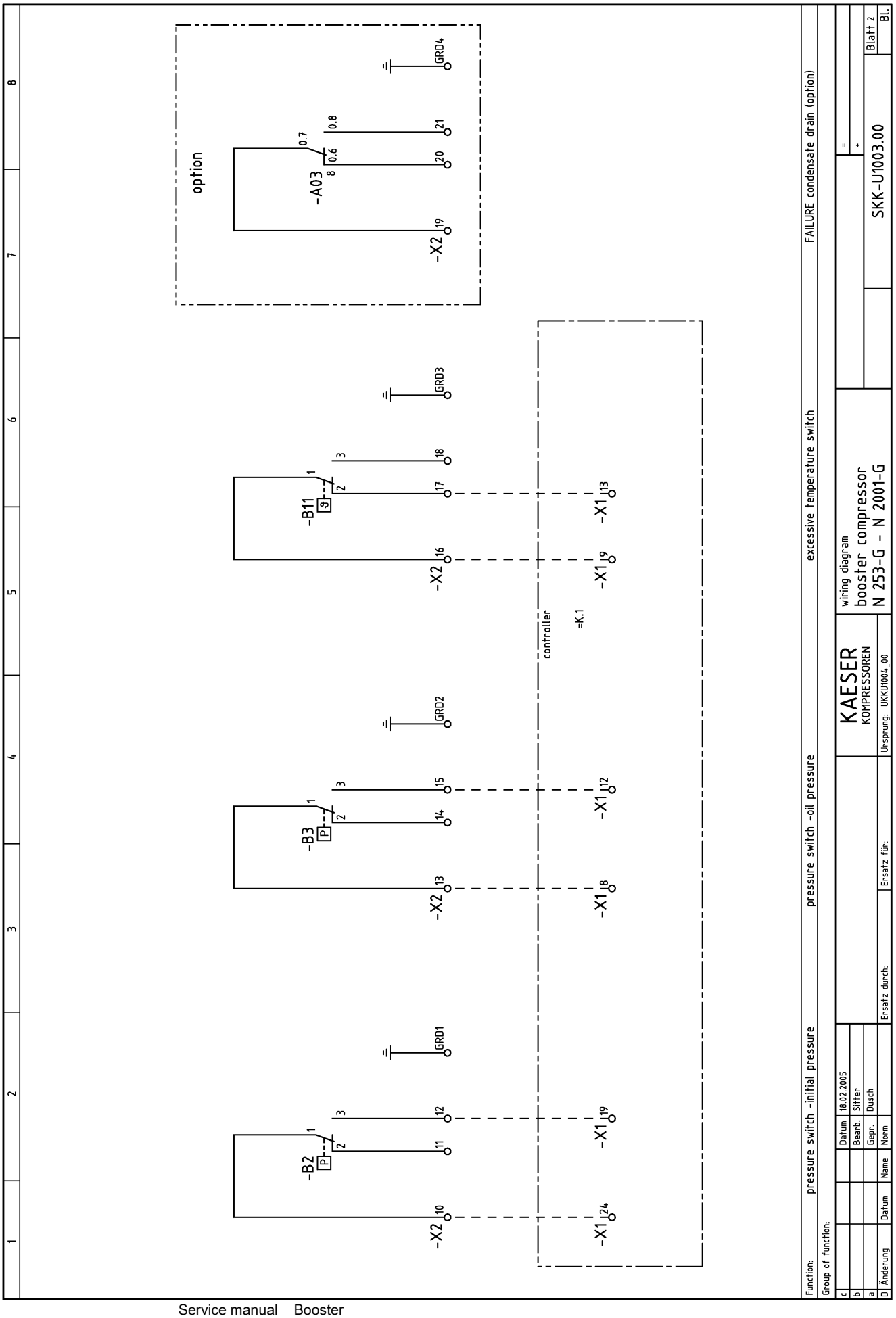
manufacturer: KAESER COMPRESSORS
96450 COBURG
GERMANY

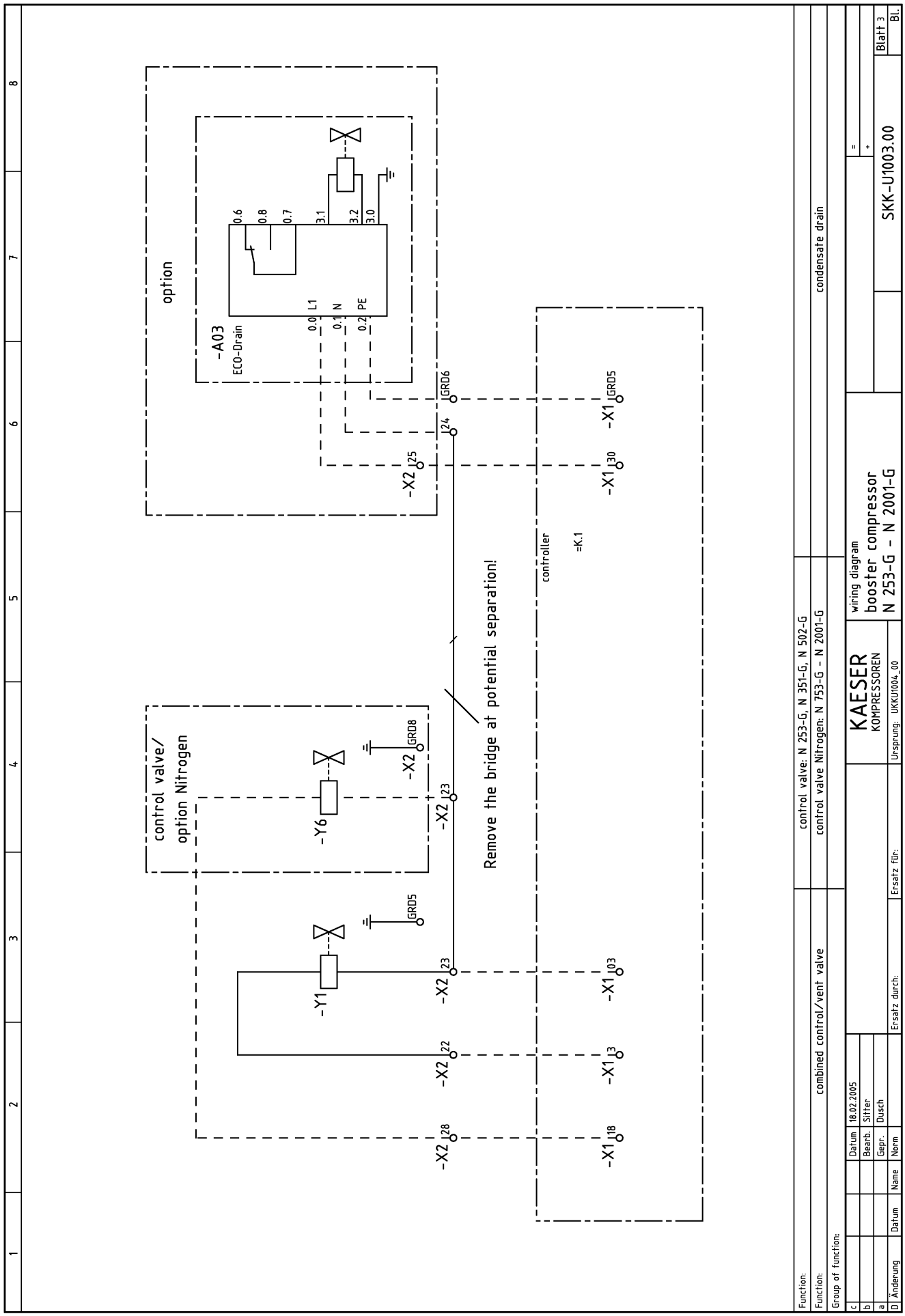
c				Datum	18.02.2005 USE		KAESER KOMPRESSOREN	cover page booster compressor N 253-G - N 2001-G	=
b				Bearb.	Sitter				+
a				Gepr.	Dusch				
A	Änderung	Datum	Name	Norm		Ersatz durch: / Ersatz für:	Ursprung: UKKU1004_00	DKK-U1003.00	Blatt 1 Bl.

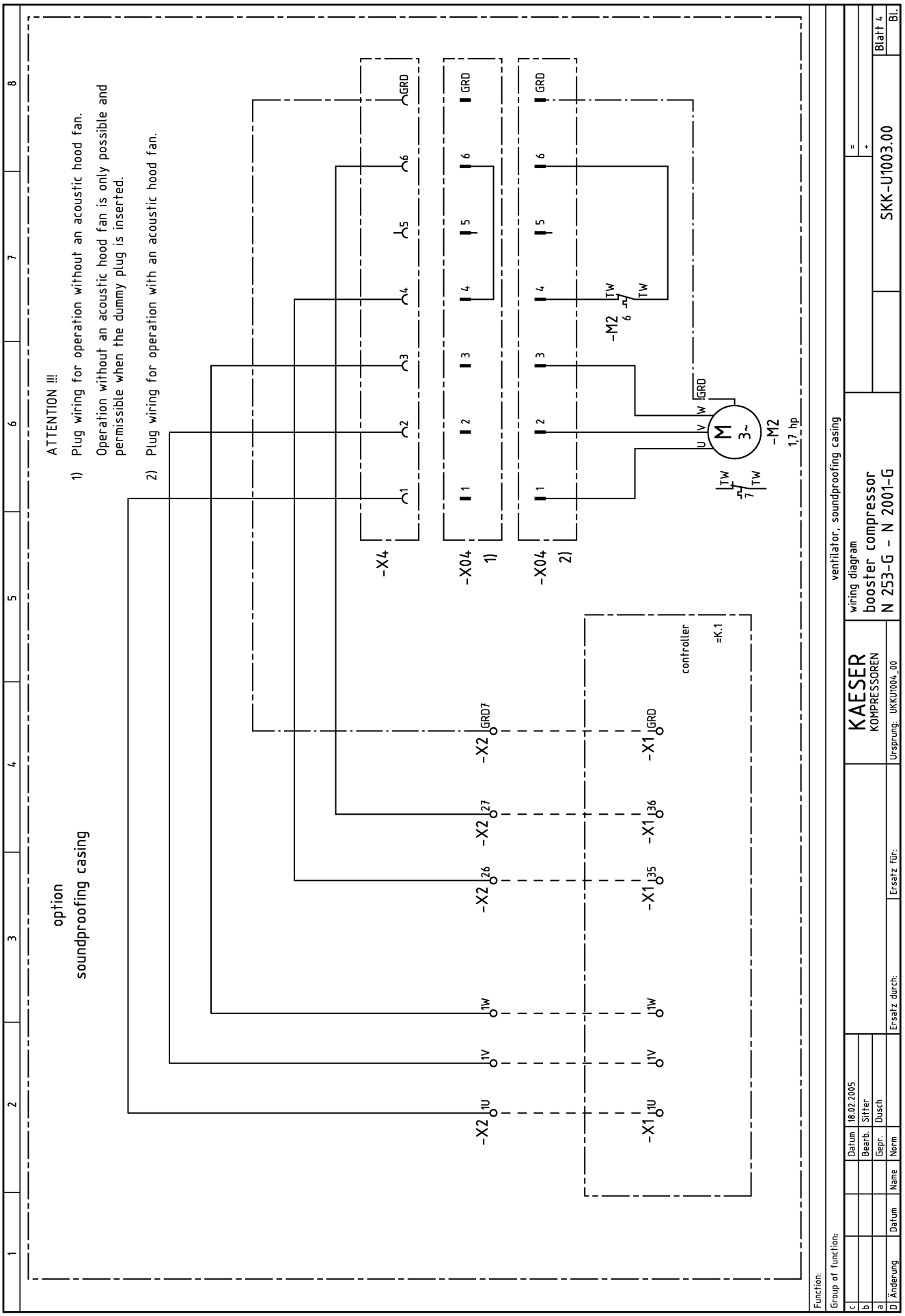
Lfd. Nr. No.	Benennung Name		Zeichnungsnummer (Kunde) Drawing No. (customer)	Zeichnungsnummer (Hersteller) Drawing No. (manufacturer)	Blatt Page	Anlagenkennzeichen Unit designation
1	cover page	N 253-G - N 2001-G		DKK-U1003.00	1	
2	list of contents			ZKK-U1003.00	1	
3	wiring diagram	N 253-G - N 2001-G		SKK-U1003.00	1	
4	wiring diagram	N 253-G - N 2001-G		SKK-U1003.00	2	
5	wiring diagram	N 253-G - N 2001-G		SKK-U1003.00	3	
6	wiring diagram	N 253-G - N 2001-G		SKK-U1003.00	4	
7	wiring diagram	N 253-G - N 2001-G		SKK-U1003.00	5	
8	component legend	N 253-G - N 2001-G		SKK-U1003.00	6	
9	terminal connection	terminal strip -X2		KKK-U1003.00	1	
10	terminal connection	terminal strip -X4,-X04		KKK-U1003.00	2	

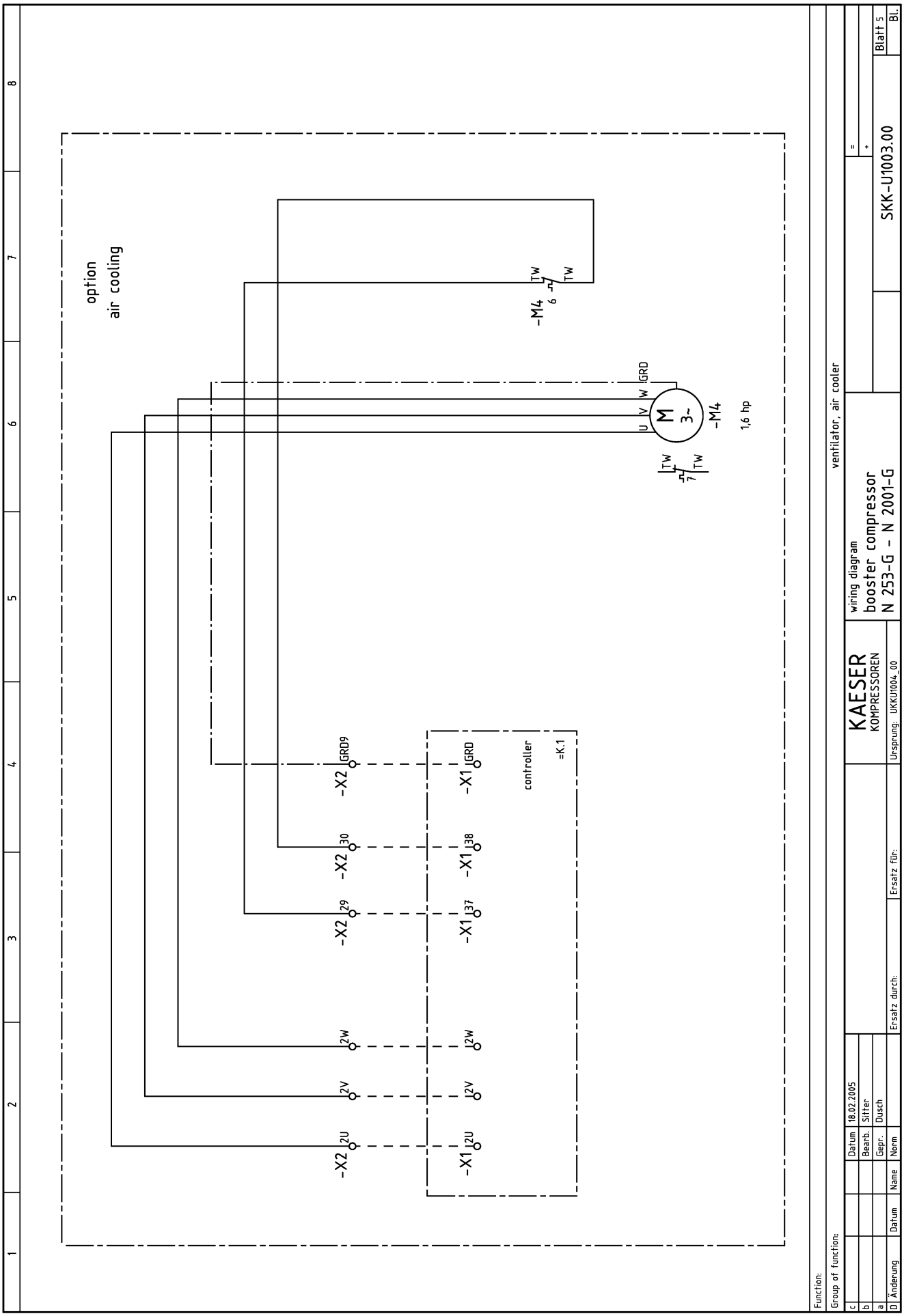
c				Datum	18.02.2005		KAESER KOMPRESSOREN	list of contents	=
b				Bearb.	Sitter			booster compressor N 253-G - N 2001-G	+
a				Gepr.	Dusch				Blatt 1
B	Änderung	Datum	Name	Norm		Ersatz durch: / Ersatz für:	Ursprung:	ZKK-U1003.00	Bl.


option
ISO-Klasse F
155-170°C
-B9
-X2 32
-X2 31
-X1 32
-X1 31
option
-B10.3
-B10.2
-B10.1
-X2 6
-X2 5
-X2 4
-X2 3
-X2 2
-X2 1
-X1 34
-X1 33
controller
=K.1
GRD
V2
U2
W2
W1
V1
U1
M
3~
-M1
Function: compressor motor
thermistor airend discharge temperature -function monitors-
thermistor, compressor motor (option)
Group of function:
Datum 18.02.2005
Bearb. Slitter
Gepr. Dusch
Norm
Name
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung: UKKU1004_00
KAESER KOMPRESSOREN
wiring diagram
booster compressor
N 253-G - N 2001-G
SKK-U1003.00
Blatt 1
Bl.


option
-A03
0.7
0.6
0.8
8
-X2 19
20
21
GRD4
-B11
-X2 16
17
18
GRD3
-B3
-X2 13
14
15
GRD2
-B2
-X2 10
11
12
GRD1
controller
=K.1
-X1 24
-X1 19
-X1 18
-X1 12
-X1 9
-X1 13
Function: pressure switch -initial pressure
pressure switch -oil pressure
excessive temperature switch
FAILURE condensate drain (option)
Group of function:
Datum 18.02.2005
Bearb. Sitter
Gepr. Dusch
Ersatz durch:
Ersatz für:
Norm
Name
Datum
Änderung
KAESER KOMPRESSOREN
Ursprung: UKKU1004_00
wiring diagram
booster compressor
N 253-G - N 2001-G
SKK-U1003.00
Blatt 2
Bl.


option
-A03
ECO-Drain
0.6
0.8
0.7
3.1
3.2
3.0
0.0 L1
0.1 N
0.2 PE
GRD6
-X2 24
-X2 25
-X1 GRD5
-X1 30
control valve/
option Nitrogen
-Y6
-X2 GRD8
-X2 23
Remove the bridge at potential separation!
controller
=K.1
-Y1
GRD5
-X2 23
-X1 03
-X2 22
-X1 13
-X2 28
-X1 18
control valve: N 253-G, N 351-G, N 502-G
control valve Nitrogen: N 753-G - N 2001-G
condensate drain
Function:
Function: combined control/vent valve
Group of function:
KAESER KOMPRESSOREN
wiring diagram
booster compressor
N 253-G - N 2001-G
SKK-U1003.00
Blatt 3
Bl.
Datum 18.02.2005
Bearb. Slitter
Gepr. Dusch
Norm
Ersatz durch:
Ersatz für:
Ursprung: UKKU1004_00
Änderung Datum Name


ATTENTION !!!
1) Plug wiring for operation without an acoustic hood fan.
Operation without an acoustic hood fan is only possible and permissible when the dummy plug is inserted.
2) Plug wiring for operation with an acoustic hood fan.
option
soundproofing casing
-X4
-X04 1)
-X04 2)
-M2 1,7 hp
controller
=K.1
-X1
-X2
GRD
TW
1U
1V
1W
ventilator, soundproofing casing
wiring diagram
booster compressor
N 253-G - N 2001-G
SKK-U1003.00
KAESER KOMPRESSOREN
Ursprung: UKKU1004_00
Ersatz für:
Ersatz durch:
Datum 18.02.2005
Bearb. Sitter
Gepr. Dusch
Norm
Name
Datum
Änderung
Blatt 4
Bl.
Function:
Group of function:


option
air cooling
-M4
TW
TW
6
GRD
W
V
U
M
3~
-M4
1,6 hp
TW
TW
7
-X2
GRD9
-X1
GRD
controller
=K.1
-X2
30
-X1
38
-X2
29
-X1
37
-X2
2W
-X1
2W
-X2
2V
-X1
2V
-X2
2U
-X1
2U
ventilator, air cooler
KAESER
KOMPRESSOREN
wiring diagram
booster compressor
N 253-G - N 2001-G
SKK-U1003.00
Blatt 5
Bl.
Ursprung: UKKU1004_00
Ersatz für:
Ersatz durch:
Datum 18.02.2005
Bearb. Sitter
Gepr. Dusch
Norm
Name
Datum
Änderung
Function:
Group of function:

1	2	3	4	5	6	7	8

-A03	ECO-Drain (automatic condensate drain) (option)
-B2	pressure switch initial pressure
-B3	pressure switch oil pressure
-B10.1, -B10.2, -B10.3	thermistor airend discharge temperature
-B11	excessive temperature switch
-M1	compressor motor
-X2	terminal strip, control

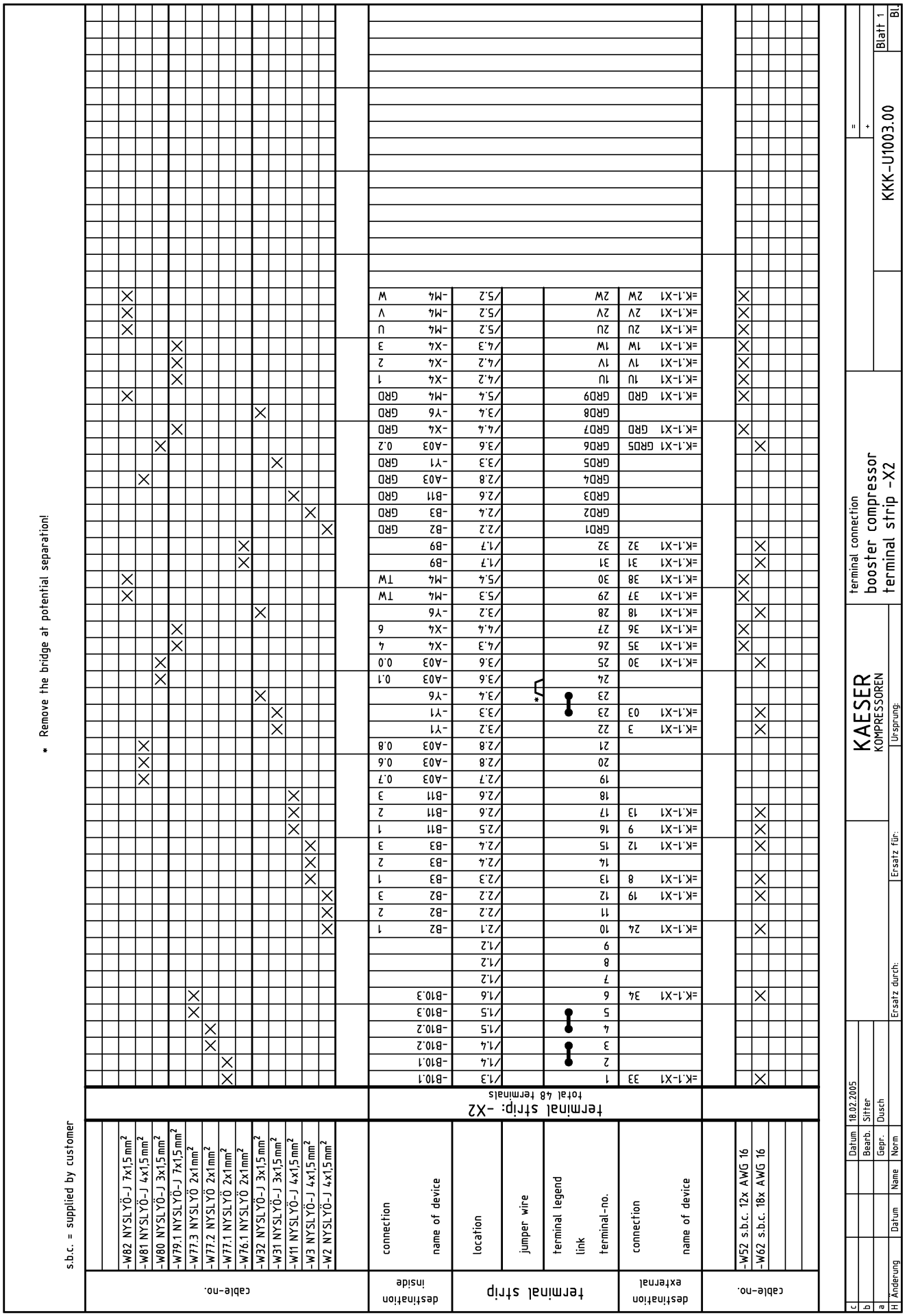
option

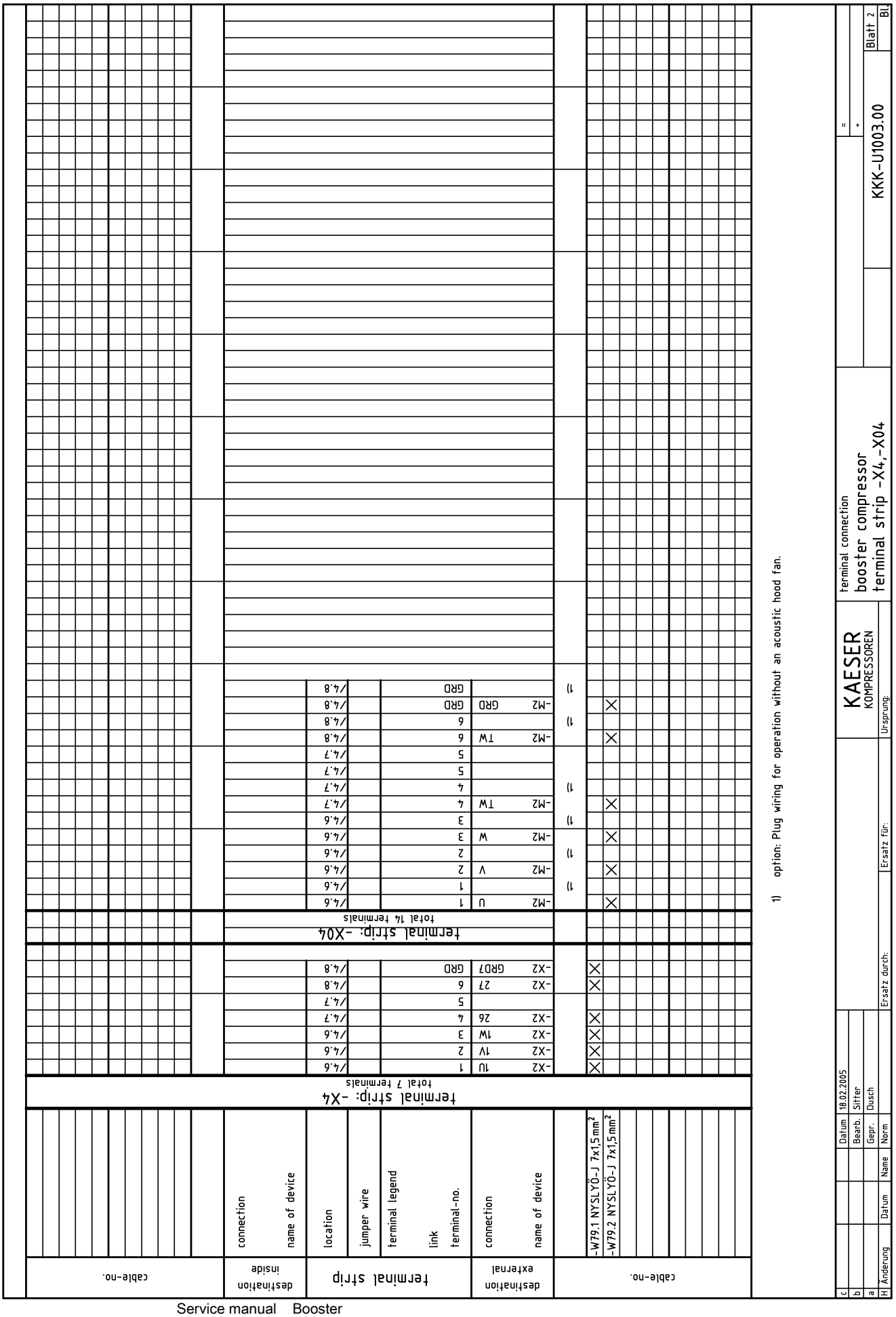
-Y1	control valve, combined control/vent valve (normally closed)
-M4	vent motor
-Y6	control valve and valve Nitrogen (normally open)
-B9	thermistor, compressor motor

option soundproofing casing

-M2	vent motor
-X4,-X04	plug-connector

c				Datum	18.02.2005		KAESER KOMPRESSOREN	component legend booster compressor N 253-G - N 2001-G		=	
b				Bearb.	Sitter					+	
a				Gepr.	Dusch						Blatt 6
E	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung: UKKU1004_00		SKK-U1003.00	Bl.


* Remove the bridge at potential separation!
s.b.c. = supplied by customer
terminal strip: -X2
total 48 terminals
destination external
terminal strip
destination inside
cable-no.
connection
name of device
location
jumper wire
terminal legend
link
terminal-no.
-W52 s.b.c. 12x AWG 16
-W62 s.b.c. 18x AWG 16
-W82 NYSLYÖ-J 7x1,5mm²
-W81 NYSLYÖ-J 4x1,5mm²
-W80 NYSLYÖ-J 3x1,5mm²
-W79.1 NYSLYÖ-J 7x1,5mm²
-W77.3 NYSLYÖ 2x1mm²
-W77.2 NYSLYÖ 2x1mm²
-W77.1 NYSLYÖ 2x1mm²
-W76.1 NYSLYÖ 2x1mm²
-W32 NYSLYÖ-J 3x1,5mm²
-W31 NYSLYÖ-J 3x1,5mm²
-W11 NYSLYÖ-J 4x1,5mm²
-W3 NYSLYÖ-J 4x1,5mm²
-W2 NYSLYÖ-J 4x1,5mm²
KAESER KOMPRESSOREN
Datum 18.02.2005
Bearb. Sitter
Gepr. Dusch
Ersatz durch:
Ersatz für:
Ursprung:
terminal connection
booster compressor
terminal strip -X2
KKK-U1003.00
Blatt 1
Änderung Datum Name Norm


terminal connection
booster compressor
terminal strip -X4,-X04
KAESER KOMPRESSOREN
KKK-U1003.00
Blatt 2
Bl.
Datum 18.02.2005
Bearb. Sitter
Gepr. Dusch
Norm
Name
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung:
cable-no.
destination external
name of device
connection
terminal strip
terminal legend
jumper wire
location
destination inside
-W79.1 NYSLYÖ-J 7x1,5 mm²
-W79.2 NYSLYÖ-J 7x1,5 mm²
terminal strip: -X4
total 7 terminals
terminal strip: -X04
total 14 terminals
1) option: Plug wiring for operation without an acoustic hood fan.

13.4 Pressure relief valve data sheet

SAFETY VALVES

Design SVW/SVWN/SVWC	DN 8	PN 50	-25 bis 180 °C	Type tested

Applications:

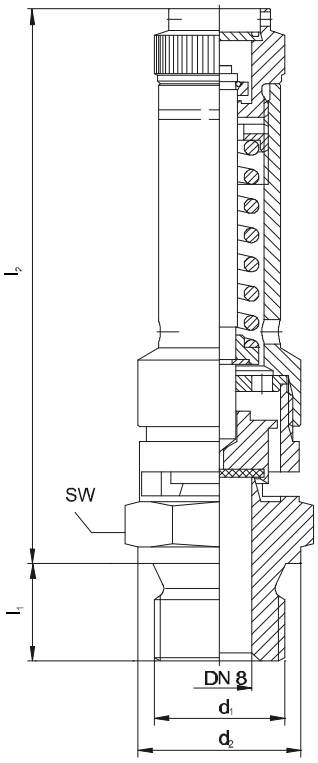
⇨ Suitable for compressed, similar non-inflammable and non-toxic gases; free discharge, not suitable for fluids and vapours.

Types:

SVW ⇨ 2.0401 (brass)
SVWC ⇨ 1.4104 (stainless steel)
SVWN ⇨ 1.4571 (stainless steel)

Characteristics:

Opening design +++ elastic seal (Viton) +++ spring of stainless steel +++ lifting device +++ connection thread according to DIN 3852 +++ mark of typetest TÜV +++ TÜV similar test and certificate (DIN EN 10204 / Germanischer Lloyd).



connection (d_1)	set pressure [bar]	d_2 [mm]	l_1 [mm]	l_2 [mm]	SW SVW	SW SVWN SVWC
M 16x1,5	00,30 – 14,20	20	12	63	20	22
	14,21 – 40,00			75		
	40,01 – 50,00			82		
G 1/4 A	00,30 – 14,20	18	10	63		
	14,21 – 40,00			75		
	40,01 – 50,00			82		
G 3/8 A	00,30 – 14,20	20	12	63		
	14,21 – 40,00			75		
	40,01 – 50,00			82		
G 1/2 A	00,30 – 14,20	24	14	63	24	24
	14,21 – 40,00			75		
	40,01 – 50,00			82		

Order term: (Please pay attention to advices at the reverse)

z.B. SVW 8 – 11 bar – G ¼ A – ...

- ... special design
- G ¼ A connection thread
- 11 bar set pressure
- 8 nominal diameter
- SVW design

Armaturen- und Metallwerke Zöblitz GmbH
Bahnhofstraße 16, 09517 Zöblitz Tel. 037363 480-0 / Fax 037363 480-90
Internet: www.armaturen-zoeblitz.de e-mail: info@armaturen-zoeblitz.de

SAFETY VALVES

Design SVW/SVWN/SVWC	DN 8	PN 50	-25 bis 180 °C	Type tested

Discharge capacity

p_e [bar]	qm [m³/h] bei 0°C/760 Torr
0,3	13,6
0,8	19,3
0,9	37,6
1,4	48,1
1,9	58,6
2	69,2
2,5	81,2
3	93,2
3,5	105,1
4	117,1
5	141,0
6	165,0
7	188,9
8	212,8
9	236,4
10	260,7
11	284,6
12	308,6
13	332,5
14	356,4
15	380,4
16	404,3
17	428,2
18	452,2
19	476,1
20	500,0
21	524,0
22	547,9

p_e [bar]	qm [m³/h] bei 0°C/760 Torr
23	571,8
24	595,8
25	619,7
26	643,6
27	667,6
28	691,5
29	715,4
30	739,4
31	763,3
32	787,2
33	811,2
34	835,1
35	859,0
36	883,0
37	906,9
38	930,8
39	954,8
40	978,7
41	1.002,6
42	1.026,6
43	1.050,5
44	1.074,4
45	1.098,4
46	1.122,3
47	1.146,3
48	1.170,2
49	1.194,1
50	1.218,1

Discharge capacities by 10% accumulation over the set pressure.

General notes:

Working temperautre for safety valves type SVWC –10 to 180°C.
Valves are delivered tested and sealed. Special designs (other connection thread, e. g. nickel-plated) on inquery.
Ordering safety valves please declare medium, temperature and other relevant details (if possible).
All rights are reserved for design changes. Safety notes and direction of maintenance you will find at backsite of our test certification or an inqury.

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SAFETY VALVES

Design SVW/SVWN/SVWC	DN 10	PN 50	-25 bis 180 °C	Type tested

Applications:

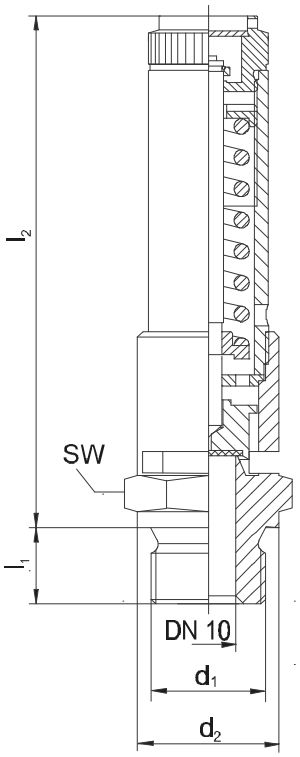
⇨ Suitable for compressed, similar non-inflammable and non-toxic gases; free discharge, not suitable for fluids and vapours.

Ausführungen

SVW ⇨ 2.0401 (brass)
SVWC ⇨ 1.4104 (stainless steel)
SVWN ⇨ 1.4571 (stainless steel)

Characteristics:

Opening design +++ elastic seal (Viton) +++ spring of stainless steel +++ lifting device +++ connection thread according to DIN 3852 +++ mark of typetest TÜV +++ TÜV similar test and certificate (DIN EN 10204 / Germanischer Lloyd).



connection (d_1)	Set pressure [bar]	d_2 [mm]	l_1 [mm]	l_2 [mm]	SW
G 3/8 A	00,30 – 08,51	22	12	75	27
	08,51 – 40,00			95	
	40,01 – 50,00			120	
G 1/2 A	00,30 – 08,51	26	14	75	
	08,51 – 40,00			95	
	40,01 – 50,00			120	
G 3/4 A	00,30 – 08,51	32	16	75	32
	08,51 – 40,00			95	
	40,01 – 50,00			120	

Order term: (Please pay attention to advices at the reverse.)

z.B. SVW 10 – 11 bar – G 3/8 A – ...

- ... special design
- G 3/8 A connection thread
- 11 bar set pressure
- 10 nominal diameter
- SVW Design

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SAFETY VALVES

Design SVW/SVWN/SVWC	DN 10	PN 50	-25 bis 180 °C	Type tested

Discharge capacity

p_e [bar]	qm [m³/h] bei 0°C/760 Torr
0,3	24,0
0,8	59,4
1,3	76,9
1,8	94,5
2,3	112,1
2,8	129,5
3,3	147,1
3,8	164,1
4	199,8
5	240,7
6	281,5
7	322,4
8	363,3
9	404,0
10	444,9
11	485,8
12	526,6
13	567,5
14	608,3
15	649,2
16	690,0
17	730,8
18	771,7
19	812,6
20	853,4
21	894,3
22	935,1
23	975,9

p_e [bar]	qm [m³/h] bei 0°C/760 Torr
24	1.016,8
25	1.057,7
26	1.098,5
27	1.139,4
28	1.180,2
29	1.221,1
30	1.261,9
31	1.302,7
32	1.343,6
33	1.384,5
34	1.425,3
35	1.466,2
36	1.507,0
37	1.547,8
38	1.588,7
39	1.629,5
40	1.670,4
41	1.711,3
42	1.752,1
43	1.792,9
44	1.833,8
45	1.874,6
46	1.919,5
47	1.956,4
48	1.997,2
49	2.038,1
50	2.078,9

Discharge capacities by 10% accumulation over the set pressure .

General notes:

Working temperautre for safety valves type SVWC –10 to 180°C.
Valves are delivered tested and sealed. Special designs (other connection thread, e. g. nickel-plated) on inquery.
Ordering safety valves please declare medium, temperature and other relevant details (if possible).
All rights are reserved for design changes. Safety notes and direction of maintenance you will find at backsite of our test certification or an inqury.

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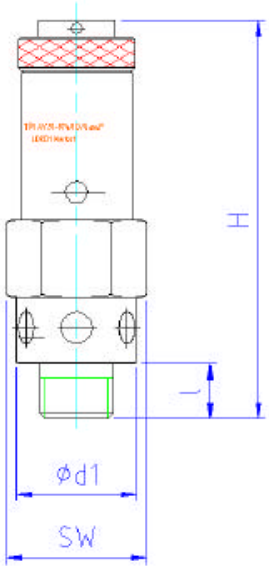
Sicherheitsventil / safety valve Typ L08

Zulassung / homologation :	CE 97/23/EG
Druckbereich / pressure range:	0,3-47,0 bar
Anschlussgewinde / inlet connection :	G ¼“, G 3/8 oder / or G 1/2“
Ausgangsgewinde / outlet connection:	frei abblasend / free outlet
Nennweite / nominal size:	8 mm
Temperaturbereich / temperature range:	-10°C bis + 180°C



AnschlußGewinde Threaded connection	Druckbereich Pressure range (bar)	H (mm)	l (mm)	Drehmoment Torque (Nm)	Schlüsselweite Width across (mm)	d1 (mm)
G ¼	0,3-0,9	72	10	14	22	21,8
	9,4-21,0	81	10	14	22	21,8
	21,1-47,0	88	10	14	24	23,8
G 3/8	0,3-0,9	72	10	40	22	21,8
	9,4-21,0	81	10	40	22	21,8
	21,1-47,0	88	10	40	24	23,8
G ½	0,3-0,9	73	12	65	27	26,8
	9,4-21,0	82	12	65	27	26,8
	21,1-47,0	90	12	65	27	26,8
M 18 x 1,5	0,3-0,9	72	10	40	22	21,8
	9,4-21,0	81	10	40	22	21,8
	21,1-47,0	88	10	40	24	23,8

Bezeichnung /	Werkstoff / material
Gehäuse / body	Messing / brass
Dichtung / seal	Elastomere (Silikon (0,3-2,3 bar, VITON 2,4-47 bar)
Kegel / cone	Messing / brass
Zugstange / spindle	Messing / brass
Einstellschraube / adjusting screw	Messing / brass
Druckfeder / spring	Stahl/steel EN 10270-1 DH

Sicherheitsventil / safety valve Typ L08

Leistungsdaten / flow rate**

Druck / Set pressure (bar)	m3/h	l/min
1	46	758
2	69	1157
3	67	1116
4	85	1410
5	102	1697
6	132	2208
7	151	2516
8	171	2848
9	190	3166
10	209	3483
12	248	4133
14	286	4767
16	325	5405
18	364	6067
20	402	6701
22	445	7450
24	479	7983
26	517	8625
28	555	9266
30	599	9983
32	632	10548
34	671	11189
36	709	11830
38	748	12471
40	796	13267
42	825	13753
44	863	14394
46	902	15035
47	921	15356

**Die angegebenen Leistungen werden bei 10% (PE <1 bar, + 0,1bar) Druckanstieg erreicht, gemessen mit Druckluft bei 20°C. Für andere Gase und Temperaturen ändern sich die Abblaseleistungen.
**The specified rates are measured at 10% (PE <1 bar, + 0,1 bar) pressure rise over the set pressure with compressed air at 20°C. The blow-off rates are different for other gases and temperatures