Service manual

Screw compressor

Aircenter SX 3/7.5 SIGMA CONTROL BASIC

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Original instructions
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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 Additional Documents

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

- Certificate of acceptance / operating instructions for the pressure vessel.

Missing documents can be requested from KAESER.

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

1.3 Copyright

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

1.4 Symbols and Identification

1.4.1 Warnings

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

- DANGER
- WARNING
- CAUTION

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

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

- ➢ Always read and comply with warning instructions.

Signal word	Meaning	Consequences of non-observance
DANGER	Warns of an imminent threat of danger	Death or serious injury may result
WARNING	Warns of possible danger	Death or serious injury are possible

Signal word	Meaning	Consequences of non-observance
CAUTION	Warns of a possibly dangerous situation	Light injuries or material damage are possible

Tab. 1 The levels of danger and their meaning

1.4.2 Other instructions and symbols

This symbol refers to particularly important information.

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

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

Option H1 — ➢ This bullet is is placed by lists of actions comprising one stage of a task.
In lists of actions with several stages the sequence of actions is numbered.
Information 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 mountings). Option indicators used in this service manual are explained in chapter 2.2 .

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

The nameplate is located on the outside of the machine:

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

➢ Enter data from the nameplate here as reference:

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

Tab. 2 Nameplate

2.2 Options

The table contains a list of possible options.

➢ Enter options here as a reference.

Option	Option code	Exists?
Modulating control	C1	
LOAD-IDLE control by remote contact	C16	
Direct online starting	C17	
Microfilter	F1	
Activated carbon filter	F2	
Adjustable machine feet	H1	
Air-cooling	K1	
Transformer power supply	T2	

Option	Option code	Exists?
Refrigeration dryer	T3	

Tab. 3 Options

2.3 Weight

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

	SX 3	SX 7.5
Weight [lb]	628	661

Tab. 4 Machine weight

2.4 Temperature

	SX 3	SX 7.5
Minimum cut-in temperature [°F]	40	40
Typical airend discharge temperature during operation [°F]	150–200	150–200
Maximum airend discharge temperature (automatic safety shut-down) [°F]	230	230

Tab. 5 Temperature

2.5 Ambient Conditions

	SX 3	SX 7.5
Maximum elevation [ft]	10 000	10 000
Permissible ambient temperature [°F]	40–115	40–115
Cooling air temperature [°F]	40–115	40–115
Inlet air temperature [°F]	40–115	40–115
Maximum relative humidity of intake air	see figure 1	see figure 1
* Higher elevation permissible only after consultation with the manufacturer.		

Tab. 6 Ambient conditions

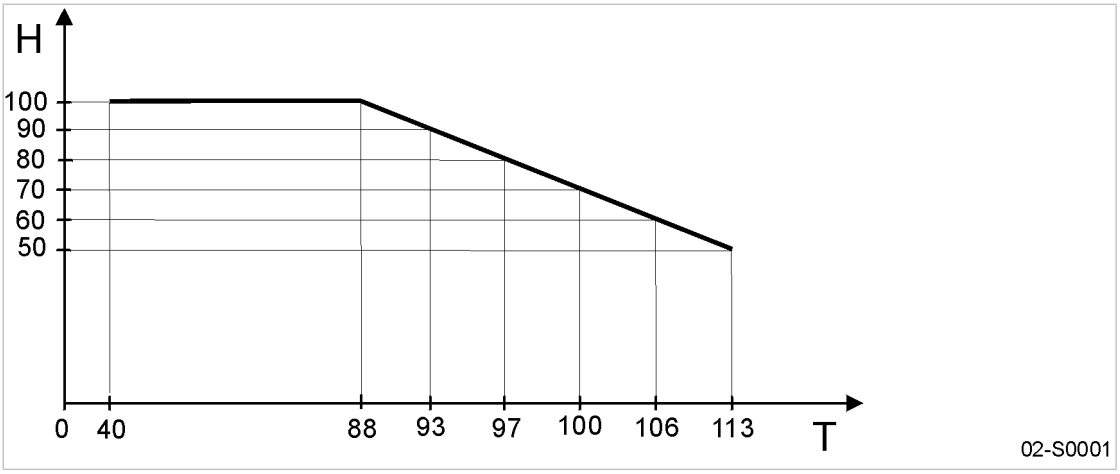


Fig. 1 Maximum relative humidity

Ⓣ Intake air temperature [°C]
Ⓗ Maximum relative humidity of intake air [%]

2.6 Ventilation

The values given are minimum guide values.

	SX 3	SX 7.5
Inlet aperture Ⓩ see figure 14 [ft]	2.2	2.2
Exhaust fan for forced ventilation: Flow rate [cfm] at 100 Pa.	883	1530

Tab. 7 Ventilation

2.7 Pressure

Maximum working pressure: see nameplate

	SX 3	SX 7.5
Safety relief valve activating pressure [psig]	230	230

Tab. 8 Safety relief valve activating pressure

2.8 Air receiver

Volume

	SX 3	SX 7.5
Volume [gal]	70	70

Tab. 9 Air receiver: Volume

Safety relief valve activating pressure [psig]

Maximum working pressure: see air receiver nameplate

	SX 3	SX 7.5
Safety relief valve activating pressure [psig]	160	160

Tab. 10 Safety relief valve: activating pressure

2.9 Free air delivery

	SX 3	SX 7.5
FAD at 160 psig[cfm] Altitude: above sea level	7.77	23.66
FAD at 160 psig [cfm] Altitude: 3,280 ft	7.70	23.48
FAD at 160 psig [cfm] Altitude: 6,560 ft	7.63	23.27
FAD at 160 psig [cfm] Altitude: 9,840 ft	7.59	23.10

Tab. 11 Free air delivery

2.10 Sound pressure level

Operational state:

- Nominal flow rate
- Nominal pressure

Measurement conditions:

- Free-field measurement to CAGI/PNEUROP PN8 NTC 2.3
- Measurement distance: 3.3 ft.

	SX 3	SX 7.5
Sound pressure level [dB(A)]	62	66

Tab. 12 Sound pressure level

2.11 Motors and power

2.11.1 Compressor drive motor

	SX 3	SX 7.5
Rated power [hp]	3.0	7.5
Rated speed [rpm]	3490	3540
Enclosure protection	TEFC	

Tab. 13 Compressor drive motor

2.12 Cooling Oil Recommendation

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

Information for ordering cooling oil can be found in chapter 13.4.

2.12.1 Basic Information

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

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

2.12.2 KAESER Lubricants

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

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

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

Regardless of the lubricant selected, the KAESER SIGMA lubricants will separate readily from water. If condensate occurs it can easily be removed. Let the compressor sit so that any water can drain back to the separator tank and separate to the bottom. See chapter 10.14 proper draining procedure.

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

M-SERIES:

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

S-SERIES:

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

Specialty KAESER LUBRICANTS:

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

2.13 Cooling oil Volume

The charge of cooling oil for machines with heat recovery is increased by the volume of oil in the heat exchanger and connecting lines.

	SX 3	SX 7.5
Total charge [gall]	3.2	3.2
Topping up volume [quart] (minimum–maximum)	0.13	0.13

Tab. 14 Cooling oil charge

2.14 Power Supply

Basic requirements

The machine is designed for an electrical supply according to National Electric Code (NEC) NEC–670, particulary 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.

Three-phase

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

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

Other power supplies are not suitable.

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

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

Further information Please contact authorized KAESER Service representative for options.

The electrical diagram 13.4 contains further specifications for electrical connection.

2.15 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.

Mains voltage: 400V±10%/3/60Hz

	SX 3	SX 7.5
Pre-fuse[A]	10	20
Supply	4xAWG14	4xAWG14
Consumption [A]	6.3	12

Tab. 15 Connection data

Mains voltage: 460V±10%/3/60Hz

	SX 3	SX 7.5
Pre-fuse[A]	10	15
Supply	4xAWG14	4xAWG14
Consumption [A]	5.7	10.7

Tab. 16 Connection data

2.16 Refrigeration dryer

Model

	SX 3	SX 7.5
Model *		
*Transfer data from dryer nameplate to the table.		

Tab. 17 Refrigeration dryer: Model

Compressed air system

	ABT 4	ABT 8
Pressure drop [psig] (referred to 100 psig working pressure)	1.6	1.6
Maximum permitted working pressure [psig]	232	232

Tab. 18 Refrigeration dryer: compressed air system

Refrigerant circuit

The refrigeration dryer contains a refrigerant that is classified by the Kyoto Protocol as a fluoridised global warming gas.

	ABT 4	ABT 8
Refrigerant	R 134a	R 134a
Global warming potential (GWP)	1300	1300
Charge quantity* [lb]		
Maximum permitted working pressure [psig]	261	261
Safety pressure switch: shutdown pressure [psig]	261	261
* Read off the charge quantity from the dryer nameplate and enter it in the table.		

Tab. 19 Refrigeration dryer: refrigerant circuit

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 industrial use in generating compressed air. Any other use is incorrect and does not comply with requirements. The manufacturer is not liable for any resulting damages. The risk involved in such incorrect use is taken solely by the user.

➢ 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 for such.

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

3.3 Improper Use

➢ Never direct compressed air at persons or animals.

➢ Cooling air, warmed after passing through the machine, may be used for heating purposes but only when it poses no health risk to humans or animals. If necessary, hot cooling air should be treated by suitable means.

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

➢ Do not operate the machine in areas in which specific requirements with regard to explosion protection are applied.

3.4 User's Responsibilities

3.4.1 Observe statutory and universally accepted regulations

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

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

3.4.2 Qualified personnel

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

Authorized operators possess the following qualifications:

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

Authorized installation and maintenance personnel have the following qualifications:

- are of legal age,
- have read, are conversant with and adhere to the safety instructions and sections of the service manual applicable to installation and maintenance,
- are fully conversant with the safety concepts and regulations of electrical and compressed air engineering,
- are able to recognize the possible dangers of electrical and compressed air devices and take appropriate measures to safeguard persons and property,
- have received adequate training and authorization for the safe installation and maintenance on this equipment.
- Additional qualifications for compressors with refrigeration dryers:
  - fully conversant with the safety concepts and regulations concerning refrigeration devices,
  - must be able to recognize the possible dangers of refrigeration devices and take appropriate measures to safeguard persons and property.

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

3.4.3 Adherence to inspection schedules and accident prevention regulations

The compressor and air receiver are subject to any local inspection schedules.

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 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 then no longer ensured.

Compressed air quality

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

Spring tension

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

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

- ➢ Do not open or dismantle any valves.

Rotating components

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

- ➢ Do not open the enclosure while the machine is 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 airends or blocks, oil and compressed air lines, coolers, oil separator tanks, motors and machine heaters.
- ➢ Wear protective clothing.
- ➢ If welding is carried out on or near the machine, take adequate measures to prevent sparks or heat from igniting oil vapors or parts of the machine.

Noise

- ➢ Operate the machine only with full soundproofing.
- ➢ Wear 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 vapor.
- ➢ Do not eat or drink while handling cooling and lubricating fluids.
- ➢ Keep suitable fire extinguishing agents ready for use.
- ➢ Use only KAESER approved operating materials.

Unsuitable spare parts

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

Conversion or modification of the machine

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

Extension or modification of the compressed air system

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

3.5.2 Safe Machine Operation

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

Transport

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

Installation

- ➢ Install the machine in a suitable compressor room.
- ➢ If installed outdoors, the machine must be protected from frost, direct sunlight, dust, rain and splashing water.
- ➢ Do not operate in areas in which specific requirements with regard to explosion protection are in force.
  For instance, the requirements of ATEX directive 94/9/EC "Equipment and Protective Systems intended for use in Potentially Explosive Atmospheres".
- ➢ Ensure adequate ventilation.
- ➢ Ensure that required ambient conditions are maintained with regard to:
  - ambient temperature and humidity,
  - clean inlet air with no damaging contaminants,
  - inlet air free of explosive or chemically unstable gases or 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, compressor oil and cooling water.
- ➢ Give refrigerant only to authorized groups for disposal.
- ➢ Dispose of the machine in accordance with local environmental regulations.

3.5.3 Organizational Measures

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

3.5.4 Danger Areas

The table gives information on the areas dangerous to personnel.

Only authorized personnel may enter these areas.

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

Tab. 20 Danger Areas

3.6 Safety Devices

Various safety devices ensure safe working with the machine.

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

Further information More information on safety devices is contained in chapter 4, section 4.9.

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.

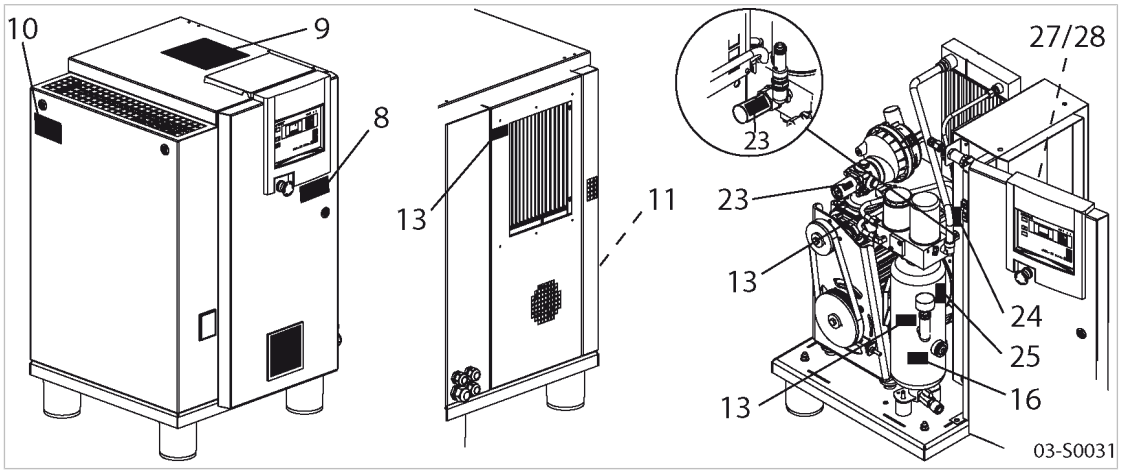


Fig. 4 Location of safety signs

Item	Symbol	Meaning
8		Danger of fatal injury from touching electrically live components! ➢ Switch off and lock out the supply disconnecting device and check that no voltage is present.
9		Machine starts automatically! Severe injury could result from rotating components, electrical voltage and air pressure. ➢ Isolate from the power supply and lock out before opening any machine enclosure or guard.
10	 	Severe injury could result from touching the belt drive or fan blade! ➢ Operate the machine only with fully closed safety guards, access doors and panels. ➢ Isolate from the power supply and lock out before opening any machine enclosure or guard.
11		Injury and/or contamination can result from breathing compressed air! Contamination of food can result from using untreated compressed air for food processing! ➢ Never breathe untreated compressed air. ➢ Air from this compressor must meet OSHA 29CFR1910.134 and FDA 21CFR178.3570 standards, if used for breathing or food processing. Use proper compressed air treatment.
13		Hot surface can cause burns! ➢ Let the machine cool down. ➢ Wear long-sleeved garments (not synthetics such as polyester) and protective gloves.
16		Wrong cooling oil level can cause machine defects or rising oil consumption (oil content for pure air)! ➢ Check the oil level regularly and top up as necessary.
23		Serious injury or death can result from loosening or opening component that is under pressure and heavily spring loaded! ➢ Do not open or dismantle the valve. ➢ Call for authorized KAESER Service representative if a fault occurs.
24		Serious injury or death can result from loosening or opening component under pressure! ➢ De-pressurize all pressurized components and enclosures. ➢ Secure that machine keeps de-pressurized. ➢ Check that machine is de-pressurized.
25		Ear damage and burns can result from loud noise and/or oil mist when the safety relief valve opens! ➢ Wear ear protection and protective clothing. ➢ Close all access doors and cover panels.
27		Risk of electric shock! If the interrupter has tripped current-carrying components of the controller should be examined and replaced if damaged to reduce the risk of fire or electric shock.

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

Tab. 21 Safety Signs

3.8 In Emergency

3.8.1 Fire fighting

Suitable extinguishing media

- Foam
- Carbon dioxide
- Sand or dirt

Unsuitable or unsafe extinguishing media

- Strong water jet

1. Keep calm.
2. Give the alarm.
3. Switch off the main power supply disconnect device if possible.
4. Move to safety:
   - warn any persons in danger
   - help incapacitated persons
   - close the doors
5. Try and extinguish the fire if you have the knowledge to do so.

3.8.2 Remove any compressor cooling oil from your person.

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

➢ Skin contact
Wash off immediately

3.8.3 Injury from Handling Refrigerant

Eye contact:

➢ Rinse thoroughly with lukewarm water and seek medical assistance.

Skin contact:

➢ Wash off immediately.

➢ Treat burns and frostbite appropriately.

Inhalation:

- ➢ Remove the affected person to fresh air and make him or her rest.
- ➢ If breathing stops, apply artificial respiration and call for medical assistance.

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 cooling oil.

- ➢ Do not allow cooling oil to escape to the environment or into the sewage system.

4 Design and Function

4.1 Housing

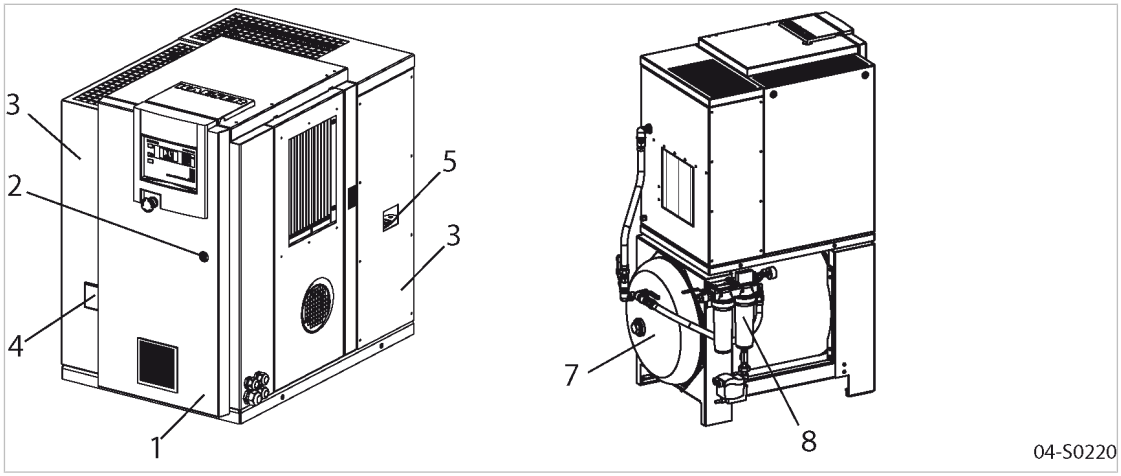


Fig. 5 Enclosure

1 Control cabinet door
2 Latch
3 Panel
4 Oil level indicator viewing window
5 Operating hours counter viewing window
6 Refrigeration dryer enclosure
7 Air receiver
8 Filter (optional)

The enclosure, when closed, serves various functions:

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

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

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

4.2 Function

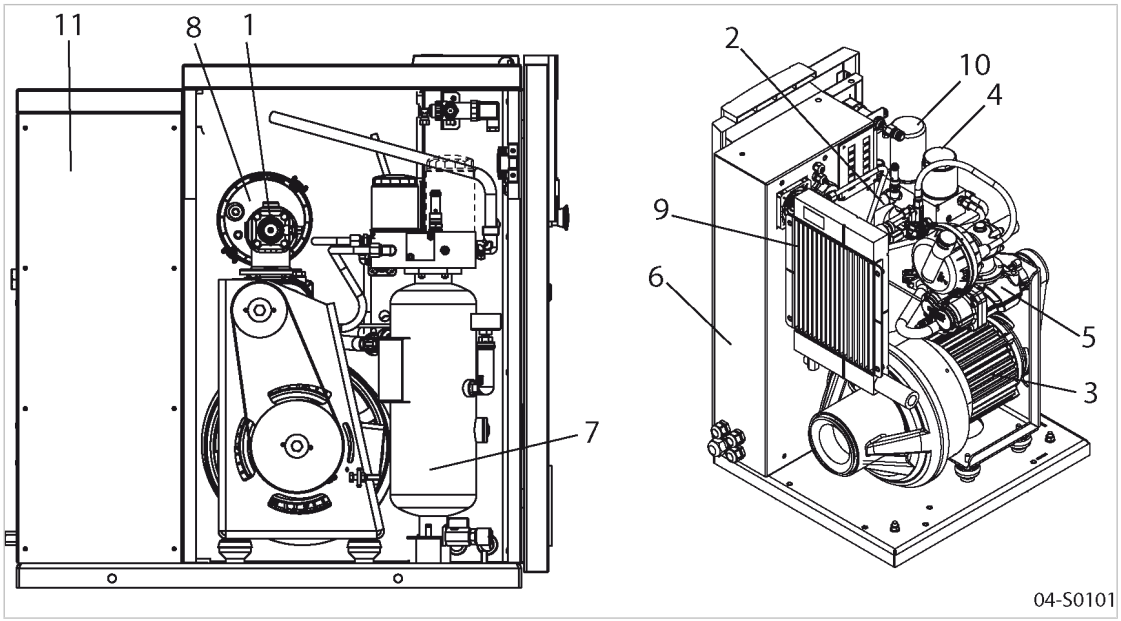


Fig. 6 Machine layout

1 Inlet valve
2 Minimum pressure / check valve
3 Drive motor
4 Oil filter
5 Airend
6 Control cabinet
7 Oil separator tank
8 Air filter
9 Oil/air cooler
10 Oil separator cartridge
11 Add-on cabinet for refrigeration dryer

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

The air is then compressed in the airend 5.

The airend is driven by an electric motor 3.

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

Cooling oil recovered from the compressed air in the oil separator tank 7 and separator cartridge 10 gives up its heat in the oil cooler 9. The oil then flows through the oil filter 4 and back to the point of injection. Pressure within the machine keeps the oil circulating. A separate pump is not necessary. A thermostatic valve maintains optimum cooling oil temperature.

Compressed air passes through the minimum pressure / check valve 2 into the air cooler 9. The minimum pressure / check valve ensures that there is always a minimum internal air pressure sufficient to maintain cooling oil circulation in the machine.

The cooler brings down the compressed air temperature to only 9 to 18 F above ambient. Most of the moisture carried in the air is removed during this cooling process.

4.3 Refrigeration Dryer

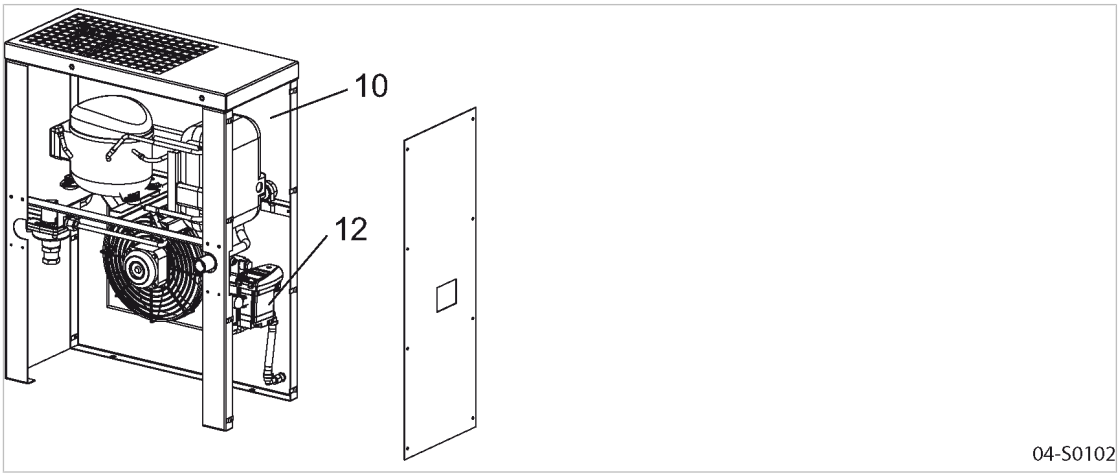


Fig. 7 Refrigeration Dryer
[10] Refrigeration Dryer
[12] Condensate drain

The downstream refrigeration dryer removes moisture from the compressed air.
The condensate drain ejects the precipitate.

4.4 Air receiver

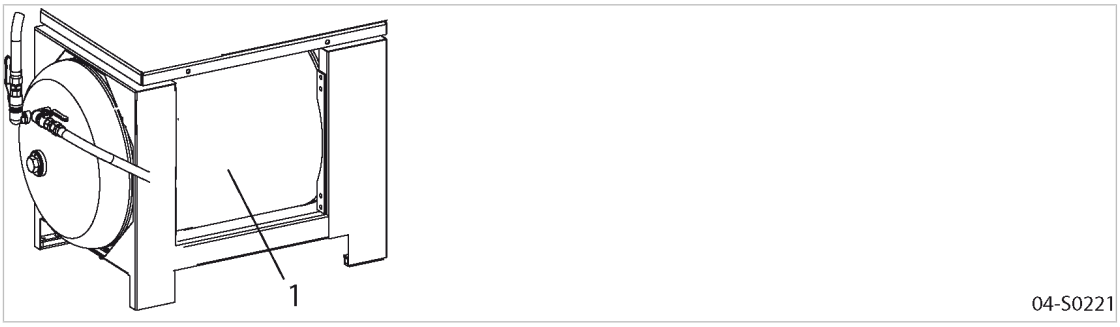


Fig. 8 Air receiver
[1] Air receiver

The compressed air stored in the air receiver filters out peaks in air consumption.
Condensate can be drained by a manually operated drain valve.

4.5 Floating relay contacts

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

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

4.6 Options

The options available for your machine are described below.

4.6.1 Option H1 Machine mountings

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

Fig. 9 Machine mountings

4.6.2 Option C16 LOAD-IDLE control by remote contact

The program module enables control of the LOAD phase by an external floating relay contact (remote contact).

Do not remove the program module

- The machine can no longer be operated once the module has been removed.
- The program module can only control the machine in which it is first installed.

➢ Contact KAESER with any queries concerning the use of the program module.

Connections

Delivery condition

- The connections in the controller are wire bridged.
- With the bridge in place, the compressor controller toggles the machine between LOAD and IDLE.
- The switching point is the system pressure setpoint.

➢ Reset to the delivery condition if the machine is to be regulated by the internal controller and the program module is still plugged in.

Remote contact function

- Contact closed: LOAD
- Contact open: IDLE

Program module

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

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

➢ Set the setpoint pressure switching point 6 psig higher than the required compressed air system pressure.

This ensures that in the event of the internal controller failing, the system pressure will regulate according to the parameters of switching point and switching differential. This prevents excessively high system pressure by, say, a continuous external load signal.

4.6.3 Option F1 Microfilter

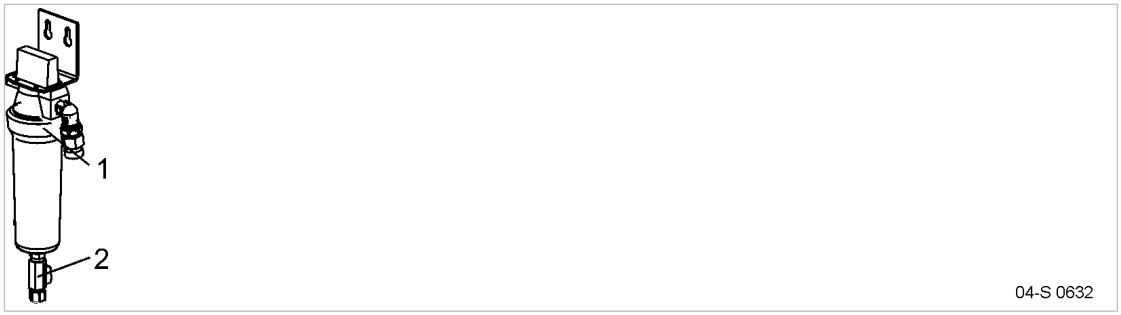


Fig. 10 Microfilter

1 Microfilter
2 Ball valve

The microfilter removes aerosols and solid particles from the compressed air.

Condensate is drained off by a ball valve.

4.6.4 Option F2 Activated carbon filter

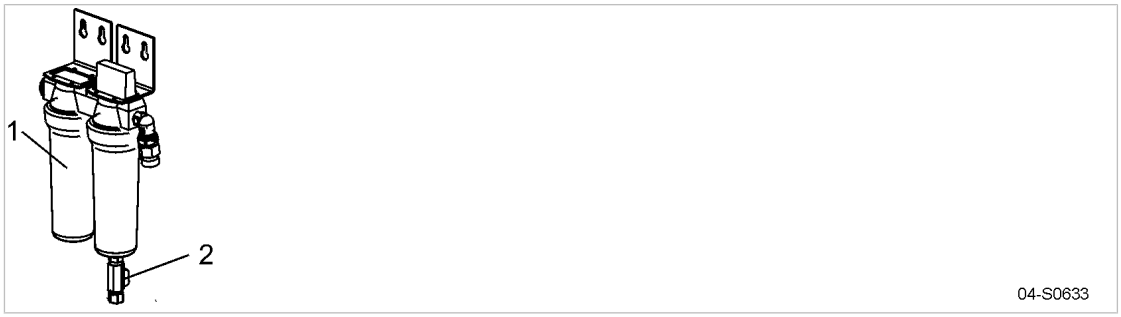


Fig. 11 Activated carbon filter

1 Activated carbon filter
2 Microfilter (option F1)
3 Ball valve

The activated carbon filter removes oil and hydrocarbon vapours that can be adsorbed by activated carbon, including solid particles, from the compressed air.
It is alwasy used together with a microfilter.

4.7 Operating modes and control modes

4.7.1 Operating modes

The machine operates in the following modes:

- LOAD:
  The inlet valve is open. The airend delivers compressed air to the distribution network.
  The drive motor runs under full load.
- IDLE:
  The inlet valve is closed. The minimum pressure/check valve shuts off the oil separator from the distribution network. The oil separator tank is vented.
  A small volume of air circulates through the bleed hole in the inlet valve, through the airend and back to the inlet valve via the venting valve.
  The compressor motor runs without load and draws little current.
- STANDSTILL:
  The inlet valve is closed. The minimum pressure/check valve shuts off the oil separator from the distribution network. The oil separator tank is vented.
  The drive motor is stopped.

Option C1
- PROPORTIONAL:
  With the help of a control valve (proportional controller), the degree of opening of the inlet valve is continuously varied in relation to the actual air demand. The airend delivers compressed air to the distribution network.
  The load and power consumption of the drive motor rises and falls with the air demand.
  The regulating valve is factory set. The setting should not be changed without consultation with KAESER Service.

4.7.2 Control modes

Using the selected control mode, the controller switches the compressor between its various operational states in order to compensate for air being drawn of by consumers and maintain system pressure between the set minimum and maximum values.

The SIGMA CONTROL BASIC can work with the following control modes:

- DUAL
- QUADRO

Option C1
- MODULATING control

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

DUAL

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

The *idling time* is fixed in SIGMA CONTROL BASIC.

QUADRO

In the QUADRO mode, the controller operates as in the DUAL mode during periods of high air demand by switching between LOAD and IDLE, but during periods of low air demand it switches directly to STANDSTILL.

This mode of control requires two preset time periods: the *running period* and the *idle/standstill period*.

The *idling/stopped* and the *running time* are set in SIGMA CONTROL BASIC.

Option C1 MODULATING control

MODULATING control is based on the DUAL control mode. The difference to DUAL is that the gas delivery is continuously varied within the control range of the machine.
This control mode is not available on variable speed machines with a frequency-controlled drive (SFC).

Compressed air demand	Operating states
Rises	MODULATING LOAD
Falls	MODULATING IDLE STANDSTILL

Tab. 22 Operating states under MODULATING control

4.8 Refrigeration Dryer Control Modes

The controller can operate in the following modes:

- CONTINUOUS
- TIMER

CONTINUOUS

In this mode the refrigeration dryer runs continuously, even if the compressor is shut down.

This mode of control is set up at the factory.

TIMER

The refrigeration dryer is time-controlled and is switched on and off when the compressor is stopped. In this mode, the operating temperature is held within tight limits.

This control mode saves energy.

Which control mode is the most practical, and when?

Control mode	Advantage	Disadvantage
CONTINUOUS	Constant dew point.	Higher power consumption when the compressor is shut down

Control mode	Advantage	Disadvantage
TIMER	Lower power consumption when the compressor is shut down	Brief increase in dew point when the compressor re-starts

Tab. 23 Refrigeration dryer control modes

4.9 Safety Devices

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

- «EMERGENCY STOP» button,
  The «EMERGENCY STOP» button shuts down the machine immediately. The motor remains stopped. The pressure system is vented.
- Safety relief valve:
  The safety relief valve protects the machine from excessive pressure. This is factory set.
- Door interlock switches:
  The machine will stop automatically if a safety interlocked door or panel is opened or removed.
- Enclosures and covers for moving parts and electrical connections:
  These protect against accidental contact.

4.10 SIGMA CONTROL BASIC Keys and Indicators

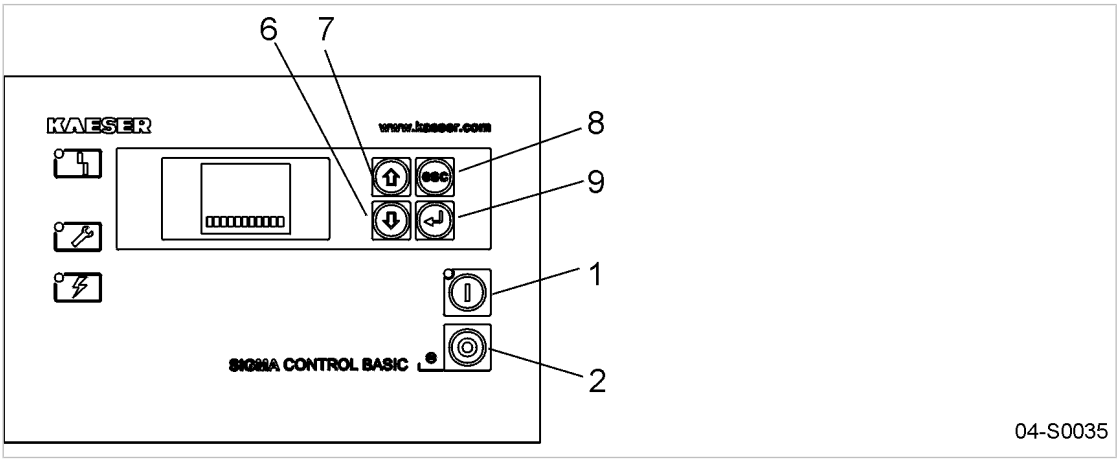


Fig. 12 Keys

Item	Description	Function
1	«ON»	Switches the machine on.
2	«OFF»	Switches the machine off. Resets alarms. Resets the maintenance interval counter.
6	«DOWN»	Scrolls down the parameter list. Reduces a parameter value.
7	«UP»	Scrolls up the parameter list. Increases a parameter value.
8	«escape»	Exits the edit mode without saving.

Item	Description	Function
9	«enter»	Enters edit mode. Exits the edit mode and saves. Only affects the value in the third line of the display.

Tab. 24 Keys

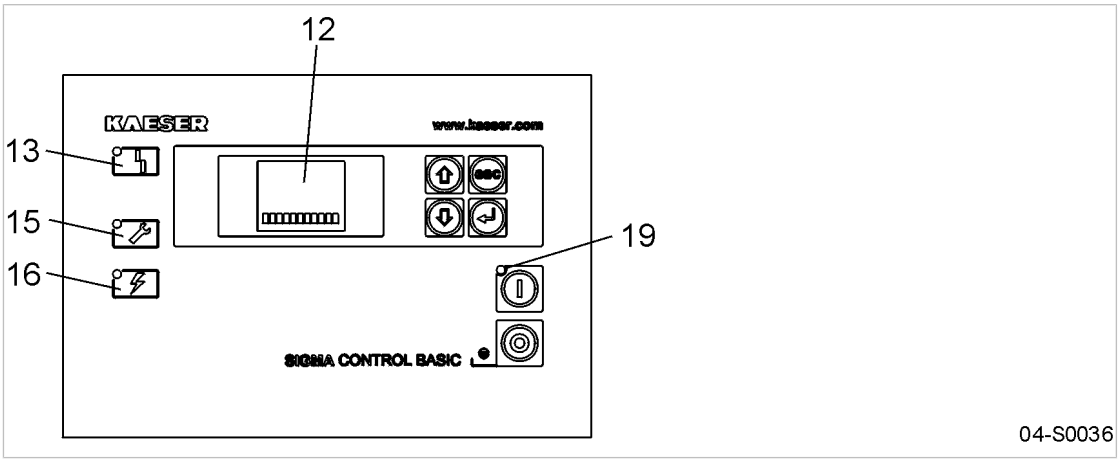


Fig. 13 Indicators

Item	Description	Function
12	Display field	Alphanumeric display with 4 lines.
13	*Alarm*	Flashes red when an alarm occurs. Lights continuously when acknowledged.
15	*Warning*	Lights yellow for: ■ maintenance work due, ■ warning messages
16	*Controller power*	Lights green when the power supply to the controller is switched on.
19	*Machine ON*	Lights green when the machine switched on.

Tab. 25 Indicators

4.11 SIGMA CONTROL BASIC function

4.11.1 Display layout

```
      xx.x psig
         yy °F
z      0000 h
12345678SpTi
```

Line 1
Line 2
Line 3
Line 4

Line	Display	Meaning
1	xx.x	Current system pressure in bar, psi or MPa.
2	yy	Current airend discharge temperature (ADT) in °C or °F.
3	z	Display of parameters and their settings (see table 27)

Line	Display	Meaning
4	1, 2, ...	Error code for alarm and warning messages (see table 32 and table 33).
	➡	Operating state: LOAD:
	⇨	Operating state: IDLE:

Tab. 26 Display

4.11.2 Parameters

Parameters	Meaning
0	**Operating hours counter** Displays the period during which the drive motor was switched on. KAESER Service reserve the right to change these parameters.
1	**Load hours counter** Shows the number of hours the drive motor has run under LOAD. KAESER Service reserve the right to change these parameters.
2	**Maintenance interval counter** Displays the number of operating hours until the next scheduled maintenance is due. SIGMA CONTROL BASIC counts down the operating hours from a default value. The warning message 'S' is displayed when the counter reaches zero. The maintenance interval counter is reset to its default value after the maintenance work has been carried out. The interval starts anew. A password is required to change these parameters.
3	**Relief valve test mode** This function switches the activating pressure check mode for the pressure relief valve on and off. The warning message *i* is displayed when the check mode is switched on. See chapter 10.9 for the password and carrying out the check. A password is required to change these parameters.
4	**Unit of measurement for display of temperature** The airend discharge temperature can be displayed in either °C or °F.
5	**Unit of measurement for display of pressure** The current working pressure can be displayed in bar, psi or MPa.
6	**Control modes** Factory setting: OFF This parameter changes the control mode. ■ OFF: QUADRO ■ ON: DUAL
7	**Refrigeration dryer control modes** Factory setting: OFF This parameter changes the dryer control mode. ■ OFF: TIMER ■ ON: CONTINUOUS

Parameters	Meaning
8	**Switching the refrigeration dryer on and off** Factory setting: ON This parameter switches the dryer permanently on or off. ■ OFF: Dryer switched off ■ ON: Dryer switched on A password is required to change these parameters.
C	**Setpoint pressure: switching differential** The switching differential determines the difference between cut-in pressure and cut-out pressure (system pressure setpoint: switching point) and therefore the switching frequency from LOAD to IDLE. Range of adjustment [psig]: −1.5 ... −72
D	**Setpoint pressure: switching point** The switching point corresponds to the working pressure of the air system and the cut-out pressure of the machine. Range of adjustment [psig]: 80 ... maximum working pressure
E	**Maximum working pressure** The machine can deliver air up to this working pressure (see nameplate). KAESER Service reserve the right to change these parameters.
F	**Options** The displayed value informs KAESER Service concerning the controller's internal machine configuration.

Tab. 27 Parameters

Further information Means of changing or adjusting parameters are given in chapter 8.4.

4.11.3 Messages

Alarm message

An alarm shuts the machine down automatically. The red LED 13 flashes (figure 13).

Warning message

The yellow LED lights 15 to indicate a warning (figure 13).

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 with regard to explosion protection are in force.
- ➢ Ensure that required ambient conditions are maintained with regard to:
  - Ambient temperature and humidity
  - clean inlet air with no damaging contaminants,
  - explosive or chemically unstable gases or vapors,
  - acid/alkaline forming substances, particularly ammonia, chlorine or hydrogen sulfide.
- ➢ Ensure sufficient and suitable lighting such that the display can be read and work carried out comfortably and safely.
- ➢ Keep suitable fire extinguishing agents ready for use.

5.2 Installation conditions

5.2.1 Determining location and clearances

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

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

- ➢ Please consult KAESER if they cannot be kept to.

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

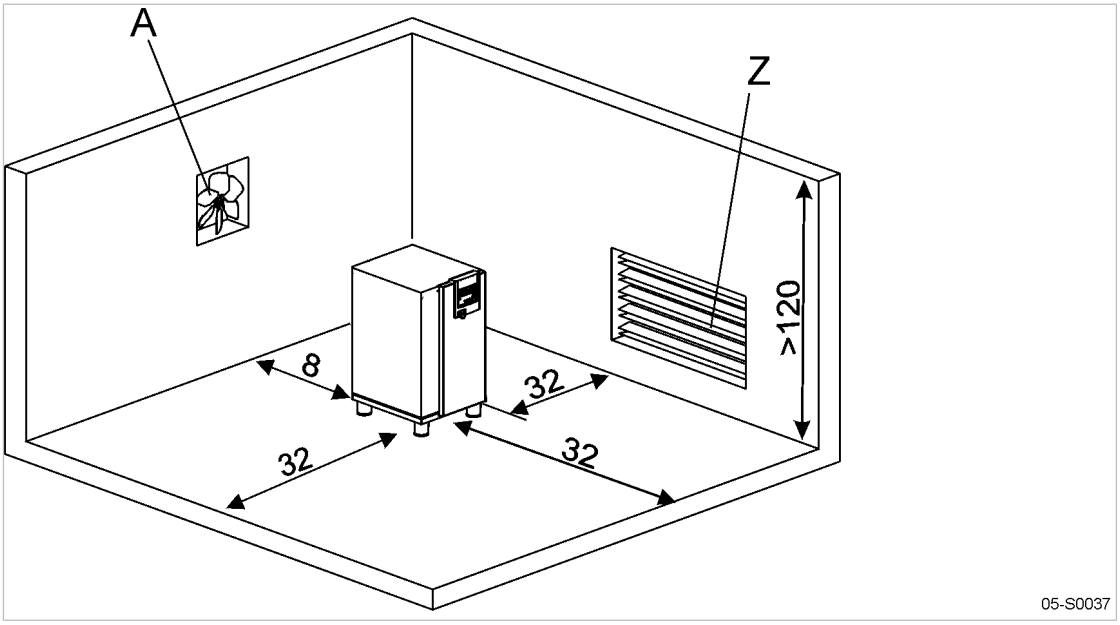


Fig. 14 Recommended machine placement and dimensions [in]

Ⓐ Exhaust fan
Ⓩ Cooling air inlet aperture

CAUTION
Ambient temperature too low.
Frozen condensate and highly viscous cooling oil can cause damage when starting the machine.

➢ Make sure that the temperature of the machine is at least +37 °F before starting.

➢ Heat the machine room adequately or install an auxiliary heater.

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

5.2.2 Ensure adequate ventilation

If the ventilation is insufficient, a partial vacuum can be created in the room.

➢ Ensure that the volume of air flowing into the machine room is at least equivalent to that being removed from it by the machine and exhaust fan.

➢ Make sure that the machine and exhaust fan can only operate when the inlet aperture is actually open.

➢ Keep the inlet and exhaust apertures free of obstructions so that the cooling air can flow freely through the room.

5.2.3 Exhaust duct design

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

➢ Consult the KAESER service representative before deciding on:
- the design of the exhaust air ducting
- the intersection between the machine and the exhaust air duct
- the length of the ducting
- the number of duct bends
- the design of flaps or shutters

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

Further information

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

5.3 Using the Compressor to Supply A Compressed Air System.

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

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

➢ Please allow KAESER to advise on this subject.

6 Installation

6.1 Safety

The following instructions must be followed for safe installation.
Warning instructions are always given before a potentially dangerous action.

Basic Safety Instructions

1. Follow the instructions in chapter 3 'Safety and Responsibility'.
2. Installation work may only be carried out by authorized personnel.
3. Before switching on, make sure that:
   - no one is working on the machine,
   - all access doors and panels are closed and secure.

Working on electrically conducting components

1. Work on electrically conducting components may only be carried out by authorized electricians.
2. Switch off and lock out the supply disconnecting device and check that no voltage is present.
3. Check that there is no voltage on floating relay contacts.

Working on pressure systems

1. Close shut-off valves or otherwise isolate the machine from the compressed air system to ensure that no compressed air can flow back into the machine.
2. Vent all pressurized components and chambers completely.
3. Check all machine hose connectors with a handheld pressure gauge to ensure that all read zero.
4. Do not open or dismantle such valves.

Working on the drive

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

Further information — Specification of authorized personnel is found in chapter 3.4.2.
Specification of dangers and their avoidance is found in chapter 3.5.

6.2 Reporting Transport Damage

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

6.3 Making the Compressed Air Connection

On the AIRCENTER the user's shut-off valve is already fitted to the machine.

Precondition — The compressed air system is vented completely.

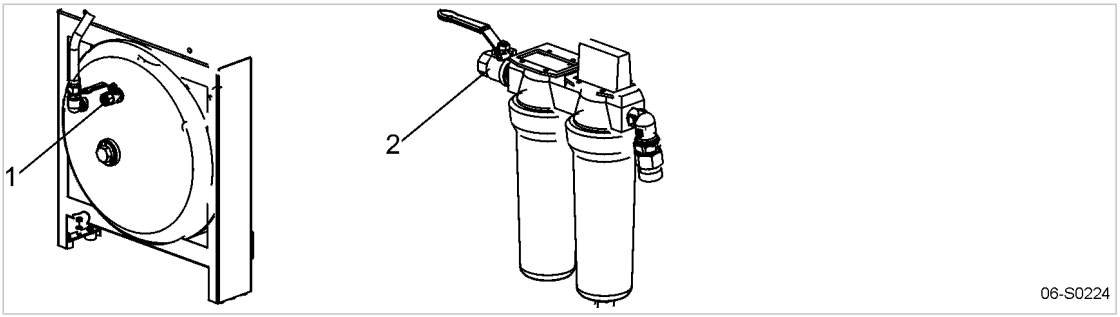


Fig. 15 Compressed air connection

1 Compressed air connection with user's shut-off valve
2 Compressed air connection with user's shut-off valve: Option F1, F2

WARNING
Serious injury or death can result from loosening or opening components under pressure.
➢ Vent all pressurized components and chambers completely.

➢ Make the compressed air connection with an axial compensator or hose.

6.4 Making the Power Supply Connection

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

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

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

7. Connect the power supply.

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

6.4.1 Option T2
Refrigeration dryer: Connecting the transformer according to the power supply.

The refrigeration dryer transformer has tappings for various power supply voltages.

1. Check that the correct connections are made for the supply voltage provided for the machine.
2. If necessary, re-connect the transformer to match the power supply voltage.

Further information The electrical diagram in chapter 13.4 contains further details of the power supply connection.

6.5 Connecting the condensate drain

A threaded hose connection is provided to connect the drain hose to the condensate drain outlet.

Condensate must drain freely.

The illustration shows typical installations.
Condensate flows into the collecting line from above, thereby preventing any backflow to the compressor.

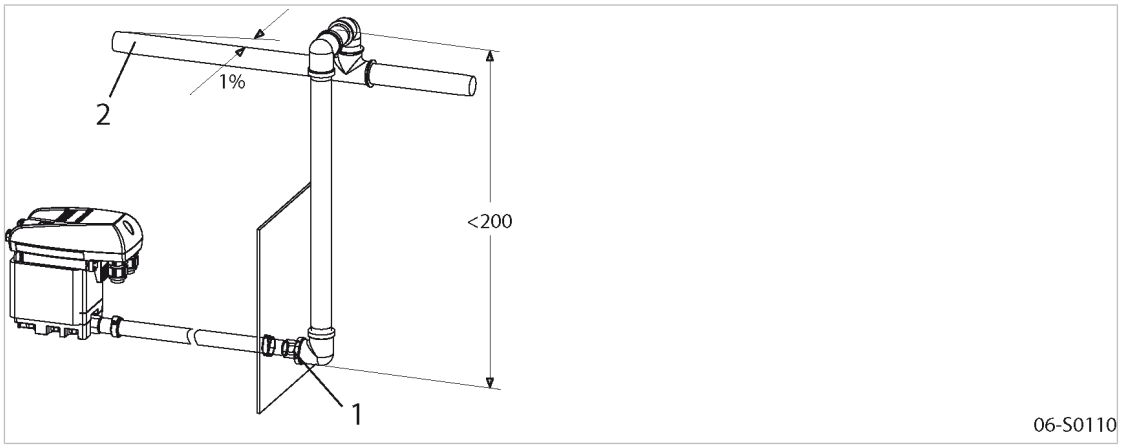


Fig. 16 Condensate drain dimensions [inch]
1 Threaded connection
2 Condensate collecting line

➢ Connecting the condensate drain line.

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

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

6.6 Options

6.6.1 Option H1
Anchoring the machine

➢ Use appropriate fixing bolts to anchor the machine.

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

6.6.2 Option C16
Connecting the remote contact LOAD-IDLE control

Material Screwdriver: DIN 5264 A – 0.4x2.5 mm
Flexible cable: 0.5–1.5 mm^2 (maximum length 100 m; Recommended is: NYSLYÖ 2x1.0 mm^2)

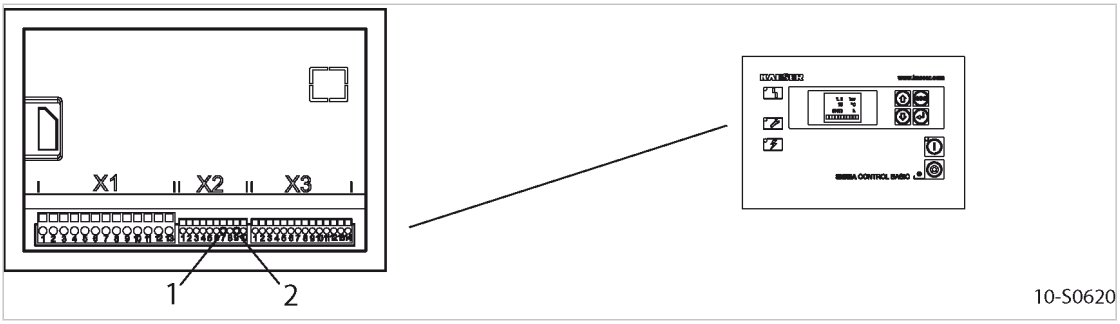


Fig. 17 Connections to SIGMA CONTROL BASIC
[1] Input I4: pin 7
[2] Supply 24 V DC: pin 9

1. Lay the cable so that it does not come under tension when the control cabinet door is opened.
2. Strip 0.5 in. of insulation from the ends of the conductors.
3. Use a screwdriver to open the spring-loaded terminals and insert the ends of the conductors in the square openings above the corresponding terminals.
4. Secure the cable so there is no tension on the X2 plug.
5. Seal the cable lead through against ingress of dirt or moisture.

7 Initial Start-up

7.1 Safety

The following instructions must be followed for safe machine commissioning.
Warning instructions are always given before a potentially dangerous action.

Basic safety instructions

1. Follow the instructions in chapter 3 'Safety and Responsibility'.
2. Commissioning may only be carried out by authorized personnel.
3. Before switching on, make sure that:
   - no one is working on the machine,
   - all access doors and panels are closed and secure.

Working on electrically conducting components.

1. Work on electrically conducting components may only be carried out by authorized electricians.
2. Switch off and lock out the supply disconnecting device and check that no voltage is present.
3. Check that there is no voltage on floating relay contacts.

Working on pressure systems

1. Close shut off valves or otherwise isolate the machine from the compressed air system to ensure that no compressed air can flow back into the machine.
2. Vent all pressurized components and chambers completely.
3. Check all machine hose connectors with a handheld pressure gauge to ensure that all read zero.
4. Do not open or dismantle such valves.

Working on the drive

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

Further information
Specification of authorized personnel is found in chapter 3.4.2.
Specification of dangers and their avoidance is found in chapter 3.5.

7.2 To be noted before commissioning

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

➢ Commissioning of the machine may only be carried out by trained and authorized installation or maintenance personnel.

Special measures for re-commissioning after storage

Storage period longer than...	Remedy
12 months	➢ Change the oil filter. ➢ Change the oil separator cartridge. ➢ Change the cooling oil. ➢ Have the motor bearings checked by an authorized KAESER Service representative.
36 months	➢ Have the overall technical condition checked by an authorized KAESER Service representative.

Tab. 28 Re-commissioning after storage

7.3 Checking positioning and operating conditions

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

To be checked	See chapter	Confirmed?
➢ Are the operators fully familiar with safety regulations?	–	
➢ Have all the positioning conditions been fulfilled?	5	
➢ Is a user's lockable power supply disconnecting device installed?	6.4	
➢ 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?	2.15	
➢ Drive motor overload protection switch set according to the supply voltage?	7.4	
➢ Have all electrical connections been checked for tightness? ➢ The check must be repeated after 50 operating hours.	–	
➢ Is a shut-off valve fitted to compressed air outlet?	6.3	
➢ Has the connection to the air system been made with a hose or axial compensator?	6.3	
➢ Is there sufficient cooling oil in the separator tank?	10.11	
➢ Is there sufficient cooling oil in the airend?	7.6	
➢ Is the machine firmly anchored to the floor? (option H1)	6.6.1	
➢ Are door interlock switches aligned and their function checked?	7.9	
➢ Are all access doors closed and latched and all removable panels in place and secured?	–	

Tab. 29 Positioning and operating conditions checklist

7.4 Setting the overload protection cut-out

Option C17 Direct online starting (SX 3 only)

In direct online starting, the motor supply current is fed via the overload protection cut-out (see nameplate on the control cabinet for motor nominal current).

To prevent the overload protection cut-out from being triggered by voltage fluctuations, temperature influences or component tolerances, the setting can be higher than the rated motor current.

➢ Check the overload protection cut-out setting.

The overload protection cut-out shuts the machine down despite being correctly set?

➢ Contact KAESER Service.

Wye-delta starting

In wye-delta start the phase current is fed via the overload protection cut-out. This phase current is 0.58 times the rated motor current (see nameplate in the control cabinet).

To prevent voltage fluctuations, temperature influences or component tolerances operating the overload protection cut-out, the setting can be higher than the arithmetical phase current.

➢ Check the overload protection cut-out setting.

The overload protection cut-out shuts the machine down despite being correctly set?

➢ Contact KAESER Service.

7.5 Hot gas bypass valve setting

The machine is designed for use at a maximum altitude of 10 000ft.

CAUTION
Higher altitude.Frozen condensate can damage the dryer.

➢ An adjustment must be made to the hot gas bypass valve if the dryer is used at altitudes above 3000ft.

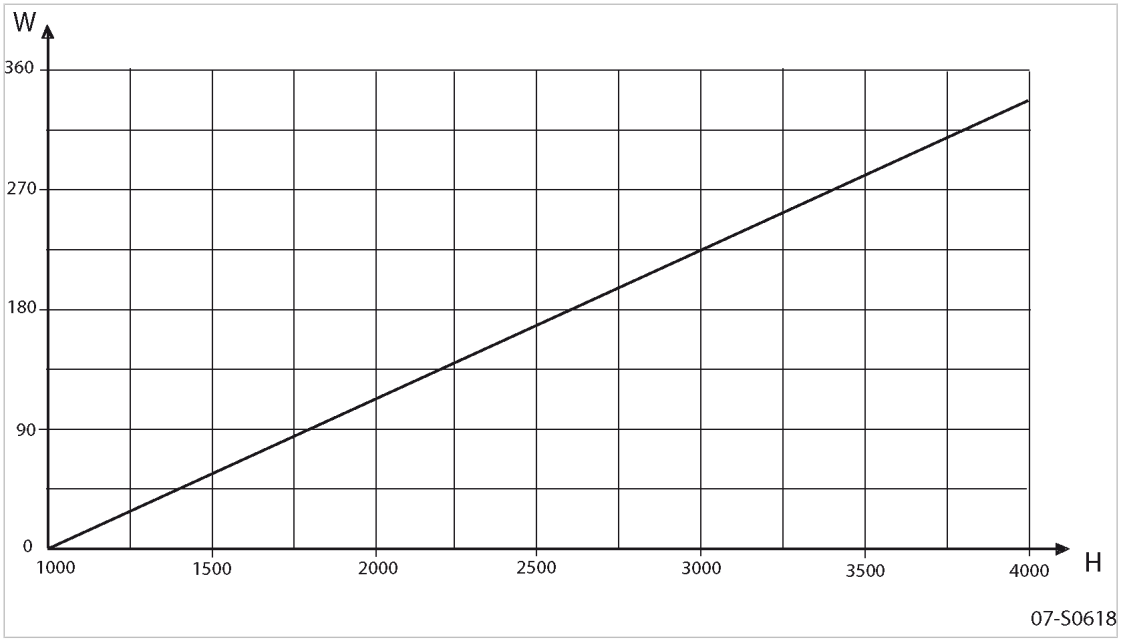


Fig. 18 Hot gas bypass valve adjustment for altitude

[H] Installation altitude [ft]
[W] Adjustment angle [°]

Hot gas bypass valve setting

1. Set the hot gas bypass valve according to the following illustrations and table.

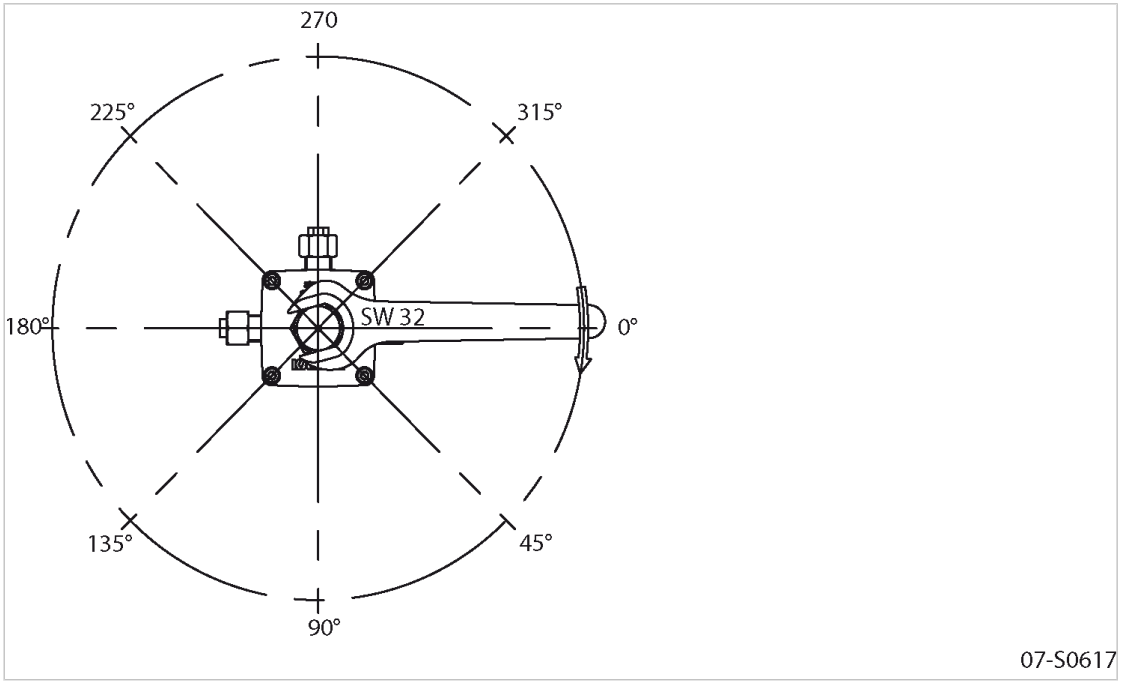


Fig. 19 Adjustment angle

➢ Take the adjustment angle from the table.

Altitude [ft]	Adjustment angle [°]

3280	0
3937	23
4593	47
5249	70
5905	93
6562	116
7218	140
7874	163
8530	186
9186	210
9843	233
10498	256
11155	279
11811	303
12467	326
13123	349

Tab. 30 Altitude correction

7.6 Pouring cooling oil into the airend

Before starting the compressor for the very first time and before re-starting after a shutdown period of more than 3 months it is necessary to pour a quantity of cooling oil into the airend.

A label showing the type of oil used is found near the oil separator tank filling port.

➢ Use the same type of oil.

Material 0.26 qt Cooling oil

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

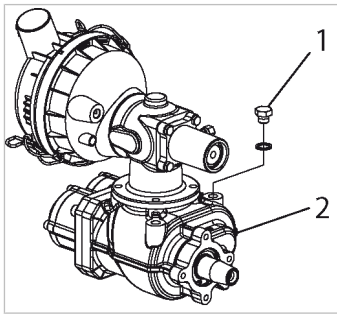


Fig. 20 Inlet valve filling port

[1] Screw plug
[2] Airend

1. Remove the filler plug from the airend.

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

7.7 Checking direction of rotation

The machine is designed for a clockwise phase sequence.

Ideally, the direction of phase rotation should be measured with a phase sequence meter. Alternatively, the machine can be started very briefly and the rotation direction of the motor cooling fans noted.

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.
- ➢ Compare the direction of rotation of the motor with the arrows on the motor and the airend casing.
- ➢ If the direction is incorrect, reverse supply phases L1 and L2.

7.8 Starting the machine for the first time

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

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

- ➢ Keep an eye on the machine during the first few hours of operation to ensure that it is operating correctly.
- ➢ After the first 50 operating hours, check all electrical connections and tighten where necessary.

Recognizing damaging condensate

Machines of this type are generally only lightly utilized. Condensate can build up in lightly utilized machines with detrimental effects to the cooling oil and the machine itself. You can determine if your machine falls into this category by regular sampling of the cooling oil during the first week of operation.

- ➢ Make sure you are familiar with the procedure before draining off any oil.

- ➢ A small quantity of cooling oil should be drained out to check for condensate at least once a week during the first 4 weeks of operation.

Condensate in the cooling oil?

➢ Contact KAESER Service.

Further information Information on draining off cooling oil is given in chapter 10.14.

7.9 Checking the Door Interlock Switch

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

The door interlock switch is an important safety device.
The machine may only be operated with a correctly functioning interlock switch.

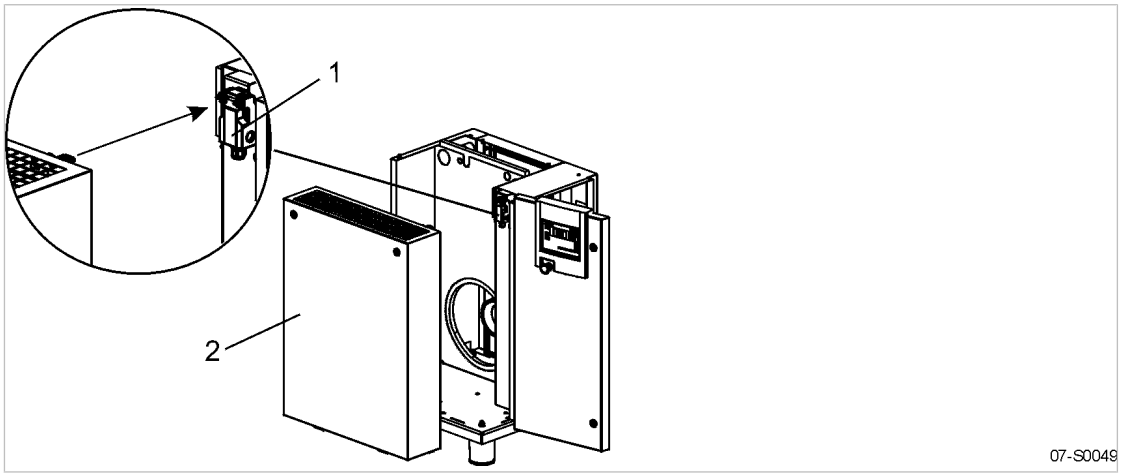


Fig. 21 Interlock switch position
[1] Door interlock switch
[2] Panel

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

The machine does not switch off automatically?.

➢ Have the interlock switch checked by an authorized KAESER Service representative agent.

7.10 Setting the setpoint pressure

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

Adjustment is necessary for individual operating conditions.

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

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

To reduce the cycling (toggling) frequency:

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

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

Setpoint pressure: switching point

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

Setpoint pressure: switching differential

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

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

8 Operation

8.1 Switching on and off

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

A power supply disconnecting device has been installed by the user.

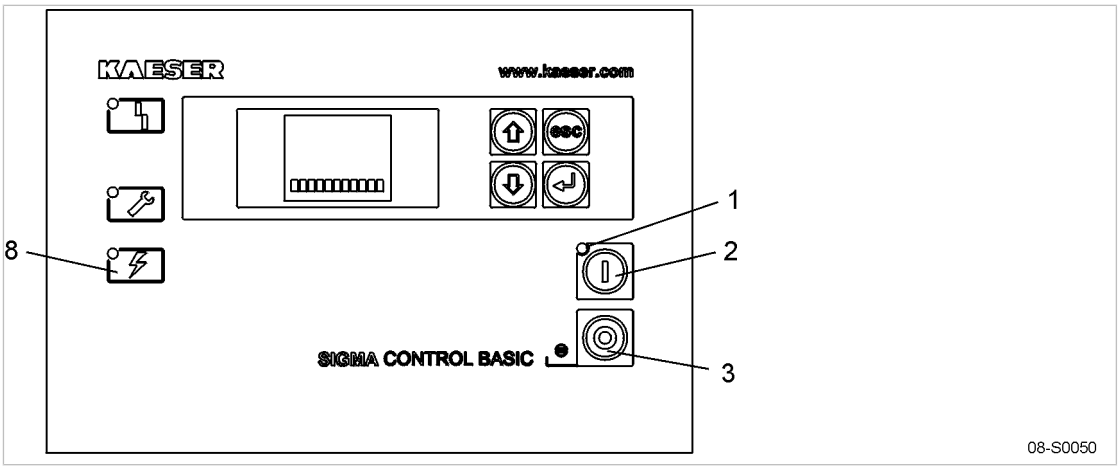


Fig. 22 Switching on and off

1 LED *Machine ON* (green)
2 «ON» key
3 «OFF» key
8 LED *Controller ON* (green)

8.1.1 Switching on

Precondition No personnel are working on the machine

All access doors and panels are closed and secure.

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

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

Result The compressor motor starts as soon as system pressure is lower than the setpoint pressure (cut-out pressure).

8.1.2 Switching off

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

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

Tab. 31 Switching off with/without run-on time.

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

8.2 Switching Off in an Emergency and Switching On again

The EMERGENCY STOP pushbutton is located below the control panel.

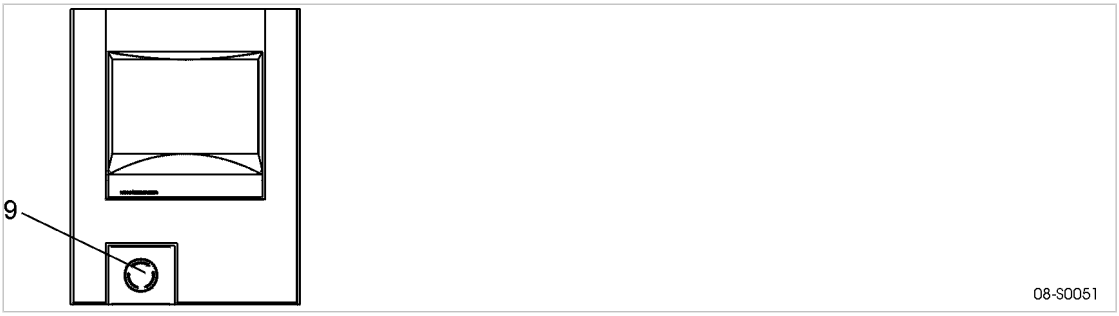


Fig. 23 Switching off in an emergency
9 EMERGENCY STOP pushbutton

Shutdown

➢ Press the EMERGENCY STOP pushbutton.
The pushbutton remains latched in.
The compressor's pressure system is vented and the machine is prevented from automatically re-starting.

Switching on

Precondition The fault has been rectified

1. Turn the EMERGENCY STOP pushbutton in the direction of the arrow to unlatch it.
2. Press the reset key to reset any alarm messages.
   The machine can now be started again.

8.3 Acknowledging alarm and warning messages

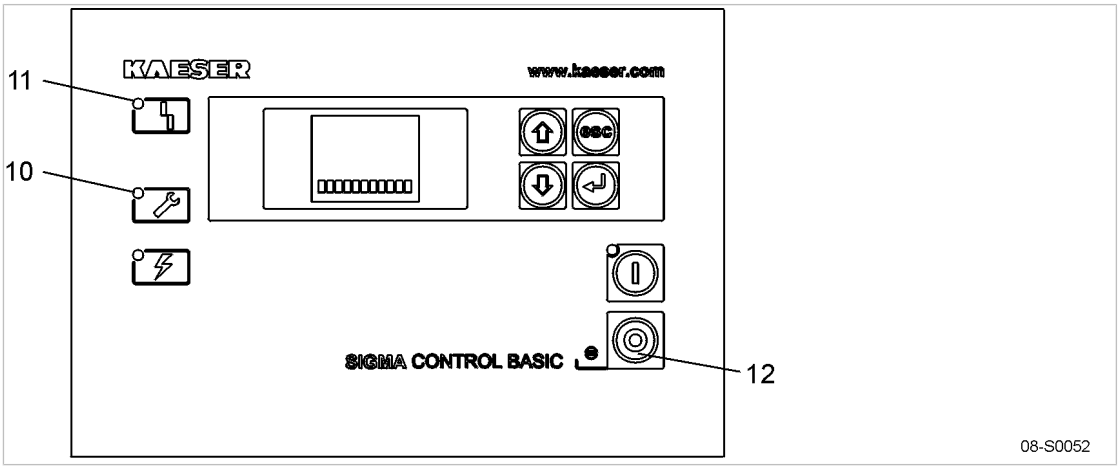


Fig. 24 Acknowledging messages
10 *Warning* LED (yellow)
11 *Alarm* LED (red)
12 «Acknowledge» key

Alarm message

Messages are displayed on the "new value" principle:

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

or

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

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

Warning message

- Message coming: LED flashes
- Message gone: LED extinguished

➢ Rectify fault or carry out maintenance.
The *Warning* LED extinguishes as soon as the cause of the warning is rectified.

8.4 Setting parameters

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

If no key is pressed for ten seconds in the edit mode, the display automatically returns to the previous mode.

Restarting the controller is not necessary. Edited parameters are immediately effective.

Network pressure and airend discharge temperature are neither updated nor displayed while in the edit mode.

Entering the edit mode

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

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

Changing a parameter that is not password protected

Precondition The current parameter setting flashes.

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

Changing a password protected parameter

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

Password: BASIC

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

Precondition The first character flashes.

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

9 Fault Recognition and Rectification

9.1 Basic Information

The following tables are intended to assist in locating causes of faults.

There are three types of fault:

- Alarm: red LED flashes - see chapter 9.2.
- Warning: yellow LED flashes - see chapter 9.3.
- Other faults: no indication - see chapter 9.4.

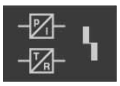
The messages valid for your machine are dependant on the controller and individual equipment.

1. Do not attempt fault removal measures other than those given in this manual.
2. In all other cases:
   have the fault rectified by an authorized KAESER Service representative agent.

9.2 Alarm messages (machine stop)

The fault code appears in the 4th line of the display field.
A sticker with symbols on the machine explains the fault code.

Fault code	Sign	Meaning	Action
1		EMERGENCY STOP pushbutton pressed. Interlocked access door open or panel removed.	➢ Unlatch the EMERGENCY STOP pushbutton ➢ Close the access door or fit the panel.
2		Motor alarm Overload protection of drive or fan motor (if fitted). Frequency-controlled machines Alarm in the frequency converter.	➢ Check overload protection cut-out / motor overload protection switch setting. ➢ Change the oil separator cartridge. ➢ Check minimum pressure/check valve. ➢ Have the frequency converter checked by an authorized KAESER service representative.
3		There is build-up of back pressure: ■ incorrect direction of motor rotation ■ drive belts parted ■ compressor not venting correctly atSTANDSTILL. ■ Back-pressure switch defective Brief interruption of power supply.	➢ Changeover phase lines L1 and L2. ➢ Replace drive belts. ➢ Have the frequency converter checked by an authorized KAESER Service Technician.

Fault code	Sign	Meaning	Action
4		Maximum permissible airend discharge temperature exceeded.	➢ Clean the cooler. ➢ Maintain sufficient distance between the cooling air inlet and exhaust openings and any wall. Check the cooling oil level. ➢ Ensure that the permissible room temperature is not exceeded. ➢ Change the oil filter.
5		Fault in the refrigeration dryer.	➢ Clean the refrigerant condenser. ➢ Ensure adequate ventilation. ➢ Install an extractor fan.
6		Defective analog input (pressure or temperature sensor).	➢ Check lines and connections.
7		Maximum permissible temperature of the controller housing exceeded.	➢ Ensure adequate ventilation. ➢ Ensure that the permissible room temperature is not exceeded.
8	–	Spare.	–

Tab. 32 Alarm messages

9.3 Warning messages

The error code appears in the 4th line of the display field.
A sticker with symbols on the machine explains the error code.

Fault code	Sign	Meaning	Action
S		Maintenance interval has elapsed.	➢ Carry out maintenance.
p		Back pressure present.	➢ Check direction of drive motor rotation.
T		Machine below minimum permissible starting temperature.	➢ Increase room temperature.
i		Pressure relief valve check mode switched on.	➢ Check pressure relief valve. ➢ Deactivate check mode.

Tab. 33 Warning messages

9.4 Other Faults

Fault	Possible cause	Remedy
Machine runs but produces no compressed air.	Inlet valve not opening or only opening partially.	Call authorized KAESER Service representative.
	Venting valve not closing.	Call authorized KAESER Service representative.
	Leaks in the pressure system.	Check pipework and connections for leaks and tighten any loose fittings.
	Air consumption is greater than the capacity of the compressor.	Check the air system for leaks. Shut down the consumer(s).
	Hose coupling or maintenance hose still plugged into the quick-release coupling on the oil separator tank.	Remove coupling or maintenance hose.
Cooling oil runs out of the air filter.	Oil level in the oil separator tank too high.	Drain off oil until the correct level is reached.
	Inlet valve defective.	Call authorized KAESER Service representative.
Compressor switches between LOAD and IDLE more than twice per minute.	Air receiver too small.	Increase size of air receiver.
	Airflow into the compressed air network restricted.	Increase air pipe diameters. Check filter elements.
	The differential between cut-in and cut-out pressure too is small.	Check switching differential.
Cooling oil leaking into the floor pan.	Hose coupling or maintenance hose still plugged into the quick-release coupling on the oil separator tank.	Remove coupling or maintenance hose.
	Oil cooler leaking.	Call authorized KAESER Service representative.
	Leaking joints.	Tighten joints. Replace seals.
Cooling oil consumption too high.	Unsuitable oil is being used.	Use SIGMA FLUID cooling oil.
	Oil separator cartridge split.	Change the oil separator cartridge.
	Oil level in the oil separator tank too high.	Drain off oil until the correct level is reached.
	Oil return line clogged.	Check dirt trap in the return line.

Tab. 34 Other faults and actions

10 Maintenance

10.1 Safety

The following instructions must be followed for safe machine maintenance.

Warning instructions are always given before a potentially dangerous action.

Basic safety instructions

1. Follow the instructions in chapter 3 'Safety and Responsibility'.
2. Maintenance work may only be carried out by authorized personnel!
3. Before switching on, make sure that:
   - no one is working on the machine,
   - all access doors and panels are closed and secure.

Working on electrically conducting components.

1. Work on electrically conducting components may only be carried out by authorized electricians.
2. Switch off and lock out the supply disconnecting device and check that no voltage is present.
3. Check that there is no voltage on floating relay contacts.

Working on pressure systems

1. Close shut-off valves or otherwise isolate the machine from the air main to ensure that no compressed air can flow back into the machine.
2. Vent all pressurized components and chambers completely.
3. Check all machine hose connectors with a handheld pressure gauge to ensure that all read zero.
4. Do not open or dismantle such valves.

Working on the drive

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

Further information

Specification of authorized personnel is found in chapter 3.4.2.

Specification of dangers and their avoidance is found in chapter 3.5.

10.2 Maintenance Schedule

10.2.1 Logging maintenance work

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

➢ Maintenance tasks should be carried out more frequently where operating conditions are unfavorable (e.g. dusty atmosphere) or when the equipment is heavily utilized.

➢ Adjust the maintenance intervals with regard to operating conditions.

➢ Keep a log of all maintenance and repair work.
This enables the frequency of individual maintenance tasks and deviations from our recommendations to be determined.

Further information A prepared list is provided in chapter 10.19.

10.2.2 Resetting maintenance interval counters

SIGMA CONTROL BASIC has a maintenance interval counter that counts down the operating hours to the next maintenance.

The counter reading shows the number of operating hours to the next periodic machine maintenance.

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

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

10.2.3 Regular maintenance tasks

The table below lists maintenance tasks required.

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

Interval	Maintenance task	See chapter
Daily	Drain condensate.	4.6.3
Weekly	Check the cooling oil level.	10.11
	Cooler: Check the filter mat.	10.3
	Control cabinet: Check the filter mat.	10.4
	Check condensate drainage	10.17.2
	Air receiver Drain condensate manually.	10.18
Up to 1,000 h	Maintain the drive belt.	10.8
	Check the air filter.	10.6
	Clean the cooler.	10.5
	Cooler: Clean the filter mat.	10.3
	Control cabinet: Clean the filter mat.	10.4
	Clean the refrigerant condenser.	10.17.1
Up to 3,000 h	Change the air filter element.	10.6
	Cooler: Change the filter mat.	10.5
	Control cabinet: Change the filter mat.	10.4

h = operating hours
*When using SIGMA FLUID S-460

Interval	Maintenance task	See chapter
Up to 3,000 h/6,000 h* At the latest every 3 years	Change the oil separator cartridge.	10.16
Up to 3,000 h/6,000 h* At least annually	Change the oil filter.	10.15
Variable, see table 36	Change the cooling oil.	10.14
Variable	Check the compressed air filter. (option F1 F2)	13.5
Annually	Check that all electrical connections are tight.	–
	Compressor Check the safety relief valve.	10.9
	Air receiver Check the safety relief valve.	10.18.2
	Check the overheating safety shutdown function.	10.10
	Check the cooler for leaks.	10.5
h = operating hours *When using SIGMA FLUID S-460		

Tab. 35 Regular maintenance tasks

10.2.4 Cooling oil changing interval

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

Authorized KAESER Service representative will support you in determining appropriate intervals and provide information on the possibilities of oil analysis.

➢ Please observe national regulations regarding the use of cooling oil in oil-injected screw compressors.

➢ Check operating conditions and adjust intervals as necessary.

KAESER LUBRICANTS			
SIGMA Lubricant	Description	Maximum Recommended Change Interval	
		First oil change	Subsequent oil change
M–460	ISO 46 Semi-Synthetic Lubricant	2,000 Hours	3,000 Hours
S–460	ISO 46 Synthetic Lubricant	6,000 Hours	8,000 Hours
S–680	ISO 68 Synthetic Lubricant	6,000 Hours	8,000 Hours
FG–460	ISO 46 Food Grade Synthetic Fluid	2,000 Hours	3,000 Hours

Tab. 36 Oil change intervals lubricants

10.2.5 Regular service work

The table below lists necessary service tasks.

➢ Only authorized KAESER Service representatives should carry out service work.

➢ Carry out service tasks punctually and with consideration of ambient and operating conditions.

Interval	Service task
Up to 12,000 h	Check valves.
Up to 12,000 h, at the latest every 3 years	Check drive motor bearings.
Up to 36,000 h, at the latest every 8 years	Check hose lines.
h = operating hours	

Tab. 37 Regular service work

10.3 Cooler: Cleaning or Renewing the Filter Mats

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

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

Precondition The machine is switched off.

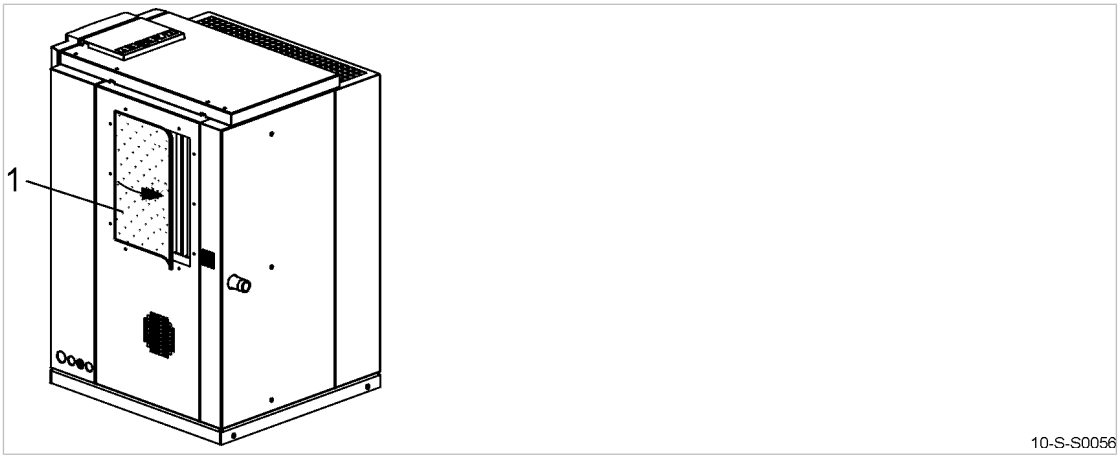


Fig. 25 Filter mat for the air and oil cooler
[1] Filter mat

No tools are needed to remove the filter mat.

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

10.4 Cleaning or Replacing the Control Cabinet Filter Mats

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

Material Warm water and household detergent

Spare parts (as required)

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

The machine has cooled down.

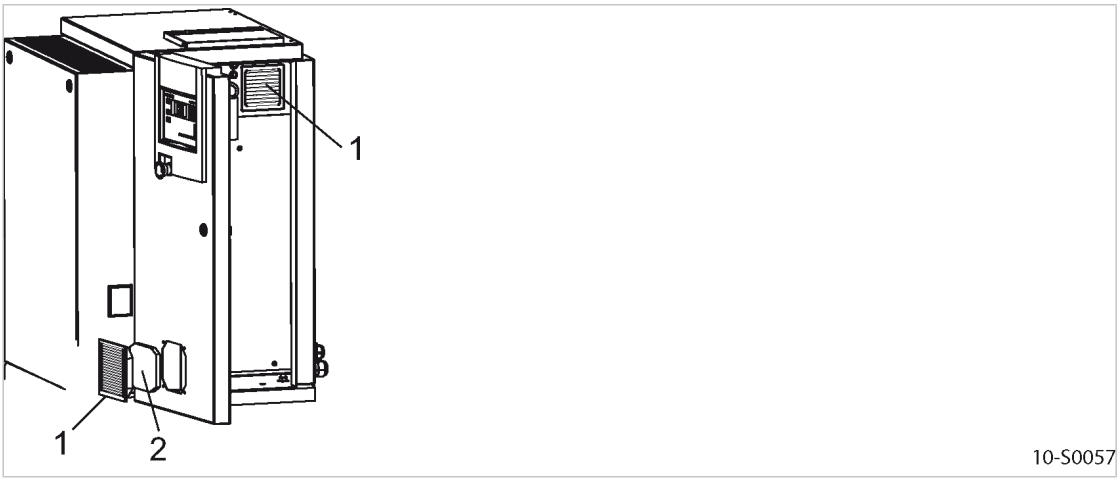


Fig. 26 Control cabinet ventilation grill

1 Ventilation grill
2 Filter mat

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

10.5 Cooler Maintenance

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

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

Material Brush and vacuum cleaner.
Breathing mask (if required)

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

The machine has cooled down.

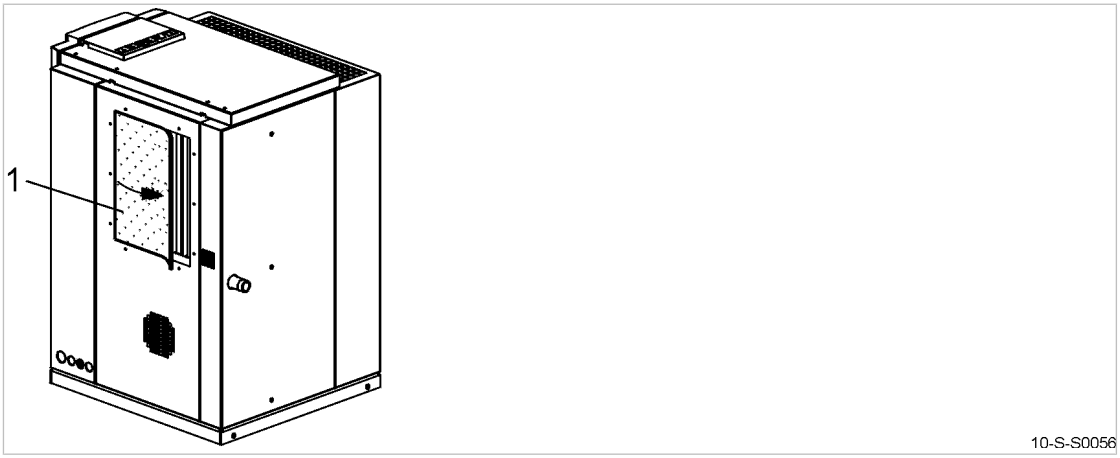


Fig. 27 Filter mat for air and oil cooler
1 Filter mat

Cleaning the cooler.

A filter mat helps to keep the cooler clean but cooler cleaning is necessary after a period of time.

Do not clean the cooler with a sharp instrument, otherwise it could be damaged.

Avoid dust disturbance.

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

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

➢ Heavy and stubborn contamination should be removed by authorized KAESER Service representative.

Check the cooler for leaks.

➢ Visual check: Is cooling oil dripping from the cooler?

Is the cooler leaking?

➢ Have the cooler repaired immediately by an authorized KAESER Service representative.

10.6 Air Filter Maintenance

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

The air filter element cannot be cleaned.

Material Replacement part

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

The machine has cooled down.

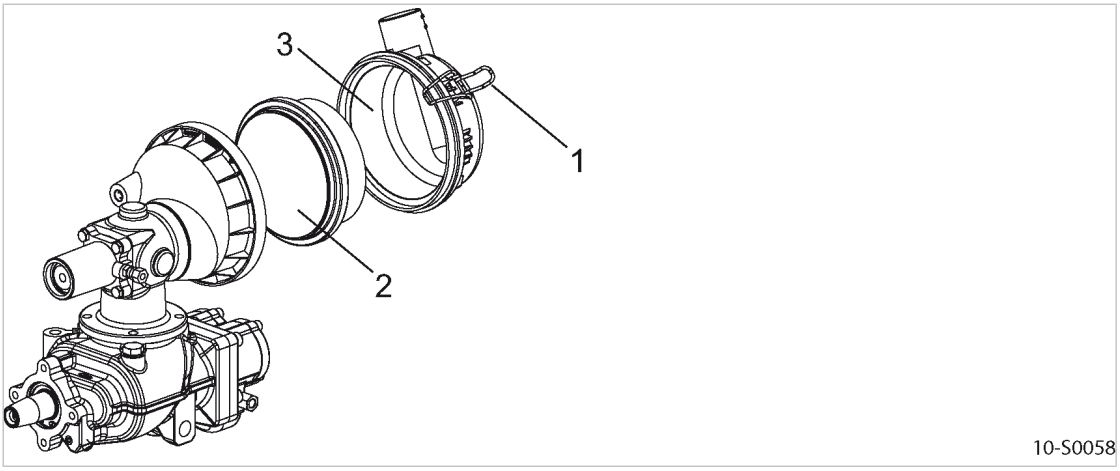


Fig. 28 Air filter maintenance

1 Snap fastener
2 Air filter element
3 Air filter housing

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

10.7 Drive Motor Maintenance

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

➢ Have the motor bearings checked by an authorized KAESER Service representative during servicing.

10.8 Maintaining the drive belts

Material Spare parts (if 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.

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.

Make a visual check for damage.

1. Turn the pulley by hand so that all of the belt can be inspected for damage.
2. Change the belts immediately if any damage is found.

Replace the drive belts

The drive motor must be moved in its bracket to change the belts. Use the appropriate tool and support the motor during belt changing.

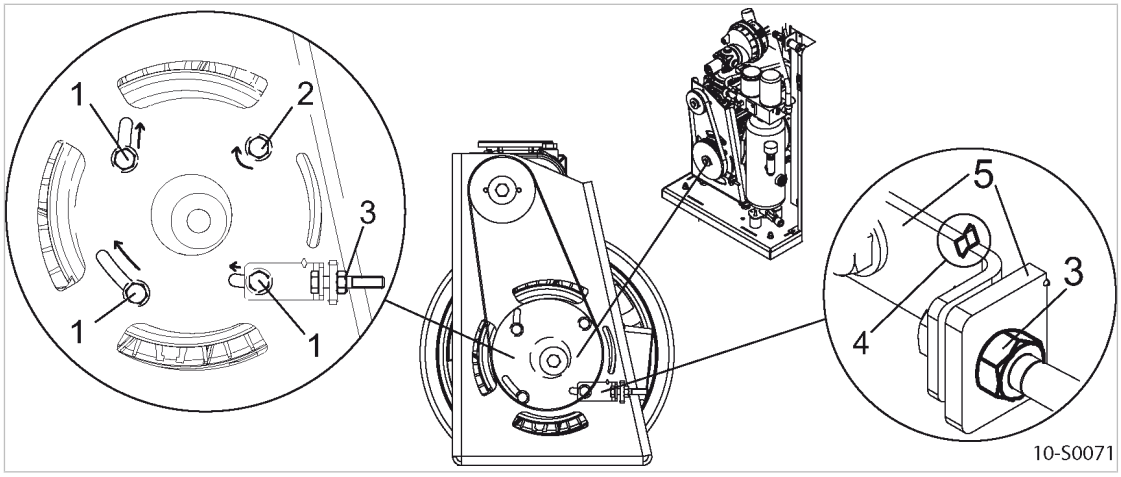


Fig. 29 Changing the belt

[1] Fixing screw
[2] Pivot point fixing screw
[3] Tensioning nut
[4] Markings
[5] Tensioning device

1. Loosen the tensioning nut [3] by approx. 0.4 in.
2. Remove the fixing screws [1].
3. Loosen the pivot point fixing screw [2] only sufficiently to allow the motor to shift to the side.
4. Move the motor to the side and fix it in position with a screw [1].
5. Place the new belts over the pulleys.
6. Ensure that all fixing screws [1] are loosened.
7. Tighten the belts by means of the tensioning nut [3] until the markings [4] coincide.
8. Tighten one fixing screw [1] to hold the motor in place then tighten the rest [1] and [2].

Result The drive belts are sufficiently tensioned.
It is not necessary to re-tension the belts.

10.9 Pressure relief valve checking

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

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

➢ Relief valves on machines with maximum permissible working pressure of 217 psig should be tested only by KAESER Service.

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

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

➢ Never operate the machine without correctly functioning pressure relief valves.

Preparation for the test

Precondition The machine is switched off.

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

Carrying out the check

The machine starts in IDLE as soon as it is switched on.
As long as the «ON» key is depressed and held, the machine switches to LOAD and pressure builds up in the oil separator tank. When the «ON» key is released, the machine switches back to IDLE and switches automatically to STANDSTILLwhen the idling period has elapsed.

Precondition The machine is switched off.

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 scalding from hot oil.
There is danger of injury from bursting components and compressed air!

➢ Close all access doors and replace and secure all removable panels.

➢ Wear ear and eye protection.

➢ Abort the test if the working pressure rises 10% above the activating pressure of the valve.

1. Press the «ON» key.
   The machine starts in IDLE.
2. Observe the display of pressure on SIGMA CONTROL BASIC while depressing and holding the «ON» key.
3. Stop the test as soon as the pressure relief valve blows off or working pressure rises to 10% above the activating pressure of the pressure relief valve.
4. If necessary, vent the machine and replace the defective pressure relief valve.

Returning the machine to operational

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

10.10 Checking the Overheating Safety Shutdown Function

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

➢ Have the safety shutdown function checked by an authorized KAESER Service representative.

10.11 Checking the cooling oil level

The oil level can be checked safely through the viewing window. The oil indicator should be fully filled with oil when the machine is at standstill. The correct oil level cannot be seen.

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

Operating state	Minimum oil level	Maximum oil level
LOAD		

Tab. 38 Permissible cooling oil level under LOAD

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

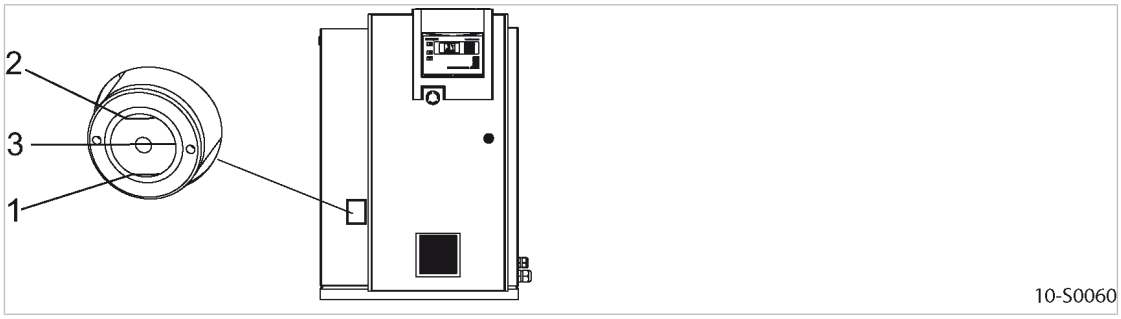


Fig. 30 Checking the cooling oil level

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

➢ Check the oil level with machine running under LOAD.

Result Top up when the indicator shows minimum level.

10.12 Venting the machine (depressurizing)

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

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

Venting takes place in three stages:

- Isolate the compressor from the compressed air system.
- Vent air from the oil separator tank.
- Vent air manually from the air cooler.

Material The hose coupling, shut-off valve and maintenance hose lie beneath the oil separator tank.

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

WARNING
Compressed air!
Compressed air and devices under pressure can injure or cause death if the contained energy is released suddenly or uncontrolled.
➢ Vent all pressurized components and chambers completely.

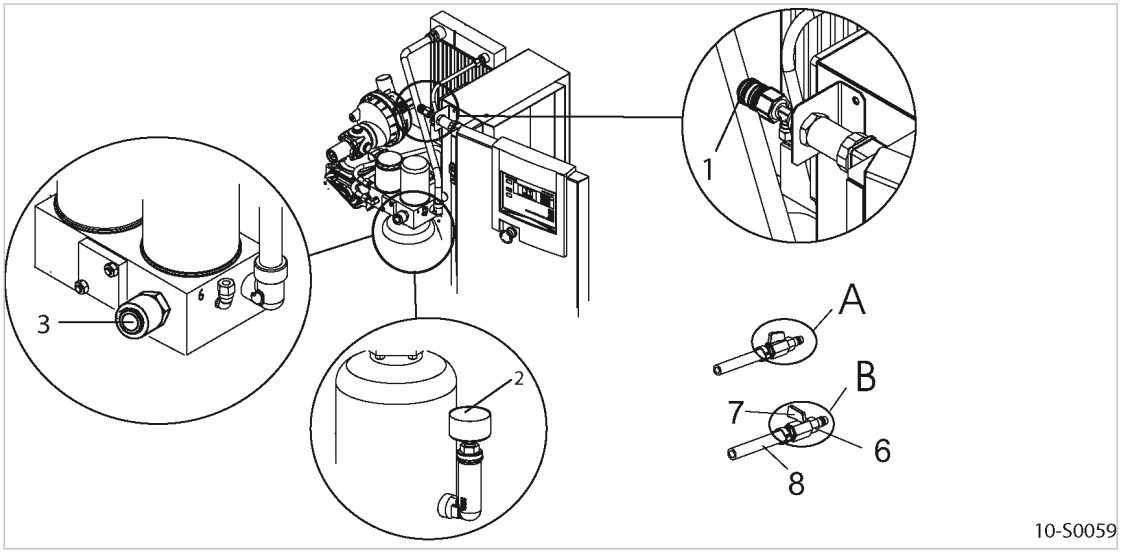


Fig. 31 Venting the machine

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

Isolate the machine from the compressed air system.

➢ Close the user's shut-off valve between the machine and the compressed air system.

If no shut-off valve is provided, the complete compressed air system must be vented.

Vent air from the oil separator tank.

WARNING
Escaping oil mist is damaging to health.
➢ Do not direct the maintenance hose at a person while venting.
➢ Do not inhale the oil mist.

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

After automatic venting the pressure gauge does not read zero?

- ➢ Make sure that the shut-off valve is closed or that the compressed air system is vented to atmospheric.
- ➢ With the shut-off valve closed, insert the male hose fitting [6] into the hose coupling [3].
- ➢ Slowly open the shut-off valve [7] to release pressure.
- ➢ Withdraw the male hose fitting [6] and close the shut-off valve [7].
- ➢ If manual venting does **not** bring the oil separator tank pressure gauge to 0 psig, call an authorized KAESER Service representative.

Vent air manually from the air cooler.

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

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

10.13 Topping up the Cooling Oil

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

Material: The hose coupling, shut-off valve and maintenance hose lie beneath the oil separator tank.

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

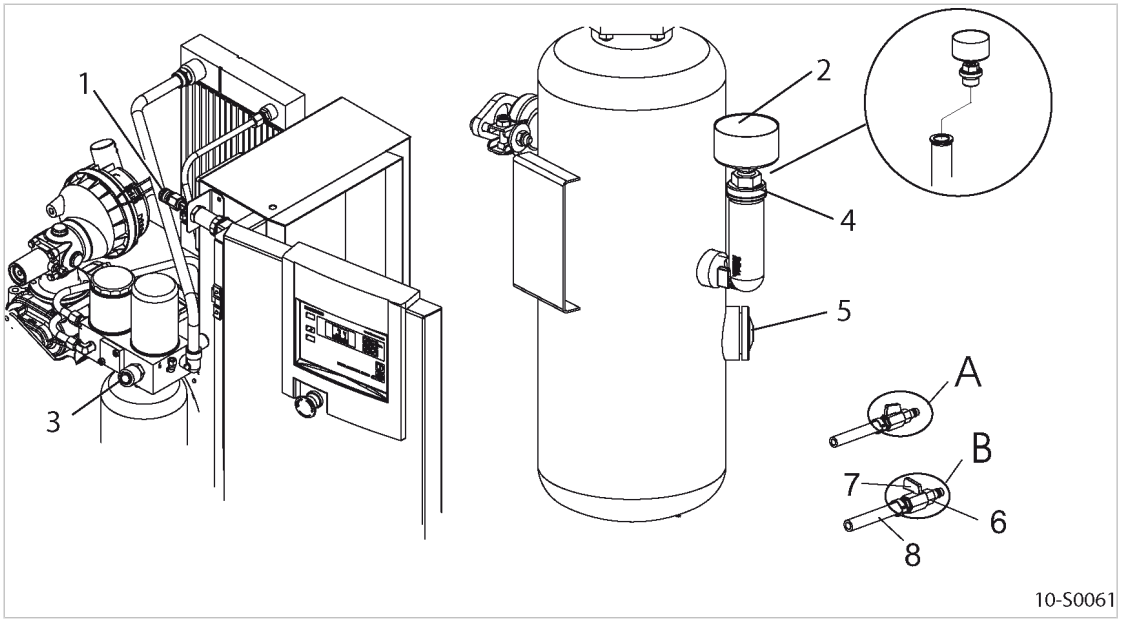


Fig. 32 Topping up the Cooling Oil

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

1. Vent the machine as described in 10.13.1.
2. Fill with cooling oil and test run as described in 10.13.2.

10.13.1 Venting the Machine (depressurizing)

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

Venting takes place in three stages:

- Isolate the compressor from the compressed air system.
- Vent air from the oil separator tank.
- Vent air manually from the air cooler.

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

➢ Vent all pressurized components and chambers completely.

Isolate the machine from the compressed air system

➢ Close the user's shut-off valve between the machine and the compressed air system.

If no shut-off valve is provided, the complete compressed air system must be vented.

Vent air from the oil separator tank

WARNING
Escaping oil mist is damaging to health.
- ➢ Do not direct the maintenance hose at a person while venting.
- ➢ Do not inhale the oil mist.

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

After automatic venting the pressure gauge does not read zero?
- ➢ Make sure that the shut-off valve is closed or that the compressed air system is vented to atmosphere.
- ➢ With the shut-off valve closed, insert the male hose fitting [6] into the hose coupling [3].
- ➢ Slowly open the shut-off valve [7] to release pressure.
- ➢ Withdraw the male hose fitting [6] and close the shut-off valve [7].
- ➢ If manual venting does **not** bring the oil separator tank pressure gauge to 0 psig, call an authorized KAESER Service representative.

Vent air manually from the air cooler

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

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

10.13.2 Top up with cooling oil and test run

Topping up the Cooling Oil

A sticker on the oil separator tank gives the type of oil it contains.

CAUTION
The machine could be damaged by unsuitable oil
- ➢ Never mix different types of oil.
- ➢ Top up only with the same type of oil as already in the machine.

1. Unscrew the filler plug [4] slowly.
2. Top up to bring the oil to the correct level.
3. Replace the plug sealing ring if necessary and screw in the plug.

Start the machine and carry out a test run

1. Close all access doors; replace and secure all removable panels.
2. Open the user's shut-off valve between the machine and the compressed air system.
3. After about 10 minutes, check the oil level again and top up if necessary.
4. Switch off the machine and visually check for leaks.

10.14 Changing the cooling oil

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

Drain the oil completely from the oil separator tank and oil cooler. Always change the oil filter and oil separator cartridge when changing the oil.

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

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

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

Material Cooling oil

Cooling oil receptacle

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

WARNING
There is risk of burns from hot components and oil.
➢ Wear long-sleeved clothing and gloves.

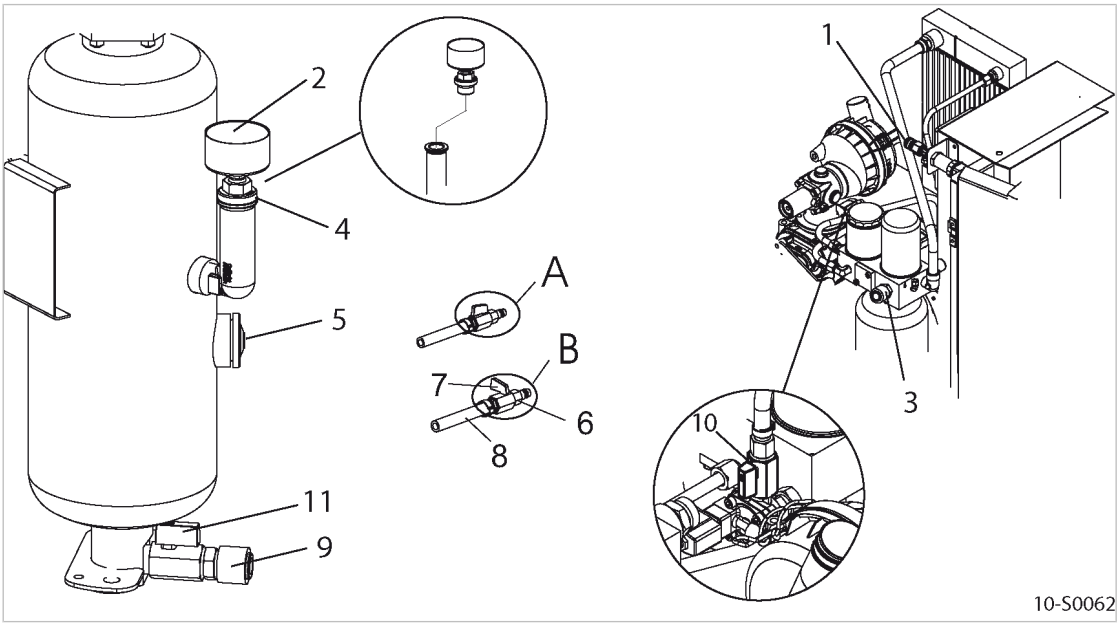


Fig. 33 Changing the cooling oil, oil separator tank

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

Changing the oil with internal pressure	Changing the oil using an external compressed air source
The machine has been running for at least 5 minutes under LOAD. The machine is fully vented, the pressure gauge on the oil separator tank reads 0 psig. 1. Close the shut-off valve [10] in the venting line. 2. Start the machine and watch the oil separator tank pressure gauge [2] until it reads 43–72 psig. 3. Switch off and lock out the power supply disconnecting device and check that no voltage is present. 4. Wait at least 2 minutes to allow the oil to flow back to the separator tank.	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 fully vented, the pressure gauge on the oil separator tank reads 0 psig. An external source of compressed air is available. 1. Close the shut-off valve [10] in the venting line. 2. With the shut-off valve closed, insert the male hose fitting [6] into the hose coupling [3]. 3. Connect the maintenance hose to the external air supply. 4. Open the shut-off valve [7] until the pressure gauge on the oil separator tank reads 43–72 psig. 5. Close the shut-off valve [7] and remove the male hose fitting from the coupling.

Draining the oil from the separator tank

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

1. Have an oil receptacle ready.
2. With the shut-off valve closed, insert the male hose fitting [6] into the hose coupling [9].
3. Place the end of the maintenance hose in the oil receptacle and secure it in place.
4. Open the shut-off valve [11].
5. Slowly open the shut off valve [7] in the maintenance hose to release oil and close immediately when air escapes.
6. Close the shut-off valve [11] and unplug the male hose fitting.

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

Draining the oil from the cooler

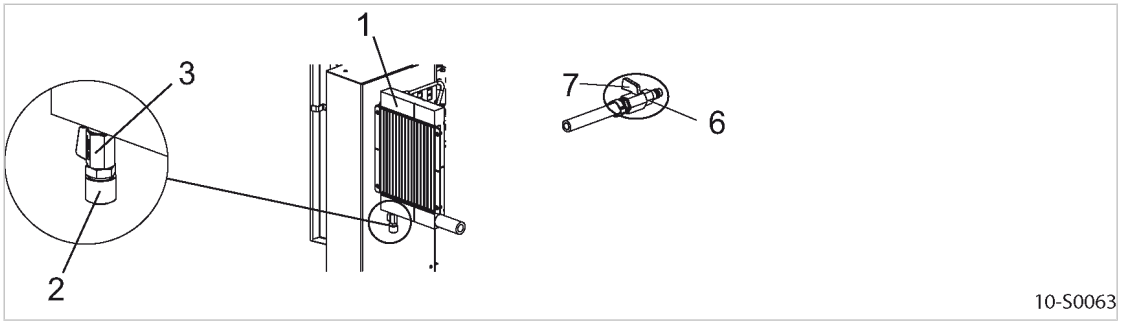


Fig. 34 Changing the cooling oil, oil cooler

[1] Oil cooler
[2] Hose coupling (oil drainage)
[3] Shut-off valve
[6] Male hose fitting
[7] Shut-off valve

1. Have an oil receptacle ready.
2. With the shut-off valve closed, insert the male hose fitting [6] into the hose coupling [2].
3. Place the end of the maintenance hose in the oil receptacle and secure it in place.
4. Open the shut-off valve [3].
5. Slowly open the shut-off valve [7] and allow cooling oil and air to escape completely until the pressure gauge reads 0 psig.
6. Close the shut-off valve [2] and unplug the male hose fitting.

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

Filling with oil

1. Slowly unscrew the filler plug [4] (see illustration 33).
2. Fill with cooling oil.
3. Check the filler plug and ring seal for damage and screw the plug back in again.

Start the machine and carry out a trial run

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

10.15 Changing the oil filter

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

All the cooling oil has run out of the filter 1–2 minutes after shutting down. A cooling oil receptacle is not needed.

Material Spares
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 is fully vented, the pressure gauge on the oil separator tank reads 0 psig.

WARNING
There is risk of burns from hot components and oil.
➢ Wear long-sleeved clothing and gloves.

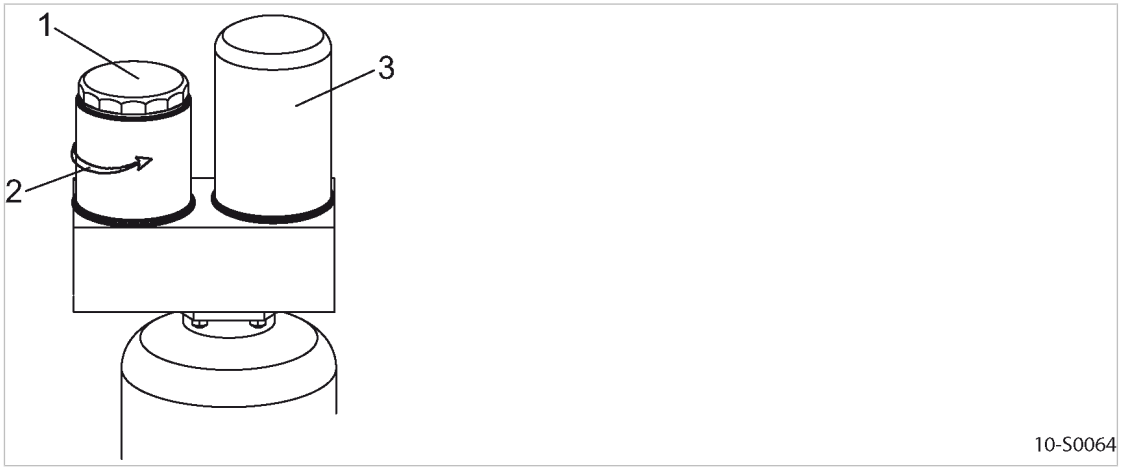


Fig. 35 Changing the oil filter
1 Oil filter
2 Direction to unscrew
3 Oil separator cartridge

Changing the oil filter

1. Unscrew the oil filter counter-clockwise and wipe off any drops of oil.
2. Lightly oil the new filter's gasket.
3. Turn the oil filter clockwise by hand to tighten.

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

Start the machine and carry out a trial run

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

10.16 Changing the oil separator cartridge

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

The life of the oil separator cartridge is influenced by:

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

All the cooling oil has run out of the separator cartridge 1–2 minutes after shutting down. A cooling oil receptacle is not needed.

Material Spares
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 is fully vented, the pressure gauge on the oil separator tank reads 0 psig.

WARNING
There is risk of burns from hot components and oil.
➢ Wear long-sleeved clothing and gloves.

Fig. 36 Changing the oil separator cartridge
1 Oil filter
2 Direction to unscrew
3 Oil separator cartridge

Changing the oil separator cartridge

1. Unscrew the oil separator cartridge counter-clockwise and wipe off any drops of oil.
2. Lightly oil the new filter's gasket.
3. Turn the oil filter clockwise by hand to tighten.

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

Start the machine and carry out a trial run

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

10.17 Refrigeration dryer maintenance

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

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

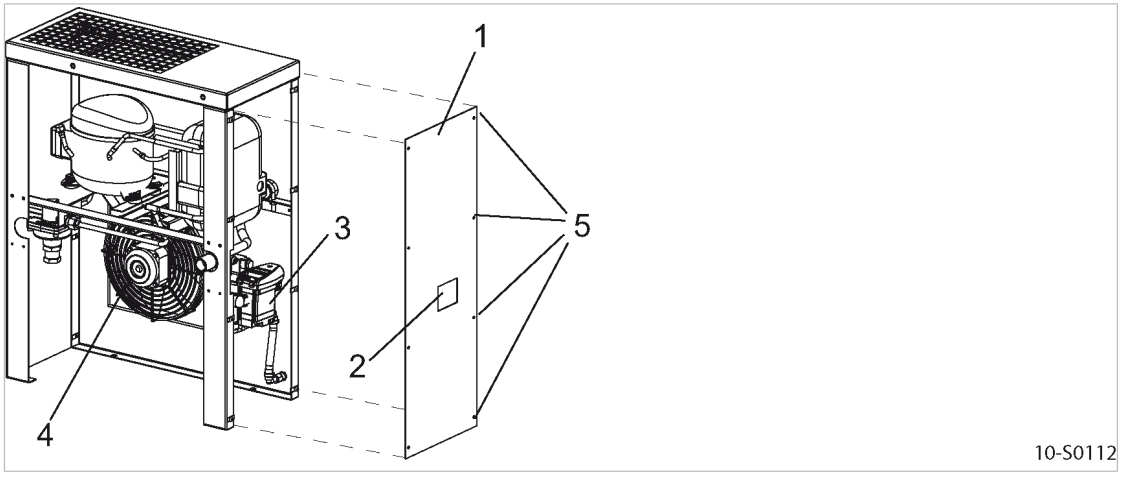


Fig. 37 Refrigeration dryer

1 Access panel
2 Viewing window: condensate drain
3 Condensate drain
4 Refrigerant condenser
5 Screw

➢ Check and clean the refrigerant condenser and condensate drain regularly as described below.

10.17.1 Cleaning the refrigerant condenser

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

1. Undo the securing screws 5 and remove the panel 1.
2. Use compressed air (<5 bar) to blow the condenser 4 through from inside to outside and then vacuum up the dirt.
3. Replace the panel again.

10.17.2 Checking condensate drainage

The condensate drain opens automatically when enough condensate has collected. The *Power* LED flashes when condensate is drained.

The viewing window [2] (Fig 37) can be carefully removed in order to press the «TEST» button.

One of the illustrated condensate drains is fitted according to compressor model (Fig 38).

Precondition The machine has run for a sufficient period under LOAD.
The *Power* LED lights.
Thee *Alarm* LED (if provided) does not light.

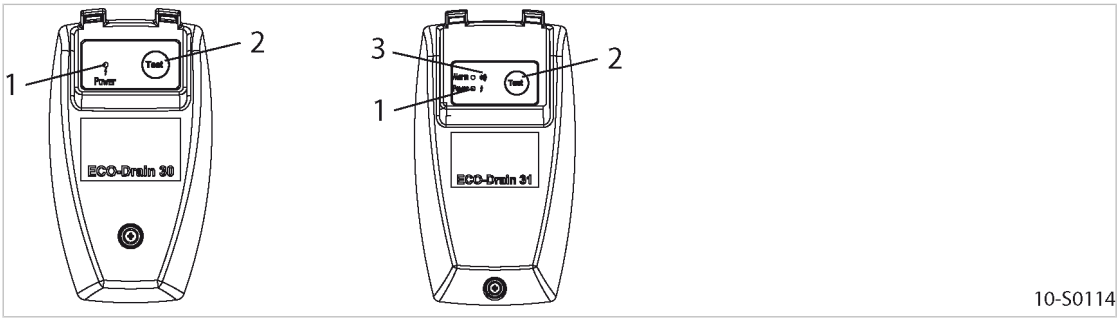


Fig. 38 Checking condensate drainage

[1] *Power* LED
[2] «TEST» button
[3] *Alarm* LED

➢ Visual check: Does condensate flow as soon as the drain automatically opens?

Condensate does not flow?

The condensate drain hose or the drain itself is blocked.

➢ Switch off the machine and clean the drain pipe.

➢ Condensate drain manual check: Press and hold the «TEST» button for at least 2 seconds.

➢ Carry out maintenance on the condensate drain if condensate still does not flow.

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

10.17.3 Condensate drain maintenance

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

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

Machine fully vented (no pressure).

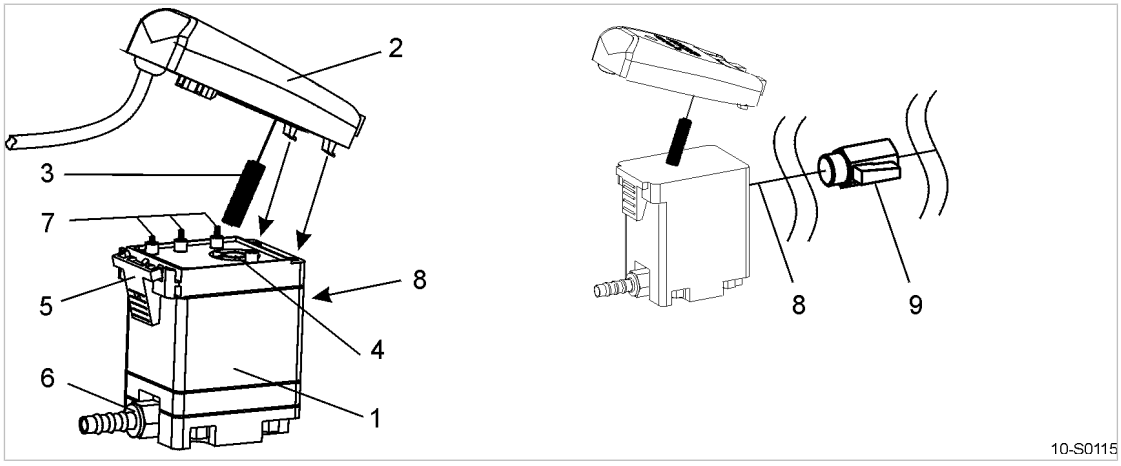


Fig. 39 Condensate drain maintenance

1. Service module
2. Control module
3. Sensor
4. Sensor opening
5. Snap fastener
6. Condensate drain hose fitting
7. Contact spring
8. Inlet
9. Shut-off valve

Removing the service module

1. Close the shut-off valve 9 upstream of the condensate drain.
2. Unscrew the drain hose fitting 6.
3. Press the snap fastener 5 and remove the control module 2 carefully from the service module 1.
4. Unscrew the service module carefully from the inlet pipe.

Fitting the service module

Use only KAESER Service modules to ensure correct function of the condensate drain.

Precondition Make sure the top of the service module and the contact spring are clean and dry.

1. Screw the service module to the inlet pipe using sealing tape.
2. Insert the control module sensor 3 carefully in the opening 4 in the new service module.
3. Place the hook of the control module into the service module eye and press until the snap fastener can be heard to click into place.
4. Fit the drain hose and open the shut-off valve upstream of the condensate drain.
5. Close all access doors, replace and secure all removable panels.

10.18 Service air receiver

10.18.1 Drain condensate manually.

Fig. 40 Condensate drain tap

[1] Condensate drain tap

1. Undo the knurled screw on the condensate drain tap and drain the condensate into a suitable canister.
2. Close the condensate drain tap.

➢ Dispose of the condensate according to valid environmental regulations.

10.18.2 Checking the safety relief valve

Precondition The machine is switched off.
Wear eye and ear protection.

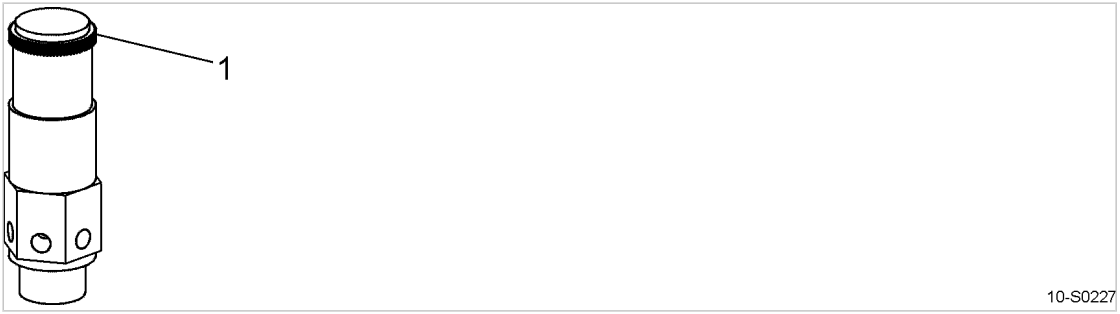


Fig. 41 Testing the safety relief valve

[1] Ring (blowoff pressure reduction)

1. Close the user's shut-off valve between the machine and the compressed air system.
2. Switch the machine on until the air receiver is full.
(machine switches to IDLE running)
3. Shut down the machine and remove the panel on the air receiver.
4. Turn the ring [1] until the safety relief valve opens.
5. Turn the ring [1] back again.
6. Open the user's shut-off valve between the machine and the compressed air system.

The safety relief valve does not open?

➢ De-commissioning the machine until the defective safety relief valve is replaced.

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. 39 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 materials are original Kaeser products. They are selected for use in KAESER machines.

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

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

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

Machine

manroland parts number list

Name	AIRCENTER SX 3	AIRCENTER SX 8
Filter mat (cooler)	80.94G40-2222	80.94G40-2222
Filter mat (control cabinet)	80.94G40-2223	80.94G40-2223
Oil filter	80.94G40-2224	80.94G40-2224
Air filter	80.94G40-2225	80.94G40-2225
Oil separator cartridge	80.94G40-2226	80.94G40-2226
Filter element E-E	80.94G40-1214	80.94G40-1214
Filter element E-G	80.94G40-2227	80.94G40-2227
ECO-DRAIN service module	80.94G40-2228	80.94G40-2228
V-belts	80.94G40-2229	80.94G40-2232
SIGMA FLUID S-460 – 3,8 l	81.94G40-2218	81.94G40-2218
SIGMA FLUID S-460 – 19 l	80.94G40-2218	80.94G40-2218
SIGMA FLUID MOL – 1,0 l	80.94G40-2231	80.94G40-2231
SIGMA FLUID MOL – 4,0 l	81.94G40-2231	81.94G40-2231

Name	AIRCENTER SX 3	AIRCENTER SX 8
SIGMA FLUID MOL – 20 l	82.94G40-2231	82.94G40-2231

Tab. 40 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.

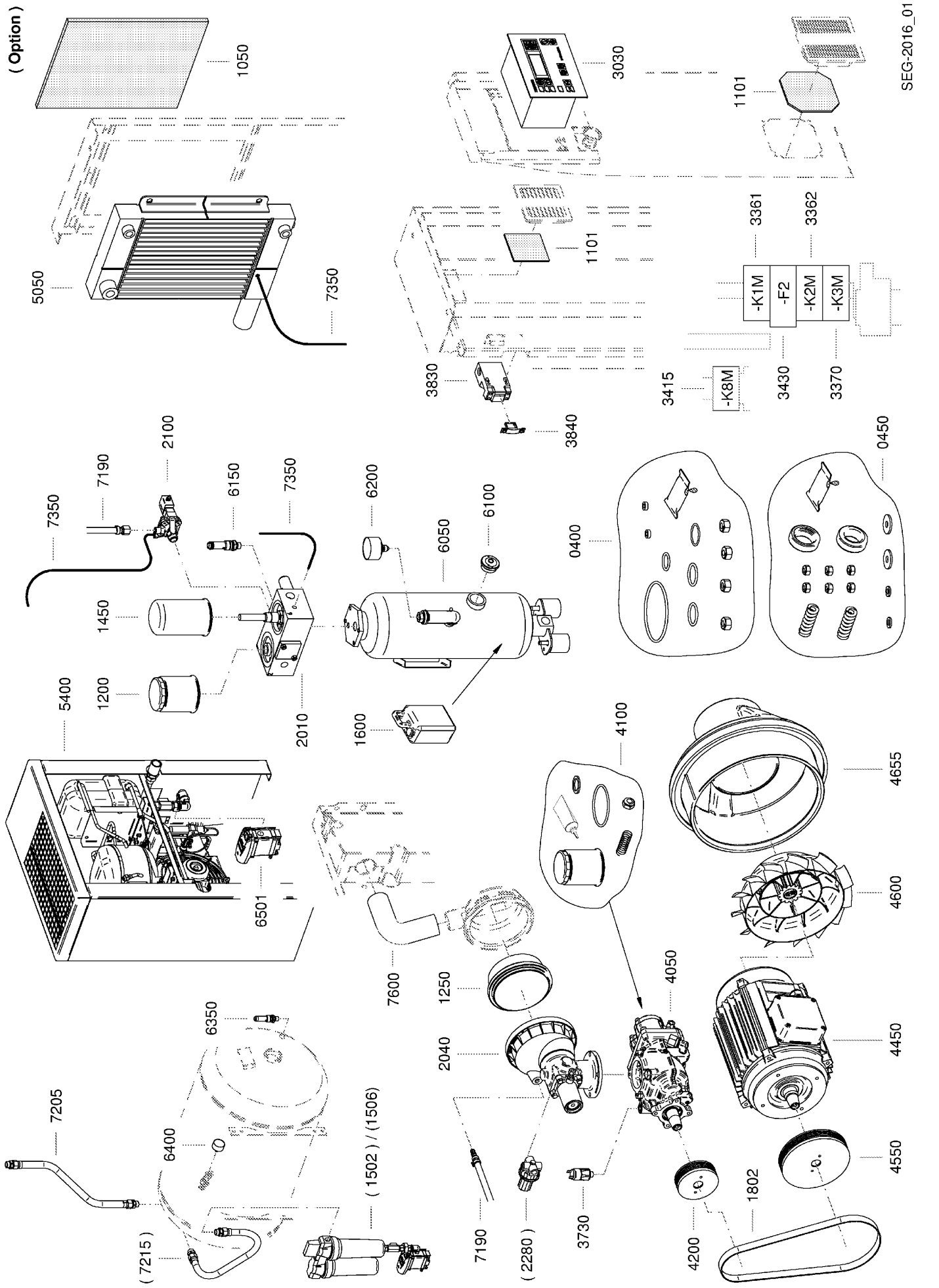
11.4 Service Addresses

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

11.5 Spare Parts for Service and Repair

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

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


(Option)
1050
5050
7350
3030
1101
1101
3361
3362
-K1M
-F2
-K2M
-K3M
3830
3840
3415
-K8M
3430
3370
SEG-2016_01
2100
7190
7350
6150
7350
6200
6100
6050
0400
0450
1450
1200
5400
2010
1600
6501
4100
4655
4600
4450
4550
7600
1250
2040
4050
6350
6400
7205
(7215)
(1502) / (1506)
7190
(2280)
3730
4200
1802

Legend	KAESER
Aircenter SX3/4/5/7.5	SEL-1850_01USE

Item	Name	Option
0400	Sealing kit	
0450	Seal ring kit	
1050	Filter mat	
1101	Filter mat (set)	
1200	Oil filter	
1250	Air filter	
1450	Oil separator cartridge	
1502	Compressed air filter	X
1506	Compressed air filter comb.	X
1600	Sigma Fluid *)	
1802	Drive belts	
2010	Valve block	
2022	Maintenance kit, MP/CV	
2024	Overhaul kit, MP/CV	
2062	Maintenance kit, thermostatic valve	
2064	Overhaul kit, thermostatic valve	
2040	Inlet valve	
2042	Maintenance kit, inlet valve	
2044	Overhaul kit, inlet valve	
2100	Venting control valve	
2102	Maintenance kit, VC valve	
2104	Overhaul kit, VC valve	
2280	Proportional controller	X
3030	SIGMA controller	
3361	Contactor	
3362	Contactor	
3370	Contactor	
3415	Contactor	
3430	Overload protection cutout	
3730	Safety pressure switch	
3732	Protective cap	
3830	Safety interlock switch	
3840	Actuator (interlock switch)	
4050	SIGMA airend	
4100	Airend installation kit	
4200	Belt pulley	
4450	Drive motor	
4451	Motor bearing kit	
4550	Belt pulley	
4600	Fan wheel	
4655	Motor cooling air flow guide	
5050	Cooler	
5400	Refrigeration dryer	
6050	Oil separator tank	
6100	Oil level indicator	
6150	Pressure relief valve	
6200	Pressure gauge	
6350	Air receiver relief valve	
6400	Manometer Druckluftbehälter	
6501	Condensate drain	
9602	Service module	
9603	Gasket kit, condensate drain	
7190	Prepared hose	
7205	Prepared hose	
7215	Prepared hose	X
7350	Control line kit	
7600	Inlet hose	

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

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

Maintenance intervals under good ambient and operating conditions, such as low to moderate ambient temperature and dry, clean inlet air.

Maintenance intervals may decrease due to ambient and operating conditions.

*) See cooling fluid recommendations

12 Decommissioning, Storage and Transport

12.1 Putting Out of Operation

This is necessary under the following circumstances:

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

Temporarily putting out of operation

Precondition The machine can be started at regular intervals.

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

Putting out of operation for a longer period

Precondition Before putting out of operation, the machine should be run under LOAD for at least 30 minutes.

Switch off the power supply disconnecting device,
the disconnect device is locked in the off position,
check that no voltage is present.

Machine fully vented (no pressure).

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

12.2 Packing

A wooden crate is required for ground transport to protect the machine from mechanical damage.

Consult an authorized KAESER Service representative 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. Place desiccant inside the machine cabinet.
2. Wrap the machine in plastic sheeting.

12.3 Storage

Moisture can lead to corrosion, particularly on the surfaces of the airend and oil separator tank.

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

Advice can be obtained from KAESER on storage and re-commissioning.

CAUTION
Machine damage from moisture and frost.
➢ Prevent ingress of moisture and condensation.
➢ Maintain >32 °F storage temperature.

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

12.4 Transporting

12.4.1 Safety

Weight and center of gravity determine the suitable transporting method. The center of gravity is shown in the drawing in chapter 13.3.

Precondition Transport only by fork truck or lifting cradle and with personnel trained in the safe use of the transport equipment.

➢ Make sure the danger zone is clear.

12.4.2 Transporting with a forklift

Precondition The whole machine must be over the forks.

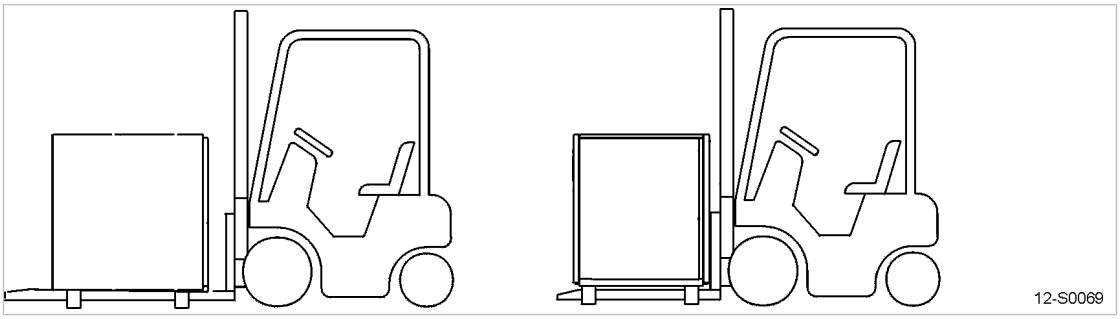


Fig. 42 Transporting with a forklift

➢ Drive the forks completely under the machine or palette and lift carefully.

12.4.3 Transporting with a crane

A suitable lifting cradle ensures correct transportation.
The lifting slings must be fully under the machine.
The slings must not press on the side of the machine.

Examples of unsuitable fixing points:

- Pipe supports
- Flanges
- Attached components such as centrifugal separators, condensate drains or filters
- Rain protection covers

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

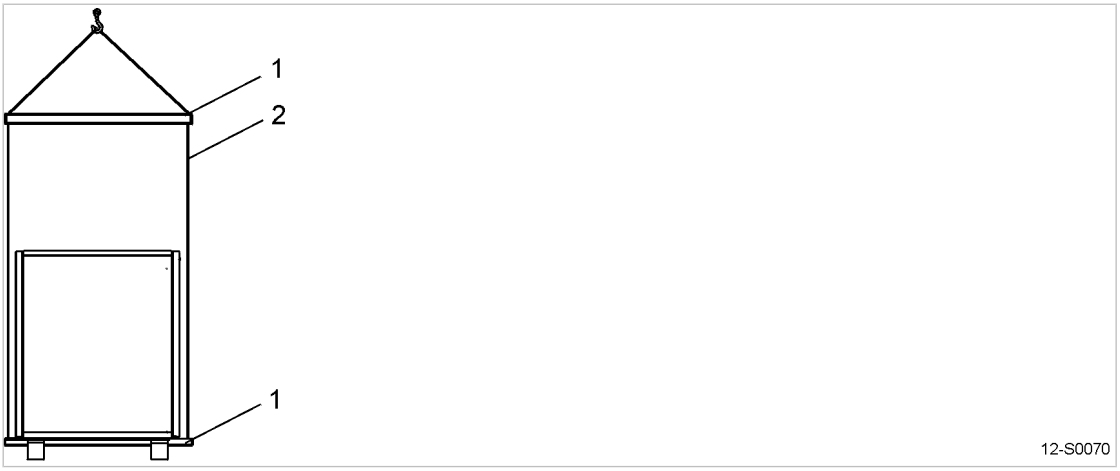


Fig. 43 Transporting with a crane
[1] Lifting cradle
[2] Slings

CAUTION
Machine damage by incorrect lifting cradle attachment.
➢ Do not attach the lifting cradle to any of the machine components.
➢ The machine manufacturer can advise on application of a suitable lifting cradle.

➢ Use the lifting cradle 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 cooling oil from the machine.
2. Remove used filters and the oil separator cartridge.
3. Hand the machine over to an authorized disposal expert.

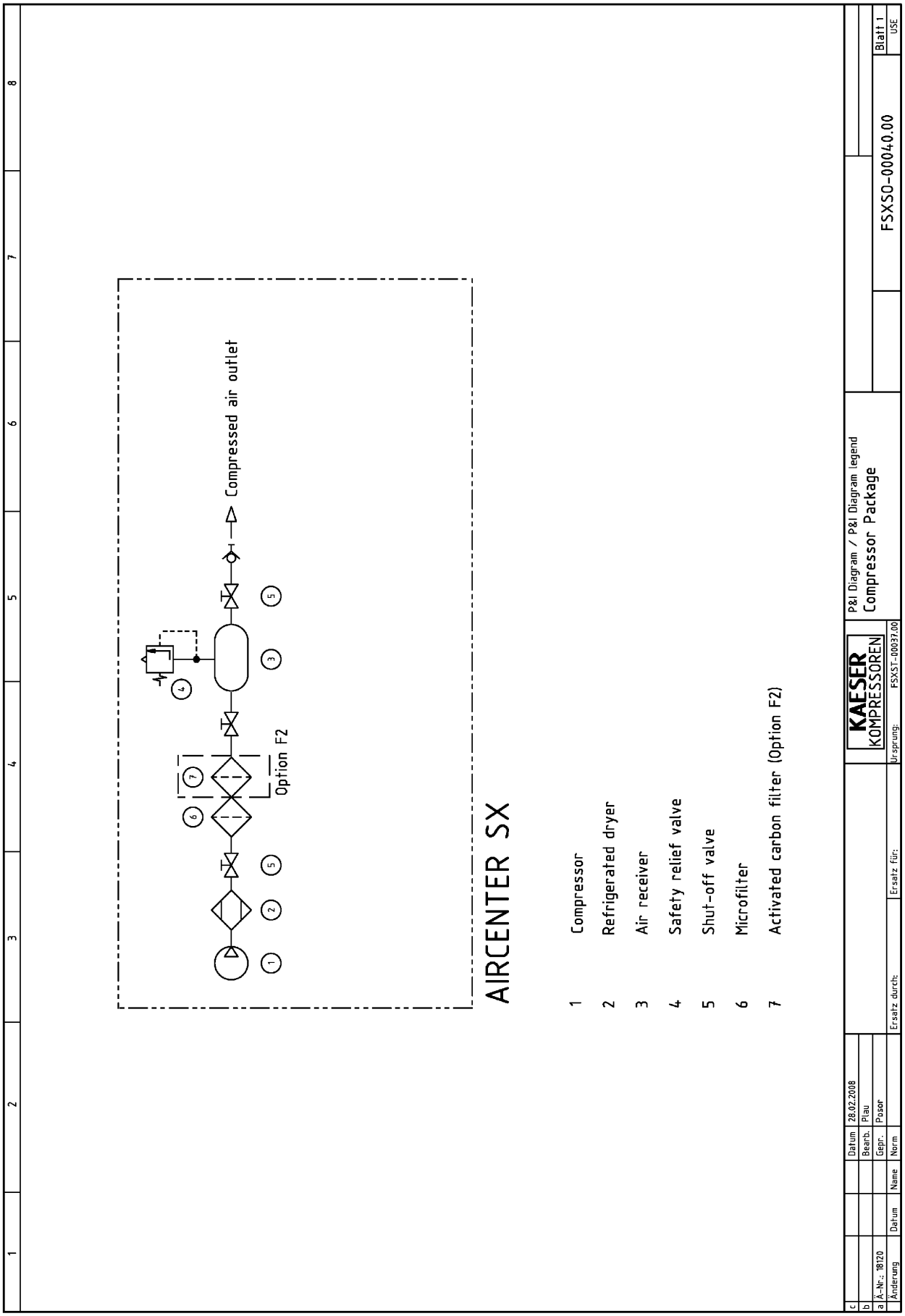
➢ Parts contaminated with cooling oil must be disposed of in accordance with local environment protection regulations.

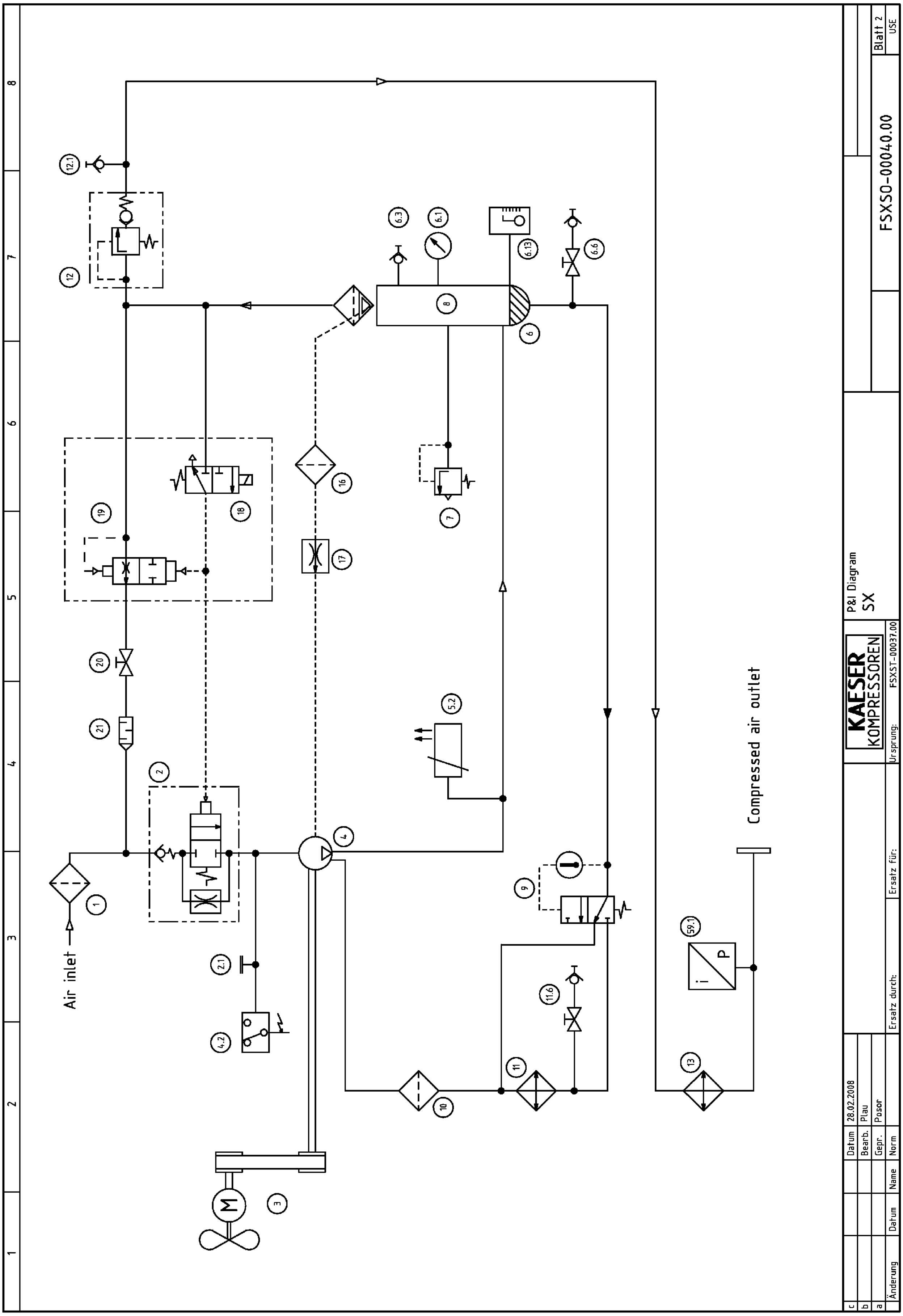
Compressors with refrigeration dryers

The sealed refrigerant circuit still contains both refrigerant and oil.
➢ Refrigerant and oil must be drained and disposed of by authorized personnel.

13 Annex

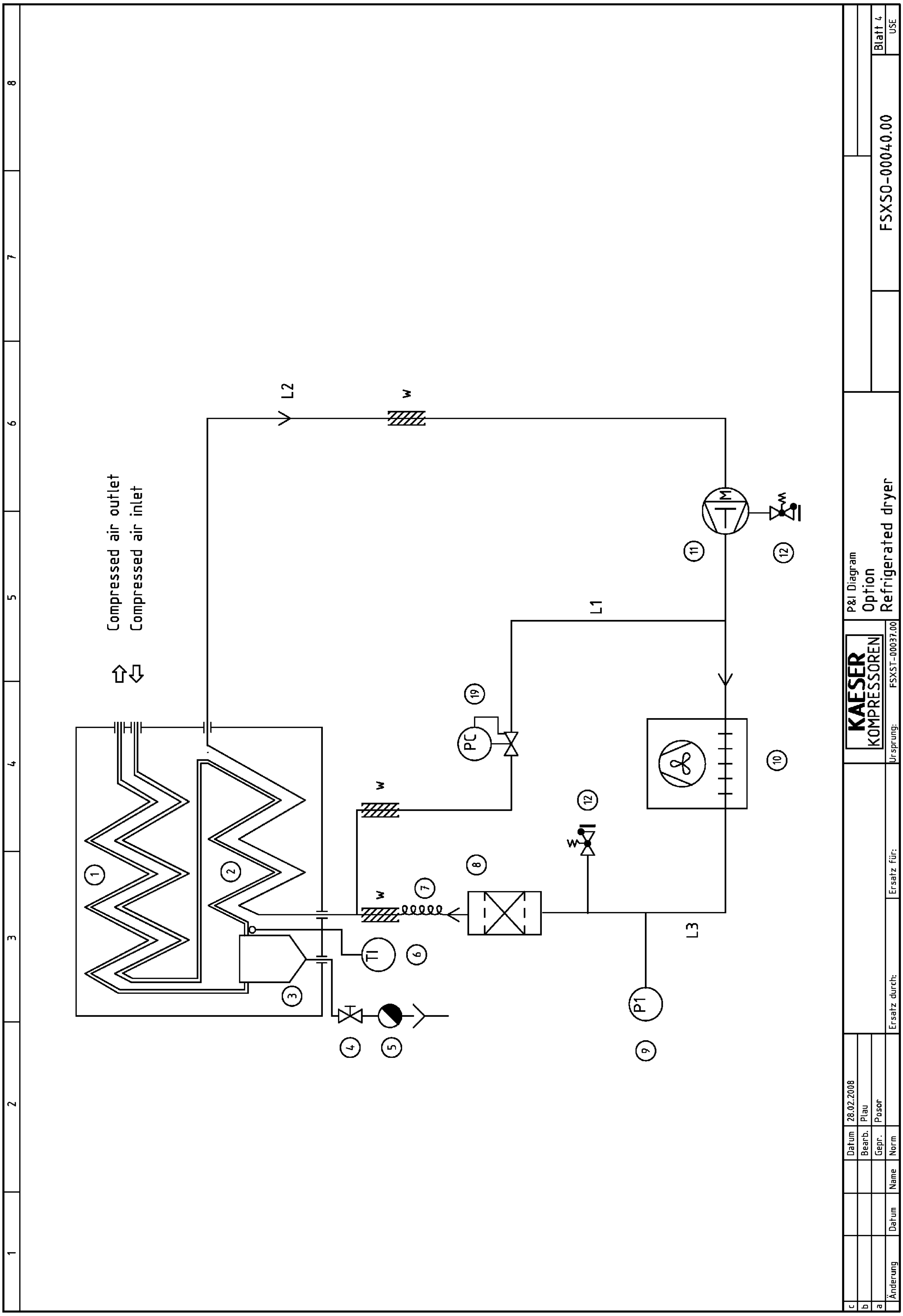
13.1 Pipeline and instrument flow diagram (P+I diagram)


Compressed air outlet
Option F2
AIRCENTER SX
1 Compressor
2 Refrigerated dryer
3 Air receiver
4 Safety relief valve
5 Shut-off valve
6 Microfilter
7 Activated carbon filter (Option F2)
KAESER KOMPRESSOREN
P&I Diagram / P&I Diagram legend
Compressor Package
FSXSO-00040.00
Blatt 1
USE
Datum 28.02.2008
Bearb. Plau
Gepr. Posor
Name Norm
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung: FSXST-00037.00


Air inlet
Compressed air outlet
P&I Diagram
SX
FSXS0-00040.00
Blatt 2
USE
KAESER
KOMPRESSOREN
Ursprung: FSXST-00037.00
Ersatz für:
Ersatz durch:
Datum 28.02.2008
Bearb. Plau
Gepr. Posor
Norm
Änderung
Datum
Name

1	Air filter
2	Inlet valve
2.1	Oil filler port with screw plug
3	Drive motor
4	Airend
4.2	Pressure switch - Wrong direction of rotation
5.2	PT100-sensor
6	Oil separator tank
6.1	Pressure gauge
6.3	Hose coupling
6.6	Shut-off valve with hose coupling - Oil drain
6.13	Oil level indicator
7	Safety relief valve
8	Oil separator cartridge
9	Oil temperature controller
10	Oil filter
11	Oil cooler
11.6	Shut-off valve with hose coupling - Oil drain
12	Minimum pressure check valve
12.1	Hose coupling
13	Air aftercooler
16	Dirt trap
17	Nozzle
18/19	Combined control/venting valve
	18 Control valve
	19 Venting valve
20	Shut-off valve - Venting line
21	Silencer
59.1	Pressure transducer - System pressure

c				Datum	28.02.2008		KAESER KOMPRESSOREN	P&I Diagram legend SX	
b				Bearb.	Plau				
a				Gepr.	Posor				
	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung: FSXST-00037.00	FSXSO-00040.00	Blatt 3 USE



Compressed air outlet
Compressed air inlet
L1
L2
L3
W
TI
PC
P1
1
2
3
4
5
6
7
8
9
10
11
12
19
P&I Diagram
Option
Refrigerated dryer
FSXS0-00040.00
Blatt 4
USE
KAESER KOMPRESSOREN
Ursprung: FSXST-00037.00
Ersatz für:
Ersatz durch:
Datum 28.02.2008
Bearb. Plau
Gepr. Posor
Norm
Änderung
Datum
Name

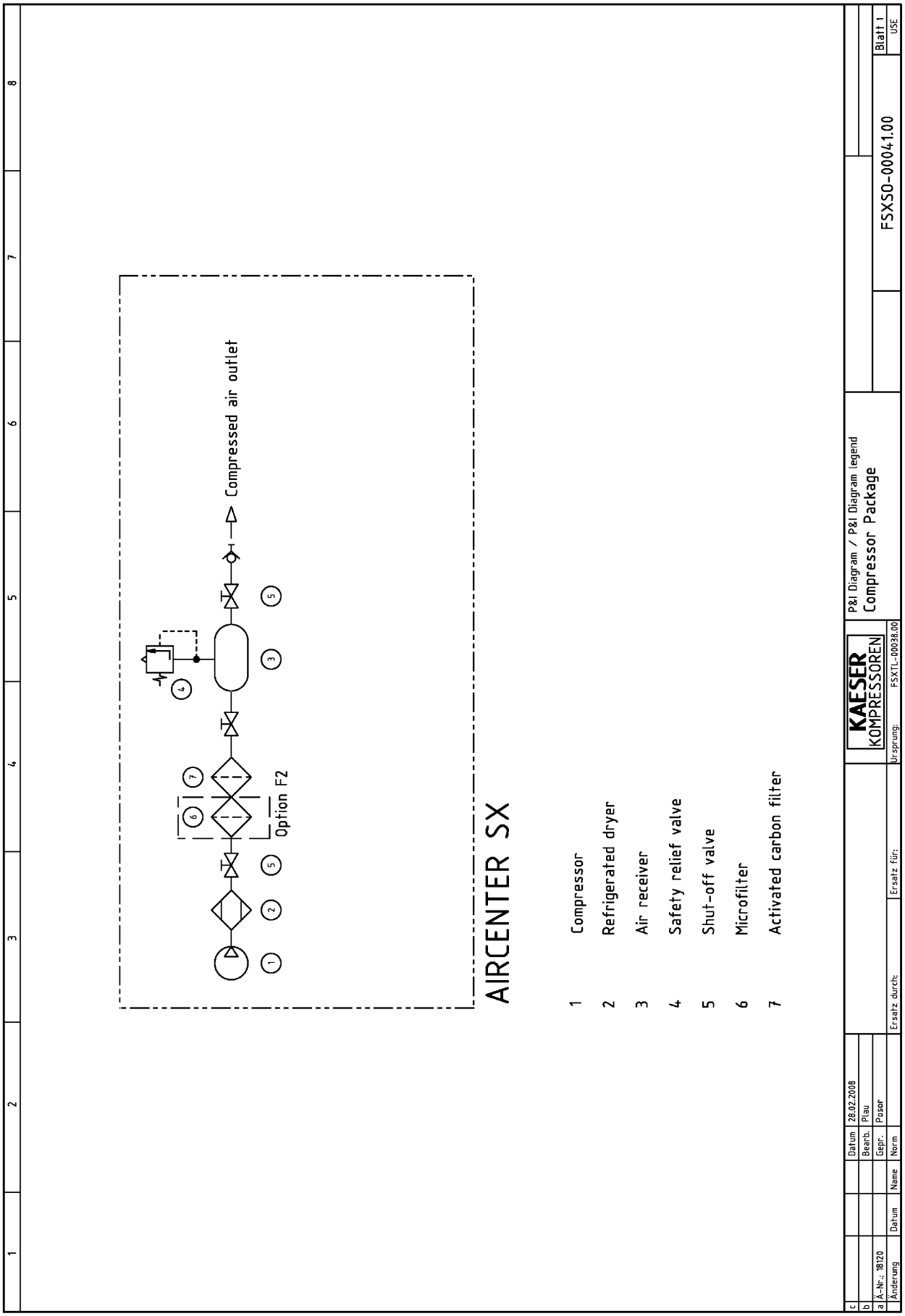
1	Air to air heat exchanger	heat insulated	
2	Air to refrigerant heat exchanger (Vapouriser)		
3	Condensate separator		
4	Shut-off valve		
5	Condensate drain		
6	Pressure dew point indicator TI		
7	Capillary tube (Refrigerant injection)		
8	Filter dryer		
9	Safety pressure switch		
10	Refrigerant condenser (air cooled condenser)		
11	Refrigerant compressor (hermetic)		
12	Service connection (Schrader valve)		
19	Hot gas bypass valve		

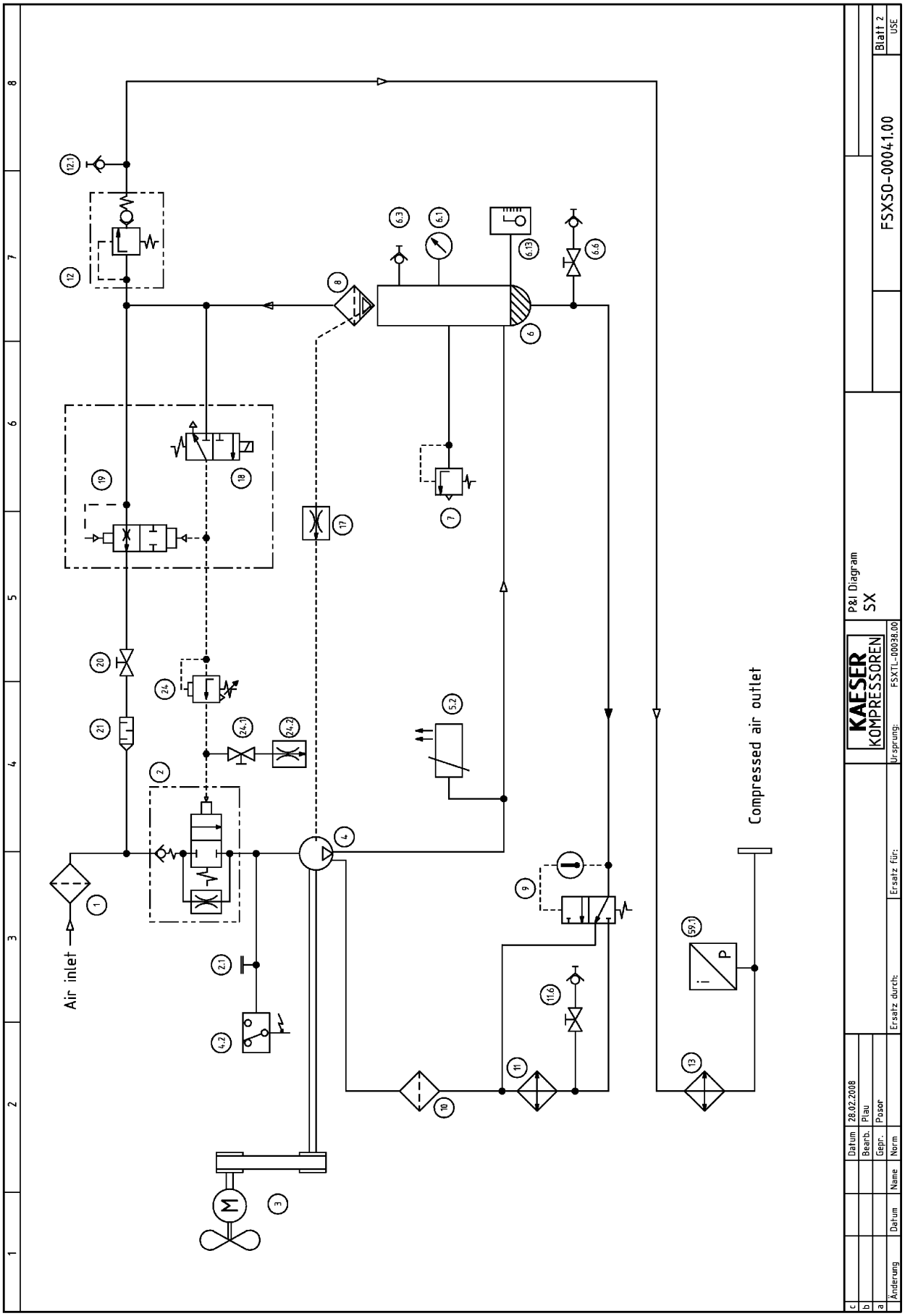
Piping:

L1	Bypass line
L2	CU-Pipe
L3	CU-Pipe
w	heat insulated

c				Datum	28.02.2008	KAESER KOMPRESSOREN	P&I Diagram legend Option Refrigerated dryer
b				Bearb.	Plau		
a				Gepr.	Posor		
	Änderung	Datum	Name	Norm		Ersatz durch: / Ersatz für: / Ursprung: FSXST-00037.00	FSXSO-00040.00 Blatt 5 USE

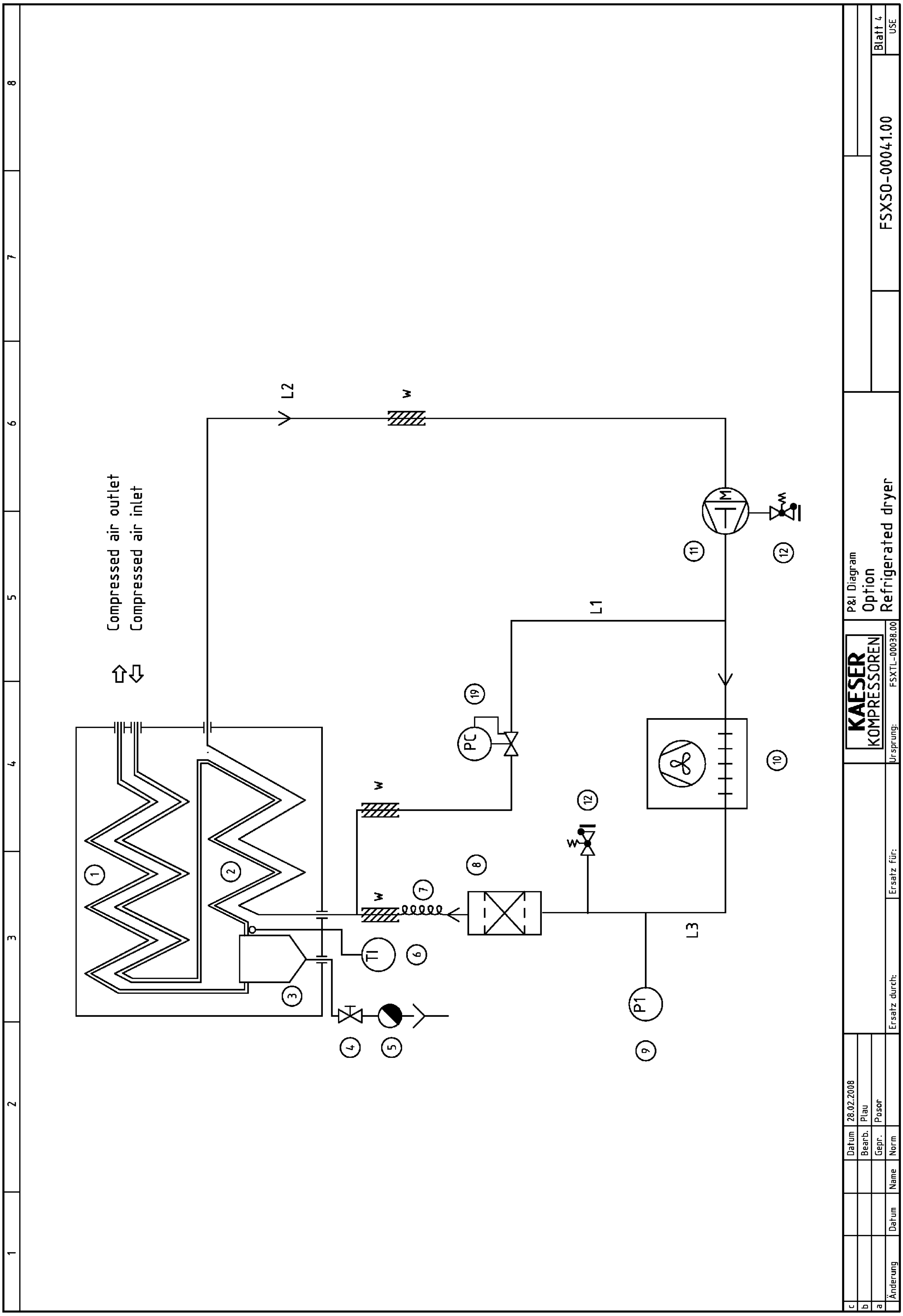
13.2 Option C1
Pipe and Instrument Flow Diagram (P+I diagram): MODULATING control mode


Compressed air outlet
Option F2
AIRCENTER SX
1 Compressor
2 Refrigerated dryer
3 Air receiver
4 Safety relief valve
5 Shut-off valve
6 Microfilter
7 Activated carbon filter
P&I Diagram / P&I Diagram legend
Compressor Package
FSXSO-00041.00
KAESER KOMPRESSOREN
FSXTL-00038.00
Datum 28.02.2008
Bearb. Plau
Gepr. Posor
Name Norm
Ersatz durch:
Ersatz für:
Ursprung:
Blatt 1
USE


Air inlet
Compressed air outlet
P&I Diagram
SX
FSXSO-00041.00
FSXTL-00038.00
KAESER KOMPRESSOREN
Blatt 2
USE
28.02.2008
Plau
Posor

1	Air filter
2	Inlet valve
2.1	Oil filler port with screw plug
3	Drive motor
4	Airend
4.2	Pressure switch - Wrong direction of rotation
5.2	PT100-sensor
6	Oil separator tank
6.1	Pressure gauge
6.3	Hose coupling
6.6	Shut-off valve with hose coupling - Oil drain
6.13	Oil level indicator
7	Safety relief valve
8	Oil separator cartridge
9	Oil temperature controller
10	Oil filter
11	Oil cooler
11.6	Shut-off valve with hose coupling - Oil drain
12	Minimum pressure check valve
12.1	Hose coupling
13	Air aftercooler
17	Nozzle
18/19	Combined control/venting valve
	18 Control valve
	19 Venting valve
20	Shut-off valve - Venting line
21	Silencer
24	Proportional controller
24.1	Shut-off valve open: machine in modulating control
	Shut-off valve closed: package running in DUAL-/QUADRO or VARIO mode
24.2	Nozzle
59.1	Pressure transducer - System pressure

c				Datum	28.02.2008		KAESER KOMPRESSOREN	P&I Diagram legend SX	
b				Bearb.	Plau				
a				Gepr.	Posor				
	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung: FSXTL-00038.00	FSXSO-00041.00	Blatt 3 USE


Compressed air outlet
Compressed air inlet
L1
L2
L3
W
TI
PC
P1
P&I Diagram
Option
Refrigerated dryer
KAESER KOMPRESSOREN
FSXSO-00041.00
Blatt 4
USE
FSXTL-00038.00
Ursprung:
Ersatz für:
Ersatz durch:
Datum 28.02.2008
Bearb. Plau
Gepr. Posor
Norm
Änderung
Datum
Name

1	2	3	4	5	6	7	8

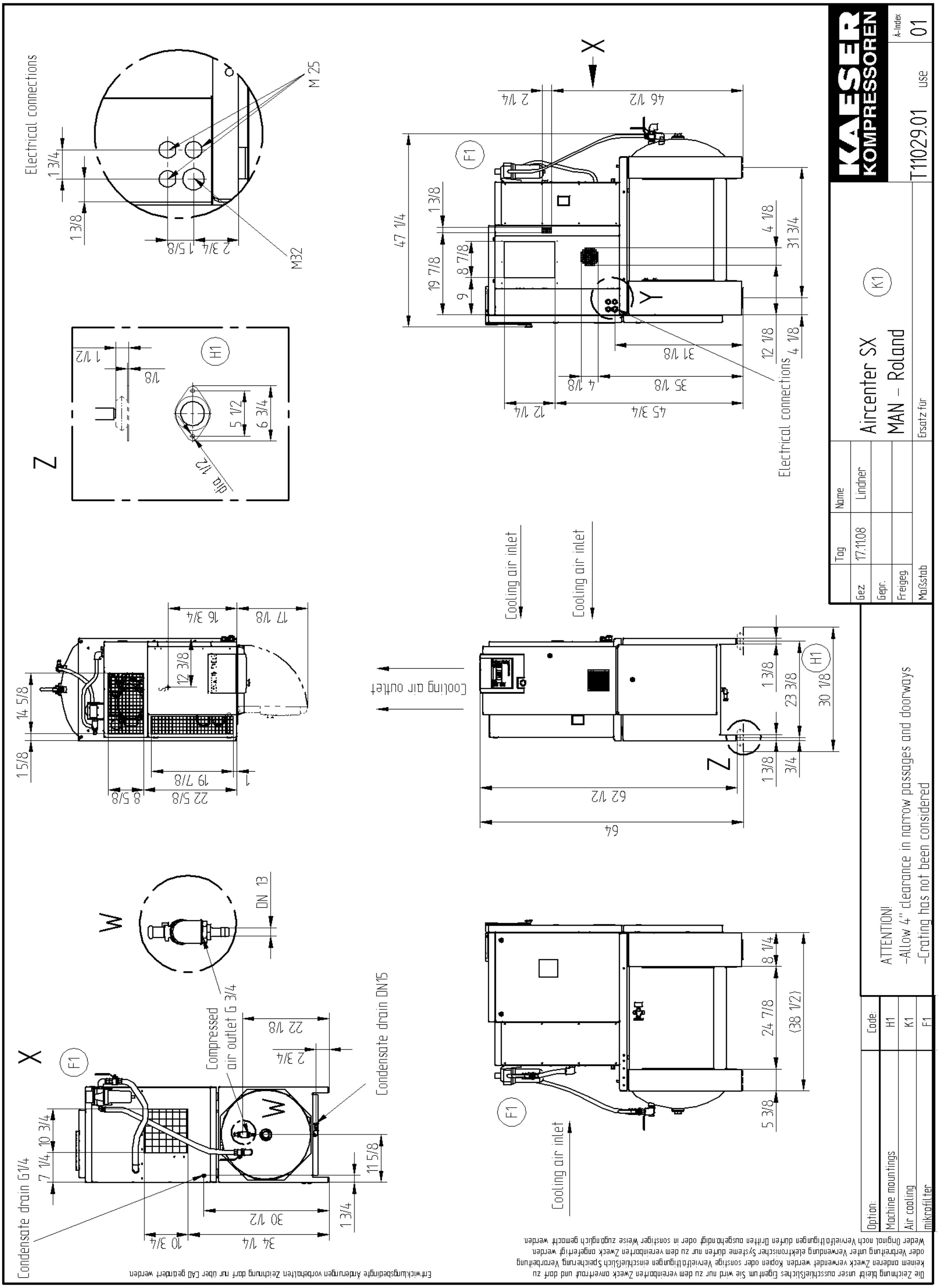
1	Air to air heat exchanger	heat insulated	
2	Air to refrigerant heat exchanger (Vapouriser)		
3	Condensate separator		
4	Shut-off valve		
5	Condensate drain		
6	Pressure dew point indicator TI		
7	Capillary tube (Refrigerant injection)		
8	Filter dryer		
9	Safety pressure switch		
10	Refrigerant condenser (air cooled condenser)		
11	Refrigerant compressor (hermetic)		
12	Service connection (Schrader valve)		
19	Hot gas bypass valve		

Piping:

L1	Bypass line
L2	CU-Pipe
L3	CU-Pipe
w	heat insulated

c				Datum	28.02.2008		KAESER KOMPRESSOREN	P&I Diagram legend Option Refrigerated dryer	
b				Bearb.	Plau				
a				Gepr.	Posor				
	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung: FSXTL-00038.00	FSXSO-00041.00	Blatt 5 USE

13.3 Dimensional drawing


Electrical connections
M 25
M32
X
Y
Z
W
F1
H1
K1
Cooling air inlet
Cooling air outlet
Compressed air outlet G 3/4
Condensate drain DN15
Condensate drain G1/4
DN 13
dia 1/2
ATTENTION!
-Allow 4'' clearance in narrow passages and doorways
-Crating has not been considered
Option:
Code:
Machine mountings H1
Air cooling K1
mikrofilter F1
Tag
Name
Gez 17.11.08 Lindner
Gepr.
Freigeg.
Maßstab
Aircenter SX
MAN - Roland
Ersatz für
KAESER KOMPRESSOREN
T11029.01
use
Ä-Index 01

13.4 Electrical Diagram

Wiring Diagram

compressor series SX T

with SIGMA CONTROL BASIC

400V±10% 3ph 60Hz 460V±10% 3ph 60Hz

Power supply:
WYE system with center point solidly grounded

ATTENTION !!!
The document gives collective information on
power supply voltages and frequencies for all machines.
The voltage and frequency and local conditions under
which any particular machine may be used
are given on the nameplate of the machine
and in the accompanying service manual.

manufacturer: KAESER COMPRESSORS
96450 COBURG
GERMANY

c				Datum	24.09.2008 USE		KAESER KOMPRESSOREN	cover page compressor series SX T		=
b				Bearb.	Sitter					+
a				Gepr.	Fischer					
A	Änderung	Datum	Name	Norm		Ersatz durch:	Ursprung: USMU2018_00		DSX.TB-U2030.00	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			DSX.TB-U2030.00	1	
2	list of contents			ZSX.TB-U2030.00	1	
3	block diagram			USX.TB-U2030.00	1	
4	block diagram			USX.TB-U2030.00	2	
5	block diagram	electrical component parts list		USX.TB-U2030.00	3	
6	wiring diagram	power unit		SSX.TB-U2030.00	1	
7	wiring diagram	power unit air dryer		SSX.TB-U2030.00	2	
8	wiring diagram	control voltage tapping		SSX.TB-U2030.00	3	
9	wiring diagram	control voltage tapping		SSX.TB-U2030.00	4	
10	wiring diagram	supply/Relay-outputs		SSX.TB-U2030.00	5	
11	wiring diagram	inputs inside		SSX.TB-U2030.00	6	
12	wiring diagram	inputs/outputs external		SSX.TB-U2030.00	7	
13	wiring diagram	volt-free contacts		SSX.TB-U2030.00	8	
14	terminal connection	terminal strip -X0,-X1,-X11		KSX.TB-U2030.00	1	
15	terminal connection	terminal strip -X31,1X31,2X31,3X31		KSX.TB-U2030.00	2	
16	lay-out	control panel		ASX.TB-U2030.00	1	

c				Datum	24.09.2008		KAESER KOMPRESSOREN	list of contents compressor series SX T	=
b				Bearb.	Sitter				+
a				Gepr.	Fischer				Blatt 1
B	Änderung	Datum	Name	Norm		Ersatz durch: / Ersatz für:	Ursprung:	ZSX.TB-U2030.00	Bl.

1	2	3	4	5	6	7	8

general instructions

ATTENTION !!!
Install supplies, grounding and shock protection
to local safety regulations.
Do not make or break
live plug-in connectors.

control cabinet wiring for non-designated conductors

primary circuits ungrounded:	black, UL-Style 1015, CSA-TEW
primary circuits grounded:	grey, UL-Style 1015, CSA-TEW
control voltage AC 115V ungrounded:	red, 18AWG UL-Style 1015, CSA-TEW
control voltage AC 115V grounded:	white, 18AWG UL-Style 1015, CSA-TEW
control voltage DC ungrounded:	blue, 18AWG UL-Style 1015, CSA-TEW
control voltage DC grounded:	white/blue, 18AWG UL-Style 1015, CSA-TEW
external voltage:	orange, 16AWG UL-Style 1015, CSA-TEW
measuring circuits:	violet, 18AWG UL-Style 1015, CSA-TEW
ground conductor:	green/yellow, UL-Style 1015, CSA-TEW

option C17 = direct on line start

c				Datum	24.09.2008		KAESER KOMPRESSOREN	block diagram compressor series SX T		=	
b				Bearb.	Sitter					+	
a				Gepr.	Fischer						
C	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung:		USX.TB-U2030.00	Blatt 1 Bl.

electrical equipment identification

general components

-A10	SIGMA CONTROL BASIC
-1FU,-2FU	primary control fuse
-3FU	secondary control fuse
-F2	overload relay compressor motor
-G1	power supply
-K4	coupling relay, FAILURE
-K1M	main contactor
-K2M	delta contactor
-K3M	wye contactor
-M1	compressor motor
-S3	emergency stop pushbutton
-S10	door safety interlock switch
-T1	control transformer

refrigeration dryer

-A04	condensate drain
-4FU,-5FU	primary control fuse
-6FU	secondary control fuse
-K8M	motor starter
-M11	compressor motor
-M12	vent motor
-T2	transformer

terminal strips/plug-in connections

-X0	terminal strip, power supply
-X1	terminal strip, motor
-X11	terminal strip, control
-X31	terminal strip refrigeration dryer
-1X31,-2X31	connector plug refrigeration dryer

sensors/actuators

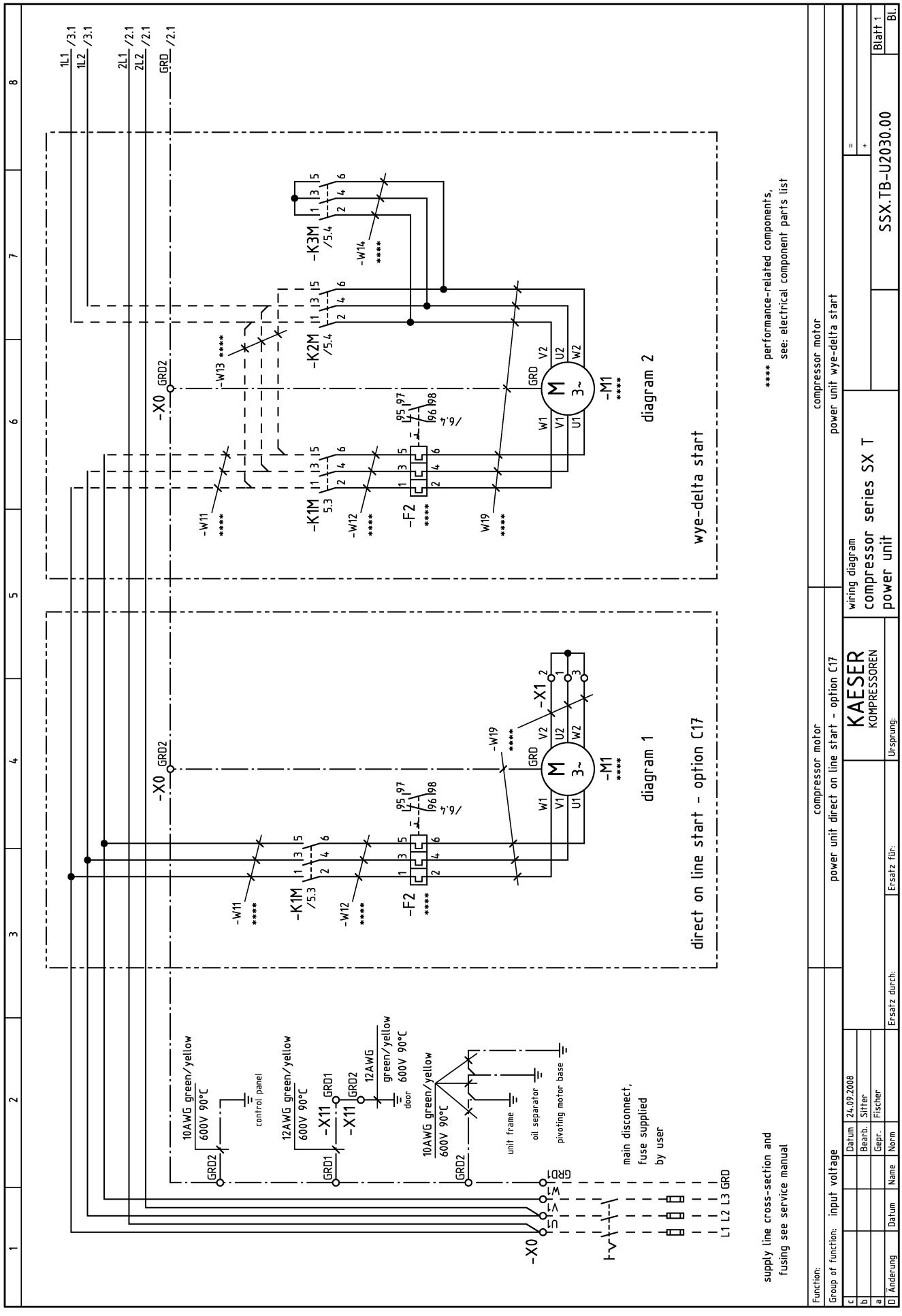
-B1	pressure transducer, air main pressure
-B2	safety air pressure switch-direction of rotation
-B11	temperature probe, airend discharge temperature
-B30	safety air pressure switch
-Y1	control valve

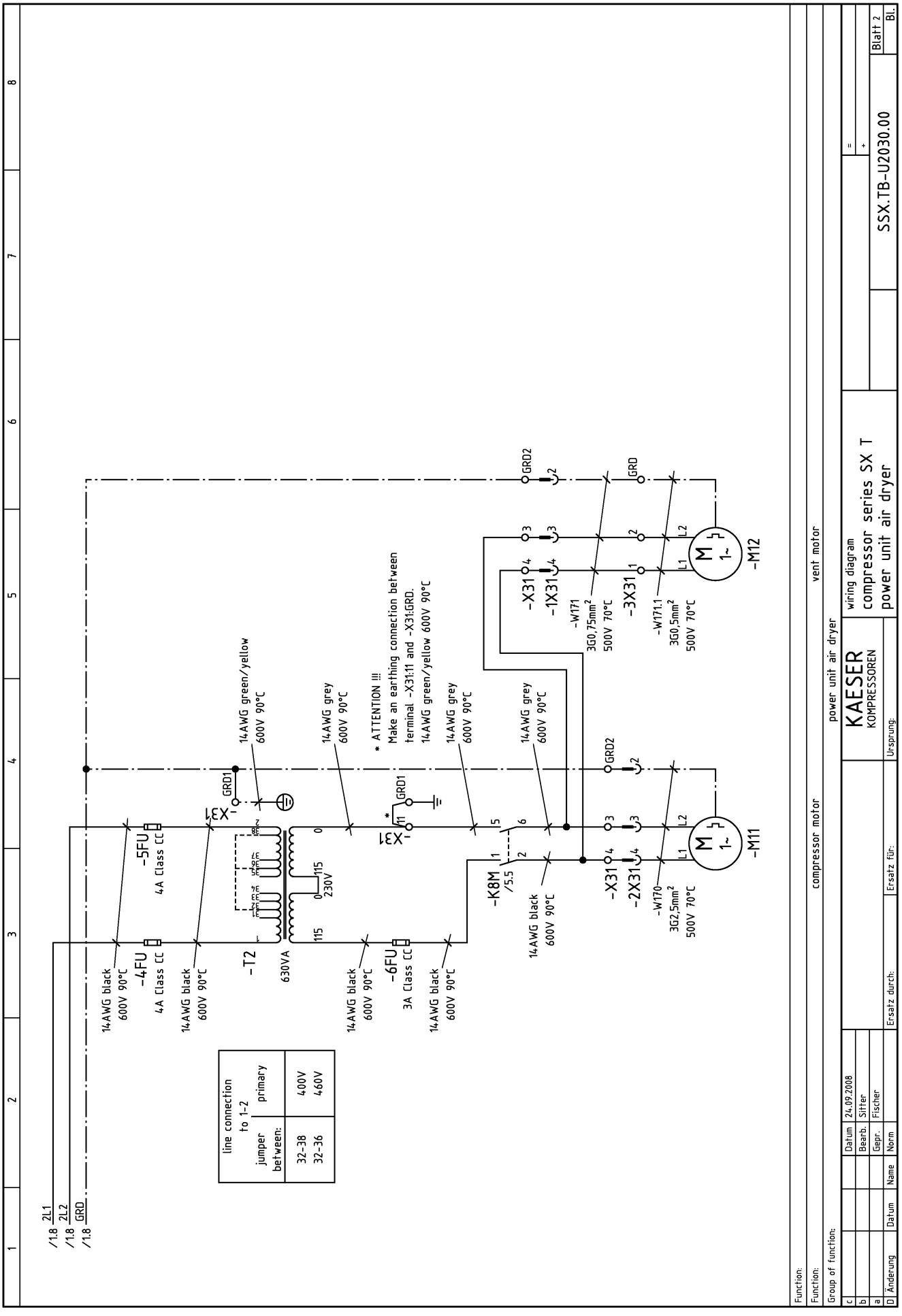
c				Datum	24.09.2008		KAESER KOMPRESSOREN	block diagram compressor series SX T	=
b				Bearb.	Sitter				+
a				Gepr.	Fischer				Blatt 2
C	Änderung	Datum	Name	Norm		Ersatz durch: / Ersatz für:	Ursprung:	USX.TB-U2030.00	Bl.

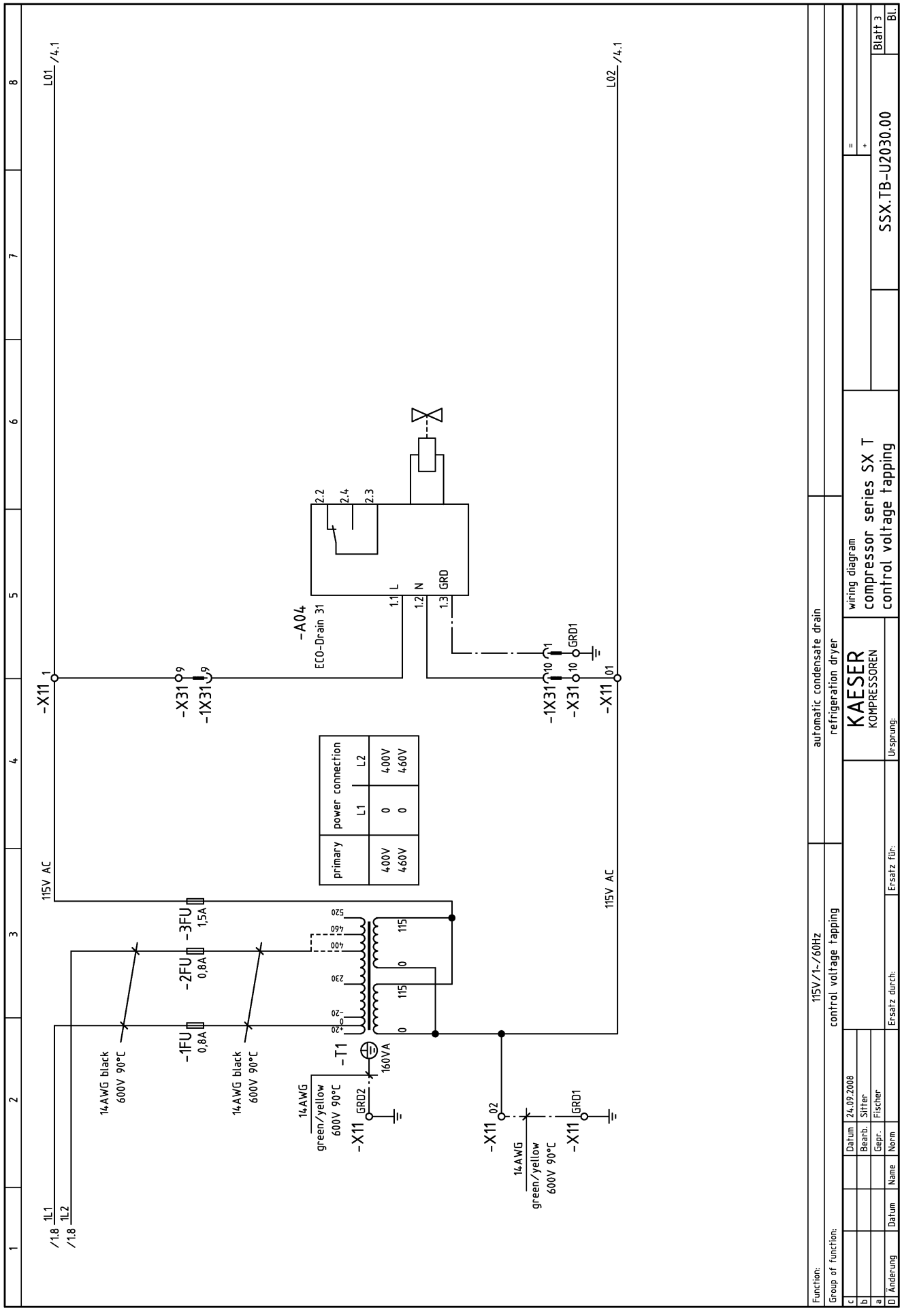
electrical component parts list

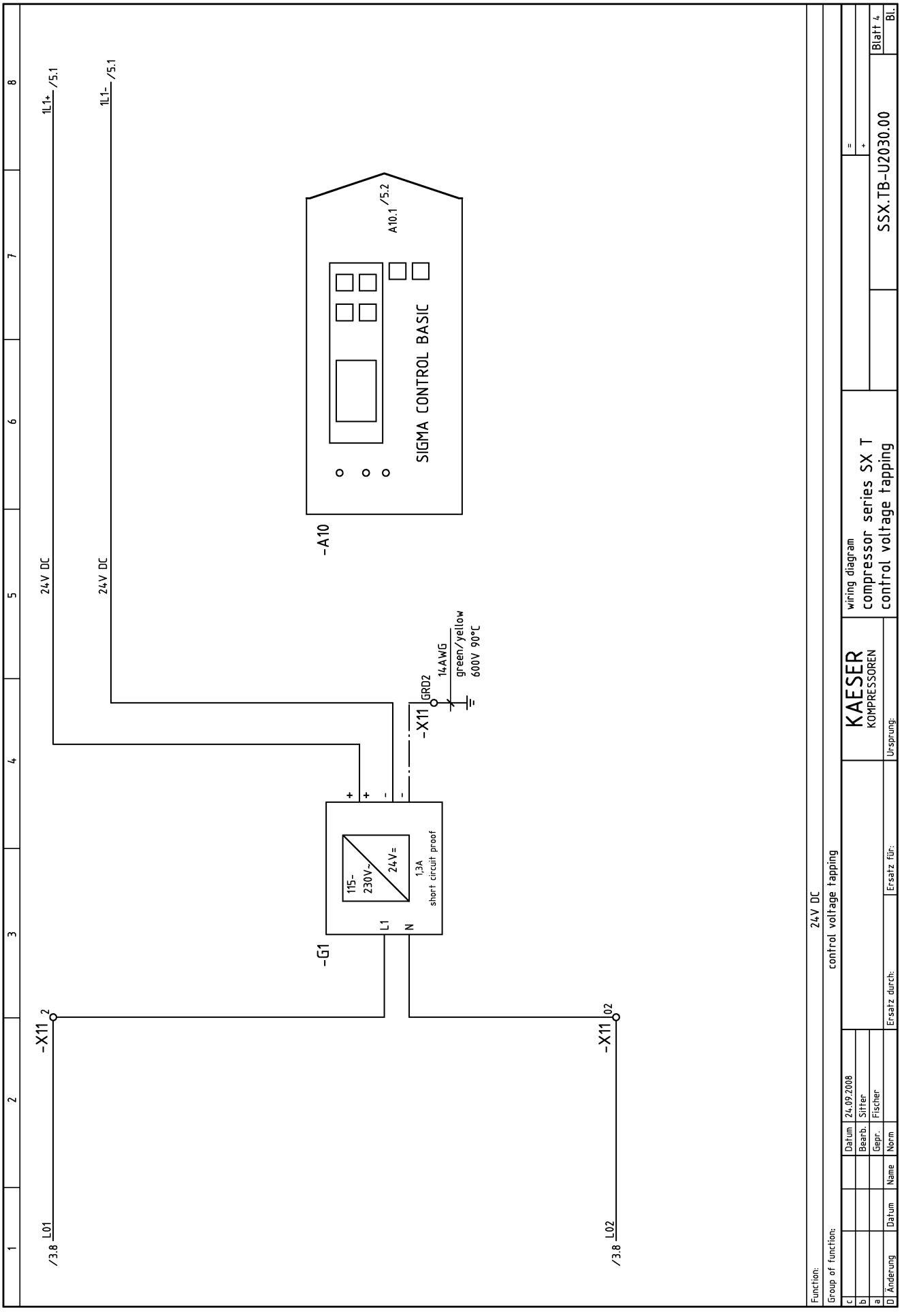
model	SX 3 T	SX 4 T	SX 5 T	SX 7.5 T
machine power supply	400 V ±10 %, 60 Hz 460 V ±10 %, 60 Hz	400 V ±10 %, 60 Hz 460 V ±10 %, 60 Hz	400 V ±10 %, 60 Hz 460 V ±10 %, 60 Hz	400 V ±10 %, 60 Hz 460 V ±10 %, 60 Hz
motor -M1	3 hp diagram 1, Sht.1 direct on line start	4 hp diagram 2, Sht.1 wye-delta start	5 hp diagram 2, Sht.1 wye-delta start	7,5 hp diagram 2, Sht.1 wye-delta start
terminal strips -X0	7.6836.00260 Wieland	7.6836.00260 Wieland	7.6836.00260 Wieland	7.6836.00260 Wieland
-X11/-X31	7.6836.00300 Wieland	7.6836.00300 Wieland	7.6836.00300 Wieland	7.6836.00300 Wieland
contactor -K1M	7.6864.00030 3RT1024-1BB40	7.6864.00030 3RT1024-1BB40	7.6864.00030 3RT1024-1BB40	7.6864.00030 3RT1024-1BB40
auxiliary switch	2x 7.3140.01690 3RH1921-1CA10	7.3140.04050 3RH1921-1XA31-0MA3	7.3140.04050 3RH1921-1XA31-0MA3	7.3140.04050 3RH1921-1XA31-0MA3
interference suppressor Siemens	7.3140.02830 3RT1926-1CB00	7.3140.02830 3RT1926-1CB00	7.3140.02830 3RT1926-1CB00	7.3140.02830 3RT1926-1CB00
contactor -K2M	---	7.6864.00030 3RT1024-1BB40	7.6864.00030 3RT1024-1BB40	7.6864.00030 3RT1024-1BB40
auxiliary switch	---	7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01
interference suppressor Siemens	---	7.3140.02830 3RT1926-1CB00	7.3140.02830 3RT1926-1CB00	7.3140.02830 3RT1926-1CB00
contactor -K3M	---	7.6864.00030 3RT1024-1BB40	7.6864.00030 3RT1024-1BB40	7.6864.00030 3RT1024-1BB40
auxiliary switch	---	7.3140.01690 3RH1921-1CA10	7.3140.01690 3RH1921-1CA10	7.3140.01690 3RH1921-1CA10
auxiliary switch	---	7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01
interference suppressor Siemens	---	7.3140.02830 3RT1926-1CB00	7.3140.02830 3RT1926-1CB00	7.3140.02830 3RT1926-1CB00
contactor -K8M Siemens	7.3140.01920 3RT1016-1JB41	7.3140.01920 3RT1016-1JB41	7.3140.01920 3RT1016-1JB41	7.3140.01920 3RT1016-1JB41
coupling relay -K4 Wieland	7.3149.00660 Flare 24 VDC-1W-2506 A	7.3149.00660 Flare 24 VDC-1W-2506 A	7.3149.00660 Flare 24 VDC-1W-2506 A	7.3149.00660 Flare 24 VDC-1W-2506 A
overload relay -F2	7.6873.00180 3RB2026-1SB0 (3-12 A)	7.6873.00180 3RB2026-1SB0 (3-12 A)	7.6873.00180 3RB2026-1SB0 (3-12 A)	7.6873.00180 3RB2026-1SB0 (3-12 A)
adapter Siemens	7.6873.00160 3RB2923-0AA1	7.6873.00160 3RB2923-0AA1	7.6873.00160 3RB2923-0AA1	7.6873.00160 3RB2923-0AA1
fuses -1FU/-2FU Gould	2x 7.3311.1 ATQR 8/10 (0,8 A, 600 V)	2x 7.3311.1 ATQR 8/10 (0,8 A, 600 V)	2x 7.3311.1 ATQR 8/10 (0,8 A, 600 V)	2x 7.3311.1 ATQR 8/10 (0,8 A, 600 V)
fuses -3FU Gould	7.3316.1 ATQR 1 1/2 (1,5 A, 600 V)	7.3316.1 ATQR 1 1/2 (1,5 A, 600 V)	7.3316.1 ATQR 1 1/2 (1,5 A, 600 V)	7.3316.1 ATQR 1 1/2 (1,5 A, 600 V)
fuses -4FU/-5FU Gould	2x 7.3161.00370 ATDR 4 (4 A, 600 V)	2x 7.3161.00370 ATDR 4 (4 A, 600 V)	2x 7.3161.00370 ATDR 4 (4 A, 600 V)	2x 7.3161.00370 ATDR 4 (4 A, 600 V)
fuses -6FU Gould	7.3161.00350 ATDR 3 (3 A, 600 V)	7.3161.00350 ATDR 3 (3 A, 600 V)	7.3161.00350 ATDR 3 (3 A, 600 V)	7.3161.00350 ATDR 3 (3 A, 600 V)
fuse socket -1FU...-6FU Wöhner	2x 7.3320.00060 AMBUS EASYSWITCH	2x 7.3320.00060 AMBUS EASYSWITCH	2x 7.3320.00060 AMBUS EASYSWITCH	2x 7.3320.00060 AMBUS EASYSWITCH
transformer -T1 Block	7.2224.10010 STU 160/2X115 V (160 VA)	7.2224.10010 STU 160/2X115 V (160 VA)	7.2224.10010 STU 160/2X115 V (160 VA)	7.2224.10010 STU 160/2X115 V (160 VA)
transformer -T2 Block	7.2238.10060 USTE630 (2,6 A)	7.2238.10060 USTE630 (2,6 A)	7.2238.10060 USTE630 (2,6 A)	7.2238.10060 USTE630 (2,6 A)
power supply -G1 Siemens	7.7025.1 230 VAC/24 VDC 1,3 A	7.7025.1 230 VAC/24 VDC 1,3 A	7.7025.1 230 VAC/24 VDC 1,3 A	7.7025.1 230 VAC/24 VDC 1,3 A
connection -W11	14 AWG black 600 V, 90°C	14 AWG black 600 V, 90°C	14 AWG black 600 V, 90°C	14 AWG black 600 V, 90°C
connection -W12	14 AWG black 600 V, 90°C	14 AWG black 600 V, 90°C	14 AWG black 600 V, 90°C	14 AWG black 600 V, 90°C
connection -W13	---	14 AWG black 600 V, 90°C	14 AWG black 600 V, 90°C	14 AWG black 600 V, 90°C
connection -W14 Siemens	---	7.3140.02130 3RA1923-3D	7.3140.02130 3RA1923-3D	7.3140.02130 3RA1923-3D
cables -W19	BETATHERM 155 7x1x2,5 mm²	BETATHERM 155 7x1x2,5 mm²	BETATHERM 155 7x1x2,5 mm²	BETATHERM 155 7x1x2,5 mm²
compressor control -A10 Siemens	7.7005.3 SIGMA CONTROL BASIC	7.7005.3 SIGMA CONTROL BASIC	7.7005.3 SIGMA CONTROL BASIC	7.7005.3 SIGMA CONTROL BASIC
emergency stop pushbutton -S3	7.3140.04060 3SB3000-1HA20	7.3140.04060 3SB3000-1HA20	7.3140.04060 3SB3000-1HA20	7.3140.04060 3SB3000-1HA20
auxiliary contact	2x 7.3140.02810 3SB3400-0E / 20E	2x 7.3140.02810 3SB3400-0E / 20E	2x 7.3140.02810 3SB3400-0E / 20E	2x 7.3140.02810 3SB3400-0E / 20E
auxiliary contact	7.3140.03120 3SB3400-0A / 10E + 1S	7.3140.03120 3SB3400-0A / 10E + 1S	7.3140.03120 3SB3400-0A / 10E + 1S	7.3140.03120 3SB3400-0A / 10E + 1S
bracket Siemens	7.3140.03090 / 3SB3901-0 AB	7.3140.03090 / 3SB3901-0 AB	7.3140.03090 / 3SB3901-0 AB	7.3140.03090 / 3SB3901-0 AB
control cabinet KAESER	221358.0	221358.0	221358.0	221358.0
control panel KAESER	221359.0	221359.0	221359.0	221359.0

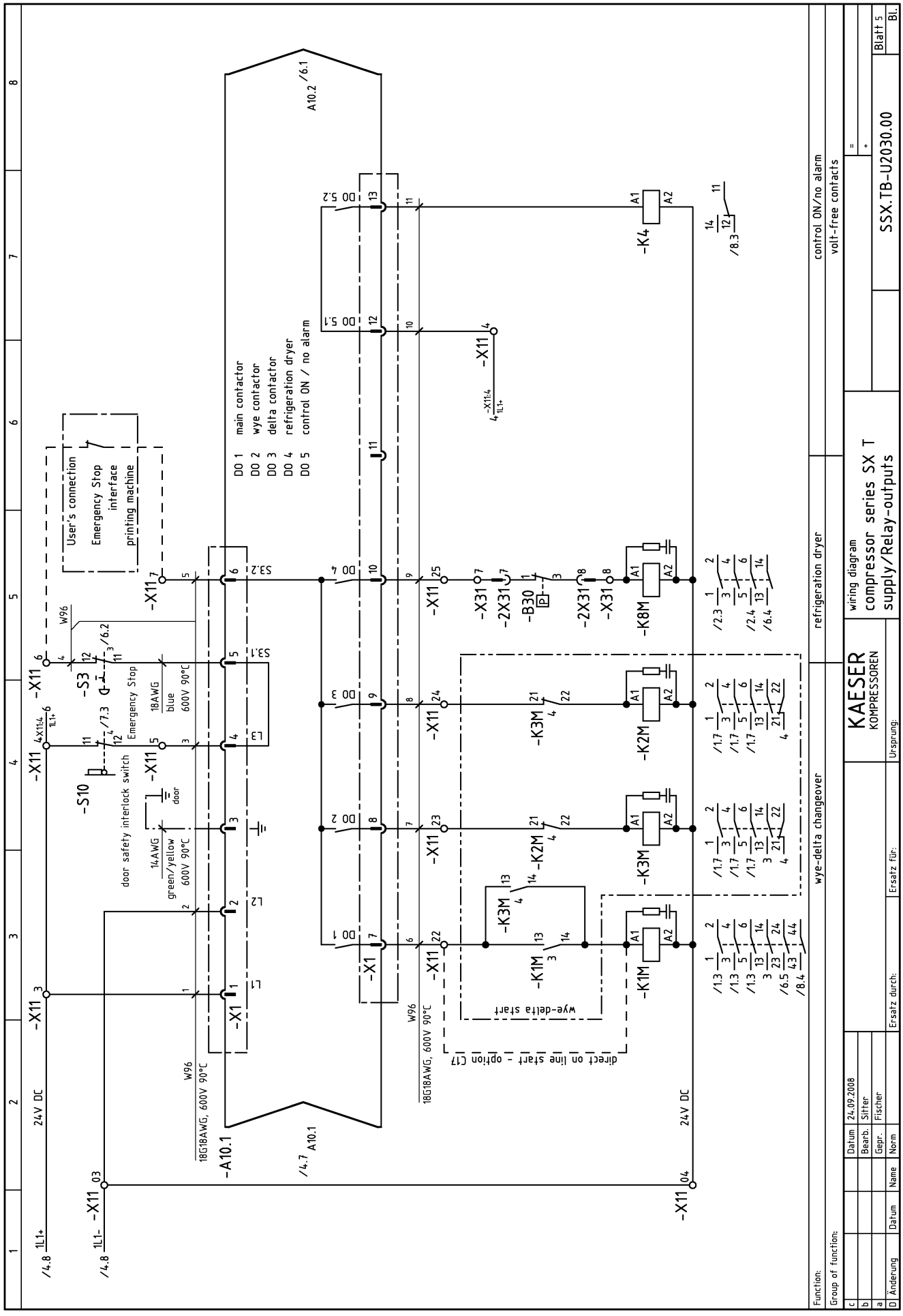
Blatt 3 BL.
USX.TB-U2030.00
block diagram
compressor series SX T
electrical component parts list
KAESER KOMPRESSOREN
Ursprung:
Ersatz für:
Ersatz durch:
Datum 24.09.2008
Bearb. Sitter
Gepr. Fischer
Norm
Name
Datum
Änderung

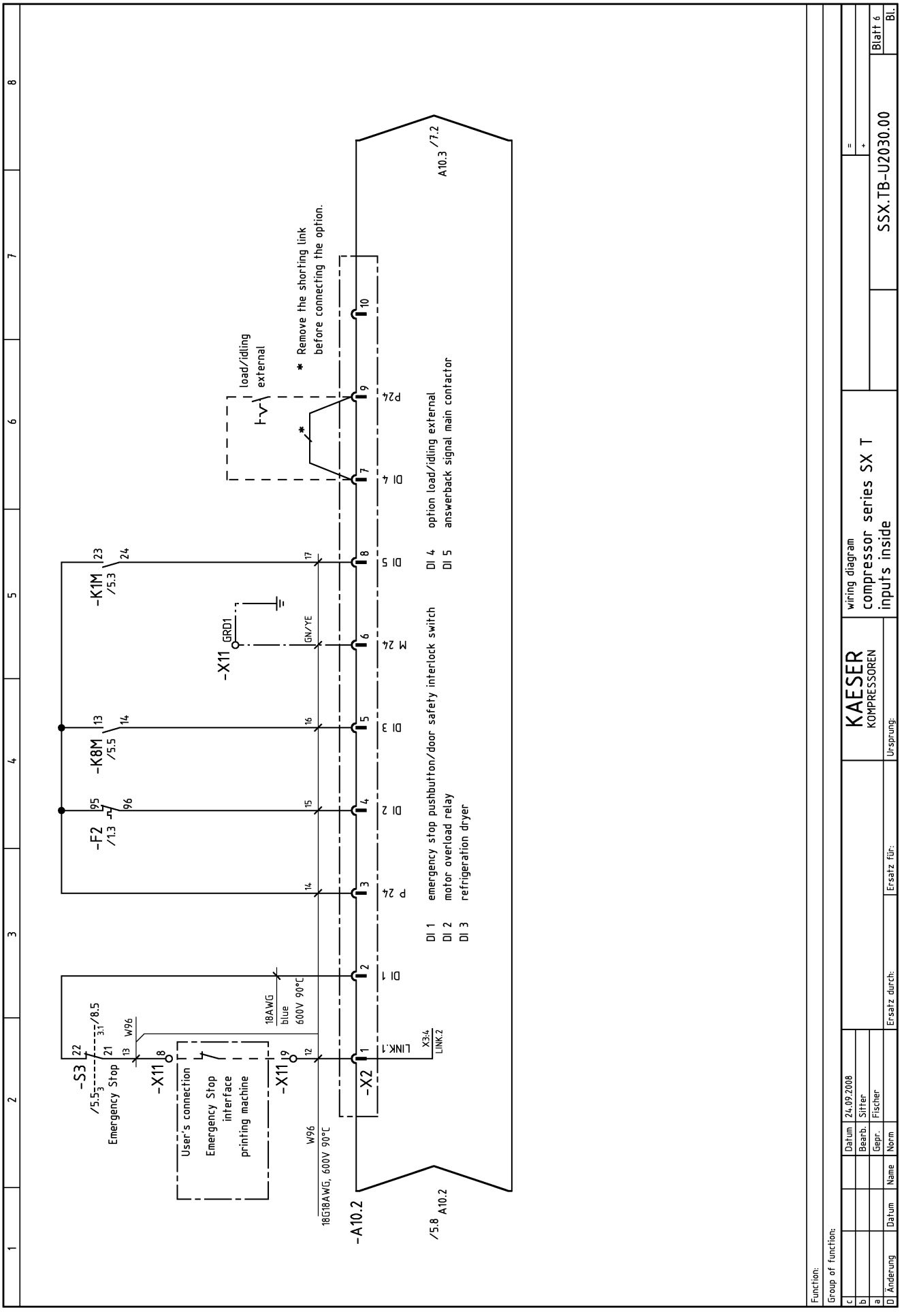

direct on line start - option C17
diagram 1
wye-delta start
diagram 2
**** performance-related components, see: electrical component parts list
supply line cross-section and fusing see service manual
main disconnect, fuse supplied by user
control panel
unit frame
oil separator
pivoting motor base
door
compressor motor
power unit direct on line start - option C17
power unit wye-delta start
KAESER KOMPRESSOREN
wiring diagram
compressor series SX T
power unit
SSX.TB-U2030.00
Function:
Group of function: input voltage
Ersatz durch:
Ersatz für:
Ursprung:
Datum 24.09.2008
Bearb. Sitter
Gepr. Fischer
Name
Norm
Änderung
Blatt 1
Bl.

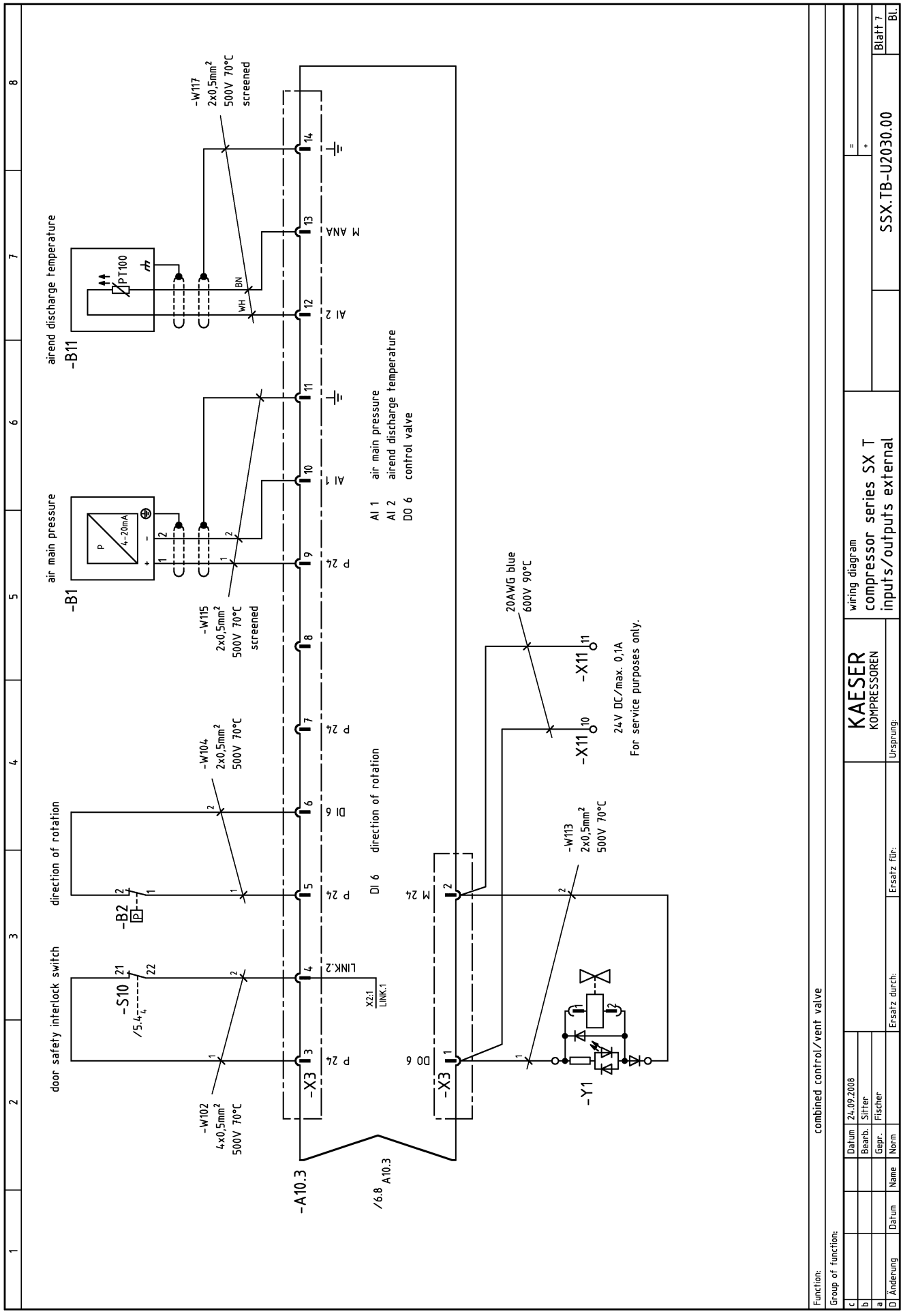

2L1
2L2
GRD
/1.8
/1.8
/1.8
14AWG black 600V 90°C
-4FU 4A Class CC
-5FU 4A Class CC
-6FU 3A Class CC
-T2 630VA
230V
115
0
-X31
GRD1
14AWG green/yellow 600V 90°C
14AWG grey 600V 90°C
* ATTENTION !!!
Make an earthing connection between terminal -X31:11 and -X31:GRD.
14AWG green/yellow 600V 90°C
-K8M /5.5
-X31
-2X31
-1X31
-3X31
GRD2
GRD
-W170 3G2,5mm² 500V 70°C
-W171 3G0,75mm² 500V 70°C
-W171.1 3G0,5mm² 500V 70°C
-M11
-M12
M 1~
line connection to 1-2
jumper between:
primary
32-38
32-36
400V
460V
Function:
Function:
Group of function:
compressor motor
vent motor
power unit air dryer
KAESER KOMPRESSOREN
wiring diagram
compressor series SX T
power unit air dryer
SSX.TB-U2030.00
Blatt 2
Bl.
Datum 24.09.2008
Bearb. Sitter
Gepr. Fischer
Name
Norm
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung:

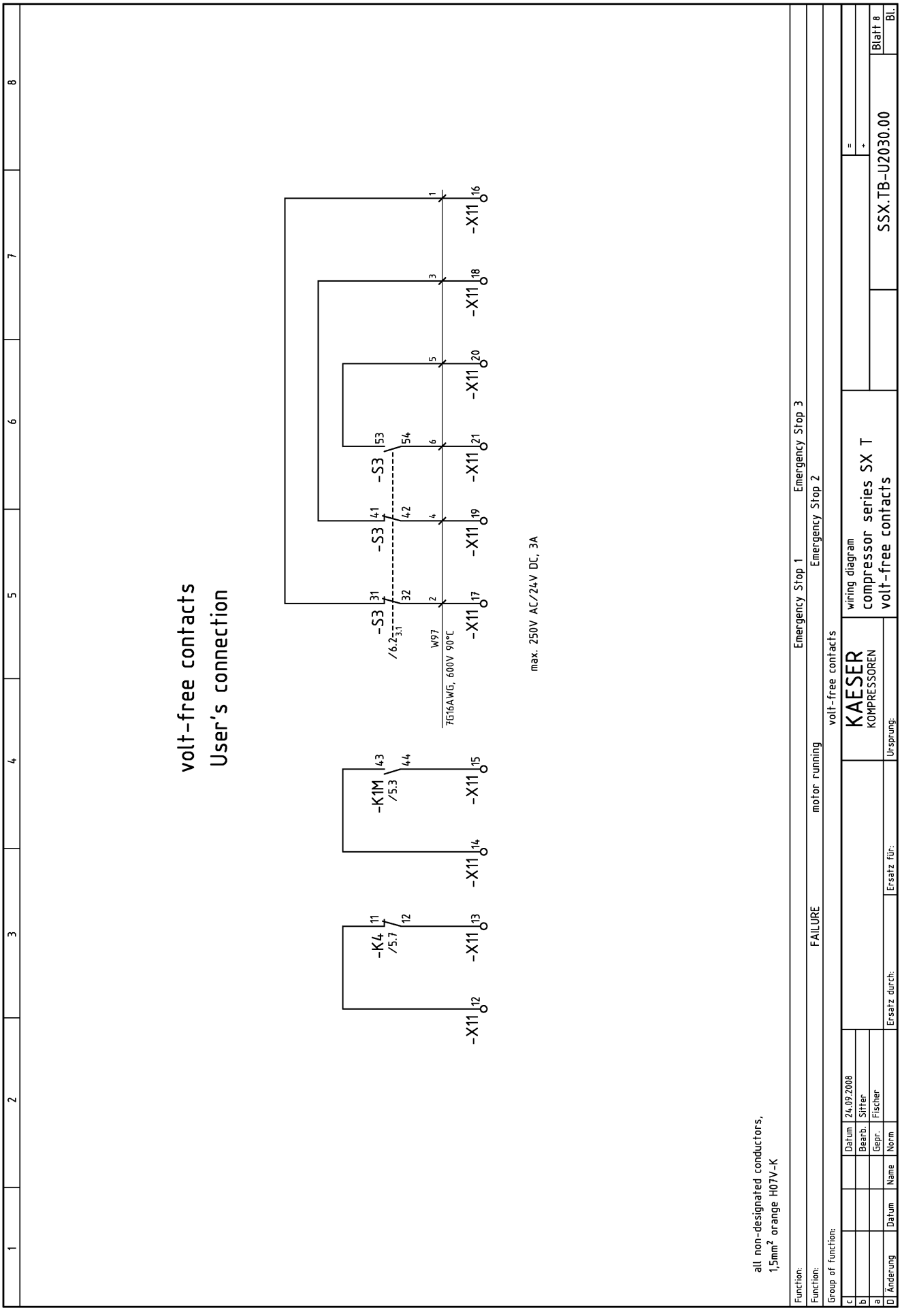

L01 /4.1
L02 /4.1
-X11 1
-X31 9
-1X31 9
-A04
ECO-Drain 31
2.2
2.4
2.3
1.1 L
1.2 N
1.3 GRD
-1X31 10 1
GRD1
-X31 10
-X11 01
115V AC
primary
power connection
L1
L2
400V
460V
0
0
400V
460V
-3FU 1,5A
-2FU 0,8A
-1FU 0,8A
520
460
400
230
-20
115
0
115
0
14AWG black 600V 90°C
14AWG black 600V 90°C
-T1
160VA
14AWG green/yellow 600V 90°C
-X11 GRD2
-X11 02
14AWG green/yellow 600V 90°C
-X11 GRD1
/1.8 1L1
/1.8 1L2
Function:
115V/1~/60Hz
automatic condensate drain
Group of function:
control voltage tapping
refrigeration dryer
KAESER KOMPRESSOREN
wiring diagram
compressor series SX T
control voltage tapping
SSX.TB-U2030.00
Blatt 3
Bl.
Datum 24.09.2008
Bearb. Sitter
Gepr. Fischer
Name
Norm
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung:

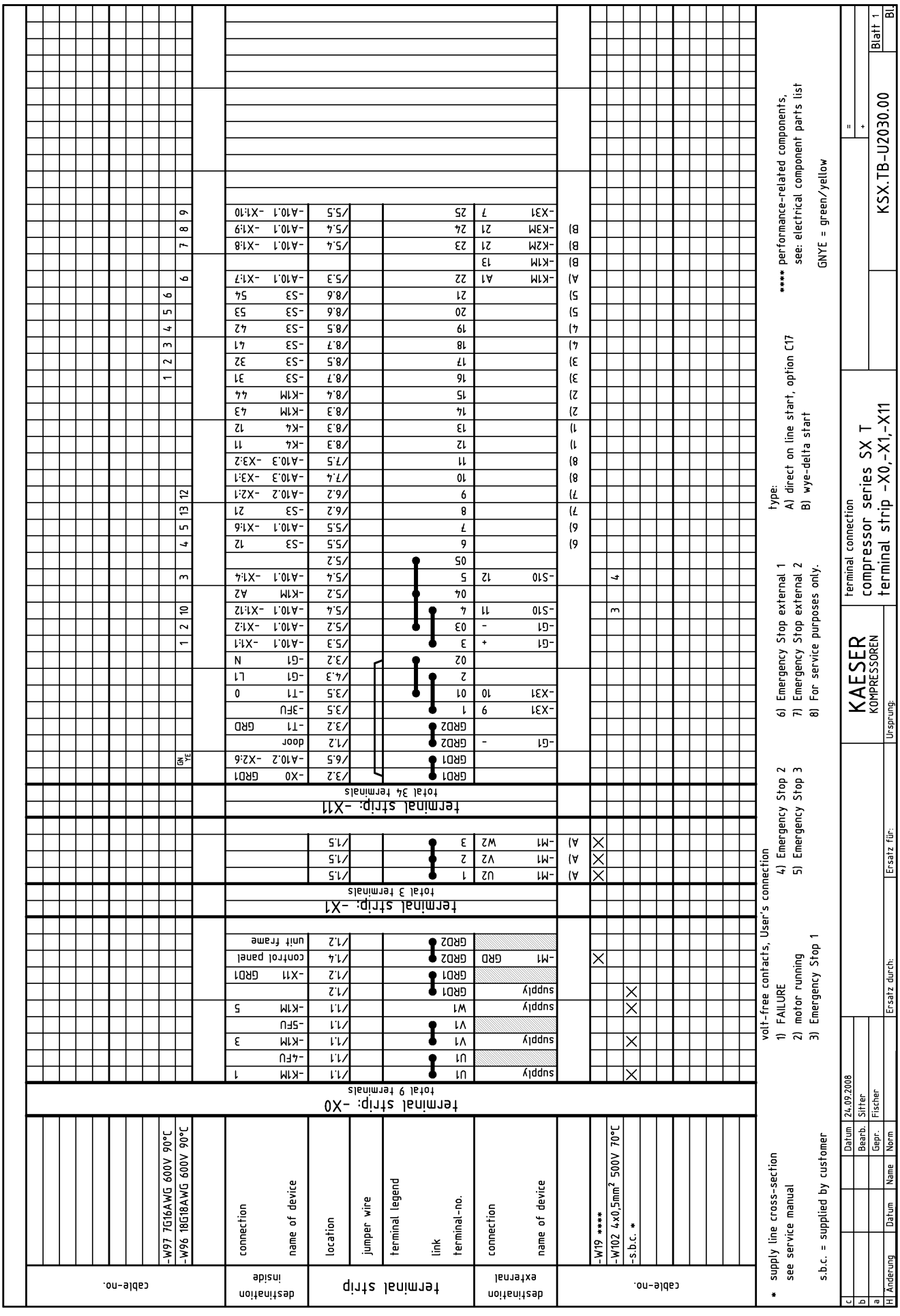

1L1+ /5.1
1L1- /5.1
24V DC
24V DC
A10.1 /5.2
SIGMA CONTROL BASIC
-A10
-X11 GRD2
14AWG
green/yellow
600V 90°C
-G1
115-
230V~
24V=
1.3A
short circuit proof
L1
N
-X11 2
-X11 02
/3.8 L01
/3.8 L02
24V DC
control voltage tapping
KAESER
KOMPRESSOREN
wiring diagram
compressor series SX T
control voltage tapping
SSX.TB-U2030.00
Blatt 4
Datum 24.09.2008
Bearb. Sitter
Gepr. Fischer
Norm
Name
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung:

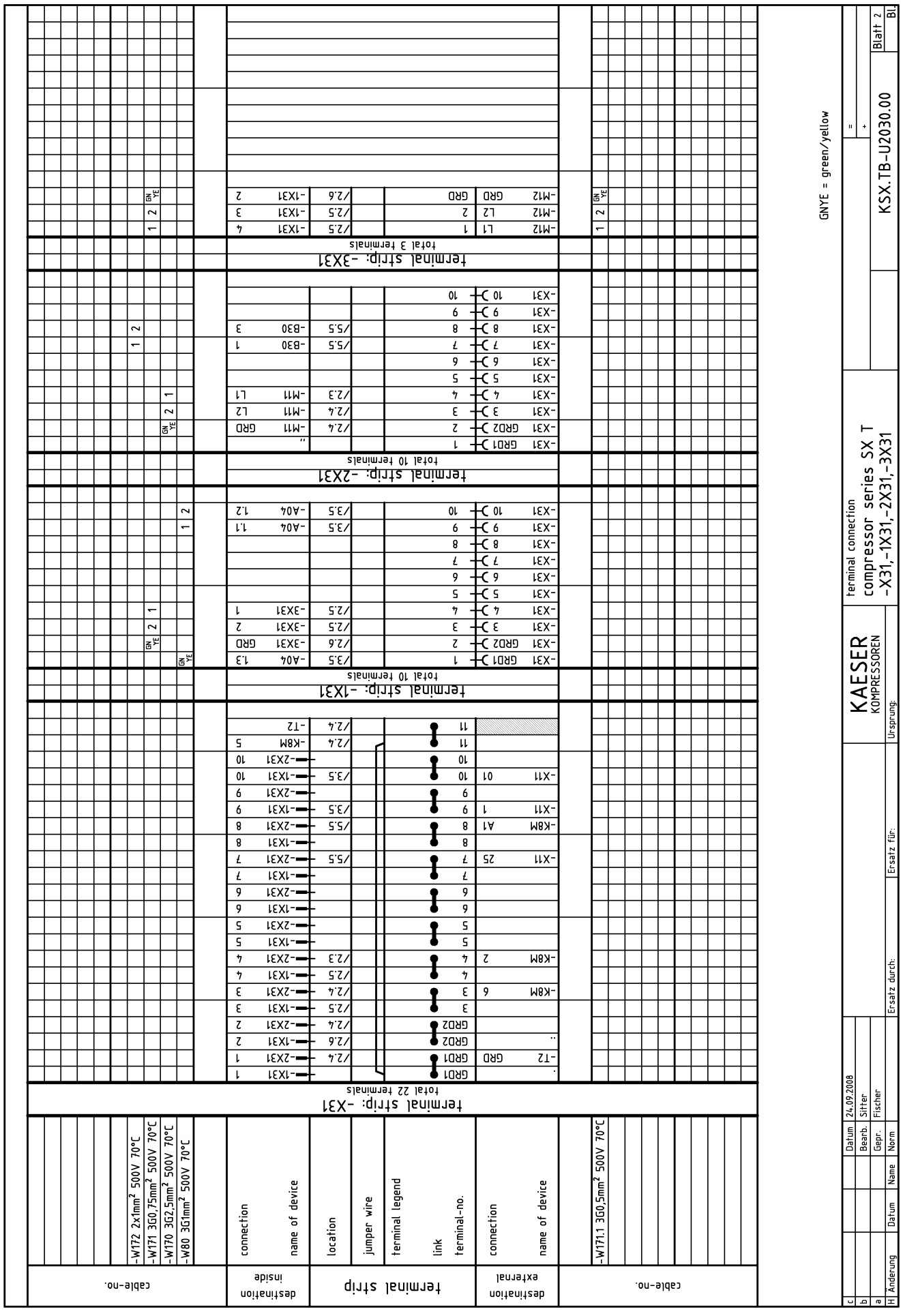

DO 1 main contactor
DO 2 wye contactor
DO 3 delta contactor
DO 4 refrigeration dryer
DO 5 control ON / no alarm
User's connection
Emergency Stop interface printing machine
door safety interlock switch
Emergency Stop
door
wye-delta start
direct on line start - option C17
wye-delta changeover
refrigeration dryer
control ON/no alarm
volt-free contacts
KAESER KOMPRESSOREN
wiring diagram
compressor series SX T
supply/Relay-outputs
SSX.TB-U2030.00
Blatt 5
24V DC
Function:
Group of function:

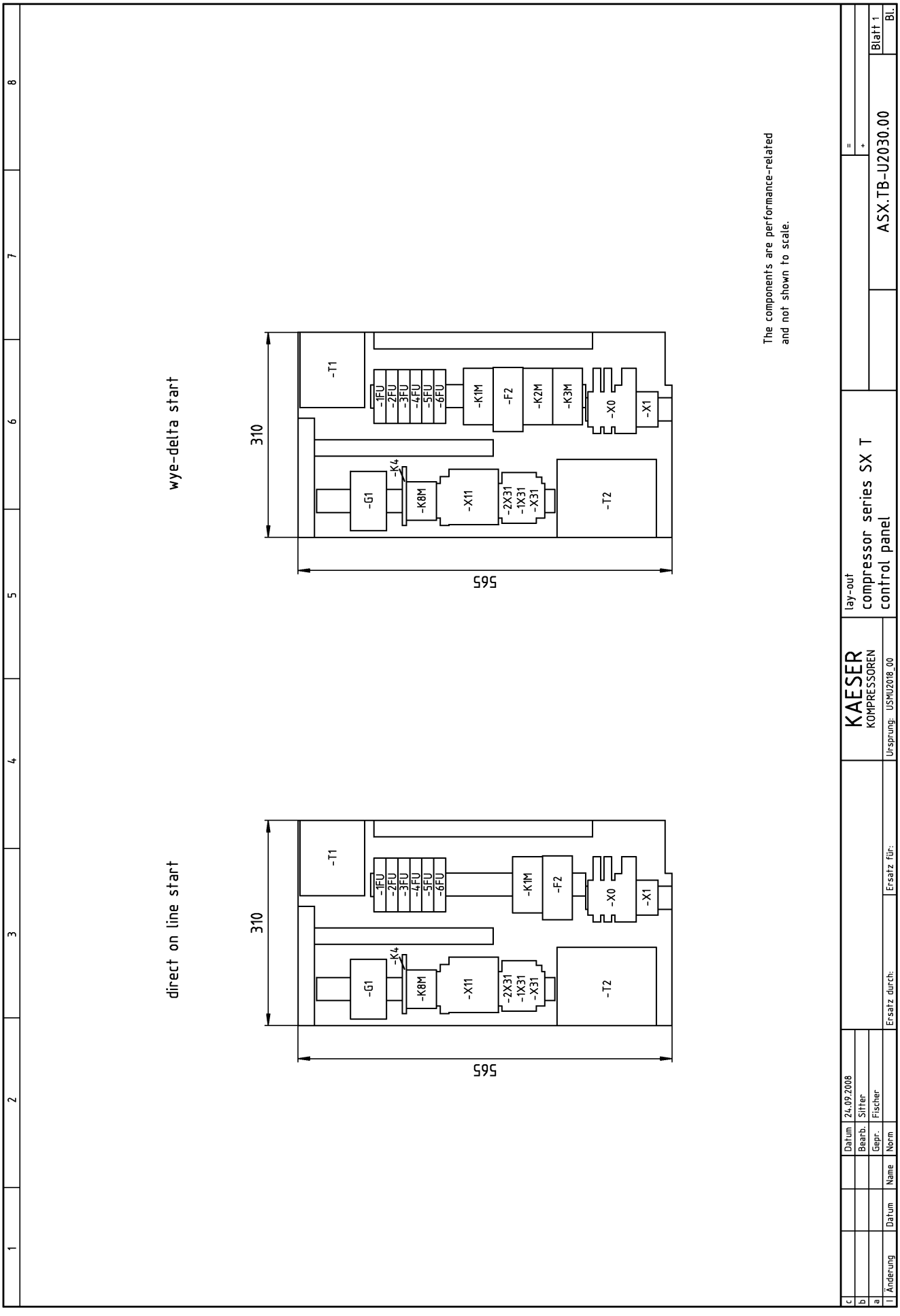

-S3
/5.5
Emergency Stop
-X11
User's connection
Emergency Stop
interface
printing machine
-X11
W96
18G18AWG, 600V 90°C
-A10.2
/5.8 A10.2
-X2
LINK.1
X34
LINK.2
18AWG
blue
600V 90°C
-F2
/1.3
-K8M
/5.5
-K1M
/5.3
-X11 GRD1
GN/YE
DI 1 emergency stop pushbutton/door safety interlock switch
DI 2 motor overload relay
DI 3 refrigeration dryer
DI 4 option load/idling external
DI 5 answerback signal main contactor
load/idling
external
* Remove the shorting link
before connecting the option.
A10.3 /7.2
Function:
Group of function:
wiring diagram
compressor series SX T
inputs inside
KAESER
KOMPRESSOREN
Ursprung:
Ersatz für:
Ersatz durch:
Datum 24.09.2008
Bearb. Sitter
Gepr. Fischer
Norm
Name
Datum
Änderung
SSX.TB-U2030.00
Blatt 6
Bl.


airend discharge temperature
-B11
PT100
-W117
2x0,5mm²
500V 70°C
screened
BN
WH
M ANA
AI 2
air main pressure
-B1
4-20mA
-W115
2x0,5mm²
500V 70°C
screened
AI 1
P 24
AI 1 air main pressure
AI 2 airend discharge temperature
DO 6 control valve
door safety interlock switch
-S10
/5.4
direction of rotation
-B2
-W104
2x0,5mm²
500V 70°C
DI 6
DI 6 direction of rotation
LINK.2
X2:1
LINK:1
-W102
4x0,5mm²
500V 70°C
-X3
-A10.3
/6.8 A10.3
M 24
DO 6
20AWG blue
600V 90°C
-X11
24V DC/max. 0,1A
For service purposes only.
-W113
2x0,5mm²
500V 70°C
-Y1
KAESER
KOMPRESSOREN
wiring diagram
compressor series SX T
inputs/outputs external
SSX.TB-U2030.00
Blatt 7
Function:
combined control/vent valve
Group of function:
Datum 24.09.2008
Bearb. Sitter
Gepr. Fischer
Name Norm
Ersatz durch:
Ersatz für:
Ursprung:
Änderung Datum Name


volt-free contacts
User's connection
-S3 31 /6.2 3.1 32
-S3 41 42
-S3 53 54
W97
7G16AWG, 600V 90°C
max. 250V AC/24V DC, 3A
-K4 11 /5.7 12
-K1M 43 /5.3 44
-X11 12
-X11 13
-X11 14
-X11 15
-X11 17
-X11 19
-X11 21
-X11 16
-X11 18
-X11 20
1
2
3
4
5
6
all non-designated conductors,
1,5mm² orange H07V-K
Emergency Stop 1
Emergency Stop 3
FAILURE
motor running
Emergency Stop 2
volt-free contacts
KAESER KOMPRESSOREN
wiring diagram
compressor series SX T
volt-free contacts
SSX.TB-U2030.00
Blatt 8
Datum 24.09.2008
Bearb. Sitter
Gepr. Fischer
Name
Norm
Ersatz durch:
Ersatz für:
Ursprung:
Änderung
Datum
Bl.


terminal strip -X0
total 9 terminals
terminal strip: -X1
total 3 terminals
terminal strip: -X11
total 34 terminals
KAESER
KOMPRESSOREN
terminal connection
compressor series SX T
terminal strip -X0,-X1,-X11
KSX.TB-U2030.00
Blatt 1
24.09.2008
Sitter
Fischer
volt-free contacts, User's connection
1) FAILURE
2) motor running
3) Emergency Stop 1
4) Emergency Stop 2
5) Emergency Stop 3
6) Emergency Stop external 1
7) Emergency Stop external 2
8) For service purposes only.
type:
A) direct on line start, option C17
B) wye-delta start
**** performance-related components,
see: electrical component parts list
GNYE = green/yellow
* supply line cross-section
see service manual
s.b.c. = supplied by customer


terminal connection
compressor series SX T
-X31,-1X31,-2X31,-3X31
KAESER KOMPRESSOREN
KSX.TB-U2030.00
Blatt 2
GNYE = green/yellow
terminal strip: -X31
total 22 terminals
terminal strip: -1X31
total 10 terminals
terminal strip: -2X31
total 10 terminals
terminal strip: -3X31
total 3 terminals
cable-no.
destination inside
terminal strip
destination external
cable-no.
-W172 2x1mm² 500V 70°C
-W171 3G0,75mm² 500V 70°C
-W170 3G2,5mm² 500V 70°C
-W80 3G1mm² 500V 70°C
-W171.1 3G0,5mm² 500V 70°C
connection
name of device
location
jumper wire
terminal legend
link
terminal-no.
Datum 24.09.2008
Bearb. Sitter
Gepr. Fischer
Norm
Name
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung:


wye-delta start
direct on line start
310
565
-T1
-1FU
-2FU
-3FU
-4FU
-5FU
-6FU
-K1M
-F2
-K2M
-K3M
-X0
-X1
-G1
-K4
-K8M
-X11
-2X31
-1X31
-X31
-T2
The components are performance-related
and not shown to scale.
KAESER
KOMPRESSOREN
lay-out
compressor series SX T
control panel
ASX.TB-U2030.00
Blatt 1
Bl.
Datum 24.09.2008
Bearb. Sitter
Gepr. Fischer
Name Norm
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung: USMU2018_00

13.5 Service Manual for Compressed Air Filter

Bedienungsanleitung
Instruction Manual

Hochleistungs - Druckluftfilter

Compressed-air filters

Serie / Series

FE (D), FF (D), FFG - 6, 10, 18, 28

Kaeser Kompressoren GmbH
Postfach 2143
96410 Coburg
Tel.: 09561/640-0
Fax: 09561/640130
http://www.kaeser.com

KAESER

gültig ab 01.08.2007

D GB

F0535	17.08.07	KL	17.08.07	JRa		
D-Name	erstellt	Name	gepr.	Name	ersetzt f.	ersetzt d.

FILTER_6-28 00 D E

Materialkennzeichnung

Sign of material

Filter: D-Pack Basic		Filter: D-Pack		Filter: Element/Cartrigde	
Typ/Type	Nr./No.	Typ/Type	Nr./No.	Typ/Type	Nr./No.
FE-6 B	9.4700.00110	FE-6 D	9.4700.00120	E-E-6	9.4860.0
FE-10 B	9.4701.00110	FE-10 D	9.4701.00120	E-E-10	9.4861.0
FE-18 B	9.4702.00110	FE-18 D	9.4702.00120	E-E-18	9.4862.0
FE-28 B	9.4703.00110	FE-28 D	9.4703.00120	E-E-28	9.4863.0

D-Pack: Filter mit Differenzdruckmanometer und ECO-DRAIN 31

D-pack: Filter with differential pressure gauge and ECO-DRAIN 31

Filter: D-Pack Basic		Filter: D-Pack		Filter: Element/Cartrigde	
Typ/Type	Nr./No.	Typ/Type	Nr./No.	Typ/Type	Nr./No.
FF-6 B	9.4720.00110	FF-6 D	9.4720.00120	E-F-6	9.4872.0
FF-10 B	9.4721.00110	FF-10 D	9.4721.00120	E-F-10	9.4873.0
FF-18 B	9.4722.00110	FF-18 D	9.4722.00120	E-F-18	9.4874.0
FF-28 B	9.4723.00110	FF-28 D	9.4723.00120	E-F-28	9.4875.0

D-Pack: Filter mit Differenzdruckmanometer und ECO-DRAIN 31

D-pack: Filter with differential pressure gauge and ECO-DRAIN 31

Filter: D-Pack Basic		**Filter: D-Pack**	
Typ/Type	**Nr./No.**	**Typ/Type**	**Nr./No.**
FFG-6 B	9.4760.00110	FFG-6 D	9.4760.00120
FFG-10 B	9.4761.00110	FFG-10 D	9.4761.00120
FFG-18 B	9.4762.00110	FFG-18 D	9.4762.00120
FFG-28 B	9.4763.00110	FFG-28 D	9.4763.00120

Filterkombination bestehend aus Serie FF & FG

D-Pack: Filter mit Differenzdruckmanometer und ECO-DRAIN 31

D-Pack-Basic: Filter mit Differenzdruckmanometer und ECO-DRAIN 30

Filter combination consist of series FF & FG

D-pack: Filter with differential pressure gauge and ECO-DRAIN 31

D-pack-basic: Filter with differential pressure gauge and ECO-DRAIN 30

Anzahl Filterelemente siehe Kapitel 3. „Technische Daten“.

Quantity of filter cartridges see chapter 3. „Technical data“.

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Contents

Wir haben den Inhalt der Bedienungsanleitung auf Übereinstimmung mit dem beschriebenen Gerät geprüft.
Dennoch können Abweichungen nicht ausgeschlossen werden, so daß wir für die vollständige Übereinstimmung keine Gewähr übernehmen.

Technische Änderungen vorbehalten.

We have examined the content of the operating instructions for conformity with the appliance described.
Inconsistencies cannot be ruled out, however, with the result that we do not guarantee complete conformity

We reserve the right to alter the specifications without prior notice

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1. Einleitung

1.1 Allgemeines

Die in dieser Betriebsanleitung dokumentierten Druckluftfilter erfüllen alle Anforderungen, die an moderne Filtersysteme gestellt werden.
Um Sie optimal nutzen zu können, benötigt der Anwender ausführliche Informationen.

In der vorliegenden Betriebsanleitung haben wir diese Informationen möglichst vollständig und in entsprechende Kapitel gegliedert zusammengestellt.

Lesen und beachten Sie diese Informationen.
Sie helfen Ihnen auch Unfälle zu vermeiden.

1.2 Erklärung der Symbole in der Bedienungsanleitung

• Aufzählungen werden mit diesem Punkt oder Sternchen
* gekennzeichnet.

Mit diesem Symbol werden Textstellen gekennzeichnet, die unbedingt zu beachten sind.

- Wichtige Sicherheitshinweise
- Wichtige Bedienungs-/Wartungshinweise
- Warnung vor möglichen Fehlbedienungen
- Warnung vor Gefahren

Elektrisches Gefahrensymbol

Ausführende Tätigkeit.
Vom Bediener auszuführende Bedienschritte.

1.3 Erklärung der Symbole am Gerät


Automatischer Kondensatablaß / Automatic Condensate Drain


Elektroanschluß / Electrical Supply

1. Introduction

1.1 General remarks

The compressed air filters documented in these instruction manual has all requirements that can be expected from a modern filter/ -system.
In order to obtain maximum benefit from using the filters/ -system the user should have sufficient information.

These instruction manual gave the user this information which has been divided into separate sections for easy reference.

Please read carefully before installing and operating the filter/ -system.

1.2 Explanation to the symbols in the instruction manual

• Technical data or instructions.
*

Parts that require absolute attention

- Vital safety instructions
- Essential operation and maintenance instructions
- Warnings on handling or moving the dryer
- Danger areas

Electrical danger symbol

Changes sequence of operation

1.3 Symbols used in the filter


Drucklufteintritt / Compressed Air Inlet


Druckluftaustritt / Compressed Air Outlet

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2. Sicherheitsregeln, Warnhinweise

2.1 Bestimmungsgemäßer Gebrauch

Achtung!

- Die Filter dürfen nur für die in dieser Bedienungsanleitung vorgesehenen Einsatzfälle zur Aufbereitung von Druckluft verwendet werden.
- Der einwandfreie und sichere Betrieb der Produkte erfordert sachgerechten Transport, Lagerung, Aufstellung und Montage, sowie sorgfältige Bedienung und Instandhaltung.

2.2 Sicherheitsregeln

Warnung!

- Die Filter dürfen nur von qualifiziertem Personal genutzt, bedient, gewartet oder instandgesetzt werden.
- Qualifiziertes Personal im Sinne der sicherheitsbezogenen Hinweise in dieser Dokumentation oder auf dem Produkt selbst, ist Personal das:

* im Umgang mit Einrichtungen der Druckluft vertraut und unterwiesen sowie über die damit verbundenen Gefahren unterrichtet ist.
* Den auf die Bedienung bezogenen Inhalt dieser Dokumentation kennt.
* Es besitzt als solches eine zur Inbetriebnahme und Wartung derartiger Einrichtungen befähigende Ausbildung bzw. Berechtigung.

2. Safety rules, warnings

2.1 Use of filter/ -system

Achtung!

- The filter must only be used for the purpose as designated in the instruction manual to upgrading the compressed air.
- To obtain maximum efficiency and operation of the filter/ -system ensure all sections of the manual are read carefully.

2.2 Safety rules

Warning!

- The filter/ -system must only be used, operated, inspected and repaired by trained personnel.
- Trained personnel are defined as follws:

* Operating staff who are skilled in the field of compressed air engineering and who are familiar with the filter/ -system and possible dangers in unauthorised operation or service.
* Who can interpret and action the contents of this operation instruction manual.
* Who have had the appropriate training and qualified as being competent in these fields.

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2. Sicherheitsregeln, Warnhinweise

2.3 Warnhinweise

Warnung!

Das (die) Filter beinhalten unter erhöhtem Druck stehende Systeme.
Vor Servicearbeiten sind sie drucklos zu machen.

Warnung!

Filtersysteme mit elektrisch gesteuerten Kondensatableitern enthalten unter elektrischer Spannung stehende Bauteile.
Vor Servicearbeiten sind diese allpolig vom elektrischen Spannungsversorgungsnetz zu trennen.
(Netzstecker ziehen, Hauptschalter ausschalten)

ACHTUNG!
Alle Arbeiten am elektrischen System dürfen nur von elektrotechnisch geschultem Fachpersonal, oder unter Aufsicht von diesem, durch Unterwiesene ausgeführt werden.

Hinweis!

Die Filter sind ausschließlich zur Aufbereitung von Druckluft einzusetzen.

ACHTUNG!
Die Verwendung in Verbindung mit brennbaren Gasen ist verboten!

ACHTUNG!

Filter/ -systeme zur Aufbereitung von Atemluft dürfen nur nach Genehmigung des Herstellers der Filter/ -systeme eingesetzt und betrieben werden.

2. Safety rules, warnings

2.3 Security-warnings

Warning!

The filter/ -system contains components under high pressure.
Before starting any service work turn off compressed air supply to the dryer and depressurise the system.

Warning!

The filter/ -systems with electrical condensate discharger contains components that are electrically live and which can cause danger to life.
Before starting any service work ensure all power is isolated from the filter/ -system, mains isolator to be off, mains plug if fitted to be removed.

ATTENTION!
Any electrical work on the dryer must only be carried out by skilled staff - qualified electricians, or persons under supervision of qualified staff.

Remark!

Use filter for compressed air applications only.

Attention!
The use of combustible gases is prohibited.

ATTENTION!

Filter/ -systems for breathing air applications must be approved from manufacturer.

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3. Technische Daten

3. Technical data

MODELL BEZEICHNUNG / MODEL DESIGNATION		Volumenstrom Capacity	Anschluß Connection	Betriebsduck Working Pressure	Abmessungen Dimensions		Gewicht Weight	AUSTAUSCH-FILTERELEMENTE FILTER REPLACEMENT CARTRIDGE			
FILTER-GRAD / GRADE	FILTER-GEHÄUSE / HOUSING	[m³/min]	[ ]	[max]	Höhe / Hight [mm]	Breite / Width [mm]	[kg]	FILTER-GRAD / GRADE		FILTER-GEHÄUSE / HOUSING	Anzahl Quantity
MODUL-BAUWEISE / MODULAR SYSTEM											
FE	-6	0,58	3/8"	16	siehe Kapitel „Maßzeichnung" see chapter „dimensional drawing"	105	siehe Kapitel „Maßzeichnung" see chapter „dimensional drawing"	E-E		-6	1
	-10	1,00	1/2"	16		105				-10	1
FF		1,75	"					E-F			
	-18		1/2"	16		105				-18	1
FG		2,83	3/4			133		E-G			
	-28			16						-28	1

- Volumenstrom m³/h bezogen auf +20°C und 1 bar absol ut, bei Betriebsüberdruck 7 bar / Air flow m³/h based on +20°C and 1 bar absolute, at working pressure 7 bar
- Größere Betriebsdrücke auf Anfrage / Contact factory for dryers with a higher working pressure

Volumenstrom - Korrekturtabelle / Sizing

Minimaler Betriebsdruck / Minimum working pressure bar	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Korrekturfaktor / Correction factor	0,38	0,52	0,63	0,75	0,88	1,00	1,13	1,26	1,38	1,52	1,65	1,76	1,87	2	2,14

Auslegung
Bei Drücken abweichend von 7 bar berechnet sich der max. Volumenstrom wie folgt:
den Korrekturfaktor des entsprechenden minimalen Betriebsdruckes mit dem gewählten Volumenstrom aus o.g. Tabelle multiplizieren.

Based on
To find the maximum flow at pressures other than 7 bar:
multiply the flow (from table above) by the correction factor corresponding to the minimum working pressure of the filter.

Betriebsbedingungen:
Min. Betriebstemperatur: +1°C
Max. Betriebstemperatur: 66°C.
Min. Betriebsdruck mit automatischem Kondensatableiter: 2,0 bar

Working conditions:
Min. Working temperature: +1°C
Max. Working temperature: 66°C
Min. working pressure with automatic condensate drain: 2,0 bar

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4. Funktionsbeschreibung

4.1 Serie FE

0,01-MIKRON-COALESCING-FILTER
(bei 0,01 ppm w/w max. Ölgehalt)

DUO-System Abscheidung
1. Stufe: flüssige Bestandteile
2. Stufe: Ölbestandteile

- Entfernt mehr als 99,99% der Öl-Aerosole
- Entfernt Feststoffpartikel bis herunter zu 0,01 Mikron
- Restölgehalt < 0,01 ppm w/w
- Automatischer Kondensatableiter
- Differenzdruckanzeige am Filtergehäuse
- max. Flüssigkeitsbeladung: 1g/m³

Anwendungen:

- Vorfilter für Membrantrockner
- Vorfilter für Adsorptionstrockner
- Endstellenfiltration (falls **geringfügige** Feuchtigkeit vorhanden ist)

Funktion:

Die Luft tritt von oben in das Filterelement FE ein und strömt durch den inneren Stützmantel, radial durch verschiedenartige Lagen Fiberglas. Dann strömt die Luft durch ein weiteres Sieb. In dieser 1. Filtrationsstufe werden größere Partikel entfernt. In der zweiten Filtrationsstufe werden Aerosole und feste Bestandteile durch eine Mehrschicht-Membranwand aus epoxidharz verstärktem Fiberglas gefiltert, daß speziell für feinste Aerosole geeignet ist. Das Filtermedium ist ein Bett aus submikrofeinen Glasfasern und wirkt nach dem Prinzip des Coalescings sowie der Tiefenfiltration. Der innere Schaumstoffmantel gleicht Luftschwankungen und Aerosolkonzentrationen aus und gewährleistet eine gleichmäßige Verteilung. Im äußeren Schaumstoffmantel werden die Öltröpfchen gesammelt, fließen durch Schwerkraft in den unteren Teil des Filters und tropfen dann in den Filterbehälter ab.

4. Description of operation

4.1 Series FE

0,01-MICRON-COALESCING-FILTER
(at 0,01 ppm w/w max. oil content)

DUO-system separation
1. Stage: liquid particles
2. Stage: oil particles

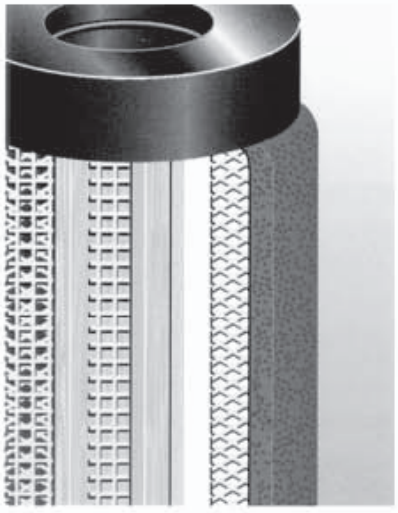
- Removes more than 99,99% of oil aerosols
- Removes solid particles down to 0,01 microns
- Oil content < 0,01 ppm w/w
- Automatic condensate drain
- Differential pressure indicater at the filter housing
- max. liquid load: 1g/m³

Application:

- Prefilter for membrane dryers
- Prefilter for pressure-swing desiccant dryers
- Point-of-use filter (may be used if light liquid load is present)

Operation:

Air enters the inside of the cartridge FE and flows through an inner foam sleeve, radially outward through various layers of glass fibers. Then the air flows through another screen. In the first stage filter section the larger solid particles are trapped. In the second stage filter section aerosols and solid particles are trapped using a multi-layered membrane wall made of epoxy resin-reinforced glass fibres which was especially designed for the finest aerosols.
The filter media is a bed of submicronic glass fibers and works to the principle of coalescing and in-depth filtration. The inner foam sleeve compensates air cycling and aerosol concentrations and maintains uniform distribution. The outer foam sleeve collects the coalesced oil droplets which then, due to gravity, travel downstream to the bottom of the sleeve and drain to the bottom of the filter bowl.



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4. Funktionsbeschreibung

4.2 Serie FF

0,01-MIKRON-COALESCING-FILTER
(bei 0,001 ppm w/w max. Ölgehalt)

- Spezial Design garantiert ultrafeine Ölabscheidung für die gesamte Standzeit des Elementes
- Entfernt mehr als 99,999% der Öl-Aerosole für ölfreie Luft
- Entfernt Feststoffpartikel bis herunter zu 0,01 Mikron
- Restölgehalt < 0,01 ppm w/w
- Automatischer Kondensatableiter
- Differenzdruckanzeige am Filtergehäuse
- max. Flüssigkeitsbeladung: 0,1g/m³

Anwendungen:

- Lackieren
- Pulverbeschichtung
- Blasformverfahren
- Instrumentenluft
- Lufflagerungen
- Pneumatische Förderung
- Verpackung von Lebens- und Arzneimitteln
- Elektronik-Anwendungen
- Vorfilter für Membrantrockner

Funktion:

Die Luft tritt von oben in das Filterelement FF ein und strömt dann radial durch den inneren Stützmantel, den inneren Schaumstoffmantel, durch das Filtermedium, den perforierten äußeren Stützmantel sowie den äußeren Schaumstoffmantel. Das Filtermedium ist ein Bett aus submikrofeinen Glasfasern und wirkt nach dem Prinzip des Coalescings sowie der Tiefenfiltration. Der innere Schaumstoffmantel ist ein beschichteter geschlossenporiger Zellschaum, der als Vorfilter und Strömungsverteiler dient. Im äußeren Schaumstoffmantel werden Aerosole abgeschieden, feste Bestandteile durch eine Mehrschicht-Membrane aus epoxidharz verstärktem Fiberglas gefiltert, die speziell für ultrafeinste Aerosole geeignet sind. Durch die Schwerkraft fließen die coalesizierten Öltröpfchen in den unteren Teil des Filters und tropfen dann in den Filterbehälter ab.

4. Description of operation

4.2 Series FF

0,01-MIKRON-COALESCING-FILTER
(at 0,001 ppm w/w max. oil content)

- Special design guarantee ultra-fine oil separation for the whole life of the cartrige
- Removes more than 99,999% of oil aerosols for virtually oil free air
- Removes solid particles down to 0,01 microns
- Oil content < 0,01 ppm w/w
- Automatic condensate drain
- Differential pressure indicater at the filter housing
- max. liquid load: 0,1g/m³

Application:

- Spray painting
- Powder coating
- Blow molding
- Pneumatique instrumentation
- Air bearings
- Pneumatic conveying
- Food and drug packaging
- Electronics manufacturing
- Prefilter for membrane dryers

Operation:

Air enters the top of the cartridge FF and flows radially outward through a reverse flow protector tube, an inner flexible foam sleeve, a filter media, an outer rigid perforated tube and an outer foam sleeve. The filter media is a bed of submicronic glass fibers and works to the principle of coalescing and in-depth filtration. The inner foam sleeve is made of a coated, closed-pore foam that acts as a pre-filter and flow distributor. In the outer foam sleeve, aerosols are trapped and solid particles are filtered out using a multi-layered membrane of epoxy resin-reinforced glass fibres which was especially designed to filter the finest aerosols. Gravity draws the coalesced oil droplets to the bottom of the sleeve; from there they drop into the filter bowl.

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4. Funktionsbeschreibung

4.3 Serie FG

0,01-MIKRON-AKTIVKOHLE-FILTER

- Zweifache Aktivkohle-Filtration für lange Standzeiten
- Entfernt Öldampf und andere Kohlenwasserstoffe, die von Aktivkohle absorbiert werden
- Entfernung von Ölgeschmack und Ölgerüchen
- Entfernt Feststoffpartikel bis herunter zu 0,01 Mikron
- Restölgehalt 0,003 ppm w/w
- 100%ige Arbeitsleistung bis zu 1000 definierten Bh.

Anwendungen:

- Nahrungsmittel- und pharmazeutische Industrie
- Prozeßluft
- Analyseluft
- Atemluftqualität

Funktion:

Die Luft tritt von oben in das Filterelement FG ein. Im Filterbett, bestehend aus granulierter Aktivkohle, werden ca. 95% der Öldämpfe absorbiert. Das Filterbett besteht aus Glasfasern, auf die in einem patentierten Verfahren mikrofeine Aktivkohlepartikel aufgebracht werden. Hier werden die verbliebenen Öldämpfe absorbiert. Die Mikroglasfasern verhindern ein Mitreißen von Kohlepartikeln, der äußere Schaumstoffmantel hält eventuell gelöste Fasern zurück. Der Hauptanteil an Öldämpfen wird bereits durch eine Membrane aus feinsten Carbonpartikeln entfernt. In der zweiten Filtrationsstufe werden in einer mehrlagigen Schicht aus Fibermaterial mit eingelagerten Carbonpartikel Öldämpfe entfernt. Viele Lagen feinsten Filtermaterials halten alle Partikel fort.

4. Description of operation

4.3 Series FG

0,01-MICRON-ACTIVATED CARBON ADSORBENT FILTER

- Two beds of carbon give long live at rated conditions
- Removes oil vapour and other hydrocarbons normally adsorbable by activated carbon
- Eliminates oily smell and taste
- Removes solid particles down to 0,01 microns
- Oil content 0,003 ppm w/w
- 100% performance up to 1000 defined hours of operation.

Applications:

- Food and drug industries where compressed air contacts products
- Process air
- Analysis air
- Breathing-quality air

Operation:

Air enters the inside of the cartridge FG and flows outwardly through a bed of finely divided activated carbon where 95% of the oil vapour is removed, then through a second bed of microfine activated carbon bonded to fibres where the remaining oil vapour is adsorbed. Outlet oil vapour concentration is typically less than 0,01 ppm by weight. This is well below the concentration that is detected by smell or taste and below the level where condensation occurs downstream. Two final filter beds prevent solid contaminants 0,01 micron and larger from passing downstream. The majority of the oil vapour is filtered out by a membrane made of the finest carbon particles. In the second filtering stage, oil vapour is removed in a multi-layered bed of fibres intercalated with carbon particles. Several layers of this extremely fine filter material trap particles.

[illegible]	[illegible]	KL	[illegible]	JPa		
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5. Kondensatableiter

5.1 D-Pack

5. Condensate discharger

5.1 D-Pack

Kondensatableiter Condensate discharger  Filter Filter	 ECO-DRAIN 30	 ECO-DRAIN 31
Kondensatableiter-anschluß Condensate drain connection	Schlauch / Tube 8-10mm (innen / female)	Schlauch / Tube 8-10mm (innen / female)
FE	-6 ... -28	-6 ... -28
FF	-6 ... -28	-6 ... -28

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6. Transport, Wareneingangkontrolle

6.1 Transport

Entsprechend der Bauform und dem Gewicht der Filter/ -systeme sind geeignete Transportmittel sowie Hebewerkzeuge zu verwenden.
Die Filtergehäuse dürfen auf keinen Fall an den Drucklufteintritts und -austrittsstutzen (oder -Flanschen) angehoben werden.

6.2 Wareneingangskontrolle

Die Ware wurde im Herstellerwerk sorgfältig geprüft und im einwandfreien Zustand dem Spediteur übergeben.

Überprüfen Sie die Filter/ -systeme auf sichtbare Beschädigungen. Bestehen Sie im Falle einer Beschädigung darauf, daß auf dem Ablieferungsnachweis des Spediteurs ein entsprechender Vermerk gemacht wird.
Verständigen Sie unverzüglich den Spediteur und veranlassen eine Begutachtung.

Für Beschädigungen während des Transportes ist der Hersteller nicht verantwortlich.

6. Transport, checking of goods received

6.1 Transport

Employ transport and lifting equipment which correspond to the size and weight of filter and system.
The filter/ -system must by no means be lifted at the compressed air inlet- or outlet connections.

6.2 Checking of goods received

The filter/ -system is thoroughly checked and packed, before it leaves the factory. It has been handed over to the forwarding agent in perfect condition.

Upon receipt please check immediately the filter/ -system for visible damage. In case of visible damage of the packing, please insist upon a respective note on the delivery sheet of the forwarding agent. Inform the forwarding agent at once and have the dryer inspected.

The manufacturer is not responsible for damages occurred during transport.

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7. Montage

7.1 Montageort

Das Filter/ -system sollte in einem trockenen, frostfreien Innenraum installiert werden.
Zur Wartung ist genügend Freiraum vorzusehen.

7.2 Montage

Das Filter/ -system ist senkrecht so zu montieren, daß der Druckluft-ein- und austritt waagerecht erfolgt.

Im Filtergehäuse eingebaute Filterelemente können sich während des Transportes lösen.
Prüfen Sie den richtigen Sitz der Filterelemente vor der Inbetriebnahme.

ACHTUNG!
Achten Sie bei der Montage darauf, daß keine Zug- und Druckkräfte auf die Geräteanschlüsse übertragen werden.

Hinweis!
Bei den D-Pack-Basic-Filtern FE und FF, sind die Kondensatableiter beigepackt und müssen wie in Kapitel 11. „Maßzeichnung" angebaut werden.

7.3 Anschluß an das Druckluftnetz

Die Druckluftein und -austrittsleitung sollte für Servicezwecke mit einem Bypass versehen werden.
Die Dimensionierung der Anschlüsse entnehmen Sie bitte dem Kapitel 3. „Technische Daten".

ACHTUNG!
Durchflußrichtung beachten.
Druckluftein- und austritt dürfen nicht vertauscht werden.

7.4 Kondensatableitung

Für die automatische Kondensatableitung ist bei den Filtern (FE, FF) ein Anschluß vorhanden.
Die Dimensionierung des Anschlusses entnehmen Sie bitte Kapitel 5. „Kondensatableiter".

Achten Sie bei der Montage der Kondensatableitung darauf, daß das abgeschiedene Kondensat ungehindert abfließen kann.

HINWEIS!
Bei der Entsorgung des Kondensats ist der Schmutzanteil zu berücksichtigen.
Beachten Sie die jeweils geltenden gesetzlichen Vorschriften.

Bei den Filtern FG entfällt der Kondensatableitungsanschluß.

7. Mounting

7.1 Location of mounting

The filter/ -system should be installed in a dry and frost-proof room indoors.
Ample free, space should be allowed for the maintenance.

7.2 Mounting

Mount the filter/ -system so that inlet and outlet connections are horizontal (filter bowl vertical).

Cartridges installed in the filter housing may become dislodged during transport.
Make sure that the cartidge is correctly installed before use.

ATTENTION!
When installing the filter/ -system ensure all connections are even and no pressure is placed on inlet and outlet connections.

Remark!
By the D-pack-basic-filter FE, FF the condensate drains are attached and must mount as shown in chapter 11. „Dimensional drawing".

7.3 Connection to the compressed air system

The compressed air inlet and outlet line should be equipped with a by-pass system for the maintenance.
For the sizing of the connections please see chapter 3. „Technical data".

ATTENTION!
Pay attention to the flow direction.
Do not exchange the compressed air inlet and outlet.

7.4 Condensate drain

The filters (FE, FF) are equipped with one connection for the automatically condensate drain.
For the sizing of the connection please see chapter 5. „Condensate discharger".

When fitting the drains please see to it, that the condensate separated is drained off into a system that does not create a back pressure.

Instruction!
When disposing of the condensate the amount of pollution has to be taken into consideration. Please act according to the prevailing regulations of law.

Condensate drain does not exist in filters FG.

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7. Montage

7.5 Elektroanschluß

Für Filter/ -systeme mit elektrischer Kondensatableitungssteuerung (Option) ist eine Spannungsversorgung 230V/1/N/PE/50Hz erforderlich.

⚠ **Ein- bzw. Anbau durch geschultes Fachpersonal.**

7.6 Installation (Filtergehäuse -6 bis -28)

⚠ **Beachten Sie die richtige Flußrichtung.**

7.6.1 Wandmontage (OPTION)

Montage-Halterung

* Entfernen Sie die vier Schrauben, die den schwarzen Plastikkopf sichern.
* Setzen Sie die Wandhalterung über die Differenzdruckanzeige auf die Löcher und verschrauben Sie diese wieder.
  Bestell-Nr.: 9.2948.0 (Filtergehäuse 6- bis -18)
  Bestell-Nr.: 9.2989.0 (Filtergehäuse -28)

7. Mounting

7.5 Electrical connection

Filter/ -systems with electric condensate drain control (optional) require a power source 230V/1/N/PE/50Hz.

⚠ **Unit should be installed or removed by trained personnel only.**

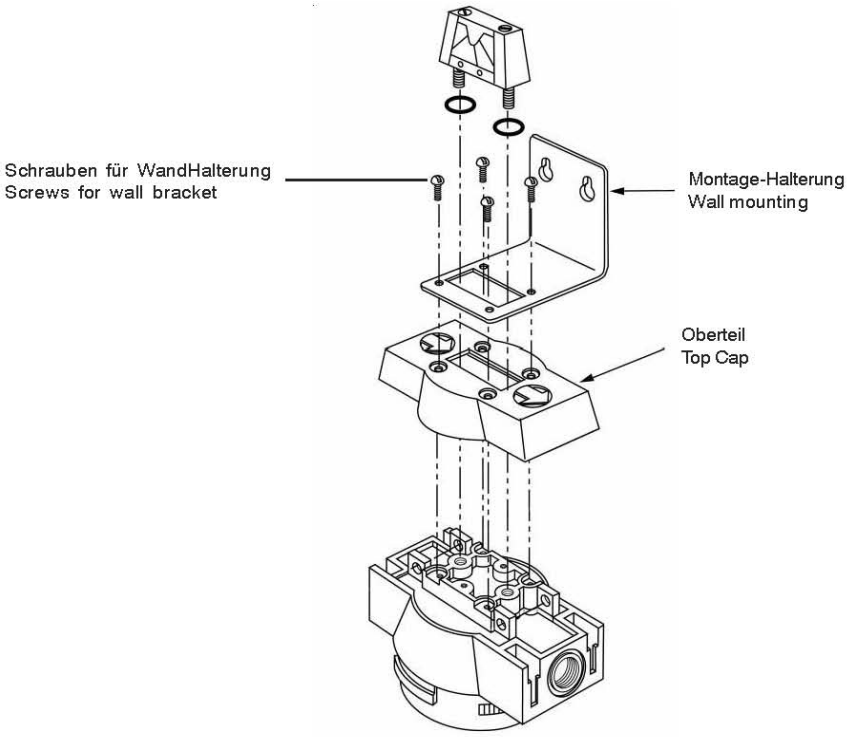
7.6 Installation (Filter housing -6 ... -28)

⚠ **ATTENTION!**
Pay attention to the flow direction.

7.6.1 Wall mounting (OPTION)

Wall mounting

* Remove four screws holding black plastic top cap to filter head.
* Place bracket on head over plastic cap and reinstall screws.
  Order-No.: 9.2948.0 (Filter housing - 6... -18)
  Order-No.: 9.2989.0 (Filter housing -28)



F0535	17.08.07	KL	17.08.07	JRa		
D-Name	erstellt	Name	gepr.	Name	ersetzt f.	ersetzt d.

7. Montage

7.6.2 Filter-Modul-Direktanschluß

a) Bajonett-Verschluß

Das entsprechende Verbindungsmaterial ist als Bestellset erhältlich.
Bestell-Nr.: 9.2996.0 (Filtergehäuse -6 bis -18)
Bestell-Nr.: 9.2990.0 (Filtergehäuse -28)

* Entfernen Sie den schwarzen Plastikkopf.
* Setzen Sie den geschmierten (geölten) O-Ring in die Nut und drücken Sie die Filterköpfe zusammen.
* Setzen Sie die beiden Verbindungselemente in die Führung der Filterköpfe und sichern Sie diese mit den vier Innensechskant-Schrauben.

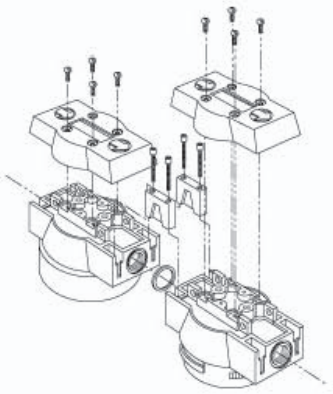
7. Mounting

7.6.2 Direct filter-to-filter (modular) connection

a) Bayonet heads

Sold as kit.
Order-No.: 9.2996.0 (Filter housing -6 ... -18)
Order-No.: 9.2990.0 (Filter housing -28)

* Remove black plastic top cap.
* Apply generous amount of lubricant to o-ring, install o-ring in groove, and insert connectors.
* Screw connectors to head using socket head cap screws.



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D-Name	erstellt	Name	gepr.	Name	ersetzt f.	ersetzt d.

8. Inbetriebnahme, Betrieb

8.1 Bereitschaft zur Inbetriebnahme

Druckluftfilter/ -systeme sind bereit zur Inbetriebnahme, wenn:

- Der auf dem Typenschild angegebene Druck dem maximalen Betriebsdruck entspricht.
- Sie entsprechend Kapitel 7. „Montage" installiert wurden.
- Alle Zu- und Ableitungen sachgerecht angeschlossen sind.
- Die erforderlichen Energien (Druckluft) verfügbar sind.
- Absperrorgane (z.B. Ventil, Kugelhahn) in der Druckluftein- und austrittsleitung geschlossen sind.
- Kondensat durch die Kondensatableitung ungehindert abfließen kann.
- Der elektrisch gesteuerte Kondensatableiter an das elektrische Spannungsversorgungsnetz mit der richtigen Betriebsspannung angeschlossen ist. (Nur bei elektrisch gesteuerten Kondensatableitern)
- Das Filter/ -system mit den richtigen Filterelementen ausgerüstet ist.

8.2 Inbetriebnahme, Betrieb

Vor der Inbetriebnahme ist sicherzustellen, daß alle Bedingungen des Abschnittes 8.1 „Bereitschaft zur Inbetriebnahme" erfüllt sind.

Setzen Sie das Filter/ -system durch langsames Öffnen der Drucklufteintritts- und austrittsleitung unter Druck.

Schließen Sie das Absperrorgan im Bypass (falls vorhanden).

Das Filter/ -system ist nun in BETRIEB.

8. Start-up, operation

8.1 Preconditions for starting the dryer

The filter/ -system is ready for starting when:

- Check unit serial number tag to verify working pressure.
- They has been installed in accordance with section 7. „Mounting".
- All inlet and outlet lines have been correctly connected.
- The required forms of energy (compressed-air) are available.
- The shut-off devices (e.g. ball valve) in the compressed-air inlet and outlet lines are closed.
- The condensate is able to flow through the condensate discharger without obstruction.
- The electrical condensate drain has been connected to the electric power supply system with the correct operating voltage (only electrical condensate drains).
- The filter/ -system is equipped with the right cartridges.

8.2 Start up, operation

Before starting the dryer, ensure that all the requirements specified in section 8.1 „Preconditions for starting the dryer" have been fulfilled.

Place filter/ -system under pressure gradually by slowly opening the compressed air inlet/outlet.

Close the shut-off device in the bypass (if installed).

The filter/ -system is now OPERATIVE.

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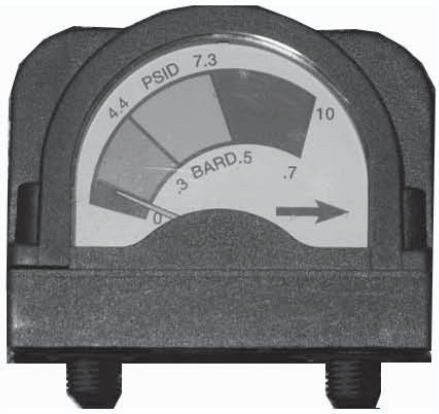
D-Name	erstellt	Name	gepr.	Name	ersetzt f.	ersetzt d.

8. Inbetriebnahme, Betrieb

8.3 Differenzdruckanzeige-Standard und D-Pack



Die Differenzdruckanzeige informiert als Störanzeige über eine atypische Verschmutzung.

Unabhängig von der Differenzdruckanzeige müssen die Filterelemente gemäß der Wartungsintervalle gewechselt werden. (Siehe Kapitel 9)

Das Filter FG benötigt keine Differenzdruckanzeige.

8. Start-up, operation

8.3 Differential pressure indicator-standard and D-Pack

The differential pressure indicator indicates atypical contamination.

We recommend installing a new filter cartridge according to the maintenance periods. (See chapter 9)

The FG filter does not require a differential pressure gauge.

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D-Name	erstellt	Name	gepr.	Name	ersetzt f.	ersetzt d.

9. Wartung Austausch der Filterelemente

9.1 Standzeit der Filterelemente

Die Standzeit der Filterelemente ist abhängig von der Beladung. Mit steigender Beladung der Elemente erhöht sich der Differenzdruck über den Filter.
Die Filterelemente müssen gemäß unten stehender Tabelle gewechselt werden.

9.2 Austausch der Filterelemente

Filtergehäuse -6 bis -28

Anzahl der Filterelemente siehe Kapitel 4. „Technische Daten".

WARNUNG!

- Verwenden Sie keine Werkzeuge! (Filtergehäuse -6 bis -28)
- Öffnen und Schließen Sie das Filter nicht mit Gewalt.
- Das (die) Filter beinhaltet(n) unter erhöhtem Druck stehende Systeme.
  Vor Servicearbeiten sind sie drucklos zu machen.

Absperrvorrichtung im Druckluftein- und -austritt schließen.

Kondensatableitungsschlauch an **(1)** lösen.
(Nur bei FE, FF).

Rändelschraube **(1)** langsam im Uhrzeigersinn lösen.
Das Filtergehäuse wird entlüftet.

9. Servicing, filter cartridge replacement

9.1 Serviceable life of cartridge

The cartridge's serviceable life depends upon the degree of contamination. As the cartridge becomes more contaminated, the differential pressure above the filter increases.
The filterelements must be changed according to the table below.

9.2 Replacing the cartridge

Filter housing -6 to -28

Number of cartridges see chapter 4. „Technical data".

CAUTION!

- Do not use any tools (filter housings -6 to -28)
- Do not force the filter open or closed.
- The filter(s) contain(s) systems under high pressure.
  All pressure must be let off before servicing.

Close the shut-off device in the compressed air inlet/outlet.

Loosen condensate drain hose at **(1)** (only on FE, FF models).

Slowly turn the knurled screw **(1)** clockwise. This will release
the air from the housing.

Wartungsintervalle / Maintenance-intervals

Wartungsteil Part of maintenance	Type	Anwendung Application	Wartungs-Intervall Maintenance-interval
Filter-Elemente / filter cartridges	FE, FF	Microfilter	3.000 Bh, max. 1 Jahr/ 3.000 Bh, max. 1 year
	FFG	Filterkombination Filter combination	1.000 Bh, max. 1 Jahr/ 1.000 Bh, max. 1 year
	FG	Aktivkohlefilter Act.carbon filter	1.000 Bh
Kondensatableiter / condensate drain	Service-unit	Vorfilter Pre-filter	6.000 Bh
	Service-unit	Microfilter	6.000 Bh
	Service-unit	Filterkombination Filter combination	6.000 Bh

Bh = Kompressor-Betriebsstunden / Working hours

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D-Name	erstellt	Name	gepr.	Name	ersetzt f.	ersetzt d.

9. Wartung Austausch der Filterelemente

Filtergehäuse entfernen.

- **Filtergehäuse -6 bis -28 (Bajonett-Verschluß)**
* Das Filtergehäuse nach oben, gegen den Filterkopf drükken.
* Dann das Filtergehäuse im Uhrzeigersinn langsam gegen den Anschlag drehen (etwa 1/8 Drehung) und nach unten abziehen.

Filterelement gemäß unten stehender Skizze abziehen, bzw. wechseln.

Hinweis: Die Schaumstoffummantelung der Filterelemente Serie FE, FF und FG dürfen nicht mit den Fingern angefaßt werden.

Filtergehäuse in umgekehrter Reihenfolge zusammenbauen.

Filter durch langsames Öffnen der Absperrvorrichtung wieder mit Druck beaufschlagen.

WARNUNG!

- Das (die) Filter beinhaltet(n) unter erhöhtem Druck stehende Systeme.
  Vor Servicearbeiten sind sie drucklos zu machen.

9. Servicing, filter cartridge replacement

Remove housing.

- **Housing -6 to -28 (bayonet-style head)**
* Push housing upwards against the filter head.
* Then slowly turn the housing clockwise to the stop (about 1/8 of a turn) and remove by pulling downwards.

Remove and replace cartridge as shown below.

Please note: Do not touch the foam sleeves of the cartridges from the FE, FF and FG series with your fingers.

Re-assemble the housing in the reverse order.

Place filter under pressure again by slowly opening the shut-off device.

CAUTION!

- The filter(s) contain(s) systems under high pressure. Alle pressure must be let off before servicing

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D-Name	erstellt	Name	gepr.	Name	ersetzt f.	ersetzt d.

9. Wartung Austausch der Filterelemente

9.3 Austausch der ECO-DRAIN Service-unit / ECO-DRAIN Membransätze

Die Wartungspakete sind gemäß unten aufgeführter Tabelle regelmäßig zu wechseln.

Wartungsteil Part of maintenance	Wartungs-Intervall Maintenance-interval
Service-Unit (ECO DRAIN 30/31)	6.000 Bh

Nähere Informationen finden Sie auch im Anhang ECO DRAIN.

9. Servicing, filter cartridge replacement

9.3 Changing of ECO-DRAIN Service-unit / ECO-DRAIN membrane set

The service packages must be changed according to the table below.

For more details please see annexe ECO DRAIN.

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D-Name	erstellt	Name	gepr.	Name	ersetzt f.	ersetzt d.

10. Garantiebedingungen

10.1 Allgemeines

Die Garantie erstreckt sich, im Rahmen unserer allgemeinen Lieferbedingungen, auf das gelieferte Filter/-system.

10.2 Garantieausschluß

Garantieansprüche bestehen nicht,

- wenn das Filter/-system durch Einfluß höherer Gewalt oder durch Umwelteinflüsse beschädigt oder zerstört wird.
- bei Schäden, die durch unsachgemäße Behandlung, insbesondere Nichtbeachtung der Betriebs- und Wartungsanleitung aufgetreten sind (regelmäßige Kontrolle des Kondensatableiters / regelmäßiger Wechsel der Filterelemente).
- falls das Filter/-system nicht seinen Bestimmungen entsprechend eingesetzt war (siehe Kapitel 3. „Technische Daten").
- falls das Filter/-system durch nicht hierfür autorisierte Werkstätten oder andere Personen unsachgemäß geöffnet oder repariert wurde und/oder mechanische Beschädigungen irgendwelcher Art aufweist.

10. Guarantee conditions

10.1 General

The guarantee covers the delivered device with regard to our general terms of delivery.

10.2 Exclusion from guarantee coverage

No guarantee claims shall be assertible,

- if the filter/-system is damaged or destroyed due to force majeurs or environmental effects.
- for damage resulting from incorrect handling, in particular failure to comply with the operating and maintenance instructions (regular inspection of the condensate discharger, regular change of the filter cartridges).
- if the filter/-system has not been used in accordance with its specifications (see section 3. „Technical data").
- if the filter/-system has been opened or repaired by workshops or other persons unauthorised for this purpose and/or reveals any type of mechanical damage.

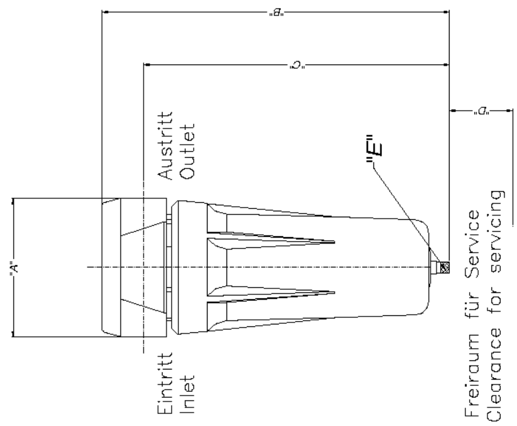
F0535	17.08.07	KL	17.08.07	JRa		
D-Name	erstellt	Name	gepr.	Name	ersetzt f.	ersetzt d.

11. Maßzeichnung

11. Dimensional drawing

Modellbezeichnung / Model designation	F -6	F -10	F -18	F -28
Anschluß / Connection	3/8"	1/2"	1/2"	3/4"
"A"	105	105	105	133
"B"	182	255	316	338
"C"	163	224	285	298
"D"	76	76	76	89
"FG" Gewicht – Weight [kg]	3,4	3,5	3,7	4,2
Handablaß Anschluß "E" / Manual Drain Connection	1/4"	1/4"	1/4"	1/4"

FG -6 - FG -28



Technische Änderungen vorbehalten
We reserve the right to alter the specifications without prior notice

Rev.	Änd. Mitteilung / Change/Communicat.	Datum / Date	Bearb. / Proc.	Datum / Date	17.08.07	Datum / Date		Bezug / Projekt: Reference / Project	Typ / Type	Zeichnungs-Nr.: / Drawing-No.:	Auftrag: / Order:	Ers. f.: / Repl. for
C							KAESER	Flanschfilter: > 06.2000	FG -6 - FG -28 Maßzeichnung Dimensional Drawing	F 0537 – D/GB		
B				Bearb. / Proc.	KL	Geprüft / Proved				Disk-Nr.: / Disk-No.: C:\technik\acad\F		Ers. d.: / Repl. throught
A												

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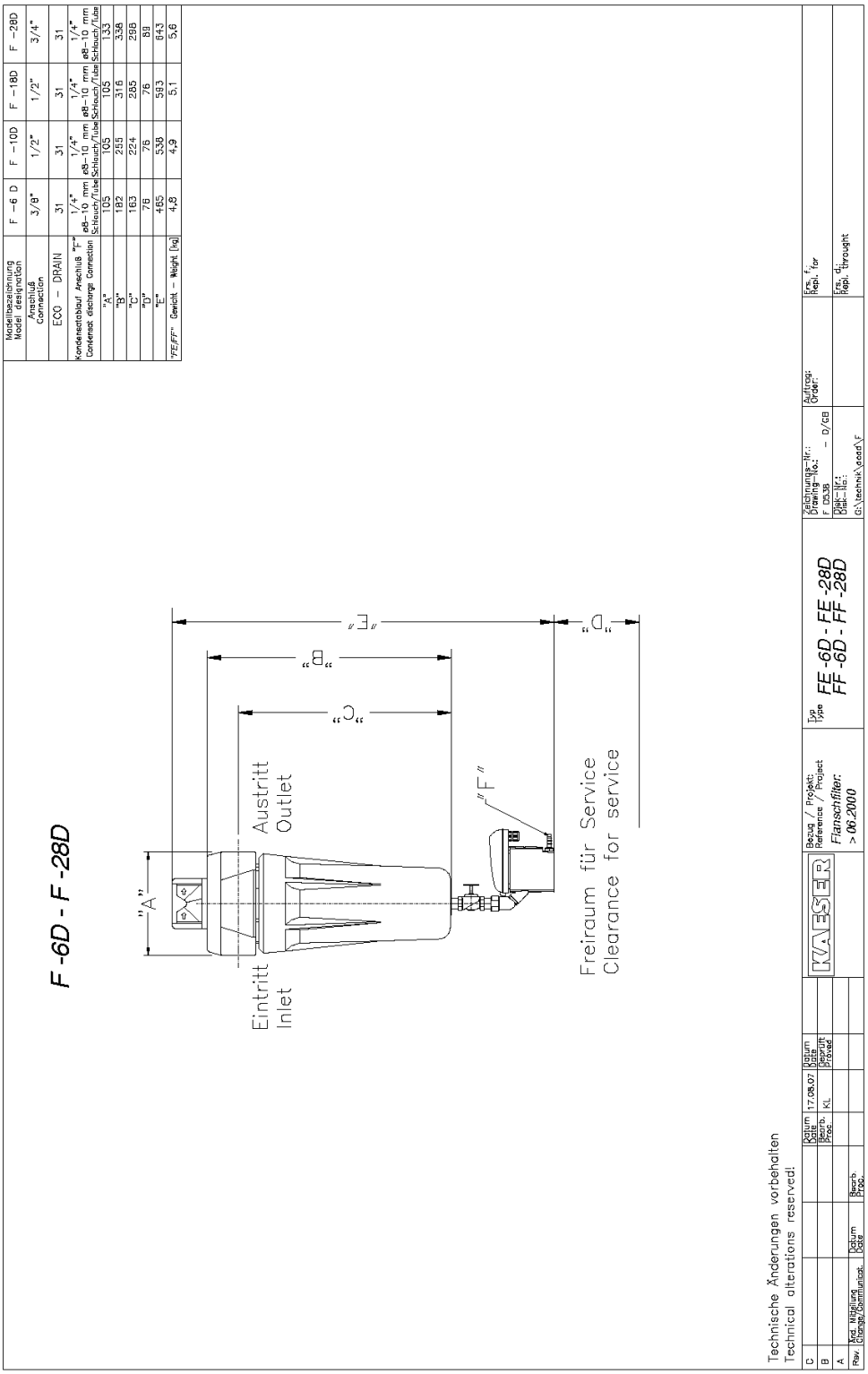
F0535	17.08.07	KL	17.08.07	JRa		
D-Name	erstellt	Name	gepr.	Name	ersetzt f.	ersetzt d.

11. Maßzeichnung

11. Dimensional drawing

Modellbezeichnung Model designation	F -6 D	F -10D	F -18D	F -28D
Anschluß connection	3/8"	1/2"	1/2"	3/4"
ECO – DRAIN	31	31	31	31
Kondensatablaur Anschluß "F" Condensat discharge Connection	1/4" ø8 - 10 mm Schlauch/Tube	1/4" ø8 - 10 mm Schlauch/Tube	1/4" ø8 - 10 mm Schlauch/Tube	1/4" ø8 - 10 mm Schlauch/Tube
"A"	105	105	105	133
"B"	182	255	316	338
"C"	163	224	285	298
"D"	76	76	76	89
"E"	465	538	593	643
"FE/FF" Gewicht - Weight [kg]	4,8	4,9	5,1	5,6

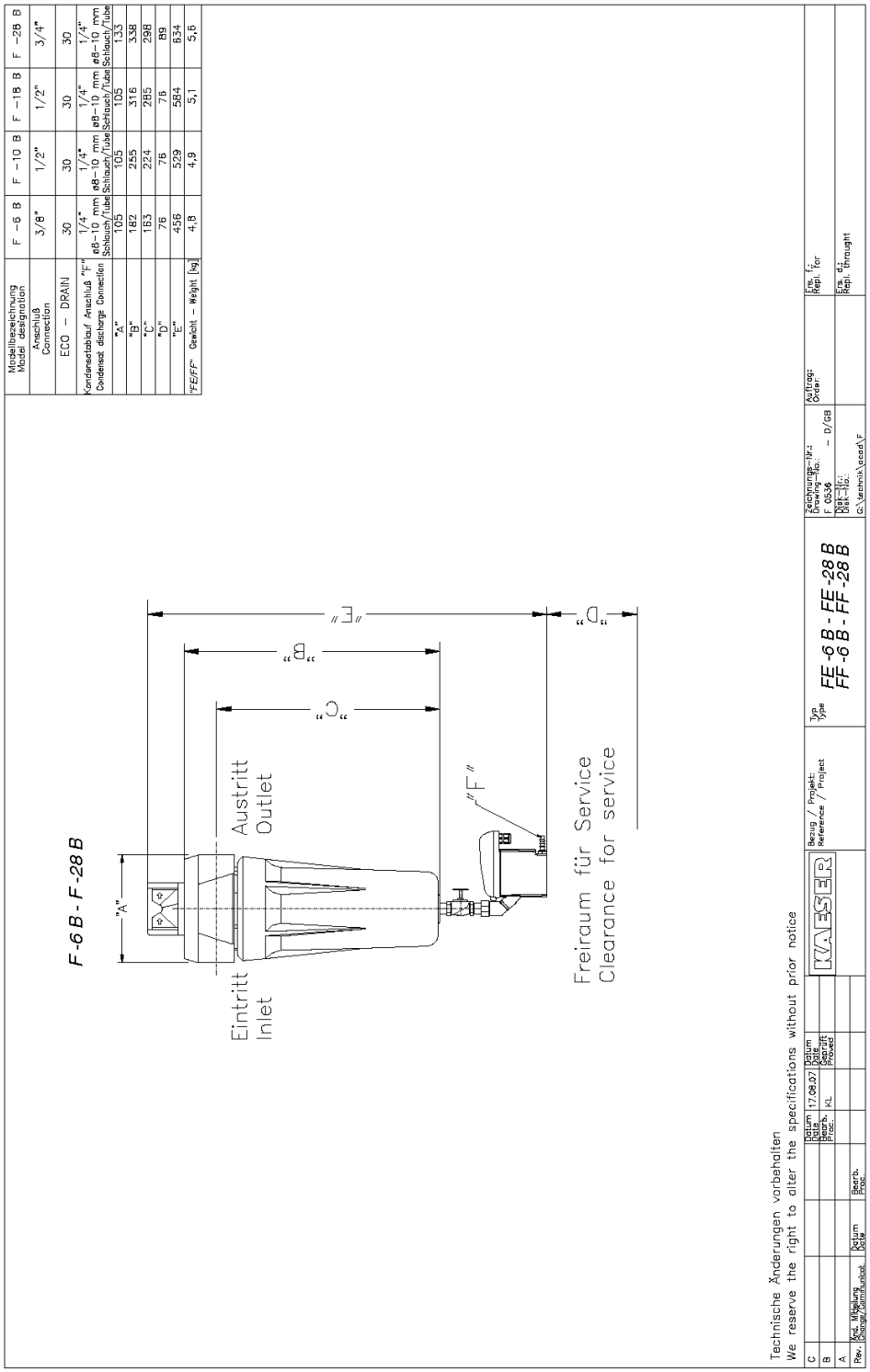


F0535	17.08.07	KL	17.08.07	JRa		
D-Name	erstellt	Name	gepr.	Name	ersetzt f.	ersetzt d.

11. Maßzeichnung

11. Dimensional drawing

Modellbezeichnung Model designation	F -6 B	F -10 B	F -15 B	F -28 B
Anschluß Connection	3/8"	1/2"	1/2"	3/4"
ECO – DRAIN	30	30	30	30
Kondensatablauf Anschluß "F" Condensat discharge Connection	1/4" ø8–10 mm Schlauch/Tube	1/4" ø8–10 mm Schlauch/Tube	1/4" ø8–10 mm Schlauch/Tube	1/4" ø8–10 mm Schlauch/Tube
"A"	105	105	105	133
"B"	182	255	316	338
"C"	163	224	285	298
"D"	76	76	76	89
"E"	456	529	584	634
"F/F" Gewicht – Weight [kg]	4,8	4,9	5,1	5,6



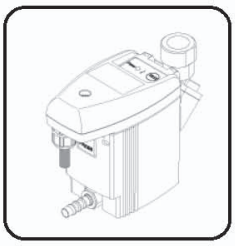
F0535	17.08.07	KL	17.08.07	JRa		
D-Name	erstellt	Name	gepr.	Name	ersetzt f.	ersetzt d.

12. Anhang (Eco-Drain)

12.1 Niveaugesteuerter Kondensatableiter ECO-DRAIN 30 (Basic Filter)

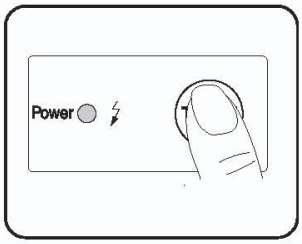
Anwendung und Funktion

Bei der Druckluftrocknung fällt unvermeidlich Kondensat an. Um Schäden am Filter zu vermeiden, muß das stetig anfallende Kondensat unbedingt kontinuierlich aus dem Filter entfernt werden.
Der niveaugesteuerte Kondensatableiter leitet das Kondensat zuverlässig und ohne unnötige Druckluftverluste ab. So kann Energie gespart und das Kondensat, wie gesetzlich vorgeschrieben einer Aufbereitung zugeführt werden.

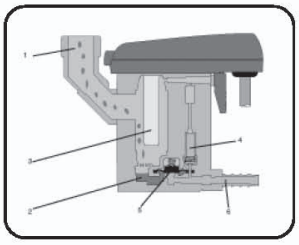


Funktionstest des niveaugesteuerten Kondensatableiters:

- TEST-Taster ca. 2 Sekunden betätigen.
- Ventil öffnet zur Kondensatableitung



Das Kondensat strömt über die Zulaufleitung (1) in den niveaugesteuerten Kondensatableiter und sammelt sich im Gehäuse (2). Ein kapazitiv arbeitender Sensor (3) erfaßt permanent den Füllstand und gibt ein Signal an die elektronische Steuerung sobald sich der Behälter gefüllt hat. Das Vorsteuerventil (4) wird betätigt und die Membrane (5) öffnet zur Kondensatausschleusung die Ablaufleitung (6). Ist der niveaugesteuerte Kondensatableiter geleert, wird die Ablaufleitung rechtzeitig wieder dicht verschlossen, bevor unnötiger Druckluftverlust entstehen kann.



12. Annex (Eco-Drain)

12.1 Level-controlled condensate discharger ECO-DRAIN 30 (Basic filter)

Application and function

Although unwanted, condensate is unavoidable during the production of compressed air. In order to prevent damage to filter it is absolutely essential to remove the continuously accumulating condensate from the filter. The level-controlled condensate discharger discharges the condensate reliably and without unnecessary loss of compressed air. On the one hand, this represents an energy saving and on the other, the condensate can subsequently be safely fed for further treatment according to legal requirements.

Functional test of level-controlled condensate discharger:

- Briefly press TEST-button
- Valve opens for condensate discharge.

The condensate flows through the feed line (1) into the level-controlled condensate discharger and accumulates in the container (2). A capacitive sensor (3) continuously registers the liquid level and passes a signal to the electronic control as soon as the container is filled. The pilot valve (4) is then activated and the diaphragm (5) opens the outlet line (6) for discharging the condensate.
When the level-controlled condensate discharger has been emptied, the outlet line is closed again quickly and tightly without wasting compressed air.

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D-Name	erstellt	Name	gepr.	Name	ersetzt f.	ersetzt d.

12. Anhang (Eco-Drain)

Sicherheitshinweise

Bei Installation und Betrieb sind ebenfalls die geltenden nationalen Bestimmungen und Sicherheitsvorschriften einzuhalten.

Bei elektrischer Installation alle geltenden Vorschriften einhalten (DIN VDE 0100) !
Die abgenommene Steuereinheit hat keinen IP-Schutzgrad mehr!

ACHTUNG!
Wartungsarbeiten nur im spannungsfreien Zustand durchführen! Alle elektrischen Arbeiten dürfen nur von befugtem Fachpersonal durchgeführt werden.

Max. Betriebsdruck nicht überschreiten (siehe Typenschild)!

ACHTUNG!
Wartungsarbeiten nur im drucklosen Zustand durchführen!

Nur Druckfestes Installationsmaterial verwenden!
Zulaufleitung (G1/2) fest verrohren. Ablaufleitung: kurzer Druckschlauch an druckfestes Rohr. Verhindern Sie, daß Personen oder Gegenstände von Kondensat getroffen werden können.

Werden am Zulauf konische Verschraubungen verwendet, übermäßige Anzugskräfte vermeiden.

Bei Montage Schlüsselfläche am Zulauf (SW27) zum Gegenhalten bzw. Kontern benutzen!

Gerät nicht bei Frostgefahr betreiben.

Niveaugesteuerter Kondensatableiter ist nur bei anliegender Spannung funktionstüchtig.

TEST-Taster nicht zur Dauerentwässerung nutzen.

Niveaugesteuerten Kondensatableiter nicht in explosionsgefährdeten Bereichen einsetzen.

Nur Original-Ersatzteile verwenden.
Andernafalls erlischt die Garantie.

Die Service Unit darf nicht zerlegt werden.

12. Annex (Eco-Drain)

Safety rules

Installation and operation must also be in compliance with the valid national regulations and safety rules.

The electrical installation must be carried out in compliance with the valid regulations !
IP protection does no longer apply to the removed control unit !

NOTE!
Maintenance work is only allowed when the device is in a de-energized condition! Electrical work must always be performed by a properly qualified person.

Do not exceed max. operating pressure (see type plate)!

NOTE!
Maintenance work must only be carried out when the device is not under pressure!

Only use pressure-proof installation material!
The feed line (½") must be firmly fixed. Discharge line: short pressure hose to pressure-proof pipe. Please ensure that condensate cannot squirt onto persons or objects.

If conical connectors are used on the inlet side, avoid excessive tightening of the connectors.

For locking or holding in position during installation, use spanner area at inflow point (spanner size 27)!

Do not operate the device when there is a danger of frost.

The level-controlled condensate discharger will only function when voltage is being applied to the device.

Do not use the TEST-button for continuous draining.

Do not use the level-controlled condensate discharger in hazardous areas (with potentially explosive atmospheres).

Only employ original spare parts, otherwise the guarantee will no longer be valid.

The service unit must not be taken apart.

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D-Name	erstellt	Name	gepr.	Name	ersetzt f.	ersetzt d.

12. Anhang (Eco-Drain)

Wartung

Service unit alle 6.000 Betriebsstunden wechseln /

Vor jeder Wartung:
- **Kondensatableiter drucklos machen!**
- **Kondensatableiter spannungsfrei schalten!**

Wartungs-Empfehlung:

- Steuereinheit (1) durch Drücken des Rasthakens (2) abnehmen
- ECO DRAIN vom Ablauf (3) lösen.
- Design-Schale (4) (wenn vorhanden) mittels Schrauben-dreher (10 entfernen.
- Service-Unit (5) durch Lösen der Überwurfmutter von der Verrohrung am Zulauf abbauen
  -oder Schrauben (6) von Winkeltülle (7) entfernen
  -oder Schrauben (8) am Zwischenadapter (9) lösen und diesen nach unten von der Service-Unit abziehen.
- Kontrollieren, ob die neue Service-Unit (5) zur Steuereinheit (1) paßt -Typbezeichnung und Farbe des Rasthakens (2)
- Montage der neuen Service-Unit (5) in umgekehrter Reine folge.

12. Annex (Eco-Drain)

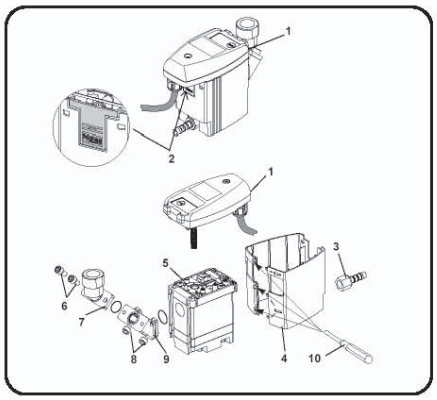
Maintenance

Changing of the service-unit every 6.000 working hours.

Before maintenance work always ensure that the device is:
- **pressureless and**
- **de-energized!**

Maintenance recommendation:

- Remove control-unit (1) by pressing latching hook (2).
- Detach ECO DRAIN from outlet (3).
- Remove design shell (4) (where applicable) using a screw driver (10)
- Remove service unit (5) from pipe at inlet by undoing union nut
  -or by undoing screws (6) at elbow connector (7)
  -or by undoing screws (8) at intermediate adapter (9) which is then detached from the service unit by downward movement.
- Check if new service unit (5) matches control unit (1) - type designation and colour of latching hook (2)
- Fit new service unit (5) in reverse order.



Technische Daten

Technical datas

	230/110/24/... Vac
Max. Volumenstrom Filter Max. air flow filter	25 m³/min
Min./max. Kondensattemperatur Min./max. condensate temperature	+1 / +60 °C
Min./max. Betriebsdruck Min./max. working pressure	0,8 / 16 bar (ü)
Kondensatzulauf Condensate feed	G 1/2"
Kondensatablauf (Schlauchmaß) Condensate discharge (hose size)	G 1/4" / di = 8-10mm
Gewicht (leer) Weight (empty)	0,8 kg
Netzspannung Power supply	... + 10% / 50-60Hz
Max. Leistungsaufnahme und Absicherung Max. power input and fuse protection	P < 0,5 VA
Kabelquerschnitt und Absicherung Cable cross-section and fuse protection	3 x 0,75-1,5 mm² / 0,5A mittelträge, time lag

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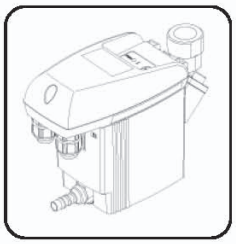
D-Name	erstellt	Name	gepr.	Name	ersetzt f.	ersetzt d.

12. Anhang (Eco-Drain)

12.1 Niveaugesteuerter Kondensatableiter ECO-DRAIN 31 (D-Pack Filter)

Anwendung und Funktion

Bei der Druckluftrocknung fällt unvermeidlich Kondensat an. Um Schäden am Filter zu vermeiden, muß das stetig anfallende Kondensat unbedingt kontinuierlich aus dem Filter entfernt werden.
Der niveaugesteuerte Kondensatableiter leitet das Kondensat zuverlässig und ohne unnötige Druckluftverluste ab. So kann Energie gespart und das Kondensat, wie gesetzlich vorgeschrieben einer Aufbereitung zugeführt werden.

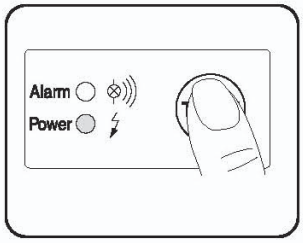


Funktionstest des niveaugesteuerten Kondensatableiters:

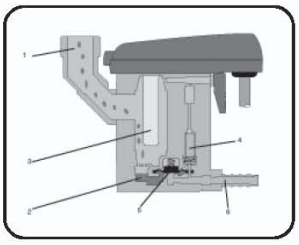
- TEST-Taster ca. 2 Sekunden betätigen.
- Ventil öffnet zur Kondensatableitung

Überprüfung der Störmeldung:

- Kondensatzulauf absperren.
- TEST-Taster mind. 1 Minute betätigen.
- Rote LED blinkt (nach 1 Minute).
- Alarmsignal wird durchgeschaltet.



Das Kondensat strömt über die Zulaufleitung (1) in den niveaugesteuerten Kondensatableiter und sammelt sich im Gehäuse (2). Ein kapazitiv arbeitender Sensor (3) erfaßt permanent den Füllstand und gibt ein Signal an die elektronische Steuerung sobald sich der Behälter gefüllt hat. Das Vorsteuerventil (4) wird betätigt und die Membrane (5) öffnet zur Kondensatausschleusung die Ablaufleitung (6).
Ist der niveaugesteuerte Kondensatableiter geleert, wird die Ablaufleitung rechtzeitig wieder dicht verschlossen, bevor unnötiger Druckluftverlust entstehen kann.



12. Annex (Eco-Drain)

12.1 Level-controlled condensate discharger ECO-DRAIN 31 (D-pack filter)

Application and function

Although unwanted, condensate is unavoidable during the production of compressed air. In order to prevent damage to filter it is absolutely essential to remove the continuously accumulating condensate from the filter.
The level-controlled condensate discharger discharges the condensate reliably and without unnecessary loss of compressed air. On the one hand, this represents an energy saving and on the other, the condensate can subsequently be safely fed for further treatment according to legal requirements.

Functional test of level-controlled condensate discharger:

- Briefly press TEST-button
- Valve opens for condensate discharge.

Checking of alarm signal:

- Shutt off condensate inflow.
- Press TEST-button for at least 1 minute.
- Red LED flashes (after 1 minute).
- Alarm signal is being relayed.

The condensate flows through the feed line (1) into the level-controlled condensate discharger and accumulates in the container (2). A capacitive sensor (3) continuously registers the liquid level and passes a signal to the electronic control as soon as the container is filled. The pilot valve (4) is then activated and the diaphragm (5) opens the outlet line (6) for discharging the condensate. When the level-controlled condensate discharger has been emptied, the outlet line is closed again quickly and tightly without wasting compressed air.

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12. Anhang (Eco-Drain)

Sicherheitshinweise

Bei Installation und Betrieb sind ebenfalls die geltenden nationalen Bestimmungen und Sicherheitsvorschriften einzuhalten.

Bei elektrischer Installation alle geltenden Vorschriften einhalten (VDE 0100) !
Die abgenommene Steuereinheit hat keinen IP-Schutzgrad mehr!

ACHTUNG!
Wartungsarbeiten nur im spannungsfreien Zustand durchführen! Alle elektrischen Arbeiten dürfen nur von befugtem Fachpersonal durchgeführt werden.

Max. Betriebsdruck nicht überschreiten (siehe Typenschild)!

ACHTUNG!
Wartungsarbeiten nur im drucklosen Zustand durchführen!

Nur Druckfestes Installationsmaterial verwenden!
Zulaufleitung (G1/2) fest verrohren. Ablaufleitung: kurzer Druckschlauch an druckfestes Rohr. Verhindern Sie, daß Personen oder Gegenstände von Kondensat getroffen werden können.

Werden am Zulauf konische Verschraubungen verwendet, übermäßige Anzugskräfte vermeiden.

Bei Montage Schlüsselfläche am Zulauf (SW27) zum Gegenhalten bzw. Kontern benutzen!

Gerät nicht bei Frostgefahr betreiben.

Niveaugesteuerter Kondensatableiter ist nur bei anliegender Spannung funktionstüchtig.

TEST-Taster nicht zur Dauerentwässerung nutzen.

Niveaugesteuerten Kondensatableiter nicht in explosionsgefährdeten Bereichen einsetzen.

Nur Original-Ersatzteile verwenden.
Andernafalls erlischt die Garantie.

Die Service Unit darf nicht zerlegt werden.

12. Annex (Eco-Drain)

Safety rules

Installation and operation must also be in compliance with the valid national regulations and safety rules.

The electrical installation must be carried out in compliance with the valid regulations !
IP protection does no longer apply to the removed control unit !

NOTE!
Maintenance work is only allowed when the device is in a de-energized condition! Electrical work must always be performed by a properly qualified person.

Do not exceed max. operating pressure (see type plate)!

NOTE!
Maintenance work must only be carried out when the device is not under pressure!

Only use pressure-proof installation material!
The feed line (½") must be firmly fixed. Discharge line: short pressure hose to pressure-proof pipe. Please ensure that condensate cannot squirt onto persons or objects.

If conical connectors are used on the inlet side, avoid excessive tightening of the connectors.

For locking or holding in position during installation, use spanner area at inflow point (spanner size 27)!

Do not operate the device when there is a danger of frost.

The level-controlled condensate discharger will only function when voltage is being applied to the device.

Do not use the TEST-button for continuous draining.

Do not use the level-controlled condensate discharger in hazardous areas (with potentially explosive atmospheres).

Only employ original spare parts, otherwise the guarantee will no longer be valid.

The service unit must not be taken apart.

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12. Anhang (Eco-Drain)

Wartung

Service unit alle 6.000 Betriebsstunden wechseln /

Vor jeder Wartung:
- **Kondensatableiter drucklos machen!**
- **Kondensatableiter spannungsfrei schalten!**

Wartungs-Empfehlung:

- Steuereinheit (1) durch Drücken des Rasthakens (2) abnehmen
- ECO DRAIN vom Ablauf (3) lösen.
- Design-Schale (4) (wenn vorhanden) mittels Schrauben-dreher (10 entfernen.
- Service-Unit (5) durch Lösen der Überwurfmutter von der Verrohrung am Zulauf abbauen
  -oder Schrauben (6) von Winkeltülle (7) entfernen
  -oder Schrauben (8) am Zwischenadapter (9) lösen und diesen nach unten von der Service-Unit abziehen.
- Kontrollieren, ob die neue Service-Unit (5) zur Steuereinheit (1) paßt -Typbezeichnung und Farbe des Rasthakens (2)
- Montage der neuen Service-Unit (5) in umgekehrter Reine folge.

12. Annex (Eco-Drain)

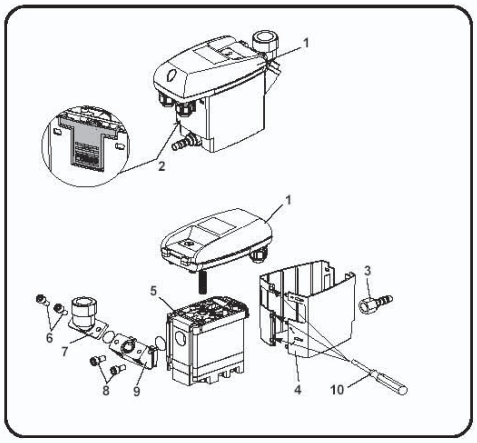
Maintenance

Changing of the service-unit every 6.000 working hours.

Before maintenance work always ensure that the device is:
- **pressureless and**
- **de-energized!**

Maintenance recommendation:

- Remove control-unit (1) by pressing latching hook (2).
- Detach ECO DRAIN from outlet (3).
- Remove design shell (4) (where applicable) using a screw driver (10)
- Remove service unit (5) from pipe at inlet by undoing union nut
  -or by undoing screws (6) at elbow connector (7)
  -or by undoing screws (8) at intermediate adapter (9) which is then detached from the service unit by downward movement.
- Check if new service unit (5) matches control unit (1) - type designation and colour of latching hook (2)
- Fit new service unit (5) in reverse order.



Technische Daten

Technical datas

	230/110/24/... Vac
Max. Volumenstrom Filter Max. air flow filter	60 m³/min
Min./max. Kondensattemperatur Min./max. condensate temperature	+1 / +60 °C
Min./max. Betriebsdruck Min./max. working pressure	0,8 / 16 bar (ü)
Kondensatzulauf Condensate feed	G 1/2"
Kondensatablauf (Schlauchmaß) Condensate discharge (hose size)	G 1/4" / di = 8-10mm
Gewicht (leer) Weight (empty)	1,0 kg
Netzspannung Power supply	... + 10% / 50-60Hz
Max. Leistungsaufnahme und Absicherung Max. power input and fuse protection	P < 2,0 VA
Kabelquerschnitt und Absicherung Cable cross-section and fuse protection	3 x 0,75-1,5 mm² / 0,5A mittelträge, time lag

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D-Name	erstellt	Name	gepr.	Name	ersetzt f.	ersetzt d.

13. Anhang
Einteilung der Filter nach Druckgeräterichtlinie 97/23/EG

13. Annexe
Grading of filters according to pressure equipment directive 97/23/EG

Filter	F...-6	F...-10	F..-18	F..-28
Kat.	0	0	0	0

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D-Name	erstellt	Name	gepr.	Name	ersetzt f.	ersetzt d.